Firm-level Input Distortion in Indian States*

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Abstract

This paper measures trends in factor misallocations for India between 1999 and 2014 using data from a rich panel of Indian firms. The misallocation of a factor is measured as an “adjustment cost”, i.e. an implicit variable cost incurred by a firm when using that factor, modelled adapting the cost-minimisation approach of De Loecker and Warzynski (2012). The paper documents trends in these factor market distortions for four factors of production (permanent labour, contract labour, land, and fixed capital) across Indian states and by firm size. Overall, we show that misallocation declined over time for labour and land, although we document significant heterogeneity with respect to state growth rates and firm size. Using these stylised facts on trends in factor adjustment costs, as well as in-depth field interviews with firms in two Indian states, the paper also discusses potential policy developments behind these trends, including a preliminary examination of the role of state-level governance in the implementation of relevant factor market policies.
1. Introduction

One of the explanations provided by the development literature for the existing large cross-country differences in productivity is the inefficient allocation of productive factors across firms in low income countries (Restuccia and Rogerson, 2017).

Factor misallocation means that the existing allocation of inputs across establishments in an economy does not reflect the firms’ relative ability to use those factors productively: in other words, aggregate output could be increased by simply reallocating existing resources towards the firms that could use them most efficiently. From a dynamic point of view, moreover, the fact that individual firms are not operating at their optimal scale can also hinder productivity growth, as incentives for productivity-enhancing investment could be crucially affected by the resources available to each firm (Hsieh and Klenow, 2009).

These distortions could be the result of regulations which make it implicitly costlier for firms to acquire or adjust their inputs. For example, overly rigid hiring and firing laws can easily result in labour misallocations, or in an increased reliance on contract labour. Regulations on land conversion from agricultural to rural use, land ceilings, or industrial estate development, instead, can cause land misallocation, which in turn may exacerbate financial misallocation if land is used by firms as loan collateral.

In this paper, we describe patterns of firm-level input misallocation in Indian states, establishing a set of stylised facts about firm growth at the state-level, and generating new hypotheses about the regulatory constraints to productivity growth and inter-state economic convergence.

Nearly three decades after the introduction of major product market reforms in 1991, comprehensive factor market policy reform still eludes India. A number of states have recently made the laws governing the hiring and firing of workers more flexible, and others are devising their own land acquisition policies for infrastructure projects and industrial development. However, although similar legislative reforms are being introduced at the federal level as well, the implementation of a comprehensive reform package at the central level still looks far from complete.

At the same time, there is growing evidence that the misallocation of productive factors has constrained firm performance in India. A large literature suggests that rigid industrial labour regulation reduces employment and productivity in firms (see e.g. Adhvaryu et al., 2013; Aghion et al., 2008; Ahsan and Pages, 2009; Amin, 2009; Besley and Burgess, 2004). Besides labour, there has been rising interest in understanding the misallocation of land and capital, as well as their effects on the manufacturing sector: some recent studies suggest that rigid land use regulation, such as land ceiling laws, have reduced productivity (Chakravorty, 2012; Duranton et al., 2015a, b; Morris and Pandey, 2007), while research on the impact of industrial parks and Special Economic Zones is gaining momentum (Blakeslee et al., 2017; Hyun and Ravi, 2017).

Factor misallocation could also be one of the reasons behind the absence of convergence and widening economic gap between Indian states, which has recently had policy makers increasingly concerned. State governments have jurisdiction over many policy areas affecting factor markets, and there is some evidence that the design and implementation of factor market policies varies across states. It could thus be that some

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5 See, for example, Chapter 10 in Government of India (2017).
states are remaining poorer than others, not because of a deficiency of resources, but because of an inefficient allocation of existing resources.

Given the strong influence of state governments on factor market policies, however, there has been surprisingly little systematic analysis of how factor market distortions vary across Indian states. There is growing evidence on the impact of a specific policy on firm performance and productivity (see e.g. Chaurey, 2015; Duranton et al., 2015a, b), but, to our knowledge, there is no study documenting the dynamics of these distortions for a number of different factors, over time, and across states in India. This paper contributes to filling this gap by describing trends in factor market distortions across Indian states, establishing some stylised facts on how these distortions have evolved over time for firms located in different parts of the country.

For our analysis, we adapt the cost-minimization approach by De Loecker and Warzynski (2012) to measure trends in factor adjustment costs over the years. The “adjustment cost” of a factor is a concept similar to the “implicit taxes” on inputs modelled in Hseih and Klenow (2009), and represents an implicit variable cost incurred by a firm in using that factor. This cost is defined as implicit in the sense that it is not reflected in the market price of that factor, nor is it included by the firm in its reported expenditure on that factor, but is nonetheless considered by the firm when deciding on factor usage. As such, the adjustment cost could be the result of regulations which make it implicitly costlier for firms to employ or adjust their inputs. For example, rigid hiring and firing laws can be an adjustment cost on labour. This cost in turn can vary across firms because the regulation in question is dependent on firm characteristics like size, or because its enforcement is variable.

We use a rich firm-level panel dataset for the period between 1999 and 2014, complementing the results of our data analysis with information learned through field interviews with private sector players in the two states of Telangana and Uttar Pradesh. The factors we examine are permanent and contract labour, land, and fixed capital.

We find that, at the all-India level, the adjustment costs for permanent labour, contract labour and land declined in our study period, while those for fixed capital remained flat. The declines have differed by firm size, with significantly faster decline among large (50+ employees) and small firms for permanent and contract labour, respectively. Land-related adjustment costs even trended in opposite directions for large and small firms, declining for large firms and increasing for small firms. Splitting states into two groups based on their manufacturing growth rates over the study period, we further find that the decline in permanent and contract labour adjustment costs was significantly faster in fast-growing states compared to slow-growing states. Consistent with this evidence, we find that the variance of permanent and contract labour adjustment costs has been falling faster in fast-growing states compared to slow-growing states, suggesting that the within-state misallocation of labour is falling faster in faster growing states; for land, on the other hand, the within-state dispersion has been rising for both fast- and slow-growing states, reflecting the rising divergence in land adjustment costs across large and small firms.

Discussing the potential causes of these trends, we also present a review of the institutional framework concerning labour and land in India, supported by grassroots evidence on the constraints faced by firms in the country gathered through our field interviews with small and medium enterprises in Telangana and Uttar Pradesh. Among the most interesting considerations emerging from the exercise, we document an important role of governance in shaping the effective enforcement of factor market policy, and show that broad state-level governance measures are strongly correlated with firms’ perceptions about business environment, regulatory ease, and transparency. Using an index of governance quality to split states into a “high” and a “low” governance group, however, we puzzlingly find that adjustment costs for certain productive factors fell significantly more in the low-governance group, compared to the high-governance one. Interestingly, a preliminary examination of available indices of governance quality over time suggests that this pattern
might partially owe to a slow convergence in governance quality across Indian states. In fact, the states that used to be less well-governed seem to have also been the most effective in improving their governance over time, which could in turn have produced a more sustained reduction in firms’ adjustment costs.

The rest of the paper is structured as follows. Section 2 discusses the existing literature on factor misallocation. Section 3 describes our empirical methodology, as well as our main data sources. Section 4 presents our main findings on factor adjustment costs, while Section 5 discusses the key factor market regulations which could be relevant to explaining these results. Section 6 conducts a preliminary exploration of the role of governance, examining how the trends in adjustment costs have varied across high- and low-governance states. Section 7 concludes with suggestions for priority areas for future policy analysis and the next steps of our research.

2. Literature

A growing body of work examines how firm-level misallocation affects aggregate productivity. This literature is reviewed comprehensively in Restuccia and Rogerson (2017). One branch of this literature has focused on quantifying resource misallocation across firms and its impact on aggregate productivity. The misallocation considered is of the ‘static’ variety, in the sense that the distribution of firm-level productivity is taken as a given. Studies of this type on India suggest that the misallocation of resources towards unproductive firms – much of which is related to factor market issues – has significantly constrained productivity growth in India. Given the distribution of firm-level productivity, Hsieh and Klenow (2009) estimate that simply reallocating resources between existing Indian firms to match U.S. levels of efficiency in resource allocation could increase India’s aggregate productivity by 60-80%.

Market distortions can also have an adverse effect on firms’ lifecycle decisions to invest in productivity improvement. This ‘dynamic misallocation’ could be a reason why the distribution of firm-level productivity differs across countries. For example, older plants in India are smaller and much less productive than their counterparts in the United States (Hsieh and Klenow, 2014). This could be because larger, more productive firms in India face higher regulatory costs, reducing their incentive to invest in better management and innovative capacity.

Firm-level data availability is often a binding constraint on how well firm-level misallocation and productivity can be measured. Rotemberg and White (2017) argue that the measured differences in misallocation between the US and India measured by Hsieh and Klenow (2009) study could be an artefact of differences in firm-level data cleaning procedures across the US and India. This issue is less of a concern in our study, which is focused on within-country differences over time, and relies on estimates from a single survey. Further, as explained in our methodology section below, we limit our work to measuring quantities that do not require production function estimation, as that would put additional demands on the data.

Another strand of the misallocation literature examines the impact of specific factor market-related polices on resource allocation and productivity. In the case of India, there is extensive work on inflexible labour laws in India and their effects on industrial performance. A large literature has found negative economic impacts of amending the IDA regulations in pro-worker directions, thereby making it harder to fire permanent workers - lower output, employment, investment, and productivity in formal manufacturing (Aghion et al., 2008; Ahsan and Pages;2009; Besley and Burgess, 2004), lower sensitivity of industrial employment to local demand shocks (Adhvaryu et al., 2013) and lower employment in the retail sector (Amin, 2009). A further consequence of these inflexible labour laws has been the increased use of contract
workers, who are not subject to IDA regulations (Chaurey, 2015; Ramaswamy, 2013; Sen et al., 2013). These workers have temporary contracts, and are very often hired indirectly through a contracting agency. Bertrand et al. (2017) show that an increased reliance by firms on contract labour is associated with an increase in their size, a decrease in the average product of labour, an increase in employment variability, and a decrease in the average cost of labour. Amirapu and Gechter (2017) look at the effects of labour regulations imposed on firms with 10 or more workers and not covered by the IDA, and find that they substantially increase the firm’s unit labour costs. Furthermore, they find a positive association between regulatory costs and corruption measures at the state level.

Apart from labour market distortions, there has been an increased focus on the misallocation of land and building inputs and its effects on the manufacturing sector.6 Duranton et al. (2015a) show that land and building misallocation in India leads to output misallocation in local areas and leads to lower labour productivity in districts. They estimate that a one standard deviation decrease in the misallocation of land and buildings is associated with a 20-25% increase in output per worker. In particular, the paper also looks at the repeal of the Urban Land Ceiling and Regulation Act (ULCRA, cf. infra) between 1999 and 2003, which led to large reductions in the misallocation of land and buildings in the areas where this strict regulation was in place: the repeal of the ULCRA seems to have resulted in an increase in output per worker of about 3% in treated areas. Furthermore, land misallocation is also an important determinant of financial misallocation for firms, because land is often used as a collateral for loans in India (Duranton et al., 2015b). In this regard, both Special Economic Zones and Industrial Areas have played a significant role in fostering industrial growth. Hyun and Ravi (2017) find that as a result of the 2005 SEZ Act in India, firms in the formal sector grew, and there was a shift in economic activity from the informal sector to the formal sector. Blakeslee et al. (2018) study the effects of the Industrial Areas (IAs) programme that facilitated the establishment of industrial firms in areas that had previously been restricted to agriculture. They find that IAs caused a large increase in the number of firms and employment, and that there were substantial spillovers to neighbouring villages.

3. Methodology and data

3.1 The theoretical framework: Using a cost-minimization approach to infer factor adjustment costs

Our method for estimating the adjustment cost is adapted from the cost-minimization approach used in studies such as De Loecker and Warzynski (2012) and De Loecker et al. (2016). One advantage of this method is that it does not require us to specify the structure of market demand for output, or to estimate a specific production function.7

6 Hsieh and Moretti (forthcoming) also provide evidence on how land could feed into other types of misallocation as well. Using data from US metropolitan areas, the authors show that restrictions on housing supply create misallocation of labour across US cities, which in turn lowered aggregate US growth by more than 50% from 1964 to 2009.

7 This exercise resembles previous work by Ghani et al. (2012), who estimate misallocation at the district level. However, there are two key differences. First, the method in Ghani at al. is based on recovering an index of misallocation which, while making intuitive sense, is not based on a specific model of markets and firm behaviour. In contrast, the method we propose recovers firm-level adjustment costs which have a specific interpretation in the context of a model of cost-minimization by firms, and are more amenable to further analysis on the causes of misallocation. Second, Ghani et al. do not focus on inter-state differences.
The following is a simplified description of the methodology in De Loecker and Warzynski (2012), to which we redirect the reader for further details. Consider a firm $i$ at time $t$ producing output using two variable factors of production, $X_{1it}$ and $X_{2it}$ with the following production technology:

$$Q_{it} = Q_{it}(X_{1it}^1, X_{2it}^2, \omega_{it})$$ (1)

Cost minimization by the firm at time $t$ delivers the Lagrangean:

$$L(X_{1it}^1, X_{2it}^2, \lambda_{it}) = (z_{it}^1 p_{it}^1) X_{1it}^1 + (z_{it}^2 p_{it}^2) X_{2it}^2 + \lambda_{it} (Q_{it}^1 - Q_{it}(.))$$ (2)

Here, $Q_{it}$ is the level of production that the firm is trying to minimise costs for. $P_{it}^v$ is the price paid by firm $i$ for factor $v$, and we assume that the firm is a price taker in factor markets: the price, thus, can vary by firm (for instance, it could vary by firm location), but it cannot be affected by the firm. When using each factor $v$, moreover, the firm also accounts for an additional cost $z_{it}^v \geq 1$, which is what we label as the “adjustment cost” for factor $v$. In practice, $z$ is a variable cost that is not explicitly paid by the firm (that is, it is not included in its reported expenditure on input $v$), but that nonetheless affects the firm’s optimal choice on factor $v$’s usage.9

The first order conditions for this Lagrangian are:

$$\frac{\partial L_{it}}{\partial X_{it}^v} = z_{it}^v p_{it}^v - \lambda_{it} \frac{\partial Q_{it}(.)}{\partial X_{it}^v} = 0$$ (3)

$$z_{it}^v \mu_{it} = \frac{\theta_{it}^v}{a_{it}^v}$$ (4)

where $\mu_{it}$ is the firm’s mark-up and $a_{it}^v = \frac{p_{it}^v X_{it}^v}{Q_{it} p_{it}}$, or the ratio of the expenditure on input $v$ to sales. The expression $\theta_{it}^v$ denotes the elasticity of output with respect to input $v$, which would need to be estimated from a production function. Equation (4) is similar to De Loecker and Warzynski (2012), but with a multiplicative adjustment cost.10

Suppose we have firm-level input and output data, including data on input expenditures and revenue. We could then use Equation (3) to infer the product of the price mark-up and the adjustment cost, $z_{it}^v \mu_{it}$, but it would require estimating a production function to measure the elasticity of output with respect to input $v$.

However, it is possible to measure the change in input adjustment costs over time without estimating a production function, if one is willing to make two further assumptions:11

A1. The production function is Cobb-Douglas. This gives us time invariant output elasticity.

A2. The production function of firm $i$ stays fixed over the study period.

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8 The model can be generalised to the case of more than two variable inputs. The key assumption is that the production function is continuous and twice differentiable with respect to at least one input, and that input is adjustable. This assumption restricts the technology so that the firm can adjust its output quantity by changing at least one variable input.

9 As such, the concept is similar in spirit to that of “implicit input tax” in Hsieh and Klenow (2009).

10 If there are no adjustment costs to either input, then the mark-up computed from either input should be the same. This also implies $\frac{\theta_{it}^1}{a_{it}^1} = \frac{\theta_{it}^2}{a_{it}^2} = 1$.

11 These assumptions are common in studies using firm-level panel data to estimate production functions. If we were to estimate the production function, we would have to make additional assumptions to address the endogeneity of input use.
Taking ratios of Equation (3) for two inputs, we get

\[
\frac{z_{it}^2}{z_{it}^1} = \frac{\theta_i^2}{\theta_i^1} \frac{\alpha_{it}^1}{\alpha_{it}^2}.
\]  

(5)

The ratio of input expenditures is inversely proportional to the ratio of the input adjustment costs.

To simplify, set \( z_{it}^1 = 1 \). In other words, we are redefining the adjustment cost on input 2 in terms to that on input 1. If \( z_{it}^2 > 1 \), this would mean that, in sum, factor market distortions are taxing input 2 relative to input 1.\(^{12}\)

Re-writing Equation (4) in logs, we obtain

\[
\log(z_{it}^2) = \log(\frac{\theta_i^1}{\theta_i^2}) + \log(\frac{\alpha_{it}^1}{\alpha_{it}^2})
\]  

(6)

Since the production function is fixed over time, if we take the difference between two consecutive time periods 1 and 2 we have

\[
\Delta \log(z_{it}^2) = \Delta \log(\frac{\alpha_{it}^1}{\alpha_{it}^2})
\]  

(7)

We can thus recover the change in the factor adjustment cost from data on the change in the ratio of input expenditures. This requires no production function estimation. It is a double difference within a firm across inputs over time. Importantly, \( z \) can be interpreted as the \( \tau \) from Hsieh and Klenow (2009), where \( \tau \)'s are distortions that raise the marginal product of one input relative to the other input. This can be generalised to the case of \( k \) variable inputs, in which changes in \( k-1 \) relative adjustment costs over time can be estimated.

Note that the price mark-up \( \mu \) does not appear in Equations (5) to (7), as it cancels out when taking the ratio of the first order conditions in Equation (4) for any two productive factors. This means that this method has the appealing feature of capturing only changes in input adjustment costs, regardless of changes in firms’ price mark-ups - or, more generally, of any distortion affecting all factors of production proportionally (such as the “input-neutral implicit tax” in Hsieh and Klenow, 2009). Clearly, the downside is that the method would be unsuitable for measuring these all-factor distortions or changes in the distribution of price mark-ups, which would instead require an estimation of the production function. Given that our analysis abstracts from such questions, however, we do not regard this feature as a limitation for our purposes.

3.2 Empirical strategy: Estimating trends in factor adjustment costs from firm-level panel data

The main objective of our descriptive analysis is to apply Equation (6) to firm-level data to estimate how factor adjustment costs have changed over time in Indian states.

Suppose there are \( k \) variable inputs, with \( z_{it}^v \) being the adjustment cost of input \( v \) (relative to input 1) for a firm. Rearranging Equation (6),

\(^{12}\) Note that the “implicit input tax” \( \tau \) in the two-input model in Hsieh and Klenow (2009) is defined in the same relative sense: an input market distortion that favours one factor of production over the other.
\[
\frac{\log a_{1t}^v}{\log a_{1v}^t} = \log(x_{1t}^v) - \log\frac{\theta_1^t}{\theta_1^v}
\]  
(8)

where the ratio of output elasticities, \( \frac{\theta_1^t}{\theta_1^v} \), is by assumption fixed over time.

Now suppose that
\[
\log(x_{1t}^v) = A_{is}^v + \alpha.Year_t^v + \sum \beta.X_i.Year_t^v + e_{it}^v
\]  
(9)

This equation specifies that the adjustment cost consists of a firm-level fixed component \( A_{is}^v \), annual shocks which depend on a set of initial firm characteristics \( X_i \), and an idiosyncratic firm-specific shock \( e_{ist}^v \). The initial firm characteristics could include, for example, the state in which the firm is located, firm size, sector and age.

We do not observe \( \log(x_{1t}^v) \), but can infer the \( \alpha's \) and \( \beta's \) – the changes over time – from the ratio of input expenditure shares \( \frac{\theta_1^t}{\theta_1^v} \), as described in Equation (8). Combining Equations (8) and (9), we arrive at our baseline regression specification:

\[
\frac{\log a_{1t}^v}{\log a_{1v}^t} = F_{is}^v + \alpha.Year_t^v + \sum \beta.X_i.Year_t^v + e_{it}^v
\]  
(10)

where \( F_{is}^v \equiv A_{is}^v - \log\frac{\theta_1^t}{\theta_1^v} \).

We are mainly interested in how the adjustment cost varies over time by state. As specified in Equation (9), we regress the ratio of firm-level input shares on firm fixed effects and on year dummies interacted with state dummies. The firm fixed effect absorbs the time-invariant output elasticity ratio and all time invariant components of the adjustment cost. Thus, the regression identifies how the adjustment cost has changed relative to the baseline year, and how that change varies by state.

We are also interested in how the adjustment cost varies over time for firms of different size and age. This involves regressing the ratio of firm-level input shares on firm fixed effects and on year dummies interacted with initial firm size and age category dummies.

### 3.2.2 Estimating the within-state variance in adjustment cost

We also examine the variance in the factor adjustment cost across firms within the same state, and how that has changed over time. A higher within-state variance in the adjustment cost for input \( v \) implies that there is greater misallocation of that input across firms within the state. In the Hsieh and Klenow (2009) model, the variance of the implicit input tax \( \tau \) within an economy is positively correlated with the extent of firm-level misallocation (and the loss of aggregate productivity due to firm-level misallocation).

To measure the variance of \( \log(x_{1t}^v) \) in a cross-section of firms, we make the additional assumption that the production function is invariant not only over time, but also across firms within the same 3-digit industry in India. This would imply that the input elasticity ratio \( \log\frac{\theta_1^t}{\theta_1^v} \) is invariant over time, and across firms within the same 3-digit industry in India. Thus, Equation (10) modifies to:
\[ \log \frac{a_{it}^1}{a_{it}^v} = Industry_{it}^v + A_{is}^v + \alpha Year_{it}^v + \sum \beta X_{it} Year_{it}^v + e_{it}^v \] (11)

Where the industry fixed effect absorbs the input elasticity ratio.

We implement this in two stages. First, we regress \( \log \frac{a_{it}^1}{a_{it}^v} \) on 3-digit industry fixed effects, and compute the residual from the regression. Per Equations (8) and (10), this residual is directly proportional to the level of the input adjustment cost. We then compute the variance of this residual across firms within every state, for every year \( t \). If one is willing to accept the additional assumption about the production function being invariant within the same 3-digit industry group in India, this variance is directly proportional to the variance of \( \log(z_{it}^v) \) within the state.

### 3.2.3 Choosing the reference input

As discussed, with a total of \( k \) variable inputs, we can measure changes in the adjustment costs of \( k-1 \) inputs relative to a reference input. The choice of reference input matters to the interpretation of the results. For example, if the reference input is fixed capital (excluding land), then any policy change which has the same effect on land and fixed capital will be difficult to discern, as the relative adjustment cost of land will be unaffected by it. Further, a good reference input should be relatively frictionless, to make it less likely that changes in the adjustment cost of the reference input might dominate changes in our measured ratios.

We pick raw materials as the reference input on the supposition that it is a relatively frictionless input, and plausibly not affected directly by land and labour market policies. Our results are however generally robust to using expenditure on purchased electricity as the reference input. However, as many firms in India use electricity generators as a backup source of power, we prefer raw material because to avoid imputing a value to self-generated electricity.

### 3.3 Data

The main sources of data for our analysis are summarised in Table 3.1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Source</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm expenditure on productive factors</td>
<td>ASI</td>
<td>1999-2014</td>
</tr>
<tr>
<td>Firm size</td>
<td>ASI</td>
<td>1999-2014</td>
</tr>
<tr>
<td>Growth rate of manufacturing sector</td>
<td>NITI Aayog</td>
<td>1999, 2014</td>
</tr>
<tr>
<td>State population</td>
<td>Indian Population Census</td>
<td>1991</td>
</tr>
<tr>
<td>Governance score</td>
<td>Transparency International India and CMS (2005)</td>
<td>2005</td>
</tr>
<tr>
<td>Investment climate indicators</td>
<td>NCAER</td>
<td>2017</td>
</tr>
<tr>
<td>Firms’ perceptions on obstacles to operations</td>
<td>Enterprise Survey</td>
<td>2014</td>
</tr>
<tr>
<td>Firms’ perceptions on corruption</td>
<td>Enterprise Survey</td>
<td>2014</td>
</tr>
<tr>
<td>% households paying bribes</td>
<td>CMS (2017)</td>
<td>2005, 2017</td>
</tr>
</tbody>
</table>
The bulk of our work is conducted on data from the Annual Survey of Industries (ASI) by the Indian Ministry of Statistics and Programme Implementation (MoSPI). The survey spans over many years, and covers the entire manufacturing sector comprising industrial units (“factories”) registered under Sections 2(m)(i) and 2(m)(ii) of the Factories Act, 1948. This includes all firms employing 10 or more workers using power, and those with 20 or more workers regardless of the use of power. The ASI data collect detailed information on employment, material inputs, and output that can be conveniently used to recover mark-ups and estimate production functions. The dataset also provides information on the location of the factory at the state and district level.

The ASI data are available both as detailed, unit-level cross-sections without firm identifiers, and as panel data with firm identifiers. Both these datasets have been widely used in the literature, most notably by Allcott et al. (2016), Hsieh and Klenow (2009), and Martin et al. (2017). In our work, we use the panel version for the period 1999-2014 for the sample of the major Indian States.

For our analysis on adjustment costs, we use four main outcome variables from the ASI – wage bill of permanent labour, wage bill of contract labour, value of land (owned and leased), and value of fixed capital excluding land. In line with our discussion in Section 3.2.3, we further divide all our outcome variables by the expenditure on materials consumed (or on electricity consumed and purchased in our robustness checks), which is our reference input for measuring relative input adjustment costs. Descriptive statistics by year on the main ASI variables used in our analysis are reported in Table A3.1.

As regards our classification of fast- and slow-growing states, we use value added time series provided by the Institution for Transforming India Policy Commission of the Government of India (NITI Aayog), and compute the growth rate of manufacturing value added from 1999 to 2014. States are classified as fast-growing if they have an above-median rate of growth (cf. Appendix Table A3.2).

In later sections of the paper (cf. Section 6), we also look at various measures of governance quality of Indian States, which we retrieve from a number of sources. Our main governance classification comes from a study carried out by Transparency International India and the Centre for Media Studies (CMS) in 2005 on the experience of the average citizen with 11 public services across the country. The measure combines information on aspects such as level of satisfaction in the services of the relevant State Department, or on number of households reporting paying bribes, or using influence to speed up administrative processes. States are then ranked with respect to a weighted average of the scores obtained by the various Departments, and we assign a State to a “low governance” group if its score lies in the bottom 50 percent of the ranking.

Alternative governance indicators come from the Indian National Council of Applied Economic Research (NCAER), the Enterprise Survey of the World Bank, the Indian National Crime Records Bureau, and various policy reports, and are described in more detail in Section 6.

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13 The main Central government’s law on conditions of work. Cf. infra Section 5 for details.
14 The cross-sectional data sets are available for the years 1983-84, 1984-85, 1989-90, 1993-94, 1994-95, and more recently from 1996-2014, whereas the panel data is available from 1998 onwards.
15 Our final sample includes Andhra Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand, West Bengal.
16 To define expenditure on materials consumed, we use the Tabulation Programme provided by the MoSPI. Materials consumed include expenditure on total basic items, non-basic chemicals, packing items, consumable stores, and total imports consumed.
17 The services considered in the study are electricity, government hospitals, income tax services, judiciary (lower courts), land administration, municipal services, police, public distribution systems, rural financial institutions, public schools up to 12th grade, water supply.
4. Results

4.1 Trends in factor adjustment costs

In this section, we show our results on the trends in adjustment costs for permanent labour, contract labour, land, and fixed capital (all relative to raw material), as produced by running Equation (9) from Section 3.2.1 on our sample of Indian firms between 1999 and 2014. For each input, we show three sets of graphs corresponding to a) all India trends in adjustment costs; b) trends in adjustment costs across fast- and slow-growing states; and c) trends in adjustment costs for large and small firms.\(^{18}\)

The all India graphs plot the \(\alpha\) coefficients on the year dummies in our baseline regression (9). The graphs for fast- and slow-growing states and for firm size, instead, plot the \(\beta\) coefficients on the interaction between the year dummies and the covariates’ matrix \(X\). In particular, we respectively focus on an indicator for fast-growing states (cf. Section 3.3), and on an indicator for whether firm size is greater than or equal to 50 employees.\(^{19}\)

In each of these graphs, the omitted year is 1999, which means that all the year dummy (and respective interaction) coefficients plotted over time should be interpreted as being relative to 1999. For example, a negative coefficient on any year dummy should be interpreted as a reduction in the adjustment cost for that input in that year relative to 1999.

4.1.1 Permanent labour

Figure 4.1 plots the trends in adjustment costs for permanent labour. At the all-India level in panel 4.1a, adjustment costs for permanent labour have gone down over the time relative to 1999, our starting year. Although there was a slight increase in the trend between 2004-07, the adjustment cost for permanent labour has declined again post-2009. In Figure 4.1b, we plot the differences in adjustment cost trends for permanent labour between fast- and slow-growing states. The trends in adjustment costs for permanent labour in fast-growing states are lower than the corresponding trends in slow-growing states, and the differences in the coefficients are statistically significant over the years. In other words, the adjustment costs on permanent labour have been falling faster over time for firms in fast-growing states compared to slow-growing states. Finally, in Figure 4.1c, we find that the trends in adjustment costs on permanent labour are lower over time for larger firms than for smaller firms, and these differences are statistically significant for most years after 2003. This suggests that adjustment costs on permanent workers have been falling faster for larger firms relative to small firms.

4.1.2 Contract labour

In Figure 4.2, we look at the trends in the adjustment costs for firms for hiring contract labour. In Figure 4.2a, we find a secular decline in the adjustment costs from hiring contract workers faced by firms all over India. Furthermore, in comparison to slow-growing states, firms in fast-growing states experienced a larger decline in contract labour-related adjustment costs. The differences between firms across fast- and slow-growing states are also statistically significant. However, looking at the differences in adjustment cost

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\(^{18}\) The regression tables from which these graphs were generated are available from the authors upon request.

\(^{19}\) The cutoff is chosen to reflect the size threshold after which various provisions of the *Industrial Disputes Act* (IDA) become binding (cf. Section 5). Results are robust to using a higher cutoff of 100 employees (after which many IDA regulations become even stricter). Results are also robust to controlling for firm age and for interactions of firm age and year dummies.
trends by firm size suggests that small firms saw larger reductions in these adjustment costs compared to large firms. These differential effects are statistically significant after 2009.

**Figure 4.1: Adjustment Cost Trends – Permanent Labour**

a: All India  
b: Fast vs. Slow Growing State Groups  
c: Large vs. Small Firms


**Figure 4.2: Adjustment Cost Trends – Contract Labour**

a: All India  
b: Fast vs. Slow Growing State Groups  
c: Large vs. Small Firms


### 4.1.3 Land

In Figure 4.3a, we find that adjustment costs for land have substantially declined in India over time, especially since 2006. In Figure 4.3b, where we compare the land-related adjustment costs for firms across fast- and slow-growing states, we do not find statistically significantly different effects across these groups after 2005. Finally, we compare adjustment cost trends across large and small firms in Figure 4.3c, where land-related adjustment costs strikingly seem to have trended in opposite directions for large firms relative to small firms. For large firms, adjustment costs have gone down over time, whereas for small firms these adjustment costs have risen over the years. In other words, over the years, it has become increasingly easier for large firms to access industrial land; on the contrary, for small firms accessing land remains a major constraint, which has even been steadily increasing over time.
Figure 4.3: Adjustment Cost Trends – Land

a: All India  
b: Fast vs. Slow Growing State Groups  
c: Large vs. Small Firms


4.1.4 Fixed capital

We finally turn our attention to trends in adjustment costs related to fixed capital in Figure 4.4. In Figure 4.4a, we find evidence of an increasing trend in fixed capital-related adjustment costs for firms across India. Although adjustment costs were lower than in 1999 until 2009, they definitely picked up after 2010. In Figure 4.4b, we compare these costs for firms in slow- and fast-growing states. The picture reflects the all-India upwards trend in adjustment costs for both groups, and there does not seem to be a clear pattern as of the differences between firms in the two sets of states. Finally, in Figure 4.4c, we find that, although fixed capital-related adjustment costs have trended upwards across firm sizes, larger firms have consistently faced relatively lower costs than small firms.

Figure 4.4: Adjustment Cost Trends – Fixed Capital (Excluding Land)

a: All India  
b: Fast vs. Slow Growing State Groups  
c: Large vs. Small Firms

4.2 Additional evidence and robustness checks

4.2.1 Within-state variance in adjustment costs

Thus far, we have shown that input-specific adjustment cost trends tend to differ by fast- and slow-growing states, as well as by firm size. This suggests that different states may have implemented various regulations (such as relaxed labour law inspections, land registry, collateral requirements to access land) differently for large versus small firms. For any input, a regulation or implementation difference across firm sizes in a particular state would lead to greater dispersion in the adjustment costs across firms within that state. For example, a state-level policy that implicitly makes it cheaper for larger firms to access land as compared to small firms would in turn lead to higher dispersion in the adjustment costs across firms in that state. In this subsection, we therefore analyse the trends in the dispersion of adjustment costs across firms within fast- and slow-growing states.

Formally, as discussed in Section 3.2.2., we first infer the levels of the adjustment costs at the firm level by using the residuals from regression of input expenditure shares on industry fixed effects, as in Equation (10) above. Then, we calculate the dispersion of these adjustment costs across firms for each state-year cell. Finally, we average these variances over fast- and slow-growing states, over time, and for each of our four productive inputs. Figure 4.5 shows the results of the analysis. For permanent labour, the within-state variance has declined more for fast-growing states compared to slow-growing states. Similarly, for contract labour, after 2005, the within-state dispersion in adjustment costs has declined more for fast-growing states. This means that the wedge between large and small firms in terms of labour-related adjustment costs has narrowed more, over time in fast- than in slow-growing states. Interestingly, for land, the within-state dispersion has trended upwards over time for both groups of states: in both sets of states, therefore, there seems to have been a divergence in the land-related adjustment costs faced by different firms.

Figure 4.5: Within-State variance in adjustment costs

![Graph showing within-state variance in adjustment costs for permanent labor, contract labor, land, and fixed capital (excluding land).]


Notes:

20 Figures A4.1-A4.4 (see Annex) show these plots for each state for the four inputs.
4.2.2 Alternative interpretations and robustness checks

A first, obvious concern with our findings is that the trends we observe in adjustment costs for firms might be due to organic technological changes rather than to misallocation over time: for instance, the use of new machineries may require installation, adaptation, training of the workforce, which would all affect relative input costs even absent any change in factor market distortions. To the extent that natural technological changes happen at the industry level over time, they should be adequately captured by the inclusion of industry-year fixed effects in our baseline regressions. In our robustness exercises, therefore, we control for a set of industry-year interaction dummies, and obtain very similar trends as in our main specifications, regardless of whether sectors are identified at the two- or three-digit level.

A potential confounder to the interpretation of our analysis could be related to selection bias as firms enter and exit the market in response to unrelated changes in the business environment. For example, distortions may result spuriously high both in states that are growing rapidly and have many entrants who have not yet reached productive efficiency, and in less well-off states that have a high share of struggling and exiting firms – but this would obviously have very different policy implications in the two cases. To deal with this concern, we first exploit information in the ASI data on the reasons why an establishment in the sample frame could not be included in the survey, in order to get some information on firm closures. Table 4.1 shows that in our sample period there was indeed quite a high turnover of firms, but that the difference between the firm exit rates of high- and low-growth states does not seem to be substantial, nor to follow a defined pattern over time. In Table 4.2, we also document firm entry, which turns out to be equally limited in our sample, as well as evenly distributed across states with different rates of growth. As a further robustness check, we also replicate our analysis excluding new entrants from the sample, and find very similar results to our baseline specification.

### Table 4.1 Firm closures, 1999-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>All India</th>
<th>Slow growing</th>
<th>High growing</th>
<th>Difference slow-high*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>0.062</td>
<td>0.068</td>
<td>0.057</td>
<td>0.011</td>
</tr>
<tr>
<td>2000</td>
<td>0.250</td>
<td>0.272</td>
<td>0.235</td>
<td>0.037</td>
</tr>
<tr>
<td>2001</td>
<td>0.230</td>
<td>0.234</td>
<td>0.228</td>
<td>0.006</td>
</tr>
<tr>
<td>2002</td>
<td>0.186</td>
<td>0.181</td>
<td>0.189</td>
<td>-0.008</td>
</tr>
<tr>
<td>2003</td>
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<tr>
<td>2004</td>
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<td>0.174</td>
<td>0.181</td>
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</tr>
<tr>
<td>2005</td>
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</tr>
<tr>
<td>2006</td>
<td>0.206</td>
<td>0.192</td>
<td>0.214</td>
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</tr>
<tr>
<td>2007</td>
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<td>0.205</td>
<td>0.187</td>
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</tr>
<tr>
<td>2008</td>
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<td>0.229</td>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>2012</td>
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<td>2014</td>
<td>0.133</td>
<td>0.145</td>
<td>0.125</td>
<td>0.020</td>
</tr>
</tbody>
</table>

* in bold when significant at 5 percent level

### Table 4.2 Firm entry, 1999-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>All India</th>
<th>Slow growing</th>
<th>High growing</th>
<th>Difference slow-high*</th>
</tr>
</thead>
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<tr>
<td>1999</td>
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<td>0.008</td>
<td>0.007</td>
<td>0.001</td>
</tr>
<tr>
<td>2000</td>
<td>0.006</td>
<td>0.007</td>
<td>0.006</td>
<td>0.001</td>
</tr>
<tr>
<td>2001</td>
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<td>0.009</td>
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<td>0.004</td>
</tr>
<tr>
<td>2002</td>
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<td>0.008</td>
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<tr>
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<td>0.006</td>
<td>0.004</td>
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</tr>
<tr>
<td>2004</td>
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<td>0.008</td>
<td>0.006</td>
<td>0.002</td>
</tr>
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<td>0.011</td>
<td>0.007</td>
<td>0.004</td>
</tr>
<tr>
<td>2006</td>
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<td>0.016</td>
<td>0.010</td>
<td>0.006</td>
</tr>
<tr>
<td>2007</td>
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<td>0.014</td>
<td>0.013</td>
<td>0.001</td>
</tr>
<tr>
<td>2008</td>
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<td>0.012</td>
<td>0.009</td>
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</tr>
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<td>2009</td>
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<td>0.010</td>
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</tr>
<tr>
<td>2011</td>
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<td>0.003</td>
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<td>0.005</td>
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<tr>
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<td>0.005</td>
<td>0.002</td>
<td>0.003</td>
</tr>
</tbody>
</table>

* in bold when significant at 5 percent level


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21 Results for this section are available from the authors upon request.

22 For this exercise, we consider as closure the following categories: closed, non-operational, non-existent within three years, closure but in existence, non-existent now, non-existent for more than three years, deregistration.

23 We define as new entrants those establishments in their first year of operations, i.e. those created in the same year as the survey.
Finally, one could be concerned that land as an input is quite different in scope from capital or labour, as firms do not often make year to year changes in their land holdings, and undertake instead lumpier land adjustments over longer periods of time. In that case, our results might be picking up noise or measurement error, rather than true adjustment costs. To avoid this source of bias, we thus replace our year-on-year specification for land-related adjustment costs with long differences (3- and 5-years): even though only around 20 percent of our original sample have sufficient information on land usage to allow for long differences estimation, we reassuringly find comparable results to our main specification.

5. Relevant Factor Market Policies in Indian States

How could differential change in land and labour regulation (de jure and de facto) across Indian states explain the trends in their adjustment costs? While finding specific causal mechanisms for these patterns is beyond the explorative scope of this paper, the institutional framework surrounding factor markets within and across Indian states is critical to understanding the implications of our results. This section presents a short survey of the most salient aspects of land and labour regulation in Indian states, complemented by in-depth firm interviews in two states (Telangana and Uttar Pradesh)24 which were conducted to gather grassroots information on broad issues of governance, policy implementation, and law enforcement in these areas. A more in depth description of the regulatory framework is also provided as an Annex.

5.1 Labour

The system of labour legislation and rules in India builds on a complex architecture. Labour regulations vary across government authorities (central and states), establishment sizes, and types of labourers. The Indian Labour Bureau (2004), for instance, estimates that in 2003 a typical enterprise might have to deal with about 25 central government and between 10 to 15 pieces of state regulations. The practical costs of complying with these regulations in turn depend heavily on various characteristics of the firm, such as size and composition of the workforce.

For example, most labour laws in the country are designed to be stricter for larger firms, with the most stringent provisions applying only beyond a certain size cut-off. This is the case for example for the Central Government’s Factories Act 1948, the main law governing conditions of work, which applies to all manufacturing premises that use electricity and employ 10 or more workers, and to non-powered premises with 20 or more employees. Similarly, social security schemes such as the Employees’ State Insurance (ESI) and Provident Fund (EPF) both require mandatory employer contributions for firms above a 20-employee threshold.

The most frequently cited source of distortions in Indian labour law (Bhattacharjea, 2006), however, is the Industrial Disputes Act 1947 (IDA), which covers a vast array of issues, from resolution of industrial disputes, to hiring and firing workers, to closure of establishments in the formal sector (Chaurey, 2015). In particular, the IDA lays down different rules for layoffs and retrenchments depending on whether an establishment’s workforce exceeds 50 or 100 permanent employees. This in turn has been shown (cf. Chaurey, 2015; Ramaswamy, 2012) to dramatically influence firms’ decisions on the optimal composition

24 We conducted semi-structured interviews and focus groups with more than fifty MSMEs, Industry Associations, consulting firms and informed academics. The two states were selected so that they respectively belonged to our “fast-” and “slow-growth” state groups. Basic convenience and availability of relevant contacts with the private sector then determined the choice in practice. The fact that Telangana is a recently formed state (2014) made it also a particularly interesting case-study for our analysis on regulations and quality of institutions.
of their labour force in terms of balance between permanent and contract workers hired under temporary contracts, often indirectly through a contracting agency. Even though the Contract Labour (Regulation and Abolition) Act 1970 (again applicable to establishments employing at least 20 contractors on any day over the previous 12 months) entitles contract workers to minimum wages, workplace health and safety, and social security cover, in fact, the use of contract workers is subject in fact to far lower administrative burdens, and firms reported, during our field interviews, to mostly use them in order to deal with demand fluctuations with greater flexibility, as well as to decrease overall labour costs.

5.2 Land
A range of policies and institutional issues potentially influence the efficiency of land markets and vary across states: policies on land use, ceilings on urban land ownership, land acquisition, conversion of farmland to industrial use, and property titling are just but a few examples in this respect.

Although the transfer of land and the change of land usage are under the jurisdiction of State governments, for instance, buyers generally need to apply for non-agricultural clearance (NAC) from local/State governments to convert farm land to other uses (Morris and Pandey, 2007). Moreover, the Indian Stamp Act 1899 still requires that expensive non-judicial stamp duties be paid on the sale and purchase of real property. In terms of land administration, however, the Digital India Land Records Modernisation Programme (DILRMP), launched in 2008, was set up to improve the transparency and efficiency of the country’s land records management system. Even though the degree of implementation of the programme varies quite substantially by States and specific DILRMP component, the programme seems to be achieving significant steps towards the digitisation of maps and land records and the minimisation of property disputes.

As regards urban land, a major identifiable policy reform was the 1999 Repeal Act of the Urban Land (Ceiling and Regulation) Act 1976 (ULCRA), which used to impose binding restrictions on vacant land, building construction, and land transfers, and was repealed by states in a staggered way between 2003 and 2008 (cf. Duranton et al., 2015a; 2016). Despite the ULCRA repeal though, a vast array of Central and State policies still restrict urban land supply and lead to higher property prices, ranging from earmarking for public use, to lack of titles in slums, to ceilings on building heights and rent controls measures (cf. Chakravorty, 2013 and Duranton et al., 2015a).

The availability of industrial land is also deeply affected by policies regarding industrial parks and estates. The main regulations governing the functioning of Special Economic Zones (SEZs) in India are laid down in the SEZ Act, 2005, and SEZ Rules, 2006. SEZs are industrial estates that produce mainly export-oriented goods, and are envisioned as comprehensive industrial townships with social facilities for employees of participating enterprises, like housing blocks, schools, and hospitals. Administrative procedures within SEZs are facilitated by the “single-window” mechanism, and SEZ developers and firms enjoy strong financial and fiscal incentives. More recently, the Indian government has launched a new zonal development model, the National Investment and Manufacturing Zones (NIMZs), in the ambit of its National Manufacturing Policy 2011. Similar to SEZs, NIMZs are large integrated industrial townships with social infrastructure and facilities, and also benefit from simplified administrative processes through the “single-window” mechanism. NIMZs, however, focus substantially on domestic technology and manufacturing rather than export-oriented production, and grant lower incentives to developers and participating firms, in terms of both lower fiscal concessions and stricter labour regulations.
In general, the administrative procedures and the degree of incentives accorded to zone participants differ widely across states, which has over time created a substantial imbalance in terms of the number and extension of zones located on the territory: according to one recent estimate (Jenkins et al., 2015), for example, nine states account for 89 percent of all notified SEZs in the country. Since developing industrial zones often involves substantial displacement of farmers, a further controversial issue refers to land acquisition for industrial estates. Since 2007, various policies have been trying to establish a legal framework for land acquisition, rehabilitation, and resettlement that avoids displacement and impoverishment, at the same time providing sufficient incentives and flexibility for investors and developers. Implementation, however, looks often far from complete, and many states have been enacting their own policies and measures to deal with this delicate issue.

Table 5.1: Factor Laws

<table>
<thead>
<tr>
<th>Factor</th>
<th>Law/regulation</th>
<th>State variation</th>
<th>Has size cut-offs</th>
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<tr>
<td>Labour</td>
<td>Factories Act 1948</td>
<td>YES</td>
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<tr>
<td></td>
<td>Shops and Commercial Establishments Acts</td>
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<td>YES</td>
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<tr>
<td></td>
<td>Minimum Wages Act 1948</td>
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<tr>
<td></td>
<td>Payment of Bonus Act 1965</td>
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<td>Equal Remuneration Act 1976</td>
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<td></td>
<td>Employees’ State Insurance Scheme (BSI)</td>
<td>NO</td>
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<tr>
<td></td>
<td>Employees’ Provident Fund (EPF)</td>
<td>NO</td>
<td>YES</td>
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<tr>
<td></td>
<td>Payment of Gratuity Act 1972</td>
<td>NO</td>
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<td>Industrial Disputes Act 1947 (IDA)</td>
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<tr>
<td></td>
<td>Contract Labour (Regulation and Abolition) Act 1970 (IDA)</td>
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<td>YES</td>
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<td>Rules on transfer of farm land to a non-agriculturist</td>
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<td>Non-agricultural clearance (NAC)</td>
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<td>Indian Stamp Act 1899</td>
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<td></td>
<td>Urban Land (Calling and Regulation) Act 1976 (ULCRA)</td>
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<td>Rules on floor space index (FSI)</td>
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<td></td>
<td>Rent legislation</td>
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<tr>
<td></td>
<td>National Manufacturing Policy 2011</td>
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5.3 Implementation and governance

Despite the non-negligible variation in State regulations on both labour and land documented in Sections 5.1 and 5.2, there seems to be more than factor market policies to justify the time trends we observed for factor adjustment costs in Section 4. For example, our results highlighted a striking decline in contract labour adjustment costs, but, with the exception of an Andhra Pradesh amendment in 2003, there were no systematic amendments to the national Contract Labour Act in our sample period introduced at the central level or by individual states. At the national level, the Contract Labour (Regulation and Abolition) Amendment Bill, 2017, has amended the definition of contract worker, provided for instances for obtaining temporary contractor licenses, mandated the online filing of electronic annual reports by the contractor, discouraged wage payment in cash, and increased the monetary penalty for certain offences related to contract labour. Between 2014 and 2017, moreover, the states of Haryana, Madhya Pradesh, Maharashtra, and Rajasthan passed laws to exempt businesses employing fewer than 50 people (as opposed to the existing 20-worker threshold) from statutory provisions preventing the employment of contract workers for work considered perennial in nature. All of these regulations however occurred after our study period.


26 At the national level, the Contract Labour (Regulation and Abolition) Amendment Bill, 2017, has amended the definition of contract worker, provided for instances for obtaining temporary contractor licenses, mandated the online filing of electronic annual reports by the contractor, discouraged wage payment in cash, and increased the monetary penalty for certain offences related to contract labour. Between 2014 and 2017, moreover, the states of Haryana, Madhya Pradesh, Maharashtra, and Rajasthan passed laws to exempt businesses employing fewer than 50 people (as opposed to the existing 20-worker threshold) from statutory provisions preventing the employment of contract workers for work considered perennial in nature. All of these regulations however occurred after our study period.
even though the Industrial Disputes Act has not seen a major reform in our study period. For land, different state policies and the staggered repeal of ULCRA could have affected the evolution of adjustment costs, but many commentators have argued that implementation and enforcement of policy tends to have been even far more uneven. Looking at governance, therefore, seems imperative for understanding the dynamics we observed in Section 4.

As regards labour for example, our interviews with firms suggested that enforcement varies in many ways. In terms of regulation avoidance, Mitchell et al. (2014) and the OECD (2007) cite the example of “voluntary” retirement schemes (VRS), which are used to bypass the rules on retrenchment. Warnecke and De Ruyter (2012) also report that public officials have considerable discretion in implementing government regulations, and that corruption is widespread in courts too. There seem to be strong elements of discretion in contract labour law as well, for example in the definition activities for which use of contract labour may be prohibited in certain states, and the precise responsibilities of the labour contractor and the employer in ensuring the contract is enforced: a qualitative survey suggests that contract labour law is poorly enforced, with workers complaining about collusive arrangements between contractors, firms and inspectors (Rajeev, 2009).

As for land-related issues, a recent report by the World Bank (2015) on six Indian States highlights that, even when the legal and institutional framework is relatively robust, there are significant challenges in terms of implementation and enforcement: the frequent sharing of responsibility for land management by a range of different departments (up to four in certain states) and agencies causes horizontal overlap and lack of coordination in the first place, and registration of land transactions seems to be often plagued by errors and fraud. Morris and Pandey (2007) also report widespread poor protection of land property rights, as well as a high degree of discretion in granting the non-agricultural clearance for the conversion of use of farm land.

This framework was confirmed during our fieldwork, when virtually all the interviewed firms (both in Uttar Pradesh and Telangana) mentioned implementation and governance issues among the main challenges they face in their regular operations. Many firms reported being subject to a high number of inspections throughout the year, whose primary purpose often turns out to be harassment. Moreover, the severity of the extortions seems to depend on the level of contacts enjoyed by firms among bureaucrats and politicians. Relatedly, larger enterprises tended to report extortion as just a sort of operating cost that they would need to account for when planning their activities, whereas these payments represent a way more severe burden for the balance sheets of smaller units.

On inspections, an independent exercise has recently been led by the Department of Industrial Policy and Promotion (DIPP) of the Ministry of Commerce and Industry of the Government of India. Every year since 2014, the Department has outlined in a Business Reform Action Plan (BRAP) the specific actions required in all States in the areas of procedural and inspection reform: a comprehensive implementation of the programme would allow enterprises to maintain unified rather than multiple registers, and be subject to joint regulatory compliance inspections for all laws, instead of separate inspections for each law. Moreover, the same official would not be allowed to visit any firm in two consecutive inspections, and environmental clearances, would be carried out based on the results of a computerised risk assessment.

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27 The States surveyed were Andhra Pradesh, Bihar, Jharkhand, Karnataka, Odisha, and West Bengal.
28 An MSME typically receives inspections by the Labour Department (Provident Fund, Employee State Insurance, Minimum Wage), Factories Act, Fire Department, Pollution Control Board, National Ground Tribunal, Electricity Department, Income Tax, GST.
Despite the potentially transformative role of these policies, however, during our interviews firms consistently expressed the view that the impact of the reforms is not being fully felt on the ground. Apart from an imperfect advertisement of the reforms themselves among private sector players, implementation issues seem to be watering down the spirit of the programme: for instance, many interviewees claimed that inspectors often do not follow the reformed procedures in practice, for example visiting the same firm more than once or setting up multiple inspections rather than joint ones.

The government, both at the State and Central level, has consequently been quite active in trying to improve governance and in seeking ways to provide for a more effective service delivery to Indian citizens. One example in this direction has been a concerted effort to move towards the digitisation of services and widespread use of e-governance, with many States developing their own e-governance projects to provide specific electronic services to citizens since the late 1990s. More recently, the National e-Governance Plan (NeGP) was endorsed by the Central government in 2006 as an ambitious initiative to develop e-government services, networking infrastructure, State data centres, and village-level centres for the delivery of core services to citizens (Bussell, 2012). The provision of NeGP services can be under the purview of either the Central (as regards e.g. income tax, pensions, postal services) or the State government (for instance for education, health, and crucially land records).

Firms interviewed during our fieldwork almost unanimously expressed satisfaction in how these initiatives are in general reducing the complexity in obtaining the information and services required to start and run a business. In Uttar Pradesh, interviewees also appreciated how the introduction of electronic platforms is starting to bear some fruit in terms of reduced corruption. Nevertheless, both in Telangana and Uttar Pradesh enterprises lamented how in practice many applications for various licenses and clearances still require the relevant documentation to be handed in manually into public offices, despite the existence of State single-window portals. In Telangana, the same applies to the single window for land acquisition under the land record modernisation programme.

6. Does governance matter?

In line with our observations from Section 5, where we documented how institutional quality and the practical implementation of laws and regulations seem to be significant determinants of firm performance, we now turn our attention to governance. In practice, we assign states to two groups based on their level of governance (see Table 6.1), and we are interested in assessing whether the pattern of factor misallocation over time differs between the two sub-samples. As discussed in Section 3.3 on data sources above, we distinguish between “high-” and “low-governance” states based on the governance rankings provided by Transparency International India and the Centre for Media Studies (2005).

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29 These State programs targeted services such as ration cards, income certificates, land records, building licences, and income tax payments. Examples include eSeva (Andhra Pradesh), Civic Centres (Gujarat), Sugam (Himachal Pradesh), Nemmadi (Karnataka), Friends (Kerala), e-Mitra (Rajasthan), RASI (Tamil Nadu), e-Suvidha (Uttar Pradesh). Bussell (2012) provides a detailed description of many of these programs.

30 Among the integrated NeGP projects, the Single Window Business Registration Act 2013 provided for the establishment of a single-window registry as a one-stop shop for the provision of online government-to-business (G2B) services to investors and business communities in the country. The resulting online platform (eBiz, launched in 2015) can now be used by anyone planning to start operations or having an existing business in India, and provides online submission and processing of composite forms and one-time payments. As before, this development is however too recent to be reflected in our data.
Table 6.1: Governance classification

<table>
<thead>
<tr>
<th>State</th>
<th>Governance score</th>
<th>Rank</th>
<th>Low governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh (incl. Telangana)</td>
<td>421</td>
<td>4</td>
<td>NO</td>
</tr>
<tr>
<td>Assam</td>
<td>542</td>
<td>15</td>
<td>YES</td>
</tr>
<tr>
<td>Bihar</td>
<td>695</td>
<td>19</td>
<td>YES</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>445</td>
<td>6</td>
<td>NO</td>
</tr>
<tr>
<td>Delhi</td>
<td>496</td>
<td>11</td>
<td>YES</td>
</tr>
<tr>
<td>Gujarat</td>
<td>417</td>
<td>3</td>
<td>NO</td>
</tr>
<tr>
<td>Haryana</td>
<td>516</td>
<td>13</td>
<td>YES</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>301</td>
<td>2</td>
<td>NO</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>520</td>
<td>14</td>
<td>YES</td>
</tr>
<tr>
<td>Karnataka</td>
<td>576</td>
<td>17</td>
<td>YES</td>
</tr>
<tr>
<td>Kerala</td>
<td>240</td>
<td>1</td>
<td>NO</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>584</td>
<td>18</td>
<td>YES</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>433</td>
<td>5</td>
<td>NO</td>
</tr>
<tr>
<td>Odisha</td>
<td>475</td>
<td>9</td>
<td>NO</td>
</tr>
<tr>
<td>Punjab</td>
<td>459</td>
<td>7</td>
<td>NO</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>543</td>
<td>16</td>
<td>YES</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>509</td>
<td>12</td>
<td>YES</td>
</tr>
<tr>
<td>Uttar Pradesh (incl. Uttarakhand)</td>
<td>491</td>
<td>10</td>
<td>YES</td>
</tr>
<tr>
<td>West Bengal</td>
<td>461</td>
<td>8</td>
<td>NO</td>
</tr>
</tbody>
</table>

Data source: Transparency International India and the Centre for Media Studies (2005).

In Tables 6.2 and 6.3, we confirm that the measure correlates well with firm perceptions on both business obstacles and corruption as captured by the latest wave of the Enterprise Survey of the World Bank. When we group States according to our “quality of governance” classification, we observe in Table 6.2 that firms in States with lower governance are far more likely to report major or severe obstacles to operations along all the dimensions considered. The difference between the two groups is particularly striking for access to land, for which there is an almost six-fold increase in the likelihood of encountering difficulties when moving from column 1 to Column 2, and for business licensing, where the percentage of firms lamenting problems grows by a factor of around 3.5. Similarly, in Table 6.3, firms in States with weaker governance tend to report a higher incidence of harassment and less-than-impartial behaviours on the part of public officials. It is interesting to notice, for example, that while the likelihood to be visited by a tax inspector, as well as the number of visits per year, does not differ substantially between the two groups of States (if anything, a firm is more likely to receive a visit in a high-governance State), the likelihood that an informal gift to the inspector is expected during one such visit more than triples in size in the low governance group, where this seems to be the case for a quarter of the respondents.

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31 Although a wave of the Enterprise Survey for the year 2005 exists, we focus on the latest wave (year 2014) due to its improved sample frame, which is representative at the State level. This was not the case for 2005 edition of the survey.
Table 6.2: Major or severe obstacles to operations (percentages)

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>High Governance</th>
<th>Low Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>access to land</td>
<td>4.06</td>
<td>23.48</td>
</tr>
<tr>
<td>access to finance</td>
<td>10.37</td>
<td>19.25</td>
</tr>
<tr>
<td>labour regulations</td>
<td>9.46</td>
<td>22.47</td>
</tr>
<tr>
<td>skilled labour</td>
<td>9.00</td>
<td>15.09</td>
</tr>
<tr>
<td>tax rates</td>
<td>24.31</td>
<td>35.75</td>
</tr>
<tr>
<td>tax administration</td>
<td>10.01</td>
<td>24.53</td>
</tr>
<tr>
<td>business licensing</td>
<td>6.44</td>
<td>22.15</td>
</tr>
<tr>
<td>political instability</td>
<td>11.86</td>
<td>24.80</td>
</tr>
<tr>
<td>corruption</td>
<td>32.18</td>
<td>52.43</td>
</tr>
<tr>
<td>courts</td>
<td>5.77</td>
<td>6.34</td>
</tr>
</tbody>
</table>

Data source: Enterprise Survey, year 2014.

Table 6.3: Corruption perceptions, 2014

<table>
<thead>
<tr>
<th>Perception</th>
<th>High Governance</th>
<th>Low Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The court system is fair, %</td>
<td>67.98</td>
<td>74.94</td>
</tr>
<tr>
<td>(2803)</td>
<td>(3304)</td>
<td></td>
</tr>
<tr>
<td>Time spent on regulatory compliance (%)</td>
<td>3.93</td>
<td>3.71</td>
</tr>
<tr>
<td>(2899)</td>
<td>(3124)</td>
<td></td>
</tr>
<tr>
<td>Visited by tax inspector, %</td>
<td>49.13</td>
<td>41.02</td>
</tr>
<tr>
<td>(2967)</td>
<td>(2373)</td>
<td></td>
</tr>
<tr>
<td>No. visits by tax inspector last year</td>
<td>3.16</td>
<td>3.59</td>
</tr>
<tr>
<td>(1574)</td>
<td>(1864)</td>
<td></td>
</tr>
<tr>
<td>Gift during tax inspection, %</td>
<td>8.17</td>
<td>25.73</td>
</tr>
<tr>
<td>(1499)</td>
<td>(1713)</td>
<td></td>
</tr>
<tr>
<td>Gift for government procurement (% cost)</td>
<td>0.17</td>
<td>1.04</td>
</tr>
<tr>
<td>(391)</td>
<td>(436)</td>
<td></td>
</tr>
<tr>
<td>Gift for hiring the wheels (% annual sales)</td>
<td>0.27</td>
<td>0.46</td>
</tr>
<tr>
<td>(2656)</td>
<td>(2443)</td>
<td></td>
</tr>
<tr>
<td>Gift for operating license, %</td>
<td>14.21</td>
<td>30.96</td>
</tr>
<tr>
<td>(492)</td>
<td>(740)</td>
<td></td>
</tr>
</tbody>
</table>

Data source: Enterprise Survey, year 2014.
Number of non-missing observations in parentheses.

In Figure 6.1, we further show that, as governance quality deteriorates, various indicators of economic efficiency and investment climate produced by the Indian National Council of Applied Economic Research (NCAER, 2017) worsen too.\textsuperscript{32} For example, land issues become more problematic in general, in particular with less land available for industrial purposes as a share of total surface area of the state, lower digitisation of land registration processes, and a higher share of entrepreneurial projects that are stalled because of land-related problems vis-à-vis other reasons. Labour issues display a similar pattern, and, interestingly, the share of contract workers in the total labour force is also higher in worse-governance States. As regards

\textsuperscript{32} The NCAER study assesses the factors creating investment opportunities and driving investment decisions in Indian States, including the availability of factors of production, the efficiency in the use of these productive factors, States’ growth prospects, and firms’ perceptions of investment opportunities as created by the socio-political and economic climate. NCAER started producing their State Investment Potential reports only in 2016, and their first edition did not feature information on land issues. For this reason, we only focus on the 2017 wave of the study.
other areas of interest, financial depth (measured as the ratio of outstanding commercial bank credit and gross State GDP) decreases with institutional quality, as does (albeit mildly) the completion rate of legal cases by courts; finally, higher shares of entrepreneurial projects are delayed by environmental clearances.

**Figure 6.1 Does governance matter?**

![Graphs showing the relationship between governance score and various indicators such as land issues, labour issues, digitized land registration, share of land stalled projects, land availability for industrial purpose, share of contract workers in total labour force, financial depth, completion rate of cases by courts, and share of environment clearance stalled projects.](image)

*Data source:* Transparency International India and the Centre for Media Studies (2005) and NCAER (2017).

### 6.1 The dynamics of governance

Given the dynamic nature of our paper, we would be ideally interested in providing at least some evidence on the evolution of governance patterns across Indian States over time. Even though we do not have data on the governance score by Transparency International India and CMS beside 2005, therefore, we try to do so by exploring a range of additional sources. First, we use an indicator of State government effectiveness in the delivery of core public services as developed by Mundle et al. (2016), who focus on infrastructure, social services, fiscal performance, justice, law and order, and quality of the legislature. Then, we turn to another work by the Centre for Media Studies (2017), and borrow their statistics on the proportion of households who were forced to pay bribes in order to obtain public services. Finally, we consult the yearly reports by the Indian National Crime Records Bureau, and retrieve the number of corruption records to be investigated by the Anti-Corruption and Vigilance Departments of each State (both as a stock and as the number of new cases reported each year).

The exercise delivers two stylised facts: (i) governance is sticky; and (ii) there nonetheless seems to be convergence in governance. In other words, it seems that States that used to have a worse governance record might be effectively catching up with the rest of the country, despite still displaying worse outcomes overall.

These suggestive results are illustrated in Figure 6.2, where we plot our various alternative measures of governance for Indian States at two different points in time, to compare earlier values to more recent ones.
Stickiness would be implied by a positive correlation between the two set of values, i.e. by the baseline values on the \( x \)-axis being good predictors of the more recent values on the \( y \)-dimension. Convergence would in turn result in the linear relationship between the past and present values cutting the 45-degree line (the grey solid line in the figure) from above: a lower value today is associated with a larger change tomorrow. As it is apparent from Figure 6.2, this seems to be the case for all the measures considered.

**Figure 6.2 The dynamics of governance**

![Graphs showing trends in governance metrics](image)

*Data sources: Mundle et al. (2016); Centre for Media Studies (2017); National Crime Records Bureau (2015)*

### 6.2 Trends in adjustment costs

Keeping in mind the suggestive evidence presented above on the correlation with governance with various measures of institutional quality and economic efficiency, as well as on the quality of its dynamic evolution, we now look at how governance shapes the trends in adjustment costs for the four inputs (permanent labour, contract labour, land, and fixed capital) for firms over time. Since our governance indicator is measured at the state level, we look at the trends separately for firms in states with high governance quality and those with low governance quality. Furthermore, we also look at these trends for large and small firms across states with differing governance qualities. In our main figures, we show these graphs for all firms in these states. To make sure that our estimated trends only capture governance quality and not other state level measures, in the Annex we repeat the analysis by restricting the sample to districts along the border in states with high versus low governance quality.

Surprisingly, the adjustment costs of permanent labour and land (Figures 6.3a and 6.5a, respectively) have fallen significantly more in the low-governance group, compared to the high-governance one. Moreover, this differential looks significantly larger among larger firms vis-à-vis the smaller ones (Figures 6.3b and 6.5b). Note that this does not imply that the levels of adjustment costs are lower in low-governance states compared to high-governance states: similar to our analysis in Section 4, all the reported coefficients are in fact relative to the omitted year 1999. In other words, the figures only show that the adjustment costs have fallen more in low-governance states relative to their own corresponding levels in 1999 as compared to the same trends in high governance states. Nevertheless, this pattern appears at least counter-intuitive at first,
as one would reasonably expect to see better rates of cost decline in better-governed states. The conundrum, however, makes more sense once the dynamic path of governance is taken into account: if low-governance states improved their governance effectiveness over time at a faster pace, it may well be that this affected the speed of adjustment of factor misallocations more than the absolute differences in governance quality per se.

Figure 6.3: Adjustment Cost Trends – Permanent Labour

a. High Governance Quality vs. Low Governance Quality
b. Triple Interaction of Governance Quality and Firm Size


Figure 6.4: Adjustment Cost Trends – Contract Labour

a. High Governance Quality vs. Low Governance Quality
b. Triple Interaction of Governance Quality and Firm Size

7. Discussion and next steps

This paper has documented trends in factor market distortions in Indian states for four factors of production over a 15-year time span. We have shown an overall decline in factor misallocation for land and labour, with important heterogeneity across both state- and firm-level attributes. In particular, three policy-relevant takeaways can be readily derived from our exercise: (i) the speed of adjustment cost reduction and the growth of the manufacturing sector tend to be correlated; (ii) firm size matters; and (iii) governance matters too.
The fact that states diverge not just in terms of manufacturing growth, but also in terms of factor market efficiency, is to be viewed with some concern. Even though our current analysis is silent about the direction of causality between the two dimensions, our evidence hints at the existence of a self-reinforcing pattern in which misallocation leads to low growth which worsens misallocation, and so on.

As state governments have jurisdiction over many policy areas affecting factor markets, our results make a convincing case for identifying successful policies in individual states to inform reform efforts elsewhere in the country. Both for labour and land policy, moreover, the next phase of our work aims to collect data on the enactment of regulatory reforms (either at the central or state level) occurred in India during our period of analysis, and then to evaluate the impact of such reforms on firms especially sensitive to the use of the affected inputs using our enterprise panel dataset.

As regards firm-level attributes, size seems to represent a significant advantage for firms when it comes to input markets. In particular, our results for India are suggestive of increasing land misallocation towards larger firms. This observation raises the question why the process of acquiring land or adjusting land use may be harder for small firms. It is possible that policies on industrial parks (for example on how land is allocated or transferred to new users), the processing of land conversion requests, or the easing of urban land ceiling laws are tilted in practice towards larger firms, possibly because of their greater bargaining power – if not resources for bribing altogether. Indeed, this is what emerged to some extent during our field consultations with private sector players. The finding that the decline in permanent labour adjustment costs has been more pronounced for larger establishments is further suggestive of a business environment favourable to these firms. As a matter of fact though, most labour laws in India are actually supposed to be stricter for larger firms, with the most stringent provisions applying only beyond a certain size cut-off. A priori, one would then assume that labour adjustments should be more problematic for larger establishments, and not the other way around as in our results. Our study therefore sheds light on how powerful law implementation can be in creating a de facto bias against SMEs.

Relatedly, our findings paint a prominent role for institutional quality, as upgrading governance seems to have paid off in terms of better factor market efficiency. In our review of Indian policies, we have provided examples of programmes aimed at improving institutional efficiency and streamlining administrative processes. Our preliminary results on the dynamics of governance would suggest that these reforms have been more effectively implemented by states that were initially worse-off, and that this in turn has had a magnifying effect on the secular reduction in factor misallocation observed for the entire country. For as appealing as this interpretation may look however, there remains the potentially problematic fact that states with lower absolute levels of governance seem to have had a more favourable evolution of factor adjustment costs over time. This in turn raises the intriguing question of how exactly institutional quality, policy implementation, and factor market efficiency interact in practice.

Input misallocation has been recognised as one of the driving forces behind the welfare and growth differentials that still persist across countries in the world. In the wake of the fourth industrial revolution, moreover, to the extent that factor market distortions affect firms’ incentives towards technology adoption, they may also contribute to a further widening of these gaps in the years to come, increasing the distance between lagging countries and their more innovative counterparts (cf. also Hallward-Driemeier and Nayyar, 2018). In this paper, we have provided stylised facts and suggestions on how regulation, law enforcement, and overall governance style could have affected the path of distortions in the allocation of resources across firms in a big developing country. In light of the severe consequences of factor misallocation on aggregate productivity growth, a more rigorous understanding of these dynamics would be a critical contribution to the development literature.
A1. Relevant Factor Market Policies in Indian States

A1.1 Labour

The system of labour legislation and rules in India builds on a complex architecture. Labour regulations vary across government authorities (central and states), establishment sizes, and types of labourers. The Indian Labour Bureau (2004), for instance, estimates that in 2003 a typical enterprise might have to deal with about 25 central government and between 10 to 15 pieces of state regulations. The practical costs of complying with these regulations in turn depend heavily on various characteristics of the firm, such as size and composition of the workforce.

The main law governing conditions of work is the Central Government’s Factories Act 1948. The Act contains specific requirements in terms of health and safety of factory workers, including hours of work, overtime and annual leave, and female and child labour conditions. The Act applies to all manufacturing premises that use electricity and employ 10 or more workers, and to non-powered premises with 20 or more employees. State governments can however lower the threshold number of workers, except in the case of family-based businesses (Mitchell et al., 2014). The regulation of smaller manufacturing units, shops, and other types of small workplaces is enacted through State-level Shops and Commercial Establishments Acts.

The Minimum Wages Act 1948 mandates that minimum wages be set for certain types of employment or industries. Depending on the specific case, the competent authority may be the Central government or the State, which means that rates of pay vary not only from industry to industry, but from state to state, and from region to region (Mitchell et al., 2014). Variations in wage regulation by establishment size can be found in the Payment of Bonus Act 1965, which mandates payment of an annual bonus to all employees with wages below a specified limit in establishments employing at least 20 persons, and in the Equal Remuneration Act 1976, which prescribes equal pay for equal work between male and female workers in establishments with 10 or more employees.

Security and welfare obligations also depend to an important extent on firm size. For example, employers and employees contribute to the Employees’ State Insurance Scheme (ESI), which provides insurance cover for employees in the case of death, sickness, workplace injury and disablement, and maternity, but the scheme is limited to enterprises with 20 or more workers. Similarly, compulsory contributions to the Employees’ Provident Fund (EPF) are mandated only for establishments above the 20-workers threshold and operating in certain industrial sectors. The Payment of Gratuity Act 1972 adopts a lower threshold, and provides for a gratuity at the point of superannuation, retirement, or resignation, to be paid to employees with continuous service of at least five years, and by establishments employing at least 10 workers.

The most frequently cited source of distortions in the Indian labour law (Bhattacharjea, 2006), however, is the Industrial Disputes Act 1947 (IDA). The IDA covers a vast array of issues, from resolution of industrial disputes, to hiring and firing workers, to closure of establishments in the formal sector (Chaurey, 2015). The rules on lay-off, retrenchment and closure in particular have been identified as especially distortive (Chaurey, 2015; Dougherty et al., 2014; Ramaswamy, 2012): Chapter V-A of the Act requires notice and compensation to firms with 50 or more workers, and Chapter V-B requires notice, compensation, and permission from government authority if the firm has more than 100 employees. Similarly, an

33 For instance, rural areas tend to have lower minimum rates than urban areas, to account for the higher cost of living in the latter.
34 Originally, Chapter V-B applied to firms employing 300 or more workers. The threshold was decreased with the Industrial Disputes (Amendment) Act of 1982, with effect from 1984 (Bhattacharjea, 2017).
establishment that were to close down would be required to inform the government with a sixty- or ninety-
day prior notice, depending on whether it employed more than 50 or 100 workers (Chaurey, 2015). Since
its inception in 1947 and its amendment in 1982, the IDA has been further amended multiple times by State
governments, with swinging levels of support for employers or workers. Besley and Burgess (2004) have
documented how these amendments have in practice introduced significant variation in the rigidity of labour
regimes across Indian States. In 2014-15, Rajasthan and Madhya Pradesh passed amendments raising the
threshold of applicability of IDA Chapter V-B from 100 to 300 workers; as other states are reportedly
considering similar initiatives, more variation is expected in the years to come, when these initiatives come
into effect (Bhattacharjea, 2017).

Chaurey (2015) and Ramaswamy (2012) have also shown how the IDA regulations might affect the
composition of a firm’s labour force, providing strong incentives to employ contract workers (i.e. workers
hired through registered labour contractors). As IDA is not applicable to non-permanent workers, their lay-
off or termination does not require notice, compensation or permission. Moreover, the size thresholds in the
Act are defined based on the number of permanent workers in a given factory, and hence contract labour
use is a way to stay below the legal cut-off size for IDA’s provisions. Although an Amendment Act to the
IDA in 1982 declared the continuing employment of workers on casual or temporary contracts to be an
“unfair labour practice” (Mitchell et al., 2014), and despite some restrictions contained in the Contract
Labour (Regulation and Abolition) Act of 1970, the use of contract labour has in fact been shown to have
increased substantially during the 1990s (Ahsan et al., 2008).

The Contract Labour (Regulation and Abolition) Act is applicable to establishments employing at least 20
contractors on any day over the previous 12 months, and entitles contract workers to minimum wages,
workplace health and safety provisions, and social security cover such as Employee Provident Fund
benefits. This is the primary responsibility of the contractor, but needs to be verified by the employer (the
firm). This dual assignation of responsibility has blurred the enforcement of the Act. Another regulatory
grey area is whether contract workers can be used for the ‘core’ activities of an establishment. In general,
the Act does not prohibit this, but some states governments have made amendments to prohibit the use of
contract labour for core activities (Rajeev, 2009).

A1.2 Land
According to some authors (Ghani et al., 2012; Lall and Chakravorty, 2005), land is probably the factor
that most severely affects the efficient location choices of manufacturing establishments in India, and as
such it might be among the most important drivers of misallocation of industrial production in the country.
Despite a long history of land reform ever since Indian independence in fact (cf. Besley and Burgess, 2000),
high spatial inequality can be observed in the allocation of agricultural land (Chakravorty, 2012), and, at
the same time, various policies restrict both the transfer of farm land and the supply of land in urban areas.

35 At the Central government level, the Act prohibits the employment of contract Labour in certain categories of work in certain
sectors (for example in mines, on railways, and port facilities), and variously regulates work conditions of contract Labourers (cf.
Mitchell et al., 2014) Among other provisions, the Act mandates that if the contractor fails to pay contract workers’ wages, the
principal employer is liable to pay the workers (ILO, 2008).
36 Among other provisions, the Act mandates that if the contractor fails to pay contract workers’ wages, the principal employer is liable
 to pay the workers (ILO, 2008).
37 At the Central government level, the Act prohibits the employment of contract Labour in certain categories of work in certain
sectors (for example in mines, on railways, and port facilities).
38 The 2005-2006 Agricultural Census of India documented a national average size of agricultural landholdings of around 3 acres,
the lowest average ever recorded. Chakravorty (2012) notes however how the national figure masks significant cross-state variation
in plot sizes: while some States like Bihar and Kerala have fragmented, very small holdings, others such as Gujarat, Haryana,
Madhya Pradesh, Punjab, or Rajasthan, have much larger, more consolidated ones.
The transfer of land and the change of land usage are under the jurisdiction of State governments. For example, the transfer of farm land to a non-agriculturist is strictly prohibited in Gujarat, Himachal Pradesh, Karnataka, and Maharashtra, with further restrictions for agriculturists from different States. In general, nevertheless, buyers do need to apply for non-agricultural clearance (NAC) from local/State governments to convert farm land to other uses (Morris and Pandey, 2007).

Another barrier to efficient land transactions is the requirement in the Indian Stamp Act 1899 that non-judicial stamp duties be paid on the sale and purchase of real property. As each State enacts its own stamp duties, cross-state variation in duty rates is substantial; however, with rates as high as 12-14 percent in many states, and frequent instances of separate stamp incidence for land acquisition and development, these taxes tend to be at least five times higher in India than in most high-income countries (Morris and Pandey, 2007). Duranton et al. (2015a) report how these prohibitive costs discourage land transactions, thereby reducing land supply on the market, and lead to widespread under-reporting of registration, which in turn stifles investment as land cannot be used as collateral when applying for loans.

For urban land, the Urban Land (Ceiling and Regulation) Act 1976 (ULCRA) used to impose ceiling limits for holdings of vacant land, prohibit transfers of land and buildings, and restrict building construction in large urban agglomerations. In 1999, a largely unanticipated Repeal Act gave rights to State governments to repeal it, which happened in a staggered way between 2003 and 2008. Duranton et al. (2015a, 2016) show how the repeal of the Act was associated with a decline in land and building misallocation in the country, and the more so among early-adopter States.

Despite the ULCRA repeal though, a vast array of Central and State policies still restrict urban land supply and lead to higher property prices (cf. Chakravorty, 2013 and Duranton et al., 2015a). Chakravorty (2013) for instance cites earmarking for (often inefficient) public use, as well as lack of titles in slum areas, which makes the land non-marketable in practice, as examples in this direction. Other harmful measures include the enforcement of low building height and low floor space indices (rarely higher than 1.5, compared to a range between 5 and 15 in other Asian cities), urban land ceilings in certain cities like Kolkata, and rent control measures favouring tenants over owners, which in practice transfer ownership rights to tenants, but not the actual title and ability to sell the property. After the Government of India designed a Model Rent Legislation in 1992, many States did actually start formulating new rent acts addressing these dysfunctional rent issues, but the process seems still far from complete (cf. Duranton et al., 2015a for details).

A more recent development in land administration is represented by the Digital India Land Records Modernisation Programme (DILRMP), launched by the Government of India in 2008. The main objective of the programme is to develop a modern, comprehensive, and transparent land records management system in the country, improving the quality of the land-titling system and minimising the scope of land and property disputes. Among the major components of the programme are the computerisation of all land records, the digitisation of maps and integration of textual and spatial data, and the survey and re-survey of all settlement records, including the creation of original cadastral records where necessary. Land records are supposed to be handled through a single-window system, which automates processes following registration and guarantees for the correctness of land titles. The degree of implementation of the programme across States varies quite substantially by the specific DILRMP component. For example, while as of today the computerisation of the records of rights is complete or almost complete in most of the bigger

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39 A non-agriculturist is defined as an individual not involved in the cultivation of crops and lacking family ties to agriculture.

40 These included Delhi, Gujarat, Haryana, Karnataka, Madhya Pradesh, Orissa, Punjab, Rajasthan, and Uttar Pradesh.

41 Examples include land used for defence (cantonments, army barracks), sick industries, unused airports and rail facilities.

42 The floor space index (FSI) is a measure of the total surface that can be built upon a plot of land. It is computed as the ratio between the floor space covered in all floors of a building to the area of the plot on which the building stands.
States, the full digitisation of cadastral maps seems to be far less common, and to display a significantly higher cross-State variation.43

A1.2.1 Industrial zones

A subject that deserves specific consideration when addressing land issues in manufacturing is the treatment of industrial estates. “Industrial Estate” (IE) is a general label that applies to a number of place-based policies, introduced to promote industrialization. Although the basic idea of industrial parks is always to set aside land for industrial development, in order for firms to benefit from scale economies, shared infrastructure, and clustering, the various types of IEs differ in terms of their economic objectives, the incentives offered, and activities promoted (Blakeslee et al., 2017).

For example, States like Karnataka have introduced Industrial Areas (IAs) programmes, whereby the government acquires agricultural land, develops it with basic utilities such as power system, recycling, and infrastructure, and then provides it to large non-agricultural firms at market rates. As no financial incentives are offered to firms to locate their operations in the areas, the main advantage for participating establishments is that land development and conversion to non-agricultural use are performed ex ante by the government – so that IAs programmes function as a de facto reform of local land-use restrictions (Blakeslee et al., 2017).

A far more complex case is represented by Special Economic Zones (SEZs), which were introduced in 2005 with the Special Economic Zones Act.44 These zones, which evolved from existing Export Processing Zones (EPZs), are industrial estates that produce mainly export-oriented goods, and are envisioned as comprehensive industrial townships with social facilities for employees of participating enterprises, like housing blocks, schools, and hospitals. Administrative procedures within SEZs are facilitated by the “single-window” mechanism, which enables faster clearances and resolution of bureaucratic red-tape through to revision of applications by a single regulatory body, the Board of Approval, that brings together the Central and State governments (Hyun and Ravi, 2017). SEZ developers and firms, moreover, enjoy strong financial incentives, such as subsidies, tax exemptions, customs privileges, and more flexible labour regulations especially in terms of hiring and firing practices. Besides Central-level incentives, States also waive a number of other levies (e.g. water and electricity duties) and make compliance with certain regulations (e.g. for environmental assessments) more agile for firms located within the SEZ.45

More recently, the Indian government has launched a new zonal development model, the National Investment and Manufacturing Zones (NIMZs), in the ambit of its National Manufacturing Policy 2011. Although similar in spirit (large integrated industrial townships with necessary social infrastructure and facilities, land use on the basis of zoning, “single-window” mechanism), the NIMZs differ from SEZs under many respects. First, while SEZs mostly target export-oriented production, NIMZs focus substantially on domestic technology and manufacturing: as such, while the service sector tends to be predominant in the former, for the latter there is a requirement that 30 percent of the area be reserved for manufacturing. As a

43 State-level progress on the major programme components can be tracked on the dedicated DILRMP web portal. See http://nlrmp.nic.in/nlrmpmap/nlrmpmap.html#. The IDFC Institute, in collaboration with the World Bank, has also recently embarked on the creation of a land governance index to assess State-level performance in modernising land records. The index will comprise sub-indicators on (i) transparency of land records; (ii) transparency of land registration; (iii) reliability of land records; (iv) reliability of land registration; and (v) reliability of spatial records.

44 Since 2005, more than 300 SEZs began operation across the nation, 80 percent of which are located in Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Tamil Nadu, and Uttar Pradesh. Since developers of SEZs can be both public and private entities, 70 percent of existing zones are either private or joint sector initiatives (Hyun and Ravi, 2017).

45 Up-to-date information on Central and State-level facilities and incentives can be easily retrieved on the dedicated SEZ web page of the Indian Ministry of Commerce and Industry, Department of Commerce: http://sezindia.nic.in/cms/facilities-and-incentives.php.
result, NIMZs are also way bigger in size: where SEZs are allowed to cover a surface ranging between a minimum of 10-1000 hectares depending on the sector (IT zones can be small) and a maximum of 5000 hectares, the minimum size for NIMZs is 5000 hectares. Finally, incentives are lower in NIMZs, which do not offer complete tax holidays and enforce stricter labour regulations (for example, sub-contracting of labour is not allowed, and lay-off and retrenchment policies are not as flexible as in SEZs). On the administrative side, NIMZs are established as Public-Private Partnerships (PPPs) through Special Purpose Vehicles (SPV), with the State government acquiring the land, the Central government funding the infrastructure, and a private player developing the zone. Contrary to SEZs, finally, State governments have in general a leading role in the development of zones, as well as in setting up the SPVs that manage them.46

A1.3 Implementation and governance
Despite the non-negligible variation in State regulations on both labour and land documented in Sections 5.1 and 5.2, many commentators have argued that implementation and enforcement of policy tends to be far more uneven – so that governance might ultimately be what really matters in determining divergence in state outcomes.

Table A1.1: Factor Laws

<table>
<thead>
<tr>
<th>Factor</th>
<th>Law/regulation</th>
<th>State variation</th>
<th>Has size cut-offs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Labour</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Factories Act 1948</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Shops and Commercial Establishments Acts</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Minimum Wages Act 1948</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Payment of Bonus Act 1965</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Equal Remuneration Act 1976</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Employees’ State Insurance Scheme (ESI)</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Employees’ Provident Fund (EPF)</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Payment of Gratuity Act 1972</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Industrial Disputes Act 1947 (IDA)</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Contract Labour (Regulation and Abolition) Act 1970 (IDA)</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td><strong>Land</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rules on transfer of farm land to a non-agriculturist</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Non-agricultural clearance (NAC)</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Indian Stamp Act 1899</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Urban Land (Controlling and Regulation) Act 1975 (ULTRA)</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Rules on floor space index (FSI)</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Urban land ceilings</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Rent legislation</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>Digital India Land Records Modernisation Programme 2008 (DILRMP)</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td><strong>Industrial zones</strong></td>
<td>Special Economic Zones Act 2005</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td></td>
<td>National Manufacturing Policy 2011</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

As regards labour for example, our interviews with firms suggested that enforcement varies in many ways. In terms of regulation avoidance, Mitchell et al. (2014) and the OECD (2007) cite the example of “voluntary” retirement schemes (VRS), which are used to bypass the rules on retrenchment. More simply, the ILO (2008) also reports that businesses often have the capacity to arbitrage between states with varying degrees of enforcement, and just relocate to areas where it is more fluid. These observations are in line with recent empirical evidence from Hsieh and Olken (2014), who find no discontinuities in the distribution of

46 Detailed information and comments on NIMZ guidelines and benefits can be respectively found in DIPP (2011) and ASA (2015).
firm size at the IDA thresholds of 50 and 100 workers. On the other hand, instead, Amirapu and Gechter (2017) argue that the distortionary effect of labour regulations depends critically on the quality of governance through the extent and type of corruption present in regulatory enforcement: firms do face a disincentive to expand beyond the 10-worker threshold of the Factories Act, but this is due more to harassment and extortion by inspectors once a factory is registered than to the cost of regulatory compliance. Warnecke and De Ruyter (2012) also report that public officials have considerable discretion in implementing government regulations, and that corruption is widespread in courts too.

There are strong elements of discretion in contract labour law as well, for example in the definition of ‘core’ activities and other activities for which use of contract labour may be prohibited in certain states, and the precise responsibilities of the labour contractor and the employer (the firm) in ensuring the contract is enforced. A qualitative survey suggests that contract labour law is poorly enforced, with workers complaining about collusive arrangements between contractors, firms and inspectors (Rajeev, 2009).

Governance seems to matter equally crucially for land-related issues (Chakravorty, 2012). Despite the DILRMP reforms, for example, a report by the World Bank (2015) on six Indian States highlights that rural land records are generally not updated regularly (in Bihar, for instance, most maps seem not to have been updated since 1922) and lack spatial reference, while urban land records are lacking for many properties. Even when the legal and institutional framework is relatively robust, the World Bank assessment points to significant challenges in terms of implementation and enforcement: the frequent sharing of responsibility for land management by a range of different departments (up to four in certain states) and agencies causes horizontal overlap and lack of coordination in the first place, and registration of land transactions seems to be often plagued by errors and fraud. Duranton et al. (2015a), for example, note how the process of evaluation for land that is publicly purchased offers wide opportunities for corruption, as valuation is done by the public agent acquiring the property without specific guidelines. Morris and Pandey (2007) report widespread poor protection of land property rights, as well as a high degree of discretion in granting the non-agricultural clearance for the conversion of use of farm land. The high increase in land value once NAC is granted moreover seems to offer further opportunities for corruption, and Morris and Pandey even argue that this might pave the way for the involvement of mafias into large and lucrative land deals.

This framework was confirmed during our fieldwork, when virtually all the interviewed firms (both in Uttar Pradesh and Telangana) mentioned implementation and governance issues among the main challenges they face in their regular operations. Many firms reported being subject to a high number of inspections throughout the year, whose primary purpose often turns out to be harassment. Moreover, the severity of the extortions seems to depend on the level of contacts enjoyed by firms among bureaucrats and politicians. Relatedly, larger enterprises tended to report extortion as just a sort of operating cost that they would need to account for when planning their activities, whereas these payments represent a way more severe burden for the balance sheets of smaller units.

On inspections, an independent exercise has recently been led by the Department of Industrial Policy and Promotion (DIPP) of the Ministry of Commerce and Industry of the Government of India. Every year since 2014, the Department has outlined in a Business Reform Action Plan (BRAP) the specific actions required

47 Amirapu and Gechter (2017) even cite evidence that inspectors, while threatening to overreport violations, tend to demand bribes proportional to the number of workers employed in an establishment.

48 The States surveyed were Andhra Pradesh, Bihar, Jharkhand, Karnataka, Odisha, and West Bengal.

49 An MSME typically receives inspections by the Labour Department (Provident Fund, Employee State Insurance, Minimum Wage), Factories Act, Fire Department, Pollution Control Board, National Ground Tribunal, Electricity Department, Income Tax, GST.
in all States in the areas of procedural and inspection reform, ranking States on the extent of reform implementation. In particular, a comprehensive implementation of the programme would allow enterprises to maintain unified rather than multiple registers, and be subject to joint regulatory compliance inspections for all laws, instead of separate inspections for each law. Moreover, the same official would not be allowed to visit any firm in two consecutive inspections. Finally, as regards environmental clearances, States are supposed to identify establishments that need to be inspected based on a computerised risk assessment: establishments falling under the low- and medium-risk categories would be allowed to submit respectively a self- and third-party certification, instead of being subject to inspections.

Despite the potentially transformative role of these policies, however, during our interviews firms consistently expressed the view that the impact of the reforms is not being fully felt on the ground. Apart from an imperfect advertisement of the reforms themselves among private sector players, implementation issues seem to be water ing down the spirit of the programme: for instance, very few firms are currently categorised as low-risk, so that inspections are still prevalent. Similarly, many interviewees claimed that inspectors often do not follow the reformed procedures in practice, for example visiting the same firm more than once or setting up multiple inspections rather than joint ones.

Even beyond inspection costs, however, red tape, inefficiencies and delays in the effective implementation of regulations and policies emerged during our interviews as a remarkable hurdle to firms – again especially so for smaller enterprises. For example, while large firms mentioned that they tended to hire specific “consultants” to take care of paperwork and compliance with red tape, this would not be a realistic possibility for smaller enterprises. Similarly, delayed payments by government agencies, both for public procurement contracts and for the award of grants and subsidies, appeared to be a pervasive issue significantly disrupting firms’ operations and in certain cases survival. As before moreover, these impediments were particularly hardly felt by smaller enterprises, who would not in many cases have a diversified pool of additional customers, or would for instance have a more limited access to finance.

The government, both at the State and Central level, has consequently been quite active in trying to improve governance and in seeking ways to provide for a more effective service delivery to Indian citizens. One example in this direction has been a concerted effort to move towards the digitisation of services and widespread use of e-governance, with many States developing their own e-governance projects to provide specific electronic services to citizens since the late 1990s. More recently, the National e-Governance Plan (NeGP) was endorsed by the Central government in 2006 as an ambitious initiative to develop e-government services, networking infrastructure, State data centres, and village-level centres for the delivery of core services to citizens (Bussell, 2012). The provision of NeGP services can be under the purview of either the Central (as regards e.g. income tax, pensions, postal services) or the State government (for instance for education, health, and crucially land records).

Among the integrated NeGP projects, the Single Window Business Registration Act 2013 provided for the establishment of a single-window registry as a one-stop shop for the provision of online government-to-business (G2B) services to investors and business communities in the country. The resulting online platform (eBiz, launched in 2015) can now be used by anyone planning to start operations or having an existing business in India, and provides online submission and processing of composite forms and one-time

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50 These State programs targeted services such as ration cards, income certificates, land records, building licences, and income tax payments. Examples include eSeva (Andhra Pradesh), Civic Centres (Gujarat), Sugam (Himachal Pradesh), Nemmadi (Karnataka), Friends (Kerala), e-Mitra (Rajasthan), RASI (Tamil Nadu), e-Savitha (Uttar Pradesh). Bussell (2012) provides a detailed description of many of these programs.

51 Details can be found on the web portal of the Ministry of Electronics and Information Technology (MeitY) of the Government of India, cf. [http://meity.gov.in/content/mission-mode-projects](http://meity.gov.in/content/mission-mode-projects).
Firms interviewed during our fieldwork almost unanimously expressed satisfaction in how these initiatives are in general reducing the complexity in obtaining the information and services required to start and run a business. In Uttar Pradesh, interviewees also appreciated how the introduction of electronic platforms is starting to bear some fruit in terms of reduced corruption. Nevertheless, both in Telangana and Uttar Pradesh enterprises lamented how in practice many applications for various licenses and clearances still require the relevant documentation to be handed in manually into public offices, despite the existence of State single-window portals. In Telangana, the same applies to the single window for land acquisition under the land record modernisation programme. Once more, this seems to weigh differently on bigger and smaller firms, as the latter do not have a large enough workforce to accommodate for a few employees taking care of the task without significantly compromising operations. In-person interactions also lend themselves to opportunities for corruption, or can if anything be more easily facilitated by the degree of influence of the applicant: again, this is likely to go in favour of larger firms, who tend to have both higher resources and a more established network of influential connections.

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52 eBiz has been developed as a PPP between Infosys Technologies Limited (Infosys) and the Department of Industrial Policy and Promotion (DIPP) of the Ministry of Commerce and Industry of the Government of India. Businesses can apply for 20 Central government services (plus a number of State Government services in Andhra Pradesh, Odisha and Delhi), to obtain licences, approvals, clearances, no objection certificates, permits, and for filing of returns. The services available on the portal include those from Ministry of Corporate Affairs (MCA), Reserve Bank of India (RBI), Department of Industrial Policy and Promotion (DIPP), Central Board of Direct Taxes (CBDT), Directorate General of Foreign Trade (DGFT), and Employees’ Provident Fund Organisation (EPFO).

Table A3.1: Summary Statistics of key ASI variables

<table>
<thead>
<tr>
<th>Year</th>
<th>Permanent Labour Mean</th>
<th>Standard Deviation</th>
<th>Contract Labour Mean</th>
<th>Standard Deviation</th>
<th>Land Mean</th>
<th>Standard Deviation</th>
<th>Fixed Capital - Excluding Land Mean</th>
<th>Standard Deviation</th>
<th>Firm Age Mean</th>
<th>Standard Deviation</th>
<th>Firm Size Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>2.104</td>
<td>2.411</td>
<td>3.300</td>
<td>2.583</td>
<td>0.844</td>
<td>2.351</td>
<td>0.938</td>
<td>2.315</td>
<td>0.0275</td>
<td>0.1636</td>
<td>0.5189</td>
<td>0.4997</td>
</tr>
<tr>
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<td>2.252</td>
<td>3.366</td>
<td>2.408</td>
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<td>2.291</td>
<td>0.845</td>
<td>2.225</td>
<td>0.0290</td>
<td>0.1677</td>
<td>0.5141</td>
<td>0.4998</td>
</tr>
<tr>
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<td>2.239</td>
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<td>2.300</td>
<td>0.793</td>
<td>2.141</td>
<td>0.0512</td>
<td>0.2205</td>
<td>0.4822</td>
<td>0.4997</td>
</tr>
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<td>2.247</td>
<td>3.266</td>
<td>2.384</td>
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<td>2.303</td>
<td>0.750</td>
<td>2.102</td>
<td>0.0885</td>
<td>0.2841</td>
<td>0.5227</td>
<td>0.4995</td>
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<td>3.236</td>
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<td>0.799</td>
<td>2.068</td>
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<td>2.400</td>
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<td>2.155</td>
<td>0.1660</td>
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<td>2.357</td>
<td>3.016</td>
<td>2.537</td>
<td>0.667</td>
<td>2.267</td>
<td>0.870</td>
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<td>2007</td>
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<td>2.931</td>
<td>2.611</td>
<td>0.663</td>
<td>2.286</td>
<td>0.846</td>
<td>2.107</td>
<td>0.3561</td>
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<td>3.096</td>
<td>2.509</td>
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<td>2.321</td>
<td>0.854</td>
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<td>2009</td>
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<td>2.347</td>
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<td>2.322</td>
<td>0.902</td>
<td>2.098</td>
<td>0.3777</td>
<td>0.4848</td>
<td>0.4484</td>
<td>0.4973</td>
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<tr>
<td>2010</td>
<td>2.558</td>
<td>2.310</td>
<td>3.034</td>
<td>2.444</td>
<td>0.476</td>
<td>2.314</td>
<td>0.820</td>
<td>2.131</td>
<td>0.4107</td>
<td>0.4920</td>
<td>0.4258</td>
<td>0.4945</td>
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<tr>
<td>2011</td>
<td>2.619</td>
<td>2.269</td>
<td>3.038</td>
<td>2.413</td>
<td>0.502</td>
<td>2.291</td>
<td>0.909</td>
<td>2.033</td>
<td>0.4469</td>
<td>0.4972</td>
<td>0.4470</td>
<td>0.4972</td>
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<tr>
<td>2012</td>
<td>2.637</td>
<td>2.261</td>
<td>3.024</td>
<td>2.378</td>
<td>0.453</td>
<td>2.312</td>
<td>0.903</td>
<td>2.028</td>
<td>0.4771</td>
<td>0.4995</td>
<td>0.4558</td>
<td>0.4981</td>
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<tr>
<td>2013</td>
<td>2.647</td>
<td>2.162</td>
<td>3.160</td>
<td>2.325</td>
<td>0.392</td>
<td>2.425</td>
<td>0.916</td>
<td>2.145</td>
<td>0.4917</td>
<td>0.4999</td>
<td>0.4320</td>
<td>0.4954</td>
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<tr>
<td>2014</td>
<td>2.630</td>
<td>2.093</td>
<td>3.170</td>
<td>2.240</td>
<td>0.389</td>
<td>2.435</td>
<td>0.924</td>
<td>2.148</td>
<td>0.5221</td>
<td>0.4995</td>
<td>0.4301</td>
<td>0.4951</td>
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<tr>
<td>Total</td>
<td>2.469</td>
<td>2.280</td>
<td>3.132</td>
<td>2.420</td>
<td>0.639</td>
<td>2.323</td>
<td>0.868</td>
<td>2.125</td>
<td>0.3165</td>
<td>0.4651</td>
<td>0.4502</td>
<td>0.4975</td>
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</table>

Av. # of Obs. | 31694 | 10361 | 24491 | 33454 | 36699 | 39286

Note: The dependent variables are input-share ratio in logs. The dependent variables are binary variables: For firm age, the value takes 1 when a firm’s initial year of operation is after 2000. For firm size, the value takes 1 when a firm employs more than 50 employees.
Table A3.2: Growth rate of manufacturing value added, Indian States, 1999-2014

<table>
<thead>
<tr>
<th>State</th>
<th>Growth rate</th>
<th>Fast-growing</th>
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<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>0.655636</td>
<td>0</td>
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<td>Assam</td>
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<td>Bihar</td>
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<td>Chattisgarh</td>
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<td>Delhi</td>
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<td>Jharkhand</td>
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<td>0</td>
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<td>0.486132</td>
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</tr>
<tr>
<td>Odisha</td>
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<td>0</td>
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<td>Uttar Pradesh</td>
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<td>West Bengal</td>
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<td>Goa</td>
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<tr>
<td>Gujarat</td>
<td>1.800211</td>
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<td>Haryana</td>
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<td>Himachal Pradesh</td>
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<td>Karnataka</td>
<td>1.224</td>
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<td>Punjab</td>
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<td>Tamil Nadu</td>
<td>1.452238</td>
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<tr>
<td>Uttarakhand</td>
<td>12.16795</td>
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</tr>
</tbody>
</table>
Figure A4.1: Within-State Variance in Adjustment Costs - Permanent Labour

Figure A4.2: Within-State Variance in Adjustment Costs - Contract Labour
Figure A4.3: Within-State Variance in Adjustment Costs - Land

Figure A4.4: Within-State Variance in Adjustment Costs – Fixed Capital (Excluding Land)
Figure A6.1: Adjustment Cost Trends (Only bordering districts) – Permanent Labour

a. High Governance Quality vs. Low Governance Quality

b. Triple Interaction of Governance Quality and Firm Size

Source: ASI 1999 - 2014

Figure A6.2: Adjustment Cost Trends (Only bordering districts) – Contract Labour

a. High Governance Quality vs. Low Governance Quality

b. Triple Interaction of Governance Quality and Firm Size

Source: ASI 1999 - 2014
Figure A6.3: Adjustment Cost Trends (Only bordering districts) – Land

a. High Governance Quality vs. Low Governance Quality
b. Triple Interaction of Governance Quality and Firm Size

Source: ASI 1999 - 2014

Figure A6.4: Adjustment Cost Trends (Only bordering districts) – Fixed Capital (Excluding Land)

a. High Governance Quality vs. Low Governance Quality
b. Triple Interaction of Governance Quality and Firm Size

Source: ASI 1999 - 2014


