

What Explains the Geographic Variation in Corporate Investment?*

Shohini Kundu[†] Nishant Vats[‡]

September 9, 2021

Abstract

We show that history can explain the geographic concentration of investment over and above traditional agglomerative forces, geography, and expectations. We use spatial variation in direct and indirect British rule to identify differences in historical circumstances. Using this within-country variation in historical circumstances, combined with a local identification approach and instrumental variable strategy, we explain the spatial differences in investment. Differences in historical origins can explain 13% of total geographic variation in investment. Moreover, investment is 8-10% lower in direct ruled areas. Our results indicate that history can have long-run consequences through its effect on economic organizations and state capacity.

*We thank Rainald Borck, Francesco D'Acunto, Zhiguo He, Lakshmi Iyer, Ralph Koijen, Yueran Ma, Nagpurnanand Prabhala, Raghuram Rajan, James Robinson, Amir Sufi, Michael Weber, Xiao Zhao, and Eric Zwick for helpful comments and suggestions. We are thankful to the Fama-Miller Center at the University of Chicago, the NSE-NYU Stern Initiative on the Study of Indian Capital Markets, and the Wheeler Institute for Business and Development at the London Business School for financial support. We thank seminar participants at the Webinar series in Finance and Development (WEFIDEV), 2021 Transatlantic Doctoral Conference at the London School of Business, 10th European Meeting of the Urban Economic Association and the NSE-NYU Conference on Indian Financial Markets, 2020. We do not have any conflicts of interest to disclose. We take responsibility for all errors.

[†]Shohini Kundu is at the Anderson School of Management, University of California, Los Angeles. email: shohini.kundu@anderson.ucla.edu

[‡]Nishant Vats (corresponding author) is at the Booth School of Business, University of Chicago. Send correspondence to 5807 S Woodlawn Ave, Chicago, IL, USA. email: nvats@chicagobooth.edu

1 Introduction

What explains geographic concentration in investment? What role does history play? It has been established that investment is geographically concentrated. From Steel City to Silicon Valley, the formation of economic clusters has garnered attention from academics and policymakers alike. Understanding the forces behind the development of such clusters is fundamental to understanding the micro-foundations of geographic inequality – why are certain areas richer than others, and what can be done to address these differences? Thus far, the literature has focused extensively on the role of agglomerative forces – the availability and cost of factors of production – and geographic advantages to explain the rise and fall of such clusters. In this paper, we diverge from the extant literature, focusing on a novel aspect that can explain the geographic concentration of investment: history. We consider how the eventual investment concentration depends on the initial starting point, set by historical factors. Specifically, we emphasize the role of the destruction of well-established economic organizations and emergence of state capacity, resulting from differences in historical circumstances, as key factors in explaining the investment concentration today.

The central role of history may seem obvious if investment is assumed to follow a path-dependent process. However, establishing the empirical relationship between history and investment is difficult. A key element in the theoretical models of firms' choice of location is the existence of multiple equilibrium. [Krugman \(1991\)](#) argues that the eventual choice of the equilibrium can either be driven by the history or self-fulfilling expectations. Hence, the empirical challenge lies in disentangling the two forces. Moreover, to clearly establish the relevance of history, one needs to rule out the effect of confounding unobservables such as agglomerative forces and geographic advantage.

In this paper, we attempt to address this issue and show that historical circumstances can explain geographic concentration over and above the traditional agglomerative forces, geographic advantages and self-fulfilling expectations. We do this by using a two-pronged approach. First, we combine within country analysis with plausibly exogenous variation in historical circumstances, originating from direct and indirect colonial rule. Second, in addition to using conventional approaches of comparison, we use (1) a local identification approach of comparing neighboring areas to rule out concerns related to differences in agglomerative forces, geography and expectations, and

(2) an instrumental variable strategy to rule out concerns related to selection bias and simultaneity. Hence, our empirical strategy is better adept at solving the difficult identification problems associated with establishing a direction of causality between history and economic activity, in general, and, in particular, investment concentration.

2 Historical Setting

This paper uses the within-country geographic variation in historical circumstances to explain spatial differences in investment. Colonial occupation of India provides such an environment. Before the onset of the British occupation of India starting in 1757, the Indian subcontinent was governed by local rulers. During the colonial era, different areas of the Indian subcontinent fell under the “direct rule” of the British, or, “indirect rule,” under the administration of native rulers. All areas, regardless of their colonial history, were brought under an identical legal and administrative framework after independence in 1947. Moreover, we verify that the direct and indirect ruled areas were similar across several observable dimensions before the onset of colonial rule. Therefore, India provides an ideal laboratory to examine the consequences of differences in historical circumstances on geographic variation in investment concentration in the present.

3 Results

Investment if Geographically Concentrated: We begin with an aggregate analysis, showing that investment is concentrated within Indian states. Using data on district-level corporate investment, we compute a state-level measure of investment concentration, using the Herfindahl-Hirschmann Index (HHI). We compare the investment HHI with three benchmark measures – (1) equal investment in all districts, $\frac{1}{N}$, (2) investment proportional to geographical area of district relative to the state, and (3) investment proportional to the population of a district relative to the state. We conclude that investment is geographically concentrated within states, relative to a frictionless spatial equilibrium. Moreover, we show that states with a larger proportion of districts historically under direct British rule exhibit a higher geographic concentration of investment. Specifically, the level of within-state investment concentration is 20 percentage points higher relative to any of the benchmarks, and the proportion of districts under direct rule can explain 13% of total variation in within-state investment concentration.

Baseline Comparison of Direct and Indirect Ruled Districts: States with a larger proportion of direct ruled districts exhibit greater investment concentration. We argue that greater investment concentration in states with a larger proportion of direct ruled districts is driven by higher investment in indirect ruled districts. A direct comparison of direct and indirect ruled districts combined with project level data indicates that the size of investment projects in direct ruled areas is 8.8% lower than the size of investment projects in indirect ruled areas within a state.

Local Comparison of Adjacent Direct and Indirect Ruled Districts: A direct comparison of direct and indirect districts may potentially bias our inference in the presence of systematic differences between direct and indirect ruled districts. Hence, we address concerns of selection and omitted variables by focusing on contiguous direct-indirect ruled district pairs, separated only by administrative borders within a state. We compare a firm's investment in direct and indirect ruled districts within a district-pair. Specifically, we include firm \times district-pair \times year fixed effect, allowing us to identify the estimate using variation in the size of investment projects announced by the same firm within a district-pair. Such an approach allows us to implicitly control for traditional agglomerative forces of [Marshall \(1920\)](#), geographic features, investment opportunities, and expectations that are likely to be similar across contiguous district-pairs. Moreover, whether a district within a contiguous direct-indirect ruled pair was under direct rule during the colonial period is likely to be a matter of chance. Hence, indirect ruled districts are a valid counterfactual to the contiguous direct ruled districts. Our local identification approach suggests that the projects announced in direct ruled districts are 10.8% smaller in size relative to the projects announced in indirect ruled districts by the same firm within a contiguous district-pair.

Instrumental Variable Analysis Using Doctrine of Lapse: The comparison of direct ruled districts with indirect ruled districts may still be prone to selection bias, hindering our ability to interpret the baseline effect as causal. We address concerns of selection through an instrumental variable strategy. We exploit a unique feature of British annexation policy in India, the Doctrine of Lapse. The Doctrine of Lapse was in effect between 1848 and 1856, which allowed the governor-general of British India to annex Indian princely states where the ruler died without a natural heir. The relevance condition posits that the death of a ruler without a natural heir is associated with a territory coming under direct British rule. We verify the relevance condition associated with this instrument in the first stage. Our two stage least square estimates (2SLS) indicate that investment

is lower in direct ruled districts relative to indirect ruled districts within a state, validating our interpretation of the relation between contemporary corporate investment and direct British rule being causal. An important assumption of this test is the exclusion restriction, which posits that the death of a ruler without a natural heir affects current corporate investment only through the territory being under direct British rule. We verify this assumption through two falsification tests. In the first falsification test, we directly study the relation between investment and the death of the ruler without a natural heir in indirect ruled districts in periods when the policy was not applicable. In the second falsification test, we directly study the relation between investment and the death of the ruler with a natural heir in indirect ruled districts when the Doctrine of Lapse was applicable. Both tests yield null results, supporting the exclusion assumption.

4 Mechanism

We explore the underlying mechanism through which direct British rule affects investment. We focus on two key channels – (1) the destruction of well-established economic organizations, and (2) differences in colonial state capacity which persist to date. We rule out alternative mechanisms that may explain our results including the geographic differences in law and enforcement, provision of public goods, and trust.

We show that the East India Company (EIC) consolidated economic power through the annexation of cotton producing territories. Specifically, a cotton producing district was 40% more likely to be under direct British rule, relative to indirect rule. This allowed the British to directly control the supply of cotton, securing a monopoly on the supply of Indian goods and products (Sahoo (2015)). The direct control of cotton producing territories allowed the British to meet their objectives of protecting the interests of the British textile industry and increase Britain's share of global trade. Specifically, we argue that areas under direct colonial rule were subject to economic policies and practices that dismantled the well-established local economic organizations centered around the cotton industry. The destruction of flourishing and dominant economic industries resulted in significant economic losses, borne by the native population. Using precolonial cotton production as an instrument for direct British rule, we show that a firm reduces its project size by 20% in direct ruled areas relative to indirect ruled areas, within a pair of adjacent districts. We argue that the economic losses have endured to the present as the destruction of strong economic

organizations (1) hampers the intergenerational transfer of skills and knowledge, and (2) disrupts the natural Marshallian process that develops over time and explains the agglomeration and dominance of industries.

Apart from the differences in the extent of economic exploitation, differences in the colonial occupation of India through direct and indirect rule altered the political incentives of the precolonial elites. While the British directly controlled the direct ruled areas in India, native rulers had considerable autonomy over the internal affairs of their dominion in indirect ruled areas. [Iyer \(2010\)](#) argues that the rulers in indirect ruled areas were under a constant threat of deposition by the British on account of misrule. Hence, local rulers exerted tremendous effort to improve state capacity, to avoid the slightest hint of misrule. Moreover, the rulers of indirect ruled districts had longer tenures which granted them incentives to plan and invest for long-term development. While the colonial geographic differences in de jure institutions were eliminated after the Indian Independence of 1947, we argue and verify that precolonial geographic differences in state capacity affect contemporary state capacity, especially the ability of the state to provide public goods in a timely fashion. We show this using data on delays in road construction. Our results show that road construction projects are delayed by 10.2% more in direct ruled districts relative to a contiguous indirect ruled districts. This result is different from [Iyer \(2010\)](#) as we focus on differences in the timely provision of public goods, rather than differences in the quantity of public goods. We do not find any differences in the latter for our sample period.

5 Conclusion

In this paper, we show that history can explain geographic concentration of investment over and above the traditional agglomerative forces, geographic differences and expectations. This paper uses within country variation in historical circumstances, combined with a local identification approach and instrumental variable strategy to explain the spatial differences in investment. We use spatial variation in direct and indirect British rule to identify differences in historical circumstances. Our aggregate analysis shows that the differences in historical origins can explain 13% of total geographic variation in investment. Our micro-level estimate suggests that investment is 8-10% lower in direct ruled areas, relative to indirect ruled areas. We further explore two channels through which history affects investment – economic organizations and state capacity. First, we show that

cotton-producing districts are more likely to be under direct British rule, and subject to adverse economic policies, resulting in the destruction of existing economic organizations with long-run detrimental effects. Second, using data on public road constructions, we show that the state takes longer than estimated to finish its projects in direct ruled districts. This systematic delay in the construction of roads reflects inefficiency, indicating lower state capacity.

Our work has three distinct contributions. First, we focus on a novel aspect that can explain the geographic concentration of investment: history. Second, our empirical strategy is better adept at solving the difficult identification problems associated with identifying the relationship between history and economic activity. Third, we explain how differences in colonial rule can produce long-run consequences, through two distinct mechanisms, namely, the destruction of well-established economic organizations and state capacity.

Our findings demonstrate that history can have enduring influence on the trajectory of economic development within a country. More broadly, this work informs discussions on the root causes of inequality, aiding our understanding of how the vestiges of history can create cleavages within a nation. Future study on how historical processes can perpetuate inequality may be a fruitful area of work, to further the discussion on economic disparities.

References

- Iyer, Lakshmi.** 2010. "Direct versus indirect colonial rule in India: Long-term consequences." *The Review of Economics and Statistics*, 92(4): 693–713.
- Krugman, Paul.** 1991. "History versus expectations." *The Quarterly Journal of Economics*, 106(2): 651–667.
- Marshall, Alfred.** 1920. "Principles of Economics." *London: MacMillan*, 621.
- Sahoo, Rajib Lochan.** 2015. "Indian Cotton Mills and the British Economic Policy, 1854-1894." *Proceedings of the Indian History Congress*, 76: 356–367.