THE EFFECT OF HOUSEHOLD CHARACTERISTICS ON CHILD LABOR SUPPLY AND SCHOOLING DECISIONS IN UKRAINE

by

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Kyiv School of Economics

Abstract

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This study investigates the issue of child labor in Ukraine using the individual-level data from "Ukraine national child labor survey" conducted in 2014-15. In particular, it explores whether the household characteristics affect child's decision regarding work, and checks the existence of a trade-off between work and schooling choices for children in Ukraine. The research shows that income-related characteristics of households affect child's decision to start working in rural areas noticeably, whereas such decisions are not responsive to income-related characteristics in urban areas. In the case of urban areas, child's decisions depend to much extent on the family characteristics such as family composition, and number of members. In its turn, the trade-off between child labor and schooling was not found. And even though this finding contradicts the literature, it highlights that children in Ukraine are more likely to combine work with schooling, rather than sacrifice school attendance for work as it often happens in lower-income countries.

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GLOSSARY

ILO. International Labor Organization

IDPs. Internally Displaced Persons

GECL. Global Estimates of Child Labor

SIMPOC. Statistical Information and Monitoring Program on Child Labor, which provides access to a comprehensive compendium of child labor statistics and methodological guidance material.

UNICEF. United Nations International Children's Emergency Fund

Chapter 1

INTRODUCTION

According to the Target 8.7 of the Sustainable Development Goals[1] 193 countries agreed to prohibit and eradicate any kind of child labor, including the worst forms of it by 2025. But, unfortunately, it became evident that this goal will not be achieved by the stated date. Such state of affairs renewed the debates on the child labor issue, its determinants, and consequences among researchers.

Literature gives us various interpretations of understanding what is meant by «child labor». However, the core idea of this concept is prevalent among all researchers. Child labor can be viewed as work that prevents a child from having a normal childhood and imposes risks on his/her future physical and mental development. According to the accepted by ILO definition «child labor refers to work that is mentally, physically, socially or morally dangerous and harmful to children; and interferes with their schooling by depriving them of the opportunity to attend school.»[2]

This definition emphasizes the possibility to sacrifice schooling as an aftermath of child labor, but misses any information about age boundaries. The peculiarities of legislation in different countries resulted in the complexity of identification of the uniform legal working age, applicable to each country in the world. According to the Minimum Age Convention[3] adopted by ILO the minimum age for being employed is 15 years. However, in order to offset the variation among countries, ILO sets the boundaries of child labor from 5 to 17 years in its reports.

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[1] https://sustainabledevelopment.un.org/post2015/transformingourworld

[2] https://www.ilo.org/ipec/facts/lang--en/index.htm

[3] https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO:12100:P12100_INSTRUMENT_ID:312283:NO

As of 2016, the total number of children in the world engaged in labor equaled 152 million and almost half of them or 73 million were found to be engaged in hazardous works (GECL, 2017). In its turn, the main sectors of child's economic activity which accounts for 71% of total child labor is Agriculture. Services and Industry sector comprise 17 and 12% respectively (GECL, 2017).

Noticeable progress has been made since the day ILO started monitoring child labor in 2000: the worldwide level of child labor decreased from 16% in 2000 to 9.6% in 2016. However, despite the overall positive dynamics in the struggle against child labor worldwide, the goal of 2025 is projected to be failed due to noticeable deceleration of progress in the last four-year interval. The slowdown in 2012-2016 took place due to the conflicts and disasters: at least for 1 out of the four children the country of its citizenship was under such circumstances[4], which created additional pressure on child labor.

Ukraine is a country of a special interest for the profound analysis of child labor due to several reasons. As a country, which has gone through a transition process, Ukraine has always been at risk of the children engagement in the labor force. This is confirmed by upward sloping trend that the child labor rates show in recent years. In 1999 child labor rate was at the level of 2.4% in Ukraine (SIMPOC, 1999). But the latest data shows situation has worsened. In 2015 around 11.6% or 607 thousand of Ukraine's child population from 5 to 17 years old worked in 2015 (ILO).

Further to this, subsistence farming plays an essential role for the prevailing number of households in Ukraine. Even though according to ILO agriculture continues to be an entry point for the youngest cohort of children aged from 5 to 11 years into child labor, this is not the only disruptive factor. The armed conflict in the East of the country has created around 1,7 million of registered IDPs, among whom about 200 thousand are children[5]. Such state of affairs is

[4] http://www.data.unicef.org/wp-content/uploads/2018/02/Data-brief-children-on-the-move-key-facts-and-figures.pdf

[5] https://en.interfax.com.ua/news/economic/351907.html

of particular importance and is likely to have negative affect on the issue of child labor in Ukraine in the nearest future, since countries with armed conflicts have higher child labor participation rates according to ILO.

Besides, the existing legislative documents, aimed at protecting children from being exploited, do not cope sufficiently with the vital mission relied on them. In its turn, they stimulate employers to steer clear of the child's formal employment in favor of an informal one. Moreover, the recent attempt to amend the parts of the Criminal Code of Ukraine[6] regarding severing the responsibility for the use of the child's labor highlights the importance of the chosen topic for policy implementation.

The question of child labor is permanently studied and monitored by ILO and UNICEF. These international organizations provide reports with descriptive statistics of current situation of child labor in Ukraine. However, the limited evidence of in-depth empirical analysis of this issue within Ukraine, provides us with the stimulus to conduct a further research. Our study is aimed at answering the question of whether household characteristics indeed affect a child's decision about joining the labor force thus sacrificing school enrolment. To answer this research question several hypotheses are testes. The main hypothesis is that there exists trade-off between child labor and schooling decisions. In addition, we test two supplementary hypotheses, in particular (1) possession of land plot, as well as, engagement of household in subsistence farming increases the probability of child joining the labor force; and (2) being raised in a complete family reduces the probability of child's decision to work.

To test these hypotheses, we use the individual-level data obtained from "Ukraine national child labor survey (2014-2015)", which was conducted by the Ukrainian Centre for Social Reforms and the State Statistics Service of Ukraine under the ILO supervision and according to its methodology.

[6] https://ubr.ua/labor-market/ukrainian-labor-market/za-detskij-trud-posadjat-roditelej-3850998

Taking into account the objectives of this work and Ukraine's specific characteristics, we follow approaches used in two core papers. With the use of methodology of trade-off estimation from Zapata et al. (2011), this work takes into account the findings of Basu et al. (2010), who linked hours of child work with the area of land possessed by household. We additionally control for the locality status and separately determine the effects for households with rural and urban locality status. We assume that households that live in rural areas are more likely to face economic constraints, thus the effects on the child's work decisions are projected to be stronger in this case.

In accordance to the estimation results, we are rejecting main hypothesis both for rural and urban households. This means that negative trade-off between child labor and schooling is unobserved. On the contrary, obtained results lead us to conclusion that children are more likely to combine work and schooling in rural areas if comparing to the urban ones. And albeit the correlation between error terms is negative in urban areas, it is statistically insignificant, meaning that children do not sacrifice attending school for working in urban areas. In their turn supplementary hypotheses are confirmed by empirical results. If locality is not controlled for, the increase in size of land possessed by household indeed increases the probability of child's engagement in labor, whereas being raised in complete family reduces the chances of such activity.

By this work we contribute to the existing literature, as we take a precise look at issue of child labor in Ukraine which is lacking in-depth analysis and provide grounds for policy implications.

This paper is structured in the following way. Chapter 2 is devoted to the literature overview, which consists of two sub-sections: theoretical and empirical papers. Chapter 3 consist of the methodology used for the analysis, as well as model specification, Chapter 4 is devoted to data description and preparation process. The main findings and estimation results are represented in Chapter 5 and conclusions along with policy discussion can be found in Chapter 6.

Chapter 2

LITERATURE REVIEW

This chapter is devoted to the literature review and divided into two main blocks. In the first part theoretical papers related to child labor are covered; whereas, the second part concentrates primarily on empirical papers.

2.1 Theoretical Papers

The topic of child labor has been raised many times in the literature, partly due to high importance of this issue in terms of policy implementation. An invaluable contribution was made by Basu and Van (1998), whose paper is one of the most influential in this field of the literature.

Authors created a strong foundation for the further empirical investigation of child labor by formulating Luxury and Substitution axioms, as well as, providing a theoretical framework for them. Luxury axiom connects the household's level of income with likelihood of child's engagement into labor, whereas the Substitution axiom perceives child and adult labor as substitutes. Interestingly, that authors questioned the role of parents for the first time, stating that in countries with low income the perception of child labor is similar to existing in developed ones. However, in such countries, the survival instinct forces parents to turn a blind eye to child labor rather than to hamper it. In addition, the distinct part of the work is dedicated to policy analysis. Inter alia, authors succeeded in showing that complete ban of child labor is not necessary a long-lasting and effective solution to the problem of child labor.

But there were economists, apart from Basu and Van (1998), who questioned the relationship between child labor and income. The work by Ranjan (2001) assumed paramount importance of income level to child labor. The author linked the presence of child labor in the economy with parent's credit

constraints by using the overlapping generations equilibrium model. According to the author's findings, the greater disparity of income distribution within the country, the higher engagement of children in labor is. The absence of child labor in steady-state is a result of lower income inequality at the beginning of convergence path. Such finding plays especially important role regarding policy implication. Neither trade sanctions nor complete legislative ban of child labor has chances to succeed in the same way as the rise in the wage of skilled workers in shortening the volumes of child labor. Overall stated above theoretical papers have some common outcomes in the context of policy discussion.

Remarkably that Ranjan (2001) is a logical continuation of the author's work published earlier (Ranjan, 2000). In this work two scenarios were considered. According to the first scenario households had an access to the credit market, however, under the second one such possibility was excluded. Notwithstanding the elimination of overlapping generations from the model, similar results were obtained: misery enhanced by the inability to borrow additional funds is likely to incentivize child labor.

Summing up, the theoretical papers give us clear understanding that household's income or any relevant to it proxy has a direct effect on child labor and can be used as one of regressors for determining of the probability for child's decision to join labor.

2.2 Empirical Papers

The issue of child labor has experienced broad dissemination among empirical studies over the last two decades. Researchers keep exploring child labor from various angles in the hope of finding a solution that will tackle this problem without noticeable negative consequences.

The biggest complication that researchers have to encounter is data collection. Since national governments are poorly motivated to gather and publish information concerning child labor on a regular basis, various surveys

conducted by international organizations became a primary source of data in this section of labor economics. Unfortunately, the content of such surveys is not unified and can vary across years even within one country. As a result, the vast majority of academic articles on this topic are trying to estimate the effects and determinants of child labor basing upon the country of interest in a particular point of time.

Altogether papers investigating child labor can be divided into three main streams: the first group perceives the level of income as a key determinant factor, the second argues that there are other important driving factors while the third one aims to evaluate the consequences of child labor.

For example, by extending the findings of Basu and Van (1998), Edmods and Schady (2012) examined the linkage between child labor and income referring to Ecuador data. Authors focused on a social program implying cash transfer to vulnerable households that can be used as a tool for suppressing the issue of child labor in developing countries as an alternative to a total ban of child labor. The effect of this particular type of policy was estimated in this article. Ecuador was chosen as a country of interest due to the adoption of Bono de Desarrollo Humano program, which stipulated monthly reward equal to a 15$ for women with children. Unlike to the exploration of resembling policies in Mexico (Skoufias and Parker, 2001), Nicaragua (Maluccio and Flores, 2005) and Columbia (Attanasio et al., 2010), authors observed a noticeably higher influence of government assistance on the narrowing the child labor, particularly on the time child spends on work. However, one of the most valuable findings of this article is confirmation the fact that money transfer does not need to exceed the forgone household's income from child labor in order to prevent child's engagement in the labor force.

The support of Endods and Schady (2012) can be found in the work of Webbink, Smits and Jong (2012) who also confirmed the relationship between income and child labor to be inverse. The main distinction of this work is that

it focuses on «hidden» forms of child labor, such as housework and work in family business, covering 16 developing countries located in Asia and Africa.

However, taking into consideration the objectives of this work, special point of interest is devoted to the work of Basu et al. (2010), who challenged the findings of Bhalotra and Heady (2003) about a positive relationship between the child work and total area of the land possessed by household. This work does not directly connect child labor with income and finds itself on the edge of two investigation streams, since the total area of land owned by household represents its wealth. In their article, the authors found the evidence of the relationship between child labor and land ownership being the inverted U-shape. When the area of the possessed land increases up to 4 ac per household, the child participation in the labor force behaves in the same upwards manner. However, afterward the child's engagement begins to dwindle. Stated above article could serve as a robust framework for further investigation of child labor based upon Ukrainian data due to high rates of involvement in subsistence farming of households in this country. Thus from our point of view the work by Basu et al. (2010) is perceived as a core paper for further analysis.

In addition, the importance of household's involvement in agriculture and farming for the issue of child labor was raised before by Bhalotra and Heady (2003). In their work authors estimated that children are more likely to be engaged in child labor in households that possess larger areas of land for rural areas both in Ghana and Pakista. Interestingly that authors by their work challenged the common view that poorer households are associated more with child labor than wealthier ones, forasmuch households that own large areas of land can be nowise to be named as poor ones.

On the other hand, we need to mention that one of the latest works regarding the issue of child labor is dedicated precisely to the viewpoint opposite to proponents of the Luxury axiom. The child labor is perceived as a consequence of low added value created by education to future earnings, rather than low level of income in the work of Kuépié (2018). The author's hypothesis was

confirmed by the empirical evidence from Mali on individual-level data. Higher returns to education, as well as, higher earnings of parents indeed prevented a child from being sent to work and vice versa. Even though it would be hard to replicate this paper building upon the data from the other country owing to the uniqueness of the dataset, it has a strong policy value. The creation of workplaces for skilled persons with a decent salary, or in other words stimulation of demand for skilled-workers, can efficiently replace a complete ban on child labor as a policy measure.

Since we are not primarily aimed at evaluating the determinants of child labor in Ukraine, but rather interested in capturing trade-off between child's work and schooling, the separate attention should be devoted to the work by Zapata et al. (2011). With the help of bivariate probit model authors confirmed the existence on trade-off between child labor and school attendance to be greater for girls as long as housework is introduced to the model.

It is worth mentioning that determination of factors stimulating child labor is not the only area of interest among researchers. For instance, Beegle, Dehejia, and Gatti (2009) in their collaborative work concentrated on the reverse side of the problem, namely on aftereffects for physical and mental development, as well as, an impact on future earnings. Despite the intention to estimate the impact on future earnings, the authors did not succeed in this due to data limitations. However, the linkages between hours worked and schooling as well as child's health were determined. In the first case, the trade-off between work engagement and school attendance took place. On the contrary, the negative influence from work on a child's health was absent according to estimations.

Later in Burrone, and Giannelli (2018) extended the investigation of the effects of child labor on human capital in future. The actors were lucky to use the panel survey data regarding child labor in Tanzania, we let them to detect negative influence of child labor on the employment in adulthood. However, despite the importance of suchlike investigations which connect child labor and its effect

on future human capital or earnings, the extreme rareness of panel data prevents us from proceeding a research in this direction.

Our contribution to the literature on child labor is an extension of work by Zapata at al. (2011) with the focus on the effects regarding the land owned by households that were estimated by Basu et al. (2010). The survey performed by ILO in 2014-2015 among Ukrainian household enables us to modify the empirical model and evaluate the effects undetected previously due to data limitations. Besides, the upward trend of child labor in Ukraine in the last two decades, emphasizes the importance of further investigation of this issue concerning policy discussion. However, it is worth mentioning that the overwhelming majority of the literature is based on the data that comes from developing countries in Asia and Africa, thus the case of Ukraine might strikingly differ from others mentioned above.

Chapter 3

METHODOLOGY

The overwhelming majority of empirical papers examine the issue of child labor employing such generalized linear models as linear probability, logit, and probit. As the data for empirical analysis usually comes from the surveys, the binary response variables prevailingly serve as key dependent variables. Forasmuch as we aim not only to evaluate the magnitudes and signs of factors that determine child's decision to work but also to capture the trade-off between work and schooling decision, a need for more precise specification arises. Thereby we are going to refer to the model used by Zapata et al. (2011) and customize it regarding the aims of our work and data availability.

Since we are dealing with households, let us assume that all the modelling will be done under the unitary model of household behavior. According to this economic approach whole household is treated as if it is a single agent who is responsible for decision-making process and willing to maximize household's utility. As we are investigation the problem of child labor in this work, in our case each household experiences some unobserved level of utility from a child either going to work $(U_{i,work})$ or attending school $(U_{i,schooling})$:

$$\left(U_{i,work}\right) = \alpha_1 C_i + \alpha_2 H_j \quad (1)$$

$$\left(U_{i,schooling}\right) = \beta_1 C_i + \beta_2 H_j \quad (2)$$

where C_i represents the vector of child related explanatory variables, and H_j in its turn is a vector of households characteristics. The parameters in front of two vectors of regressors $(\alpha_1, \alpha_2, \beta_1, and\ \beta_2)$ are unknown. It is known that some unobserved factors can affect the utility levels households experience. For this reason, we are introducing then to the model and name in the following way:

ϵ_{work} (unobserved factors that affect household's utility from child going to work) and $\epsilon_{schooling}$ (unobserved factors that affect household's utility from child attending school). As a result, our equations transform to:

$$\left(U_{i,work}\right) = \alpha_1 C_i + \alpha_2 H_j + \epsilon_{work} \quad (3)$$

$$\left(U_{i,schooling}\right) = \beta_1 C_i + \beta_2 H_j + \epsilon_{schooling} \quad (4)$$

Equations (3) and (4) represent random utility functions from child going to work and attending school respectively. However, it is impossible to evaluate random utility functions directly due to the nature of utility. To address this problem we introduce to the model two dummy variables, in particular $y_{i,work}$ and $y_{i,schooling}$ that represent the decision of i's child to work and to attend school respectively. Suggested dummy variables are defined in the following way:

$y_{i,work}$ = 1 meaning that child works iff $U_{i,work} > 0$, and zero otherwise;

$y_{i,schooling}$= 1 meaning that child attends iff $U_{i,schooling} > 0$, and zero otherwise;

importantly that random utility functions $U_{i,work}$ and $U_{i,schooling}$ play here role of latent variable reflecting households utilities from child's engagement in such activities as work and schooling.

By plugging introduced above dummy variables in the respective equations, we can see that the probability of a child decision to work or to attend school depend on the utility that household gets from child's work or school attendance:

$$\Pr\left(y_{i,work} = 1\right) = \Pr(\alpha_1 C_i + \alpha_2 H_j + \epsilon_{work} \geq 0) \quad (5)$$

$$\Pr\left(y_{i,schooling} = 1\right) = \Pr(\beta_1 C_i + \beta_2 H_j + \epsilon_{schooling} \geq 0) \quad (6)$$

The obtained equations should be modelled jointly, so that the decisions regarding working and schooling are correlated. As we can see, in equations (5) and (6) introduced before dummy variables, particular $y_{i,work}$ and $y_{i,schooling}$, serve as dependent variables, C_i and H_j are the vectors of explanatory variables as previously and $\eta = (\epsilon_{work}, \epsilon_{schooling})$ is the vector of error terms is that is assumed to follow a normal distribution with:

$$\mathrm{E}[\eta] = 0$$

$$Var(\epsilon_{work}) = Var(\epsilon_{schooling}) = 1$$

$$Cov(\epsilon_{work}, \epsilon_{schooling}) = \rho$$

Taken into consideration the fact that variances equal to the unity and ρ is a correlation coefficient, which shows the existence of joint nature of taking decisions regarding working and schooling, the unknown parameters $(\alpha_1, \alpha_2, \beta_1, and\ \beta_2)$, as well as, ρ can be found by using maximum-likelihood estimation:

$$L = \prod \int_{-\infty}^{a'X} \int_{-\infty}^{\beta'Y} \varphi(\epsilon_{work}, \epsilon_{schooling}, \rho) d\epsilon_i \qquad (7)$$

where φ is the bivariate normal density function. Thus in order to estimate (7) the bivariate probit model is used.

The composition of vectors with explanatory variables that are used in the model is described in the Chapter 4.

Chapter 4

DATA DESCRIPTION

This study is based upon the individual-level data from the "Ukraine national child labor survey" (2014-2015). The Survey was performed by the Ukrainian Centre for Social Reforms and State Statistics Service of Ukraine under the ILO supervision and according to its methodology. It encompasses two independent parts: Modular Sample population survey on child labor and Sociological Survey of Children Working on the Street. As a side note, the previous Modular Survey regarding child labor in Ukraine took place as early as in 1999. The relevance of the chosen dataset is also highlighted by the fact its results became available only in 2017, thus it has not found wide use in literature yet.

For the research purposes, the results of the Sociological Survey are not included to our analysis for the following reason. Information obtained from interviewing 402 children working on the street, provides qualitative statistics insufficient for analysis. Thus we are focusing only on the Modular Survey.

The Modular Child Labor Survey covers 25 Ukrainian regions, excluding the temporarily occupied territory of Autonomous Republic Crimea and Sevastopol City. During the Survey 4.8 thousand households with children aged from 5 to 17 years old were interviewed in the period of October-November 2014. All the interviewed households are part of the national representative territorial sample used for Labor Force Survey, conducted permanently in Ukraine. This makes this sub-sample of households reliable and representative dataset.

The data was obtained from two Questionnaires. The first one was designed for parents(guardians), whereas another one - for children aged 5-17 years. An important point here is that children answered to the questions of the interviewer on their own. Even though the presence of parents(guardians) at

the interview was allowed, only in 26% cases they indeed were present. Besides, the level of interviewee's honesty was evaluated at the end of each interview. All this let us state that the answers obtained are unbiased.

Overall, the dataset sums up to 6 400 observations, since households with more than one child were allowed to provide information regarding all children, and records information regarding household living conditions, family composition, schooling and health status, as well as, reasons for joining the labor market and working conditions.

4.1 Dependent variables

To evaluate the trade-off between the child's work and schooling decisions, two dependent variables are used.

The first one is a binary variable, which reflects the decision of a child to start working. The lack of information regarding the exact number of working hours for each child, who confirmed participation in work activities, forces us to define child work in a slightly different way than usual. As a result, the value equal to 1 is assigned to $y_{i,work}$ if:

- child confirmed working for pay, profit or as a being family worker for at least one hour during reference week;
- child confirmed working during last 12 months;
- child confirmed conducting any one of listed activities[7] that meet the ILO definition of child labor even for an hour during the reference week.

Such marking enables us to detect every single child in the sample engaged in child labor. As a result, we came up to the total number of working children in our dataset, which is equal to 1730. To check whether the obtained number is true, the question regarding the age at which child started to work was used as a control one (see Table 1).

[7] Working for salary or payment in kind, running own business, help unpaid in a household business, etc. is meant under listed activities.

Table 1. Decomposition of «child working» dependent variable

Variable	Observations	Yes	No
Worked at least 1 hour during reference week	6,357	816	5541
Worked during last 12 month	5541	271	5270
Performed any one of listed by ILO activities	5,270	643	4,627
Total number of working children		1730	
No. of children that stated age at which they started to work	6,397	1730	

Note: Total number of children that work is the summation of lines (1), (2), and (3)
Source: Own calculations

It is worth mentioning that the Questionnaire is built in such a way that it cancels out the possibility of giving positive answers («yes») on more than one question related to child work. For example, if interviewed child confirms working at least 1 hour during reference week he or she skips other work-related questions and goes directly to the question about the age at which he or she started to work. Such structure of the Questionnaire allows to avoid any intersections of working children cohorts.

As estimated number of working children coincides with the number of those, who stated the age when they started to work, we can say that the way we define child labor is credible.

The second dependent variable, which is also binary, is aimed to highlight the schooling decisions of children in the sample. In this case, we state that $y_{i,schooling}$ is equal to 1 if the child reported being enrolled in school, kindergarten or other educational institution and zero otherwise. The data shows very high school enrolment rate, in particular 96.7% of all children in the sample confirmed being enrolled in one of the educational institutions stated in the Questionnaire. Unfortunately, we are lacking any information connected with school performance, thus the precise effect of child work on educational achievements cannot be measured in this work

4.2 Independent variables

For convenience' sake all the explanatory variables are grouped by two dimensions: child-related regressors, and those concerning household's living conditions.

4.2.1 Child-related independent variables

All children in the sample are 5-17 years old with the mean value 10.8 and a standard deviation of 3.73 years. According to categorization used in the Survey, 40.33% of the dataset is devoted to children from 5 to 9 years on, and the remaining 59.67% are formed by children 10-17 years old.

Due to a wide recognition in the academic literature regarding child labor (Kuépié, 2018; Haile, 2011; Basu et al., 2010) we also introduce age as an explanatory variable to our model. In line with the literature, we expect the relationship between child's decision to join the labor force and age to be positive. Our hypothesis is also supported by the Figure 1: with the rise of age, the number of working children rises.

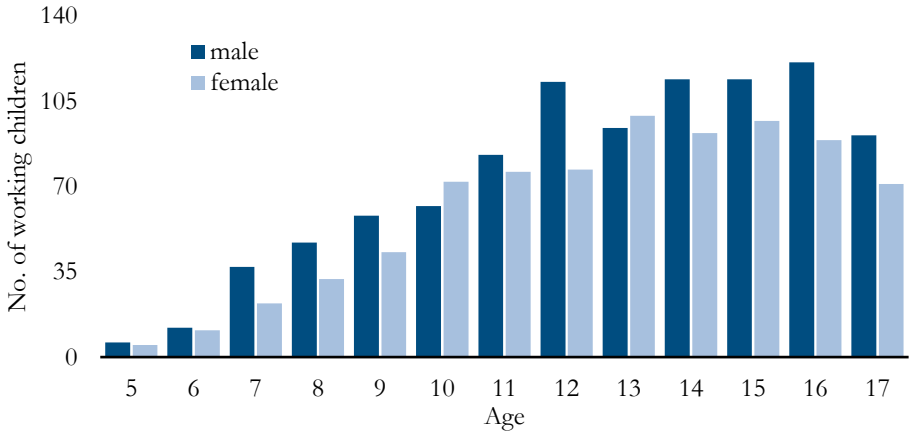

Figure 1. Number of working children by age and gender

Gender, introduced in the model as a dummy variable, is also one of the key explanatory variables used in this field of academic literature. As literature states (Ray, 2000; Webbink, et al. 2012) boys are more likely to be engaged in work rather than girls, which cannot be said towards household chores. In this case, girls are more likely to be engaged in this type of activity in comparison to boys.

As it can be seen from the Figure 1, males are more susceptible to work than females at any age. Thus we hypothesize that positive relationship is indeed present in terms of Ukrainian data.

Besides that, we enrich our model with two additional explanatory variables regarding family composition. Namely, we introduce a dummy variable called «complete family», which is equal to 1 if both parents are present and zero otherwise, and a total number of members in the household. Precisely 75.2% of families in the sample have both parents present, thus are complete ones, while the average number members in household equals to 4.2 (Figure 2). The total number of members in household varies from one to 15. Such variation makes us suspicious, since having 15 members in the household is very rare event. According to distribution, extremely large households which account for 9 and more persons are concentrated in the 99th percentile. Thus we perceive them as outliers and exclude from the sample.

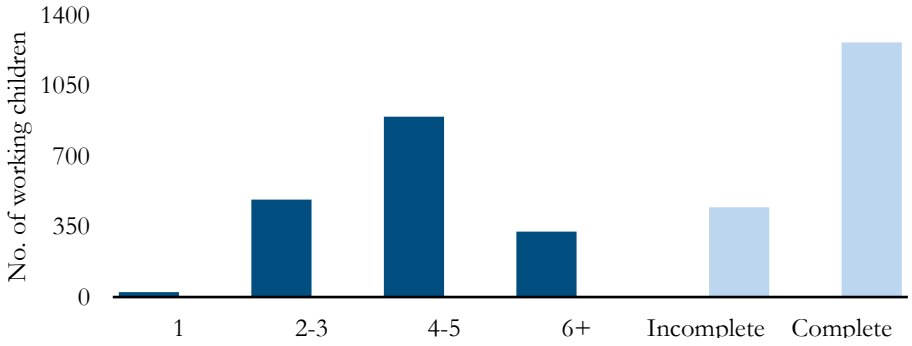

Figure 2. Number of working children by number of household members and family status

In the event of the presence of both parents, we expect the probability of a child going to work be lower. Meanwhile, the increasing number of household members is expected to have an opposite effect, since it might capture financial difficulties that extended families might experience. Even though according to Figure 3 the effect is ambiguous.

4.2.2 Household-related independent variables

Explanatory variables concerning household characteristics play particular interest for us additionally serving as a proxy for the level of income. Unfortunately, data limitations do not let us to include the level of household's income directly to the model. In turn, the Survey provides us with information regarding monthly expenditure and self-assessment of the household's income.

If in the first case we can introduce information regarding household expenditures as dummy variable, then in the second case obtained data might be biased, since people are apt to embellish their income status and omit using it. Taking into consideration the fact that the information regarding household's expenditures is provided by ranges rather than by exact numbers, and our aim to proxy the level of income, we extend our model by dummy called «low monthly expenditures». It equals to one if household indicated having monthly expenditures below 1,500 UAH and zero otherwise. Typically, households with low monthly expenditures are associated with low incomes, therefore we expect the relationship between low expenditures and child work to be positive. Low expenditures can be viewed as a reflection of budget constraints; thus such households will be more susceptible to child labor in order to mitigate insufficient incomes.

We also introduce to the model the explanatory variables aimed to capture the overall welfare of each household, such as: the size of dwellings and land plot owned by household, dummies for subsidy and car ownership.

Both the size of dwelling, where household lives, and land plot it owns enter the model in logarithmic form. This is done to mitigate the undesirable positive skewness of distribution and obtain a symmetric one. Since larger total living area is associated with higher incomes, we expect to obtain a negative association of this regressor with child's positive decision to go to work. In other words, the increase in the living space will reduce the probability for a child to be working.

However, out of the whole sample about 30% of observations stated not owning a land plot, thus provided zero values for the size of the land. To omit cutting dataset noticeably and take into account both households that own a land plot the following procedure was performed. Since we are sure that in this case missing values indeed mean zero land size, but not underreporting the information, we add one to the size of land for all observation in the sample. And only after that transform obtained values to the logarithmic form.

It is worth mentioning, that such explanatory variable as the land plot size is of special interest for us. As it was shown by Basu et al. (2010) land size and number of hours worked by a child appear to be in the inverted U-shaped relationship. Despite the absence of data regarding hours of work, we are to test the relationship between a child's decision to work and the size of land plot owned by the household, which is expected to be positive. The subsidy dummy helps us to detect vulnerable households in our sample, since such subsidies were introduced in Ukraine with the purpose to lower the burden which "low-income" households face from increased tariffs on utilities. This regressor equals to 1 if the household receives a subsidy to pay for the dwelling, gas or other utilities.

We additionally introduce two dummies to the model as controls: livestock dummy which equals to one if household owns any kind of livestock, and car dummy which equals to one if household owns a car. If the first dummy is supposed to strengthen the effect that comes from subsistence farming, then

the second one is aimed at capturing the level of household's income. For instance, poorer households are not able to afford buying a car.

As we are aiming not only to evaluate the effect of household characteristics on child labor, but also to understand how this effect varies across Ukraine, we intentionally control for the place of residence of a household. If to be precise we are estimating the effects separately for households that live in rural and urban areas, as well as look on the whole sample. In line with literature (Webbink, et al. 2012, Basu et al., 2008), we expect households from rural areas, in particular in villages, to show stronger effects in comparison to urban areas, and, as a result, higher probabilities of having children engaged in the labor due to income constraints.

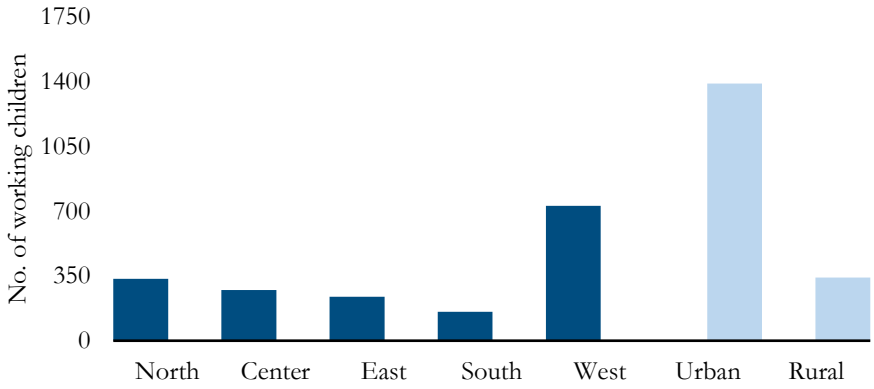

Figure 3. Number of working children by region and locality status

Apart from controlling for the place of residence we include to the model dummies for the regions of Ukraine, in particular North, South, East and West. The 5th Central region is not included into the model in order to avoid multicollinearity. We expect regions to have different effects on child labor, since the level of engagement in subsistence farming and household's characteristics vary across Ukraine.

Before we proceed to the model estimation, we check all variables that ought to be used in the model for the presence of multi-collinearity problem. According to correlation matrix all correlation coefficients between chosen variables are below 0.5. Thus we can make a conclusion that variables introduced to the model do not suffer from multi-collinearity problem.

Chapter 5

ESTIMATION RESULTS

To estimate equation (7) the individual-level data from the "Ukraine national child labor survey" (2014-2015) is used. For this research, we separately control for the locality status and estimate bivariate probit model for 3 cases: for all households in the sample («Full» model), for those who live in rural areas («Rural» model), and those who live in urban areas («Urban» model).

Due to the peculiarities of used model, the interpretation of empirical results is divided into two parts: at first, we comment on the signs of estimated coefficients, as well as, discuss the correlation coefficients between dependent variables - child work and schooling. After that, we take a close look at the marginal effects of explanatory variables to comment on their magnitudes and significance. To account for possible problem of heteroscedasticity in bivariate probit model we use robust standard errors.

5.1 Effects and trade-off between child labor and schooling

The very first conclusion that can be made after looking at the estimation results (see Table 2) is that all three models coincide in signs. This means that associations between key dependent variables and regressors are «locality-invariant» (remain unchanged across the household's place of residence). As all the associations are similar in their directions, we for convenience concentrate the discussion of results on the «Full» model for a while.

Overall, the obtained results support stated before assumptions regarding the directions of effects of explanatory variables on child labor. In terms of crucial child-related regressors we, as expected, obtained opposite signs for age and gender. If in the first case, as the older child gets as higher, the probability of a

child's positive decision to start working becomes, than being female, on the contrary, decreases this probability.

Table 2. Bivariate probit, child labor and schooling, children aged 5–17

	Full		Rural		Urban	
Explanatory variable	Child work	Schooling	Child work	Schooling	Child work	Schooling
Age	0.152***	0.081***	0.155***	0.072***	0.152***	0.107***
	(0.006)	(0.014)	(0.007)	(0.015)	(0.011)	(0.029)
Female	-0.120***	-0.025	-0.087*	-0.039	-0.191**	0.037
	(0.040)	(0.067)	(0.047)	(0.081)	(0.076)	(0.121)
Complete family	-0.139***	0.147*	-0.102*	0.173*	-0.238***	0.032
	(0.049)	(0.081)	(0.061)	(0.098)	(0.090)	(0.152)
No. of members in household	0.044**	-0.022	0.027	-0.029	0.077**	0.036
	(0.017)	(0.029)	(0.019)	(0.034)	(0.035)	(0.056)
Positive attitude towards child work	0.508***	0.029	0.602***	-0.008	0.347***	0.046
	(0.068)	(0.088)	(0.080)	(0.119)	(0.114)	(0.148)
Log(flat size)	-0.168**	-0.059	-0.237***	-0.003	-0.189*	-0.264*
	(0.055)	(0.086)	(0.067)	(0.114)	(0.104)	(0.138)
Log(land size)	0.171***	-0.098***	0.087***	-0.049	0.301	0.036
	(0.018)	(0.028)	(0.022)	(0.034)	(0.045)	(0.065)
Livestock	0.755***	0.104	0.548***	0.290**	0.655	-0.171
	(0.066)	(0.103)	(0.089)	(0.119)	(0.111)	(0.200)
Car	0.086*	0.169**	0.135**	0.119	0.007	0.278*
	(0.047)	(0.085)	(0.056)	(0.103)	(0.091)	(0.145)
Low expenditures	0.173***	0.003	0.187***	-0.065	0.063	0.279*
	(0.042)	(0.072)	(0.049)	(0.087)	(0.085)	(0.155)
Subsidy	0.293***	-0.099	0.399***	-0.066	0.109	-0.267
	(0.082)	(0.134)	(0.105)	(0.173)	(0.150)	(0.206)
North	0.379***	0.109	0.323***	0.029	0.577***	0.188
	(0.069)	(0.129)	(0.086)	(0.161)	(0.121)	(0.226)
South	-0.303***	-0.211*	-0.383***	-0.144	-0.102	-0.331
	(0.078)	(0.125)	(0.088)	(0.155)	(0.171)	(0.208)
East	0.123	-0.058	0.038	-0.017	0.278**	-0.116
	(0.072)	(0.121)	(0.088)	(0.156)	(0.131)	(0.198)
West	0.082	-0.046	0.142**	-0.081	0.050	-0.066
	(0.059)	(0.110)	(0.071)	(0.132)	(0.119)	(0.197)
Constant	-3.312***	1.503***	-2.639***	1.089**	-3.337	1.838***
	(0.232)	(0.367)	(0.311)	(0.526)	(0.400)	(0.607)
Observations	5,930		3,408		2,522	
Correlation coefficient (ρ)	0.117**		0.198***		-0.147	
	(0.056)		(0.0585)		(0.132)	
Wald test ρ =0	χ^2=4.2765 Prob > χ^2 = 0.0386		χ^2= 11.489 Prob > χ^2 = 0.0007		χ^2= 1.2399 Prob > χ^2 = 0.2655	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Supplementary child-related explanatory variables also provide us with logical and predictable linkages. More precisely being raised in a complete family

indeed decreases the probability of child work. Meanwhile, the increase in the number of members in the household increases the chances for a child to be engaged in work activities in terms of the «Full» model.

Moving to the discussion of the effects of key household characteristics on child work, the following results should be mentioned. The flat size in logarithmic form is the only household-specific explanatory variable that reduces the chances of a child to be working. Such a result coincides with the literature and our hypotheses, as this regressor potentially captures the variation in wealth across the households in the dataset. On the contrary, the household-related explanatory variable of our concern such as logged land size is in direct relationship with child work: the increase in the size of the land plot increases the probability of child work. Not surprisingly that the dummy for livestock ownership works in the same direction as the logged size of the land plot. Both of these regressors reflect the household's engagement in subsistence farming, which is known to attract the use of child labor.

Interestingly that region dummies are the only which start to differ in their effects, as well as, significance if the locality is controlled for. For rural area living in the North or West increases the probability of child work, meanwhile living in South region decreases such chances. And only East dummy is statistically insignificant. On the contrary, in the case of urban locality, two regions are statistically significant and show a positive relationship with child work. If to be precise, leaving in the North or East region boosts the probability of child labor.

In the same time, the second equation, which represents the schooling decisions, provides us occasionally with unexpected signs and mostly insignificant results in all three models. However, the obtained signs and significance levels for regressor in this part of the model do not arise much concern from our side, since we are focused on the determinants of child labor and effects connected with them. A possible explanation for the obtained results in the «schooling» equation across all three models can be hidden in very

high rates of school participation among children in the sample, and thus used regressors have weak explanatory power.

The correlation coefficient between the two dependent variables is what interests us in the bivariate probit the most. It barely means that a child's decision to go to work affects his/her decision regarding going to school in a negative, as we hypothesize, or in a positive way. However, as we proceed to discuss the existence of a trade-off between work and schooling decisions, the results start to differ as we control for the locality.

For the «Full» model, the correlation coefficient between error terms of two dependent variables equals to 0.117 and is statistically significant according to the Wald test. The obtained result confirms that there is a relationship between two outcomes, and some unobserved factors are positively associated with both child work and schooling. As we start to control for locality and look separately on households located in rural areas, we observe the rise in the value of correlation coefficient to 0.198, as well as, it's significance. Even though under urban locality this coefficient gives us desirable negative sign and equals to -0.147, it is completely statistically insignificant, meaning that two equations, in this case, should be estimated separately.

Even though the obtained results contradict existing literature, and we are forced to reject our main hypothesis that there exists a negative trade-off between child work and schooling decisions, they reflect the real state of affairs in Ukraine. In fact, the explanation is covered under the features of child labor in Ukraine, as well as, the dataset itself. The strong positive correlation coefficient between child labor and schooling can be interpreted in the following way: on average, and especially in the rural areas, children are more likely to combine work and schooling, rather than sacrifice schooling due to work activities. On the contrary, the results from the «Urban» model show that children living in urban areas are not at risk of sacrificing school attendance due to engagement in work.

Unfortunately, we are not able to evaluate the direct effect of child work on school performance, which would be a much more accurate measure, due to data limitations. However, the results we obtained are supported by the data. Thus the number of children that combine work and schooling is higher in the rural areas in comparison to the urban ones, 912 and 145 children respectively.

Overall, all three models fit the data well. In the case of «Full» model Wald χ^2=1383.04 with p<0.0000. Under rural and urban localities Wald χ^2 equals to 741.80 and 412.78 respectively with p<0.0000 in both cases.

In order to conduct robustness check, we replaced dummies representing four large regions (North, South, East, and West) by 24 dummies generated separately for each oblast in Ukraine. As an additional robustness check we reduced our model primarily to key independent variables (see Appendix B). Since the sings of effects remained unchanged, and magnitudes experienced minor fluctuations in both cases, we can conclude that our model provides robust results.

5.2 Marginal effects for Bivariate probit model

Since it is impossible to make judgements regarding magnitudes of the effects just by looking on the output from bivariate probit, we estimate marginal effects. For this work all marginal effects were calculated at mean values as it was done by Haile (2011), and Chisadza (2015). For each model the combination of four of marginal effects is calculated:

- Child work=0, Schooling =0
- Child work=0, Schooling=1
- Child work=1, Schooling=0
- Child work=1, Schooling=1

As we move to the discussion of results, we focus our attention primarily on the marginal effects where both child work and schooling equal to one,

meanwhile the full list of marginal effects can be found in the Appendixes. As we hypothesize the effects to be stronger for households whose place of residence is a rural area, we discussion obtained results by comparing households that live in rural and urban areas (see Table 3).

Table 3. Marginal Effects for Bivariate probit model

	Full Sample	Rural Locality	Urban Locality
Explanatory variable	Marginal effects Work & School	Marginal effects Work & School	Marginal effects Work & School
Age	0.042***	0.057***	0.018***
	(0.002)	(0.002)	(0.001)
Female	-0.033***	-0.032*	-0.022**
	(0.011)	(0.017)	(0.009)
Complete family	-0.037***	-0.034	-0.028***
	(0.014)	(0.022)	(0.010)
No. of members in household	0.012**	0.009	0.009**
	(0.005)	(0.007)	(0.004)
Positive attitude towards child work	0.139***	0.219***	0.041***
	(0.018)	(0.029)	(0.013)
Log(flat size)	-0.046***	-0.086***	-0.022*
	(0.015)	(0.025)	(0.012)
Log(land size)	0.046***	0.031***	0.035***
	(0.005)	(0.008)	(0.005)
Livestock	0.207***	0.204***	0.075***
	(0.018)	(0.033)	(0.013)
Car	0.025*	0.051**	0.002
	(0.013)	(0.021)	(0.011)
Low expenditures	0.047***	0.067***	0.008
	(0.012)	(0.018)	(0.009)
Subsidy	0.079***	0.144***	0.012
	(0.023)	(0.038)	(0.017)
North	0.105***	0.108***	0.068***
	(0.019)	(0.032)	(0.014)
South	-0.084***	-0.142***	-0.012
	(0.022)	(0.032)	(0.019)
East	0.033*	0.014	0.032**
	(0.019)	(0.032)	(0.015)
West	0.022	0.051*	0.005
	(0.016)	(0.026)	(0.014)
Observations	5,930	3,408	2,522
Predicted Probability of outcome	0.2701	0.3043	0.2934

Namely marginal effects show that the probability of combining work and school rises with the years of life for children in rural areas by 5.7%. Meanwhile, the analogical increase in age results only in 1.8% rise of such probability in rural areas. In its turn, being a girl who lives in urban areas decreases the likelihood of combining work with schooling by 2.2%. Interestingly that under rural locality gender is less statistically significant, however, decreases probability of outcome by 3.2%. Additional child-related independent variables that are observed also vary in significance and signs. If under rural locality being raised in a complete family and increase in the number of household's members does not affect work and schooling decisions. Then both of these regressors are statistically significant if a child lives in urban area. Under such conditions being raised in complete family reduces the probability of combining work and school by 2.8%, meanwhile additional member in household increases this probability by 0.9%. Interestingly, that parents' positive attitude to child work, in fact, encourages child work and thus increases the probability of combining work and schooling more in urban areas rather than in rural ones. The probability increases by 4.1 and 2.19% respectively.

If we consider household related characteristics, then the effects start to differ noticeably. As we expected the size of flat and land plot have opposite effects on the probability of combining work and schooling. With the increase of flat-size the probability of child labor decreases by 8.6% in a rural area, however, in an urban area, such effect results only in drop by -2.2% and is statistically significant at the 10% level. At the same time, the increase of land size pushes up the probability of combined child work and schooling both in rural and urban areas. The fact that is again slightly stronger for urban areas (3.5%) in comparison to the rural areas, which account for a 3.1% rise. Overall, we should understand that despite these two regressors effects provide us with expected signs and are statistically significant at the essential level, correct magnitudes of impact coming from the size of a flat and land plot are very moderate in economic terms.

Interestingly, that ownership of livestock is highly statistically significant in both cases, and the magnitude is higher for the rural locality. With statistical significance at the level of 1% the coefficients for livestock equal to 0.204 and 0.075 respectively in rural and urban areas. This means the following: if the household owns any livestock, the probability of child combining work and school increases by 20.4% in rural areas and 7.5% in an urban area. Such strong positive effect for urban areas might be explained by the possibility of having a land plot and some livestock even though household lives in the city.

The considerable difference is observed regarding the magnitudes of subsidy dummy, in particular receiving a subsidy in a rural area increases the probability of child's engagement in work by 14.4% and is statistically significant at 1% level, while is completely statistically insignificant if the locality is urban. The same situation is observed if we are talking about dummy for low expenditures. It is entirely statistically insignificant under urban locality. Meanwhile, it results in the rise of the probability of combining work and school by 6.7% in rural areas. Such results let us make a conclusion that income-related characteristics of households do not affect much child's decision to work in case of urban locality, which cannot be said regarding rural areas.

And finally, region dummies also show variation across the locality. Living in the rural area in the North of Ukraine increases the probability of child labor by 10.8%, meanwhile living in the rural area in the South decreases the probability by 14.2%. In the same time, living in urban areas in the North of Ukraine increases the likelihood of combining child work with schooling by 6.8%. Overall, we can say that the prevailing number of explanatory variables confirm our hypothesis that effects have stronger magnitudes in the rural areas.

In the end, we would like to comment briefly on the predicted probabilities of outcomes, as they support our findings by varying across localities (see Appendix C). The predicted probabilities of going to work only or participating in neither of two activities are extremely low and does not exceed 4% level for both localities, as well as, for the whole sample. However, we are interested in

the predicted probability that reflects participation in work and schooling simultaneously, and here findings described above are confirmed. As we start to control for the locality, the predicted probability of joint participation in work and schooling rises from 29,34 % in urban areas to 30,43%. Meanwhile, the predicted probability of attending school only moves in opposite direction: drops from 68,85% in urban areas to 65,60% in rural ones.

Chapter 5

CONCLUSIONS

In this study we investigate the issue of child labor in Ukraine. In particular, we estimate how living conditions of households affect the child's decision regarding work, as well as, check whether there exists a trade-off between work and schooling decisions for children in Ukraine. The study is based on the individual-level data from the "Ukraine national child labor survey" (2014-2015) and uses bivariate probit model to answer the main research question of whether household characteristics indeed influence child's decisions regarding work. We control for locality status on purpose, and separately estimate the effects for households that live in urban and rural areas, assuming the obtained effects to be stronger in rural areas.

We can conclude that the characteristics of households affect a child's decision regarding whether to start working or not. However, the association between child labor and schooling decisions in Ukraine does not go along with the literature, which on the contrary predicts the strong presence of trade-off between work and schooling (Zapata, et al. (2010)). In Ukraine children from rural areas are more likely to combine work and schooling, whereas in urban areas such relationship is not observed, as well as, negative trade-off itself.

The inconsistency with the literature, which also questions the issue of child labor can be explained in the following way. The prevailing majority of existing literature that explores the issue of child labor focuses on developing countries located in Asia and Africa. However, Ukraine, being a transition country, is at a much higher level of development, and thus, the child's decision to start working does not come primarily from survival motives. As a result, children in Ukraine are able alongside schooling to do some part-time work without sacrificing school attendance. Additionally, school enrollment rates are very

high in Ukraine. About 96% of children from the sample we use is enrolled in school, whereas enrollment rates in developing countries might even be below 80%[8]. The developed network of schools creates grounds for high enrollment rates in Ukraine. Whereas inaccessibility of schools in rural areas in developing countries, in its turn, promotes child work instead of schooling.

This study also provides an in-depth analysis of other important factors that affect child labor in Ukraine. For example, this work shows that in rural areas, where the prevailing number of households has low incomes or even can be perceived as vulnerable ones, children are more at risk of child work. From the policy perspective, an introduction of irrevocable monetary monthly payments to vulnerable households with children can be used to overcome the problem of child labor in Ukraine. Such a step will ease the income constraints this cohort faces and thus discourage them from sending children to work. However, such a solution might be costly and is likely to unambiguous effect.

Another interesting finding is related to the importance of family composition. Unlike the rural areas, the decisions of children living in urban areas are almost unaffected by income-related characteristics of households, but stay under the impact of family-related ones. In other words, our findings suggest that children who are being raised in incomplete families have higher chances to be compelled to work activities to provide financial help for the family in urban areas. However, the main aim here is not to increase the incomes of single-parent families to sufficient level, but to encourage children from such families not to give up schooling in favor of work. Thus, as a policy intervention, an introduction of school scholarships explicitly developed for children from single-parent families might become a well-functioning incentive. From the one side, a child receiving such scholarship will have a feeling of being able to help

[8] https://ourworldindata.org/primary-and-secondary-education

his or her parent, and on the other hand, he or she will get an incentive to perform better on classes in order to receive this scholarship.

The last point that is worth mentioning is that the number of working children in the sample that receive a monetary reward for their work does not exceed 17%. Apart from the cohort of children who are engaged in family businesses and thus might not be paid, there is a noticeable share of children that are involved in market activities who still do not receive monetary reward for their work. Unfortunately, children engaged in market work activities are not adequately protected and stay at risk of being unpaid at all, as well as, being exploited. Such conclusion supports the recent aim to tighten the Criminal Code of Ukraine in questions related to the protection of working children.

Overall, main complications faced during this study were related to data. The absence of the exact number of hours of work, as well as, any information regarding school performance, did not let us investigate the issue of child labor in the way we were initially planning to. Even though we observe high school enrollment rates, and absence of trade-off between work and school attendance, we cannot argue that there is no adverse effect of child work on school performance. Since even if a child successfully combines work and school, meaning that he or she does not miss classes due to employment, the effect on his or her school performance is unobservable. Such state of affairs gives grounds for further investigations of the issue of child labor in Ukraine.

Among possible extensions of this thesis, the analysis of the effect of child work on human capital in adulthood is the one that worth attention. However, to proceed such analysis, it is necessary to collect additional data by conducting several equivalent surveys with the same sample in future, so it would be possible to capture the effects of work during childhood on education and labor market outcomes of adults. Alternatively, it is possible to develop an entirely new Survey with a broader list of questions, which will be conducted in several waves.

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APPENDIX A.

Table 4. Definition of variables and descriptive statistics

Variable name	Obs	Definition	Mean	Std. Dev
Dependent variables				
Child work	6,397	1 if child confirmed one of the following: work at least for an hour during reference week/or performing listed activities/or work during last 12 month	0.272	0.445
Schooling	6,397	1 if child attends school, kindergarten or other educational institution, 0 otherwise	0.969	0.171
Child-specific independent variables				
Age	6,397	Age of a child, can take values from 5 to 17	10.808	3.731
Female	6,397	1 if child's gender is female, 0 otherwise	0.486	0.499
Complete family	6,397	1 if both parents are present, 0 otherwise	0.737	0.439
No. of members in household	6,397	Number of members in household, restricted to 9 persons	2.368	0.758
Positive attitude	6,357	1 if child's parent/guardian has positive attitude towards child work, 0 otherwise	0.83	0.375
Household-specific independent variables				
Log(flat size)	6,237	Size of the flat owned by household in logarithmic form	3.876	0.416
Log(land size)	4,540	Size of land owned by household in logarithmic form, missing values are substituted by zeros.	2.623	3.213
Livestock	6,357	1 if household owns any kind of livestock, 0 otherwise	0.571	0.495
Car	6,367	1 if household owns a car, 0 otherwise	0.273	0.445
Subsidy	6,357	1 if household receives a subsidy, 0 otherwise	0.055	0.228
Low expenditures	6,013	1 if household monthly expenditures < 1500 UAH, 0 otherwise	0.403	0.49
North	6,357	1 if a child lives in the North region, 0 otherwise	0.178	0.383
South	6,357	1 if a child lives in the South region, 0 otherwise	0.131	0.337
East	6,357	1 if child lives in the East region, 0 otherwise	0.165	0.372
West	6,357	1 if child lives in the West region, 0 otherwise	0.364	0.481

Source: Author's own calculations

APPENDIX B.

Table 5. Robustness check

	Initial Model		Robustness Check 1		Robustness Check 2	
	Child work	Schooling	Child work	Schooling	Child work	Schooling
Age	0.152***	0.081***	0.169***	0.079***	0.164***	0.080***
	(0.006)	(0.014)	(0.006)	(0.014)	(0.005)	(0.013)
Female	-0.120***	-0.025	-0.166***	-0.018	-0.159***	-0.017
	(0.040)	(0.067)	(0.042)	(0.067)	(0.041)	(0.067)
Complete family	-0.139***	0.147*	-0.172***	0.139**		
	(0.050)	(0.081)	(0.053)	(0.081)		
No. of members in household	0.044**	-0.022	0.031*	-0.021		
	(0.017)	(0.029)	(0.017)	(0.029)		
Positive attitude towards child work	0.508***	0.029	0.467***	0.065		
	(0.068)	(0.088)	(0.070)	(0.093)		
Log(flat size)	-0.168**	-0.059	-0.175***	-0.070	-0.131***	-0.036
	(0.055)	(0.086)	(0.057)	(0.087)	(0.053)	(0.085)
Log(land size)	0.171***	-0.098***	0.169***	-0.112***	0.323**	-0.082***
	(0.018)	(0.028)	(0.019)	(0.029)	(0.013)	(0.020)
Livestock	0.755***	0.104	0.820***	0.138		
	(0.066)	(0.103)	(0.070)	(0.104)		
Car	0.086*	0.169**	0.096**	0.156*		
	(0.047)	(0.085)	(0.049)	(0.085)		
Low expenditures	0.173***	0.003	0.079*	0.014		
	(0.042)	(0.072)	(0.045)	(0.073)		
Subsidy	0.293***	-0.099	0.328***	-0.086		
	(0.082)	(0.134)	(0.086)	(0.136)		
North	0.379***	0.109				
	(0.069)	(0.129)				
South	-0.303***	-0.211*				
	(0.078)	(0.125)				
East	0.123	-0.058				
	(0.072)	(0.121)				
West	0.082	-0.046				
	(0.059)	(0.110)				
Constant	-3.312***	1.503***	-3.246***	1.519***	-2.902***	1.665***
	(0.232)	(0.367)	(0.228)	(0.365)	(0.217)	(0.358)
Oblast dummies	No		Yes		Yes	
Observations	5,930		5,930		5,930	
Correlation coefficient (ρ)	0.117**		0.137**		0.142**	
	(0.056)		(0.06)		(0.060)	
Wald test ρ=0	χ^2 = 4.27652 Prob > χ^2 = 0.0386		χ^2 = 4.75398 Prob > χ^2= 0.0292		χ^2 = 5.39578 Prob > χ^2 = 0.0202	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX C.

Table 6. Marginal effects for Bivariate Probit Model

	"Full" Model				"Urban" Model				"Rural" Model			
	Marginal effects Neither	Marginal effects School only	Marginal effects Work only	Marginal effects Work & School	Marginal effects Neither	Marginal effects School only	Marginal effects Work only	Marginal effects Work & School	Marginal effects Neither	Marginal effects School only	Marginal effects Work only	Marginal effects Work & School
Age	-0.004***	-0.038***	0.0001	0.042***	-0.003***	-0.015***	-1.11e-06	0.018***	-0.005***	-0.053***	0.0002	0.057***
	(0.001)	(0.002)	(0.0001)	(0.002)	(0.0005)	(0.001)	(0.0001)	(0.001)	(0.001)	(0.003)	(0.0002)	(0.002)
Female	0.002	0.032***	-0.0004	-0.033***	-0.0005	0.023**	-0.0005	-0.022**	0.003	0.029*	-0.0001	-0.032*
	(0.003)	(0.011)	(0.0005)	(0.011)	(0.003)	(0.009)	(0.0004)	(0.009)	(0.004)	(0.018)	(0.001)	(0.017)
Complete	-0.006	0.045***	-0.002**	-0.037***	-0.001	0.029**	-0.0006	-0.028***	-0.008	0.046**	-0.004**	-0.034
family	(0.004)	(0.014)	(0.001)	(0.014)	(0.001)	(0.011)	(0.0006)	(0.010)	(0.005)	(0.022)	(0.002)	(0.022)
Members in	0.001	-0.013***	0.0004	0.012**	-0.002	-0.008*	0.0001	0.009**	0.001	-0.012	0.001	0.009
household	(0.001)	(0.005)	(0.0002)	(0.005)	(0.004)	(0.004)	(0.0002)	(0.004)	(0.002)	(0.007)	(0.001)	(0.007)
Positive	-0.004	-0.138***	0.002**	0.139***	-0.002	-0.039***	0.0006	0.041***	-0.005	-0.219***	0.006**	0.219***
attitude	(0.004)	(0.019)	(0.001)	(0.018)	(0.004)	(0.014)	(0.0006)	(0.013)	(0.006)	(0.029)	(0.002)	(0.029)
Log(flat size)	0.004	0.043***	-0.0004	-0.046***	0.007*	0.015	0.0004	-0.022*	0.002	0.086***	-0.002	-0.086***
	(0.004)	(0.015)	(0.001)	(0.015)	(0.004)	(0.013)	(0.0005)	(0.012)	(0.006)	(0.025)	(0.002)	(0.025)
Log(land size)	0.004***	-0.051***	0.002***	0.046***	-0.002	-0.034***	0.0005*	0.035***	0.002	-0.034***	0.0016**	0.031***
	(0.001)	(0.005)	(0.0003)	(0.005)	(0.002)	(0.006)	(0.0003)	(0.005)	(0.002)	(0.008)	(0.001)	(0.008)
Livestock	-0.008*	-0.202***	0.003***	0.207***	0.003	-0.081***	0.002*	0.075***	-0.021***	-0.184***	0.0002	0.204***
	(0.005)	(0.018)	(0.0009)	(0.018)	(0.005)	(0.014)	(0.001)	(0.013)	(0.007)	(0.033)	(0.002)	(0.033)
Car	-0.008**	-0.016	-0.001	0.025*	-0.007*	0.006	-0.0008	0.002	-0.007	-0.072***	-0.001	0.051**
	(0.004)	(0.013)	(0.001)	(0.013)	(0.004)	(0.011)	(0.001)	(0.011)	(0.006)	(0.018)	(0.002)	(0.021)
Low	-0.001	-0.047***	0.001	0.047***	-0.007*	-0.0001	-0.001	0.008	0.002	-0.149***	0.003*	0.067***
expenditures	(0.003)	(0.012)	(0.0005)	(0.012)	(0.004)	(0.011)	(0.001)	(0.009)	(0.004)	(0.038)	(0.002)	(0.018)
Subsidy	0.003	-0.085***	0.002**	0.079***	0.007	-0.019	0.001	0.012	0.0001	-0.116***	0.005	0.144***
	(0.006)	(0.023)	(0.001)	0.042***	(0.005)	(0.018)	(0.001)	0.018***	(0.009)	(0.032)	(0.003)	(0.038)

Table 6. Continued

	Full Sample				Urban Locality				Rural Locality			
	Marginal effects Neither	Marginal effects School only	Marginal effects Work only	Marginal effects Work & School	Marginal effects Neither	Marginal effects School only	Marginal effects Work only	Marginal effects Work & School	Marginal effects Neither	Marginal effects School only	Marginal effects Work only	Marginal effects Work & School
North	-0.007	-0.099***	0.001	0.105***	-0.006	-0.062***	0.068***	0.071***	-0.004	-0.132***	0.002	0.108***
	(0.006)	(0.019)	(0.001)	(0.019)	(0.006)	(0.015)	(0.014)	(0.015)	(0.008)	(0.032)	(0.003)	(0.032)
South	0.011*	0.073***	0.0001	-0.084***	0.008	0.003	-0.012	-0.008	0.011	0.131***	-0.001	-0.142***
	(0.006)	(0.022)	(0.001)	(0.022)	(0.005)	(0.021)	(0.019)	(0.019)	(0.008)	(0.033)	(0.003)	(0.032)
East	0.002	-0.036*	0.001	0.033*	0.002	-0.035**	0.032**	0.035	0.001	-0.015	0.001	0.014
	(0.006)	(0.021)	(0.001)	(0.019)	(0.005)	(0.016)	(0.015)	(0.016)	(0.008)	(0.033)	(0.003)	(0.032)
West	0.002	-0.025	0.0007	0.022	0.002	-0.007	0.005	0.008	0.003	-0.056**	0.002	0.051*
	(0.005)	(0.017)	(0.001)	(0.016)	(0.005)	(0.014)	(0.014)	(0.014)	(0.007)	(0.027)	(0.002)	(0.026)
Observations	5,930	5,930	5,930	5,930	2,522	2,522	2,522	2,522	3,408	3,408	3,408	3,408
Predicted Probability of outcome	0.0247	0.7003	0.0047	0.2701	0.0138	0.6885	0.0043	0.2934	0.0359	0.6560	0.0049	0.3043

Notes: Marginal effects are computed at the mean values of the respective variables and sum to zero across the four possible categories. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1