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CHILD LABOUR AND EDUCATIONAL SUCCESS IN PORTUGAL

Pedro Goulart
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Arjun S. Bedi

August 2005

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ABSTRACT

The 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.[a] An intermediate step in our analysis is an assessment of the factors that determine the duration of work and the probability of succeeding in school. Our analysis reveals that the two types of labour have asymmetric effects. While economic work hinders educational success, domestic work does not appear to be harmful. 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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CONTENTS

1 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 Cunnigham 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 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 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

[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.

[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.

Table 1
Incidence of child work in Portugal (%)
(absolute number of children working)[*]

	1998[b]	2001
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 (9285)	0.43 (5,130)
Domestic work – within the household	7.68 (83,037)	4.05 (48,165)
Total	*11.67* *(126,114)*	*8.18* *(97,298)*

Notes*:* [*] Incidence is defined as the percentage of all children in the age group 6 to 15 who report that they work, at least one hour of work per week.

participation rates in developed (2 percent) and transition countries (4 percent) as estimated by the ILO (2002).

Thus, while not as large as previously thought the percentage of working children in Portugal is considerably higher than that expected for a developed country. The persistence of child workers 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 percent of Portuguese children work may not be a matter of concern. However, an issue which is of concern and the focus of this paper is whether the work activities of Portuguese children hamper their educational performance/success. The motivation for our work stems from the potential consequences of the early entry of children into the labour force on their educational success especially if entry is not accompanied by any redeeming features. 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. Additionally, given the nature of child labour in Portugal and the expected changes in the economic structure, it is unlikely that the tasks carried out by working children today are likely to enhance their future labour market skills. Unlike the case in developing countries where it is sometimes argued that child labour may provide useful on-the-job learning, in a developed country setting the consequences of a lower school achievement are limited opportunities in a labour

market that will increasingly demand skilled workers. 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.[3]

This paper addresses several issues. 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 hinders their educational success[4]. Throughout the paper we draw a distinction between domestic and economic work and assess the influence 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.

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 3 discusses our analytical approach; section 4 discusses the data and the specification of the empirical model. Section 5 presents estimates and section 6 provides concluding remarks.

[3] Functional illiteracy is defined as the share of the population aged 16-65 scoring at the lowest level (level 1) on the prose literacy scale of the International Adult Literacy Survey. Level 1 prose literacy indicates very poor ability to understand and use information from texts such as newspapers, brochures and instruction manuals. Details on other educational outcomes and comparisons with other EU countries are provided later on in the text.

[4] We focus on educational success rather than enrolment or attendance as almost all children are formally enrolled in school and appear to be attending school regularly.

2 A TYPOLOGY OF CHILD LABOUR AND EDUCATIONAL SUCCESS IN PORTUGAL

2.1 Typology and definition of child labour in Portugal

There is considerable disagreement on which activities truly constitute child labour. There appear to be 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 termed 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; Bequele and Boyden, 1988; Blanc, 1994). The "type of work" approach argues that it is the type 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.

Box 1
Work considered child labour by the Portuguese government

	Supervision	
Type of work	Extra-household	Intra-household
Economic work	Yes	Yes
Domestic work	Yes	No

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.

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 a benign one in terms of its impact on a child's development, as implied by its exclusion from the official definition, are debatable and researchable issues.[5]

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.

2.2 Child labour in Portugal

As mentioned in the introduction, the issue of child workers attracts considerable scrutiny in Portugal. This attention was sparked, in part, by the publication of a report by Anti-Slavery International (Williams, 1992) and the airing of international television programs (for e.g., ITV, Storyline, February 4, 1993) on child workers in Portugal. Anti-Slavery International (ASI) reported that there were about 200,000 child workers in Portugal and documented the use of child labour in the shoe and garment industries and to a lesser extent in the ceramics and stone-breaking industry. Although the figure of 200,000 was disputed by the government (Briefing Paper, 1993) and described as … "mythical and fantasized", the government acknowledged the existence of the problem and took several steps to curb the practice.

[5] 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.

These steps included the creation 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, the creation, in 1998, of a policy team (PEETI-Plan on the Elimination of Child Exploitation) to design and develop concrete interventions and measures to prevent the early entry of children into active life, and the constitution of a National Council (CNCETI-National Council against Child Labour). 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.[6]

Our analysis begins with the numbers presented in table 1. The table breaks down the overall incidence of child labour in Portugal into four mutually exclusive categories and shows that in 1998 about 12 percent of Portuguese children were involved in some form of work (economic, domestic or both) while it fell to about 8 percent in 2001.[7] This decline is associated with the smaller number of children engaged in domestic labour in 2001. 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. 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.

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[6] 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.

[7] 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, (which broadly coincides with the school summer holidays) while it remains at the same level between October and June.

In any case, ignoring domestic work reduces the incidence of child labour to about 3 to 4 percent. Other features exhibited in table 1 are that most of the economic work is carried out in the context of a family farm or a family enterprise and a very small percentage of the child workers (about 9 percent of all child workers) work outside the household in an employer-employee relationship. There are very few children (about 5 percent of the child workers) who do both economic and domestic work. There is a clear regional pattern in the incidence of work (see table 2). For both

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	*14.3*	*16.1*	*4.3*	*4.8*	*4.7*	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	*12*	*9.6*	*2.4*	*3.7*	3.6	*7.8*	*1.35*

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

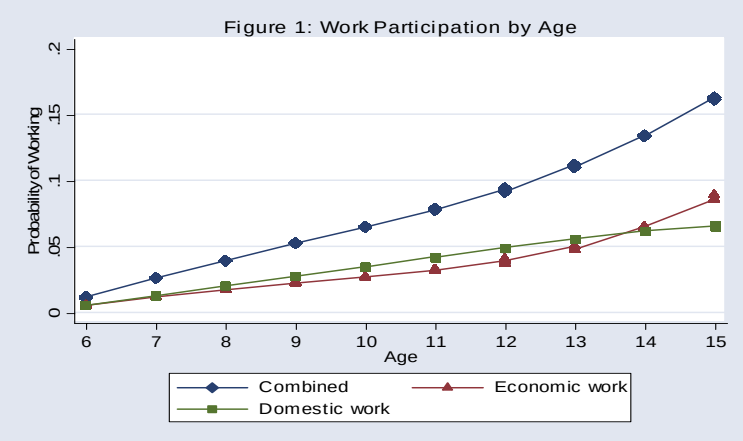
the survey years the incidence of both domestic and economic labour is highest in the Northern and Central parts of the country. Both regions have characteristics that favour the practice of child labour. The presence of small family farms and larger and more traditional families promotes child work on farms and in the household while the presence of small and medium sized family owned enterprises promotes economic child labour.

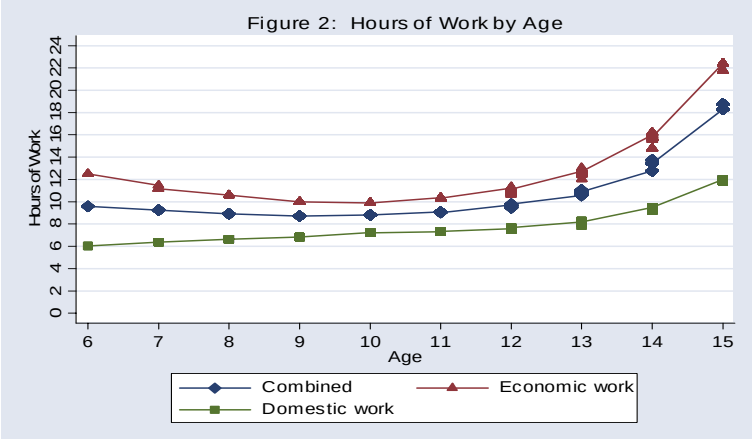
Table 3 further characterises child workers in Portugal. The average economically active child in Portugal is male (72-73 percent are male), is between 12 and 13 years of age and contributes 14 hours of work per week. The work contribution of a child increases with age and there is a convex relationship 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.[8]

[8] 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.

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 terms of regional distribution, the majority of child workers are in the North of Portugal (about 54-57 percent of the child workers) followed by the Centre (21-29 percent).

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.[9] The most important domestic tasks are house cleaning, cooking, washing, ironing clothes and looking after younger siblings and elderly members. Most of the children doing excess domestic work reside in the Northern and Central regions of the country.





[9] The questionnaire enquires whether a child does economic work and whether a child does ***excess*** domestic work, with the definition of excess being left to the subjective view of the child.

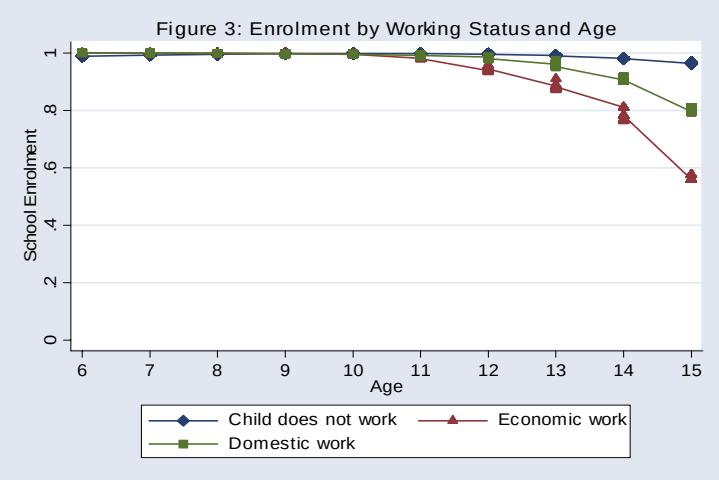


Figure 3: Enrolment by Working Status and Age
School Enrolment
0
.2
.4
.6
.8
1
6
7
8
9
10
11
12
13
14
15
Age
Child does not work
Economic work
Domestic work

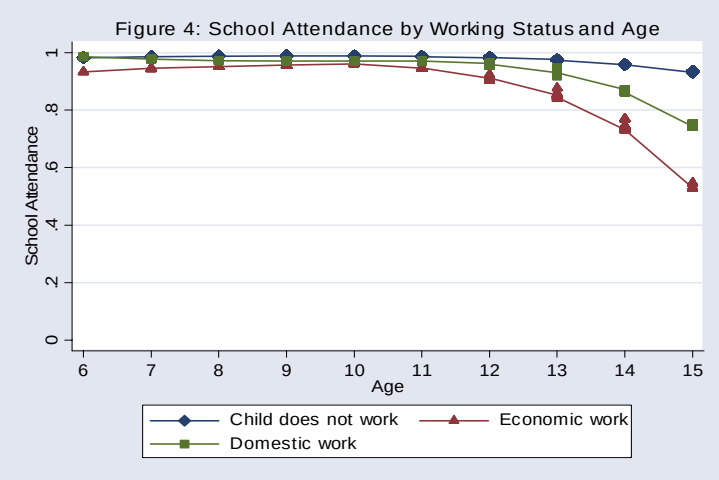


Figure 4: School Attendance by Working Status and Age
School Attendance
0
.2
.4
.6
.8
1
6
7
8
9
10
11
12
13
14
15
Age
Child does not work
Economic work
Domestic work

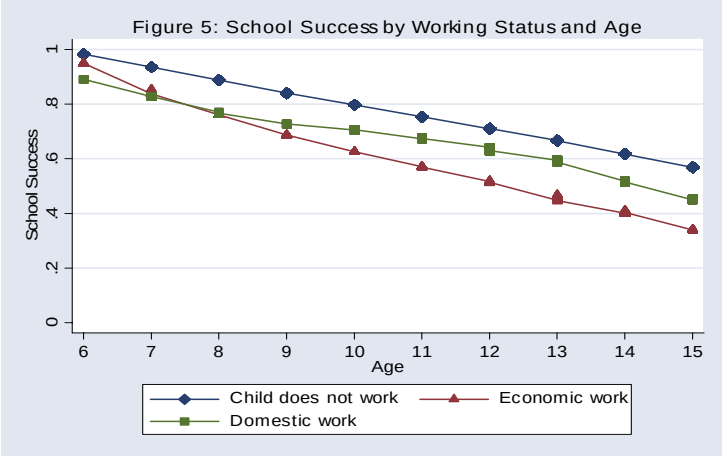


Figure 5: School Success by Working Status and Age
School Success
0
.2
.4
.6
.8
1
6
7
8
9
10
11
12
13
14
15
Age
Child does not work
Economic work
Domestic work

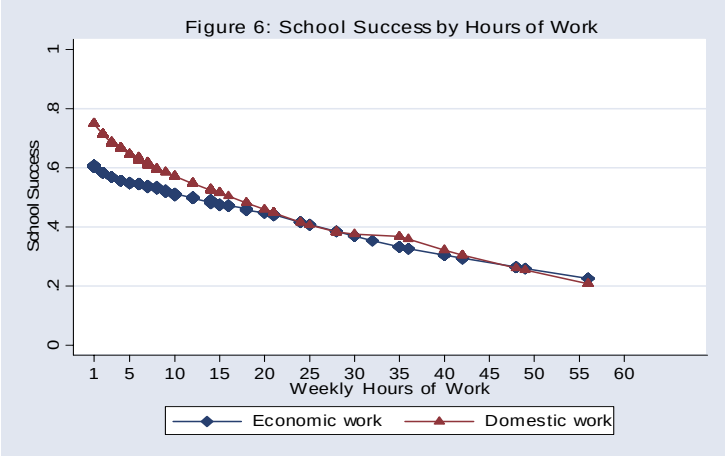


Figure 6: School Success by Hours of Work
School Success
0
.2
.4
.6
.8
1
1
5
10
15
20
25
30
35
40
45
50
55
60
Weekly Hours of Work
Economic work
Domestic work

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
Regional Distribution (%)		
North	57.3	54.5
Centre	29.4	21.5
Lisbon	9.3	9.2
Alentejo	2.6	3.4
Algarve	1.5	2.1
Domestic work		
Male (%)	28.8	26.0
Age	12.3	12.23
Weekly hours of work	n.a.	8.36
		(8.77)
Regional Distribution (%)		
North	54.4	73.8
Centre	28.9	12.9
Lisbon	13.1	6.0
Alentejo	2.3	1.0
Algarve	1.3	1.1

2.3 Education and child labour

The spread of education and the enforcement of compulsory education laws is a relatively recent phenomenon in Portugal.[10] The 48 year long dictatorship in Portugal viewed mass 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

[10] 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.

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.[11]

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.[12] A comparison of achievement scores in reading and Mathematics across seven countries shows that Portuguese children do not perform well. Portuguese children are second from the bottom in terms of Mathematical skills and at the bottom of the chart in terms of reading skills.[13] 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 working 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

[11] 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.

[12] 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.

[13] 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).

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.

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.[14] 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, which is whether a child has never failed in school, shows that 77 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 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 hours of work – regardless of whether it is economic or domestic work – appears to be associated with a reduction in the educational success of working children.

[14] Attendance is a bivariate variable and is defined as 1 if a child misses school less than once a week.

3 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 or reduced form approach, studies the links between child work and schooling by examining the effects of education related measures such as concentration of schools, distance to schools, school fees (subsidies) and school quality on the incidence of child labor. If schooling and child work are substitutes then a reduction in school fees or a reduction in the time required to reach school, should lead to an increase in school attendance and at the same time lead to a reduction in the incidence and duration of work. (see Ravallion and Wodon (2000); Hazarika and Bedi (2003) and references therein).

A second approach that may be termed the direct or structural approach gauges the links between schooling and child labour by comparing children's educational outcomes across work status. These papers recognize the endogeneity between school participation and working status and use statistical techniques that control for this possibility (see Boozer and Suri, 2001; Beegle, Dehejia and Gatti, 2003; Ray and Lancaster, 2003).

Our work in this paper is a combination and extension of the direct and indirect approaches. 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. Although our study shares some of the features of the papers outlined above it differs in several ways. First, we draw a distinction between economic and domestic work and examine the different effects of these two types of work on a child's success. Second, the bulk of the literature uses a discrete indicator (set of discrete indicators) to measure child work. This measure of work is clearly not very informative. In our paper we rely on the number of hours worked by a child in a week. Finally, in addition to standard measures of education policy such as distance to school, we use educational related variables such as a child's interest and educational ambitions as factors that have a bearing on working and educational outcomes.

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) and educational characteristics (E). 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 work (W) contributed by children. That is,

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

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. 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,

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

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 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.

To obtain consistent estimates we use a two-stage estimation approach which is closely related to the Heckman (1976) procedure. Reduced form expressions for the two types of work may be written as,

$$W_i = C_i\beta_c + F_i\beta_F + SE_i\beta_{SE} + E_i\beta_E + D_i\beta_D + v_i. \quad (3)$$

In addition to the variables in (2), this specifcation includes a set of of demand for labour variables (D). In the first stage we estimate the hours of work equations using

tobit models. These first step estimates are used to construct a generalized residual (λ) of the form:

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

where I_i indicates whether a child works or not and $\phi(.)$ and $\Phi(.)$ denote the probability density and cumulative distribution function of the standard normal distribution evaluated at the tobit estimates (for details see Vella, 1993). In the second stage we include estimates of the generalized residual in (2). This procedure yields,

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

As shown by Rivers and Vuong (1988) and discussed by Vella (1993), this augmented probit equation yields consistent estimates. As the coefficient δ captures the correlation between the error terms in the school success and hours of work equation a test of the null, $\delta = 0$, is a test (Hausman) for the exogeneity of W_i.

While the estimation procedure is straightforward, a key issue that needs to be confronted is the identification of the 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, differences in functional form are a weak basis for identification. A look at equations (2) and (3) shows that there may be variables that influence child working patterns but do not have a direct influence on school outcomes. These include variables that capture the demand for labour (*D*). It is possible that these variables influence the hours of work provided by a child but do not exert a direct influence on educational success. Their influence on schooling may be mediated via their effect on the hours of work decision. Thus, a second identification strategy is to exclude the variables denoted by *D* from the schooling equation. While we rely on this identification strategy we are aware that it is questionable. In our empirical work we conduct a sensitivity analysis to examine variations in the estimates in response to changes in the identification strategy.

4 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.[15] 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 data set is qualitative information on aspects such as a child's interest in school and a child's academic ambitions.[16]

While we have utilised both surveys to provide information on the incidence of child labour, we use the more recent 2001 survey for our econometric work. Apart from the obvious virtue of being a more recent data set, the 2001 survey has a wider geographical coverage than the 1998 survey.[17] A total of 19,849 households were interviewed and our study focuses on a sample of 26,045 respondents in the age group 6 to 15. Of these 26,045 children, 2152 or about 8 percent perform economic or domestic work or both. In terms of absolute numbers, 968 children provide economic labour while 1071 may be classified as domestic workers. Only 113 children perform both activities. Due to the smaller size of this group, for the most part, we focus on the differences between children who provide exclusively domestic or economic work.

Specification

The school success and hours of work equations are specified as functions of child, family, socio-economic, education and 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 an age-squared term is included in the specifications. The family

[15] DETEFP is the statistics department of the Labour and Training Ministry, and SIETI is a recently established government statistics unit focusing on child labour.
[16] Additional details on the survey are available in SIETI (2003).
[17] The two data sets are independent cross-sections and do not constitute a panel data set. They are not directly comparable as the 2001 data has better geographical coverage and some of the key questions, for instance, the questions on domestic work, were fielded in a different manner between the two surveys.

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 in income during the last year. Household income is not available as a continuous variable but only as a set of 7 income levels ranging from the lowest level -1 to the highest income level -7. 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 contrast to this variable which captures parental evaluation of the current level of interest, another variable captures the level of education that a child aspires to reach. Children were asked about their educational ambitions in terms of 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 do not provide information on their school ambitions. It is likely that a child's current interest in school and future educational ambitions are correlated but of greater concern is that educational ambitions (interest) and educational success (work patterns) are simultaneously determined. 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.[18] 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

[18] 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).

observed outcomes. Thus, despite endogeneity concerns, we feel it is worthwhile exploring the relationship between such measures and the outcomes of concern, rather than omitting them from our analysis.[19]

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.[20] As shown in Portugal and in other agricultural contexts, in situations where household 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.

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 as a measure of local employment prospects and economic dynamics.

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

[19] We do estimate specifications where these potentially endogenous education related variables are omitted from the analysis (see table 9 and 10).
[20] See for example Cunhal (1976, pp. 98).

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

Table 5
Descriptive statistics

Variables	Mean	Standard deviation
Child characteristics		
Sex (Male = 1)	0.513	0.499
Age	10.89	2.794
Family characteristics		
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
Socio-economic characteristics		
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
Educational characteristics		
School success = 1	0.746	0.435
Pre-school attendance = 1	0.725	0.446
Time to reach school (1 to 5, increasing in time)	1.388	0.689
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
Demand characteristics		
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
Occupational status of household head - employer = 1	0.083	0.278
Household employs domestic worker	0.085	0.278
Regional characteristics		
Urban	0.384	0.486
Semi-urban	0.368	0.482
Regional unemployment	0.066	0.020
N	26,045	

Table 6
Selected descriptive statistics

Variables	Child does not work		Economic Work		Domestic Work	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Child characteristics						
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
Family characteristics						
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
Socio-economic characteristics						
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
Educational characteristics						
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
Demand characteristics						
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
Occupational status of household head - employer = 1	0.082	0.275	0.130	0.337	0.064	0.246
N	24,006	.	968	.	1,071	.

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 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. 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.[21]

[21] 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.

5 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.

5.1 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 a percentage point while reducing the probability of doing domestic work by two 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 work. This inter-generational persistence leads to a half-percentage point increase in the probability of working.

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. However, controlling for wealth levels the effect

vanishes suggesting that child labour is a structural rather than a transient phenomenon.

Table 7
Probit Marginal Effect (ME) Estimates of the probability of working

Dependent variable	**Economic CL**		**Domestic CL**		**Total CL**	
Characteristics	ME	Std. Error	ME	Std. Error	ME	Std. Error
Child characteristics:						
Sex (Male = 1)	0.0127	0.0013	-0.0242	0.0018	-0.0155	0.0024
Age	0.0046	0.0019	0.0159	0.0024	0.0259	0.0039
Age^2	-0.0001	0.0001	-0.0006	0.0001	-0.0008	0.0002
Family characteristics						
Household size	0.0025	0.0004	0.0019	0.0006	0.0065	0.0009
Female headed household = 1	0.0031	0.0017	0.0021	0.0019	0.0085	0.0033
Schooling of HH - 5 to 9 years = 1	-0.0027	0.0013	-0.0035	0.0015	-0.0072	0.0026
Schooling of HH - > 9 years = 1	-0.0095	0.0019	-0.0057	0.0025	-0.0173	0.0042
Years worked by HH till age 12	0.0023	0.0004	0.0006	0.0006	0.0050	0.0009
Socio-economic characteristics						
Household income (1 to 7)	-0.0017	0.0005	-0.0014	0.0005	-0.0044	0.0009
Reduction in income = 1	-0.0015	0.0015	0.0007	0.0020	-0.0004	0.0032
Number of rooms in dwelling	0.0005	0.0005	-0.0022	0.0007	-0.0021	0.0011
Adequate housing conditions = 1	-0.0039	0.0018	-0.0022	0.0023	-0.0101	0.0038
Good housing conditions = 1	-0.0072	0.0023	-0.0034	0.0025	-0.018	0.0045
Educational characteristics						
Time to reach school (1, short, to 5)	0.0016	0.0008	0.0006	0.0009	0.0033	0.0016
Interest in school– adequate = 1	-0.0011	0.002	-0.0062	0.0025	-0.0107	0.0042
Interest in school – very interested = 1	-0.0038	0.0022	-0.0047	0.0028	-0.0123	0.0047
School ambition – < compulsory = 1	0.0592	0.0172	0.0077	0.0092	0.0839	0.0224
School ambition – compulsory = 1	0.0295	0.0061	0.0082	0.0042	0.0526	0.0087
School ambition – upper secondary = 1	0.0099	0.0034	0.0065	0.0034	0.0221	0.0059
School ambition – tertiary = 1	0.0058	0.0024	0.0037	0.0026	0.0137	0.0045
Demand characteristics						
Backyard = 1	0.0065	0.0014	0.0063	0.0015	0.0181	0.0026
Occupational status of HH - wage labour=1	0.0008	0.0018	0.0024	0.002	0.0043	0.0035
Occupational status of HH - self employed=1	0.0224	0.0044	-0.0009	0.0026	0.0281	0.0061
Occupational status of HH - employer = 1	0.0300	0.0061	0.0010	0.0033	0.0367	0.0079
Domestic house worker hired = 1	-0.0082	0.0022	-0.0077	0.0026	-0.0215	0.0043
Regional variables						
Norte = 1	0.0090	0.0022	0.0493	0.0043	0.0721	0.0052
Centro = 1	0.0139	0.0037	0.0519	0.0081	0.0783	0.0093
Alentejo = 1	0.0094	0.0048	0.0452	0.0122	0.0615	0.0128
Algarve = 1	0.0000	0.0031	0.0027	0.0052	0.0043	0.0073
Acores = 1	-0.0025	0.0029	0.0529	0.0132	0.0353	0.0111
Madeira = 1	-0.0116	0.0015	-0.0178	0.0016	-0.0385	0.0032
Urban = 1	-0.0088	0.0017	0.0233	0.0031	0.0116	0.0039
Semi-urban = 1	0.0020	0.0015	0.0176	0.0025	0.0204	0.0034
Regional unemployment = 1	-0.0879	0.0299	-0.0652	0.0339	-0.2448	0.0593
N	26045		26045		26045	
Log likelihood	-2975.8557		-3600.343		-5814.8496	

Table 8
Tobit Marginal Effect (ME) estimates of hours of work

Dependent variable	Economic CL		Domestic CL		Total CL	
Characteristics	**ME**	**Std. Error**	**ME**	**Std. Error**	**ME**	**Std. Error**
Child characteristics:						
Sex (Male = 1)	0.1129	0.0136	-0.1771	0.0145	-0.1469	0.0221
Age	0.0344	0.0193	0.1085	0.0175	0.2084	0.0364
Age^2	-0.0005	0.0009	-0.0037	0.0008	-0.0602	0.0016
Family characteristics						
Household size	0.0247	0.0043	0.0175	0.0037	0.0685	0.0080
Female headed household = 1	0.0300	0.0165	0.0144	0.0129	0.0803	0.0298
Schooling of HH - 5 to 9 years = 1	-0.0209	0.0124	-0.0260	0.0106	-0.0542	0.0233
Schooling of HH - > 9 years = 1	-0.0918	0.0161	-0.0387	0.0161	-0.1604	0.0343
Years worked by HH till age 12	0.0208	0.0041	0.0033	0.0040	0.0421	0.0082
Socio-economic characteristics						
Household income (1 to 7)	-0.0152	0.0042	-0.0109	0.0037	-0.0398	0.0079
Reduction in income = 1	-0.0114	0.0145	0.0125	0.0139	0.0067	0.0289
Number of rooms in dwelling	0.0037	0.0051	-0.0182	0.0048	-0.0250	0.0099
Adequate housing conditions = 1	-0.0304	0.0169	-0.0145	0.0156	-0.0775	0.0326
Good housing conditions = 1	-0.0650	0.0218	-0.0274	0.0178	-0.1659	0.0404
Educational characteristics						
Time to reach school (1, short, to 5)	0.0118	0.0074	0.0053	0.0067	0.0242	0.0143
Interest in school – adequate = 1	-0.0124	0.0183	-0.0384	0.0175	-0.0864	0.0365
Interest in school – very interested = 1	-0.0428	0.0209	-0.0366	0.0200	-0.1280	0.0418
School ambition – < compulsory = 1	0.7238	0.2208	0.0526	0.0633	0.9382	0.2542
School ambition – compulsory = 1	0.3077	0.0686	0.0496	0.0276	0.4910	0.0876
School ambition – upper secondary = 1	0.1022	0.0350	0.0357	0.0225	0.1957	0.0552
School ambition – tertiary = 1	0.0605	0.0226	0.0198	0.0177	0.1241	0.0398
Demand characteristics						
Backyard = 1	0.0545	0.0131	0.0386	0.0108	0.1442	0.0237
Occupational status of HH - wage la-	0.0068	0.0171	0.0126	0.0135	0.0243	0.0306
Occupational status of HH - self em-	0.2204	0.0456	-0.0070	0.0176	0.2556	0.0566
Occupational status of HH - employer =	0.2899	0.0653	-0.0040	0.0219	0.2997	0.0739
Domestic house worker hired = 1	-0.0693	0.0198	-0.0505	0.0177	-0.1769	0.0378
Regional variables						
Norte = 1	0.0693	0.0204	0.3317	0.0332	0.5928	0.0496
Centro = 1	0.1108	0.0348	0.3751	0.0669	0.6790	0.0939
Alentejo = 1	0.0719	0.0440	0.3094	0.0945	0.5173	0.1253
Algarve = 1	-0.0057	0.0272	0.0221	0.0369	0.0211	0.0625
Acores = 1	-0.0265	0.0263	0.3463	0.1011	0.2470	0.0998
Madeira = 1	-0.1023	0.0131	-0.1170	0.0096	-0.3203	0.0240
Urban = 1	-0.0877	0.0164	0.1415	0.0229	0.0474	0.0345
Semi-urban = 1	0.0187	0.0147	0.1082	0.0196	0.1551	0.0326
Regional unemployment = 1	-0.8357	0.3011	-0.4097	0.2707	-2.1401	0.5766
N	26045		26045		26045	
Log likelihood	-5741.413		-6686.3753		-12122.75	

In part, the opportunity cost of schooling is captured by the time taken to reach school. Our categorical variable which takes on 5 values reflecting the time taken to reach school (1 is the shortest and 5 is the longest) shows that the time taken to get to school is positively associated with the probability and duration of working. Thus, while it is possible to reduce the incidence of work by increasing school accessibility the magnitude of the variable is quite small (the marginal effect on the overall probability of working is 0.33 percent). Children who are interested in school are clearly less likely to participate in work, although the differences between those who display adequate interest and great interest are not large. The key difference seems to be between the approximately 5 percent of the children who are disinterested in school and the rest of the children. The educational ambition variables show marked variation across the 4 ambition categories. 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 3/5 of a percentage point. The two points that may be drawn here are, first, even after controlling for a variety of socio-economic variables, interest and ambition appear to have a direct and large effect on the working patterns of children.[22] Second, these variables also appear to be more important than variables such as the cost of schooling (as measured by the time to get to school) in determining patterns of economic work.[23]

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 2 percentage points. The role of the small farm in calling for increased domestic work may be linked to the role of domestic child workers in releasing other household

[22] 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.

[23] As mentioned earlier, educational aspirations and the incidence/duration of work may be endogenously determined. We also estimated versions of the probit and tobit models that excluded these educational characteristics. These were used as part of the sensitivity analysis conducted to check whether the link between child work and educational success is influenced by the inclusion of these variables. As shown in table 10, regardless of these educational variables we detect a negative link of work on educational success.

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 who are not different from the reference category of those whose occupations are not known) while the effect of these variables on domestic work is negligible. The presence of a domestic worker clearly reduces the need for children to work, although the effect of such a worker seems to decrease both domestic and economic work suggesting that this variable may be capturing household wealth/status and not just substitution possibilities between hired help and children performing domestic chores.

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 absent from some of the poorest regions of the country.

5.2 School success[24]

Estimates 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 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 about 2 percentage points while belonging to a household with a well

[24] 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.

educated household head (more than 9 years) boosts educational performance by about 11 percentage points. 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 ability of richer parents to send their children to better schools or to buy extra educational inputs for their children.[25]

Table 9
Probit Marginal Effect (ME) Estimates of the probability of school success

	1		2	
Characteristics	**ME**	**Std. Error**	**ME**	**S.E Error**
Child Characteristics				
Sex (Male = 1)	-0.108	0.005	-0.0478	0.0051
Age	-0.138	0.008	-0.1594	0.0086
Age^2	0.004	0.0004	0.0051	0.0004
Family characteristics				
Household size	-0.039	0.002	-0.0295	0.0020
Female headed household = 1	-0.025	0.006	-0.0231	0.0064
Schooling of HH – 5 to 9 years = 1	0.091	0.005	0.0643	0.0053
Schooling of HH - > 9 years = 1	0.159	0.005	0.1159	0.0067
Socio-economic characteristics				
Household income (1 to 7)	0.036	0.002	0.0281	0.0018
Reduction in income = 1	-0.026	0.008	-0.0199	0.0074
Number of rooms in dwelling	0.026	0.003	0.0191	0.0025
Adequate housing conditions = 1	0.059	0.008	0.0454	0.0085
Good housing conditions = 1	0.107	0.010	0.0792	0.0099
Educational characteristics				
Pre-school attendance = 1	.	.	0.0102	0.0057
Time to reach school (1, short, to 5)	.	.	0.0115	0.0036
Interest in school – adequate = 1	.	.	0.1178	0.0111
Interest in school – very interested = 1	.	.	0.2392	0.0145
School ambition – < compulsory = 1	.	.	-0.2471	0.0376
School ambition – compulsory = 1	.	.	-0.1650	0.0136
School ambition – upper secondary = 1	.	.	0.0034	0.0087
School ambition – tertiary = 1	.	.	0.1179	0.0086
Regional variables				
Norte = 1	0.026	0.007	0.0395	0.0066
Centro = 1	-0.003	0.010	0.0054	0.0095
Alentejo = 1	0.006	0.012	0.0381	0.0109
Algarve = 1	-0.020	0.012	0.0045	0.0109
Acores = 1	-0.102	0.017	0.0686	0.0172
Madeira = 1	-0.077	0.016	0.0755	0.0153
Urban = 1	-0.001	0.008	0.0131	0.0075
Semi-urban = 1	0.008	0.007	0.0167	0.0068
N	26045		26045	
Log likelihood	-11548		-10181	

[25] While the majority of Portuguese children attend public schools, there are sharp differences in educational inputs across schools. As may be expected, schools located in richer neighbourhoods typically offer better conditions.

The educational characteristics show that attending pre-school has a positive impact on future success although the marginal effect of one percentage point is small. The interest and aspirations of children is strongly linked to their educational success. Despite controls for the education of the head of the household and several income and wealth characteristics (variables which probably determine ambitions) we find the interest and ambition variables have large effects. 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. For instance, children with educational ambitions up to the compulsory level are 25 percentage points less likely to be successful than those whose educational ambitions are unknown. Despite controlling for several characteristics (such as income, wealth, education of parents, family structure) that may determine aspirations there is a large net effect of educational aspiration 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 influencing their educational success. Not only are high aspirations correlated with greater educational success they are also associated with lower levels of labour effort.

5.3 School success and work

To explore the link between school success and the work activities of children, table 10 presents estimates of the school success equation including measures of the hours of work contributed by children. The standard probit estimates (columns 1 and 2) show that an additional hour of work spent on domestic or economic work has negative consequences for the educational success of children. 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 implemented Vella's (1993) suggested methodology. Estimates based on this approach are provided in the remaining columns of the table. The estimates in column 3 and 4 show that the effect of economic work is robust to this change in methodology

Table 10
School success and hours of work
Marginal Effect Estimates (Std. Error)

	1 Probit	2 Probit	3[a] IVP	4[a] IVP	5[b] IVP	6[c] IVP	7 IVP[d]
Hours of economic work	-0.004	-0.002	-0.005	-0.003	-0.005	-0.003	-0.003
	(0.001)	(0.0009)	(0.002)	(0.0016)	(0.0015)	(0.0016)	(0.0015)
Hours of domestic work	-0.005	-0.004	-0.002	-0.0002	-0.002	-0.0025	-0.0009
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.0019)
Generalised residual-economic			0.0002	0.0003	0.0002	0.0002	
			(0.0004)	(0.0005)	(0.0005)	(0.0005)	
Generalised residual-domestic			-0.0013	-0.0016	-0.0013	-0.0013	
			(0.0006)	(0.0006)	(0.0006)	(0.0006)	
Includes educational characteristics	No	Yes	No	Yes	Yes	Yes	Yes
N	26045	26045	26045	26045	26045	26045	26045
Log likelihood	-11515	-10170	-11219	-10166	-10166	-10440	-10166

Notes: [a] Instrumental Variables Probit (IVP), identification is based on excluding the demand for labour characteristics from the school success equation. [b] Identification is based on differences in functional form. [c] Identification is based on excluding the demand for labour characteristics and socio-economic characteristics from the school success equation. [d] Selection correction terms used in this specification are robust to departures from joint normality of the error terms (see Vella, 1993 for details).

and there continues to be a negative and statistically significant relationship between hours of economic work and school success. In contrast, there is a change in the effect of domestic work. The coefficient is smaller and the effect of this type of work is no longer statistically significant. The selection effect for this type of work is negative suggesting that children who provide domestic work are less likely to be successful in school even if they were not working.[26] In terms of magnitude, the size of the coefficient on hours of economic work is quite robust across specifications and implies that the average work contribution of an economic worker (14 hours per week) reduces educational success by 4.2 to 7 percentage points. While this is not a trivial effect, neither is it extremely large as compared to the 28 percent educational success gap between economic workers and non-workers. At most, the economic work contribution of children accounts for about 25 percent of the educational gap.

A key concern with the methodology used here is the sensitivity of the estimates to variations in the specification of the hours of work and the school success equation (identification strategy). A comparison of the estimates presented in (1) versus those in (2) and a comparison of estimates in (3) versus (4) suggests that the effects of hours of work are not sensitive to changes in the specification of the school success equation. Regardless of whether the specification contains the (potentially endogenous) educational characteristics or not the signs and statistical significance of the hours of work variables remains unaffected. As shown in table 9, these educational characteristics have a large impact on educational success and if their inclusion does not affect the hours of work variable it suggests that the estimates will be robust to changes in the educational success equation. Additionally, we re-estimated the equations using identical specifications for the school success and hours of work equation, that is, relying only on differences in the functional form to aid identification.[27] These estimates, (see column 5) are not substantially different from those in columns (3) or (4). Column (6) presents estimates which rely on an alternative exclusion strategy to aid identification and column (7) presents estimates based on using non-parametric selection correction terms that are robust to departures

[26] A joint test of whether the selection effects are different from zero, that is, the null hypothesis of no specification errors, records p-values ranging from 0.02 to 0.12.
[27] The demand characteristics were included in the school success equation.

from normality (see Vella, 1993 for details). Regardless of these variations the key effects remained unaltered.

6 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 alongside low levels of educational success 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, that is, domestic and economic work, hinders their educational success.

Based on two comprehensive surveys, conducted in 1998 and 2001, we found that the incidence of child labour (domestic and economic) lies in the range of 8-12 percent. Our analysis suggested that while poverty is indeed a factor that promotes child work, variables that capture the demand for labour may be equally responsible for 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 potentially increase child labour in the present and probably also its resilience in the future. A long tradition of relying on child workers slows the change of habits and mentalities and leads to the persistence of a harmful norm.

Our analysis of the effects of child work on school success revealed that the two types of work have different effects. Regardless of the specification used we found that economic work hampers the educational success of children. For the average child involved in economic work, working is associated with a 4.2-7 percentage point reduction in school success. While this effect is not trivial, it is small as compared to the 28 percentage point educational success gap between non-workers and economic workers. While economic work hampers the development of children and should be eliminated, eliminating work would, at most, reduce about 25 percent of the educational success gap. In contrast to the effect of economic work, domestic work does not appear to have harmful educational consequences. Whether domestic

work is truly benign or whether the effect is driven by the curious manner in which these data are collected cannot be determined.[28]

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 lowered the probability and duration of work. These psycho-social variables had a large marginal effect and assume added importance in the context of Portugal where despite economic progress child labour persists. Thus, standard approaches such as controlling child labour through inspections and encouraging school attendance through cash subsidies need to be supplemented with programs that drive home the importance of education and foster higher educational aspirations.[29]

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[28] Children are asked whether they do excess domestic work and for the numbers of excess hours of domestic work that they provide, with the judgment of excess left to the subjective view of the child.

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

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