

Trade-offs between chore hours and leisure time

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Abstract

Playing is a vital aspect of children's social, emotional and cognitive development. While playing, children interact with playmates, use language to communicate, think about what to play, create scenarios and engage in activities, the combination of which can enhance their social and cognitive skills. It is also one of the fundamental rights of children. Article 31 of the United Nations Convention on the Rights of the Child states that all children have the right to rest and engage in leisure activities. To the extent domestic chores interfere with children's playtime, in addition to violating the fundamental rights of children, they jeopardize children's opportunities to achieve basic skills and succeed in life. Despite its policy significance, little is empirically known whether chores interfere with children's playtime. Using time-diary data from the 2009 Young Lives survey in Ethiopia and applying instrumental variables (IV) estimators, we find that a one hour increase in chores is associated with a decrease in playtime by 45 minutes, statistically significant at the 1% level. The finding suggests that excessive involvement in chores can have detrimental effects on children's wellbeing and human capital.

Keywords: Playtime, chores, children, Ethiopia

JEL classification: D13, J22, I00, O15

1. Introduction

Child labour is traditionally seen as harmful to children. Concerns over child labour mainly stem from beliefs that it interferes with children's education, jeopardizes their physical and

mental development, and deprives them of their childhood (Baland & Robinson, 2000; Beegle, Dehejia, & Gatti, 2009; International Labour Organisation (ILO), 1973). In Ethiopia, children are expected to help their family with chores well before reaching school age. A nationally representative survey in 2011 shows that more than two-thirds of children age five to 14 were involved in domestic tasks in the week preceding the survey. About 35% of them spent more than 28 hours of chores per week (Central Statistical Agency (CSA) & ICF International, 2012).

Despite absorbing a substantial share of children's time, domestic activities are not viewed as reprehensible practices. In some communities, chores are even believed to teach children useful life skills and prepare them for adult life (Levison, Moe, & Knaul, 2001). However, chores can be harmful to children and hence constitute child labour. Basically, playing is one of the fundamental rights of children. Article 31 of the United Nations Convention on the Rights of the Child states that all children have the right to rest and engage in leisure activities. Article 32 of the convention urges signatory countries to protect children from performing activities that deprive them of their childhood (The United Nations (UN), 1989). The lack of rest, or playtime, is one of the potential mechanisms through which chores affect children's wellbeing. Childhood playtime is believed to play vital roles for the development of behavioural and cognitive skills of children at least until the age of nine (Fromberg & Gullo, 1992; Garvey, 1977; Rogers & Sawyers, 1988).

In this context, there is little empirical evidence that shows whether chores interfere with leisure time, thereby denying children's right to play and relaxation as well as jeopardizing their wellbeing. This paper examines the relationship between time spent on domestic chores and playtime. Our data come from the 2009 Young Lives survey. The sample comprises of children age 7.5 to 8.5 years. Since both leisure and domestic work are outcomes of households' time allocation decisions, we apply instrumental variable estimator to tackle

endogeneity problems. Using community-level female daily wage as an instrument for chore hours, we find that one additional hour allocated to chores is associated with a reduction of leisure time by 45 minutes, statistically significant at the 1% level. This is a very strong effect. The result is robust to alternative specifications. Our finding suggests that domestic chores not only violate the fundamental rights of children but also may endanger their opportunities to achieve basic skills and succeed in life. For example, lack of playtime from extended chore hours can impede the development of socialization skills such as relationships with other children and hobbies. Therefore, parental decisions about children's involvement in household chores should reaffirm the application of the provisions of international conventions on child labour.

The paper proceeds as follows. Section 2 outlines the identification strategy. Section 3 explains the data and reports some descriptive statistics. Section 4 presents and discusses the results. Section 5 concludes.

2. Empirical Strategy

2.1 Base Specification

The objective of this paper is to estimate the effect of chore hours on leisure time. Suppose the relationship can be written in an estimable form as:

$$Play_{cj} = x_{cj}\beta + \varphi chores_{cj} + u_{cj} \quad (1)$$

where, c and j are subscripts for a child and a household, respectively; $play_{cj}$ and $chores_{cj}$ represent, respectively, time spent in play and chores in a day; φ measure the effect of chores on playtime; x_{cj} includes unity and an array of exogenous child and household

attributes; β is a vector of parameters associated with x_{cj} ; u_{cj} and ϵ_{cj} are composite error terms that include all unobservables affecting playtime.

The standard approach is to apply Ordinary Least Square to Eq. (1). However, there are various potential sources of bias. First, both $chores_{cj}$ and $play_{cj}$ are outcomes of time allocation decisions of the household, and the relationship between them can be bidirectional. Given other things, allocating more time to chores will leave less time for leisure and vice versa. Moreover, involvement in chores may correlate with unobserved factors that affect playtime. The first is associated with self-selection at household level: the difficulty of identifying households that resort to children to perform chores. The second is related to selection at the child level: which children parents select to do chores and which one they favour to enjoy more leisure time. The level of parental altruism may vary across children; and while more-liked children may be allowed to spend more leisure time, less-liked ones may be required to spend more time in chores.

To address selection biases, we control for an array of child and household characteristics discussed in Section 3. However, it is empirically impossible to control for all potential unobservable confounders. We use instrumental variables (IV) estimator to tackle endogeneity problems in our empirical model. The estimator recognizes the presence of an omitted variable in the error term, but it clears any correlation with chore hours. The ideal instrument should also be associated with a significant variation in the amount of time spent in chores but affects leisure time only through chores.

2.2 Instrumental Variables

There is a convincing reason to suppose that adult wage at the community level is strongly associated with the allocation of children's time to work. In the Ethiopian context, household responsibilities seem to follow the traditional gender role. Often household chores are viewed as the primary responsibilities of women, whereas economic activities outside the house are

the responsibilities of men. It does not mean, however, that women do not participate in the labour force. In rural areas, for example, depending on the type of crop and stage of production, women contribute to 45% to 62% of on-farm labour (CSA, 2014). An increase in female wage may increase women's participation in the labour force. In response, children could be recruited for doing chores. There is substantial empirical evidence that shows a high degree of substitution between children and the mother in household production (Diamond & Fayed, 1998; Goldin, 1979). An increase in the wage income of the mother is also found to lead to an increase in children's involvement in domestic work (Skoufias, 1993). The estimates in Table 2, columns (1-3) show a significant association between chore hours and average female daily wage within a commune.

As for the exogeneity assumption, our measure of female wage is determined at the community-level and investment in child health and consequent outcomes are determined at the household-level; it is highly unlikely that there is reverse causation. A concern is instead whether community-level daily wage correlates with unobserved factors in the error term that may confound the causal health effect of harmful chores. However, the Young Lives survey shows that only 2% of the sample households have migrated to new places, and there is no evidence that their decision is influenced by labour market opportunities or preferences for child leisure activities. Of course, the error term may also contain individual unobservable attributes that correlate with employability in the labour market and intra-household time allocation decisions. However, we do not expect the attributes to correlate with the community-level daily wage. In countries like Ethiopia, where unemployment is rampant, workers have less bargaining power when it comes to the determination of wage: they are often wage-takers (Fella, 2000).

Establishing the validity of the exclusion restriction requires controlling for other mechanisms through which female daily wage would affect leisure time. In reality, a child's

time can also be allocated to other activities such as schooling and economic work. This implies that these activities may also compete with leisure regarding time use. Female wage may affect leisure time via time use in school and economic tasks. To the extent an increase in community-level female wage leads to an increase in household income, the family may allocate more/less time to education/economic work (Fallon & Tzannatos, 1998; Udry, 2006). Either way, the amount of leisure time also may change.

We include monthly household expenditure per adult in our model to capture the income effect of female wage. We also control for the number of hours spent in schooling and economic activities. However, like our variable of interest (time spent in domestic work), the variables are endogenously determined in the model. We use the availability of a primary school at the community level as an instrument for the schooling variable. It is also customary in the literature to use geographical location (often measured as distance to school) as an instrument for school attendance (Altonji, Elder, & Taber, 2005; Heckman & Vytlacil, 2001). The assumption will be violated, however, if households migrate based on school availability. We check for the pattern of household mobility over the previous three survey rounds, and we see that only 2% of the households have relocated to new residential areas. However, no evidence shows migration decision was influenced by the availability of school infrastructures. As for the excludability restriction, it is straightforward to assume that the availability of school affects leisure time only through time spent in school.

To mitigate the endogeneity problem associated with economic work, we use community-level male daily wage as an instrument. As for the exogeneity assumption, we expect male daily wage to be determined in the same way that female daily wage is determined. Therefore, we do not expect reverse causality between leisure time and time spent in economic activities.

Ensuring the validity of the proposed instruments requires accounting for the structural feature and quality of the local economy as it may simultaneously affect the labour market and household time allocation decisions in each community. On the one hand, the quality of the local economy may play a key role in influencing household decisions on the allocation of children's time. Demand for child labour could be high in communities where the labour market is thin, and employment opportunities for adults are limited (Wyck, 1999). On the other hand, since the average female and male wages result from demand-supply equilibria in each community, they could reflect structural features of the community that also affect household time allocation decisions. To bolster the credibility of our instruments, we control for an array of community attributes. Our model includes (log) population size of the community, a dummy for rural-urban settings, and whether the community has a financial institution, a healthcare centre and a factory or commercial farm with at least 50 employees. We compute the community-level daily wage of men and women from data collected by Young Lives survey (the survey design is discussed in the next section). The survey provides a wealth of information on payments made to adult female and male in a given community. Section 4 of the community questionnaire lists more than 30 occupations. Some of the occupations are for skilled labour such as teachers, police and health extension workers. The others are for less-skilled workers such as security guards, housemaids and construction workers (do not include engineers or those with formal training). In the Ethiopian context, a person does not require formal training to be a security guard, a housemaid or a construction worker. The questionnaire also contains information on payments made to adults performing various agricultural activities such as planting, weeding, harvesting and pasturing (which are more relevant to rural areas).

In this study, we focus on payments made to less-skilled occupations for two crucial reasons. First, about 75% of the sample in the survey is drawn from food insecure and poor

communities (Outes-Leon & Sanchez, 2008), we would expect employment in less-skilled occupations to be more common. Since most of the labour force in Ethiopia is less-skilled, it would be misleading to use wage for skilled labour as a representative for labour income. Second, in Ethiopia, the government is the primary source of employment for skilled workers; and, for a given occupation, salaries of such workers are often identical across communities. Therefore, there is little cross-community variation in teachers' or health workers' salary. In fact, the survey also shows that some of the skilled-occupations are not common in many of the sample communities. Therefore, we exclude payments made to police, teachers, health officers, computer operators, carpenters and military personnel, and include payments made to the rest of the occupations.

For all the occupations we consider, payments are reported separately for men and women. Payments made for doing agricultural work are reported in daily wage, whereas payments made for employment in all other occupations are reported in monthly salary. We convert the monthly salaries into their daily equivalent to compute the community-level daily wage of both men and women. Since there are about 4.33 weeks in a month and there are five working days in a week, we divide the monthly salaries by 21.7.

3. Data and Description of Variables

This paper uses data from the Young Lives Survey, a research project on child poverty in Ethiopia, India, Peru and Vietnam (www.younglives.org.uk). The survey is administered by the Department of International Development (the University of Oxford) in collaboration with partner research institutes in each country. In Ethiopia, the study follows 3,000 children starting from 2002 over the subsequent 15 years. The sample is divided into younger and older cohorts. When the first wave was conducted in 2002, the younger cohort consisted of 2,000 children aged one year and the older cohort consisted of 1,000 children aged eight years (Barnett et al., 2013).

Young Lives draws its sample from 20 sentinel sites chosen purposely so that the cost of tracking children through the subsequent rounds would be easily manageable. The sites were selected from five different regions namely Addis Ababa, Oromia, Amhara, SNNPR (Southern Nations, Nationalities and Peoples Region) and Tigray were selected. The regions constitute more than 90% of the population in the country(CSA2012). Three to five study sites were chosen from each region depending on the population size of the region. Although the study areas reflect the cultural, geographical and livelihood diversities of the country, they are mainly poor and food-deficient communities. From each community, 50 children born between April 1994 and June 1995 (as the older cohort) and 100 children born between April 2001 and June 2002 (as the younger cohort) were selected using a random sampling technique. The survey was designed in a way that children in the older and younger cohort do not belong to the same household (Outes-Leon & Sanchez, 2008).

Our sample is restricted to the 2009 survey of the younger cohort for two important reasons. First, although one may argue that leisure activities are beneficial for all children, the social and behavioural benefits of leisure time are higherfor children younger than nine (Frost, 1990). Second, the ILO's Minimum Age Convention, while allowing children from the age of 12 to engage in light work, urges children younger than 12 not be involved in any work, including domestic tasks(ILO1973). It is, therefore, more importantfrom a public policy perspectiveto examine whether young children lose their leisure time to chores. The first two surveys are excluded because children in the younger cohort were too young to be involved in child work; and no available time diary data. Children in the older cohort were excluded because the survey in 2002 did not include time diary data, and in 2006 they were already older than 11, the minimum threshold for involvement in light work.

Although the Young Lives sampling method is not nationally representative, it provides high-quality longitudinal data. In each survey round, the validity and reliability of the survey tools

went under scrutiny by the Ethics Committee of the University of Oxford and the data collection process was overseen by the Ethiopian Development Research Institute (EDRI) (Woldehanna, Behrman, & Araya, 2017). The survey also provides a wealth of information on the various attributes at child, household and community level that are relevant to our study. The child questionnaire covers topics related to children's demographic characteristics and time use. The time diary data shows how many hours per day are allocated to paid work, unpaid economic work, domestic chores, leisure, and sleep. The household context survey covers topics on personal characteristics of the household head, household expenditure, asset ownership and livelihood activities. The survey also includes special modules on community level attributes such as average wages and salaries of adult workers, the provision of local public goods and vulnerability to aggregate shocks.

Figure 1 depicts the scatterplot of time spent in chores and leisure activities. We can see that the time spent in chores is negatively correlated with time spent in leisure. In Table 1 below we present the definitions, sample means and standard deviations of our main variables. In the week preceding the survey, a child spent an average of 4.5 leisure hours per day. This does not include time spent in sleeping. The survey separately reports sleeping hours. However, we exclude it from the analysis as it does not significantly vary across children. In the sample, children spend on average 2.5 hours of chores per day. Household chores include tasks such as washing, cleaning, cooking, and caregiving to younger siblings. Regarding the extensive margin, about 85% of children spend non-zero hours in domestic work. For those involved in the activity, the average hours of domestic work per day amount to 3.1 hours.

[Figure 1 here]

Time spent in economic activities such as paid employment, work for a family business, street vending, helping on the family's farms, and tending crop or cattle average 1.5 hours per day. Overall, 93% of children in the sample are engaged in either domestic or economic task,

and they spend four hours of work. The survey also shows that a substantial share of children's time (around six hours a day) is allocated to attend class and study at home. Nearly 80% of children are enrolled in school. When we restrict the sample to those attending school, the average time allocated to educational activities becomes 7.2 hours. Regarding adult wage, we can see at the bottom of Table 1 that average female daily wage is 45.34 Birr, which is equivalent \$US 2.4, whereas average male daily wage is 64.63 Birr, which is close to \$US 3.2.

Our exogenous covariates include child-specific characteristics such as age and sex. As return from chores may vary with age, we expect the allocation of children's time to vary with age. As discussed in Section 2, time allocation to child work seems to be influenced by traditional gender roles, and hence we expect girls to spend more hours in chores than boys do.

Also included are characteristics such as age, education, and sex of the household head. It is customary to control for parental education and age in household decision models. Regrettably, there are substantial missing data on the mother's and the father's attributes. In developing countries, often male-head households are wealthier than female-headed households (Buvinić & Gupta, 1997). If child leisure is a normal good, we expect male-headed children to spend more leisure time than do children of female-headed families. However, evidence shows that empowerment of the mother improves welfare outcomes of children (Duflo, 2012). In this spirit, children of female-headed families may spend more leisure time and work fewer hours than do children of male-headed families. Age of the household head, through its effect on productivity and income, can also affect decision outcomes on the allocation of children's time. Literate household heads may also be able to earn more income and afford to consume more child leisure. Literacy may also provide people with new information regarding the costs and benefits of child work, and influence time allocation decisions.

Parental altruism is another crucial factor. Altruistic parents may allocate more time to leisure and less time to chores, given that they perceive the latter is harmful to children. In this context, the household head might be more altruistic toward her offspring than a foster child or a child of a distant relative. In other words, biological children may be allowed to spend more leisure time; and foster children might be required to spend more time in chores. To rule out such cases, we include a dummy variable that shows whether the household head is the biological parent of the index child.

Household size is one of the key factors that affect intra-household resource allocation (Lundberg, Pollak, & Wales, 1997). Large family size may mean many helping hands are available so that children would spend more leisure time. On the other hand, large family size may cause resource scarcity, and children need to work hard to meet the family's needs. Of course, we expect the effect on the allocation of time to depend on the family's demographic composition. As a result, we group household members by age and gender. Since children under-five are likely to be too young to be involved in child work, regardless of gender, their presence in the family expected to increase time in chores. Old household members may require similar labour commitment. However, our sample does not show a substantial variation in the number of old household members across households. The adverse effects on leisure of young children can be offset by the presence of girls and women with whom children presumably share domestic tasks.

[Table 1 here]

Household income is the other key variable that often appears in household decision models. We use (log) monthly household expenditure per adult as a proxy for household income, and we include it in our empirical model to capture time allocation effects associated with resource constraints. Household shocks can also be important sources of economic hardship and have a simultaneous effect on chores and leisure time. For instance, functional disability

of the household head may necessitate a shift in time from chores and leisure to market work (Dillon, 2012). Shocks such as crop failure may also undermine the household's ability to consume child leisure or forgo child labour (Beegle, Dehejia, & Gatti, 2006). However, we cannot directly include idiosyncratic shocks in the model as they could be correlated with household unobservables. To mitigate the problem, we include aggregate shocks such as the occurrence of droughts and the outbreak of human diseases at the community level.

We also control for additional community attributes to capture effects associated with the structural feature and the quality of local economy. Rural and urban areas may have different social and economic characteristics that determine labour market opportunities and affect household decisions. For this, we include a dummy that shows whether the area is urban or rural. We also capture the level of development of physical and social infrastructures by including dummy variables that show the availability of a financial institution, a healthcare centre and a business firm with at least 50 employees in the community.

4. Results and Discussion

4.1 Instruments: Relevance and Exclusion

Table 2 reports the first stages of our instrumental variables estimates. We use OLS for all the estimations; standard errors are clustered at the community level.

[Table 2 here]

Columns (1-2) show the results obtained with a model using time in chores as an outcome variable. The model includes variables thought to be relevant for selection into chores both at the household and community level. We can see that female daily wage is a strong predictor of chore hours. A 10% increase in the wage results in a 4.9% (30 minutes) increase in the hours of chores, statistically significant at the 1% level. In columns (3-4), we use time spent in economic work as an outcome variable. There is a significant correlation between male

daily wage and hours of economic work. A 10% increase in the male daily wage leads to a 6% increase in hours of economic work, statistically significant at the 1% level.

Time use in education appears as an outcome variable in column (5-6). We see a strong positive association between the presence of a primary school at the community level and the amount of time spent in education. On average, the amount of time that children in areas with a primary school spend on education exceeds by two hours, statistically significant at the 1% level. Having established that our instruments have predictive powers in the first stage, we fit the model in columns (7-8) to check the plausibility of the exclusion restriction. The results show that the coefficients associated with all the instruments, with an F-statistic of 0.13, are not jointly statistically different from zero. Together, the results confirm the validity of the use of adult wage and school availability as instrumental variables in our empirical model.

4.2 Main Results

Table 3 illustrates the estimates for the leisure equation. Although we do not believe that they show a causal relationship between the explanatory variables and chore hours, for the sake of comparison, we report OLS estimates in columns (1-2). We note that a significant and negative association between leisure between our variables of interest. A one hour increase in time use in chores is significantly associated with a decrease in leisure time by 0.45 hours. Girls spend more leisure time than do boys. Children seem to spend fewer leisure hours as they become older. We see an unexpected relationship between literacy and leisure time: children in households with a literate head spend fewer leisure hours. Leisure time is also inversely related to household expenditure. Children seem to spend less /more time in leisure when there are young children/adult female in the family.

[Table 3 here]

In columns (3-4), we examine the estimates obtained with an instrumental variables estimator that includes child and household characteristics only. The model is just identified: female

wage, male wage, and school availability are used as instruments for hours spent on domestic task, education and economic. We see that a one hour increase in the amount of time allocated to domestic work is associated with a reduction of playtime by about 0.83 hours (which is about 50 minutes), statistically significant at the 1% level. Leisure time is also significantly associated with time spent in economic work. A child spends 1.2 fewer leisure hours for every additional hour spent on economic tasks. Since most economic activities are performed outside the house, the extra 0.2 hours might represent the average traveling time. We also see a strong substitution between schooling and leisure activities. An increase in the amount of time for education by one hour necessitates a reduction in leisure time by 0.53 hours, significant at the 1% level.

The result also shows that, on average, boys spend more leisure hours than girls do. The amount of leisure time that boys spend is higher by 0.8 hours. Regarding household attributes, we see that only the presence of female children aged six to 17 years has a significant positive association with leisure time. The result conforms to the traditional gender role in which girls are primarily responsible for doing chores, and their presence in the family reduces the burden of doing domestic tasks.

In regard to the estimates in columns (3-4), we are concerned that our instruments may be related to structural features of the community that simultaneously affect labour market outcomes and household time allocation decisions. In columns (5-6) we include an array of community attributes that could be related to both demand and supply sides of the local economy. We see that the coefficient on chores is of a similar order of magnitude and it is statistically significant at the 1% level. A one hour increase in the time allocated to domestic work is associated with a reduction in leisure time by 0.75 hours (equivalent to 45 minutes). For those involved in domestic work, the mean number of work hours leads to a 2.3 hours reduction in leisure time per day. This is a sizeable effect: it accounts for more than half of the

mean value of leisure time (4.4 hours) a child spends in a day. Of course, if a child's time were allocated only between leisure and domestic work, the substitution between time use in chores and leisure would be one-to-one. Our sample shows that about 75% of children attend school, and 41% of them do economic work, suggesting that a child's time is allocated to multiple tasks. Thus, we do not necessarily expect leisure time to decrease by the full amount of chore hour increase.

Leisure time also profoundly responds to changes in the hours of economic work and schooling. The point estimates are of similar orders of magnitude to those obtained in columns (3-4). Our estimates show that boys spend more leisure time than girls do, and the difference is statistically significant at the 1% level. Children also spend more leisure hours when the biological parent is the household head. The result is consistent with the altruism hypothesis. Biological parents might be more altruistic, they derive more utility from the child's leisure activity, and they allocate more time to it. As expected, leisure time decreases with an increase in the number of young children. More young children might mean more responsibility of babysitting. Nevertheless, leisure time increases with an increase in the number of female household members aged six years and older. More girls in the family might mean more helping hands and less household responsibility per head.

Leisure time is also significantly associated with the community's population size and the presence of a large-scale business firm in the locality. Children in communities where there are large-scale business activities spend fewer leisure hours. On the contrary, children of more populous communities spend more leisure hours. The opposing effects on leisure time of population size and the availability of business firms show that the variables represent different sides of the local economy. An increase in the population size may lead to an increase in the supply of labour, which may lead to a fall in adult wage (or the opportunity cost of leisure time). As a result, time spent in leisure activities may increase. On the other

hand, the presence of a large commercial farm or factory in the locality may increase demand for labour and raise the opportunity cost of leisure time. As a result, children may be allowed to spend only a few hours.

5. Conclusion and Discussion

There are two rationales for public policy intervention to eliminate child labour. The first relates to the violation of a fundamental human right. Child labour is believed to deprive children of their right to attend formal school, lead a healthy life and enjoy their childhood (ILO1973; UN1989). The second, which is a central argument in the discourse of development economists, is that child labour undermines human capital formation and undermines earning ability in later life (Baland & Robinson, 2000; Basu & Van, 1998). In their day today life, children perform varies activities, and there seems to be a bias in the empirical literature when it comes to identifying the activities that constitute child labour. Often only involvement in economic activities is viewed as child labour(Bandara, Dehejia, & Lavie-Rouse, 2015; Bhalotra & Heady, 2003; Emerson & Souza, 2007; Ersado, 2005; Patrinos & Psacharopoulos, 1997; Ray, 2000). Chores such as cooking, cleaning and washing arenot viewed as a reprehensible practice. The presumption is that chores are undertaken inside own house under safe working conditions and with close supervision of parents or other adult household members. In some cultures, chores are also consideredintegral parts of growing up and ways of acquiring useful skills for future life (ILO, 2013).

However, domestic workalso can deny children of their childhood, and therefore it can be tantamount to child labour. For example, extensive involvement in chores may necessitate a reduction in leisure time and lack of rest, which can have subsequent effects on their wellbeing. This paper aims to examine the potential hazards associated with doing chores. Using time-diary data of 1,884 young children in Ethiopia and applying an IV estimator, we find that play time decreases by 45 minutes for every hour spent doing domestic chores. This

is a sizeable effect. Such a negative effect may arise in two different ways. Firstly, the allocation of time to chores may necessitate a reduction in the allocation of time to leisure activities. Secondly, if chores involve laborious activities that exert undue physical drain, children may lack the motivation to engage in play activities.

Our finding complements the existing literature on welfare consequences of domestic chores. There is evidence that shows children doing domestic work often experience verbal and physical abuses for not quickly finishing their work or breaking dishes (Thorsen, 2012). They are also more likely to drop out of school as extended hours of chores leave little or no time for school attendance (Edmonds, 2008). Moreover, household chores involve handling sharp objects such as knives, or the use of cooking fires and toxic fumes which can cause risks of injury, burning or respiratory diseases (Forastieri, 2002; Graitcer & Lerer, 1998).

From a policy perspective, the negative effects of chores on leisure time may also translate into poor cognitive outcomes. There is a substantial body of literature that suggests childhood playtime is vital for the development of behavioural and cognitive skills of children at least until the age of nine (Garvey, 1977). While playing, children interact with playmates, use language to communicate each other and often respond emotionally to the play activity (Fromberg & Gullo, 1992; Piaget, 1962). In addition to practicing what they have already known, children learn new things while playing: they think about what to play, create scenarios and engage in activities, the combination of which can enhance their cognitive skill (Johnsen & James 1986; Rogers & Sawyers, 1988). The lack of rest due to domestic responsibilities also can undermine children's motivation to study, or do homework (Zapata, Contreras, & Kruger, 2011).

To the extent chores interfere with leisure time, and leisure time is important for children's mental development and school achievement, this study suggest that excessive involvement in chores can be tantamount to child labour. Therefore, failures to include chores in statistical

definitions of child labour can understate the prevalence of child labour in a given society. Moreover, evidence in developing countries shows that boys are more likely to do economic activities, whereas girls are mainly responsible for doing chores (Basu, Das, & Dutta, 2010; Haile & Haile, 2012; Lloyd & Blanc, 1996). This is suggestive that treating economic activities as the only source of child labour and excluding chores from child labour measurements can also exacerbate gender gaps in policy outcomes. Since chores are often undertaken in the home, children's involvement in the activities may largely go unrecognized by child labour investigators.

However, our finding should not be interpreted as domestic chores are necessarily bad for children. Performing light domestic work may have some benefits. When household responsibilities are divided evenly, and children participate in domestic activities, there will be more time for parents, especially for the mother, to provide parental care. Children's involvement in chores is believed to increase their confidence and self-esteem. Children would feel pride when they use their ability to achieve some household task goals and realize that their work eases pressures on everyone in the family (East, 2010; White & Brinkerhoff, 1981). Therefore, to treat all chores carried out by children as equally unacceptable trivializes the issue, thereby making it more difficult to end the suffering of children.

In general, the findings in this study justify the ongoing concerns over the adverse effects of child work and provide directions for future studies. For a better understanding of the effects of household chores on children's development, we suggest future studies to use data on social and cognitive skills.

References

- Altonji, J. G., Elder, T. E., & Taber, C. R. (2005). An evaluation of instrumental variable strategies for estimating the effects of catholic schooling. *Journal of Human Resources*, 40(4), 791-821.
- Baland, J. M., & Robinson, J. A. (2000). Is child labour inefficient? *Journal of Political Economy*, 108(4), 663-679.
- Bandara, A., Dehejia, R., & Lavie-Rouse, S. (2015). The impact of income and non-income shocks on child labor: Evidence from a panel survey of Tanzania. *World Development*, 67(1), 218-237.
- Barnett, I., Ariana, P., Petrou, S., Penny, M. E., Duc, L. T., Galab, S., . . . Boyden, J. (2013). Cohort profile: The Young Lives study. *International Journal of Epidemiology*, 42(3), 701-708.
- Basu, K., Das, S., & Dutta, B. (2010). Child labour and household wealth: Theory and empirical evidence of an inverted-U. *Journal of Development Economics*, 91(1), 8-14.
- Basu, K., & Van, P. H. (1998). The economics of child labour. *American Economic Review*, 88(3), 412-427.
- Beegle, K., Dehejia, R., & Gatti, R. (2009). Why should we care about child labour? The education, labour market, and health consequences of child labour. *Journal of Human Resources*, 44(4), 871-889.
- Beegle, K., Dehejia, R. H., & Gatti, R. (2006). Child labour and agricultural shocks. *Journal of Development Economics*, 81(1), 80-96.
- Bhalotra, S., & Heady, C. (2003). Child farm labour: The wealth paradox. *The World Bank Economic Review*, 17(2), 197-227.

- Buvinić, M., & Gupta, G. R. (1997). Female-headed households and female-maintained families: are they worth targeting to reduce poverty in developing countries? *Economic Development and Cultural Change*, 45(2), 259-280.
- Central Statistical Agency (CSA). (2012). *2007 Population and housing census of Ethiopia*. Addis Ababa: Central Statistical Agency (CSA).
- Central Statistical Agency (CSA). (2014). *Key findings on the 2013 national labour force survey*. Addis Ababa: Central Statistical Agency (CSA).
- Central Statistical Agency (CSA), & ICF International. (2012). *Ethiopia demographic and health survey 2011*. Addis Ababa and Calverton, Maryland: Central Statistical Agency (CSA) and ICF International.
- Diamond, C., & Fayed, T. (1998). Evidence on substitutability of adult and child labour. *The Journal of Development Studies*, 34(3), 62-70.
- Dillon, A. (2012). Child labour and schooling responses to production and health shocks in northern Mali. *Journal of African Economies*, 22(2), 276-299.
- Duflo, E. (2012). Women empowerment and economic development. *Journal of Economic Literature*, 50(4), 1051-1079.
- East, P. L. (2010). Children's provision of family caregiving: Benefit or burden? *Child Development Perspectives*, 4(1), 55-61.
- Edmonds, E. (2008). *Defining child labour: A review of the definitions of child labour in policy research*. (Working Paper). International Programme on the Elimination of Child Labour. International Labour Organisation. Geneva.
- Emerson, P. M., & Souza, A. P. (2007). Child labour, school attendance, and intrahousehold gender bias in Brazil. *The World Bank Economic Review*, 21(2), 301-316.
- Ersado, L. (2005). Child labor and schooling decisions in urban and rural areas: Comparative evidence from Nepal, Peru, and Zimbabwe. *World Development*, 33(3), 455-480.

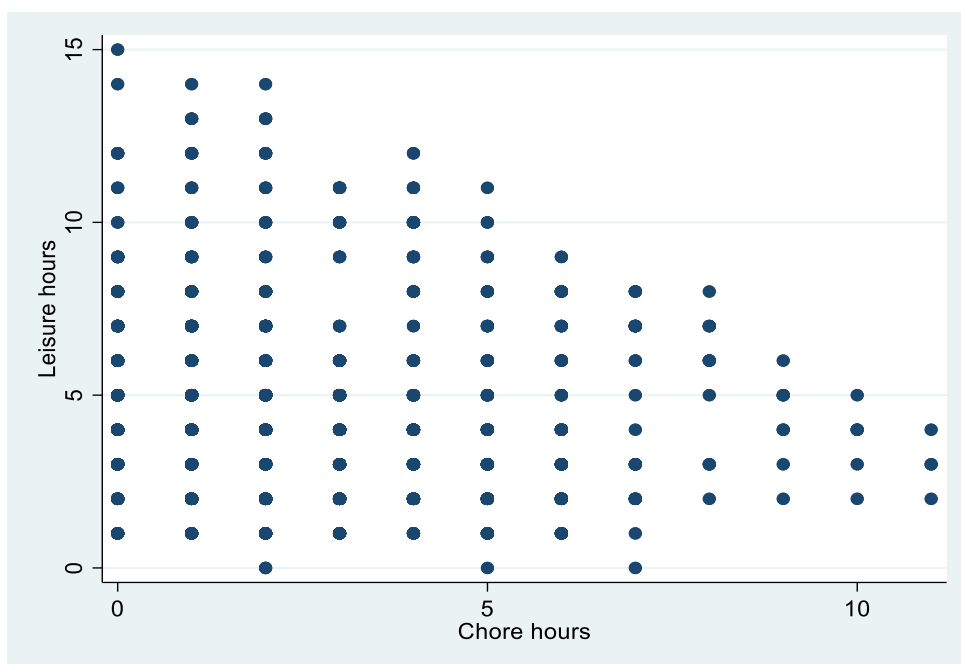
- Fallon, P., & Tzannatos, Z. (1998). *Child Labour: Issues and directions for the World Bank*. Washington, DC: The World Bank.
- Fella, G. (2000). Efficiency wage and efficient redundancy pay. *European Economic Review*, 44(8), 1473-1490.
- Forastieri, V. (2002). *Children at work: Health and safety risks* (2nd ed.). Geneva: International Labour Office (ILO).
- Fromberg, D. P., & Gullo, D. F. (1992). Perspectives on Children. *Williams, LR & Fromberg, DP Encyclopedia of Early Childhood Education*. NY: Garland Publishing, Inc.
- Garvey, C. (1977). *Play*. Cambridge, MA: Harvard University Press.
- Goldin, C. (1979). Household and market production of families in a late nineteenth century American city. *Explorations in Economic History*, 16(2), 111-131.
- Graitcer, P. L., & Lerer, L. B. (1998). *Child labour and health: Quantifying the global health impacts of child labour*. The World Bank Washington, DC.
- Haile, G., & Haile, B. (2012). Child labour and child schooling in rural Ethiopia: Nature and trade-off. *Education Economics*, 20(4), 365-385.
- Heckman, J. J., & Vytlačil, E. (2001). Policy-relevant treatment effects. *American Economic Review*, 91(2), 107-111.
- International Labour Organisation (ILO). (1973). *Minimum age convention(No.138)*. Geneva: International Labour Organisation (ILO).
- International Labour Organisation (ILO). (2013). *Making Progress against child labour: Global estimates and trends 2000 to 2012*. Geneva: International Labour Organisation (ILO).
- Johnsen, P., & James, C. (1986). Pretend play and logical operations. In K. Blanchard (Ed.), *The many faces of play* (pp. 50-58). Champaign, IL: Human Kinetics.

- Levison, D., Moe, K. S., & Knaul, F. M. (2001). Youth education and work in Mexico. *World Development*, 29(1), 167-188.
- Lloyd, C. B., & Blanc, A. K. (1996). Children's schooling in sub-Saharan Africa: The role of fathers, mothers, and others. *Population and Development Review*, 22(2), 265-298.
- Lundberg, S. J., Pollak, R. A., & Wales, T. J. (1997). Do husbands and wives pool their resources? Evidence from the United Kingdom child benefit. *Journal of Human Resources*, 32(3), 463-480.
- Outes-Leon, I., & Sanchez, A. (2008). *An assessment of the Young Lives sampling approach in Ethiopia*. (Technical Note). Young Lives. Department of International Development. University of Oxford. Oxford.
- Patrinos, H. A., & Psacharopoulos, G. (1997). Family size, schooling and child labor in Peru: An empirical analysis. *Journal of Population Economics*, 10(4), 387-405.
- Piaget, J. (1962). *Play, dreams, and imitation in childhood*. New York: W.W. Norton & Co. .
- Ray, R. (2000). Child labour, child schooling, and their interaction with adult labour: Empirical evidence for Peru and Pakistan. *The World Bank Economic Review*, 14(2), 347-367.
- Rogers, C. A., & Sawyers, J. (1988). *Play in the lives of children*. Washington, DC: NAEYC.
- Skoufias, E. (1993). Labor market opportunities and intrafamily time allocation in rural households in South Asia. *Journal of Development Economics*, 40(2), 277-310.
- The United Nations (UN). (1989). *Convention on the rights of the child*. New York: The United Nations (UN).
- Thorsen, D. (2012). *Child domestic workers: Evidence from West and Central Africa*. Dakar: The United Nations Childre's Fund (UNICEF).
- Udry, C. (2006). Child labour. In A. V. Banerjee, R. Benabou, & D. Mookherjee (Eds.), *Understanding poverty* (pp. 243-258). New York: Oxford University Press.

- White , L., & Brinkerhoff, D. B. (1981). Children's work in the family: Its significance and meaning. *Journal of Marriage and the Family*, 43(4), 789-798.
- Woldehanna, T., Behrman, J. R., & Araya, M. W. (2017). The effect of early childhood stunting on children's cognitive achievements: Evidence from young lives Ethiopia. *The Ethiopian Journal of Health Development*, 31(2), 75.
- Wydick, B. (1999). The effect of microenterprise lending on child schooling in Guatemala. *Economic Development and Cultural Change*, 47(4), 853-869.
- Zapata, D., Contreras, D., & Kruger, D. (2011). Child labour and schooling in Bolivia: Who's falling behind? The roles of domestic work, gender, and ethnicity. *World Development*, 39(4), 588-599.

Appendix

Figure 1 Scatterplot of hours spent in leisure and chores



Source: Young Lives unit record file

Table 1 Definitions and Summary Statistics

Variable	Definition	mean	sd
Playtime	Hours/day spent in leisure activities	4.44	2.39
Chores	Hours/day spent in household chores	2.49	1.97
Econwork	Hours/day spent in economic work	1.51	2.23
Education	Hours/day spent in education	5.89	3.07
Child sex	1 if the child is male	0.53	0.50
Child age	Age of the child in months	97.43	3.71
Head sex	1 if the household head is male	1.19	0.39
Head age	Age of the household head	44.23	11.01
Head literate	1 if the household is literate	0.37	0.48

Bioparent	1 if the household head is the child's biological parent	0.82	0.39
Log (expend)	log of household monthly expenditure per adult	4.82	0.59
Ch05	Number of children age 5 and under	0.98	0.84
Male0617	Number of male children age 6 and 17	0.96	0.95
Female0617	Number of female children age 6 and 17	1.01	0.96
Male18	Number of males age 18 and older	1.71	1.17
Female18	Number of females age 18 and older	1.89	1.13
Urban	1 if the area of residence is urban	0.40	0.49
Finance	1 if a financial institution is available in the area	0.74	0.44
Healthcare	1 if a healthcare centre is available in the area	0.66	0.47
Primschl	1 if a primary school is available in the area	0.63	0.48
Firm	1 if a factory or commercial farm with at least 50 employees is available in the area	0.33	0.47
Diseases	1 if an outbreak of human disease in the area in the previous 3 years	0.42	0.49
Droughts	1 if droughts occurred in the area in the previous 3 years		
Log (popsize)	Log of population size of the area	8.92	0.79
Male wage	Community-level male daily wage in current birr	54.45	17.34
Female wage	Community-level female daily wage in current birr	46.10	13.15

Note: The sample size for this study is 1,884.

Table 2 The relevance and exclusion of the instrumental variables

	Chores		Economic work		Education		Play	
Variable	coef.	s.e.	coef.	s.e.	coef.	s.e.	coef.	s.e.
Child sex	-1.228***	0.076	1.297***	0.085	-0.019	0.113	0.109**	0.046

Child age	0.015	0.010	0.015	0.012	0.045 ***	0.015	0.010 *	0.006
Head sex	-0.128	0.129	-0.594 ***	0.144	-0.562 ***	0.192	0.089	0.072
Head age	-0.004	0.004	0.005	0.004	-0.008	0.006	0.000	0.002
Literate	-0.125 ***	0.090	-0.168 *	0.100	0.407 ***	0.133	0.021	0.049
Bioparent	-0.440 ***	0.128	-0.204	0.142	-0.731 ***	0.190	0.360 ***	0.071
Log(expend)	-0.214 ***	0.077	-0.018	0.086	0.663 ***	0.115	0.028	0.043
Ch05	0.459 ***	0.052	0.218 ***	0.058	-0.180 **	0.077	-0.124 ***	0.029
Male617	0.121 ***	0.043	-0.024	0.048	-0.235 ***	0.064	-0.016	0.024
Female617	-0.107 ***	0.041	0.111 *	0.046	0.014	0.061	0.014	0.023
Male18	-0.065 *	0.037	-0.007	0.041	0.098 *	0.054	0.020	0.020
Female18	-0.108 ***	0.039	0.010	0.044	0.003	0.058	0.030	0.022
Urban	0.138	0.134	-1.838 ***	0.149	1.051 ***	0.199	0.076	0.077
Finance	0.153	0.143	-0.087 ***	0.159	0.266	0.213	0.211 ***	0.079
Healthcare	-0.090	0.126	0.654 ***	0.140	0.176	0.188	-0.059	0.070
Firm	0.348	0.101	-0.326	0.112	-0.131	0.150	-0.182 ***	0.056
Diseases	0.357	0.126	-0.058	0.140	0.107	0.188	0.058	0.069
Droughts	-0.085	0.102	-0.153	0.113	0.287 *	0.151	0.020	0.056
Log(popsiz)	-0.234 ***	0.071	0.105	0.079	0.462 ***	0.106	0.118 ***	0.039
Male wage	0.004	0.003	-0.010 ***	0.003	0.039 ***	0.004	0.008	0.802
Female wage	0.014 ***	0.004	0.014 ***	0.004	-0.027 ***	0.005	0.001	0.002
Primschl	-0.859 ***	0.097	-0.116	0.108	1.944 ***	0.144	-0.181	0.156
Chores							-0.812 ***	0.014
Econwork							-0.871 ***	0.013
Education							-0.860 ***	0.010

_cons	4.675	1.429	-0.564	1.589	-7.002 ***	2.123	9.835 ***	0.788
R-squared	0.313			0.335		0.371	0.861	
Observation	1,884			1,884		1,884	1,884	

Note: Standard errors clustered at the community level. ***Significant at the 1% level; ** significant at the 5%; and * significant at the 10% level.

Table 3 Effects of chores on leisure time: IV estimates

	Model		Mode 2		Model 3	
<i>Variable</i>	<i>coef.</i>	<i>s.e.</i>	<i>coef.</i>	<i>s.e.</i>	<i>coef.</i>	<i>s.e.</i>
Chores	-0.446***	0.029	-0.826***	0.186	-0.754***	0.119
Econwork			-1.149***	0.270	-1.078***	0.217
Education			-0.532***	0.126	-0.564***	0.065
Child sex	-0.235**	0.109	0.831***	0.203	0.942***	0.279
Child age	-0.046***	0.014	0.004	0.012	0.001	0.010
Head sex	1.004***	0.174	-0.042	0.298	0.078	0.184
Head age	-0.003	0.005	0.004	0.003	0.003	0.003
Literate	-0.319***	0.114	-0.034	0.107	0.004	0.074
Bioparent	1.559	0.168	0.405	0.264	0.590***	0.153
Log(expend)	-0.424***	0.116	-0.010	0.058	0.059	0.069
Ch05	-0.514***	0.072	-0.132	0.168	-0.272***	0.090
Male617	0.120	0.063	-0.036	0.034	-0.054	0.038
Female617	-0.004	0.054	0.075**	0.038	0.085**	0.041
Male18	0.004	0.046	0.028	0.026	0.038	0.027
Female18	0.124***	0.051	0.027	0.052	0.081***	0.031
Urban					-0.471	0.374

Finance					0.097	0.107
Healthcare					0.101	0.168
Firm					-0.396***	0.107
Diseases					-0.127	0.110
Droughts					0.001	0.080
Log(popsize)					0.202***	0.069
_cons	9.425***	1.598	11.102***	1.308	8.255***	1.277
R-Squared	0.113		0.741		0.756	
Observation	1,884		1,884		1,884	

Note: Standard errors clustered at the community level. *** Significant at the 1% level; ** significant at the 5% level; and * significant at the 10% level.