



# Improving educational and labor outcomes through child labor regulation<sup>☆</sup>

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## ABSTRACT

We explore the effects of a child labor regulation that changed the statutory minimum working age in Spain in 1980. In particular, the reform raised the minimum working age from 14 to 16, while the age for compulsory education remained at 14 until 1990. To study the effects of this change on the incentives to work or study, we consider the different alternatives available at age 14 to individuals born at various times of the year before and after the reform. Before the reform, individuals born at the beginning of the year were legally able to work before finishing compulsory education. We show that individuals born at the beginning of the year were more likely to complete *both compulsory and post-compulsory* education if they turned 14 after the reform. The increase in educational attainment translates into better labor market outcomes in adulthood only partially. Depending on the level of socioeconomic development of the region, we provide evidence of differential impacts of the reform on men and women and offer plausible explanations for these differences. To the best of our knowledge, this is the first paper that, apart from increases in educational attainment, also finds relevant effects on long-term labor market outcomes from child labor regulations that forbid teenager work. We show that this type of regulation can be a generator of economic development and point to the conditions required for this to be the case.

## 1. Introduction

Changes in the legislation regulating minimum school leaving ages allow exploring the consequences of an exogenous change in the level of education and have been used to estimate the causal effect of education on different outcomes. For example, [Oreopoulos and Salvanes \(2011\)](#) review the effect on pecuniary and non-pecuniary returns to schooling; [Grenet \(2013\)](#) focuses on wages (see [Dickson & Harmon, 2011](#) for a review); [Anderberg and Zhu \(2014\)](#) on marital status; [Black, Devereux, and Salvanes \(2008\)](#), and [Haveman and Wolfe \(1984\)](#) on fertility; [Lochner, \(2004\)](#) on criminal behavior; [Milligan, Moretti, and Oreopoulos \(2004\)](#) and [Dee \(2004\)](#) on voter turnout. For their part, [Clark and Royer \(2013\)](#), [Heckman, Humphries, Veramendi, and Urzúa \(2014\)](#), [Lleras-Muney \(2005\)](#), [Oreopoulos \(2006\)](#), and [Brunello, Weber, and Weiss \(2015\)](#) among others, address the impact of education on health behaviors and outcomes.

In contrast, changes in the legislation regulating the minimum age to work have received less attention. On the one hand, [Edmonds and Shrestha \(2012\)](#) analyze the effects of minimum age of employment

regulation in 59, mostly low income, countries. However, they do not find evidence consistent with enforcement of these rules. Note that child labor can be required in some developing countries to guarantee mere subsistence of the family. When this is the case, enforcement of child labor regulations may be difficult, as children may, and probably will continue to work in the underground economy out of need.

On the other hand, [Lleras-Muney and Shertzer \(2015\)](#) investigate the impact of several policies aimed at assimilating immigrants between 1910 and 1930 in the USA, including laws regulating compulsory schooling and working-age permits. They find that increasing the age required to obtain a work permit resulted in higher educational attainment and earnings, mainly of immigrants. In particular, rising the work permit age by one year increased schooling by about a tenth of a year.

Other work has used the legal age to work as a complement to estimate the returns to education. [Acemoglu and Angrist \(2000\)](#) use the minimum age for a work permit at a given point in time as an instrument for compulsory schooling laws to estimate the returns to education. However, they do not exploit changes in the regulation of the

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minimum working age over time to identify the specific impact of child labor regulations. Goldin and Katz (2011) and Lleras-Muney (2002) explore the joint effect of state compulsory schooling and child labor laws on high school enrollments in the US from 1910 to 1939. The former find that these policies were only modestly responsible for the substantial increase in secondary school enrolments in the U.S. in that period. The latter, however, finds that the laws increased the education only of those in the lower percentiles of the distribution of education, contributing largely to the decrease in educational inequality. It is worth noting that the minimum age to work was then typically set at a lower age than the age of compulsory schooling.

In this paper, we focus on a child labor law regulating the *minimum statutory working age* in Spain in 1980. The reform raised the legal age to work from 14 to 16, without changing the school leaving age. We show that this implied important increases in educational attainment as well as some positive impacts on long-term labor market outcomes for certain groups.

Before the reform, both the school leaving age and the minimum working age were set at 14 years. Under these circumstances, individuals born at the beginning of the year (between January and May) found themselves legally able to work before completing their compulsory education, as they turned 14 before the end of the schooling year in June. This provided an incentive (or at least the legal possibility) for leaving school to work before completing compulsory education. Individuals born at the end of the year reached the legal working age after completing their compulsory education, as they turned 14 after the end of the schooling year in June. In 1980, when the legal age to work increased to 16, this difference in incentives between those born at the beginning and the end of the year was removed. Indeed, to be legally able to work after the reform, individuals needed to be 16, and this occurred more than a year after completing compulsory education. We exploit this difference in incentives affecting individuals born at the beginning and the end of the year (treated and non-treated individuals, respectively) before and after the reform.

We rely on a theoretical model to explain how the observed statistically significant effects could emerge from the change in child labor regulation. To this end, we propose a simple model of educational decisions that shows that some individuals who leave school early due to impatience may continue studying beyond compulsory education if they are forced to attain this basic level of instruction. In other words, some individuals' preferences may be dynamically inconsistent: although they prefer to quit school early, they will attain, when forced to stay, not only the level of education that they obtain by merely staying in school until they can work but also post-compulsory education. Based on a similar model, Cadena and Keys (2015) provide evidence for the existence of such preference reversals in the USA. This approach differs significantly from that explaining child labor in the context of household decisions in developing countries (e.g., Edmonds & Shrestha, 2012).

Our results show that the increase in the minimum statutory working age in effect decreased the number of early school leavers (individuals not finishing compulsory education, henceforth ESL). In particular, we find that the reform reduced the number of ESLs by 7.6% in the case of men and by 11% in the case of women. We refer to dropouts (henceforth DO) as individuals who do not attain any level of post-compulsory education. By definition, a reduction in the number of early school leavers who later do not attain post-compulsory education leaves the number of dropouts in the cohort unchanged. If the number of DO also falls, the number of individuals attaining post-compulsory education must be increasing. We find such positive impact on post-compulsory education attainment. Specifically, we observe that dropouts fell on average by 3.3% for men and by 2.7% for women. We also report significant increases in university education for men.

In addition, we show that this child labor regulation had some significant labor market effects in the long-term. Using the Spanish Labor Force survey, we show that working accidents fell for both men

and women as a result of the increase in educational attainment. We also prove that, for treated men, the reform increased wages and the overall probability of working, and it decreased the probability of working in a low-skilled sector. However, we do not find any significant effect for women. The apparent absence of long-term labor market effects for women, in spite of the important increases in educational attainment mentioned before, motivates a division of the sample by regions according to their level of socioeconomic development that allows further insight to the effect of the policy on both genders. In particular, we first find that, in fact, for men, the positive impact of the reform concentrates in less developed regions, where the incentives to attain a higher level of education seem to have been stronger in terms of wages. We provide evidence that wages may have been in some cases higher for non-educated men in more developed regions and this may have induced boys out of secondary education in spite of the reform. Second, we are able to see that the positive effects of the reform on the educational attainment of women concentrate conversely in more developed regions. Since these were the regions where secondary educational attainment of women was higher to begin with, we believe that social norms may have played a role in this outcome. Still, even in these regions, the positive effect on educational outcomes for women does not translate into improved labor market outcomes, perhaps due to the existence of stereotypes against women working outside the home, still strong at the time in Spain. Indeed, as we will see, activity rates of women in Spain were among the very lowest in the European context during the 80s.

Summing up, the division of the sample by regions according to the level of socioeconomic development allows a deeper understanding of the mechanisms in place. In particular, we are able to see that the change in the incentives to complete education induced by the reform may have been dominated by other, potentially stronger, limitations or incentives that did not change with the reform. Absent these limitations, our results underline the role of impatience in educational decisions made by the young and provide relevant information for policy-makers. To the best of our knowledge, this is the first paper that, apart from increases in educational attainment in the short run, also finds important positive impacts on long-term education and labor market outcomes from child labor regulations that induce teenagers to stay longer at school. Hence, this type of regulation can represent an important road to foster economic development in developing countries where child labor is no longer strictly necessary for family subsistence. Moreover, the heterogeneous effects found across regions for men and women also point to the role of the existing socioeconomic environment in hindering or enhancing the positive results of child labor regulations on education and labor market outcomes.

Another paper that exploits the same reform (Bellés, Jiménez, & Vall, 2015), provides additional evidence of the impact of the increase in the minimum working age on both fertility decisions and infant health outcomes. The results show that this same child labor regulation decreased marriage and fertility rates and deteriorated infant health outcomes mainly due to the postponement in the age of delivery. However, Bellés, Cabrales, Jimenez-Martin, and Vall (2017) also show that more educated parents were able to reverse, in the long-run, these negative shocks on their children at birth. This reversal operates mainly through increased parental vigilance.

The rest of the paper is organized as follows. Section 2 describes the reform. Section 3 presents a theoretical model that explains how impatience can affect, before the change in the law, the educational decisions of individuals born at different times of the year. Section 4 presents the data, empirical strategy and main results for educational attainment. Section 5 presents the long-term labor market impact of the child labor regulation. In Section 6 we explore the existence of heterogeneous effects across regions in Spain according to the social development of each region, Section 7 provides additional robustness checks, and Section 8 concludes.

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