The Politics of Obsolescence:
Evidence from South Asia after the Industrial Revolution

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Abstract

How do communities respond when technological change from abroad makes traditional methods of production obsolete? I study this in the context of colonial South Asia, whose traditional manufacturing industry declined precipitously due to the Industrial Revolution and rapid globalization. According to conventional wisdom, re-employing obsolete producers into comparative advantage sectors will reduce demands for protectionism. I test this by exploiting a global cotton boom during the US Civil War (1861-65), which led some declining communities to adjust to agriculture. To analyze how this opportunity to adjust affected preferences for open markets, I measure regional participation in the *Swadeshi* Movement: a popular boycott movement against British textiles in 1905. In contrast to conventional wisdom, I show that communities that had adjusted to agriculture were more likely to become protectionist than those that stayed in the declining industry. Probing mechanisms, I show that successful economic adjustment might nevertheless lead to demands for protectionism if those who adjust have institutional or identity-based attachments to their old industry. Simply re-employing producers from comparative disadvantage to comparative advantage sectors might not be sufficient to make globalization self-sustaining.

Keywords: Technology and Globalization, Comparative Advantage, Protectionism

1   Introduction

> "*The English cotton machinery produced an acute effect in India … The bones of the cotton-weavers are bleaching the plains of India.*"
>
> Karl Marx, *Capital*, Vol. I (1867)

> "*Machinery in the past has made us dependent on England, and the only way we can rid ourselves of the dependence is to boycott all goods made by machinery.*"
>
> M.K. (Mahatma) Gandhi, (1932)

In a world of open markets, technologies invented in one country have global effects, often rendering older methods of production in other countries obsolete. When do communities that are made obsolete by this process react against open markets and become receptive to demands for protectionism? The conventional wisdom is that communities become protectionist if they fail to be re-employed in new comparative advantage industries. In this paper, I challenge this view. I argue that producers who are successfully re-employed in comparative advantage sectors might still support protectionism if they have institutional or identity-based attachments to their old industry.

I use colonial South Asia as a laboratory to test this argument.[1] In the 18th and 19th centuries, the Industrial Revolution and rapid globalization led to a steep decline in South Asia's most prominent traditional manufacturing industry: handloom textiles. In little over a century, India went from being one of the world's leading textile producers to a net importer of textile goods. This globalization-induced obsolescence displaced millions of people who had derived their livelihood from handloom textiles. Among these communities, many transitioned en masse into agriculture, the comparative advantage industry in South Asia.

How did these communities – made obsolete by foreign technology – view globalization and open markets? To answer this, I study participation in the *Swadeshi* movement[2], a proto-nationalist boycott in 1905 that encouraged Indians to substitute machine-made British cloth with domestic Indian cloth.[3] This movement was a precursor to the eventual Indian independence movement and set the tone for its combination of anti-imperialism with protectionism. I use a region's level of political organization for the *Swadeshi* Movement to measure its preference for protectionism.

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[1] Throughout this paper, I use the term South Asia or British India to refer to the region that contains contemporary Pakistan, India, and Bangladesh.

[2] In Sanskrit, *swadeshi* means 'of one's own country.'

[3] The movement was sparked by the partition of Bengal (the largest province in British India) in 1905 and quickly spread from Bengal to other parts of British India.

When would we expect the technological shock of the Industrial Revolution to lead to demands for protectionism? I argue that a new technology's political consequences depend on how societies choose to adjust to it economically. I focus on one prominent adjustment method: societies can deepen their integration into the world economy, providing obsolete producers an opportunity to transition into comparative advantage sectors. On the one hand, prominent theories of political economy suggest that such transitions can compensate producers for lost income and therefore quell demands for protectionism. On the other hand, if producers have attachments to their old industry based on their political power or their social identification with the industry, transitions out of the industry may make them more supportive of protectionism.

To test these competing predictions, I ask how the opportunity to adjust out of the declining industry affected support for protectionism among South Asian weaving communities. Using newly digitized archival sources, I create a dataset of towns in South Asia that specialized in the weaving of cloth using handlooms before the advent of the Industrial Revolution. These communities faced intense competition from rapidly mechanizing British textiles in the late 18th and early 19th centuries. I exploit a natural experiment in the 19th century that provided some of these communities an opportunity to adjust to the comparative advantage industry – agriculture. Specifically, I exploit a boom in the global price for raw cotton provided by the US Civil War (1861-65). As Union forces blockaded Confederate ports in North America, the resulting embargo deprived British textile producers of their primary source of raw cotton leading to a frantic search for new sources of raw cotton among British policymakers and industrialists. This drove up the price of raw cotton at Liverpool from 6.88 pence a pound in February 1861 to 31.5 pence a pound in July 1864, an almost 5-fold increase (Brady, 1963). Many regions of South Asia found it highly profitable to switch to cotton cultivation. Such a significant shock to the availability of agriculture as an outside option led large communities of weavers to abandon weaving for agriculture permanently.

I use data on the ongoing roll-out of railways in British India and regional suitability to grow cotton to geographically isolate the impact of the US Civil War cotton boom on Indian handloom weavers. I present two main results. I first show that weaving towns that experienced the cotton boom in the 1860s featured higher rates of participation in the *Swadeshi* movement in 1905. Specifically, weaving towns that had a standard deviation higher exposure to the cotton boom held 21 percent more *Swadeshi* protest events than otherwise similar weaving towns. Second, I show that these towns also had higher agricultural wages up until the 1890s and were much less likely to be active sites of handloom weaving in 1900, suggesting that large numbers of handloom weaving communities abandoned weaving for agriculture in these regions.

Why did producers who successfully adjusted from a declining industry into a booming one exhibit such a strong preference for protectionism, even 40 years after they adjusted? I present two results suggesting that producers often have attachments to their industry beyond considerations of short-term income. First, I show that the effect of the cotton boom on protectionism is larger in regions where weaving became part of a community's caste identity. Second, I show that the effect is stronger in regions where those who transitioned into agriculture experienced a significant decline in bargaining power with landed elites. Taken together, attachments to industries that go beyond current income strongly condition the political success of economic transitions.

How then can societies adjust to technological change without creating a demand for protectionism? I find evidence that adopting technology from the frontier can quell demands for protectionism. I show that weaving communities that incrementally adopted technology from certain Protestant missions were more likely to keep weaving and consequently less likely to support the *Swadeshi* Movement than communities located farther from these missions.[4] My results suggest that communities that could directly adopt technology from the global frontier were much less likely to become supportive of the *Swadeshi* Movement.

These results help resolve puzzles that arise if we look at the problem of adjustment purely from the perspective of economic theory. First, according to both Ricardian theories of comparative advantage and factor-based models of the domestic distribution of gains from trade, abundant factors and comparative advantage sectors should always favor free trade (Rogowski, 1990; Alt and Gilligan, 2002). This makes it puzzling that so many societies throughout history – most notably post-colonial states – chose to work against the grain of their comparative advantage and engage in protectionist industrial policies. If decolonization enfranchises abundant factors (e.g., agricultural labor), anti-colonial movements should have been free-trading rather than protectionist.[5] Instead, many of these movements had their ideological roots in some version of dependency theory: the idea that colonialism had imposed a division of economic labor on the world economy in which colonized states in the global south specialized in primary commodities while colonizers in the global north specialized in manufactured goods. My results suggest that the most captive domestic audience for this ideology might have been communities that felt deprived of the benefits of the Industrial Revolution by adjusting from manufacturing to agriculture.

Secondly, economic theories also suggest that popular discontent with globalization should

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[4]Specifically, Swiss Basel missionaries were prominently known to actively encourage the adoption of modern technological improvements into traditional textile production methods in British India (Roy et al., 1999).

[5]Bhavnani and Jha (2014) make a similar point while explaining why landed interests supported the civil disobedience movement in the 1930s.

diminish as those who are dislocated due to foreign competition find employment in alternative sectors (Autor et al., 2016; Caprettini and Voth, 2020).[6] As many have pointed out, this idea's record is fairly dismal. For example, programs such as Trade Adjustment Assistance (TAA) remain underutilized and fail to adequately compensate losers from globalization (David, Dorn and Hanson, 2013; Rodrik, 2017). Often the idea of adjustment into new industries is opposed by those who would purportedly benefit from it.[7] While this literature focuses on factors such as time inconsistency that make compensation difficult, it does not question the idea that making the losers from technology 'whole' by replenishing them with lost income will counteract a backlash against open markets. By contrast, I show that these losers include those that miss out on the fruits of technological knowledge, not just income. To make globalization self-sustaining then involves a nuanced look at how political institutions condition the process of adjustment to technology.

Lastly, this paper also helps us understand how the politics of globalization and technological change are related. While our understanding of how societies react to technological change[8] and to globalization[9] has progressed rapidly, we lack a fuller picture of how the two interact.[10] One implication of this paper is that an open trading system cannot be sustained without a corresponding open flow of technology. This is because if trade flows are freer than technology flows, technological advances in one country will be experienced by other countries as increased competition rather than opportunities to adopt the technology. Adjusting to this competition through specialization in comparative advantage sectors can create domestic demand for protectionism that undoes the free trade regime.

2   The Politics of Adjustment to Technological Change

Political movements for industrial revival and protectionism often emphasize the experiences of a specific set of producers that experienced an economic decline after facing competition from technologically sophisticated rivals from abroad. Beyond the political rhetoric, how-

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[6]While classical Ricardian comparative advantage theory is the origin of this idea, modern versions of this theory bolster it. Eaton and Kortum (2002), for example, conduct counterfactual analyses of the effect of a manufacturing technology improvement in one country (the US in their example) on other countries. They conclude that as long as other countries can shift labor out of manufacturing, all countries benefit.

[7]For example, fossil fuel workers in the US often oppose the idea of transitioning into employment in renewable energy industries. See: New York Times (2021) "The Achilles' Heel of Biden's Climate Plan? Coal Miners."

[8]For e.g. Dasgupta (2018); Voth and Caprettini (2019); Zhang (2019)

[9]For e.g. Dippel, Gold and Heblich (2015); Feigenbaum and Hall (2015); Autor et al. (2016); Jensen, Quinn and Weymouth (2017); Ballard-Rosa et al. (2017); Colantone and Stanig (2018); Ritchie and You (2021); Baccini and Weymouth (2021)

[10]See Wu (2019), Zhang (2019), and Chaudoin and Mangini (2022) for exceptions.

ever, the conditions under which those affected by global technological change will demand barriers to open markets are less well-understood. Moreover, under what conditions are such movements motivated primarily by a demand for income-based compensation as opposed to a demand for the revival of a particular sector?

The Adjustment Hypothesis An extensive literature predicts that protectionist movements will find their greatest support among producers who failed to adjust to other sectors of the economy. In this line of work, a domestic backlash against open markets usually reflects the breakdown of a "re-distributive bargain" between the winners and losers from globalization (Ruggie, 1982; Bisbee et al., 2020). Absent redistribution, producers[11] made obsolete by technology from abroad will seek to restrict open markets to protect themselves from technologically advanced competition.[12]

Theoretically, a lack of mobility out of one's sector of employment leads to a preference for industry-specific compensation (Alt and Gilligan, 2002). In models with high factor mobility, based on the Heckscher-Ohlin theorem, producers have attachments to their factor ownership rather than their sector. They, therefore, will demand compensation in the form of factor-specific transfers such as assistance for trade adjustment (Rogowski, 1990). In both these cases, successfully compensating obsolete producers by re-employing them in comparative advantage sectors can reduce their support for protectionism.[13] Several empirical studies support the compensation hypothesis. Margalit (2013), for example, shows that support for re-distributive policies increases after people lose their jobs during recessions but returns as they regain employment. Hiscox (2002) similarly shows that high labor mobility between industries makes industry distinctions less relevant than class distinctions over trade policy. Kim and Pelc (2021) show that counties in the US that face import competition are less likely to demand protectionism if they have traditionally relied on Trade Adjustment Assistance (TAA) to compensate them for job loss.

By implication, redistributing the gains from openness by helping the non-adopters of technology to adjust to different sectors will reduce the likelihood of domestic backlash to

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[11]Throughout this paper, I use the term producers to encompass different types of groups to which the theory applies. These include workers and firms, but more generally, owners of various factors of production.

[12]Of course, redistribution need not take the form of re-employing producers into new sectors. It may involve pure income redistribution through a more expansive welfare state (Scheve and Serlin, 2022). As Acemoglu and Robinson (2001) argue, however, compensation for economic decline often takes the form of inefficient policies such as tariffs and subsidies rather than simple redistribution because the winners of globalization cannot commit to sustaining income redistribution in the long run. Inefficient policies such as tariffs ameliorate such commitment problems by keeping the declining sector artificially large and therefore politically powerful.

[13]In factor-based models, relatively scarce factors oppose trade precisely because the comparative advantage sector does not have enough demand for them. In principle, however, if this demand were created, it would compensate these factors for income lost under trade.

open markets (Rodrik, 2007; Lastra-Anadón, Scheve and Stasavage, 2020). This also reflects a popular view amongst economists that new technologies create "short-term disruption, long-term benefits" (Mokyr, Vickers and Ziebarth, 2015). There might be a transitory period of unemployment for the non-adopters, but in the long run, they adjust into newly created sectors of the economy, making everyone better off eventually. This idea has a long history in political economy, going back to Jeremy Bentham, who claimed that "opposition to machinery is well grounded, [only] if no care is taken to provide immediate employment for the discharged hands." (Hollander, 2019). However, this perspective assumes that producers' main concern is their current income. It fails to explain why, even in societies with expansive welfare states and compensation programs, movements for protectionism and social revival actively seek the revival of specific sectors of the economy.

Identity-Based Attachments   One possibility is that support for protectionism is rooted in an identity-based attachment to a specific sector or line of work. A large body of work in social psychology and political economy suggests that people's actions, including their sector of work, affect their identity.[14] The basic idea is that people working in a given sector over time start to think of performing particular kinds of work as part of their identity (Ellemers, 2001; Gaikwad, 2018). These identities may be valuable in and of themselves or because they designate membership in a social group with high-status (Tajfel and Turner, 1986). Functionally, this means that people derive utility from working in that sector and disutility from not working in the sector *independently* of the income they derive from working in the sector. Working outside a sector prescribed by one's identity might be costly because it creates cognitive dissonance between one's identity and actions (Festinger, 1957; Acharya, Blackwell and Sen, 2018).

Recent work in international political economy has applied this framework to understand the contemporary political backlash against globalization (Rodrik, 2021; Abramson and Shayo, 2022; Baccini and Weymouth, 2021). Broadly, this work finds that negative economic shocks activate identity and social status concerns that go beyond income.[15] However, these studies also imply that economic adjustments compensating people for negative economic shocks will temper identity and status-based reactions.

However, social identity theory also suggests that compensation can exacerbate identity concerns. If adjustment involves switching to a different sector, producers might see their

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[14]See Shayo (2009) for a model of how identities and actions are chosen together.

[15]A more recent group of studies connects *positive* economic shocks to regional ethnic tensions and conflict, relying on the mechanism of the effects of these shocks on patterns of internal migration (Zucker, 2021; Helms, 2021; Serlin, 2022). I abstract away from internal migration dynamics in this paper since my focus is not on explaining inter-group tensions but on preferences over national trade policy.

incomes increase but suffer the cognitive dissonance costs of working in a sector not prescribed by their identity. Beyond these costs, a mass movement of workers out of a sector may exacerbate its economic decline and, therefore, social status. To the extent that workers value the social status of their group, adjustment may create an identity-based grievance among workers who see their social status decline.[16] On the other hand, those who stay in a declining sector might be less likely to organize for protectionism since they do not suffer such identity-based costs.

Institutional Advantages   Another possibility is that people value the sector where they work because they hold positions of greater bargaining power within the sector than outside it. Under the contract theoretic approach of Hart and Moore (1999) and Tirole (1999), a party's bargaining power within a commercial contract arises from its "residual control rights" or control over productive assets. In principle, this control could come from ownership of productive assets in the case of land ownership, inalienable assets such as human capital, or legally defined advantages such as the right to coerce labor under the threat of physical violence.

Often, existing political institutions provide some factors of production within an industry with an advantage in bargaining over conditions of contract (Hall and Soskice, 2001). For example, laws that protect workers' rights to unionize provide labor with an institutional advantage in bargaining over wage contracts with management. Similarly, "master and servant" laws in 19th century Britain made a breach of employment contracts a criminal offense, providing owners of capital with structural bargaining power over labor (Naidu and Yuchtman, 2013).

If producers have institutional advantages within specific sectors of work, adjustments that involve moving powerful producers out of their sectors will exacerbate the decline in their power. These people will then demand policies that insure them against negative shocks (Iversen and Soskice, 2001). Conversely, if producers can adopt technology rather than switch sectors, they can retain their bargaining power and should be less likely to support protectionism.

The Rationality of Switching Sectors   This raises an important theoretical question: why would producers move out of a sector to which they have identity-based or institutional attachments? Surely rational producers will foresee the long-term consequences of adjust-

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[16]Of course, identities need to be 'sticky' for this mechanism to be at play. If those who adjust to the comparative advantage sector take on the identity of their new sector, they might become less supportive of protectionism than if they had stayed. If switching identities in this way is costly, however, we can still consider the adjustment process as creating identity-based costs that are unwanted ex-ante.

ment and will decide not to adjust in the first place. As is often the case, I assume that the movement out of the old sector is not up to individual choice. I assume that adjustment occurs when opportunities arise in new sectors that are attractive enough in the short run to move a critical mass of producers over into the new sector. Given that a region's economy as a whole is adjusting to a new sector, it may be individually rational to adjust. Nevertheless, having switched sectors, it might still be valuable to organize for protectionism if the gains from protectionist policies outweigh the costs. If identity and power concerns are important, then the gain from protectionism may be higher among those who switched sectors since protectionism will compensate producers not just for lost income but also for lost identity and power.

Another possibility is that it might be rational for individual producers to switch sectors, but political organization is easier among the switchers than among those who stay. For example, adjustment to the comparative advantage sector could, on-net, leave a group better off, but they are also easier to mobilize around a shared sense of lost power or identity rather than a shared sense of lost income. Those who did not have a chance to adjust might be harder to mobilize since they do not have the same identity and power-based concerns as the adjusters. This would also explain why movements for protectionism and industrial revival focus not just on a demand for monetary compensation but also use imagery and symbolism that invoke a sense of shared identity or loss of social prestige and power.

Testing the Hypothesis In summary, technological change may lead to a demand for protectionism for at least three different reasons: a loss of income, an identity-based attachment to the sector, or institutional advantages specific to the sector. Which of these concerns dominates has important implications for the success of adjustment policies. If protectionism is merely the result of a loss in income, compensating the losers of technology by re-employing them in comparative advantage sectors will reduce demand for protectionism. If identity or power-based concerns are dominant, such re-employment might increase demands for protectionism.

How do we empirically adjudicate between these different perspectives on adjustment? In what follows, I consider the following counterfactual scenario: what happens to support for protectionism among obsolete producers if adjustment into comparative advantage sectors is made easier? I test the following null hypothesis:

> **Null Hypothesis:** *Moving obsolete producers into comparative advantage sectors will reduce the demand for protectionism.*

The next section presents the case in which I test this hypothesis. I first present the historical context of textile production in South Asia and the economic effects of the Indus-

trial Revolution. I then introduce the *Swadeshi* movement as an ideal setting to measure the degree of regional support for protectionism. Section 4 then presents the research design I use to empirically test the hypothesis above.

3 Historical Context

3.1 Traditional Textile Production in South Asia

In 1750, India produced 24.8% of the worlds manufacturing output (Bairoch, 1982). By 1913, this share had dwindled to 1.4%. This stunning decline in global industrial leadership primarily reflects the devastation of India's most prominent pre-colonial industry: textiles. Before the Industrial Revolution, Mughal India was one of the leading global centers for handloom-based textile goods. Textile weaving was a well-organized manufacturing industry centered around a weaving town – what Haynes (2012) calls "small-town" capitalism. Figure 1 shows the distribution of weaving towns in the subcontinent in pre-colonial times from the *Atlas of the Mughal Empire* (Habib, 1982). Weavers were prominent members of the local community and, before the arrival of cheaper machine-produced cloth, were also local monopolists (Roy et al., 1999). In addition to the local trade, South Asian textiles were a major export good, with Bengal being world-renowned for its high-quality fabrics.

Figure 1: **Weaving Towns in South Asia, 1500-1800**
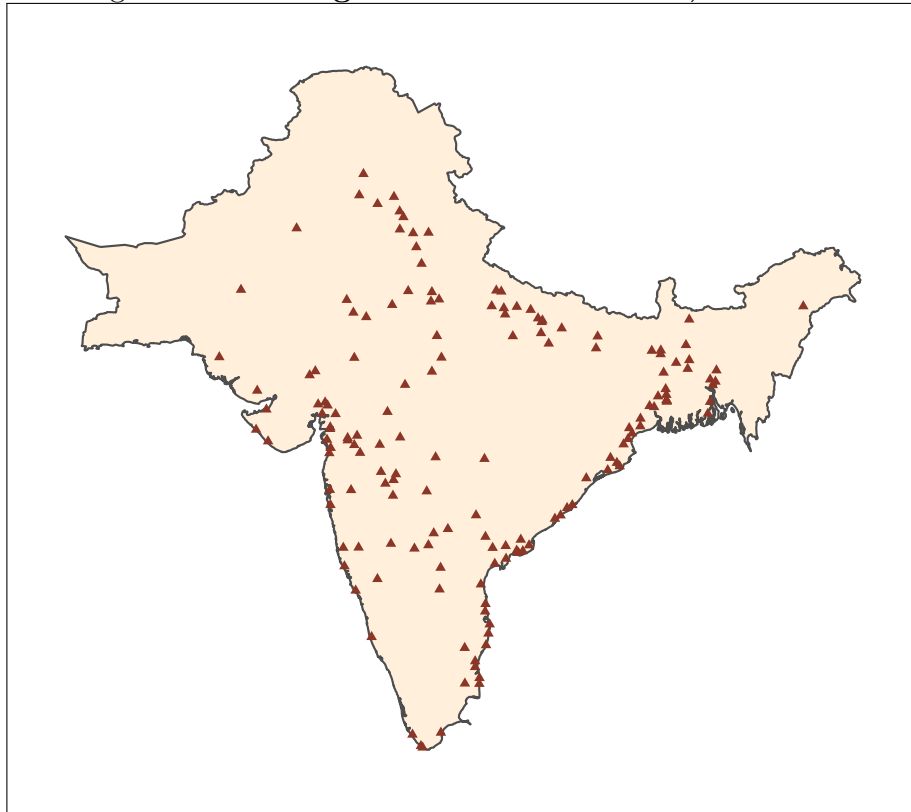
Source: Habib (1982). Each triangle denotes the location of a town that specialized in the weaving and spinning of cotton textiles before the advent of British rule in the 19th century.

3.2 The Industrial Revolution and its Effect on India

Handloom spinning and weaving around the world had always been a labor-intensive industry, as key procedures in the spinning and weaving process required using human fingers (Mokyr, 1992). As the Industrial Revolution took off in Britain in the 18th century, a series of technological improvements in the spinning and weaving process overcame this major bottleneck, creating an enormous cost advantage for modern mill-made cloth relative to traditional handloom spinning and weaving. While Indian hand-spinners took 50,000 hours to spin 100 pounds of cotton, British Arkwright rollers and the self-acting mule brought these down to 135 hours (Chapman, 1972). Slower improvements in mechanized weaving and the rise of the factory system made hand-weaving obsolete in Britain by the late 1830s (Harley, 1998).[17] Indian handloom textiles now faced intense competition from British textiles. To understand the magnitude of this competition, Figure 2 shows the relative exports

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[17]Mokyr (1992) reports that the combined effect of these improvements was a drop in the price of cotton cloth by 85% between 1780 and 1850. Lancashire in northwest England became the center of the modern textile industry (and the Industrial Revolution).

of Indian and English cotton goods to West Africa, an important market for textile goods (Inikori, 2002).[18] While Indian and English goods divided the market fairly equally before the 1800s (with a slight advantage for Indian goods), after the 1820s, Britain's market share skyrocketed as the Industrial revolution took off.

Figure 2:
Effect of the Industrial Revolution:
Britain Overtakes Indian Textiles in Foreign Markets
Exports of Cotton Goods to West Africa 1750-1850, (Log Scale)
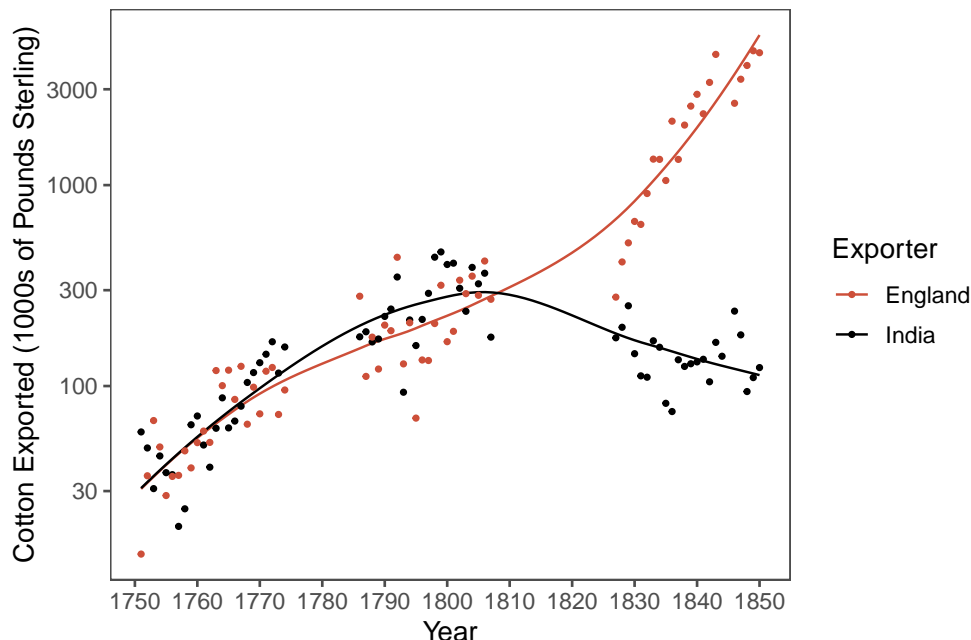
Source: Inikori (2002). The West African market was historically an important export destination for Indian and British cloth. Data for after 1820 is only available in terms of yards, a constant price of 0.27 pounds per yard is applied to those years. Solid lines denote LOESS regressions.

Complementing technological change in British textile production was the rapid integration of India into international markets.[19] The combination of technological change and

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[18]West African textile markets were an important part of the Atlantic slave trade, as sites where Europeans traded enslaved people for Indian (and later British) textile goods.

[19]This process was led by two primary forces: improvements in international transportation technology, and a concerted state-led effort to build railways further inland in India. O'Rourke and Williamson (1999) report that improvements in steamship technology in the 19th century, as well as the opening of the Suez Canal in 1869 reduced real British freight rates by 70% between 1840 and 1910. While this deepened the integration of port towns in British India into the larger global market, inland areas in India still remained relatively isolated from world markets until mid-century. Around this time, partly to integrate British military forces in India and partly to enable a greater supply of cotton to Lancashire, the British rapidly built railway lines throughout India, replacing bullock-based transport and bringing large parts of the rural hinterland out of "near autarky" (Donaldson, 2018). The blockade of Southern Confederate ports during the US Civil War (1861-65) and the resulting 'cotton famine' further intensified British efforts to create alternative sources of raw cotton in the colonies, further galvanizing the construction of railways in British India.

rapid globalization proved lethal to local communities specialized in the old handloom industry. Bagchi (2010) estimates that in Bengal alone between 1809 and 1828, at least one million people employed in the textile industry lost their jobs.[20]

Handloom weaving and factory-based production required completely different mixes of labor and capital, preventing handloom weavers from adapting to the new industry. As one editorial in the Indian Newspaper *Amrita Bazar Patrika* lamented in 1906: "... a weaver in Lancashire can do the work of at-least ... nine handloom weavers. Do you think the Indian workman ... can ever hope to compete with the European if the disparity between them is so great?".[21,22]

3.3   Support for Protectionism: The *Swadeshi* Movement

The obsolescence of the traditional Indian textile industry did not result in an immediate mass uprising or revolt. As a slow moving process that de-skilled and de-industrialized Indian weavers in fits and spurts throughout the late 18th and 19th centuries, it is hard to pinpoint a single moment where we would expect to see a mass movement for protectionism. This process did however, inspire and animate much of the subsequent Indian independence movement. Dadabhai Naoroji, one of the founding members of the Indian National Congress, for example, blamed British commercial policy as well as excessive international openness as a cause of the 'wealth drain' from India to Britain. Ideological leaders of the movement continued to advocate versions of protectionism and economic nationalism throughout the struggle for self-rule.

In this paper, I focus on one of the earliest manifestations of this broader movement. In 1905, the colonial administration under Viceroy Lord Curzon decided to partition Bengal, the largest Indian province, ostensibly to aid its administration. The partition created a new province, Eastern Bengal and Assam, joining together districts of Eastern Bengal with the existing province of Assam. To many Indians, especially the leadership of the recently created Indian National Congress, the decision to partition Bengal was just the latest manifestation of the British policy of 'divide and rule'. The partition sparked the *Swadeshi*

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[20]While economic historians do actively debate whether the decline of Indian textiles was reflective of a broader industrial decline (Roy, 2013), there are few who would doubt that large populations of handloom weavers became obsolete in this time period.

[21]*Amrita Bazar Patrika*, January 20th 1906.

[22]Not all textile producers in India experience obsolescence at the hands of modern machinery, however. Some handloom weavers, especially if we look at later time periods of the 20th century, survived. In Madras presidency in 1901, for example, half a million people were actively employed as handloom weavers, 13 weavers for every 1000 people (Gait, 1902). By contrast, Bengal, which had been the historical center of Mughal textiles, had only around 309,000 weavers, 4.14 per 1000 people. Across India in 1901, a third of the industrial workforce of 13 million was employed in cotton handloom weaving (Roy, 2018).

movement, the first manifestation of the eventual non-violent movement for home-rule by the leadership of Congress. The Swadeshi movement (specifically its first manifestation) ended formally in 1911 when the British re-united Bengal.[23] However, the movement saw a second manifestation after World War I under the leadership of Mahatma Gandhi as part of the broader non-cooperation movement and continued to inspire the remained of the Indian independence movement and post-Independence industrial policy.

While a protest movement in response to the partition was expected, a peculiar feature of the *Swadeshi* movement was its emphasis on boycotting machine-made British textile goods in favor of traditional Indian handloom woven cloth. The fact that the movement adopted an economic nationalist character allows us to study support for protectionism in British India. It also indicates how heavily de-industrialization and obsolescence weighed on the collective imagination of Indian leaders.

In principle, the *Swadeshi* movement could have been primarily an anti-colonial movement without preferences over trade policy. Yet its call for the purchase of Indian made cloth instead of British cloth meant that it was an explicitly protectionist movement. In fact, some *Swadeshi* leaders did demand tariff protection from the British administration, but since tariff policy at this time was not in the hands of local Indian governments, this was widely seen as a lost cause. As one editorial in a popular Indian daily put it:

> "*The whole 'white portion' of the British Empire, in short, is for Protection, but when we poor Indians adopt a rough and ready method of Protection the shout of sedition is raised! Russia is protectionist, Germany is protectionist, France is protectionist; all the free and self-governing nations are protectionist. But Indians, because they are voiceless and helpless, must be Free Traders and must be tied to the wheels of the Juggernaut car of Lancashire!*"
> - **The Tribune (Lahore), 21st September 1905**

The demand for tariff protection resonated with mill owners, who had been trying for years (and who would indeed continue to do so up until independence) to get the British administration to place tariffs on cotton piece-goods imports (Casler and Gaikwad, 2019). However, in its first manifestation in 1905, the *Swadeshi* movement was avowedly luddite. As Kannangara (1968) states, "Swadeshism was not born out of a concern for the cotton-manufacturers[mill owners] ... There was a concern for the peasants, for urban artisans and rural handicraftsmen, especially for handloom weavers whose decline in the face of cheap mass-produced imports from Britain was one of the great themes of the nationalist case

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[23]While Bengal was reunited in 1911, a few districts of the Bihar region and Orissa were joined into the separate province of Bihar and Orissa.

against the record of British rule". This fact allows us to use regional support for the *Swadeshi* movement as a measure, albeit an imperfect one[24], of support for protectionism.

Figure 3: **Timeline of Events**
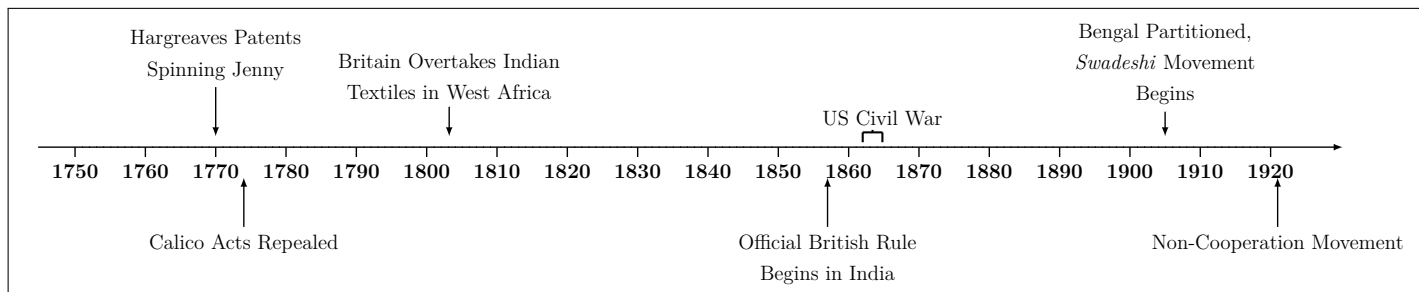
The timeline depicts the sequence of events that form the historic setting of the project. By 1800, the Industrial Revolution was in full force in Britain. Throughout the century, competition from machine-produced textiles greatly diminished the global and domestic market share of the South Asian handloom textile industry.

Putting this historical context together, Figure 3 shows the timeline of events that are relevant for the rest of this paper. In the next section, I present my research design that builds on this historical sequence of events to analyze how producers in South Asia that were made obsolete by the Industrial Revolution reacted to their industrial decline.

4 Research Design

My research design starts by identifying a set of towns in South Asia that historically specialized in handloom weaving. These communities faced severe competition from Britain after the Industrial Revolution, making their production methods relatively obsolete. For this set of towns, I then estimate the following empirical model:

$$Y_i = \beta_0 + \tau OpportunitytoAdjust_i + \mathbf{X}_i + \epsilon_i \tag{1}$$

Where i is a weaving town that historically specialized in methods of production that are made obsolete by technology. Y_i is that community's level of support for protectionism as measured by participation in the *Swadeshi* movement. $OpportunitytoAdjust_i$ is the degree to which these producers had the opportunity to adjust into agriculture. $\mathbf{X}_i$ is a set of

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[24]Since the movement was sparked by the partition of Bengal, adherence to it was strongest in Bengal. In analyses below, I attempt to control for this by looking at variation only within provinces.

observed control variables. ϵ_i captures all other (unobserved) factors that affect i's level of support for protectionism.

In this setup, τ represents the effect of the opportunity to adjust into agriculture among obsolete producers.[25] The theory presented in Section 2 implies that τ will be positive (i.e. adjustment into agriculture will lead to more protectionism) if the adjustment into agriculture creates identity-based costs or results in a decline in producers' bargaining power. An ideal experiment would randomly assign opportunities to adjust into agriculture to a subset of weaving communities. It would then estimate Equation 1 as the effect of being provided the opportunity to adjust into agriculture for obsolete communities.

The US Civil War Shock To approximate this research design, I exploit a massive shock to British India's comparative advantage due to the US Civil War (1861-65). Before the war, Britain's burgeoning textile industry relied predominantly on cotton grown in Southern states using enslaved labor in the United States. During the war, the forces of the Union (the "North") blockaded Confederate ports in the South and suddenly deprived British textile producers of cotton, their primary input. The resulting 'Lancashire cotton famine' led to a frantic search for alternative sources of raw cotton from among Britain's colonies (Beckert, 2015). As Figure 4 shows, this drove up the price of raw cotton at Liverpool from 6.88 pence a pound in February 1861 to 31.5 pence a pound in July 1864 an almost 5-fold increase (Brady, 1963). This massive shock provided an opportunity to adjust to agriculture to those regions of South Asia that were well connected to the global economy and climatically suited to produce raw cotton, leading many weavers to leave the handloom to take up agriculture. Beckert (2015) reports that "the number of weavers decreased by as much as 50 percent during the US war, with former weavers moving into agricultural labor".

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[25]Estimating this specification for non-weaving towns represents the effect of adjustment among non-obsolete communities, and represents a placebo test for the theory.

Figure 4:
US Civil War Caused a Boom in World Cotton Prices
London Price of Indian Raw Cotton 1853-75
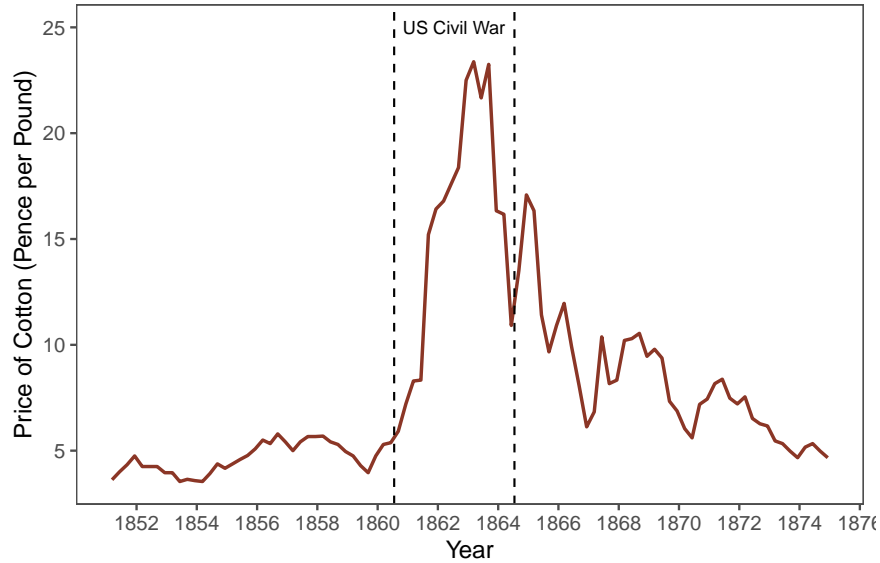
Source: Hanlon (2015). Price shown is for the Surat (fair) variety. Prices are normalized to pence per pound.

While this was one of many 'globalization shocks' to Indian handloom weavers from Lancashire textile mills throughout the 19th century, the abruptness of this particular shock allows us to isolate the causal effect of adjustment opportunities on political action. To isolate the civil war shock, I use two facts about regions that were most affected: they were connected to international ports using the railway and they had agro-climatic conditions suitable to grow cotton. I exploit the ongoing but incomplete roll-out of the British Indian railway system during this time. The roll-out meant that during the civil war, districts that happened to have a completed railway line were connected to the international economy to a much larger degree than otherwise similar districts that had not yet received a railway line. In addition, I use the fact that certain communities in the region had exogenous soil and climatic conditions that made them particularly suited to growing cotton.

In what follows, I construct proxy variables for $Agriculture_i$ that combine community i's degree of cotton soil suitability and railways access. Having laid out my overall research design, I describe the data that I collected in the next section.

5   Data and Measurement

I use a wide variety of colonial and pre-colonial data sources to create an economic and political database of colonial South Asia during the first era of globalization. Most of these

data are newly digitized, enabling me to conduct a fresh data-driven empirical analysis of century-old questions about the effects of the Industrial Revolution on South Asia.

I compile data at two levels of analysis. First, my main variables are at the town level and restricted to towns that historically specialized in handloom textile weaving. Next, some variables are collected at the district level, the level of administration below the province in British India[26]. I collect three types of data: the degree of technological obsolescence in a region, the exposure of a region to the US Civil War shock, and finally a region's support for the *Swadeshi* movement.

5.1 Technological Obsolescence

Historical Weaving Towns   I use Habib's (1982) *An Atlas of the Mughal Empire* to geolocate towns in South Asia that historically specialized in handloom weaving. The atlas provides detailed province-level maps of the location of various forms of economic activity that prevailed in a location roughly from the 16th to the early 19th century. A town is listed as specializing in handloom weaving if it was consistently a local center of the manufacture of cotton cloth using traditional methods of production. In order to have a universe of towns to embed these data in, I collect the locations and 1901 populations of towns in British India from the 1901 Census of British India (Gait, 1902). The census reports data on a group of towns that range from small rural towns with a few hundreds of people to larger cities with hundreds of thousands of people. I include all provinces of British India, excluding Native States.[27]

Employment in Handloom Textiles   At the district level, I digitize district level employment and population data from the 1901 Census of British India (Gait, 1902). For districts in the data, I calculate the number of people actively employed in the cotton handloom industry as the number listed as working in the industry minus the number of individuals listed as "partially agricultural".

In order to measure obsolescence, ideally one would compare a town's employment in handloom weaving in the 18th century to that in 1900. However systematic india-wide data on town level employment was not collected in this time period. In the absence of this data, I use a variety of primary and secondary sources[28] at the town-level to come up with an indicator for whether a town was still actively involved with weaving as of 1900. While

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[26]I often use district level variables in town-level regressions. All regressions in the paper cluster standard errors at the district level, accounting for arbitrary correlation in the error term within a district.

[27]This includes Bengal, Bombay, Madras, United Provinces, Berar, Central Provinces, Punjab, and Assam.

[28]Most prominently Roy (2020) and town gazetteers published by the British government.

around 27% of towns (totalling 365) in the data are historical weaving towns, only 4% (or 55 towns) remained actively weaving as of 1900. This reflects large scale obsolescence of handloom weaving due to the Industrial Revolution.[29]

In order to measure the extent to which specialization in handloom weaving was internalized as part of a region's identity, I collect data on district level population of traditionally weaving castes in 1901. I use the *Report of the Fact Finding Committee (Handloom and Mills)* (1942) and caste descriptions in the 1901 census to create a list of castes whose traditional occupation was handloom weaving. I then collect each district's population of tradition weaver castes. Appendix Section A.2 details the names of traditionally weaving castes as well as provinces where they were predominantly found.

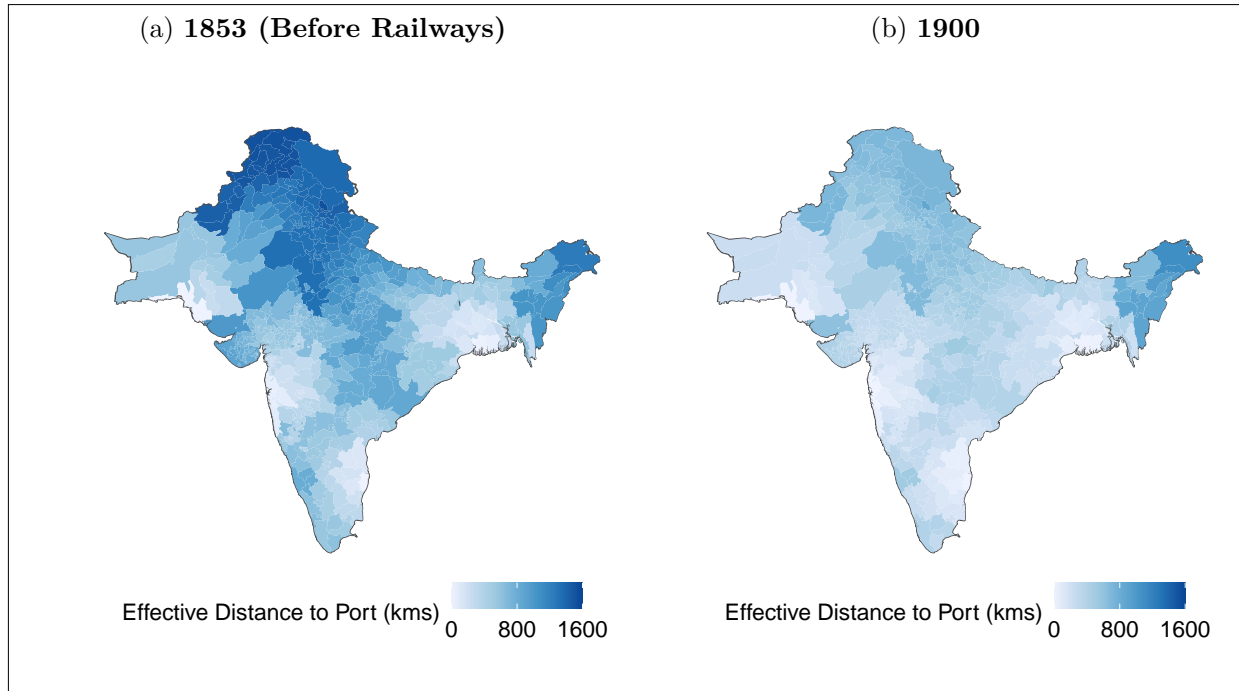## 5.2 Opportunities to Adjust into Agriculture

Railway Network   I collect the location of railway lines in British India from Donaldson (2018). The earliest railway line was constructed in 1853, and the system grew rapidly until partition in 1947. To use this network to construct a yearly panel of town-level international trade costs, I convert the geospatial railway data into a yearly network dataset where the nodes are towns and edges between towns are either railway lines or straight lines if they are not connected by railways in a given year. Using this network, I calculate D_{it}, town i's effective distance to international ports in kilometers.[30] More formally, I use Dijkstra's algorithm to find the length of the shortest path between town i and the nearest port.[31] Figure 5 shows the district-level averages of trade costs for 1853 (before any lines were built) and 1900 (after a considerable amount of lines had been built). The decline in effective trade costs is apparent in every region in South Asia, especially in the Northwest.

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[29]In the *Imperial Gazetteer of India* (1909), it is common to read town descriptions of the following sort, this one from Jahanabad town in Bengal: *"[Jahanabad] was once famous for its weaving industry, and in 1760 it formed one of the eight minor branches connected with the central factory of the East India Company at Patna ...The manufacture of cotton cloth has now been displaced by Manchester goods, but large numbers of the Jolaha or Muhammadan weaver class still live in the neighbourhood."*

[30]I selected the ports based on whether they appeared as major export or importing ports in the *Price and Wages Series of India*, 1901. They include Karachi, Bombay, Madras, and Calcutta.

[31]For segments of this path connected by railways, I use a weight of 1, while for segments not connected by rail, I use a weight of 2.375. These weights are based on Donaldson (2018)'s estimates of the relative trade costs per unit distance of railways versus roads in British India.

Figure 5: **Trade Cost to Nearest Port 1853-1900**

(a) **1853 (Before Railways)**   (b) **1900**

Effective Distance to Port (kms)   0   800   1600

Effective Distance to Port (kms)   0   800   1600

Notes: *Both Panels show, for each district, the effective distance, in kms, to the nearest international port.*

Soil Suitability for Cotton I collect data on soil suitability from the Global Agro-Ecological Zones (GAEZ) database of the FAO (2021). This variable, called the cotton suitability index, ranges from 0-10000 and uses information on historical regional rainfall and soil quality and other environmental variables to predict how suitable a given area is to grow cotton.[32]. A district's suitability is simply the mean of the index within a district, while for towns, I calculate the mean suitability within a geodesic disc of angle 0.1 (approx. 5.5 miles) around the town. Both at the town and district level, I standardize this variable such that it has a standard deviation of one.

5.3 Support for Protectionism

Collective Action in the *Swadeshi* Movement I measure a community's support for protectionism using the number of *Swadeshi* events held in a town in 1905: the first year of the boycott. During the movement, the main method through which political elites tried

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[32]While the variable is from the time period 1961-1990 and could be considered post-treatment, variation across districts is likely to reflect long-run climactic conditions rather than contemporary social variables. In order to ensure this, I use the 'low-input' configuration which reports soil suitability as mainly a function of soil nutrients, temperature and rainfall.

to encourage and spread awareness of the boycott was through *Swadeshi* meetings. I use the NewsBank (2021) database of South Asian Newspapers to geo-locate *Swadeshi* meetings held in 1905. Figure 6a shows an example of two meeting mentioned in a news article. A minority of events are not *Swadeshi* meetings but rather the creation or inauguration of *Swadeshi* organizations (e.g. civic organizations created to encourage indigenous goods) or bonfires of foreign goods. Since both of these types of events are indicative of collective action for the *Swadeshi* movement, I count them as *Swadeshi* events. This exercise yields a total of 242 *Swadeshi* events held at 67 distinct districts. Figure 6b shows the distribution of *Swadeshi* meetings in this time period.

Figure 6: **Measuring Political Organization**

(a) **News Article Mentioning two *Swadeshi* Meetings**

(b) **Swadeshi Events in 1905**

Swadeshi Meetings
- 5
- 10
- 15

The size of each dot denotes the number of events held at this location.
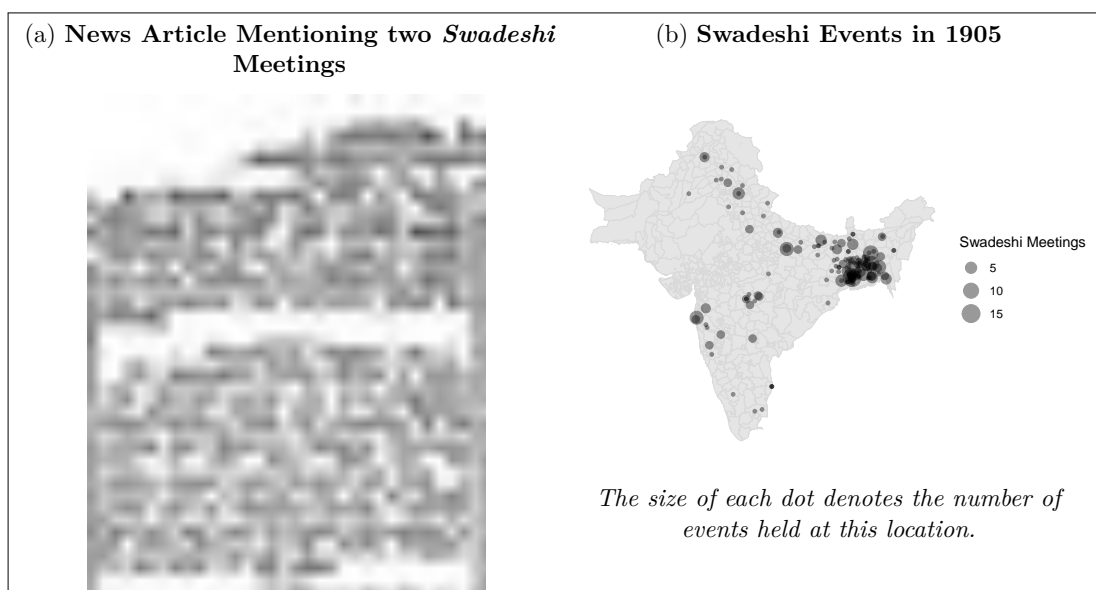
It is important to note that *Swadeshi* events held in a town need not be purely organized and attended by weavers (or former weavers) for this to be a good measure of local support for protectionism. Instead, I think of a town's inhabitants as internalizing the interests of the weaving industry in a sociotropic manner. An extensive literature in international political economy has shown that sociotropic concerns dominate individual seld-interest in explaining policy support in developed countries (Duch and Stevenson, 2008; Mansfield and Mutz, 2009; Colantone and Stanig, 2018). This is an especially appropriate assumption in the setting of colonial South Asia, where labor mobility was relatively much lower than in contemporary developed countries.

6   Empirical Analysis and Results

6.1   Political Effects

In order to test the main proposition of this paper as simply as possible, I first conduct an analysis at the level of the town. Table 1 shows town-level averages of the number of *Swadeshi* events held per 1000 people for 1,479 towns in British India. The average non-weaving town hosted 0.02 meetings per 1000 people in 1905. Compared to this, the 371 weaving towns in the sample hosted 0.09 meetings per 1000 people on average. Moreover, among weaving towns, those that had a high suitability for cotton (defined as above the mean) featured almost 1.6 times as many events on average than those with low cotton suitability. For both weaving and non-weaving towns, having had a railway during the US Civil War increases the number of *Swadeshi* events, although the effect is much larger among weaving towns.

Table 1:
Weaving Towns Exposed to Cotton Boom
Participated more in *Swadeshi* Movement
Number in Cell Denotes Number of Swadeshi Meetings per
1000 people

	All Towns	**Cotton Suitability**		**Had Railway$_{1865}$?**	
		High	Low	Yes	No
Weaving Town	0.09	0.11	0.07	0.28	0.03
Non-Weaving Town	0.02	0.02	0.02	0.08	0.01
#Towns	1,479	775	704	239	1,240

The table suggests not only that towns historically specialized in handloom textiles were more likely to participate in the protectionist *Swadeshi* movement, but also that having had the opportunity to adjust into agriculture enhanced this effect. Of course, this analysis might be subjected to omitted variable bias. Larger towns, for example, will tend to host more collective action events. Moreover, having a railway in 1865 might proxy for general railway access, rather than be specific to the US Civil War era. To more systematically conduct a town-level analysis, I present my main specification:

$$log(NumSwadeshiMeetings + 1)_i = \beta_0 + \tau OpportunitytoAdjust_i + \gamma_{p(i)} + \alpha \mathbf{X}_i + \epsilon_i$$

Where i indexes towns and $p(i)$ is the province of town i. $\gamma_{p(i)}$ is a set of province fixed

effect. $\mathbf{X}_i$ is a vector of town level controls, including town population in 1901 (logged), effective distance to nearest port in 1855 and 1900, cotton suitability, percent of a district's population that is Muslim, linear terms for town latitude and longitude, and whether it is a large city (defined as having population above 100,000).

$OpportunitytoAdjust_i$ is a continuous treatment variable capturing a town's exposure to the US Civil War shock as a function of its cotton suitability and whether it happened to be connected to the railway system during the cotton boom. Specifically, I define the treatment as[33]:

$$OpportunitytoAdjust_i = CottonSuitability_i * \sum_{t=1857}^{1875} \left(\frac{Exports_t}{q(D)_{it}} \right) \qquad (2)$$

Where i indexes town. $CottonSuitability_i$ is a towns index of cotton suitability, standardized by dividing by its standard deviation. $Exports_t$ is the value of Indian raw cotton exported to the UK in year t.[34] $q(D)_{it}$ is the effective trade cost, in percentiles, between town i and the nearest major international port given the state of the railways in year t as described in Section 5.[35] To ease interpretation, I standardize $OpportunitytoAdjust_i$ by dividing by its standard deviation so that it has a standard deviation of one.[36] The treatment variable has a mean of 0.36 and a median of 0.12.

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[33]I use the terms US Civil War shock, cotton boom, and opportunity to adjust interchangeably to refer to this variable throughout the paper.

[34]From the *Annual statements of the trade of the United Kingdom with foreign countries and British possessions.*

[35]The ports I use are: Karachi, Bombay, Madras and Calcutta

[36]I do not de-mean the variable since that would result in some towns having a negative treatment, which is counter-intuitive. This does not change the results.

Table 2: Weaving Towns with Opportunity to Adjust Have More *Swadeshi* Participation

	Dependent variable:		
	log(Events+1)	Events per 1000 People	Any Event?
	(1)	(2)	(3)
Opportunity to Adjust	0.192***	0.066***	0.097***
	(0.047)	(0.024)	(0.020)
Num.Obs.	360	360	360
# Districts	115	115	115
DV Mean	0.33	0.09	0.22
Controls?	✓	✓	✓
Province FE?	✓	✓	✓

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: *All regressions are at the town level. Standard errors are clustered at the district level in parentheses. Controls include town population (logged), effective distance to nearest port in 1855 and 1900, cotton suitability, percent of a district's population that is Muslim, linear terms for town latitude and longitude, and whether the town is a large city.*

Table 2 shows the results. Columns 1 and 2 show that the opportunity to adjust had a large and positive effect on the number of *Swadeshi* meetings held in a town both when looking at aggregate number and per capita. Columns 3 shows a similar effect on the probability of a town selecting into the *Swadeshi* Movement. On average, a one standard deviation increase in the opportunity to adjust is associated with a 21 percent increase in the number of *Swadeshi* events held at a weaving town. Similarly, on the extensive margin, a one standard deviation increase in the opportunity to adjust is associated with a 10 percentage point higher likelihood of a weaving town hosting a *Swadeshi* event, a 40 percent increase from the baseline probability of 22 percent for the average weaving town.[37] This suggests that the opportunity presented by the US Civil War boom increased the likelihood of protectionism among weaving towns.[38] To investigate why, the next section delves into the economic effects of the cotton boom on these weaving towns.

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[37]As a placebo exercise, Appendix Table 14 shows that the effects were significantly smaller, but still positive, in non-weaving towns. Since handloom weaving was widespread in pre-colonial South Asia, we would still expect there to be a historical legacy of weaving in towns not classified as prominent weaving towns in Habib (1982), albeit to a much smaller degree.

[38]As a placebo check, in Appendix Section F I show that the opportunity to adjust is not associated with the likelihood that a town participated in the anti-colonial Mutiny of 1857, four years before the US Civil War. This helps rule out cotton boom towns having a higher pre-shock level of anti-colonial grievance or collective action capacity.

6.2 Economic Effects

Table 3: Weaving Towns Exposed to Opportunity to Adjust Transitioned into Agriculture

	Dependent variable:			
	log(Agricultural Laborer Wage)			Prominent Weaving Town in 1900?
	1870s	1880s	1890s	
	(1)	(2)	(3)	(4)
Opportunity to Adjust	0.027***	0.032***	0.034***	−0.023**
	(0.009)	(0.012)	(0.010)	(0.009)
Num.Obs.	355	355	355	360
# Districts	115	115	115	115
DV Mean	1.61	1.65	1.72	0.06
Controls?	✓	✓	✓	✓
Province FE?	✓	✓	✓	✓

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: *All regressions are at the town level. Standard errors are clustered at the district level in parentheses. Controls include town population (logged), effective distance to nearest port in 1855 and 1900, cotton suitability, percent of a district's population that is Muslim, linear terms for town latitude and longitude, and whether the town is a large city.*

The previous section showed evidence that the US Civil War shock lead to increased participation in the *Swadeshi* Movement. In this section, I present evidence that suggests that this was because the US Civil War shock lead weavers to abandon agriculture in a long-term way. To show this, I estimate regression of the same form as in the previous section, looking at two sets of outcomes at the town level. At the weaving town level, I regress the log of average monthly agricultural wages in Rupees[39] and an indicator for whether a town is still actively involved in weaving in 1900[40] on the town's shock from the US Civil War.

Table 3 presents the results. Columns 1-3 show that weaving towns with higher levels of opportunity to adjust sustained higher agricultural wages than otherwise less treated towns up until the 1890s. Specifically, a one standard deviation increase in the opportunity to adjust is associated with a 2.7 percent higher agricultural wage up until the 1870s. This wage gap between more and less shocked places persists throughout the rest of the century, expanding slightly to 3.5 percent by the 1890s. Therefore, places that had the opportunity to transition into agriculture in the 1860s sustained a higher agricultural wage up until at-least

[39]I construct an agricultural wage series using the *Prices and Wages in India* from 1902, a colonial era document that recorded yearly agricultural wages at given districts and towns from the 1870s to the 1890s. I average a district's decadal wage and then use spatial interpolation to estimate the agricultural wage at any given town in my sample. I use simple interpolation with a quadratic kernel to estimate this town level wage series. I then estimate the effect of the civil war shock on long-term town level agricultural wages.

[40]I use a variety of archival sources, most notably Roy (2020) and the *Imperial Gazetteer of India* 1909 to measure whether a town was still actively involved in weaving as of 1900.

the 1890s.

Did the higher agricultural wage in treated regions result in a long-term transition out of handloom weaving? Column 4 confirms that weaving towns that had a larger shock from the US Civil War were less likely to still be actively engaged in weaving in 1900, and that districts with a larger shock were likely to have a greater pool of weavers who had abandoned weaving. Quantitatively, a one standard deviation opportunity to adjust is associated with a 2.3 percentage point lower likelihood of being an actively weaving town. Given that the on average only 6 percent of towns were actively weaving in 1900, this suggests that for the average town, a two standard deviation increase in the opportunity to adjust is sufficient to make it almost completely abandon handloom weaving.

Taken together with the results in the previous section, this establishes strong evidence that regions that had seen rapid transition out of weaving and into agriculture in the 19th century exhibited greater levels of support for the *Swadeshi* movement. It also suggests that political organization was weaker among regions that continued to have large numbers of active weavers holding on to their profession. This includes handloom weavers who survived perhaps due to improvements in production technology or product differentiation. But it also includes weavers who were in a precarious economic situation because their industry was in decline. Without the outside option of cotton cultivation, one might expect these regions to be particularly likely to take part in movements for economic nationalism. However, this is not what I find.

7   Mechanisms and Discussion

Why did communities that transitioned into agriculture exhibit higher levels of support for the *Swadeshi* Movement? In this section, I probe the mechanisms behind this result.

Section 2 outlined three possible reasons why producers made obsolete by technology might support protectionism. First, the null hypothesis is that protectionism will arise when producers fail to adjust to comparative advantage sectors. The results in Section 6 strongly suggest that the null hypothesis is incorrect in our setting. In South Asia after the Industrial Revolution, agriculture – especially exported cash crops – was the comparative advantage sector (Bhavnani and Jha, 2014). Declining weaving communities that found themselves enriched by the cotton boom should have internalized the preferences of their new sector and become likely to support a movement for the revival of handloom weaving. In the sections below, I test whether my results are driven by identity or power-based attachments to the declining industry.

7.1 Identity-Based Attachment to the Declining Sector

As theorized in Section 2, one possibility is that weavers who transitioned to agriculture felt a greater sense of cognitive dissonance from working in a sector not prescribed by the identity. To test this, I exploit the fact that much of pre-Industrial Revolution textile manufacturing in South Asia was conducted by members of caste-based groups specializing in weaving (Roy et al., 1999). Appendix Section 9 lists the castes that are classified as historically specialized in weaving in different regions of South Asia.

If identity concerns drive my results, we should observe a larger treatment effect in regions where textile production was more caste-based. This is because weaving is more likely to have become a part of weavers' identity in these regions. As producers left agriculture, not only would they have felt a cognitive cost of not actively weaving, but the social status of the weaving group would have experienced a decline. In response to the cotton boom, places where weaving was internalized in caste identity would become more protectionist. To test this, I collect district-level data on the percent of a district that belongs to a weaver caste (multiplied by 1000 to ease interpretation) and interact this variable with the US Civil War shock. Table 4 shows the results.

Table 4: Effect of Opportunity to Adjust Stronger in Areas with Caste-Based Weaving

	Dependent variable:	
	log(Events+1)	Prominent Weaving Town in 1900?
	(1)	(2)
Opportunity to Adjust X Weaver Caste per Capita	0.022***	0.002**
	(0.003)	(0.001)
Opportunity to Adjust	0.178**	−0.092***
	(0.076)	(0.028)
Weaver Caste per Capita	−0.005***	0.003**
	(0.002)	(0.001)
Num.Obs.	342	342
# Districts	115	115
DV Mean	0.33	0.06
Controls?	✓	✓
Province FE?	✓	✓

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: *All regressions are at the town level, and only include weaving towns. Weaver Caste per Capita records number of weaver caster members per 1000 people in a district in 1901. Standard errors are clustered at the district level in parentheses. Controls include town population (logged), effective distance to nearest port in 1855 and 1900, cotton suitability, percent of a district's population that is Muslim, linear terms for town latitude and longitude, and whether the town is a large city.*

Column 1 shows a positive and statistically significant interactive effect of caste identity

on the effect of the opportunity to adjust. Specifically, increasing the percent of weaver caste per 1000 people in a district by one standard deviation (30.4 units) increases the effect size by 0.66. This means that in a town that goes from having no weaver castes to one standard deviation more weaver castes per 1000 people, the effect of the cotton boom on the number of *Swadeshi* meetings is 3.8 times larger.[41]

While this test shows that the effect of the opportunity to adjust is stronger in regions where traditional weaver castes live, it is biased by the possibility that producers belonging to a weaver caste might also be less likely to leave weaving for agriculture. Column 2 of Table 4 confirms that towns located in districts with more weaver castes are also more likely to have kept actively weaving until at least 1900.

A more pointed test is to see whether the effect is stronger in regions populated by weaver castes who left their traditional occupation for agriculture. To test this, I use the fact that the 1901 Census of India listed, for a selected group of castes in each province, the number of caste members still working in their caste's traditional occupation.[42] I use this province-level variable to come up with the following measure of caste obsolescence at the district level:

$$\textbf{Caste Obsolescence}_i = \sum_{k \in K} s_{k,p(i)} m_{ik}$$

Where K is the set of weaver castes in British India[43], m_{ik} is the proportion of district i's population that belongs to caste k (multiplied by 1000 for ease of interpretation). $s_{k,p(i)}$ is the proportion of active working members of caste k in district i's province $p(i)$ that work in a profession other than textiles. Caste obsolescence then estimates the number of "obsolete" weaver caste members per 1000 people in a district. This variable has a mean of 4.4 and a standard deviation of 6.1. I interact this variable with the US Civil War shock in regressions similar to those in Table 4.[44]

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[41]Appendix section F.4 uses the tercile binning estimator from Hainmueller, Mummolo and Xu (2019) to show that the effect is linear.

[42]For example, in Bengal, 53 percent of the active working population of the Jolaha weaver caste worked in textile weaving. Compared to this, in Madras, 94 percent of the Devanga weaver caste worked in textile weaving.

[43]See Appendix Section A.2 for the list of weaver castes in British India.

[44]For Punjab and UP, I use the 1911 census to calculate the province level measure m_{ik} since the 1901 census does not report this information. While this number is likely biased downward due to the *Swadeshi* movement itself, both these provinces have one main weaving caste (Jolahas) and so are unlikely to bias the results significantly. Removing Punjab and UP from the analysis does not change the results meaningfully.

Table 5: Effect of Opportunity to Adjust Stronger in Areas with more Caste Obsolescence

	Dependent variable:	
	log(Events+1)	Prominent Weaving Town in 1900?
	(1)	(2)
Opportunity to Adjust X Caste Obsolescence	0.031***	−0.004***
	(0.006)	(0.001)
Opportunity to Adjust	0.121**	−0.012
	(0.052)	(0.010)
Caste Obsolescence	0.001	−0.001
	(0.007)	(0.004)
Num.Obs.	360	360
# Districts	115	115
DV Mean	0.33	0.06
Controls?	✓	✓
Province FE?	✓	✓

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: *All regressions are at the town level, and only include weaving towns. Standard errors are clustered at the district level in parentheses. Controls include town population (logged), effective distance to nearest port in 1855 and 1900, cotton suitability, percent of a district's population that is Muslim, linear terms for town latitude and longitude, and whether the town is a large city.*

Table 5 shows the results. Column 1 shows a positive and statistically significant interactive effect of caste obsolescence on the effect of the opportunity to adjust. Specifically, towns in districts with one standard deviation more obsolete weaving castes (6.6 higher units) have a 1.6 times larger treatment effect. At the same time, these towns are significantly less likely to have kept weaving through 1900. Appendix section F.4 uses the tercile binning estimator from Hainmueller, Mummolo and Xu (2019) to show that the effect is driven largely by the highest tercile of caste obsolescence. Taken together, these results suggest that identity-based attachments to the declining industry were an important reason those who transitioned into agriculture became more protectionist.

7.2 Institutional Advantages in the Declining Sector

Another possibility outlined in Section 2, not mutually exclusive with identity-based concerns, is that transitions to agriculture exacerbated a decline in handloom communities' institutionalized bargaining power with their commercial intermediaries. What does this mean in our context? In British India, agricultural cultivators were often ruthlessly exploited by landlords for whom they served as tenants (Bagchi, 2010). This system of exploitation has its roots in the revenue needs of the colonial (and pre-colonial) state. Under British Rule, the "Permanent Settlement" of 1793 declared many areas of British India under a *zamindari* (i.e. landlord-based) tenure system where the state made landlords ultimately liable for a

fixed amount of tax revenue. In other areas, a flexible or "temporary" settlement made landlords responsible for more variable amounts of taxes that depended on output. In both these *zamindari* areas, landlords institutionally exercised greater bargaining power than cultivating tenants. They were free to decide the terms of a contract with cultivators. The lack of well-functioning financial markets meant that cultivators often found themselves heavily indebted under high-interest loans from landlords.[45]

In contrast to agricultural laborers, weavers often had much more bargaining power with their intermediaries, such as merchants and (in earlier times) the East India Company (Parthasarathi et al., 2001; Arasaratnam, 1980). Weavers often exercised various methods of protest and collective action to extract favorable terms from intermediaries and political authorities. These included petitions, work stoppages, and temporary abandonment of looms. Wielenga (2016), for example, mentions instances of "weavers dismantling their looms and leaving without returning advances because of unfair treatment."

If the mechanism behind the main results is a loss of bargaining power as weavers moved into agriculture, areas with greater landlord-power will feature a stronger effect of the civil war shock on economic nationalism. I test this by looking at the heterogeneity of the effect by which land-tenure institution was put in place by the British. I use agricultural surveys[46], supplemented with data from Banerjee and Iyer (2005) and Lee (2019) to code districts into either zamindari or non-zamindari based land-tenure systems. I then interact this dummy variable with the opportunity to adjust variable in regressions similar to those in Tables 2 and 3. Column 1 of Table 6 shows the results. As the coefficients show, land-tenure institutions have a strong interactive effect on political organization for the *Swadeshi* movement. Specifically, the effect of the opportunity to adjust is 4.3 times larger in *zamindari* areas than in *non-zamindari* areas.[47]

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[45]Areas not under a landlord-based tenure system were largely under *raiyatwari* (cultivator-based) or more rarely *mahalwari* (village-based) land-tenure. In these areas, the responsibility to pay taxes to the state lay with individual cultivators or village communities rather than landlords. Hence the distribution of bargaining power between landlords and peasants was much more equal in these areas. As an extensive literature in political economy has shown, areas with non-landlord-based land tenure performed better in the long run, having higher productive investments in agriculture, health, and education (Banerjee and Iyer, 2005; Kapur and Kim, 2006; Pandey, 2010).

[46]Specifically, I use the *Agricultural Statistics of India* (1894).

[47]I fail to find any such interactive effects on whether the town is still weaving, suggesting that the effect of landlord power did not operate by encouraging or discouraging weavers from leaving their profession but was based on what happened after weavers had already adjusted into agriculture.

Table 6: Effect of Opportunity to Adjust Stronger in Areas with Powerful Landlords

	Dependent variable:	
	log(Events+1)	Prominent Weaving Town in 1900?
	(1)	(2)
Opportunity to Adjust X Landlord Tenure	0.598***	−0.039
	(0.131)	(0.068)
Opportunity to Adjust	0.139***	−0.021*
	(0.053)	(0.011)
Landlord Tenure	−0.128**	−0.003
	(0.053)	(0.027)
Num.Obs.	232	232
# Districts	115	115
DV Mean	0.33	0.06
Controls?	✓	✓
Province FE?	✓	✓

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: *All regressions are at the town level, and only include weaving towns. Standard errors are clustered at the district level in parentheses. Controls include town population (logged), effective distance to nearest port in 1855 and 1900, cotton suitability, percent of a district's population that is Muslim, linear terms for town latitude and longitude, and whether the town is a large city.*

These must be interpreted with caution. First, they rely on relatively sparse variation since land tenure did not vary meaningfully within many provinces such as Bengal. The regression, therefore, excludes provinces with no variation in land tenure institutions. Even within provinces, *zamindari* areas might not be assigned in a way that is plausibly exogenous to the region's politics. While Banerjee and Iyer (2005) make a strong case that the division of districts into *zamindari* and non-*zamindari* land tenures was often decided haphazardly, they admit that in many areas, the British chose to institute a *zamindari* system because it had already existed before colonial rule. Nevertheless, these results support the idea that those who transitioned into agriculture became protectionist because they found their political power diminished considerably.

7.3 Technology Adoption Reduced Protectionism

If the mechanism behind the main result has to do with weaving communities having institutional or identity based attachments to weaving, then providing these communities with the ability to adopt technology rather than adjust to agriculture should make them less protectionist. This is because adopting technology would allow them to remain in the weaving sector.

To test this, I use the fact that certain Protestant missionaries in British India were prominent for aiding the process of technology transfer and adoption from the global frontier.

Specifically, Basel missions were Swiss protestant missions that, as early as 1851, imparted highly specialized technical knowledge about textile weaving to former handlooms weavers. These included the introduction of the fly-shuttle loom and modern methods of dyeing (Roy, 2020).

I use the *Atlas of Protestant Missions* (Beach, 1901) to geo-locate protestant missions in South Asia as on 1901, coding whether the mission belonged to the Swiss Basel missionaries. I found 26 towns in Madras and Bombay with an active Basel mission as of 1901. Restricting the analysis to these two provinces, I use an indicator for the presence of a Basel mission in a town as the independent variable. I regress the relevant town-level political and economic outcomes on this indicator. I control for the presence of any protestant mission in a town to account for the possibility that contact with Western missionaries affected political preferences. Table 7 shows the results of the regression. Column 1 shows that towns with a Basel mission were much less likely to host *Swadeshi* meetings, while Column 2 shows that these towns were more likely to be actively weaving in 1900. The ability to borrow technology from the global frontier reduced the likelihood of weaving communities becoming protectionist.

Table 7: Technology Transfer through Missionaries Reduced Protectionism

	Dependent variable:	
	log(Events+1)	Prominent Weaving Town in 1900?
	(1)	(2)
Basel Mission	−0.222*	0.101*
	(0.124)	(0.055)
Any Protestant Mission	0.327***	−0.075**
	(0.091)	(0.030)
Num.Obs.	360	360
# Districts	115	115
DV Mean	0.33	0.06
Controls?	✓	✓
Province FE?	✓	✓

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: *All regressions are at the town level, and only include weaving towns in Bombay and Madras. Standard errors are clustered at the district level in parentheses. Controls include town population (logged), effective distance to nearest port in 1855 and 1900, cotton suitability, percent of a district's population that is Muslim, linear terms for town latitude and longitude, and whether the town is a large city.*

Taken together, I find evidence suggesting that switching to agriculture rather than staying in weaving deprived weaving communities of the opportunity to benefit from the technology produced during the Industrial Revolution. It is important to note that this evidence is suggestive, as data availability constraints prevent us from having direct evidence of technology adoption in Basel mission areas. Nevertheless, the result above does suggest

that methods of adjustment that involve internalizing the benefits of technology can reduce the demand for protectionism.[48]

8   Conclusion

Globalization makes it easy for countries to share technological innovations across borders. In principle, sharing technology can improve global welfare, vindicating open borders and highlighting the perils of luddite policies that block technological change. However, in a world where adapting to new technologies is not frictionless, technological change can make obsolete large populations specialized in old forms of production. This is not new. From the printing press to the modern computer, new technologies often displace large sections of a country's population. Under what conditions do those affected by technological change organize politically to counter it? And in an open economy, how does this interact with preferences for barriers to international trade? Despite the intricate connection between technological change and trade policy, we have surprisingly little scholarly work on how the politics of the two interact.

In this paper, I make progress on this question by studying one of the most consequential instances of technological obsolescence in modern history: the decline of manufacturing in South Asia as a consequence of the Industrial Revolution. Throughout the late 18th and 19th centuries, improvements in British textile machinery, as well as the rapid integration of India into world markets displaced large communities of handloom textile workers in India. How did these communities react to technological disruption from abroad?

To answer this question without large-scale surveys or data on voting behavior is an empirical challenge. I overcome this challenge by studying the *Swadeshi* movement: a boycott movement of British textile goods in the early 20th century by the nascent Indian nationalist movement. I use new digitized archival data to measure adherence to the movement using geo-located data on political organization. I find that while all types of Indian textile producers could have supported the boycott in principle, support was highest in regions where weavers had transitioned into agricultural cultivation. To identify the effect of transitioning into agriculture, I utilize a natural experiment provided by the US Civil War, which increased world demand for raw cotton, providing many weaving communities an opportunity to adjust to agriculture. I find consistent evidence that communities that adjusted into agriculture were *more* likely to organize for protectionism than communities that had not

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[48]Other explanations are also possible, and I assess them in Appendix C. Specifically, I argue that my findings are unlikely to result from lower long-term income in agriculture, organization by landed elites themselves, or a general change in market access.

had this opportunity.

To probe the mechanism behind this result, I evaluate its heterogeneity by the geographical distribution of social and political institutions that affected producers' attachment to their sectors. I find evidence that identity mattered – producers who had internalized their sector of work as part of their identity were more likely to respond to adjustment by participating in the *Swadeshi* Movement. I further find evidence suggesting that transitioning into agriculture resulted in a fall in weavers' bargaining power with their commercial intermediaries. Political institutions that govern the distribution of power and rents within different industries, therefore, strongly condition the political success of adjustment to new technology.

The results also suggest that those who transitioned into agriculture could not fully benefit from technology from the Industrial Revolution. Those who stayed in weaving were able to incrementally adopt new technology in weaving or find employment in modern mechanized mills. Overall, this highlights the perils of assuming that adjustment to technology is an unmitigated good. Adjustment, even when successful in income terms, can fail if those who adjust cannot internalize the benefits of new technology.

The results raises important questions for future research. First, why do those made obsolete often channel their grievance into protectionism rather than luddism, or a demand to slow or tax technological progress? How do existing political institutions work to determine the nature of this grievance? Relatedly, what happens when the distribution of power is more unequal in the industry subject to the new technology shock, rather than the comparative advantage industry? Does this make adjustment to technological disruption easier or harder? This paper also draws a causal arrow between 19th century globalization and the global movement for de-colonization that occurred a century later. Not only were movements to de-colonize animated by globalization shocks, this legacy also helps to explain why so many former colonies started their lives as independent states in a state of protectionist trade barriers. My findings suggest a large part of the answer was that colonized societies failed to benefit economically from Britain's rise to technological dominance.

The theory laid out in this paper also helps us understand other instances of technological disruption. For example, the theory predicts that when producers move to an industry where they experience an increase in institutionalized power, adjustment will not result in political organization. This helps explain why agricultural mechanization in the United States in the 20th century did not result in a mass movement among those who were displaced. Agricultural labor was low-skilled, and moved into largely service and manufacturing sector jobs, many of which were unionized. In general, technology biased against low-skilled labor might be less likely to engender a political backlash. This is because adjustments to such

technologies involves increasing the skill-level of workers, in effect helping them internalize the benefits of technological progress.

More broadly, this paper also joins recent work by Jha (2013), Casler and Gaikwad (2019), Bhavnani and Jha (2014) and others that analyzes the international political economy of South Asia, especially in a historical context. As a region that today houses a quarter of the world's population, South Asia and its position in the global economy is important for scholars of international relations to understand in its own right. Further, the experience of this region with historical forces such as globalization and the Industrial Revolution is poorly understood within international political economy[49]. By gaining a fuller understanding of South Asia's politics during past periods of economic change, we can better understand the trajectory of the region both politically and economically.

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[49]By contrast, the economic history of South Asia is a vibrant field of study within economic history. See Roy (2018) for an excellent overview

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