

Trade disruption, industrialisation, and the setting sun of British colonial rule in India*

[Preliminary, please do not circulate]

Roberto Bonfatti (Universities of Padua and Nottingham)
Björn Brey (University of Nottingham)

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Abstract

Colonial trade policies typically encouraged trade between the mother country and the colonies, and the resulting specialisation of the colonies in the production of primary products. Did this hinder development in the colonies, and was it instrumental in keeping the European empires together? We address these questions in the context of colonial India, by studying the impact of the World War I-related drop in net imports from Britain in 1913-1917 on Indian industrialisation and attitudes towards empire. We exploit cross-district variation in exposure to the trade shock, stemming from initial (1911) differences in industry specialization. We find that districts more exposed to the trade shock experienced a greater increase in the share of industrial employment to total population between 1911 and 1921. In our baseline estimate, the average district saw its share of industrial employment increase by 7% of its initial value due to the trade shock. This was entirely due to an increase in the number of Indian-born (as opposed to British-born) administrative staff and workers. We also find that, in districts more exposed to the trade shock, members of the Indian National Congress expressed stronger anti-empire feelings by 1922, being more likely to support civil disobedience and the boycott of British goods and courts. These results suggest that colonial trade may have played an important role in keeping some colonial economies behind, and in embedding foreign rule.

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1 Introduction

One common feature of European colonial empires was the prominence of trade between the colonial power and the colonies. Such trade was strongly encouraged by the colonial power, resulting in a pattern of specialisation whereby the colonies would export mainly primary products. This prompts two important questions: did specialisation in primary products hinder development in the colonies? And was the economic interdependence created by specialisation one of the forces that helped to keep the empires together?

We attempt to answer these questions in the context of colonial India in the early 19th century, using World War I as an exogenous negative shock to trade. Colonial India is the quintessential example of what we intend to study, for a number of reasons. First, Britain was the most successful colonial power of the last two centuries, and India was her most important colony. Second, Britain kept India open to the most unfettered free trade in the second half of the 19th and early 20th century (though this applied to trade with any country, not just Britain). Third, the expansion of British-Indian trade in the 19th century went hand-in-hand with one of the most spectacular episodes of specialisation in history, whereby Britain experienced the Industrial Revolution and became the “workshop of the world”, while India (once an important producers of manufactures) progressively de-industrialised. And fourth, academic and non-academic commentators have repeatedly argued that colonial trade was one of the root causes of India’s poor economic performance in colonial times.

In approaching the problem, we are guided by the following theoretical considerations. First, to be able to hypothesise that specialisation may be bad for development, one needs to adopt a dynamic model of trade.¹ We (informally) adopt one prominent model of this kind, the so-called infant industry argument. According to that argument, there may exist in a country manufacturing industries which would become competitive if they were able to reach a minimum size (e.g. due to increasing returns to scale). If such industries exist, then trade openness may make it impossible for them to emerge, putting the country on a lower growth trajectory and ultimately reducing its welfare. One implication of this model is that even a temporary reduction in trade (such as the one generated by World War I) could have a positive and lasting effects on colonial industrial development. We take this as our first testable hypothesis.

Second, we expect that specialisation in primary products should make it less attractive for a colony to rebel against the colonial power, while industrialisation should make it more attractive. This follows from the observation that to be part of an empire typically meant lower trade costs between the colony and the mother country.² But while for producers of primary products this was beneficial, as it meant easier access to an important destination market, for manufacturers it was detrimental, as it implied greater competition. Thus, it is reasonable to

¹Specialisation cannot possibly be bad for welfare in a static model, where countries simply get to produce more of what they are relatively good at producing. Another dynamic model of trade in which specialisation may be bad for welfare is the endogenous growth model by [Grossman & Helpman \(1993\)](#). In that model, the manufacturing sectors generate more growth than the primary sectors, e.g. due to greater spillovers or learning by doing.

²It could also mean greater trade costs with the rest of the world, in which case the argument would only holds insofar as the mother country is important enough a trade partner for the colony. This is less of concern for early 20th century colonial India, which was allowed to trade with everyone on a non-discriminatory basis, and for whom Britain was by far the most important trade partner.

expect that a colony where producers of primary products are very influential should be less hostile to empire than a colony where manufacturers are very influential. This yields a second testable hypothesis: to the extent that a temporary reduction in trade has a positive and lasting effect on industrial development, it should also increase hostility towards the empire.

To test for the first hypothesis, we investigate whether Indian districts with a higher exposure to the trade shock induced by World War I (1914-1918) were also those which industrialised more between 1911 and 1921 (that is three full years after the end of the war). More in detail, we compare product-level data on Indian net imports from Britain in 1913 and 1917 (respectively, the last full year before the war, and the last full year of the war) to infer the impact of the war on colonial trade at the product level.³ We then match this product-level measure of trade shock to industry-level employment data from the 1911 and 1921 Indian censuses, and construct a district-level measure of exposure as in [Autor et al. \(2013\)](#). In this approach, an Indian district had a large exposure to the trade shock if, in 1911, it employed many people in sectors which were then hit hard by the shock. Finally, we regress the change in a district’s share of industrial employment to total population between 1911 and 1921, on its exposure to the 1913-1917 trade shock.

To test for the second hypothesis, we investigate whether districts with greater exposure to the 1913-1917 trade shock were also those where, in 1922, members of the Indian National Congress (INC) were more in favour of rebellion against Britain. In the summer of 1922, at a time in which it was re-organising to become the mass party that would lead the country to independence (1947), the INC entrusted a “Civil Disobedience Enquiry Committee” with the task to tour the country and ask local party members how they thought the party should best conduct its struggle against Britain. The party members were presented with a questionnaire which asked them how ready they felt to adopt civil disobedience, whether or not they favoured a boycott of British courts, education and products, and whether or not they favoured private defence and labour organisation. From the Committee’s report, we know the responses to these questions for up to 194 local party members, scattered all over India. We then regress a district’s average response to each question on the district’s exposure to the 1913-1917 trade shock.

Our results are supportive of both hypotheses. In the first set of regressions, we find that Indian districts that were exposed to a greater fall in net imports from Britain in 1913-1917 witnessed a greater increase in industrial employment between 1911 and 1921. This is after controlling for initial (1911) industrial employment, which alleviates the worry that initially more industrialised districts may be both more exposed to the trade shock, and more likely to industrialise further. The effect is statistically and economically significant: in our baseline, as one moves from the 10th to 90th percentile in exposure to the shock, the share of industrial employment to total population increases, on average, by an extra 12% of the initial value. As one would expect based on an infant industry argument, the effect is entirely driven by the fall in net imports of manufactures between 1913 and 1917. Finally, two separate pieces of evidence suggest that the shock primarily benefited indigenous Indian manufacturing, as opposed to British-owned one. First, when we decompose our baseline result, we find that the rise in industrial employment was entirely driven by Indian nationals (administrators and unskilled

³In the aggregate, import for Britain accounted for a huge proportion of Indian imports (64.2% in 1913), and the war had a tremendous impact on them (their real value decreased by 52% between 1913 and 1917).

workers), as opposed to British nationals living in India. Second, the shock also had a positive and significant effect on the number of industrial firms operating in a district, but only in the case of Indian-owned firms.

In our second set of regressions, we find that, controlling for 1911 industrial employment, INC members from districts that were more exposed to the trade shock were also more likely to take a rebellious stance against Britain. In particular, as one moves from the 10th to 90th percentile in exposure to the shock, INC members become 3% more likely to declare themselves ready for civil disobedience, 29% more likely to be in favour of a boycott of British products, and 15% more likely to be in favour of a boycott of British courts for political cases. Reassuringly, a placebo test reveals that exposure to the trade shock does not predict pre-existing attitudes towards rebellion, as measured through an indicator variable for whether or not a district took part in the 1857 Indian mutiny.

Our results are preliminary, but if taken at face value they have important implications for the debate on the economic legacy of empires. At first sight, the colonial relationship between Britain and India in the early 20th century may appear a relatively benign one, since India, unlike the colonies of most other European powers, was not subject to the kind of discriminatory regulations that would explicitly favour the business of British nationals over that of Indians or third-country nationals.⁴ Yet, our results suggest a more nuanced view: by failing to adopt a more proactive policy of industrial protection (at least not until the 1920s), British *laissez-faire* may have significantly slowed down Indian industrial development. If one takes the infant industry argument literally, this may have decreased the joint welfare of Britain and India.

It is easy to imagine reasons why Britain may have consciously chosen such a suboptimal policy. First, to promote manufacturing activity in India would have come at the cost of discouraging manufacturing activity in Britain, and the UK government was presumably more capable to tax the latter than the former. Second, UK manufacturers were presumably more politically influential than Indian manufacturers, both for their closeness to the British government and for their role as creators of employment in Britain. But our political results suggest a third reason: industrialisation in India was likely to make her rebellion more likely. To the extent that Britain anticipated this, the fear of compromising future rent from empire may have played a role in shaping her colonial industrial policy, in India as well as in other colonies.

The paper is related to two strands of literature in economics. The first is a literature on the impact of import competition on deindustrialisation and political attitudes in developed countries in recent decades, started and continued by a series of papers by David Autor, David Dorn, Gordon Hanson and colleagues (Autor et al. (2013), Autor et al. (2015), Acemoglu et al. (2016) and Autor et al. (2016)). We apply the method devised by those authors to a very different context, that of colonial India during World War I. As a result, our paper differs from those in that literature in several respects: from a theoretical perspective (we focus on the infant-industry argument, while they focus on the decline of mature industries), for the nature of the trade shock considered (ours is more plausibly exogenous than theirs, and more short-term in nature) and for the political outcome of interest (they focus on political polarisation and

⁴For a survey of colonial policies in that period, see [US Tariff Commission \(1922\)](#).

anti-globalisation sentiments in modern democracies, while we focus on anti imperial sentiments in a colony).

The second literature is the empirical literature on the infant industry argument. The paper in that literature which is closest to our own is also the most recent one, [Juhász \(2018\)](#). She studies the effect of protection from British imports resulting from the Napoleonic Wars (1803-1815) on the adoption of mechanised cotton-spinning in France. She finds that protection had a positive effect on technology adoption and value added per worker both in the short-run and in the long-run. Differently from us, [Juhász \(2018\)](#) exploits geographical variation, stemming from the fact that the increase in trade costs generated by the wars differed across regions of France. Also, she does not focus on the political implications of the trade shock.

The paper is also related to an earlier paper by one of the current authors, [Bonfatti \(2017\)](#). That paper models a colony's cost of rebellion as a function of trade flows between the colony, the colonial power, and the rest of the world. It finds that industrialisation in the colonial power makes it less attractive for the colony to rebel, while industrialisation in the colony makes it more attractive. The political part of the current paper is closely inspired by the latter result. Another implication of [Bonfatti \(2017\)](#) is that the effect of colonial industrialisation on the cost of rebellion should be stronger, the more industrialised the colonial power is relative to the rest of the world. This suggests an additional reason why early 20th-century India should be seen as a quintessential case study for us (given how relatively industrialised Britain was back then), and why one should be cautious to generalise our results to the case of other colonies and colonial empires.

Finally, the paper is related to a thick literature on early 20th-century India by economic historians and political scientists. We will summarise that literature in Section 2 of this paper.

The paper is organised as follows. Section 2 provides some historical background. Sections 3 and 4 describe our empirical approach, and how we collected and prepared the data. Sections 5 and 6 present our results on, respectively, industrialisation and political outcomes. Section 7 concludes by describing our current and future research plans.

2 Historical Context

We begin in Section 2.1 by reviewing India's involvement in the World economy on the eve of World War I. We then briefly discuss the impact of World War I on industrialisation (Section 2.2) and anti-empire sentiments (Section 2.3).

2.1 Colonial trade, specialisation and industrialisation

India adhered to the principles of free trade on the eve of World War I, and Britain was by far her most important trade partner. Figure 1 shows that Britain was the most important source of imports for India, with Germany only a very distant second. Table 1 reveals that Britain accounted for a huge share of Indian imports, though it was less important as a destination for India's exports.⁵ The same table reveals that almost all of India's main sources of imports

⁵India had a trade deficit vis-a-vis Britain, but a trade surplus overall. Thus, it earned foreign exchange on world markets, which it then transferred to Britain both through the trade deficit and through capital movements

(with the exception of Java) were advanced industrial countries, suggesting a classical pattern of specialisation whereby India imported manufactures and exported primary products. This pattern is evident in Figure 2, which decomposes India's trade flows with Britain in these two categories. India's main imports from the UK were cotton textiles (both intermediate and final), iron, steel and copper products, and machinery and parts (Figure 3).

This pattern of trade was the result of a century-long process of specialisation. Until the 18th century, India was the world's dominant producer and exporter of cotton textiles, a position which she held thanks to her low wages and her abundant stock of human capital (in the form of family-transmitted artisanal skills; see Gupta & Roy (2017), p. 229). In the 19th century, however, as Britain went through the industrial revolution, India progressively de-industrialised. This process went hand in hand with a surge in trade between the two, and the progressive consolidation of British colonial rule over India.⁶

What the 1913 pattern of trade does not fully reveal is a trend towards re-industrialisation which had been at play in India since the last decades of the 19th century. This is the period when modern industry began to emerge in peripheral countries, as technology from Britain and other industrial countries began to spread and the decline in trade costs, which had until then favoured an increase in international specialisation, subsided (Clingingsmith & Williamson (2008), pp. 223 and 231).⁷ As part of this broader trend, India was rather successful. Her industrial employment grew from around 100,000 in 1860 to around 2 millions in 1940. India accounted for 55 per cent of cotton spindles installed outside Europe, North America and Japan in 1910, and for 50 per cent of steel produced in 1935 (Gupta & Roy (2017), p. 232). The output of manufacturing industries increased at an average real rate of 5.16% between 1900 and 1944 (Sivasubramonian (1997), p. 140). The first industries to take off were the Calcutta jute industry, the Madras textile industry, the Bombay and Ahmedabad cotton textile industry, and metallurgy and engineering (which however only developed after 1900, as the railways provided both access to the required minerals and demand for finished products; Gupta & Roy (2017), pp. 239-41). While some of these industries were dominated by Europeans (mainly in Calcutta, Madras and Kanpur), others were chiefly indigenous (in Bombay and Ahmedabad). According to some historians, these two groups of producers specialised in complementary activities: while the Europeans raised capital on the London market and produced for export markets using London as a transportation hub, the indigenous producers (mostly traders and bankers) raised capital from family and community resources and sold their products in India and China (*Ibid.*, pp. 236-7).⁸

(mainly the salaries and pensions to British civil servants and other skilled immigrants working in India; see for example Gupta & Roy (2017), p. 236).

⁶Although hard data on India's deindustrialisation are hard to come by, historians tend to accept that industrialisation did happen, particularly in upstream industries such as cotton spinning and metal smelting (see for example *Ibid.*, pp. 230-31).

⁷India artisanal manufacturing also had a revival in the early decades of the 20th century (Gupta & Roy (2017), pp. 240-41).

⁸Despite this relative success, modern industry remained a very small part of the Indian economy, limited to consumer goods, and almost entirely concentrated in a few regions. In particular, industrialisation happened in the port cities, where the Indian merchants with greatest entrepreneurial skills and access to British technology lived, and where skilled European workers could more easily move (Gupta & Roy (2017)). Indeed, in our data, average 1911 district employment in factories above 10 employees was just 0.64% of the total population, but with a relatively large standard deviation of 2.14%.

What is remarkable about this relative success is that, unlike other late-industrialisers, India did not benefit from an interventionist state, at least not until the late interwar period. Towards the end of the 19th century, former or more independent colonies like Latin America, Australia, Canada and New Zealand were able to protect their industries behind a high tariff wall (Williamson (2005), p. 202). In contrast, the Indian colonial government was *laissez-faire*, all the way through World War I and beyond. This meant that Indian industry was fully exposed to competition from advanced industrial countries (*in primis* Britain). In terms of industrial policy, at least in peace time, the colonial government followed a hands-off policy in respect of Indian industry. While this may appear a relatively benign colonial policy, it fell short of providing the kind of active support that many argue is required to kickstart industrialisation. Furthermore, it has been argued that British policy was less neutral than it might seem. At least until World War I, the Indian colonial government followed a buy-British policy in respect of purchases for defence, railways or administration (Gupta & Roy (2017), p. 241). Kohli (2004), pp. 232 and 312, argues that despite *laissez-faire*, in practice the colonial state often helped British businesses in India.

The lack of British support for Indian industrialisation is easy to rationalise, and fits well in the context of broader British and European colonial policy of the time. India was ruled by the Secretary of State for India, which was influenced by a narrow group of agents, amongst which were the British industrialists (Kohli (2004), p. 230). British policy towards industrialisation in the colonies was heavily influenced by the requirement that industrialisation should not damage British economic interests. Meredith (1975), pp. 485 and 497-98, argues that “[...] as time went on the aim of increasing standards of living in the colonies conflicted with that of the maintenance of the colonial empire in a complementary position to Britain as supplier of raw materials and consumer of British manufactures. Where these two clashed it was British metropolitan interests which prevailed”. And: “The unwritten rule in the colonial office was that ‘any proposals, whether in the field of industry or tariffs, which give rise to any conflict of economic interest, should be approached from the standpoint that the United Kingdom trade interests must rank first, Dominions’ trade interests second, and those of the colonies last’”.⁹ Such an anti-industrial approach was common to all other colonisers in Asia in this period, with the exception of the Japanese in Korea, Taiwan and Manchuria (Perkins (2013), p. 26; Kohli (2004)).

The perceived self-interest of British colonial policy sparked a nationalist backlash from the late 19th century onwards. In a famous book (“The discover of India” of 1947), Jawaharlal Nehru, the first president of independent India, squarely blamed colonial policy for the de-industrialisation of India, and similar positions were adopted by leading Indian nationalist writers and economic historians (Clingingsmith & Williamson (2008), p. 217). This view has not yet been proven right or wrong, although Clingingsmith & Williamson (2008) partially criticises it by arguing that the dynamics of domestic grain prices had a bigger role in explaining the drop in Indian manufacturing competitiveness in 1760-1810 than globalisation, and continued to play a role in explaining further de-industrialisation in 1810-1860, and re-industrialisation in 1860-1913. So, the question remains as to what would have happened to India’s industry had it been able to erect protective tariffs like Latin America, Australia, Canada and New Zealand.

⁹It is interesting to note that different parts of the British government had different attitudes: “The Colonial Office was always anxious to avoid giving the impression that they were holding a brief for the United Kingdom manufacturer, but the Board of Trade and the Treasury were quite clear whose interests came first.” (*Ibid.*).

In this paper, we attempt to answer that question by investigating the impact of the *de facto* protection created by World War I.

2.2 World War I and industrialisation

This paper has two goals, the first of which is to study the effect of an exogenous interruption in the traditional colonial exchange (manufactures for primary products) on industrialisation in India (for a discussion of the second goal, see the next section). As a source of that exogenous shock, we are going to use the dramatic collapse in trade flows that occurred because of World War I. However it would be simplistic to characterise the economic effect of World War I simply as an interruption in the traditional colonial exchange: the war had a more complicated effect on trade, and had also non trade-related effects on the Indian economy. In this section, we will first provide an overview of the economic effects of World War I on India. Building on that overview, we will then describe how we intend to single out the “trade delinking” effect of the war. Finally, we will conclude by describing how the historiography of colonial India sees the effect of World War I on Indian industry.

How close to an interruption in the traditional colonial exchange was the shock to British-Indian trade generated by World War I? On the side of India’s imports, the answer is: quite close. India’s imports rapidly collapsed during the war (reaching a low point in 1918, see figure 1), and this was almost entirely due to a collapse in imports of manufactures (figure 2). Such a collapse was likely due to an increase in trade costs between Britain and India,¹⁰ and to a shift in the British economy from production for export markets to production for the war effort (Morris (1983), p. 600). Indeed, Figure 3 shows that the greatest decline happened in war-related industries, such as steel, iron and copper products, locomotives, and wool fabric. The collapse in imports from Britain had two effects on Indian industry, one positive and one negative. The positive effect was that it reduced competition from British manufactures in the domestic market. The negative one was that it made it harder to get hold of the imported capital and intermediate inputs (such as machinery, raw materials, spares, and chemicals) that Indian industries heavily relied on (Gupta & Roy (2017), p. 241).

On the side of India’s exports to Britain, the trade effect of the war was much less similar to an interruption in the traditional colonial exchange. While some exports did fall, others boomed due a rise in war related demand. This applied to both primary products (the bulk of India’s exports) and to manufactures. As a result, the war had a mixed effect on total Indian exports in both categories (figure 2).

The war affected India’s trade with other countries as well. Most notably, trade with Germany collapsed to zero, having been banned by law in 1915. Unlike the case of trade with Britain, this closely resembled to an interruption in the traditional colonial exchange, both on the import side and on the export side. At the same time, imports from British allies such as the US and Japan boomed. Note however that such an increase was too small to compensate for the fall in imports from Britain (figure 1).

¹⁰Important determinants of this increase in trade costs were the unrestricted submarine warfare adopted by Germany in late 1916, and the demand for shipping capacity by the British war effort (Morris (1983), p. 600).

While the war shocked the Indian economy through trade, it had other effects as well. During the war period, the Indian colonial government became a much more important buyer of Indian products. An industrial commission was appointed in 1916 to survey the subcontinent’s industrial resources and potential, and in 1917 a munitions board was created to expedite the production of war materiel. By the end of the war, the munitions board played a huge role as a purchaser of industrial products (Lockwood (2012), p. 37).¹¹ While this was to some extent a manifestation of the trade shock - the colonial government demanded locally products that it would have normally imported from Britain - the bulk of it was likely due to a war-related expansion in public expenditure. For example, India sent more than a million Indian troops overseas, to fight or serve as noncombatants behind the Allied lines. The government of India paid for all these troops, and it must have therefore scaled up its demand for locally-produced equipment. To the extent that this equipment is not recorded in the export data (being carried abroad by soldiers), it is a non-trade channel through which the war may affected industrial production in India.

In summary, the war did imply an interruption in the traditional colonial exchange of manufactures for raw materials: a collapse of imports from and some exports to Britain, and a total collapse of trade with Germany. But it also implied a boom in some exports to Britain, and a relatively small rise in imports from the US and Japan. At the same time, the war scaled up colonial public expenditure, and thus demand for local industrial products.

Because Britain was by far India’s most important trade partner, we focus on trade between India and Britain in our analysis. To isolate the “trade delinking effect” of the war, we proceed as follows. First, we collect data on the change in net imports at the product level from Britain between 1913 and 1917 (respectively the last full year before the war, and the last full year of the war), and construct a district-level measure of exposure to the war shock that is based on the district’s initial specialisation on products for which net imports fell substantially. So, we will be comparing the effect of the war on industry in districts with high exposure and in districts with low exposure, where exposure to the war shock is calculated using only the effect of the war on trade flows. Second, to determine whether the overall effect was due to less competition from imported manufactures and less demand for exported primary products (as in the trade delinking case), or to a war-related boom in demand for exported manufactures or raw materials, we will be decomposing our main exposure variable into four components, constructed using only imports, only exports, and within these two categories using only manufactures and only primary products. Third, to control for a possible correlation between our measure of exposure and the increase in war-related public expenditure, we will check that our baseline estimates are robust to excluding military products.

Economic historians have argued that World War I had initially a negative effect on Indian industry, but eventually a positive effect. At the beginning of the war, industrial production was hit by the lack of capital goods, spares, raw materials and chemicals normally imported from Britain or Germany (Gupta & Roy (2017), p. 241), and by a shortage of skilled workers, particularly British ones (who were in strong war demand, Morris (1983), p. 602). Later, however,

¹¹For example, the Tata Iron and Steel Company began to receive Indian government support once the war started, and by 1916 was producing 100,000 tons of steel per year (*ibid*; Gupta & Roy (2017), pp. 240-41).

Indian industry overcame some of these supply constraints.¹² According to Morris (1983), “As a consequence of wartime shortages and necessities, a variety of things were manufactured in India that had never been produced before [...]” though only for few industries this had important consequences for large-scale industry: jute, cotton, steel, and cement. Lockwood (2012) adds to that list sugar engineering and chemicals. That the war had a positive effect on Indian industry through import substitution was apparent to contemporary observers: Lockwood (2012), pp. 41-42 reports the *Madras Times* as writing, during the war: “as far as the development of industries in India is concerned, the longer the war lasts the better. As soon as it is over, the flood of foreign goods will revive”.

Historians have also argued that the war had lasting effects. Even the constrained expansion during the war years was significant enough to generate handsome profits for many firms. This created a boom psychology after the war, and industrial expansion continued (*Ibid*; Lockwood (2012), pp. 41-42).¹³ Perhaps as a result of this, there was a boom in orders of replacement machinery in 1919 and 1920 (Chaudhuri (1983), p. 838). This “boom psychology” could be rationalised through the implications of the infant industry argument. According to that argument, even a temporary reduction in competition from imports may make an industry permanently more competitive, by generating learning by doing and scale economies. Another possibility is that the war might have changed the reality or at least the perception of industrial policy in India. Gupta & Roy (2017), p. 241, argue that “After the war, the government began to look towards local sources and became more open to promoting such sources by means of protective tariffs. In cotton, protective tariffs became available, with the understanding that a new framework of preferential trade within the empire would minimize the losses to British industry”. It is possible that, for a few years after the war, the actions of the Indian industrialists were influenced by the expectation of a permanent shift in industrial policy (an expectation that would be largely disappointed; Kohli (2004)).

2.3 World War I and the rise of anti-empire sentiments in India

The second and final goal of this paper is to study the effect of an exogenous shock to colonial industrialisation on anti-imperial sentiments in the colony. As a source of that exogenous shock, we are going to use the industrial expansion that (our analysis will reveal) occurred in 1911-1921 because of World War I. In this section, we first discuss the institutional setting, and we then discuss the link that the historical literature has drawn between the emergence of nationalist movements in India in the early 20th century, colonial industrialisation, and World War I.

Unlike more independent colonies such as Australia, Canada and New Zealand, India was still under direct British rule on the eve of World War I. Many nationalistic movements formed from the end of the 19th century to demand for more autonomy. Prominent amongst these was the Indian National Congress (INC), until World War I an elite party, but that would later transform into the mass party that would lead the country to independence in 1947. There

¹²Many factories expanded production by hiring more labour force and working the machines around the clock (*Ibid* p. 621). See also Gupta & Roy (2017), p. 241.

¹³The textbook example of all this would be TISCO (e.g. Lockwood (2012), p. 42). Another development was that, following the war, industrial production became smaller in scale and more geographically spread out. Examples include rice mills on the Madras coast, sugar mills in the Gangetic plains and brick and tile works in Southwestern India Gupta & Roy (2017), p. 241).

was much heterogeneity in the strategies and goals pursued by the nationalists, and indeed the INC was often internally divided. But one goal that they tended to have in common was the determination to secure some sort of protection against foreign manufactures. In fact, the interpretation of India's 19th century de-industrialisation as driven mainly by British trade was one of the most potent weapon in the nationalists' critique of colonial rule (Clingingsmith & Williamson (2008), p. 210). Not surprisingly, a strong sentiment against foreign trade and investment became one of the two key planks of India's development strategy after independence (Roy (2002)).

At the beginning of World War I, India was promised "dominion status" (the status of Australia, Canada and New Zealand) in exchange for its contribution to the war. At the end of the war, however, Britain reneged on her promise, and only conceded the establishment of representative institutions elected on a very limited franchise.¹⁴ Indian nationalism was stirred up by this U-turn, and the INC was no exception. Shortly after the war, the party came under the leadership of Ghandi, who re-organised it into a mass, urban-based party (Krishna (1966)). In September 1920, Ghandi started the *non-cooperation movement*. This consisted of a boycott of elections, government institutions, courts, British education and foreign goods, and eventually of taxes. The non co-operation movement benefited from an alliance that Ghandi was able to form with the All India Muslim League, the leading muslim nationalist party. In February 1922, however, following the killings of police men by an angry mob in the village of Chauri Chaura, Ghandi called off the movement, and was subsequently arrested. He would stay in jail until 1924, thereafter spend a few years on the sideline of Indian politics. By the time that Ghandi got out of jail, the INC had split (as party members who intended to participate in elections seceded into the Swaraj Party) and the alliance with the Muslim League had collapsed, resulting in sectarian violence in many places.

The Indian industrialists had long-standing grievances against the British empire, and some of them are known to have sympathised with the INC from a very early stage. As World War I made the industrialists stronger, however, their support for the INC became more prominent. Gupta & Roy (2017) argue that "[...] World War I enabled big Indian business to expand, and made the leading entrepreneurs take an interest in national politics". The industrialists started to finance Ghandi's movement in the 1920s. Kohli (2004), p. 253, argues that "post World War I furious demand for protection by Indian industrialists was not immediately met by the Colonial State but was taken up by the nationalists, cementing the alliance between the Congress and the industrialists."

To investigate whether industrialisation had a causal effect on the rise of Indian nationalism, we will study whether districts that experienced greater industrial growth between 1911-1921 (as a consequence of being more exposed to the trade shock of World War I) were also those where support for Ghandi's non-cooperation movement appeared stronger. To measure support for the non-cooperation movement, we will use an internal survey run by the INC in the summer of 1922, shortly after Ghandi's detention. The survey was conducted by a "Civil Disobedience Enquiry Committee", whom the INC leaders had entrusted with the task of sensing grass root opinions on

¹⁴Following the India Act of 1919, the first election in the history of colonial India was held in 1920. This election returned the elected members of the Imperial Legislative Assembly and Council of State (the Lower and Upper Houses of India's new parliament, based in Dehli) and the Provincial Legislative Councils.

how best to continue the struggle against Britain. As the Committee toured the country in the summer of 1922, they asked local party members how ready they felt to adopt civil disobedience, whether or not they favoured a boycott of British courts, education and products, and whether or not they favoured private defence and labour organisation. From the Committee’s report, we know responses to these questions for up to 194 local party members, scattered all over India.

3 Empirical Approach

Following Autor et al. (2013), we construct a measure of district-level exposure to changes in British-Indian trade during World War I as follows:

$$\text{EX-IM Shock}_n = \sum_{i=1}^I \frac{L_{n,i,11}}{L_{n,11}} \frac{\Delta(EX - IM)_{i,17-13}^{UK}}{L_{i,11}} \quad (1)$$

where for each industry i , $\Delta(EX - IM)_{i,17-13,i}^{UK}$ is the change in net exports to the UK (in 1911 £) between 1913 and 1917.¹⁵ We use years 1913 and 1917 as they reflect the last full year of peace/war, respectively. $L_{n,i,11}$ denotes the employment in district n and industry i from the Indian 1911 census. $L_{i,11}$ is the employment in an industry at the national level (for the states included in our sample) and $L_{n,11}$ is total district population. Accordingly, the measure EX-IM Shock_n captures a district’s exposure to the change in net Indian exports to the UK between 1913 and 1917, in £ per person. To exemplify, consider first a district with a share of industrial employment to total population equal to 1, or $\sum_{i=1}^I L_{n,i,11}/L_{n,11} = 1$ (everyone works in industry). Then, an exposure of £10 for that district indicates that, in the average sector in the district, net Indian exports to the UK rose between 1913 and 1918 by £10 (per person employed in India in that sector in 1911). This positive change could be the result of an increase in Indian export to the UK, or of a fall in Indian imports from the UK. Consider now two districts which are identical to the first district, except for having shares of industrial employment to total population equal to 0.5 and 0.1 respectively. Then, these districts’ exposure to the trade shock would be £5 and £1 respectively.

As this example illustrates, the difference in EX-IM Shock_n across districts stems entirely from variation in local industrial employment structure in 1911. The observed variation has two potential sources. First, there are differences across districts in the 1911 share of industrial employment to total population share. The less initially industrialised a district is, the smaller is the shock. This makes sense, since for a given effect of the shock, our dependent variable (the change in the share of industrial employment to total population share) will also tend to be smaller in less industrialised districts.¹⁶ Second, there are differences across districts in industrial specialization in 1911. However, in our case differences in share of industrial employment are not the primary source of variation. In a bivariate regression of the EX-IM Shock_n on the 1911

¹⁵We write the specification as net exports to the UK even-though the shock is predominantly driven by a decline in imports from the UK to make it easier to highlight that an industry experiencing less competition due to the decline in UK imports records a positive shock that should lead to an increase in employment.

¹⁶To go back to our example, if an increase in net exports by £10 leads to a rise in national employment by 10% in the average sector, then our dependent variable will be equal to 0.05 in the second district, but only 0.01 in the third district.

share of industrial employment, the latter explains less than 2 percent of the observed variation in the former. Despite its low explanatory power, we will control for the 1911 share of industrial employment to total population in all main specifications. By doing so, we will focus exclusively on cross-district variation in exposure to the World War I trade shock based on differences in the initial industry mix, as opposed to differences in the initial level of industrialization.

Next we will discuss some common concerns to identification in this type of estimation. The main concern, usually, is that the trade shock in equation 1 might be driven by an exogenous fall in local demand (which would lead us to under-estimate the true impact of the trade shock), or an exogenous rise in local productivity (which would lead us to over-estimate it). For example, if all falls in Indian imports from the UK (or rises in Indian exports to the UK) were driven by an exogenous fall in Indian demand, which also penalises Indian industry, then one would observe a positive EX-IM Shock at the same time as a decline in Indian industry, but it would be a mistake to conclude that the former has caused the latter. Conversely, if all falls in Indian imports from the UK (or rises in Indian exports to the UK) were driven by an exogenous rise in Indian productivity, then one would observe a positive EX-IM Shock at the same time as a rise in Indian industry, but it would be a mistake to conclude that the former has caused the latter. However this is less of a concern in our case, since the fall in Indian-British trade in 1913-1917 was clearly driven by exogenous war-related shocks to UK supply and demand, and to trade costs. Three observations corroborate this point. First, the UK's exports to countries other than India also fell substantially during the war. Second, Indian imports from countries less affected by the war (such as the US and Japan) boomed during the war (see Figure 1). And third, Indian imports from the UK resumed very quickly after the war, particularly when expressed in current rupees.¹⁷ These facts are hard to reconcile with the notion that it was permanent or even temporary shocks to Indian demand or productivity which led to the fall in Indian-British trade in 1913-1917.

One threat to identification that is specific to our case is that the fall in imports from and exports to the UK might have been accentuated by similar changes in trade with Germany (whose imports were banned altogether in 1915), while at the same time been alleviated by opposite changes in trade with the US and Japan (who were war allies of the UK and less affected by war, and thus could continue to trade with India). Indeed, Table 1 shows that the share of the UK in total Indian imports fell from 64.2% in 1913 to 54.5% in 1917 (with the UK share in total exports increasing slightly),¹⁸ while the shares of Germany fell to zero and the shares of the US and Japan increased significantly. For imports, this pattern is also illustrated in Figure 1. To the extent that cross sectoral changes to UK trade were positively correlated with cross sectoral changes to German trade, and negatively correlated with cross sectoral changes to US and Japanese trade, by only studying the effect on Indian industry of a change in British-Indian trade, we may end up overestimating or underestimating the impact of the trade shock.

¹⁷Discussing the continuous fall in imports during the war, Chaudhuri (1983) argues “That this was due to disruptions on the supply side and not the lack of demand in India can be surmised from an inspection of the import figures in the immediate post-war years”. Indeed, Figure 1 illustrates that real imports from the UK recovered substantially after the end of the war, despite large UK inflation which was not fully compensated by an appreciation of the rupee. Both in current £ and in current rupees, Indian imports from Britain were much higher in 1920 and 1921 than 1913.

¹⁸As explained in Section 2, some exports to the UK were in great war demand and boomed between 1913 and 1917.

It is true that, as highlighted in Figure 1, the rise in US and Japanese imports were roughly equivalent to the decline in trade from Germany, and nowhere near sufficient to compensate for the decline in imports from the UK. Nevertheless, the contemporaneous changes in these other trade flows will impose us some caution in interpreting our coefficients literally.

Next we will discuss the models we will estimate. The following equation highlights our baseline specification studying the effect of the trade shock on the change in industrial employment:

$$\Delta\Lambda_n^I = \beta_1 \text{EX-IM Shock}_n + X'_{n,11}\beta_2 + \epsilon_n \quad (2)$$

with the dependent variable, $\Delta\Lambda_n^I = \sum_i \left(\frac{L_{n,i,21}}{L_{n,21}} - \frac{L_{n,i,11}}{L_{n,11}} \right)$, being the change in the share of industrial employment to total population in district n from 1911 to 1921, and EX-IM Shock_n being the World War I trade shock experienced by a district as described in equation 1. As the model is so far specified in first differences, it is closely related to a fixed effects regression (see Autor et al. 2013) in which however the trade shock variable only covers a part of the differenced period. Accordingly, $X'_{n,11}$ is a vector of controls accounting for differential trends between districts based on observables in 1911. Standard errors are clustered at the level of state sub-divisions to account for spatial correlations across districts.¹⁹

We will then decompose the effect of the trade shock by estimating:

$$\Delta\Lambda_{n,e}^I = \beta_e \text{EX-IM Shock}_n + X'_{n,11}\beta_2 + \epsilon_n \quad (3)$$

where the dependent variable, $\Delta\Lambda_{n,e}^I = \sum_i \left(\frac{L_{n,i,e,21}}{L_{n,21}} - \frac{L_{n,i,e,11}}{L_{n,11}} \right)$, now carries the subscript e . This refers to one of the five subcategories of industrial employment provided by the census: British administrative staff, Indian administrative staff, British skilled workers, Indian skilled workers and unskilled workers. We will be running equation 3 separately for each of these categories, and the sum of the five estimated β_e (one per each of the five categories) will equal β_1 in equation 2.

We will also study the effect of the trade shock on the number of firms in a district, by ownership:

$$\Delta F_{n,o}^I = \beta_o \text{EX-IM Shock}_n + X'_{n,11}\beta_2 + \epsilon_n \quad (4)$$

where $\Delta F_{n,o}^I$ denotes the 1911-1921 change in the number of firms in district n , for different subsets of ownership o and by nationality (British or Indian).

Finally, we will look at the effect of the trade shock on political outcomes:

$$P_{p,j,n,22} = \beta_p \text{EX-IM Shock}_n + X'_{n,11}\beta_2 + X'_{j,22}\beta_3 + \epsilon_{n,j} \quad (5)$$

where the dependent variable, $P_{p,j,n}$, represents the 1922 position on political issue p by respondent j in district n . In these regressions, we will continue to control for the district-level characteristics included in the previous regressions ($X'_{n,11}$), and we will in addition control

¹⁹ These sub-divisions for our 7 states are taken from the 1911 census. The majority of these state sub-divisions are sets of 4-8 districts which form a connected geographical unit. In addition, the 44 small native states reported in the different census documents are treated as one unique sub-division for each state. In total we have 41 sub-divisions of which 34 are sets of British districts and 7 sets of native states.

for a set of individual-level characteristics ($X'_{j,22}$), such as which INC provincial committee the respondent belongs to. In the following we will provide detailed information on the data sources.

4 Data Sources and Measurement

This section provides information on our data sources and construction, with further details given in Appendix C.

We collect our trade data from the annual Statement of Trade of the United Kingdom (see [Customs and Excise Department \(1911-1921\)](#)). We focus on the 1914 and 1919 volumes, containing data on UK exports and imports by country and product in terms of value and quantity, for the years 1911-1919. The trade categories are organised along a maximum of 4-levels of detail. We collect information on 372 trade categories for the years 1910-1919, to be matched to the industrial sectors for which we have census data (on which more below). Of these trade categories, 335 cover Indian imports from the UK and 37 cover Indian exports to the UK. For some smaller import categories the data is not available for India alone, but only for subsets of countries and dependencies which include India. In these cases we adjust the available data by India's share in total UK trade with the relevant countries and dependencies. For example the trade category parts of iron and steel bedsteads is reported only for Australia, Canada and other British possessions. Accordingly, we first calculate India's share in total UK trade for British possessions excluding Australia and Canada in 1911. Following this we adjust the value of "parts of iron and steel bedsteads" across all years by India's 1911 share in UK trade for the specific group of countries in other British possessions. We do this for all 117 trade categories where trade is only reported for other British Possessions and not specifically India.

For nearly all categories, trade in terms of quantities decreased, while in terms of nominal value the picture is mixed due to high levels of inflation from the onset of World War I up to 1920 (see [Phillips 1958](#)). To construct the trade shock, we need the value of Indian trade with the UK at constant prices (we choose 1911 prices). This requires calculating 1911-1919 prices for each of 372 trade categories which can in principle be done by combining data on trade values and quantities. For Indian import categories, quantity data is not always available. For this reason, we create a price index at the 1st-level of detail (a weighted average of all sub-categories for which quantity and value data is available over the entire period), and use this index to deflate the subcategories for which the data is missing.²⁰ A simple example here is the trade in hats which is reported at the 1-level of detail as "Hats and Bonnets, Trimmed and Untrimmed" and is only further divided at the 2-level of detail into the subcategories "Felt", "Straw" and "Other Sorts". The first step in constructing a price index for "Hats and Bonnets, Trimmed and Untrimmed" is checking for which of the three 2-level categories data is available for value and quantity over the whole time period. Second, we create a price index by dividing value by quantity in each year for each of those 2-level categories. Third, we create a weight for the

²⁰For categories where there is no consistent value and quantity data available for at least one subcategory we use instead the average price index across all products. This applies to the following categories: "Apparel", "Carriages", "Glass", "Instruments and Apparatus, Scientific (other than Electrical)", "Jewellery", "Mica Manufactures", "Perfumery and Articles used in the Manufacture thereof (except Spirits, Perfumed in Bond, and Essential Oils)", "Poultry and Game", "Saddlery and Harness", "Spirits, Foreign, Mathylated in the United Kingdom", "Umbrellas".

importance of the respective price index at the 1-level of detail based on the share of traded value in 1911 of all 2-level categories in "Hats and Bonnets, Trimmed and Untrimmed" were value and quantity data is available. Finally, we sum up all price indexes with regards to the constructed weight at the 1-level of detail and use this aggregate price index to deflate all value data of the 2-level categories. In case we have more levels of detail we follow the same procedure, but use the most detailed level for which we have data. For Indian export categories quantity data is always available, so that we can adjust for each category's specific price. Figure 2 shows the value of Indian imports and exports from the UK for the years 1911 to 1919 in real terms. During the 5-year period between 1913 and 1918, the import value in real terms declined by a factor of 3, from £60 million to £18 million (with £1 in 1911 being roughly equal to \$150 in 2017). In contrast, Indian exports remained rather stable over the whole time period. Figure 2 also highlights the common pattern of colonizer-colony trade with Indian imports from the UK being dominated by intermediary and final manufactured products, while Indian exports to the UK mostly consisting of primary products, i.e. raw materials and food.

Figure 1 highlights the long-run pattern of Indian imports from the UK, US, Japan and Germany, India's top trade partners (by overall trade) in 1911.²¹ As also shown in Table 1, the UK dominates Indian imports. Between 1900 to 1913 Indian imports for all countries are increasing. During World War I imports from the UK drastically decline as highlighted before. This decline is not compensated by an increase in imports from another trade partner. Rather, it appears that increased trade with Japan and the US is only roughly equal to the decline in imports from Germany. After the end of the war Indian imports from the UK recover and reach a level roughly equal to 1911. In contrast to before the war, after the recovery UK imports stagnate during the 1920s up to the Great Depression, which drastically reduces UK imports again. The observed pattern of trade with UK imports recovering after the war alleviates concerns that the change in India-UK trade between 1913 and 1917 may be substantially correlated with industry demand shocks in India, which would lead us to underestimate the true impact of the World War I trade shock.²² We suspect differences in trade between industries to be primarily driven by war related changes in demand in the UK and the establishment of a shipping licences system. Britain alone was controlling 50% of world-tonnage at the point of the armistice in 1918 (Salter 1921).

To assess the effect of the trade shock due to World War I on Indian industry, we need data on industrial employment by Indian districts, and by sectors that can be matched to our trade categories. We obtain this from the different state-specific volumes of the 1911 and 1921 Censuses of India (see [Census Commissioner \(1911, 1921\)](#)). These provide homogenous information on industrial employment in factories with more than 10 employees, by district and

²¹The aggregate trade data used to construct Figure 1 and Table 1 are taken from the RICardo Project (see [Dedinger & Girard \(2017\)](#) and from the Review of the Trade of India (see [Indian Department of Statistics \(1911-1921\)](#)).

²²This has been a major concern when studying the effect of increased exposure to Chinese imports driven by productivity growth in the Chinese economy (see e.g. [Autor et al. 2013](#); [Autor et al. 2014](#); [Acemoglu et al. 2016](#)). In contrast, we observe a short-run shock to UK import supplies which returns to roughly the pre-war level with industrial employment measured by the Indian census in 1911 and 1921.

sector, for seven Indian states covering the most developed part of the British Raj and more than 75% of its population (242 out of 315 million).²³

One issue when constructing a dataset combining census data from 1911 and 1921 is that boundaries of districts changed. To account for district boundary changes we lump together districts that have undergone changes of territory affecting more than 2% of the population of any individual district.²⁴ For example, if district A has lost territory to adjacent district B between 1911 and 1921, then we consider A and B as a single district both in 1911 and 1921. Accordingly, we construct 235 districts out of an initial 257 (253) districts reported in the 1911 (1921) census. The average district has a population of 1 million inhabitants and an area of 5 thousand square miles.

The factory information provided in the censuses can be compiled into 262 different census industrial sectors. In cases where the reported factories in a district produce more than one product we allocate the observation to the 262 census industrial sectors by weighting factory numbers and employment by the inverse of the number of products produced.

We match the 262 census industrial sectors to our 372 trade categories, and are left with 106 traded sectors, of which 95 are import-competing and 30 are export sectors (there are 19 sectors that appear to be competing with imports and exporting at the same time, such as cotton fabric and fibre fabric). Our matching procedure proceeds in four steps. First, we match all trade categories and census industrial sectors that are a perfect match. Second, we aggregate up groups of trade categories which together either comprise a perfect match with a broader census industrial sector, or at least a substantial subset of products of that sector. Third, we aggregate up groups of census industrial sectors to match broader trade categories. Finally, where this is not suitable we weight broader trade categories by the set of products included and match them to narrower census industrial sectors. However, we carefully aim to construct traded sectors where the underlying census industrial sectors cover at least an equal or wider set of products than the underlying trade categories. This assures that we do not overestimate the size of the World War I trade shock.

There are 49 census industrial sectors that are not matched to any trade category, for one of the following three reasons: 1) the sector produces a non tradable good, e.g. "Electric power houses and water works"; 2) the sector produces a good that is potentially tradable, but does not appear to be traded between the UK and India, e.g. "Ice factories"; and 3) the sector does not match to any trade category because a definition issue: for example, the census industrial sector "Dye factories" refers to a part of the production process of textiles of different materials (e.g. cotton, jute, wool), while in the [Annual Statement of the Trade of the United Kingdom](#)

²³We use the censuses of Bengal, Bihar & Orissa, Bombay, Central Provinces & Berar, Madras, Punjab, and the United Provinces of Agra & Oudh. In addition to the British ruled districts of these states, the 7 censuses also include information on 44 Indian native states inside the surveyed area. The remainder of British India not covered in our dataset are the censuses individually collected by a set of larger Princely States as well as the censuses for the provinces Ajmer-Merwara, Adanamans and Nicobar, Assam, Baluchistan, Burma, Coorg and the North-West Frontier province. In these documents, the industry data was either not collected at all, or the threshold for the definition of a firm was increased to more than 20 employees.

²⁴We do this by comparing the population figure of a district in 1911, to the one reported for 1911 in the 1921 census, since the latter figure refers to contemporary (1921) district boundaries. The 1921 census also provides information on important boundary changes that occurred since 1911.

textiles are reported by the material. Given that the first two cases are by far the most frequent, we group all these unmatched census industrial sectors together in one "non-traded" sector.

Figure 5 depicts the national industrial employment numbers in 1911 and 1921 for our 107 matched sectors (106 traded + 1 non traded). Total industrial employment (in factories with more than 10 employees) was 1.34 million in 1911, and increased by 37% to 1.83 million in 1921. When we split the traded sectors into two macro groups, raw materials and food (or rather their industrial processing) and manufactures, we observe that, in 1911, 0.52 million worked in raw materials and food, and 0.70 million worked in manufacturing. The greatest increase in the decade that followed was in manufactures, by 51% to 1.06 million as compared to 21% to 0.63 million for food and raw materials. Finally, the non-traded sector was initially small (0.13 million) and essentially did not change in 1911-1921. This pattern is confirmed when looking at the share of industrial employment in total population in the average district (Table 2, Panel A and B). The share increased by 0.17% in 1911-1921 (or 26% of the 1911 share, 0.64), but such an increase was entirely driven by the traded sectors (+0.15%) and within them by manufacturing (+0.13%).

Figures 3-4 show the 1911-1919 evolution of Indian imports from and exports to the UK, for the top 12 matched sectors in terms of their 1911 value of imports and exports. Despite the aggregation required by the matching procedure, the change in imports from the UK during World War I varies greatly across traded sectors. The greatest decline in imports during the war appears to be in sectors most clearly associated with the war effort. Compared to imports, exports remain much more stable, apart from sugar, malt and pigeon pea which collapse. In sectors like fibre, which includes jute used for producing sandbags, there is even a small war-related export boom. Such boom would look much bigger if one looked at nominal exports, since the value of these important products boomed during the war. Figure 6 depicts the relationship between changes in net exports to the UK per employee during World War I and employment across traded sectors. As can be seen, in sectors where net exports to the UK increased more, a bigger increase in employment between 1911 and 1921 is recorded.

Calculating the 1913-1917 change in net exports to the UK in our 106 traded sectors and combining this information with the 1911 data on district-level employment in those sectors and on total population (the latter also obtained from the 1911 census), we can now calculate the district-level measure of exposure to the World War I trade shock defined in equation 1.

Panel A of Table 2 shows descriptive statistics for exposure to the trade shock and for the share of industrial employment to total population in the Indian districts in our sample. We consider all districts, including 63 for which exposure to the trade shock is zero. These are districts which in 1911 did not employ anyone in sectors that record positive trade flows between India and the UK. Exposure to the trade shock for the average district (or, in other words, the increase in net exports to the UK that is attributable to the average district) is £0.11 per person (\approx \$16.5 in 2017). This means that the average district experiences a shock (or an increase in attributable net exports to the UK) which is equal to about 2% of annual income per person in a district (based on an Indian per capita income of \$895 in 1913, Source: Bolt et al. 2018). While this sizeable shock may be expected to have a sizeable effect on industry, this expectation will be reinforced after taking into account that the population employed in industry is only

0.64% of the total on average. When we decompose the trade shock in its import and export components (by considering only imports and only exports in the numerator of equation 1), we find that, consistently with the pattern described in Figures 2-4, the rise in net exports to the UK was entirely driven by a fall in imports from the UK.

Panel A of Table 2 also documents the considerable geographic variation in exposure to the World War I trade shock. Districts at the 90th percentile of exposure experienced an increase in net exports to the UK of £0.2 per worker, which is roughly twice as large as that faced by the average district. In contrast, districts at the 10th percentile of exposure experienced a minor decline in net exports to the UK. The remainder of Panel A of Table 2 provides summary statistics for the remaining variables used in the baseline specification discussed in the next Section 5.1, which we also obtained from the 1911 and 1921 Indian censuses.

From the censuses, we also collect data on some breakdowns of industry employment. We collect data on industrial employment by occupation and ethnicity. The breakdown is into administrative staff (including all employees related to direction, supervision and clerical work), skilled workers and unskilled workers. In addition, employment in administrative staff and skilled workers is further subdivided into Indian and British workers (where we include in British also Europeans as well as Anglo-Indian workers.) Summary statistics for the main variables constructed from this data are presented in Panel B of Table 2. The figures suggest that the 1911-1921 increase in the share of industrial employment to total population was entirely driven by an increase in the numbers of Indian workers in industrial employment, across all levels (administrative, skilled and unskilled).

To further study the effect of the trade shock on the composition of Indian industry, we collect factory ownership information. While the number of firms is available in the 1911 and 1921 censuses at the district-sector level, data on the number of firms by ownership is only reported at the state-sector level. To obtain a district level measure of ownership, we combine state-level data on sector ownership with district-level data on the number of firms in each sector.²⁵ We have the following data on ownership, for 1911 and 1921. First, we know the number of firms owned privately, by a company or by the government. Second, for firms owned privately, we have a further breakdown into the owner being British or Indian. Finally, for firms owned by a company, we know whether the board of directors is British, Indian or from both groups. Summary statistics for the main variables constructed from this data are presented in Panel C of Table 2. The information on the ownership data provided here is complemented by information in the Data Appendix C.

We also collect data on information related to the demand for independence. As source for this we use the civil disobedience enquiry committee report ([Indian National Congress 1922](#)), which was conducted by the Indian National Congress to collect information on the opinions of their members on how to strive for independence in 1922. It includes questions on support for immediate civil disobedience, support for using means of private defence, the boycott of British goods, education and courts. This information was collected between 30th of June and 16th of August, just half a year after the first non-co-operation movement was surprisingly

²⁵For Bombay, the ownership data in 1911 at the state level is not matching fully into the industry classification at the district level. Accordingly, we do not use Bombay when we look at changes in ownership between 1911 and 1921.

called off by Gandhi, despite its success, after violence against police men occurred at the Chauri Chaura incident. Panel D of Table 2 provides information on the political variables and the short description provided here is accompanied by more detailed information in the Data Appendix C.

5 Results: Industrialization

This section analyses the effect of the World War I trade shock on industrial employment across districts in India. Section 5.1 finds a positive effect of the trade shock on industrial employment and analyses the robustness of this finding. Section 5.2, studies the compositional effect of the trade shock and highlights that the increase in industrial employment was entirely driven by a rise in the number of Indians employed in industry. The section also finds that the trade shock had a positive effect on the number of privately owned industrial firms, but only for firms owned by Indians.

5.1 Effect on Industry

Our starting point is Figure 8, which visualizes the estimation strategy outlined in Section 3. The figure plots a simple bivariate regression of the change in the share of industrial employment to total population between 1911 and 1921, on our measure of exposure to the World War I trade shock. The figure shows a substantial increase in industrial employment in districts facing a large exposure to the trade shock, that is districts whose industrials sectors faced either a big rise in exports to the UK, or a big drop in imports, or both. We explore the significance and robustness of this result in subsequent regression tables.

Consider first Panel A of Table 3. We start in column 1 with the relationship highlighted in Figure 8. The coefficient of 0.474 indicates that a £1 increase in the trade shock is predicted to increase the share of industrial employment to total population by half a percentage point. In the second column, we add as a control the initial (1911) share of industrial employment. This specification addresses the concern that exposure to the World War I trade shock might be positively correlated with initial industrial development, and more industrialised districts might be on a pattern of divergence by which they would have continued to industrialise faster than the others, even in the absence of World War I (thus leading us to over-estimate the effect of World War I).²⁶ The column 2 estimate implies that initially more industrialised districts seem indeed to experience a slightly higher growth in the share of industrial employment to total population, but this coefficient is not significant. This leads us to conclude that there is no evidence of industrial divergence or convergence across Indian districts between 1911 and 1921. This specification finds no sizeable change in the effect of the trade shock on the industrial employment share compared to the corresponding estimate in column 1. Column 3 augments the regression model with dummies for the seven states in our sample, absorbing state-specific trends (e.g. due to geography or policy) in the industrial employment share. Column 4 additionally controls for the 1911 share of a district's population that is literate in any language and specifically in English.²⁷ We observe that a higher overall literacy rate is weakly associated with a higher increase in industrial

²⁶Conversely, there might have been convergence, in which case we would be under-estimating our coefficient.

²⁷The number of observation drops here as the literacy rate is not always reported for individual native states.

employment, however this is not statistically significant. This specification finds a slightly smaller effect of the trade shock on industrial employment than does the corresponding estimate in columns 1-3, but the relationship remains economically large and statistically significant. The model in column 5, which additionally controls for the initial share of the population at prime economic age, indicates a positive, sizeable and statistically significant impact of exposure to the World War I trade shock on the industrial employment share. The control variables included are not able to explain any changes in the industrial employment share.

We choose column 5 as our baseline specification. To interpret the magnitude of our coefficient of interest, recall that the 10th to 90th percentile range in exposure to the trade shock was approximately £0.2 per worker (Table 2). Then, the 0.393 coefficient in column 5 implies that the share of industrial employment to total population in a district at the 90th percentile of exposure increased by 0.08% (0.2×0.393) more than in a district at the 10th percentile. This might seem a small number, but it should be seen in the context of the industrial employment share only being 0.64% in the average district in 1911. Our baseline estimate implies that, for the average district in terms of 1911 industrial employment share, being at the 90th percentile of exposure to the World War I trade shock as opposed to at the 10th percentile, implied a 12% ($0.08/0.64$) higher industrial employment share by 1921. Another way to appreciate the magnitude of the effect is to work out the contribution of the World War I trade shock to the overall increase in industrial employment between 1911 and 1921. Since average exposure to the trade shock was 0.11 (Table 2), our coefficient implies an increase of the industrial employment share of 0.04 percentage points (0.11×0.393) in the average district. Multiplying this by the average 1911 district population (1.03 million), we obtain an increase of 443 industrial workers in the average district, or 105,000 industrial workers in total for our 236 districts. Compared with an overall increase of 490,000 between 1911 and 1921 (Figure 5), this implies that growth in the Indian industrial workforce in this period was 27% higher due to World War I trade shock ($105,000/385,000$).

Panel B of Table 3 separates the trade shock faced by districts into its two components: IM Shock, only including changes in Indian imports from the UK; and EX Shock, only including changes in Indian exports to the UK. The coefficients on the two shocks are positive and similar in size, to each other²⁸ and to the coefficient on the overall shock. However only the coefficient on IM Shock is significant, due to the standard errors on the coefficient on EX Shock being much larger. These results can be rationalised using the infant industry argument. Recall from Figure 2 that India imported mostly manufactures and exported mostly food and raw materials. But you would expect increasing returns to scale to be more important in the former industries, while the latter industries experienced on average a *negative* shock, due to the fall of exports to the UK (see Table 2, Panel B). For both reasons, based on the infant industry argument, you would expect the coefficient on IM Shock to be significantly greater than zero, not the coefficient on EX Shock.

To verify the robustness of our baseline result, Table 4 attempts various sample modifications. Panel A contains several repetitions of our baseline specification, each dropping one of several important sectors from the sample. Column 1 drops sectors directly related to the war

²⁸In fact, they are not statistically different from each other.

effort: "Ammunition", "Arms" and other "Military products" (including for example military and naval stores). This addresses the concern that the war may have stimulated Indian industrial activity through an expansion in government expenditure on war-related products: if this was the case and if there was a simultaneous drop in imports of these products from Britain, then we may erroneously attribute this effect to the trade shock, over-estimating our coefficient. However our coefficient remains significant, and increases in size. Next we analyse whether our estimated trade shock effect is driven exclusively by the cotton industries. These have been argued to be the sector that most drastically suffered from competition from British imports as Lancashire came to dominate global production in the 19th century. Indeed, "cotton fabrics" was still by far the largest import from the UK in 1913 (see Figure 3). We group the various cotton sectors in two groups, raw-to-intermediate and final (the first including "Cotton, raw" and "Cotton yarn and thread", the second including "Cotton fabrics", "apparel" and "hosiery"), which represented respectively 4% and 39% of total India-UK trade in 1913, and which were potentially orthogonally affected by World War I (as the former was an export sector, the latter an import-competing sector). Column 2 and 3 present results when dropping each of the two groups. In both cases we see a decline in the estimated coefficient for the trade shock, but the coefficient remains economically and statistically significant. Finally, column 4 present results when dropping "Iron products" and "Steel products", two sectors that were the second and third biggest Indian import from the UK by value in 1911, and which accounted for a large chunk of the World War I-related decline in imports. Now the estimated coefficient declines by about 25% in size, but again remains economically and statistically significant.

Panel B of Table 4 analyses whether specific districts drive our results. Column 1 drops districts with zero exposure to the trade shock, i.e. districts which in 1911 did not employ anyone in sectors that record positive trade between India and the UK. The estimated coefficient remains statistically significant and increases slightly in size. This suggests that our results are not driven by faster industrialisation in districts exposed to the trade shock than in districts non affected, but rather by different speed of industrialisation across districts with different exposure to the shock. In Column 2, we drop outlier districts that are far more exposed to the trade shock than the bulk of districts (those with exposure below -1.5£ per person or above 1.5£ per person, see Figure 8).²⁹ This specification addresses the concern that our results might be driven by a few districts with exceptional characteristics. However the size of the coefficient on the trade shock roughly doubles, highlighting that the trade shock had an even bigger effect across districts with more average characteristics. Column 3 drops districts belonging to native states that were not directly under British rule. These districts might have experienced political support by Indian rulers for import substitution during the war, which could drive our result. However, the estimated coefficient remains similar in size to our baseline estimate. Finally, column 4 drops all districts which experienced a change in geographic boundaries. While we have already reduced the number of these districts by merging together the ones in which boundary changes affected

²⁹This procedure removes 6 districts, of which 5 experienced an exceptionally positive shock (Ahmadabad, Calcutta, Madras, Bombay and Singhbhum), and 1 (Darjeeling) experienced an exceptionally negative one. The former 5 were the cradle of Indian industrialisation (Singhbhum hosted Jamsetji Tata's, and India's, first steel factory, and still hosts Tata Steel's headquarters). The latter was severely hit by the drop in exports of tea and other food products to the UK.

more than 2% of the population, the fact that our coefficient is unchanged further rules that boundary changes are driving our results.

In the first two columns of Table 5, we conduct a falsification exercise. So far, we have constructed the dependent variable (the change in the share of industrial employment to total population between 1911 and 1921) using all industrial employment. This includes both traded sectors (that is sectors that we were able to match to some categories of trade between India and the UK) and non-traded ones. However if what we are picking up is indeed the lasting effect of the World War I trade shock on Indian industry, then we would expect that our effect should be stronger for employment in traded sectors, because they only will have been directly affected by changes in import competition or export opportunities during World War I. For example, we would not expect a non traded sector such as "Laundries" to have been affected directly by the trade shock, though it may have been affected indirectly through backward and forward linkages with traded sectors. We then redefine the dependent variable to include only traded sectors (in column 1 of Table 5) or only non-traded sectors (in column 2). Results are encouraging. The coefficient on the trade shock is still significant and bigger in size for traded sectors, while it is non significant for non-traded sectors. The fact that it is negative might indicate that workers in districts with a big exposure to the trade shock moved out of the non-traded sectors to move into the traded sector, or that non-traded sectors were still suffering in 1921 from the fall in the imports of capital and intermediate goods during the war.³⁰

In the last two columns of Table 5 we attempt a further decomposition of the trade shock. We now redefine the dependent variable to include only traded sectors producing raw materials & food (Column 3), or only traded sectors producing manufacturing (Column 4). We also adapt the trade shock variable to include, respectively, only changes in the trade flows involving raw materials & food, and only changes involving manufacturing. The trade shock is significant only for manufacturing (Column 4). This result is in line with the earlier result that the effect of the shock is due to changes in imports from, and not export to Britain (since imports were mostly manufactures and exports mostly raw materials & food). The fact that the trade shock has a lasting effect on industries producing manufactures but not on industries processing raw materials & food seems to support the infant industry argument. On the one hand, you would expect increasing returns to scale to be more important in the former industries. On the other hand, the latter industries experienced on average a *negative shock*, due to the fall of exports to the UK (see Table 2, Panel B): this should not in theory be associated with a permanent decline in size.

If we now work out the contribution of the World War I trade shock to the overall increase in manufacturing employment between 1911 and 1921, we find that the war for responsible for a 156,000 increase. This means that growth in manufacturing employment was 104% higher due to World War I than it would have been without the war.³¹ Note that the estimated effect of

³⁰Many non traded sectors (such as "Boat repairs", "Bridge works", "Dredging Works", "Electricity", "Public Transport", etc) will have relied heavily on such imported products.

³¹As for the earlier estimates on total industrial employment, the first number is found by multiplying 0.12 (the average trade shock for manufacturing industries) by 0.537 (the coefficient in Column 4), dividing by 100, multiplying by 1025578 (the average district population) and then by 236 (the number of districts). The second number is found by dividing 156,000 by 306,000-156,000 (the increase in manufacturing employment that would have occurred even without the war).

World War I on manufacturing employment (156,000) can be higher than the estimated effect on total industrial employment (105,000) only because the coefficients in Columns 2 and 3 predict that the war had a negative effect on employment in non-traded sectors and in traded industrial sectors processing raw materials & food (when only considering the latter industries, the average trade shock was negative).

5.2 Effect on Composition of Industry by Nationality

Prior research on the labour market impact of international trade has focussed on the overall effect on employment, as well as on its breakdown by age cohorts or education levels. In the context of colonial India a much more crucial cleavage exists which is the employment and ownership of industries by nationality, particularly that of the colonisers (British) versus that of the colonised (Indian). Figure 10 shows that a non negligible number of British nationals were employed in Indian industry in 1911: around 14% of administrative workers, and around 1% of skilled workers (though all unskilled workers were Indians). We begin by assessing the degree to which the World War I trade shock had a different effect on the industrial employment of British versus Indian nationals.³² We conduct this analysis for different skill-levels, to highlight that the difference in effects across nationalities is not purely driven by an expansion of the unskilled Indian workforce in British-controlled firms. Subsequently, we will investigate the effect of the trade shock on firm ownership.

The Indian censuses decompose total industrial employment into five subcategories: British administrative staff, Indian administrative staff, British skilled workers, Indian skilled workers and unskilled workers (who presumably are all Indian). In Figure 11, we represent the impact of the trade shock on the share of industrial administrative staff to total population. This includes all occupations related to direction, supervision and clerical work, accordingly requiring a considerable level of education. The left panel considers only British administrative staff, while the right panel only considers Indian administrative staff. While there appears to be an overall increase in British administrative staff across India it does not appear related in any way to the trade shock. For Indian administrative staff, instead, a clear positive correlation emerges.

We study this further in Table 6. This table repeats our baseline specification (column 5 of Table 3) but breaking down the dependent variable into changes in the share of industrial employment in each of the five above-mentioned categories to total population. Because our baseline dependent variable is the sum of these variables, the sum of the estimated coefficients across the five columns of Table 6 equals our baseline coefficient (0.393). This decomposition yields interesting results. Columns 1 and 2 confirm that the trade shock only increased the industrial employment of Indian administrative staff. The positive and significant coefficient for Indian administrative workers implies that around 8% ($0.0336/0.393$) of the overall effect was driven by a rise in the number of Indian administrative workers, while the coefficient on British administrative workers is actually negative. A similar picture emerges for skilled workers in Columns 3 and 4, though neither of the two coefficients is significant. Finally, Column 5 shows that the trade shock also increased the industrial employment of Indian unskilled workers. Un-

³²The definition of British that we use here is taken from the census, and also includes Anglo-Indians as well as a small number of Europeans from other countries.

surprisingly, the effect of unskilled workers account for a vast majority of the overall effect (66%, or 0.2614/0.393). This suggests that the trade shock added roughly 1 Indian administrative worker per each 10 Indian unskilled workers.

Usual back of the envelop calculations suggest that the 1911-1921 increase in the industrial employment of Indian administrative staff, skilled workers and unskilled workers was, respectively, 39%, 12% and 29% higher due to the World War I trade shock (though the coefficient is not significant).³³ Between 1911 and 1921, the share of administrative staff to total employment in Indian industry increased from 3.88% to 4.77%, with 96% of this increase being accounted for by Indian administrative staff. Without the World War I trade shock, the increase would have been to 4.55%, with 86% of it due to Indian administrative staff. These numbers suggest that not only the trade shock had a positive effect on Indian industry, but it also made the industrial leadership more genuinely Indian.

We next look at the effect of the trade shock on company ownership. As explained in Section 4, this analysis is based on state-sector-level data on ownership provided by the census, which we convert to a district-sector level based on a district's initial industrial specialisation. For each district, we know the number of firms in each of the following categories: privately owned firms, with a further breakdown into the owner being British or Indian; firms owned by a company, with a further breakdown into the board of director being made up of British citizens, Indian citizens, or both; and firms owned by the state. Our regression model is presented in equation 4. Unlike our baseline regression model, this model features a dependent variable (the number of firms) which is not scaled by population. Accordingly, we add total population to our baseline list of controls.

We begin in Figure 12 by inspecting the initial ownership structure of firms. The figure shows the number firms by different types of ownerships in 1911. 2227 firms were privately owned by Indians accounting for roughly half of all firms in 1911. However, about a third of firms were either British privately-owned (516) or by companies of which the directors are exclusively British (1041). The remaining firms were owned by the government (201) and companies of which the directors were exclusively Indians (574) or of mixed nationalities (106). By 1921 the ownership structure had changed drastically, with the number of Indian privately owned firms having risen to 8200 and accounting for more than 70% of all firms as the number of firms owned by other types of ownership remained nearly stable. Figure 13 inspects the ownership structure of Indian privately owned firms across states. As seen before half of firms were privately-owned by Indians, but substantial differences existed across states: while Bombay, Punjab and the United Provinces had a high (close to 60%) share of private Indian ownership, in Bengal and Madras the share was closer to 40%. By 1921 the ownership structure had changed drastically, with all states having a share of Indian privately owned firms by of more than 60% and Bombay, Punjab and the United Provinces reaching 80%. The key question is whether this drastic change in ownership structure was driven by the trade shock caused by World War I.

Figure 14 makes a dent into this question by plotting the change across districts in the number of privately owned firms owned by British (left panel) and Indians (right panel), and exposure

³³These figures are calculated as in footnote 31, but using the average overall shock (0.11), the coefficients in Table 6, and the numbers for change in employment in the three categories (respectively 32,040, 147,198 and 309,108).

to the World War I trade shock.³⁴ The figure highlights that there is no association between exposure to the trade shock and the change in the number of privately owned firms owned by British, however for privately owned firms owned by Indians there is a positive correlation.

The formal regressions are presented in Table 7, which also extends the analysis to firms owned by a company or by the state. In panel A, we explicitly show the baseline controls with total population added, but we do not include the state fixed effects. The rationale for the latter choice is that since the ownership data is only observed at the state-sector level, we are concerned that much of the variation in the dependent variable would be lost by including state fixed effects. Column 1 presents the effect of the trade shock on the change in the total number of firms in a district. The coefficient on the trade shock is positive, with the value of the coefficient implying that, on average, the trade shock adds 3 (0.11×26.1736) firms per district between 1911 and 1921. However, the effect is not significant. Column 2-4 focus on privately owned firms. Column 2 finds a significant growth in the total number of privately owned firms due to the trade shock, with the estimate suggesting that, on average, the trade shock adds 1 (0.11×8.3795) firm per district between 1911 and 1921. Columns 3 and 4 find that only the number of privately owned firms owned by Indian increases with the trade shock, while the number of British privately owned firms stays constant. Column 5-8 focus on firms owned by companies, and column 9 on firms owned by the state. It appears that the trade shock did not increase the number of firms owned by companies independently on the nationality of directors, nor the number of firms owned by the state. The discrepancy between the coefficient in the overall change in firm numbers and the categories of ownership likely reflects the loss of information from matching state-industry level data to the district for categories of ownership, while the total number of firm is reflecting the actual change in number of firms. Accordingly, the effect on firm ownership by different categories should be seen as a lower bound. In line with this the estimated effect for the trade shock only explains an increase in the number of Indian privately owned firms of 1 compared to the observed average increase of 23 privately Indian owned firms across districts. Accordingly, our estimate for the effect of the WW1 trade shock is only able to explain 4.3% of the observed increase in Indian privately owned firms between 1911 and 1921.

Panel B presents the result when additionally controlling for state fixed effects. We confirm that the coefficients remain roughly identical to Panel A, but for columns 2 and 4 while the estimated coefficients for the trade shock increase in size the standard errors increase even more so that the results are no longer significant at the 10% level, but merely close to conventional significance levels. Accordingly, the results presented support the conclusion that due to the disruptions caused to trade by the World War I trade shock industry has become overall more Indian at all levels from unskilled workers up to the owners of companies.

In summary, the estimated effect of the World War I-related trade shock on the number of industrial firms in India was small. This suggests that most of the substantial impact on industrial employment, which we have documented in the previous section, must have been driven by an increase in the size of firms. This seems consistent with an infant industry argument interpretation of the impact of the shock, since according to that argument firms become more

³⁴For Bombay the classification of industries in the ownership data differs between 1911 and 1921 for this reason we exclude it from the sample. See also Appendix C.1.

competitive precisely because they are allowed to increase in size. Despite the small impact of the trade shock on firms, our results do pick up a pattern which is similar to the one found for employment: the trade shock benefited disproportionately the expansion into industry of Indian nationals. However, in addition to data availability issues for the change in the number of firms (and to a smaller extent industry employment share) our estimates might suffer from the issue that new firms that open due to less British competition during WW1 can be allocated randomly across India. Accordingly, our estimate on the effect of the WW1 trade shock on the change in new firms relies on network effects in industrial production, i.e. that new firms in a certain industry are more likely to open in districts that were already specialised in these industries in 1911.

6 Results: Political Outcomes

In the previous section, we have documented a positive effect of the World War I trade shock on Indian industry. Districts that were more exposed to the 1913-1917 trade shock experienced a bigger increase in industrial employment in 1911-1921, and this effect was both statistically and economically significant. In this section, we address the second key question of the paper: by promoting industrialisation, did the trade shock also increase anti-imperial feelings in India? The theoretical argument is that if the empire was seen as unfriendly to Indian industrialisation, then the strengthening of industry under the protection of World War I should result in stronger vested interests opposed to empire, and thus in stronger anti-imperial feelings after the war.

To measure anti-imperial sentiments, we use the data contained in the 1922 report of the Civil Disobedience Enquiry Committee of the Indian National Congress, or INC (see [Indian National Congress 1922](#)). As explained in Section 2, this report was compiled in the immediate aftermath of the collapse of Ghandi's non-cooperation movement (August 1920 - February 1922). It contains the opinions of hundreds of local party members on how best they thought the INC should continue its struggle against the British. These opinions were collected by the Committee as it toured India in the summer of 1922.³⁵ Respondents were predominantly secretaries and presidents of provincial and district congress committees, but also INC members only working outside of the INC (e.g. headmasters, merchants and engineers). Since respondents were scattered throughout India, this data allows us to construct several district-level measures of anti-imperial feelings amongst INC members, one per each question asked to the respondents. We start by focusing on two key questions: (i) support for immediately starting civil disobedience in a district and (ii) support for a boycott of British products. On civil disobedience seven different answers are provided for the question asked with the full list of answers reported in Table C.2. The provided responses can include combinations of answers A to E and F to G. Answers provided that are against immediate civil disobedience of any form are responses F - "For Provinces or Districts not yet ready for Civil Disobedience in any form" and G - "Against any form of Civil Disobedience on principle". The supportive responses on immediate civil disobedience range from A - "For immediate Mass Civil Disobedience" to E - "For immediate Individual Defensive Civil Disobedience only". Accordingly, we code answers A-E (F-G) as 1 (0) reflecting

³⁵Detailed information on the data is provided in the Data Appendix C.2.

support of (opposition to) immediate civil disobedience. On the boycott of British goods the answers given are only twofold "Against (For) boycott of British goods only", which we code as 0 (1) in our dependent variable capturing opposition (support) of a member to the boycott of British goods. However, a large section of members does not provide an answer for this question.

The left panel of Figure 15 plots exposure to the World War I trade shock against support for civil disobedience, finding a small positive relationship. The right panel presents an analogous plot for support of a boycott of British goods. Perhaps not surprisingly, given how attractive this form of protest could appear to the industries that had expanded under the protection of World War I, we see a much more positive relationship in this panel.

To formally evaluate these relationships, in Table 8, we estimate the model in equation 5. Due to the binary nature of our dependent variables we present the marginal effects of a Probit estimation. In addition to previous specification we additionally control for the INC province congress committee an individual belongs to, which in addition to geographic characteristics also accounts for differences in the timing of the interviews being conducted. One issue with this model is that the dependent variable does not record the change in the underlying variable from before the war to after the war (as in previous models), but only its level after the war. This is done out of necessity, since the opinion of INC members is only observed in 1922 as prior to 1920 there was no non-cooperation movement. This prompts the concern that exposure to the trade shock might be correlated with unobserved anti-imperial sentiments before the war, leading us to erroneously attribute observed anti-imperial sentiments after the war to the trade shock. To address this concern, we pursue two strategies. First, we will always control for 1911 industrial employment (to account for pre-war economic structure that might shape political attitudes), state fixed effects (to account for differences across state colonial administrations which might also shape political attitudes), and INC province fixed effects (accounting for differences in attitudes between different congress province committees, and differences in the timing of interview determined by the Committee's choice of itinerary). We will also progressively include a further expanded set of controls compared to our baseline specification. Second, we will run a falsification test, by regressing one available measure of anti-imperial sentiment before the war on exposure to the trade shock: a district's involvement in the great Indian mutiny of 1857.

Column 1 of Table 8 presents the relationships illustrated in the left panel of Figure 15, but controlling for 1911 industrial employment, state fixed effects, and INC province fixed effects. It documents a positive and significant relationship between a district's exposure to the trade shock and the likelihood that the district's INC members support immediate civil disobedience. This result is supportive of the argument that the expansion of Indian industry during World War I created vested interests opposed to empire, and thus an increase in anti-imperial feelings. In column 2 we add two new controls: the district share of privately and company-owned firms located that were British owned, and the district share of all firms that were government-owned. The coefficient on exposure to the trade shock becomes smaller, but remains significant. Finally, in column 3 we include our remaining baseline controls, and again the coefficient on the trade shock becomes smaller, but remains significant. The coefficient of 0.137 suggests that, controlling for all the variables and fixed effects included in this specification, a 0.2£ higher exposure to

the trade shock (that is the difference between the 90th and 10th percentile of exposure) is associated with a 3% increase in support for immediate civil disobedience.

In columns 4-6, we run the same specifications for support of a boycott of British goods. The number of observations here falls considerably, because many INC members appear from the report as not having an opinion on this matter, and because the probit estimation drops some observations that are perfectly predicted by the state and INC province fixed effects. The estimated coefficients on exposure to the trade shock are always positive, suggesting that INC members in districts that were more exposed to the World War I trade shock were more likely to support a boycott of British goods. The coefficient in column 6 suggests that a 0.2£ higher exposure to the trade shock is associated with a 30% increase in support for the boycott of British products. This confirms that the trade shock had a much stronger effect on support for a boycott of British goods than for support for civil disobedience in general. This result is intuitive, as districts that had industrialised more under the protection of World War I might not only be more likely to want to protest against the return to the pre-war status quo under British rule, but also more likely to choose a boycott of British goods as a way to channel that protest. This result also corroborates our interpretation of the effect of the trade shock as being driven by the interests of industries that had expanded during World War I.

The controls included in Table 8 are largely insignificant, with only a few, non-robust exceptions. INC members in districts in which a greater share of firms was owned by the government appear more likely to be in favour of a boycott of British products, while members in districts in which a greater share of firms is in British hands appear less likely to be in favour. Perhaps more interestingly, INC members located in districts that were more industrialised in 1911 were neither more likely to support civil disobedience in 1922, nor to support a boycott of British products (in fact, in some specifications they appear less likely to support either form of protest). While this may appear at odds with the argument that colonial industrialisation should lead to anti-imperial sentiment, it is important to keep in mind that 1911 industrialisation could well be endogenous: for example, it is possible that some districts were exposed to greater industrialisation opportunities under the empire (e.g. because of their location on the coast, or because of their comparative advantage), and because of this they were both more industrialised and less resentful of empire. In fact, the coefficient on the trade shock suggests that, once we identify a plausibly exogenous source of industrialisation, the effect of industrialisation on anti-imperial sentiments is strongly positive.

Table 9, panel A further studies the impact of the trade shock on a broader set of dimensions. For comparability, columns 1 and 2 report the effects on support for civil disobedience and a boycott of British products. All other dependent variables are dummies coded as 1 for support for the respective measure, and as 0 for lack of support. Column 3 considers the question on support for private defence. This was an important issue for the INC, as there was a worry that if the party would grant its members the right to self-defence, then the action of non-cooperators could easily turn into violence. Respondents could choose between being in favour of private defence in all cases allowed by law, only in grave cases, or never. We code the first two responses as support, and the last one as lack of support. The estimated coefficient is positive, but not statistically significant. This could be explained with the observation that

responses to this question are more likely to reflect an individual member’s moral standpoint on the use of force and believe in non-violence, than his anti-imperial feelings. Column 4 considers the question on support for a boycott of government-controlled educational institutions. The estimated coefficient is only an eighth of the coefficient on the boycott of British products, and again non significant. This could be explained with the fact that while competition from British products was seen as a clear threat to Indian industrialisation, the role of British education could have more mixed evaluations. Finally, column 5 and 6 consider the question on a boycott of British courts, respectively in political cases and in private cases. They find again smaller coefficients on the trade shock than for support of a boycott of British products. The slightly bigger and more significant coefficient in column 5 might indicate that British courts were seen as a threat to Indian industrialisation insofar as they helped to entrench colonial rule through political rulings, while their evaluation as a source of justice in private cases was more mixed. Panel B of Table 9 provides the corresponding Ordered-Probit results in which we coded the answers as -1, 0 and 1 where 0 is no answer given, while 1 (-1) represents in favour (against) now. The coefficient presented are not adjusted to represented marginal effects. The results supports our main conclusions on support for civil disobedience and boycott of British goods, but also highlights that the effect on the different types of boycott of courts and private defence appears sensitive to the estimation technique and the sample of observations in terms of statistical significance. Panel C of Table 9 provides the corresponding OLS results.³⁶

To further rule out that our results are driven by a correlation between exposure to the trade shock and some pre-war anti-imperial sentiments, we conduct a falsification exercise by replacing our dependent variable with support for the great Indian mutiny of 1857. This variable is constructed by measuring whether or not there was at least one town or city inside the boundaries of a district in which a mutiny took place.³⁷ The information on town and cities having experienced a mutiny is based on Map 1 of David (2003). Table 10 presents the results of this falsification exercise. Neither probit nor OLS specifications find any statistically significant correlation between the World War I trade shock and support for the mutiny of 1857. While not perfect (if anything, the mutiny took place a long time before our period of interest), this falsification exercise should at least allow us to rule out that there exist some long-term factors causing both anti-imperial feelings and exposure to the trade shock. Interestingly, we observe a positive correlation between support for the mutiny and industrial employment in 1911, though it is not clear in which direction this effect runs. One potential explanation is that the stationing of additional British troops after the rebellion led to industrialization due to local demand for military goods and supplies. This finding highlights the importance of controlling for initial level of industrial development when studying the effect of the World War I trade shock on anti-imperial sentiments in 1922.

³⁶The variation in sample size between Panel A and C is due to the Probit estimation dropping some observations as they are perfectly predicted by the state and congress province fixed effects.

³⁷We match towns to district boundaries in 1911 and 1921 based on the [Census of India](#).

7 Conclusion

In the *laissez-faire* British empire of the early 20th century, colonial India was exposed to the most unfettered free trade, and this has been blamed for India’s slow pace at industrialisation. We have investigated this claim by studying the effect of the exogenous drop in net imports from Britain generated by World War I, on the change in Indian industrial employment between 1911 and 1921. To shed light on the role of trade in keeping the empire together, we have also studied whether such an exogenous increase in industrial employment increased anti-imperial sentiments in India, as measured by a survey on attitudes towards non-cooperation circulated by the Indian National Congress (INC) amongst its members in 1922.

We have found that Indian districts that were more exposed to the trade shock (because they employed more people in 1911 in sectors which were hit hardest by the 1913-17 trade shock) witnessed a greater increase in industrial employment between 1911 and 1921. This effect is robust to controlling for initial (1911) industrial employment, and is economically significant: as one moves from the 10th to 90th percentile in exposure to the shock, the share of industrial employment in total population increases, on average, by an extra 12% of the initial value. As one would expect based on an infant industry argument, the effect is entirely driven by the fall in net imports of manufactures. When we decompose our baseline result, we find that the rise in industrial employment was entirely driven by Indian nationals (administrators and unskilled workers), as opposed to British nationals living in India. The shock also had a positive and significant effect on the number of industrial firms operating in a district, but only in the case of Indian-owned firms.

We also found that as one moves from the 10th to 90th percentile in exposure to the trade shock, INC members become 3% more likely to declare themselves ready for civil disobedience, 29% more likely to be in favour of a boycott of British products, and 15% more likely to be in favour of a boycott of British courts for political cases. These results are robust to controlling for 1911 industrial employment. Reassuringly, a placebo test reveals that exposure to the trade shock does not predict pre-existing attitudes towards rebellion, as measured through an indicator variable for whether or not a district took part in the 1857 Indian mutiny.

Our analysis is preliminary, and we have a long to-do list. Our top priorities are to control for more potentially omitted factors, to strengthen our capacity to disentangle the trade shock effect of World War I from any other effects, and to investigate the longer run consequences of the trade shock on Indian industrialisation and anti-imperial sentiments. To this purpose, we are collecting data on 1901 and 1926 industrial employment. This will allow us to control for pre-trends, as well as to study the persistent effect of the trade shock even after free trade resumed in the early 1920s. We are also collecting data on religion and soldier presence in 1911 and 1921, where the latter will be useful to approximate the war-related expansion in public expenditure at the district level. Finally, we have collected 1937 electoral results at the district level, and are in the process of matching 1937 districts to 1921 districts. The 1937 election was the first election run on a significant franchise, and which the INC contested (and won). We plan on studying the correlation between the INC’s share of votes in a district in 1937, and that district exposure to the 1913-1917 shock.

References

- Acemoglu, D., Autor, D., Dorn, D., Hanson, G. H. & Price, B. (2016), ‘Import competition and the great us employment sag of the 2000s’, *Journal of Labor Economics* **34**(S1), S141–S198.
- Autor, D., Dorn, D. & Hanson, G. H. (2013), ‘The china syndrome: Local labor market effects of import competition in the us’, *American Economic Review* **103**(6), 2121–68.
- Autor, D., Dorn, D., Hanson, G. & Majlesi, K. (2016), Importing political polarization? the electoral consequences of rising trade exposure, Technical report, National Bureau of Economic Research.
- Autor, D. H., Dorn, D. & Hanson, G. H. (2015), ‘Untangling trade and technology: Evidence from local labour markets’, *The Economic Journal* **125**(584), 621–646.
- Autor, D. H., Dorn, D., Hanson, G. H. & Song, J. (2014), ‘Trade adjustment: Worker-level evidence’, *The Quarterly Journal of Economics* **129**(4), 1799–1860.
- Bolt, J., Inklaar, R., de Jong, H. & Luiten van Zanden, J. (2018), Rebasing ‘maddison’: new income comparisons and the shape of long-run economic development, Technical report, Maddison Project Database, version 2018.
- Bonfatti, R. (2017), ‘The sustainability of empire in a global perspective: the role of international trade patterns’, *Journal of International Economics* **108**, 137–156.
- Census Commissioner (1911, 1921), *Census of India*, Calcutta: Superintendent government printing, India.
- Chaudhuri, K. N. (1983), Foreign trade and balance of payments (1757-1947), in D. Kumar & M. Desai, eds, ‘The Cambridge Economic History of India’, Vol. 2, Cambridge University Press.
- Che, Y., Lu, Y., Pierce, J. R., Schott, P. K. & Tao, Z. (2016), Does trade liberalization with china influence us elections?, Technical report, National Bureau of Economic Research.
- Clingingsmith, D. & Williamson, J. G. (2008), ‘Deindustrialization in 18th and 19th century india: Mughal decline, climate shocks and british industrial ascent’, *Explorations in Economic History* **45**(3), 209–234.
- Colantone, I. & Stanig, P. (2018), ‘The trade origins of economic nationalism: Import competition and voting behavior in western europe’, *American Journal of Political Science* **62**(4), 936–953.
- Customs and Excise Department (1911-1921), *Annual Statement of the Trade of the United Kingdom with Foreign Countries and British Possessions*, His Majesty’s Stationery Office, London.
- David, S. (2003), *The Indian Mutiny: 1857*, Penguin UK.
- Dedinger, B. & Girard, P. (2017), ‘Exploring trade globalization in the long run: The ricardo project’, *Historical Methods: A Journal of Quantitative and Interdisciplinary History* **50**(1), 30–48.
URL: <http://ricardo.medialab.sciences-po.fr>
- Grossman, G. M. & Helpman, E. (1993), *Innovation and growth in the global economy*, MIT press.

- Gupta, B. & Roy, T. (2017), From artisanal production to machine tools - industrialization in india over the long run, in K. H. O'Rourke & J. G. Williamson, eds, 'The Spread of Modern Industry to the Periphery Since 1871', Oxford University Press.
- Indian Department of Statistics (1911-1921), *Review of the Trade of India*, Calcutta.
- Indian National Congress (1922), *Civil Disobedience Enquiry Committee Report, 1922*, Tagore.
- Juhász, R. (2018), 'Temporary protection and technology adoption: Evidence from the napoleonic blockade', *American Economic Review* **108**(11), 3339–76.
- Kohli, A. (2004), *State-directed development: political power and industrialization in the global periphery*, Cambridge University Press.
- Krishna, G. (1966), 'The development of the indian national congress as a mass organization, 1918-1923', *The Journal of Asian Studies* **25**(3), 413–430.
- Lockwood, D. (2012), *The Indian bourgeoisie: a political history of the Indian capitalist class in the early twentieth century*, Vol. 5, IB Tauris.
- Meredith, D. (1975), 'The british government and colonial economic policy, 1919-39', *The Economic History Review* **28**(3), 484–499.
- Morris, M. D. (1983), The growth of large-scale industry to 1947, in D. Kumar & M. Desai, eds, 'The Cambridge Economic History of India', Vol. 2, Cambridge University Press.
- Perkins, D. H. (2013), *East Asian Development*, Harvard University Press.
- Phillips, A. W. (1958), 'The relation between unemployment and the rate of change of money wage rates in the united kingdom, 1861–1957 1', *economica* **25**(100), 283–299.
- Roy, T. (2002), 'Economic history and modern india: redefining the link', *Journal of Economic Perspectives* **16**(3), 109–130.
- Salter, J. A. (1921), *Allied shipping control: an experiment in international administration*, Clarendon Press.
- Sivasubramonian, S. (1997), 'Revised estimates of the national income of india, 1900-1901 to 1946-47', *The Indian Economic & Social History Review* **34**(2), 113–168.
- US Tariff Commission (1922), *Colonial Tariff Policies*, US Government Printing Office.
- Williamson, J. G. (2005), Explaining world tariffs, 1870-1938: Stolper-samuelson, strategic tariffs, and state revenues, in R. Findlay, R. G. Henriksson, H. Lindgren & M. Lundahl, eds, 'Eli Heckscher, International Trade and Economic History', MIT Press.

Appendix

A Figures

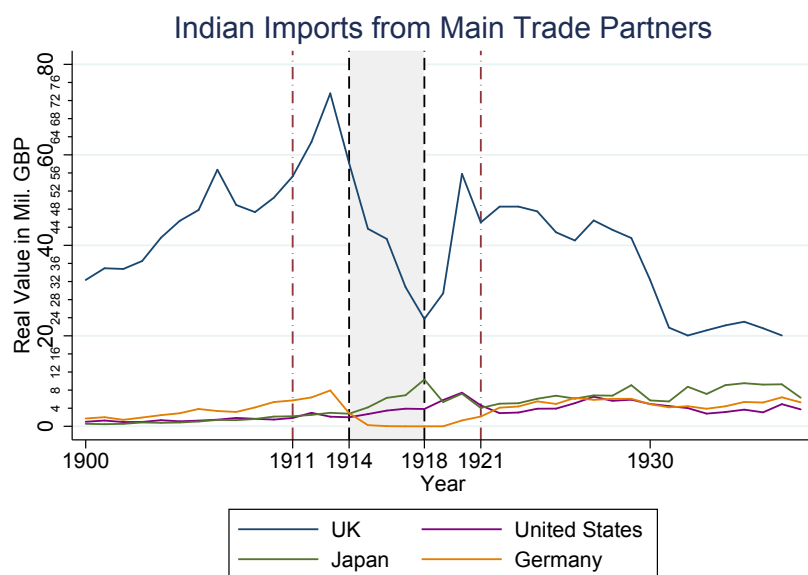


Figure 1: Total Indian imports from top-4 trade partners in 1911 (by overall trade volume), in 1900 GBP. The grey shaded area highlights the First World War, while the red dashed lines for 1911 and 1921 highlight the years of the Indian census. Source: RICardo Project. Since Indian imports from the UK in 1929-37 were missing from this source, they were obtained from various yearly editions of the "Review of the trade of India", and converted from Rupees into GBP using the exchange rate dataset provided by the RICardo Project.



Figure 2: Indian imports from and exports to the UK for the collected trade data between 1911 and 1919. Total includes trade in (i) raw materials and food and (ii) manufactured products. Adjusted to be in 1911 prices. This adjustment is described in detail in Section 4. Source: [Annual Statement of the Trade of the United Kingdom](#)

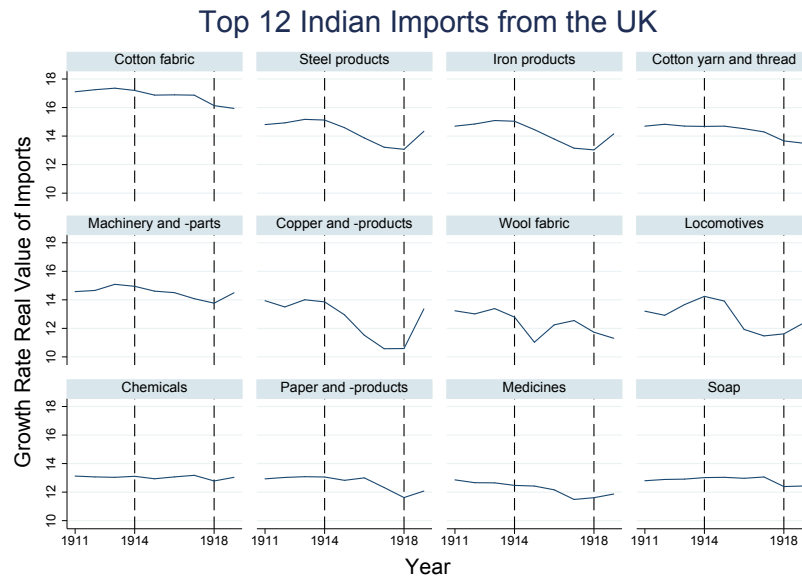


Figure 3: Indian imports from the UK in the 12 industries with the highest value of imports in 1911. Industries are ordered in descending log value of imports from the UK in 1911. The term industries refers to the 106 traded industry categories in our dataset that have been merged out of the industry sectors reported in the *Census of India* and the product categories from the [Annual Statement of the Trade of the United Kingdom](#). Values are adjusted to be in 1911 prices. This adjustment is described in detail in Section 4. Source: [Annual Statement of the Trade of the United Kingdom](#)

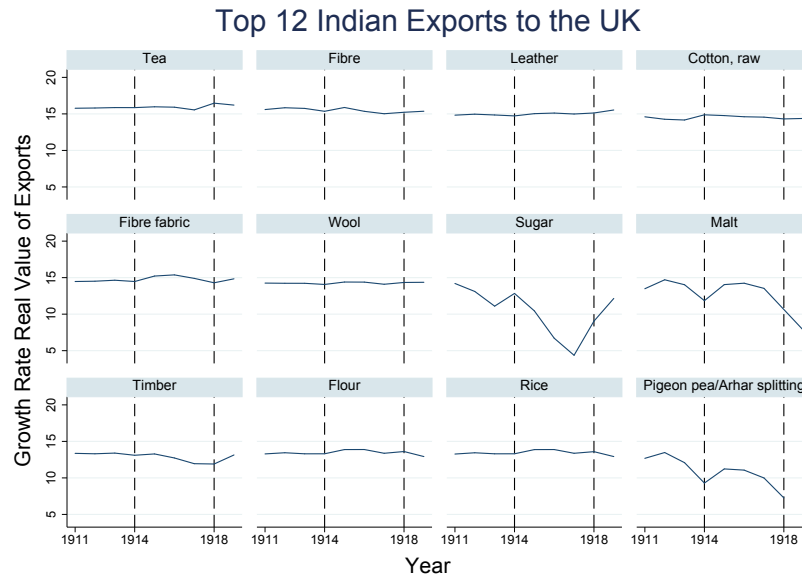


Figure 4: Indian exports to the UK in the 12 industries with the highest value of exports in 1911. Industries are ordered in descending log value of exports to the UK in 1911. The term industries refers to the 106 traded industry categories in our dataset that have been merged out of the industry sectors reported in the [Census of India](#) and the product categories from the [Annual Statement of the Trade of the United Kingdom](#). Values are adjusted to be in 1911 prices. This adjustment is described in detail in Section 4. Source: [Annual Statement of the Trade of the United Kingdom](#)

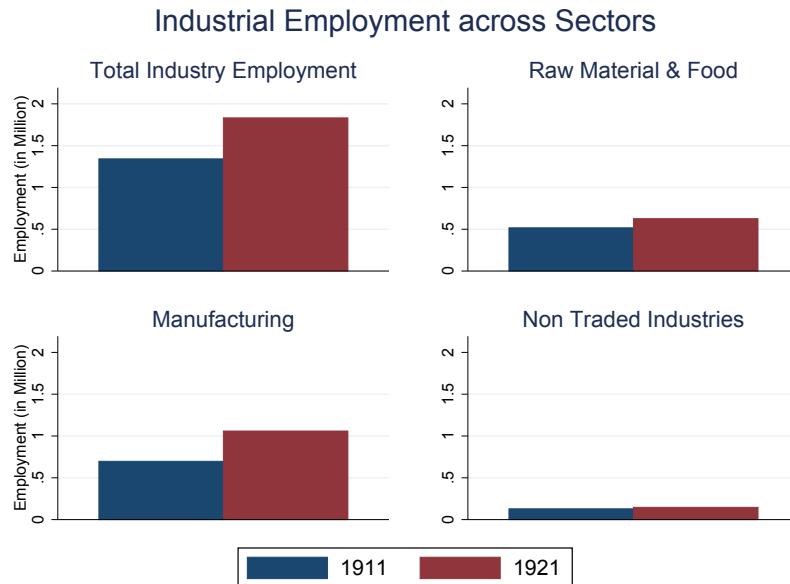


Figure 5: The figure displays industrial employment in India for 1911 and 1921 by sectors. The graph on the top left shows the total number of workers employed in firms over 10 employees. The remaining graphs show the employment for three sectors of industries: (i) top-right depicts employment in raw materials and food, (ii) bottom-left depicts employment in manufacturing industries and (iii) employment in non-traded industries. Source: [Census of India](#)

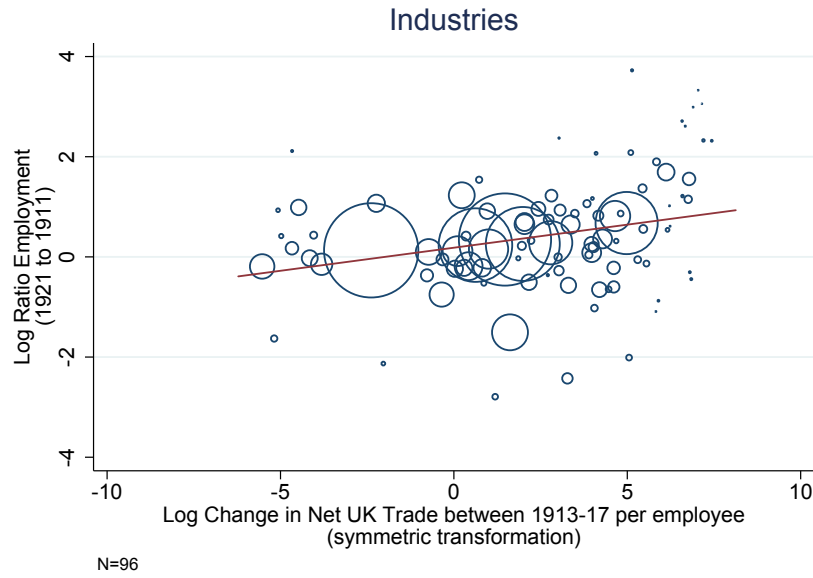


Figure 6: Change in net exports to the UK per worker and ratio of employment in 1921 to 1911 across Indian industries. The y-axis, being the ratio of employees in and industry in 1921 divided by 1911, is transformed by a standard log. The x-axis, being the change in net exports to the UK in an industry per 1911 employee, is transformed by a symmetric log transformation, for which we take the log of the absolute value plus 1 and then multiply by the original sign. These transformations are done to make variations along the x- and y-axis easier to view. The circle size reflects the number of industry employees in 1911. The term industries refers to the 106 traded industry categories in our dataset that have been merged out of the industry sectors reported in the [Census of India](#) and the product categories from the [Annual Statement of the Trade of the United Kingdom](#).

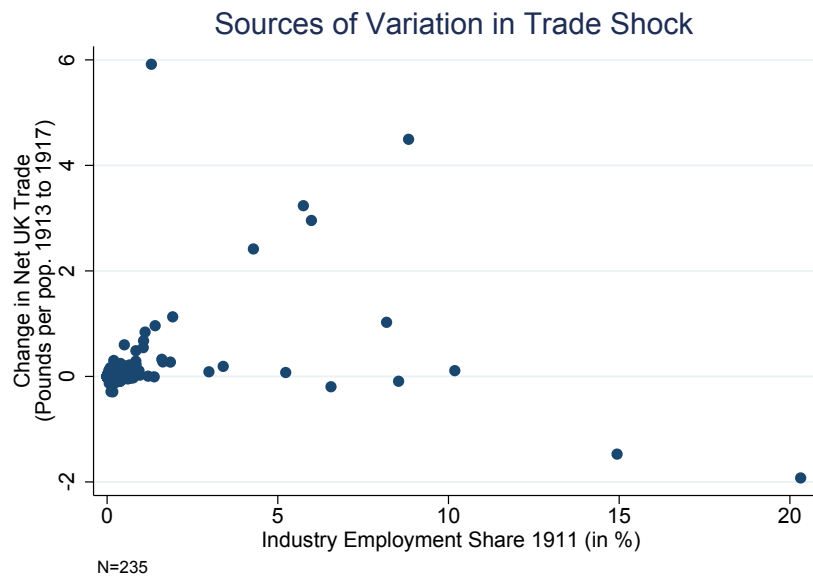


Figure 7: This figure highlights the relationship between initial industry employment share across districts and exposure to the constructed trade shock.

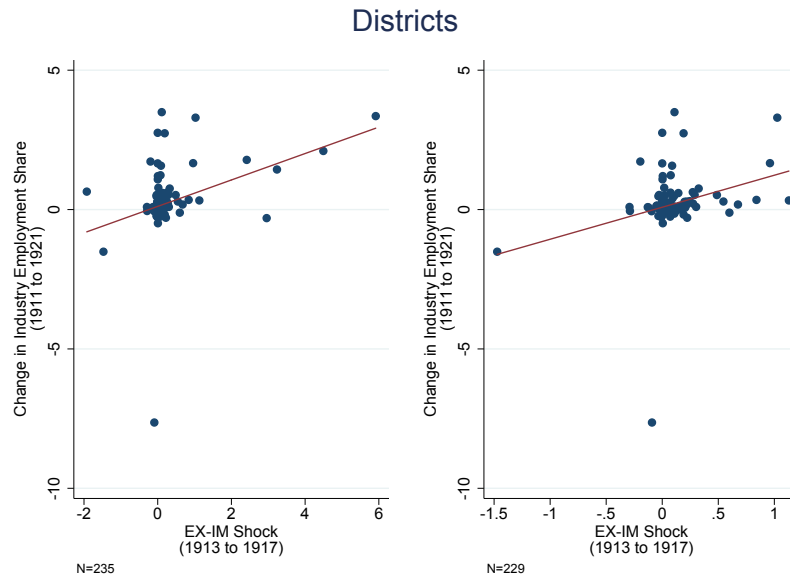


Figure 8: Change in net UK exports per person and change in industry employment across Indian districts. The graph is equivalent to the first column from Panel A of Table 3.

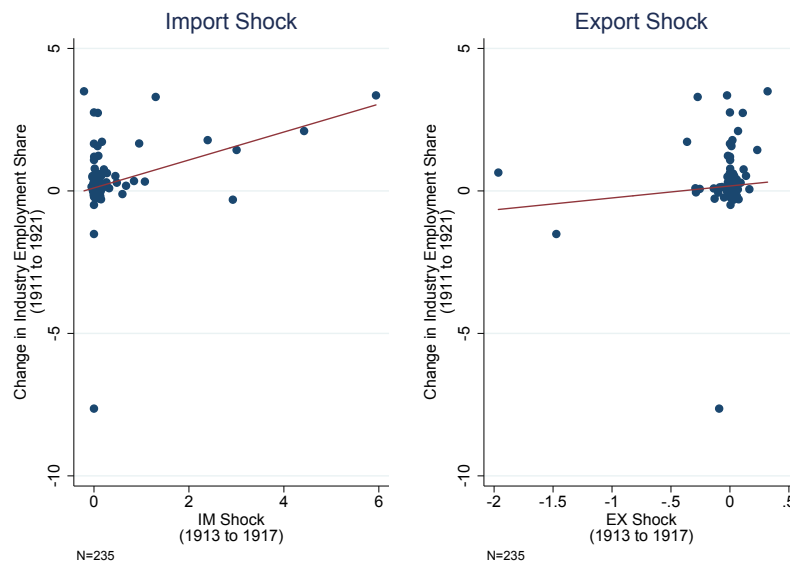


Figure 9: EX-IM Shock is the change in net UK exports per person across Indian districts. IM Shock is the decline in UK imports per person across Indian districts.



Figure 10: The figure displays industrial employment in India for 1911 and 1921 by occupation and nationality. Employment numbers are reported in thousands. Source: [Census of India](#)

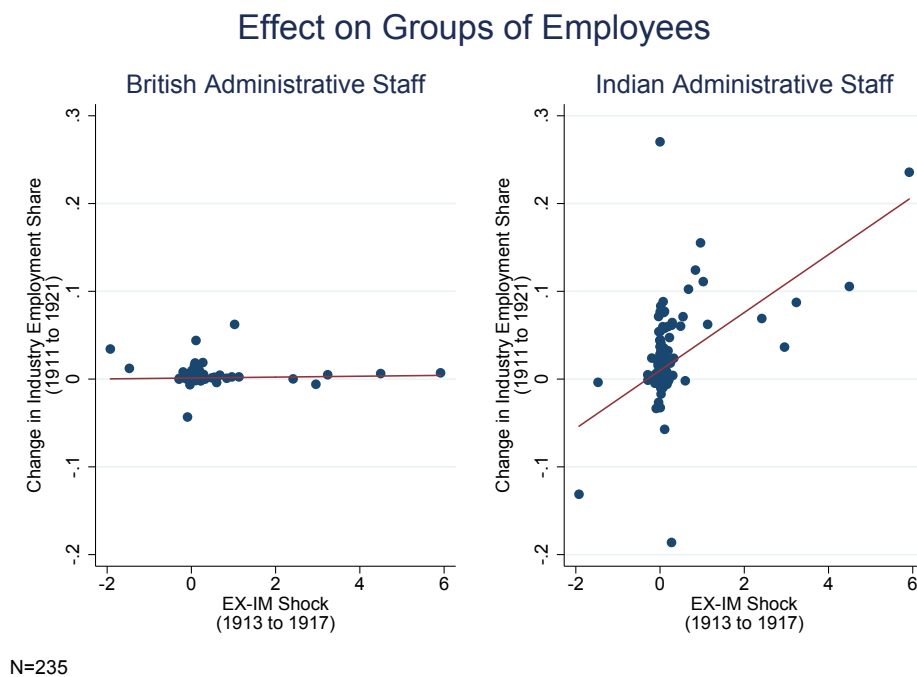


Figure 11: Change in net UK exports per person and change in administrative staff (managers, supervisors and clerks) for (i) British/Anglo-Indians and (ii) Indians.

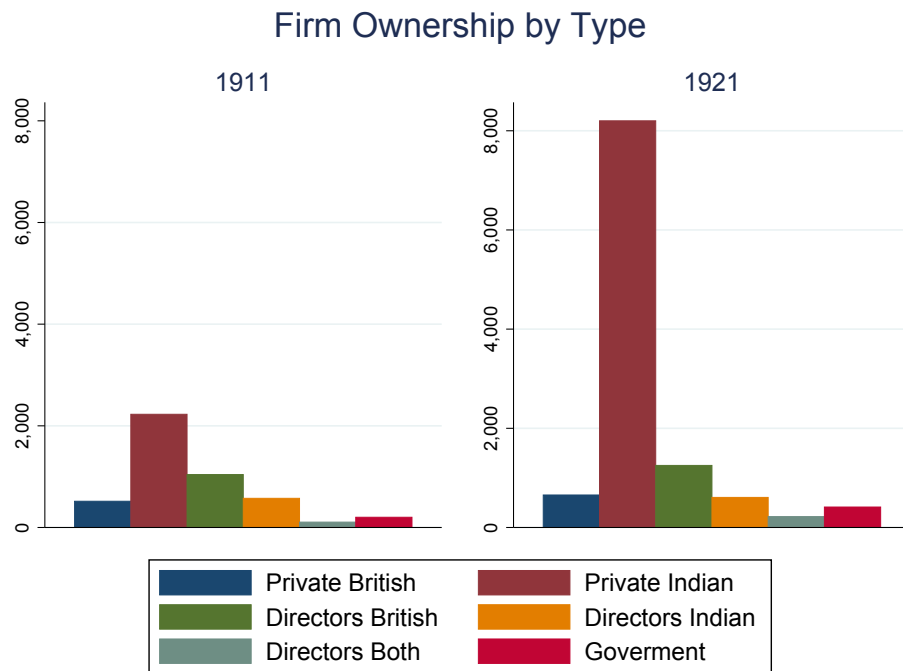


Figure 12: Number of firms owned across different types of ownership. For the state of Bombay the industry-classification of the ownership data changes between 1911 and 1921 so the change in the number of firms across categories should be taken with caution. When excluding Bombay privately owned Indian firms are less important in 1911 (1921), but still count for more than 1800 (6300) firms in 1921, while the number of firms for the other groups remain nearly unchanged. Source: [Census of India](#)

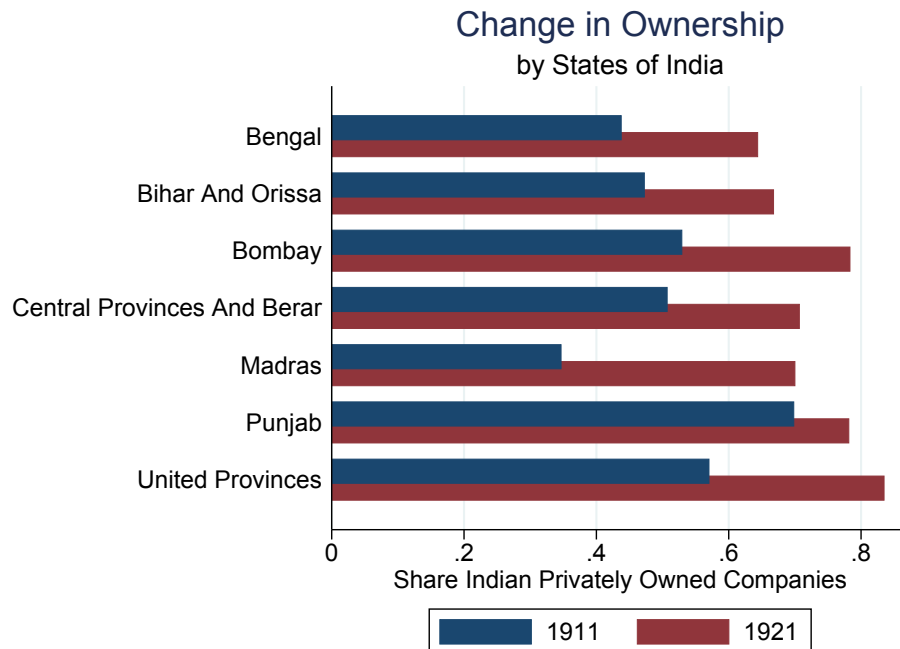


Figure 13: Share of Indian privately owned companies in 1911 and 1921 by states. For the state of Bombay the industry-classification of the ownership data changes between 1911 and 1921 so the variation in the share should be taken with caution. Source: [Census of India](#)

Effect on Ownership

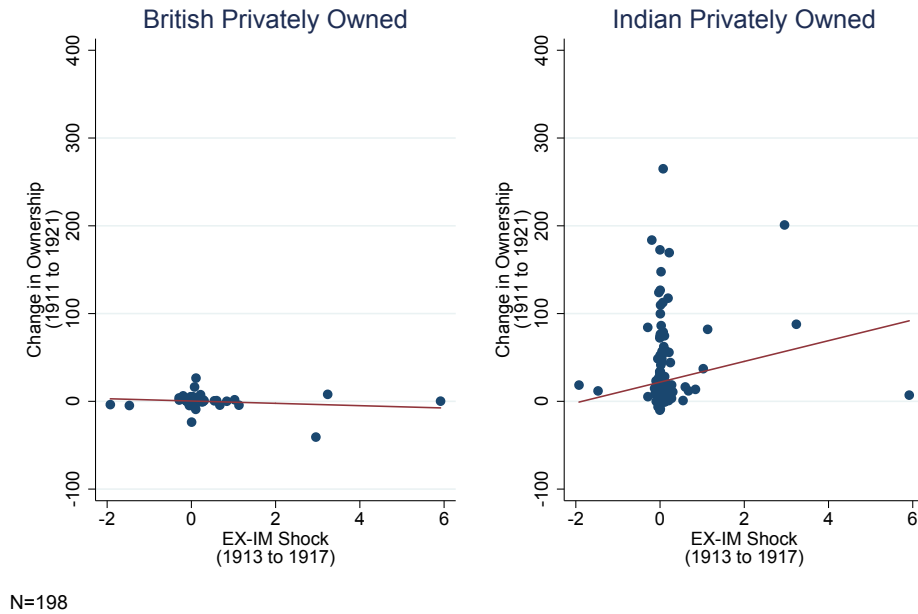


Figure 14: Change in net UK exports per person and change in number of private owners of companies for (i) British/Anglo-Indians and (ii) Indians. Excluding the state of Bombay, due to the industry-classification for ownership data changing between 1911 and 1921.

Anti Imperial Feeling

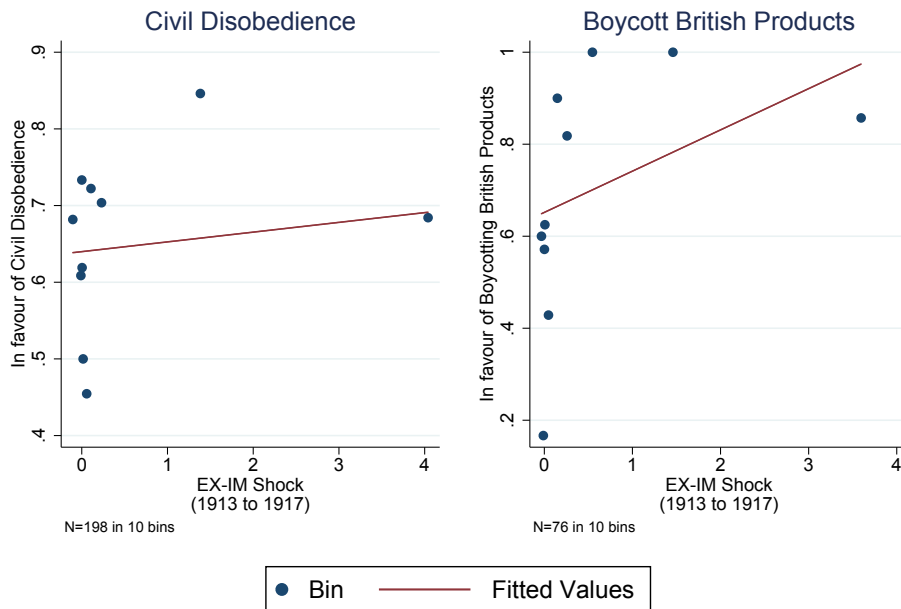


Figure 15: Change in net UK exports per person and support for civil disobedience (left column) and boycott of British products (right column). Observations are put together into 10 bins based on their position on the x-axis as the y-axis is based on a dummy variable to make the relationship observable. The underlying number of observations is reported below the respective graph.

B Tables

	Pre-War		WW1		Post-War	
	1911	1913	1915	1917	1919	1921
Panel A. Share of Indian imports by country						
United Kingdom	62.4%	64.2%	59.1%	54.4%	50.5%	56.7%
Total British Empire	68.9%	69.9%	67.7%	64.1%	60.3%	66.6%
Japan	2.5%	2.6%	5.7%	12.1%	9.2%	5.1%
United States	3.8%	2.6%	6.0%	7.9%	9.2%	8.1%
Java	6.8%	5.9%	10.2%	7.8%	9.4%	8.9%
China	1.1%	0.9%	1.5%	1.4%	1.8%	1.4%
Italy	0.9%	1.2%	1.5%	1.2%	0.7%	0.8%
France	1.5%	1.5%	1.5%	1.1%	0.9%	0.8%
Austria Hungary	1.9%	2.3%	0.0%	0.0%	0.1%	0.1%
Germany	6.5%	6.9%	0.3%	0.0%	0.0%	2.7%
Belgium	1.7%	2.3%	0.2%	0.0%	0.3%	2.0%
Total Foreign Countries	31.1%	30.1%	32.3%	35.9%	39.7%	33.4%
	1911	1913	1915	1917	1919	1921
Panel B. Share of Indian exports by country						
United Kingdom	26.4%	23.4%	38.0%	25.5%	29.9%	14.2%
Total British Empire	42.2%	37.9%	55.4%	52.5%	44.3%	29.1%
Japan	7.3%	9.1%	9.3%	14.1%	14.2%	11.2%
United States	6.9%	8.8%	10.8%	12.6%	14.8%	7.4%
Java	1.9%	0.8%	0.9%	1.1%	0.6%	1.2%
China	4.4%	2.3%	2.7%	1.8%	3.3%	3.2%
Italy	2.8%	3.2%	4.6%	2.3%	2.5%	1.7%
France	6.0%	7.1%	4.8%	3.6%	5.1%	2.9%
Austria Hungary	3.3%	4.0%	0.0%	0.0%	0.1%	0.2%
Germany	9.9%	10.6%	0.0%	0.0%	0.4%	4.7%
Belgium	5.9%	4.9%	0.1%	0.0%	3.2%	2.3%
Total Foreign Countries	57.8%	62.1%	44.6%	47.5%	55.7%	70.9%

Table 1: Share of imports and exports of India by main trade partners between 1911 and 1921. The information is provided for trade inside the British Empire and with foreign countries. Source: Review of the Trade of India (see [Indian Department of Statistics \(1911-1921\)](#)).

Summary Statistics

	Mean	Std. dev.	10th Perc.	90th Perc.	Valid obs.
Panel A. Baseline Variables					
EX-IM Shock	0.11	0.62	-0.00	0.20	235
IM Shock	0.13	0.59	0.00	0.15	235
EX Shock	-0.01	0.17	-0.01	0.03	235
Industrial Empl. Share 1911	0.64	2.14	0.00	1.06	235
Δ Industrial Empl. Share	0.17	0.76	-0.04	0.52	235
Literate	5.50	4.04	2.55	9.75	216
Literate English	0.72	1.64	0.11	1.13	216
Age 20+	53.59	3.27	49.28	57.13	216
Panel B. Composition Employment Variables					
Δ Industrial Empl. Share (Traded)	0.15	0.75	-0.05	0.41	235
Δ Industrial Empl. Share (Non-Traded)	0.02	0.20	-0.01	0.05	235
Δ Industrial Empl. Share (Raw Materials & Food)	0.02	0.58	-0.05	0.13	235
Δ Industrial Empl. Share (Manufacturing)	0.13	0.45	-0.01	0.28	235
Raw Materials & Food EX-IM Shock	-0.01	0.19	-0.01	0.03	235
Manufacturing EX-IM Shock	0.12	0.54	0.00	0.16	235
Δ British Admin Empl. Share	0.00	0.01	-0.00	0.00	235
Δ Indian Admin Empl. Share	0.01	0.04	-0.00	0.05	235
Δ British Skilled Empl. Share	-0.00	0.00	-0.00	0.00	235
Δ Indian Skilled Empl. Share	0.06	0.26	-0.03	0.19	235
Δ Unskilled Empl. Share	0.10	0.66	-0.05	0.36	235
Panel C. Ownership Variables					
Δ Nr. Firms	26.52	52.08	0.00	72.00	235
Δ Nr. Private Ownership	23.15	40.35	0.00	72.06	198
Δ Nr. Private Ownership (English)	0.24	4.44	-1.06	2.26	198
Δ Nr. Private Ownership (Indian)	22.91	40.28	0.00	74.22	198
Δ Nr. Directors	2.01	9.37	-2.68	7.89	198
Δ Nr. Directors (English)	1.01	5.13	-1.40	4.69	198
Δ Nr. Directors (Indian)	0.38	4.33	-1.88	2.23	198
Δ Nr. Directors (Both)	0.62	2.22	-0.01	1.49	198
Δ Nr. Government Ownership	0.62	2.63	-0.30	2.12	198
Share Government Owned 1911	0.06	0.10	0.00	0.20	173
Share British Owned 1911	0.31	0.26	0.03	0.67	173
Panel D. Political Variables					
Pro Civil Disobedince	0.65	0.48	0.00	1.00	198
Private Defense	0.83	0.38	0.00	1.00	122
Boycott British Goods	0.70	0.46	0.00	1.00	76
Boycott British Education	0.61	0.49	0.00	1.00	123
Boycott Political Cases	0.69	0.46	0.00	1.00	123
Boycott Individual Cases	0.46	0.50	0.00	1.00	124
Mutiny 1857	0.25	0.44	0.00	1.00	226

Table 2: Summary statistics for the main variables used. Panel A provides information on the different trade shocks, industrial employment shares, and other controls used in Table 3. Employment shares are shares in total population. All Panel B provides information on different compositional components of industry employment and the trade shock. Panel C provides information on variables related to ownership. Panel D provides information on political outcome variables.

Dependent Variable: Change in Industry Employment Share

Panel A. Net Trade Shock

	(1)	(2)	(3)	(4)	(5)
EX-IM Shock	0.474*** (0.082)	0.466*** (0.091)	0.471*** (0.102)	0.395*** (0.124)	0.393*** (0.114)
Industrial Empl. Share 1911		0.022 (0.071)	0.010 (0.071)	-0.008 (0.079)	-0.004 (0.080)
Literate				0.046 (0.032)	0.051 (0.031)
Literate English				-0.019 (0.113)	0.000 (0.109)
Age 20+					-0.033 (0.028)
State FE	No	No	Yes	Yes	Yes
adj. R^2	0.145	0.145	0.142	0.152	0.158
N	235	235	235	216	216

Panel B. Import & Export Shock

	(1)	(2)	(3)	(4)	(5)
IM Shock	0.486*** (0.085)	0.442* (0.244)	0.432* (0.231)	0.388* (0.222)	0.385* (0.214)
EX Shock	0.348 (0.243)	0.658 (1.474)	0.797 (1.369)	0.476 (1.594)	0.476 (1.606)
adj. R^2	0.142	0.142	0.141	0.148	0.154
N	235	235	235	216	216

Robust standard errors in parentheses are clustered on state sub-divisions

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: For all regressions the dependent variable is the change in the share of employment in industry between 1911 and 1921. Panel A presents the results for a the net trade shock from the UK between 1913 and 1917 with the net trade shock specified as exports minus imports. Panel B presents the corresponding results for the change in imports and exports between 1913 and 1917 as separate shocks. A negative (positive) coefficient on the import (export) shock is going in the same direction as the positive coefficient for the net trade shock.

Panel A. Robustness of results to excluding specific industries				
	(1)	(2)	(3)	(4)
	Ex. Military Prod.	Ex. Cotton Interm.	Ex. Cotton Final	Ex. Iron & Steel
EX-IM Shock	0.412*** (0.102)	0.346** (0.133)	0.342* (0.193)	0.299** (0.115)
Industrial Empl. Share 1911	-0.007 (0.081)	-0.011 (0.086)	-0.011 (0.087)	-0.013 (0.080)
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
adj. R^2	0.166	0.137	0.090	0.106
N	216	216	216	216
Panel B. Robustness of results to excluding specific districts				
	(1)	(2)	(3)	(4)
	No Shock	Outliers	Native	Boundaries
EX-IM Shock	0.431*** (0.091)	1.002*** (0.354)	0.388*** (0.121)	0.433*** (0.142)
Industrial Empl. Share 1911	0.003 (0.090)	-0.041 (0.140)	0.077 (0.051)	-0.048 (0.136)
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
adj. R^2	0.143	0.190	0.369	0.179
N	170	210	190	148

Robust standard errors in parentheses are clustered on state sub-divisions

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Panel A presents the results for the exclusion of important industries from the dataset. Column 1 excludes military products, column 2 excludes raw and intermediate cotton products, column 3 excludes cotton fabric and textiles, and column 4 excludes iron and steel products. Panel B presents the results for the exclusion of specific geographical areas from the data. Column 1 excludes all districts that do not record a trade shock. Column 2 excludes districts with a trade shock that is outside the common range of -1.5£ to 1.5£. Column 3 excludes all native states included inside the British states' censuses. Column 4 excludes all districts which experienced a change in boundaries between 1911 and 1921. All columns include the full vector of control variables from column 5 of Table 3.

Dependent Variable:				
	(1)	(2)	(3)	(4)
	$\Delta Traded$	$\Delta NonTraded$	$\Delta Primary$	$\Delta Secondary$
EX-IM Shock	0.488*** (0.065)	-0.095 (0.064)		
Raw Materials & Food EX-IM Shock			0.118 (0.924)	
Manufacturing EX-IM Shock				0.537*** (0.095)
Controls	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
adj. R^2	0.168	0.209	0.013	0.488
N	216	216	216	216

Robust standard errors in parentheses are clustered on state sub-divisions

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Each column in the table presents the result for a subdivision of the industry employment share. Column 1 provides the effect of the trade shock on the change in the share of industry employment for traded industries only. Column 2 and 3 present the results for a further subdivision of the employment into primary (food and raw materials) and secondary (manufacturing) industry categories for each column the trade shock is constructed for the respective sector only. Column 4 provides the effect of the trade shock on the change in the share of non-traded industry employment. All columns include the full vector of control variables from column 5 of Table 3.

Dependent Variable:					
	(1)	(2)	(3)	(4)	(5)
	$\Delta Bri.Adm.$	$\Delta Ind.Adm.$	$\Delta Bri.Sk.$	$\Delta Ind.Sk.$	$\Delta Unskilled$
EX-IM Shock	-0.0005 (0.0010)	0.0336*** (0.0069)	-0.0005 (0.0021)	0.0986 (0.0925)	0.2614** (0.1261)
Controls	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.216	0.394	0.250	0.086	0.097
N	216	216	216	216	216

Robust standard errors in parentheses are clustered on state sub-divisions

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Each column in the table presents the result for a subdivision of the industry employment share. Column 1 and 2 provides the result for the change in industry employment that is in administrative roles of British and Indian ethnicity, respectively. Column 3 and 5 provides the result for the change in industry skilled employment by British and Indian workers. Column 5 provides the result for the change in the share of unskilled industrial employment that is exclusively Indian. All regressions include the full vector of control variables from column 5 of Table 3.

Dependent Variable: Change in number of firms owned by

Panel A. No state dummies

	Firms		Personal		Company with Directors				State	
	Total		Total		Total	British	Indian	Both	Total	
EX-IM Shock	(1) 26.1736 (17.8828)	(2) 8.3795* (4.4405)	(3) -0.6204 (0.7782)	(4) 8.9999* (4.6931)	(5) -1.7942 (2.1505)	(6) -0.7001 (1.0718)	(7) -1.3505 (1.1660)	(8) 0.2565 (0.2172)	(9) -0.1373 (0.1458)	
Industrial Empl. Share 1911	7.8947**	3.3697	0.0396	3.3302+	1.9212***	0.3179	1.1426***	0.4607**	0.0178	
Literate	(3.1811)	(2.3135)	(0.3647)	(2.0739)	(0.5288)	(0.2803)	(0.2790)	(0.1873)	(0.0386)	
Literate English	2.6872+	4.1612***	0.3920**	3.7692***	-0.2761	0.1112	-0.3722***	-0.0152	-0.0841	
	(1.6636)	(1.1477)	(0.1564)	(1.1445)	(0.2537)	(0.1288)	(0.1195)	(0.0732)	(0.1351)	
Age 20+	-4.4579	-4.7418*	-1.2226	-3.5191	0.1276	-0.3477	0.4674	0.0079	0.0290	
	(3.3974)	(2.7837)	(0.9917)	(3.2096)	(0.5292)	(0.3403)	(0.4940)	(0.1125)	(0.2846)	
Age 20+	1.7217**	1.4775*	-0.2705*	1.7481**	-0.3419	-0.2717**	-0.0749	0.0047	0.0181	
	(0.7681)	(0.7981)	(0.1520)	(0.8179)	(0.2553)	(0.1198)	(0.1228)	(0.0488)	(0.0654)	
Pop. in Mil.	26.4090***	21.5238***	-0.6124	22.1362***	1.3527*	0.4728+	0.3454	0.5345**	1.0698+	
	(6.0873)	(4.6225)	(0.4740)	(4.6037)	(0.6917)	(0.2958)	(0.3106)	(0.1967)	(0.7166)	
State Fixed Effects	No	No	No	No	No	No	No	No	No	
adj. R^2	0.401	0.319	0.096	0.334	0.202	0.045	0.341	0.198	0.083	
N	216	183	183	183	183	183	183	183	183	

Panel B. Including state dummies

EX-IM Shock	(1) 26.8794+ (17.6596)	(2) 9.2024+ (5.7598)	(3) -0.5224 (0.7842)	(4) 9.7248+ (6.0910)	(5) -2.1195 (2.0003)	(6) -0.8460 (1.0189)	(7) -1.4755 (1.1119)	(8) 0.2020 (0.2920)	(9) 0.0323 (0.1751)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.407	0.313	0.189	0.323	0.206	0.028	0.436	0.206	0.162
N	216	183	183	183	183	183	183	183	183

Robust standard errors in parentheses are clustered on state sub-divisions

+ $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: The table presents the results on the change in the number of firms between 1911 and 1921. Column 1 presents the overall change in number of firms. Column 2-4 present the effect on the change in firms in private ownership by total, British owned and Indian owned, respectively. Column 5-8 present the results for the change in firms owned by a company with directors: Column 5 presents the results for the total of those firms, Column 6 for firms owned by companies with only British directors, Column 7 for firms owned by companies with only Indian directors and Column 8 for firms owned by companies which have both Indian and British directors at the same time. Column 9 presents the result on government owned firms. Data on number of firms is available at the district level, while ownership data is constructed from state-industry cells that are matched to the district-industry structure. More information is given in Section C.1. Excluding the state of Bombay, due to the industry-classification for ownership data changing between 1911 and 1921.

Dependent Variable: Support for civil disobedience and boycott of British goods

	(1)	(2)	(3)	(4)	(5)	(6)
	Civil Dis.	Civil Dis.	Civil Dis.	Bri. Prod.	Bri. Prod.	Bri. Prod.
EX-IM Shock	0.2215** (0.0953)	0.1815** (0.0860)	0.1370* (0.0810)	0.8177** (0.3922)	1.0927** (0.5396)	1.4764*** (0.4871)
Industrial Empl. Share 1911	-0.0738 (0.0516)	-0.0466 (0.0474)	-0.0746* (0.0427)	-0.4163** (0.2062)	-0.5733** (0.2839)	-0.3501 (0.6746)
Gov. Owned		-0.8826 (0.8201)	-1.2156 (0.8576)		3.7342 (2.8459)	10.8571** (4.3632)
Br. Pri. Owned		0.2241 (0.2454)	0.2769 (0.2844)		-0.4472*** (0.0965)	-0.2872 (0.2813)
Literate			0.0425 (0.0459)			-0.0755 (0.0602)
Literate English			-0.0294 (0.0847)			-0.2327 (0.3900)
Age 20+			-0.0107 (0.0158)			0.0031 (0.1376)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
INC Province FE	Yes	Yes	Yes	Yes	Yes	Yes
pseudo R^2	0.151	0.161	0.173	0.206	0.223	0.295
N	197	192	192	51	51	51

Coefficients reported are marginal effects of Probit regressions

Robust standard errors in parentheses are clustered on state sub-divisions

⁺ $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: The table presents the effect of the trade shock on support for independence as reported in the 1922 report of the civil disobedience enquiry committee (see [Indian National Congress 1922](#)). Column 1-3 present the results for support of immediate civil disobedience and column 4-6 present the results for support of the Boycott of British goods. Both dependant variables are coded as 1 for supporting and 0 opposing the action. Mutiny predicts success perfectly in the case of Boycott of British goods, accordingly no coefficient is presented.

Panel A. Marginal effect of trade shock on support for independence						
	(1)	(2)	(3)	(4)	(5)	(6)
	Civil Dis.	Bri. Goods	Priv. Def.	Bri. Educ.	Pol. Cases	Pri. Cases
EX-IM Shock	0.1370*	1.4764***	0.3390	0.1944	0.6905*	0.5776 ⁺
	(0.0810)	(0.4871)	(0.5227)	(0.2529)	(0.3922)	(0.3980)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
pseudo R^2	0.173	0.295	0.385	0.427	0.434	0.388
N	192	51	80	95	86	97
Panel B. Ordered probit results						
	(1)	(2)	(3)	(4)	(5)	(6)
	Civil Dis.	Bri. Goods	Priv. Def.	Bri. Educ.	Pol. Cases	Pri. Cases
EX-IM Shock	0.4270*	0.3053*	0.3415*	-0.3083	0.1952	0.0141
	(0.2274)	(0.1770)	(0.1760)	(0.2638)	(0.2736)	(0.2148)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
pseudo R^2	0.111	0.213	0.215	0.177	0.178	0.167
N	216	216	216	216	216	216
Panel C. OLS results						
	(1)	(2)	(3)	(4)	(5)	(6)
	Civil Dis.	Bri. Goods	Priv. Def.	Bri. Educ.	Pol. Cases	Pri. Cases
EX-IM Shock	0.1164*	0.6145*	-0.1224	-0.0772	0.1505	0.4707**
	(0.0582)	(0.2779)	(0.2278)	(0.1359)	(0.4040)	(0.1963)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
INC Province FE	Yes	Yes	Yes	Yes	Yes	Yes
adj. R^2	0.093	0.264	0.191	0.402	0.430	0.421
N	193	75	119	121	121	122

Robust standard errors in parentheses are clustered on state sub-divisions

+ $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Each column presents the result for a different question related to independence asked in the civil disobedience enquiry committee report. All models include the full vector of control variables from Table 8. Panel A presents the marginal effects of Probit regressions. Panel B presents the corresponding results using a linear regression model. The difference in observation size reflects observation dropped in the Probit estimation that are perfectly predicted by the fixed effects.

Panel A. Marginal effect of trade shock on 1857 mutiny			
	(1)	(2)	(3)
	Mutiny	Mutiny	Mutiny
EX-IM Shock	-0.0346 (0.0373)	-0.0333 (0.0440)	-0.0334 (0.0422)
Industrial Empl. Share 1911	0.0106 ⁺ (0.0065)	0.0118 ⁺ (0.0074)	0.0127* (0.0075)
Literate		0.0067 (0.0190)	0.0077 (0.0193)
Literate English		-0.0214 (0.0332)	-0.0156 (0.0348)
Age 20+			-0.0062 (0.0142)
State FE	Yes	Yes	Yes
pseudo R^2	0.191	0.173	0.174
N	206	187	187
Panel B. OLS result for number of towns with mutiny			
	(1)	(2)	(3)
	Nr. Towns	Nr. Towns	Nr. Towns
EX-IM Shock	-0.0177 (0.0182)	-0.0119 (0.0210)	-0.0124 (0.0216)
Industrial Empl. Share 1911	0.0112* (0.0056)	0.0121** (0.0060)	0.0129** (0.0061)
State FE	Yes	Yes	Yes
adj. R^2	0.180	0.160	0.157
N	235	216	216

Robust standard errors in parentheses are clustered on state sub-divisions

⁺ $p < 0.15$, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Panel A presents the effect of the trade shock on a district having had at least one town rebel during the 1857 mutiny from David (2003). The dependant variable is coded as 1 for a district having a town that rebelled and 0 otherwise. Coefficients are reported as marginal effects. Panel B. presents the corresponding OLS results for the number of towns with a mutiny inside a district.

C Data Appendix

C.1 Ownership Data

Data for ownership is also collected from the [Census of India](#). The data is not provided at the district level, so that we collect the data on ownership for each state broken down by industry categories. For all data sources, apart from the Bombay 1911 census, the industry categories provided for the ownership data are nearly identical to the ones provided at the district level for firms and employment numbers. Accordingly, we match the data from the state-industry cells to the respective district industry cell, weighting the data by number of firms in the district industry cells. This gives us a good approximation of the number of firms in different ownership groups at the district level for 1911 and 1921. The following main types of ownership groups are reported in the census: (i) firms that are privately owned by a single individual, (ii) firms which are owned by a company with a set of directors and (iii) government owned firms. Group (i) privately owned firms is broken down into British and Indian owned firms, where the category British includes all Europeans and Anglo-Indian owners. For Indian privately owned firms ownership is further broken down by caste, but we do not utilize this information. Group (ii) firms owned by a company with a set of directors is further divided into the directors being exclusively British or Indian or from both groups. We then construct shares of ownership and total numbers of firms owned by each of these categories of ownership at the district level for 1911 and 1921. In addition, for each state apart from Bombay we further construct the change in the number of firms owned between 1911 and 1921 for each of these groups. We are unable to do this for Bombay as the Bombay 1911 census provides for the ownership data industry categories at a more aggregated level and does not cover all industry categories.

C.2 Political Data

For political attitudes we use the data given in the civil disobedience enquiry committee report ([Indian National Congress 1922](#)) set up by the Indian National Congress in 1922. Witnesses were heard on the committee's tour through India from the 30th of June till the 16th of August. Table 11 summarises the answers given on civil disobedience in [Indian National Congress \(1922\)](#). The answers provided range from supporting the start of mass civil disobedience to being against any form of civil disobedience on principle grounds. Some respondents also provided a mix of answers from either category A-E or F-G, but those two groups are mutually exclusive. Accordingly we code an individual as supporting immediate civil disobedience of any form as 1 and an individual stating that his area is not ready for civil disobedience or opposes it on principle as a 0.

The remaining responses on using private defence, boycott of British products, education, courts in political and private cases are all either reported as "for" or "against". Accordingly, these questions are all coded as 1 for supporting measures against British institutions or 0 for being against a boycott.

We match the political data to districts by the information on town or district provided for as many individuals as possible. We always attribute the shock based on the district information provided even in cases where a representative represents a wider area than the district of residency. This occurs for example in cases where a representative is part of the provincial or the all India congress committee. Some individuals are from outside the area we study the impact of the trade shock, but live in other states. Additionally, the report provides information on the provincial congress province the interviewed person is from. This also acts additionally as a control for the point in time the interview was conducted as it reflects the itinerary of the committee starting from Delhi over Madras to Calcutta with the aim of being representative of as much of India as possible. We are able to match up to a maximum of 194 individuals that provided a response to any of the outlined questions to our districts, which is about slightly

Nr.	Nature of Evidence	Immediate action	Witnesses
A	For immediate Mass Civil Disobedience	1	4
B	For immediate non-payment of taxes generally	1	3
C	For immediate Civil Disobedience limited to particular taxes and laws	1	5
D	For immediate Aggressive and Defensive Individual Civil Disobedience	1	100
E	For immediate Individual Defensive Civil Disobedience only	1	131
F	For Provinces or Districts not yet ready for Civil Disobedience in any form	0	161
G	Against any form of Civil Disobedience on principle	0	9

Table 11: Responses given by witnesses on attitudes towards civil disobedience. The list only gives the unique responses. Some individuals gave as a response either a mix of answers A-E or F-G, but there is not overlap. Accordingly we code the responses into either supporting immediate civil disobedience of any kind or not. Source: [Indian National Congress \(1922\)](#)

above half of the maximum of 380 answers provided. This lower matching rate is due to three reasons: (i) the individual is from an area outside the 7 major-census states we use in constructing our trade shock, (ii) there is no information provided on the location of the individual and (iii) for the member a town/village is reported which is so small that it is not reported in the 1921 census and can not be matched to a district (the smallest towns reported are classified as cantonments with a population of above 200 individuals).