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Labor Conflict and Foreign Investments: An Analysis of FDI in India*

Nidhiya Menon
Dept. of Economics & IBS
MS 021, Brandeis University
Waltham, MA 02454
nmenon@brandeis.edu

Paroma Sanyal
Dept. of Economics & IBS
MS 021, Brandeis University
Waltham, MA 02454
psanyal@brandeis.edu

Abstract:

This paper analyzes patterns of foreign direct investment in India. We investigate how labor conflict, credit constraints, and indicators of a state's economic health influence location decisions of foreign firms. We account for the possible endogeneity of labor conflict variables in modeling the location decisions of foreign firms. This is accomplished by using a state-specific fixed effects framework that captures the presence of unobservables, which may influence investment decisions and labor unrest simultaneously. Results indicate that labor unrest is endogenous across the states of India, and has a strong negative impact on foreign investment.

Keywords: Foreign Direct Investment, Labor Disputes, Developing Countries, India.

J.E.L. Classification: L2, L5, O2

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Section 1: Introduction

With the initiation of liberalization policies and economic reforms in India in 1991[1], the role of private investment in economic growth has gained significant importance. States now compete with one another by instituting policies to attract new investment, especially from foreign sources. It is evident that states benefit from the presence of foreign investment, both in terms of increased productivity and other spillover effects. This is clear from table 2 (these basic regressions are used to motivate our study, we implement a more rigorous approach below), where the number and shares of foreign firms appear to have clear positive effects on net value-added and the net income of states.[2] In the light of this evidence, inter-state competition across the regions of India has heightened. This paper studies some of the factors that influence foreign direct investment (FDI) across the states of India. These factors include labor conflicts, credit and market conditions, and other state-level economic indicators. We find that overseas investment is particularly sensitive to variables that measure labor conflict at the state level.

Although labor unrest, credit availability, and other measures of the "economic health" of states exert a substantial influence on the location decisions of new foreign investment, it is unlikely that the effect of these variables is exogenous. In particular, labor laws in India fall under the purview of state governments. This introduces variation in labor statutes across the different states, and also allows for the possibility that state governments may manipulate labor laws in order to attract more investment from abroad. Hence for example, state governments may influence the location decisions of foreign companies by providing incentives in the form of subsidies and tax-breaks, or by

[1] India started major economic reforms and nationwide liberalization in 1991 in response to a fiscal and balance of payments crisis. These reforms encompassed all major areas – like industrial policy, trade and exchange rate policy, tax reforms and public sector policies.

[2] The positive effect of FDI shares is measured imprecisely in column (2) of table 2.

introducing amendments that make labor legislation within the state more pro-employer (and consequently, less pro-worker).

In this paper, we consider the effect of labor conflicts on the location choice of foreign firms, and implement an approach that allows us to control for the possible non-random nature of labor unrest. Our method is unique in that it not only allows us to confirm the presence of endogeneity; it also allows us to sign the direction of the bias that results when the heterogeneous nature of labor unrest is not taken into account. We implement our method in two steps. First, we use a state fixed-effects model to account for the effect of unobservables that may influence location decisions of new foreign firms and the labor conflict variable simultaneously. Second, we extract estimated measures of state-level unobservables from the first step. These are then used as determinants of labor unrest across the various states of India. Results from the second step confirm the non-random nature of our labor conflict variable.

We find striking evidence that new foreign investment in India is negatively influenced by state-level labor unrest, and positively affected by state-level credit and market features. Real gross domestic product exerts a positive influence on shares of FDI, whereas planned outlay and state-support for research and development have the hypothesized effects (although these are imprecisely measured). Furthermore, results of our two-step estimation confirm that the influence of labor unrest is not exogenous. In fact, states with high latent FDI location propensities (this term is discussed in detail below) experience lower levels of labor unrest.

The paper is organized as follows. Section 2 discusses previous literature in the area. This includes a review of studies that have analyzed the determinants of FDI location in both developed and developing countries. Section 3 provides details on the technique used in the paper, and section 4 discusses our data. The results of our

estimations are also presented in Section 4. Section 5 concludes with policy implications. All tables and figures are provided at the end of the paper.

Section 2: Literature Review

Governments do much to attract foreign direct investment (FDI) since domestic firms operating in local markets benefit from the productivity and knowledge spillovers generated by foreign owned firms and their subsidiaries. Recent research has documented that productivity differences across countries are tied to variations in foreign and domestic innovation (Keller, 2002, Eaton and Kortum, 1999), and that flows of foreign direct investment significantly predict international technology transfers. The extent to which FDI is valued may be gauged by considering the incentives offered by governments to attract the flow of foreign funds. For example, the U.S. state of Alabama spent $230 million to influence the location of a Mercedes plant in 1994.[3]

Incentives to attract FDI are not provided by the governments of developed countries alone. Developing countries, particularly in East Asia, have managed to spur economic growth by harnessing the power of foreign direct investment. Researchers argue that the adoption of FDI-friendly policies was responsible for China's ability to maintain a growth rate that exceeded 10 percent per annum in the 1990s[4], and that by tapping into foreign capital, technology, and markets, Malaysia was able to transform itself from an exporter of raw-materials to an exporter of manufactured commodities. Other Asian countries that have recognized the importance of FDI include Indonesia and Thailand.

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[3] Head, K. (1998), "Comment on Doms and Jensen", in Robert Baldwin, Robert Lipsey, and J. David Richardson (eds.), *Geography and Ownership as Bases for Economic Accounting*. Chicago: The University of Chicago Press. p. 256.

[4] Bajpai, N., and J. Sachs (2000), "Foreign Direct Investment in India: Issues and Problems", Harvard Institute for International Development, Development Discussion Paper No. 759. p. 4.

Since tangible evidence exists to suggest that increased flow of funds from overseas influences economic growth in the receiving economy, FDI has been linked to poverty reduction also. Economic growth is a necessary but not a sufficient condition for economic development and poverty alleviation. Although distribution of wealth created by economic growth is important in the fight against poverty, clearly, growth lays the foundation for improved well-being by increasing the "size-of-the-pie". With its positive effect on growth, FDI is key to poverty reduction initiatives. Moreover, foreign enterprises may have indirect effects on poverty by incrementing human capital. When foreign firms hire local workers, the latter benefit from the training and other human resource improvements that may be offered by the foreign firm. This has additional positive income effects over and above those already created by productivity and technology spillovers. That FDI is an important ingredient in poverty reduction initiatives cannot be disputed.

Despite these well-documented truths about FDI, India has lagged in terms of attracting its share of foreign capital. In discussing manufacturing firms in developing countries, Tybout (2000) summarizes that "…because of institutional entry barriers, labor market regulations, poorly functioning financial markets and limited domestic demand, the industrial sectors of developing countries are often described as insulated, inefficient oligopolies".[5] This was particularly true of India before 1991. After 1991, India adopted a policy of economic openness that liberalized banking, substantially reduced entry barriers primarily through a reduction in tariffs and the increased ability of foreign firms to repatriate profits overseas, and removed bureaucratic red-tape associated with foreign equity ownership in domestic firms of up to 51% (before 1991, foreign firms were

[5] Tybout, J.R. (2000), "Manufacturing Firms in Developing Countries: How Well Do They Do, and Why?", *Journal of Economic Literature* 38(1). p. 30.

allowed to own a maximum of 40% equity in Indian firms[6], after 1991, they were allowed controlling ownership). Such measures significantly improved flows of foreign capital into the country, although levels are still far from optimal. For example, the ratio of actual FDI as a proportion of FDI approved from 1991 to 1998 was only 21.7%[7] in India, as opposed to China, Malaysia, Indonesia and Thailand, where this ratio was substantially higher.

Researchers have documented several obstacles to increased flows of FDI into India. These include the fact that foreign ownership of more than 51% equity still requires government approval (which involves substantial lags of time), tariff rates continue to remain high by international standards, there is a lack of decentralized decision-making at the level of state governments, exit barriers still exist (for example, a firm that hires over one hundred workers needs to get approval from the state government before it can shut down operations), banking and insurance systems are not competitive, and finally, labor laws are overly stringent. In this paper, we consider how labor conflicts and other indicators of a state's "economic health" (these indicators include share of disbursements from the Investment Credit and Industrial Corporation of India (ICICI) Bank, amount of loans disbursed by the Export Import (EXIM) Bank, and state support for research and development) influence the location of overseas investment projects in India.

We focus on the role of labor conflicts for two reasons. First, labor laws fall under the jurisprudence of state governments in India. Thus, as observed before, states may use labor laws as instruments to attract (or deter) foreign direct investment. On a

[6] Chhibber, P.K., and S.K. Majumdar (1999), "Foreign Ownership and Profitability: Property Rights, Control, and the Performance of Firms in Indian Industry", *Journal of Law and Economics* 42(1). p. 213.
[7] Bajpai, N., and J. Sachs (2000), "Foreign Direct Investment in India: Issues and Problems", Harvard Institute for International Development, Development Discussion Paper No. 759. p. 2.

more general level, heterogeneity in labor regulations at the state level in India arises from two sources. First, depending on the (political) nature of the government in power, states pass amendments to labor laws that are either more pro-worker or more pro-employer. Second, the implementation of laws may be affected by other considerations. For example, in a state like West Bengal, the Communist party has been in power for the past twenty years. It is common knowledge that the party has a pro-worker bias. This may affect outcomes of collective bargaining, disputes, and strikes, even without any formal changes in labor policies at the state government level. Given costs of locating in India (exit barriers, lack of adequate infrastructure, and other factors mentioned above), it is likely that foreign firms will veer away from states that have a pro-worker bias (pro-worker bias may be signaled by a large number of labor conflicts/disputes) since such biases may translate into higher production costs, and thus, reduced profits. In this context, it is important to note that labor laws are subject to manipulation by state governments, but variables such as ICICI and EXIM loans (which we use as proxies of a state's overall "economic health") are not. It is our hypothesis that such manipulations result in the fact that labor laws influencing employer-employee relations cannot be treated exogenously. Other variables that are not under the control of state governments (such as our proxies for a state's overall economic climate) are considered to be exogenous in our estimations. (Note that our use of a state fixed-effects approach corrects for omitted variable bias; we are thus confident that such biases do not contaminate variables in the estimation that are treated exogenously). Hence, our study of endogeneity in the two-step framework mentioned above focuses on labor dispute variables alone.

Our second reason for considering the influence of labor laws in addition to other indicators of state-level economic activity stems from a paper (Sanyal and Menon, 2005),

where it is shown that such factors significantly influence the location of new private and public plants in India from 1998-1999. If Indian private and public plants are influenced by industrial regulations at the state level, then it is conceivable that foreign private plants are even more sensitive to these issues. Given their lack of knowledge of ground realities and the additional rules that foreign enterprises may need to operate under, investment from overseas will be particularly cognizant of labor laws and other indicators of economic activity within a state.

To the best of our knowledge, our study is the first to evaluate how foreign direct investment responds to measures of labor disputes and other state-level economic indicators in India. In the context of developed economies, several researchers have studied the influence of industrial and labor relations on U.S. foreign direct investment. Cook (1997) examines outflows of funds from the U.S. to nineteen OECD countries. He finds empirical evidence to conclude that foreign direct investment from the U.S. is negatively affected by "…the presence of high levels of union penetration, centralized collective bargaining structures, stiff government restrictions on layoffs, and pervasive contract extension policies"[8] in the receiving economies. Karier (1995) considers whether the average rate of unionization across ten geographic regions predicts outward flows of investment from the United States. His study does not find a significant relationship between levels of union activity and foreign direct investment.

Contrary to Karier's (1995) conclusion, our results suggest that foreign direct investment in India is very sensitive to measures of labor disputes. Our specification provides consistent evidence to demonstrate that states with large numbers of work stoppages and lockouts deter the location of foreign plants. Other variables such as loans

[8] Cooke, W.N. (1997), "The Influence of Industrial Relations Factors on U.S. Foreign Direct Investment Abroad", *Industrial and Labor Relations Review* 51(1). p. 3.

from banking institutions, support for research and development (R&D) by state governments, and input cost variables, also have predictive power. Furthermore, results from our fixed effects technique confirm that measures of labor conflicts are endogenous in an analysis of FDI location in India. We find strong empirical evidence to substantiate our hypothesis that labor disputes across states of India arise in a non-random fashion – states may 'subdue' pro-worker legislations in order to attract foreign direct investment.

Section 3: Theoretical Background

Section 3.1: The Fixed Effects Model

We justify our use of a fixed effects model by first presenting a linear Ordinary Least Squares (OLS) regression. Thus, where f_{jt} denotes the share of foreign projects in location (state) j at time t , X_{ijt} is a matrix of exogenous variables where i denotes a particular variable, j denotes a location, and t denotes time, $L_{i'jt}$ is a matrix of labor dispute variables where i' denotes a particular labor conflict variable for j , t defined above, and υ_{jt} is an idiosyncratic error term,

$$f_{jt} = \gamma_{i'} L_{i'jt} + \beta_i X_{ijt} + \upsilon_{jt} \quad ---(1)$$

Equation (1) relates the share of FDI projects in state j at time t to labor conflict and other variables in X_{ijt}, under the assumption that the right hand side variables in (1) are exogenous.

Next, we implement a Durbin-Wu-Hausman test to check that $L_{i'jt}$ is indeed exogenous in (1). In order to accomplish this, $L_{i'jt}$ is hypothesized to be a function of regional dummy variables (list of regional dummies is provided at the end of the paper)

and the X_{ijt} in equation (1). This is the standard format of the Durbin-Wu-Hausman test. The *p*-value from this test is 0.0139 (F[1,67]=6.39), thus we strongly reject the null hypothesis at the 95% level that OLS provides consistent results. Results of the Durbin-Wu-Hausman test indicate that our labor dispute variable ($L_{i'jt}$) is endogenous, that is, it is correlated with a systematic component of the error term in equation (1).

Given the fact that states benefit from the location of FDI projects, and thus may manipulate labor laws to reduce the incidence of labor conflicts, we hypothesize that υ_{jt} consists of a state specific component μ_j and an idiosyncratic component ε_{jt}. Equation (1) is modified to account for this state-specific heterogeneity. This leads to the following:

$$f_{jt} = \gamma_{i'} L_{i'jt} + \beta_i X_{ijt} + \mu_j + \varepsilon_{jt} \quad ---(2)$$

Equation (2) is a fixed effects regression that controls for state-specific unobservables which affect the labor variable $L_{i'jt}$. The other (exogenous) variables in X_{ijt} that are believed to influence the location of FDI projects across the various states of India include loans from ICICI Bank, loans from Exim Bank, real value of growth state domestic product, state support for R & D, volume of software exports, and other input cost variables such as wage levels and power rates.

Although the Durban-Wu-Hausman test provides evidence that our labor dispute variable cannot be treated exogenously, we are explicitly interested in the sign of the correlation between the labor variable and the state-specific error component in (2). This is because the sign gives us information on the strategy that states use to attract FDI. In particular if the sign is negative, then we have statistical evidence that states try to reduce the incidence of labor conflicts in order to influence the location of new FDI projects.

Our methodology for analyzing the direction of such correlations is discussed in the next section.

Section 3.2: Estimating the Endogeneity of Labor Regulations

Consider the following relationship between the labor variable and the measure of state-level heterogeneity, μ_j.

$$L_{i'jt} = \theta_{i''} Z_{i''jt} + \delta_{i'} \mu_j + \eta_{i'jt} \quad ---(3)$$

Equation (3) shows that the labor variable is a function of a set of exogenous determinants ($Z_{i''jt}$) which include state specific measures such as the literacy rate, the proportion of urban male workers, measures of inequality, and regional dummy variables. As discussed before, since states benefit from having FDI projects, the presence of μ_j in (3) captures the notion that some states may influence labor laws in order to attract more FDI projects. These influences may be over and above those exerted by the variables in $Z_{i''jt}$, and are unobserved by the researcher since they are not measured in the data. These unobserved influences are captured by the correlation of $L_{i'jt}$ with the systematic part of the error term in (3), μ_j. Therefore, as long as $\delta_{i'} \neq 0$ in (3), $L_{i'jt}$ is endogenous in (2). Thus an estimation of (2) that does not correct for this endogeneity will result in biased and inconsistent measures of $\hat{\gamma}_{i'}$, the true estimated effect of the labor disputes variable on the share of FDI projects in a state.

With observations on variables across time, equation (2) may be estimated consistently by using a Least Squares Dummy Variable (LSDV) approach. An advantage of the LSDV approach is that it allows us to measure location specific effects, net of labor variables, loans from ICICI Bank, loans from EXIM Bank, inputs, and other

variables in equation (2). This is of use in assessing correlations between state specific unobservables and labor measures in equation (3). Hence, we estimate equation (2) using the LSDV technique. After this, we extract estimates of the μ_j (denoted as $\hat{\mu}_j$) parameters from (2) for use as independent variables in equation (3). These extracted $\hat{\mu}_j$ are interpreted as latent FDI location propensities for each state j, net of labor and other variables.

A potential problem with the $\hat{\mu}_j$ estimated from equation (2) is that they are likely to be measured with error (Pitt, Rosenzweig, and Gibbons,1993, Pitt, Rosenzweig, and Hassan,1990). The nature of the measurement error problem[9] is as follows. If FDI shares and labor regulation variables are measured inaccurately (as they may be), then the derived estimates of $\hat{\mu}_j$ are contaminated with the errors that affect the FDI and labor regulation variables in equation (2). This implies that in measuring the effects of $\hat{\mu}_j$ on labor variables in equation (3), a simple linear model (such as OLS) leads to inconsistent results. In fact, as is well known, measurement error in a right hand side variable in a least squares framework causes the true effect of that variable to be biased downwards (attenuation bias – the coefficient is biased towards zero).

Consistent estimates may be obtained given errors in variables by using an instrumental variables technique. As noted in Pitt, Rosenzweig, and Hassan (1990), variables that may be used as instruments include repeated observations (over time) on the variable that is measured with error ($\hat{\mu}_j$). Repeated observations on the variable that is measured with error are valid instruments as long as errors are uncorrelated across time periods. Given that there have been no dramatic changes across states in the time periods

[9] Pitt, Rosenzweig, and Hassan (1990) provide a detailed discussion of how the measurement error problem arises on pp. 1145-1146.

we consider, we do not believe that the assumption of uncorrelated errors is an overly restrictive one. Furthermore, we present tests for the validity of our instruments below.

Since repeated observations on the measured with error variable may be used as instruments, we instrument for $\hat{\mu}_j$ from 1996-1997 using the $\hat{\mu}_j$ from 1998-2000. Equation (3) is then estimated using an instrumental variables technique. A significant $\hat{\delta}_{i'}$ coefficient from the instrumental variables estimation of equation (3) provides evidence that the labor variable in equation (2) is endogenous.

A brief discussion on the expected sign of $\hat{\delta}_{i'}$ is warranted. If $\hat{\delta}_{i'} > 0$, this would support a state government policy where regions with high $\hat{\mu}_j$ also see an increase in labor unrest. Alternatively if $\hat{\delta}_{i'} < 0$, then net of labor and other variables, states with high $\hat{\mu}_j$ experience low magnitudes of labor activity. Since our labor variable measures labor disputes in the state, a negative sign on $\hat{\delta}_{i'}$ suggests a decline in labor unrest in regions where FDI location propensities are high. This may occur when state governments "subdue" labor laws in the hopes of translating high latent FDI location propensities into actual sizeable numbers of FDI projects within that state. Indirect evidence for this may be obtained by considering the location of the seven export processing zones (EPZs) in India – five of these EPZs are located in states that have high latent FDI location propensities[10], and were at the forefront of enacting reforms to encourage foreign direct investment (Gujarat, Kerala, Maharashtra, Uttar Pradesh, and

[10] FDI location propensities are high in these states since they possess a relatively skilled workforce and a well-developed transportation and communication infrastructure.

Andhra Pradesh).[11] Given the fact that states value the presence of FDI, our prior is that the sign of $\hat{\delta}_{i'}$ is negative.

Section 4: Data and Results

Section 4.1: Variables and Data

Table 1(B) provides the sources of the variables used in our estimations.[12] From 1996 to 2000, the total number of FDI projects in India (as reported by the Ministry of Commerce and Industry) was 8,337. Figure 1 depicts shares of FDI projects by state during 1996 – 2000 (our estimations span these years). From the figure, it is clear that most foreign projects locate in Maharashtra, Tamil Nadu, Karnataka, and Delhi.

Section 4.1.1: Labor Conflict Variables

Labor variables capture "on the ground" labor conditions. We consider several alternatives including the number of lockouts, number of strikes, and the number of man-days lost in the state due to work-stoppages. The summary statistics of these variables are provided in Table 1. Figure 2 depicts one of the main labor conflict variables used in the estimations from 1996-2000 (the normalized number of man-days lost due to work-stoppages). In comparing figures 1 and 2, an inverse relationship between new FDI and the pro-worker stance of the state (as captured by the normalized number of man-days lost in disputes resulting in work stoppages) is apparent. This is particularly true for states such as Kerala and West Bengal, which have traditionally favored workers over employers (these states have comparatively large numbers of man-days lost due to

[11] Bajpai, N., and J. Sachs (2000), "Foreign Direct Investment in India: Issues and Problems", Harvard Institute for International Development, Development Discussion Paper No. 759. p. 14.

[12] We mention the original sources for the majority of our data, even though we use the electronic versions put together by Indiastat, a web based data vendor specializing in Indian data.

disputes in figure 2). As seen from figure 1, the number of new foreign projects that Kerala and West Bengal receive is relatively small.

Section 4.1.2: Indicators of State "Economic Health"

We use state-level economic characteristics like gross state domestic product, measures of credit availability such as EXIM bank loans and ICICI bank disbursements, planned outlay by the state on the manufacturing sector, and measures of research and development expenditures by the state government, as indicators of a state's "economic health". We hypothesize that FDI prefers to locate in states with relatively high levels of social and economic development. Alternatively, high input costs and poor infrastructure should have negative impacts on location propensities. In order to capture such influences, we use the average daily wage of unskilled male and female workers, the average power rate for large and small industries, and kilometers of surfaced roads available in the state. Other variables that are thought to affect the location of foreign projects include the average Gini for rural and urban areas of the state, the average urban workforce participation rate for male and female workers, and measures of the availability of a skilled workforce such as enrolments in literacy programs.

We hypothesize that labor conflict variables, variables that measure resource availability, input cost and infrastructure variables, and other indicators of economic development at the state level, have significant effects on the location of foreign projects. In particular, the availability of loans from EXIM and ICICI banks should have a sizeable positive impact on overseas investment since a large number of FDI projects have an export orientation.

Before discussing our results, we note that our estimations are likely to be affected by two main sets of selection issues. First, our data consists of only those FDI

projects that were located in the various states of India. If labor conflict deters new investment, a large set of FDI projects may not have been undertaken. Thus we have a non-randomly selected sample and our estimates may reflect sample selection bias. However, this is a conservative bias since our estimates do not capture the negative impact of labor conflict on those projects that were never implemented. Our results thus underestimate the overall deterring effects of labor problems; eliminating the bias should only strengthen the results of our study.

Second, our estimates may be affected by bias resulting from selection on unobservables. Consider two scenarios. First, a foreign firm that has extensive previous experience dealing with labor conflict issues decides the location of a project. The firm may locate the project in a state with relatively more labor problems solely because it is confident of being able to handle future conflicts, given its past experience. We can think of this firm (or project) as being more "able" to cope with labor problems. Since we do not have data on firm's past experience, this variable is unobserved from our perspective. However, the lack of such data may not be too problematic. This is because such unobserved variables lead to an underestimation of the true negative impact of labor conflict. If we included information on firm's past experience in dealing with labor issues (that is, if we had this information), our results should become stronger.

Alternatively, consider a scenario in which a state has a pro-worker reputation. That is, regardless of the true nature of labor laws, the local government has traditionally favored the worker in labor disputes. Foreign firms may shy away from locating projects in such states even if labor problems are relatively infrequent. Since we do not have information on the "local enforcement history" of states, the results of this study may overestimate the negative impact of labor conflict. However, our use of state fixed-effects controls for the influence of all such unobservables that are state-specific and time invariant. We acknowledge that overestimation of labor conflict's negative effect may

still be an issue in the case of unobservables that are not state-specific and time-invariant. Given paucity of data for correcting this in the present study, we hope to account for such concerns in future work.

Section 4.2: Empirical Results

Table 3(A) reports the results of a state fixed-effects estimation that controls for the endogeneity of our labor disputes variable. The dependent variable is the share of FDI projects (in a particular year) received by a state.[13] From column (1) of table 3(A), we find that lagged man-days lost normalized by size of the workforce and the number of lockouts normalized by size of the workforce have significant negative impacts on the share of FDI projects that a state receives. Loan disbursements from ICICI and EXIM banks, and the income level of a state (as measured by gross state domestic product) have strong positive effects on FDI. Planned outlays and research expenditures by states have no significant effects on the dependent variable, although input cost variables such as the average wage of unskilled labor has a significant negative effect on the share of FDI projects that a state receives. Column (2) reports results for the significant variables of the basic model in column (1).

In columns (3) – (4) of table 3(A), labor conflict variables are normalized by two different parameters. In column (3), labor variables are normalized by the size of the state's manufacturing sector; in column (4), labor variables are normalized by gross state domestic product. In both cases our base results hold, that is, states with relatively high

[13] In an alternative specification, we used the share of total new FDI investment the state receives as the dependent variable. In general, labor dispute variables (particularly man-days lost due to work-stoppage normalized by size of the workforce) exerted negative effects on the share of FDI investment at the state level. We report results of estimations that use the share of FDI projects at the state level as the dependent variable, since these results are more robust.

levels of labor disputes receive smaller shares of FDI projects.[14] Results for the other variables in columns (3)-(4) are consistent with those obtained in the basic model of column (1). Table 3(A) also provides measures of the estimated state-specific fixed effects. We observe that for the parsimonious specification of the basic model in column (2), many of the state-specific fixed effects are significant. This underlines the importance of controlling for state-specific unobservables in the estimation (a test that these state-level effects are jointly zero is strongly rejected).[15]

To investigate the influence of state-level heterogeneity on the labor disputes variable, we estimate models similar to the basic specification in table 3(A) separately for 1996-1997 and for 1998 – 2000. Estimates of state fixed-effects are obtained from both sets of regressions. As discussed above, estimates of fixed effects from 1998-2000 are used as instruments for the fixed effects from 1996-1997. The results of the instrumental variables specification are presented in table 3(B). The dependent variable in both columns of table 3(B) is mean man-days lost due to work-stoppage (lagged 1 year) normalized by size of the workforce (mean of the variable taken over 1996 and 1997). The independent variables include instrumented values of the 1996-1997 state-specific fixed effects (identifying instruments are the state fixed-effects from 1998-2000, the average Gini variable for rural and urban areas, normalized expenditures by the state on research and development, and normalized number of research and development projects in the state), average wage, gross state domestic product, other labor conflict variables, measures for literacy, and dummies for regions of the country that have traditionally been pro-worker in their political orientation. Since the normalized number of lockouts is

[14] In column (3), normalized number of strikes appears to increase the share of FDI projects that a state receives. This is counterintuitive, and is probably due to the high degree of correlation between the labor variables in column (3). The normalized number of lockouts in column (4) also has a positive effect; this is similarly explained.
[15] F[16,58]=75.91, Probability > F = 0.0000.

insignificant in column (1), column (2) reports results for the estimation that excludes this variable.

Both columns of table 3(B) show that the instrumented value of state-level unobservables has a significant negative impact on the labor conflict variable. This negative sign suggests that in states where location propensities are high, governments modify labor regulations (make them more pro-employer) in the hopes of translating high latent FDI location propensities to actual increasing amounts of FDI. Ignoring such correlations induces a downward bias in the labor coefficient, that is, the estimated effect will be smaller than its true value (note that the true effect of the labor conflict variable on shares of FDI is negative).

Various tests of validity for our identifying instruments were conducted. An F-test that these identifying instruments are jointly zero is rejected (F[4,11]=5.58, Probability > F = 0.0106). We also conducted two tests of the overidentifying restrictions. The *p*-value for Sargan N*R-sq test = 0.8231, and the *p*-value for the Basmann test = 0.9707. These *p*-values indicate that the null hypothesis cannot be rejected, that is, our identifying instruments are valid.

Finally, we also investigate whether there are any biases that result from the differing size of state economies. For example, if states with larger economies tend to have larger projects and smaller projects are excluded from our estimations, then spurious correlations could arise. In order to determine whether such a bias is present, we formulate a 'big state' dummy[16]. This dummy takes the value one if a state's industrial gross state product exceeds the median value (over all states). We interact this dummy with the labor conflict variables, and introduce these interaction terms into the basic model of table 3(A). The model thus contains the variables listed in column (1) of table 3(A) along with three additional terms (the interactions of the three labor disputes variables of column (1) with a big state dummy). If systematic differences in labor

[16] Big state dummy = 1 if state industrial GSP is greater than the median.

unrest by size of the state economy exist, then the interaction terms should be significant. Upon estimating the model, we find that the interactions are insignificant. Hence our estimates do not suffer from bias which results due to the differing size of state economies.

Section 5: Conclusions

This paper investigates the sensitivity of overseas investment to labor conflict across states of in India, using a state fixed-effects approach. We find that foreign direct investment tends to veer away from states that have high incidences of labor conflict, particularly as measured by the number of man-days lost due to work stoppages. Furthermore, results of our fixed effects technique confirm that measures of labor conflicts are endogenous in an analysis of FDI location in India. We find striking empirical evidence that labor disputes across states of India arise in a systematic fashion – state-level heterogeneity measures have significant negative impacts on our labor conflict variable. This suggests that states 'muffle' pro-worker legislations in the hopes of attracting new foreign direct investment.

This research has important implications for policy. Since the presence of foreign direct investment has significant positive benefits for a state (as seen from estimates of table 2 and from a poverty amelioration perspective), local governments that seek to encourage investments from abroad should be given a free hand (within reasonable limits) to modify labor laws and regulations. Moreover, states with low FDI location propensities (either due to poor infrastructure, lack of educated workers, or the presence of a political climate that favors an overly militant workforce) should be provided with adequate incentives by the central government to move to fostering an environment more hospitable to investment from overseas. Such a strategy would be welfare improving from all perspectives for a developing country like India.

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Table 1

Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent variables					
Number of FDI projects norm. by GSDP	80	0.1990	0.2454	0.0000	1.0408
Share of FDI projects	80	0.0625	0.0682	0.0016	0.2980
Net value added in state norm. by GSDP	80	1840.4080	1720.7210	547.8171	9781.8170
Net income of state	80	382249.8000	548769.1	0.0000	2668724
Mean man-days lost due to work-stoppage (lag. 1 year) norm. by size of workforce (mean of variable taken over 1996 & 1997)	16	0.0027	0.0019	0.0004	0.0086
Regressors **Labor variables**					
Man-days lost due to work-stoppage (lag. 1 year) norm. by size of workforce	80	0.0028	0.0042	0.0000	0.0333
Number of lockouts normalized by size of workforce	80	0.0001	0.0001	0.0000	0.0004
Number of strikes normalized by size of workforce	80	0.0001	0.0001	0.0000	0.0002
Man-days lost due to work-stoppage (lag. 1 year) norm. by size of state's manuf. sector	80	8.2980	11.9032	0.0000	77.0654
Number of lockouts normalized by size of state's manufacturing sector	80	0.2015	0.2544	0.0000	1.5560
Number of strikes normalized by size of state's manufacturing sector	80	0.2854	0.1935	0.0129	0.8755
Man-days lost due to work-stoppage (lag. 1 year) norm. by GSDP	80	2.0032	2.8690	0.0000	18.8793
Number of lockouts normalized by GSDP	80	0.1515	0.7382	0.0000	6.1345
Number of strikes normalized by GSDP	80	0.0444	0.0641	0.0000	0.2993
Variables that measure resource availability					
ICICI disbursement norm. by GSDP	80	17.2286	19.5034	1.1505	114.2497
EXIM loans norm. by GSDP	80	0.0419	0.0468	0.0000	0.2276
Planned outlay by state on manufac. Norm. by GSDP	80	22.5605	19.1661	2.5724	84.3262
GSDP	80	616.1555	403.2261	31.6243	2007.8480
Expenditures on R&D by state Norm. by GSDP	80	11.0959	6.1438	0.0000	25.7124
Number of R&D projects Norm. by GSDP	80	0.3110	0.6290	0.0000	3.3501

GSDP = Gross state domestic product. Data Range: 1996 – 2000.

Table 1 continued

Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Input cost and infrastructure variables					
Average wage for male and female unskilled labor	80	47.1998	13.3853	26.1633	96.2500
Average power rate for large and small industries (lag. 1 year)	80	336.8785	67.0306	169.2153	480.7041
Kilometers of surfaced roads (norm. by area of state) (lag. 1 year)	80	1.3763	3.7818	0.0000	16.2883
Other variables					
Average Gini for rural and urban areas (lag. 1 year)	80	0.2789	0.0165	0.2276	0.3150
Average urban workforce participation rate for males and females (lag. 1 year)	80	32.6380	2.9860	24.4125	39.2750
Enrolment in literacy program (per thousand of population)	80	124.0121	103.9686	0.0000	761.5831
Dummy for southern states	80	0.2500	0.4357	0.0000	1.0000
Dummy for eastern states	80	0.1875	0.3928	0.0000	1.0000
Fixed effects					
State fixed-effects from 1996-1997	16	-0.1093	0.0771	-0.3611	-0.0272
State fixed-effects from 1998-2000	16	0.0143	0.0534	-0.0354	0.1704

Data Range: 1996 – 2000.

Table 1(B)

Variables That Are Available From 1996-2000 With Their Sources

Variables	Source
FDI	
FDI projects by state	SIA Newsletter 2001 Annual Issue, Ministry of Commerce & Industry, Govt. of India
Labor variables	
Number of lockouts, strikes Man-days lost due to work-stoppage	Rajya Sabha Starred Question No. 196, dated 08.03.2001 Pocket Book of Labour Statistics 2000, Labour Bureau, Ministry of Labour, Govt. of India
Variables that measure resource availability	
EXIM bank loans	Report on Development Banking in India 2000-01, Industrial Development Bank of India
ICICI bank disbursement	Rajya Sabha Unstarred Question No.1794, dated 8.8.2000
Planned outlay by state on manufacturing	Handbook of Industrial Policy and Statistics, Ministry of Commerce & Industry, Govt. of India, 2000
Gross state domestic product	Central statistical organization
Number of R&D projects	Research and Development Statistics - Ministry of Science and Technology, Govt. of India
Expenditures on R&D by state	Research and Development Statistics - Ministry of Science and Technology, Govt. of India
Net value added	Annual Survey of Industries (1996-2000)
Net income of state	Annual Survey of Industries (1996-2000)
Input cost and infrastructure variables	
Average daily wage for unskilled male and female workers	Building Material Prices and Wages of Labour, Ministry of Urban Development & Poverty Alleviation, Govt. of India.
Average power rate for large and small industries	Rajya Sabha Unstarred Question No. 845, dated 24.07.2002.
Kilometers of surfaced roads	Basic Road Transport Statistics of India, Ministry of Transport and Highways, Govt. of India
Other variables	
Average Gini for rural and urban areas	National Human Development Report 2001, Planning Commission, Govt. of India.
Average urban workforce participation rate for males and females	India Yearbook 2002, Manpower Profile.
Enrolment in literacy program	Annual Report 1998-99, Literacy Campaigns in India, National Literacy Mission, Directorate of Adult Education, Ministry of Human Resource Development.
Normalization variables	
Industrial GSP	Central statistical organization
Gross state domestic product	Central statistical organization
Total workforce	2001 Census, Government of India
Population in Thousands (1996-2000)	Population Projections for India and States 1996-2016, Registrar General, Ministry of Home Affairs, Govt. of India.
Area in Square Kilometers (1996-2000)	1991 Census, Govt. of India

Table 2

Effect of FDI on Selected State Outcomes

Variable	Net Value Added (normalized by gross state domestic product) in State (1)	Net Income of State (2)
Number of FDI projects normalized by gross state domestic Product	945.26255[#] (508.55880)	
Share of FDI projects		3345080 (4249360.00000)
Man-days lost due to work-stoppage (lagged 1 year) normalized by gross state domestic product	-3.16825 (51.58542)	-3158.31205 (37917.00315)
Planned outlay by state on manufacturing normalized by gross state domestic Product	33.21648** (7.86574)	-3984.39995 (5945.84403)
Constant	909.25230** (232.24996)	269399.0343 (345177.91568)
Observations	80	80
Number of state fixed-effects	16	16
R-squared	0.274	0.024

A linear state fixed-effects model is used to estimate the above specifications. Data range from 1996-2000. Standard errors in parentheses. [#] Significant at 10%; * significant at 5%; ** significant at 1%.

Table 3(A)

Fixed Effects Estimation: Basic Model & Sensitivity Analyses

Variable	Basic Model (1)	Sensitivity Analyses (2)	(3)	(4)
Man-days lost due to work-stoppage	-0.97187**	-1.01394**		
(lag. 1 year) norm. by size of workforce	(0.31892)	(0.23688)		
Number of lockouts normalized by	-54.52534*	-41.82276#		
size of workforce	(24.04185)	(24.92590)		
Number of strikes normalized by	0.63088			
size of workforce	(50.88053)			
Man-days lost due to work-stoppage (lag. 1			-0.00053**	
year) norm. by size of state's manuf. sector			(0.00017)	
Number of lockouts normalized by			-0.01734**	
size of state's manufacturing sector			(0.00563)	
Number of strikes normalized by			0.02775#	
size of state's manufacturing sector			(0.01457)	
Man-days lost due to work-stoppage				-0.00166*
(lag. 1 year) norm. by gross state dom. pdt.				(0.00075)
Number of lockouts normalized by				0.00604*
gross state domestic product				(0.00264)
Number of strikes normalized by				-0.02276
gross state domestic product				(0.02664)
ICICI disbursement normalized by	0.00054**	0.00048**	0.00054**	0.00064**
gross state domestic product	(0.00012)	(0.00012)	(0.00012)	(0.00012)
EXIM loans normalized by	0.13941**	0.14613**	0.12982**	0.09522#
gross state domestic product	(0.05159)	(0.05042)	(0.04689)	(0.05191)
Planned outlay by state on manufacturing	-0.00004		0.00002	-0.00021
norm. by gross state domestic product	(0.00019)		(0.00017)	(0.00018)
Gross state domestic product	0.00007*	0.00008*	0.00007#	0.00007*
	(0.00003)	(0.00003)	(0.00004)	(0.00003)
Expenditures on R&D by state	-0.00125		-0.00165	-0.00175
norm. by gross state domestic product	(0.00117)		(0.00112)	(0.00106)
Average wage for male and female	-0.00044#	-0.00052*	-0.00039	-0.0003
unskilled labor	(0.00027)	(0.00023)	(0.00026)	(0.00026)
Average power rate for large and	0.00002		0.00003	0.00003
small industries (lag. 1 year)	(0.00004)		(0.00003)	(0.00004)
Average Gini for rural and urban	0.17783		0.13172	0.35981*
areas (lag. 1 year)	(0.15940)		(0.14958)	(0.16976)
Average urban workforce participation	-0.00028		-0.00034	-0.00074
rate for males and females (lag. 1 year)	(0.00087)		(0.00093)	(0.00097)
Kilometers of surfaced roads	-0.00037		-0.00012	-0.00138
(norm. by area of state) (lag. 1 year)	(0.00209)		(0.00175)	(0.00213)
Enrolment in literacy program	0.00001		-0.000003	0.00004#
(per thousand of population)	(0.00002)		(0.00002)	(0.00002)

Data range = 1996-2000. Dependent variable is share of FDI. Robust standard errors in parenthesis. # Significant at 10%; * significant at 5%; ** significant at 1%.

Table 3(A) continued

Fixed Effects Estimation: Basic Model & Sensitivity Analyses

Variable	Basic Model	Sensitivity Analyses		
	(1)	(2)	(3)	(4)
Andhra Pradesh Dummy	-0.02517	0.0078	-0.00494	-0.06111
	(0.05325)	(0.02244)	(0.05425)	(0.05078)
Bihar dummy	-0.04422	-0.01055	-0.03286	-0.08297#
	(0.04346)	(0.01282)	(0.04428)	(0.04311)
Gujarat dummy	-0.02361	-0.00319	-0.01252	-0.04885
	(0.05774)	(0.02087)	(0.05889)	(0.05235)
Haryana dummy	0.01809	0.04171**	0.02449	-0.01174
	(0.04910)	(0.01084)	(0.05049)	(0.04758)
Karnataka dummy	0.04411	0.08045**	0.05472	0.00724
	(0.05069)	(0.01714)	(0.05144)	(0.04909)
Kerala dummy	0.0004	0.02694#	0.01335	-0.03109
	(0.04585)	(0.01389)	(0.04758)	(0.04629)
Madhya Pradesh dummy	-0.05951	-0.02086	-0.04777	-0.09774#
	(0.05114)	(0.01778)	(0.05177)	(0.04897)
Maharashtra dummy	0.08931	0.11810*	0.10912	0.05769
	(0.07561)	(0.04971)	(0.07750)	(0.06832)
Orissa dummy	-0.02778	0.00399	-0.01992	-0.0638
	(0.04369)	(0.00824)	(0.04477)	(0.04484)
Punjab dummy	-0.02447	0.00409	-0.01136	-0.05838
	(0.04646)	(0.01150)	(0.04754)	(0.04588)
Rajasthan dummy	-0.04078	0.00017	-0.03579	-0.08095#
	(0.04334)	(0.01239)	(0.04472)	(0.04475)
Tamil Nadu dummy	0.05951	0.09483**	0.06617	0.02419
	(0.05418)	(0.02227)	(0.05608)	(0.05076)
Uttar Pradesh dummy	-0.06353	-0.02859	-0.04766	-0.10202#
	(0.06427)	(0.03431)	(0.06552)	(0.05907)
West Bengal dummy	-0.031	0.00984	-0.01227	-0.0736
	(0.05018)	(0.02029)	(0.05175)	(0.05007)
Other dummy	0.00142	0.02677**	0.00726	-0.04066
	(0.04019)	(0.00996)	(0.04143)	(0.04541)
Delhi dummy	0.04054	0.08657**	0.0421	0.00324
	(0.04818)	(0.01230)	(0.04769)	(0.05208)
Observations	80	80	80	80
R-squared	0.992	0.991	0.992	0.992

Data range = 1996-2000. Dependent variable is share of FDI. Robust standard errors in parenthesis. # Significant at 10%; * significant at 5%; ** significant at 1%.

Table 3(B)

Instrumental Variables Results for Labor Conflict (1996-1997)

Variable	(1)	(2)
Instrumented state fixed	-0.02533#	-0.02183#
effect from 1996-1997	(0.01533)	(0.01171)
Average wage for male	0.00007	0.00007
and female unskilled labor	(0.00009)	(0.00008)
Gross state domestic product	0.00001*	0.00001*
	(0.000004)	(0.000003)
Enrolment in literacy program	0.00003*	0.00003**
(per thousand of population)	(0.00002)	(0.00001)
Dummy for southern states	0.00131	0.00101
	(0.00167)	(0.00107)
Dummy for eastern states	0.00305	0.00298
	(0.00274)	(0.00242)
Loans disbursed by ICICI norm.	-0.00006	-0.00006
by gross state domestic product	(0.00005)	(0.00004)
Number of strikes normalized	36.02684#	34.30241#
by size of workforce	(20.49070)	(18.47100)
Number of lockouts normalized	-5.70305	
by size of workforce	(21.89861)	
Constant	-0.01562#	-0.01491#
	(0.00865)	(0.00808)
Observations	16	16
R-squared	0.388	0.44

Dependent variable is mean man-days lost due to work-stoppage (lagged 1 year) normalized by size of workforce (mean of the variable taken over 1996 and 1997). Southern states include Andhra Pradesh, Kerala, Tamil Nadu, and Karnataka. Eastern states include Bihar, Orissa, and West Bengal. Robust standard errors in parentheses.
Significant at 10%; * significant at 5%; ** significant at 1%.

Tests of Instrument Validity:

1. Identifying instruments include the derived state fixed-effect from 1998-2000, the average Gini for rural and urban areas, normalized expenditures by the state on R&D, and the normalized number of R&D projects in the state. An F-test that these identifying instruments are jointly zero is strongly rejected (F[4,11]=5.58, Probability > F = 0.0106).

2. Tests of overidentifying restrictions: *p*-value for Sargan N*R-sq test = 0.8231, and *p*-value for Basmann test = 0.9707. Thus, the null hypothesis cannot be rejected, which implies that our identifying instruments are valid.

Figure 1
Share of FDI Projects Per State

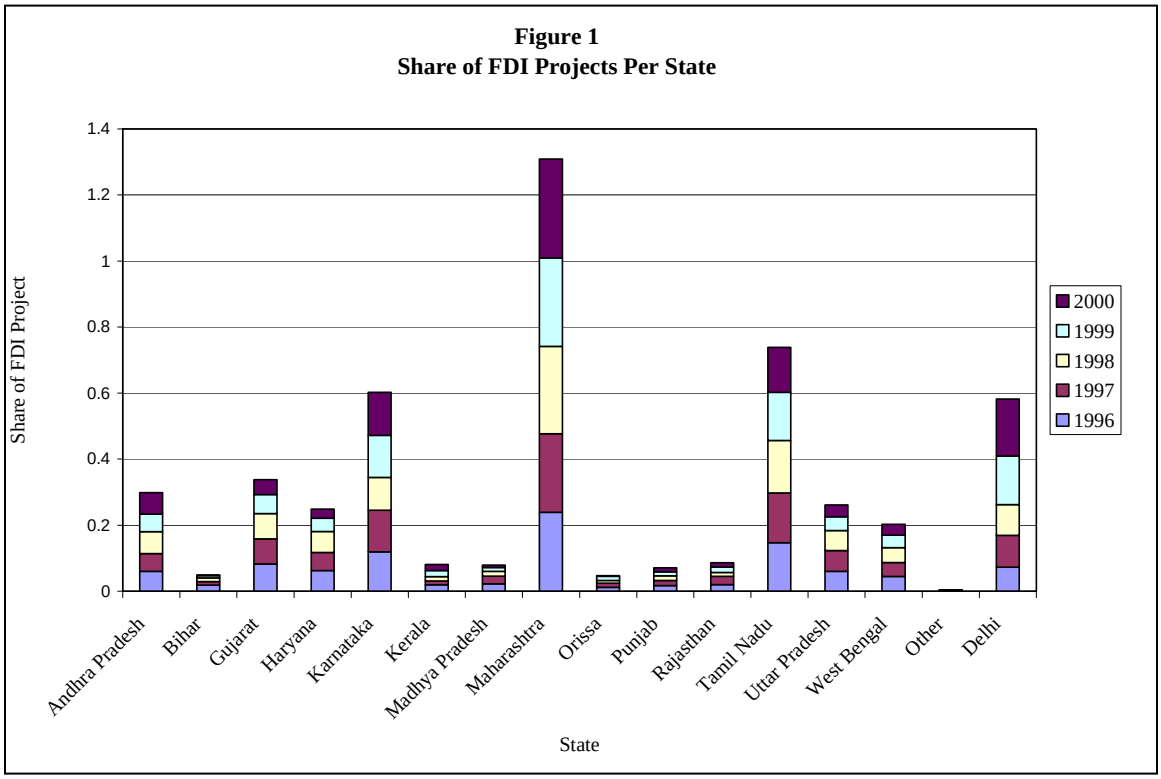
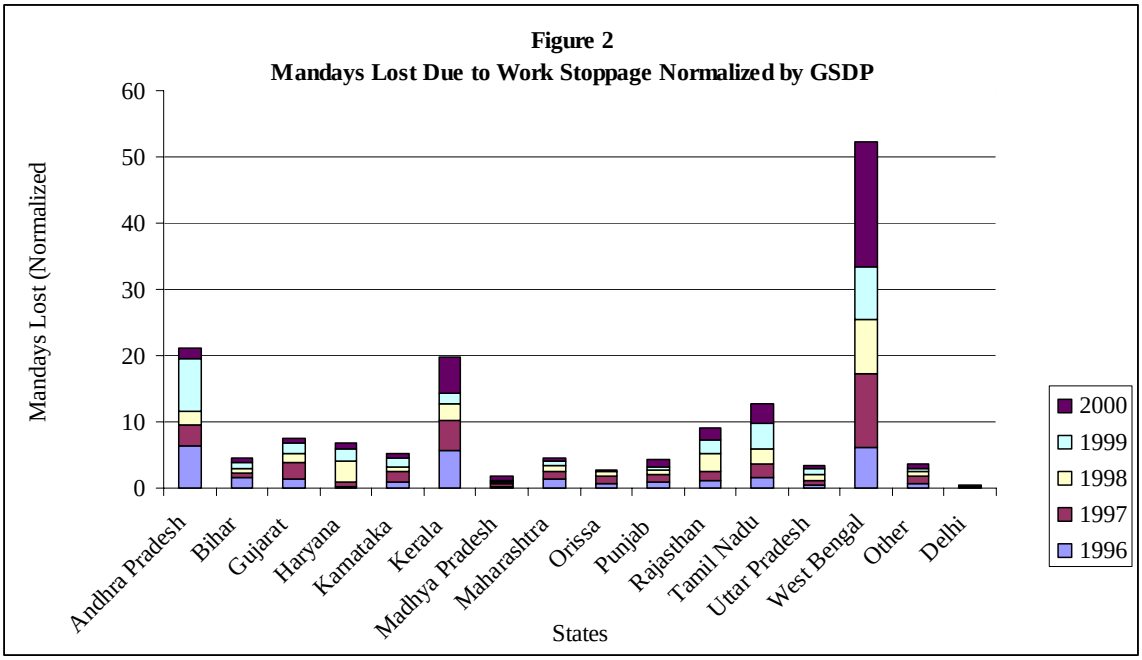


Figure 2
Mandays Lost Due to Work Stoppage Normalized by GSDP



Supplementary Appendix

Table 4 - State/Union Territory Classifications

State/ Union Territory	Classification Code	State/Union Territory	Classification Code
Andhra Pradesh	1	Orissa	9
Bihar, Jharkhand	2	Punjab, Chandigarh	10
Gujarat, Dadar & Nagar Haveli	3	Rajasthan	11
Haryana	4	Tamil Nadu, Pondicherry	12
Karnataka	5	Uttar Pradesh, Uttaranchal	13
Kerala	6	West Bengal	14
Madhya Pradesh, Chattisgarh	7	Arunachal Pradesh, Jammu & Kashmir, Mizoram, Nagaland, Sikkim, Himachal Pradesh, Assam, Tripura Meghalaya	15
Maharashtra, Goa, Daman & Diu	8	Delhi	16

Table 5 - Regional Dummies

Dummies	Regions	States
Region 1	North	Haryana, Punjab, Rajasthan, Uttar Pradesh, Delhi
Region 2	South	Andhra Pradesh, Kerala, Tamil Nadu, Karnataka
Region 3	East	Bihar, Orissa,West Bengal
Region 4	West	Gujarat, Madhya Pradesh, Maharashtra
Region 5	Other	Arunachal Pradesh, Jammu & Kashmir, Mizoram, Nagaland, Sikk Himachal Pradesh, Assam, Tripura, Meghalaya