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Protecting the borrower: An experiment in colonial India ☆

Latika Chaudhary [a,*], Anand V. Swamy [b]

[a] Naval Postgraduate School, United States
[b] Williams College, United States

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ABSTRACT

We study the impact of the Deccan Agriculturists' Relief Act (DARA), a key legislation to protect debtors that was enacted in western colonial India. Using a panel dataset and a difference-in-difference estimation, we find a substantial short-run decline in mortgage-backed credit after the passage of DARA. The contraction in credit did not reduce cropped area or agricultural investments in bullocks and carts, but may have led to less intensive cultivation.

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1. Introduction

Researchers and policy-makers have long recognized the need to regulate credit markets, which when left to themselves can generate sub-optimal outcomes for a range of reasons. Lenders may restrict credit to borrowers who lack collateral because they cannot observe their actions or their types.[1] When legal systems are weak, lenders may also fear strategic default, i.e. situations in which borrowers do not repay, though they can. Borrowers may need protection too. Absent bankruptcy law, risk-averse low-income borrowers may not borrow for sound projects. Lenders may not practice due diligence and may give loans to potentially unproductive borrowers, or may even be predatory, deliberately deceiving them.[2] It is difficult to design rules to address all these concerns.[3]

This paper provides a historical perspective on these issues by studying the Dekhan Agriculturists Relief Act (DARA), a landmark credit market legislation passed in late 19th century western India. DARA is an important case study for three

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* Corresponding author.
E-mail addresses: lhartman@nps.edu (L. Chaudhary), anand.v.swamy@williams.edu (A.V. Swamy).

[1] Stiglitz and Weiss (1981) is a classic paper on the topic.

[2] See, for instance, Manove et al. (2001).

[3] For example, Barth et al. (2012) highlight the problem of regulation in contemporary United States. Calomiris and Haber (2014) study the evolution of banking institutions in Brazil, Britain, Canada, Mexico, and the United States. They discuss the role of regulation and how the interaction between political and banking institutions can co-opt regulation. In the historical context, Temin and Voth (2013) study usury laws, a form of credit market regulation to protect borrowers from high interest rates, and how they reduced credit in England.

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reasons. First, DARA was the first major policy designed to better regulate credit markets in colonial India. It heavily influenced similar laws passed in other parts of India in the 20th century.[4] Indeed, specific provisions of DARA, and certainly its spirit, have survived into 21st century India (Swamy, 2016). Second, there is an abundance of qualitative evidence on DARA allowing us to piece together the history leading up to the legislation and contemporary discussion on its impact. Third and finally, we have put together a detailed district-level dataset for twenty years straddling the legislation that allows us to evaluate the impact of DARA on credit market and agricultural outcomes. There is, as far as we know, no other such statistical work on credit markets in colonial India.

In the early 19th century, the British introduced fundamental changes in law and property rights in western India making it easier for creditors to recover their money in the event of default by borrowers. These changes expanded credit markets and led to some economic growth. But, by the 1850s British officials became concerned that predatory lenders were using the courts to expropriate land from uneducated peasants. A strong impetus to enact legislation came in 1875 when peasants rioted and attacked immigrant lenders in four districts in the Deccan (also known as Dekhan) region of the Bombay Presidency.[5] DARA was passed soon after in 1879 in the four districts where the riots occurred. It was subsequently expanded to districts in the Sind division (now in Pakistan) in 1901 and to the remaining fourteen districts of Bombay Presidency in 1905. We refer to these three regions as early-DARA, Sind, and late-DARA, respectively.

DARA's main goal was to slow down what colonial authorities perceived was a large-scale transfer of land from peasants to moneylenders. To this end the Act strengthened the legal position of borrowers in credit disputes. The most important provision of DARA allowed judges to go "behind the bond", i.e., to investigate the history of transactions and award the creditor less than the amount to which he was formally entitled on paper. This could reduce the amount of payment and delay payment to the creditor. Our reading of the historical documents suggests that judges did in fact reduce interest rates and repayments.

In our empirical analysis we study whether the extensions of DARA in 1901 and 1905 influenced credit and agricultural outcomes. We focus on the 1901 and 1905 extensions as opposed to the initial passage of the law in 1879 because detailed information on most outcomes was not collected until the 1890s. Using annual *Reports on the Administration of the Registration Department* and the *Agricultural Statistics of British India* among other data sources, we construct a new dataset on the 21 districts of Bombay Presidency from 1896 to 1916 including all the districts in early-DARA, Sind and late-DARA.[6] The data include registered mortgages and sales of land, total area under cultivation, livestock, ploughs, carts, population and rainfall. Together they provide a detailed picture of local economic conditions over twenty years.

Using these data, we estimate regressions where the dependent variables are, first, the amount of credit, and second, the economic variables – acreage, livestock, and carts. Our independent variables are population, rainfall and their respective squared terms (to account for non-linear relationships). We present the results for different samples: districts in all three regions; Sind and late-DARA districts; early-DARA and late-DARA; and early-DARA and Sind. We use a difference-in-difference setup for these four samples, exploiting the variation in the passage of DARA within districts over time. We also present simple before-after regressions studying late-DARA and Sind districts separately. Our preferred specification includes districts from Sind and late-DARA regions because we can exploit the variation in the passage of DARA in a standard difference-in-difference estimation. The analysis in which we include the early-DARA districts is non-standard, because DARA is in place in those districts throughout the period for which we have data.

Our main variable of interest is an indicator for DARA that takes the value 1 when the law is in place and 0 otherwise. The indicator is always 1 for districts where the law was initially enacted in 1879 (early-DARA). It turns from 0 to 1 in 1902 in the Sind districts (where the law was passed in 1901) and in 1906 in the late-DARA districts (where the law was enacted in 1905). We chose to turn on the DARA indicator the year after its introduction in order to allow for lags in implementation. If anything, this weakens our results because the effect of DARA seems to have been immediate. We also include district fixed effects to account for unobservable and time invariant district characteristics; year fixed effects to account for common macroeconomic shocks, and district specific time trends to account for unobservable district specific factors trending up or down that may bias the estimates on the DARA dummy.[7]

In line with expectations of British officials, and their subsequent commentary, we find DARA contracted formal credit. Registered mortgages declined after the legislation. The decline ranges from 25 to 40% across the range of specifications. We subject the finding on mortgage credit, which is central to this paper, to a series of robustness checks. As noted above, our preferred specification is the difference-in-difference with the two regions (late-DARA and Sind), but we find similar results using three regions (early-DARA, late-DARA and Sind) as well as simple before-and-after comparisons within late-DARA and Sind separately. We also change our dependent variable to mortgages per capita and cumulative borrowing over three years. The decline in mortgages appears to be robust.

We might expect that the credit market would eventually adjust to the new legal environment, perhaps with a change in the mix of lenders. Historians and official colonial commentary on DARA both allude to DARA shifting the mix of lenders to

[4] See Sivaswamy (1939).

[5] The Bombay Deccan refers to a division of Bombay Presidency comprising six districts. A province/presidency in colonial India comprised several divisions, which in turn had several districts. The remaining divisions of Bombay Presidency were Gujarat, Konkan, Karnatak, and Sind.

[6] The number of districts in Sind varied over time, as districts were reorganized. As we describe below, we construct three "super-districts" with unchanging boundaries, and follow them over time. Please see the map in Fig. 3 for a visual picture of these regions.

[7] The district fixed effect absorbs the DARA dummy in the districts where it always takes the value 1.

local richer peasants (Government of India, 1912). So we investigate the possibility that DARA contracted mortgage credit only temporarily by using different indicators to measure the short-run and long-run impact of DARA. We find that the negative impact of DARA is concentrated in the first six years after the legislation is passed. The coefficient on year 7 and beyond after DARA is small and statistically insignificant. This supports the hypothesis that DARA had a temporary impact.

Next, we investigate the impact of DARA on agriculture. Households needed credit for a variety of reasons, ranging from nutritional survival to marriages to critical production inputs. Similar to other agricultural economies, the most important productive asset in colonial India, besides land, was the bullock. At least one pair was needed for ploughing. Bullocks also pulled carts and provided manure. In theory, a credit squeeze could reduce their availability for at least three reasons: first, a household might be forced to sell them to finance other expenditure (for example a marriage); second, they might die because they were under-fed if households needed to borrow to feed bullocks; and third a household might not be able to buy a replacement when a bullock died.[8] A reduction in the number of bullocks could either reduce acreage or the intensity of cultivation.

We find mixed evidence of the impact of DARA on bullocks and cropped acreage. There is no statistically significant impact of DARA on total cropped acreage. We also do not find evidence of a decline in the number of bullocks and other productive assets such as ploughs and carts. But when we explore the data further, it appears that DARA leads to some decline in bullocks available per acre cultivated. It is possible that DARA's impact was on the intensity of cultivation, rather than the extent of cultivation. We are, however, cautious in drawing strong conclusions regarding the intensive margin results because we only observe the livestock data for four years and are unable to control for year fixed effects in these regressions.

Taken together our findings suggest a significant short-term credit contraction following DARA with at most a modest impact on other outcomes. These results match accounts in contemporary India where expansion of credit has not always improved agricultural outcomes (Cole, 2009). Our quantitative evidence in also in line with the views of many British officials who argued that lenders were still willing to lend for agricultural production after DARA, but were cutting back on consumption loans, such as those for expenditures on marriages and funerals. That said, an important caveat is that we only measure the impact of DARA on formal credit markets namely mortgages that were officially registered. As is common in poor countries today and in the past, there was a large informal credit market. Our analysis cannot speak to that market, though we provide some back-of-the-envelope calculations. Thus, the substantial short-term decline in mortgages we observe likely corresponded to a smaller decline in the overall supply of credit.

This paper relates to three different literatures. First, it relates to a growing body of empirical work on colonial India using new data and statistical methods such as Cassan (2015), Iyer (2010), Donaldson (forthcoming) and Gupta (2014). In this spirit, our paper is the first quantitative evaluation of DARA even though the legislation has been extensively discussed in the literature on colonial India (Catanach, 1970; Charlesworth, 1978; Fukazawa, 1984; Hardiman, 1996; Kranton and Swamy, 1999; Hall-Matthews, 2005; Kaiwar, 1994).

Second, our paper relates to a large literature in economic history on the regulation of credit markets (for example, Stock, 1984; Alson, 1984, and Rucker and Alston, 1987). Many studies have focused on the United States and India offers an interesting point of comparison. After a rise in US agricultural prices, which encouraged farmers to borrow, their sharp decline in the Great Depression left many farmers unable to repay and lenders began to seize land. Subsequent protests by farmers, especially in the Mid-west, lead many states to pass moratoria on foreclosures.[9] Alson (1984) and Rucker and Alston (1987) show that while these moratoria may have achieved their objective of reducing the incidence of foreclosure, they also restricted the availability of credit.

Third and finally, our paper relates to the large literature on legal origins. The seminal work in this literature is La Porta et al. (1998), which broadly argues that countries which imported British Common Law legal traditions did better than those that imported Civil Law traditions, especially from France. Our study of DARA illustrates the complexity of the process of importation of European legal tradition. Early British-Indian law likely gave too much power to the lender, in comparison to his usually illiterate borrower who was less capable of negotiating the formal legal procedures. By empowering the judge to act in favor of the borrower, DARA may have corrected this imbalance. Many British officials explicitly viewed this (and DARA more generally) as turning the clock back. By putting the borrower and lender on a similar footing, they argued, DARA was reverting back to conditions as they had been prior to British rule. In their minds, DARA was an explicit repudiation of some aspects of British legal tradition.[10]

The remainder of this paper is organized as follows. Section 2 describes the background history and the events leading up to DARA. Section 3 discusses the introduction of DARA in the four districts in 1879, its impact on the functioning of courts, early favorable evaluations, and its subsequent extension to Sind in 1901 and to the rest of the Bombay Presidency in 1905, Section 4 describes the data and Section 5 presents the results. In Section 6 we discuss the relationship between registered mortgage credit and aggregate credit. We conclude in Section 7.

[8] See Rosenzweig and Wolpin (1993) for a discussion of households using bullocks for consumption smoothing in post-independence India.

[9] On the relationship between foreclosure and protests, see Stock (1984) and Alston (1983).

[10] An alternative interpretation, suggested by a referee, is that DARA was one dimension of a broader turn from contract to equity in British governance of agrarian India. This is an intriguing and plausible idea, but one that needs elaboration in ways that would take us beyond the scope of this paper.

2. Institutional change: strengthening creditor rights

After the British conquest of the regions controlled by the Maratha Peshwa in 1818, the state immediately confronted a familiar task: how would it collect land taxes, its main source of revenue? It decided that, in principle, it would declare the actual cultivator of a piece of land its owner and make him liable for the tax. The government would seize the land if he failed to pay. The land was freely transferable. This arrangement was known as *raiyatwari*. It replaced pre-colonial arrangements in which land transfer did occur, but less easily.[11] If land was freely transferable it could be used as collateral for a loan or sold in order to repay debt.

Who would adjudicate a dispute between borrower and lender? In pre-colonial times it would have been a village council usually consisting of five people, known as panchayat. The panchayat's methods were informal, in the spirit of what Glaeser et al. (2003) have called the "neighbor" model. The panchayat also did not necessarily enforce its decisions. Instead the lender was permitted to use some coercion.[12] The first Commissioner of the Bombay Deccan wanted to preserve the panchayat as a judicial body, but this was not to be. Though Regulation VII of 1827, which laid the foundation of the new legal system, allowed a role for the panchayat, the vast majority of plaintiffs resorted to new civil courts located in administrative centers outside the village.[13]

The implications of this change depended on the identity of the lender. A resident rich-peasant lender might have been happy with the pre-colonial arrangement, since he might have good social capital in the village, especially with influential people who were on village councils. But, especially in relatively poor and dry areas, the lender was often an immigrant trader-lender. For instance, in the Bombay Deccan lenders were often Marwaris or Gujaratis, both immigrants from the north. These lenders were in a weak position in the village because they were outsiders.

The move from panchayat to civil court was to the immigrant lender's advantage (Kumar, 1965, 1968). But it was disadvantageous for the peasant-borrower. In the panchayat, his peers, who were likely to be sympathetic, judged the peasant-borrower. In contrast, in the district court the judge would know neither borrower nor lender. Also, panchayats seem to have practiced a version of limited liability.[14] These conditions did not hold in the civil court, in which procedures were more formal and there was greater reliance on written evidence. The 1827 Regulation did have some protections for the borrower in court: his implements and cattle could not be seized for loan repayment; annual interest rates could not exceed 12%; compound interest was permitted, but the old Hindu law of *Damdupat*, restricting interest accumulation to the amount of the principal, was retained. But it also allowed imprisonment for default on debt, a frightening prospect for the borrower.

The new civil courts worked quickly. The lenders won their cases most of the time, with many of the decisions being *ex-parte*, i.e. with the defendant absent. In the early British period agricultural growth was slow, partly because land taxes were set too high. However, after they were moderated agricultural growth picked up, and the decade of the 1850s, especially, was a good period. With the coming of the railways cotton began to be exported and cultivated area increased. Land was now a valuable commodity. Emboldened by the better options for loan recovery, immigrant lenders moved into the region in large numbers.

British officials now began to worry that the peasants were spendthrift and were borrowing too much. The following comment by Captain Wingate, Revenue Commissioner of Bombay and one of the architects of the land ownership and tax system (*raiyatwari*) summarizes the official view that emerged by mid-century:

> The facilities which the law affords for the realization of debt have expanded credit to a most hurtful extent . . . In addition to ordinary village bankers, a class of low usurers is fast springing up . . . (Government of India, 1876, p. 31.)

These concerns did not receive much attention in the 1850s when times were good. Indeed in 1855 the interest rate ceiling was repealed, following the abolition of usury laws in Britain.

In 1859, the Code of Civil Procedure was implemented across British India as part of a broad effort to generate uniformity. Under this Code, in addition to imprisonment, even cattle and implements could be attached. The Deccan Riots Commission (Government of India, 1876, p. 41) argued that, strictly interpreted, the Code of Civil Procedure would allow "the very clothes on the back of the unfortunate debtor" to be sold. The Deccan Riots Commission described the environment created by the Code of Civil Procedure as

> In order to recover a debt, it is obvious that resort can only be had to the property, present and future, of the debtor and to the labour of the debtor and his family. A law which allows an unlimited resort to all these means of recovery gives the greatest help to the creditor that it is physically possible to give. The law of India appears to be the only

[11] Guha (1985, p. 9) notes that in pre-colonial times the buyer of land "had acquired a member's share in a corporate body and not a separate and individual property, although aspects of that were also present since the exact location and area were also specified." Kaiwar (1994) notes "the colonial government introduced a measure of clarity to property rights, bringing them in line with European norms of a single owner for a particular piece of land."

[12] A common method was called *dharna*. The lender, or more likely his employee, would squat outside the borrower's house, thereby shaming him. In the period under study *dharna* also imposed an additional cost on the borrower: he had to pay for the meals of his tormentor.

[13] The Regulations created the Presidency-wide superior court, Sadar Diwani Adalat, District (Zillah) Courts, as well as the "Native Commissioners" to whom the district judge could assign cases involving smaller sums of money.

[14] Steele (1868) reports that the Panchayat gave awards "according to the debtor's circumstances". An earlier edition of this work was published in 1826.

> modern law which allows such unlimited resort, and we find that under it the debtor and his family are liable in person and property to an extent which is practically unlimited.

The pendulum had swung a long way in a short while: beginning with a pre-colonial environment in which the lender was at a disadvantage in front of a Panchayat, he was now apparently all-powerful in a court. It also appears that the sheer volume of cases eventually got to the point where judges perfunctorily ruled in favor of lenders. A.D. Pollen, a judge in Poona, described the situation before DARA was passed as follows:

> …I have been in courts where the Judge has disposed of fifty or sixty suits on bonds in about an hour. The Judge merely asked the defendant if the signature on the bond was his, and this being admitted, the judge would at once pass a decree, whether there was a defence or not.[15]

This was not a sustainable trajectory.

The house of cards collapsed when the economic situation deteriorated. Cotton, which had received a boost from the American Civil War, slumped after the war ended. Land taxes were sharply increased in the late 1860s. Peasants had borrowed heavily in the good times and tensions grew, as they defaulted and their land went to moneylenders, many immigrant. By the early 1870s lenders were reluctant to lend to already heavily leveraged peasants.

The contraction of credit, which peasants needed for payment of land taxes and other necessities, was the immediate provocation for riots that broke out in Poona and Ahmednagar districts in 1875. Peasants attacked moneylenders, mainly the immigrants, and tore up the records ("bonds") of their debt. Though the loss of life was quite small especially compared to present-day riots, British officialdom was greatly exercised.[16] The Raj was now in its conservative phase, after the rebellion of 1857, concerned that its rule would be threatened if it disrupted Indian society. The Deccan Riots Commission (DRC) was set up to investigate the riots and suggest policy changes. Its famous and detailed report laid the foundation for DARA.

3. The backlash: weakening creditor rights

3.1. *The Deccan Agriculturists' Relief Act, 1879*

The Deccan Riots Commission identified the legal system as the root of the problem. British policy (they argued) had been well intentioned but was inappropriate for the Deccan and DARA was a comprehensive effort to protect the debtor. Most significantly, it entitled the judge to go "behind the bond" in all cases, and insisted that he do so if the defendant challenged the claim:

> The Court shall, if the amount of the creditor's claim is disputed, enquire into the history and merits of the case, from the commencement of transactions between parties and the persons (if any) through whom they claim, out of which the suit has arisen, first with a view to ascertaining whether there is any defence to the suit on the ground of fraud, mistake, accident, undue influence, or otherwise… (Government of India, 1882, p. 368).

The court was permitted to proceed as above even if the debtor admitted the claim, "if it thought fit." Another important element of discretion was the interest rate: if the Court thought the rate agreed on by the two parties was "unreasonable," it could lower it (Government of India, 1882, p. 370, 14 (b)).

Under some circumstances it allowed payment in installments, with or without interest (Government of India, 1882, p. 371). If the court thought the defendant was unable to pay the full decree amount, it could "direct the payment of such portion of the same as it considers him able to pay, and grant a discharge from the balance" (Government of India, 1882, p. 371). Because DARA's central goal was to make the judge intervene actively in defense of the borrower, it strongly discouraged *ex-parte* decisions: "In every suit the court shall examine the defendant as a witness, unless, for reasons to be recorded by it in writing, it deems it unnecessary to do so" (Government of India, 1882, p. 367).

DARA also placed limits on the demands made on the debtor and the punishments that could be imposed on him: compound interest was banned and interest was not allowed to accumulate beyond the amount of the principal (Government of India, 1882, p. 369, 13 (g)); attempts to evade this restriction by combining interest and principal into a fresh loan were forbidden (Government of India, 1882, p. 369, 13 (d)); the debtor could not be arrested or imprisoned (Government of India, 1882, p. 372).

While the existing code allowed the debtor to apply for insolvency only after a decree was passed against him, DARA permitted this at any time, if the debt was more than fifty rupees. DARA also tried to reduce the level of fraud by requiring more documentation: courts would only recognize agreements recorded with Village Registrars (Government of India, 1882, p. 381, 56); agriculturists could ask for receipts of payments to their creditors, and could ask to have a passbook in which loans and repayments were recorded.

[15] See Deccan Relief Commission (Government of India, 1892, p. 22).

[16] Some historians think the British over-reacted, and that the scale and scope of the Deccan Riots was exaggerated. In a provocative paper Charlesworth (1972) referred to them as a "minor grain riot."

Table 1
Eligible cases disposed of in which past history was examined.

Year	Total number of eligible cases	Number contested	Number in which history was examined	Ratio of cases in which history was examined to all eligible cases (in %)	Ratio of cases in which history was examined to all eligible cases contested (in %)
1881	3096	1278	618	19.9	48.2
1882	5781	2766	1404	24.4	50.3
1883	6677	3136	1763	26.4	56.2
1884	7835	3412	1823	23.2	53.4
1885	9220	3833	2134	23.1	55.6
1886	8412	3327	1867	22.1	56.1
1887	5228	2038	1052	20.1	51.1
1888	4395	1831	852	19.3	46.4
1889	3344	1348	508	15.1	37.6
1890	3280	1335	547	16.9	40.9

Source: Deccan Relief Commission (Government of India, 1892, p. cxiii). Only cases involving "agriculturists" were eligible. The cases had to involve "money recovery" or mortgages. Suits for movable property, for instance, were excluded.

In this first incarnation DARA had provisions pertaining to documentation (as noted above), and local arbitration. These were ineffective, and were not always included when DARA was extended to other regions. The provisions of greatest practical import were in chapter 3, pertaining to discretion available to the judge to investigate the history of transactions (go "behind the bond"), adjust payments, allow payment in installments, allow early mortgage redemption, etc. These critical sections were extended to Sind in 1901 and to the remainder of the Bombay Presidency in 1905.[17]

While crafting the legislation British officials were explicit about their policy goal to turn back the clock. In a Minute dated August 30, 1878, the Governor of Bombay quoted what he called "pertinent observations" regarding DARA by an officer "well-versed in the actual working of the laws in the interior of the country" (Government of India 1882, p. 52.):

> The provision for the settlement of the amount due in cases of doubt upon equitable considerations and for reference to arbitration will, if adopted, simply lead to the matters in dispute being determined very much in the same way and by the same means they used to be settled before we introduced the complicated and unsuitable machinery of Civil Courts…

The hope was that after DARA disputes could be adjudicated as they once had been, before British rule.

3.2. Impact of DARA on legal process

Using various official reports on the working of DARA, Table 1 studies the impact of DARA on the courts. In cases pertaining to "money recovery" (i.e., loans) and suits for foreclosure and redemption in which the debtor was an agriculturist the judge examined the history of the transaction in roughly half of the cases when the defendant contested the claim. The incidence of *ex-parte* decisions was also lower in DARA court cases than in cases in other parts of Bombay Presidency; close to 6% in cases under DARA compared to roughly 36% in cases heard in non-DARA districts (Government of India, 1892, p. cix).

After DARA, judges also reduced the amount paid by agriculturists to creditors, compared to their claims. Figs. 1 and 2 illustrate this contrast by comparing court outcomes between DARA and non-DARA districts in 1899.[18] Fig. 1 shows the percentage of cases disposed in a Subordinate Court in each interest rate category for cases involving simple bonds. Judges allowed more than 24% interest only in 4% of cases in DARA districts; in contrast judges allowed more than 24% interest in 33% of cases in the control districts. Fig. 2 shows a similar pattern for cases involving mortgage bonds. In the DARA group the annual interest rate allowed was 12% or less in 81% of the cases, whereas this was true for only 35% of cases in the control group. In the courts at least, DARA was working as policymakers envisioned.

Some readers may wonder why DARA had such a large impact on the behavior of judges. Could it be that other complementary factors were also at work? By the late 19th century, British officialdom was unnerved by peasant protests in relation to land loss in various regions. There were proposals for legal intervention across British India.[19] The dominant official view was that the legal system was allowing lenders to exploit their unsophisticated clients. DARA translated this

[17] See Shingne and Phadke (1906, p. 8) for details regarding the extension of DARA to Sind and the rest of the Bombay Presidency. The only parts of DARA that were consequential were the sections empowering the judge, i.e. chapter 3. The Deccan Agriculturists' Relief Act Commission (Government of India 1912, p. 3), after summarizing the Act, commented: "Of the above-stated methods by which the objects of the Act were to be attained all except those consisting in action by the Courts have admittedly failed."

[18] These figures are based on the 1899 Annual Report, which compared the four DARA districts to a control group.

[19] In 1895 the Government of India wrote to the various provinces of British India asking if restrictions on land transfer were warranted. Its accompanying *Note on Land Transfer and Agricultural Indebtedness in India* pointed out that "proposals for the protection of the landed classes from the effects of debt" had been advanced in the North-Western Provinces in 1859 and 1872–73, in Punjab in 1870, in the Deccan in the mid-1870s, by the Famine Commission of 1879–80, by the Chief Commissioner of Central Provinces in 1874 and 1888, and in Burma, Bengal, Ajmer, Coorg, and Madras after 1890 (Government of India, 1895, pp. 1–2). Thus in every major province of India proposals to reduce land transfers were being evaluated.

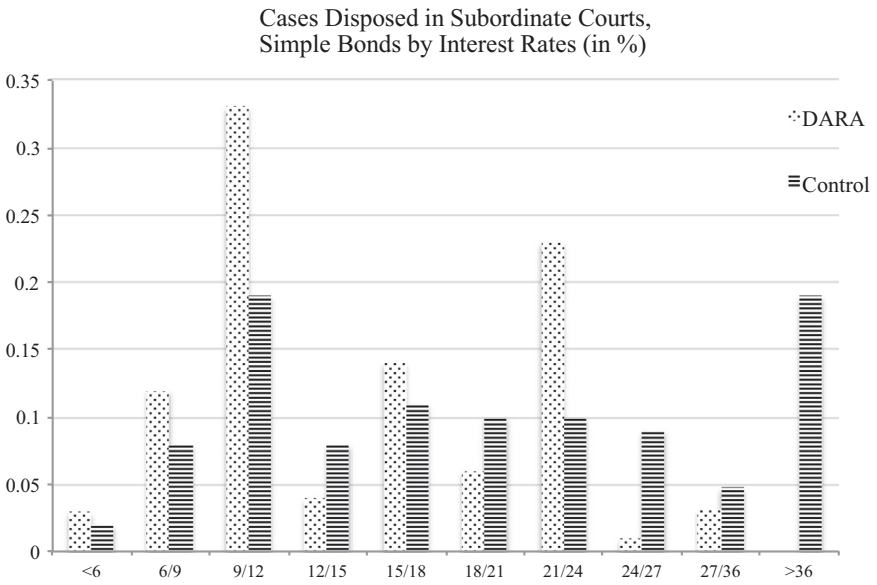

Fig. 1. Cases disposed in subordinate courts, simple bonds by interest rates (in %).

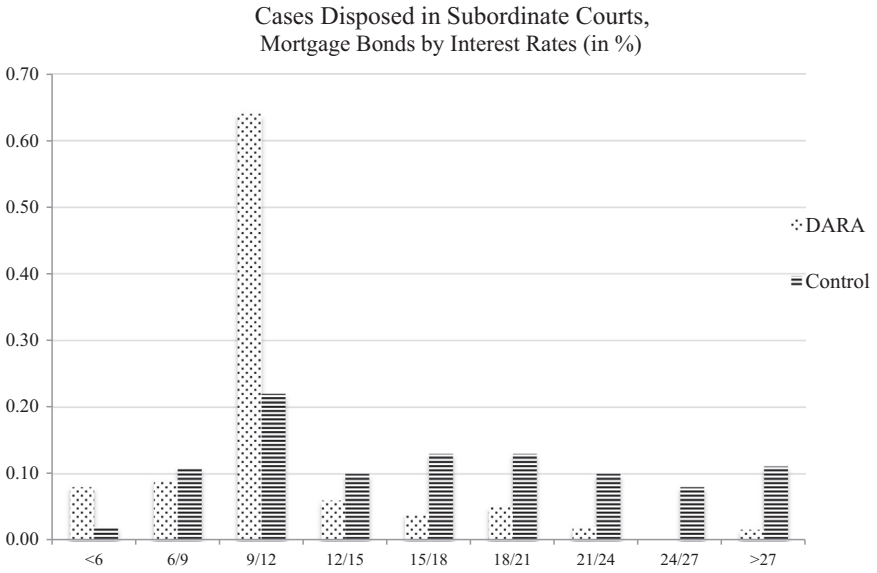

Fig. 2. Cases disposed in subordinate courts, mortgage bonds by interest rates (in %).

growing common sense into law, and allowed judges to act accordingly. The law packed a punch because it came in response to a changed understanding.

That said DARA had its critics, the harshest among them being Raymond West, a Bombay High Court judge. West argued that judges had been given too much discretion and both parties were more likely to lie because judges were inclined to pick a mid-point between the claims of lender and debtor (West, 1893, p. 711). Given the risks, he argued, lenders had become very cautious and had to "refuse credit in innumerable cases in which it could otherwise have been granted" (p. 711). Judges were also criticized for allowing payment in installments, without interest payments to compensate for the delay. This, it was argued, undermined lenders who had themselves borrowed (at interest) the money they had loaned.

One of West's criticisms came to be widely accepted: moneylenders were evading the law by disguising a loan with land as collateral as a sale, where the land would be repurchased by the original borrower at a later date. Charlesworth (1985, p. 178), quotes a British administrator writing in 1899, "The same ryot whose land was apparently sold for ever in 1880 may have full possession of it in 1885 and again borrow for a marriage and go through a mock sale in 1890, and so on." DARA was amended to address this problem, allowing courts to investigate such "spurious sales" (Lalbhai 1911, p. 385). Given the apparent pervasiveness of this subterfuge, we also examine sales as an outcome in our econometric exercise.

Table 2
Woodburn's difference-in-difference, 1888.

Dara	District	Percentage of land held by moneylenders 1876–77	1887–88	% Inc in Sales (value) over Rs. 100/Land Revenue from 1874/75 to 1875/76 average to 1887/88 total	% Inc in Mortgages (value) over Rs. 100/Land Revenue from 1874/75 to 1875/76 average to 1887/88 total
Yes	Poona	13.7	13.7	82	3
Yes	Ahmednagar	13.8	12.9	79	−7
Yes	Satara	5.2	6.4	60	−32
Yes	Sholapur	10.3	10	53	−29
DARA average		10.75	10.75	70	−17
No	Khandesh	8	10	198	97
No	Nasik	8.2	10.5	98	17
No	Ratnagiri	12.2	14.6	106	67
No	Thana	12.9	18.3	134	48
No	Bijapur	.	.	88	27
Comparison average		10.325	13.35	135	61

Source: Government of India (1897). Papers relating to the Deccan Agriculturists' Relief Act, 1875–94, Volumes I and II. Calcutta, Office of the Superintendent of Government Printing, India. Appendix E, form #4, p. 30, 78 and 126.

The critics notwithstanding, overall, the Government of Bombay came to view DARA favorably. The Commission of 1892 (Government of India, 1892), which interviewed peasants, moneylenders, and officials, came to the following conclusion (25):

> The Riots Commission foresaw that any limitation of the powers of recovering claims, or any obstacles in the way of unfair dealing, would inevitably lead to the restriction of business to its legitimate limits; the worst class of borrowers would be unable to borrow, while sound business would be unaffected. This expectation has been fulfilled…

The Government also marshaled quantitative evidence. It appointed an officer named A.F. Woodburn to investigate the working of DARA in the four districts where it was first introduced in 1879. To assist with his analysis, he was given a comparison group of neighboring districts.[20]

Table 2 summarizes Woodburn's main findings.[21] He argued that DARA had restricted land transfers between peasants and moneylenders, and slowed overall land transfers. The percentage of land held by Sahukars (moneylenders) rose in one of the four DARA districts, whereas it rose in all the comparison group districts. To show that land mortgages and sales were rising at a slower rate after DARA, Woodburn computed (a) the average value of sales divided by land tax revenue in 1874/75 and 1875/76 (before DARA); (b) the same number for 1887/87 (after DARA); (c) the percentage increase between (a) and (b). This figure (c) is reported in column (3) of Table 2. Column (4) reports the same calculation for mortgages. For sales the average percentage increase is greater in the comparison group compared to DARA: 135 versus 70. For mortgages the average increase in the comparison group is 61, compared to −17 for DARA.

Woodburn also looked at data on cattle arguing they were the "most valuable evidence of the condition of the peasantry" (p. 26). He found no clear patterns in livestock between DARA and the comparison districts. While bullocks and cows increased by a larger percentage in the comparison districts, buffaloes, sheep and goats, and carts increased by a larger percentage in the DARA districts. Woodburn's analysis suggests that even if DARA reduced credit (at least as reflected in land mortgages and sales of land) it did not hurt agricultural outcomes.

By the mid-1890s concerns about credit and land transfer were no longer regional issues and had become a major policy concern for the Government of India. In 1895 the Government of India sought the opinion of various provincial governments on the desirability of taking measures to reduce land transfer (see footnote 19). It was in this environment that DARA was extended to other parts of Bombay Presidency, first to Sind and then to the rest.

The storyline in Sind, as told by British officials, was the same as in Bombay Deccan: lenders were predatory and the peasants were simple-minded and in need of protection.[22] Compared to the Deccan, there were two additional causes for worry. First, borrowers were Muslim and the lenders Hindu, a potentially salient fault line. Second, Sind was close to the politically sensitive and turbulent border region of Baluchistan. Indeed, many local officials preferred a stronger measure along the lines of the Punjab Land Alienation Act, but this was at odds with Bombay's *raiyatwari* system that allowed unrestricted land transfer (Cheesman, 1997, p. 211). [23] As a compromise, the key provisions of DARA were extended to Sind in 1901. Officials in the rest of Bombay Presidency had differing views on the desirability of extending DARA to their districts.

[20] The comparison group of districts was adjoining the original DARA districts.
[21] The report is reproduced in Government of India (1897), p. 12–86.
[22] Cheesman (1997, p. 163) suggests British officials in Sind imported European anti-semitism: the "cunning" lender was the "eastern Shylock" able to "swindle the dull peasant."
[23] In Punjab, the Raj took a more radical step, prohibiting transfers of land from peasants to "non-agriculturists" under The Punjab Land Alienation Act of 1900. The Deccan and Punjab Acts influenced a series of subsequent interventions over the next few decades. Sivaswamy (1939, p. 386–90) provides a list.

Some thought the peasant needed protection but others argued that DARA would needlessly restrict credit and hurt economic outcomes.[24] The views of the Government of India prevailed and DARA was extended to the entire Bombay Presidency in 1905. This staggered introduction of DARA allows us to investigate the competing views of its potential impact using econometric techniques. We now turn to this task.

4. Data and methodology

4.1. Data

To evaluate the legislation we constructed a district-level data set for Bombay Presidency using multiple historical sources from 1896 to 1916. Unfortunately, we are unable to econometrically study the first DARA introduction in 1879 because there are no comprehensive economic or population data for that period. We begin in the late 1890s exploiting the introduction of DARA in Sind in 1901 and in the rest of Bombay presidency in 1905. Fig. 3 is a map of colonial India showing the four districts where DARA was introduced in 1879 (early-DARA), the Sind districts where it was introduced in 1901 and the remaining districts of Bombay presidency (late-DARA) where it was introduced in 1905.

We follow a panel of 21 districts for 21 years covering the pre- and post-DARA period. With the exception of Sind districts, there are no major changes in district boundaries.[25] Sind begins with five districts in 1896, but Shikarpur district is divided into two districts (Sukkur and Larkhana) in 1901 using portions of Karachi district. Another new district Nawabshah is created in 1913 from Hyderabad and Thar and Parkar districts. In line with Kumar and Somanathan's (2009) methodology for creating Indian district-level panels for the 1971–2001 period, we constructed super districts for Sind that follow consistent geographic units but do not correspond to a single administrative district.[26]

Using the annual *Report on the Administration of the Registration Department in the Bombay Presidency*, (Bombay (Presidency), 1896–1916). we constructed the number of mortgages and sales from 1896 to 1916. These data were not collected in 1912 and 1914. Initially the *Reports* counted the number of mortgages and sales, but beginning in 1903 they began recording the monetary value of mortgages and sales. We present results only for the number of registered documents, because we observe the value of mortgages before the passage of DARA only for the late-DARA districts, and that too for only three years. The correlation between the number and value of sales and mortgages is high when they are jointly reported (0.8 for mortgages and 0.9 for sales).

These *Reports* record documents that had to be registered (compulsory registration), and those that did not (optional registration). In the case of the latter, it was up to the parties concerned to register their documents. During our period of study, there were changes to what documents had to be registered; for example, mortgage deeds under rupees 100 came under compulsory registration only in 1904. Sale and mortgage deeds over rupees 100 were under compulsory registration for the entire period. We focus on sales and mortgages over rupees 100 because they are consistently reported over time and numerically the more important category.[27] We discuss the appropriateness of this choice in detail in Section 6.

To measure agricultural outcomes, we used the annual *Agricultural Statistics of British India* (India, 1896–1916) that report total cropped area, livestock, ploughs and carts for each district. The livestock, plough and cart series are reported sporadically unlike the annual acreage series.[28] Though data on yields are available, they are unreliable (Heston, 1973, 1978) and we have chosen not to use them.

We collected information on rainfall from McAlpin (1983) the *District Gazetteers* for Sind and *Rainfall of India* (Government of India, Meteorological Department, 1896–1916). District population is another important control in our analysis. We used the 1891 Census of India combined with the *Annual Report of the Sanitary Commissioner for the Government of Bombay* (Bombay (Presidency), 1896–1916) to construct annual population for each district. Beginning with the census population of each district in 1891 we added births and subtracted deaths in each year from the *Sanitary Reports* to generate an annual population series for 1896 to 1916. One could also use the decennial census from 1891 to 1921 and create a linearly interpolated population series. The correlation between the interpolated and vital statistics series is very high (0.98), but we chose to use the constructed series because it better captures annual fluctuations in population. That said our results are robust to the choice of population series.

Table 3 presents the summary statistics. The average district population was around 880,000 with substantial variation across districts. Rainfall averaged 39 in. in our period of study with some districts receiving as low as 0.8 in. and others as high as 144. A higher number of sales than mortgages were registered. The total area cropped averaged 1.3 million acres per

[24] See Government of Bombay (1904).

[25] In 1906 the district of Khandesh is divided into East and West Khandesh. We aggregate the data for the two districts from 1907 to 1916 and follow the undivided district in our panel.

[26] For example, we aggregate the information on Karachi and Shikarpur up to 1900, and then Karachi, Sukkur and Larkana from 1901 to 1916 following this aggregate unit in our panel. Because of the aggregation our panel follows three districts in Sind namely Upper Sind Frontier (no border change), Karachi and Shikarpur (Karachi, Sukkur and Larkana after 1900), and Hyderabad and Thar and Parkar (Hyderabad, Thar and Parkar and Nawabshah after 1913).

[27] In the years after 1910 the series report sales and mortgages both over and under rupees 100. In these years, the series over rupees 100 account for 77% of the total series on average for both sales and mortgages.

[28] The data are reported separately for Sind and the rest of Bombay Presidency, and the years do not always overlap. The data are reported for the same years for Sind and the rest of Bombay Presidency in 1900, 1906, 1910 and 1916

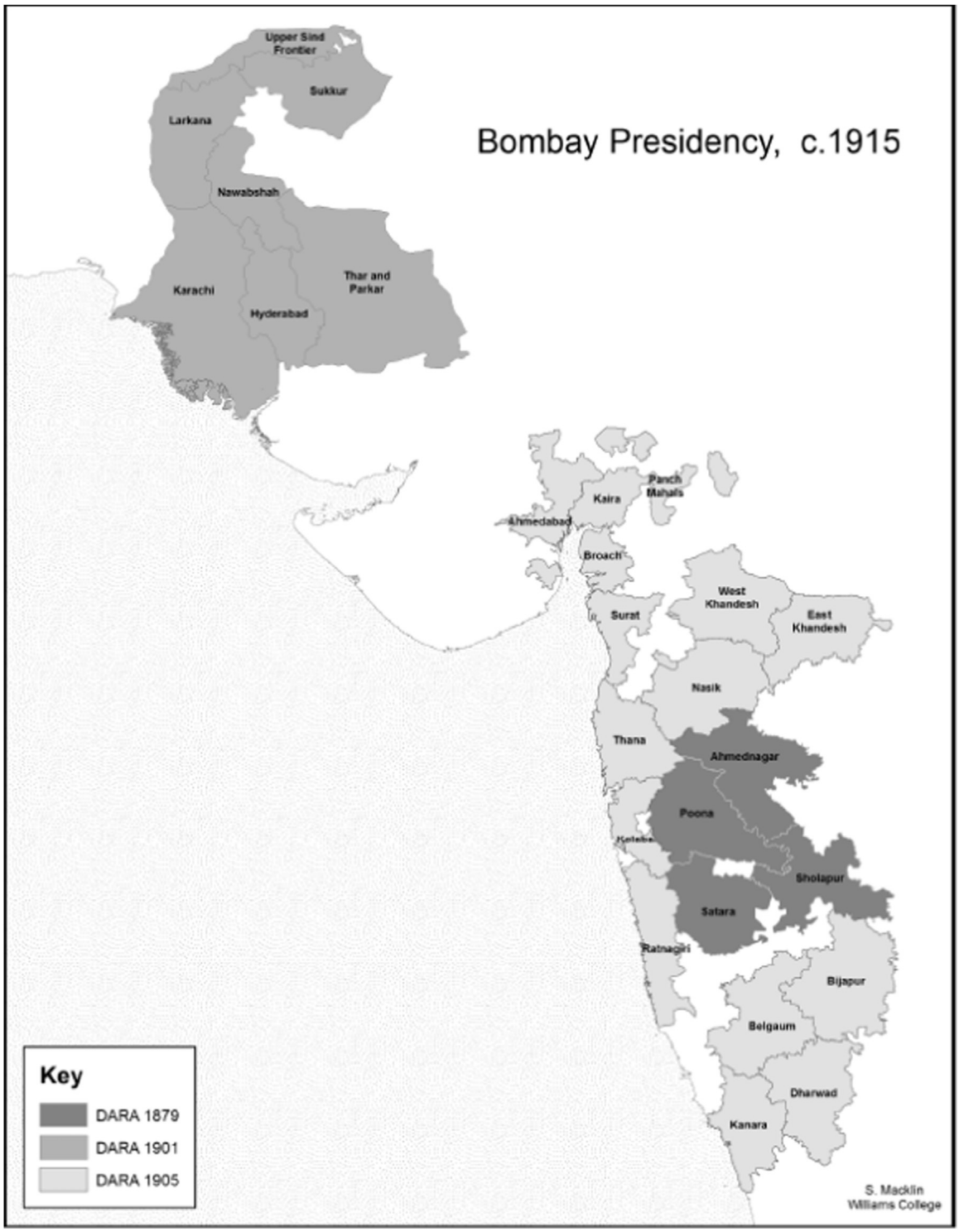

Fig. 3. Bombay Presidency, c.1915.

district. Within livestock we focus on bulls and bullocks that accounted for 22% of total livestock. Other livestock included cows, sheep and goats, among other animals.

Fig. 4 plots the number of loans above 100 rupees. The three lines represent the averages across districts for our regions, early-DARA, late-DARA, and Sind. DARA is always in place (in our sample period) in the early-DARA regions, so we have only two regions (17 districts) where DARA switches from zero to one. In the first switch DARA is introduced in Sind in 1901, and

Table 3
Summary statistics.

	N	Mean	Std dev	Min	Max
Population	441	880,620	384,543	237,949	1,765,839
Average rainfall (year *t* and *t-1*)	441	38.8	30.1	0.8	144.0
No. mortgages (over Rs. 100)	399	2,637	1,965	156	10,971
No. sales (over Rs. 100)	399	3,191	2,444	245	15,640
Total area cropped (in acres)	441	1,344,269	910,136	104,005	3,928,472
Livestock	84	703,472	442,529	103,157	2,215,216
Bullocks	84	154,597	80,812	33,885	394,982
Ploughs	84	59,984	29,966	13,261	140,881
Carts	84	27,251	24,117	1132	135,437

Sources: Please see text for data sources. The data cover 21 districts for the years 1895/96 to 1915/16. The data on sales and mortgages are unreported for 1912 and 1914. The livestock and implements data cover cross-sections where we have complete data for all the districts in Bombay Presidency: 1899/1900, 1905/06, 1909/10 and 1915/16.

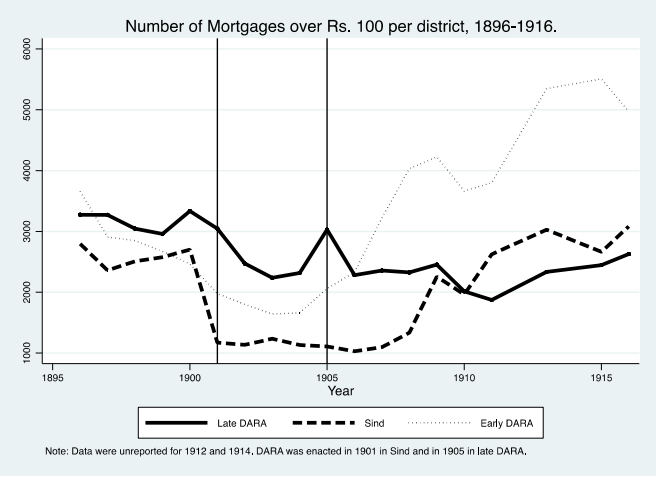

Fig. 4. Number of mortgages over Rs. 100 per district, 1896–1916.

mortgage lending falls sharply. Mortgage lending also falls in the other two regions, but not nearly as much. In the second switch, when DARA is introduced in the late-DARA districts in 1905, mortgage lending falls. But, mortgage lending rises in both the other regions. In interpreting these graphs it is useful to remember that Sind is not contiguous with early-DARA or late-DARA districts. This suggests that comparisons between Sind and other regions are less likely to be contaminated by spillovers.

This graph of course also reflects broader trends in the economy. The downward trend in borrowing in the first few years of the graph is probably on account of several bad years and eventually the 1899 famine. Sind was an arid region so rainfall shocks were less of a concern here compared to other regions. According to the *Report on the Administration of the Bombay Presidency for 1900–01*: "The misfortunes which have attended the Bombay Presidency during the concluding years of the XIXth century culminated during the year 1899–1900 in a famine of unprecedented severity, accompanied by an outbreak of the plague, the mortality due to which has only once been exceeded (Government of Bombay, 1901)." This was a period in which population declined, cattle died, and cropped area declined. It is not surprising that the number of mortgages registered declined, because lenders would be reluctant to lend in bad times. It is possible, of course, the borrowers might be more eager to borrow in downturns, but we find it plausible that credit is pro-cyclical.

After 1901, though the rains did periodically fail, famine-related mortality was markedly lower. Fig. 5 shows that rainfall continued to fluctuate across the three regions. However, famine-related deaths declined (McAlpin, 1983).[29] The decline in

[29] According to McAlpin, famine-related deaths per thousand peaked in 1900 at 37.9 then declined to 9 and 1.2 respectively in 1901 and 1902. By 1913 the number was at 0.2.

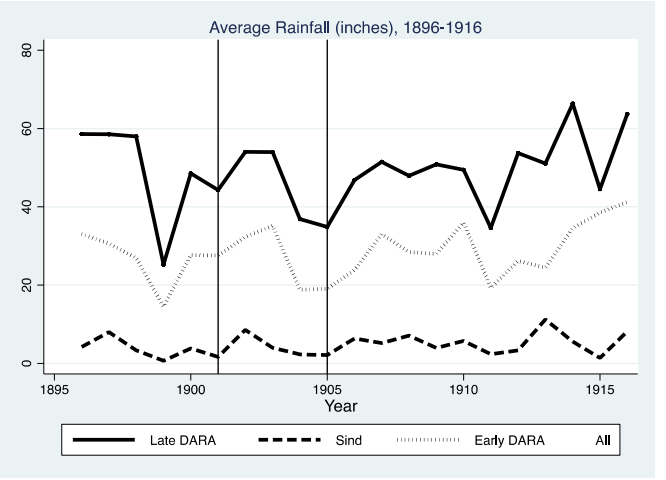

Fig. 5. Average rainfall (inches), 1896–1916.

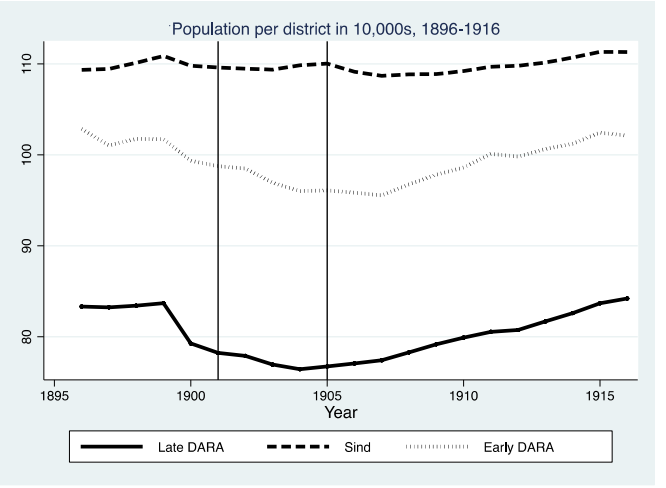

Fig. 6. Population per district in 10,000s, 1896–1916.

famine-related deaths allowed population to recover and grow, as Fig. 6 shows. More importantly, the Indian economy as measured by real national income shown in Fig. 7 also moved to an upward trajectory from 1900 onwards, the period for which we have data from Sivasubramanian (1997). Given this uptick in national income in the broader macro-economy, it is not surprising that the volume of credit in Bombay Presidency increased. We now turn to the formal econometric analysis.

4.2. Empirical strategy

To identify the effects of DARA, we estimate the following regressions:

$$Y_{it} = \alpha_i + \delta_t + \beta \text{DARA}_{it} + \lambda_i * Trend + \psi X_{it} + \varepsilon_{it}$$

Y_{it} is an outcome in district i in year t. The district fixed effects, α_i, control for unobservable time-invariant characteristics of districts and year fixed effects, δ_t, control for temporal changes that influence all districts in the same manner. In addition, we include district time trends to control for district-specific changes over time due to factors we cannot observe. $DARA_{it}$ is an indicator, which turns to one when DARA is in place and is zero otherwise.

Our preferred specification focuses only on the Sind and late-DARA regions because it is a standard difference-in-difference approach as described in Angrist and Pischke (2015), p. 198–199.[30] The vector, X_{it}, includes controls such as average rainfall in the current year and year before, average rainfall-squared, population and population-squared. We averaged the

[30] As noted earlier, when we add the early-DARA districts, the set-up is non-standard because the DARA dummy in the early-DARA districts always takes the value 1, and any impact of DARA has already been absorbed in the intercept of these districts.

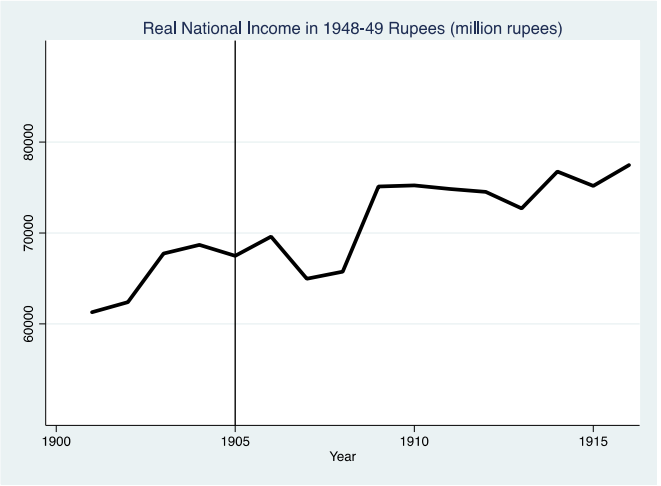

Fig. 7. Real national income in 1948–49 rupees (million rupees).

Table 4
Impact of DARA on credit market outcomes.

	(1)	(2)	(3)	(4)	(5)	(6)
	Late DARA, Sind	Early DARA, Late DARA, Sind	Early DARA, Late DARA	Early DARA, Sind	Late DARA only	Sind only
Panel A: Log number of mortgages over Rs. 100						
DARA	−0.502***	−0.565***	−0.799***	−0.057	−0.179**	−0.774*
	[0.086]	[0.104]	[0.106]	[0.100]	[0.083]	[0.261]
Panel B: Log number of sales over Rs. 100						
DARA	0.023	0.065	0.101	0.160**	0.298***	−0.146**
	[0.068]	[0.052]	[0.065]	[0.052]	[0.060]	[0.025]
Observations	323	399	342	133	266	57
#Districts	17	21	18	7	14	3
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No	No
District-trends	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at the district level in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
We include controls for average rainfall, average rainfall squared, population and population squared. The data cover years 1896–1916. The data are missing for 1912 & 1914.

district rainfall over the two years because rainfall is more important for sowing that occurs earlier in the agricultural season, in the previous calendar year.

In regressions where we have data for a smaller number of years such as for livestock and implements, we replaced the year fixed effects and district-specific trends with separate trends for early-DARA, late-DARA and Sind districts. Due to multi-collinearity we cannot include the DARA indicator and year fixed effects together in these regressions.

To address concerns of serial correlation, we cluster the standard errors at the district-level. We are identifying the effects of the Act by examining its introduction in Sind in 1901, and in the late-DARA districts in 1905. While this is our preferred specification because it is the standard difference-in-difference estimation, we also present results using early-DARA, late-DARA and Sind, early-DARA and late-DARA, and early-DARA and Sind.

An important concern with identifying the effects of such legal changes is that legislation is normally preceded by a few years of 'discussion' before it is implemented. There could be anticipation effects even before the legislation is passed. To test for such anticipation effects, we include a pre-DARA dummy for the 3 years before DARA is passed. We also test for potential differences between the short-run and long-run effects of DARA by including dummies for different short and long run windows. We explain the construction of these variables below.

5. Results

The main results of the paper are in panel A of Table 4. Our preferred specification is column (1), where we use the data from the two regions where the law was introduced in 1901 and 1905 respectively. The introduction of DARA reduces the number of registered mortgage backed loans by roughly 50 log points, or 40% (exponent $(-0.502) - 1 = -0.394$). In the remaining columns we show results with all the available combinations of the three regions, and before-and-after results for late-DARA and Sind regions. The DARA coefficient is negative and significant in all cases except column (4), in which we have data for only seven districts (four from early-DARA and the three Sind districts).

In panel B we ask whether sales went up when DARA was introduced – as mentioned earlier, many officials argued that DARA led to loans being disguised as sales. From 1907 judges were also asked to further investigate such spurious sales (Catanach 1970, p. 93). There is some evidence for DARA increasing sales, but it is not robust. While the coefficient is positive in columns (4) and (5), we are cautious in drawing strong conclusions because these specifications do not exploit the variation within late-DARA districts (in the case of column (4)) and do not control for broader macro-economic trends (as in the case of column (5)), the simple before-after regression of late-DARA districts). In particular, we do not see a significant coefficient in our preferred specification (column 1).

Table 5 subjects our findings regarding DARA's negative impact on mortgage-backed credit to three robustness checks. In panel A we drop the controls (population, rainfall and their squared terms) and obtain similar results. Indeed, the coefficient hardly changes in our preferred specification (now -0.471 log points, compared to -0.502 log points with controls), as well as the others. The same is true in panel B, where we use log of mortgages per capita as our dependent variable. In panel C our dependent variable is the cumulative number of mortgages in the current year and the previous two. This should help smooth fluctuations to the extent our data are noisy. The downside is we now have fewer observations because we lose years 1896 and 1897.

It is striking to see very similar coefficients in the three difference-in-difference specifications, just above a 25% decline in mortgage-backed credit on the low end (Panel C, column (1)). This magnitude is far from trivial, although the coefficients are smaller than in our previous specifications. There is one positive though highly insignificant coefficient, in column (5), in the before-and-after for the late-DARA districts only. DARA was introduced in 1905 in the late-DARA districts and, as we have argued above, these were good economic times. The before-and-after regression cannot, of course, include year effects, so the DARA dummy will pick up the change in the macroeconomic conditions. Putting our results together, a reasonable estimate is that DARA reduced our measure of mortgage backed credit by somewhere in the 25 to 40% range.

As we have mentioned earlier it is possible that DARA's impact, in terms of contracting registered mortgage credit, was temporary. The credit market might eventually have adjusted with, for instance, the mix of lenders changing as suggested by historical commentary in the Deccan Agriculturists' Relief Commission Report (Government of India, 1912). We test for this in Table 6, using data from late-DARA and Sind, our preferred specification. Here, instead of a single DARA dummy we use two

Table 5
Impact of DARA on mortgage credit, robustness checks.

	(1)	(2)	(3)	(4)	(5)	(6)
	Late DARA, Sind	Early DARA, Late DARA, Sind	Early DARA. Late DARA	Early DARA, Sind	Late DARA only	Sind only
Panel A: Log number of mortgages over Rs. 100 - No controls						
DARA	−0.471***	−0.539***	−0.756***	−0.176	−0.154*	−0.836*
	[0.075]	[0.089]	[0.111]	[0.192]	[0.085]	[0.196]
Observations	323	399	342	133	266	57
#Districts	17	21	18	7	14	3
Panel B: Log number of mortgages per-capita						
DARA	−0.535***	−0.587***	−0.793***	−0.217	−0.180**	−0.834*
	(0.074)	(0.085)	(0.104)	(0.170)	(0.081)	(0.238)
Observations	323	399	342	133	266	57
#Districts	17	21	18	7	14	3
Panel C: Log cumulative number of mortgages over last three years						
DARA	−0.307***	−0.271***	−0.294***	0.071	0.012	−0.728*
	(0.079)	(0.072)	(0.077)	(0.088)	(0.060)	(0.217)
Observations	289	357	306	119	238	51
#Districts	17	21	18	7	14	3
District FE, D. Trend	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No	No

Notes: Robust standard errors clustered at the district level in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
The data cover years 1896–1916, with the data being unreported for 1912 & 1914. In Panel A we only include the fixed effects and trends, but do not include controls for population or rainfall. In Panel B we include controls for rainfall and rainfall squared. In Panel C we include the average rainfall over the past 3 years and its square plus the average population over the last three years and its square as controls. Since 1912 and 1914 are missing, we calculate the cumulative mortgages for the past three years for 1913 for example as the sum of 1913, 1911 and 1910.

Table 6
Dynamics of DARA on mortgage credit, late DARA and Sind comparison.

	(1)	(2)	(3)	(4)	(5)	(6)
	Short=Years 1–3 Long = 4+	Short = 1 to 4 Long = 5+	Short = 1 to 5 Long = 6+	Short = 1 to 6 Long = 7+	Short = 1 to 7 Long = 8+	Short = 1 to 8 Long = 9+
Panel A: Log number of mortgages over Rs. 100, Post-DARA dynamics						
DARA, Short run	−0.509***	−0.644***	−0.549***	−0.452***	−0.439***	−0.435***
	[0.075]	[0.104]	[0.105]	[0.101]	[0.093]	[0.085]
DARA, Long run	−1.046***	−1.080***	_0 719***	−0.250	−0.069	0.058
	[0.159]	[0.218]	[0.219]	[0.187]	[0.151]	[0.096]
Panel B: Log number of mortgages over Rs. 100, pre and post-DARA dynamics						
PreDARA (Year −2, −1, 0)	−0.261***	−0.204***	−0.117**	−0.050	−0.045	−0.057
	[0.053]	[0.048]	[0.051]	[0.054]	[0.057]	[0.060]
DARA, Short run	−0.784***	−0.873***	−0.678***	−0.506***	−0.487***	−0.495***
	[0.100]	[0.119]	[0.118]	[0.114]	[0.105]	[0.100]
DARA, Long run	−1.389***	−1.359***	−0.870***	−0.312	−0.122	−0.006
	[0.179]	[0.224]	[0.219]	[0.180]	[0.137]	[0.099]
Observations	323	323	323	323	323	323
#Districts	17	17	17	17	17	17
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District-trends	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors clustered at the district level in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
We include controls for average rainfall, average rainfall squared, population and population squared. The data cover years 1896–1916. The data are missing for 1912 & 1914.

indicators: DARA short-run and DARA long-run. In column (1) of Table 6, DARA-short-run takes the value 1 for years 1–3 after DARA is introduced (and 0 otherwise), whereas DARA long-run takes the value 1 for years 4 and beyond after DARA was introduced (and 0 otherwise). In panel A column (1) we see that coefficients on both dummies are negative and significant.

We then change the definition of DARA short-run and DARA long-run, such that the switch from short-run to long-run occurs later, in years 5, 6, 7, and 8, and 9, in columns (2), (3), (4), (5), and (6) respectively. The DARA-long-run coefficient steadily decreases in size and is essentially zero in column (6). Thus, the evidence is consistent with DARA's effect being temporary. In Panel B of Table 6 we conduct a similar analysis, but now allow for anticipation effects. Again, the evidence is consistent with DARA's effect being temporary.

We now turn to agricultural outcomes. In Table 7 we do not see any evidence that DARA reduced investment in livestock, including the all-important bullocks, ploughs, or carts. We do not show the before-after results for Sind districts alone because we only have 12 observations in that case. In panel A of Table 8 we look at total cropped acreage. Again, we do not see any clear evidence of a decline in total cropped acreage.

These results pertaining to acreage and livestock are somewhat surprising, because our econometric evidence suggests that credit contracted, even if temporarily. Also, as we will discuss below, there was consensus among British officialdom that DARA had reduced the availability of credit. One explanation for this, which was repeatedly offered by British officials, was that credit for productive activity did not shrink. As the Deccan Agriculturists' Relief Act Commission (Government of India, 1892, p. 24) put it, only “unsound credit” had shrunk. Two decades later a district officer in Bombay made exactly this argument when he told the Deccan Relief Commission of 1912 (Government of India, 1912, p. 75): “The Act has restricted [the] agriculturist's borrowing power, but not so that a good agriculturist cannot get what he wants for cultivation.”

Still, because it is somewhat counter-intuitive that a credit squeeze would have no impact on any production decision, we consider another possibility in panel B of Table 8: DARA might have reduced the capital intensity of cultivation, in particular the (log of) the ratio of bullocks to cropped area. In our preferred specification (column 1), the coefficient is quite large, −0.2338 log points, which is approximately a 20% reduction. This is not very precisely estimated and is significant only at the 10% level. The 95% confidence interval confidence includes the number −0.004, which is only a 0.4% decline. While it suggests intensity of the cultivation may have declined, the findings are not conclusive. We also need to be cautious because, as noted before, we only observe the livestock data for four years, and are unable to control for year fixed effects in these regressions.

6. Registered mortgage credit and aggregate credit

Overall, we do not find a large negative impact of DARA on agricultural outcomes despite a credit decline in the short run. But our econometric evidence has only looked at a portion of the credit market, mortgage credit, and in particular at loans

Table 7
Impact of DARA on livestock and productive assets.

	(1)	(2)	(3)	(4)	(5)
	Late DARA Sind	Early DARA, Late DARA, Sind	Early DARA, Late DARA,	Early DARA, Sind	Late DARA only
Panel A: Log number of livestock					
DARA	0.1395	0.1374	0.1811	−0.1056	0.1857
	[0.1270]	[0.1154]	[0.1443]	[0.0987]	[0.1599]
Panel B: Log number of bulls and bullocks					
DARA	0.0913	0.0944	0.1183	−0.0183	0.1154
	[0.0840]	[0.0767]	[0.0955]	[0.0572]	[0.1056]
Panel C: Log number of ploughs					
DARA	0.0985	0.0944	0.1049	−0.0112	0.1105
	[0.0803]	[0.0734]	[0.0932]	[0.0653]	[0.1027]
Panel D: Log number of carts					
DARA	0.0343	0.0257	0.0382	−0.0404	0.0497
	[0.0423]	[0.0426]	[0.0392]	[0.1484]	[0.0373]
District FE	Yes	Yes	Yes	Yes	Yes
Early DARA trend	No	Yes	Yes	Yes	No
Late DARA trend	Yes	Yes	Yes	No	Yes
Sind trend	Yes	Yes	No	Yes	No
Observations	68	84	72	28	56
#Districts	17	21	18	7	14

Notes: Robust standard errors clustered at the district level in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
We use the following years of data when the livestock information was reported in the Agricultural Statistics of India: 1899/1900, 1905/06, 1909/10 and 1915/16. We include controls for average rainfall, average rainfall squared, population and population squared. Early DARA, Late DARA and Sind trends refer to separate time trends for the districts where DARA was introduced in 1879, in 1905 and 1901 respectively.

Table 8
Impact of DARA on cropped acreage.

	(1)	(2)	(3)	(4)	(5)	(6)
	Late DARA, Sind	DARA, Late DARA, Sind	Early DARA, Late DARA	Early DARA, Sind	Late DARA only	Sind only
Panel A: Log of total cropped acreage						
DARA	−0.091	−0.040	0.050	−0.154*	0.024	0.072
	[0.082]	[0.069]	[0.057]	[0.069]	[0.042]	[0.067]
Observations	357	441	378	147	294	63
#Districts	17	21	18	7	14	3
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	No	No
District-trends	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: Log of bullocks/total cropped area						
DARA	−0.2338*	−0.2274*	−0.1832	−0.3865***	−0.1901	
	[0.1237]	[0.1140]	[0.1393]	[0.1041]	[0.1529]	
Observations	68	84	72	28	56	
#Districts	17	21	18	7	14	
District FE	Yes	Yes	Yes	Yes	Yes	
Early DARA trend	No	Yes	Yes	Yes	No	
Late DARA Trend	Yes	Yes	Yes	No	Yes	
Sind Trend	Yes	Yes	No	Yes	No	

Notes: Robust standard errors clustered at the district level in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
In both panels, we include controls for average rainfall, average rainfall squared, population and population squared. The data cover years 1896–1916 in Panel A and the following cross-sections in Panel B: 1899/1900, 1905/06, 1909/10 and 1915/16.

above 100 rupees in size. This could be problematic for two reasons. First, one may worry that a 100-rupee mortgage is an unusually large loan, not representative of typical credit market transactions. Second, it is possible that the informal credit, may, even in the short run, have fully expanded to compensate for the decline in mortgage credit. In particular, mortgage-backed lending by immigrant trader-lenders may have been replaced by informal (undocumented) credit provided by rich peasants. We address each of these concerns below.

6.1. Loan size: was a hundred rupee mortgage unusually large?

A loan of 100 rupees or more was not unusually large. As noted in footnote 27, we have data from 1910 onwards for mortgages both above and below 100 rupees. The former are 77% of the total and would be an even larger percentage in value. Several additional pieces of information also suggest that it was not unusual for a peasant to need a loan of more than 100 rupees.

First, cattle, including the essential bullocks, were costly. The bare minimum required for cultivation was a pair of bullocks. Indeed, Charlesworth (1985) points out that many heavier ploughs needed several pairs of oxen. A comprehensive 1912 report by the veterinary department (Hewlett, 1912), which reported prices of various breeds of cattle, found that in every instance a pair of bullocks cost more than one hundred rupees, usually closer to 200.[31] Farmers often needed to borrow to buy bullocks because, as Hall-Matthews (2005, p. 95) notes, "replacing bullocks or other farm implements was beyond poorer ryots' annual budgets."

Second, marriages were expensive. A 100-rupee marriage was not unusual. The Government of India (1892), which conducted interviews with farmers, provided examples of this. For instance, a farmer in a village called Warwand in Poona told the Commission "Nobody *ever* spends less than Rupees 75 to Rupees 80; and seldom less than Rupees 200" (p. iii, italics in original).[32]

Third, in the late 19th century the land tax was substantial. The Deccan Riots Commission (1876) came up with a very approximate figure indicating the annual land tax was one-tenth the value of the land. Fukazawa (1984, p. 194) points out that the total land revenues (i.e., taxes realized by the government) went up by 37% between 1856–57 and 1870–71, and by another 18% by 1890. He notes "in no other part of British India did revenues rise as fast." Hall-Matthews (2005, p. 111) also highlights a complaint familiar to students of Indian economic history: the land tax was collected rigidly. He writes "Because land revenue [tax] was set at fixed amounts and times, it inevitably necessitated debt in poor or late harvests, as few had the resources to store grain after good seasons."[33]

Fourth, Bombay Presidency was particularly famine-prone, which forced farmers into debt. McAlpin (1983, p. 48) notes, "Because Bombay Presidency contained some of the districts where monsoon rainfall was and remains particularly capricious and because very little of its cultivated area was irrigated (always less than five percent), it was one of the provinces of British India in which fluctuations in harvests and changes in the rate of population growth were most marked."

Finally, a mortgage of 100 rupees did not necessarily represent a single loan. It could be that a smaller loan without a mortgage ("on account"), with a high rate of interest, had grown over time, and was eventually converted into a mortgage loan of 100 rupees or more.[34] For instance one farmer in Patas village in Poona took out a mortgage of 400 rupees "to pay father's debts on account and buy bullocks" (Government of India, 1892, Appendix I, xi). Thus, loans of over 100 rupees were taken out for a variety of routine reasons such as buying bullocks, paying for a marriage or making the land tax payment.

6.2. Did informal credit quickly expand to fully compensate for the decline in mortgage lending?

We cannot definitively rule out this possibility, but there is considerable evidence against it. First, though it is very difficult to estimate the relative magnitudes of mortgage-backed credit and other credit including informal credit (which, by definition, is not documented), the one estimate we can find suggests that mortgage-backed credit was important. When the Deccan Riots Commission (1876, chapter IV, page 1) studied 12 villages to ascertain the amount of debt, it found that of 1876 farmers, 523 were "embarrassed with debt." The average debt for these 523 households was 371 rupees of which 146 was on mortgage of land, the rest on personal security. Thus 39% of credit was backed by a mortgage. If we use this estimate with our lower-bound estimate of the decline in mortgage-backed credit (25%), DARA may have led to a short-run decline in total credit of about 10% ($0.39^{*}0.25 = 0.0975$). The decline in total credit would have been smaller if DARA induced substitution from mortgage-backed credit to informal credit. Still, a full and quick offset was unlikely given that mortgage credit

[31] A "fairly good class" pair of Kankreji bullocks cost Rupees 250 (Hewlett 1912, p. 8), a "really good pair" of Kathiawar bullocks would cost 200 rupees in the Deccan (p. 11), a single Krishna Valley bullock could cost between Rupees 200 and Rupees 225 (p. 14), an adult khillari bull cost between Rupees 150–250 (p. 20), a "good pair" of Malvi bullocks cost Rs. 150–200 (p. 23), "moderately good animals" of the "mongrel" Deccani breed sold from Rupees 60–80 each (p. 28), and a "fairly good" Dangi bullock was worth 60 rupees (p. 31). Prices of cattle had risen by 1912, but a 100-rupee expense for a pair of bullocks was not unusual even for the earlier period. The 1885 Gazetteer for the Satara district in Bombay (p. 36) reported that a "common" khillari bullock would sell for 50 rupees and a "good" one for 100 rupees.

[32] The farmers in Karati village (also in Poona) told the Commission that marriages cost Rs. 125–200 (p. xxii)

[33] Consistent with this, a Marwari lender in a village called Bori told the 1892 Commission that his clients always had to borrow for the first installment of revenue – whether or not they borrowed for the second installment depended on the crops (Appendix I, p. ii). The burden of the land tax fell over time, as agricultural prices increased in the 20th century, and the land tax did not keep pace.

[34] Another had taken a mortgage three years earlier "to pay off an old marriage debt." (xi). Another farmer in Tardoli village took a mortgage of Rs. 300 for "old debts"(xxi).

was a large portion of the aggregate credit market.

Second, while official reports as well as present-day historians agree that rich peasant lenders became more important, the consensus is also that it had become harder for the peasant to borrow.[35] When the Deccan Agriculturists' Relief Commission (Government of India, 1912) asked the officials and judges to comment on the general working of DARA, the Collector of Karachi (Sind) reported (p. 74): "[M]oneylending continues on a restricted scale. Curtailment of extravagant and thriftless borrowing on the part of the zamindars has been beneficial."

Similarly, the Collector of Satara, an early-DARA district (p. 74) claimed: "Act has decreased advantageously agriculturists' credit. Easy credit is the curse of the agriculturist." The district judge of Thana (late-DARA) argued that farmers were better off: "The restriction of their credit is highly beneficial, because it teaches thrift." The district judge of Surat had a more negative view: "Agriculturists' credit has been shattered….The Act [DARA] should be recast altogether." Charlesworth (1985, p. 255) agreed: "Overall, it is likely that the new regulations introduced by the Deccan Act…produced some contraction or halt, to the expansion of credit availability." Thus, our qualitative evidence strongly suggests that the decline in mortgage credit that we observe in our econometric estimates led to a decline in overall credit availability, at least in the short-run.

7. Conclusion

We have found that DARA led to some short-run contraction in credit with at most a modest adverse impact on outcomes such as agricultural investment. We have explained this finding by quoting, at several points in this paper, British officials' view that lenders had withdrawn credit judiciously: post-DARA, it was harder to borrow for consumption expenditures like marriages and funerals, but it was still possible to borrow for agricultural production. Indeed even the 1912 Commission, which was very critical of DARA, said in its main report (Government of India, 1912, p. 8): "The evidence placed before us in Guzerat [Gujarat] leaves no doubt that the expenditure of the cultivating classes on marriages and funerals, especially the latter which are the heavier of the two in that province, have greatly decreased."

To some readers this explanation may have the (unpleasant) flavor of a colonial-era analysis, with the "improvident" peasant at its center. We conclude this paper by discussing some recent research with broadly consistent findings. If reducing credit does not necessarily reduce investment or output, it follows that expanding credit should not necessarily increase investment or output. Indeed the expansion of bank credit to agriculture was one of the largest development initiatives undertaken by the Indian state after independence. Exploiting this expansion Cole (2009) finds no positive impact of bank credit on agricultural output. In more recent research, Banerjee et al. (2015) have studied the impact of the expansion of micro-credit in informal settlements in urban India. Some people use credit productively, but others merely spend more on what the authors politely call "temptation goods". We would expect a reduction in credit to lead to a decline in the expenditures on such goods. This would especially be true, if as in post-DARA Bombay Presidency, lenders became more cautious, and began to scrutinize the purpose of the loan.

Appendix A. Supplementary data

Replication data and do file to this article can be found online at http://dx.doi.org/10.1016/j.eeh.2016.07.004.

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[35] On the increasing importance of rich peasant lenders, see, for instance, Charlesworth (1978, 110–11; 1985, 257), and Fukazawa (1984, 196). Kaiwar (1994, 808, 823) makes the same point, suggesting that the trader-lender now sometimes used the rich peasant as an intermediary. Also see the Deccan Agriculturists' Relief Commission (Government of India, 1912, p. 9).

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