Indian Labour Regulation and Its Impact on Unemployment: A Leximetric Study, 1970-2006

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2011

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Abstract

This paper analyses a new leximetric dataset on Indian labour law over a long period 1970-2006. There are five broad aspects of labour law such as Alternative employment contracts, Regulation of working time, Regulation of dismissal, Employee representation and Industrial action. Indian labour regulation is more concerned with the regulation of dismissal. It is more pro-labour than any of the four major OECD countries such as France, Germany, UK and USA. There is no evidence that more labour friendly regulation leads to more unemployment and industrial stagnation. Rather the direction of causality is from unemployment and output to labour regulation.

1. Introduction

The regulation of labour market to protect the interest of labour is often taken as an exogenous interference with market relations causing a reduction in employment and productivity. During the era of Reaganomics and Thatcherism in the 1980s, USA and UK underwent a process of labour market deregulation (along with other things) and subsequently it has become the essential part of 'Washington Consensus'-IMF-World Bank policy package prescribed to the crisis-stricken less developed countries.

In the late 1990s La Porta and his collaborators (La Porta et al., 1997, 1998, 1999, 2000; 2006, 2008; Djankov et al., 2003; Glaeser and Shleifer, 2002, 2003; Beck et al., 2003a, 2003b; Botero et al., 2004) set in motion a series of systematic analysis of the relationships between legal and economic variables. Legal variables ('leximetric' data) are by and large binary variables (0, 1) used to quantify the quality of various types of law that exist in different countries to protect the interests of various stakeholders such as shareholders, creditors and labourers. The countries are classified according to their 'legal origin': English common law and civil law are two broad categories. Through various cross-section regression studies of these 'leximetric' data, it is argued that English common law systems are more market-friendly; they provide higher level of shareholder and creditor protection to promote financial development. It is also pointed out that the civil law countries interfere more in the labour market which exerts a negative impact on employment and productivity.

A similar viewpoint can be found in IMF (2003). The IMF called for the deregulation of European labour markets and argued that reforms intended to bring European labour laws into lines with those of the US would cut unemployment by over a third. The OECD has maintained the view that the deregulatory approach of its 1994 Jobs Strategy (OECD, 1994) retains 'plausibility' (OECD, 2004: 165). The World Bank's *Doing Business Report* stated that 'laws created to protect workers often hurt them' and that 'more flexible labour regulations boost job creation' (World Bank, 2008: 19).

This World Bank view ('laws created to protect workers often hurt them') was supported by Besley and Burgess (2004) in the context of India. They showed that that Indian provinces ('states ') which enacted pro-labour regulation experienced lowered output, employment, investment, and productivity in registered or formal manufacturing. The work of Bhattacharjea (2006) strongly refuted their arguments.

In this perspective, we shall study Indian labour law and its unemployment consequence on the basis of a new dataset available from the source of Centre for Business Research, CBR (University of Cambridge, UK) over a long time span 1970-2006.[1] Availability of such a long continuous leximetric data provides us an opportunity to use more sophisticated econometric technique to address the causality issue (without relying on casual empiricism based on scattered evidence). In the next section we shall first discuss the changing pattern of the various aspects of labour regulation in India over the whole

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[1] CBR data on labour regulations are available for five countries: four OECD countries (UK, USA, France and Germany) and India over a long time span, 1970-2006.

period (1970-2006) for which the CBR data are available. In section 3 we shall examine the impact of labour regulations on the state of unemployment.

2. Indian Labour Regulation: A Leximetric Study

CBR data on labour regulation index consists of 40 variables (numbered 1 to 40 – see Table 1 for details). Each variable assumes the value between 0 (least labour-friendly) and 1 (most labour-friendly). This dataset is available for 5 countries (France, Germany, UK, USA and India) over the period 1970-2006. We are analysing here Indian data.

Examining the data at the variable-level, we find that India experienced changes only in 9 variables (in all cases only once). So the variability of the labour regulation index is accounted for by these nine variables. Simple average of these nine variables is plotted along with the simple average of the 40 variables in Figure 1. Evidently the changes are not frequent. Over the 37 year period (1970-2006), changes in the regulation took place in the following six years: 1971, 1974, 1976, 1984, 1985 and 1998.

Out of the 9 variables only one declined (became less pro-labour). This is the law relating to political industrial action – whether strikes over political (i.e. non-work related) issues are permitted (variable 33). It becomes the most stringent in 1998 (it got the score 0 during 1998-2005 from the earlier period score 0.5).

Eight other variables improved (became more pro-labour):

1. Variable 7 concerning the prohibition of the use of agency labour – it rose from 0 to 0.5 in 1974;

2. Variable 8 concerning equal treatment of agency workers rose from 0 to 0.5 in 1974;

3. Variable 16 concerning the legally mandated notice period for all dismissals of the workers with 3 years of employment attains the perfect score 1 (12 weeks' notice for dismissal) in 1976 from 0.33 (3 weeks' notice) ;

4. Variable 20 concerning constraint on dismissal improved from 0 to 0.33 in 1971;

5. Variable 21 concerning reinstatement remedy for unfair dismissal improved from 0.33 (compensation is the normal remedy) to 0.67 (reinstatement and compensation are, de jure and de facto, alternative remedies) in 1971;

6. Variable 22 regarding notification of dismissal improved from 0.67 (third party or a state body has to be notified prior to dismissal) to 1 (the employer has to obtain the permission of a state body or third party prior to dismissal) in 1976.

7. Variable 27 concerning employers' duty to bargain rose from 0 (the employers may lawfully refuse to bargain with workers) to 0.5 (moderate legal binding to bargain) in 1984.

8. Variable 40 regarding replacement of striking workers attained the perfect score (law prohibits employers to fire striking workers or to hire replacement labour to maintain the plant in operation during a non-violent and non-political strike) in 1985 from the minimum score (no prohibition).

Out of 30 variables showing no change, seven variables attained the perfect score 1:

Variable 1 concerning the legal status of the worker (law mandates the employee status, if certain conditions are met), Variable 6 regarding the maximum duration of fixed term contracts (one year is the maximum duration of fixed term contract which is deemed to be permanent), Variable 11 concerning overtime premium (it is double), Variable 19 concerning the procedural constraints on dismissal (dismissal is necessarily unjust if the employer fails to follow procedural requirements prior to dismissal), Variable 23 concerning redundancy selection (by law employer must follow priority rules based on seniority etc prior to dismissing for redundancy), Variable 24 regarding priority in re-employment (by law employer must follow priority rules relating to the re-employment of the former workers) and Variable 34 concerning sympathetic strike action (there are no constraints on secondary or sympathy strike action). Subsequently three more variables attained that perfect score (variables 16, 22 and 40 already mentioned).

Six variables remained at the minimum possible score (zero):

Variable 12 concerning weekend working (no premium for weekend working), Variable 13 concerning limits to overtime working (no limit), Variable 26 regarding collective bargaining (no entry in the constitution), Variable 29 regarding closed shop (neither pre-entry nor post-entry closed shops are permitted to operate), Variable 30 regarding board membership (no legal right of the unions and/or workers to nominate board-level directors) and Variable 36 concerning right to industrial action incorporated in the constitution (no such constitutional right).

The 40 variables are broadly categorized into 5 components: regulations concerning alternative employment contracts (variables 1 to 8), regulation of working time (variables 9 to 15), regulation of dismissal (variables 16 to 24), regulations relating to employee representation (variables 25 to 31) and industrial action (variables 32 to 40).

In terms of the broad categories, we find that regulations concerning alternative employment contact (variables 1 to 8) changed for the better once in 1974; similarly regulations relating to employee representation (variable 25 to 31) changed for the better once in 1984. The regulations relating to industrial action (variables 32 to 40) changed for the better in 1984 and worsened in 1998. Regulation of working time (variables 9 to 15) remained unchanged throughout the period of study. Regulation of dismissal (variables 16 to 24) is the most important element in Indian labour regulation; it becomes more and more labour-friendly (see Figure 2). Compared to four other countries Indian labour regulation concerning dismissal is more labour-friendly (see Figure 3).

3. Labour Regulation and Unemployment: A Study of Causality

Now the question is: is there causal impact of labour regulation on unemployment during 1970-2006. To answer this question we have collected data on registered unemployment (number of people in live unemployment resister) from the source of RBI (Reserve Bank of India, Handbook of Statistics on Indian Economy –available online). To control for the state of the economy - especially the organized sector, we have used real output of the

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Very Convenient Location industrial sector - India's industrial output (at 1999-2000 prices) collected from the same RBI source.

As a first step towards the study of relationships among these variables we have to follow the standard practice of conducting the unit root test. That is to say we have to examine the order of integration – how many times the data are to be differenced to achieve stationarity. Our ADF (Augmented Dickey-Fuller) tests show that all the series are I (1) – integrated of order 1 – first-difference stationary (Table 2).

In view of the non-stationarity in the series the standard regression analysis of the variables in level terms is misleading. We have to go for cointegration analysis. Various tests of cointegration (Trace and Maximum Eigenvalue) are done - these support that the three variables are cointegrated - that is to say meaningful long-term relationships exist between them (Table 3).

To ascertain the nature of short-term adjustment process leading to long-term relationships we have estimated three possible VEC (Vector Error Correction) models - estimates are reported in Table 4. On the basis of the VEC models we undertake Granger causality test to ascertain the direction of causality (Table 5). These show one meaningful relationship (model 1 in Table 4) - labour regulation has a short-term negative relationship with unemployment and there exists a stable adjustment path leading to a long-term negative relationship. That is to say, less unemployment leads to more labour friendly regulation.

We also find a positive effect of industrial output on labour-friendly regulation but the Granger causality tests tell that the arrow runs from the opposite direction -from labour-friendly regulation to industrial growth. The VEC model (Model 3 of Table 4) shows a positive long-term impact of labour regulation and a negative long-term impact of unemployment on industrial output. The implication is that a more labour-friendly regulation pushes up industrial output and less unemployment increases industrial production (perhaps due to demand-pull). However, the adjustment path from the short-term to long-term relationship is not significantly stable discounting the importance of these observations. There is, however, no evidence that more labour friendly regulation leads to more unemployment (as per the findings of Model 2 of Table 4 and causality test results reported in Table 5).

4. Conclusions

This paper examines Indian labour law and its unemployment consequence on the basis of a new dataset available from the source of Centre for Business Research, CBR (University of Cambridge, UK) over a long time span 1970-2006. There are five broad aspects of labour law such as Alternative employment contracts, Regulation of working time, Regulation of dismissal, Employee representation and Industrial action. Indian labour regulation is more concerned with the regulation of dismissal. It is more pro-labour than any of the four major OECD countries such as France, Germany, UK and USA.

After describing the trend and pattern of Indian labour regulation, this paper examines the causal impact of labour regulation on unemployment. Availability of such a long continuous leximetric data provides us an opportunity to use more sophisticated econometric technique - Vector Error Correction (VEC) model and VEC causality tests to address the causality issue (without relying on casual empiricism based on scattered evidence). It finds no evidence that more labour friendly regulation leads to more unemployment and industrial stagnation. Thus it questions the conventional wisdom found in the phrases such as 'laws created to protect workers often hurt them.'

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Table 1. India's Labour Regulation Index, 1970-2006: Different Components

Variables (Values and the Changes)	Description
A. Alternative employment contracts (0.5 during 1970-73, thereafter 0.63)	*Measures the cost of using alternatives to the 'standard' employment contract, computed as an average of the variables 1-8.*
1. The law, as opposed to the contracting parties, determines the legal status of the worker (1 –no change)	Equals 0 if the parties are free to stipulate that the relationship is one of self-employment as opposed to employee status; 0.5 if the law allows the issue of status to be determined by the nature of the contract made by the parties (as in the case of the English common law 'mutuality of obligation' test); and 1 if the law mandates employee status on the parties if certain specified criteria are met (such as form of payment, duration of hiring, etc.). Scope for scores between 0 and 1 to reflect changes in the strength of the law.
2. Part-time workers have the right to equal treatment with full-time workers (0.5 –no change)	Equals 1 if the legal system recognises a right to equal treatment for part-time workers (as, for example, in the case of EC Directive 97/81/EC. Equals 0.5 if the legal system recognises a more limited right to equal treatment for part-time workers (via, e.g., sex discrimination law or a more general right of workers not be treated arbitrarily in employment). Equals 0 if neither of the above. Scope for scores between 0 and 1 to reflect changes in the strength of the law.
3. The cost of dismissing part-time workers is equal in proportionate terms to the cost of dismissing full-time workers (0.5 –no change)	Equals 1 if as a matter of law part-time workers enjoy proportionate rights to full-time workers in respect of dismissal protection (notice periods, severance pay and unjust dismissal protection). Equals 0 otherwise. Scope for further gradation 0 and 1 to reflect changes in the strength of the law.
4. Fixed-term contracts are allowed only for work of limited duration. (0.5 –no change)	Equals 1 if the law imposes a substantive constraint on the conclusion of a fixed-term contract, by, for example, allowing temporary hirings only for jobs which are temporary by nature, training, seasonal work, replacement of workers on maternity or sick leave, or other specified reasons. Equals 0 otherwise. Scope for gradation between 0 and 1 to reflect changes in the strength of the law.
5. Fixed-term workers have the right to equal treatment with permanent workers (0.5 –no change)	Equals 1 if the legal system recognises a right to equal treatment for fixed-term workers (as, for example, in the case of EC Directive 99/70/EC).

	Equals 0.5 if the legal system recognises a more limited right to equal treatment for fixed-term workers (via, e.g., more general right of workers not be treated arbitrarily in employment)
	Equals 0 if neither of the above.
	Scope for further gradation between 0 and 1 to reflect changes in the strength of the law.
6. Maximum duration of fixed-term contracts (1 –no change)	Measures the maximum cumulative duration of fixed-term contracts permitted by law before the employment is deemed to be permanent. The score is normalised from 0 to 1, with higher values indicating a lower permitted duration. The score equals 1 if the maximum limit is 1 year or less and 0 if it is 10 years or more or if there is no legal limit.
7. Agency work is prohibited or strictly controlled (0 during 1970-73, thereafter 0.5)	Equals 1 if the legal system prohibits the use of agency labour. Equals 0.5 if it places substantive constraints on its use (in the sense of allowing it only if certain conditions are satisified, such as a demonstrable need on the part of the employer to meet fluctuations in labour demand). Equals 0 if neither of the above. Scope for further gradation between 0 and 1 to reflect changes in the strength of the law.
8. Agency workers have the right to equal treatment with permanent workers of the user undertaking (0 during 1970-73, thereafter 0.5)	Equals 1 if the legal system recognises a right to equal treatment for agency workers, in relation to permanent workers of the user undertaking, in respect of terms and conditions of employment in general Equals 0.5 or another intermediate score if the legal system recognises a more limited right to equal treatment for agency workers workers (for example, in respect of anti-discrimination law) Equals 0 if neither of the above. Scope for further gradation between 0 and 1 to reflect changes in the strength of the law.
B. Regulation of working time (0.39 –no change)	*Measures the regulation of working time, computed as an average of variables 9-15.*
9. Annual leave entitlements (0.5 –no change)	Measures the normal length of annual paid leave guaranteed by law or collective agreement. The same score is given for laws and for collective agreements which are de facto binding on most of the workforce (as in the case of systems which have extension legislation for collective agreements). The score is normalised on a 0-1 scale, with a leave entitlement of 30 days equivalent to a score of 1.
10. Public holiday entitlements (0.28 –no change)	Measures the normal number of paid public holidays guaranteed by law or collective agreement. The same score is given for laws and for collective agreements which are de facto binding on most of the workforce (as in the case of systems which have extension legislation for collective agreements). The score is normalised on a 0-1 scale, with an entitlement of 18 days equivalent to a score of 1.
11. Overtime premia (1 –no change)	Measures the normal premium for overtime working set by law or by collective agreements which are generally applicable. The same score is given for laws and for collective agreements which are de facto binding on most of the workforce (as in the case of systems which have extension legislation for collective

	agreements). The score equals 1 if the normal premium is double time, 0.5 if it is time and half, and 0 is there is no premium.
12. Weekend working (0 –no change)	Measures the normal premium for weekend working set by law or by collective agreements which are generally applicable. The same score is given for laws and for collective agreements which are de facto binding on most of the workforce (as in the case of systems which have extension legislation for collective agreements). The score equals 1 if the normal premium is double time, 0.5 if it is time and half, and 0 is there is no premium. Also equals 1 if weekend working is strictly controlled or prohibited.
13. Limits to overtime working (0 –no change)	Measures the maximum weekly number of overtime hours permitted by law or by collective agreements which are generally applicable. The score equals 1 if there is a maximum duration to weekly working hours, inclusive of overtime, for normal employment; 0.5 if there is a limit but it may be averaged out over a reference period of longer than a week; and 0 if there is no limit on any kind.
14. Duration of the normal working week (0.13 –no change)	Measures the maximum duration of the normal working week exclusive of overtime. The score is normalised on a 0-1 scale with a limit of 35 hours or less scoring 1 and a limit of 50 hours or more, or no limit, scoring 0. The same score is given for laws and for collective agreements which are de facto binding on most of the workforce (as in the case of systems which have extension legislation for collective agreements).
15. Maximum daily working time (0 .85–no change)	Measures the maximum number of permitted working hours in a day, taking account of rules governing rest breaks and maximum daily working time limits. The score is normalised on a 0-1 scale with a limit of 8 hours or less scoring 1 and a limit of 18 hours or more scoring 0.
C. Regulation of dismissal (0.61 in 1970, 0.69 during 1971-75;0.8 thereafter)	***Measures the regulation of dismissal, calculated as the average of variables 16-24***
16. Legally mandated notice period (all dismissals) (0.33 during 1970-75 and 1 thereafter)	Measures the length of notice, in weeks, that has to be given to a worker with 3 years' employment. Normalise the score so that 0 weeks = 0 and 12 weeks = 1.
17. Legally mandated redundancy compensation (0.5 –no change)	Measures the amount of redundancy compensation payable to a worker made redundant after 3 years of employment, measured in weeks of pay. Normalise the score so that 0 weeks = 0 and 12 weeks = 1.
18. Minimum qualifying period of service for normal case of unjust dismissal (0.66 in 1970 thereafter 0.67)	Measures the period of service required before a worker qualifies for general protection against unjust dismissal. Normalise the score so that 3 years or more = 0, 0 months = 1
19. Law imposes procedural constraints on dismissal (1 –no change)	Equals 1 if a dismissal is necessarily unjust if the employer fails to follow procedural requirements prior to dismissal Equals 0.67 if failure to follow procedural requirements will normally lead to a finding of unjust dismissal. Equals 0.33 if failure to follow procedural requirement is just one factor taken into account in unjust dismissal cases. Equals 0 if there are no procedural requirements for dismissal. Scope for gradations between 0 and 1 to reflect changes in the strength of the law.
20. Law imposes substantive constraints on dismissal (0 in 1970, 0.33 thereafter)	Equals 1 if dismissal is only permissible for serious misconduct or fault of the employee. Equals 0.67 if dismissal is lawful according to a wider range of legitimate reasons (misconduct, lack of capability, redundancy, etc.).

	Equals 0.33 if dismissal is permissible if it is 'just' or 'fair' as defined by case law.
	Equals 0 if employment is at will (i.e., no cause dismissal is normally permissible).
	Scope for gradations between 0 and 1 to reflect changes in the strength of the law.
21. Reinstatement normal remedy for unfair dismissal (0.33 in 1970, 0.67 thereafter)	Equals 1 if reinstatement is the normal remedy for unjust dismissal and is regularly enforced.
	Equals 0.67 if reinstatement and compensation are, de iure and de facto, alternative remedies.
	Equals 0.33 if compensation is the normal remedy.
	Equals 0 if no remedy is available as of right.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
22. Notification of dismissal (0.67 during 1970-75, 1 thereafter)	Equals 1 if by law or binding collective agreement the employer has to obtain the permission of a state body or third body prior to an individual dismissal.
	Equals 0.67 if a state body or third party has to be notified prior to the dismissal.
	Equals 0.33 if the employer has to give the worker written reasons for the dismissal.
	Equals 0 if an oral statement of dismissal to the worker suffices.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
23. Redundancy selection (1 –no change)	Equals 1 if by law or binding collective agreement the employer must follow priority rules based on seniority, marital status, number or dependants, etc., prior to dismissing for redundancy.
	Equals 0 otherwise.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
24. Priority in re-employment (1 –no change)	Equals 1 if by law or binding collective agreement the employer must follow priority rules relating to the re-employment of former workers.
	Equals 0 otherwise.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
D. Employee representation *(0.2 during 1970-83, 0.27 thereafter)*	***Measures the strength of employee representation, calculated as the average of variables 25-31.***
25. Right to unionisation (0 .33–no change)	Measures the protection of the right to form trade unions in the country's constitution (loosely interpreted in the case of system such as the UK without a codified constitution).
	Equals 1 if a right to form trade unions is expressly granted by the

	constitution.
	Equals 0.67 if trade unions are described in the constitution as a matter of public policy or public interest.
	Equals 0.33 if trade unions are otherwise mentioned in the constitution or there is a reference to freedom of association which encompasses trade unions.
	Equals 0 otherwise.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
26. Right to collective bargaining (0 –no change)	Measures the protection of the right to collective bargaining or the right to enter into collective agreements in the country's constitution (loosely interpreted in the case of system such as the UK without a codified constitution).
	Equals 1 if a right to collective bargaining is expressly granted by the constitution.
	Equals 0.67 if collective bargaining is described as a matter of public policy or public interest (or mentioned within the chapter on rights).
	Equals 0..33 if collective bargaining is otherwise mentioned in the constitution.
	Equals 0 otherwise.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
27. Duty to bargain (0 during 1970-83, 0.5 thereafter)	Equals 1 if employers have the legal duty to bargain and/or to reach an agreement with unions, works councils or other organizations of workers.
	Equals 0 if employers may lawfully refuse to bargain with workers.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
28. Extension of collective agreements (0.75 –no change)	Equals 1 if the law extends collective agreements to third parties at the national or sectoral level. Extensions may be automatic, subject to governmental approval, or subject to a conciliation or arbitration procedure.
	Equals 0 if collective agreements may not be extended to non-signatory workers or unions, or if collective agreements may be extended only at the plant level. Mandatory administrative extensions of collective agreements are coded as equivalent to mandatory extensions by law.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
29. Closed shops (0 –no change)	Equals 1 if the law permits both pre-entry and post-entry closed shops.
	Equals 0.50 if pre-entry closed shops are prohibited or rendered ineffective but post-entry closed shops are permitted (subject in some cases to exceptions e.g. for pre-existing employees).
	Equals 0 if neither pre-entry or post-entry closed shops are

	permitted to operate.
	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
30. Codetermination: board membership (0 –no change)	Equals 1 if the law gives unions and/or workers to right to nominate board-level directors in companies of a certain size. Equals 0 otherwise. Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
31. Codetermination and information/consultation of workers (0 .33–no change)	Equals 1 if works councils or enterprise committees have legal powers of co-decision making. Equals 0.67 if works councils or enterprise committees must be provided by law under certain conditions but do not have the power of co-decision making. Equals 0.5 if works councils or enterprise committees may be required by law unless the employer can point to alternative or pre-existing alternative arrangements. Equals 0.33 if the law provides for information and consultation of workers or worker representatives on certain matters but where there is no obligation to maintain a works council or enterprise committee as a standing body. Equals 0 otherwise. Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
E. Industrial action (0.48 during 1970-83;0.59 during 1985-97, 0.54 thereafter)	*Measures the strength of protections for industrial action, measured as the average of variables 32-40.*
32. Unofficial industrial action (0.5 –no change)	Equals 1 if strikes are not unlawful merely by reason of being unofficial or 'wildcat' strikes. Equals 0 otherwise. Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
33. Political industrial action (0.5 during 1970-97, 0 thereafter)	Equals 1 if strikes over political (i.e. non work-related) issues are permitted. Equals 0 otherwise. Scope for gradations between 0 and 1 to reflect changes in the strength of the law.
34. Secondary industrial action (1 –no change)	Equals 1 if there are no constraints on secondary or sympathy strike action. Equals 0.5 if secondary or sympathy action is permitted under certain conditions. Equals 0 otherwise.

	Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
35. Lockouts (0.5 –no change)	Equals 1 if lockouts are not permitted. Equals 0 if they are. Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
36. Right to industrial action (0 –no change)	Measures the protection of the right to industrial action (i.e. strike, go-slow or work-to-rule) in the country's constitution or equivalent Equals 1 if a right to industrial action is expressly granted by the constitution Equals 0.67 if strikes are described as a matter of public policy or public interest. Equals 0.33 if strikes are otherwise mentioned in the constitution. Equals zero otherwise. Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
37. Waiting period prior to industrial action (0.67 –no change)	Equals 1 if by law there is no mandatory waiting period or notification requirement before strikes can occur. Equals 0 if there is such a requirement. Scope for gradations between 0 and 1 to reflect changes in the strength of the law.
38. Peace obligation (0.5 –no change)	Equals 1 if a strike is not unlawful merely because there is a collective agreement in force. Equals 0 if such a strike is unlawful. Scope for gradations between 0 and 1 to reflect changes in the strength of the law.
39. Compulsory conciliation or arbitration (0.67 –no change)	Equals 1 if laws do not mandate conciliation procedures or other alternative-dispute-resolution mechanisms (other than binding arbitration) before the strike. Equals 0 if such procedures are mandated. Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.
40. Replacement of striking workers (0 during 1970-84, 1 thereafter)	Equals 1 if the law prohibits employers to fire striking workers or to hire replacement labor to maintain the plant in operation during a non-violent and non-political strike. Equals 0 if they are not so prohibited. Scope for further gradations between 0 and 1 to reflect changes in the strength of the law.

Table 2. Labour Regulation, Employment and Industrial Production in India, 1970-2006: Tests of Stationarity[1]

Series[2]	Level (with intercept and linear trend	First difference (with intercept)	First difference (with intercept and linear trend)
Private Sector Employment	-2.981758 (1)	-4.137613 (0)*	
Registered Unemployment	-2.047574 (0)	-0.283508 (4)	-6.249062 (0)*
Real Industrial Output	-3.258256 (1)	-4.624424 (0)*	
Labour Regulations	-1.930935 (0)	-5.697512(0)*	

*   The null hypothesis of unit root is rejected at 1 per cent level. In other cases it is not rejected even at 5 per cent level

1   It is based on the null hypothesis of non-stationarity. Lag length in parentheses selected on the basis of SIC (Schwarz Information Criterion).

2   Excepting the labour regulation series, all the series are in natural log.

Table 3. Labour Regulation, Unemployment and Industrial Production in India, 1970-2006: Tests of Cointegration

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Selected* Number of Cointegrating Relations by Model

Data Trend:	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	2	3	2	2	1
Max-Eigenvalue	2	3	2	2	1

* Based on 0.05 level critical values.

Table 4. Labour Regulation, Unemployment and Industrial Production in India, 1970-2006: Vector Error Correction Models

Model I *(Left hand Variable: LR)*	Estimates	Model II *(Left hand Variable: LUN)*	Estimates	Model III *(Left hand Variable: LIND)*	Estimates
Long-run Relationship		Long-run Relationship		Long-run Relationship	
				LR	20.74464 [4.91776]
LUN	-0.054884 [-6.88399]	LR	-18.22028 [-8.85517]		
				LUN	-1.138547 [-5.06894]
LIND	0.048205 [5.60176]	LIND	-0.878313 [-7.42730]		
Short-run Relationship		*Short-run Relationship*		*Short-run Relationship*	
Adjustment Coefficient, θ	-0.484543 [-4.97834]	Adjustment Coefficient, θ	0.128764 [3.56684]	Adjustment Coefficient, θ	-0.023723 [-1.02473]
ΔLR$_{t-1}$	0.092418 [0.58305]	ΔUN$_{t-1}$	0.218132 [1.03972]	ΔLIND$_{t-1}$	0.109202 [0.63421]
ΔLR$_{t-2}$	0.229964 [1.52350]	ΔUN$_{t-2}$	-0.322875 [-1.52298]	ΔLIND$_{t-2}$	-0.115572 [-0.63785]
ΔUN$_{t-1}$	-0.083954	ΔLR$_{t-1}$	-0.211995	ΔLR$_{t-1}$	-0.470295

	[-2.70431]		[-0.19790]		[-0.60132]
ΔUN_{t-2}	-0.050101 [-1.59709]	ΔLR_{t-2}	0.053584 [0.05253]	ΔLR_{t-2}	1.965253 [2.63868]
$\Delta LIND_{t-1}$	0.035904 [1.02887]	$\Delta LIND_{t-1}$	0.376042 [1.59453]	ΔUN_{t-1}	0.045061 [0.29417]
$\Delta LIND_{t-2}$	0.063855 [1.73889]	$\Delta LIND_{t-2}$	0.250397 [1.00899]	ΔUN_{t-2}	-0.412977 [-2.66803]
Constant, $\Box$C	0.003330 [1.07386]	Constant, $\Box$C	0.020078 [0.95820]	Constant, $\Box$C	0.075959 [4.96506]
Adjusted R-Square	0.427470	Adjusted R-Square	0.427276	Adjusted R-Square	0.164582

Table 5. Labour Regulation, Unemployment and Industrial Production in India,

1970-2006: VEC Causality Analysis[1]

Dependent Variables[2]	Excluded Independent Variables[1]	Chi-square	Degree of Freedom	Probability
Unemployment (LUN)				
	Industrial Production (LINDPRD)	3.767127	2	0.9801
	Labour Regulation Index (LR)	0.040137	2	0.152
Labour Regulation Index (LR)				
	Industrial Production (LINDPRD)	4.312412	2	0.1158
	Unemployment (LUN)	14.3085*	2	0.0008
Industrial Production (LINDPRD)				
	Labour Regulation Index (LR)	7.062344*	2	0.0293
	Unemployment (LUN)	7.511676*	2	0.0234

*   Significant at 5 per cent level; no causality null hypothesis is rejected.

1   The lag order of the test is 2.

2   Except labour regulation index all variables are in natural log. VEC causality tests are done on the basis of first differences of the variables.

Figure 1:

Labour Regulation Index in India and Four OECD Countries, 1970-2006
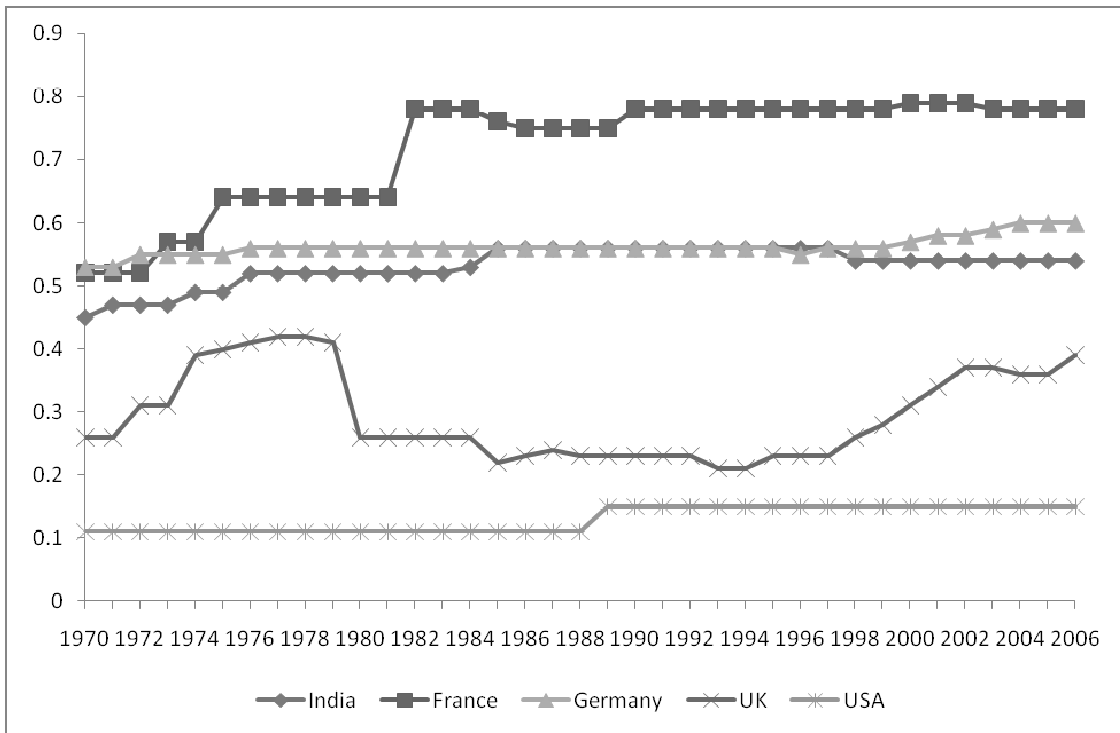
Figure 2:

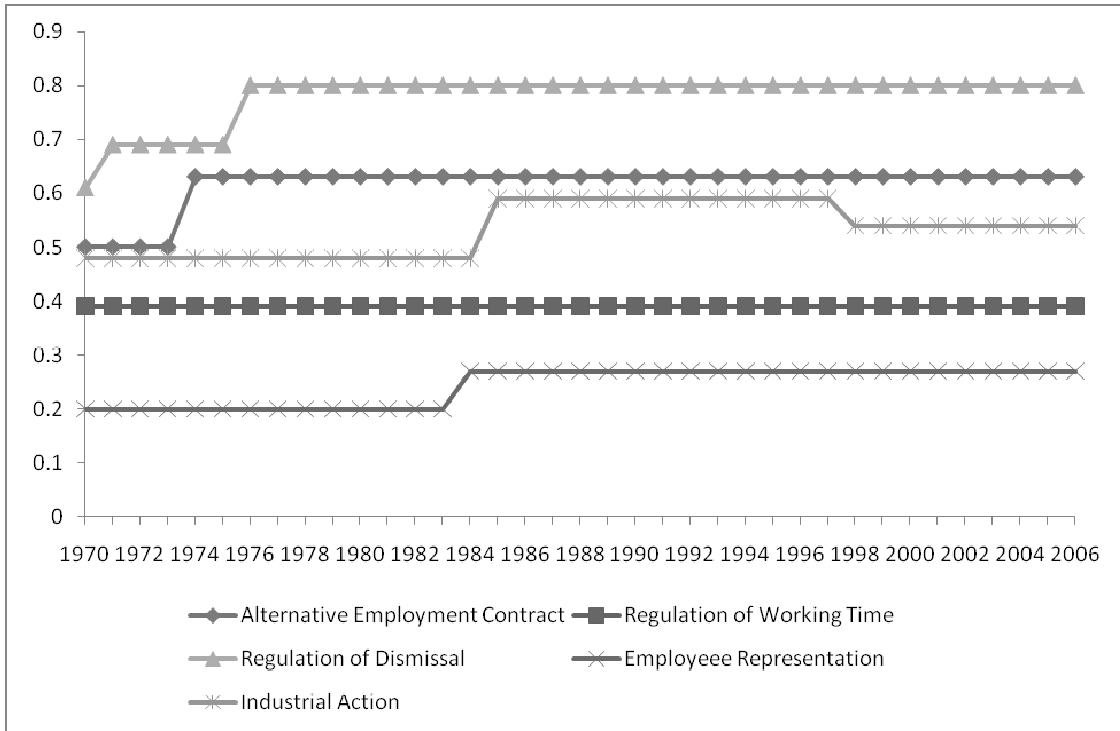Indian Labour Regulations, 1970-2006: Different Components

Figure 3:

Labour Regulation Relating to Dismissal in India and Four OECD Countries