

Child labour and Educational Success in Portugal

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Abstract

The recent debate on child labour has focused mainly on developing countries. However, child labour also persists in some developed countries. Portugal is an example of a country where child labour is still a matter of concern as about 8-12 percent of Portuguese children aged 6-15 may be classified as workers. This paper studies the patterns of child labour in Portugal and assesses the consequences of working on the educational performance of Portuguese children. In particular, we draw a distinction between domestic and economic child work and examine the effect of these two types of labour on school success. We control for typically unobserved attributes such as a child's interest in school and educational ambitions (proxies for ability) and use geographical variation in policies designed to tackle child labour and in labour inspection regimes to instrument child labour. We find that the two types of labour have asymmetric effects. While economic work hinders educational success, domestic work does not appear to be harmful. According to our estimates, economic work may be responsible for about 15 percent of the educational success gap between working and non-working children. We also find that, after controlling for a host of relevant socio-economic variables, factors such as a child's interest in school and educational ambitions appear to have a direct and large effect on boosting educational success and reducing economic work.

JEL Codes: J23, J24, O15

Keywords: Child labour, educational success, Portugal

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I. Introduction

Historically, the development of countries has been associated with a long-run decline in child employment. The economic history of currently developed countries suggests that industrial development is accompanied by an initial increase in the use of child labour while ultimately being associated with a virtual elimination of the practice (see Cunningham and Viazzo, 1996; Brezis, 2001). Accordingly, the current focus in the child labour debate is on the conditions faced by children in developing countries. While devoting attention to child labour in developing countries is indeed required and called for by its severity, there are examples of developed countries where a large number of children still participate in the labour force. Portugal is an example of a relatively developed country which is still struggling with the issue of working children.

Since the early 1990s, child labour in Portugal has been a particularly sensitive and high-profile issue that has attracted considerable public attention. A 1992 report by Anti-Slavery International (Williams, 1992) estimated that there were 200,000 working children in Portugal employed mainly in the export-oriented shoe, garment, ceramics and stone-breaking industries in the Northern districts of Oporto and Braga. While the numbers presented in this report are disputed, its publication along with other articles and programs in the popular press generated social and political debate and, in part, led to the establishment of special commissions and research projects designed to investigate the true extent of child labour in Portugal.¹

In particular, along with the International Labour Organization, the Government of Portugal decided to carry out two household surveys designed to provide credible and comprehensive information on working children in Portugal. The first of these surveys was

¹ Child labour was a major issue in two movies. Solveig Nordlund in “Até amanhã, Mário” portrayed Madeira, Portugal and the street children in the city and “Jaime” tells the story of a child in Oporto who had to work.

conducted in 1998 and the second in 2001. Based on these surveys (see Table 1) it is estimated that about 8-12 percent of Portuguese children in the age group 6 to 15 are involved in some form of economic or domestic work.² While this figure is considerably lower than the 20-25 percent work participation rates suggested by other sources (Williams, 1992), it is higher than the average work participation rates in developed (2 percent) and transition countries (4 percent) as estimated by the ILO (2002).

The resilience of child workers in Portugal despite overall economic progress and considerable efforts to tackle the issue suggests that Portugal's economic and cultural characteristics still generate a favourable environment for child labour. Per se, the fact that about 8-12 percent of Portuguese children work may not be a matter of concern. However, an issue that is of concern and the primary focus of this paper is whether the work activities of Portuguese children hampers their educational performance? The motivation for our work stems from the potential consequences of the early entry of children into the labour force on their educational success. The importance of education in promoting the growth of individuals and nations is well known and early entry into the labour market is likely to lead to forgone education and an unprepared labour force. For an individual, lower educational attainment translates into a life-long handicap, leading to a lower probability of employment and access to low-paying jobs. In the Portuguese context, several studies have shown that there are high private returns to education and that educational returns rise with the level of education.³ The high returns to individual investments in education and the persistence of

² Domestic labour consists of domestic chores and economic labour refers to paid or unpaid activities performed on the family farm/enterprise or for an employer.

³ Several studies have shown that there is a high rate of return to education in Portugal (for example, Kiker and Santos, 1991; Kiker, Santos and Oliveira, 1997; Vieira, 1999; Hartog et al., 2001). Pereira and Martins (2001) show that in the 1990s the rate of return to education in Portugal was about 9 percent. This is at the upper end of the range of educational returns for developed countries. They also report that marginal returns increase with the level of education during their period (1982-1995) of analysis.

child labour provides additional motivation for our work and raises concerns about the factors that drive child labour. Why is it that despite high educational returns, children are engaged in activities that may prevent them from achieving higher educational levels?⁴ Beyond the individual, from a national perspective, and in the context of an enlarged and increasingly competitive environment within the European Union (EU), the ability of Portugal to compete depends on a well-educated and skilled labour force. With functional literacy at about 52 percent (OECD, 2000) and extremely low levels of educational success as compared to its EU counterparts, any factor that prevents Portuguese children from attaining their full education potential needs to be highlighted and addressed.⁵

As discussed above, the persistence of child labour and the low educational success of Portuguese children are key issues of concern. In this paper we assess the factors that determine both these outcomes and examine whether the work activities of children has a causal impact on their educational success.⁶

There are several notable features of our study. First, while there is a large literature that examines the link between child work and educational outcomes for developing countries, for obvious reasons there is little work on developed countries. Examining this issue in the context of a relatively high-income country where child labour still persists may provide guidance on the additional policies (beyond poverty alleviation) which developing countries may need to adopt if they are to tackle the problem of child labour. Second, the

⁴ Botelho and Pinto (2004) use an experimental approach to estimate educational returns and find that the expected returns to college based on the expectations of college students is quite close to the actual rate of return to education. Although in this case limited to Portuguese college students, this line of work suggests that parents may well have a good idea of the expected returns to education that may accrue to their children. If this is true, then the persistence of child labour may even be more puzzling.

⁵ Details on educational outcomes and comparisons with other EU countries are provided later on in the text.

⁶ We focus on educational success rather than enrolment or attendance as almost all children are formally enrolled in school (98.5 percent) and appear to be attending school regularly (97.8 percent of children do not miss school more than once a week). In contrast 25 percent of students have failed at least once.

bulk of the child work-educational outcome literature focuses largely on the correlation between these two outcomes and does not identify a causal relationship.⁷ In our work we attempt to identify the causal effect of child work on educational success. Thus, our paper is similar in approach to the more recent literature (Boozer and Suri, 2001; Beegle, Dehejia and Gatti, 2003; Gunnarson, Orazem and Sanchez, 2003) which uses an instrumental variables (IV) estimation strategy to identify the impact of child work on educational outcomes.⁸ We rely on geographical variation in policy responses to reducing child labour and geographical variation in labour inspection regimes to instrument child labour and to identify its causal impact on educational success. Third, in addition to the econometric strategy we have information on unusual educational related measures such as a child's interest in school and educational ambitions (proxies for a child's ability). Such measures allow us to identify the effect of work on educational success after controlling for unobserved abilities that may have a bearing on educational success. Thus, a novel feature of our work is that we are able to control directly for unobserved attributes of children *and* use an IV strategy to control for the correlation between unobserved attributes that may determine educational success and child work.⁹ Fourth, we draw a distinction between domestic and economic work and assess the

⁷ Some examples of this first generation literature are Patrinos and Psacharopoulos (1995), Psacharopoulos (1997), Jensen and Nielsen (1997).

⁸ Boozer and Suri's (2001) work on Ghana and Beegle, Dehejia and Gatti's (2003) work on Vietnam are arguably the more credible pieces of work in the new genre of the literature. Boozer and Suri (2001) rely on geographical variation in rainfall patterns to instrument child labour. Beegle, Dehejia and Gatti (2003) rely on crop shocks and variation in rice prices to instrument child labour. Gunnarson, Orazem and Sanchez (2003) also use a credible IV strategy, however their work has a cross-country focus. They pool data from several Latin American countries to carry out a cross-country analysis. They use differences in legal structures across several Latin American countries to instrument child labour. Ray and Lancaster's (2003) identification strategy is questionable as it relies on excluding household income and assets from the schooling equation in order to identify the child labour equation.

⁹ Heady (2003) does not use an IV strategy and treats child labour as exogenous. However, he includes controls for the abilities of children to account for the endogeneity between work and educational outcomes. In our paper we are able to include proxies for ability and use an IV strategy to identify the effect of work on educational outcomes.

influence of the duration of these two types of work on the educational success of children. Differentiating between these two types of labour is important from a policy perspective as tailor-made solutions will be possible if the reactions of the different types of labour to varied stimulus are known. Apart from Heady's (2003) work there are few studies in the literature that distinguish between the effect of different types of work on educational outcomes.

The following section of the paper provides a discussion of the distinction that we draw between domestic and economic child labour. This discussion is followed by a descriptive and diagrammatic analysis of child labour and educational success in Portugal. Section III discusses our analytical approach, section IV discusses the data and the specification of the empirical model. Section V presents estimates and section VI provides concluding remarks.

II. A Typology of Child Labour and Educational Success in Portugal

II.1 Typology and definition of child labour in Portugal

There is considerable disagreement on which activities truly constitute child labour. There are two discernible approaches in terms of classifying the activities carried out by children as child labour. One approach may be termed the "supervision approach" while the other maybe called the "type of work approach".

The supervision approach argues that working on a family farm/enterprise or carrying out household chores, provides on the job training and equips a child with essential skills that may not be learned elsewhere. Since work on a family enterprise or domestic work is typically executed under the guidance and supervision of parents, it is deemed not to be exploitative and not to harm the healthy development of a child. According to this view, only work that involves an employer-employee relationship and that is remunerated in cash or kind constitutes child labour (see Rodgers and Standing, 1981; Bequle and Boyden, 1988; Blanc, 1994). The "type of work" approach argues that it is the kind of work which

determines whether an activity is child labour rather than the nature of its supervision. In addition to work carried out in the context of an employer-employee relationship any work on a family farm or enterprise is also deemed to fall under the rubric of child labour (so-called economic work). While the latter approach is more inclusive, neither approach considers time spent by children on domestic chores as a form of child labour, a feature which is reflected in most of the empirical work on this issue.

In the Portuguese case, while the household surveys collect information on the work activities carried out by children as well as details on the place of work and the type of supervision, a reading of official documents shows that the government adopts a combination of the two approaches to define child labour. As displayed in Box 1, the government does not include domestic work performed by children and supervised by household members in its definition of child labour. At the same time domestic work done outside the household is included and is treated as economic work.

Box 1: Work considered child labour by the Portuguese government

<i>Type of Work</i>	<i>Supervision</i>	
	Extra-Household	Intra-Household
Economic work	Yes	Yes
Domestic work	Yes	No

As Table 1 shows, the bulk of child labour in Portugal is carried out within the context of the household and under the supervision of household members. Excluding intra-household domestic work from the definition of child labour cuts the number of workers by at least 50 percent and suggests a child labour force participation of 4 percent. Whether this is an appropriate restriction and whether domestic work has a different effect as compared to economic work and is benign in terms of its impact on a child’s development,

as implied by its exclusion from the official definition, are debatable and researchable issues.¹⁰

In this paper we adopt an empirical approach. We draw a distinction between the government's child labour concept and domestic work carried out within the household and try to discern whether there are any differences between the impacts of these two types of work on the educational performance of children. Such a distinction is desirable to detect whether there is any merit to the argument that these two types of work are different and that they should be treated asymmetrically.

II.2 Child Labour in Portugal

In recent years the government of Portugal has taken several steps to curb child labour. These included the creation, in 1998, of a research and statistical framework (SIETI-System of Statistical Information on Child Labour) to provide accurate information on the extent of child labour in Portugal. A policy team (PETI-Plan on the Elimination of Child Exploitation) was set up to design and develop concrete interventions and measures to prevent the early entry of children into active life. As part of its policy to have a more informed debate on child labour the government conducted two household surveys in 1998 and 2001. We use information from these surveys to construct a portrait of the incidence and distribution of child labour in Portugal.¹¹

¹⁰ Alves Pinto (1998) points out that for rural families in Northern Portugal, child labour in agriculture and domestic work is part of a strategy of socio-economic continuity, and that it plays an important role in socialising minors into a rural economics mentality. She goes on to add that it will continue due to its strong cultural roots and that despite being arduous this type of effort is not viewed as work as it is not very visible.

¹¹ The instrument gathers information on the activities of children from household heads as well as from children. In our work we use the responses provided by children. Based on their analysis of the 1998 data set, Chagas Lopes and Goulart (2003) conclude that parents tend to understate the work activities carried out by their children. According to Pais (1998), based on the 1998 sample survey and expanded for the population, 43,000 children admit their involvement in economic activity while only 18,000 adults acknowledge that their children work. Our analysis of the 2001 data shows that the total number of children providing labour is similar whether we use the parental or the child responses. In the sample, based on responses from children, 2,152 children maybe classified as child workers while the corresponding number according to parents is 2,082.

Our analysis begins with the numbers presented in Table 1. The table breaks down the overall incidence of child work and the absolute number of working children in Portugal into four mutually exclusive categories. The absolute numbers for working children are obtained by weighting the sample data to obtain population totals. In 1998 about 12 percent of Portuguese children (about 126,000) were involved in some form of work (economic, domestic or both) while it fell to about 8 percent (about 97,000) in 2001.¹² Across the two years, the incidence of economic work does not change sharply (3.1 percent in 1998 and 3.7 percent in 2001). However, there is a decline in the number of children involved in domestic work. While the decline seems promising it is an apparent rather than a real decline as there was a change in the information gathering process between the two surveys. In 2001, the question requesting information on child work activities was adjusted from “Do you perform domestic chores?” to “Do you perform domestic chores in *excess*?”, with the definition of excess being left to the subjective judgement of the respondent.¹³ Thus, notwithstanding the discussion that government documents do not consider intra-household domestic work as child labour, by definition, the 4 percent of Portuguese children contributing excess work, should be considered as child workers.

Other features in Table 1 are that most of the economic work is carried out in the context of a family farm or enterprise and only a small percentage of the child workers (about 9 percent of all child workers) work outside the household in a formal employer-employee relationship. There are very few children (about 5 percent of the child workers) who do both

¹² The survey instrument gathers information on work participation and the hours of work contributed by children during the week prior to the survey, that is, the first week of October. This week is an acceptable reference week and is not plagued by seasonal patterns of work. As shown in Goulart (2003), the incidence of work peaks during July, August and September, while it remains at the same level between October and June.

¹³ According to personal communication between one of the authors and SIETI members, in both years the survey manual used the word “excess”, although in 1998 it was not (explicitly) written in the survey questionnaire. While this may be the case it is still very likely that the questions for the two years contain different information.

economic and domestic work, and accordingly, in this paper we focus on the two categories of economic and domestic work. There is a clear regional pattern in the incidence of work (see Table 2). The incidence of both domestic and economic labour is highest in the Northern and Central parts of the country. Both regions have characteristics that favour the practice of child labour. The presence of small family farms and larger and more traditional families promotes child work on farms and in the household while the presence of small and medium sized family owned enterprises promotes economic child labour.

Table 3 further characterises child workers in Portugal. The average economically active child in Portugal is male (72-73 percent are male), is between 12 and 13 years of age and contributes 14 hours of work per week. The work contribution of a child increases with age and there is a convex relationship between age and probability of working/hours of work (see Figures 1 and 2). The weekly work contribution shows a discernible increase between the age of 12 and 13 with the contribution of 15 year old child workers rising to about 22 hours a week.¹⁴ About half the economically active children work in agriculture while the remaining workers are spread out across other sectors such as manufacturing, commerce and construction.

In contrast to economic work, the typical child involved in domestic work is female (about 70 percent are female) is about 12 years old and contributes around 8 hours of excess work per week. The most important domestic tasks are house cleaning, cooking, washing, ironing clothes and looking after younger siblings and elderly members.

¹⁴ Figures 1-5 are based on estimating locally weighted sum of squares (lowess) regressions of hours of work, the probability of working and the various education measures on age. Figure 6 is based on a lowess regression of school success on hours of work. A bandwidth of 0.8 was used to estimate the smoother.

II.3 Education and child labour

The spread of education and the enforcement of compulsory education laws is a relatively recent phenomenon in Portugal.¹⁵ The 48 year long dictatorship in Portugal viewed education as dangerous and did not pay much attention to this sector. Following the end of dictatorship in 1974 considerable efforts have been made to improve the educational sector. There is a stronger enforcement of compulsory education and there has been an expansion of educational facilities at all levels especially pre-school and university education. In the mid-1980s, the government finally extended compulsory education to 9 years and at the moment there is an intention to further increase compulsory education to 12 years.¹⁶

Despite progress since 1974 and continued expenditure on education (5.5 percent of GDP-slightly above the EU average), educational attainment and achievement in Portugal lags considerably behind most European countries. For instance, the adult upper secondary school completion rate in Portugal is 20.6 percent as compared to the EU average of 64.6 percent and 81 percent for the New Member States (NMS). While at 47 percent the school completion rate for youth aged 20-24 is higher amongst more recent generations, reflecting educational progress, it is still quite low as compared to the EU average of 75 percent and NMS average of 88.3 percent.¹⁷ A comparison of achievement scores in reading and Mathematics across seven countries shows that Portuguese children do not perform well.

¹⁵ At the beginning of the 19th Century, as a result of the spread of liberal ideas in Europe, Portugal approved some of the most advanced and progressive legislation in Europe. One of these laws regarded compulsory education which was approved in 1840, but was never implemented.

¹⁶ In Portugal, children are expected to start school at the age of 6 and are expected to continue till they are 15 unless they complete 9 years of compulsory schooling at an earlier age. Consistent with these educational requirements, minors are only allowed to work under three conditions – they are at least 16 years old, they have completed compulsory school and there is medical confirmation of their physical and psychological capabilities for that job. There are some exceptions to the minimum age. At 14 and 15 light work is allowed, some additional activities are permitted when the child is 16 and 17 years old and at 18 all types of work are allowed.

¹⁷ The level of early school leavers, that is, the share of the population aged 18-24 with less than upper secondary education and not in education or training, is 41.1 percent in Portugal. This is much higher than the EU average of 18.1 percent or the NMS average of 7.5 percent.

Portuguese children are second from the bottom in terms of Mathematical skills and at the bottom of the chart in terms of reading skills.¹⁸ The gap between Portugal and other EU states combined with the importance of human capital acquisition as a means for economic progress suggests the importance of tackling any factors that deter the educational success of children.

We begin our examination of the link between education and child labour by examining the patterns of educational enrolment, attendance and school success by work status. Table 4 shows that children who do not work enjoy a 10 percentage point advantage in terms of enrolment and attendance rates as compared with children who do work. The age-specific enrolment pattern displayed in Figure 3 shows that till the age of 12 there are limited differences in enrolment rates by work status. However, between 13 and 15 a clear enrolment gap emerges. The 1 percentage point gap in enrolment rates at the age of 12 grows rapidly to a 30 percentage point gap at the age of 15 (96 percent versus 66 percent). The age dynamics of the attendance pattern are similar to the enrolment pattern.¹⁹ The 2 percentage point gap at the age of 12 grows rapidly to a 31 percentage point gap by the age of 15 (93 percent versus 62 percent). The speed with which educational differences appear between the two groups is quite remarkable and is matched by the increase in the work effort provided by children in the same age group (see Figures 1 and 2).

Our measure of educational success is based on whether a child has never failed in school. This measure shows that 76 percent of non-working children have never failed in school while the corresponding number for working children is 55 percent. The age dynamics presented in Figure 5 show that while the success gap does increase with age it is

¹⁸ The comparison countries are Spain, Ireland and Greece, as these countries are similar to Portugal in terms of their later entry into the EU and their low initial development, and 4 NMS – the Czech Republic, Hungary, Poland and Slovakia. A detailed comparison is provided in OECD (2003).

¹⁹ Attendance is a binomial variable and is defined as 1 if a child misses school less than once a week.

not as dramatic as the temporal pattern for enrolment and attendance. The final figure in our diagrammatic analysis shows the link between hours of work and school success. The figure shows that there is an approximately linear relationship between hours of work and educational success and both economic and domestic work appear to be associated with a reduction in the educational success of working children.

III. Analytical approach

There is a growing body of literature that studies the substitutability between children's schooling and labor and the effectiveness of education related policy measures in reducing child labor. This literature may be divided into two broad categories. One approach, which may be termed the indirect approach studies the links between child work and schooling by examining the effects of education related measures such as distance to schools, school fees and school quality on school attendance and on the incidence/duration of child labor (for example, see Ravallion and Wodon, 2000; Hazarika and Bedi, 2003). A second approach which may be termed the direct or structural approach gauges the links between schooling and child labour by estimating the effect of incidence/duration of work on children's educational outcomes. These papers recognize the endogeneity between school participation and work and use statistical techniques to control for this possibility (see Boozer and Suri, 2001; Beegle, Dehejia and Gatti, 2003).

Given that our primary aim is to examine the effect of the numbers of hours worked by children on school success it is natural to adopt the direct approach. However, a credible implementation of the direct approach requires that we account for the potential endogeneity between school success and hours of work and accordingly implementation of the direct approach nests the indirect approach.

Framework

The educational success of children is usually measured by their performance on standardized tests. Following the educational production function literature (see Glewwe, 2002) we treat the test scores of children (Y^*) as a function of child (C), family (F), socio-economic (SE), educational characteristics (E) and demand for labour characteristics (D). Since we are interested in the link between educational success of children and their work pattern, we extend this basic educational production function by treating test scores as a function of the hours of economic and domestic work (W) contributed by children. That is,

$$Y_i^* = C_i\beta_c + F_i\beta_F + SE_i\beta_{SE} + E_i\beta_E + D_i\beta_D + W_i\beta_W + \varepsilon_i. \quad (1)$$

In our data set we do not observe the test scores received by children, however, we do observe whether a child succeeds or fails in school.²⁰ When the test scores obtained by a student cross a certain threshold we observe school success ($Y = 1$). Thus, the probability that a child succeeds is,

$$\Pr ob[Y_i = 1] = \Pr ob[C_i\beta_c + F_i\beta_F + SE_i\beta_{SE} + E_i\beta_E + D_i\beta_D + W_i\beta_W + \varepsilon_i > 0]. \quad (2)$$

Assuming that the error term is normally distributed allows estimation of (2) using a probit model.

The key econometric issue with single-equation probit estimation of (2) is that the school outcomes of children and their work status may be simultaneously determined. It is likely that unobserved factors that determine school success and child working hours/work participation may be correlated. If children who work are less likely to succeed in school even if they were not working then probit estimates of (2) will exaggerate the negative effects

²⁰ The school success–child work relationship is based on all the children in our sample and *not* a select sample of children who are still enrolled in school. The school enrollment rate in our sample is 98.5 percent and information on whether a child ever failed a grade in school is available for all children regardless of whether they are currently enrolled in school or not. School enrollment and regular school attendance are almost universal and accordingly the appropriate concern is the educational performance of children.

of working on school success. On the other hand if children who work are also more likely to succeed in school then probit estimates of (2) will underestimate the negative effects of working.

Our empirical strategy to control for the correlation between unobserved factors that determine educational success and hours of work consists of two parts. First, we are able to include a set of unusual educational related variables in the educational success equation. These include two variables that capture whether a child is very interested or adequately interested in school and four variables which capture the educational ambitions of children. These variables, which are discussed in more detail in the following section, may be viewed as proxies for the educational ability and educational motivation of a child. To the extent that the lower educational ability and motivation drive the working patterns of children, the inclusion of such variables may be expected to reduce the negative effect of work on school success.

In addition to these direct controls for ability we rely on an IV strategy to account for the potential correlation between unobserved factors that may determine educational success and child work. In particular, we use a two-stage estimation approach developed by Vella (1993). Reduced form expressions for the two types of work may be written as,

$$W_i = C_i\beta_c + F_i\beta_f + SE_i\beta_{SE} + E_i\beta_E + D_i\beta_D + P_i\beta_P + LI_i\beta_{LI} + v_i. \quad (3)$$

In addition to the variables in (2), this specification includes a set of variables that captures geographical variation in child labour policies (P) and in the labour inspection regime (LI). In the first stage we estimate the hours of work equations using tobit models. These first step estimates are used to construct generalized residuals (λ) of the form:

$$\hat{\lambda}_i = -\hat{\sigma}(1 - I_i) \left\{ \frac{\phi(X_i \hat{\beta})}{(1 - \Phi(X_i \hat{\beta}))} \right\} + I_i (W_i - X_i \hat{\beta}_i), \quad (4)$$

where $\hat{\sigma}$ and $\hat{\beta}$ are tobit maximum likelihood estimates of the parameters in the hours of work equations, X_i represents all the explanatory variables in (3), I_i indicates whether a child works or not and $\phi(\cdot)$ and $\Phi(\cdot)$ denote the probability density and cumulative distribution function of the standard normal distribution evaluated at the tobit estimates (for details see Vella, 1993; Vella, 1998). In the second stage we include estimates of the generalized residuals in (2). This procedure yields,

$$Y_i = C_i \beta_c + F_i \beta_F + SE_i \beta_{SE} + E_i \beta_E + D_i \beta_D + W_i \beta_W + \hat{\lambda}_i \delta + \varepsilon_i. \quad (5)$$

This augmented probit equation yields consistent estimates (Rivers and Vuong, 1988; Vella, 1993). A test of the null hypothesis that the coefficients on the generalized residuals are zero, is a (Hausman) specification test for the exogeneity of W_i .

The key issue that needs to be confronted is the identification of this two-stage model. There are several possibilities that may be explored. First, since the hours of work equation is estimated as a tobit model and our school success model is a probit equation, we may achieve identification on the basis of differences in functional form. Although feasible, and we do use this approach, differences in functional form may be a weak basis for identification.

In addition to functional form identification we rely on two sets of potential instruments to implement the IV strategy.²¹ The first set pertains to geographical variation in the implementation of plans to tackle the problem of child labour. Under the aegis of PETI

²¹ The data to fashion the instruments were obtained from PETI and from the labour inspectorate. The PETI data are for 2002 and the labour inspectorate data are for 2001. We are forced to use 2002 data for the PETI variables as we were unable to get information for 2001 or for earlier years. However, given that our survey data are from October 2001 and the PETI data are for early 2002 the use of these data should not pose a problem.

multi-disciplinary teams have been set up across the country. These teams work with local authorities to raise awareness, monitor and prevent child labour and more pro-actively, to design tailor-made training programs to help working children or children considered at risk to acquire certain competencies. These training programs are delivered through centres (PIEF centres) that are set up in co-operation with the local administration. Despite the desire to set up such centres in all counties, till 2002, about 45 percent of the children in our sample had access to such centres (see Table 5). PETI initially concentrated its efforts on regions with a higher population density (which may not be regions with higher incidence of child labour) and then tried to negotiate with different local entities to set up such centres. Whether a county has set up such a centre or not maybe interpreted as a signal of the local administration's attitude towards and willingness to devote resources (transport, classrooms) to tackling child labour. A second variable constructed to capture variation in resources devoted to tackling child labour is the total number of children in a county divided by the number of members in the multi-disciplinary teams (the number of members in the multi-disciplinary teams range from 1 to 8). While the presence of a PETI-centre in a county may be negatively correlated with child labour, the ratio of youngsters per PETI member is likely to be positively correlated with child labour. Both these variables may be expected to influence child labour while they should have no direct bearing on educational success.

The second set pertains to the labour inspection regime in Portugal. All counties in Portugal have labour inspectors who are charged with ensuring that the labour laws are followed in the firms that lie in their territory. We gathered comprehensive information from the labour inspection office on the number of inspectors, number of firms, number of workers, the frequency of the inspection regime, the number of serious illegalities detected (including child workers) and the total fines charged for labour illegalities. Based on this information we created two variables that capture inter-county variation in the strictness of

the labour inspection regime. These are the total number of illegalities detected per worker (the detection rate is about 2 illegalities per 1000 workers) and the average fine per illegality (about Euro 1200).²² Both these variables may be expected to reduce the use of child workers but should not have a direct bearing on educational success.²³

Overall, the availability of the variables that proxy ability as well as the two sets of instruments should allow us to obtain estimates of the effect of child labour on educational success which are purged of unobserved attributes of children which may influence patterns of work and educational success. In our empirical work we conduct a sensitivity analysis to examine variations in the estimates in response to the inclusion of the educational ability proxies and to changes in the identification strategy. We also conduct statistical tests to probe the validity of the instruments.

V. Data, specification and descriptive statistics

Our paper relies on information contained in two household surveys. The first of these was conducted in 1998 and the second in 2001, by DETEFP and SIETI, respectively, with the assistance of ILO.²⁴ The main aim of these surveys was to gather information on the work activities of children aged 6 to 15. The surveys provide detailed information on the work activities of children and the economic, demographic and family environment in which they are raised. In addition to the quantitative information a relatively unique aspect of the

²² The idea was to generate variables that capture the probability that an illegality is detected and the fine per illegality. To create the former we would have liked information on the total number of illegalities. However, this is not observed and thus we use the total number of workers in the county as a proxy for the total number of illegalities. Average fine per illegality is obtained by dividing the total provisional fines by the total number of detected illegalities. The actual fine may differ as it depends on the fine imposed by the courts. The fines that may be imposed lie in a range and we use the amount that corresponds to the minimum fine for the illegality.

²³ While merging the county level information with our household survey provides instruments and allows us to control for the potential endogeneity between educational success and child labour, it comes at a cost. Information on the implementation of child labour policies and labour inspection regimes is not available for Azores and Madeira and this reduces the number of observations under analysis from about 26,000 to 24,000.

²⁴ DETEFP is the statistics department of the Labour and Training Ministry, and SIETI is a recently established government statistics unit focusing on child labour.

data set is qualitative information on aspects such as a child's interest in school and a child's academic ambitions.²⁵

While we have utilised both surveys to provide information on the incidence of child labour, we rely on the more recent 2001 survey for our econometric work. Apart from the advantage of being a more recent survey, the 2001 data has better geographical coverage and additional information on some of the key questions, for instance, on hours of domestic and economic work. It should also be noted that the two data sets are independent cross-sections and do not constitute a panel. In the 2001 survey a total of 19,849 households were interviewed and our study focuses on a sample of about 26,000 respondents in the age group 6 to 15.

Specification

The school success and hours of work equations are specified as functions of child, family, socio-economic, education and labour demand characteristics. The tasks carried out by children are often determined by their own characteristics such as maturity and gender. We use age as a proxy for maturity as well as a potential indicator of the labour market contribution of children. To capture the potentially non-linear effect of age we introduce an age-squared term in the specifications. The family characteristics include household size, whether a household is female headed, the educational attainment of the household head and a variable indicating the number of years worked by the household head below the age of 12.

The socio-economic characteristics include variables that capture the level of household income and a dummy indicating whether a household has experienced a reduction

²⁵ Additional details on the survey are available in SIETI (2003).

in income during the last year. Household wealth is captured by the number of rooms in the household's dwelling and the conditions of the house.

The educational characteristics included are a variable indicating pre-school attendance, the time taken to reach school and two sets of variables that capture a child's interest and educational ambitions. Parents were asked to provide information on their child's interest in school. This variable consists of three categories, namely, whether a child is very interested, shows adequate interest or has no interest in school (the omitted category). In addition to the interest variable, children were asked about their educational ambitions and the educational level that they would like to achieve. This variable consists of four categories – tertiary, upper secondary, compulsory and less than compulsory education. The omitted category consists of children who are not sure about their school ambitions.

In standard economic analyses of educational performance, variables such as interest and ambition fall in the category of unobserved attributes and are often ignored (omitted variable bias). In contrast, sociological examinations of educational success often use measures such as ambition, motivation and interest in their analyses.²⁶ Given the current level of economic development in Portugal, the persistence of child labour and low educational success we believe that along with the social and economic dimensions, psycho-social factors are important in explaining the observed outcomes. Accordingly, we include these variables in some of our specifications and treat them as proxies for the unobserved academic abilities and motivation of a child. However, an added issue which arises with the inclusion of such variables is that since these are proxies for ability and not measures of inherent academic ability it is likely that a child's educational ambitions (interest) and

²⁶ The role of educational aspirations in determining attainment and the formation of such aspirations has been a lively area of research in sociology since the work of Kahl (1957). Early examples of empirical work which incorporate such types of information include, Sewell and Hauser (1972), Alexander et al. (1975), Otto and Haller (1979).

educational success are simultaneously determined. While this simultaneous formation of success and ambition (interest) does not detract from the ability of such variables to control for unobserved attributes, the coefficients on these variables should be interpreted carefully. Notwithstanding our remarks about the usefulness of controlling for such unobservables, we are sensitive to this additional source of endogeneity and for all our econometric work present estimates with and without these educational attributes.

We include several variables to capture the role of demand side factors in influencing the working patterns of children. Previous studies in Portugal have documented the links between ownership of small land-holdings and the use of child labour.²⁷ As shown in Portugal and in other agricultural contexts, in situations where households have small land-holdings they tend to farm intensively and in such situations children are expected to work on the family farm. We use a variable indicating ownership of a backyard or small farm as a proxy for the land-holdings of a household.

Since most economic work takes place on the family farm or firm the occupational status of the household head may be expected to reflect the household demand for labour. We use a set of three variables to capture the potential links between the occupation of the household head and child work. If a parent is self-employed or an employer it is more likely that children will be expected to provide contributions as compared to situations where a household head is a wage labourer. To capture demand for domestic work we include a variable that indicates whether a household employs domestic help. While this variable may also reflect household income and status it should certainly reduce the burden of domestic tasks within the household.

²⁷ See for example Cunhal (1976, p. 98).

A final set of variables are included to control for variations in child labour practices across different regions. These are indicators for geographical location and the degree of urbanization (urban, semi-urban, rural). We also include regional unemployment and the structure of employment (percentage of workers in the primary, secondary and tertiary sectors of the economy) as a measure of local employment prospects and economic dynamics.²⁸ While all the variables discussed so far are included in the hours of work and the educational success equation, as discussed in the previous section, we include information on variation in the implementation of child labour policies and the labour inspection regime only in the incidence/hours of work equations.

Descriptive Statistics

Table 5 presents descriptive statistics for the variables used in our work while Table 6 shows selected descriptive statistics conditional on the working status of the child. As shown in Table 6, children who work come from families where the household head has lower educational attainment and where the household head entered the labour market at an earlier age. Consistent with the lower levels of educational attainment, child workers belong to families with lower incomes and poorer housing conditions. There also appears to be a clear pattern across the two categories of work. In terms of their socio-economic conditions domestic child workers belong to families that are better-off as compared to families where children are doing economic work.

With regard to the educational characteristics, children who work are far less likely to have attended pre-school (about 56-60 percent versus 74 percent for non-working children). In terms of interest in schooling there is a clear difference between children involved in economic work and those who do not work. While 60 percent of non-working children are

²⁸ The degree of urbanization, regional unemployment and the structure of employment regards information from INE (National Statistics Institute).

very interested in schooling, the corresponding number is 42 percent for children involved in economic work. The interest gap is not as pronounced between non-working children and domestic workers (60 versus 55 percent). A similar pattern holds for school ambition. Differences in the educational ambitions of non-workers and domestic workers are not as sharp as the differences between non-workers and economic workers. While more than 50 percent of non-workers/domestic workers aspire to reach a tertiary level of education, less than a third of working children share the same aspirations. Among other reasons, the better educational characteristics of domestic child workers is probably linked to the larger percentage of females involved in this type of work. There is evidence to show that at the primary levels girls are often more interested in studying than boys (OECD, 2003).

The demand side variables show marked differences across work categories. The ownership of small farms is substantially higher among children who provide economic work (67 percent) as compared to non-workers (43 percent). The pattern for occupational status shows that while parents of domestic workers and non-workers are equally likely to be employed in wage labour parents of economic workers are clearly more likely to be employers or self-employed.²⁹

VI. Regression results and discussion

We begin our discussion of the regression results by presenting reduced form probit estimates of the probability of working and tobit estimates of the hours worked by children. This is followed by probit estimates of school success. Finally, we present estimates that assess the effect of hours worked on the school success of children. In all the tables we present estimates with and without the educational interest and ambition variables.

²⁹ Although not displayed in the table, the descriptive statistics suggest that economic labour is usually prevalent in semi-urban and rural areas while domestic work is usually found in semi-urban and urban areas.

VI. 1 Economic and domestic work

Table 7 presents probit estimates of the probability that a child works, while Table 8 presents tobit estimates of the hours of work. There is a clear difference in the role of gender in determining the type of work provided by children. Male children are more likely to be economic workers and less likely to be involved in domestic work. Being male increases the probability of being an economic worker by 1.2 to 1.8 percentage points while reducing the probability of doing domestic work by 2.5 to 2.7 percentage points. The age patterns are similar across the two categories and show an increase in the working contributions of children as they age.

The education level of the head of household is likely to be associated with household income, the academic abilities of children and the importance that parents attribute to education. The two education variables show that higher educational attainment of parents is clearly associated with a lower probability of working and a lower duration of work. Even though our specification contains parental education and family wealth variables we find that children of parents who worked in their pre-teen years are also more likely to contribute to economic work. This inter-generational persistence leads to a 0.2 percentage point increase in the probability of working.³⁰

The income and wealth variables have the expected signs and show that children belonging to households with higher incomes and better housing conditions are less likely to be doing domestic or economic work. Transitory income shocks have little bearing on the incidence or duration of child work. In specifications which did not account for household wealth (housing conditions) the income vulnerability variable displayed a large effect.

³⁰ For more details on the intergenerational persistence of child labour see Chagas Lopes and Goulart (2005).

However, controlling for wealth levels the effect vanishes suggesting that child labour is a structural rather than a transient phenomenon.

Turning to the educational variables, a comparison of the estimates shows that their inclusion does not have a very large effect on the other estimates. The educational characteristics themselves reveal interesting patterns. Pre-school attendance which may reflect parental attitudes towards education as well as availability of such options is negatively linked to both economic and domestic work. The time taken to reach school has no bearing on domestic or economic work. For both economic and domestic work, children who are interested in school are 0.4 to 0.6 percentage points less likely to work. The educational ambition variables show marked variation across the 4 ambition categories and across the two types of work. Children falling in the lowest educational ambition category are 6 percentage points more likely to provide economic work as compared to those whose educational ambitions are unknown while the marginal effect for those in the highest ambition is about 0.6 percentage points. The effect of these ambition variables is markedly smaller among domestic workers and there are no clear patterns across the ambition levels. Overall, we see that, even after controlling for a variety of socio-economic variables, interest and especially ambition appears to have a direct and large effect on the working patterns of children.³¹ The lack of sharp changes in the estimates of the other coefficients suggests that the educational variables are picking up aspects that are not captured by the other variables.

Turning to the demand side characteristics we find that family ownership of a small farm calls for labour effort from children. The marginal effect is about 0.4 to 0.8 percentage points. The role of a small farm in calling for increased domestic work may be linked to the

³¹ In specifications where we did not control for socio-economic characteristics (SEC), the marginal impact of a child's ambition and interests were 7-8 times larger than the estimates presented in Tables 7 and 8. Thus, while a large portion of the impact of ambition/interest is mediated via these SEC, they still exert a large direct effect.

role of domestic child workers in releasing other household workers for agricultural tasks. The effect of the occupational status variables differs across work categories. We find that being self-employed or being an employer is associated with a 2 to 3 percentage point increase in the probability that a child is an economic worker (as compared to wage labourers) while the effect of these variables on domestic work is negligible. The presence of a hired domestic worker reduces domestic and economic work. The presence of such workers probably reflects household wealth and status. Additionally, hired help may release children from domestic chores and may also release adult labour which in turn can lead to a reduction in a child's contribution to economic work.

The effects of the demand for labour variables shows that the incidence of child labour in Portugal is determined not just by the socio-economic background of a family but whether there are work opportunities. Households that operate a small farm or run their own businesses are likely to have a greater demand for labour and are more likely to call on their children to provide (cheap) labour. The presence of work opportunities due to the economic structure prevailing in some parts of the country appears to have led to the persistence of a norm that sanctions the use of child labour. The labour demand generated by such activities explains the higher reliance of child labour in regions of the country that are not as poor while it is lower in some of the poorer regions of the country.³² Although not reported in Tables 7 and 8, as may be expected, the regression results show that, the incidence and duration of child labour is higher in the northern and central parts of the country.

The final set of variables in the specification pertains to variations in the implementation of child labour reduction policies across counties and to the variations in the

³² Although not reported in Tables 7 and 8, as may be expected, the regression results show that the incidence and duration of child labour is higher in the northern and central parts of the country.

labour inspection regime. Across all specifications the presence of a PETI supported centre is negatively linked to child labour. The coefficient is statistically significant and the effect ranges between 0.6 to 1.7 percentage points. The number of children per PETI member does not have such a clear-cut effect. Consistent with expectations both the labour inspection regime variables are negatively linked to child labour. While the probability of detection does not appear to have a statistically significant effect, the effect of the fine per illegality is stable across specifications and is statistically significant at conventional levels. A Euro 1000 increase in the fine per illegality is likely to reduce child work by about 0.3 percentage points.

Jointly these four variables are expected to capture the local administration's attitude towards the problem of working children (and other labour market illegalities), as well as their ability, willingness and resources available to tackle these problems. We exploit these differences in responses to tackling the problem of working children and in labour market inspections to instrument child labour. To serve as valid instruments these variables need to be correlated with patterns of work while at the same time they should be valid exclusions from the educational success equation. While the individual statistical significance of these variables differs across specifications, jointly they are statistically significant in all the probit and tobit models presented in Table 7 and 8 (the chi-square test-statistics range between 23 and 134 and the p-values are always less than 0.0001). At the same time there is little reason to expect that these variables should have a direct bearing on educational success. This is also supported by statistical tests. For example, tests for the inclusion of the child labour policy variables in table 9, spec. 1 recorded a p-value of 0.95 while the inclusion of the policy and labour inspection variables recorded a p-value of 0.42.

*VI.2 School success*³³

Several specifications (with and without educational and hours of work variables) of the impact of various characteristics on the educational success of children are presented in Table 9. The estimates show that male children are 5-10 percentage points less likely to succeed in school as compared to females. As may be expected older children are more likely to have failed at least once in their educational careers. Belonging to a female-headed household reduces the chances of educational success by 2.1-2.6 percentage points. The presence of a well educated household head (more than 9 years) boosts educational performance by about 11-15 percentage points. The large effect of education probably reflects a combination of inherited ability, as well as the greater interest and knowledge of more educated parents who may be help their children with school-work. The income and wealth variables show that children belonging to families with higher income and wealth are more likely to succeed. This positive link may reflect the monetary ability of richer parents to send their children to better schools or to buy extra educational inputs for their children.³⁴

The inclusion of the educational characteristics leads to several interesting changes in some of the other coefficients. In particular, a comparison of specification 1 and 3 shows that the negative effect of being male is now lower, the effect of parental schooling and household income and wealth is also considerably lower. The interest and aspirations of children is strongly linked to their educational success. Children who are extremely interested in schooling are 24 percentage points more likely to succeed as compared to those who have no interest. Children who aspire to higher educational levels appear to be more successful.

³³ Our analysis of educational success is essentially a demand side analysis and does not account for the role of educational inputs and the quality of teaching. We are unable to match the children in our sample with the school that they attend and are unable to say more on the role of such characteristics.

³⁴ While the majority of Portuguese children attend public schools, there are differences in educational inputs across schools. As may be expected, schools located in richer neighbourhoods typically offer better teaching inputs (see Clements, 1999).

For instance, children with educational ambitions up to the compulsory level are 24 percentage points less likely to be successful than those whose educational ambitions are unknown. While those with higher educational ambitions (tertiary level) are 12 percentage points more likely to succeed. Thus, despite controlling for several characteristics (such as income, wealth, education of parents, family structure) that may determine educational interest and aspirations there is a large direct effect of these variables on educational performance.

As shown by several authors (for example, Otto and Haller, 1979) educational aspirations/ambitions are not just a psychological or internally constructed notion, they are formed and modified in interaction with various influences and depend on social, economic and other innate factors. In this case, exploratory regressions showed that the effects of the ambition/interest variables are 2-3 times larger in the absence of controls for socio-economic characteristics. Despite controlling for a variety of observed characteristics it is likely that unobserved characteristics that determine educational aspirations and educational success are correlated and that the estimates presented here exaggerate the impact of ambition/interest on educational success. While acknowledging this possibility it would be incorrect to ignore such variables considering their potential role in influencing educational and labour outcomes. It is difficult to correct our estimates for this source of endogeneity and we would like to emphasise that these estimates should not be imbued with a causal interpretation. Our aim is to show that in addition to socio-economic factors, psychological factors such as the aspirations of children, however they may be formed, play a large role in determining their educational success. Not only are high aspirations correlated with greater educational success they are also associated with lower levels of labour effort.

VI.3 School success and work

To explore the link between school success and the work activities of children, Table 9 presents estimates of the school success equation including measures of the hours of work contributed by children. The estimates in Table 9, specification 2 show that an hour of economic work reduces educational success by 0.4 percentage points while an hour of domestic work has a negative effect of 0.5 percentage points. At the mean value of weekly hours of work provided by children these translate into educational success reductions of 5.6 percentage points for economic work (14 hours of work) and 4 percentage points for domestic work (8 hours of excess domestic work). As discussed earlier, these single-equation probit estimates may be misleading as they do not account for the potential correlation between unobserved characteristics that determine school success and the work activities of children. To account for this correlation we re-estimated the hours of work effect with the inclusion of the educational interest and ambitions variables. As shown in Table 9, specification 4, the inclusion of these controls reduces the negative effect of work. At the mean the effect of economic work is now 4.2 percentage points while that of domestic work is 3.2 percentage points. While the effect of hours of work on educational success is now smaller the effect of the educational interest and ambition variables is almost unchanged.

The second stage of our empirical strategy to identify the effect of work on educational outcomes includes controls for ability *and* uses an IV approach. Table 10 presents several sets of estimates based on Vella's (1993) suggested methodology. These specifications include *all* the variables used in the school success regressions reported in Table 9. Given that the main focus here is on the effect of the hours of work variables we do not present the coefficients on all the other variables. Although the coefficients on the other variables do change in response to the alternative identification strategies they do not show sharp variations. The effects of the other variables are still reflected by the estimates displayed in Table 9.

To aid comparison the estimates in column 1 of table 10 are the same as those reported earlier in Table 9, specification 2, which do not include the educational characteristics of the child. Column 2 presents IV estimates that are based on functional form identification. In addition, column 3 relies on variation in child labour policies to aid identification. While column 4 relies on variation in child labour policies and labour inspection regimes to support identification. Regardless of the identification approach we find that there is a sharp difference in the IV estimates as compared to the single-equation probit estimates. There is a sharp decline in the effect of hours of economic work. The marginal effect is halved from 0.4 to 0.2 percentage points. The effect of hours of domestic work also falls from 0.5 to 0.2 percentage points and it is no longer statistically significant. Across all specifications, the selection correction variables are individually and jointly statistically significant.³⁵ The sign on the generalised residuals suggests that unobserved attributes that determine hours of work and educational success are negatively correlated. In other words unobserved characteristics that reduce educational success increase work effort and in the absence of an appropriate empirical strategy we would tend to overestimate the negative effect of work.³⁶

Columns 5-8 report estimates that include the proxies for the educational ability of children. Column 5 repeats the estimates presented earlier in Table 9, specification 4. Column 6 presents IV estimates that rely only on differences in functional form for identification, while column 7 estimates rely on variation in child labour policies and column 8 on variation in child labour policies and the labour inspection regime. Once again, regardless

³⁵ The selection terms are jointly statistically significant with p-values of about 0.02.

³⁶ Since we have four instrumental variables and two endogenous variables we estimated school success using OLS and carried out a test for overidentifying restrictions. The statistical test did not reject the null hypothesis that all the instruments are not correlated with the error term in the school success equation (a computed test statistic of $4.87 < 5.99 (\chi^2_2)$).

of the identification strategy, a comparison of the probit and the IV estimates shows that the magnitude of the effect of domestic work on educational success drops sharply and it is no longer statistically significant. On the other hand the effect of economic work is stable across specifications and is unaffected by the change in estimation approach and identification strategy.³⁷

Overall, a comparison of the various estimates presented in Table 10 shows that regardless of whether we include or exclude proxies for academic ability the story emerging from these estimates remains the same. There are clear differences across the effects of the two types of work. While domestic work does not appear to have a bearing on educational success, economic work does appear to inhibit educational success. From a methodological standpoint, the changes in the effects of work in response to the inclusion of the proxies for ability and especially the use of the IV estimation strategy highlights the importance of correcting for the potential endogeneity between work patterns and educational success. In the absence of this approach the effect of work, especially domestic work, on educational success would have been substantially overestimated. The IV estimates suggest that the entire negative effect of domestic work on educational success displayed in the probit estimates may be attributed to selection (unobserved ability) effects. In other words the lack of educational success of children may well be driving parents to channel them to domestic work. As far as economic work is concerned, while controlling for selection effects reduces the negative effect of this type of work it still persists. Thus, only a part of the probit estimates of the negative effect of work may be attributed to selection effects (ability bias). In terms of magnitude, the size of the coefficient on hours of economic work implies that

³⁷ The selection effects are individually statistically significant only for domestic work. However, they remain jointly statistically significant with p-values of about 0.045.

the average work contribution of an economic worker (14 hours per week) reduces educational success by 2.8 to 4.2 percentage points. While this is not a trivial effect, neither is it very large as compared to the 27 percent educational success gap between economic workers and non-workers. Thus, at most, the economic work contribution of children accounts for about 15 percent of the educational gap.

Interestingly, the signs on the selection effects and the inference that the patterns of work, especially domestic work, are driven by unobservable attributes (low ability) that drive educational success and not the other way round are consistent with the work on educational returns for Portugal. Vieira (1999) and Modesto (2003) find that IV estimates of returns to education are lower than the corresponding OLS estimates and argue that low investment in education may be related to low ability rather than to high marginal costs. In other words, at least for some children their lower educational success may be driving their correspondingly higher work effort. Parents may be making time-allocation decisions on the basis of their perception of the comparative advantages and the expected educational returns for their children, rather than the high average returns to education.

VII. Concluding remarks

Despite economic growth and development, and various laws and inspection policies promoted by the government, child labour persists in Portugal. The presence of child labour coupled with low levels of educational success and the high returns to investments in education provided the motivation for our work. This paper assessed the factors that determine child labour and educational success and examined whether the work activities of children hinders their educational success.

There are several aspects of the paper which distinguish it from the existing literature on this topic. First, we study the issue of child labour in a relatively developed country setting. Examining this issue in the context of a relatively high-income country may provide guidance on the additional policies (beyond poverty alleviation) which developing countries may adopt if they are to tackle the problem of child labour. Second, the empirical approach used in this paper recognizes the potential endogeneity between child labour and educational success and combines two approaches to try and obtain the causal effect of work on educational success. We include several controls for typically unobserved qualities. Our estimates of educational success control for a child's educational interest and educational ambitions. While these variables may be interesting in their own right, they also serve as proxies for academic ability and are included to control for unobserved factors that may determine educational success and patterns of work. In addition, we exploit geographical differences in the implementation of policies designed to tackle child labour and in the labour inspection regime to instrument child labour. Finally, our work is one of the few pieces that draws a distinction between domestic and economic work and assesses the influence of the duration of these two types of work on the educational success of children. Differentiating between these two types of labour is important from a policy perspective as tailor-made solutions will be possible if the reactions of the different types of labour to varied stimulus are known.

Regardless of the inclusion of proxies for educational ability and across variations in identification strategy our results highlighted the importance of treating child work as endogenous and distinguishing between types of work before assessing the effect of child labour on educational outcomes. We found sharp differences between the single-equation probit estimates and the instrumental variable probit (IVP) estimates. Treating child labour as exogenous and relying only on probit estimates (even after controlling for proxies of

educational ability) led to overestimates of the negative effect of work on educational success. While the single-equation estimates suggested that both economic work and domestic work hinder educational success the IVP estimates revealed that it is only economic work which exerts a negative effect on educational outcomes. The pattern of selection effects, especially for domestic work, suggests that this type of work and the accompanying loss of investment in education (due to this work) may be driven by parental perception/knowledge of the comparative advantages of their children rather than lack of information about the benefits of education. In other words it seems that lack of educational success may be responsible for the pattern of domestic work rather than the other way round.

In contrast, only a part of the effect of economic work on educational success is driven by ability bias, and it seems that economic work does have a negative causal effect on educational success. While no empirical strategy is perfect, the effect of economic work on educational success appears to be robust to the inclusion of controls for ability as well as changes in identification strategy. Nevertheless, the estimated effect of this type of work on educational success is not particularly large. On average, economic work leads to a 2.8-4.2 percentage point reduction in school success. While this effect is not trivial, it does seem small as compared to the 27 percentage point educational success gap between non-workers and economic workers. While economic work hampers the development of children and should be eliminated, it would at most reduce 15 percent of the educational success gap. Clearly, increasing the educational success of Portuguese children requires a lot more than just reducing their work effort.

The apparently benign effect of domestic work as compared to the effect of economic work suggests that policy initiatives should focus on trying to eliminate economic work. We found that while increases in income are associated with reduced economic work, variables that capture the household occupational structure play a large role in determining

the observed pattern of child labour in Portugal. Child labour in Portugal is concentrated in the Northern and Central parts of the country, precisely those areas that have a strong presence of small and medium sized family enterprises and small land ownership. While the presence of such enterprises and self-employment practices may enhance growth, these features increase child labour in the present and also its resilience in the future. A long tradition of relying on child workers, probably slows the change of habits and mentalities and leads to the persistence of this norm. From the perspective of developing countries the results presented here suggest that, while reductions in poverty are likely to reduce child labour they should also be accompanied by sensitisation programs that work towards breaking entrenched norms and traditions.

Although tentative, an interesting aspect of our work was the correlation between qualitative characteristics such as a child's educational ambitions (and interest in schooling) and educational and labour outcomes. We found that higher ambitions were associated with greater educational success while at the same time they lowered the probability and duration of economic work. While a part of the estimated effect of these psycho-social variables is probably simultaneously determined with educational success the magnitude of the coefficients suggests that these types of variables should not be ignored. It is quite possible that parents and teachers have low ambitions for some children regardless of their performance and such prejudices may translate into self-fulfilling prophecies. From a policy perspective these results suggest that standard approaches such as controlling economic work through labour inspections/fines, or encouraging school attendance through cash subsidies and boosting educational performance through better educational inputs may need to be supplemented with programs that attempt to foster higher educational aspirations.³⁸

³⁸ While it is not the aim of this paper to discuss the manner in which educational aspirations may be generated, there is a literature on how educational expectations, motivation and aspirations are formed and various

sensitising strategies and mentoring programs that maybe used to boost such aspirations (see Redd et al., 2002).

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Table 1
Incidence of Child Work in Portugal (%)^a
(Absolute number of children working)

	1998	2001
Economic work	3.13 (33,792)	3.70 (44,003)
Economic work – Outside the household	0.68 (7,342)	0.73 (8,689)
Economic work – Within the household	2.45 (26,450)	2.97 (35,314)
Both economic and domestic work	0.86 (9,285)	0.43 (5,130)
Domestic work – Within the household	7.68 (83,037)	4.05 (48,165)
Total	<i>11.67</i> <i>(126,114)</i>	<i>8.18</i> <i>(97,298)</i>

Notes: ^a Incidence is defined as the percentage of all children in the age group 6 to 15 who report at least one hour of work per week. Estimates of the absolute number of working children working are based on weighting the sample data to obtain population figures.

Table 2
Incidence of Child Work by Regions (%)

1998	North	Centre	Lisbon	Alentejo	Algarve	Azores	Madeira
Economic work	4.3	4.7	1	1.5	1.5	n.a.	n.a.
Domestic work	10.0	11.4	3.3	3.3	3.2	n.a.	n.a.
Combined	<i>14.3</i>	<i>16.1</i>	<i>4.3</i>	<i>4.8</i>	<i>4.7</i>	n.a.	n.a.
2001							
Economic Work	4.8	5.8	1.4	2.8	2.3	3.4	0.29
Domestic Work	7.2	3.8	1.0	0.9	1.3	4.4	1.06
Combined	<i>12</i>	<i>9.6</i>	<i>2.4</i>	<i>3.7</i>	<i>3.6</i>	<i>7.8</i>	<i>1.35</i>

Notes: The 1998 survey did not cover the Azores and the Madeira regions.

Table 3
Child Workers in Portugal – A Profile
(Standard Deviation)

	1998	2001
Economic work		
Male (%)	72.4	73.5
Age	13.0	12.54
Weekly hours of work	n.a.	14.05 (13.96)
Sector of Work (%)		
Agriculture	55.7	46.73
Industry	12.0	11.15
Restaurants and Hotels	10.5	12.40
Commerce	9.9	14.34
Construction	6.4	10.68
Others	5.5	4.7
Domestic work		
Male (%)	28.8	26.0
Age	12.3	12.23
Weekly hours of work	n.a.	8.36 (8.77)

Table 4
Educational Indicators by Working Status

	Does not work	Economic Work	Domestic Work	Domestic and/or Economic Work
Enrolment (%)	99.3	84.9	95.0	90.1
Attendance ^a (%)	97.9	81.1	91.6	86.6
School Success ^b (%)	76.4	48.8	61.0	55.2

Notes: ^a Attendance = 1 if a child misses school less than once a week. ^b School success = 1 if a child has never failed in school.

Table 5
Descriptive Statistics

Variables	Mean	Standard Deviation
<i>Child characteristics</i>		
Sex (Male = 1)	0.513	0.499
Age	10.89	2.794
<i>Family characteristics</i>		
Household size	4.412	1.312
Female headed household = 1	0.231	0.421
Schooling of household head		
5 to 9 years = 1	0.342	0.474
> 9 years = 1	0.154	0.361
Years worked by household head till age 12	0.405	1.086
<i>Socio-economic characteristics</i>		
Household income (1 to 7, increasing in income)	4.429	1.628
Reduction in income = 1	0.137	0.344
Number of rooms in dwelling	3.943	1.209
Housing conditions		
Adequate = 1	0.291	0.454
Good = 1	0.623	0.485
<i>Educational characteristics</i>		
School success = 1	0.746	0.435
Pre-school attendance = 1	0.725	0.446
Time to reach school (in minutes)	13.27	10.17
Interest in school – adequate = 1	0.375	0.484
Interest in school – very interested = 1	0.556	0.497
School ambition , < compulsory = 1	0.018	0.133
School ambition , compulsory = 1	0.103	0.304
School ambition, upper secondary = 1	0.206	0.404
School ambition, tertiary = 1	0.523	0.499
<i>Demand characteristics</i>		
Backyard = 1	0.448	0.497
Occupational status of household head - wage labour = 1	0.632	0.482
Occupational status of household head - self employed = 1	0.125	0.331
	0.083	0.278
Occupational status of household head - employer = 1	0.085	0.278
Household employs domestic worker		
	0.446	0.497
<i>Child labour policies</i>		
Counties with a PIEF centre = 1	44,464	27,145
Children per PETI member		
	1.97	1.47
<i>Labour Inspection</i>		
Serious illegalities per 1000 workers	1177.8	601.41
Fine per illegality (in Euros)		

Table 6
Selected descriptive statistics

Variables	Child does not work		Economic Work		Domestic Work	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<i>Child characteristics</i>						
Sex (Male = 1)	0.517	0.500	0.735	0.442	0.261	0.439
Age	10.76	2.794	12.54	2.387	12.238	2.268
<i>Family characteristics</i>						
Schooling of household head						
5 to 9 years = 1	0.350	0.477	0.236	0.425	0.263	0.440
> 9 years = 1	0.164	0.370	0.020	0.139	0.063	0.242
Years worked by household head till age 12	0.374	1.034	0.910	1.666	0.586	1.337
<i>Socio-economic characteristics</i>						
Household income (1 to 7)	4.482	1.627	3.704	1.523	3.980	1.504
Reduction in income = 1	0.135	0.341	0.156	0.363	0.161	0.367
Housing conditions						
Adequate = 1	0.287	0.452	0.337	0.473	0.339	0.474
Good = 1	0.633	0.482	0.506	0.500	0.528	0.499
<i>Educational characteristics</i>						
Pre-school attendance = 1	0.738	0.439	0.559	0.497	0.599	0.490
Interest in school – adequate = 1	0.373	0.483	0.411	0.492	0.383	0.486
Interest in school – very interested = 1	0.567	0.495	0.333	0.471	0.481	0.499
School ambition, < compulsory = 1	0.012	0.110	0.133	0.340	0.035	0.185
School ambition, compulsory = 1	0.093	0.291	0.276	0.447	0.150	0.358
School ambition, upper secondary = 1	0.203	0.402	0.224	0.417	0.228	0.420
School ambition, tertiary = 1	0.532	0.499	0.306	0.461	0.514	0.500
<i>Demand characteristics</i>						
Occupational status of household head - wage labour = 1	0.641	0.480	0.444	0.497	0.619	0.486
Occupational status of household head - self employed = 1	0.120	0.325	0.257	0.437	0.120	0.325
	0.082	0.275	0.130	0.337	0.064	0.246
Occupational status of household head - employer = 1	0.432	0.495	0.674	0.468	0.580	0.493
Backyard = 1	24,006	.	968	.	1,071	.
<i>N</i>						

Table 7
Probit marginal effect (ME) estimates of the probability of working

Variables	Economic CL		Economic CL		Domestic CL		Domestic CL		Total CL	
	ME	Std. Error	ME	Std. Error	ME	Std. Error	ME	Std. Error	ME	Std. Error
Child Characteristics:										
Sex (Male = 1)	0.018*	0.001	0.012*	0.001	-0.027*	0.002	-0.025*	0.002	0.017*	0.003
Age	0.001	0.002	0.004*	0.002	0.018*	0.003	0.018*	0.002	0.027*	0.004
Age squared*10	0.001	0.001	-0.001	0.001	-0.006*	0.001	-0.006*	0.001	-0.008*	0.001
Family Characteristics:										
Household size	0.003*	0.001	0.003*	0.0005	0.003*	0.001	0.002*	0.001	0.009*	0.001
Female headed household = 1	0.006*	0.002	0.004*	0.002	0.002	0.002	0.003	0.002	0.012*	0.004
Schooling of HH- 5 to 9 years = 1	-0.006*	0.001	-0.003*	0.001	-0.004*	0.002	-0.003*	0.001	-0.007*	0.003
Schooling of HH- > 9 years = 1	-0.013*	0.002	-0.009*	0.002	-0.005‡	0.003	-0.004	0.003	-0.014*	0.005
Years worked by HH till age 12	0.002*	0.0005	0.002*	0.0004	0.0004	0.001	0.0003	0.001	0.005*	0.001
Socio-economic characteristics:										
Household income	-0.003*	0.0005	-0.002*	0.0005	-0.002*	0.001	-0.002*	0.001	-0.005*	0.001
Reduction in income*10 = 1	-0.001	0.002	-0.002	0.002	-0.000	0.000	-0.002	0.002	-0.002	0.003
Number of rooms in house*100	0.008	0.001	0.040	0.001	-0.002*	0.001	-0.002*	0.001	-0.002	0.001
Adequate housing conditions = 1	-0.012*	0.003	-0.007*	0.002	-0.006*	0.003	-0.004	0.003	-0.018*	0.005
Good housing conditions = 1	-0.006*	0.002	-0.004*	0.002	-0.004*	0.002	-0.003	0.002	-0.012*	0.004
Educational characteristics:										
Pre-school attendance	.	.	-0.004*	0.001	.	.	-0.004*	0.002	-0.011*	0.003
Time to reach school	.	.	0.001	0.001	.	.	-0.001	0.001	0.001	0.002
Adequate interest in school = 1	.	.	-0.001	0.002	.	.	-0.006†	0.003	-0.011*	0.004
Very interested in school = 1	.	.	-0.004†	0.002	.	.	-0.006*	0.003	-0.014*	0.004
School ambition < compulsory = 1	.	.	0.062*	0.019	.	.	0.004	0.009	0.081*	0.023
School ambition, compulsory = 1	.	.	0.028*	0.006	.	.	0.006‡	0.004	0.048*	0.009
School ambition, upper sec. = 1	.	.	0.011*	0.003	.	.	0.005‡	0.003	0.021*	0.006
School ambition, tertiary = 1	.	.	0.006*	0.003	.	.	0.003	0.003	0.013*	0.005
Demand characteristics:										
Backyard = 1	0.008*	0.002	0.006*	0.001	0.004*	0.001	0.004*	0.002	0.016*	0.003
HH works as wage labour = 1	0.001	0.002	0.000	0.002	0.002	0.002	0.002	0.002	0.002	0.004
HH is self-employed = 1	0.025*	0.005	0.023*	0.005	-0.001	-0.001	-0.001	0.003	0.028*	0.006
HH is employer = 1	0.033*	0.006	0.031*	0.006	-0.001	-0.001	-0.001	0.003	0.035*	0.008
Domestic house worker hired = 1	-0.010*	0.002	-0.008*	0.002	-0.008*	0.003	-0.007†	0.003	-0.021*	0.004
Pro-active child labour policies:										
Counties with a PIEF centre = 1	-0.006*	0.002	-0.006*	0.002	-0.017*	0.002	-0.017*	0.002	-0.034*	0.003
Children per PETI member*100000	0.005	0.003	0.007*	0.003	0.000	0.000	0.000	0.000	0.010†	0.005
Labour Inspection:										
Serious illegalities per worker*10	-0.010	0.001	-0.004	0.001	-0.002‡	0.001	-0.001	0.009	-0.024‡	0.001
Fine per illegality	-0.003†	0.001	-0.003*	0.001	-0.003‡	0.002	-0.003‡	0.002	-0.009*	0.003
N	24382		24031		24382		24031		24031	
Log Likelihood	-3171.25		-2811.12		-3517.60		-3369.67		-5457.25	

Notes: Other variables included in the specification are a set of regional indicators for the province of residence, indicators for residing in urban, semi-rural, rural areas, variables capturing county level regional unemployment and the proportion of individuals working in the primary, secondary and tertiary sectors. Standard errors are heteroscedasticity consistent. * Significant at the 1 % level. † Significant at the 5 % level. ‡ Significant at the 10 % level.

Table 8
Tobit marginal effect (ME) estimates of hours of work

Variables	Economic CL		Economic CL		Domestic CL		Domestic CL		Total CL	
	ME	Std. Error	ME	Std. Error	ME	Std. Error	ME	Std. Error	ME	Std. Error
Child Characteristics:										
Sex (Male = 1)	0.199*	0.019	0.106*	0.014	-0.220*	0.016	-0.182*	0.015	-0.159*	0.023
Age	-0.023	0.026	0.031	0.019	0.123*	0.020	0.121*	0.018	0.219*	0.037
Age squared*10	0.003*	0.001	-0.003	0.001	-0.004*	0.009	-0.004*	0.008	-0.006*	0.002
Family Characteristics:										
Household size	0.041*	0.006	0.024*	0.005	0.028*	0.004	0.019*	0.004	0.071*	0.008
Female headed household = 1	0.069*	0.024	0.039*	0.018	0.018	0.015	0.017	0.014	0.099*	0.032
Schooling of HH- 5 to 9 years = 1	-0.067*	0.016	-0.021‡	0.013	-0.035*	0.013	-0.025‡	0.011	-0.053*	0.024
Schooling of HH- > 9 years = 1	-0.155*	0.020	-0.086*	0.017	-0.045‡	0.019	-0.026	0.018	-0.135*	0.037
Years worked by HH till age 12	0.023*	0.006	0.021*	0.004	0.003	0.005	0.001	0.004	0.038*	0.008
Socio-economic characteristics:										
Household income	-0.030*	0.006	-0.014*	0.004	-0.015*	0.004	-0.013*	0.004	-0.043*	0.008
Reduction in income*10 = 1	-0.050	0.210	-0.142	0.145	0.012	0.016	0.008	0.014	-0.007	0.029
Number of rooms in house*100	0.064	0.072	0.272	0.523	-0.021*	0.006	-0.017*	0.005	-0.024*	0.010
Adequate housing conditions = 1	-0.149*	0.033	-0.064‡	0.023	-0.053‡	0.022	-0.031‡	0.018	-0.171*	0.042
Good housing conditions = 1	-0.005*	0.021	-0.038‡	0.017	-0.036‡	0.017	-0.018	0.016	-0.094*	0.033
Educational characteristics:										
Pre-school attendance	.	.	-0.030‡	0.013	.	.	-0.024‡	0.011	-0.081*	0.025
Time to reach school	.	.	0.007	0.008	.	.	-0.004	0.007	0.004	0.015
Adequate interest in school = 1	.	.	-0.012	0.019	.	.	0.035‡	0.018	-0.083‡	0.037
Very interested in school = 1	.	.	-0.046‡	0.022	.	.	0.042‡	0.021	-0.142*	0.043
School ambition < compulsory = 1	.	.	0.721*	0.231	.	.	0.035	0.062	0.879*	0.258
School ambition, compulsory = 1	.	.	0.294*	0.070	.	.	0.036	0.027	0.441*	0.087
School ambition, upper sec. = 1	.	.	0.108*	0.037	.	.	0.026	0.022	0.183*	0.057
School ambition, tertiary = 1	.	.	0.063*	0.023	.	.	0.017	0.018	0.122*	0.041
Demand characteristics:										
Backyard = 1	0.083*	0.019	0.051*	0.014	0.033*	0.013	0.027‡	0.011	0.126*	0.025
HH works as wage labour = 1	0.018	0.022	-0.000	0.017	0.014	0.016	0.010	0.014	0.009	0.031
HH is self-employed = 1	0.301*	0.061	0.224*	0.047	-0.006	0.021	-0.011	0.018	0.251*	0.058
HH is employer = 1	0.396*	0.086	0.296*	0.066	-0.020	0.024	-0.015	0.021	0.285*	0.073
Domestic house worker hired = 1	-0.105*	0.027	-0.068*	0.020	-0.060*	0.021	-0.049*	0.019	-0.174*	0.039
Pro-active child labour policies:										
Counties with a PIEF centre = 1	-0.062*	0.019	-0.052*	0.014	-0.125*	0.015	-0.114*	0.013	-0.276*	0.027
Children per PETI member*100000	0.003	0.003	0.005‡	0.002	0.002	0.010	0.008	0.024	0.012‡	0.006
Labour Inspection:										
Serious illegalities per worker*10	-0.013‡	0.007	-0.007	0.007	-0.008	0.007	-0.006	0.006	-0.023‡	0.012
Fine per illegality	-0.036‡	0.020	-0.039*	0.015	-0.026	0.019	-0.021	0.016	-0.098*	0.031
N	24382		24031		24382		24031		24031	
Log Likelihood	-6467.09		-5439.41		-6780.61		-6364.61		-11526.38	

Notes: Other variables included in the specification are a set of regional indicators for the province of residence, indicators for residing in urban, semi-rural, rural areas, variables capturing county level regional unemployment and the proportion of individuals working in the primary, secondary and tertiary sectors. Standard errors are heteroscedasticity consistent. * Significant at the 1 % level. † Significant at the 5 % level. ‡ Significant at the 10 % level.

Table 9
Probit marginal effect (ME) estimates of the probability of school success

Variables	Spec. 1		Spec. 2		Spec. 3		Spec. 4	
	ME	Std. Error	ME	Std. Error	ME	Std. Error	ME	Std. Error
Child Characteristics:								
Sex (Male = 1)	-0.108*	0.005	-0.109*	0.005	-0.047*	0.005	-0.049*	0.005
Age	-0.138*	0.008	-0.142*	0.008	-0.161*	0.009	-0.160*	0.009
Age squared*10	0.004*	0.0004	0.004*	0.0004	0.005*	0.0004	0.005*	0.0004
Family Characteristics:								
Household size	-0.039*	0.002	-0.037*	0.002	-0.029*	0.002	-0.028*	0.002
Female headed household = 1	-0.026*	0.007	-0.025*	0.007	-0.021*	0.006	-0.021*	0.006
Schooling of HH- 5 to 9 years = 1	0.090*	0.005	0.089*	0.005	0.063*	0.005	0.064*	0.005
Schooling of HH- > 9 years = 1	0.152*	0.006	0.151*	0.006	0.112*	0.006	0.112*	0.006
Years worked by HH till age 12	-0.007*	0.002	-0.007*	0.002	-0.006*	0.002	-0.006†	0.002
Socio-economic characteristics:								
Household income	0.036*	0.002	0.035*	0.002	0.027*	0.002	0.027*	0.002
Reduction in income = 1	-0.027*	0.007	-0.026*	0.008	-0.020*	0.007	-0.020*	0.007
Number of rooms in house*100	0.022*	0.002	0.022*	0.003	0.015*	0.002	0.015*	0.002
Adequate housing conditions = 1	0.106*	0.010	0.103*	0.010	0.076*	0.010	0.076*	0.010
Good housing conditions = 1	0.061*	0.008	0.059*	0.008	0.046*	0.008	0.046*	0.008
Educational characteristics:								
Pre-school attendance	.	.	.	.	0.011	0.006	0.011	0.006
Time to reach school	.	.	.	.	0.009*	0.003	0.009*	0.003
Adequate interest in school = 1	.	.	.	.	0.116*	0.010	0.116*	0.010
Very interested in school = 1	.	.	.	.	0.237*	0.014	0.237*	0.014
School ambition < compulsory = 1	.	.	.	.	-0.243*	0.037	-0.239*	0.037
School ambition, compulsory = 1	.	.	.	.	-0.162*	0.014	-0.160*	0.014
School ambition, upper sec. = 1	.	.	.	.	0.005	0.009	0.006	0.009
School ambition, tertiary = 1	.	.	.	.	0.119*	0.009	0.120*	0.009
Demand characteristics:								
Backyard = 1	0.012‡	0.006	0.014‡	0.006	0.023*	0.005	0.024*	0.005
HH works as wage labour = 1	-0.018*	0.007	-0.019*	0.007	-0.010	0.007	-0.011	0.007
HH is self-employed = 1	0.028*	0.009	0.031*	0.009	0.034*	0.009	0.034*	0.009
HH is employer = 1	0.038*	0.011	0.039*	0.011	0.036*	0.010	0.037*	0.010
Domestic house worker hired = 1	0.055*	0.012	0.054*	0.012	0.036*	0.012	0.036*	0.012
Child work:								
Hours of economic work	.	.	-0.004*	0.0006	.	.	-0.003*	0.0009
Hours of domestic work	.	.	-0.005*	0.001	.	.	-0.004*	0.001
N	26429		26429		26045		26045	
Log Likelihood	-11493.50		-11458.07		-10128.08		-10114.80	

Notes: Other variables included in the specification are a set of regional indicators for the province of residence, indicators for residing in urban, semi-rural, rural areas, variables capturing county level regional unemployment and the proportion of individuals working in the primary, secondary and tertiary sectors. Standard errors are heteroscedasticity consistent. * Significant at the 1 % level. † Significant at the 5 % level. ‡ Significant at the 10 % level.

Table 10
School success and hours of work: Marginal effect probit and instrumental variable probit estimates
(Std. Error)

	1 Probit	2 IVP ^A	3 IVP ^B	4 IVP ^C	5 Probit	6 IVP ^A	7 IVP ^B	8 IVP ^C
Hours of Economic Work	-0.004* (0.0006)	-0.002† (0.001)	-0.002‡ (0.001)	-0.002‡ (0.001)	-0.003* (0.0009)	-0.003‡ (0.001)	-0.003‡ (0.001)	-0.003‡ (0.001)
Hours of Domestic Work	-0.005* (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.004* (0.001)	-0.0002 (0.0019)	-0.0003 (0.0019)	-0.0003 (0.0019)
Generalised residual – Economic work	.	-0.0007‡ (0.0003)	-0.0007‡ (0.0003)	-0.0007‡ (0.0003)	.	0.0002 (0.001)	0.0001 (0.0005)	0.0001 (0.0005)
Generalised residual – Domestic work	.	-0.0013‡ (0.0006)	-0.0013‡ (0.0005)	-0.0013‡ (0.0006)	.	-0.002‡ (0.001)	-0.002‡ (0.001)	-0.0016 (0.0006)
N	26429	26429	24381	24381	26045	26045	24031	24031
Log Likelihood	-11458	-11452	-10390	-10390	-10114	-10111	-9185	-9185

Notes:

1. To enable comparisons, the estimates reported in column 1 of Table 10 are the same as the estimates in Table 9, spec. 2. Estimates presented in columns 2, 3 and 4 of Table 10 include *all* the variables in the specification reported as Table 9, spec. 2 and two additional variables to correct for the endogeneity of hours of economic work and hours of domestic work.

2. To enable comparisons, the estimates reported in column 5 of Table 10 are the same as the estimates in Table 9, spec. 4. Estimates presented in columns 6, 7 and 8 include *all* the variables in the specification reported as Table 9, spec. 4 and two additional variables to correct for the endogeneity of hours of economic work and hours of domestic work.

3. ^A Identification is based only on differences in functional form. ^B Identification is based on differences in functional form and the inclusion of the variables that capture the policies of the county towards tackling child labour, namely, whether a county has a PIEF program and the number of children per PETI member. ^C Identification is based on differences in functional form, the policies of the county towards tackling child labour and the labour inspection regime, that is, number of illegalities detected per worker and the fine per illegality.

4. * Significant at the 1 % level. † Significant at the 5 % level. ‡ Significant at the 10 % level.

Figure 1: Work Participation by Age

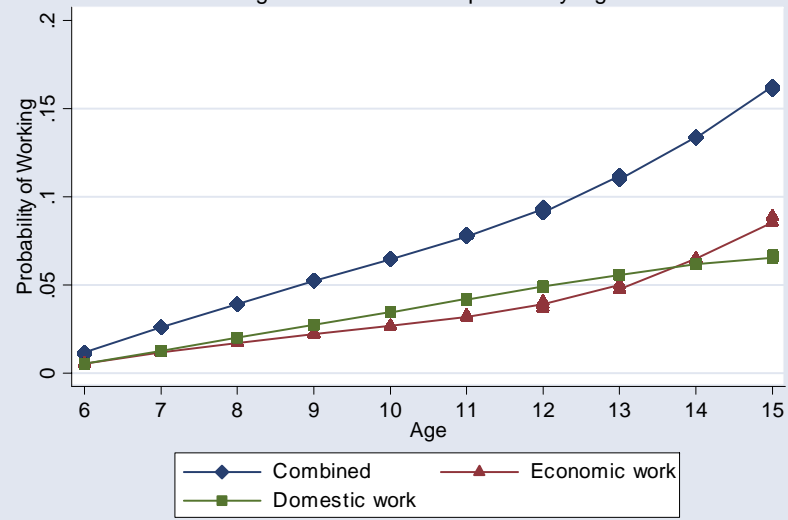


Figure 2: Hours of Work by Age

