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COMPOSITION**

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Child Labor, Urban Proximity, and Household Composition*

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Abstract

Using detailed survey data from Nepal, this paper examines the determinants of child labor with a special emphasis on urban proximity. We find that children residing in or near urban centers attend school more and work less in total but are more likely to be involved in wage work or in a small business. The larger the urban center, the stronger the effect is. Urban proximity is found to reduce the workload of children and improve school attendance up to 3 hours of travel time from the city. In areas of commercialized agriculture located 5 to 8 hours from the city, children do more farm work. Children unrelated or loosely related to the household head work more, especially in market work and household chores, and are less likely to attend school. This is especially true of child servants, a small group who appear particularly at risk.

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1. Introduction

Recent years have seen growing concerns regarding the welfare of children in poor countries (e.g. Grootaert & Kanbur 1995, ILO 2002, Basu & Tzannatos 2003). Lack of education and child labor have received particular attention as they potentially have dramatic long-term effect on human capital accumulation and hence on development. Furthermore, child labor is often portrayed in the popular press as a growing problem fueled by international trade (Cigno, Rosati & Guarcello 2002).

The evidence suggests that many children in poor countries do work (e.g. ILO 2002, Ersado 2002, Grootaert & Kanbur 1995, Basu 1999). In the overwhelming majority of cases, the work performed by children takes place within the household – usually in household chores and on the family farm (Basu & Ray 2002). Wage work and work in small enterprises remain the exception (ILO 2002). Child labor is considered primarily a rural phenomenon in Africa where children are engaged in farming. In contrast, it is regarded as an urban phenomenon as well in Asia and Latin America where children often also work in small-scale industrial enterprises or in small trade and service businesses. Most child labour studies have focused on rural areas – see Basu (1999) for a survey. A few studies have examined child labour participation at a national level and distinguished between urban and rural areas (e.g. Ersado 2002, Wahba 2005). But those studies do not focus on how urban proximity affects child labour incidence or intensity.

Little is known on whether the intensification of market exchange brings about an increase or decrease in child labor. In this respect, theory is not a useful guide because it does not make sharp predictions one way or another: depending on substitution elasticities between adult and child labor in production and consumption, the effect of marketization on child labor can go either way (e.g. Edmonds & Pavcnik 2004, Wahba 2005). Economic theory is also ambiguous regarding the impact of trade policy and globalization on child labour. See for example, Jafarey

& Lahiri (2002). Based on the scant available evidence, it does not appear that globalization increases the incidence of child labour (Cigno, Rosati & Guarcello 2002). Edmonds & Pavcnik (2004), for instance, study the relationship between trade liberalization (measured as the change in the relative price of an exported commodity) and child labor using household level data from Vietnam. They find that higher rice prices are associated with declines in child labor, suggesting that in this case greater market integration is associated with less child labor, not more.

The purpose of this paper is to throw some indirect light on this important policy question using detailed survey data from Nepal. Unlike Edmonds & Pavcnik (2004) who use price variation to capture differences in levels of market integration, we rely on cross-section differences in proximity to cities as a measure of marketization. Jacoby (2000), Fafchamps & Shilpi (2003) and Fafchamps & Shilpi (2005) have indeed shown that, in the studied country, proximity to cities is strongly related to market orientation and increased specialization. A cross-section approach has the drawback that it cannot control for unobserved heterogeneity across locations. But it offers the advantage of comparing households at the same point in time and thus in similar macroeconomic conditions, something that cannot be done in studies of child labor based on national time series data.

Our results show that children living in or around cities work more for the market in the form of wage work or small business employment. The increased intensity of market exchange associated with cities thus appears to be empirically correlated with an increased involvement of children in market-related forms of work. This result appears to provide support to the popular perception that child labor is associated with a intensification of market exchange.

This perception, however, is only partially correct. The reason is that while market work rises with proximity to cities, work by children on the family farm and on household chores falls dramatically. When we combine all three forms of labor, we see that children living in or around

cities work in total much less than their rural counterparts. This is true whether or not we control for child-specific effects and for household and village characteristics. We also find that school attendance increases dramatically with proximity to cities. Taken together, these results suggest that, on average, urban proximity is associated with an improvement in child welfare – at least as far as total child labor and education are concerned.

The above findings only holds for the average child, however. We remain concerned that children working for the market may be engaged in dangerous activities. The data show that more than three quarters of child wage employment (77%) is in agriculture, a sector where children may have to work long hours in harsh weather and use harmful pesticides and fertilizers. Another 8% work in domestic services, a sector where abuses of various kind are easy to dissimulate. In the studied country, child wage employment in sectors other than farming and domestic services remains small (2% in construction, 4% in manufacturing, and 10% in services).

We also investigate how parental education affects child labor. It has been noted that better educated parents are more likely to send their children to school and less likely to ask their children to work (Grootaert & Kanbur 1995). Since school attendance is higher in and around cities, the association between child labor and urban proximity may in fact be due to better parental education. We therefore need to control for education when estimating the effect of proximity to cities on child labor. Empirical results show that proximity effects remain even when we control for education, either at the household or ward level. Our results further confirm that adult education has a strong negative effect on child labor: the better educated parents are, the less children work. We also uncover a village education effect whereby the average education level of other adults in the village has a beneficial effect on child labor and school attendance that is distinct from that of parental education, suggesting the possible existence of an education externality on child labor.

Parental occupation has a strong effect on child labor. Parents who are involved in farming are more likely to ask their children to help on the farm or with housework, but less likely to send their children to work for a wage or in a business. Since farming is a less frequent occupation in and around cities (Fafchamps & Shilpi 2003), much of the association between urban proximity and total child labor disappears once we control for parental occupation – although it survives for farm work and household chores. Other results of interest are that firstborns tend to work more than their younger siblings. The effect is strong and affects both boys and girls and all types of work. This suggests that firstborns tend to be 'sacrificed' to the welfare of their younger brothers and sisters, who are less likely to work and more likely to go to school. This topic has already been studied by Edmonds (2004).

Surveyed households often are complex, and children residing in the household are not always those of the household head. Psychologists have pointed out that altruism within the household is associated with the number of genes individuals have in common (e.g. Brems 2001, Allison 1992, Cronk 1991, Dawkins 1989). Posel & Bowles (2004) show that genetic relatedness helps predict intra-household resource allocation in South Africa. To examine this possibility, we express the relationship between individual children and the household head as the proportion of genes the two have in common. We find that the more closely related children are to the household head, the more likely they are to go to school and the less likely they are to do market work. However, these children also work more on the home farm and other subsistence activities and, for girls only, on household chores. To the extent that genes shared in common are a good proxy for altruism, these results suggest that involving children in farm work and housework is more common when parents feel altruistic towards the child. This constitutes evidence that helping on the farm and at home is seen by parents as useful to the children, who one day will have their own farm and household and need the necessary practical skills to manage them

effectively. Work by children in subsistence and housework activities is perceived to be in the interest of the child. In contrast, wage work and work in small enterprises are seen by Nepalese parents as less favorable – a perception that broadly coincides with popular opinion.

A few authors have studied child labour in Nepal. Basu & Ray (2002) have examined the effect of a balanced power structure within the household between the husband and wife on child labour using data from Nepal. Ersado (2002) has focused on the impact of poverty on child labour in rural versus urban areas in three countries: Nepal, Peru, and Zimbabwe. Edmonds (2004) has focused on the sibling differences in child labor in Nepal. He argues that sibling differences reflect comparative advantage in household production. Using the Nepal NLFS survey data, he finds that older girls work more than boys within the same household, because older girls spend more time in domestic work. He also shows that the extra work required of older girls increases in the number of younger siblings (especially younger boys) and the spacing between siblings. Given that the focus of his study is on sibling differences, Edmonds (2004) studies only 6-15 year old children of head with siblings. In contrast, we examine all children in the household who are 5-15 years old.

The paper is organized as follows. In Section 2 we present the conceptual framework underlying our empirical analysis. The data are introduced in Section 3, together with a brief description of the survey area. Econometric results are presented in Section 4. Conclusions appear at the end.

2. Conceptual framework

The incidence of child labor and the form that it takes are driven by supply and demand factors. Supply factors are affected in part by attitudes towards child work. These attitudes are likely to be shaped by public opinion – which may vary with isolation. Supply also depends on decision

taken within households. Indeed, most minors are in the custody of their parents or guardian who have the authority to decide whether the child works. Parents' desire to put their children to school may also lead them to keep children out of the labor force. The opposite may also arise, as when poor parents partly finance their children's schooling with child work – either directly through child wages, or indirectly by substituting children for adults in house chores or household production. Parents may also choose to sacrifice some children in order to send others to school. Edmonds (2004), for instance, provides some evidence that first-borns are more likely to work, probably to enable their parents to educate younger siblings. For these reasons, household composition is likely to affect the supply of child labor.

Demand factors originate primarily from outside the household. As Fafchamps & Shilpi (2003) and Fafchamps & Shilpi (2005), urban proximity shapes economic activity in many important ways. In Nepal, they find that households living up to three hours of travel time from cities are more likely to engage in non-farm work than in agriculture. They are also more likely to work for a wage and to rely on the market for a number of goods and services that, in rural areas, are normally self-provided (e.g., food, water, fuel). These changes in the activity mix reflect urban and regional economic processes that have been discussed in great detail elsewhere and need not be revisited here (e.g. Henderson 1988, Fujita, Krugman & Venables 1999).

Some demand factors originate from within the household itself. This is because most households in poor countries are self-employed. The activities in which a household engage shape the demand for child work within the household. Rather than work outside the household for a wage, children may be called to assist in the family farm or business, or to help with household chores. So doing, they free adults to engage in more market-oriented activities. Of course, the health and safety of children is not equally at risk in all these activities. For most parents, involving children in household work is probably seen as an essential part of a good education.

But ignoring home production and household chores from an assessment of child labor would result in a distorted image of children's involvement in productive activities.

To guide our econometric analysis, we develop a simple household model the purpose of which is to help identify supply and demand forces at work within the household. Since the focus of the model is on the household, we take local market forces as given and we think of them as setting wages and as shaping the range of productive activities in which the household can engage. In the econometric work, forces external to the household are captured explicitly using variables such as urban proximity, local wages, and other measures of local economic activity.

Consider a household decision model in which altruistic parents make decisions regarding work by their children. For now, we ignore education; it is introduced later. Formally, let the household decision process be represented as the maximization of a welfare function made of weighted individual utilities $U^i(Y, l_i)$ where Y denotes household consumption and l_i individual leisure. Index 0 denotes the parents and indices 1 and above denote the children. The number of children N is taken as predetermined.¹ The household is engaged in K activities, each with its own production function and fixed factors A_j .² Household chores are counted as part of these activities, in which case the imputed value of the services generated by housework is added to consumption. Household members can also hire out their labor force for a wage w_j . Presumably,

¹It is conceivable that parents' decisions regarding the number of children they choose to have be partly determined by their labor needs (e.g. Rosenzweig & Evenson 1977, Wolpin 1984, Nugent 1985, Rosenzweig & Schultz 1987, Becker, Murphy & Tamura 1990). We do not reject this possibility but, in the analysis presented here, we focus on child labor conditional on household composition. Our analysis can thus be construed as focusing on short-term time allocation decisions.

²Fixed factors include parental skills, land, equipment, capital, etc.

$w_0 > w_i$ for $i > 0$ in most cases. We have:

$$\begin{aligned} & \max_{L_{ij} \geq 0, H_i \geq 0} \sum_{i=0}^N \omega_i U^i(Y, l_i) \text{ subject to} \\ Y &= \sum_{j=1}^K Q^j(\bar{A}_j, L_j) + \sum_{i=0}^N w_i H_i \end{aligned} \quad (2.1)$$

$$L_j = \sum_{i=0}^N L_{ij} \gamma_{ij} \text{ for all } j \quad (2.2)$$

$$T_i = \sum_{j=1}^K L_{ij} + H_i + l_i \text{ for all } i \quad (2.3)$$

where ω_i denote welfare weights and γ_{ij} denotes the productivity of individual i in activity j . Equation (2.1) is the usual budget constraint. Equation (2.2) defines effective labor to activity j . Presumably children are less productive than parents, so that $\gamma_{0j} > \gamma_{ij}$ for $i > 0$ in most cases. We set $\gamma_{0j} = 1$ for all j , so that labor is expressed in adult equivalent units. Equation (2.3) is the time constraint. Welfare weights are normalized so that $\omega_0 = 1$. If parents care more for children than for themselves, $\omega_i > 1$ and vice versa.

The resulting labor decisions depend on household fixed factors \bar{A}_j , wages w_i , productivity coefficients γ_{ij} , welfare weights ω_i , and number of children N . We immediately note that leisure consumption l_i increases with altruism ω_i : the more altruistic parents feel towards children, the less children work. It is reasonable to assume that for a young enough child, $\gamma_{ij} = w_i = 0$ and that γ_{ij} and w_i rise with child age. Consequently, we expect older children to work more than young ones.

In general, we expect labor to be allocated to activities where returns to labor are highest. As long as $H_i > 0$,³ the model behaves like a separable household model. In this case, a simple arbitrage argument predicts L_{ij} to increase with \bar{A}_j and γ_{ij} and H_i to increase with w_i . These

³Or if H_i can become negative.

adjustments are accomplished simply by shifting labor between self-production and wage work. Endowments, labor productivity, and wages thus shape what the household does. A household with more land is predicted to devote more labor to agricultural production, much of which will probably come from the household. Higher wages in contrast will divert household labor from farming to wage work. The model also predicts that more productive household members, for instance because of better human capital, will be affected to tasks in which their human capital is most useful (e.g. Fafchamps & Quisumbing 1999, Yang 1997). These predictions apply to parents as well as children.

Now suppose that, because of transactions costs or imperfect markets, H_i is constrained to remain positive: the household cannot hire labor for self-production. When $H_i = 0$, the model then behaves like a non-separable household model (e.g. de Janvry, Fafchamps & Sadoulet 1991, Key, Sadoulet & de Janvry 2000). In this case, endowment and productivity effects may be mitigated or even reversed by income effects operating in the opposite direction or by changes in household shadow prices. Total labor supply depends on price as well as income effects. Provided leisure is a normal good, leisure consumption for all household members increases as Y rises. An increase in \bar{A}_j , w_i , or γ_{ij} may therefore generate an income effect so strong that H_i falls to zero and the resulting rise in the household shadow wage reduces L_{ij} in all activities, even those where returns to labor rise. Because of this, it is difficult to sign a priori the effect that \bar{A}_j , w_i , or γ_{ij} may have on labor – except to say that if the income elasticity of leisure is small, the labor returns effect is likely to dominate and the net effect should be positive. The same prediction obtains if the model is separable.

It is reasonable to expect children to be more productive in household activities than in wage work, i.e., to assume that $\gamma_{ij}/\gamma_{oj} > w_i/w_0$. The reason is that children probably work best under the supervision of their parents. The nominal wage received by children may also overestimate

returns to parents if parents fear children to be mistreated or abused by employers. For these reasons, we expect children to work mostly in K self-production activities with their parents. The immediate corollary is that, other things being equal, children in farming households are in general expected to spend more time working than children whose parents do not farm. This is because in non-farming households the marginal return to child labor is lower. Of course, as we have already emphasized, these returns effects may be reversed by sufficiently strong income effects, so that children of large farmers may work less than children of poor landless households even though the returns to child labor are lower for the landless. These income effects are at the heart of the argument of Basu & Van (1998). It is also reasonable to assume that the gap between γ_{ij}/γ_{oj} and w_i/w_0 falls as the child gets older, i.e., that w_i increases faster with age than γ_{ij} . Consequently, we expect older children to be more likely to engage in wage work than small children.

The above model can be expanded to allow for education and learning-by-doing. Suppose that the long-term income potential of a child depends on human capital Z which, for the sake of this model, we represent as a vector of skills $Z = \{S^j\}$. Without loss of generality, schooling is represented by S_i^0 . Other skills are activity-specific and are acquired through learning-by-doing, i.e., $S_i^j = S(L_{ij})$. The future utility of child i is written $V_i(S_i^0, \dots, S_i^K)$ with $\partial V_i / \partial S_i^j \geq 0$ for all

j .⁴ The decision problem faced by parents now is:

$$\begin{aligned} & \max_{L_{ij} \geq 0, H_i \geq 0} U^0(Y, l_0) + \sum_{i=1}^N \omega_i (U^i(Y, l_i) + V_i(S_i^0, S(L_{i1}), \dots, S(L_{iK}))) \text{ subject to} \\ Y &= \sum_{j=1}^K Q^j(\bar{A}_j, L_j) + \sum_{i=0}^N w_i H_i \end{aligned} \quad (2.4)$$

$$L_j = \sum_{i=0}^N L_{ij} \gamma_{ij} \text{ for all } j \quad (2.5)$$

$$T_i = S_i^0 + \sum_{j=1}^K L_{ij} + H_i + l_i \text{ for all } i \quad (2.6)$$

The main difference with the earlier model is that an increase in ω_i need not result in an increase in child leisure. This is because if γ_{ij} is very small (or even negative), parents may nevertheless decide to involve the child in activity j because doing so generates skills that will be useful to the child later in life. An increase in ω_i nevertheless has an unambiguous effect on schooling, which is predicted to rise with altruism.

Turning to urban proximity, we know from other work in the studied country (e.g. Fafchamps & Shilpi 2003, Fafchamps & Shilpi 2005) that it is associated with more emphasis on non-farm activities and wage work, and less emphasis on farming. Agriculture tends to be more market oriented up to three hours travel time from large urban centers, focusing on fruits and vegetables. Commercial agriculture proper in grains and cash crops predominates between 3 and 8 hours of travel time. Beyond livestock production takes more importance. Very isolated households revert to self-subsistence, except for occasional labor migration.

Fafchamps & Shilpi (2005) also document large differences in the composition of household chores for households living near urban centers: they spend less time fetching water and firewood but more time shopping and cleaning the house. The emphasis on wage work in and around

⁴Discounting is subsumed in function $V_i(\cdot)$.

urban centers and the presence of large employers with a need for literate workers also suggest higher returns to education near cities – together with a better supply of schools (Fafchamps & Quisumbing 1999). For these reasons, we expect school attendance to be higher in the vicinity of urban centers.

The decreased emphasis on agriculture may reduce child labor provided perverse income effects do not force poor urban households to send their children to work outside the household. At the same time, increased opportunities in wage work and non-farm self-employment around cities may raise child labor. Neighborhood effects may also affect parental decisions. Irrespective of whether the ward is rural or urban, the kind of activities other individuals in the wards engage in circumscribes work opportunities other than farm work or household chores. For this reason we expect child labor in market oriented activities to be less if other villagers are predominantly occupied in farming. Which of these effects dominates is an unresolved empirical question and one emphasis of the remainder of this paper.

3. The data

We investigate the above empirical questions using survey data from Nepal in the late 1990's. Home to the Everest, Nepal is located nearly entirely at the foot of the Himalaya mountains. It is largely rural, with 86% of its 21 million inhabitants living in villages or towns of less than 10,000 people. In the early 1990's, Kathmandu, the capital city and largest urban center, had a population of around half a million people.⁵ At the last publicized census, there were only 34 cities and towns of 10,000 inhabitants or more. Given the mountainous terrain, communications are difficult within Nepal. People living in the remote Northern part of Nepal must trek for many hours by foot or bullock cart before reaching the nearest road. Nepal thus offers a perfect

⁵ 421,000 inhabitants in 1991. Current estimates put the 2000 Kathmandu population level at around 1 million. A population census was conducted in 2001 but the results are not yet available.

testing ground to examine the effect of proximity to cities on child labor.

The data we use come from the Nepal Labor Force Survey (NLFS) of 1998/99. The data were collected by the Central Bureau of Statistics of Nepal (CBS). The questionnaire and survey methodology were designed in collaboration with the International Labor Organization, drawing from survey experience in similar countries (Government of Nepal 1999). The NLFS survey data have already been used by Fafchamps & Shilpi (2005) to study occupational and sectoral specialization and by Edmonds (2004) to study sibling differences in child labor.⁶

It is important to recognize that because the data used here is based on a household survey, it misses certain categories of children that are particularly at risk, such as street children. We also suspect that children engaged in prostitution or bonded labor are not adequately captured or the nature of their work accurately described, although some may live in surveyed households. The results presented here should be interpreted with this caveat in mind.

Geographical coverage in the NLFS is extensive. The survey covers 14,355 urban and rural households spread among 719 villages or 'wards' distributed over 73 of the 75 districts of the country.⁷ Twenty households were selected at random in each ward and employment-related information was collected on each household member except small children (i.e., below the age of 5). Wards are administratively classified as urban and rural on the basis of their sectoral specialization relative to neighboring wards. Rural wards are those that emphasize agriculture; urban wards are those that do not. Some urban wards are located in moderately large cities; most belong to small towns and district-level administrative centers. By design, half of the surveyed wards were selected in areas classified as 'urban'; the other half were selected in rural

⁶The reader may wonder about the validity and reliability of the NLFS. The reader will find comfort in the fact that, three years prior to the NLFS, the Central Bureau of Statistics of Nepal conducted a Living Standard Measurement Survey (the Nepalese Living Standard Survey or NLSS). The results from this earlier survey can easily be compared with similar LSMS surveys in other countries. This comparison suggests that the work done by CBS is of high quality. This is also the opinion of the World Bank staff in Katmandu.

⁷Two of the most remote districts of the country were not included in the analysis because of difficulties reaching them. Their population is very small so that the resulting bias is negligible.

areas. Urban areas are thus overrepresented in the sample, a feature that suits our purpose well.

There are some 74,622 individuals identified in the sample. We focus on those who are aged between 5 and 15 years of age – 19,191 individuals in total. Each of these individuals was asked to describe how much time he or she worked over the seven days preceding the survey. They were asked to distribute their hours of work into 16 different activities which can be divided into three categories: (1) market work, that is, work done primarily or exclusively for the market; (2) what we call subsistence-related work, which may in part be for the market but is largely for self-consumption; and (3) household chores, which are not for the market. The first category includes wage work and work in a non-farm business operated by the household. The second category includes primarily farming, plus a few residual categories such as handicrafts and house construction, which can potentially be provided for the market or for household consumption. The third category includes various household chores, including fetching fuelwood and water, cooking, visiting the market, cleaning, and caring for children and the elderly.

Table 1 summarizes respondents' answers. A little under half of all surveyed children aged 5 to 15 work in one way or another. Less than 5% of surveyed children perform what we have called market work. One fourth are involved in subsistence work, primarily assisting on their parents' farm, and a third of surveyed children participate in household chores. As could be expected, participation in housework is much higher among girls than boys. Participation in all work categories increases with age, together with the number of hours worked in all categories. The increase is strongest in market work because the number of small children involved in market-related work is very small. Roughly three quarters of all children aged 5-15 go to school. As is common in South Asia, school attendance is higher among boys than girls (ILO 2002), Kingdon (2003).

We complement these NLFS data with information about urban population in Nepal using

the 1991 population census. For our purpose, a town is defined as a settlement of more than 10,000 inhabitants. There were 34 such towns in 1991. We first compute the distance between each of the 719 surveyed ward and each of these towns. Distances are normally taken along existing roads, except when roads do not exist, in which case we calculate the shortest arc distance to the nearest road, and then the distance to various cities along the road.⁸ Distances are then converted into travel time using available information about trucking and walking speeds along various types of roads in Nepal.⁹ Off the road travel is assumed to take place by foot – a reasonable assumption for Nepal given the nature of the terrain.

Available information on distance to towns is summarized in the first columns of Table 2.¹⁰ The average distance from surveyed wards to the nearest town is around 3 hours, with large differences across wards. Around 30% of surveyed wards are located either within towns or very close to towns. A little under half of the surveyed households live more than two hours travel away from a town or city; the median distance is 1 hour and 35 minutes. Compared to nationally representative surveys (Fafchamps & Shilpi 2003), this sample is slightly more urban in the sense that more sample households live in or near towns than in the country as a whole. However, there also are many households living far from towns and cities in the sample, a reflection of the mountainous and isolated nature of much of Nepal. A quarter of surveyed individuals are

⁸This is a very time consuming process that requires a combination of various techniques. e.g., visual inspection of maps, statistical information on road grades, calculation of arc distances, comparisons across various measurements to identify shortest distances, etc. The assistance of Jyotsna Puri (GIS lab, Department of Research of the World Bank) was essential to the success of this operation.

⁹Travel speeds are calculated for various terrains and types of road. Assumed travel times are as follows, in km/hour:

	Highway	Provincial road	Secondary road	Off road
Terai	60	35	10	5
Siwalik	51	29.75	8.5	4.25
Middle mountain	42	24.5	7	3.5
High mountain	36	21	6	3
High Himalayas	30	17.5	5	2.5

These figures were obtained through discussion with various transportation experts and South Asia operations staff at the World Bank. Travel on highways and provincial roads is assumed to take place by truck; travel on secondary roads is assumed to be by cart.

¹⁰Most wards classified as urban for the purpose of sampling are not large enough to qualify as town according to our definition.

located more than 4 hours travel time from the nearest town; five percent are more than 10 hours away. The extent of this variation makes it easier to identify the effect of distance from towns on child labor. It is the main reason why Nepal was chosen.

We are interested not only in testing the effect of proximity to cities on child labour, but also in identifying the effect of town size. To this purpose, we construct a measure of urban population residing at various distances h from household i , denoted P_i^h . To construct these P_i^h variables, we combine information on distance to towns with data on population in these towns. The resulting variables give the urban population at various time distances from each ward, up to ten hours of travel time. These variables basically measure the urban population residing in a 'donut' defined by travel distance from the ward. To see how the variables are constructed, suppose that a ward i is 2,5 hours away from the nearest town, which has a population of 30,000. The next nearest town is 4,5 hours away and has a population of 100,000. Put differently, there is a town in the donut 2 to 3 hours of travel time and another, larger town in the donut 4-5 hours of travel time. In this case we have, for each household in the ward, $\{P_i^1; \dots; P_i^{10}\} = \{0;0;30,000;0;100,000;0;0;0;0;0\}$. The right-hand columns of Table 2 summarizes the P_i^h variables. The average surveyed ward has an urban population of 74,000 inhabitants located within an hour of travel time. The median, however, is zero. As could be expected, urban population in each donut increases with distance since the area covered by a donut increases with its radius.

4. Empirical results

We now turn to econometric analysis. To keep things focused, we use the division of child work into the three broad categories listed in Table 1. We also consider school attendance as a separate dependent variable. We first examine whether a child is involved in any of four

activities – market work, subsistence work, housework, and school attendance – as a function of proximity to urban centers.

Fafchamps & Shilpi (2003) have shown that, in Nepal, proximity to urban centers is associated with more non-farm work and less emphasis on subsistence agriculture. Fafchamps & Shilpi (2005) further show that wage labor is more frequent in the vicinity of urban centers. These results suggest that wage work and non-farm employment are more readily available near cities. We therefore expect market oriented work to be *ceteris paribus* more prevalent for all household members, including children. Fafchamps & Shilpi (2005) also argue that large hierarchies (e.g., large firms, hospitals, schools, public administration) generate higher returns to education in urban areas because the skills imparted by schooling are valuable in monitoring and supervision tasks. Consequently, we also expect the demand for schooling to be higher in and around urban areas. Partly for this reason, the supply of schools is also likely to be higher in towns. To the extent that child leisure and education are normal goods, we also expect that children in richer households to work less and go more to school. Since incomes are also higher in and around cities, the net effect of urban proximity on child labor and education is a priori ambiguous: higher incomes should lower child labor but more wage employment opportunities may raise it – hence the need for empirical investigation.

4.1. Urban proximity

We begin by estimating reduced form logit regressions of child labor on urban proximity. These regressions can be construed as summarizing the combined effect of supply and demand factors on child labor. The dependent variable takes value 1 if the child is involved in one of four activities, 0 otherwise.

We investigate the effect of urban proximity by regressing these variables on the urban

population variables (in log) $\{P_i^1; \dots; P_i^{10}\}$ for up to ten hours of travel time, after which the effect of urban proximity tapers off. To facilitate interpretation, the coefficients of urban population variables are summarized in Figures 1.1-1.5, together with their 95% confidence interval. We see that child market work and schooling are more likely in the vicinity of urban population while the opposite is true for subsistence work. To investigate which effect dominates, we reestimate the model combining market and subsistence work. The result, presented in Figure 1.5, shows that proximity to urban population is associated with a strong reduction of combined market and subsistence work. This implies that children are less likely to work in absolute terms when they live in and around large population centers although, if they work, they are more likely to work in market-related work, possibly without their parents. These results suggest that supply and demand (i.e., the availability of market work) in and around cities combine to reduce child labor in absolute terms but to increase the share of market work. Figures 1.1- 1.5 furthermore show that the effect of urban population on market and subsistence work by children extends over a large area – up to four hours of travel time. Only after 6 hours of travel time do coefficients become mostly non-significant.

We find a strong positive effect of urban population on schooling, consistent with the idea that cities offer better access to schools and more opportunities to take advantage of a good education. This effects again extends well beyond the towns themselves, reaching areas located up to three hours away. We also find that children residing in areas located 4 to 6 hours away from a large city attend school less. This area corresponds with what Fafchamps & Shilpi (2003) have identified as the commercial farming zone. It is possible that in this zone the work of children is essential to assist parents in agriculture. If confirmed by further work, this would suggest that the commercialization of agriculture made possible by the relative proximity to market outlets may raise child labor, but only in areas located sufficiently far away from cities.

For household chores, the effect is non-linear, with a reduction of child work around cities relative to isolated rural communities, but a compensating positive effect in cities themselves. This may be because children help parents cope with the many demands on their time. As Fafchamps & Shilpi (2005) have shown, city life is also associated with more emphasis on cleaning and cooking. These home-based, relatively light chores¹¹ may encourage parents to enlist children help.

One important conclusion therefore emerges from the reduced-form analysis presented so far: urban proximity has a strong effect on child labor. The effect extends well beyond the confines of the town itself, reaching areas located up to 5 hours away. This suggests that cities shape child labor in surrounding rural areas, introducing a strong differentiation between rural areas (e.g. Fafchamps & Shilpi 2003, Fafchamps & Shilpi 2005). An immediate corollary is that urban-rural dichotomy often used in theoretical and empirical work is insufficiently informative.

4.2. Adding more controls

The above reduced-form analysis can be improved by adding other covariates. Doing so should both reduce the possibility of omitted variable bias and generate valuable information on the determinants of child labor. Omitted variable bias is a potential threat given that proximity to urban centers is likely to be correlated with household and individual characteristics that make various categories of child work more or less likely. To this effect, we reestimate all the regressions with additional regressors.

The mean and standard deviation of these variables are presented in Table 3. In addition to the usual regional and seasonal dummies, we include a number of individual-specific and household-specific variables. The first set of regressors is child specific and contains the gender

¹¹Relative to collecting water and fetching firewood.

and age of each child.¹² To allow for non-linear age effects, the age of the child is captured using dummy variables. We also compute two variables hypothesized to be correlated with the welfare weight of the child, i.e., the rank of the child among his or her siblings, and a coefficient of relatedness to the household head. The relative rank of the child is also included to capture possible rank effects – e.g., firstborns may be favored by parents or, on the contrary, sacrificed to provide for their younger siblings, as shown by Edmonds (2004).¹³ Because absolute rank R_i is affected by household size, we use relative rank instead, measured as follows:

$$r_i = \bar{R} - R_i$$

where R_i is the absolute rank of the child (i.e., firstborn=1, second born=2, etc) and \bar{R} is the average rank of other children in the same household. With this definition, a single child has rank 0, a firstborn in a two children household has rank 0.5, a firstborn in a three children household has rank 1, etc. Because we suspect that rank matters differently by gender, we compute rank separately for boys and girls.

Altruism is captured using a variable that measures the extent to which the child shares genes with the household head. Experimental research by psychologists has indeed shown that altruism is an increasing function of the number of genes that two individuals share (e.g. Brems 2001, Allison 1992, Cronk 1991, Dawkins 1989). Following common practice, the shared genes variable takes the following values: 1 if the child is head of household; 0.5 if the child is the son, daughter, sister or brother of the head; 0.25 if the child is the grandchild, niece, or nephew of

¹²Child education is not included because it is jointly determined with work.

¹³A few studies have examined the effect of birth order on child labor. For example, Emerson & Souza (2002) study the effects of birth order on child labor and school attendance in Brazil. They find that male last-born children are less likely to work and more likely to go to school than their first- and middle-born siblings, which they argue, is because older children can command higher wages. However, they find that females who are first-borns are less likely to attend school and no more or less likely to work than their middle- or last-born siblings because the oldest female children are kept out of school to assist the mother with housework and childcare.

the head, and 0 if the child is unrelated.

To control for household composition, we include the size of the household and the number of siblings present in the household as well as the number of other children who are less than 6 years of age. We do not have data on household income but since this variable is endogenous to child labor decisions, it would not be of much use. We control for permanent income determinants via the education of the household head and his spouse, and a dummy that takes value 1 if the main occupation of the household head is agriculture. A similar dummy is included for the head's spouse. A dummy is also included if the household head does not have a spouse. Other variables include dummies for terrain (which broadly corresponds to the North-South gradient, Terai being the plain bordering India) and East-West regional dummies. We also include as regressor a dummy variable that equals one if the surveyed ward is administratively classified as urban. Edmonds (2004) has indeed shown that child labor is different in urban areas. By survey design, this occurs for about half (46%) of the sample.

Regression results are summarized in Table 4. We also estimated the model for boys and girls separately but since all qualitative results remain unchanged, results are not presented here to save space. The estimated coefficients of the urban dummy show that children residing in wards classified as urban work much less in subsistence work and somewhat less on house chores, but are more likely to attend school. The effect on market work is not significant.

Once we control for the urban dummy, the coefficients of urban population variables become smaller but remain strongly significant. This indicates that residing in a ward classified as urban does not fully capture the effect of urban proximity. The size of urban population matters as well. The combined effect of the urban dummy and the urban population variables continue to indicate that children living in urban areas work much less in total.

Controlling for individual and household effects tends to lower the magnitude of the co-

efficients of urban proximity variables, without however making their effect disappear. The remaining effect of the urban variables can basically be interpreted as the combined effect of market labor demand and school supply effects. These effects appear strong since urban population and the urban dummy retain a strong independent influence on child labor in the regressions presented in Table 4. Household-based supply and demand effects are, to the extent possible, controlled by individual and household characteristics. We see that these effects account for part of the effect of urban proximity – particularly whether parents are involved in farming. This confirms that proximity to urban centers is associated with more market work and better school attendance for children, but less involvement in farming and household chores.

Turning to child characteristics, we see that, as expected, the propensity to work increases monotonically with age in all work categories. For market work, the increase is strongest among children aged 14 and above, suggesting that parents are reluctant to let young children work for a wage or as self-employed workers. We also find strong gender differences, with boys more likely to participate in market work while girls are more likely to participate in subsistence work and much more likely to be engaged in household chores. Birth rank is also significant, with firstborn boys more likely to enter market work, and firstborn girls more likely to undertake household chores, and all firstborn children more likely to undertake subsistence work. We also find that firstborn boys and girls are less likely to attend school. This suggests that firstborn children are de facto 'sacrificed' in the sense that they are more likely to work and less likely to receive education than their younger siblings. Edmonds (2004) reports a similar finding. One possible explanation is that as households become wealthier over their life cycle, they can better afford sending their children to school.

The shared genes variable is particularly interesting as it captures the possible effect of altruism. We find that children who share more genes with the household head are more likely

to attend school and less likely to engage in market work, as predicted by the model presented in Section 2. At the same time, they are more likely to participate in subsistence activities. The effect on housework is also negative and significant. These results suggest that participation in subsistence work – primarily farming – is seen as a beneficial activity by parents, probably because it teaches important skills to children. Market and housework, in contrast, are not seen as beneficial, probably because learning is limited and negative externalities present. For household work, these results are consistent with the work of Fafchamps & Quisumbing (2003) who provide some evidence of rapid learning of household chores in rural Pakistan.

Turning to household variables, we find that household size has a strong negative effect on all forms of child labor and a positive effect on schooling. The effect is particularly strong in housework, which suggests the existence of returns to scale in housework (e.g. Deaton & Paxson 1998, Fafchamps & Quisumbing 2003). These effects, however, are mitigated by household composition. In particular, we find some evidence of competition for education among siblings (Garg & Morduch 1998): school attendance falls with an increase in the number of other children in the household, especially young children. Coupled with the rising child participation in household chores that is observed in households with small children, this suggests that children are called to assist their parents in child care provision by substituting for them in housework and, to a lesser extent, in subsistence and market work. As a result they cannot attend school.

Child labor in market oriented activities is closely related to household size: children in households with more adults and fewer children are much less likely to be involved in market work and much more likely to go to school. This suggests that child labor is associated with high child fertility, a feature consistent with theories emphasizing the trade-off between child quantity and quality (e.g. Becker, Murphy & Tamura 1990, Nugent 1985).

We also find that the education of the household head has a significant negative effect on

child market and subsistence work and a strong positive effect on schooling. Spouse education has a strong negative effect on child participation in household chores and subsistence work as well as a positive – albeit less strong – effect on school attendance. Better educated parents are thus less likely to let their children work and more likely to send them to school. This effect may reflect a direct education effect – better educated parents value education more – or an indirect income effect – wealthier parents can afford to educate their children and to pull them out of the labor force.

Whether or not the household is engaged in farming has a very strong effect on child labor: children in farming households are much less likely to engage in market work and much more likely to engage in subsistence work and, to a lesser extent, in housework. The positive effect on subsistence work dominates so that the net effect on combined market and subsistence work is strongly positive. We also find that the absence of a spouse to the household head is associated with less market work and more subsistence work. It therefore appears that children raised by a single parent work more to make up for the absence of spouse.

4.3. Adding ward variables

So far we have let the urban dummy and urban population variables capture the combined effect of market labor demand and school supply on household child labor decisions. We now seek to measure these effects more directly. In so doing we are constrained by the available data.

As shown in the conceptual section, household labor supply depends on wage levels. The NLFS survey collected information on wages for all salaried workers in the sample. Some 8% of all 75,000 individuals covered in the survey were working for a wage, generating 6395 observations with wage data. We suspect that wage variation within each ward depends primarily on worker characteristics. In contrast, wage variation between wards probably measures differences in

labor market conditions. Jacoby (2000), for instance, has shown that Nepalese wage levels vary systematically with distance from the nearest town or market, which as we have seen vary dramatically between wards.

To construct a ward-specific wage measure, we could in principle compute the average wage in each ward. The problem is that this average would partly reflect differences in worker characteristics between wards. To correct for possible differences in worker characteristics between wards, we proceed as follows. We first estimate a standard mincerian earnings function by regressing log wage on worker characteristics and ward dummies:

$$\log w_i = X_i\beta + \sum_{k=1}^N \gamma_k D_{ik} + u_i w \quad (4.1)$$

where X_i is the vector of regressors, D_{ik} is a dummy variable for ward k , and γ_k is the ward-specific coefficient. Given the data at our disposal, X_i includes a male dummy, worker age, age squared, years of education, and seasonal dummies. Results are summarized in Table 5. We see that, as expected, education has a strong and significant effect on earnings.

Coefficient estimates $\hat{\gamma}_k$ are an estimates of the ward-specific wage level that controls for differences in the gender, age and education composition of the workforce between wards. This estimate is then corrected to purge the own household effect from the ward average.¹⁴ The

¹⁴The correction proceeds as follows. Consider first taking a straight mean of the log wage in each ward. This is equivalent to estimating a model of the form:

$$\log w_i = \sum_{k=1}^N \gamma_k D_{ik} + u_i \quad (4.2)$$

with $\hat{\gamma}_k$ being the ward-specific mean of $\log w_i$. Taking out the own household effect from the mean is obtained as:

$$\hat{\gamma}_k^c = \frac{N_k \hat{\gamma}_k - \log w_i}{N_k - 1}$$

where N_k be the total number of wage earners in ward k . Applying this approach to (4.1) requires that we take out not just $\log w_i$ but $\log w_i - X_i \hat{\beta}$. The correction formula becomes:

$$\hat{\gamma}_k^c = \frac{N_k \hat{\gamma}_k - (\log w_i - X_i \hat{\beta})}{N_k - 1}$$

corrected estimate value, denoted $\widehat{\gamma}_k^c$, is reported in Table 6 together with its standard deviation.

As discussed in the conceptual section, the anticipated effect of the wage level on child labor is ambiguous. The substitution effect suggests an increase in child labor, either directly or indirectly (if children work more on self-produced goods to enable parents to devote more time to market work). The income effect, on the other hand, operates in the other direction. The net effect depends on the magnitude of the income elasticity of child leisure.

The wage rate alone may not capture differences in local economic structure. As emphasized in Section 2, whether or not parents can send their child to work outside the family farm depends on local work opportunities for children. In particular, we expect children living in wards where other households farm to be more likely to farm themselves. To capture this effect, we construct a variable that measures the proportion of sampled adults in other households in the same ward who are engaged in subsistence agriculture.¹⁵ The variable is summarized in Table 6. On average, more than half of ward households are engaged in agriculture. We also compute the average education level of adults in the ward as another measure of local market conditions.¹⁶ Because returns to education are higher in non-farm jobs, we suspect that wards with a better educated workforce are also wards where non-farm work is more prevalent. To the extent that children primarily on their parents' farm, this should have an additional dampening effect on

In practice, this can be done more easily by noting that, for each $i \in N_k$, we have:

$$\begin{aligned}\widehat{\log w}_i &= X_i \widehat{\beta} + \widehat{\gamma}_k \\ X_i \widehat{\beta} &= \widehat{\log w}_i - \widehat{\gamma}_k\end{aligned}$$

where $\widehat{\log w}_i$ is the predicted value of $\log w_i$ from equation (4.1). The correction formula can thus be rewritten:

$$\begin{aligned}\widehat{\gamma}_k^c &= \frac{N_k \widehat{\gamma}_k - (\log w_i - \widehat{\log w}_i + \widehat{\gamma}_k)}{N_k - 1} \\ &= \widehat{\gamma}_k - \frac{\log w_i - \widehat{\log w}_i}{N_k - 1}\end{aligned}$$

¹⁵Own household is omitted from the calculation of the ward mean to avoid spurious correlation.

¹⁶To avoid spurious correlation, we again omit members of the child's household when calculating the ward average.

child labor. On the other hand, if children provide cheap manpower for labor-intensive crafts, we would expect child labor in market oriented activities to increase with the level of non-farm activity and thus with the level of adult education in the ward.

Two more variables are constructed to capture local conditions. The first one measures the average travel time to the nearest school. This variable captures school supply effects. We expect children located closer to schools to be more likely to attend school and less likely to work. The second measures the proportion of households whose head was born outside the ward and migrated to the ward. This variable captures the extent of labor mobility in the area. Some parents may migrate in the hope of providing a better future livelihood for their children. These parents may also be altruistic towards their children. Areas with lots of migrants may thus have less child labor. The information from which these two variables are constructed is the Nepalese Living Standard Survey (NLSS) of 1996/96. Because the NLFS and NLSS surveys did not visit the same wards, we cannot compute these variables at the ward level. Both are thus constructed at the district level from the NLSS household data and matched with the NLFS data. There are 73 districts covered in both surveys. The two variables are summarized in Table 6. We see that on average the nearest school is located 20 minutes travel time (0.36×60 minutes) from the household. The average proportion of (domestic) in-migrants in a district is 24% with quite a bit of variation across districts.

We also revisit the relatedness variable. We have seen in Table 4 that a child who shares fewer genes with the household head is more likely to perform market and house work and less likely to attend school and to participate in the subsistence activities of the household – e.g., farming. This is true conditional on the child being present in the household. The reason for a child to be in a household can vary. Most children are there because they are staying with their parents. Some children are there because they were adopted or are being fostered (e.g.

Zimmerman 2003, Ainsworth 1996, Akresh 2003). Finally some children may have been brought into the household explicitly as servants. The survey does not record whether a child is fostered but it records whether the child is regarded as a household servant or helper. Such children represent a very small proportion (0.6%) of our sample. Presumably, these children are the least likely to benefit from altruism from the head of household and are thus more likely to work. The question is whether this category alone is responsible for the significance of the shared genes variable, or whether the effect of the shared genes variable is due to difference of treatment between children of the head and other relatives. We are also interested in finding out in which kind of activity servant children are involved.

Regression results are presented in Table 7. Before focusing on the ward variables, we briefly discuss the effect of including the child servant dummy. Results show that child servants are much more likely to be engaged in market work and less likely to attend school or assist the household in subsistence activities. They are slightly more likely to participate in household chores but the effect is not significant. Once we include the child servant dummy, the shared genes pool variable only remains significant – with a positive sign – in the subsistence work regression. These results suggest that child servants are brought into the household primarily to participate in market work, less so to assist with household chores. They also confirm that working on the family farm is thought beneficial to children by their parents. Because children immediately related to the head are more likely to inherit their parents' land, assisting on the parental farm is probably seen as a preparation for a future farming career.

Turning to ward variables, we first see that the wage level in the ward has a strong negative effect on market and subsistence work. This result suggest that the income effect dominates the substitution effect in the household decision process: parents living in neighborhoods where pay is higher are much less likely to put children to work in the market or on the farm. To the extent

that this result captures underlying parental preferences, it suggests that child labor should fall as the country becomes more prosperous. This finding is in line with Edmonds & Pavcnik (2004) who finds that an increase in the price of agricultural output is associated with a fall of child labor in Vietnam. In contrast, we also find that a higher wage is associated with more child involvement in household chores, a result consistent with the idea that children substitute for parents in home production. The effect on schooling is, as anticipated, strongly positive.

Next, we find that, as expected, children living in wards where most adults are engaged in subsistence agriculture are much less likely to engage in market work and more likely to engage in subsistence and housework. Surprisingly, we also see that they are more likely to attend school. In contrast, children living in wards where adults are better educated are less likely to undertake market or subsistence work and much more likely to attend school. This effect comes in addition to the direct effect of parental education. This suggests that parental education has a kind of external effect on child labor, possibly because parents surrounded by well educated adults imitate the behavior of other parents, or perhaps because wards with more educated adults are more prosperous. This issue deserves further investigation.

The coefficient of the distance to school variable measures, with a change of sign, the effect of school supply. Contrary to expectations, we find that children living in districts where schools are distant are more likely to attend school and less likely to work on the farm. This findings suggests that, if anything, school attendance is influenced more by the demand for education than by supply constraints.

Finally, we find that, as anticipated, wards with a larger proportion of in-migrants have more schooling, possibly reflecting migrant parents' concerns for their children's future. However, wards with more migrants also witness more child labor in market work and house work. This is probably because wards with lots of in-migrants are more urban, with more opportunities for

non-farm work and more demands on parental time.

We now reexamine the urban proximity variables to see if, by adding household and ward characteristics, we have captured most of the demand and supply forces shaping child labor in Nepal. To facilitate interpretation, the coefficients of the urban population variables are presented graphically in Figures 2.1 to 2.5. We see that, with the inclusion of household and ward controls, urban population no longer has a systematic and significant effect on market work by children (even though some coefficients remain mildly significant). The urban dummy even becomes negative and significant (see Table 7). This suggests that the ward variables capture all of the positive effect of urban proximity on child market work.

In contrast, subsistence work remains negatively associated with urban proximity, while children residing 4 to 8 hours from a large city tend to do more subsistence work. This is again a possible reflection of the important role of commercial agriculture at this distance from urban centers. The net residual effect of urban proximity on the sum of market and subsistence work is depicted in Figure 2.5. Nor surprisingly, the pattern is dominated by subsistence work, which we just discussed. The effect of urban proximity on child schooling basically disappears once we include all ward controls. The effect on household chores is more complicated. The urban dummy is strongly negative and significant but urban population size within one hour travel time has a positive significant effect. This suggests that children living in town are in general less likely to be involved in household chores but this effect is reversed slightly if the town is particularly large. This is possibly because commuting to work in large congested cities is more time consuming for parents, who then enlist the help of their children for house work. In contrast, children living between one to two hours from a large city are less likely to engage in house work. This may be because households residing in these peri-urban zones indirectly benefit from urbanization in terms of water and fuel availability – hence reducing the time spent

on chores – but work nearby and do not have to incur long commutes.

4.4. Hours worked

So far we have examined child work and schooling propensity. We now use the available information about the amount of child work done during the week preceding the survey. We reestimate the regressions presented in Table 7 using as dependent variable the (log of the) time spent in various work activities.¹⁷ This enables us to also examine the total amount of child work (market, subsistence, and housework) performed in the week preceding the survey. The dependent variable is expressed as a share of total time. Results are summarized in Table 8; tobit is the estimator.

Regarding total work, results confirm that children living in and around urban centers spend less time working in general, although we again observe an increase in market work – from a very low base. Results indicate that child servants work on average 11 hours per week more than other children in market work. They also work more in household chores, but the magnitude of the effect is much smaller – less than one hour. From the last column of Table 8, we see that child servants work on average 31 percentage points more than other children of similar characteristics. This is a massive difference. Altruism, as measured by the shared gene variable, is again shown to have a positive and significant effect on subsistence work. It also has a negative effect on house work. Having farming parents is again shown to have a strong net positive effect on child labor: being born in an agricultural household is a major determinant of child labor. These results further confirm our earlier conclusions and suggest that as development takes place and households move out of farming, child labor should fall.

Other qualitative results regarding market, subsistence and house work are unchanged. As

¹⁷To avoid losing zero observations, we take the log of work time plus 1.

anticipated, we find that boys are more likely to do market work and girls more likely to do subsistence work and household chores. Hours worked by children increase more or less linearly with age. In addition, we find evidence that children in larger households work less, a result consistent with the existence of returns to scale in household size (Deaton & Paxson 1998) (Fafchamps & Quisumbing 2003). This effect, however, is reversed in households with many children, especially of a young age, in which case other children tend to work more in market and housework.

We find that lower ranked children (e.g., those born first) are penalized relative to their younger siblings in terms of all categories of work, even after we control for age dummies. We also found that these children are less likely to attend school. Taken together, these results suggest that households with many children tend to enlist the help of older siblings to substitute for parents' work. This interpretation is consistent with models of child fertility in which a trade-off exists between the quantity and quality of children (e.g. Becker, Murphy & Tamura 1990, Becker 1981). Our results illustrate how in practice this trade-off operates: the welfare and education of older siblings is basically 'sacrificed' to help raise their younger siblings (Edmonds 2004).

Other results of interest point to the fact that children raised by single parents work more in subsistence-related activities. Coupled with our findings that children in household with more adults work less and that those in households with more small children work more, these results indicate that child work serves as substitute for adult labor: when there is a shortage of adult labor, children have to participate more.

Parental education is found to have a strong negative association with child labor and a positive association with school attendance. This probably reflects both a direct effect – educated parents care more about education – and an indirect effect – educated parents have a higher income and child leisure is a normal good. The fact that the education of the household head

matters more for market work and schooling than education of the spouse militates in favor of an indirect effect. In contrast, the mother's education has a strong negative effect on child participation in household chores, especially for girls. This is probably the result of a direct education effect since, in the region, the financial returns to female education are low (Fafchamps & Quisumbing 1999).

5. Conclusion

Using a large survey data set from Nepal, we have examined the determinants of various forms of child labor, with a particular emphasis on urban proximity. Results indicate that children born in households residing away from urban centers work more than their urban counterparts. The main reason is that rural children assist their parents on the farm and in house chores. We also find that children living near towns and cities are more likely to attend school, a result consistent with a better supply of schools and with the existence of higher returns to education in non-farm activities and hence in urban areas (e.g. Fafchamps & Quisumbing 1999, Fafchamps & Shilpi 2005).

These effects go well beyond the traditional rural-urban distinction. First, we find that city size has an additional effect on child labor that is not captured by the urban dummy. Second, urban population has a large and significant impact on child labor and schooling that extends up to 3 to 5 hours of travel time. Cities shape the type of work children do and their propensity to attend school well beyond the confines of cities themselves. Furthermore, we find some evidence that child agricultural work is higher in areas located 5 to 8 hours of travel time from large urban centers. According to Fafchamps & Shilpi (2003), this corresponds in Nepal to the zone where commercial agriculture is prevalent and focuses on grains and export crops.

To the extent that we can regard proximity to cities as a measure of marketization of economy

– and hence of development – the results suggest that, if anything, children work more and receive less education in more isolated, less commercialized areas. The fear that an increase in market exchange may result in a increase in child labor thus appears unwarranted. However, while children living in and around urban centers do much less subsistence and housework, they spend more time in market-related activities such as wage employment and work in non-farm household enterprises. Though a cause for concern, this pattern affects a relatively small proportion of children.

Models of intrahousehold allocation of labor emphasize the role of altruism (Becker 1981). In general, the importance of altruism is difficult to verify empirically. Here we borrow from the psychology literature and construct a measure of altruism based on the number of genes children share with the head of household. The psychology literature has indeed shown that the shared genes variable is a strong predictor of altruistic behavior in experimental situations (e.g. Brembs 2001, Allison 1992, Cronk 1991, Dawkins 1989). Our findings are consistent with this interpretation. We indeed find that children related more closely to the household head work much less in total and are more likely to attend school.

There is an important exception to this observation, however: children related to the household head are much more likely to participate in farm work. This suggests that parents find farm work beneficial to children, possibly because they learn professional skills that will be useful in their future life and that they could not learn otherwise. The negative effect of shared genes on market and housework is so strong, however, that the net effect on total work remains negative. The introduction of a child servant dummy variable confirms this interpretation: children who do not live with their parents work long hours doing market work. These children therefore appear the most vulnerable to abuse.

Finally, we investigated the form taken by local labor demand and school supply effects. We

find a strong negative association between the wage rate prevailing in a ward and the extent of child labor in market and subsistence work. It nevertheless has a positive effect on house work, suggesting that children substitute for parents in house chores when parents' opportunity cost of time is higher. The net effect on total child labor is negative. These findings are in agreement with theoretical predictions and suggest that the income effect dominates the price effect, except for house chores.

Wards with a large proportion of households engaged in farming show a dramatic increase in the involvement of children in subsistence work and a large albeit less dramatic increase in housework. At the same time, we observe less child work in market activities. One possible interpretation of these findings is that children substitute for parents on the family farm when the latter work as agricultural laborers (Fafchamps & Shilpi 2003). We also find that children living in wards with a better educated adult population in general work much less in subsistence activities and are much more likely to attend school. This effect comes in addition to the influence of the education levels of the head and his spouse.

Taken together the results presented here suggest that child labor cannot be understood in isolation from other forces that affect parents and their capacity to support themselves and their dependents. In rural areas, the participation of children in the family farm and in household chores is probably essential otherwise parents could not cope with the many demands upon their time. Besides, parents seem to think that participating in the family farm is a way for children to acquire valuable skills. In and near urban centers, the situation is in general more favorable to children, with less work and more education. In towns, there is more child involvement in market-related work but the effect only affects a relatively small proportion of children who tend to be older and predominantly male.

Of more concern is the situation of child dependents who are not related to the household

head – particularly child servants. In their study of South African orphans, Case, Paxson & Ableidinger (2003) find that orphans are significantly less likely than non-orphans to be enrolled in school. We find similar results here in the sense that children less closely related to the household head spend long hours doing housework and are less likely to attend school. This is particularly true of child servants who were found to work much more longer hours, mostly in market work. This is a very small group of children but their plight requires special attention. Even so, it would nevertheless be perilous to jump to the conclusion that child servants are worse off than if they had not been put into service. As Akresh (2003) has shown in his study of child fostering in Burkina Faso, while biological children may be treated better than non-biological children by fostering parents, fostered children often are better off than they would have been by staying with their biological parents. This is because fostered children often come from very poor households.

Using South African data, Zimmerman (2003) also finds that fostered children tend to move from homes that have difficulty enrolling them in school to homes that are more apt to do so. In our case, we also suspect that servant children also come from poor households. Our findings are less benign but we cannot say if they would have been better off staying with their biological parents. This issue deserves more research.

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Table 1: Children's Activities

	All	Male	Female	Age 5-10	Age 11-15
A. Schooling					
% of children attending school	77.2%	83.5%	70.4%	76.4%	78.2%
B. Work					
Market work					
% of children	4.3%	4.6%	4.0%	1.2%	8.3%
<i>average number of hours/week</i>	1.4	1.2	1.2	0.3	2.9
Subsistence work					
% of children	28.3%	25.6%	31.2%	17.6%	42.4%
<i>average number of hours/week</i>	6.5	7.5	7.5	3.5	10.5
Household chores					
% of children	32.6%	18.5%	52.4%	20.5%	48.4%
<i>average number of hours/week</i>	3.6	6.0	6.0	2.1	5.7
All Work					
% of children	46.6%	37.6%	43.9%	30.2%	67.9%
<i>share of all work in total time (%)</i>	14.8	15.6	15.6	11.6	16.7
Number of observations	19191	9889	9302	10861	8330

Table 2 Distance and Urban Proximity

Travel Time	Distance to nearest town		Urban population within travel time radius	
	% of Wards (N=719)	% of Hhlds (N=19191)	Mean	Std. Dev.
0 -1 hour	29.5%	26.2%	74804	180351
1 -2 hour	22.1%	21.5%	54514	130480
2 -3 hour	9.7%	11.0%	97443	167273
3-4 hour	9.5%	9.5%	151752	223457
4-5 hour	5.4%	5.6%	164544	225559
5-6 hour	3.2%	3.6%	214631	268668
6-7 hour	1.9%	2.1%	342046	320305
7-8 hour	3.2%	3.3%	338362	320061
8-9 hour	1.1%	1.2%	288493	299774
9-10 hour	1.7%	1.5%	341247	309812

Table 3: Sample characteristics

	Total sample	
	mean	std dev
<i>Child's characteristics</i>		
Male (%)	51.5%	
Age (years)	9.96	10.56
% of children: 5-10 years old	56.6%	
% of children : 11-15 years old	43.4%	
Standardised rank among males	0.19	0.36
Standardised rank among females	0.20	0.41
Shared genes	0.46	0.11
<i>Shared genes: frequency distribution</i>		
Gene = 0	1.8%	
Gene= 0.25	13.2%	
Gene = 0.5	84.9%	
Gene = 1	0.1%	
Child servant	0.6%	
<i>Household's characteristics</i>		
Household size	6.54	2.52
Number of siblings in household	2.07	1.59
Number of children less than 6 years in household	0.95	1.03
Education of head of household	3.71	4.57
Education of spouse of household head	1.26	3.08
Household head has no spouse	14.3%	
Head of household in agriculture	56.3%	
Spouse of household head in agriculture	56.9%	
<i>Regional characteristics (%)</i>		
Region1: Eastern	23.7%	
Region2: Central	37.5%	
Region3: Western	16.9%	
Region4: Midwest	12.4%	
Region5: Farwest	9.4%	
Belt1: Mountain	5.5%	
Belt2: Hill	46.2%	
Belt3: Terai	48.3%	
Urban sample dummy	46.3%	
Number of observations	19191	

Table 4: Logits of Children's Activities

	Market Work		Subsistence Work		House Work		Schooling	
	Coef.	z-stat	Coef.	z-stat	Coef.	z-stat	Coef.	z-stat
Urban Proximity								
Urban sample dummy	-0.110	-1.11	-0.977	-20.11	-0.293	-6.32	0.763	15.53
Urban population within 0-1 hour of travel time	0.787	2.50	-2.364	-9.19	0.793	4.74	0.733	3.40
Urban population within 1-2 hours of travel time	0.348	0.92	-1.785	-8.24	-0.373	-2.02	0.834	3.98
Urban population within 2-3 hours of travel time	0.956	2.78	-0.605	-2.70	-0.031	-0.16	-0.037	-0.19
Urban population within 3-4 hours of travel time	0.133	0.46	0.530	3.38	0.089	0.58	0.385	2.54
Urban population within 4-5 hours of travel time	-0.477	-1.36	0.686	4.40	0.275	1.78	-0.174	-1.14
Urban population within 5-6 hours of travel time	0.733	2.37	0.358	2.31	0.093	0.60	-0.813	-5.54
Urban population within 6-7 hours of travel time	0.592	2.26	0.536	4.10	0.465	3.67	-0.098	-0.74
Urban population within 7-8 hours of travel time	0.549	2.03	0.046	0.33	-0.056	-0.40	-0.304	-2.19
Urban population within 8-9 hours of travel time	-0.031	-0.07	-0.175	-0.95	0.272	1.49	-0.222	-1.19
Urban population within 9-10 hours of travel time	1.030	3.42	0.462	3.00	-0.352	-2.37	-0.548	-3.36
Child characteristics:								
Male	0.053	0.53	-0.402	-7.59	-1.788	-34.86	0.883	16.69
Rank of male child among male children	0.327	2.68	0.131	1.92	0.295	4.31	-0.037	-0.50
Rank of female child among female children	-0.006	-0.05	0.179	2.84	0.200	3.44	-0.072	-1.17
Shared genes variable	-3.974	-11.89	1.089	4.16	-0.592	-2.58	2.146	8.35
<i>Age of the child (omitted dummy is 12 years old):</i>								
Age is 5	-5.109	-5.07	-3.611	-21.36	-3.391	-26.55	-0.925	-9.68
Age is 6	-5.086	-5.06	-3.109	-24.32	-2.590	-25.53	-0.517	-5.99
Age is 7	-2.784	-8.39	-1.994	-21.06	-1.824	-21.22	-0.001	-0.01
Age is 8	-2.269	-8.89	-1.297	-15.84	-1.464	-18.32	0.305	3.41
Age is 9	-1.385	-6.80	-0.909	-10.70	-1.148	-14.01	0.396	4.04
Age is 10	-0.821	-5.49	-0.505	-6.77	-0.575	-8.02	0.185	2.16
Age is 11	-0.780	-4.46	-0.200	-2.38	-0.273	-3.43	0.417	3.99
Age is 13	0.100	0.75	0.163	2.02	0.294	3.86	-0.094	-1.01
Age is 14	0.452	3.68	0.420	5.29	0.537	7.19	-0.538	-6.11
Age is 15	0.777	6.51	0.341	4.21	0.584	7.65	-0.899	-10.27
Household characteristics:								
Household size	-0.235	-9.55	-0.057	-5.10	-0.256	-22.49	0.137	12.42
Number of siblings in household	0.174	5.17	-0.016	-0.99	0.020	1.25	-0.150	-9.23
Number of children less than 6 years in household	0.239	4.26	0.063	2.27	0.473	17.50	-0.271	-10.04
Education of head of household	-0.029	-2.76	-0.034	-5.64	-0.002	-0.33	0.170	24.56
Education of spouse of household head	-0.004	-0.29	-0.078	-6.27	-0.026	-3.12	0.052	3.84
Household head has no spouse	-0.623	-5.03	0.502	6.50	0.001	0.02	0.109	1.51
Head of household in agriculture	-0.538	-5.45	0.702	14.50	0.126	2.73	0.036	0.75
Spouse of household head in agriculture	-0.891	-8.91	1.041	17.38	0.108	2.12	-0.156	-2.79
Location and time dummies (Eastern region, Mountain belt and season 1 are omitted categories)								
Central region	0.116	0.85	-0.412	-6.22	-0.527	-8.08	-0.381	-6.00
Western region	-0.101	-0.68	-0.243	-3.56	0.155	2.34	0.450	6.12
Mid-western region	0.151	1.03	0.686	10.04	0.863	13.17	-0.496	-7.38
Far-western region	0.041	0.22	0.534	6.98	0.211	2.78	-0.203	-2.58
Hills	0.197	0.77	0.198	2.35	-0.102	-1.20	0.280	3.33
Terai	0.862	3.44	-0.016	-0.18	-0.333	-3.91	-0.475	-5.73
Season 2	0.145	1.53	-0.072	-1.48	-0.046	-1.01	0.013	0.28
Season 3	0.191	2.05	-0.167	-3.47	-0.037	-0.83	0.012	0.25
Intercept	-0.104	-0.29	-0.922	-4.87	2.329	13.26	-0.623	-3.33
Number of observations	19191		19191		19191		19191	
LR chi2	1430.59		7001.08		6147.76		4270.76	
Log Likelihood	-2687.83		-7940.1557		-9043.5679		-8173.9241	

Table 5: Earnings Function for adults

(Dependent variable is the log hourly wage of all individuals aged 19 and above)

	Coef.	t-stat
Male	0.2030	12.16
Age	0.0370	10.82
Age squared	-0.0004	-8.43
Years of education	0.0550	35.61
Ward dummies	included but not shown	
Intercept	1.2140	4.56
<i>Number of observations</i>	6526	
<i>Adj. R-squared</i>	0.52	

Table 6. Ward characteristics
(excluding own HH)

	Total sample	
	mean	std dev
Predicted adult wages premium in ward	2.39	0.46
Proportion of adults of ward in subsistence agriculture (%)	56.2%	30.6%
Average years of education among adults in ward	3.14	2.28
Average travel time to nearest school in the district	0.36	0.23
Proportion of migrants in the district	23.6%	18.7%

Table 7: Logit of Children's Activities with Ward Controls

	Market Work		Subsistence Work		House Work		Schooling	
	Coef.	z-stat	Coef.	z-stat	Coef.	z-stat	Coef.	z-stat
Urban Proximity								
Urban sample dummy	-0.295	-2.31	-0.468	-8.08	-0.354	-6.33	0.293	4.89
Urban population within 0-1 hour of travel time	0.205	0.54	-2.382	-7.44	0.685	3.56	0.375	1.47
Urban population within 1-2 hours of travel time	-0.357	-0.80	-1.872	-7.33	-0.923	-4.45	0.487	1.98
Urban population within 2-3 hours of travel time	0.289	0.77	-0.021	-0.09	-0.231	-1.12	-0.136	-0.66
Urban population within 3-4 hours of travel time	0.161	0.49	0.574	3.50	0.012	0.08	0.143	0.88
Urban population within 4-5 hours of travel time	-0.343	-0.94	0.689	4.23	0.266	1.66	-0.133	-0.81
Urban population within 5-6 hours of travel time	0.590	1.83	0.336	2.08	0.152	0.94	-0.558	-3.61
Urban population within 6-7 hours of travel time	0.639	2.31	0.580	4.25	0.637	4.79	0.090	0.64
Urban population within 7-8 hours of travel time	0.750	2.58	-0.224	-1.46	0.109	0.73	0.072	0.48
Urban population within 8-9 hours of travel time	0.448	1.00	-0.365	-1.79	0.321	1.61	-0.245	-1.19
Urban population within 9-10 hours of travel time	0.714	2.15	0.355	2.11	-0.355	-2.23	-0.113	-0.62
Child characteristics:								
Male	0.015	0.14	-0.412	-7.29	-1.810	-33.67	0.930	16.24
Rank of male child among male children	0.401	3.10	0.139	1.89	0.300	4.16	-0.081	-1.03
Rank of female child among female children	0.084	0.64	0.184	2.73	0.210	3.47	-0.119	-1.81
Gene pool/relatedness variable	0.076	0.15	0.987	3.36	-0.397	-1.50	0.399	1.35
Child servant dummy	5.272	13.55	-0.946	-1.96	0.273	1.11	-5.996	-18.54
<i>Age of the child (omitted dummy is 12 years old):</i>								
Age is 5	-4.958	-4.91	-3.449	-19.99	-3.377	-25.26	-1.097	-10.64
Age is 6	-4.924	-4.90	-3.053	-22.80	-2.592	-24.44	-0.575	-6.18
Age is 7	-2.647	-7.91	-1.915	-19.08	-1.830	-20.22	-0.099	-1.03
Age is 8	-2.180	-8.34	-1.260	-14.55	-1.492	-17.79	0.252	2.64
Age is 9	-1.274	-6.04	-0.845	-9.33	-1.134	-13.19	0.292	2.78
Age is 10	-0.783	-4.95	-0.508	-6.42	-0.580	-7.74	0.181	1.97
Age is 11	-0.702	-3.83	-0.193	-2.15	-0.294	-3.55	0.393	3.49
Age is 13	0.101	0.70	0.184	2.12	0.286	3.59	-0.099	-0.98
Age is 14	0.465	3.53	0.503	5.93	0.559	7.18	-0.563	-5.94
Age is 15	0.843	6.61	0.374	4.30	0.595	7.45	-0.930	-9.87
Household characteristics:								
Household size	-0.189	-7.15	-0.053	-4.41	-0.252	-20.96	0.104	8.82
Number of siblings in household	0.086	2.43	-0.024	-1.35	0.012	0.71	-0.109	-6.20
Number of children less than 6 years in household	0.229	3.84	0.022	0.74	0.481	16.93	-0.202	-6.97
Education of head of household	-0.055	-4.57	-0.021	-3.19	-0.006	-1.07	0.174	22.83
Education of spouse of household head	-0.030	-1.75	-0.051	-3.89	-0.029	-3.41	0.073	4.61
Household head has no spouse	-0.489	-3.75	0.429	5.08	0.013	0.19	0.057	0.73
Head of household in agriculture	-0.532	-4.97	0.488	9.39	0.086	1.74	0.146	2.77
Spouse of household head in agriculture	-0.807	-7.33	0.890	13.61	0.123	2.23	-0.094	-1.54
Location and time dummies (Eastern region, Mountain belt and season 1 are omitted categories)								
Central region	0.074	0.52	-0.524	-7.37	-0.575	-8.26	-0.383	-5.58
Western region	-0.085	-0.52	-0.321	-4.27	-0.023	-0.32	0.207	2.56
Mid-western region	0.155	0.94	0.526	6.82	0.677	9.27	-0.657	-8.44
Far-western region	0.191	0.87	0.342	3.82	0.108	1.23	-0.349	-3.67
Hills	0.073	0.22	0.085	0.82	-0.123	-1.16	0.175	1.61
Terai	0.216	0.63	-0.006	-0.05	-0.404	-3.48	-0.650	-5.43
Season 2	0.256	2.50	-0.019	-0.37	-0.032	-0.66	-0.077	-1.47
Season 3	0.316	3.14	-0.115	-2.19	-0.064	-1.34	-0.065	-1.24
Ward characteristics (excluding own household):								
Predicted adult wage in ward	-0.588	-4.35	-0.248	-3.89	0.173	2.81	0.310	4.86
Proportion of adults in agriculture in the ward	-1.334	-5.35	1.459	10.70	0.254	2.05	0.395	2.96
Average adult years of education in the ward	0.000	0.00	-0.132	-6.24	0.018	1.06	0.257	12.03
Proportion of migrants in the district	0.979	2.93	-0.204	-1.28	0.610	4.02	1.044	6.42
School distance	0.130	0.49	-0.374	-3.54	0.015	0.15	0.231	2.02
Intercept	0.134	0.23	-0.605	-2.21	1.668	6.45	-1.318	-4.77
Number of obs	17726		17726		17726		17726	
LR chi2	1711.38		6652.70		5706.21		4768.33	
Log Likelihood	-2410.62		-6985.52		-8257.04		-7042.71	

Table 8: Tobit of Log of Hours of Children's Activities

	Hours of market work		Hours of subsistence work		Hours of house work		Hours of total work as % of total time	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Urban Proximity								
Urban sample dummy	-0.602	-1.95	-0.701	-8.36	-0.358	-5.99	-0.033	-10.78
Urban population within 0-1 hour of travel time	0.352	0.38	-3.551	-8.09	0.397	1.90	-0.011	-0.95
Urban population within 1-2 hours of travel time	-0.975	-0.92	-2.884	-8.01	-1.196	-5.32	-0.108	-9.12
Urban population within 2-3 hours of travel time	0.658	0.70	-0.026	-0.08	-0.337	-1.51	-0.010	-0.84
Urban population within 3-4 hours of travel time	0.385	0.48	0.910	3.86	-0.038	-0.22	0.022	2.58
Urban population within 4-5 hours of travel time	-0.750	-0.85	1.000	4.27	0.247	1.43	0.030	3.46
Urban population within 5-6 hours of travel time	1.326	1.64	0.658	2.85	0.185	1.06	0.039	4.49
Urban population within 6-7 hours of travel time	1.660	2.45	0.884	4.55	0.666	4.69	0.049	6.79
Urban population within 7-8 hours of travel time	1.803	2.49	-0.341	-1.56	0.047	0.30	-0.001	-0.07
Urban population within 8-9 hours of travel time	0.894	0.81	-0.520	-1.77	0.377	1.79	0.011	0.98
Urban population within 9-10 hours of travel time	1.415	1.76	0.486	2.00	-0.407	-2.39	-0.007	-0.83
Child characteristics:								
Male	0.018	0.07	-0.615	-7.66	-2.158	-37.00	-0.071	-24.61
Rank of male child among male children	0.998	3.11	0.220	2.10	0.331	4.19	0.021	5.35
Rank of female child among female children	0.095	0.29	0.269	2.85	0.242	3.87	0.015	4.31
Gene pool/relatedness variable	-0.463	-0.38	1.447	3.52	-0.645	-2.38	-0.005	-0.38
Child servant dummy	11.230	13.99	-1.294	-1.97	0.892	3.54	0.314	23.91
<i>Age of the child (omitted dummy is 12 years old):</i>								
Age is 5	-10.421	-6.40	-5.286	-23.96	-3.906	-28.56	-0.256	-35.76
Age is 6	-10.016	-6.45	-4.771	-26.47	-3.011	-26.90	-0.217	-36.54
Age is 7	-6.081	-8.86	-2.993	-20.65	-2.102	-21.47	-0.149	-29.38
Age is 8	-5.128	-9.03	-1.938	-15.33	-1.737	-19.09	-0.116	-24.90
Age is 9	-3.085	-6.37	-1.276	-9.67	-1.311	-14.02	-0.084	-17.38
Age is 10	-1.871	-4.95	-0.759	-6.61	-0.694	-8.54	-0.050	-11.78
Age is 11	-1.704	-3.90	-0.313	-2.42	-0.344	-3.83	-0.027	-5.73
Age is 13	0.273	0.75	0.258	2.10	0.331	3.89	0.016	3.59
Age is 14	1.266	3.78	0.733	6.22	0.627	7.65	0.048	11.03
Age is 15	2.227	6.72	0.601	4.96	0.727	8.67	0.061	13.91
Household characteristics:								
Household size	-0.473	-7.42	-0.085	-5.01	-0.301	-24.18	-0.013	-21.07
Number of siblings in household	0.223	2.58	-0.032	-1.31	0.026	1.48	0.001	1.32
Number of children less than 6 years in household	0.609	4.18	0.045	1.07	0.602	20.07	0.023	15.07
Education of head of household	-0.135	-4.56	-0.036	-3.88	-0.014	-2.28	-0.003	-8.70
Education of spouse of household head	-0.073	-1.81	-0.076	-4.17	-0.032	-3.45	-0.002	-3.40
Household head has no spouse	-1.247	-3.77	0.699	5.78	0.011	0.14	0.002	0.52
Head of household in agriculture	-1.279	-4.86	0.736	9.78	0.070	1.32	0.015	5.59
Spouse of household head in agriculture	-1.998	-7.19	1.389	14.82	0.116	1.95	0.016	5.01
Location and time dummies (Eastern region, Mountain belt and season 1 are omitted categories)								
Central region	0.049	0.14	-0.857	-8.48	-0.589	-7.96	-0.034	-9.02
Western region	-0.163	-0.42	-0.692	-6.39	-0.118	-1.52	-0.031	-7.71
Mid-western region	0.408	1.02	0.598	5.55	0.555	7.22	0.028	6.88
Far-western region	0.184	0.35	0.453	3.59	-0.036	-0.38	0.006	1.21
Hills	0.184	0.24	0.204	1.39	-0.108	-0.97	0.003	0.59
Terai	0.527	0.68	0.130	0.78	-0.414	-3.40	-0.010	-1.50
Season 2	0.549	2.20	-0.099	-1.33	-0.109	-2.14	-0.014	-5.15
Season 3	0.765	3.09	-0.283	-3.78	-0.144	-2.82	-0.017	-6.25
Ward characteristics (excluding own household):								
Predicted adult wage in ward	-1.514	-4.54	-0.451	-4.99	0.134	2.05	-0.019	-5.48
Proportion of adults in agriculture in the ward	-3.263	-5.28	2.365	11.97	0.270	2.03	0.029	4.16
Average adult years of education in the ward	-0.012	-0.15	-0.208	-6.93	0.001	0.03	-0.003	-2.98
Proportion of migrants in the district	2.468	3.03	-0.536	-2.35	0.668	4.10	0.003	0.32
School distance	0.394	0.65	-0.610	-4.09	0.019	0.18	-0.012	-2.23
Intercept	-0.300	-0.22	-0.429	-1.11	2.581	9.54	0.222	15.73
Number of obs	17726		17726		17726		17726	
Number of uncensored observations	802		4759		5670		8072	
LR chi2(47)	1699.620		7286.620		6391.220		9105.230	

Figures 1.1-1.5: Child Labour/Schooling and Urban Proximity

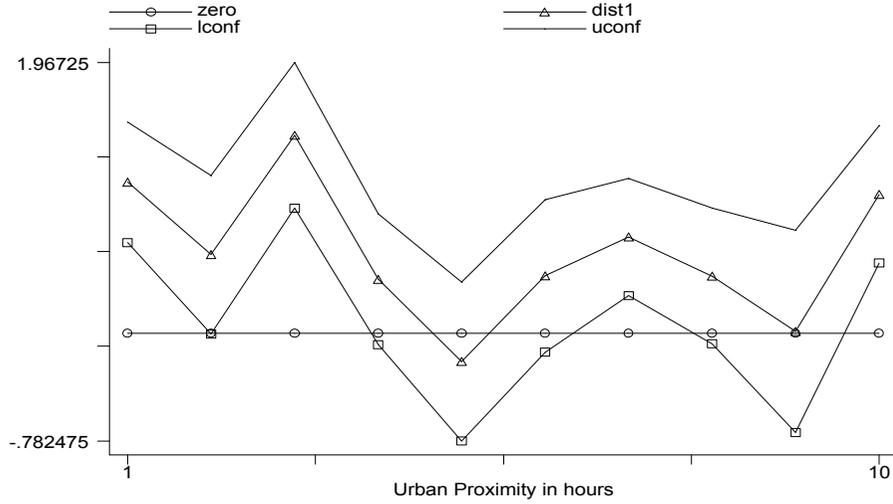


Fig 1.1: Probability of child market work

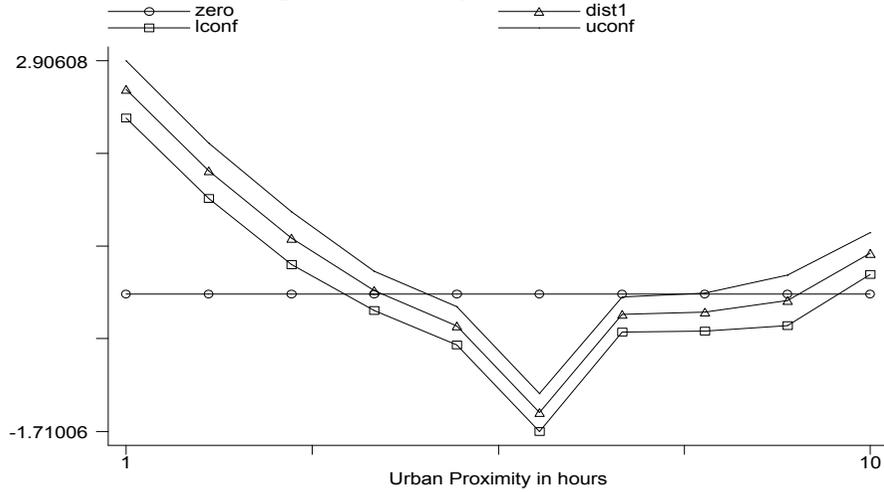


Fig 1.2: Probability of child schooling

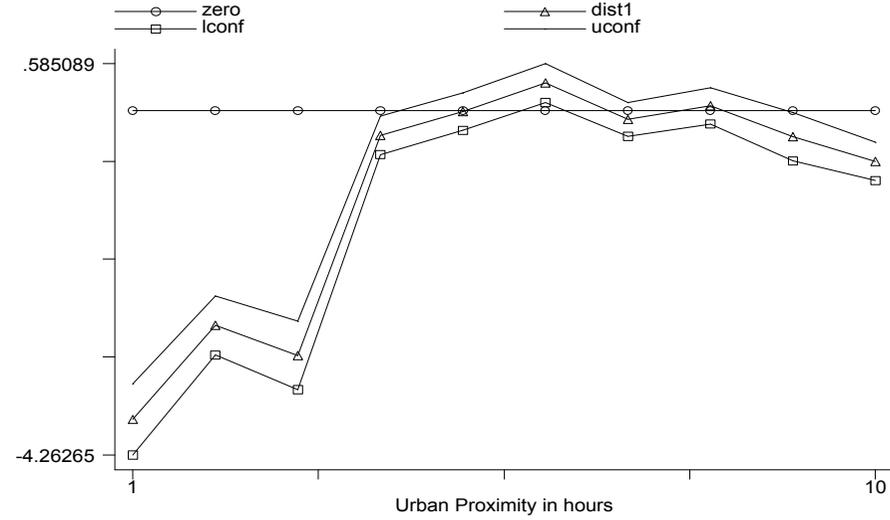


Fig 1.3: Probability of child subsistence work

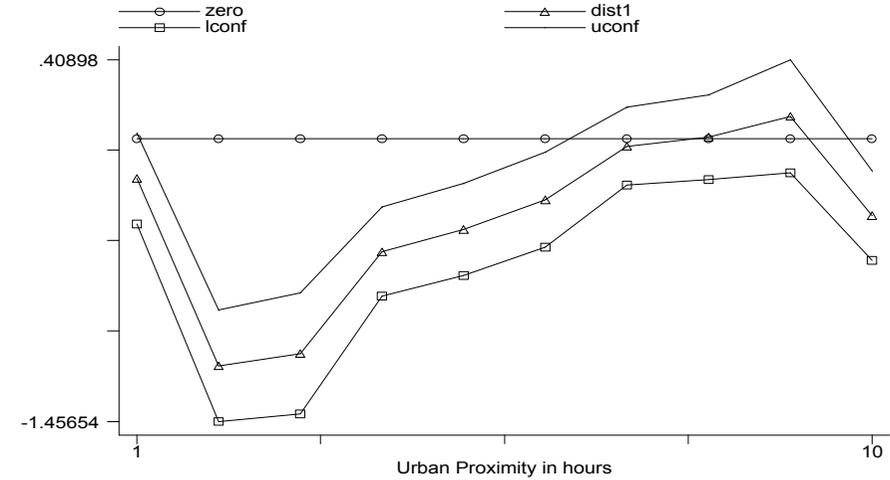


Fig 1.4: Probability of child housework

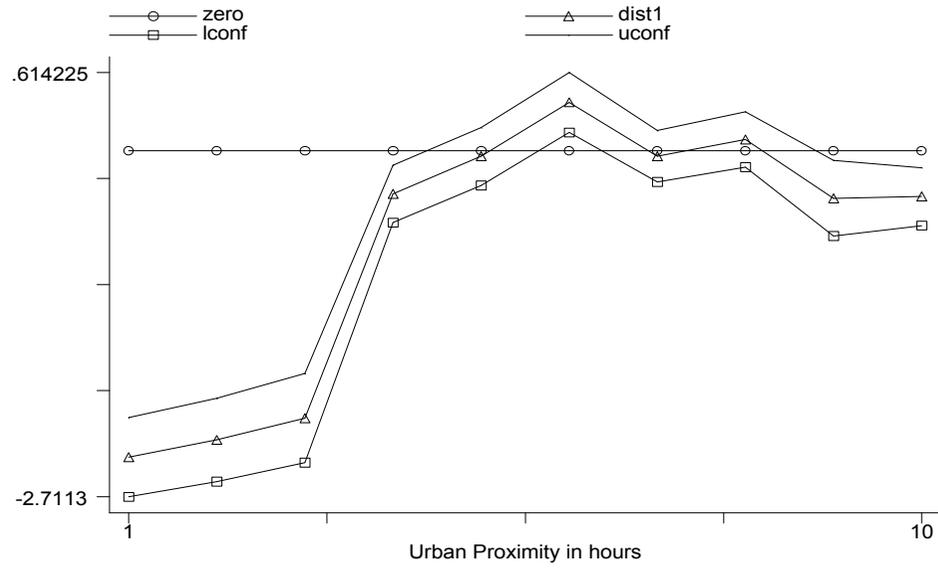


Fig 1.5: Probability of child market or subsistence work

Figures 2.1-2.5: Urban Proximity: with all controls

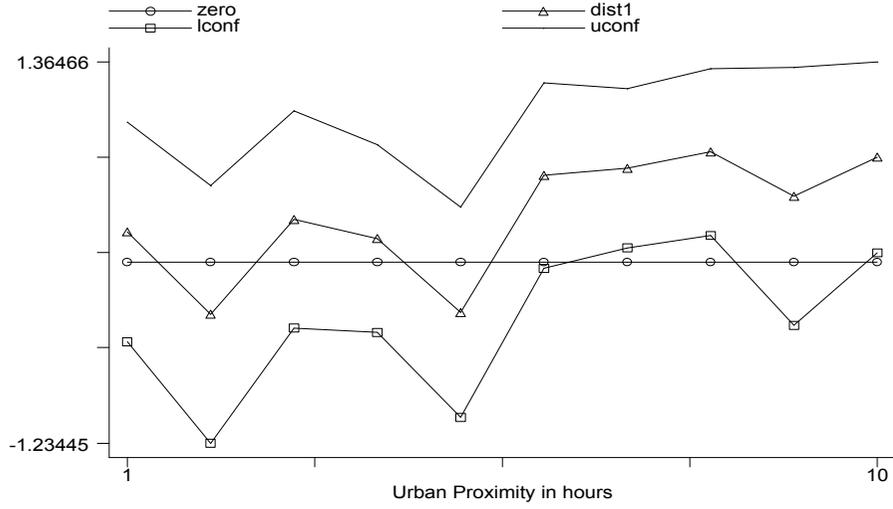


Fig 2.1: Probability of child market work

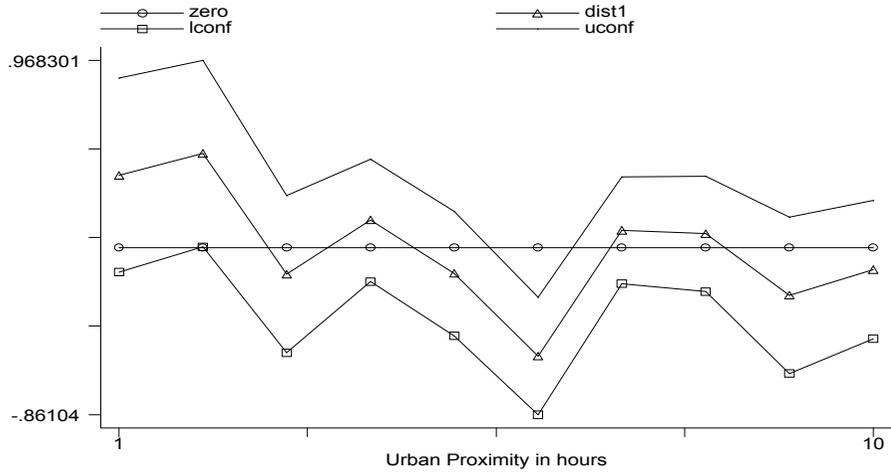


Fig 2.2: Probability of child schooling

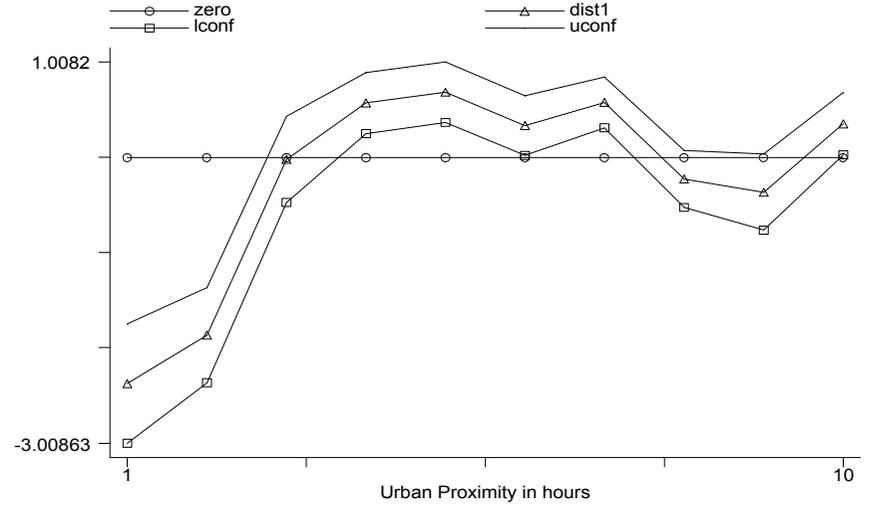


Fig 2.3: Probability of child subsistence work

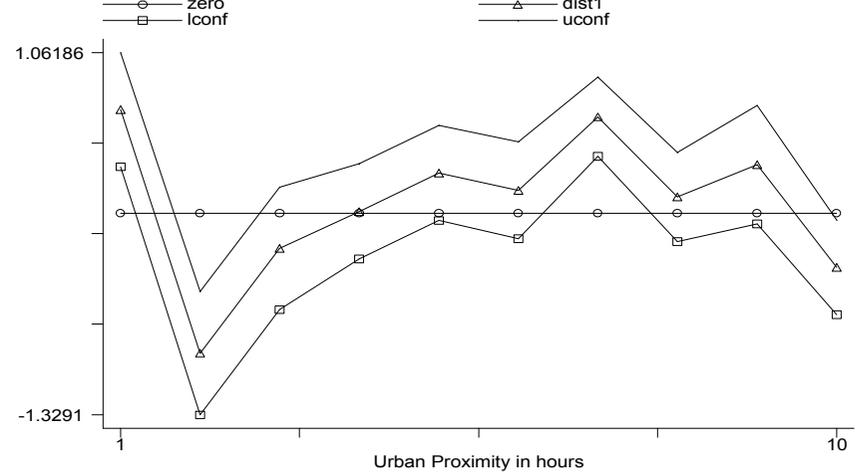


Fig 2.4: Probability of child housework

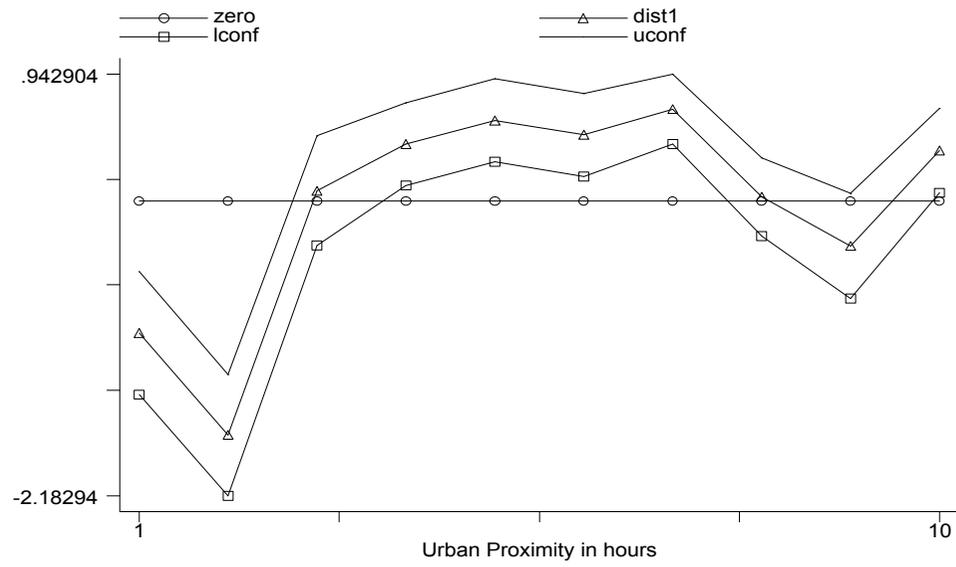


Fig 2.5: Probability of child market or subsistence work