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Labor coercion and the accumulation of human capital ☆

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ABSTRACT

This paper examines the effect of labor coercion on human capital accumulation. We use micro data from Puerto Rico, where unskilled laborers were forced to work for landowners during 1849–1874. Using variation in municipality-level suitability for coffee cultivation and international coffee prices, we estimate the response of schooling to exogenous increases in relative demand for unskilled labor in regimes with and without forced labor. During the coercive regime, increased coffee prices had no effect on individuals' literacy rates in coffee growing regions. Following the abolition of forced labor in 1874, similar changes in coffee prices reduced literacy rates by 12%, consistent with a diminished skill premium in the free labor market regime relative to the coercive period.

1. Introduction

Throughout history, many types of labor arrangement have involved the use of coercion — the threat or use of force to compel workers to enter into an employment relationship. Slavery was a common way of organizing labor in plantation economies throughout the Americas and has long been the focus of economic historians.[2] Other forms of forced labor, such as debt peonage and the state-sanctioned forced recruitment of laborers, also played an important role in the hacienda system found in Latin America during the colonial and post-colonial periods.[3] Episodes of coercion are not confined to the historical record: they have persisted in many forms across both industrialized and developing countries throughout the twentieth century (Andrees and Belser, 2009).

While the conditions determining the degree and precise form of coercion have been studied extensively, in particular the role of international trade, less is known about the consequences of coercion for economic development.[4] Scholars have argued that coercive labor institutions can lead to socially inefficient outcomes as they involve a costly transfer of resources from workers (e.g. Acemoglu and Wolitzky, 2010;

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[2] E.g., Mintz (1969); Fogel and Engerman (1974); Wright (1978); Lockhart and Schwartz (1983).

[3] E.g., McCreery (1994); Alston et al. (2009); Acemoglu and Wolitzky (2010); Dell (2010).

[4] In a seminal study, Domar (1970) argued that the incentives to coerce workers increase significantly if (shadow) wages rise. Consequently, if export commodity booms increase the relative demand for unskilled labor, this suggests a strong link between periods of increased international trade and episodes of labor market coercion. Empirical evidence in the context of U.S. slavery (e.g., Fogel and Engerman, 1974; Goldin, 1976; Wright, 1978, 1986), European serfdom (Brenner, 1976; North and Thomas, 1973; Postan, 1944), and 19th century Britain (Naidu and Yuchtman, 2013) is generally consistent with this view. A well-developed literature also documents the deterioration of labor institutions in parts of Latin America during the period of globalization in the late nineteenth century (e.g., Coatsworth, 1974; Katz, 1974).

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Coatsworth, 1999; Conning, 2004; Engerman and Sokoloff, 1997). Consistent with these arguments, empirical studies have found a negative relationship between the historical prevalence of coercion and measures of current economic development such as income and levels of education.[5] In contrast, less empirical analysis has been devoted to identifying the mechanisms that may lead to these differences in human capital accumulation. It is difficult to overstate the importance of this channel given that it is arguably one of the most prominent determinants of development in the modern period (e.g. Galor, 2005). This paper provides empirical evidence to answer the question of what are the consequences of labor coercion for individuals' education decisions in the context of increasing commodity export trade.

We study legislation by the Spanish government in Puerto Rico that forced free unskilled workers – *jornaleros* – to seek employment on legally titled farms during 1849–1874, followed by abolition of this legislation after 1874. Using micro data on cohorts of individuals across municipalities, we exploit variation in the suitability of coffee cultivation across municipalities and in coffee prices over time to identify exogenous changes in unskilled labor demand following the insight of Domar (1970) that the incentive to coerce is increasing in the demand for unskilled laborers. We then examine whether and to what extent the availability of legally sanctioned coercion by landowners against unskilled workers affected how literacy patterns responded to these changes. Consequently, identification of the effect of coercion on human capital accumulation comes from a 'triple difference' strategy that explicitly takes into account the possibility that regions possessing high demand for unskilled labor might have different levels of human capital accumulation regardless of whether labor market coercion exists.

We start by providing suggestive evidence that, during the coercive period, coffee-region local governments allocated more resources toward the enforcement of coercive labor measures. We then show that literacy rates were significantly *higher* among cohorts of schooling-age in coffee growing regions in response to an increase in coffee prices during the coercive regime relative to comparable cohorts in the non-coercive regime. Specifically, during the coercive period, higher coffee prices had no effect on individuals' literacy rates in coffee growing regions, whereas, after the abolition of coercion in 1874, similar changes in coffee prices reduced literacy rates by 12%, consistent with a diminished skill premium. These results suggest that the abolition of forced labor had important consequences, eliminating landowners' ability to extract unskilled workers' income but also reducing laborers' incentive to accumulate human capital, as the abolition of coercion of unskilled workers raised the relative wages of unskilled workers by lowering the skill premium.

While our finding of increased human capital accumulation coincident with coercion might seem perverse and surprising, we believe it is intuitive and can be easily rationalized by standard economic theory. Our results are consistent with models where, in the context of a free labor market, positive coffee price changes lead to a decrease in the skill premium and therefore a reduction in human capital investments. However, in a coercive regime, unskilled wages are artificially suppressed and therefore this effect is mitigated as workers avoid coercion and invest in human capital. After these coercive institutions are removed, similar changes in coffee prices reduce literacy rates, consistent with a diminished skill premium. This does not imply that workers are better off as a result of coercion. In fact, unskilled and skilled workers' welfare, as measured by lifetime income, is lower under the coercive labor regime than in a free labor market.

Our results are fully consistent with the negative relationship between the prevalence of historical coercive institutions and long-run levels of human capital accumulation but suggest an alternate interpretation of this correlation.[6] As argued by Domar (1970) and Acemoglu and Wolitzky (2010), labor coercion is more likely to exist in regions that experience high unskilled labor demand. To the extent that certain regions possess fixed or persistent characteristics (e.g. geography) that encourage specialization in the production of unskilled labor-intensive goods, these regions are more prone to historical episodes of coercion, and in the cross-section should also experience a higher demand for unskilled labor. Consequently, these regions will also possess lower demand for education, despite the possibility that, under a forced labor regime, this negative relationship may be partially mitigated due to a higher skill premium.

The research design and the richness of the data allow us to distinguish our explanation for educational outcomes from numerous competing explanations that we assess in the robustness section. We do so by exploiting variation in the suitability for coffee cultivation across otherwise similar municipalities. First, we show that the observed patterns of literacy in response to changes in unskilled labor demand are not due to a change in the availability of schooling, consistent with our demand-side hypothesis. Second, from a purely technological perspective, there are disincentives to establish coffee plantation economies, as there are constant (or even decreasing) returns to scale in coffee cultivation.[7] Third, using unique land ownership distribution data, we show that coffee region municipalities did not experience a greater degree of concentration of land ownership relative to a comparison group of municipalities, as would be the case with the traditional factor endowments–economic inequality hypothesis.[8] We also rule out many other possible explanations for our results including differences in natives' and immigrants' sorting patterns across regions, in transportation cost changes and other technological improvements, and alternate means of the establishment of a coercive political system. In summary, our findings emphasize changes in relative wages and the incentive of elites to create and maintain a coercive labor regime as important mechanisms affecting workers' incentives to accumulate human capital.

The paper is structured as follows: Section 2 describes the historical background and context. Section 3 discusses the theoretical background of our study. Section 4 describes the data used in the analysis and discusses the empirical strategy. Section 5 presents the main empirical results of the paper and evidence supporting our identifying assumptions. Section 6 assesses alternative explanations. Section 7 concludes.

2. Historical background

This section provides historical detail regarding the Island and municipal institutions against which we conduct our empirical investigation. First, we discuss the 1849 General Laborers' Law — the coercive labor institution under study. Second, we describe the details of coffee cultivation including Puerto Rico's role in world coffee markets, the geographic factors influencing coffee cultivation on the island, and the interplay between the two. Finally, we discuss the degree to which local municipalities had control over local administration including enforcement of coercive action, the provision of public schooling, and the collection of tax revenue.

[5] Mitchener and McLean (2003) and Lagerlöf (2005) present evidence using income per capita across U.S. states and counties, respectively. Nunn (2008) provides evidence for British colonies in the Caribbean. Finally, Nugent and Robinson (2005) provide evidence on incomes and schooling levels across coffee economies in the Caribbean basin.

[6] See Engerman and Sokoloff (1997); Acemoglu et al. (2008); Dell (2010); Gallego (2010); Martínez-Fritscher and Musacchio (2010).

[7] See Berry and Cline (1979), Binswanger and Ronsenzweig (1986), and Binswanger et al. (1986).

[8] The factor endowments hypothesis asserts that certain geographic endowments could have generated the incentives for the establishment of plantation economies, and that the resulting differences in economic inequality would influence the development of labor and other economic institutions. For a discussion, see Engerman and Sokoloff (1997), Engerman et al. (2002), Acemoglu and Robinson (2005), and Galor et al. (2009).