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Abstract

This paper provides evidence on the extent of child labor in Tunisia, its determinants and its impact on schooling. It shows that 5.87% of the target population are involved in work. A rate which may increase in the future if policy-makers and stakeholders do not take adequate measure to protect children's rights to a decent life and to a better education. In this paper, and using TLMPS data (2014), we show the "atypical" picture of Tunisia regarding this phenomenon. First, child labor is mostly an urban phenomenon: the impact of poverty on child labor is more pronounced in urban areas than in rural ones. Second, most children are involved in the service sector with 51.6% in services against only 32.2% in agriculture. And third, poverty is not the main reason to explain child labor family characteristics and the kind of father's job are still significant. Moreover, we provide evidence that working-children are more likely to repeat school-grade and to lag behind grade levels. Likewise, working-children are more at risk to dropout, with girls more affected by dropout than boys.

JEL Classification: J1

Keywords: Child Labor, schooling, dropout, Tunisia

ملخص

تقدم هذه الورقة دلائل على مدى عمل الأطفال في تونس ومحدداته وأثره على التعليم. وتبين أن 5.87٪ من السكان المستهدفين يشاركون في العمل. وهو معدل قد يزداد في المستقبل إذا لم يتخذ صانعو السياسات وأصحاب المصلحة تدابير كافية لحماية حقوق الأطفال في حياة كريمة وإلى تعليم أفضل. في هذه الورقة، وباستخدام بيانات المسح التتبعي لسوق العمل في تونس (2014)، نعرض الصورة "غير النمطية" لتونس بشأن هذه الظاهرة. أولا، يعتبر عمل الأطفال ظاهرة حضرية في الغالب: فأثر الفقر على عمل الأطفال أكثر وضوحا في المناطق الحضرية منه في المناطق الريفية. ثانيا، يشارك معظم الأطفال في قطاع الخدمات بنسبة 51.6٪ في قطاع الخدمات مقابل 32.2٪ فقط في قطاع الزراعة. وثالثا، فإن الفقر ليس هو السبب الرئيسي لشرح خصائص أسرة عمل الأطفال ونوع عمل الأب لا يزال اثره كبيرا. وعلاوة على ذلك، فإننا نقدم أدلة على أن الأطفال العاملين هم أكثر عرضة لتكرار الصف الدراسي والتخلف عن مستويات الصف. وبالمثل، يكون الأطفال العاملون أكثر تعرضا لخطر التسرب، حيث تتأثر الفتيات أكثر من البنين.

1. Introduction

Since 1959, the UN General Assembly adopted the Declaration of Children's Rights, representing the first major international consensus on the fundamentals of children's rights. The 1989 UN International Convention on Children's Rights has been ratified by 193 states out of 195[1]. However, more than twenty-seven years later, millions of children are in the labor market. According to Humanium[2], worldwide, there are nearly 250 million working children even though international statistics (ILO 2012) indicate that their percentage decreased from 17.6% to 11.8% between 2000 and 2012.

The fight against child labor is making progress, but not enough to eliminate the worst labor forms[3]by 2016 as already set by the ILO[4].

The academic literature on child labor and its impact on school attendance and educational performance is very rich; Patrinos H. A. and Psacharopoulos G. (1995), Edmonds, Eric (2002), Heady C. (2003) are important contributions. For the MENA region, only few empirical studies have been conducted regarding this issue, and they focus mainly on Egypt and Jordan.

Statistics on Tunisian child labor are rare making it difficult to determine its prevalence and its nature. TLMPS 2014 provides valuable information on children's participation in paid and unpaid activities inside or outside the family.

This paper is structured in two sections. The first consists of a descriptive overview of the determinants of child labor in Tunisia. We first propose international definitions for legal minimum age and child labor. We justify in this context the adoption of the 16-year age limit for the Tunisian case. Then we analyze according to TLMPS's results the characteristics and determinants of child labor in Tunisia. We find that 5.9% of all interviewed children work according to the extended definition[5]. We analyze the structure of children laborers by region, rural-urban area and gender. Poverty in Tunisia is not the main determinant of children's labor. However, poverty is more closely associated with child labor in urban that in rural area. When analysing the impact of sociodemographic determinants, we show that the father's role remains crucial in the prevention of children against labor. Nonetheless, it is only when the father is absent that children are exposed to child labor. At the end of this first section we use logit regressions to determine child labor determinants. Personal characteristics, family conditions and geographic factors are deemed to be the most important.

The second section attempts to disentangle the links between work involvement and school. We begin by providing some key indicators about child labor and schooling in Tunisia. After that, a multivariate analysis of child labor on grade repetition is conducted to assess the linkages

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[1]The United States and Somalia are the only countries in the world to have signed but not ratified it.

[2] An international child sponsorship NGOs committed to ending violations of children's rights worldwide. Website: http://www.humanium.org/

[3]The worst forms of child labor as defined by Article 3 of ILO Convention No. 182:

- all forms of slavery or practices similar to slavery, such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labor, including forced or compulsory recruitment of children for use in armed conflict;
- the use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic performances;
- the use, procuring or offering of a child for illicit activities, in particular for the production and trafficking of drugs as defined in the relevant international treaties;
- work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children.

[4] In 2006, the ILO Governing Body has set 2016 as the deadline for the elimination of the worst forms of child Labor. ILO (2011)

[5]According to the market definition, the question asked is: did you participate in any activity during the past seven days (or 3 months for extended market definition) with the purpose of sales/marketing/earning wage. According to the Extended definition the question asked is : did you participate in any activity during the past seven days (or 3 months for extended market definition) with the purpose of sales/marketing/earning wage/helping in a family business (even if for a short period or irregularly)?

between child labor and grade repetition. Following that, we provide evidence on the risk of dropping out associated with child labor, first for the whole sample, second by gender, third by area of residence and finally by the regions of Tunisia[6]. The last section gives an assessment of the magnitude of the risk of dropping out due to child labor. Section 4 concludes.

2. Child Labor

2.1. Child labor: definition, minimum age and magnitude in Tunisia

Child labor may actually be more or less tolerated. Hence, we distinguish two types of child labor:

- "Acceptable» or "light" work which does not prevent normal education of the child. It takes place in the family context and does not exclude education;
- And "unacceptable" work which is time-consuming. It affects the very young, and exposes young individuals to risks and hazards.

According to the conventions 138 and 182 of the International Labor Organization, "unacceptable" child labor is a form of exploitation that violates children's and adolescents' fundamental rights. Itis performed on the market or inside the family, whether on a regular basis or a temporary basis.

Minimum employment age or minimum age levels must be legally set for different types of activities. To some extent, these age levels may vary according to a country's economic and social situations. In any case, the general minimum employment age should not be less than the compulsory schooling completion age, fixed at 16 years for most countries. This age level should never be fixed below 15 years. However, there are some considerations that may affect this minimum. In some developing countries, 14 years is accepted. When working for few hours and only occasionally, the limit is 13-15 years. This limit becomes 12-14 years in developing countries. Finally, for hazardous work, the limit is extended to 18 years (16 years under certain conditions in developing countries).

In the Tunisian case, the TLMPS data base includes1584 children aged 16 years or less corresponding to different reference periods, ie one week or three months. Thus, we have statistics on working children with market definition and with extended definition[7]. The market definition is universally considered in defining an employee. It implies the need for children to work in order to gain vital income to survive. From this point of view, the child under 16 years may be treated as an "active" and occupied. Considered as workers according to the extended definition, those working according to market definition and those who undertake to perform tasks that are not necessarily commercial, but which are essential to meet their basic needs such as domestic work and household tasks inside or outside of the family.

In this paper, the age of 16 years old is justified by the law for compulsory basic education. A child must stay in school until age 16 or until he/she finishes lower secondary education.

Figure 1 shows that the prevalence of child labor is growing with age: 68.8% of working children are aged between 15 and 16 years.

Table 2 summarizes data on the situation of child labor according TLMPS. Obviously, the number depends on whether the definition is broader or narrower and the reference period is shorter or longer. According to the market definition with one week as reference period, only 49 children are working. This number rises to 93 children according to the broad definition with a reference period of three months.

[6]There are seven regions: Greater Tunis, North East North West, Center East, Centre West South East and South West.

[7]As mentioned above it means broad definition that includes unpaid household services

TLMPS (2014) data reveals that 5.87% are working. This rate is lower than the international average which is 11.8% reported by the ILO in 2012. TLMPS (2014) represents a unique source of data for analysing child labor determinants in Tunisia.

The estimated number of all children aged 6 to16 years and who are neither in school nor in training in 2014 is 183,000[8], which corresponds to 11.2% of the total individuals between 6 and 16 years. Assuming that the distributions for occupied children is homogeneous, the total number of children workers is 95160 according to the extended definition and 60455according to the market definition.

2.2. Determinants of child labor according to TLMPS

Reviewing the literature and synthesizing the various empirical studies on child labor, we distinguish economic, demographic, institutional and cultural factors.

2.2.1. Poverty and rural/urban areas

The studies conducted, mainly in Africa[9], on the relationship between poverty and child labor at an early age show that the proportion of economically active children (5-14 years) is significantly higher in "poor" households than in “non-poor” households.

In Tunisia, wealth quintiles analysis for all households reveals the existence of a concentration of 83.9% of children working in the first three quintiles. This concentration is significantly more pronounced in urban areas than in rural areas. It appears that the low standard of living of the family leads children to work more in urban areas than in rural ones.

From this point of view, we can say that the less wealthy households impel relatively more their children to work. These results suggest that the impact of poverty on child labor is further felt in urban than in rural areas.

However, if we do not take into consideration the wealth quintiles, the employment rate of children in rural areas appears significantly higher than in urban areas. It is clear that child labor prevalence is higher in rural areas, but this should not be explained primarily by poverty. The impact of access to parallel activities, informality, household chores, family work and the difficulties of access to school are more significant factors.

2.2.2. Child labor by regions

Figure 3 shows that South West and Centre East regions have the highest proportions of working children. However, the lowest rates are found in the North and the South East. Moreover, the North West and the Centre West have similar rates which are below the global average of 5.9%.

Now, trying to find a link between the region’s poverty line (as provided by the INS 2010) and the employment rate of children [10](Figure 4), we did not find any clear relationship between the two variables (poverty rate employment of children by region). It is only in the South West region that we notice a high employment rate of children and high poverty level. Paradoxically, the Centre-East region, where the poverty level is the lowest, child employment rate is among the highest (almost twice the global average). Overall, there is a negative but weak correlation between poverty and child labor as shown in Figure 4.

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[8] The method for estimating that number is based on the total of children enrolled in private and public, the rate of school dropouts and acceptance to training centres at the age of 16 years.

[9]Vissého ADJIWANOU (2005) Impact de la pauvreté sur la scolarisation et le travail des enfants de 6-14 ans au Togo; Moussa KEITA (2004) Pauvreté et arbitrage entre scolarisation et travail des enfants au Mali Jean-Pierre Lachaud(2005) Le travail des enfants et la pauvreté en Afrique : Un réexamen appliqué au Burkina Faso…

[10] Here we must use the division into six regions and not seven (as in Figure 3) to harmonize with the INS data on the poverty line, 2010.

It is assumed that more than 15 hours per week, the task becomes heavy and prevents the child to have a normal life and indulge in his studies.

Figure 5 shows that for regions of the South West and South East there is no working children for more than 30 hours. More than half do not work for more than 15 hours per week. This relatively less alarming situation exists despite relatively high poverty rates.

The North-East region has the highest proportion of working children in extreme conditions according the number of hours:90% work more than 30 hours; 20% work more than 48 hours per week, and the number of children working less than 15 hours falls to zero. In the Centre-East region with a high rate of child workers (10.1%) there are 39.4% who work more than 30 hours per week. In the Centre West region four out of five working children work for less than 15 hours per week. In the North-West region, 46.2% of child workers work for more than 30 hours per week, one third of these children work for more than 48 hours per week.

2.2.3. Child labor and business sectors

We classify workers by type of children's activity. Summary statistics are provided in Table 4. It appears that 51.6% of working children are in the service sector. The agricultural sector has almost one third of children workers. This proportion is significantly lower compared to the world average where 59% of working children are doing agricultural tasks (ILO 2012). Moreover, 16.1% of working children are in the Building and Public Works (BPW) where they are exposed to important risks.

2.2.4. Duality of the production system and informality

In the ILO's Resolution on Decent Work (2002), the term "informal economy" refers to all economic activities conducted by workers and economic units that are not covered, in legislation or practice, by formal arrangements. This means that the law does not apply to them; or even the law is not respected because it is inappropriate, burdensome, or imposes an "undue burden". The structure of the labor market impacts child labor in different ways. First, the existence of an informal economy means that an important part of economic and labor relationships escapes regulation and inspection by competent authorities, which promotes the use and exploitation of child labor. In addition, markets that have a high unskilled labor demand and intensive activities can attract children and adolescents for labor.

In the case of Tunisia and according to TLMPS, 73.2% of working children responded that the work they perform does not require any qualification and 95.3% of child workers are in the informal economy.

2.2.5. Demographic determinants

The literature indicates that families with fewer children have the best conditions to keep them in school and thus are able to protect them against child labor. Finally, migration is also a demographic element that strongly impacts child labor. In general, families that migrate to new locations are attracted by the informal market and poor neighbourhoods, because of rigid and restrictive immigration policies. These factors increase their level of vulnerability, deprive them from support and social protection networks and push them to opt for child labor as a means of facing these difficulties and supplementing their family income.

Child labor by gender

Figure 6 shows that only three out of 10 child laborers are girls. This result implies that boys are more exposed to work in order to help their families.

Overall, 47.5% of working children carry out activities for more than 16 hours per week. For 9% of the working children the task is very heavy in terms of hours per week (48 hours per week). Gender analysis shows that it is rather the boys who perform the most demanding tasks in terms of hours. Indeed, in the 49 to 70 hours' interval, boys account for 11.3% against 4%

for girls. However, 44% of girls work on tasks that require less than 5 hours a week against 32.1% for boys.

The effects of family characteristics

Family characteristics are among the factors that can "push" a child to work. We analyze in the following section the role of father and mother, parents' education level, father's work and the size of the family along with the rank of siblings.

Child labor and presence of the father and / or mother

2.62% of the interviewed children are not living with their mothers. In this group, no child is working. Nonetheless, 13.06% of children are not living with their fathers. Among these, 17.2% are exposed to work. These results highlight the important role played by the father as breadwinner and source of income. Indeed, in the absence of the father the risk of being a child laborer is much higher than in case of the mother's absence.

Child labor and father's education level

Analysis of the structure of working children by father's educational level[11] reveals that higher education levels of the father (secondary) decreases remarkably child participation in the labor force.

By focusing on the influence of the nature of the father's occupation on the child labor, it appears that 43.6% for the fathers of working children are occupied in industry and handicraft as shown in Figure 9. The artisans appear most favorable to the work of their children. However, office workers have rarely their children in the labor force. TLMPS data provides evidence that the child is more exposed to work when the father runs his own business. The reason is that the child will be accompanying the father in his activities.

Child labor and family size

Generally large family can be a determining factor to push the child to work. Liabilities to siblings generate pressure to incorporate activity at an early age. By computing the employment rate of working children by the number of brothers and sisters alive, we can see that these rates increase remarkably with number of siblings. Indeed, for a number from 0 to one brother and 0 to 2 sisters, employment rates are lower than average. However, these rates reach 31.4% when the number of brothers is 4 and 16.7% when the number of sisters is 6.

2.3. Child labor determinants: a global approach by Logit estimations

Up to here the study of child labor determinants was performed by partial approach. Some results need to be tested within a more general framework allowing to take into account simultaneous effects.

We apply the logit estimation technique to integrate the various quantifiable determinants of child labor. For this purpose, three groups of determinants are introduced, namely:

- - Individual characteristics including age and gender;
- - The family effects including the impact of father's education, the father presence in the family, wealth, small or average household size (1-4) and large household size (5-10);
- - Geographic factors with rural area impact and different regions from R1 to R7.

It is known that the logistic regression is non-linear due to the non-linearity of the transfer function and in this case the logistic function. The aim of the estimates is to distinguish between positive and negative effects with respect to a linear frontier, based on a linear combination of variables.

[11] The analysis of the impact of the educational level of the mother is not conclusive because the number of responses is very low

Table 5 provides logit's estimates for a complete model integrating all variables simultaneously (estimate 1) and the two partial models incorporating individual characteristics or the effect of the family (Estimation 2) or geographical factors (estimate 3).

The constant in the model can be interpreted as the "effect" of the reference category. It allows calculating the probability of the dependent variable when all the variables correspond to the terms coded zero.

Overall, results of the various estimates 1, 2 and 3 indicate that individual characteristics related to age and the male effect is positive and highly significant. It is remarkable that the different estimated coefficients do not change too much between the different estimates. From these results we retain that the risk for a child to be occupied increases with age and affects boys more than girls.

In addition to the effects associated to individual characteristics that are statistically significant, we identify among the variables of family characteristics those of wealth that has a negative impact and medium or large households that have positive impacts. The effects remain almost stable with and without the effects of the geographical area. From these results we can say that it is unlikely that children living in relatively high-income households would be workers. However, larger family size increases the risk of child labor. It should be noted that the level of father's education and his presence in the family do not appear statistically significant although we obtain a positive coefficient when the father has a low level of education and a negative coefficient if the father lives in the household, that is the right sign but a non-significant effect.

As for the impact of the region, we can say without risk of error that children living in rural areas are more likely to be employed compared to those living in urban areas.

The nuanced effects appear when analysing the impacts of geographical areas. We note that only the coefficients associated with the Great Tunis region, North East, Central East and North West are significantly different from zero in the estimation number 1 and only the coefficient Great Tunis and North East in the estimation number 3.

Individual characteristics are significant and indicate that boys and older children are more likely to work. The wealth of the family acts negatively while household size acts positively. In the rural areas child labor is larger than in urban areas. However, we identified some effects with the expected sign but not statistically significant, such as the father's education level and his presence in the household. As for the impact of geographical factors, only the effects of the rural areas appear positive and significant. By against the effect of zones from 1 to 7 do not appear strong enough to generate conclusive results.

3. Child labor and Education

3.1. Education characteristics

The Tunisian government has pursued a policy that guarantees the right to education for all children aged 6-16 years. The basic compulsory education in Tunisia lasts for nine years is and is divided into two complementary cycles: the first cycle lasts six years and corresponds to primary education. The official primary school entrance age is 6. The second cycle corresponds to lower secondary and lasts three years. The official entrance age to lower secondary is 12 years[12]. At the end of the basic education, the student can continue her/his education to upper secondary or take a secondary vocational education. Tunisia has a total of 2.199.000 pupils enrolled in primary and secondary education. Of these pupils, about 48% are enrolled in primary education[13]. Though the country has achieved near universal primary education, with

[12] http://uis.unesco.org

[13] http://www.epdc.org/sites/default/files/documents/EPDC%20NEP_Tunisia.pdf.

a primary net enrolment rate at 99% and primary completion rate at 102%, it still encounters problems of grade repetition and drop out among 6-16 years children. For both males and females, the average repetition rate across primary grades is 6.2%[14]. Regarding dropout, the ministry of education launched in 2015 a campaign "The school regains its students"; an initiative characterized by the establishment of robust targets for number of children to return to education as quickly as possible.

Dropout emerges as a major education issue in the developing world since larger numbers of children, most of whom are vulnerable, leave school without acquiring basic skills (UNESCO 2011). Dropout is interrelated to the repetition grade phenomena. Students who repeat grades have a greater tendency to drop out and not to continue to subsequent education cycles. Tunisia is one of the countries that are concerned by these phenomena. Despite the efforts made by the Tunisian government in terms of resources allocated to the education sector[15] regardless of the economic crisis of 2008-2009 and the political changes (OECD 2013), Tunisia continues to exhibit high rates of dropout in lower secondary education. Figure 13 shows the cyclical pattern of the cumulative dropout rate to the last grade of lower secondary general education for both females and males during 1979-2012.

This rate is around 28% and 15% in 2012 for males and females respectively; whereas it was at around 22% in 1979 for both sexes. Thus, it has increased for males by 6 percentage points and decreased by only 7 percentage points for females in 33 years. Nonetheless, the gender gap in the out-of-school population is in favor of girls. In addition, the cumulative dropout rate to the last grade of primary education has recorded a decrease since 1999 for both females and males. However, available data shows that the dropout rate of girls has been increasing since 2009 (Figure 14).

To help identify students at risk of falling off track in their schooling and not completing one of the education cycles, some "predictor" indicators are useful to study. Among these indicators is grade repetition[16]. Figures 15 and 16 show the percentage of repeaters in primary education and lower secondary general education all grades for both females and males. It is worthy to note that the percentage of female repeaters in primary and lower secondary education is less than that of males. In primary education, and in the fifteen past years, the percentage of repeaters both sexes, has decreased but at a very slow rate. However, an upward shift has been observed since 2010. When examining the percentage of repeaters in lower secondary education, we notice that it has increased in the 2000s for both sexes more than in the 1980s and 1990s. It recorded a decrease in 2010 than a marked increase in 2013.

The causes underlying grade repetition and hence dropout are widely discussed in the literature and vary enormously with countries. Poverty is invoked as a key factor of dropout, where children from poor homes are far more likely to dropout than children from wealthier homes (Birdsall et al, 2005; Cardoso and Verner, 2007). Yet, identifying the causes of dropping out is extremely challenging because educational process is influenced by many factors, some of which are related to the individual student and to her family. Other factors are related to school and to peer group effects (Colclough et al. 2000; Hunt 2008 and Sabates et al. 2010). Therefore, research suggests that both demand and supply factors contribute to dropout. From a demand side perspective, this paper sheds light on child work as a factor that makes students at risk of dropping out.

[14]The average dropout rate is not available.

[15] The government expenditure per secondary student as a percentage of GDP per capita is 24.2% in 2000 and 24.8% in 2008 (http://data.worldbank.org/indicator/)

[16] Other predictors of dropout are poor academic performance, overage for grade and absenteeism (Hunt 2008).

3.2. Key indicators on child labor and education

TLMPS 2014 data show that 90.73% of the target population (children aged 5-16 years old) have schooling as their main activity. It also reveals that the overall prevalence of child labor among school children aged 5-16 years old is 1.36%. Moreover, data shows that 3.4% of this target population are working and are no longer at school and 4.51% are neither working nor at school.

Figure 17 displays the gender differences regarding child labor. It indicates the higher presentation of males than females among the working children. The proportion of males combining work and schooling is around 3.10%. This proportion decreases to 1.30% for females.

Furthermore, the proportion of males who are not at school and working is modestly larger than that of females: 3.84% against 1.96%. On the whole, in Tunisia, boys are twice more likely to be in the labor force than girls.

Turning now to the grade repetition which is not only a common phenomenon associated with child labor but also a precursor to drop out, we can notice from Figure 18 that boys are more prone to repeat one or two years while they are working. However, working girls are more likely to repeat three or four years than working boys.

Child labor impedes access to education (Assaad, Levison and Zibani 2002; Whabe 9916; Blanco Allais and Hagemann 2008). Additionally, combining education and work may contribute to erratic school attendance and regular school absences (Brock and Cammish 1997; Sommerfelt 2001; UCW 2004; Erasado 2005; Guarcello et al. 2005) and hence to an increasing probability of grade repetition and to an increasing risk of dropping out. While empirical studies highlighting the impact of child labor on education are abundant for African, south Asian and Latin American countries, they are rare in the context of MENA region (Ragui et al. 2010; Whabe 9916; Guarcello et al. 2005) due mainly to data scarcity. Using TLMPS 2014 data for individuals aged 5 to 16 years; we provide evidence that child labor is correlated with grade repetition and drop out in Tunisia. Hence, it hurts the child's accumulation of human capital in terms of reduced educational attainment.

3.3. Child labor and grade repetition

To assess the relationship between child Labor and grade repetition, we conduct an ordered probit regression where the outcome is the number of repeated years which takes the values 1, 2, 3 and 4 (we dropped 5 and 6 years for which there is one to two observations). We control for age, area of residence (urban/ rural) and region. Our sample is composed of 150 females and 192 males making a total of 342 individuals.

Since our question of interest is the relationship between child labor and grade repetition, our interpretation goes only to the coefficient associated with whether the child is involved in work or not. A positive coefficient means that an increase in the predictor leads to an increase in the predicted probability. In this case, the coefficient associated with "child is working" is positive and significant for girls which mean that girls' involvement in child labor increases the predicted probability of repeating grades. For males, this coefficient is negative and not significant (Table 6).

We computed then the predicted probabilities for the whole sample, when the child is working, maintaining all the other predictors at their mean values. The results are shown in Figure 17 for instance, we find that the probability of repeating 1 year when the child is working and the rest of the variables are at their mean values is 67%[17].

[17]The decreasing pattern of predicted probabilities may be attributed to the sample size used for estimation.

Even though, our sample is small, the results obtained are quite informative. They show that child labor is positively correlated with grade repetition. These results are similar to the findings in the literature (Sedlacek et al. 2005). Working children are more vulnerable than their peers who are not engaged in work. Child labor impedes academic progress since working-children are significantly less likely to be in the appropriate grade level than non-working children.

3.4. Child labor and dropping out

In this section, we measure the risk associated to child labor on dropping out. We estimate the relative risk[18] of dropping out when individuals within a group are involved in work compared to those who are not involved in work. The relative risk is first estimated for the whole sample of the target population, then by gender to disentangle the effect of child labor on boys and girls separately. After that, it is estimated by the area of residence (urban/rural) and finally by exterior region to determine the areas and regions of high risk of dropping out when children are involved in work.

The relative risk measures the magnitude of an association between an exposed and non-exposed group to a risk factor (McNutt et al. 2003). In this particular case, it describes the likelihood of dropping out from school in a group exposed to the risk factor, which is the child labor, compared to a non-exposed group (Box 1). As suggested by Zou (2003) we use "a modified Poisson approach" in order to estimate the relative risk by accounting for robust error variance.

Box 1

The relative risk is given by the following formula:

$$The\ relative\ risk\ (RR) = \frac{Risk\ in\ exposed}{Risk\ in\ non-exposed}$$

In our case, we have:

	Drop out	*Do not drop out*	*Totals*	*Incidence on schooling*
Individuals who are involved in child labor	**a**	**b**	**a+b**	$\frac{a}{a+b}$
Individuals who are not involved in child labor	**c**	**d**	**c+d**	$\frac{c}{c+d}$

Where $\frac{a}{a+b}$ measures the incidence of dropping out in the exposed group and $\frac{c}{c+d}$ measures the incidence of dropping out in the non-exposed group. Hence, the relative risk is given by:

$$\boldsymbol{The\ relative\ risk\ (RR) = \frac{\frac{a}{a+b}}{\frac{c}{c+d}}}$$

If RR=1, the risk in exposed= risk in non-exposed and there is no association between the risk factor and the outcome variable.
If RR>1, the risk in exposed is higher than the risk in the non-exposed group. Then, there is a positive association between the risk factor and the outcome variable.
If RR<1, the risk in the exposed group is lower than the risk in the non-exposed group and the association between the risk factor and the outcome variable is negative.

The estimated relative risk of dropping out for children engaged in work is 15.12, with 1% significance level. This result shows that child labor may exert a certain pressure on young

[18] This methodology has gained popularity in medical and public health research.

individuals who are enrolled at school and absorb a huge time supposed to be allocated for their out-of-school studies. These conditions can ultimately impact on the likelihood of children to drop out from school.

There also appears to be a gender gap in the incidence of child labor, where girls are more at risk of dropping out than boys, though the gap is not very pronounced. It is around 16 for girls and 14 for boys[19] (Figure 18). Like the previous research studies (Colclough et al, 2000; Ersado, 2005; Kane, 2004), these results show consistent evidence that it is the girl who is the most affected. In many contexts, girls take on a heavier workload within domestic/household settings (e.g. water and fuel collection, younger sibling care, and general domestic tasks) and outside the house.

Regarding the incidence of child labor on school drop out across urban and rural areas, TLMPS 2014 data reveals an urban risk bias in dropping out when engaged in work. Though it is widely known that the child activity rates are substantially higher in rural areas than in urban areas, suggesting that rural working children are more at risk to drop out; the picture is totally different in Tunisia. The risk of dropping out is 5 times higher in urban areas than in rural ones (Figure 19).

Regional differences are very apparent[20]. The relative risk of dropping out is very high in coastal regions particularly in Centre East (governorates of Sousse, Monastir, Mehdia and Sfax), followed by North East region to a lesser extent. Likewise, in Greater Tunis (governorates of Tunis, Ariana, Ben Arous and Manouba), the risk is very high and equals to 24.63 (Figure 20). Children living and working in North West, Centre West and South East are less at risk of dropping out while engaged in certain activities.

A plausible explanation of this "atypical" picture is the use of children in services such as tourism, traditional crafts industry; in markets and cafés; in street work including shining shoes, vending and scavenging garbage[21] . These activities are most predominant in urban and coastal regions than in rural and inland regions. Besides, urban and coastal regions may provide permanent jobs for these young individuals.

3.5. Assessment of the attributable risk of dropping out

In this section, we try to answer the following questions:

- To what extent does child labor lead to dropping out?
- And, if we could eliminate child labor in the country, to what extent could we reduce the incidence of drop out?
- These questions are of paramount importance to policymakers since they will serve as guidance to ensure the adequate and successful interventions. To answer these questions, we estimate the attributable risk. The latter is a measure of excess risk (in this case drop out) that is attributed to exposure (which is in this case child labor).
- The attributable risk in the exposed group equals the difference between the incidence in the exposed group and the incidence in the non-exposed group[22] (Newson 2013). The contribution of a risk factor (child labor) to dropping out is quantified using the population attributable fraction (PAF)[23].

[19] The estimation results are significant at 1%.

[20]Dropping out is missing for South West.

[21] https://www.dol.gov/sites/default/files/documents/ilab/reports/child-Labor/findings/2014TDA/tunisia.pdf

[22]The exposed group is the children who are involved in child Labor. The non-exposed group are those children who are not engaged in Labor and having schooling as their sole activity.

[23] The PAF is the proportional reduction in drop out (in this case) that would occur if exposure to a risk factor (child Labor) is reduced to an alternative ideal exposure scenario (no child Labor).

We compare “scenario 1”, a fantasy world in which no child is working with “scenario 0”, to the real world in which the data is collected. We determine the fractions of drop out attributable to child labor (Box2).

Box 2

Scenario 0 : The real world
Scenario 1: A fantasy world, where no child is working

Population attributable and unattributable fractions

	Ratio	95% Confidence interval	
Population unattributable fraction (PUF)	0.598	0.588	0.608
Population attributable fraction (PAF)	0.401	0.391	0.411

In a fantasy scenario, where no child is engaged in labor, we might expect that 59.8% of the dropout rate is explained by other factors rather than child labor. The population attributable fraction which is computed by subtracting the PUF from 1 is equal to 40.1% with confidence limits from 39.1% to 41.1%, suggests that 40.1% of the dropout is attributed to child labor in Tunisia.

To determine the extent by which we could reduce the incidence of dropout among children involved in labor, we compute the population attributable fraction in the exposed subpopulation (working children) by region. The results are highlighted in Table 7.

As is evident from Table 7, 93.95% to 97.73% of the dropout from working-children is attributed to their engagement in labor. In all the exterior regions of Tunisia, nearly all working-children might be saved from dropping out if they were not engaged in labor. Our results provide evidence that child labor is the sole factor of dropping out for those working-children.

4. Conclusion

TLMPS (2014) data represents a unique source for analyzing the child labor determinants in Tunisia and its impact on education. According to this data 5.87% of the target population are involved in work. This rate is lower than that reported by ILO in 2012 which is 11.8%.

The analysis of the data has provided several insights regarding the determinants of child labor in Tunisia. The number of children involved in work grows with age. Children aged 15 to 16 years old represent 68.8% of the working children. In addition, data shows that poor households impel relatively more their children to work. However, the impact of poverty on child labor is more pronounced in urban areas than in rural ones. Furthermore, the rate of working children is higher in rural regions than in urban regions. Thus, higher rate of child labor in rural areas should not be attributed to poverty. This finding in the case of Tunisia discredits the idea that poverty is the main determinant of child labor

When studying the distribution of child labor by the type of economic activity we find that 51.6% of the working children are in the service sector followed by the agricultural sector with a rate equals to 32.2%. This picture breaks with the traditional distribution of child labor in the world which generally shows that most working children are involved in the agricultural activities. Regarding gender, TLMPS data reveals that boys are more involved than girls in work and they are likely to perform the most demanding tasks in terms of hours.

Involvement in child labor is analysed by family characteristics: the presence of the father and the mother, the father’s education level, the children’ commitment to help the family and the family size. No child works in the sample when the mother is absent nonetheless, 17.2% of

children reported that they work in the absence of their father. While child labor decreases with father's education, it increases when fathers run their own businesses, this can be explained by the fact that children accompany their fathers in their activities and it also increases with family size.

When introducing some determinants of child labor simultaneously by using logit model estimations we find that more aged, males and those in the rural areas are more exposed to the risk of being workers. Moreover, it was possible to confirm the negative impact of household's wealth on child. However, the logit estimations do not provide concluding results about region effects.

We have provided evidence that working-children are more likely to repeat school-grade and to lag behind grade levels. Likewise, working-children are more at risk to dropout, with girls more affected by dropout than boys. Additionally, we come to a conclusion that child labor in Tunisia is mostly an urban phenomenon. The risk of dropping out according to the exterior region is very high in Centre East, North East and Greater Tunis; the wealthier parts of Tunisia. Two plausible explanations can be given. The first one deals with parents' and students' lower expectations for school programs which increase the exposure of children to work and push towards withdrawal. The second explanation of this "atypical" picture, explained in the first part of this paper, is the involvement of children in services such as tourism, traditional crafts industry; in markets and cafés; These activities are most predominant in urban and coastal regions than in rural and inland regions. Besides, urban and coastal regions may provide permanent jobs for these young individuals. Furthermore, we show that around 40% of dropout rate in the target population is explained by child labor. Moreover, child labor is found to be the sole factor of dropout in Tunisia for those working-children.

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Figure 1: Structure of Child Labor by Age (TLMPS wide definition)

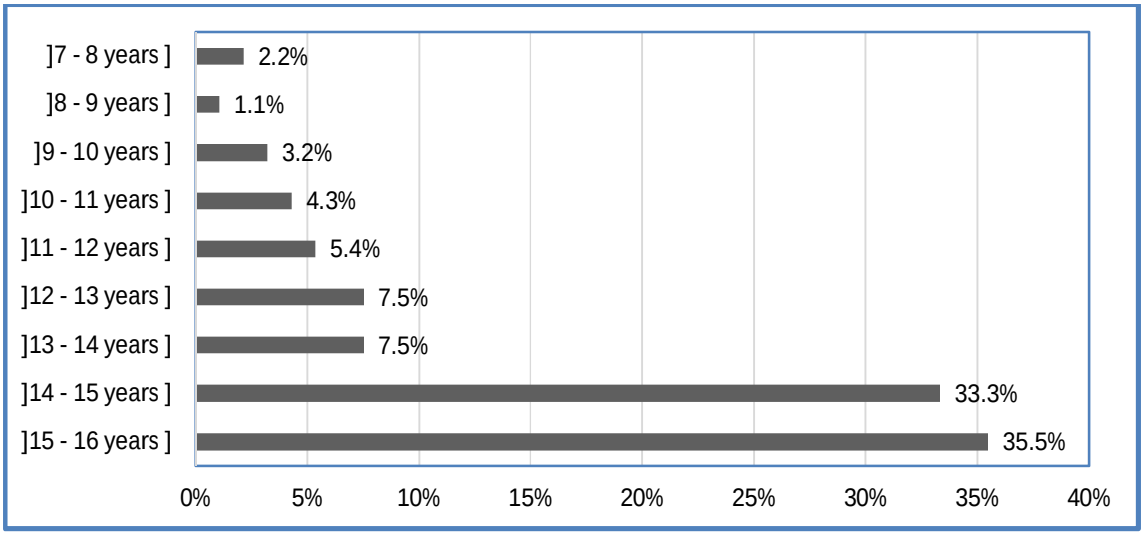


Figure 2: Child Labor Rate for Urban and Rural Areas

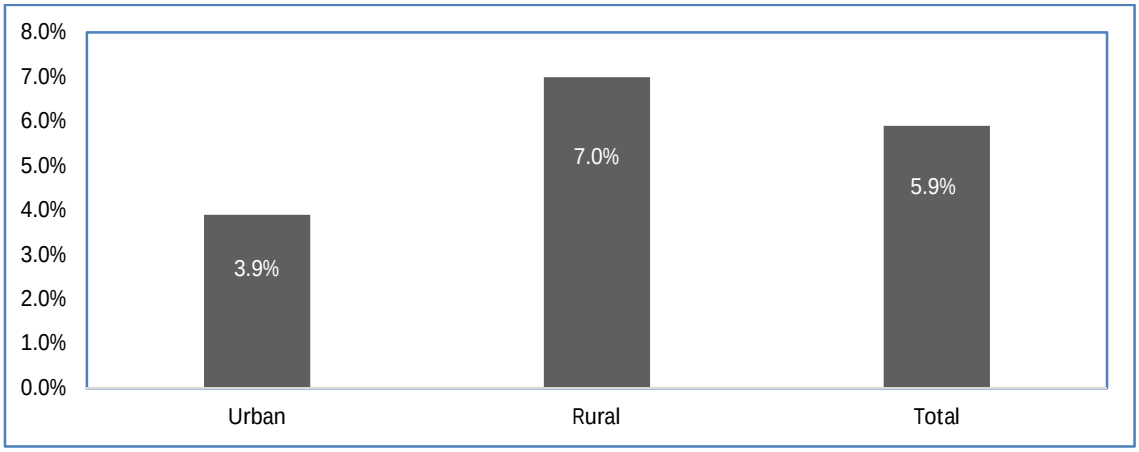


Figure 3: Children's Employment Rate by Regions

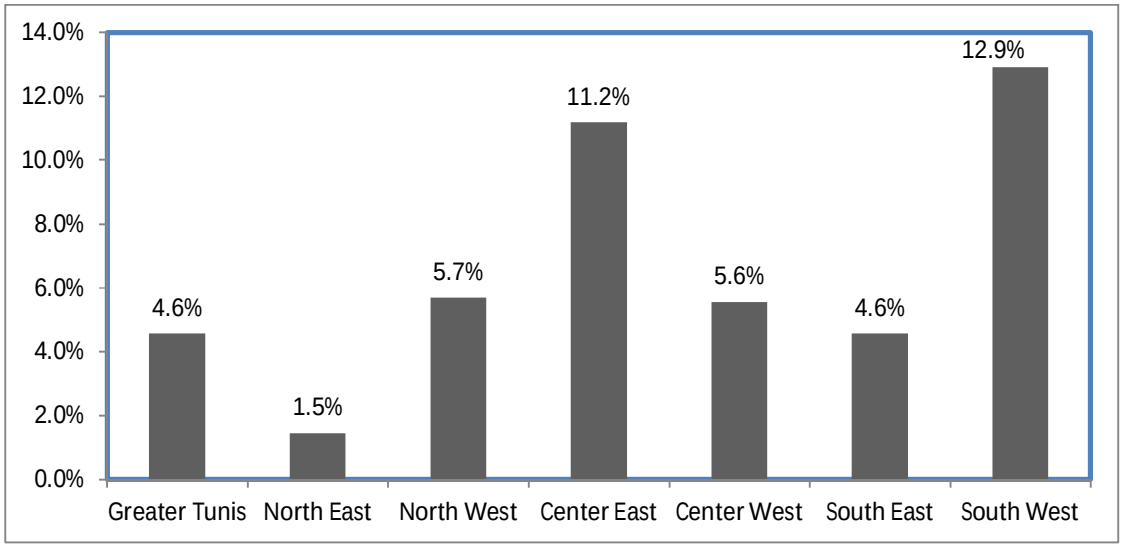


Figure 4: Link between Poverty Levels and Child Labor by Region

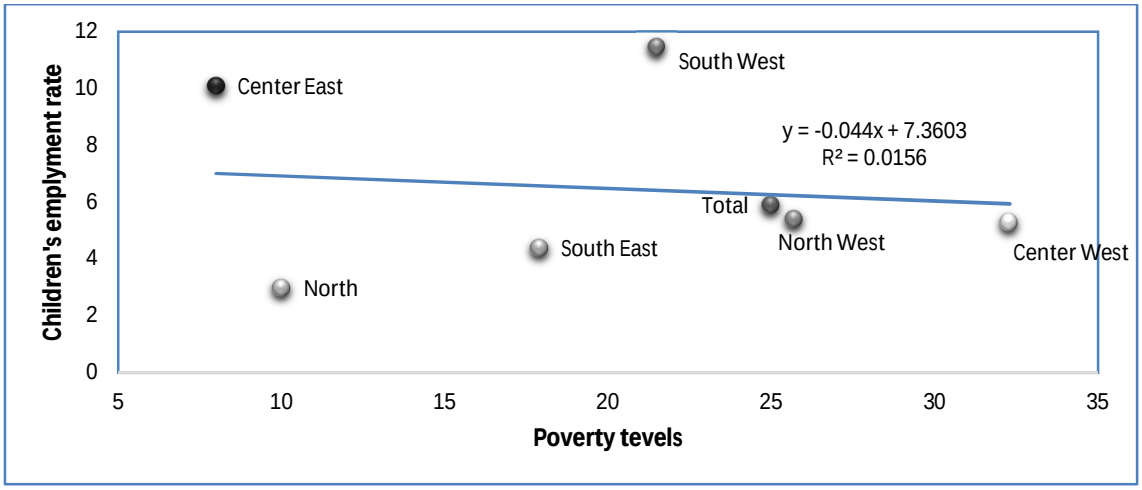


Figure 5: Extent of Child Tasks in Hours Per Week and Region

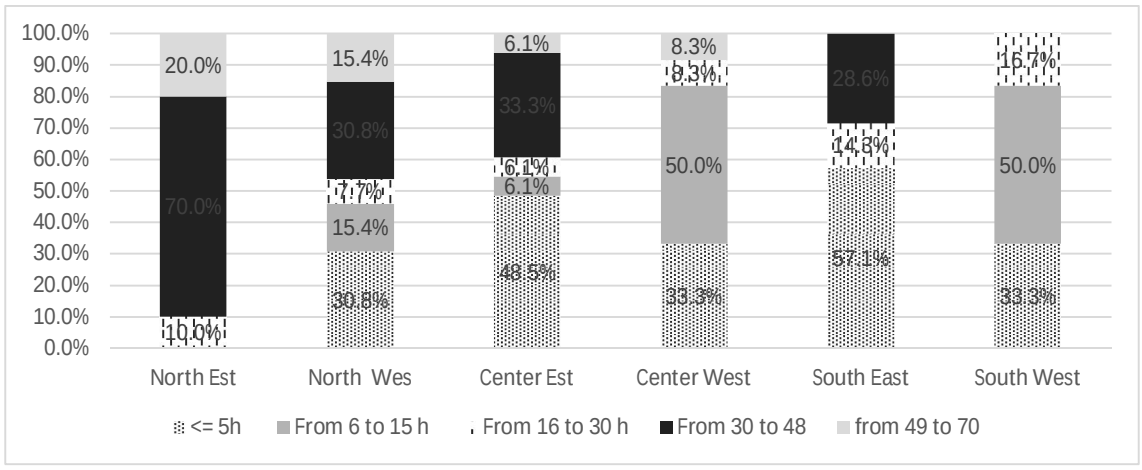


Figure 6: Structure of Child Laborers by Gender

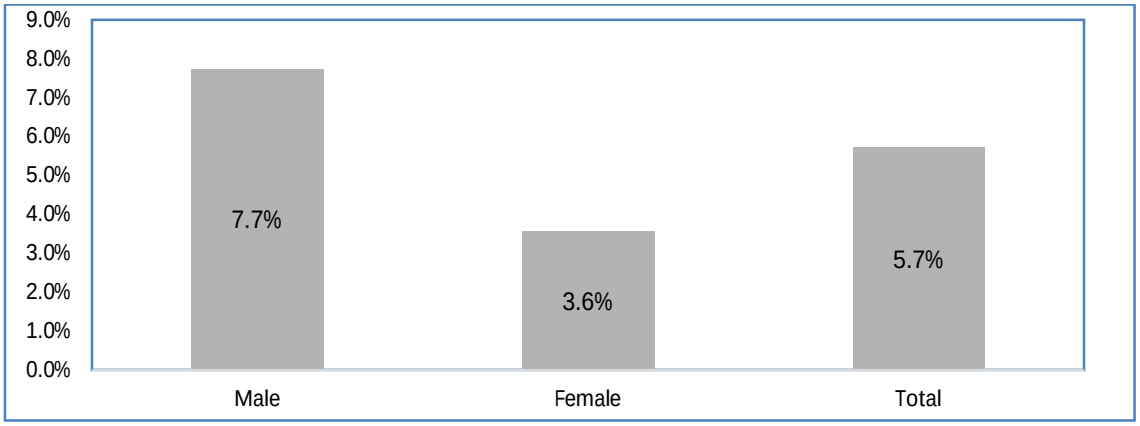


Figure 7: Number of Hours Per Week Performed in Job (Market Definition) Or in Subsistence Activities (Extended Definition) by Gender

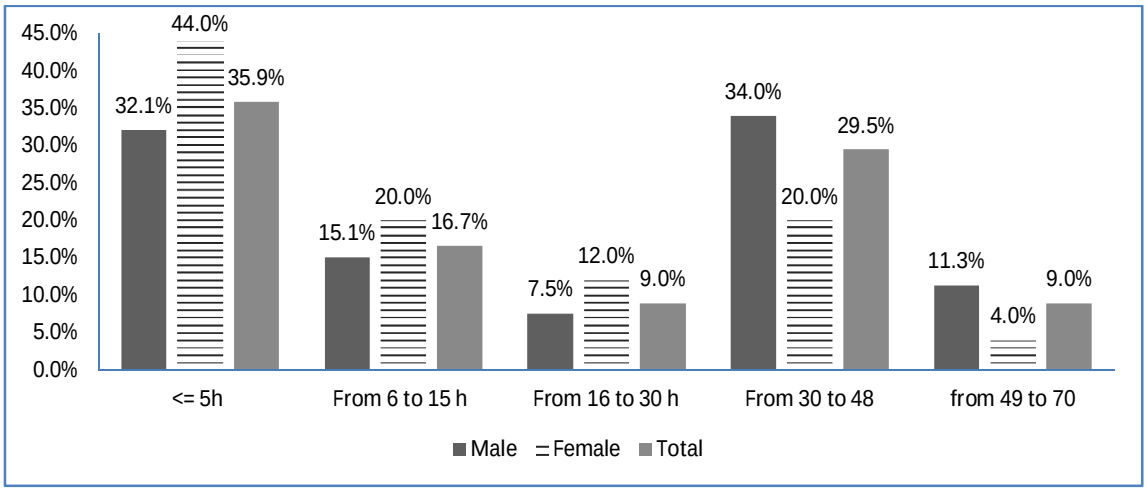


Figure 8: Structure of Working Children by Father's Education Level

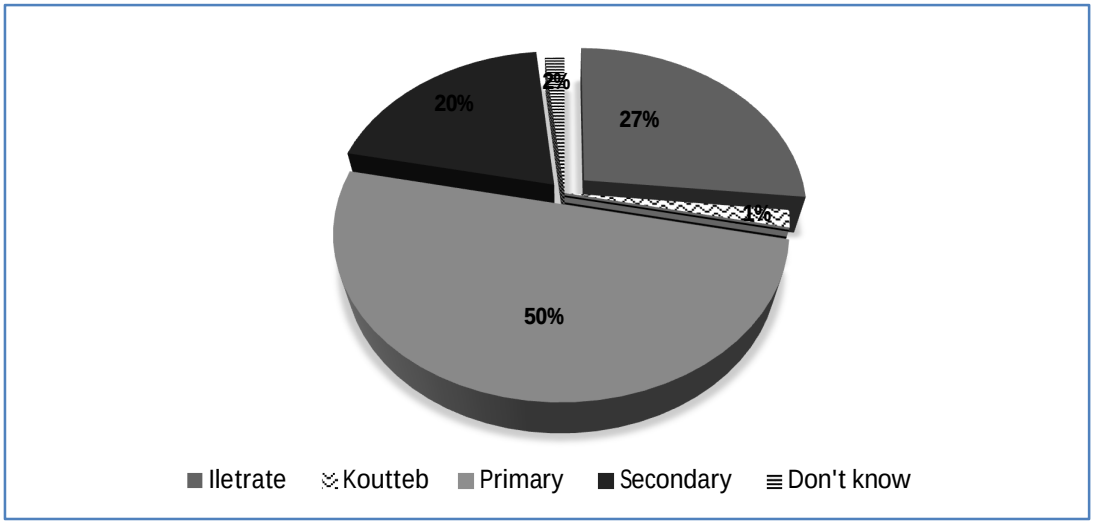


Figure 9: Distribution of Working Children by Father's Occupation

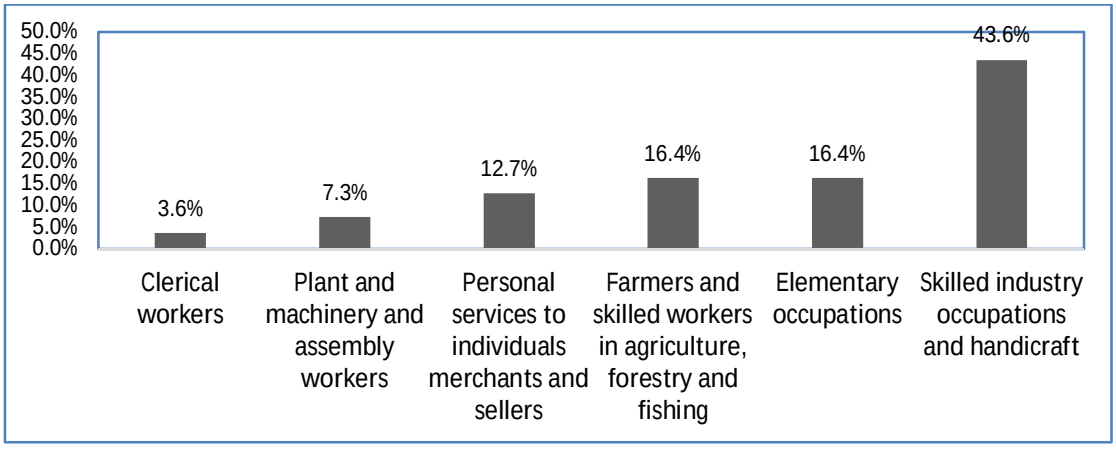
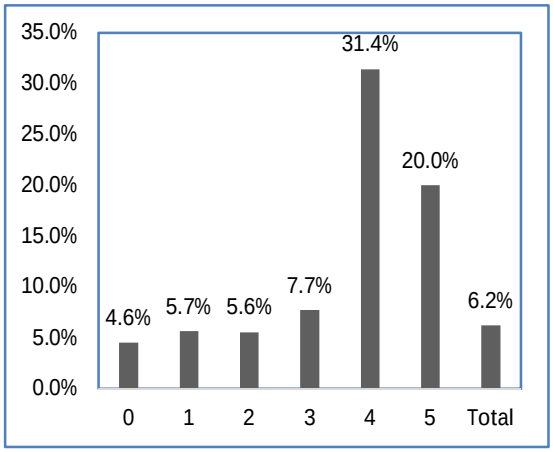


Figure 10: Structure of Children's Employment Rates by:

Number of living brothers



Number of living sisters

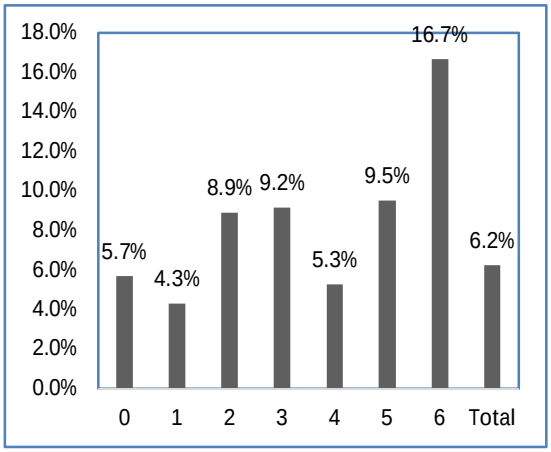
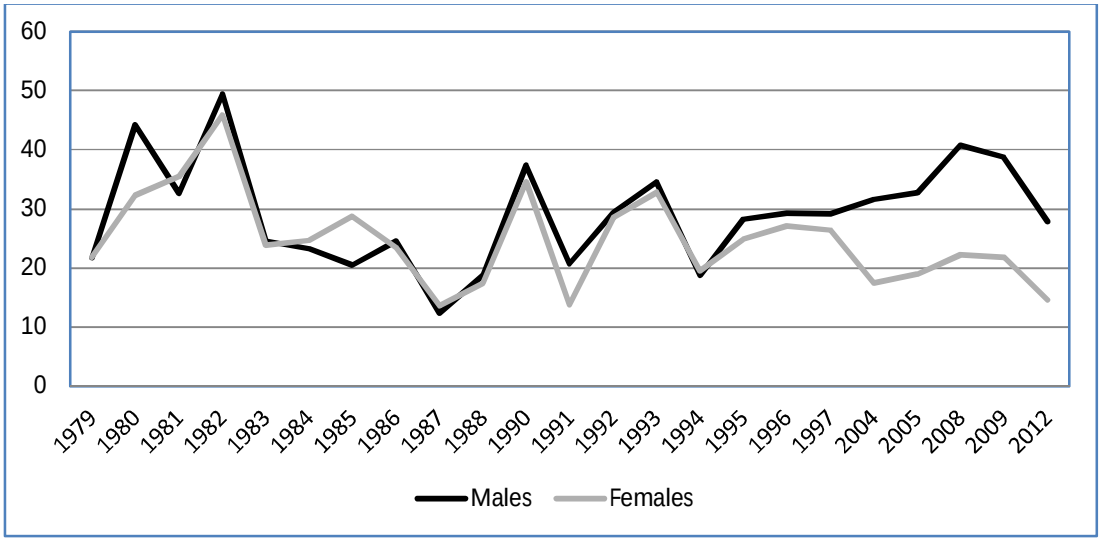
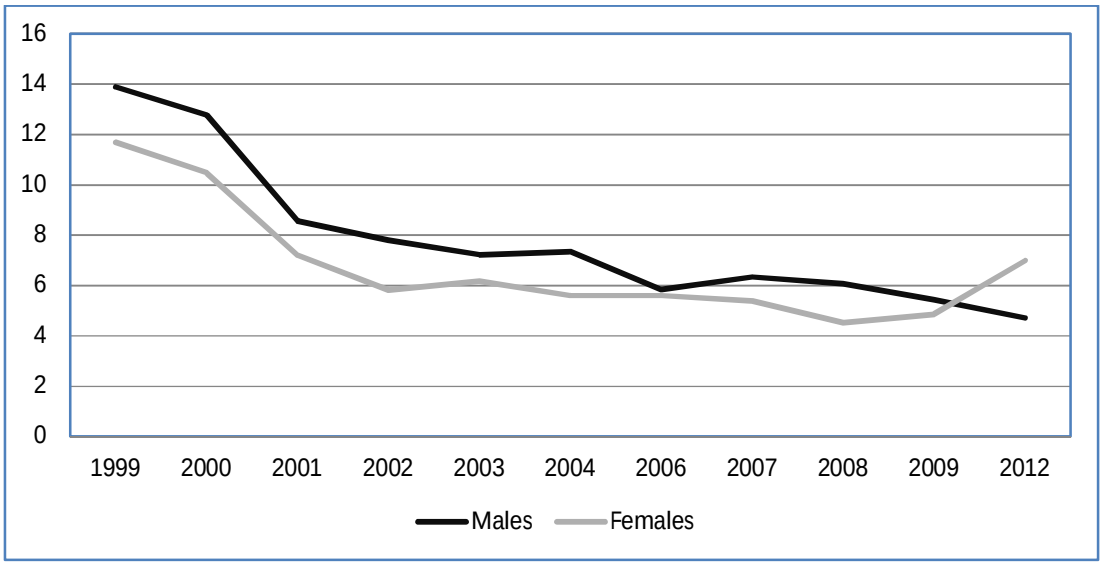


Figure 11: Cumulative Dropout Rate the Last Grade of Lower Secondary General Education (%)[24]



Source: UIS Statistics

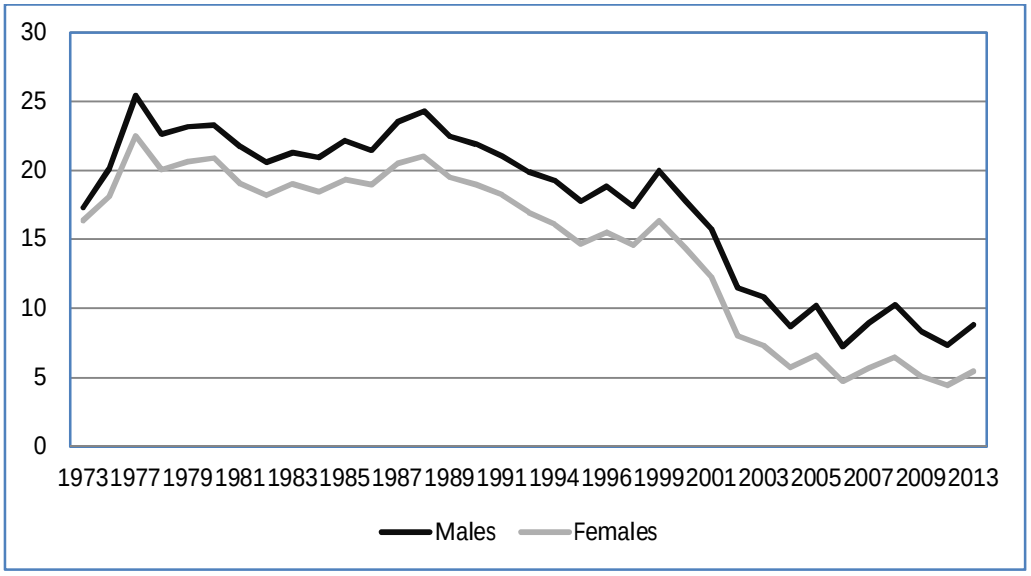
Figure 12: Cumulative Dropout Rate to The Last Grade of Primary Education (%)



Source: UIS Statistics

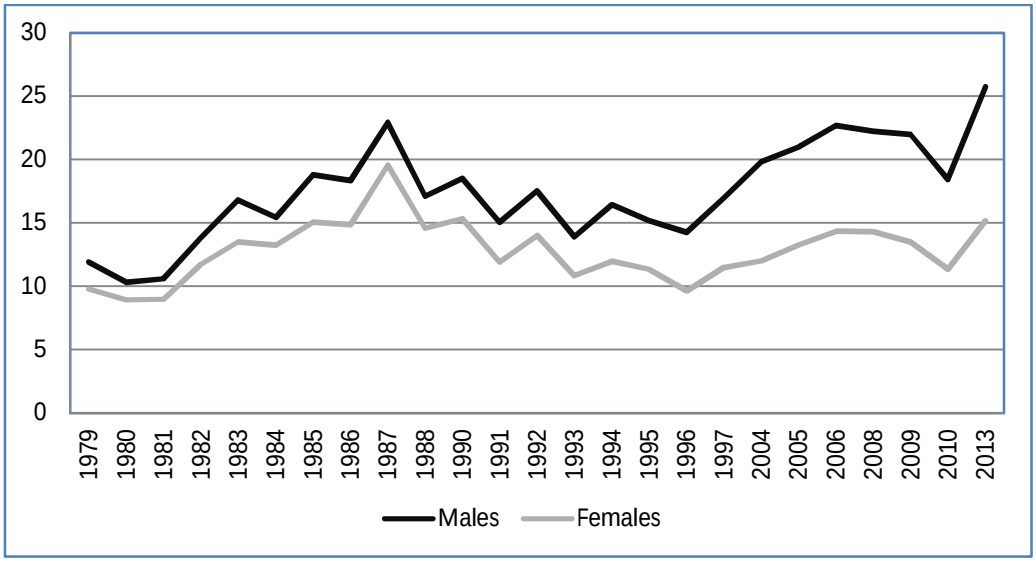
[24]This rate corresponds to the proportion of pupils from a cohort enrolled in a given grade at a given school year who are no longer enrolled in the following school year. Cumulative dropout rate in lower secondary general education is calculated by subtracting the survival rate from 100 at a given grade (http://uis.unesco.org).

Figure 13: Percentage of Repeaters in Primary Education, All Grades (%)



Source: UIS Statistics

Figure 14: Percentage of Repeaters in Lower Secondary General Education, all Grades (%)



Source: UIS Statistics

Figure 15: Distribution of Children Involved in Child Labor by Gender

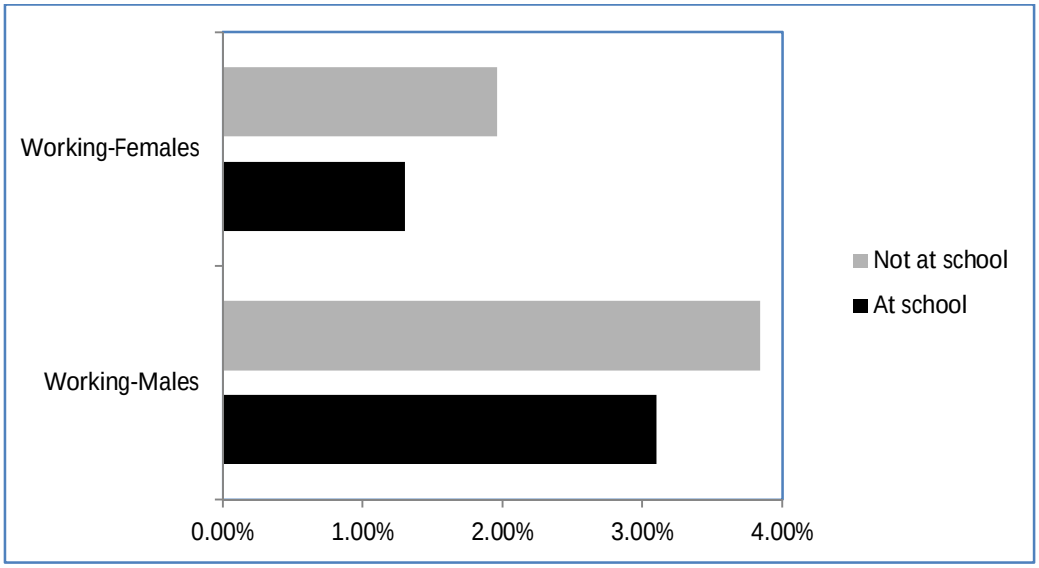


Figure 16: Distribution of Repeating Years of Working-Children, by Gender

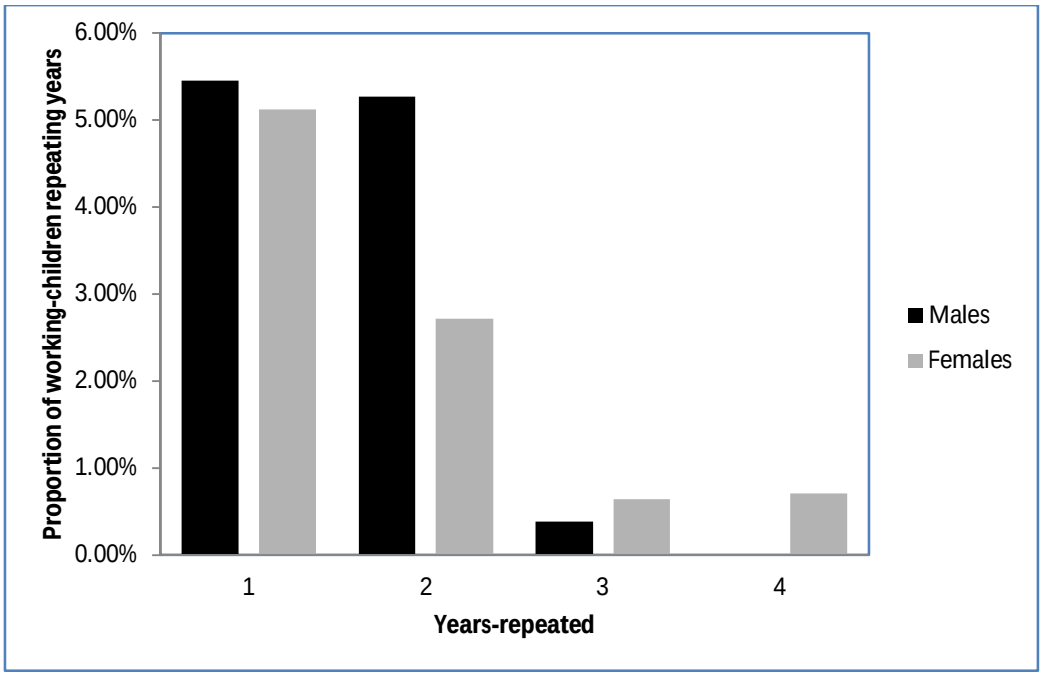


Figure 17: Predicted Probabilities of Work on Grade Repetition

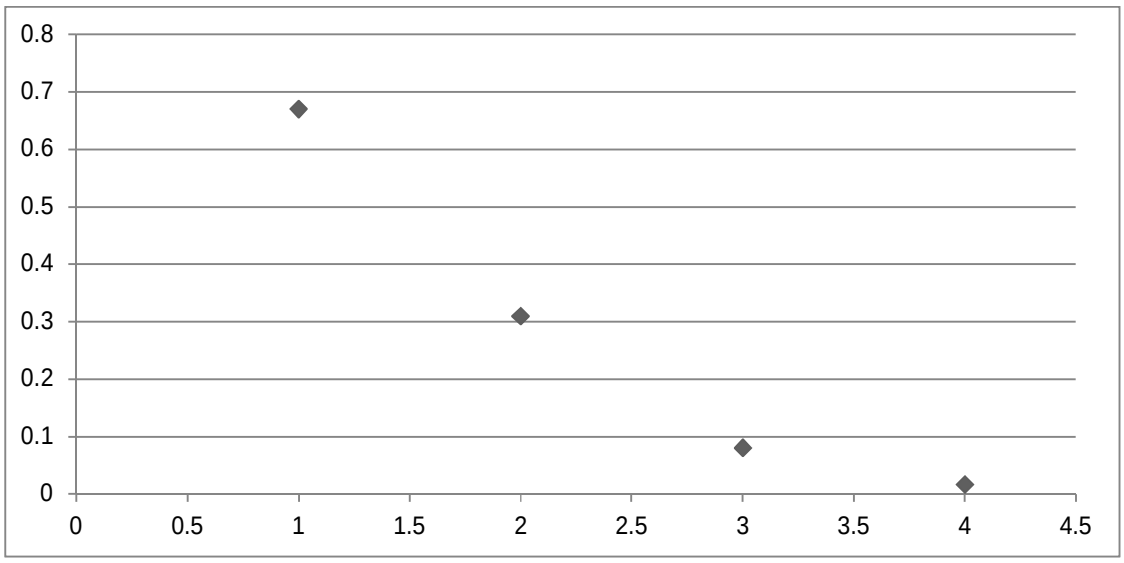


Figure 18: Relative Risk of Dropping Out by Gender

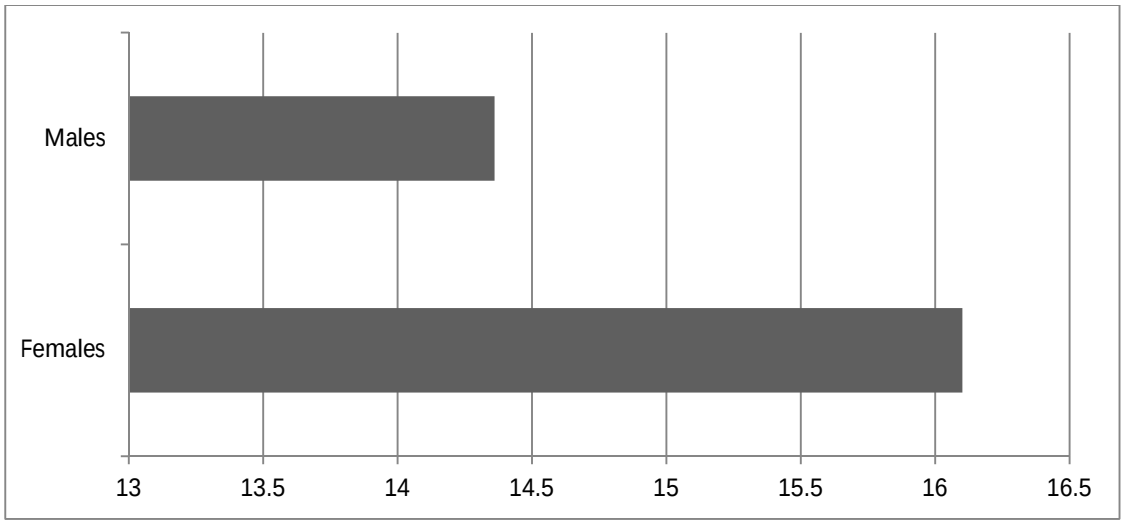


Figure 19: Relative Risk of Dropping Out by Urban/Rural

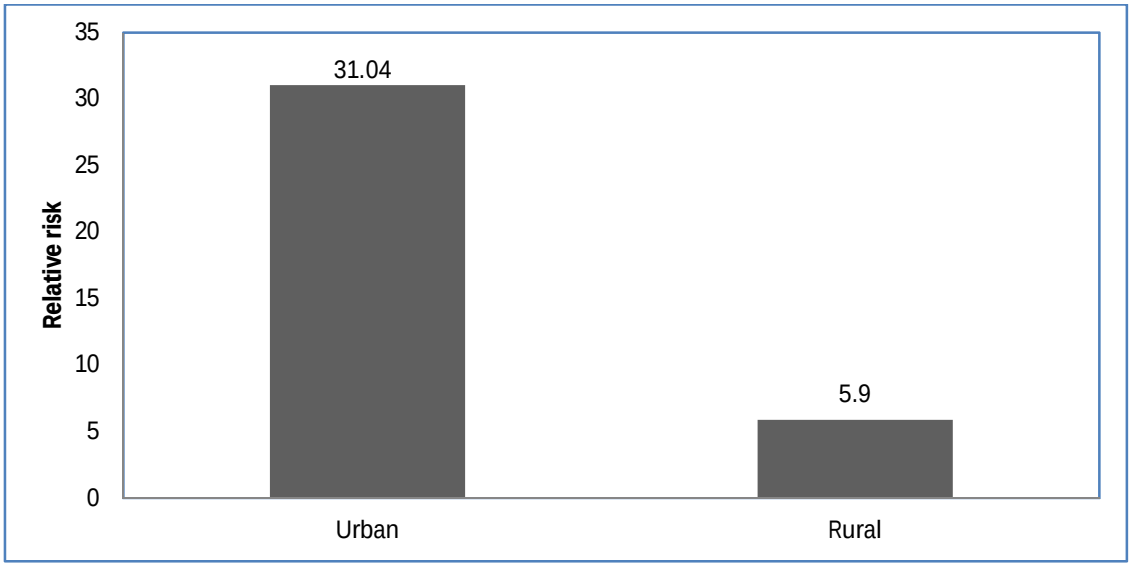


Figure 20: Relative Risk of Dropping Out by Exterior Region

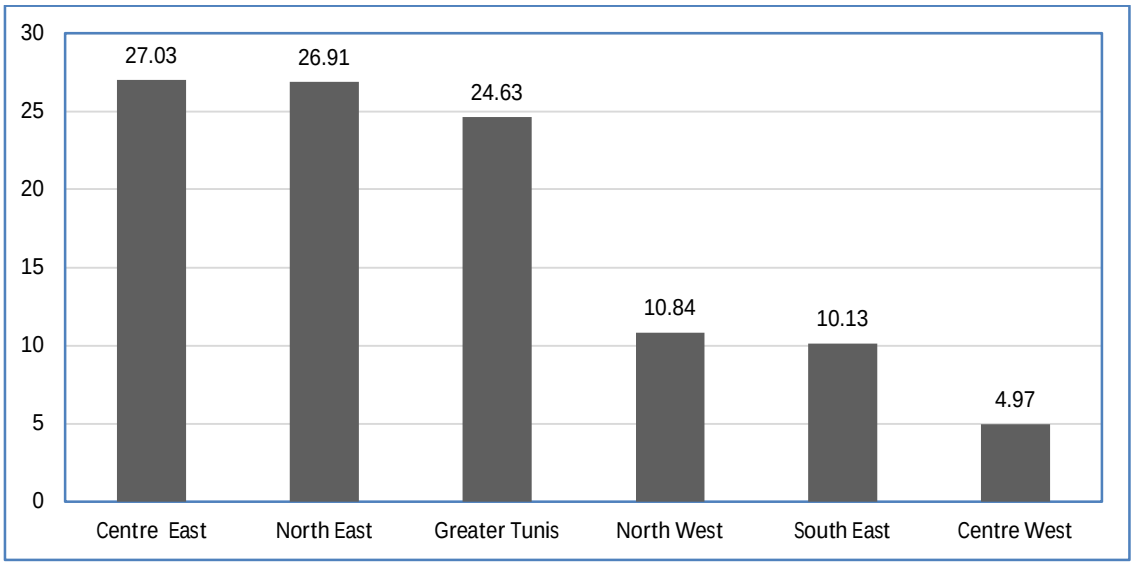


Table 1: Legal Minimum Age of Child Labor[25]

	Developed countries	Developing countries
Working	15 years	14 years
light work activities	13-15 years	12-14 years
Hazardous jobs	18 years	18 years

Table 2: Child Labor Statistics (aged 6-16 years)

	Market definition		Extended definition	
Reference period	One week	Three months	One week	Three months
Number	49	59	84	93
% of the population	2.91%	3.69%	5.25%	5.87%

Table 3: Quintiles of Wealth and Child Employment

	1	2	3	4	5
Cumulative quintiles of household wealth	34,4%	61,3%	83,9%	92,5%	100,0%
Cumulative quintiles of household wealth (rural only)	12,9%	32,9%	62,9%	77,1%	100,0%
Cumulative quintiles of household wealth (urban only)	30,4%	65,2%	91,3%	95,7%	100,0%

Table 4: Structure of Child Workers by Sector in Tunisia (TLMPS 2014)

Sector	Activity	%	
Agriculture, Forestry and Fishing	Crop and animal production, hunting and annex services	14,0	32,3
	Forestry and logging	15,1	
	Fisheries and aquaculture	3,2	
Services	Repair and installation of machinery and equipment	18,3	51,6
	Installation of industrial machinery and equipment	16,1	
	Storage and auxiliary transport services	8,6	
	telecommunications	1,1	
	Information Services	7,5	
BPW	Construction and Building	9,7	16,1
	Civil engineering	6,5	
Global			100

[25] Minimum age for admission to employment or work (ILO Convention 182)

Table 5: Estimated Logit Equations of Access Children Labor (extended definition)

Dependent variable **Work** **1 : Participate** **0 : Does not participate**	**Estimation (1)**	**Estimation (2)**	**Estimation (3)**
Independent variables	Coefficients	Coefficients	Coefficients
Individual characteristics			
Age	0.483***	0.458***	0.467***
	[0.0761401]	[0.0720122]	[0.0735908]
Gender (male)	1.111***	0.942***	1.006***
	[0.3188532]	[0.304095]	[0.3062747]
Family Characteristics			
Weak father's education level	0.554	0.519	----
	[0.4549207]	[0.4257519]	
Father living with family	-0.269	-0.285	----
	[0.4072911]	[0.4085652]	
Wealth (qwealth)	-0.300**	-0.343**	----
	[0.1329573]	[0.1145245]	
Household size (1-4)	13.807***	13.93***	----
	[0.788087]	[0.6139617]	
Household size (5-10)	13.386***	13.661***	----
	[0.7559997]	[0.5635606]	
Geographical factor			
Area (Rural)	0.666*	----	0.976***
	0.4022446		[0.3597874]
R1 Greater Tunis	-1.614*	----	-1.25*
	[0.8757671]		[0.8182259]
R2 North East	-2.443**	----	-2.112**
	[0.94873]		[0.9118871]
R3 Center East	-1.238*	----	-0.507
	[0.6738525]		[0.6489016]
R4 South East	-0.252	----	0.151
	[0.633318]		[0.6225215]
R5 North West	-1.517*	----	-0.828
	[0.7153737]		[0.6767748]
R6 Center West		----	-0.547
	-0.989		
	[0.7584205]		[0.716342]
R7 South West	omitted	----	omitted
Constant	-22.106***	-22.297***	-9.530***
	[1.6656611]	[1.412585]	[1.211919]
Pseudo R2	0.2412	0.1887	0.2113
Log likelihood =	-182.282	-194.903	-189.48
Number of observations	1240	1240	1240

Notes: * Indicates significance at the 10%, ** Indicates significance at the 5%. *** Indicates significance at the 1%. Sta; Err. In [.]

Table 6: Ordered Probit Estimation Results

	Females	Males
Years-repeated	**Coefficient**	**Coefficient**
Child is working	0.72 (0.38)*	-0.17 (0.21)
Age	0.10 (0.04)**	0.16 (0.03)***
Urban	0.45 (0.24)*	-0.16 (0.21)
Greater Tunis	0.07 (0.43)	0.53 (0.30)*
North East	0.53 (0.37)	0.43 (0.33)
Centre East	0.068 (0.26)	0.36 (0.25)
South East	0.18 (0.35)	0.92 (0.26)***
North West	-0.69 (0.40)*	-0.73 (0.30)**
Centre West	-0.019 (0.30)	-0.37 (0.25)
South West	0.14 (0.49)	-4.08 (0.31)***

Notes: Robust standard errors between parentheses. Prob> Chi2= 0.0255 for the subsample of females; Prob>Chi2= 0.000 for the subsample of males. Significance levels:*** Significant at 1%; ** Significant at 5%; *Significant at 10%.

Table 7: Population Attributable Fraction by Region

	Estimate	Minimum	Maximum
Total	96.30%	93.95%	97.73%
Greater Tunis	95.94%	91.25%	98.11%
North East	96.28%	89.68%	98.66%
North West	90.78%	81.92%	95.29%
Centre East	96.30%	93.95%	97.73%
Centre West	79.89%	51.83%	91.60%
South East	90.13%	78.20%	95.53%

Notes: 95% confidence interval for the population attributable fraction.