When Private Firms Provide Public Goods: The Allocation of CSR Spending

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This paper studies how firms allocate their Corporate Social Responsibility (CSR) expenditures to shed light on the potential welfare effects of corporate contributions to public goods. We use a novel dataset covering the universe of the CSR expenditures of large Indian firms over the period 2015-2019, which includes detailed information on the projects and social topics (e.g. health, education) firms invest in. CSR expenditures in our data represent 0.1% of GDP. Using natural language processing we construct an index of the technological proximity between industries and topics to capture how much firms' production technologies give them a comparative advantage in a topic. We find that a one standard deviation increase in proximity increases CSR spending by 17%, consistent with an efficient allocation of CSR expenditures across topics. Looking across locations, however, we find that firms spend more in areas where social returns are low; CSR spending seems less equitably allocated than government expenditures.

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Firms around the globe spend vast amounts on corporate social expenditure (CSR) activities (Hart and Zingales, 2017; Allcott et al., 2023; Fioretti, 2022; Starks, 2023). In India, the focus of this paper, CSR expenditures represent 0.1% of GDP, similar to the share observed in the US.[1] Governments actively seek to promote the private sector's participation to social causes, whether through tax incentives (in place in most countries, see Pickering et al., 2014) or laws that mandate CSR spending by firms, which are increasingly popular in low-and-middle-income countries.

CSR, defined as the allocation of some profits to social causes, is hard to justify by standard economic principles that suggest contributions to such causes is best done by individuals, not firms (Friedman, 1970). One justification stems from the idea that firms may have a comparative advantage in producing public goods relative to the public or non-profit sector (Besley and Ghatak, 2007; Hart and Zingales, 2022). This occurs when the public good is *naturally bundled* with the production of the private good: a firm producing healthcare products may have a comparative advantage in setting up local health projects, for example. In practice however, firms could engage in CSR for many reasons that lead them to maximize their private returns, potentially at the expense of social returns. There is, to the best of our knowledge, no systematic evidence on how firms allocate their CSR expenditures that could help understand the welfare effects of CSR.

This paper seeks to shed light on the motives for CSR and its potential welfare effects, by studying how Indian firms allocate their CSR expenditures. The Indian context is particularly well-suited to this purpose because in 2013 India became the first country to mandate that large firms must allocate a share of profits to a specified list of social causes. Two aspects of the law are key to our ability to provide comprehensive evidence on firms' CSR activities. First, the law imposed a common reporting format for CSR projects which makes it possible to consider CSR allocations across firms, locations and social topics. This provides us with, to the best of our knowledge, the first dataset documenting the CSR activities of the quasi-universe of large firms in any economy: we observe all CSR expenditures of the 6,500 largest Indian firms over the period 2015-2019. The data includes detailed information on the projects to which CSR expenditures are allocated (e.g., women's employment training or primary health care centers). Second, there is no selection into CSR activities (up to the mandated profit share) or into our data. Our results are thus relevant for all large Indian firms, not just a selected sub-sample, though we consider whether firms that voluntarily spend more than the limit (or spent prior

[1] In the US, charitable giving by corporations represented 27.36 trillion USD in 2023, just under 0.1% GDP (The Giving Institute, 2023)

to the reform) behave differently.

To test whether firms use their comparative advantage in deciding how to allocate their CSR expenditures, we use Natural Language Processing. We construct an index of technological proximity between the firms' for-profit activity and 16 social topics by analyzing two types of texts. For a description of firms' technologies used in their for-profit activity, we rely on the text contained in the industry classification guidelines. From the textual descriptions of projects in the CSR data, we obtain a large corpus of text describing the activities within each topic. We use word embeddings to obtain a vector representation of the text and measure the proximity between industries and social topics using the cosine similarity between these vectors.

We find that firms do follow their comparative advantage when choosing social causes: a one standard deviation increase in the proximity between a firm's industry and a social topic increases the probability that the firm allocates any CSR expenditure to the topic by 10%, and the amount spent by 17%. Our baseline specification includes firm- and topic- fixed effects to account for the fact that some social causes (e.g., education) are popular with all firms. These results are robust to a wide range of robustness checks and not driven by a particular topic or industry. Changing the method used to construct the proximity index in particular hardly affects our results, suggesting our baseline method captures the proximity between firms' industries and social causes well.

Our results indicate that firms use their comparative advantage when deciding how to allocate their CSR spending. The theoretical literature suggests this is a necessary condition for CSR to be welfare maximizing, but it is by no means a sufficient one. Having firms in charge of some social spending may have implications for equity as well as efficiency. To study the equity characteristics of CSR we compare the allocation of CSR expenditures across areas. We find that, whilst both government and CSR expenditures increase with local development levels, firm expenditures are three times more elastic with respect to local GDP than government expenditures. Much, but not all, of the difference can be explained by the fact that firms tend to spend more in states where their headquarters are located. Overall, the evidence suggests CSR spending is systematically biased towards richer areas relative to government expenditures.

This paper's first contribution is to the empirical literature on CSR. An earlier literature has focused on the incidence of CSR, in particular on profits (see Margolis et al., 2007; Hong and Shore, 2023, for reviews).[2] More recent papers seek to measure

[2]Previous contributions have investigated CSR in the Indian context in particular. In the accounting literature, Manchiraju and Rajgopal (2017); Dharmapala and Khanna (2018); Mukherjee et al. (2018); Bhattacharyya and Rahman (2019) investigate the effect of the CSR mandate on firm value, focusing on listed firms. In the strategy literature, Gatignon and Bode

firms' and investors' social impact (see for example Allcott et al., 2023; Kahn et al., 2023), or the stakeholder's preferences behind firms' prosocial stances (Fioretti et al., 2023; Conway and Boxell, 2024). We build on these papers by considering what information on CSR projects can teach us about both firms' motivations and the welfare properties of corporate social expenditures. Our approach in particular complements that of Fioretti (2022) who uses detailed data on the prosocial actions of one firm to estimate the firm's objective function and show that the firm spends prosocially beyond profit maximization, thereby increasing welfare. By contrast, we consider all large firms in a context in which the amount of prosocial spending is given, and consider whether the *allocation* of CSR spending is consistent with social welfare maximization. Finally, our paper's approach is reminiscent of work on charitable giving by individuals that also describes the entire scope of giving via administrative data, though this work has so far only documented spending patterns in rich countries (see List, 2011, for a review).[3]

Within the larger CSR literature, our second contribution is to test whether firms allocate their CSR spending according to the comparative advantage of their industry. The assumption that this is how firms behave is central to much of the theoretical literature on CSR (see Kitzmueller and Shimshack, 2012, for a review); in most models it is a necessary condition for CSR to increase welfare - that of shareholders (Hart and Zingales, 2017, 2022) or of society (Besley and Ghatak, 2007; Magill et al., 2015; Broccardo et al., 2022).[4] This paper is, to the best of our knowledge, the first to define and empirically implement a test of this assumption. Seen through the light of this literature our results imply that firms' CSR activities have the potential to be welfare-improving. Our results regarding the spatial allocation of CSR point however to potential equity effects from delegating some public good provision to the private sector which this literature has so far not considered.

Our third contribution is to the literature on the private provision of public goods, of which CSR expenditures are an example. This literature emphasizes trade-offs between the efficiency gains of relying on firms to provide public goods and potential adverse effects in quality or distributional outcomes. This literature focuses mostly on private provision via privatization or outsourcing (see Hart et al., 1997; Kotchen, 2006; Behaghel et al., 2014; Mukherjee, 2021; Knutsson and Tyrefors,

(2023) provide a descriptive analysis of Indian firms' CSR strategies.

[3]Within this literature Card et al. (2010) find that contributions from individuals increase substantially in areas where a firm's headquarters are located, our results suggest corporate contributions exhibit a similar type of home bias.

[4]Note that this condition is necessary but not sufficient for CSR expenditures to increase social or shareholder welfare - one also needs to assume government under-provision of the public good and, for shareholder welfare, shareholder preferences for being socially responsible. CSR expenditures could also increase shareholder welfare if shareholders look to management to solve their free-riding problem (Morgan and Tumlinson, 2019), common ownership leads shareholders to want to maximize industry profit, not firms' profit, etc.. Hart and Zingales (2022) however, argue that such considerations are second-order explanations compared to the comparative advantage motivation.

2022). This paper points to a similar efficiency-equity tradeoff for CSR activities: our results on comparative advantage suggest firm provision of public goods could be efficient, but will lead to less spending in deprived areas than if the government had been in charge of the allocation.

Finally, our results speak to debates regarding how to finance development. A large literature focuses on overcoming tax capacity constraints to raise more resources in low- and middle- income countries (LMICs) (see for example Besley and Persson, 2009; Best et al., 2015; Gadenne, 2017; Jensen, 2022; Bergeron et al., 2024). Our results suggest that mandating CSR spending can be a complement to such efforts, and indeed several LMICs recently implemented CSR mandate laws similar to India (Lin, 2021). The focus of our paper is not to compare the CSR mandate to an increase in taxes on large Indian firms. We note however that the reform was reasonably well enforced, with a clear and economically significant increase in CSR expenditures. This suggests that the public discussion of the law as asking firms to contribute to development goals, together with the reporting requirements, may have de facto enforced a transfer of resources from the private sector to public good provision in a context where tax enforcement itself is weak.

The paper is organized as follows. Section 1 describes our context of study and data and provides evidence on the implementation of India's CSR mandate. Section 2 outlines a simple conceptual framework that defines our hypothesis of interest and derives empirical tests of different conceptions of CSR. Section 3 presents our main results regarding the effect of technological proximity on firms' choice of social causes, and Section 4 sheds light on the potential equity implications of these choices.

I. Institutional Setting and Data

A. CSR mandate

India's companies have a long-standing tradition of contributing to public goods. In 1892, the Tata Group established one of India's first philanthropic trusts. Since then, a large number of firms have followed the example, supporting communities with philanthropic efforts. On 29th of August, 2013, India became the first country to legislate on CSR. Section 135 of the Companies Act 2013 by the Ministry of Corporate Affairs (MCA) stipulates that firms above a certain size must form a CSR committee with at least one independent director, formulate a CSR policy, and spend at least 2% of their average profits over the last three years on CSR. Schedule VII of the Act lists the activities that qualify for CSR expenditures. CSR spent within the firm in pursuance of its normal course of business, e.g., employee welfare, does not qualify as CSR. Like most provisions of the law, Section 135

came into effect on April 1st, 2014. Since the Indian fiscal year runs from March to March, the law is applicable from FY 2014-15 onwards. In our notation, year t is the fiscal year ending in March of year t. For instance, the year 2015 is the fiscal year 2014-15.

The CSR mandate applies to firms with profits above INR 50 million, income above INR 10 billion, or a net worth above INR 5 billion in any of the three immediately preceding financial years. This captures a large share of the Indian economy, corresponding to approximately 60% of the formal sector activity. Importantly, these particular thresholds apply only to Section 135 and are not associated with any other requirements in Indian company law. The CSR spending requirement applies to a comply-or-explain basis; if firms do not spend 2% of their profits on CSR, the CSR committee is responsible for explaining why the firm could not reach the target in a report presented at general shareholder meetings. In alignment with firms complying with the policy, we establish an economically strong effect on CSR spending of the policy.

B. Data

B1. CSR project data

Crucially for this study, the policy mandated CSR reporting to the MCA. Since 2015, each firm liable under the policy needs to submit a report with the amount of CSR spent project by project. The data additionally contains the textual description of each project, the name of the associated social topic, and its location (at the district level). The MCA made the data available on their website, and we web-scraped it. Table 1 displays a typical firm-year-project observation in our data. Utilizing the reporting mandate allows us to create a country-wide universe of CSR activities. To our knowledge, this is the most comprehensive dataset on CSR activities that exists. The data contains 11,486 firms, 34,043 firm-years, and 124,812 firm-year-projects. It spans five years (2015 to 2019), 16 social topics, and 35 states. This dataset is the primary input for our empirical analysis.

B2. Firm accounting data

Firm-level accounting data comes from the Prowess database compiled by the Centre for Monitoring the Indian Economy (CMIE). It includes all publicly traded firms as well as a large number of private firms. The dataset contains information from the income statements and balance sheets of companies comprising more than 70% of the economic activity in the formal sector in India and 75% of all corporate taxes collected by the government. It is thus representative of large and medium-

sized Indian firms. We consider the data from 2007 to 2019, which contains 40,967 firms and 271,684 firm-year observations. These firms belong to 76 different 2-digit industries in 35 states. We utilize the Prowess data for two purposes. First, we merge it with the MCA CSR project data to empirically test whether firms use their comparative advantage. This test requires information on the firms' industries, which is not available in the MCA data. Second, we utilize Prowess to test for the relevance of the CSR mandate in Section I.C since it provides pre- and post-policy CSR spending.

B3. Merging

We merge the MCA data with Prowess on two levels: firm-level and firm-year-level. The primary reason why we do not only match on firm-year-level is that the industry classification for a given firm does not change over time, which means that we can recover the industry for a firm in the project data, even if we do not have that given year for a given firm in Prowess. The merge is done based on firm's Corporate Identification Number (CIN).[5] Table A1 shows the quality of the merge. For the firm-level match, we match 61% (7,063) of firms and 65% of firm-years in the project data. We match better for large firms. As a consequence, we match 93% of the average profit over the past three years and 91% of CSR spending in the project data. For the firm-year-level match, we observe a very similar pattern. We match 55% (6,305) of firms and 54% of firm-years as well as 88% of the average profit of the past three years and 86% of the CSR spending. Finally, we take a series of data-cleaning steps, which are described in Appendix B (not yet provided). To conclude, our merged sample captures a large share of firm profits and CSR spending reported to the MCA.

B4. Descriptive statistics

Table 2 shows descriptive statistics for the merged data. Since our main analysis is on the firm $\times$ topic level, we report summary statistics on the firm level, topic level, and industry topic level. In our sample, we have 6,573 firms. The average firm reports a profit of INR 5 billion as a basis for the CSR policy between 2015 and 2019. Correspondingly, the mandated expenditure is INR 87 million (1.7%). The actual CSR spending during the years is slightly below the prescribed one with INR 78 million (1.6%). These 6,573 firms are in 71 industries. Figure 1 shows the top 20 industries by share of CSR contributed. Since CSR spending is closely tied to

[5] In rare cases, a given firm can have multiple CINs, for instance if it changed its state of registration. We augment the merge by CIN by a matching procedure based on subcomponents of the CIN and fuzzy string matching based on firm's name, address of registration, and contact email address.

profits, these are the largest industries in the country by profit measures. The 6,573 firms spend on 16 social topics. The average firm has five projects on 2.5 unique topics per year. Figure 2 depicts all topics by share of CSR allocated. The two largest categories are education and health, with 32% and 17%, respectively. 8% is spent on infrastructure and environmental sustainability. Categories falling in the range of 1%-6% are vocational skills, technology incubators, livelihood enhancement, sanitation, hunger and malnutrition, safe drinking water, vulnerable populations, emergency relief, sports, and women empowerment. Finally, less than 1% is spent on agroforestry and animal welfare. To also capture zero spending on topics, we fill our data on the firm $\times$ topic level. This results in 105,168 firm-topic observations. Finally, Figure 3 depicts the geographical distribution of CSR spending across the country.

C. Relevance of CSR mandate

C1. Raw trends

To investigate the relevance of the CSR mandate, we examine raw CSR trends as well as the causal effect of the reform on firm-level CSR spending. We utilize the Prowess data, which, in contrast to the MCA data, provides pre- and post-policy data on CSR spending. Table A2 describes summary statistics of the Prowess data, Discussion A1 the construction of the CSR spending variable. Following the CSR policy, we define liable firms as firms with profits above INR 50 million, income above INR 10 billion, or net worth above INR 5 billion in any of the three preceding financial years. Table A4 shows the characteristics of treated and control firms in 2014. Liable firms tend to be larger than non-liable firms. As expected, they have higher profits, income, net worth, and CSR spending.

Figure 4 demonstrates how aggregate CSR developed over time. While there was already CSR spending before the policy, we can see a clear and substantial upward trend subsequent to the policy. The total CSR spending almost tripled between 2014 and 2019, rising from INR 59 billion (USD 0.97 billion) to INR 158 billion (USD 2.27 billion). This corresponds to approximately 0.1% of the Indian GDP and 2% of government development spending in 2019. Next, we investigate raw trends separately for liable and non-liable firms (Figure 5). We observe a substantial increase in CSR activity for liable firms. Between 2014 and 2019, CSR spending for liable firms multiplies by a factor of 2.4. CSR spending for non-liable firms, in contrast, has remained stable over the years. Thus, both the aggregate raw trends and the raw trends split by treatment status provide evidence that the CSR reform stimulated an economically meaningful increase in CSR spending.

C2. Difference-in-difference

To identify the causal effect of the policy, we utilize a difference-in-differences (DiD) design in Equation 1. The outcome is CSR spending in year t of firm f, scaled by average profits in the proceeding three years (t-3, t-2, and t-1). $\text{Treated}_{f,t}$ is equal to one if the firm is liable under the CSR regulation in year t, that is, if either profits, income, or net worth, are above their respective thresholds in any of the three preceding financial years. Post_t is a dummy equal to one every year from 2015 onwards. Standard errors are clustered on the firm level. This specification compares firms above and below the thresholds after and before the implementation of the reform. The coefficient β_1 identifies the causal effect of the policy.

$$\left(\frac{\text{CSR}_{f,t}}{\overline{\text{Profit}}^{3y}_{f,t}}\right) = \beta_0 + \beta_1 \text{Post}_t \times \text{Treated}_{f,t} + \alpha_f + \alpha_t + \varepsilon_{f,t} \tag{1}$$

Figure 6 presents the yearly coefficients from this regression, with three different fixed effect structures. We show results with year fixed effects only, year-industry-state fixed effects only, and year-industry-state with firm fixed effects. The omitted year is 2013. Table 3 summarizes these results. We observe that post-policy, the share of profit used for CSR increases by 1.1%-1.3% for liable firms relative to non-liable firms. This is a substantial increase. However, it is different from the 2% mandated by the policy. This can have three potential reasons. First, the mandate works on a comply-or-explain basis, which leaves firms with a certain degree of freedom in their compliance decision. Second, among liable firms, some were already spending a positive share of their profits on CSR before the reform, as suggested by Figure 5. Third, the reform may also have affected norms on CSR for non-liable firms, even though the raw trends in Figure 4 suggest this effect is limited. To summarize, both trends in the raw data and causal estimates suggest that the CSR policy induced an economically meaningful increase in CSR for liable firms.

Finally, we explore two types of manipulation (see Discussions A2 and A3). We find that bunching around the profit threshold exists but is minimal. Additionally, results are robust to utilizing treatment definitions based on accounting variables from 2013, further suggesting minimal influence of sorting behavior. Second, we investigate the manipulation of CSR reporting. We do not find any evidence of re-labelling. Firms are not less likely to report spending in categories close to CSR, such as expenses related to the environment, employee welfare, employee training, or social amenities. In 2019, 45% of liable firms spent more than 2% of their average profits over the past year on CSR, 29% spent more than 2.2%, and 23% more

than 2.4%. This provides suggestive evidence that some firms indeed not only target the 2% policy threshold but prioritize the impact of their CSR projects (A5).

II. Conceptual Framework

The traditional view among economists is that Corporate Social Responsibility is not socially desirable: the most famous statement of this traditional view is Friedman (1970), who argues that private corporations should focus on maximizing profits, while governments should deal with public goods and externalities. At the core of this argument lies the idea that CSR can always be replicated by individual donations by shareholders or customers so that there is no reason for public goods contributions to be made within the firm.

The main argument in favor of CSR being welfare-increasing occurs when the production of the public good is naturally bundled with the production of the private good (Besley and Ghatak (2007), Morgan and Tumlinson (2019), Hart and Zingales (2017)). For instance, it may be less costly for a healthcare firm to set up a local health project than for the government or a NGO. When firms have such a comparative advantage in the provision of the public good CSR expenditures can be welfare increasing relative to individual donations or even taxation, depending on agency costs.[6]

Firms may however allocate their CSR expenditures to maximize objectives beyond welfare maximization. They may for example choose to invest in social causes that are valued by their customers but have little social value. In what follows we outline a simple conceptual framework in which firms differ in both the technology they use to produce public goods from their CSR expenditures, to capture the comparative advantage mechanism, and in their preferences across types of public goods. We use this to define the tests we take to the data and their implications.

A. Set-up

Our object of interest is how firms f allocate an exogenous CSR amount E across a set of projects d, where projects are defined by development sectors s and locations l. We write s_{fd} the share that firm f allocates to project d. Shares become projects via production functions that vary at the firm and project level: the amount

[6]Intuitively, in a world with no agency costs individuals or the governments can contract out public good provision to firms according to their comparative advantage and replicate the CSR outcomes - in our example the firm can be asked to set up a local health project using tax contributions or individual donations. As soon as there are agency costs, coordination costs, or tax inefficiencies however CSR can be the most efficient way of providing public goods when comparative advantages exist.

of project d produced by firm f is given by:

$$g_{fd} = \alpha_{fd}(s_{fd}E)^{\rho} \tag{2}$$

where $\rho < 1$.

Firms obtain utility U from their vector of projects g_{fd}, defined in the following way:

$$U_f = \sum_d \beta_{fd}\alpha_{fd}(s_{fd}E)^{\rho} \tag{3}$$

where the β_{fd} capture how much firm f values projects of type d. Social welfare is a function of the projects funded by all firms and defined as follows:

$$W = \sum_d \gamma_d \sum_f \alpha_{fd}(s_{fd}E)^{\rho} \tag{4}$$

where the γ_d capture the social welfare returns to project d.

B. Socially optimal allocation

Maximizing social welfare in expression (4) subject to $\sum_d s_{fd} = 1, \forall f$ yields:

$$s^*_{fd} = \frac{(\gamma_d\alpha_{fd})^{1/(1-\rho)}}{\sum_i(\gamma_i\alpha_{fi})^{1/(1-\rho)}} \tag{5}$$

The socially optimal amount firm f allocates to a project d is increasing in its comparative advantage in this project, α_{fd}, and in the social returns parameter γ_d. We define a CSR allocation as **allocatively efficient** if firms with a higher comparative advantage on a project type spend more on that type. The socially optimal allocation clearly satisfies allocative efficiency.

C. Privately optimal allocation

Each firm maximizes its utility in expression (3) subject to $\sum_d s_{fd} = 1$. This yields:

$$s_{fd}^{P} = \frac{(\beta_{fd}\alpha_{fd})^{1/(1-\rho)}}{\sum_i (\beta_{fi}\alpha_{fi})^{1/(1-\rho)}} \tag{6}$$

When firms internalize social welfare ($\beta_{fd} = \gamma_d, \forall f, \forall d$) or have no preferences across project types ($\beta_{fd} = \beta_f, \forall f, \forall d$), allocative efficiency holds, and firms spend more on project types they have a comparative advantage in. However, when firms' preferences across types are different from those of the benevolent social planner allocative efficiency may not hold. In particular, if the correlation between firms' preferences across topics and their comparative advantage across topics is negative and large, allocative efficiency will not hold.

D. Hypotheses taken to the data

In what follows, we start by considering how CSR expenditures are allocated across one dimension of project type, that of social topic. We do not impose any shape on the distribution of social returns across topics and test whether the private allocation is allocatively efficient by considering whether $\frac{\partial s_{fd}^{P}}{\partial \alpha_{fd}} > 0$. We allow for any pattern of aggregate firm preferences towards topics (or equivalently for firms to internalize the social welfare function in their objective function) by including topic fixed effects.

We then consider how CSR spending is allocated across the other dimension of project type, location. There, we use location's economic development to proxy for the social returns of spending on location, and test whether $\frac{\partial s_{fd}^{P}}{\partial \gamma_d} > 0$.

III. Do Firms Use Their Comparative Advantage?

A. Empirical strategy

To test whether firms use their comparative advantage, we utilize the merged sample of MCA projects and Prowess firm-level account information on the firm $\times$ topic level described in Table 2. Our main regression of interest is Equation 7. First, we investigate on the extensive margin whether firm f allocates any funds to social topic s. Second, on the intensive margin, we examine the share of total CSR spending that firm f allocates to the social topic s. The main explanatory variable is Proximity, describing the technological proximity of an industry i and a social topic s. We employ firm- and topic-fixed effects. The firm-level fixed effects adjust for the fact that certain firms have production functions that are generally closer related to

social topics than other firms and thus have generally higher proximity values. The topic-level fixed effects adjust for the pattern that firms across industries have been choosing some topics, such as education, more than others.[7] Finally, we cluster standard errors on the topic-industry level. If firms use their comparative advantage – if they spend more on social topics close to their own production function – we expect $\beta_1 > 0$.

$$(7) \qquad (\frac{\text{Spending}_{f,s}}{\text{Spending}_f}) = \beta_0 + \beta_1 \text{Proximity}_{i(f),s} + \alpha_f + \alpha_s + \varepsilon_{f,s}$$

B. Construction of the proximity variable

To capture the technological advantage of a firm undertaking a given CSR project, we develop the metric Proximity on the industry $\times$ topic level. This metric measures the textual closeness between the firm's for-profit production function and the production function of projects in a given social topic. To obtain a textual description of a firm's for-profit production function, we use its' industry description from the Handbook of the National Industrial Classification (NIC). For each of the 2-digit industries, we recover all the text that contains details about this industry and its sub-components. For the average industry, we obtain 225.0 tokens. Table B1 provides an example of the recovered text for one industry. To obtain a textual description of the production functions of projects in a given social topic, we utilize the textual descriptions of the CSR projects in the MCA data. The average project has a description that contains 4.5 tokens. Table 1 displays some sample observations from this dataset. We apply some basic cleaning procedures to this textual data, detailed in Appendix B. The key assumption is that activities described by a more similar vocabulary are closer in terms of technology.

We encode the two bodies of textual data using word embeddings. Word embeddings are a key tool in Natural Language Processing, in which individual words are represented as real-valued vectors in a high-dimensional space. These vectors are meant to capture the meaning of words: similar words have similar vectors. For instance, the word "tree" and the word "forest" will have similar coordinates. In addition, there is an internally consistent geometry on the vector space that allows relating words to one another. For instance, the sum of the vector "king" and of the vector "female" is approximately the vector "queen". We use word embeddings provided by Word2Vec, which is pre-trained on Google News data. This model provides 300-dimensional embeddings for more than 3 billion words. We apply

[7] Topic fixed effects explain 24% of the variation in the CSR share. The firm fixed effects explain no variation in the CSR share by construction.

these embeddings to our two bodies of textual data. We obtain a 300-dimensional vector representation of the text for each CSR project description, denoted $\vec{\mathbf{v}}_{p,s(p)}$ for a CSR project p belonging to social topic s, and for each industry description, denoted $\vec{\mathbf{v}}_i$ for each industry i. We leave more details on word embeddings and on the implementation to Appendix B.

In the final step, we measure the proximity between each CSR project and the 71 industries. The proximity can be measured by the cosine similarity between their embedding vectors. The cosine similarity of two vectors is the cosine of the angle between the vectors; that is, it is the dot product of the vectors divided by the product of their lengths. The cosine similarity belongs to the interval $[-1,1]$. More similar vectors have a higher cosine similarity. In particular, two proportional vectors have a cosine similarity of 1, two orthogonal vectors have a similarity of 0, and two opposite vectors have a similarity of -1. We leverage this insight to construct proximity, the measure of closeness between each CSR project p belonging to social topic s and the 71 industries i (Equation 8):

$$\text{Proximity}_{p,s(p),i} = \cos(\vec{\mathbf{v}}_{p,s(p)}, \vec{\mathbf{v}}_i) \tag{8}$$

We then define the proximity variable at the industry $\times$ topic level by averaging over projects p belonging to the same social topic s. Denoting $\mathscr{P}_s$ the set of projects belonging to social topic s, we obtain:

$$\text{Proximity}_{s,i} = \frac{1}{\text{card}(\mathscr{P}_s)} \sum_{p \in \mathscr{P}_s} \text{Proximity}_{p,s(p),i} \tag{9}$$

C. Descriptive statistics of proximity variable

Table 2 describes the properties of the proximity variable. On the industry-topic level, the variable has a mean and median of 0.27 and a standard deviation of 0.06. It ranges from 0.12 to 0.58. Figure 7 shows the distribution of the variable. It also indicates an example. The medical and botanical industry has a proximity of 0.19 with vocational skills (around one standard deviation below the mean), 0.26 with hunger and malnutrition (approximately the mean), and 0.33 with health (around one standard deviation above the mean). We will keep this example in mind when interpreting the economic significance of our regressions on the comparative advantage hypothesis. Finally, Figure 8 shows a heat map, showing in which range the proximity variable falls for each combination of the top 20 industries and all topics. Figure 9 shows the same heat map but describes the residual of proximity after taking industry and topic fixed effects. We observe intuitive patterns in both figures. For instance, combinations with a proximity value of more than one standard

deviation above the mean include food and beverages × hunger and malnutrition, chemicals × sanitation, and civil engineering × infrastructure. We conclude that the proximity construction successfully captures the closeness of the industry to a given social topic.

D. Main Results

We find that firms do follow their comparative advantage when choosing social causes: a one standard deviation increase in the proximity between a firm's industry and a social topic increases the probability that the firm allocates any CSR to the topic by 10%, and the amount spent by 17%. Table 5 describes the results. As proximity increases by one, any CSR spending increases by 0.35. A one standard deviation increase in proximity thus increases the likelihood of any CSR spending on a topic by 0.35 × 0.06 = 0.021. Relative to the mean of any CSR spending, this is 0.021/0.22 = 10%. Turning toward the share of spending, we see that as proximity increases by one, the share of CSR spending on a topic increases by 0.17. A one standard deviation increase in proximity thus increases the share of spending on a given topic by 0.17 × 0.06 = 0.0102. Expressed relative to the mean of the CSR spending share, this is 0.0102/0.06 = 17%. This means that the medical and botanical industry has approximately a 10% higher likelihood to spend - and spends 17% more - on health than on hunger and malnutrition. This is the first empirical evidence supporting theoretical models that make a case for firms' efficiency in providing public goods.

E. Robustness

Figure 10 summarizes a variety of first-order robustness checks. We test for robustness along different fixed effects structures, levels of clustering, construction of the proximity variable, and level of the data. Across different specifications, the coefficient remains statistically significant at the 5% level and stable, ranging from 0.09 to 0.22 for the CSR share. The only exception is when we omit topic fixed effects; those are necessary for our specification to hold. Additionally, our results are robust to dropping specific topics (Figure A6) or industries (Figure A7), suggesting that the results are not driven by a narrow subset of observations. Coefficients for the CSR share range between 0.11 and 0.19, all significant at the 1% level.

Next, we test whether our results are robust to using a different large language model. We apply the OpenAI language model. In contrast to Word2Vec that generates word embeddings for individual words, the OpenAI model processes sequences of words, capturing context and relationships across a text. We find that the main coefficient on CSR spending share increases from 0.17 (for Word2Vec) to 0.27, which

is statistically significant at the 1% level (Table A7). Among different constructions of the proximity level such as aggregate or weighted mean, the coefficients range from 0.16 to 0.28. We conclude that there is robust empirical evidence for the comparative advantage hypothesis.

IV. Is There an Efficiency-Equity Trade-off?

After demonstrating that firms use their comparative advantage, so there is potential for an efficiency gain, we turn towards equity. Since firms maximize private returns, not social returns, they might not sufficiently take into account equity considerations. To test whether there is potential for an efficiency-equity trade-off, we focus on one specific dimension of equity: the geographical distribution of resources. This has the advantage that we have a clear prediction of where CSR spending should flow: under the assumption that the social returns of projects are larger in more disadvantaged areas, CSR spending should flow to states with lower GDP or other development indicators. To test whether firms spend more in states that are better off, we run regression Equation 10. We regress the log of state-level CSR spending (in million rupees, aggregated over 2015 to 2019) on the log of state-level GDP (in million rupees, in 2011), scaling both variables by population. Here k denotes state. To obtain CSR spending location, we utilize the MCA project-level information. The state location is available for 84% of projects. GDP data is obtained from the RBI. If firms spend more in richer states, we expect $\beta_1 > 0$. Beyond that, we are interested in comparing the geographical distribution of CSR spending to that of government spending. For this purpose, we repeat 10 with the log of state-level government spending (in million rupees, aggregated over 2015 to 2019) as the dependent variable. We restrict our attention to government spending on the social causes covered by CSR. We collect state-level government spending from the RBI.

$$\log(\text{Spending per 1m people})_k = \beta_0 + \beta_1 \log(\text{GDP per 1m people})_k + \varepsilon_k \tag{10}$$

In a second step, we repeat the exercise on the state-topic level (Equation 11). The dependent variables are the logs of state-level CSR and government spending on a given social topic. The independent variable stacks topic-specific development indicators. For instance, for education we utilize literacy rates. A higher development indicator value means that the state is better off on this dimension. The development indicators are standardized to have a mean of zero and a standard de-

viation of one. Here s denotes social topic.

$$\log(\text{Spending per 1m people})_{k,s} = \beta_0 + \beta_1 \mathrm{D}_{k,s} + \alpha_s + \varepsilon_{k,s} \tag{11}$$

Table 6 shows the results. Column 1 and 2 refer to Equation 10, Column 3 and 4 to Equation 11. Columns 1 and 3 report firms' CSR spending, while Columns 2 and 4 refer to government spending. We find that if GDP per one million people increases by 10%, CSR spending increases by 13.5%. In contrast, government spending shows a weaker response with 4.1%. This suggests that firms' expenditures are three times more elastic with respect to local GDP than government expenditures. We reject equality of the coefficients for firm and government spending at the 1% level. Similarly, firms' spending is five times more elastic to local development indicators than government spending. Here, we reject equality of the coefficients for firm and government spending at the 10% level. Figure 11 and Figure 12 show the results graphically.

Why is CSR more likely to be distributed in states that are better off compared to government spending? We show that one likely explanation is that firms are spending more in their own state. To obtain firms' location, we utilize the address registered with the Registrar of Companies reported by Prowess. Figure 13 shows CSR resources by firm location and by spending location. We observe a strong overlap. Indeed, 60% of CSR resources are spent in the state where the firm is registered. Figure 14 shows that if we eliminate same-state spending, increasing GDP per one million people by 10% increases CSR spending only by 10.3%, compared to 13.5% in the full sample. To summarize, that firms spend in their own state seems to be an important factor for the efficiency-equity trade-off. Note that firms might spend more in their own states for various reasons. For instance, they might face lower implementation costs or are more aware of local needs; both could increase efficiency of spending, but come at the cost of equity.

V. Conclusion

In this paper, we use a novel dataset on the quasi-universe of the CSR expenditures of Indian firms to shed light on the welfare effects of CSR. A robust finding of the theoretical literature on CSR is that CSR can be welfare-improving only if firms have a comparative advantage in the provision of some public goods. We test this hypothesis by constructing an index of technological proximity between a firm's for-profit activity and various social causes, and showing that technological proximity does predict the allocation of firm's CSR spending across social causes. We

then show that this efficiency gain appears to be accompanied by equity losses, as firms allocate their spending to areas where social returns are relatively low. These results highlight an important trade-off associated to firms acting as providers of public goods.

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Tables

Table 1: Project-Level CSR Data Example

Firm	Year	Topic	State	District	Spent	Description
Lohiya Edible Oils	2015	hunger malnutrition	Telangana	Hyderabad	1,400,000	food subsidies
The Andhra Sugars	2017	environmental sustainability	Gujarat	West Godavari	10,000,000	promotion of green energy
Welspun India	2019	vocational skills	Gujarat	Kutch	7,500,000	career guidance program at Ratnal village

Table 2: Summary Statistics Merged Project and Firm Accounting Data

	Mean	SD	Median	Min	Max
Firm-level					
Avg profit past 3y (m INR)	5,055	46,978	427	-432,203	1,864,825
Income (m INR)	50,023	424,301	6,397	0	23,389,356
Net worth (m INR)	30,566	254,386	3,225	-180,965	13,795,679
Mandated CSR (m INR)	87.02	701.84	9.24	0.00	32,455.87
CSR spending (m INR)	78.21	707.16	8.43	0.00	34,242.65
CSR/avg profit past 3y (%)	0.05	0.83	0.01	0.00	46.82
Unique projects per year (nr)	4.76	8.18	2.60	1.00	271.34
Unique topics per year (nr)	2.53	1.84	1.94	1.00	13.95
Topic-level					
Any CSR spending on topic (yes/no)	0.22	0.18	0.18	0.04	0.75
CSR spending (m INR)	4.11	5.25	2.94	0.26	20.94
CSR spending, non-zero (m INR)	14.97	7.74	15.57	2.94	28.07
CSR share (%)	0.06	0.09	0.04	0.01	0.38
CSR share, non-zero (%)	0.21	0.10	0.18	0.12	0.51
Industry-topic-level					
Proximity	0.27	0.06	0.27	0.12	0.58
Unique observations					
Unique firm-topics (nr)	105,168				
Unique industry-topics (nr)	1,136				
Unique firms (nr)	6,573				
Unique industries (nr)	71				
Unique topics (nr)	16				

Notes: This table shows the merged MCA and Prowess data (2015 to 2019). Firm-level and topic-level variables are summed over all years, except unique projects per year and unique topics per year. Those are depicted as the average over the years since there is no unique project-level identifier. All monetary variables are presented in real terms, denominated in 2015 rupees. These variables are not winsorized. CSR share (%) is the main outcome of interest in Equation 7. Proximity is the textual measure of closeness between an industry and a topic defined in Section III.B.

Table 3: Effect of the Policy on CSR Spending (Diff-in-Diff)

	$\text{CSR}_{f,t}/\overline{\text{Profit}}^{3y}_{f,t}$		
	(1)	(2)	(3)
Treated × Post	0.013***	0.012***	0.011***
	(0.001)	(0.001)	(0.001)
Constant	0.008***	0.008***	0.008***
	(0.000)	(0.000)	(0.000)
Year FE	Yes		
Year × Ind. × State FE		Yes	Yes
Firm FE			Yes
Group FE	Yes	Yes	Yes
R-squared	0.01	0.06	0.37
Observations	233,523	226,335	222,660

Notes: This table shows the causal effect of the policy on CSR spending over average profits in the past three years. Data is from Prowess (2007-2019), on the firm-year level. Equation 1 describes the regression. All monetary variables are presented in real terms, denominated in 2015 rupees. Variables are winsorized at the 99th percentile. Profits are additionally winsorized at the 1st percentile. Standard errors are clustered at the firm level. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

Table 4: Comparative Advantage

	Any CSR Spending (1)	CSR Share Unconditional (2)	CSR Share Conditional (3)
Proximity	0.021***	0.010***	0.021***
	(0.003)	(0.003)	(0.006)
Avg dep var	0.223	0.062	0.280
Firm FE	Yes	Yes	Yes
Topic FE	Yes	Yes	Yes
R-squared	0.33	0.24	0.36
Unique firms	6,573	6,573	6,573
Unique topics	16	16	16
Observations	105,168	105,168	21,688

Notes: This table shows a test for whether firms use their comparative advantage when engaging in CSR activities. Data is from MCA and Prowess (2015-2019), on the firm-topic level. Equation 7 describes the regression. Spending share is the share of CSR that a firm allocates to a given topic. Proximity is the textual measure of closeness between an industry and a topic defined in Section III.B. Standard errors are clustered at the industry-topic level. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

Table 5: Comparative Advantage (Listed)

	Listed			Unlisted		
	Any CSR Spending	CSR Share Unconditional	CSR Share Conditional	Any CSR Spending	CSR Share Unconditional	CSR Share Conditional
	(1)	(2)	(3)	(4)	(5)	(6)
Proximity	0.026***	0.011***	0.022***	0.020***	0.010***	0.021***
	(0.005)	(0.003)	(0.007)	(0.004)	(0.003)	(0.006)
Avg dep var	0.282	0.062	0.221	0.205	0.062	0.304
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Topic FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.37	0.29	0.38	0.32	0.22	0.35
Unique firms	6,573	6,573	6,573	6,573	6,573	6,573
Unique topics	16	16	16	16	16	16
Observations	24,576	24,576	6,638	80,592	80,592	15,050

Notes: This table shows a test for whether firms use their comparative advantage when engaging in CSR activities. Data is from MCA and Prowess (2015-2019), on the firm-topic level. Equation 7 describes the regression. Spending share is the share of CSR that a firm allocates to a given topic. Proximity is the textual measure of closeness between an industry and a topic defined in Section III.B. Standard errors are clustered at the industry-topic level. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

Table 6: Equity - Distribution Across States

	Log(Spending per 1m people)			
	Firms	Government	Firms	Government
	(1)	(2)	(3)	(4)
Log(GDP per 1m people)	1.35***	0.41**		
	(0.29)	(0.16)		
Development indicators (standardized)			0.22**	0.03
			(0.09)	(0.06)
$\beta(\text{firms}) = \beta(\text{gov})$	0.00	.	0.07	.
Topic FE	No	No	Yes	Yes
R-squared	0.44	0.19	0.44	0.72
Unique states	30	30	30	30
Unique topics	.	.	8	8
Observations	30	30	222	222

Notes: This table shows how firms and governments allocate their spending geographically across states. Data is from MCA, Prowess, and RBI, on the state level. Equations 10 (columns 1 and 2) and 11 (columns 3 and 4) describe the regressions. The outcome variable is the log of spending (real million rupees) per one million people by firms (CSR) or the government, aggregated from 2015 to 2019. The independent variables are the log of GDP (real million rupees) per one million people (2011), or standardized topic-specific development indicators (e.g., literacy rate, various years). Variables are not winsorized and standard errors are not clustered. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

Figures

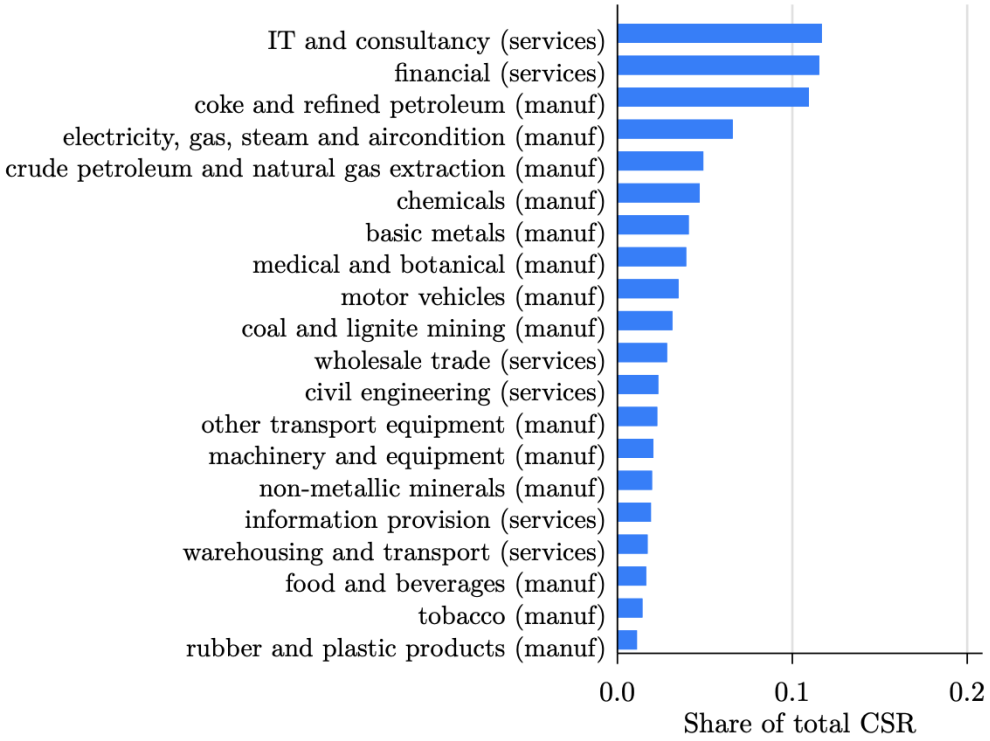


Figure 1. CSR Spending Share by Top 20 Industries. Data is from MCA and Prowess (2015-2019). Share of total CSR is aggregated CSR spending by industry over total CSR spending.

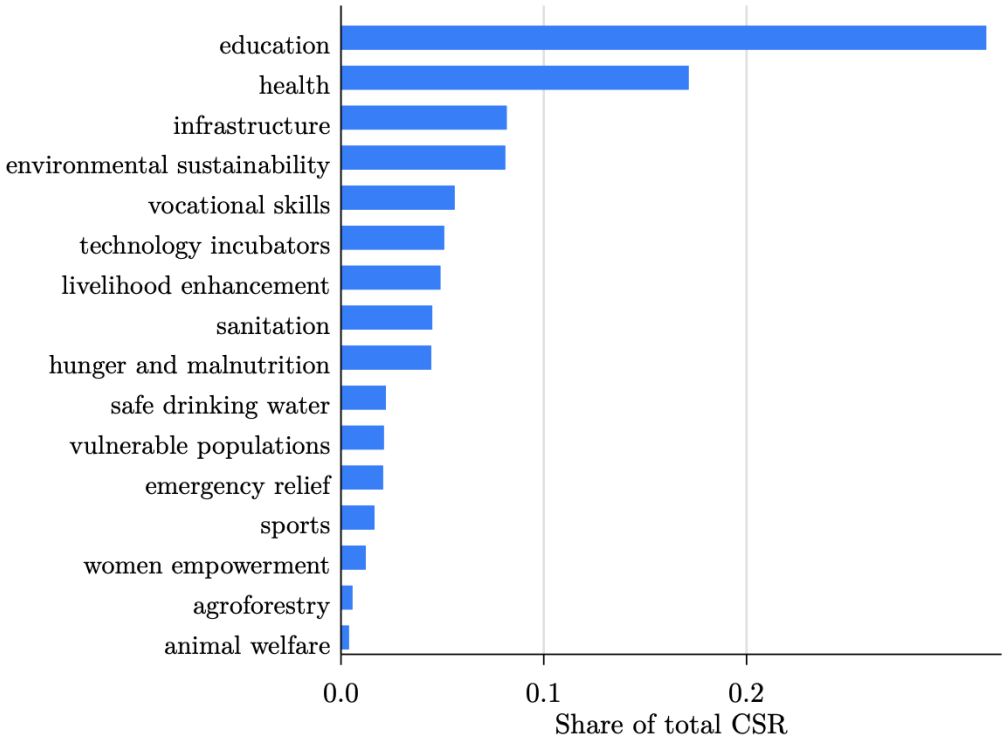


Figure 2. CSR Spending Share by Topics. Data is from MCA and Prowess (2015-2019). Share of total CSR is aggregated CSR spending by topic over total CSR spending.

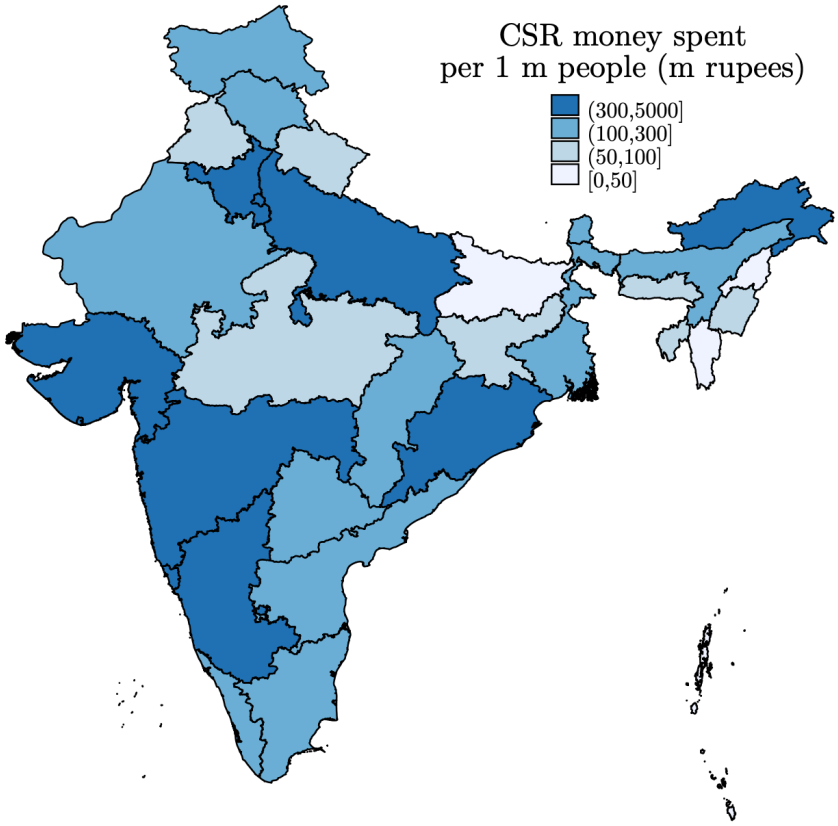


Figure 3. Geographical Distribution of CSR Spending. Data is from MCA and Prowess (2015-2019), aggregated by states. CSR money spent is in millions, presented in real terms, denominated in 2015 rupees.

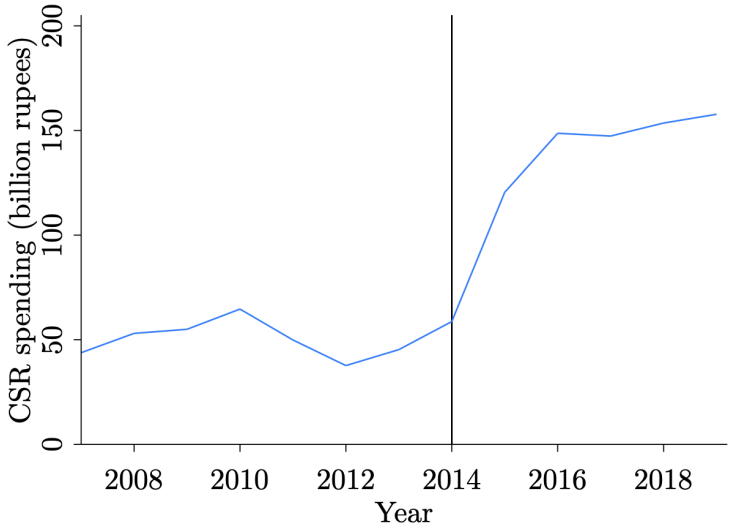


Figure 4. Total CSR Spending Tripled Between 2014 to 2019. Data is from Prowess (2007-2019), aggregated by years. CSR spending in billions, presented in real terms, denominated in 2015 rupees.

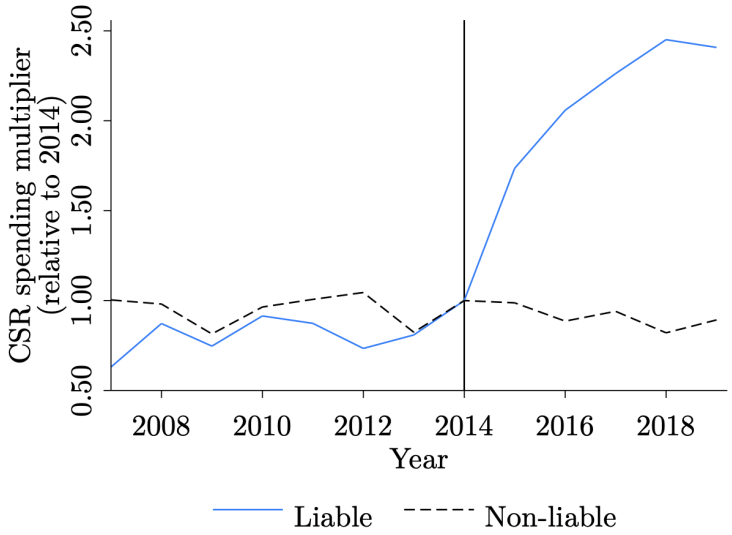


Figure 5. Raw Trends Indicate Substantial Increase in CSR Spending for Liable Firms. Data is from Prowess (2007-2019), aggregated by years and liability status. The blue line (solid) indicates liable firms and the black line (dashed) represents non-liable firms. Underlying CSR spending data presented in real terms, denominated in 2015 rupees.

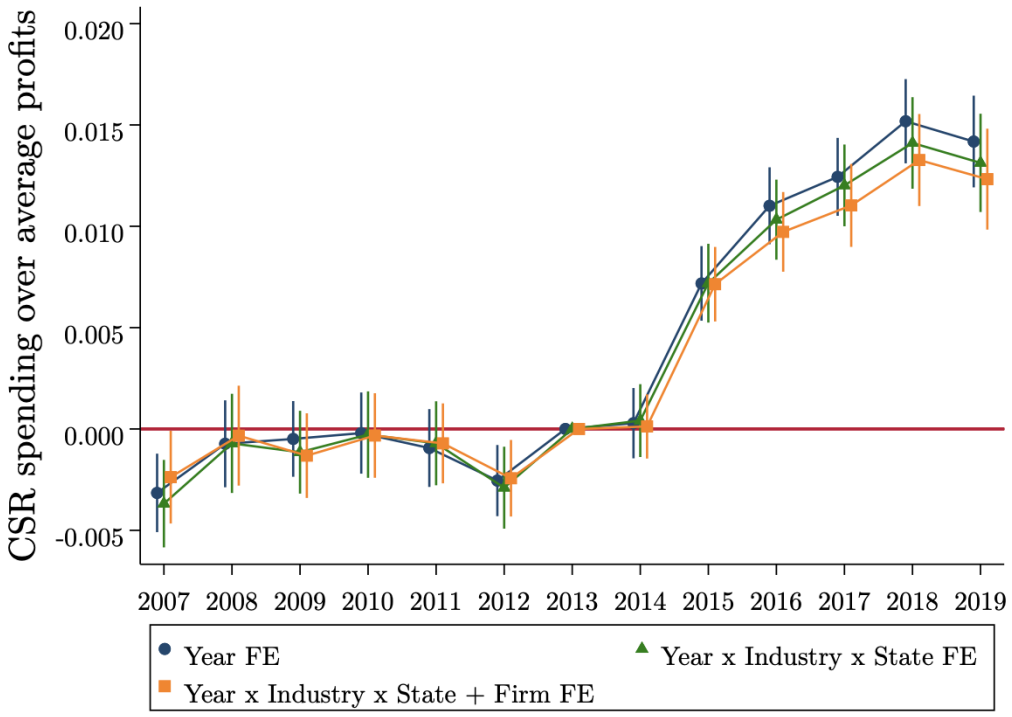


Figure 6. Difference-in-Difference Shows Increase in CSR Spending for Liable Firms. Data is from Prowess (2007-2019), on the firm-year level. Equation 1 describes the regression, with different fixed effect structures. The main outcome of interest is $\text{CSR}_{f,t}/\overline{\text{Profit}}^{3y}_{f,t}$, the CSR spending over average profits in the preceding three years. CSR spending (million rupees) and average profit over the past three years (million rupees) are expressed in real terms, denominated in 2015 rupees. Variables are winsorized at the 99th percentile. The profit measure is additionally winsorized at the 1st percentile. Treatment status is one if the firm's profits, income, or net worth cross the respective thresholds defined by the policy in any of the three preceding financial years. Standard errors are clustered at the firm level. The figure shows 95% confidence intervals.

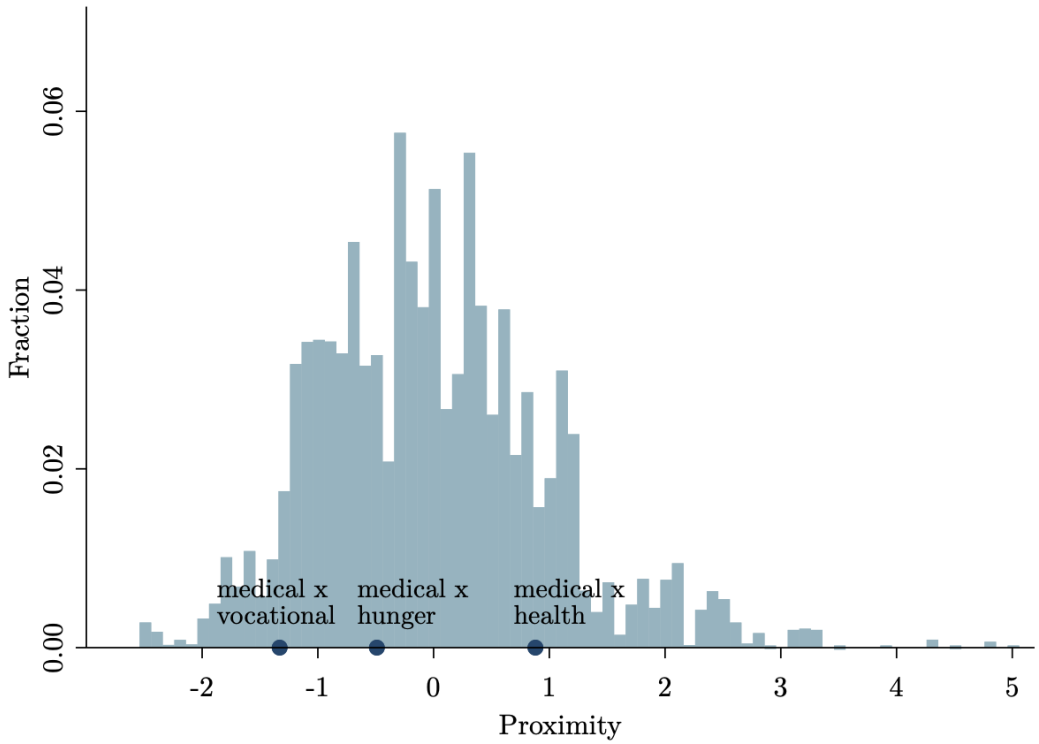


Figure 7. Distribution of Technological Proximity. Data is from MCA and Prowess (2015-2019), on the industry-topic level. Proximity is the textual measure of closeness between an industry and a topic defined in Section III.B. The histogram shows three examples, corresponding to approximately one standard deviation below the mean (medical and botanical × vocational skills), the mean (medical and botanical × hunger and malnutrition), and one standard deviation above the mean (medical and botanical × health).

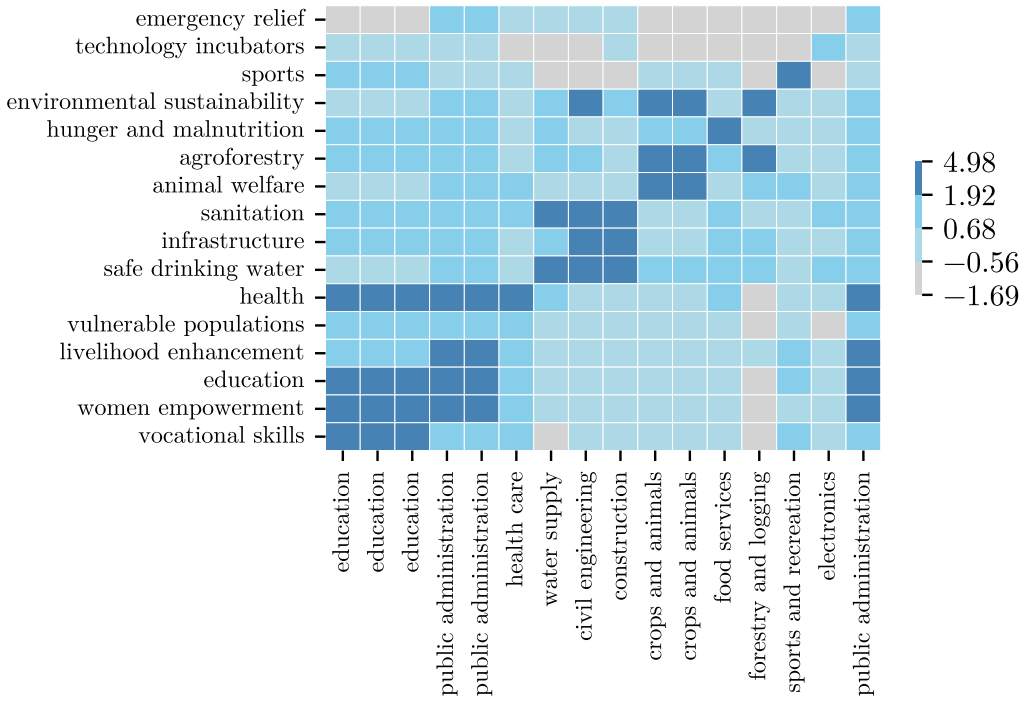


Figure 8. Distribution of Technological Proximity. Data is from MCA and Prowess (2015-2019), on the industry-topic level. Proximity is the textual measure of closeness between an industry and a topic defined in Section III.B. The heat plot shows the proximity for all topics and the industries with the highest proximity per topic.

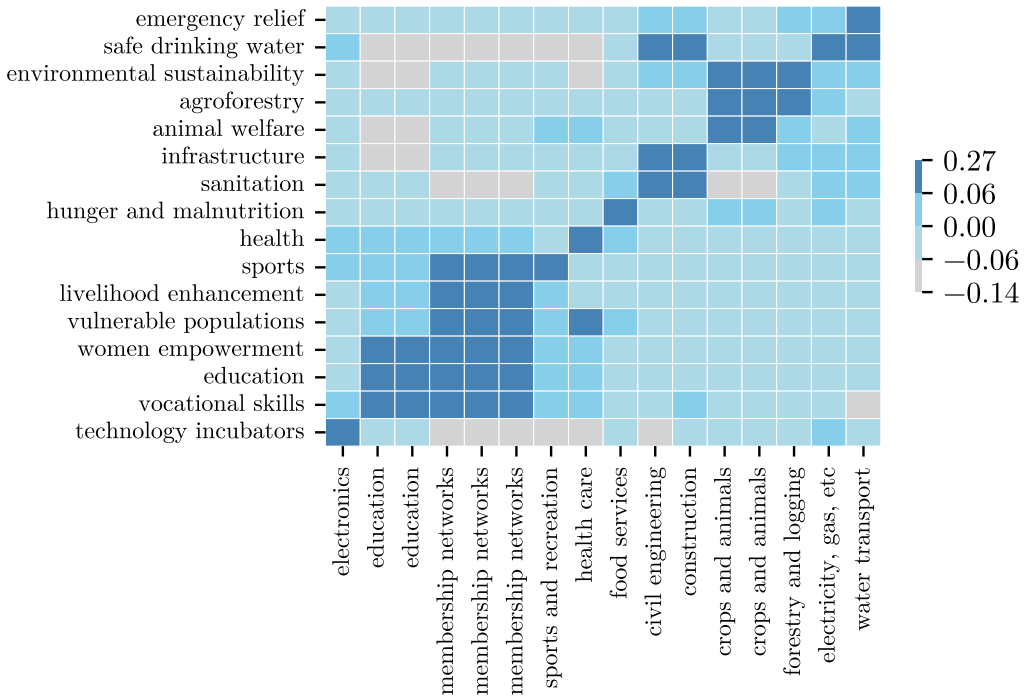


Figure 9. Distribution of Technological Proximity with Fixed Effects. Data is from MCA and Prowess (2015-2019), on the industry-topic level. Proximity is the textual measure of closeness between an industry and a topic defined in Section III.B. The heat plot shows the residuals of proximity after industry and topic fixed effects for all topics and the industries with the highest proximity-residuals per topic.

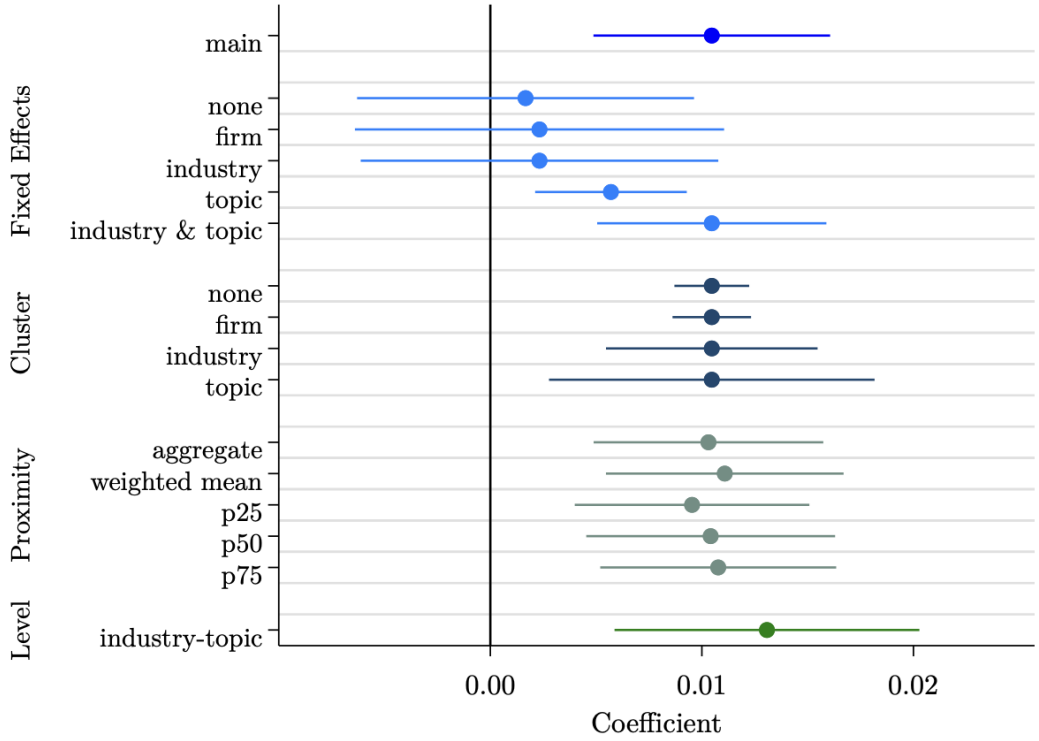


Figure 10. Comparative Advantage Robustness Tests Summary. Data is from MCA and Prowess (2015-2019). Equation 7 describes the regression. The main outcome is spending share, the share of CSR that a firm allocates to a given topic. The main independent variable is proximity. Rows 2 to 6 describe different fixed effect structures; in the main regression, we employ firm and topic fixed effects. Row 7 to 11 show different clustering of standard errors; in the main regression, we cluster standard errors at the topic $\times$ industry level. Row 12 to 16 show different versions of the proximity variable; in the main regression, we take the mean across projects. Row 17 repeats our main regression, collapsing the data on the industry-topic level. The figure shows 95% confidence intervals.

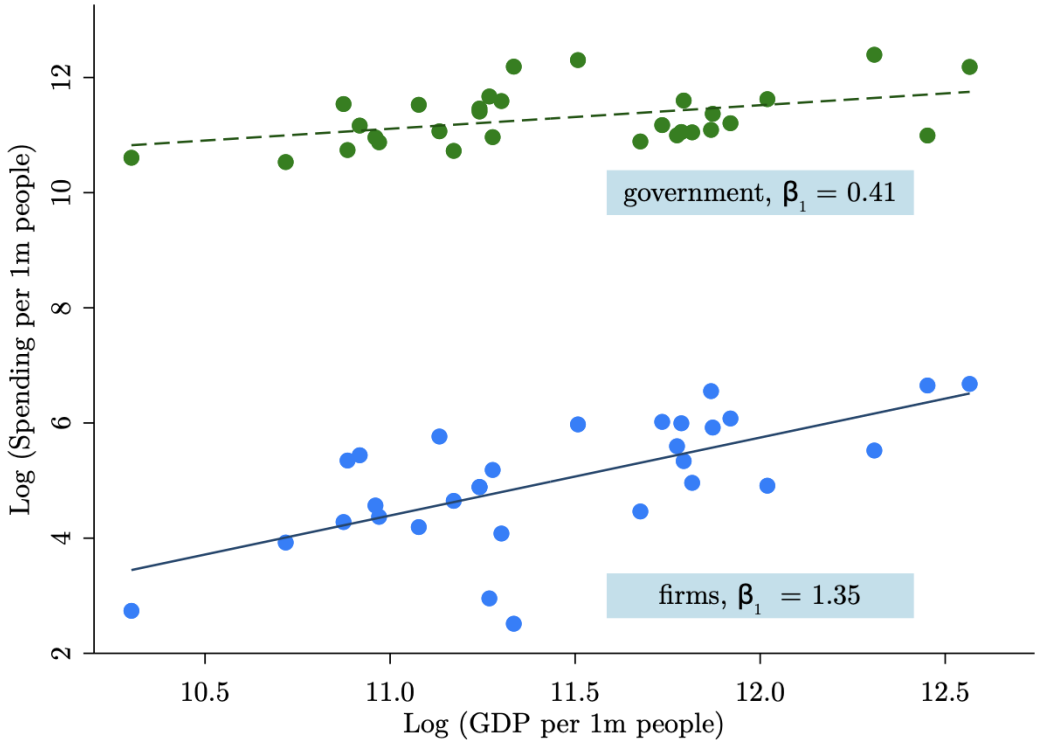


Figure 11. CSR Spending is More Sensitive to GDP than Government Spending. Data is from MCA, Prowess, and RBI, on the state level. Equation 10 describes the regression. The main outcome variable is the log of spending per one million people, either from firms or the government (2015-2019). State-level GDP is measured in 2011. The underlying spending and GDP data is in millions, in real terms, denominated in 2015 rupees. The scattered dots indicate state-level observations, blue for CSR spending and green for government spending. The lines indicate fitted linear approximations, blue for CSR spending (solid) and green for government spending (dashed).

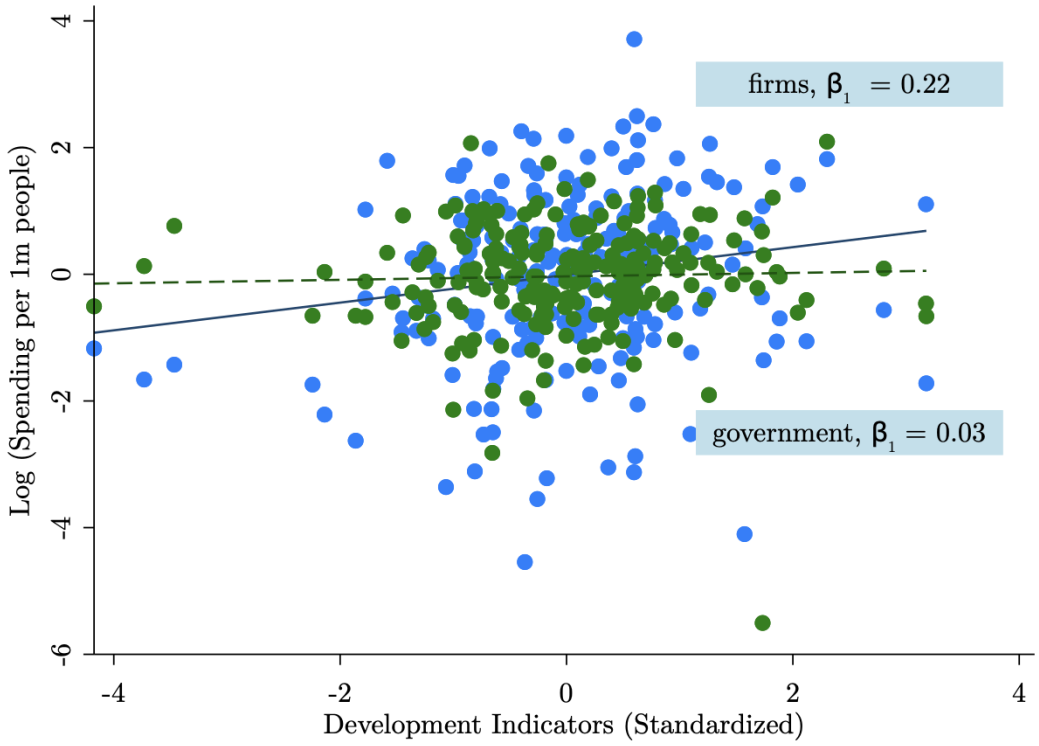
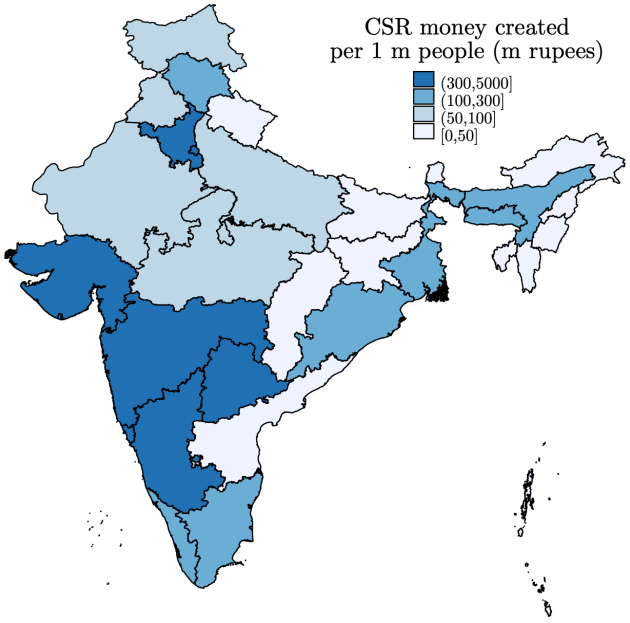
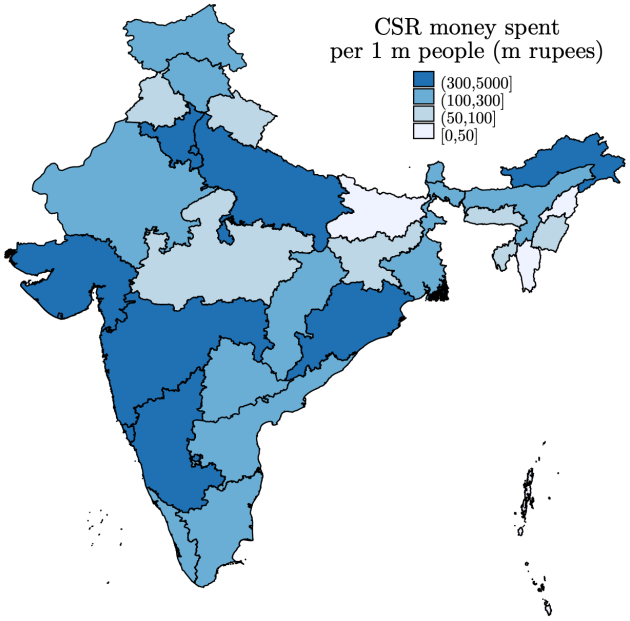


Figure 12. CSR Spending is More Sensitive to Development Indicators than Government Spending. Data is from MCA, Prowess, and RBI, on the state-topic level. Equation 10 describes the regression. The main outcome variable is the log of spending per one million people, either from firms or the government. The underlying spending data is in millions, in real terms, denominated in 2015 rupees. Spending is demeaned by topic fixed effects. The main independent variable is a stacked variable containing development indicators for different topics measured in various years depending on data availability, transformed such that a higher indicator always means a better status. Development indicators are standardized with a mean of zero and a standard deviation of one. The scattered dots indicate state-level observations, blue for CSR spending and green for government spending. The lines indicate fitted linear approximations, blue for CSR spending (solid) and green for government spending (dashed).



(a) CSR Firm Location



(b) CSR Project Location

Figure 13. CSR Firm and Project Location Show Strong Overlap. Data is from MCA, Prowess, and RBI, on the state level. We depict CSR expenses by state of origin (state of registration of the firm) and state of spending. The variables are in millions, in real terms, denominated in 2015 rupees.

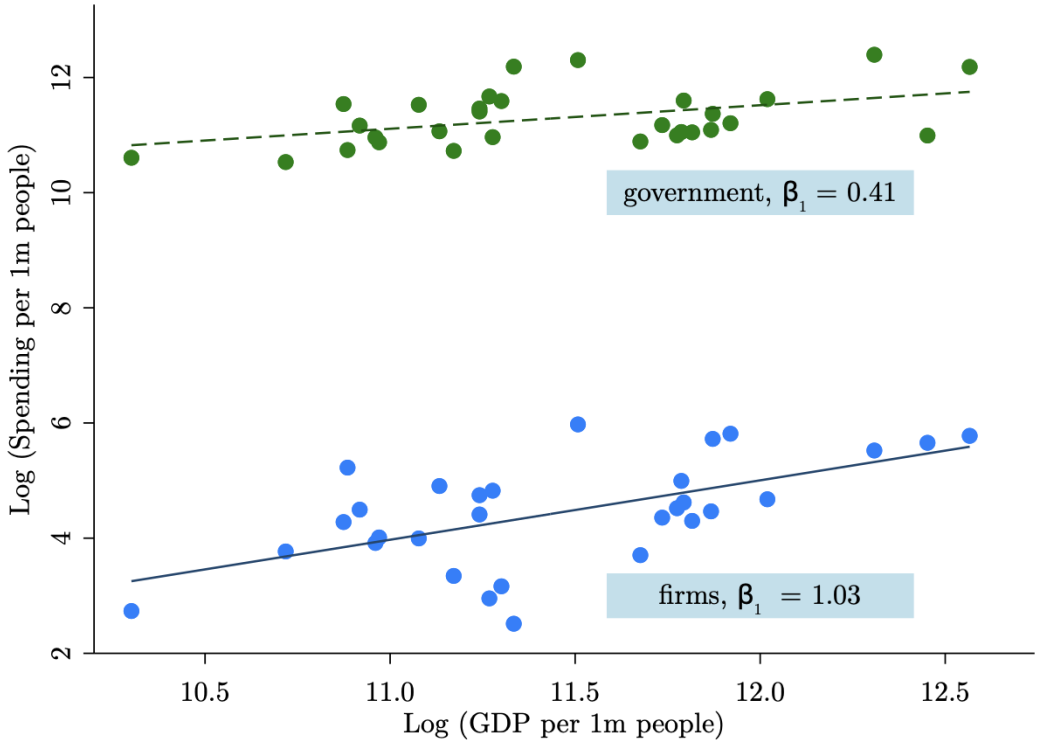


Figure 14. CSR Spending is Less Sensitive to GDP if Same State is Eliminated. Data is from MCA, Prowess, and RBI, on the state level. Equation 10 describes the regression. The main outcome variable is the log of spending per one million people, either from firms or the government (2015-2019). State-level GDP is measured in 2011. The underlying spending and GDP data is in millions, in real terms, denominated in 2015 rupees. The scattered dots indicate state-level observations, blue for CSR spending and green for government spending. The lines indicate fitted linear approximations, blue for CSR spending (solid) and green for government spending (dashed). In contrast to Figure 11, we eliminate CSR that is spent in the same state as the firm is registered.

Appendix A

Tables

Table A1: Merge of CSR Project and Firm Accounting Data

	MCA only	Prowess match	Matched (%)
Firm match			
Firms (nr)	4,423	7,063	61
Firm-years (nr)	11,925	22,118	65
Avg profit past 3 years (m INR)	2,210,746	27,892,015	93
CSR spending (m INR)	50,759	522,823	91
Firm-year match			
Firms (nr)	5,181	6,305	55
Firm-years (nr)	15,686	18,357	54
Avg profit past 3 years (m INR)	3,593,131	26,509,630	88
CSR spending (m INR)	80,442	493,141	86

Notes: This table shows the total over observations conditional on an unsuccessful merge ("MCA only") and a successful merge ("Prowess match"). Years 2015 to 2019. All monetary variables are presented in real terms, denominated in 2015 rupees. These variables are winsorized at the 98th percentile. Profit measures are additionally winsorized at the 2nd percentile.

Table A2: Summary Statistics Firm-Year-Level Financial Accounts Data

	Mean	SD	Median	Min	Max
Firm-year-level					
Profit (m INR)	329	5,912	4	-258,049	441,335
Avg profit past 3 years (m INR)	284	4,719	4	-107,115	358,093
Income (m INR)	4,787	54,382	273	0	5,620,830
Net worth (m INR)	2,589	28,886	131	-273,693	3,553,998
Treatment status (1=liable)	0.28	0.45	0.00	0.00	1.00
CSR spending (m INR)	4.59	98.58	0.00	0.00	15,660.00
CSR / avg profit past 3 years (%)	32.35	11,047.19	0.00	0.00	5,033,165.00
Any CSR committee (1=yes)	0.13	0.34	0.00	0.00	1.00
CSR directors (nr)	0.45	1.20	0.00	0.00	14.00
Unique observations					
Unique firm-years (nr)	245,464				
Unique firms (nr)	39,053				
Unique years (nr)	13				
Unique 2-digit industries (nr)	77				
Unique states (nr)	35				
Unique districts (nr)	423				

Notes: Data is from Prowess (2007-2019). All monetary variables are presented in real terms, denominated in 2015 rupees. These variables are not winsorized. CSR over average profits in the past three years (%) is the main outcome of interest in Equation 1.

Table A3: Firm-Level Accounting Data - Two Similar CSR Measures

	Mean	SD	Median	Min	Max
Firm-year-level					
CSR spending (m INR) - constructed	7.91	131.97	0.00	0.00	15,642.70
CSR spending (m INR) - explicit	6.30	93.77	0.00	0.00	7,447.12

Notes: Data is from Prowess (2007-2019). The analysis is limited to the years 2016 to 2019 to capture the years in which CSR was explicitly collected. CSR constructed is the sum of social and community expenses as well as donations, which are collected before and after the policy. CSR explicit is directly collected in financial statements in response to the policy. All monetary variables are presented in real terms, denominated in 2015 rupees. These variables are not winsorized. For more details see Discussion A1.

Table A4: Treated and Control Firms Before the Policy (2014)

	All (1)	Control (2)	Treated (3)	Difference (4)
Profit (m INR)	287	-114	1,225	0.00
	(5,409)	(1,761)	(9,444)	
Avg profit past 3 years (m INR)	262	-120	1,155	0.00
	(4,564)	(1,674)	(7,867)	
Income (m INR)	5,033	1,359	13,629	0.00
	(61,210)	(14,126)	(109,270)	
Net worth (m INR)	2,522	337	7,633	0.00
	(26,368)	(7,575)	(46,373)	
CSR spending (m INR)	2.77	0.29	8.57	0.00
	(56.13)	(13.74)	(100.15)	
CSR / avg profit past 3 years (%)	0.05	0.01	0.12	0.33
	(4.95)	(0.22)	(8.84)	
Observations	20,793	14,566	6,227	20,793

Notes: Data is from Prowess (2007-2019), on the firm-year level. The last column shows the p-value of a t-test on the difference between control and treatment in 2014. All monetary variables are presented in real terms, denominated in 2015 rupees. These variables are winsorized at the 99th percentile. Profit and net worth measures are additionally winsorized at the 1st percentile.

Table A5: Results Robust to Treatment Based on 2013 Accounting

	$CSR_{f,t}/\overline{Profit}^{3y}_{f,t}$					
	DID	DID	DID	IV-DID	IV-DID	IV-DID
	(1)	(2)	(3)	(4)	(5)	(6)
Treated × Post	0.013***	0.012***	0.011***	0.012***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Year FE	Yes			Yes		
Year × Ind. × State FE		Yes	Yes		Yes	Yes
Firm FE			Yes			Yes
Group FE	Yes	Yes	Yes	Yes	Yes	Yes
First-Stage F Stat				26,200	19,151	17,582
R-squared	0.01	0.06	0.37	0.00	0.00	0.00
Observations	233,523	226,335	222,660	202,154	195,259	193,994

Notes: This table shows the causal effect of the policy on CSR spending over average profits in the past three years. Columns 4 to 6 instrument the true treatment status with a treatment status calculated from 2013 accounting variables. Data is from Prowess (2007-2019), on the firm-year level. Equation 1 describes the regression. All monetary variables are presented in real terms, denominated in 2015 rupees. Variables are winsorized at the 99th percentile. Profits are additionally winsorized at the 1st percentile. Standard errors are clustered at the firm level. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

Table A6: Relabeling

	Percent of Total Expenses (x100)								
	CSR (social + donations) (1)	Social (2)	Donations (3)	Environment (4)	Employee Welfare (5)	Employee Training (6)	Social Amenities (7)	Advertising (8)	Marketing (9)
Treated × Post	0.39**	0.45***	-0.06**	-0.03	0.40	-0.04	-0.00	0.07**	0.05
	(0.17)	(0.17)	(0.02)	(0.02)	(0.43)	(0.05)	(0.00)	(0.04)	(0.16)
Avg dep var	0.227	0.112	0.115	0.020	0.611	0.048	0.000	0.611	1.290
Year × Ind. × State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.27	0.27	0.35	0.28	0.31	0.20	0.15	0.47	0.24
Observations	233,207	233,207	233,207	233,207	233,207	233,207	233,207	233,207	233,207

Notes: This table shows the causal effect of the policy on other expense categories to test for manipulation via relabeling. Data is from Prowess (2007-2019), on the firm-year level. Equation 1 describes the regression. All monetary variables are presented in real terms, denominated in 2015 rupees. Variables are winsorized at the 99th percentile. Standard errors are clustered at the firm level. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

Table A7: Robustness to OpenAI Language Model

	Any CSR Spending (1)	CSR Share Unconditional (2)	CSR Share Conditional (3)
Proximity	0.022***	0.010***	0.020***
	(0.004)	(0.003)	(0.006)
Avg dep var	0.223	0.062	0.280
Firm FE	Yes	Yes	Yes
Topic FE	Yes	Yes	Yes
R-squared	0.33	0.24	0.36
Unique firms	6,573	6,573	6,573
Unique topics	16	16	16
Observations	105,168	105,168	21,688

Notes: This table shows the robustness of the results to applying an OpenAI language model instead of Word2Vec. Data is from MCA and Prowess (2015-2019), on the firm-topic level. Equation 7 describes the regression. Spending share is the share of CSR that a firm allocates to a given topic. Proximity is the textual measure of closeness between an industry and a topic defined in Section III.B. Standard errors are clustered at the industry-topic level. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

Table A8: Proximity Predicts Indirect Implementation Negatively

	Indirect Implementation (1)
Proximity	-0.008**
	(0.003)
Avg dep var	0.148
Firm FE	Yes
Topic FE	Yes
R-squared	0.36
Unique firms	5,361
Unique topics	16
Observations	74,742

Notes: This table shows that proximity predicts indirect implementation negatively. Data is from MCA and Prowess (2015-2019). Equation A1 describes the regression. The data is on the project level, weighted by the inverse of the number of projects by topic to give equal weight to all topics as in our main regressions. The main outcome is an indicator that is one if a project was indirectly implemented, through a third party. Standard errors are clustered at the topic-industry level. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

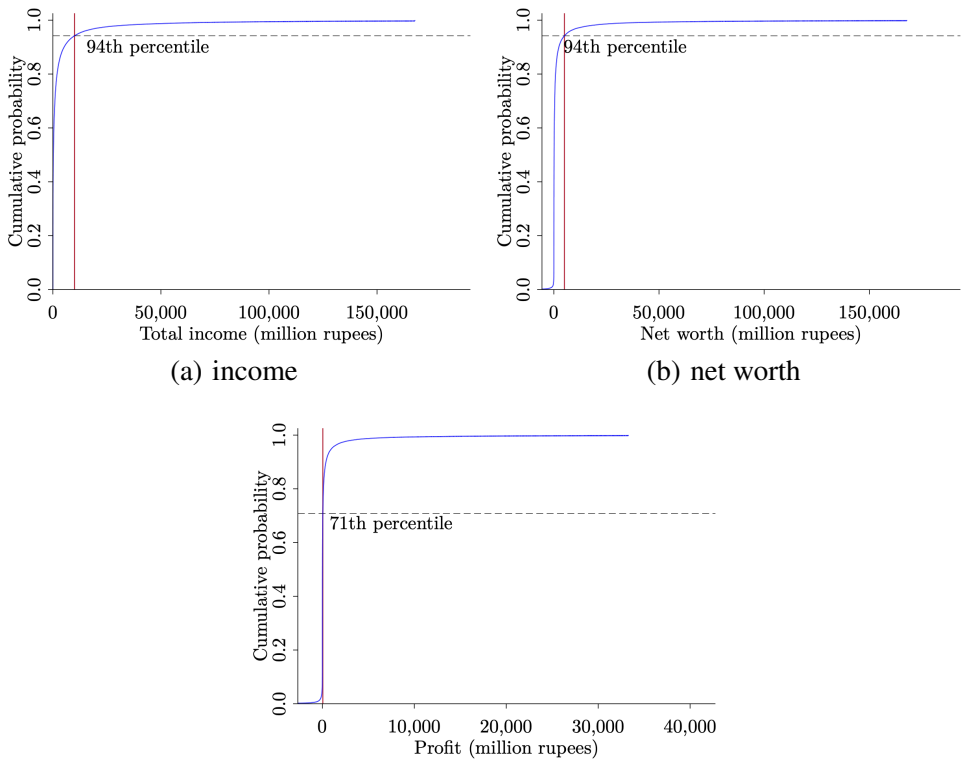
$$\text{(A1)} \qquad \text{Indirect Implementation}_{p,f,s} = \beta_0 + \text{Proximity}_{i(f),s} + \alpha_f + \alpha_s + \varepsilon_{p,f,s}$$

Table A9: Stronger Effects for Directly Implemented Projects

	CSR Spending Share	
	Direct Projects (1)	Indirect Projects (2)
Proximity	0.009***	0.002**
	(0.002)	(0.001)
Avg dep var	0.054	0.009
Firm FE	Yes	Yes
Topic FE	Yes	Yes
R-squared	0.20	0.10
Unique firms	6,062	6,062
Unique topics	16	16
Observations	96,992	96,992

Notes: This table tests the robustness of proximity to alternative drivers of CSR spending allocation. Data is from MCA and Prowess (2015-2019), on the firm-topic level. The only difference to Equation 7 is the underlying data sample. We split our main sample into two samples: projects directly and indirectly implemented. We hypothesize that we find a stronger relationship for directly implemented projects. $***$, $**$ and $*$ indicate significance at the 1%, 5% and 10% levels.

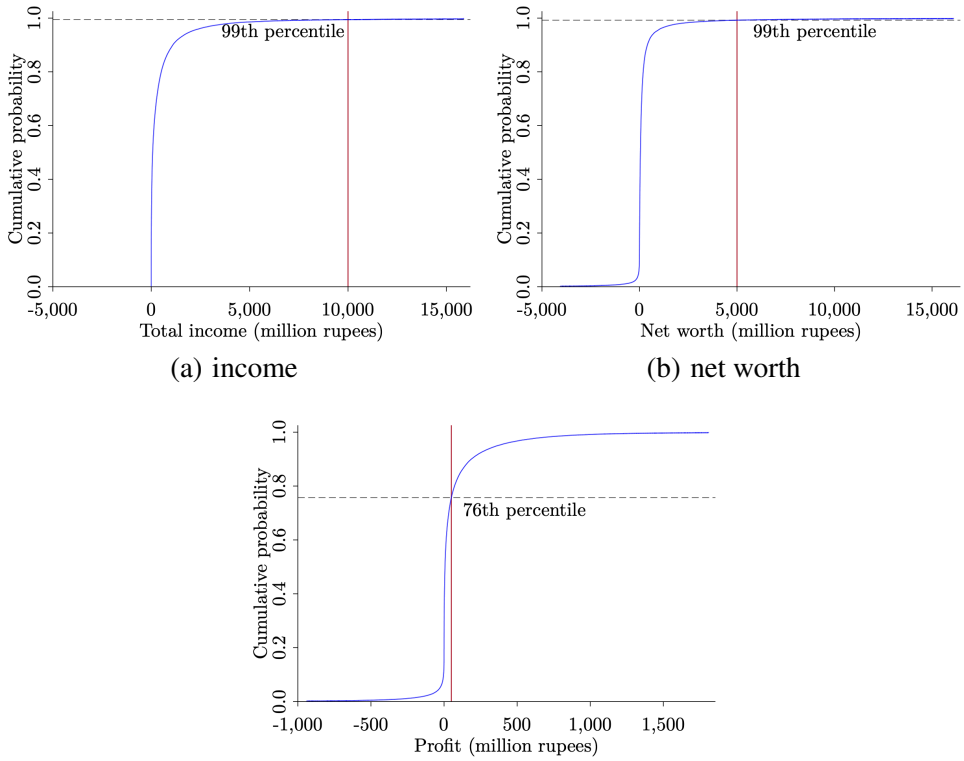
Figures



(a) income (b) net worth

(c) profit

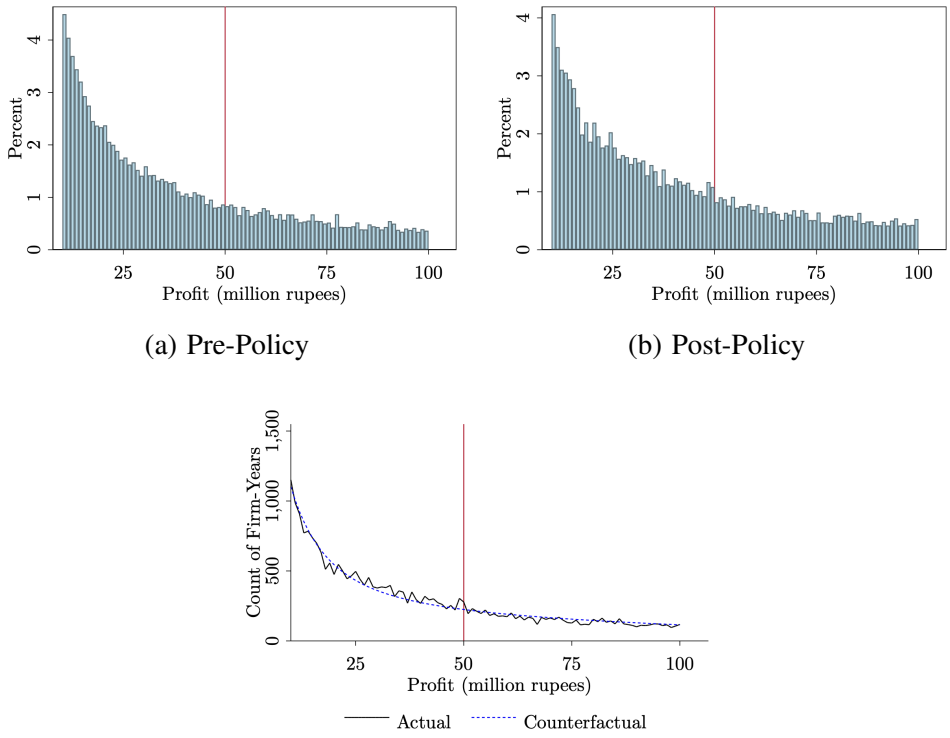
Figure A1. Thresholds of total income, net worth, and profits. Data is from Prowess (2007-2019), on the firm-year level. The red lines indicate the policy threshold, and the blue lines indicate the unconditional cumulative distribution. For more details see Discussion A2.



(a) income (b) net worth

(c) profit

Figure A2. Thresholds of total income, net worth, and profits, conditional. Data is from Prowess (2007-2019), on the firm-year level. The red lines indicate the policy threshold, and the blue lines indicate the cumulative distribution, conditional on the other two variables being below their respective thresholds. This indicates that profits are the binding measure for the policy. For more details see Discussion A2.



(a) Pre-Policy

(b) Post-Policy

(c) profit

Figure A3. Distribution of profits. Data is from Prowess (2007-2019), on the firm-year level. Pre-policy refers to years between 2007 and 2014 and post-policy to years between 2015 and 2019. The red lines indicate the policy threshold. The last figure plots the actual and counterfactual profit distribution. This indicates that profits are the binding measure for the policy. For more details see Discussion A2.

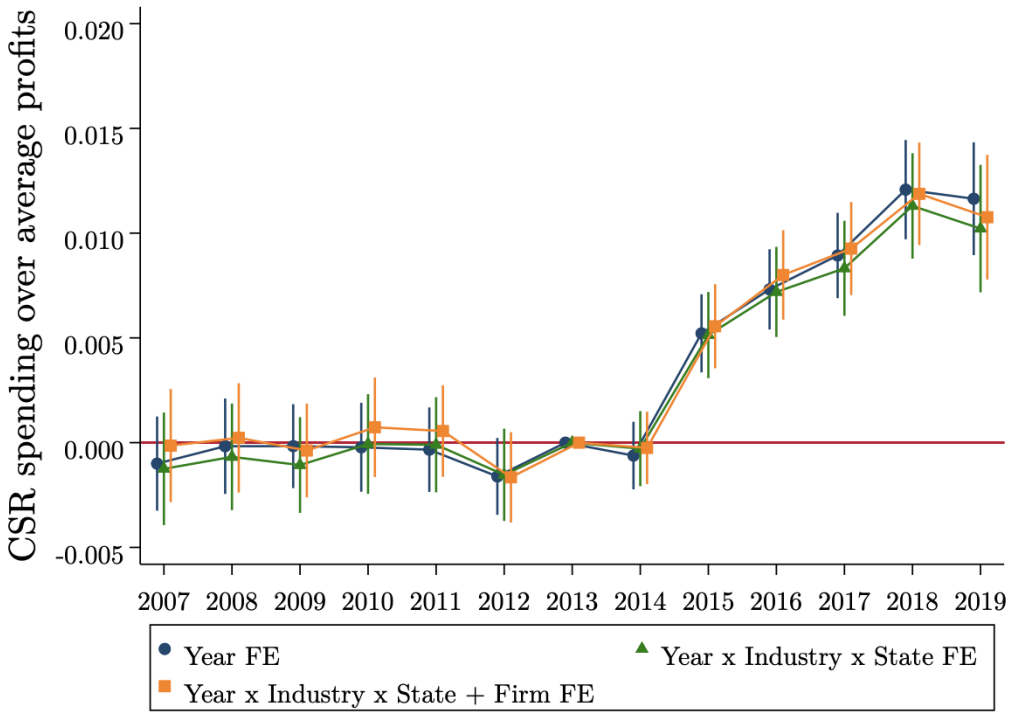


Figure A4. Difference-in-Difference based on 2013 accounting variables. Data is from Prowess (2007-2019), on the firm-year level. Equation 1 describes the regression, with different fixed effect structures. In contrast to Figure 6, treatment is based on 2013 accounting variables. The main outcome of interest is $\text{CSR}_{f,t}/\overline{\text{Profit}}^{3y}_{f,t}$, the CSR spending over average profits in the preceding three years. CSR spending (million rupees) and average profit over the past three years (million rupees) are expressed in real terms, denominated in 2015 rupees. Variables are winsorized at the 99th percentile. The profit measure is additionally winsorized at the 1st percentile. Treatment status is one if the firm's profits, income, or net worth cross the respective thresholds defined by the policy in any of the three preceding financial years. Standard errors are clustered at the firm level. The figure shows 95% confidence intervals.

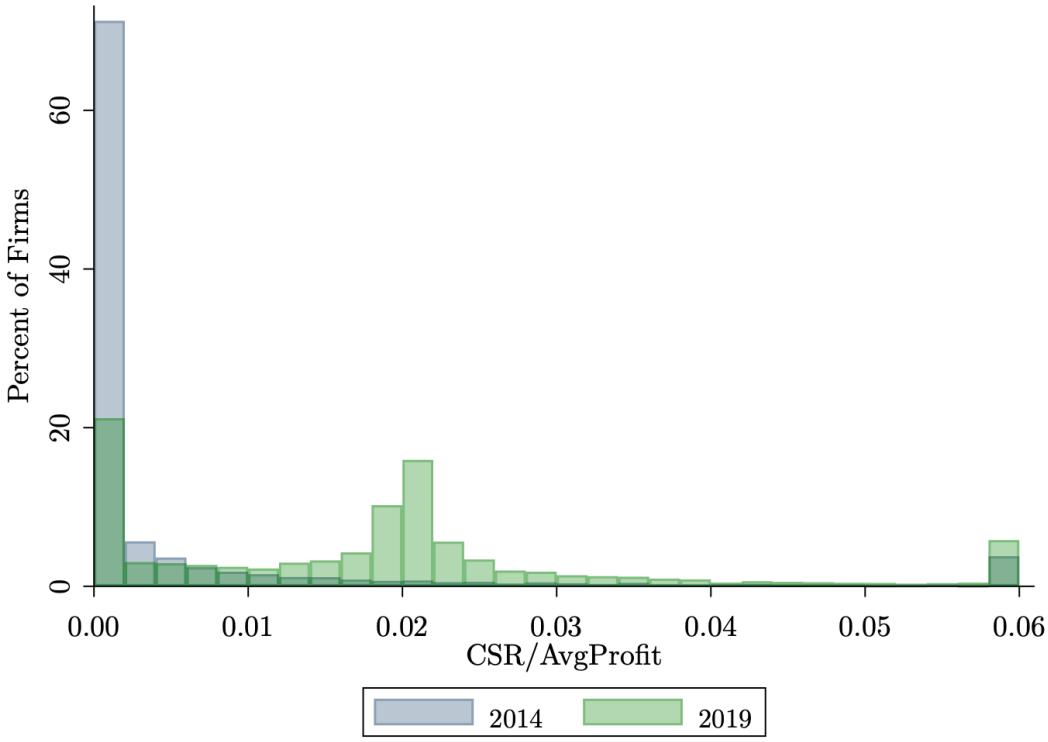


Figure A5. Histogram of CSR spending over average profits for liable firms. Data is from Prowess (2014 and 2019). The main outcome of interest is $\text{CSR}_{f,t}/\overline{\text{Profit}}^{3y}_{f,t}$ for a given year, the CSR spending over average profits in the preceding three years. CSR spending (million rupees) and average profit over the past three years (million rupees) are expressed in real terms, denominated in 2015 rupees. Variables are winsorized at the 99th percentile. The profit measure is additionally winsorized at the 1st percentile. Treatment status is one if the firm's profits, income, or net worth cross the respective thresholds defined by the policy in any of the three preceding financial years.

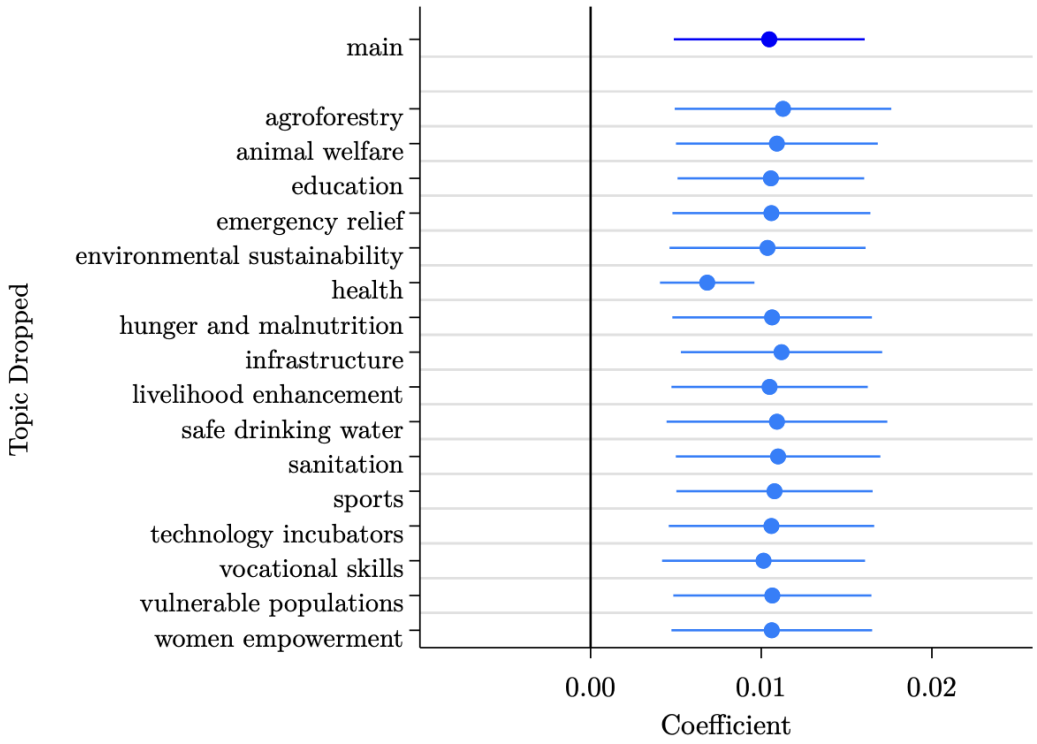


Figure A6. Comparative advantage test robust to dropping topics. Data is from MCA and Prowess (2015-2019). Equation 7 describes the regression. The main outcome is spending share, the share of CSR that a firm allocates to a given topic. The main independent variable is proximity. Each row drops one specific topic from the sample. The figure shows 95% confidence intervals.

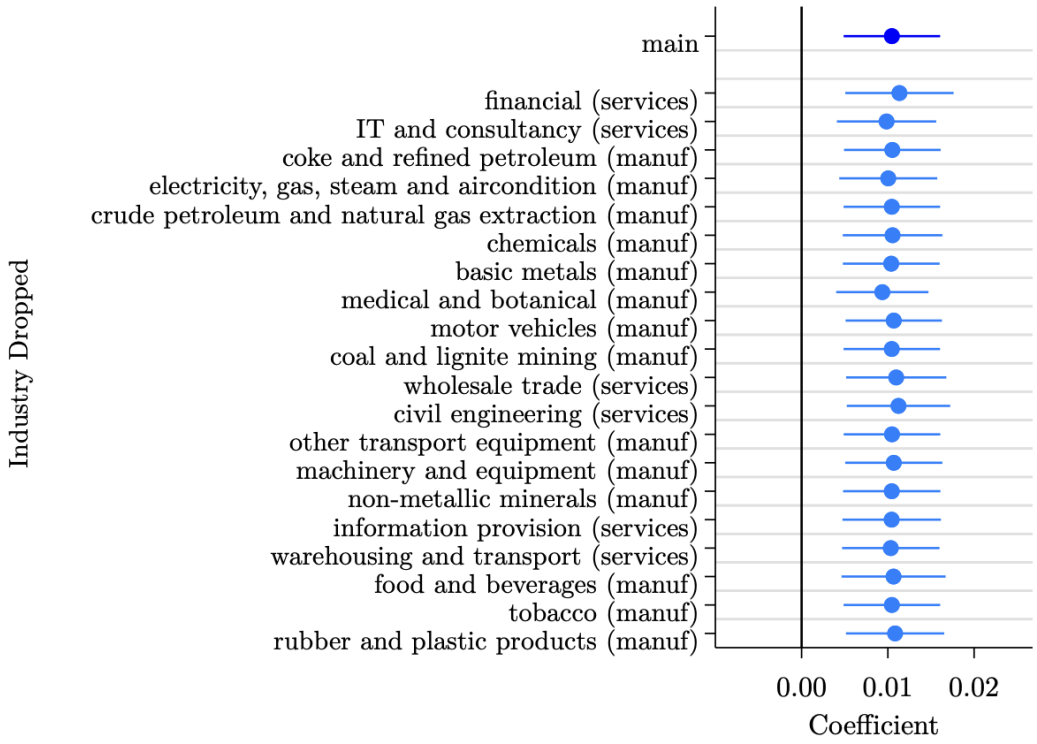


Figure A7. Comparative advantage test robust to dropping industries. Data is from MCA and Prowess (2015-2019). Equation 7 describes the regression. The main outcome is spending share, the share of CSR that a firm allocates to a given topic. The main independent variable is proximity. Each row drops one specific top-20 industry from the sample. The figure shows 95% confidence intervals.

Discussions

Discussion A1: CSR spending variables in Prowess. Our Prowess CSR spending in Table A2 is the sum of two variables reported by Prowess: social and community expenses as well as donations. Social and community expenses are expenses incurred by firms for the benefit of society in general. Donations are reported separately in Prowess. They include donations for social causes, religious purposes, or political parties. Both social and community expenses, as well as donations, are reported in the schedules or notes to financial statements of the annual reports under the break-up of expenses or under welfare expenses. Due to the close relationship of these two variables, we define CSR as the sum of the two. In 2015, in alignment with the introduction of the policy, Prowess began to collect explicit CSR data. Since this variable was not available before, we do not utilize it for estimating the policy impact, which requires pre- and post-policy data. As expected, this explicitly collected CSR data closely maps our constructed version, as can be observed in Table A3; the means are INR 3.42 million and INR 3.76 million, respectively.

Discussion A2: Manipulation of treatment status. We next explore the degree of manipulation by firms under the policy. First, we discuss that firms may try to manipulate their financial accounts so as not to appear liable to the legislator. This could lead to a bias in our causal estimate since firms that manipulate their earnings to fall just below the threshold are also those with the highest dis-utility for CSR spending. In other words, the positive effect on CSR spending could arise from a tendency of firms just below the threshold to spend less. To investigate whether firms manipulate their financial accounts, we initially examine which of the three thresholds is binding. Liable firms have profits above INR 50 million, income above INR 10 billion, or net worth above INR 5 billion in any of the three preceding financial years. As shown in Figure A1, only 6% of firm-year observations lie above the income threshold. Similarly, only 6% of firm-year observations are above the net worth threshold. In contrast, 29% of firm-year observations cross the profit threshold. We, therefore, expect that profits are the main determinant of a firm's liability status. To further investigate this, we look at the distributions of each variable, conditional on the two other variables being below their respective thresholds, plotted in Figure A2. The probability that a firm in a given year becomes liable because income or net worth cross their thresholds while the two other variables remain below is less than 1%. On the other hand, given that income and net worth are below their thresholds, the probability that profits cross the threshold is 24%. Therefore, the key sorting variable is profits.

We first provide visual evidence of the profit distribution. We plot the distribution before and after 2014 in Figure A3. The distributions are limited to the range of INR 10 million to INR 100 million, relatively close to the threshold of INR 50 million. Indeed, we observe some evidence of bunching post-policy. However, visually, the distortion appears to be small, suggesting that only a few firms manipulated their accounts. To quantify the magnitude of the distortion, we characterize the abnormal mass in the distribution by estimating the counterfactual distribution, absent the threshold, as in Chetty et al. (2011). We use the range from zero profits to INR 200 million. Figure A3 plots the actual and counterfactual distribution. The difference yields the abnormal mass to the left of the threshold and the missing mass to the right of the cutoff. We observe that the counterfactual distribution is remarkably similar to the actual distribution. The missing mass to the right of the cutoff corresponds to around 94 firm$\times$year observations, which is very small compared to the almost 23,000 firm$\times$year observations located to the right of the cutoff. This suggests that bunching exists but is minimal. Finally, to further alleviate concerns of bias due to bunching, we utilize treatment definitions based on accounting variables from 2013, the last year before the policy was known. We repeat our difference-in-difference analysis with this new treatment, depicted in Figure A4. Results look very similar to Figure 6 with the original treatment definition. Additionally, we compute the Wald-DiD estimator in columns (4) to (6) of Table A5, instrumenting our previous treatment status with treatment status based on 2013 accounting variables. We find that estimates are very similar to before, providing further evidence that the influence of bunching is minimal.

Discussion A3: Manipulation of CSR reporting. Firms have a second potential dimension on which they can manipulate: They could manipulate their CSR spending reports, reallocating expenses on other categories into this category. According to the policy, CSR spent within the firm in pursuance of its normal course of business, e.g., employment welfare, does not qualify as CSR. To investigate whether firms reallocate spending, we repeat our DiD analysis with accounting categories from which firms could have reallocated. The results are depicted in Table A6 show that there is no evidence of manipulation via CSR relabelling. Finally, one might also raise the concern that firms had CSR spending before, but did not report them. With the policy, they might start reporting CSR for the first time. One imperfect test for this is whether firms are more likely to have any CSR reporting after the policy. Indeed, we find this is the case. Note, however, that this positive effect might simply come from firms truly occurring CSR for the first time. This result is thus no evidence that firms engage in this type of manipulation.

Table B1: Example of text recovered from NIC handbook (division 16, Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials)

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Panel A: Text from explanatory notes

16 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials. This division includes the manufacture of wood products, such as lumber, plywood, veneers, wood containers, wood flooring, wood trusses, and prefabricated wood buildings. The production processes include sawing, planning, shaping, laminating, and assembling of wood products starting from logs that are cut into bolts, or lumber that may then be cut further, or shaped by lathes or other shaping tools. The lumber or other transformed wood shapes may also be subsequently planed or smoothed, and assembled into finished products, such as wood containers. With the exception of sawmilling, this division is subdivided mainly based on the specific products manufactured.
161 Sawmilling and planning of wood.
162 Manufacture of products of wood, cork, straw and plaiting materials. This group includes the manufacture of products of wood, cork, straw or plaiting materials, including basic shapes as well as assembled products.

Panel B: Text from further industry breakdown

Saw milling and planing of wood
Saw milling and planing of wood
Sawing and planing of wood
Manufacture of unassembled wooden flooring including parquet flooring
Manufacture of wooden railway sleepers
Activities related to saw milling and planing of wood n.e.c.
Manufacture of products of wood, cork, straw and plaiting materials
Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board and other panels and board
Manufacture of ply wood and veneer sheets
Manufacture of particle board and fibreboard including densified wood
Manufacture of flush doors and other boards or panels
Manufacture of other plywood products n.e.c.
Manufacture of builders' carpentry and joinery
Manufacture of structural wooden goods [intended to be used primarily in the construction industry such as beams, rafters, roof struts, glue-laminated and metal connected, prefabricated wooden roof trusses, doors, windows, shutters and their frames, whether or not containing metal fittings, stairs, railings, wooden beadings and mouldings, shingles and shakes etc.]
Manufacture of prefabricated buildings, or elements thereof, predominantly of wood
Manufacture of builders' carpentry and joinery n.e.c.
Manufacture of wooden containers
Manufacture of wooden boxes, barrels, vats, tubs, packing cases etc.
Manufacture of plywood chests
Manufacture of market basketry, grain storage bins and similar products made of bamboo or reed
Manufacture of other wooden containers and products entirely or mainly of cane, rattan, bamboo, willow, fibre, leaves and grass n.e.c.
Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
Manufacture of wooden industrial goods
Manufacture of cork and cork products
Manufacture of wooden agricultural implements
Manufacture of various articles made of bamboo, cane and grass
Manufacture of broomsticks
Manufacture of articles made of palm leaf, dhak leaf, screw-pine leaf and khajoor leaf; articles of vegetables fibre etc,.
Manufacture of products of pith and shalapith
Manufacture of other wood products n.e.c.