WIDER Working Paper 2024/8

Cultivating change: the long-term impact of forced labour in Mozambique

Margherita Bove,[1] Rute M. Caeiro,[2] Rachel Coelho,[3]
Sam Jones,[2] and Patricia Justino[2]

February 2024

United Nations University World Institute for Development Economics Research
wider.unu.edu

Abstract: Following the abolition of slavery, various forms of compulsory labour were adopted by colonial powers to develop their economies. This paper analyses the contemporary consequences of compulsory cotton production—a forced labour system that operated in colonial Mozambique from 1926 to 1961. During this period, the Portuguese colonial government granted geographic concessions to private companies, within which smallholder farmers were forced to cultivate cotton for payment in cash. Women bore the brunt of this regime, but in doing so often took on responsibilities traditionally reserved for men and engaged in active resistance strategies. Employing a spatial regression discontinuity, we explore the enduring impact of this exposure to forced cotton cultivation on present-day human and social capital, focusing specifically on rural southern Mozambique. Our estimation strategy relies on the arbitrarily defined historical borders of the concessions, which reflected the tendency of concessionaires to absorb as much territory as possible, often ignoring agronomic conditions. Drawing on bespoke individual-level survey data collected along the concession border, we find lower educational outcomes among women in former concession areas. However, this is counterbalanced by positive effects on social capital, in the form of higher levels of civil participation, more progressive attitudes towards gender norms, and an increased presence of women in leadership positions. These results suggest that exogenous ruptures that push women outside traditional boundaries can help to reinforce their role in society.

Key words: long-run development, violence, gender, social capital, regression discontinuity

JEL classification: F54, I24, J16, D02

Acknowledgements: We would like to thank Milena Mendonca, Edson Mazive, Ivandra Vieira, and Jose Neto for their invaluable research assistance. Additionally, we would like to express our appreciation for the collaborative efforts of CEEG. We are grateful to a dedicated team of enumerators and supervisors, whose contributions were essential to the successful completion of this project in the field. The support of the UK Economic and Social Research Council (ESRC) and of UNU-WIDER is gratefully acknowledged. This project has IRB approval from UNU (Ref No: 202204/01). Usual disclaimers apply. Authors are listed in alphabetic order.

This study is published within the UNU-WIDER project Inequality and governance in unstable democracies—the mediating role of trust, implemented by a consortium led by Institute of Development Studies (IDS). The support of the UK Economic and Social Research Council (ESRC) is gratefully acknowledged.

[1] Sapienza University of Rome, Italy, margherita.bove@uniroma1.it; [2] UNU-WIDER, Helsinki, Finland, caeiro@wider.unu.edu, jones@wider.unu.edu, justino@wider.unu.edu; [3] Universidade Federal da Bahia, Salvador, Brazil, rachcoelho@yahoo.com

This study is published within the UNU-WIDER project Inequality and governance in unstable democracies—the mediating role of trust, implemented by a consortium led by Institute of Development Studies.

Information and requests: publications@wider.unu.edu

ISSN 1798-7237 ISBN 978-92-9267-466-3

https://doi.org/10.35188/UNU-WIDER/2024/466-3

Typescript prepared by Siméon Rapin.

United Nations University World Institute for Development Economics Research provides economic analysis and policy advice with the aim of promoting sustainable and equitable development. The Institute began operations in 1985 in Helsinki, Finland, as the first research and training centre of the United Nations University. Today it is a unique blend of think tank, research institute, and UN agency—providing a range of services from policy advice to governments as well as freely available original research.

The Institute is funded through income from an endowment fund with additional contributions to its work programme from Finland and Sweden, as well as earmarked contributions for specific projects from a variety of donors.

Katajanokanlaituri 6 B, 00160 Helsinki, Finland

1 Introduction

Between 1938 and 1961 the Portuguese colonial regime imposed a system of forced cotton cultivation throughout Mozambique by establishing cotton zones and granting concessions to private companies. While the goal of forcing Africans to produce cotton for European textile industries was common to many colonial powers, the forced labour regime implemented in Mozambique was among the most brutal and oppressive in Africa, leading one historian to describe it as 'the mother of poverty' (Isaacman 1995). By the 1940s, over 750,000 Mozambicans were compelled to cultivate cotton. In the absence of detailed agronomic information, cotton concession areas in Mozambique were defined based on a combination of salient geographical characteristics and existing administrative limits. In practice, the boundaries of the cotton concession were driven by the tendency of concessionary companies to absorb as much territory as possible to increase total output. As such, concession areas varied substantially according to their suitability for cotton production.

Given this setting, we examine the legacies of the forced labour regime using spatial regression discontinuity (RD) methods. To do so, we collected original survey and experimental data from 2000 individuals living in 200 villages along the historical border of the *Algodeira do Sul do Save*, a former cotton concession in the South of Mozambique. Our estimation strategy relies on the arbitrary definition of the historical borders of the cotton concession areas. Consistent with how the borders of the cotton concessions were determined, we show that key geographic and pre-concession ethnic group characteristics are not significantly different across the historical border. We also provide evidence suggesting that selective migration is unlikely to be a threat to identification in our study.

A large number of studies have shown material long-run negative effects of extractive and coercive institutions on present-day economic outcomes (La Porta et al. 1997; Acemoglu et al. 2001; Sokoloff and Engerman 2000; Nunn 2020, 2008; Acemoglu et al. 2002). A common explanation for these persistent effects pertains to impacts on institutions, ranging from macro- (governance) to micro-levels (norms and culture). We focus on the latter, paying special attention to gender norms. Despite a colonial discourse emphasizing women's domestic responsibilities, a parallel requirement for men to undertake forced *wage* labour—often involving long periods away from home—meant women were principally responsible for meeting the imposed demand for cotton. As such, women came to perform roles traditionally reserved for men and were also propelled to organize collectively and develop coping-strategies, such as organizing work groups and labour exchanges (Isaacman 1995).

The main aim of this paper is to capture the long-term legacies of such labour practices on measures of women's empowerment, social capital and human capital. To capture these effects, our survey included measures of demographic characteristics and family history, as well as

civic participation, trust, attitudes towards governance, gender empowerment and norms. Our experimental measures included two trust games, a real-life trust measure, and one public good game. In addition, respondents also played a matching grant activity.

Our results show that women living in former concession areas are today significantly more empowered, have more positive perceived norms about their role in society, and display higher levels of social capital. At the same time, we find that women residing in former concession areas exhibit lower levels of education, which may be explained by the wider set of responsibilities undertaken by women in these areas, leaving less time available for education. Taken together, these results suggests that a relatively short-term rupture, which brought women into previously male-dominated roles, and at the same time reinforced their importance in society and capacity to engage in collective action, significantly altered gender roles and norms with persistent effects to this day.

This study contributes to several strands of literature. A number of studies have adopted a gender lens in examining the long-term consequences of colonialism. Several scholars across different contexts have proposed the idea that ruptures associated with colonialism, including the introduction of cash crops, significantly altered gender relations in ways that hinder the economic and social status of women(Boserup 1970; Korieh 2001; Allina 2012). One focus of this research has been on the legacies of missionary activity on educational outcomes by gender (among others, Nunn 2014; Montgomery 2017). Other papers examine the long-term effects of different legal and policy frameworks on women's status. For example, Anderson (2018) shows that variations in marital property rights between British common law and French civil law countries affected HIV vulnerability among women in today's Sub-Saharan Africa. Guarnieri and Rainer (2021) exploit the Anglo-French partition of Cameroon after WWI and find that policies promoting female employment in former British territories had persistent effects on women's economic empowerment, but made women highly vulnerable to IPV and male backlash. Along similar lines, several anthropologists and historians have highlighted the negative gendered effects of the introduction of colonial cash crop systems in Africa among women. Among others, Boserup (1970) documented that this system was biased towards men, who were considered as the principal market agent in the household and assumed control over land and incomes. Despite enduring the double-burden of cash and food crop production, women's work was often invisible. While the colonial discourse was similar in Mozambique, where colonial authorities assumed 'real' producers were male and women tasks were considered 'domestic chores' (Isaacman 1995), we find in contrast to the literature to date that the introduction of cash crop systems is associated with long-term positive outcomes for women. This happened because women took on traditional male responsibilities. Even though we find negative effects in terms of women's long-term human capital outcomes, changes in the role of

women - whether intended or not by the colonial authorities - led to strong changes in gender norms across time.

This suggests that it is not the colonial system per se that generates gender inequalities across time, but rather how production is organized. Broadly, this finding mirrors findings in recent literature on the historical roots of contemporary differences in gender roles and norms. A common argument underpinning these studies is that even short-term shocks can have long-term effects on gender outcomes by changing norms and beliefs regarding the appropriate role of women in society, which are in turn transmitted across generations (Giuliano 2017). For instance, a group of studies examine the effect of shocks to sex ratios on gender outcomes, particularly employment. Acemoglu et al. (2004); Fernandez et al. (2004); Goldin and Olivetti (2013) focus on the context of the United States to understand the role that the short-term increase in female labour force participation during WWII had on the huge rise in women's employment in the 1940s and 1950s. Recent contributions on other contexts examine both short-term and longer-term changes in female labour force participation in response to demographic shocks caused by the slave trade (Teso 2019), wars (Alix-Garcia et al. 2022), and pandemics (Fenske et al. 2022). For example, Teso (2019) finds that the female-biased sex ratios caused by the transatlantic slave trade, which caused a surge in female labour force participation, still affect women employment and fertility rates to this day. However, historical exposure to the slave trade has no effect on attitudes on the role of women in other spheres, such as politics. We contribute to these results by showing how female forced labour impacted on gender norms over time. This practice was carried out under violent conditions and hinder the human capital development of affected women. However, it also forced women into labour and collective action practices that over time generated important normative changes. Contrary to the existing literature to date, this effect was not driven by changes in sex ratios but rather by attitudinal changes about the role of women in society.

This result in turn connects to emerging analyses of the historical roots of comparative development, particularly the legacies of violent historical shocks, including slavery. Previous studies in this field have found mixed results with respect to impacts on social capital: while some events appear to have led to a fall in trust in the medium- and long-run (Blouin 2021; Nunn and Wantchekon 2011), others boosted prosocial behaviour, perhaps as a substitute for weakened governance quality (Lowes and Montero 2021). As shown by a growing body of studies in the conflict literature, this increase in prosocial behaviour may be a direct consequence of the trauma of violence (Bauer et al. 2016). Importantly, these studies find that the effect of exposure to violence does not diminish with time and, if anything, may even strengthen. We add to this literature, by showing how the gendered practice of forced labour in Mozambique reduced the human capital of women over the long term but has the unexpected consequence of improving female empowerment measures. To the best of our knowledge, this is the first study

to document the persistent effects of colonial concession systems on female empowerment and gender norms.

2 Historical background

2.1 The colonial forced cotton regime

Initial efforts by Portuguese colonial authorities to transform Mozambique into a cotton-producing colony began in the mid-18th century. These endeavors faced significant challenges, including vague directives, capital shortages, and global price fluctuations, ultimately leading to the collapse of all cotton ventures by 1926. In an effort to revitalize production, a new cotton regime was introduced, drawing inspiration from the forced production system implemented in the Belgian Congo. Under a decree issued in 1926, designated cotton zones were established, within which private concessionary companies were granted exclusive rights to purchase cotton from farmers at below-market prices. Despite these measures, initial setbacks persisted, including the failure to mobilize the Mozambican labour force for cotton production[1]. Consequently, by 1938, the colonial regime undertook a restructuring of the labour process, adopting a state interventionist system aimed at achieving direct state supervision over all production and marketing aspects of the cotton industry.

This paper explores the forced labour system enforced between 1938 until its abolition in 1961, during which colonial powers compelled a substantial portion of Mozambique's rural population to produce cotton. The establishment of the Colonial Cotton Board (Junta de Exportação de Algodão Colonial), tasked with overseeing cotton production and wielding the full power of the state at its disposal, marked the beginning of this regime (Bravo 1963).

The Cotton Board's central objective was to increase overall cotton production. To achieve this, extensive areas of the country were designated as cotton zones, with subsequent control handed over to concession companies. Within these zones, every adult residing in rural areas was compelled to cultivate cotton. However, the absence of soil data, temperature, and rainfall patterns resulted in cotton zones being designated across various regions, regardless of their suitability for cotton cultivation, in an attempt to boost agricultural production. Expanding territory was seen as a means to accommodate more cotton growers and achieve greater output, as articulated in one of the Cotton Board reports: 'Without an infusion of new technology or sufficient knowledge of rainfall and soils, the only way to increase total output is by expanding the area under cultivation' (J.E.A.C. 1940). Thus, large concession areas were established throughout

[1] By 1937, approximately 80,000 individuals were involved in the system, representing a fraction of the rural population totaling 4 million (Isaacman 1985).

the country, with limited consideration for agronomic conditions and with concession boundaries being defined using a combination of salient geographic characteristics and administrative limits.[2] Alongside the forced expansion of the number of rural Mozambicans engaged in cotton cultivation, other strategies to increase production included extending farmers' working hours, implementing fixed mandatory cultivation calendars, defining a minimum plot size per person for cultivation, and discouraging the production of food crops.[3] (Isaacman 1985).

The cotton production regime operated as a system primarily centered on surplus extraction, devoid of agricultural technology or investment, and heavily reliant on labour. Without access to fertilizers, pesticides, plows, or other mechanized inputs, farmers were compelled to dedicate the majority of their labour to meeting the demands of cotton cultivation. Conservative estimates from cotton board officials suggest that farmers spent between 110 and 175 days cultivating just one hectare of cotton (Bravo 1963). In addition to being time-consuming and labour-intensive, cotton production followed a similar cycle to the food crops grown in Mozambique. This dual demand resulted in widespread food shortages and famine, earning cotton the infamous title of 'the mother of poverty' (Isaacman 1995).

This highly controlled labour regime heavily relied on coercion, violence, and intimidation. Local police, concession employees, and authorities were instructed to utilize any coercive methods necessary to boost cotton production. Violence was deemed essential to drive production while curtailing food crops or more profitable cash crops. Beatings and sexual assaults were commonplace tactics used to subjugate farmers. Although the colonial regime was repressive and violent, its coercive measures were inadequate to ensure the system's success. As a result, state officials progressively delegated the supervision of peasant cotton production to chiefs, known as 'régulos', upon whom the system relied (Isaacman 1985; O'Laughlin 2002). The Mozambican chiefs were in a complex position with both the colonial state and the peasantry during that period whereby they were tasked with enforcing an unpopular and coercive system at the behest of colonial officials, and were required too to maintain social order.[4]

The coercive strategies, coupled with recurrent food shortages, fomented widespread discontent and social unrest. Although major revolts and rebellions were rare due to the vulnerable position of rural households, clandestine forms of resistance and acts of defiance undermined the system at pivotal moments. Methods such as pre-boiling cotton seeds before planting or

[2] For example, one description of a cotton concession border reads: 'From the boundaries of the Manhica district to the banks of the Incomati River, following the meridian passing through the confluence of the Vaneteze River with the Incomati River' (J.E.A 1953).

[3] In some cases, the peasants were obligated to destroy the agricultural plantations to give place to the cotton production (Isaacman 1997).

[4] Nevertheless, the position of a state-appointed chief came with several material advantages. The colonial administration exempted the régulos from arduous labour and tax obligations (Isaacman 1985).

adulterating cotton with foreign objects to inflate market weight were among the subtle forms of resistance employed.

Throughout the country, women traditionally bore the majority of the burden for agricultural work, shouldering particular responsibility for managing food plots as well as children's upbringing and tending to home chores (household reproduction). However, as one leading historian put it: 'The most salient feature of the labour process in the South was that cotton production [also] was done almost entirely by women – wives, daughters, sisters and nieces. ... [Men] either fled to South Africa to avoid [c]hibalo (forced labour) or were conscripted to work on the large European plantations to work in Lourenco Marques. ... The imposition of the cotton regime helped to restructure the gendered division of labour and led to a dramatic increase in women's agricultural work' (Isaacman 1992b: 829).

An essential point here is that, unlike other contexts where expansion of cash crop production tended to elevate the role of men and provide them with additional direct sources of (cash) income, this was not the case in Southern Mozambique. This is stressed in Young's history of women within agriculture in this region: 'development of cash crops and of new agricultural techniques did not lead to male dominance of modern agriculture. Instead women took over cash crop production ... Their income from crop production gave them substantial independence' (Young 1977: 77). As a result, women came to assume a number of ritual functions, previously reserved for men, thereby assuming greater importance in collective community life beyond the household. In the remainder of the paper, we investigate the long-term effects of gender changes driven by the regime of forced cash crop production in Mozambique.

3 Measurement and data

To examine the long-term implications of the forced labour regime, we leverage the quasi-experimental spatial variation of the arbitrarily defined borders of cotton concessions. We combined archival data with survey and experimental data collected along the cotton concession borders. Below, we provide a detailed overview of the various data sources and their structures.

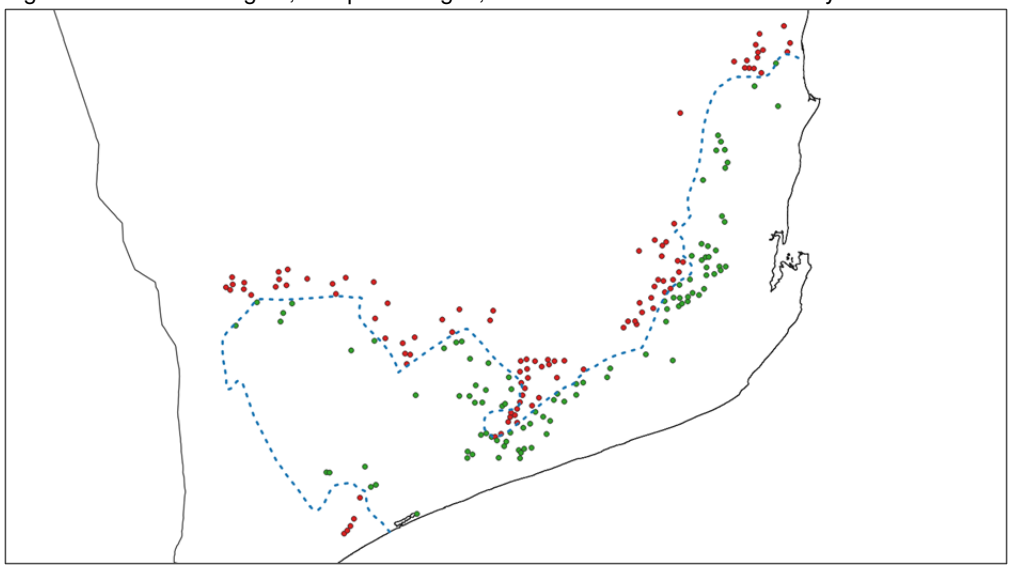
3.1 Cotton concessions

To define the boundaries of the cotton concessions, we rely on archival data. Specifically, the J.E.A (1953) report, produced by the colonial cotton board, provides maps of the cotton concessions areas, along with detailed descriptions of their boundaries. In our analysis, we rely on georeferenced historical maps, verifying their borders by crosschecking them with the boundary descriptions.

3.2 Field work

Our primary data collection was conducted in the southern provinces of Maputo-Province, Gaza, and Inhambane, where the cotton concession Algodoeira do Sul do Save operated. We utilized the most recent Mozambique Census Data available to randomly select 200 villages along the concession border. Following Cattaneo et al. (2019), we prioritized villages in close proximity to the concession border, defining our targeted bandwidth as 20 kilometers on each side. We excluded observations in the 10 percent tails of the population distribution within this predefined bandwidth. To ensure representative sampling, we aggregated villages within 5 kilometers of border segments and randomly selected villages within these segments, maintaining proportions reflective of the overall village population by segment. Our final selection comprised 100 villages outside and 100 villages inside the concession border. During the data collection phase, logistical challenges led to the inability to locate five villages in the field. Consequently, these villages were randomly substituted with others from the same or neighbouring segments. After accounting for these substitutions, our final sample consisted of 200 villages, with villages inside the concession border positioned within a 20-kilometer radius of the border, while those outside were located within a 24-kilometer radius. For geographical context, Figure 1 depicts the cotton concession border as well as the location of the sampled villages.

Figure 1: Field work region, sampled villages, and cotton concession boundary



Note: the map displays the region of the Algodoeira do Sul do Save, in southern Mozambique. The light-blue dotted line is the former cotton concession boundary. Red dots indicate the villages in the sample within 24 km outside of the former cotton concession boundary, while green dots indicate the villages in the sample within 24 km inside of it.
Source: authors' construction.

Our primary data source comprises survey and experimental data collected in the sampled villages. During the last quarter of 2022, we conducted face-to-face surveys and experimental

measures involving over 2,000 household members, 200 local government representatives, and local elders.

Within each village, we employed a random-walk procedure to select 10 households. The sample of individuals was stratified by gender, with an approximately equal representation of women and men. Additionally, we limited our sample to individuals whose mothers were originally from the village to mitigate potential contamination effects, as surveying individuals whose family originates from outside the area during the forced labour regime might introduce bias. Households taking part in the data collection activities received a 60 MZN (approximately 1 USD) participation fee.[5]

Our survey measures included a module on demographic characteristics and family history as well as modules on civic participation, trust, government perceptions, and gender empowerment and norms. Our experimental measures included two trust games, a real-life trust measure, and one public good game. In addition to the behavioural games, respondents also played a matching grant activity. Participants randomly selected one of the games at the end of the experiments and received the corresponding payoff.[6] The matching grant activity was not included in the randomized payoff selection, and the final earnings were paid independently of the other games.

The experimental trust measure was a standard trust game to measure trust between individuals within the village. Respondents played both the role of senders and receivers. Senders were randomly and anonymously matched with a player in the receiver position. Senders and receivers received 100 MZN in 10 MZN coins each. The sender could send some of the 100 MZN to the receiver. The experimenter had to triple every amount sent to the receiver. After receiving the amount in triplicate, the receiver could reciprocate by sending some of the triplicated sender's transfers back to him. Senders made their decisions using the strategy method.

The real-life trust measurement requests respondents to state their willingness to receive the game's payoffs through a third party (who is not a member of their household) in the eventuality that they could not be present at the time of the payments at the end of all activities. We record the respondent's answer as well as the identity of the third-party individual.

The second trust game measured individuals' trust in leaders. The game followed the same structure as the standard trust game, except that each respondent was matched with the villager leader. Respondents were informed that the matched participant in the game was the leader. In

[5] The participation fee is equivalent to a half day's salary in the region.

[6] Alongside these measures, we also collected survey data on agricultural and business decisions, and participants took part in a risk game. However, these measures are not the focus of this paper.

contrast, the leader was informed that the matched participant was one of the respondents taking part in the experimental session. The village leader did not know exactly which respondent he was paired with.

The final behavioural game was a standard public game played in a group setting with ten respondents. Each player received 100 MZN in 10 MZN coins. Players anonymously and independently decided how much money they wished to allocate to their private or public accounts. The amount allocated to the player's private account belonged to that player. The total amount that every player allocated to the public account was tripled by the experimenter and divided among the ten players. Thus, the activity payoff structure for each player was their contribution to their private account plus their share of the public good account.

The last activity was a real-life behavioural measurement of social cohesion and cooperation in the form of a matching grant activity inspired by Casey et al. (2012). In this activity, the respondents and the village leader were invited to raise funds towards a community objective of their choosing in response to a matching grant opportunity. The group was instructed that if they collectively raised funds for a community project, the amount raised would be tripled by the experimenter up to 1800 MZN, and the total amount would be given back to the community. The group should then decide if they wish to participate in the matching grant activity, the project in which they invest, the total amount they raised, and the individual responsible for receiving both the amount raised and the matched grant. All decisions were communicated to the enumerators, who paid the amount corresponding to the group's decisions.

Outcome measures

To analyze the long-term impacts of the forced labour system, we focus on seven sets of outcomes: social cohesion, civic participation, interpersonal trust, institutional trust, attitudes to governance, empowerment and gender norms, and education. For each outcome variable, we aggregate survey questions[7] and behavioural measures in a standardized index. Table 1 presents descriptive statistics for the indexes, distinguishing between observations inside and outside the cotton concession border. Appendix B presents descriptive statistics for each variable included in the indexes.

[7] The survey variables used are described in Appendix A.

Table 1: Summary statistics - index

	Mean	SD	Min	Max	N
SOCIAL COHESION					
Social cohesion inside cotton zone	-0.06	0.96	-5	3	991
Social cohesion outside cotton zone	0.06	1.04	-5	4	987
CIVIC PARTICIPATION					
Civic participation inside cotton zone	-0.01	0.98	-2	3	1000
Civic participation outside cotton zone	0.01	1.02	-2	4	999
INTERPERSONAL TRUST					
Interpersonal trust inside cotton zone	0.04	0.96	-4	2	1000
Interpersonal trust outside cotton zone	-0.04	1.04	-4	2	999
INSTITUTIONAL TRUST					
Institutional trust inside cotton zone	0.02	0.98	-4	2	1000
Institutional trust outside cotton zone	-0.02	1.02	-4	2	999
ATTITUDES TOWARDS GOVERNANCE					
Attitudes to governance inside cotton zone	0.05	0.95	-5	3	1000
Attitudes to governance outside cotton zone	-0.05	1.05	-4	3	999
EMPOWERMENT					
Empowerment inside cotton zone	-0.03	1.00	-2	2	1000
Empowerment outside cotton zone	0.03	1.00	-2	2	999
NORMS					
Norms inside cotton zone	0.04	1.01	-4	4	1000
Norms outside cotton zone	-0.04	0.98	-3	4	999
GENDER NORMS					
Gender norms inside cotton zone	0.08	1.01	-4	4	1000
Gender norms outside cotton zone	-0.08	0.98	-3	4	999

4 Estimation strategy

We exploit the border of the former cotton concession zones in a regression discontinuity design (RDD) to identify the effect of the colonial forced cotton regime on contemporaneous outcome measures. Drawing from existing literature (Dell 2010; Ambrus et al. 2020; Jones et al. 2022; Michalopoulos and Papaioannou 2014) that utilizes spatial RDD, we define a one-dimensional running variable: the distance of each village to the nearest point on the cotton concession border. While the primary focus of this paper lies in exploring the heterogeneous effects by gender, our baseline specification illustrates the pooled effect for both men and women. The equation is outlined as follows:

$$Y_{i,v} = \alpha + \beta Cotton_{i,v} + f(geographic_v) + \delta X_i + \gamma C_v + {}_{i,v} \tag{1}$$

where $Y_{i,v}$ represents the outcome of interest for individual i, in village v. $Cotton_v$ is an indicator variable, equal to one if the village v is inside a cotton zone and zero otherwise. We employ a local linear polynomial following Gelman and Imbens (2019), denoted as $f(geographic_v)$, which controls for smooth functions of geographic location. The coefficient of interest is β, which represents the effect of forced cotton production on the pooled sample of men and women. The vector X_i contains observed individual-level characteristics, including age, religious affiliation,

and the number of household members, while the vector C_v contains village-level geographic characteristics, including cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects.

Our main specification estimates the differential effects for men and women:

$$Y_{i,v} = \alpha + \beta_1 Cotton_{i,v} + \beta_2 Gender_{i,v} + \beta_3 Cotton_{i,v} \times Gender_{i,v} + f(geographic_v) + \delta_1 X_i + \gamma_1 C_v + f(geographic_v) \times Gender_{i,v} + \delta_2 X_i \times Gender_{i,v} + \gamma_2 C_v \times Gender_{i,v} + \epsilon_{i,v} \quad (2)$$

where $Gender_i$ is an indicator variable that takes the value of zero for women and one for men. The $Gender_{i,v}$ indicator is interacted with the $Cotton_v$ variable, the RD polynomial ($f(geographic_v)$) and the control vectors. Our main coefficient of interest β_1 represents the effect for women, while β_3 represents the differential effect of cotton for men relative to women.

We employ a triangular weighting kernel, whereby the weight assigned to each observation decreases with distance from the border. Our preferred specification uses the 24km bandwidth around the cutoff. Standard errors are clustered at the village level.

4.1 Identifying assumptions

To effectively identify treatment effects under the RD design employed in this paper, two crucial assumptions must be met. Firstly, all pertinent factors aside from the treatment should exhibit smooth variation at the cotton border. A significant threat to the RD design's validity would arise if concession boundaries were determined based on pre-existing characteristics, such as more favorable agronomic conditions. To evaluate the plausibility of this assumption, Table 2 examines various geographic and pre-concession characteristics, employing a specification consistent with that outlined in equation 1. We find no statistically significant differences between villages located inside and outside the concession border, indicating comparability along the border.

Table 2: Pre-characteristic balance: field work villages

	(1) Cotton suitability	(2) Soil suitability	(3) Slope	(4) Altitude	(5) Rainfall	(6) River	(7) Ethnic group
Treat	0.124	-0.168	0.131	0.920	-21.750	-0.127	19.605
	(0.122)	(0.242)	(0.080)	(8.746)	(25.906)	(0.126)	(57.942)
Observations	200	200	200	200	200	200	200
Outside Mean Dep. Var.	4.576	3.779	2.208	72.587	754.487	0.500	385.770

Note: the unit of observation is the village. All regressions include a local linear polynomial. Standard errors are robust to heteroskedasticity. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.
Source: authors' estimation.

The second assumption requires that there is no selective sorting across the treatment boundary. Selective sorting encompasses scenarios where villages opt out of the forced cotton cultivation system or individuals engage in selective migration to evade the forced cultivation system. While the former scenario is unlikely, as villages had no input in opting into or out of the cultivation system when the concession borders were defined, we analyze the case for selective migration. Although migration was one possible way of resistance towards the forced labour regime, severe limitations were imposed on people's mobility. The loyalist local chiefs (*régulos*) prevented peasants from fleeing through fear and physical intimidation. Individuals who were caught in the act of trying to escape faced incarceration, and in case someone succeeded fleeing their entire family would be arrested (Isaacman 1995). In addition, trying to escape the cotton regime was both long and dangerous. Peasants would have to walk several hundreds kilometers through unknown territories, without food or shelter, and facing the threat of being caught by bandits or police patrols (Isaacman 1992a). Leveraging historical population data from both before and after the implementation of the concession system, we document migration patterns using a difference-in-differences design.[8]

Because historical population data is not available at the village level, we use the smallest geographical unit available, the district. We define treated districts as those with at least 40 percent of their area lying within the cotton concession area, with control districts encompassing the remainder. Taking into account data availability, we define the pre-treatment period spanning from 1927 to 1932, while the post-treatment period extends from 1963 to 1970. Tables 3 and 4 document these results. We present the results for the interaction term between being a treated district and the time variable. Column (1) displays the results for the entire population, while columns (2) and (3) separate the results for men and women. Table 3 focuses on migration patterns in the historical southern districts, where the fieldwork was conducted, while Table 4

[8] We employ the following specification: $Y_{d,t} = \alpha + \beta_1 Cotton_d + \beta_2 Cotton_d \times After1961_t + d_d + t_t + \epsilon_{d,t}$, where $Y_{d,t}$ is the population variable in district d at time t. $Cotton_d$ is a dummy variable taking the value of one if at least 40 percent of the district area lies inside the cotton concession area and zero otherwise. $After1961_t$ is a time indicator, taking the value of zero for the years before the cotton concession system (1927 to 1932) and one for the years after the system was abolished (1963 to 1970). d_d and t_t are district and year fixed effects, respectively. Observations are weighted by the area of the district and standard errors are robust to heteroskedasticity.

extends the analysis to the rest of the country. Notably, none of the coefficients are statistically significant at conventional levels, suggesting that selective migration is unlikely a concern in our study.

Table 3: Selective migration: population - field work area

	(1) Total	(2) Men	(3) Women
Treat x After 1961	-466.434	-3220.042	2753.608
	(9618.343)	(4820.284)	(4870.665)
Observations	169	169	169
Outside Mean Dep. Var.	60050.048	29669.398	30380.651

Note: the table presents the difference-in-difference estimation, depicting the change in population numbers in treated districts after the abolition of the cotton concession system. The unit of observation is the district. Treated districts are defined as those with at least 40 percent of their area lying within the cotton concession area. All estimations include district and year-fixed effects. Observations are weighted by the area of the district, and standard errors are robust to heteroskedasticity. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.
Source: authors' estimation.

Table 4: Selective migration: population - whole country

	(1) Total	(2) Men	(3) Women
Treat x After 1961	6296.504	3063.992	3232.511
	(5431.295)	(2607.808)	(2862.550)
Observations	647	647	647
Outside Mean Dep. Var.	50295.598	24777.342	25518.256

Note: the table presents the difference-in-difference estimation, depicting the change in population numbers in treated districts after the abolition of the cotton concession system. The unit of observation is the district. Treated districts are defined as those with at least 40 percent of their area lying within the cotton concession area. All estimations include district and year-fixed effects. Observations are weighted by the area of the district, and standard errors are robust to heteroskedasticity. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.
Source: authors' estimation.

5 Results

Table 5 reports estimates on the impact of forced cotton labour on social cohesion and cooperation. Columns (1) and (2) do not include any fixed effects or controls; columns (3) and (4) include boundary segment fixed effects; columns (5) and (6) add individual controls; columns (7) and (8) also include village-level geographic characteristics. Columns (2), (4), (6), and (8) report estimates of differential effects for men and women, as in specification 2. The same applies for all the tables in this section. We find no significant effects of the cotton regime on social cohesion.

Table 6 shows estimates for the civic participation index. Across all specifications, we find evidence of differential long-run effects of the regime on the participation in civil society by gender. Women living in villages just inside the former cotton concession area are significantly more likely to actively participate in civil society. In standard deviation terms, women inside

the cotton zone are approximately 0.22 standard deviations more active in civil society organization. Women inside former cotton concession areas are also more likely to hold leadership positions in civil society organizations (Table 7).

Tables 8 and 9 report estimates for interpersonal and institutional trust, respectively. In the specification with all fixed effects and controls, we find that individuals inside the former concession are more trusting towards others and towards the institutions. However, we find no statistically significant effect of the colonial forced labour regime on present-day attitudes towards governance (Table 10).

Table 11 shows results for the empowerment and gender norms index. Across all specifications, we find a positive impact on gender norms and women's autonomy. In Tables 12 and 13 we unbundle the two components of the index: economic empowerment and autonomy, on one hand, and gender attitudes and norms, on the other. Our estimates show that the positive coefficient on the empowerment and gender norms index for women is driven by the social norms component: women in former cotton concession areas perceive more positive norms on their role in society (Table 13). Table 11 reports evidence of a significant and negative differential effect for men relative to women. We find that the forced labour regime had negative long-term implications for men's empowerment relative to women's (Table 12). Moreover, men just inside the former concession perceive more negative gender norms (Table 13).

Lastly, we evaluate whether the forced labour regime had a lasting effect on education (Table 14). We find that women inside the concession areas are approximately 0.6 standard deviations less educated, which is a large effect.

Overall, we find evidence that the forced cotton regime had a persistent effect on women's social capital and on gender norms. A growing body of evidence shows that traumatic events caused by conflict and violence increase individuals' prosocial behaviour (Bauer et al. 2016). Our results suggest that variations in attitudes and preferences caused by coercive and violent events persist over time and across generations. This is in line with what Lowes and Montero (2021) find for former rubber concessions in the Congo. In particular, we find differential effects by gender in some forms of pro-social behaviour, as participation and leadership in civic society and community organization. As previously discussed, the forced labour regime was highly gendered: especially in the South, cotton was cultivated almost entirely by women (Isaacman 1995). Women felt the weight of the colonial forced labour regime, but at the same time were pushed in positions traditionally held by men. Women were the main organizers of coping and resistance strategies, which also entailed cooperating among each other to form working groups and labour exchanges. Our results suggest that this experience had a role in persistently altering norms and beliefs on the appropriate role of women in civil society, which were transmitted across generations, and still affect women's roles today.

Table 5: Social cohesion

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.102	0.183	0.110	0.186	0.099	0.177	0.076	0.136
	(0.192)	(0.198)	(0.192)	(0.199)	(0.184)	(0.191)	(0.196)	(0.203)
Treat × Male		-0.165		-0.155		-0.157		-0.124
		(0.139)		(0.139)		(0.136)		(0.136)
Observations	1978	1978	1978	1978	1978	1978	1978	1978
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 6: Civic participation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.084	0.221*	0.086	0.219*	0.109	0.255**	0.076	0.225**
	(0.102)	(0.122)	(0.102)	(0.121)	(0.101)	(0.118)	(0.098)	(0.114)
Treat × Male		-0.275**		-0.268**		-0.297**		-0.300**
		(0.129)		(0.128)		(0.126)		(0.129)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 7: Leadership

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.024	0.082*	0.023	0.080*	0.027	0.080*	0.026	0.074*
	(0.036)	(0.045)	(0.036)	(0.045)	(0.035)	(0.044)	(0.035)	(0.042)
Treat × Male		-0.115		-0.115*		-0.106		-0.097
		(0.070)		(0.069)		(0.068)		(0.070)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 8: Interpersonal trust

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.189	0.218	0.186	0.211	0.189	0.209	0.226**	0.228
	(0.129)	(0.165)	(0.129)	(0.165)	(0.126)	(0.164)	(0.108)	(0.152)
Treat × Male		-0.057		-0.052		-0.053		-0.021
		(0.172)		(0.172)		(0.168)		(0.168)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	-0.038	-0.038	-0.038	-0.038	-0.038	-0.038	-0.038	-0.038
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 9: Institutional trust

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.167	0.097	0.169	0.098	0.176	0.108	0.216*	0.142
	(0.136)	(0.167)	(0.136)	(0.168)	(0.134)	(0.165)	(0.125)	(0.154)
Treat × Male		0.141		0.143		0.134		0.149
		(0.151)		(0.151)		(0.150)		(0.148)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 10: Attitude to governance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.120	0.008	0.120	0.003	0.130	0.013	0.156	0.044
	(0.099)	(0.115)	(0.099)	(0.114)	(0.095)	(0.110)	(0.097)	(0.111)
Treat × Male		0.226		0.233		0.234		0.224
		(0.144)		(0.144)		(0.146)		(0.155)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	-0.050	-0.050	-0.050	-0.050	-0.050	-0.050	-0.050	-0.050
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 11: Empowerment and gender norms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.094	0.237**	0.091	0.236**	0.084	0.234**	0.160*	0.336***
	(0.102)	(0.114)	(0.102)	(0.114)	(0.101)	(0.116)	(0.094)	(0.104)
Treat × Male		-0.297**		-0.293**		-0.308**		-0.357**
		(0.146)		(0.146)		(0.148)		(0.144)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	-0.043	-0.043	-0.043	-0.043	-0.043	-0.043	-0.043	-0.043
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 12: Empowerment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.000	0.081	-0.003	0.079	-0.007	0.073	-0.018	0.103
	(0.103)	(0.117)	(0.102)	(0.117)	(0.104)	(0.128)	(0.091)	(0.117)
Treat × Male		-0.173		-0.169		-0.174		-0.251*
		(0.149)		(0.149)		(0.151)		(0.151)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 13: Gender norms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.117	0.225	0.116	0.224	0.112	0.228*	0.218*	0.332***
	(0.137)	(0.139)	(0.136)	(0.138)	(0.132)	(0.136)	(0.122)	(0.124)
Treat × Male		-0.218		-0.217		-0.231		-0.227*
		(0.135)		(0.136)		(0.141)		(0.135)
Observations	1999	1999	1999	1999	1999	1999	1999	1999
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	-0.078	-0.078	-0.078	-0.078	-0.078	-0.078	-0.078	-0.078
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

Table 14: Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	-0.386	-0.820*	-0.400	-0.831*	-0.128	-0.493	-0.393	-0.582*
	(0.397)	(0.461)	(0.396)	(0.460)	(0.325)	(0.365)	(0.301)	(0.350)
Treat × Male		0.885*		0.862*		0.755*		0.414
		(0.471)		(0.471)		(0.432)		(0.430)
Observations	1998	1998	1998	1998	1998	1998	1998	1998
Clusters	200	200	200	200	200	200	200	200
Bandwidth	24	24	24	24	24	24	24	24
Kernel	triangular	triangular	triangular	triangular	triangular	triangular	triangular	triangular
Outside Mean Dep. Var.	3.222	3.222	3.222	3.222	3.222	3.222	3.222	3.222
Controls	no	no	strata	strata	strata + indv.	strata + indv.	strata + indv. + geo	strata + indv. + geo

Notes: The unit of observation is the individual. All regressions include a local linear polynomial. Columns 1, 3, 5, and 7 employ specification 1, while columns 2, 4, 6, and 8 employ specification 2. Individual-level controls include age, religious affiliation, and the number of household members. Geographic-level controls include cotton soil suitability, slope, altitude, the presence of a river, and province and boundary segment fixed effects. Standard errors are clustered at the village level. Asterisks indicate significance levels * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Source: authors' estimation.

6 Conclusion

This paper studies the long-term effects of colonial forced labour practices on gender outcomes and norms. This practices were common among most of the developing world following the abolition of slavery. This paper analyses the contemporary consequences of compulsory cotton production—a forced labour system that operated in colonial Mozambique from 1926 to 1961. The empirical analysis relies on the arbitrary historical boundaries of cotton concession areas granted by the Portuguese colonial government to large private companies to employ a spatial regression discontinuity. These private companies were largely interested in quantity over quality and tended to absorb as much territory as possible independently of the suitability of the areas for cotton production. Labour was cheap and therefore land size was more important than agricultural conditions when designing the boundaries of cotton concessions. Most of this cotton production was done by women as men were drawn into the mines in South Africa. Women bore the brunt of this regime, but in doing so often took on responsibilities traditionally reserved for men and engaged in active resistance strategies. We explore the enduring impact of this exposure to forced cotton cultivation on present-day human and social capital.

The results show a negative effect of these labour practices on women's education outcomes over the long-run, in line with a well-established literature on how colonial labour practices have contributed to increases in gender inequalities over the long-term. However, we show also strong evidence for positive long-term effects of forced cotton production on women's empowerment measures. This effect is largely explained by the fact that women took over traditionally male responsibilities in the cultivation of cotton, but also in collective action in cotton concessions. Over the long term, these new responsibilities generated persistent changes in gender norms. Taken together, these results suggest that even an unintended rupture to gendered practices may generate positive long term effects on gender equality.

References

Acemoglu, D., Autor, D. H., and Lyle, D. (2004). 'Women, War, and Wages: The Effect of Female Labor Supply on the Wage Structure at Midcentury'. *Journal of Political Economy*, 112(3): 497-551. https://doi.org/10.1086/383100

Acemoglu, D., Johnson, S., and Robinson, J. A. (2001). 'The Colonial Origins of Comparative Development: An Empirical Investigation'. *American Economic Review*, 91(5): 1369-1401. https://doi.org/10.1257/aer.91.5.1369

Acemoglu, D., Johnson, S., and Robinson, J. A. (2002). 'Reversal of Fortune: Geography and Institutions in the Making of Modern World Income Distribution'. *Quarterly Journal of Economics*, 117(4): 1231-1294. https://doi.org/10.1162/003355302320935025

Alix-Garcia, J., Schechter, L., Valencia Caicedo, F., and Zhu, S. J. (2022). 'Country of Women?

Repercussions of the Triple Alliance War in Paraguay'. *Journal of Economic Behavior and Organization*, 202(October): 131–167. https://doi.org/10.1016/j.jebo.2022.07.025

Allina, E. (2012). *Slavery by any other name: African life under company rule in colonial Mozambique*. Charlottesville: University of Virginia Press.

Ambrus, A., Field, E., and Gonzalez, R. (2020). 'Loss in the time of cholera: Long-run impact of a disease epidemic on the urban landscape'. *American economic review*, 110(2): 475–525. https://doi.org/10.1257/aer.20190759

Anderson, S. (2018). 'Legal Origins and Female HIV'. *American Economic Review*, 108(6): 1407-1439. https://doi.org/10.1257/aer.20151047

Bauer, M., Blattman, C., Chytilová, J., Henrich, J., Miguel, E., and Mitts, T. (2016). 'Can War Forster Cooperation?' *Journal of Economic Perspectives*, 30(3): 249-274. https://doi.org/10.1257/jep.30.3.249

Blouin, A. (2021). 'Culture and Contracts: The Historical Legacy of Forced Labour'. *The Economic Journal*, 132(): 89-105. https://doi.org/10.1093/ej/ueab031

Boserup, E. (1970). *Woman's role in economic development*. New York: St. Martin's Press.

Bravo, N. S. (1963). 'A cultura algodoeira na economia do norte de moçambique'. Estudos de ciências politicas e sociais 66. Lisbon: Junta de Investigações do Ultramar, Centro de Estudos Políticos e Sociais.

Casey, K., Glennerster, R., and Miguel, E. (2012). 'Reshaping institutions: Evidence on aid impacts using a preanalysis plan'. *The Quarterly Journal of Economics*, 127(4): 1755–1812. https://doi.org/10.1093/qje/qje027

Cattaneo, M. D., Titiunik, R., and Vazquez-Bare, G. (2019). 'Power calculations for regression-discontinuity designs'. *The Stata Journal*, 19(1): 210–245. https://doi.org/10.1177/1536867X19830919

Dell, M. (2010). 'The persistent effects of Peru's mining mita'. *Econometrica*, 78(6): 1863–1903. https://doi.org/10.3982/ECTA8121

Fenske, J., Gupta, B., and Yuan, S. (2022). 'Demographic Shocks and Women's Labor Market Participation: Evidence from the 1918 Influenza Pandemic in India'. *Journal of Economic History*, 82(3): 875-912. https://doi.org/10.1017/S0022050722000304

Fernandez, R., Fogli, A., and Olivetti, C. (2004). 'Mothers and sons: Preference formation and female labor force dynamics'. *The Quarterly Journal of Economics*, 119(4): 1249-1299. https://doi.org/10.1162/0033553042476224

Gelman, A., and Imbens, G. (2019). 'Why high-order polynomials should not be used in regression discontinuity designs'. *Journal of Business & Economic Statistics*, 37(3): 447–456. https://doi.org/10.1080/07350015.2017.1366909

Giuliano, P. (2017). 'Gender: An Historical Perspective'. NBER Working Paper 23635. Cambridge, MA: National Bureau of Economic Research. https://doi.org/10.3386/w23635

Goldin, C., and Olivetti, C. (2013). 'Shocking Labor Supply: A Reassessment of the Role of World War II on Women's Labor Supply'. *American Economic Review*, 103(3): 257-262. https://doi.org/10.1257/aer.103.3.257

Guarnieri, E., and Rainer, H. (2021). 'Colonialism and female empowerment: A

two-sided legacy'. *Journal of Development Economics*, 151(June): 102666. https://doi.org/10.1016/j.jdeveco.2021.102666

Isaacman, A. (1985). 'Chiefs, Rural Differentiation and Peasant Protest: The Mozambican Forced Cotton Regime 1938-1961'. *African Economic History*, 14(1985): 15-56. https://doi.org/10.2307/3601112

Isaacman, A. (1992a). 'Coercion, Paternalism and the Labour Process: The Mozambican Cotton Regime 1938-1961'. *Journal of Southern African Studies*, 18(3): 487-526. https://doi.org/10.1080/03057079208708325

Isaacman, A. (1992b). 'Peasants, Work and the Labor Process: Forced Cotton Cultivation in Colonial Mozambique 1938-1961'. *Journal of Social History*, 25(4): 815-855. https://doi.org/10.1353/jsh/25.4.815

Isaacman, A. (1995). *Cotton is the mother of poverty: Peasants, work, and rural struggle in colonial mozambique, 1938-1961*. Heinemann, Portsmouth; James Currey Ltd., London; David Philip Publishers (Pty) LTd, Cape town.

Isaacman, A. (1997). 'Historical amnesia, or, the logic of capital accumulation: cotton production in colonial and postcolonial Mozambique'. *Environment and Planning D: Society and Space*, 15(6): 757-790. https://doi.org/10.1068/d150757

J.E.A. (1953). *Reajustamento das zonas algodoeiras de moçambique*. Lisbon: Ministério do Ultramar.

J.E.A.C. (1940, November 30). *Relatório annuario 1939-1941*. Relatório de Posto de Porto Amelia, Faria Leal.

Jones, M., Kondylis, F., Loeser, J., and Magruder, J. (2022). 'Factor market failures and the adoption of irrigation in Rwanda'. *American Economic Review*, 112(7): 2316–2352. https://doi.org/10.1257/aer.20210059

Korieh, C. J. (2001). 'The Invisible Farmer? Women, Gender, and Colonial Agricultural Policy in the Igbo Region of Nigeria'. *African Economic History*, 29(2001): 117-162. https://doi.org/10.2307/3601709

La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. (1997). 'Legal Determinants of External Finance'. *The Journal of Finance*, 52(3): 1131-1150. https://doi.org/10.1111/j.1540-6261.1997.tb02727.x

Lowes, S., and Montero, E. (2021). 'Concessions, violence, and indirect rule from the Congo Free State'. *The Quarterly Journal of Economics*, 136(4): 2047–2091. https://doi.org/10.1093/qje/qjab021

Michalopoulos, S., and Papaioannou, E. (2014). 'National institutions and subnational development in Africa'. *The Quarterly Journal of Economics*, 129(1): 151–213. https://doi.org/10.1093/qje/qjt029

Montgomery, M. (2017). 'Colonial Legacy of Gender Inequality: Christian Missionaries in German East Africa'. *Politics & Society*, 45(2): 225–268. https://doi.org/10.1177/0032329217704432

Nunn, N. (2008). 'The Long-Term Effects of Africa's Slave Trade'. *The Quarterly Journal of Economics*, 123(1): 139-176. https://doi.org/10.1162/qjec.2008.123.1.139

Nunn, N. (2014). 'Gender and Missionary Influence in Colonial Africa'. In E. Akyeampong, R. H. Bates, N. Nunn, and J. Robinson (eds), *Africa's Development in Historical Perspective* (p. 489-512). Cambridge University Press. https://doi.org/10.1017/CBO9781139644594.021

Nunn, N. (2020). 'The historical roots of economic development'. *Science*, 367(6485): eaaz9986. https://doi.org/10.1126/science.aaz9986

Nunn, N., and Wantchekon, L. (2011). 'The Slave Trade and the Origins of Mistrust in Africa'. *American Economic Review*, 101(7): 3221-52. https://doi.org/10.1257/aer.101.7.3221

O'Laughlin, B. (2002). 'Proletarianisation, Agency and Changing Rural Livelihoods: Forced Labour and Resistance in Colonial Mozambique'. *Journal of Southern African Studies*, 28(3): 511-530. https://doi.org/10.1080/0305707022000006495

Sokoloff, K. L., and Engerman, S. L. (2000). 'Institutions, Factor Endowments, and Paths of Development in the New World'. *Journal of Economic Perspectives*, 14(3): 217-232. https://doi.org/10.1257/jep.14.3.217

Teso, E. (2019). 'The Long-Term Effect of Demographic Shocks on the Evolution of Gender Roles: Evidence from the Transatlantic Slave Trade'. *Journal of the European Economic Association*, 17(2): 497–534. https://doi.org/10.1093/jeea/jvy010

Young, S. (1977). 'Fertility and Famine: Women's Agricultural History in Southern Mozambique'. In R. Palmer and N. Parsons (eds), *The Roots of Rural Poverty in Central and Southern Africa* (chap. 2). Los Angeles: University of California Press.

Appendix

A Variables definitions

Table A1: Survey questions

Questions
CIVIC PARTICIPATION
How often do you participate in...:
1. Religious ceremonies (excluding weddings and funerals)?
2. Community meeting?
3. Work groups?
4. Community activities?
Are you a leader, active member, or not a member of a...:
1. Religious group?
2. Union, professional association, political party?
3. Local association?
4. Farmers' association?
5. Saving group?
6. Work group?
In the last 12 months:
1. Have you participated in a community meeting?
1.2. If not, would you like to participate if you had the opportunity?
2. Have you met with other people to discuss something?
2.1. If not, would you like to meet with others if you had the opportunity?
In the last 12 months, how many times...:
Have you contacted any of the following people to resolve an important personal or community problem?
1. A representative from the municipality/district or central government?
2. A traditional leader (e.g. régulo)?
3. A non-traditional community leader?
INTERPERSONAL TRUST
How much do you trust in...:
1. Your family members?
2. Your neighbours?
3. People of the same ethnic group or religion?
4. People of different ethnic groups or religions?
INSTITUTIONAL TRUST
How much do you trust in...:
1. Political parties?
2. The provincial government?
3. Municipal or district government?
4. Traditional leaders?
5. Community leaders (not traditional)?

ATTITUDES TOWARDS GOVERNANCE

How often do you think the following entities do their best to listen to what people have to say to them?:

1. The political parties?
2. The provincial government?
3. The district government?
4. The traditional leaders (e.g régulos)?
5. The community leaders (not traditional)?

Who do you consider to be primarily responsible for... :

1. Keeping the community clean?
2. Managing schools?
3. Managing health centres?
4. Tax collection?
5. Resolving local conflicts?
6. Allocating land?
7. Protecting rivers and forests?
8. Maintaining law and order?

To what extent would you say the District Government is doing well or poorly in:

1. Keeping the community clean?
2. Managing schools?
3. Managing health centres?
4. Tax collection?
5. Resolving local conflicts?
6. Allocating land?
7. Protecting rivers and forests?
8. Maintaining law and order?

Which of these two statements is closer to your personal opinion?

1. Community-related decisions are:

Statement 1:

More effective when community leaders make decisions alone on behalf of the community.

Statement 2:

More effective when community leaders consult widely with others before making decisions.

2. Privileged position:

Statement 1:

Once in a position of authority, leaders have to help their own families or ethnic groups.

Statement 2:

Because leaders represent everyone, they should not favour their own families or ethnic groups.

3. Permission to make important decisions:

Statement 1:

For only those who understand matters very well.

Statement 2:

All people should be allowed to make important decisions.

4. Time in power:

Statement 1:

There should be no limit to how long leaders stay in power.

Statement 2:

The leaders of a community should only be able to remain in office for a fixed period.

5. Leaders:

Statement 1:

The communities' leaders should always be people whose families have lived in the area for a long time.

Statement 2:

No one should be able to become a leader if the majority of people living there do not agree.

GENDER NORMS AND WOMEN'S AUTONOMY

Which of these two statements is closer to your personal opinion?

Statement 1:

Community leaders must always be men.

Statement 2:

Women must be allowed and encouraged to become community leaders.

In your opinion, how many people in your village think that:

1: If a woman has power at home it means she takes it away from her husband.

2: Women's opinions are valuable and should always be considered when household decisions are made.

3: A woman should not be boss when the man is present.

4: A woman can make household decisions when the man is away for extended periods.

5: It is more important that a man goes to school than a woman.

6: Women and men should have equal decision power over their agricultural plots.

7: A man's job is to earn money; a woman's job is to look after the home and children

8: Women should have the same inheritance rights as men

EDUCATION AND EMPOWERMENT

1. What is the highest level of education you have completed?

2. Have you worked in the last 12 months?

3. Have you carried out any work for which you received goods or money in the last 12 months?

4. Main occupation - farmer in the machamba:

What is (was) your main occupation?

B Descriptive statistics

Table A2: Descriptive statistics: social cohesion and cooperation variables

Games variables	Mean	SD	Min	Max	N
Public goods game contribution	0.44	0.29	0	1	1978
Matching grants contribution (log)	3.81	0.59	0	6	1978

Table A3: Descriptive statistics: civic participation variables

Variables	Mean	SD	Min	Max	N
Frequency of participation in:					
Religious ceremonies	2.55	1.06	0	4	1998
Community reunions	1.97	0.85	0	4	1976
Work groups	0.54	1.04	0	4	1998
Community activities	0.86	1.10	0	4	1997
Leader, active member, or not a member of:					
Religious groups	0.72	0.45	0	1	1999
Unions, professional assoc., political parties	0.39	0.49	0	1	1999
Local association	0.23	0.42	0	1	1999
Farmers association	0.17	0.37	0	1	1999
Saving groups	0.33	0.47	0	1	1999
Work groups	0.22	0.41	0	1	1999
Respondent participated or would participate if given the opportunity					
Attended or would have attended a community meeting	3.07	0.94	0	4	1998
Joined or would have joined the others to raise an issue	2.65	1.17	0	4	1996
Contacted any of the following people to resolve an issue:					
Contact government	0.39	0.74	0	3	1985
Contact traditional leader	0.78	1.00	0	3	1993
Contact non-traditional leader	1.22	1.19	0	3	1996

Table A4: Descriptive statistics: interpersonal trust variables

Questionnaire variables	Mean	SD	Min	Max	N
Level of trust in the following institutions:					
Trust in family members	3.59	0.88	0	4	1996
Trust in neighbours	3.36	1.11	0	4	1995
Trust in people of the same ethnic group or religion	2.86	1.22	0	4	1980
Trust in Mozambicans of different ethnic group or religion	2.37	1.28	0	4	1960
Others trusted with money	0.51	0.50	0	1	1998
Games variable					
Interpersonal Trust: Amount sent	0.31	0.21	0	1	1978

Table A5: Descriptive statistics: institutional trust variables

Questionnaire variables	Mean	SD	Min	Max	N
Level of trust in the following institutions:					
Trust in political parties	2.91	1.31	0	4	1969
Trust in provincial government	3.19	1.13	0	4	1980
Trust in municipal or district government	3.20	1.12	0	4	1977
Trust in traditional leaders	3.33	1.02	0	4	1977
Trust in community leaders (not traditional)	3.54	0.89	0	4	1996
Games variables					
Leader trusted with money	0.73	0.44	0	1	1998
Leader trust: amount sent	0.33	0.22	0	1	1978
Leader trusted with MG money	0.18	0.39	0	1	1981

Table A6: Descriptive statistics: attitudes towards governance variables

Variables	Mean	SD	Min	Max	N
Frequency with:					
Political parties listen to the people	1.10	0.71	0	3	1925
Provincial government listen to the people	1.10	0.71	0	3	1938
Municipal or district government listen to the people	1.17	0.71	0	3	1949
Traditional leaders listen to the people	1.50	0.83	0	3	1970
Community leaders (non-traditional) listen to the people	1.79	0.81	0	3	1992
Government or community leaders are:					
Responsible for keeping the community clean	0.25	0.43	0	1	1999
Responsible for managing schools	0.64	0.48	0	1	1999
Responsible for managing health centers	0.68	0.47	0	1	1999
Responsible for tax collection	0.92	0.27	0	1	1999
Responsible for resolving local conflict	0.87	0.34	0	1	1999
Responsible for allocating land	0.81	0.40	0	1	1999
Responsible for protecting rivers and forest	0.64	0.48	0	1	1999
Responsible for maintaining law and order	0.79	0.41	0	1	1999
The District Government's work in:					
Keeping the community clean	2.33	0.84	0	3	1762
Managing schools	2.40	0.82	0	3	1886
Managing health centers	2.28	0.91	0	3	1671
Tax collection	2.63	0.61	0	3	1735
Resolving local conflicts	2.57	0.68	0	3	1886
Allocating land	2.60	0.68	0	3	1705
Protecting rivers and forests	2.54	0.71	0	3	1623
Maintaining law and order	2.60	0.64	0	3	1898
Influence traditional leaders currently have on:					
Local community governance	3.28	0.79	1	4	1960
Influence of traditional leaders in the governance should:					
Increase, maintain or decrease	2.88	1.00	0	4	1934
Statement closer to respondent opinion:					
Community leaders should:					
1. Make decisions alone or					
2. Consult others before making decisions	3.57	1.04	0	4	1995
Leaders must:					
1. Help their own families or ethnic groups or					
2. Not favor their families or ethnic group	3.60	0.96	0	4	1997
Community decisions should be made by:					
1. Only those who are experts or					
2. All the people (including new residents)	2.25	1.82	0	4	1994
Leaders power time::					
1. No limits on how long leaders remain in power or					
2. Only for a fixed period	3.35	1.28	0	4	1988
Leaders should be:					
1. People whose family has lived in the area for a long time					
2. People that the majority of the community agrees with	2.73	1.73	0	4	1995
Community leaders elected by the community:					
Voting, consensus or nomination	0.96	0.20	0	1	1999

Table A7: Descriptive statistics: empowerment and education variables

Variables	Mean	SD	Min	Max	N
Empowerment variables					
Worked in the past 7 days	0.78	0.42	0	1	1999
Paid work in the past 7 days	0.24	0.42	0	1	1999
Main occupation: farmer in the machamba	0.82	0.39	0	1	1999
Respondent owns at least one machamba alone	0.54	0.50	0	1	1999
Respondent decides on at least one machamba	0.51	0.50	0	1	1975
Respondent decides on money from selling products	0.38	0.49	0	1	1806
Education variable					
Years of education	3.27	3.07	0	15	1998

Table A8: Descriptive statistics: Gender norms and women's autonomy variables

Variables	Mean	SD	Min	Max	N
Statement closer to respondent opinion:					
Gender of leaders:					
1. Only men should be a leader					
2. Women should be encouraged to become a leader	4.66	0.92	1	5	1997
Norms					
1: If a woman has power at home it means she takes it away from her husband	2.67	1.13	1	5	1953
2: Women's opinions are valuable and should always be considered when households decisions are made	3.42	0.92	1	5	1980
3: A woman should not be boss when the man is present	2.76	1.11	1	5	1968
4: A woman can make household decisions when the man is away for extended periods	3.49	0.89	1	5	1975
5: It is more important that a man goes to school than a woman	3.42	1.08	1	5	1980
6: Women and men should have equal decision power over their agricultural plots	3.44	0.92	1	5	1988
7: A man's job is to earn money; a woman's job is to to look after the home and children	2.66	1.02	1	5	1982
8: Women should have the same inheritance rights as men	3.16	0.96	1	5	1964