Can Labor Regulation Hinder Economic Performance? Evidence from India*

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Abstract

This paper investigates whether the industrial relations climate in Indian states has affected the pattern of manufacturing growth in the period 1958-92. We show that pro-worker ammendments to the Industrial Disputes Act are associated with lowered investment, employment, productivity and output in registered manufacturing. Regulating in a pro-worker direction is also associated with increases in urban poverty. This suggests that attempts to redress the balance of power between capital and labor can end up hurting the poor.

JEL: H0, H1, I3, J5, K2, L5, L6, O2, O4

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1 Introduction

One of the key challenges of development economics is to identify policies that harm or hinder growth, along with an assessment of their effectiveness in poverty reduction. Traditional views of the growth process put development of manufacturing at centre stage in the structural change accompanying economic development.[1] A casual look at the performance of some of the more successful Asian economies after 1960 adds credence to this view. For example, between 1960 and 1995, manufacturing as a share of GDP grew from 9 percent to 24 percent of GDP in Indonesia, 8 percent to 26 percent in Malaysia and 12.5 percent to 28 percent in Thailand. All of these countries had strong overall growth performances and saw significant falls in absolute poverty.

In contrast, the Indian economy did not experience a significant expansion of manufacturing as a share of national income. Manufacturing output constituted 13 percent of GDP in 1960 (ahead of the countries listed above) but grew to only 18 percent of GDP by 1995. India's overall growth over this period was also relatively modest and did not exhibit the extent of declining absolute poverty experienced elsewhere in Asia. While this pattern reflects a complex array of phenomena, a key issue concerns the way in which policy choices can be identified as playing a role.

This paper studies the role of labor market regulation in explaining the performance of Indian manufacturing between 1958 and 1992. There are four reasons for this focus. First, labor market regulations have frequently been cited in explaining India's poor growth performance [see, for example, Dollar, Iarossi and Mengitsae 2001, Stern 2001 and Sachs, Varshey and Bajpai 1999]. The charge is that granting excessive bargaining power to organized labor blunted investment incentives and gave India a generally unfavorable business climate. Second, in the Indian constitution labor regulation is in part under the control of the states. This means that different parts of India faced different regulatory climates. This gives rise to both time series and cross-sectional variation that can be used to identify its effects. Third, regulation applies to a specific sector – registered manufacturing – which provides a focus for studying its impact. Fourth, the choice of period is opportune as it extends from the heyday of central planning in the late 1950s to the onset of liberalization in 1992. Whilst there was some dismantling of planning

[1] See, for example, Kaldor [1967] for an early forcefull statement of this view.

structures during this period manufacturing remained highly protected from international competition. This helps us to isolate the impact of domestic policies on industrial performance.

Between 1958 and 1992 manufacturing grew by 3.3 percent in India as a whole. This, however, masks significant variations across states. For example, West Bengal which was the largest producer of manufactured output per capita at the beginning of the period had fallen to seventh in 1992 with output per capita falling at an average rate of 1.5 percent per annum. West Bengal was also a state that had the greatest body of pro-worker labor regulation passed in the state legislature. Its performance contrasts with Andhra Pradesh which grew at nearly 6 percent per year over the same period but which experienced anti-worker labor regulation. Here, we develop an econometric analysis of whether the patterns of regulation can account for the cross-state variation in patterns of manufacturing performance over time. The analysis is consistent with the view that pro-worker labor regulation resulted in lower growth of manufacturing output, investment and employment. Regulating in a pro-worker direction also resulted in lower rates of poverty reduction over the period.

Our data on labor regulation come from looking at state amendments to the Industrial Disputes Act of 1947. While the act was passed at the central level, state governments were given the right to amend it under the Indian Constitution. We read the text of each amendment (121 in all) and classified each as pro-worker, pro-employer or neutral. This gave a sense of whether workers or employers benefited or whether the legislation had no appreciable impact on either group. The results are interpreted through the lens of a simple two-sector model of incomplete contracts where firms invest in capital ahead of bargaining with labor over the surplus.

The paper illuminates long-standing debates about the role of the state in promoting or hindering economic development. While there is now an abundance of cross-country evidence on determinants of growth, relatively little of this identifies robust relationships with policy regimes. Moreover, there is the inevitable difficulty of identifying the true sources of variation in a predominantly cross-sectional context. The relatively long time period (35 years) and the fact that so much of the policy environment is common to the Indian states makes it an ideal testing ground for the effects of regulation on output and welfare.

The remainder of the paper is organized as follows. In the next section, we review the literature on regulation and economic performance. In section

three we trace the evolution of labor market regulation in India, detail how we capture the direction of regulatory change and examine how economic performance has varied across different states. In section four, we set out a simple two sector model in which affecting the bargaining power of labor affects the pattern of employment and capital accumulation in an economy. The model is based on incomplete contracts between labor and capitalists. Section five contains the empirical analysis of the effect of labor regulation on manufacturing performance. Section six turns to the welfare consequences of regulation in terms of poverty reduction and section seven concludes.

2 Related Literature

There is a significant literature on cross-country growth, much of which has tried to study how policies impact on economic performance [see Barro, 1997]. Few simple and definitive lessons about the role of the state have emerged from this. In early cross-country growth work, government activism was often proxied crudely by some measure of the size of the state [see Temple, 1999 for a review]. However, the results tend not to be robust and conceptually, it is not clear whether this captures anything interesting from a theoretical point of view. Hall and Jones [1999] provides one of the most compelling efforts at identifying the effect of government on growth by developing an index of social infrastructure reflecting a broad range of government activities such as contract enforcement, bureaucratic quality and government repudiation of contracts. In OLS and IV specifications, they find that good social infrastructure is positively related to growth.

Looking at policies directly is notoriously difficult given that the details of government intervention vary strongly across countries. An important and innovative contribution in this vein is the recent paper by Djankov et al [2002] which looks at regulations governing the start of businesses in a cross-section of 85 countries.[2] This is a potentially important way of measuring regulatory severity cross-sectionally. They find that countries with higher regulation of entry have less impressive performance across an array of social, political and economic indicators. Of particular note in relation to this study, they find that greater regulation expands the size of the unofficial economy. They argue that this is in line with a public choice view of regulation as being put

[2]In the context of our study it is interesting to note that India is close to average in this dimension. Moreover, it is ranked above Indonesia and Japan.

in place by officials or insiders intent on extracting rents (see, for example, Stigler [1971], De Soto [1989], and Shleifer and Vishny, [1998]).

Our focus is on labor market regulations. This is related to studies of how economic performance has varied among OECD economies which have frequently cited labor market institutions as a determinant of economic performance [see Freeman, 1988; Blanchard, 2000; Lindbeck and Snower, 2001]. Blanchard and Wolfers [2000] which builds on Nickell [1997] consider how observable shocks interact with institutions in explaining the evolution of European unemployment. While institutions are fixed cross-sectionally, interacting them with time-varying regressors allows their dynamic effects to be considered. They conclude that interacting shocks and institutions does a good job at accounting for the variation in unemployment across Europe. Nickell and Layard [2000] argue that, for European countries, labor market institutions such as unions and social security systems are important drivers of economic performance with strict labor market regulations, employment protection and minimum wages playing a lesser role.

This work is also related to that which looks at whether the political complexion of governments changes economic performance [see, for example, Alvarez, Garrett and Lange, 1991]. This literature looks, for example, at whether having left leaning governments in office lowers growth. We show that the propensity of governments in India to pass labor regulations is a function of political control and hence that they provide a mechanism by which political history has a lasting effect on economic performance.

The strategy of state led industrialization which India adopted at Independence has meant that government policies have taken center stage in trying to explain manufacturing performance up to the onset of liberalization in 1992 [see Mookherjee, 1997]. Bhagwati and Desai [1970] discuss how the requirement to obtain a license to set up a new unit or expand production served as a barrier to entry and limited competition.[3] The advisability of closing off Indian industry behind a range of tariff and non-tariff barriers as a means of promoting infant industries has also been the subject of heated debate. Singh [1964] and Bhagwati and Srinivasan [1975] were early critics in particular as regards the presumption of export pessimism. Bhagwati [1998] points to the choice of an import substitution strategy over export promotion as being a major reason as to why India did not experience a development

[3]This led to a 'license raj' where the benefits of industrialization became concentrated in the hands of a few major firms.

"miracle" of the type seen in various East Asian countries [see World Bank, 1993].

Central planning and trade protection, however, have limited scope in explaining cross-state variation in manufacturing performance over time. Here notions of 'business' or 'investment' climate, which in part reflect state controlled policies, take center stage. And these factors became increasingly important over the 1958-1992 period as firms and capital become increasingly mobile.[4] Stern [2001] points to improvement of the investment climate as being key to increasing productivity and reducing poverty and identifies reform of India's cumbersome labor regulations as a priority. Sachs, Varshey and Bajpai [1999] echo this sentiment by pointing to restrictive regulations on labor redundancy as being a key reason as to why India has done poorly in terms of export performance. Using a cross-sectional survey of about one thousand manufacturing establishments drawn from ten Indian states Dollar, Iarossi and Mengitsae [2001] show that productivity is forty-four percent lower in states judged by managers to have poor business climates. They then break apart investment climate. Entrepreneurs were asked how much of their labor force they would lay off if there was greater labor market flexibility to capture the 'cost' of labor regulation.[5] This factor alongside others was found to be important in explaining cross-state differences in productivity.[6] Fallon [1987] and Fallon and Lucas [1993] argue that strengthening job security regulations through central government amendment of the Industrial Disputes Act in 1976 and 1982 was associated with a reduction in labor demand in firms covered by the regulation but not in small firms uncovered by job security regulations. The stringency of employment protection regulation has thus been used to explain the phenomena of jobless growth in industry in the 1980s whereby industrial output growth was accompanied by stagnation in employment [see Bhalotra, 1998].

[4]Though radical liberalization only took place from 1992 onwards steps to relax and dismantle central controls and regulations were being undertaken from the early 1970s [see Mookherjee, 1997].

[5]The average figure was 16-17 percent.

[6]Other factors included power reliability, visits from government regulators, custom clearance delays and internet connectivity.

3 Institutional Background and Data

Our aim is to look at whether the direction of labor regulation affects economic performance across Indian states. As we note above, there is considerable variation in economic performance which could have a variety of explanations. The particular focus on labor regulation in this paper is motivated by the observation that states retain a considerable degree of autonomy in determining this unlike other forms of regulation. In addition, it is regulation which targets a particular sector – registered manufacturing which is comprised of firms with more than ten employees with power or more than twenty employees without.[7]

3.1 Labor Regulation in India since Independence

Since Independence India has been a federal democracy. The Indian Constitution of 1949 divides legislative powers into three lists – the Union List, the State List and the Concurrent List. Central and state governments are sovereign as regards making laws relating to matters in the Union and State Lists, whereas both central and state governments can make law relating to matters in the Concurrent List. While the Constitution did provide the states with some jurisdiction over industrial development,[8] these powers could be overridden by central government powers. Specifically Entries 7, 52 and 54 of the Union List give the central government jurisdiction over defense industries and over other industries and mines when this is deemed to be in the 'public interest'. This public interest clause was invoked in the Industries (Regulation and Development) Act of 1951 which effectively granted central government control over all key industries in India.

The situation as regards industrial labor was different. Matters relating to trade unions and industrial and labor disputes fall under the Concurrent List (Entry No. 22). This implies that both central and state governments are empowered to introduce legislation with respect to these matters. The

[7]This definition comes from the definition of a factory in the Factories Act of 1948. All firms which fit this description have to register with Industrial Inspectorates in each state and are surveyed on an annual basis by the Annual Survey of Industries. This implies that we have detailed information on the functioning and performance of the registered manufacturing sector across states and time.

[8]Entries 23, 24 and 27 of the State List authorize the states to regulate mines and mineral development, industries and the production, supply and distribution of goods.

key piece of central legislation relating to industrial disputes is the Industrial Disputes Act of 1947 which sets out the conciliation, arbitration and adjudication procedures to be followed in the case of an industrial dispute. This Act has been extensively amended by state governments during the post-Independence period. It is these amendments that we use to study the impact of labor market regulation on manufacturing performance and poverty.

The Industrial Disputes Act was designed to offer workers in the organized sector some protection against exploitation by employers. This was in contrast with labor legislation introduced prior to World War I which was designed to limit labor rights and to protect the commercial interests of the British.[9] This Act, which is in forty sections, specifies the powers of government, courts and tribunals, unions and workers and the exact procedures that have to be followed in resolving industrial disputes.[10] It defines the bargaining positions of the different parties involved in an industrial dispute. As noted above, state legislatures have the power to amend this act.

3.2 Coding Legislative Changes

Our effort to measure the direction of policy in a state began by reading the text of all state level amendments to the Industrial Disputes Act of 1947 from Malik [1997]. Our reading of the individual amendments lead us to code each one as either being neutral, pro- or anti-worker. While this method

[9]Political reforms introduced after the war and the fact that India had joined the International Labor Organization in 1919 provided some impetus to protect the interests of labor culminating in the Trade Union Act of 1926. Major strikes in 1928 involving the cotton textile industry of Bombay, Tata Iron and steel workers and railway workers, however, made it transparent that there was no effective machinery for the settlement of industrial disputes. (See Kannappan [1959] for an analysis of the Tata Steel strike.) The Trade Disputes Act passed in 1929 which required unions to give 14 days notice prior to strikes in public utility concerns and which prohibited strikes which might cause severe hardships to the public and the Bombay Industrial Disputes Act passed in 1938 served as precursors to the Industrial Disputes Act of 1947.

[10]Sections are arranged within seven chapters which cover (I) definitions; (II) authorities under this Act, notice of change and reference of certain individual disputes to grievance settlement authorities; (III) reference of disputes to Boards, Courts or Tribunals; (IV) procedures, powers and duties of authorities; (V) strikes and lockouts, lay-off and retrenchment, special provisions relating to lay-off, retrenchment and closure in certain establishments, unfair labour practices; (VI) penalties and (VII) miscellaneous [see Malik, 1997].

of classification required a number of judgement calls, we found surprisingly few cases of uncertainty.[11] We coded each pro-worker amendment as a one, each neutral amendment as a zero, and each anti-worker amendment as a minus one.

It is useful to give a couple of examples of this procedure. A sample pro-employer reform is from Andhra Pradesh in 1987. Our synopsis is: "If in the opinion of the state government it is necessary or expedient for securing the public safety of the maintenance of public order or services or supplies essential to the life of the community or for maintaining employment or industrial peace in the industrial establishment it may issue an order which (i) requires employers and workers to observe the terms and conditions of an order and (ii) prohibits strikes and lockouts in connection with any industrial dispute." This amendment gets a code of minus one in our data. A sample pro-worker reform is from West Bengal in 1980 where our synopsis is: "The rules for lay-off, retrenchment and closure may according to the discretion of the state government be applied to industrial establishments which employ more than 50 workers. Under the central act, these rules only apply to establishments which employ more than 300 workers." This gets coded as a plus one in our data.

Having obtained the direction of amendments in any given year, we cumulated the scores over time to give a quantitative picture of the regulatory environment as evolved over time. This is our basic regulatory measure used below. In years in which there were multiple amendments, we use an indicator of the general direction of change. So, for example, if there were four pro-worker amendments in a given state and year, we would only code this as plus one rather than plus four.

This method of analysis divides the states into "treatment" and "control" groups. The latter are states that do not experience any amendment activity in a pro-worker or pro-employer direction over the 1958-1992 period. There are six of these: Assam, Bihar, Haryana, Jammu & Kashmir, Punjab and Uttar Pradesh. Among those that have passed amendments, our method classifies six states Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Rajasthan and Tamil Nadu as "pro-employer". This leaves four "pro-worker" states: Gujarat, Maharastra, Orissa and West Bengal. Figure

[11] Summaries of all amendments and their coding is available at http://econ.lse.ac.uk/staff/rburgess/#wps.

1 graphs the history of the regulatory structure across states over the period in question. For the most part, changes are monotonic although states move in different directions.

For later reference, it is important to see that the Indian experience gives important sources of both time-series and cross-sectional variation in regulation. Finding comparable variation while being able to control for common institutions is problematic even in OECD countries. The empirical analysis will exploit the time-series dimension of change and will incorporate state fixed effects in the analysis.

3.3 Background Facts

Overall, non-agricultural output per capita in India accounts for 66 percent of total output. Among non-agricultural output, on average manufacturing is about 13 percent of total state output of which 9 percent is in registered manufacturing. The share of registered manufacturing in total manufacturing has increased over time from 50 percent to 65 percent over the period in question.

Figures 2 and 3 give an idea of how economic performance in registered manufacturing varies by Indian states. Figure 2 looks at registered manufacturing output per capita and Figure 3 at employment in registered manufacturing over our data period for each of the sixteen states in our sample. Certain states: Andhra Pradesh, Gujarat, Karnataka, Tamil Nadu and Maharashtra show striking growth, while states like Assam, Jammu and Kashmir and West Bengal display relative stagnation (albeit from very different base levels). Note that we have both pro-worker and pro-employer states among the fast growers.

Table 1 breaks out certain state indicators by the type of regulatory stance of the state. These show that the pro-worker states on average had high registered manufacturing output in 1960 relative to control states and pro-employer states. By 1990, there is no statistically significant difference between pro-worker and pro-employer states. Moreover, the average registered manufacturing output in the pro-employer states has overtaken that in the control states. This pattern is less pronounced when looking at overall output per capita. Other state characteristics such as total taxes per capita, development expenditure per capita, installed electricity per capita and literacy show no significant difference between treatment and control states.

4 The Model

We begin by laying out a theoretical model that links increases in bargaining power with economic performance. The aim is to motivate the empirical tests and to give some structure to the interpretation. However, it falls short of providing a full blown dynamic general equilibrium model of the Indian economy. We home in specifically on one sector – manufacturing, supposing that it is embedded in a larger economy only through wages and prices.

For the sake of realism in an Indian context, we allow for two manufacturing sectors: registered and unregistered. In line with the situation in India, we assume that the defining difference between these sectors is scale. Registered firms can be of any size, but are subject to government regulation affecting the way in which they bargain over wages. Unregistered firms are unregulated, but are restricted in size to employ no more than $\overline{L}$ workers.[12] All firms operate in a common set of factor markets for labor and capital whose prices (w and r) they treat as parametric. For simplicity, we suppose that firms all produce a common manufactured good.

A firm in either sector is characterized by ownership of a non-marketed factor, such as a technology embedded in human capital, ownership of which is distributed among an entrepreneurial class. For our purposes this could be thought of as human capital or technology. We suppose that there is a continuum of firms indexed by $\theta \in \left[\underline{\theta}, \overline{\theta}\right]$. Production in a firm is $\theta F(L, K)$ where $F(K, L)$ is a homogeneous production function satisfying the INADA conditions and exhibiting decreasing returns to scale. Hence, owners of firms enjoy a rent due to the scarcity of the factor embodied in θ. Prices of all manufactured goods are normalized at one.

We assume that each firm must first decide whether to become registered or unregistered (stage 0). Having made that decision, we assume that it must decide how much capital to employ (stage 1). Having sunk the capital investment, it then decides on how much labor to employ (stage 2) and bargains with workers over rents. For simplicity, we focus on the case where capital has no value if it is removed from production at stage 2.

We assume that owners of capital in unregistered firms have complete bargaining power at stage 2 and hence capture all rents. (This is actu-

[12] As per the Factories Act of 1948 the cut-off for becoming registered is twenty employees for firms without power and and ten with.

ally stronger than we need as we explain below.) The firm then behaves just like a standard firm where labor and capital hiring decisions equate the marginal product to the price. The only restriction faced by an unregistered firm is that the number of workers hired at stage 2 cannot exceed $\overline{L}$. Let $\pi_U\left(r, w, \theta; \overline{L}\right)$ be the conditional profit function in the unregistered sector.[13]

Turning now to the registered manufacturing sector, we assume there is a well-defined pool of "inside" workers with whom the firm bargains if it registers. (In reality, it is best to think of this as a union.) We assume that contracts are incomplete along the lines described in Grout [1984] – any contracts negotiated at the time of the capital accumulation decision are subject to renegotiation *ex post,* creating a hold-up problem.[14] Following Grout [1984], we use a generalized Nash bargaining solution with bargaining power of firm owners being represented by $\alpha \in [0, 1]$. Using his results, the equilibrium payoff to a firm owner in the unregistered sector is $\alpha\pi_R\left(\frac{r}{\alpha}, w, \theta\right)$.[15] The bargaining power of the firm enters now in two places – affecting directly the share of the rent that the firm owner receives and the "price" of installed capital. Ex post bargaining ensures that labor is allocated efficiently at

[13]Formally, this is defined as:

$$\pi_U\left(w, r, \theta, \overline{L}\right) = \arg\max\left\{f(L, K) - rK - wL : L \leq \overline{L}\right\}$$

[14]For a detailed macro-economic analysis of an economy with hold-up issues, see Caballero and Hammour [1998].

[15]The rents in the firm are distributed as:

$$\arg\max_{L,T}\left\{\theta F(K, L) - wL - T\right\}^{\alpha}\left\{T\right\}^{(1-\alpha)}$$

where the threat point is assumed to be zero payoffs all round. The capital accumulation decision solves:

$$\alpha\theta F_K(K, L) = r.$$

In this case it is as if the profit function being maximized is,

$$\pi_R\left(\frac{r}{\alpha}, w, \theta\right) = \arg\max\left\{\theta F(K, L) - \frac{r}{\alpha}K - wL\right\}$$

price w. However, because of the hold-up problem, more bargaining power for workers raises the cost of capital to $r/\alpha > r$. Thus less capital is installed and less labor is also employed.[16]

Firms can choose one of three states: inactivity, being registered or unregistered. A firm is inactive if it would make a loss no matter which sector it operated in. It is now straightforward to determine the equilibrium size of the registered sector.

Proposition 1 *There are three possible cases:*

1. *For high enough $\overline{L}$ and low enough α all active firms are unregistered*
2. *For low enough $\overline{L}$ and high enough α all active firms are registered.*
3. *Otherwise, there exists a critical value $\widehat{\theta}\left(\alpha, \overline{L}\right)$ which is decreasing in α and increasing in $\overline{L}$ such that all firms with $\theta \geq \widehat{\theta}\left(\alpha, \overline{L}\right)$ choose to register. In this case, an increase in the bargaining power of labor reduces the size of the registered manufacturing sector and increases the size of the unregistered manufacturing sector (other things being equal).*

Thus unless we are at one of the boundary cases (which is not empirically the case in our data), then we expect the size of the registered manufacturing sector to be larger in states that give greater bargaining power to owners of firms. Total labor and capital used in the registered sector (assuming an interior solution for $\widehat{\theta}\left(\alpha, \overline{L}\right)$) are

$$L_R = \int_{\widehat{\theta}\left(\alpha,\overline{L}\right)}^{\overline{\theta}} L\left(\frac{r}{\alpha}, w, z\right) dz \text{ and } K_R = \int_{\widehat{\theta}\left(\alpha,\overline{L}\right)}^{\overline{\theta}} K\left(\frac{r}{\alpha}, w, z\right) dz. \qquad (1)$$

Using these, it is straightforward to show the following empirical implication of our model:

Proposition 2 *An increase in the bargaining power of labor (i) reduces output, capital formation and employment in the registered manufacturing sector; (ii) increases output in the unregistered manufacturing sector and (iii) reduces overall manufacturing output.*

[16]The model has one-sided investment, i.e., by owners of capital. If workers were also allowed to invest in firm specific human capital, then the effect of increasing the bargaining power of workers on investment would depend upon the relative importance of firms' and workers' investments in the production process.

The third part of Proposition 2 says that overall output in manufacturing is lower if workers in registered firms have greater bargaining power. This stems from the fact that a firm will chose to register only if it will produce a significantly higher amount of output to compensate for the loss in bargaining power. Hence, on the margin, an increase in the fraction of firms that do not register reduces manufacturing output.

Earnings of workers in the registered manufacturing sector have two components: wage labor earnings and rents captured in the bargaining process. In our data, we have only measures of total earnings of workers which captures both components. Thus, absent general equilibrium effects on wages, it is the rental component of earnings that responds to labor market regulation. In terms of the theoretical model, this is:

$$(1-\alpha)\int_{\widehat{\theta}\left(\alpha,\overline{L}\right)}^{\overline{\theta}}\pi_R\left(\frac{r}{\alpha},w;z\right)dz.$$

There are three effects of increasing worker bargaining power which can go in different directions. First, a fall in α increases the effective cost of capital by exacerbating the hold-up problem. This lowers total rents. Through this effect it also reduces the size of the registered sector on the margin, and hence also lowers rents in the registered sector. These are both bad for workers. However, there is a first order effect that increasing worker bargaining power increases the share of any given available rents which makes workers as a whole better off.[17] In general, we expect there to be a rent maximizing value of α strictly below one. Hence workers would not want to see all bargaining power going to them as it reduces incentives for capital accumulation. In a neighborhood of the optimal α, there would be no effect of increasing labor power on total labor earnings (barring general equilibrium effects on wages).

The model does not embed the decision within a federal system like India's. In reality entrepreneurs may be able to choose between registered or unregistered sectors in a number of states. As we argued above, α is likely to be state dependent depending on the regulatory structure in place governing industrial relations. We view an increase in our regulatory measure as akin to a fall in α. We might also expect other features of states (such as their

[17]This result generalizes to allowing workers to share in the rents in unregistered manufacturing provided that their share of the rents in that sector is lower than their share in the registered sector.

infrastructure to govern the allocation decision). In principle, all registered firms would want, according to the model, to migrate to the state with the highest α. In reality, we might expect θ to contain some kind of state specific component which gives a potential entrepreneur a comparative advantage in remaining within a state. This could be due to cultural factors such as speaking local languages or access to supplier networks etc. However, there will still be a possible margin of substitution across states which can result in firms choosing to set-up in other jurisdictions.

5 Empirical Method

The model yields predictions that can be tested empirically. For state s and time t, there are parameters $(r_t, w_{st}, \alpha_{st})$ which vary (along with other important factors that makes states attractive or unattractive as a place to do business). We will suppose that the industrial relations climate is captured by our regulatory measure discussed above which varies both at the state level and over time.

We have direct measures of a number of the variables from the theory: output in the registered and unregistered manufacturing sectors. We also have measures of employment and fixed capital for the registered sector. For the former we have a variety of different measures from two different data sources. In addition, we use number of registered "factories" in a state as a crude measure of investment. We also use data on value added per worker. To get a handle on worker rents, we also have three sources of data on remuneration of workers in the registered manufacturing.

We run panel data regressions of the form:

$$y_{st} = \alpha_s + \beta_t + \lambda y_{st-1} + \mu r_{st} + \xi x_{st} + \varepsilon_{st}$$

where y_{st} is a (logged) outcome variable, r_{st} is the regulatory measure, x_{st} are the exogenous variables of interest that explain the outcomes, α_s is a state fixed effect and β_t is a year effect. We allow for robust standard errors.

We expect differences in climate and culture to be picked up in the fixed effects along with heterogeneous initial conditions. We have experimented with a number of different specifications and sets of control variables. In the tables below, we use development expenditure per capita and installed electricity capacity as our controls (the x_{st}). The presence of a lagged

dependent variable reflects the reasonable supposition that the patterns in the data are affected by slow moving capital stocks reflecting long range decisions with relative immobility of capital ex post. It allows us to interpret the parameters on the other exogenous variables as growth effects.[18]

In the case of registered manufacturing output, employment and capital, we expect a more pro-worker regulatory regime to be associated with lower growth. While overall output in manufacturing will be lower, we expect it to be higher in the unregistered sector. As well as focusing on outcome variables that the theory predicts are affected, it is also useful to check that labor regulation in the registered manufacturing sector does not affect outcomes in other sectors where we expect it not to bite. Thus, we also estimate the model with agricultural output as an outcome measure.

Given our rather crude quantification of the regulatory regime, it will be important to check robustness to alternative measures. We will attempt to differentiate pro-worker or pro-employer regulation from general activism. Hence, we will introduce the *total* number amendments to the Industrial Relations Act as a regressor, ignoring the direction of change.

A further concern is that there is some common omitted factor which is driving both regulation and economic performance. Ideally, this would be dealt with by instrumenting regulation. However, it is hard to find a factor that affects regulation, but which will not affect economic performance directly. One intermediate way into this is to recognize that regulation (like many policies) is an intensely political activity. The fact that the amendments to the Industrial Disputes Act that we code in our data have to be passed in the state legislatures guarantees this is the case. We thus construct "political histories" for each state by looking at patterns of historical political control by looking at episodes of majority control in the legislature. During our data, there are five political groupings that control state legislatures – hard left parties, the Congress party, Hindu parties, Janata parties and regional parties. In each year, we created a dummy variable equal to one if one of these groups controls the legislature. To create a history vari-

[18] The presence of a lagged dependent variable in a panel with fixed effects raises the usual issue of bias. In this instance, the longish time horizon, probably means that this is not hugely important. In each of our models, we test for autocorrelation in the errors using a test that is robust to the existence of a lagged dependent variable. Since in all cases, we find none, we proceeded without making any allowance for this. We also performed the test for stationarity in panel data suggested by Madalla and Wu [1999] which seemed to suggest no difficulty with assuming stationarity.

able, we cumulate this pattern of political control. So for example, if a state had a Congress majority three times in the past this variable would take on the value 3 in that state ever after. We then show that regulation is highly correlated with this pattern of control. We then introduce them directly into the x_{st} vector above as regressors which might be picking a whole array of omitted policies affecting development of registered manufacturing.

6 Results

This section gives our main empirical results on the empirical links between labor regulation and development of manufacturing in India. We begin by looking at measures of sectoral output per capita at the state level. We then focus more on outcomes specific to the registered manufacturing sector – employment, labor earnings, fixed capital investment, numbers of factories and efficiency. We then discuss a number of robustness checks including different ways of measuring regulation. Finally, we consider the possibility that labor regulation could be proxying for other policy choices.

6.1 Basic Results

We first look at measures of output per capita in Table 2. Total state output per capita is in column (1). The data here suggests no correlation between output and the labor regulation regime. A negative correlation is apparent in column (2) which looks only at non-agricultural output per capita. There is no good reason to expect any correlation with agricultural output which is confirmed in column (3). This result is reassuring since these regulations have no direct effect on the agricultural sector.[19] Column (4) shows that the point estimate becomes larger and more significant when looking at manufacturing output. This is consistent with the final prediction of Proposition 2.

In column (5), we look only at registered manufacturing output and now find an even larger and more statistically significant effect. Looking at other coefficients, there is some evidence that the stock of installed electricity capacity is positively correlated with registered manufacturing. Turning to unregistered manufacturing, we get the opposite sign – that high levels of

[19]This suggests that general equilibrium effects which feedback on to the agricultural sector have not been important. Given the size of the registered manufacturing sector, this is not too surprising.

pro-worker labor regulation encourages unregistered manufacturing. These results make sense as the labor regulations we are looking at apply to firms in the registered manufacturing but not to those in the unregistered manufacturing sector. Our findings are thus directly in line with the prediction of Proposition 1.

The growth effect of labor regulation in column (5) of Table 2 goes some way towards explaining the differences in growth rates across the Indian states. To illustrate this, consider Andhra Pradesh, which grew at 6 percent per annum between 1958 and 1992. Our estimate predicts that it would have grown at 4.1 percent had it not passed pro-employer reforms. West Bengal, whose registered manufacturing output per capita declined at 1.5 percent per annum over the data period would have grown at 2.2 percent, according to the point estimate in column (5), had it not legislated in a pro-worker direction. Thus we can explain more than two thirds of the difference in their growth rates.

We now look at a number of performance measures within the registered manufacturing sector. Table 3 considers four employment measures taken from two different sources. The data in columns (1), (2) and (3) come from an industrial census – the Annual Survey of Industries – while that in column (4) which is based on returns from registered manufacturing firms comes from the Indian Labor Yearbook.[20] The first variable (number of employees) in column (1) gives the broadest definition of employment and includes ("blue collar") workers as well as those in supervisory or managerial positions. Workers in column (2) are therefore a subset of employees. The mandays variable in column (3) is defined as the total number of days worked in a year and is a measure of gross labor input employed in the sector. Daily employment in column (4) defined as total worker attendances over a year divided by the total number of days worked by the factory has the advantage that it is a measure of the intensity of labor usage. However, there is significant variation in the fraction of firms furnishing a return which makes

[20] All firms in the registered manufacturing sector (i.e. those with ten or more employees with power or with twenty or more employees without) are under the Factories Act of 1948 required to submit returns to State Chief Inspectors of Factories. Compliance with this requirement is variable which introduces a bias into the Indian Labour Yearbook figures. In contrast the Annual Survey of Industries covers all the firms in the registered manufacturing sector – those with more 100 employees are completely enumerated whereas firms with less than 100 employees are captured via stratified sampling. This implies that ASI data is likely to more reliable, however, we include both sources as a robustness check.

it a poor indicator of aggregate employment.

Qualitatively, all four measures tell a similar story. States which have more pro-worker legislation have lower levels of employment. Quantitatively, the size of this effect is similar for the employee, worker and manday measures but somewhat larger for the daily employment measure which is consistent with there being significant reductions in intensity of labor usage.[21] This may be because part of what pro-worker labor regimes do is to prevent firms from shedding workers.

To gauge the economic significance of these findings, Table 4 asks what manufacturing output and employment would have been in 1990 had all states not passed their individual amendments to the Industrial Disputes Act (columns (1) and (2)). These take the estimated coefficients in Tables 2 and 3 and use them to compute the output loss or gain in each state over the entire period. We then express this as a ratio of actual output in 1990. By construction, this ratio is one for the control states – the numbers for the treatment states are given in Table 4. The most extreme cases are Andhra Pradesh and West Bengal which were (according to our measure) the most pro-employer and pro-worker states, respectively over the period. Our empirical model predicts that, without their pro-employer reforms, Andhra Pradesh would have registering manufacturing output which was 84 percent of its actual 1990 level and manufacturing employment that was 94 percent

[21] This can be explored as follows. Suppose that $E_{st} = \theta_{st}\gamma_{st}L_{st}$ where θ_{st} is the fraction of firms who submit returns, γ_{st} is the intensity with which workers are used and L_{st} is number of workers employed. Then the variance of employment is:

$$var\left(\log E_{st}\right) = \psi_{\theta} + \psi_{\gamma} + \psi_{L}$$

where ψ_j is the variance of the log of the jth variable. Let n_{st} be our measure of labor regulation. Then consider how we would expect the regression coefficient of $\log E_{st}$ and $\log L_{st}$ on n_{st} to vary. Denote the former by $\widehat{\beta}_E$ and the latter as $\widehat{\beta}_L$. Finally let μ be the regression coefficient from regressing γ_{st} on n_{st}. It is then easy to show that:

$$[\beta_E - \beta_L] = \frac{\psi_{\gamma}\mu - \psi_L\beta_L}{\psi_{\gamma} + \psi_{\theta} + \psi_L} < 0$$

if $\mu < \left(\frac{\psi_L}{\psi_{\gamma}}\right)\beta_L$. Thus, our results are consistent with there being significant negative correlation between intensity of labor utilization and labor regulation.

of its 1990 level. Had West Bengal not passed any pro-worker amendments it would have enjoyed a registered manufacturing output that was 14 percent higher than its 1990 level and employment that was 4 percent higher. This comparison starkly brings out how the direction of regulatory change matters. The output and employment effects we observe are large and significant and go some way towards explaining the variation in economic performance across the states over this period. The fact that output falls more than employment is indicative of firms being forced to stay open when they are no longer viable (see Fallon and Lucas, 1993).

In Table 5, we look at the effect of labor regulation on various measures of earnings in the registered manufacturing sector. The first three measures come from the Annual Survey of Industries and the last from Indian Labor Yearbook data based on firm returns. In every case, there is no significant effect of regulation on payments to workers. This is significant as our theoretical model suggested that the prediction on wages is ambiguous.

Table 6 considers measures of firm efficiency and investment. In columns (1) and (2) we look at measures of valued added. These show that value added in firms is lower in which there is more labor regulation. There is no significant effect for the log of registered manufacturing output per manday. The next three columns (4)-(6) look at various measures of investment. The number of factories variable comes from the list maintained by the Chief Inspector of Factories in each state which is updated to take into account both deregistration of firms and new entrants. It thus captures the net flow of firms in the registered manufacturing sector. In column (4) we see that the number of firms is significantly lower in states with more pro-worker regulation. This suggests that pro-worker regulation is either acting as a deterrent to new firms entering the sector (either from other states or by growing above $\overline{L}$) or is leading to firms dying at a higher rate. In line with pro-worker regulation exacerbating the hold-up problem we find in column (5) that pro-worker regulation decreases fixed capital investment, however, we do not find that capital is adjusted significantly more than labor (column (6)).[22]

Overall, these results are consistent with our simple theoretical story of

[22]It is also interesting to note that our measure of labor regulation is significantly positively correlated with mandays lost to strikes and lockouts. Regulating in a pro-worker direction thus appears to be related to a deterioration in the industrial relations climate. Visible signals like strikes and lockouts may be what deters investors from locating in pro-worker states.

what happens when there is an increase in the bargaining power of labor in an incomplete contracts model.

6.2 Robustness

Our principal concern is with what our measure of regulation is capturing. This has two components. First, whether the empirical results are robust to the specific way that we have chosen to measure the information from reading the amendments to the Industrial Disputes Act. Second, whether the patterns in the data can really be attributed to labor market regulation as opposed to some other factor which is correlated with this. We now consider ways of dealing with these concerns.

Table 7 tries to deal with the concern that our measure of labor regulation may simply be proxying for governments' general proclivities towards intervention in the economy. The fact that the effects show up only for registered manufacturing emphasizes that any such omitted effects are specific to the registered manufacturing sector. One way of approaching this is to recall that there are 121 amendments to the laws effected over the period, even though the results so far rely only on eighteen reform episodes to identify their effects, i.e. only those that can be rated decisively as pro-worker or pro-employer. As an alternative, we coded *all* of the amendments (regardless of our assessment of their direction) and cumulate these over time for each state. This gives a sense of the degree of government activism in regulation and is denoted by the variable "total changes" in the Table.[23] We then see what happens when we put in total changes and whether this knocks out the influence of the labor regulation variable. Column (1) shows that activist states have lower rates of growth in registered manufacturing output. However, this effect goes away when the labor regulation variable is re-introduced into the regression (column (2)).

Looking across the remaining columns of Table 7, we find that our activism measure contributes no statistically interesting information either by itself or when the labor regulation variable is introduced. This confirms the point that government activism or intrusiveness itself is not driving the

[23]The correlation between this cumulative change variable and labor regulation is 0.16. Thus, there is no sense in which this simply replicates the information in the regulation variable. States that we classified as control states have an average of 1.3 changes cummulated over the period. Pro-worker states have an average of 10.7 and pro-employer states have an average of 12.3.

results. However the direction of the change is important.

As a further robustness check on our measure of regulation, we experiment with a cardinalization based entirely on the rank of state's regulatory regime relative to its own past history.[24] By construction, this has the same mean number of regulations across each state and relies only on the qualitative nature of each state's own regulatory history to identify the effect of labor regulation. Thus, this deals with the concern that West Bengal, for example, may appear as an outlier. Using this as a measure of labor regulation we re-ran a subset of our results and report them in Table 8. The main message of the basic results is unchanged with the pattern of significance and signs being retained.

We now turn to the issue of whether the effects are really coming from labor regulation and not some other policy which happens to be correlated with this. There is a whole host of potential policies which may affect the development of a state and its manufacturing base. One crude way to proxy for this is to assemble a picture of each state's "political history" as measured by the number if years during our data period that particular political groupings have held a majority of the seats in the legislature. In our data period, the relevant groupings are: the Congress party, the Janata parties, hard left parties and regional parties (see the data Appendix for the exact definitions).

Column (6) of Table 9 shows that two groupings – hard left control and Congress party control – are positively correlated with more pro-worker regulation. While it may be possible to use these political histories as instruments, this would be problematic if, as seems reasonable, they are also drivers of omitted policies that affect growth. Instead, we content ourselves with including them directly in the regressions to see whether the coefficient on labor regulation remains significant. The first five columns confirm the pattern of results found in the earlier tables. However, for output and employment, the absolute size of the coefficient on labor regulation is smaller suggesting that other omitted policies which are positively correlated with labor regulation could also be important. Also indicative of this, a history of political control by the hard left is negatively correlated with the growth of registered manufacturing output. Control by the Congress party and regional parties is correlated with lower wages. However, the political histories

[24] In creating this we count all amendments in all years. See the data appendix for details.

do not appear to be correlated with value added and fixed capital. Overall these results make us sanguine that the effects found here are associated with the labor regulation regime.

7 Welfare Consequences

We turn now to the effect of labor regulation on poverty. This is important for a number of reasons, not least because it may give a sense of the where the burden of the effects identified in the last section have been felt. To assess this, we use poverty data from Ozler, Datt and Ravallion [1996]. As in Besley and Burgess [2000], we use a slightly different econometric model – GLS with a parametric correction for first order serial correlation, with a state specific auto-correlation parameter.[25]

We expect the direct effect on poverty to depend on the extent to which the earnings of the poor are derived from registered manufacturing. While we have no direct quantitative estimate of this, it is instructive to consider the correlation between poverty rates and different components of state output in India. To do so, we disaggregated state output into agricultural, registered manufacturing, unregistered manufacturing and "other" (non-agricultural/non-manufacturing).[26] We find that for urban poverty, the largest coefficient is on registered manufacturing and "other".[27] Agricultural output and unregistered manufacturing are not significantly correlated with urban poverty. For rural poverty, there is a significant negative correlation between unregistered manufacturing and poverty and no significant correlation with registered manufacturing.

Given this pattern of correlations, our prior was that pro-worker regulation would be positively correlated with poverty in urban areas – with an effect operating through lowered registered manufacturing output and

[25]The results are robust to a number of alternative ways of running the model.

[26]Specifically, we run

$$p_{st} = \alpha_s + \beta_t + \gamma y_{st} + \varepsilon_{st}$$

where α_s is a state fixed effect, β_t is a year effect, y_{st} is a vector of our income measures. The regression is estimated with robust standard errors.

[27]We cannot reject the hypothesis that the coefficients on these two output sources are equal.

employment. There is no reason to expect a strong relationship with rural poverty. Table 9 shows that this is indeed the case. Regulating in a pro-worker direction is associated with higher urban poverty for both the headcount and the poverty gap measure (columns (1) and (2)). And from Table 4 we know that these effects on urban poverty are large – West Bengal, example, would have had 10 percent less poverty in 1990 had it not regulated in a pro-worker direction. In column (3) we see that, in line with our expectations, there is no significant effect on rural poverty. This is consistent with the majority of registered manufacturing firms being in urban locations. In columns (4) and (5) we run the difference between rural and urban poverty as a left hand side variable. This helps to control for any omitted variables (e.g. unobserved government policies) that have common effects on poverty in both places.[28] We see that pro-worker regulation is associated with widening the gap between rural and urban poverty.

It is interesting to ask whether the coefficients in Table 10 are consistent with the entire effect on poverty reduction coming through the effect on registered manufacturing output. The regression of poverty on registered manufacturing gives a coefficient of -3.8. The size of the effect implied in Table 2 is around -2.7. Hence, it does appear that the observed poverty effect may be a little larger than that implied by a pure income effect. However, the coefficient lies within the 95 percent confidence interval of the two estimates making them empirically indistinguishable. How exactly this effect is mediated (e.g. via labor markets etc.) is not entirely clear.

The economic significance of these effects can be gauged by looking back at Table 4 column (3) which gives an idea of what urban poverty would have been in 1990 had states not passed pro-worker or pro-employer amendments using the coefficient from Table 10. Our empirical model predicts that, without their pro-employer reforms, then Andhra Pradesh would have urban poverty that was 110 percent of its 1990 level.[29] Similarly, had West Bengal not passed any pro-worker amendments it would have had urban poverty that was 10 percent lower in 1990. This comparison starkly brings out how the direction of regulatory change matters. According to our estimates, there would have been 1.7 million more urban poor in Andra Pradesh in 1990 and 1.8 million less urban poor in West Bengal had these states not amended the

[28]Unlike poverty *levels*, it is also a variable that does not trend downwards over time.

[29]The employment effects are larger if we use numbers of employees or workers instead of mandays.

Industrial Disputes Act.[30]

In some ways, these welfare results are the most striking of the findings. The battle cry of labor market regulation is typically that pro-worker labor market policies redresses the unfavorable balance of power between capital and labor, with an undercurrent that this will have a progressive effect on income distribution. We find no evidence of this here – indeed the distributional effects appear to have worked against the poor.

8 Conclusions

This paper is about the link between regulation and long-run development. The source of identification here which allows for both time-series and cross-sectional variation provides a credible source of evidence on this link. The evidence amassed in the paper points to the direction of labor regulation as a key factor in the pattern of manufacturing development in India. Regulating in a pro-worker direction was associated with lower levels of investment, employment, productivity and output in registered manufacturing.

The results of the paper leave little doubt that regulation of labor disputes in India has had quantitatively significant effects. In India, the hand of government has been at least as important as the invisible hand in determining resource allocation. This has provoked heated debate about which aspects of this role have constituted a brake on development. It is apparent that much of the reasoning behind labor regulation was wrong-headed and led to outcomes that were antithetical to their original objectives.

The paper finds little evidence that pro-worker labor market regulations have actually promoted the interests of labor and, more worryingly, that they have been a constraint on growth and poverty alleviation. Our results have not been able thus far to find any gainers except for the extent to which there may have been capital and labor flows across Indian states in response to policy disparities as they have developed. Our finding that regulating in a pro-worker direction was associated with increases in urban poverty are particularly striking as they suggest that attempts to redress the balance of power between capital and labor can end up hurting the poor.

The analysis reinforces the growing sentiment that government regulations in developing countries have not always promoted social welfare. The

[30]The urban population of Andra Pradesh and West Bengal were 17.15 and 18.15 million respectively in 1990.

example that we have studied here is highly specific and it is clear that it cannot be used to promote a generalized pro- or anti-regulation stance. Future progress will likely rest on improving our knowledge of specific regulatory policies. Research involving particular country experiences will be an important component of this. Only then can the right balance between the helping and hindering hands of government be found.

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9 Appendix: Proofs of Results

Proof of Proposition 1: As a preliminary observe that since the production function $F(K,L)$ is homogeneous, the cost function can be written as $c(y;r,w) = y^{1/\lambda}\phi(r,w)$ where $\lambda < 1$ is the degree of homogeneity and $\phi(r,w)$ is increasing and concave. Then the output decision is characterized by the condition:

$$\theta = \frac{1}{\lambda} y^{\left(\frac{1}{\lambda}-1\right)} \phi(r,w).$$

Thus, output decisions map one-to-one with variations in unit costs. Let $y = h(\theta/\phi(r,w))$ solve the above equation. We now establish three claims:

Claim 1: Define $\widetilde{\theta}\left(\overline{L}\right)$ from $h\left(\widetilde{\theta}\left(\overline{L}\right)/\phi(r,w)\right)\phi_w(r,w) = \overline{L}$. Then for all $\theta < \widetilde{\theta}\left(\overline{L}\right)$, the firm will be unregistered if $\alpha < 1$ (assuming that it is active). To see this, observe that in this range: $\pi_U\left(r,w,\theta;\overline{L}\right) = \pi_R(r,w,\theta) > \alpha\pi_R\left(\frac{r}{\alpha},w,\theta\right)$. It is easy to check that $\widetilde{\theta}\left(\overline{L}\right)$ is increasing in $\overline{L}$.

Claim 2: If $\underline{\theta} < \widetilde{\theta}\left(\overline{L}\right)$, then for high enough α, there exists a unique $\widehat{\theta}$, such that all firms choose with $\theta > \widehat{\theta}$ choose to register. Moreover, all firms in the registered sector produce strictly higher output than those in the unregistered sector.

To see this, note that $\widehat{\theta}\left(\alpha,\overline{L}\right)$ is defined by

$$\pi_U\left(r,w,\widehat{\theta};\overline{L}\right) = \alpha\pi_R\left(r/\alpha,w,\widehat{\theta}\right). \tag{2}$$

Note that (using the envelope theorem):

$$\frac{\partial\left[\alpha\pi_R\left(r/\alpha,w,\widehat{\theta}\right) - \pi_U\left(r,w,\widehat{\theta};\overline{L}\right)\right]}{\partial\theta} = \alpha y_R - y_U.$$

If this is positive everywhere, then $\widehat{\theta}$ is unique. Suppose then that it is not unique and let θ' be the lowest value of $\widehat{\theta}$. Now since $\underline{\theta} < \widetilde{\theta}\left(\overline{L}\right)$, $\alpha y_R - y_U$ has to be positive at θ'. This implies that $y_R > y_U$ at θ'. We now show that $\frac{\partial[\alpha y_R - y_U]}{\partial\theta} > 0$. To show this observe that:

$$\frac{\partial\left[\alpha y_R - y_U\right]}{\partial\theta} = \alpha y_R \frac{\partial \log\left(y_R\right)}{\partial\theta} - y_U \frac{\partial \log\left(y_U\right)}{\partial\theta}.$$

For fixed ϕ, then $\frac{\partial \log(y_j)}{\partial\theta} = \frac{\lambda}{\theta(1-\lambda)} > 0$. It now suffices to show that $\frac{\partial \log(y_U)}{\partial\theta} < \frac{\lambda}{\theta(1-\lambda)}$. To see this, define $\overline{w}\left(\overline{L}, y_U, r\right)$ from:

$$y_U \phi_w\left(r, \overline{w}\left(\overline{L}, y_U, r\right)\right) = \overline{L}$$

for fixed y_U. This is the shadow price of labor which would make the constraint on employing only $\overline{L}$ workers just bind (see Neary and Roberts [1980] for discussion). Now it is easy to check that $\partial\overline{w}\left(\overline{L}, y_U, r\right)/\partial y_U > 0$ and consequently that $\partial\phi/\partial y_U > 0$, i.e. it as if unregistered firms that produce more output do so at higher unit cost because the constraint on labor hiring bites more. Then y_U solves:

$$\theta = \frac{1}{\lambda} y^{\left(\frac{1}{\lambda}-1\right)} \phi\left(r, \overline{w}\left(\overline{L}, y_U, r\right)\right).$$

Hence,

$$\frac{\partial \log\left(y_U\right)}{\partial\theta} = \frac{\frac{1}{\theta}}{\left(\frac{1}{\lambda}-1\right)+\Omega}$$

where $\Omega = \frac{\partial \log\phi}{\partial \log y_U} > 0$ which proves the result.

Claim 3: As $\alpha \to 1, \underline{\theta} > \widetilde{\theta}\left(\overline{L}, \alpha\right)$, and all firms choose to register. This is easy to show since $\phi\left(r, \overline{w}\left(\overline{L}, y, r\right)\right) > \phi\left(r, w\right)$ for all y such that such that $\overline{w}\left(\overline{L}, y, r\right) > \phi\left(r, w\right)$.

Together these claims prove the result. Part 1 of the Proposition follows from Claim 1, Part 3 follows from Claim 3 and part 2 from Claim 2 after observing that $\partial\widehat{\theta}\left(\alpha, \overline{L}\right)/\partial\overline{L} = \frac{\partial\pi_U\left(r,w,\widehat{\theta};\overline{L}\right)}{\partial\overline{L}} \cdot \frac{1}{\alpha y_R - y_U} > 0$ and $\partial\widehat{\theta}\left(\alpha, \overline{L}\right)/\partial\alpha = -\frac{\partial\left(\alpha\pi_R\left(r/\alpha, w, \widehat{\theta}\right)\right)/\partial\alpha}{\alpha y_R - y_U} < 0$ which can be verified by differentiating (2) and using the fact $\alpha y_R - y_U$ is positive at $\widehat{\theta}$. QED

Proof of Proposition 2: The first part follows from differentiating (1) and remembering that $\widetilde{\theta}\left(\overline{L}, \alpha\right)$ is decreasing in α. Total manufacturing output is:

$$y\left(r,w,\alpha,\overline{L}\right)=\int_{\underline{\theta}}^{\widehat{\theta}\left(\alpha,\overline{L}\right)}y\left(r,w,z;\overline{L}\right)dz+\int_{\widehat{\theta}\left(\alpha,\overline{L}\right)}^{\overline{\theta}}y\left(\frac{r}{\alpha},w,z\right)dz$$

Differentiating this with respect to α yields:

$$\left[y\left(r,w,\widehat{\theta}\left(\alpha,\overline{L}\right);\overline{L}\right)-y\left(\frac{r}{\alpha},w,\widehat{\theta}\left(\alpha,\overline{L}\right)\right)\right]\frac{\partial\widehat{\theta}\left(\alpha,\overline{L}\right)}{\partial\alpha}+\int_{\widehat{\theta}\left(\alpha,\overline{L}\right)}^{\overline{\theta}}-\frac{r}{\alpha^{2}}\frac{\partial y\left(\frac{r}{\alpha},w,z\right)}{\partial\left(r/\alpha\right)}dz>0$$

since $\left[y\left(r,w,\widehat{\theta}\left(\alpha,\overline{L}\right);\overline{L}\right)-y\left(\frac{r}{\alpha},w,\widehat{\theta}\left(\alpha,\overline{L}\right)\right)\right]<0$ and $\frac{\partial\widehat{\theta}\left(\alpha,\overline{L}\right)}{\partial\alpha}<0$. QED

10 Data Appendix

The data used in the paper come from a wide variety of sources.[31] They cover the sixteen main Indian states listed in Table I and span the period 1958-1992. Haryana split from the state of Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. Variables expressed in real terms are deflated using the **Consumer Price Index for Agricultural Laborers** (CPIAL) and **Consumer Price Index for Industrial Workers** (CPIIW). These are drawn from a number of Government of India publications which include Indian Labor Handbook, the Indian Labor Journal, the Indian Labor Gazette and the Reserve Bank of India Report on Currency and Finance. Ozler, Datt and Ravallion [1996] have further corrected CPIAL and CPIIW to take account of inter-state cost of living differentials and have also adjusted CPIAL to take account of rising firewood prices. The reference period for the deflator is October 1973- March 1974. **Population** data used to express magnitudes in per capita terms comes from the 1951, 1961, 1971, 1981 and 1991 censuses [Census of India, Registrar General and Census Commissioner, Government of India] and has been

[31] Our data sets builds on Ozler, Datt and Ravallion [1996] which collects published data on poverty, output, wages, price indices and population to construct a consistent panel data set on Indian states for the period 1958 to 1992. We are grateful to Martin Ravallion for providing us with this data and to Guarav Datt for answering various queries. To these data, we have added information on labor regulation, manufacturing performance, political representation, infrastructure and public finances of Indian states.

interpolated between census years. Separate series are available for urban and rural areas.

The **labor regulation** variable comes from state specific text amendments to the Industrial Disputes Act 1947 as reported in Malik [1997]. We decided to code each change in the following way: a 1 denotes a change that is pro-worker or anti-employer, a 0 denotes a change that we judged not to affect the bargaining power of either workers or employers and a -1 denotes a change which we regard to be anti-worker or pro-employer. There were 121 state specific amendments which was coded in this manner. Where there was more than one amendment in a year we collapsed this information into a single directional measure. Thus reforms in the regulatory climate are restricted to taking a value of $1, 0, -1$ in any given state and year. To use these data, we then construct cumulated variables which map the entire history of each state beginning from 1947 – the date of enactment of the Industrial Disputes Act.

State output comes from Estimates of State Domestic Product published by Department of Statistics, Ministry of Planning, Government of India. Output variables are deflated and expressed in log per capita terms. The breakdown of total output into agricultural, non-agricultural and manufacturing output is done under the National Industrial Classification System (NIC) which conforms with the International Standard Industrial Classification System (ISIC). Within manufacturing – registered manufacturing is defined by the Factories Act of 1948 to refer to firms with ten or more employees with power or twenty or more employees without power. Unregistered manufacturing refers to firms below these cutoffs and the size of this sector is appraised by sample surveys carried out by the Department of Statistics.

Figures on **employees, workers and mandays** come from the Annual Survey of Industries, Central Statistical Office (Industrial Statistics Wing), Department of Statistics, Ministry of Planning and Programme Implementation, Government of India. Workers are defined as to include all persons employed directly or through any agency whether for wages or not and engaged in any manufacturing process or in any other kind of work incidental to or connected to the manufacturing process. Employees includes all workers and persons receiving wages and holding supervisory or managerial positions engaged in administrative office, store keeping section and welfare section, sales department as also those engaged in purchase of raw materials etc. or purchase of fixed assets for the factory and watch and ward staff. Mandays represent the total number of days worked and not the number of days paid

for during the accounting year. **Daily employment** figures are from returns submitted from firms under the Factories Act of 1948 which have been analyzed and collated in the Indian Labor Yearbook, Labor Bureau, Ministry of Labor, Government of India. They are obtained by dividing total worker (defined as above) attendances in a year by the number of days worked by the factory.

Wages are defined to include all remunerations capable of being expressed in monetary terms and also payable more or less regularly in each pay period to workers. It includes (a) direct wages and salary payments, (b) remuneration for period not worked, (c) bonuses and ex-gratia payments paid both at regular and at less frequent intervals. It excludes (a) lay off payments which are made from trust or other social funds sets up expressly for this purpose, imputed value of the benefits in kind, (b) employer's contribution to the old age benefits and other social security charges, direct expenditure on maternity benefits and crèches and other group benefits, (c) travelling and other expenditure incurred for the business purpose, are re-imbrued by the employer are excluded. The wages are expressed in terms of gross value i.e. before deduction for fines, damages, taxes, provident funds, employee's state insurance contribution etc. **Salaries** are defined in the same way as wages but paid to all employees plus the imputed value of benefits in kind. These come from the Annual Survey of Industries and are expressed in real terms and per worker or per employee respectively. **Annual earnings per worker** comes from the Indian Labor Yearbook and is defined as gross workers wage bill divided by daily employment as defined above.

Value-added in the registered manufacturing sector is the increment to the value of goods and services that is contributed by the factory and is obtained by deducting the value of total inputs and depreciations from the value of output. The **number of factories** variable comes from the list maintained by the Chief Inspector of Factories in each state which is updated to take into account both deregistration of firms and new entrants. It thus captures the net flow of firms in the registered manufacturing sector. **Fixed capital** represents the depreciated value of fixed assets owned by the factory on the closing date of the accounting year. Fixed assets are those which have a normal productive life of more than one year. Fixed capital covers all types of assets new or used or own constructed, deployed for production, transportation, living or recreational activities, hospitals, schools etc for factory personnel. All these measures come from the Annual Survey of Industries.

The data on **political histories** comes from Butler, Lahiri and Roy [1991]. This primary data is aggregated into four political groupings which are defined in the text and expressed as shares of the total number of seats in state legislatures. State political configurations are held constant between elections. Political history is measured by the number if years during our data period that particular political groupings have held a majority of the seats in the legislature. In our data period, the relevant groupings are: the Congress party, the Janata parties, hard left parties and regional parties. These groupings contain the following parties (i) Congress Party (Indian National Congress + Indian Congress Socialist + Indian National Congress Urs + Indian National Congress Organization), (ii) Janata parties (Lok Dal+Janata+Janata Dal), (iii) a hard left grouping (Communist Party of India + Communist Party of India Marxist), and a (iv) grouping made up of regional parties.

The **poverty** figures we use for the rural and urban areas of India's 16 major states, spanning 1957-58 to 1991-92 were put together by Ozler, Datt and Ravallion [1996]. These measures are based on 22 rounds of the National Sample Survey (NSS) which span this period. The NSS rounds are not evenly spaced: the average interval between the midpoints of the surveys ranges from 0.9 to 5.5 years. Surveys were carried out in the following years 1958, 1959, 1960, 1961, 1962, 1963, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1973, 1974, 1978, 1983, 1987, 1988, 1990, 1991, 1992**.** Because other data is typically available on a yearly basis weighted interpolation has been used to generate poverty measures for years where there was no NSS survey. The poverty lines used are those recommended by the Planning Commission [1993]. The headcount and poverty gap measures are estimated from the grouped distributions of per capita expenditure published by the NSS, using parameterized Lorenz curves using a methodology detailed in Datt and Ravallion [1992]

Table 1: State Economic Characteristics by Labor Regulation Status

	Pro Employer	Neutral	Pro Worker
Registered manufacturing ouput in 1960	35	48	109*
Registered manufacturing output per capita in 1990	149	132	229
Output per capita in 1960	763	822	950
Output per capita in 1990	1380	1463	1574
Population growth (percent)	2.1	2.2	2.2
Total taxes per capita	91	93	97
Development expenditure per capita	93	112	99
Installed electrical capacity per capita	0.03	0.04	0.04
Literacy rate (percent)	40	32	43

Notes: Registered manufacturing and total output figures are expressed in real per capita terms. Population growth is the annual rate of population growth, total taxes refers to all central and state tax revenues allocated to a state; log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real per capita terms, installed electrical capacity measured in watts is expressed in per capita tems, literacy is the population literacy rate. Figures for population growth, development expenditure, electricity and literacy are averages for the 1960-1990 period. The neutral states are Assam, Bihar, Haryana, Jammu & Kashmir, Punjab and Uttar Pradesh. The pro-employer states Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Rajasthan and Tamil Nadu and the pro-worker states are Gujarat, Maharastra, Orissa and West Bengal.

Table 2: Labor Regulation and Output in India: 1958-1992

	(1)	(2)	(3)	(4)	(5)	(6)
	Log state output	Log state non-ag output	Log state ag outptut	Log total manu output	Log reg manu output	Log unreg manu output
Lagged dep var	0.544	0.692	0.326	0.609	0.416	0.747
	(11.27)**	(17.50)**	(5.57)**	(12.83)**	(4.72)**	(13.81)**
Labor regulation	-0.003	-0.010	0.009	-0.026	-0.094	0.020
	(0.60)	(2.10)*	(1.07)	(2.84)**	(5.05)**	(1.99)*
Population growth	-3.645	-3.528	-0.768	-2.345	3.545	-2.905
	(1.97)*	(1.89)	(0.26)	(0.83)	(0.85)	(0.69)
Log electricity	0.012	0.004	0.051	0.008	0.084	-0.037
	(0.98)	(0.47)	(2.52)*	(0.52)	(3.13)**	(1.63)
Log dev exp	0.081	0.128	0.055	0.199	0.100	0.196
	(2.58)*	(4.56)**	(1.21)	(4.41)**	(1.30)	(2.81)**
Observations	478	473	473	473	473	473
R-squared	0.95	0.98	0.88	0.97	0.96	0.93

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Total, non-agricultural, agricultural, total manufacturing, registered manufacturing and unregistered manufacturing output figures are all components of state domestic product and are expressed in log real per capita terms. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. See the Data Appendix for details on the construction and sources of the variables.

Table 3: Labor Regulation and Employment in Registered Manufacturing in India: 1958-1992

	(1)	(2)	(3)	(4)
	Log employees	Log workers	Log mandays	Log daily employment
Lagged dep var	0.603	0.690	0.780	0.614
	(4.28)**	(9.39)**	(21.40)**	(6.20)**
Labor regulation	-0.046	-0.032	-0.031	-0.245
	(2.74)**	(2.19)*	(3.96)**	(3.27)**
Population growth	13.887	-2.021	7.193	-6.463
	(2.45)*	(0.48)	(3.41)**	(0.85)
Log electricity	-0.002	0.043	0.001	0.048
	(0.09)	(2.08)*	(0.05)	(1.35)
Log dev exp	0.015	0.090	0.015	0.231
	(0.32)	(1.54)	(0.39)	(1.62)
Observations	511	512	513	441
R-squared	0.99	0.96	0.99	0.94

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Employees and workers refer to numbers employed where the former contains those in supervisory or managerial positions in addition to workers. Mandays is defined as the total number of days worked in a year whereas daily employment is defined as total worker attendances over a year divided by the total number of days worked. All employment variables refer to the registered manufacturing sector and are expressed in log terms. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. See the Data Appendix for details on the construction and sources of the variables.

Table 4: Output, Employment and Poverty Effects of Labor Regulation

	(1)	(2)	(3)
State	Manufacturing Output	Manufacturing Employment	Urban Headcount
Andrha Pradesh	84%	94%	110%
Karnataka	98%	99%	101%
Kerala	96%	99%	103%
Madhya Pradesh	96%	99%	102%
Rajasthan	89%	96%	107%
Tamil Nadu	88%	96%	107%
Gujarat	106%	102%	97%
Maharashtra	107%	102%	97%
Orissa	103%	101%	98%
West Bengal	114%	104%	90%

Notes: The figures represent what manufacturing output, employment and urban poverty would have been in 1990 had states not passed any pro-labor or pro-firm amendments expressed as a ratio of actual figures for 1990. Results obtained by using estimated effect as predicted by the coefficient in Tables 2, 3 and 10. We only present results for pro-labor and pro-firm states as the ratio for neutral states is by definition one. Manufacturing ouptut is defined as log real registered manufacturing output per capita. Manufacturing employment is defined as log mandays in registered manufacturing. Poverty is defined as the proportion of the population beneath the urban poverty line.

Table 5: Labor Regulation and Wages and Earnings in India: 1958- 1992

	(1)	(2)	(3)	(4)
	Log wages per worker	Log salary per employee	Log salary per manday	Log annual earnings per worker
Lagged dep var	0.642	0.281	0.367	0.356
	(5.83)**	(3.81)**	(2.78)**	(5.08)**
Labor regulation	-0.009	-0.006	0.008	-0.028
	(0.63)	(0.35)	(0.41)	(1.29)
Population growth	10.065	9.037	1.336	-0.525
	(2.04)*	(1.20)	(0.53)	(0.13)
Log electricity	-0.020	-0.049	0.007	-0.019
	(0.95)	(0.94)	(0.27)	(0.87)
Log dev exp	-0.006	0.199	0.149	0.176
	(0.09)	(3.54)**	(3.12)**	(2.48)*
Observations	509	507	507	443
R-squared	0.85	0.82	0.79	0.69

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Wages refers to all remunerations payable to workers whereas salaries refers to renumerations payable to employees. Annual earnings per worker is defined as the gross workers wage bill divided by daily employment. All earning figures are expressed in real log terms. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. See the Data Appendix for details on the construction and sources of the variables.

Table 6: Labor Regulation and Efficiency and Investment in Registered Manufacturing in India: 1958- 1992

	(1)	(2)	(3)	(4)	(5)	(6)
	Log value added per employee	Log value added per manday	Log reg manu income per manday	Log factories per capita	Log fixed capital	Log capital labour ratio
Lagged dep var	0.312	0.426	0.331	0.720	0.539	0.569
	(3.34)**	(4.04)**	(3.99)**	(8.90)**	(5.38)**	(5.16)**
Labor regulation	-0.083	-0.048	-0.016	-0.104	-0.067	-0.006
	(4.03)**	(2.23)*	(1.43)	(2.42)*	(2.23)*	(0.27)
Pop growth	-0.041	0.023	0.058	-0.008	0.091	0.055
	(0.60)	(0.50)	(2.69)**	(0.38)	(1.81)	(1.06)
Log electricity	0.334	0.264	0.182	0.175	0.310	0.316
	(3.44)**	(2.74)**	(2.45)*	(1.93)	(2.01)*	(1.95)
Log dev exp	1.829	-4.458	-9.730	1.034	23.998	9.366
	(0.18)	(0.84)	(2.43)*	(0.19)	(2.86)**	(1.35)
Observations	400	400	473	443	352	352
R-squared	0.73	0.69	0.80	0.95	0.96	0.83

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Value-added in the registered manufacturing sector is the increment to the value of goods and services that is contributed by the factory and is obtained by deducting the value of total inputs and depreciations from the value of output. The number of factories refers to the number in the registered manufacturing sector in each state where adjustments are made for deregistration and new entrants. Fixed capital represents the depreciated value of fixed assets owned by the factory on the closing date of the accounting year. The capital labour ratio is given by dividing fixed capital by mandays. All efficiency investment variables are expressed in real log terms. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. See the Data Appendix for details on the construction and sources of the variables.

Table 7: Checking Robustness to Introducing Aggregate Number of Regulatory Changes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log reg manu output per capita	Log reg manu output per capita	Log mandays	Log mandays	Log value added per worker	Log value added per worker	Log fixed capital	Log fixed capital
Lag dep var	0.467	0.414	0.806	0.780	0.332	0.304	0.557	0.537
	(5.11)**	(4.70)**	(24.12)**	(21.49)**	(3.45)**	(3.22)**	(5.85)**	(5.34)**
Labor regul		-0.084		-0.034		-0.096		-0.076
		(4.22)**		(3.68)**		(3.83)**		(2.24)*
Total changes	-0.011	-0.004	-0.001	0.001	0.000	0.007	0.001	0.006
	(3.20)**	(1.21)	(0.93)	(0.89)	(0.02)	(1.58)	(0.32)	(1.30)
Pop growth	3.014	3.684	6.808	7.121	4.005	1.792	25.253	24.126
	(0.70)	(0.88)	(3.19)**	(3.39)**	(0.39)	(0.18)	(2.85)**	(2.87)**
Log electricity	0.108	0.088	0.007	-0.000	-0.017	-0.046	0.106	0.087
	(3.33)**	(3.13)**	(0.46)	(0.03)	(0.26)	(0.66)	(2.18)*	(1.70)
Log dev exp	0.074	0.093	0.013	0.015	0.308	0.329	0.283	0.304
	(0.87)	(1.19)	(0.36)	(0.40)	(3.17)**	(3.45)**	(1.90)	(2.00)*
Observations	473	473	513	513	400	400	352	352
R-squared	0.96	0.96	0.99	0.99	0.72	0.73	0.96	0.96

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Output is defined in log real per capita terms. Mandays is defined as the total number of days worked in a year and is expressed in log terms. Value-added is the increment to the value of goods and services and is obtained by deducting the value of total inputs and depreciations from the value of output. Fixed capital represents the depreciated value of fixed assets owned by the factory on the closing date of the accounting year. All these variables are for the registered manufacturing sector. Total changes refers to the total number of state level legislative changes made to the Industrial Disputes Act. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. See the Data Appendix for details on the construction and sources of the variables.

Table 8: Checking Robustness to Introducing Within Year State Rank

	(1)	(2)	(3)	(4)	(5)
	Log reg manu output	Log mandays	Log salary per manday	Log value added per employee	Log fixed capital
Lagged dep var	0.475	0.802	0.368	0.312	0.543
	(5.13)**	(23.40)**	(2.79)**	(3.34)**	(5.50)**
Within year state rank	-0.003	-0.001	0.000	-0.005	-0.003
	(2.68)**	(2.19)*	(0.26)	(3.75)**	(2.14)*
Pop growth	3.332	6.985	1.234	2.822	24.763
	(0.76)	(3.29)**	(0.50)	(0.28)	(2.89)**
Log electricity	0.103	0.006	0.005	-0.031	0.099
	(3.33)**	(0.39)	(0.17)	(0.45)	(2.03)*
Log dev exp	0.094	0.014	0.149	0.325	0.300
	(1.14)	(0.38)	(3.11)**	(3.36)**	(1.97)
Observations	473	513	507	400	352
R-squared	0.96	0.99	0.79	0.73	0.96

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Output is defined in log real per capita terms. Mandays is defined as the total number of days worked in a year and is expressed in log terms. Value-added is the increment to the value of goods and services and is obtained by deducting the value of total inputs and depreciations from the value of output. Fixed capital represents the depreciated value of fixed assets owned by the factory on the closing date of the accounting year. All these variables are for the registered manufacturing sector. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. See the Data Appendix for details on the construction and sources of the variables.

Table 9: Checking Robustness to Inclusion of Political Histories

	(1)	(2)	(3)	(4)	(5)	(6)
	Log reg manu output	Log mandays	Log salary per manday	Log value added per employee	Log fixed capital	Labor regulation
Lagged dep var	0.379	0.770	0.307	0.308	0.535	
	(4.54)**	(20.57)**	(2.31)*	(3.27)**	(5.36)**	
Labor regulation	-0.056	-0.023	-0.013	-0.089	-0.060	
	(3.05)**	(2.37)*	(0.94)	(3.41)**	(1.82)	
Pop growth	4.077	7.068	2.648	2.896	25.677	
	(0.97)	(3.22)**	(1.09)	(0.28)	(2.90)**	
Log electricity	0.080	-0.003	0.004	-0.033	0.107	
	(2.82)**	(0.21)	(0.18)	(0.48)	(1.92)	
Log dev exp	0.071	0.014	0.197	0.335	0.320	
	(0.91)	(0.36)	(3.46)**	(3.22)**	(2.02)*	
Congress majority	0.001	-0.001	-0.007	-0.000	-0.004	0.041
	(0.19)	(0.37)	(2.72)**	(0.04)	(0.56)	(4.58)**
Janata majority	-0.005	0.006	-0.007	-0.008	-0.016	-0.017
	(0.52)	(1.20)	(1.37)	(0.59)	(0.89)	(-0.82)
Hard left majority	-0.032	-0.006	0.004	0.011	-0.002	0.226
	(3.45)**	(1.45)	(0.52)	(1.11)	(0.16)	(9.46)**
Regional majority	0.004	-0.001	-0.016	0.002	0.002	-0.005
	(0.88)	(0.36)	(3.62)**	(0.31)	(0.29)	(-0.53)
Observations	473	513	507	400	352	513
R-squared	0.96	0.99	0.80	0.73	0.96	0.73

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Output is defined in log real per capita terms. Mandays is defined as the total number of days worked in a year and is expressed in log terms. Value-added is the increment to the value of goods and services and is obtained by deducting the value of total inputs and depreciations from the value of output. Fixed capital represents the depreciated value of fixed assets owned by the factory on the closing date of the accounting year. All these variables are for the registered manufacturing sector. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms. Political history is measured by the number if years during our data period that particular political groupings have held a majority of the seats in the state legislatures. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. See the Data Appendix for details on the construction and sources of the variables.

Table 10: Labor Regulation and Poverty in India: 1958-1992

	(1)	(2)	(3)	(4)	(5)
	Urban headcount	Urban poverty gap	Rural poverty gap	Rural-urban poverty gap difference	Rural-urban headcount difference
	GLS	GLS	GLS	GLS	GLS
Labor regulation	1.815	0.550	0.020	-0.548	-2.266
	(4.97)**	(2.85)**	(0.07)	(1.83)	(3.60)**
Population growth	-197.176	-179.161	-269.790	-89.197	-54.597
	(1.73)	(3.10)**	(3.40)**	(1.21)	(0.32)
Log electricity	0.756	0.360	0.051	-0.325	-0.773
	(1.39)	(1.66)	(0.19)	(1.13)	(1.03)
Log dev exp	3.259	0.594	1.012	0.511	-1.608
	(2.26)*	(0.97)	(1.25)	(0.58)	(0.75)
Observations	513	513	513	513	513

Notes: Absolute t statistics calculated using robust standard errors are reported in parentheses, * significant at 5%; ** significant at 1%. Poverty measures in other regressions have been interpolated between survey years. In columns (4) the poverty gap difference is the difference between the rural and urban poverty gap measures for each state. In column (5), the headcount difference is the difference between the rural and urban headcount index for each state. See the Data Appendix for details on the construction and sources of the variables. The data are for the sixteen main states for the period 1958 - 1992. Haryana split from the Punjab in 1965. From this date on, we include separate observations for Punjab and Haryana. We therefore have a total of 552 possible observations. Deviations from this are accounted for by missing data. Labor regulation captures the direction of regulatory change in a given state and year (1=pro-worker, 0=neutral, -1=pro-employer) and has been cumulated over the period. Population growth is the annual rate of population growth, log electricity is log installed electrical capacity measured in watts, log development expenditure refers to expenditures by state governments on key economic and social services and is expressed in real log per capita terms.

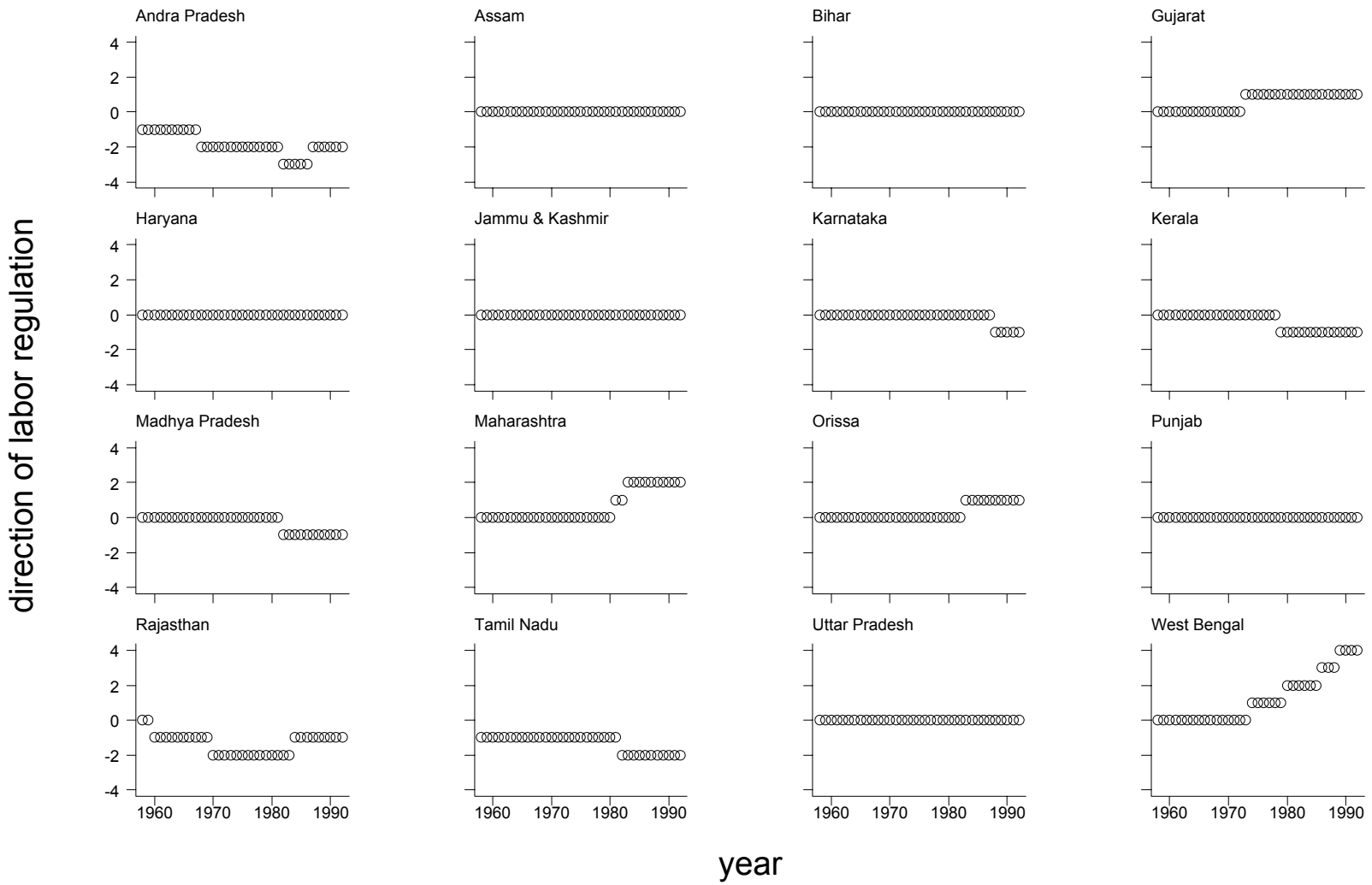

Figure 1: Labour Regulation in India: 1958-1992

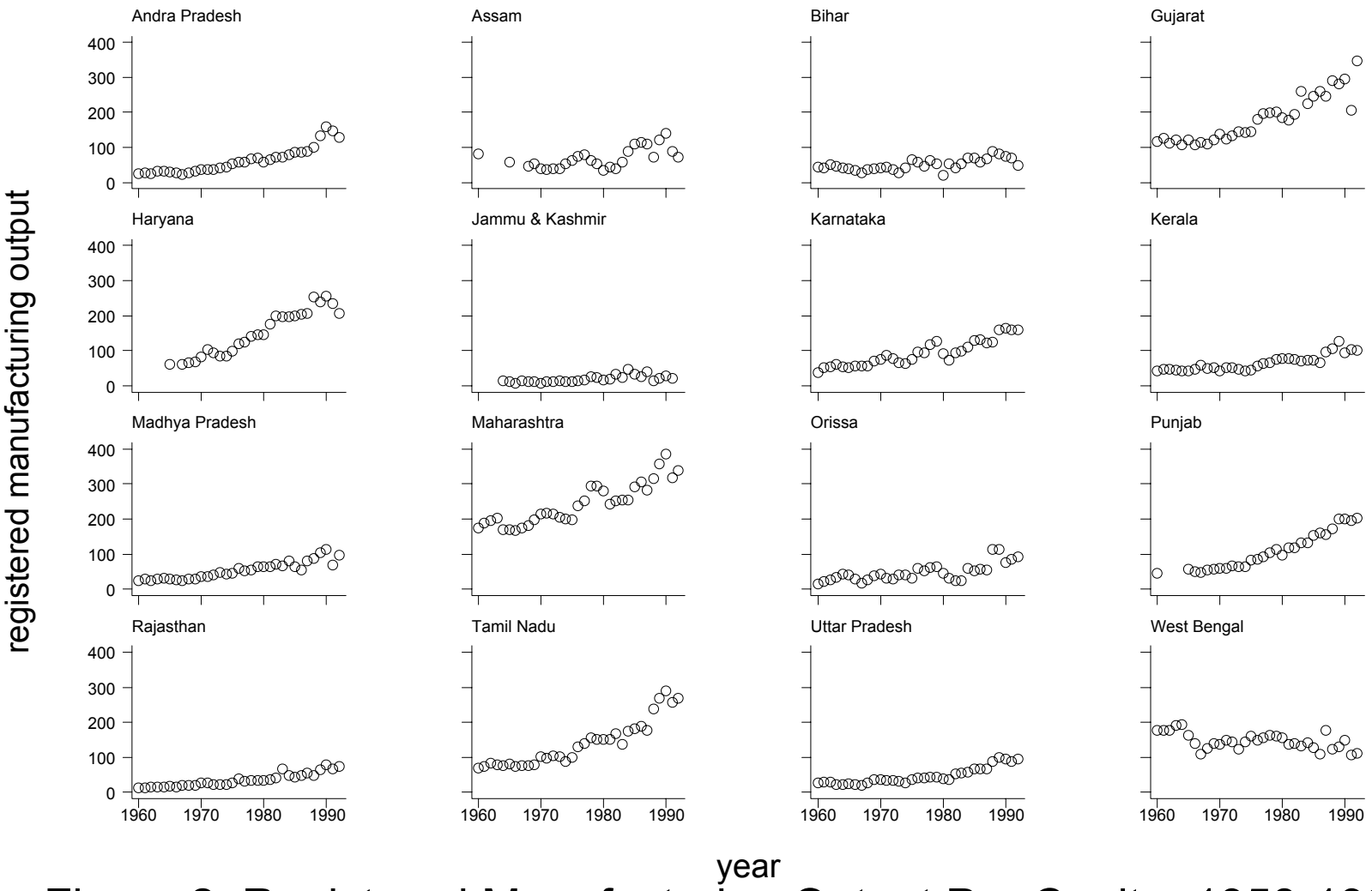

Figure 2: Registered Manufacturing Output Per Capita: 1958-1992

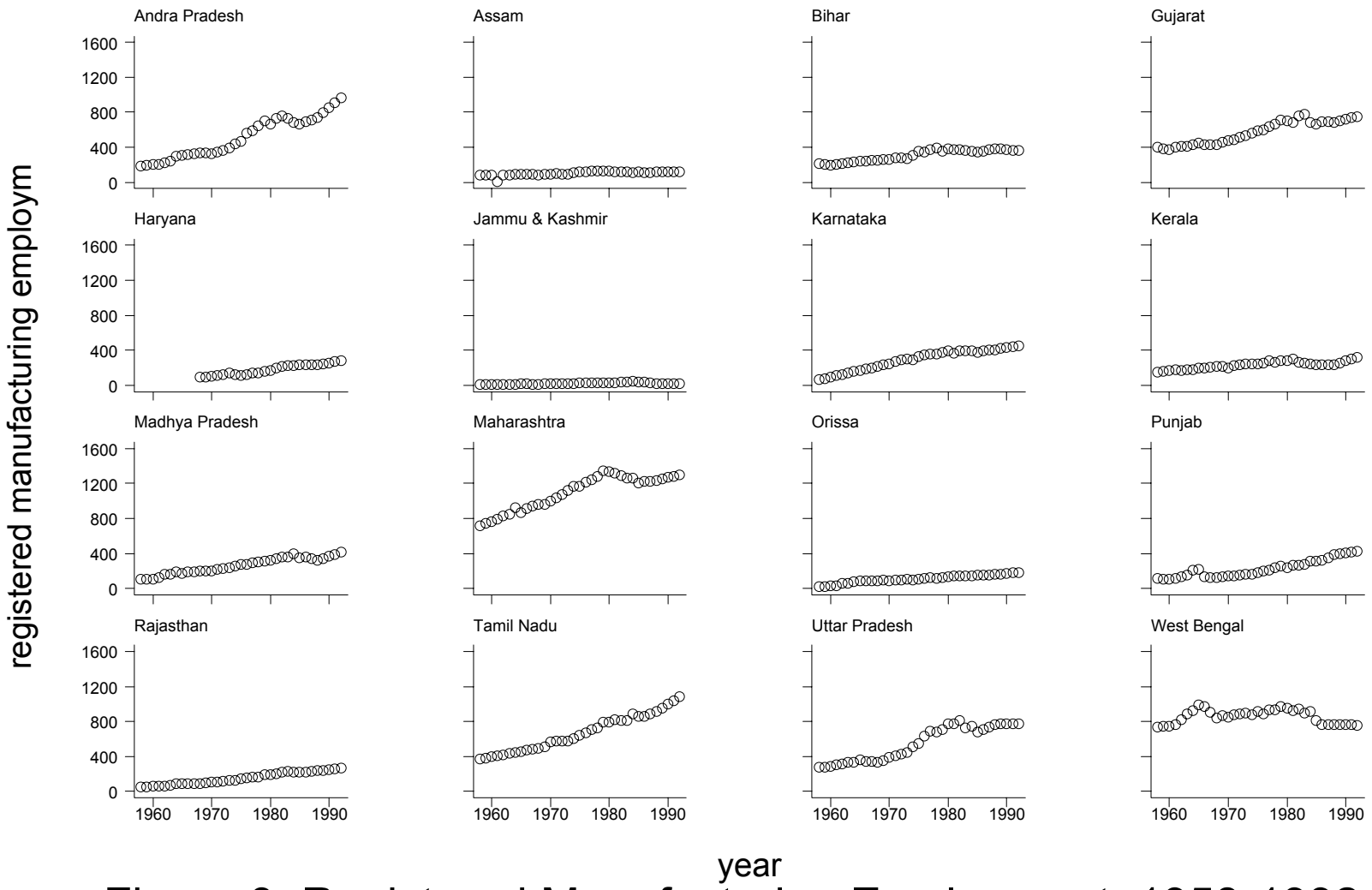

Figure 3: Registered Manufacturing Employment: 1958-1992