A Complicating Factor: The Effect of Land Acquisition Costs on Industrial Composition in India*

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Abstract

Land transaction costs are instrumental in explaining lower sectoral productivity in agriculture and manufacturing, as it prevents firms and farms from operating at the optimal scale. However, given the heterogeneity in land intensity across sectors, these costs might also introduce allocative inefficiencies *across* sectors. To answer this question, this paper studies the impact of land acquisition costs on sectoral composition by exploiting a policy shock in India that increased these costs for Special Economic Zones (SEZs). I first show that increased land costs reduce entry of manufacturing SEZs by 8-10 percentage points, while the entry of services SEZs increases by almost the same amount. Using a difference-in-difference with heterogeneous treatment, I show that this effect is fully driven by states for which the cost increase is relatively higher.

JEL classification: L16, O14, Q15
Keywords: Land Reform, Industry Mix, Structural Change, India.

I. Introduction

Land market distortions, such as land fragmentation, inaccurate land records and land use regulations, are instrumental in explaining lower sectoral productivity in developing countries.[1] The bulk of evidence on this link is for the agricultural sector. First, these imperfections contribute to land misallocation by hindering farms from achieving their optimal scale (Adamopoulos and Restuccia, 2014; Britos et al., 2022). Furthermore, the inefficiently small plot sizes generate underutilization of labour or disguised employment: in the case of India, Foster and Rosenzweig (2022) showed that if all farms were at optimal size, output per worker would increase by 68% while reducing the total agricultural labour force by 16%. A more recent stream of literature has investigated this connection for the manufacturing sector: Duranton et al. (2016) established that in India, land misallocation is the main driver for output misallocation in manufacturing. This has been corroborrated more formally by Sood (2022), who demonstrated that land market frictions restrict firm expansion and thereby reduce lifetime producer profits by 6.5%. Still, while the presence of imperfect land markets is clearly linked to lower output and efficiency within sectors, it is not yet clear how this affects sectoral *composition*. Given heterogeneity in land intensity across sectors, and therefore differences in exposure to land transaction costs, these market

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[1] However, it is important to note that these market imperfections are especially, but not exclusively, relevant for developing countries. See for example Herkenhoff et al. (2018), which shows how state-level land use regulations have depressed macroeconomic activity in the US.

imperfections might also cause allocative inefficiencies across sectors. Specifically, manufacturing has a higher land intensity in production than services; a change in land market distortions is thus likely to affect these sectors differently (Batista e Silva et al., 2014). Understanding whether this mechanism indeed contributes to inefficient sectoral composition has vital implications for aggregate productivity and structural transformation and thus welfare.

This paper aims to understand how land market frictions affect sectoral composition using a policy shock that dramatically increased land acquisition costs for Special Economic Zones (SEZs) in India. This context is especially suitable to address this question for three reasons. First, India's land market is fragmented and lacks accurate land records, implying high land transaction costs (Prabhakar et al., 2020; Wahi, 2020). Second, as will be elaborated on later, the shock to land acquisition costs for SEZs was sufficiently large and unexpected. Finally, since this setting contains the universe of applications, I observe the effect on *proposed* sectoral composition as a precursor to the long-run consequences for *actual* sectoral composition. Then, to understand both whether these materialise and how they affect the local economy, I also investigate the spatial spillovers of this change in SEZ industrial composition. I employ a shift-share approach, leveraging geographically disaggregated data to capture India's extensive variation in both geographical and economic characteristics. Furthermore, the choice of India also facilitates a broader exploration of how this eventually affects structural transformation, as India is not only characterized by land market distortions but also a large growth in services compared to manufacturing (Chari et al., 2016).

Instated with the explicit goal of fostering industrial growth, India's 2005 SEZ Act provided a myriad of benefits to firms located in an SEZ (Central Government of India, 2005).[2] Importantly, it explicitly allowed both public and private developers to create a SEZ to create a level-playing field. Within three years after the law was instated, more than 500 SEZs in a variety of sectoral specializations in manufacturing and services were approved. One key contributor to this large uptake is the fact that many State Governments helped private developers with obtaining the necessary land; they conducted compulsory land acquisition using the colonial Land Acquisition Act (1894), and transferred this land at a lower cost to developers (Levien, 2012). Thus, the State Governments shielded private developers, and any firms locating in the SEZ, from the normally high transaction costs due to the aforementioned imperfect land markets.

To understand the effect of land transaction costs on sectoral composition, I exploit an unexpected policy change in 2007. At the end of 2006, the West Bengal State Government expropriated 4,047 hectares of land for a chemical SEZ, leaving a large number of farmers landless and without livelihood. The subsequent protest was violently shut down by state police, with fourteen farmers being killed and more than a hundred missing. In response, the Central Government announced that from then on, *forced* land acquisition was prohibited, and that landlosers must be compensated properly (SEZ Board of Approval, 2007). Importantly, SEZs that were already approved were exempt from this policy; only new developers were exposed to this dramatic increase in land acquisition costs. This means I can identify the effect on SEZ entry and investment by sector; given its higher land intensity, I would expect manufacturing to be disproportionally impacted by this policy change. I show that this is indeed the case: SEZs in general become smaller and the share of manufacturing SEZs decreases by eight percentage points. In the preferred specification, using ex-ante differences in land acquisition commitment across states to allow for heterogeneous treatment intensity, I find that the share of manufacturing SEZs in highly active states is twelve to sixfteen percentage points lower, and that of services is eleven to fifteen percentage points higher.

[2] Firms were not only exempt from sales taxes and import duties, they also profited from automatic approval of FDI up to 100% and single-window clearance, which dramatically lowered the administrative burden of operating a business.

The next question is whether this SEZ policy generates local spillovers, and can thereby affect local sectoral composition. To answer this question properly, geographically disaggregated data is of the utmost importance. I have created a novel dataset of all SEZ proposals between 2006-2022 including proposals that were rejected or established zones that were discontinued. I have information on their specific location at the village level, their size in hectares and the sector in which they operate. To assess the effect of land acquisition costs on sectoral composition, I match this novel village-level dataset with the SHRUG dataset, using their rich open source data to track economic development and sectoral composition (Asher et al., 2021). Specifically, I use the Economic Census (EC, 1990-2013), which contains information for each village-industry combination on hired and non-hired employment, the number of active firms, the share of firms using power and the share of public firms. I supplement this with a novel data set containing rich agricultural census data, that provides me with the exact plot size distribution, crop types and irrigation in India's subdistricts.[3] Importantly, I leverage this data to construct a proxy for transaction costs by computing land concentration at the subdistrict level. To control for economic activity ex ante, I employ the DMSP-OLS dataset (1994-2013), which provides annual measures of night time luminosity at the pixel level. Finally, I can control for local agricultural productivity using a pixel-level remote sensing GPP dataset (2001-2019) developed by Gangopadhyay et al. (2022). In preliminary results, I show that the sectoral composition of SEZs matters for local sectoral composition, with services SEZs being the main driver of both manufacturing and services employment. Together, this implies that place-based policies such as SEZs cannot just lead to agglomeration benefits, but also affect industrial composition through intersectoral linkages.

This paper is related to multiple different strands of literature. First, it contributes to the literature on structural transformation in developing countries (McMillan and Rodrik, 2011; Herrendorf et al., 2014). There are a plethora of papers on the removal of external barriers such as trade liberalization or financial liberalization, with for example Erten and Leight (2021) describing how China's accession to WTO in 2001 resulted in local structural transformation in regions more exposed to the reduction in tariff uncertainty. Another subset of this literature, closer to this paper, focuses on how internal barriers, such as factor market frictions, impact structural change. Caselli and Coleman (2001) demonstrated how increasing access to education has contributed to both structural change and regional convergence in the U.S, while Dekle and Vandenbroucke (2012) studied limited labour mobility in China, concluding that the decrease in mobility costs only moderately affected labour reallocation out of agriculture. Finally, Kitamura (2022) analysed how credit frictions impact structural change, specifically showing how improved credit access help overcome the relative scarcity of capital in agriculture. This in turn leads to reallocation of labour to the nonagricultural sector. My paper complements this literature by investigating the impact of land market frictions, an internal barrier previously understudied, but extremely relevant to the experience of many developing countries (Deininger, 2003).

It also relates to a set of papers describing India's growth puzzle and India's atypical structural transformation, characterised by services-led growth with a still-growing manufacturing sector.[4] Chari et al. (2016) advocated that this is not the result of limited labour mobility, instead highlighting costly skill accumulation as an explanation. Relatedly, Djidonou and Foster-McGregor (2022) contended that the relative underperformance of the manufacturing sector in India is

[3] A subdistrict is the third administrative boundary level in India; as of 2011, India consists of more than 6,000 subdistricts.

[4] As noted in Fan et al. (2023), this pattern of structural transformation is not unique to India, as the combination of growth in services with limited industrialization is observed in other developing countries.

driven by informality, as labour reallocates from agriculture to the informal sector. According to Dehejia and Panagariya (2014), the growth puzzle can partly be explained by intersectoral linkages: they showed that the large growth in services in India is partly generated by the growth in manufacturing, which created a stronger internal market for services. Finally, Fan et al. (2023) analysed the growth of services in India, stating that the development process led to a productivity increase in services, and the growth was reinforced by increased demand due to income effects. My paper is the first to assert that land market imperfections, due to their differing impact on manufacturing and services, might contribute to differences in factor reallocation from agriculture to these respective sectors and thereby influence structural transformation.

Finally, my paper contributes to the stream of literature on the (socio-)economic impact of place-based policies in general but SEZs in India specifically. Building on the research of spatial policies in developed countries (e.g. Greenstone et al. (2010) and Brachert et al. (2019)), Koster et al. (2019) highlighted how the consequences of such policies in developing countries might play out differently, since the location targeting strategy is quite different. Thereby, most evidence on place-based policies in developing countries, especially in China, is favourable, provided a few conditions are met (Frick et al., 2019). However, this does not translate to the Indian SEZ experience: Görg and Mulyukova (2022) showed, based on PROWESS data, how the productivity of firms in close proximity of SEZs is actually negatively affected; this effect is most pronounced for state-owned SEZs. In his paper, Alkon (2018) investigated the oft-made claim that SEZs not only bring economic but also developmental benefits, such as improvements in human capital or infrastructure, finding no effect. This is complementary to Aggarwal (2007), who finds that SEZs create jobs but have limited impact on human development. Finally, Hyun and Ravi (2018) used night light data to show that SEZs boosted economic activity. They further provided evidence that SEZs draws workers out of informality, such that the formal sector grew in size and productivity. My paper is complementary to this existing literature by considering land as an input in the production function, and attempting to catalogue the opportunity costs of these SEZs.

In the next section, the institutional environment for SEZs, their tenuous relationship with land and the protest and subsequent policy changes will be elaborated upon. Section III discusses the data and the empirical methodology. Finally, section IV will provide a conclusion and suggestions for future research.

II. INDIA: LAND AND SEZS

I. The Indian SEZ experience

Starting with industrial estates and townships from the late forties to establishing the first ever Export Processing Zone (EPZ) in 1965, the Indian Central Government was in some sense ahead of the curve when it came to implementing place-based policies (Levien, 2012). The objective for these EPZs was to manufacture commodities for export to obtain foreign exchange, in exchange for tax breaks and smoother trade procedures. In 2000, inspired by the success of Chinese SEZs in the Guangdong province, the Export-Import policy was established, as a precursor to the SEZ act (Hyun and Ravi, 2018). The pre-existing EPZs were converted to SEZs, could process imports duty-free and did not need any license to import. At the same time, the focus shifted from exports to general processing, as evidenced by SEZ developments inland instead of close to the port. Several states, including "economically backward" states, introduced specific SEZ legislation. Nevertheless, it was not until after the ratification of the 2005 Special Economic Zone Act that

the popularity and prevalence of SEZs materialized Tewari (2020). Established with the goal of increasing employment and thereby economic growth, the Indian Act differs from most other SEZ endeavours by allowing both public and private developers to set up a SEZ (Central Government of India, 2005).[5] Firms locating inside an SEZ can profit from duty-free imports, single window clearance and 15-year income tax benefits.[6] They can also set up a joint venture with up to 100% FDI with automatic approval, instead of the 49% threshold.

The development of an SEZ proceeds through three stages. First, the developer submits a proposal to the State Government of the proposed location and the SEZ Board of Approval (BoA). The BoA meets between four and 25 times a year to judge whether proposals are of sufficient quality. In general there are three elements to this jugdment: the State Government must approve the proposal; the plan for the SEZ must meet the requirements and, importantly, the developer should own the land.[7]. The SEZ can only be approved if the developer (whether private or public) owns the land, otherwise only in-principal approval can be granted; if there are multiple unfulfilled requirements the proposal is deferred. In the latter two cases, the proposal can be resubmitted to the BoA to be discussed again. After the formal approval is received, the SEZ moves to the notification stage, which involves the Central Government changing the SEZ plot to industrial land. The Government does so if it believes that the SEZ will bring about economic development and will be for the greater good. Then, the developer can start building on the land and eventually start operating, which is the final phase of SEZ development. The developer also sets up a SEZ Board of Approval, which then can decide which firms to allow into the SEZ.

This process immediately showcases the direct effect of SEZs on the local economy, which is the developer and other firms locating in the SEZ. Moreover, following Dehejia and Panagariya (2014), the SEZ might have an indirect effect on regional economic outcomes, through either agglomeration benefits or these intersectoral linkages. The potential spillovers are sizeable, as the uptake was high: within three years after the law was instated, more than 500 SEZs in a variety of sectoral specializations in manufacturing and services were approved. In total, as of 29 October 2022, the Board of Approval has considered 1,439 proposals, of which more than 800 were approved.

II. Land in SEZs

One key contributor to this large uptake is the fact that many State Governments provided land to SEZ developers, as the government was concerned that land costs would deter especially the private sector from participating. In India, land is technically abundant, but practically, the land sector is encumbered by major concerns and challenges, leading to a land crisis (Chaudhry, 2020). Land conflicts constitute 25 percent of cases at the Supreme Court, with land disputes in general threatening investments worth 200 billion dollars (Wahi, 2020). An important contributor to this problem is the lack of accurate and up-to-date land records, and thereby insecure property rights (Prabhakar et al., 2020). Moreover, land ownership in India is extremely fragmented, with an average parcel size one hundred times smaller than in the U.S. – 2.9 acres versus 234 acres (Sood, 2022). Finally, it has been estimated that land in India is governed by more than 1,000 laws, some of which are contradictory in nature (Wahi, 2020). All aforementioned factors highlight that acquiring land in India is a time-consuming and costly land acquisition process. Anecdotal

[5] Another notable difference is the minimal size requirement, which varies across industries and is lower than in for example China (Hyun and Ravi, 2018).

[6] The latter is only for units operating before 30 June 2020.

[7] Alternatively, the developer must have a twenty-year lease on the land

evidence furthermore suggests that state investment in land is a prerequisite for many private developers, in line with the fear of the Central Government (Levien, 2012)

To circumvent this lack of incentive, the State Governments were incentivized to expropriate land for private developers, often before their proposal was to be discussed in the Board of Approval meetings. Specifically, they used the colonial Land Acquisition Act (LAA, 1894), which allowed the government to forcibly acquire land for 'public purposes' (Singhi, 2020). As the definition for public purposes is suitably vague, acquiring land for SEZ developers technically fit the bill. While the SEZ Act does not explicitly mention the LAA as a tool to facilitate private SEZs, both anecdotal evidence and state-specific SEZ policies and acts suggest this strategy, and other land acquisition strategies, was used in abundance.[8] Upon completing the compulsory land acquisition, the State Governments would transfer this land at a lower cost to developers (Levien, 2012). Thus, the State Governments shielded private developers, and any firms locating in the SEZ, from the normally high transaction costs.

III. Protests and land acquisition reforms

To understand the effect of land transaction costs on sectoral composition, I exploit an unexpected policy change to land acquisition for SEZs. After the 2005 SEZ Act, the West Bengal Industrial Development Corporation and the Salim Group, a private firm, proposed to set up a chemical SEZ in Nandigram, close to Haldia port.[9] This proposal was accompanied by a notification of land acquisition for 4,047 hectares of land, directly affecting 29 villages and more than 100,000 people in Nandigram (Patra, 2019). When the land acquisition program started in January 2007, farmers and other locals began to barricade the area in protest. On March 14, 2007, the West Bengal State Government decided to intervene, by sending 3,000 police officers to suppress the 5,000 villagers participating in the protest. In the ensuing violence, 14 farmers were killed and more than a hundred farmers went, and remained, missing (Levien, 2012). Moreover, there were extensive reports of acts of sexual violence by the police officers.

This protest, and its violent ending, not just changed the trajectory for Nandigram but also for the rest of India. First, the SEZ at Nandigram was cancelled; the West Bengal Industrial Development Corporation announced it would move the SEZ to Nayachar, an empty strip of land also close to Haldia. Second, the West Bengal State Government would eventually lose the next election due to their involvement in repressing the protest (Patra, 2019). Finally, and most relevant for this paper, the Central Government revisited the SEZ policy. After three months, during which the BoA meetings were suspended, the Central Government announced that effective immediately, *forced* land acquisition was prohibited and landlosers must be compensated properly (SEZ Board of Approval, 2007). It furthermore promised to revise the rules on land acquisition and resettlement and rehabilitation more formally by passing new acts. A first step was the National Policy on Rehabilitation and Resettlement in October 2007, which advocates for land-for-land compensation, and preference to the landlosers for employment.

The process eventually culminated in two new bills, introduced in Lok Sabha (Lower House) on 6 December 2007. The Resettlement and Rehabilitation Bill was a formalization of the existing

[8] Eleven states have published either a state-specific SEZ policy or state-specific rules; the other states adhere to the national SEZ Act. Of these 11, eight states – Chandigarh, Gujarat, Haryana, Karnataka, Punjab, Madhya Pradesh, Tamil Nadu and West Bengal – have declared that the government would provide the necessary land. The first five states name the Land Acquistion Act as the appropriate method to do so.

[9] Haldia is one of India's major ports, increasingly taking over traffic from Kolkata as Haldia is more easily accessible for ships.

National Policy, while the Land Acquisition (Amendment) Bill most notably redefines "public purpose" beyond strategic or military provisions and infrastructure investments. Specifically, the provision of land for any other project under the umbrella of public purchases is limited to thirty percent of the total area of land necessary, and conditional on the other seventy percent having been legally acquired by the developer (Ministry of Rural Development, 2007). The Land Acquisition (Amendment) Bill was passed in Lok Sabha on 25 February 2009, but both bills lapsed with the dissolution of the parliament on 1 June 2009. It wasn't until 2011 when both bills were introduced in the combined Land Acquisition, Resettlement and Rehabilition Bill in 2011. The Right to Fair Compensation and Transparency in Land Acquisition Resettlement and Rehabilitation Act was finally passed on 27 September 2013, coming into effect on 1 January 2014 (Ministry of Law and Justice, 2013).

The restriction on forced land acquisition should have increased land transaction costs: even if the government would still undertake the negotiations with the numerous landowners, the higher costs of resettlement and rehabilitation would be borne by the developers.[10] This increase would be most markedly felt, or at least more present, in the states explicitly committed to aiding SEZ developers in land acquisition. As mentioned before, these states are Chandigarh, Gujarat, Haryana, Karnataka, Punjab, Madhya Pradesh, Tamil Nadu and West Bengal. Furthermore, the impact of this could be exacerbated by credit frictions: despite the lenient allowances for FDI for SEZs, the foreign capital flow was "disappointing", with most of the SEZ financing coming from internal accruals and domestic bank loans (Levien, 2012).

III. Data and Methodology

I. Data

I.i. SEZ data

I first created a dataset of the universe of SEZ proposals discussed in the Board of Approval meetings. This data is not readily available, unlike data on notified and operational SEZs, but is of the utmost importance to analyze the effect of the policy shock on the *proposed* and then approved SEZ sectoral composition. My principal data source are the BoA meeting minutes, which are publicly available from SEZ India (2022b). After collecting the meeting minutes, I used text analysis to extract information about all SEZ proposals. Specifically, I have information on the developer, the proposed location, the size in hectares, the sector in which they plan to operate and the decision of the Board, including, if applicable, the reason for deferral. I complement this data with similarly collected data from the corresponding meeting agendas of the BoA, which provide, for a subset of firms around the shock, information on initial proposal data, state government approval and land possession (SEZ India, 2022a). I also collected data on whether the SEZ developer is a public or private entity and the exact location at the village level.[11] For all SEZs that were notified in 2014, I have data on land use within each zone and, if the SEZ was operational in 2021, I have a list of all firms operating from the SEZ (SEZ India, 2014).

Figure 1 shows the location of proposed SEZs and their distribution of SEZ proposals by states, where darker colours signify a higher number of proposals. This shows two notable patterns: SEZs

[10] This is for example explicitly mentioned in the SEZ policy of Uttar Pradesh (2008).

[11] To find out which SEZs were developed by public entities, I extracted a list of all state Industrial Development Corporations from the website of Council of State Industrial Development and Investment Corporations of India (COSIDICI), supplemented with ownership data from SEZ India (2014).

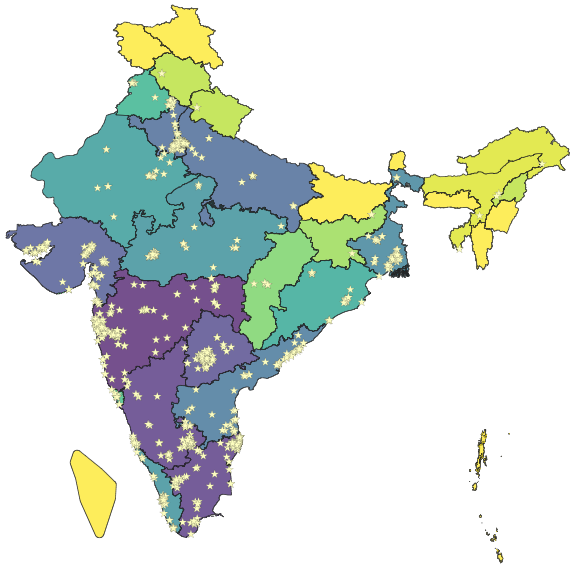

Figure 1: *SEZ distribution by state*

locate either close to urban areas or in rural areas, and SEZs tend to cluster together (Tewari, 2020). This implies that it is of the utmost importance to control for pre-existing economic conditions and to investigate the spatial spillovers of these new SEZs.

I.ii. Administrative data

To measure sectoral composition at the local level, I use the Economic Census (EC, 1990-2013), which is a complete count of all economic units (both agricultural and non-agricultural) in the country except for crop production, plantation and production solely for direct consumption and takes place once every seven to eight years. The EC contains information for each village-industry combination on hired and non-hired employment, the number of active firms, the share of firms using power and the share of public firms. One important note is that villages in India are subject to border changes over time. To provide consistent comparisons, I use the Socioeconomic High-resolution Rural-Urban Geographic Data Platform for India (SHRUG) (Asher et al., 2021). The unit of aggregation in the SHRUG is a shrid, which is unchanging over time and comprises at least one village or town.

The second novel dataset is the scraped Agricultural Census (AC, 1995-2015), which provides me with the exact plot size distribution, crop types and irrigation in India's subdistricts. A subdistrict is the third administrative boundary level in India; India consists of more than 6,000 subdistricts. This dataset is publicly available, but one needs to download the data separately for each subdistrict-year combination. I therefore scraped the Agriculture Census website and compiled the dataset. I then use the detailed plot size distribution data to calculate land concentration at the subdistrict, district and state level, which serves as a proxy for land transaction costs. I use the Gini coefficient, Sen's social welfare function and the percentile ratio of the top and bottom ten percent.

Table 1: *Proposed SEZs discussed before and after the protest*

Variable	Pre	Post	Difference
Log Area	4.236	3.645	-0.591***
	(1.752)	(1.663)	(0.090)
Ownership	0.872	0.891	0.019
	(0.334)	(0.311)	(0.017)
Power	0.020	0.020	-0.000
	(0.141)	(0.141)	(0.007)
Manufacturing	0.350	0.259	-0.091***
	(0.477)	(0.439)	(0.024)
Services	0.629	0.720	0.091***
	(0.483)	(0.449)	(0.025)
Observations	642	794	1,436

I.iii. Other data

To control for local economic activity before the development of an SEZ, and analyze how this pattern has changed following this establishment, I follow Hyun and Ravi (2018) and employ the DMSP-OLS dataset (1994-2013), which provides annual measures of night time luminosity at the pixel level. Finally, to control for local agricultural productivity, and perhaps shed some light on the opportunity costs of transforming farmland into an SEZ, I use a pixel-level agricultural gross primary productivity dataset (2001-2019) developed by Gangopadhyay et al. (2022).

II. Empirical methodology

II.i. Sectoral composition of SEZs

Table 1 shows the difference-in-means before and after the protest and the ensuing policy change. The raw data suggests that, while there is both an intensive and extensive margin response after the shock to land transaction costs. First, the difference in log size is 0.591, which implies SEZ developers reduce the size of SEZs by 13 percent. There is no significant change in ownership: almost 90 percent of SEZs are set up by private developers. Moving to the sectoral composition of SEZ proposals, we see that the share of Power SEZs, which includes refineries and renewable energy, remains unchanged. However, the share of manufacturing decreases by nine percentage points and the share of services SEZ proposals increases by nine percentage points.

First, I run a set of fixed-effects regressions:

$$Y_{irst} = \beta Post_t + \alpha_r + \epsilon_{irst}, \tag{1}$$

where Y_{irst} refers to any outcome at the SEZ-level, $Post_t$ is a dummy designating whether the proposal i was discussed before or after the protest and I include subdistrict fixed effects α_r. To formalize this analysis, I opt for a differences-in-differences with heterogenous treatment intensity. Specifically, I use the fact that eight states submitted policy suggesting that the State Government would be responsible for land acquisition for SEZs. This results in the following regression equation:

$$Y_{irst} = \beta Post_t \cdot LA_s + \alpha_t + \alpha_r + \epsilon_{irst}, \tag{2}$$

where LA_s equals 1 if the state s ex ante committed to facilitating the land for SEZ developers. I control for year fixed effects α_t and subdistrict fixed effects α_r, and standard errors are clustered at the subdistrict-level.

II.ii. Spatial spillovers

We estimate variants of the following shift-share equation to identify how land market distortions impact sectoral composition:

$$y_{ist} = [LC_{s,00}P_t]\beta_1 + \alpha_t + \alpha_s + \epsilon_{ist}, \tag{3}$$

where subscripts i, s and t indicate shrids, subdistricts and years respectively. $\Delta LC_{i,00}$ denotes the level of land concentration in a subdistrict in the year 2000, and P_t is the dummy that equals one post-protest. Subdistrict and year fixed effects are denoted as α_s and α_t. Finally, $\epsilon_{i,t}$ captures any remaining unobserved shrid-year specific variables that also affect the outcome variable y_{ist}.

The unexpected nature of the policy change that I exploit helps subside concerns of reverse causality as a threat to our identification, but it might still be possible that land concentration in 2000 has influenced sectoral composition in the first place. To circumvent this issue, I control for 1990 manufacturing employment The only remaining concern is that $\epsilon_{i,t}$ (partly) consists of omitted variables that are correlated with land concentration $LC_{s,00}$. I can try to control for these other initial conditions by simply including them in (3), or, if they are unobserved, by including other initial conditions in (3) that proxy for them. The second specification relies on an even weaker identification assumption. It provides unbiased estimates of our coefficients of interest in the presence of unobserved variables that are correlated to one (or more) of the included regressors, but that exhibit *the same trend in the pre- and post-reform period*. I can leverage the time dimension of the panel dataset to take out the time trend.

IV. RESULTS – PRELIMINARY

In this section, I provide evidence that the policy shock changed the proposed sectoral composition of SEZs.

I. Sectoral composition of SEZs

Table 2 shows the results of estimating Equation 1 for both the intensive margin, as proxied by log proposed area, and the extensive margin, which would be reflected in a change in sectoral composition. Including subdistrict fixed effects, to account for time-invariant characteristics that might influence the SEZ location choice, does not dramatically change the coefficient. IT should be noted that the number of observations declines somewhat with the addition of subdistrict fixed effects, as a few SEZs do not have subdistrict-level location information. The preferred baseline specification in the second column shows that the log area of SEZs decreases by -0.617 after the protest, which is equivalent to a 46% decrease in SEZ area.[12] The third and fourth column show that the share of manufacturing SEZs (or rather, the probability that an SEZ is in the manufacturing sector) decreases by 8.6 to 9.3 percentage points from a baseline average of 35 percent, while the share of services SEZs increases by 7.6 to 8 percentage points from 62.9 percent.

[12] Since $\exp(-0.617) \approx 0.5395$.

Moving to the differences-in-differences strategy, Table 3 displays the results of estimating Equation 2. In column (1), we see that the reduction in SEZ size after the protest is present in all states, and does not significantly differ across states that committed to land acquisition. Specifically, the results from this regression predict that after the protest, SEZs are on average 34% smaller. One possible reason for this response across the board is the increased scrutiny on SEZs and the suspicion that the developers were using this as a real estate opportunity. Column (2) adds year fixed effects, and as expected the coefficient on the treatment interaction variable absorbs the PostProtest effect, with a slightly lower significance. The coefficient implies that the average size of SEZs in states that facilitated land acquisition is 28% lower than in those states that did not. Looking at sectoral composition, column (3) and (5) show that the opposite is true: the effect of the protest seems to be fully driven by changes in entry in states that mediated land acquisition. Specifically, column (3) shows that the share of manufacturing in SEZ proposals decreases by twelve percentage points in these states; this slightly increases to thirteen percentage points when including year fixed effects. Column (5) and (6) show that this is almost fully mirrored by the effect on services entry, with the share of services increasing by eleven percentage points in land acquisition states compared to those states with lower land acquisition intensity.

Table 2: *Effect of increased difficulty of land acquisition on proposed SEZs.*

	Log proposed area		Share manufacturing		Share services	
PostProtest	-0.583***	-0.617***	-0.0860***	-0.0926***	0.0764**	0.0799***
	(0.114)	(0.0922)	(0.0309)	(0.0266)	(0.0331)	(0.0271)
Subdistrict FE	No	Yes	No	Yes	No	Yes
Observations	1456	1276	1456	1276	1456	1276
R-squared	0.0278	0.638	0.00868	0.551	0.00654	0.567

Standard errors in parentheses

The standard errors are clustered at the subdistrict level.

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

V. Conclusion

In this paper, the effect of land acquisition costs on sectoral composition in India was analyzed. I compile a novel dataset of the universe of SEZ proposals, and supplement this with administrative data on sectoral employment, unique census data on agricultural plot size distribution and night lights data to show that a shock to land acquisition costs affected the *proposed* sectoral composition of SEZs.

Table 3: *Proposed sectoral composition changes more in states that mediated land acquisition*

	Log proposed area		Share manufacturing		Share services	
PostProtest=1	-0.410***		-0.00299		0.00696	
	(0.147)		(0.0330)		(0.0313)	
PostProtest=1	-0.288	-0.326**	-0.124***	-0.133***	0.101**	0.111**
× LA_use_all=1	(0.186)	(0.153)	(0.0473)	(0.0478)	(0.0474)	(0.0479)
Subdistrict FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
Observations	1276	1276	1276	1276	1276	1276
R-squared	0.639	0.661	0.554	0.558	0.569	0.573

Standard errors in parentheses

The standard errors are clustered at the subdistrict level.

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

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