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Introduction

Economists have for long been concerned as to the interlinkage between the real and financial sector of an economy. Does the financial structure of a country affect its industrial growth? What factors influence the distribution of industries within a country? Attempting to uncover evidence to these questions is important for ascertaining the development potential of economies. While work on characterizing the factors influencing industrial location have been undertaken at the cross-country level (Rajan and Zingales, 1998), there is limited evidence as towards the reasons behind industrial location in sub-national regions. This assumes all the more importance for developing economies typically characterized by lower levels of investment and overall economic activity being concentrated in one or a few sub-national regions. A major concern for policymakers therefore remains to promote balanced expansion across regions in the interests of equitable growth and development.

Towards this end, the paper chooses India as a case study and examines whether industrial characteristics influence state-level industrial growth. The role arises from the conjecture that the performance of the industrial sector has been very diverse across states (Bajpai and Sachs, 1999; Besley and Burgess, 2000, 2004). Evidence seems to suggest that industrial location is typically influenced by several factors: availability of infrastructure, market access and urbanization and localization economies (the economic geography criteria) and the structure of wages, taxes, subsidies and incentives offered by governments (the political economy criteria). The private sector responds to these considerations, and the outcome is an industrial setup that is shaped by the twin features of economic geography and political economy.

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In large federal structures such as the US and India, an additional dimension is introduced by the existence of component federal states with their democratically elected governments. The latter, in effect, provides a convenient anchor for studying sub-national dimensions of macro policy. Since the nation comprises of several states with not only differential growth patterns, but also differential abilities to respond to macro policies, it would therefore, be of interest to understand the extent of such reactions at the state-level.

We choose India as a case study for three reasons. First, India is presently one of the most important developing countries with a rich history of industrial sector controls. These controls were introduced in the aftermath of independence in order to dovetail private investment into desirable areas within a mixed economy framework through a process of industrial licensing. Second, like the US, India is a federal polity comprising of states with their own governments and a measure of policy autonomy. Over time, states develop distinct economic characteristics, partly due to inherent geographical features and partly owing to differing economic policies pursued. Accordingly, it bypasses the limitations of cross-country studies (Rodrik, 2005) by focusing on the effect of industrial policies on industrial growth within a country. The findings so obtained may be representative of the role of industrial policies on sub-national industrial growth in other emerging markets. Third, India has a rich history of state-level industrial data. The cross-sectional and time series variation in the data makes it amenable to regression analysis and provides an ideal laboratory to explore the effects of industrial policies on state-level industrial growth.

The primary motivation of the paper stems from the work of Rajan and Zingales (RZ, 1998). In an influential study, RZ (1998) argued that industries that are naturally heavy users of external finance due to technological factors grow disproportionately faster in countries with developed financial systems. Using the ratio of domestic credit and stock market capitalization to GDP and country accounting standards as measures of financial development, their analysis suggests that *ex ante* development of financial markets facilitates the *ex post* growth of sectors dependent on external finance. The RZ

(1998) methodology has subsequently been employed by various cross-country studies. Fisman and Love (2003), for instance, studied whether industries that depend more on trade credit benefit more or less from financial development. Claessens and Laeven (2003), on the other hand, examined whether industries that rely more on tangible assets benefit more or less from the protection of property rights. Finally, Claessens and Laeven (2005) investigate whether greater competition in banking systems across countries promotes faster growth in industries with higher financial dependence.

The findings arising from the analysis suggest that industries with higher fixed capital and bigger factory sizes tend to grow slower in states with lower penetration of banking. More importantly, the findings testify that financial development of states tends to overwhelm their financial structure in influencing industrial growth.

The reminder of the paper unfolds as follows. Section 2 presents an overview of the literature, followed by a brief description of the evolution of industrial policies in India. The empirical strategy and the database are detailed in Section 4. Section 5 discusses the results, followed by the policy implications and the concluding remarks.

II. Related Literature

In the Indian case, it is possible to discern two distinct sets of studies that have explored the interlinkage between industrial policies and economic growth. The first set of studies examines how changes in labor laws impact manufacturing performance. Besley and Burgess (hereafter, BB 2004) find that movement towards pro-worker policies at the state-level is linked to declines in employment and output in manufacturing industries. Subsequently, Sanyal and Menon (2005) find that state-level labor regulation variables such as number of labor courts, number of registered unions and number of mandays lost owing to labor disputes act as significant disincentives on firm location. Vasudeva Dutta (2004) finds that differences in state labor market regulations influenced the inter-industry wage premia. Employing the codification employed by BB (2004) to classify state labor policies as pro-worker, neutral or pro-employer over the period 1958-92, the analysis finds that an increase in the share of industry employment in pro-worker

states (relative to the employment share in neutral states) by one percentage point raises the industry relative wage by about 0.2 per cent. The main message emanating from these studies is that institutional environment affects entrepreneurs' investment and location decisions and thereby, state-level economic growth.

The second set of studies evaluates the effect of trade liberalization on Indian industry. Thus, Aghion et al (2005) uncovers evidence that state industries with greater technological capability benefited more from liberalization. In contrast, laggard state industries that were below India's median productivity experienced below trend rates of increase in output, employment and total factor productivity following liberalization in 1991. Hasan et al. (2003), using industry level data on 15 states for the period 1980-97 finds that trade liberalization had a positive effect on labor demand elasticities in manufacturing. More importantly, these elasticities are higher states with more flexible labor regulations, but are also impacted to a larger degree by trade reforms. These studies drive home the point that the initial technological choices made by firms coupled with the pre-reform investment climate at the state level influences the way the manufacturing sector responds to liberalization.

The study which comes closest to the spirit of our paper is Besley and Burgess (2004). Using data on 16 major Indian states for the period 1958-92, the analysis demonstrates that the policy choices of state governments as regards labor regulation have strongly affected manufacturing performance. While there are certain similarities between our analysis and BB (2004), there are also significant differences. First, unlike their study, we seek to understand how the state's financial structure interacts with industrial characteristics to influence industrial growth. Second, we explore as to whether state-level industrial features affect its industrial growth through its interface with financial development of the state. Third, borrowing from cross-country studies, we examine the effect of a state's financial structure as well as its financial development on industrial growth, operating through various industrial policies. The latter two tests are important in the context of India, since our dataset includes data from 1981 to 1998, which falls on both sides of the massive economic liberalization program that begun in

India in 1991. Prior to liberalization, the Indian economy was relatively closed and heavily regulated, with many industries reserved for the government sector. The liberalization program, which reduced the regulation of industry, would be expected to have differential impact on the relative roles of the government and market access in the location of production. Finally, unlike BB (2004) which focuses primarily on the impact of labor policies on manufacturing output, the present study is more concerned with how the financial structure and development interact with industrial characteristics to shape industrial growth of sub-national regions.

The paper, therefore, connects three strands of literature. First, it contributes to the development literature by addressing the pattern of industrial growth across sub-national regions and consequently, their effects on state-level growth. Second, it supplements the industrial organization literature by directly exploring the interlinkage between industrial characteristics and their impact on industrial growth. And third, it augments the literature on regional economics by exploring how state-level industrial policies influence the geography of industrial location.

III. Regulatory Framework of Labor Policies

The Trade Union (TU) Act of 1926 and the Industrial Disputes (ID) Act of 1947 and the Industrial Employment (IE) (Standing Orders) Act, 1946 are the three enactments that are relevant in the consideration of the statutory regulation of industrial relations in India. The first Act allows registration of unions in an industrial establishment subject to the proviso that the union has at least seven members from the establishment. It does not, however, deal with the recognition of unions. Following the economic reforms process initiated in 1991, the Act has been revised in 1993 and now requires a minimum membership of 10 per cent of the employees in any firm[1]. The Industrial Employment Act, which is applicable, by and large, to establishments employing 100 or more workmen, provides for standing orders to be certified from prescribed authorities, after hearing the employers' and workers' representatives, in respect of several matters relating to conditions of employment. Since 1984, an

amendment of the Act has extended the coverage by allowing the Act to be applicable to establishments employing 50 or more workers[2].

The ID Act provides the bedrock of the dispute resolution mechanism: a machinery for dealing with existing or apprehended industrial disputes. Apart from the provision for the formation of work committees with limited functions of consultations in units of a certain size (100 or more workers), the Act provides of consultation by a board or a conciliation officer, investigation by a court of inquiry, arbitration on mutual consent of parties and adjudication by labor courts and industrial tribunals. There is a special chapter governing the payment of lay-off and retrenchment compensation. There are sections dealing with strike and lockouts, stipulation of the circumstances in which such disputes shall be deemed illegal and the penalties thereof. It offers some protection to individuals to in the matter of disciplinary proceedings under certain circumstances. Employment regulations in India, as the above discussion suggests, operate primarily on the basis of factory size. The gains to the workers as conferred by the three major Acts pertain to bargaining rights (from the Trade Union Act), income security (from the Industrial Employment Act) and job security (from the Industrial Dispute Act). In evaluating employment regulations, Mathur (1992) has noted that in the manufacturing sector where the employment security is the highest, 78.5 per cent of the establishments employ less than 50 employees and another 10.8 per cent of establishments less than 100 employees, leaving the bulk of the workers outside the purview of employment regulations.

It is not altogether clear whether the threat of Government intervention has helped quicker settlements or not. For example, between 1980 and 1988, about 16 per cent of the disputes per year were disposed by the Office of the Controller of Industrial Relations machinery after a delay of at least four months. However, the rate of settlement through Government intervention increased steadily from 27.5 per cent in 1982 to 48 per cent in 1987. But there often lurks the danger that official agencies can often activate a biased outcome. For instance, an employer in larger firm opting for a closure is required to serve a notice to the Government at least 90 days in advance

asking for permission. However, the relevant provisions of the Industrial Disputes Act stipulate that if a notice is not received from the Government within 60 days, the permission is deemed to have been granted. The employer therefore often has the incentive to influence the relevant administrative machinery to delay the response beyond 60 days, thereby enlarging the scope of 'legal' disputes.

Secondly, Indian law allows for multiple unions in enterprises. Each union strives to increase its membership, thereby engendering a constant competition for membership loyalty. Given the inter-union bickering, stable labor-management relationships are often at a premium. Management has little incentive to invest in developing long-term relationships with any single unions, so much so that unions often resort to strikes and other forms of industrial action to meet their demands.

Thirdly, in industries affected by vicissitudes of the business cycle or by seasonal demand, the threat of a strike by the workmen is often pre-empted by lockouts (during which no wages have to be paid) as a way of disciplining workers or avoiding paying them, given the legal difficulties in retrenchment. This often results in a large number of workdays being lost due to strikes and lockouts-more than in most developed/newly industrialising economies.

The regulatory mechanism provides a crucial backdrop towards understanding industrial relations in India. The Government has announced its intention to effect changes in the ID Act, the Contract Labor Act and the TU Act. Simultaneously, a Labor Commission had been constituted to examine the extant labor laws and suggest changes, as the need may be, in view of the changes in the use of technology and labor brought about by the reforms process. Pertinent from the point of view of the present exercise are the ID Act and the TU Act. The amendments to the ID Act include a provision to allow employers to dispense with the services of workmen who do not perform satisfactorily or are indisciplined. Another change being sought entails the creation of bargaining councils in industrial units. This is expected to enable ease the pressure of workload from the ambit of labor courts and tribunals. Amendments in the TU Act include provisions to end the multiplicity of trade unions in plants as competition among unions

is seen as a major cause for industrial disputes. It also intends to implement the secret ballot system for choosing the biggest union in a plant.

III. Industrial Policies in India

The introduction of the concept of a socialist economy in the 1960s with its concomitant focus on poverty reduction, egalitarianism and social equality meant that the Indian government followed highly restrictive policies with respect to trade, industry and finance. The process of transition towards self-reliance (read 'import substitution'), driven to an overarching extent by concerns of 'export pessimism' amongst developing nations nested on the logic of heavy-industry oriented industrialization within a closed economy framework. Such a policy engendered the need for industrial licensing whereby firms would have to apply for a license for setting up new units or for capacity expansion. In effect, the policy exerted multiple controls over private investment that limited areas in which private investors were allowed to operate and also determined the scale of operations, the location of new investments and even the technology employed. This was buttressed by a highly protective trade policy, often providing tailor-made protection to each sector of industry. The costs imposed by these policies have been extensively studied (Bhagwati and Desai, 1965; Bhagwati and Srinivasan, 1971; Ahluwalia, 1985), and by 1991, a consensus emerged on the need for greater liberalization and openness.

The post 1991 reforms laid strong emphasis on enabling markets and globalization coupled with lower degrees of direct government involvement in economic activities. The list of industries reserved solely for the public sector was gradually scaled down and reduced to three: defense aircrafts and warships, atomic energy generation and railway transport. The process of industrial licensing by the central government has been almost abolished, except for a few hazardous and environmentally-sensitive industries. The requirement that investment by large houses needed a separate clearance under the Monopolies and Restrictive Trade Practices Act to

discourage the concentration of economic power was replaced by a new competition law that attempts to regulate anti-competitive behavior.

The net effect of this process has been a sharp rise in industrial growth. From an average of 4% in the 1970s and around 6.5% in the 1980s, industrial growth jumped to over 8% during the period 1992-98, reflecting the effect of liberalization of various controls. Notwithstanding these advancements, there is evidence to suggest that the investment climate varies widely across states, and these differences are reflected in a disproportional share of investment, especially foreign investment, being concentrated in certain states perceived as more investor-friendly. These differences across states have led to a variation in state growth rates, with the 'reform-oriented' states growing at a faster clip *vis-à-vis* the 'lagging reformers'.[2] Illustratively, the difference in per capita state domestic product (SDP) between the richest (Punjab) and poorest (Bihar) state was 2.95 in 1981 (the beginning of the sample period), by 1998, this divergence increased to 4.36. Because liberalization created a more competitive environment for industry to operate, the payoff from pursuing good policies increased, raising the importance of state-level action.

IV. Methodology

A panel model using state-industry panel dataset is used for the test. The model was innovated by Rajan and Zingales (1998) to show that industries with high external financing need to grow faster in countries with high financial development. The similar methodology was employed by Beck and Levine (2002) and Carlin and Mayer (2003) to examine the relationship between finance and industrial growth. We employ three models, starting with the following basic model:

$$g_{ij} = \alpha_i + \gamma_j + \beta(FS_i * IC_j) + \delta z_{ij} + \varepsilon_{ij} \qquad \text{(Model 1)}$$

[2]Bajpai and Sachs (1999) classified Indian states into three categories – reform oriented, intermediate reformers and lagging reformers – and claimed that reform oriented states performed better in terms of economic growth in the post-reform period.

In Model 1, the dependent variable g(i, j) represents the annual average growth rate of industry j in state i. The industrial growth rate is measured as the change in the annual real value added averaged over the sample period 1981-1998.

FS(i) is a measure of the state's financial structure. To capture financial structure, we include the share of industry in net domestic product (NDP) of the state. Given that the pattern of industrial development has exhibited marked variation over this period, this, in effect, provides us with a rich cross-sectional variation in the degree of industrialization in the states over this period.

IC (j) represents industry j's unique characteristics. Industry's unique features are measures along three dimensions: factory size, fixed capital per employee and monthly wage per employee. The factory size of the industry is measured by the ratio of total number of employees in an industry by the number of factories averaged over the period 1981-1998. The fixed capital per employee is defined as the ratio of fixed capital stock in an industry divided by the total number of employees. Industry j's fixed capital stock per employee is the mean value of the variable over the period 1981-1998. The monthly wage per employee in an industry in the average of the total wage bill divided by the total number of employees in the industry.

The cross section term of FS (i) and IC (j), FS (i)*IC(j) is to test whether industrial growth is directly affected by financial structure. Partial differentiation of g(i, j) with respect to IC (j) yields β FS(i). If $\beta > 0$, it implies that industries with higher IC (j), for instance higher factory size, grow relatively faster in industrialized states than in non-industrialized ones. In addition, indicator variables to correct for potential uniqueness of state and industry, respectively, are included. Finally, an additional term, z(i,j) to measure industry j's share in state i as of 1981 is included to control for regression to the mean or the convergence effect, which means that an industry with a large share in a state tend to grow slower over time and vice versa.

The existing literature reports that it is financial development and not financial structure that affects the real economy (the financial services hypothesis).[3] To address this aspect, we specify model 2, which reads as follows:

$$g_{ij} = \alpha_i + \gamma_j + \beta(FD_i * IC_j) + \delta z_{ij} + \varepsilon_{ij} \qquad \text{(Model 2)}$$

Model 2 tests whether the financial services hypothesis is valid. In this specification, FD (i) measures state i's financial development. As was the case with the measure of financial structure, we adopt as a simple proxy of the financial development a measure akin to that most commonly employed in the cross-country growth regressions: the ratio of bank credit to state NDP. The specification is then used to examine whether the coefficient of the interactive term FD (i)*IC(j), is statistically significant. Since the role of market-based financing tends to increase as financial sector develops, it is possible that the financial structure measure FS (i) in fact reflects the information contained in the financial development measure FD (i). In other words, the financial structure variable FS(i) could not only measure financial structure itself, but also operate as a proxy for financial development. Therefore, even if the coefficient of the interactive term FS(i)*IC(j) from specification (1) is significant, we may not readily conclude that financial structure affects the real economy if the coefficient of the interactive term FD (i)*IC(j) from specification (2) is also significant.

$$g_{ij} = \alpha_i + \gamma_j + \beta_1(FS_i * IC_j) + \beta_2(FD_i * IC_j) + \delta z_{ij} + \varepsilon_{ij} \qquad \text{(Model 3)}$$

Finally, Model 3 includes both FS(i)*IC(j) and FD(i)*IC(j). This is to test whether the significance of FS(i)*IC(j) changes substantially after the effect of FD(i)*IC(j) has been controlled for. If the coefficient of the variable involving the financial structure term is significant, then we would conclude that financial structure has a net impact on the growth of different industries over and above the impact, if any, of financial development on industrial growth. Table 1 provides a summary of all the variables and the methods of their measurement.

Table 1

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[3] Beck et al. (2001), Beck and Levine (2002) and Levine (2002).

Variables in Panel Models

	Notation	Definition	Measurement (Data Source)
Dependent variable	g (i, j)	Average annual growth rate of real value added	Average growth rate of real value added over 1981-1998 for industry j in state i (EPWRF 2003)
Explanatory variables	State dummies	State-specific effects	Dummy variable with value 0 or 1 for each state
	Industry dummies	Industry-specific effects	Dummy variable with value 0 or 1 for each industry
	FS (i)	Financial structure of state i	Average share of banking and finance in NSDP over 1981-98 of state i (EPWRF, 2003)
	FD (i)	Financial development of state i	(Average bank credit/average NSDP) over 1981-98 of state i (RBI a; EPWRF, 2003)
			(Average bank credit/average number of bank offices) over 1981-98 of state i (RBI a, b)
	Size (j)	Factory size of industry j (size)	Average of (total number of employees/total number of factories) over 1981-98 of firms belonging to industry j (EPWRF, 2003)
	Kap (j)	Capital per employee of industry j (labor productivity)	Average of (fixed capital stock/total number of employees) over 1981-98 of firms belonging to industry j (EPWRF, 2003)
	Wage (j)	Monthly wage per employee of industry j (remuneration)	Average of (total wage bill/total number of employees), deflated by 12 over 1981-98 of firms belonging to industry j (EPWRF, 2003)
	z (i, j)	Share of industry j in state i	Industry j's share in NSDP of state i in 1981 (EPWRF, 2003)

V. Data and Measurement

The study combines two sets of data. First, it utilizes annual state-level data on national accounts along with state-level credit numbers. Second, it employs data on industries at the two-digit level. We have confined our attention to 14 (out of the possible 32) major Indian states, during the sample period. There are several reasons for

restricting ourselves to these states. First, these states have existed for the entire sample period without any alteration in their geographical area or administrative setup. For example, among the states that have been left out, several have moved from being centrally administered to ones where they elect their own state-level governments. Second, over 90% of the population resides in these states. Third, over 80% of all factories are located in these 14 states. For many of the states excluded from the sample, industrialization is a recent phenomenon and consequently, the methodology for collecting data in these states is not the same as in the states examined in our study. The data collection methodology for the 14 states in our sample has remained largely unaltered throughout our period of analysis. Most recent analysis on India that utilizes state-level data typically confines attention of these 14 states (Ahluwalia, 2002; Sachs *et al.*, 2002; Nachane *et al.*, 2002).[4]

We employ three main datasets: the state-level national accounts data published by the Economic and Political Weekly Research Foundation (EPWRF), the Annual Survey of Industries (ASI) data produced by the Central Statistical Organization of India, a data collection agency of the Union Government and data on state-level credit extended by banks and number of bank offices by states published by the Reserve Bank of India (RBI).

The national accounts data on states is available at annual frequency over the sample period and is further decomposed into that arising from agriculture (agriculture, forestry, fishing), industry (mining, registered and unregistered manufacturing, construction, electricity, gas and water supply) and services (transportation, storage and communication, trade, hotel and restaurants, banking, insurance and public administration). Utilizing this database, we compute the shares of agriculture, industry and banking in NSDP, at 1980-81 prices.

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[4]These states, in order are regional location are, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu in Southern region, Haryana, Punjab, Rajasthan and Uttar Pradesh in the Northern region, Bihar, Orissa and West Bengal in the Eastern region and Gujarat, Maharashtra and Madhya Pradesh in the Western region.

The ASI data provides information on industry at the 2-digit level at the state-level. The data covers all factories registered under the Factories Act 1948 (defined as units employing 20 or more workers). The ASI frame can be classified into two sectors – the census sector and the sample sector. Units in the 'census' sector (all factories will more than 100 workers) are covered with a sampling probability of one, while units in the 'sample' sector (employing between 20 and 99 persons) are covered with probabilities one-half or one-third. The census sector covers over 80% of the formal sector of Indian industry and is considered more reliable than the sample sector. We utilize the census database to cull out information on 18 industries at the 2-digit level for the 14 states.[5] For each state industry pair, data on a wide range of variables is available, from number of factories, to capital employed, workers employed, value added and capital formation. We have data for the period 1981 to 1998, which is an especially interesting period for the reasons mentioned above: the liberalization of the economy, which begun somewhat hesitantly in the 1980s and was rapidly pushed forward in 1991 post inception of a wider process of reforms. The period is thus one of rapid change and growth in the Indian economy, coupled with the emergence of inequalities in the state-level growth process (Ahluwalia, 2002).

Third, we extract information on credit extended by banks in a particular state. Information on this variable is obtained from the *Basic Statistical Returns*, a yearly publication of the Reserve Bank of India (RBI), which provides extensive data on the

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[5] The 18 industries (along with their National Industrial Classification or NIC code) are the following: manufacture of food products (NIC 20-21), manufacture of beverages, tobacco and related products (NIC 22), manufacture of cotton textiles (NIC 23), manufacture of wool, silk and man-made fibre textiles (NIC 24), manufacture of jute and other vegetable fibre textiles, except cotton (NIC 25), manufacture of textile products, including wearing apparel (NIC 26), manufacture of wood and wood products (NIC 27), manufacture of paper and paper products and printing (NIC 28), manufacture of leather and products of leather, fur and substitutes of leather (NIC 29), manufacture of basic chemicals and chemical products, except products of petroleum or coal (NIC 30), manufacture of rubber, plastic, petroleum and coal products and processing of nuclear fules (NIC 31), manufacture of non-metallic mineral products (NIC 32), basic metal and alloys industries (NIC 33), manufacture of metal products and parts, except machinery and equipment (NIC 34), manufacture of machinery and equipment other than transport equipment (NIC 35-36), manufacture of transport equipment and parts (NIC 37), other manufacturing industries (NIC 38) and electricity (NIC 40).

business of commercial banks based on data on advances and deposits collected under the Basic Statistical Returns System. The main types of data available from this publication are advances and deposits classified according to population groups, bank groups, sub-national levels and sectoral pattern of advances for bank groups and states.

Finally, we collate information on number of bank offices in a state in a given year. The *Statistical tables relating to banks in India*, an annual RBI publication provides information on this variable.

Tables 2 and 3 present the values of the variables for financial structure (FS) and financial development (FD), respectively. Over the entire period, there has been a distinct decline in the share of agriculture across all states; the same has, however, being quite pronounced in respect of certain reform-oriented states (Gujarat, Maharashtra, and Tamil Nadu) where the share of industry in NSDP has exceeded the 30% mark. This rise in the share of industry was particularly rapid during the second sub-period (1991-98). The evidence as regards the penetration of banking also reveals that states such as Maharashtra, and to a lesser extent, Gujarat, Tamil Nadu and West Bengal have a significant presence in banking as evidenced from their share in NSDP. Thus, during 1981-90, the share of banking for Maharashtra was 7.4% in NSDP, the figures for Gujarat, Tamil Nadu and West Bengal were in the range of 4-6%. During the second sub-period, the share of banking in most of these states doubled from their previous decadal averages. Compared to this, in case of 'lagging reformers' such as Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh, the share of banking has consistently remained lower than the all-India averages.

Similar evidence is obtained when we consider the state-level financial development. Employing the bank credit to NSDP ratio as a proxy for financial deepening, it is clear that the penetration of credit has been quite rapid in the states of Karnataka, Kerala, Maharashtra and Tamil Nadu; similar evidence is obtained when we consider a measure of financial widening such as credit per bank office. In other words, the credit advanced by banks in these states has witnessed a significant upturn in view of the relatively higher outreach of banking.

Moreover, over the 1981-98 period, the correlation between FS(i) as proxied by the share of industry and FD(i) as captured by the ratio of bank credit to NSDP is 0.79 and statistically significant.

Table 2
Financial structure of states: 1981 to 1998
(as per cent of NSDP at 1980-81 prices)

State	1981-1990			1991-98			1981-1998		
	AGCR	INDY	SERV	AGCR	INDY	SERV	AGCR	INDY	SERV
Andhra Pradesh	42.03	18.93	39.04	31.61	24.25	44.14	37.40	21.30	41.30
Bihar	45.15	25.95	28.90	38.01	27.93	34.06	41.97	26.83	31.20
Gujarat	33.65	31.47	34.88	23.34	38.73	37.93	29.07	34.69	36.24
Haryana	48.60	21.78	29.62	43.12	23.64	33.24	46.17	22.61	31.22
Karnataka	42.79	21.35	35.86	34.93	23.21	41.86	39.30	22.18	38.52
Kerala	36.55	23.88	39.57	33.35	24.44	42.21	35.13	24.13	40.74
Madhya Pradesh	50.07	21.22	28.71	42.51	24.98	32.51	46.71	22.89	30.40
Maharashtra	24.68	34.79	40.53	19.06	34.77	46.17	22.18	34.78	43.04
Orissa	50.11	17.72	32.17	37.04	23.53	39.43	44.30	20.31	35.29
Punjab	49.72	20.02	30.26	46.97	24.60	28.43	48.50	22.06	29.44
Rajasthan	48.13	20.16	31.71	44.10	22.05	33.85	46.34	21.00	32.66
Tamil Nadu	25.49	32.31	42.20	22.46	31.56	45.98	24.15	31.98	43.87
Uttar Pradesh	47.96	17.98	34.06	42.28	19.77	37.95	45.44	18.78	35.78
West Bengal	32.35	28.12	39.53	32.36	26.31	41.33	32.35	27.32	40.33
All India (% of NDP)	41.70	23.56	34.74	33.63	25.42	40.95	35.39	24.06	40.55

Table 3
Financial development of states: 1981 to 1998

	1981-1990		1991-98		1981-98	
	Bank credit /NSDP (per cent)	Bank credit /Bank office (Rs mn.)	Bank credit /NSDP (per cent)	Bank credit /Bank office (Rs mn.)	Bank credit /NSDP (per cent)	Bank credit /Bank office (Rs mn.)
Andhra Pradesh	39.56	9.70	90.81	29.87	62.34	18.67
Bihar	19.95	4.21	52.67	10.36	34.49	6.94
Gujarat	38.70	10.94	78.63	31.59	56.45	20.12
Haryana	38.52	13.93	59.99	28.57	48.07	20.44
Karnataka	52.50	9.97	112.43	29.05	79.13	18.45
Kerala	59.30	9.01	117.00	24.70	84.95	15.99
Madhya Pradesh	25.57	5.87	59.50	16.80	40.65	10.73
Maharashtra	64.89	25.39	139.61	84.02	98.10	51.45
Orissa	25.66	6.34	55.31	13.26	38.83	9.41
Punjab	44.12	13.06	81.02	31.14	60.52	21.09
Rajasthan	27.83	6.20	53.68	15.96	39.32	10.54
Tamil Nadu	58.38	13.88	146.99	49.03	97.76	29.50
Uttar Pradesh	23.88	6.11	52.50	14.67	36.60	9.92
West Bengal	38.95	13.68	78.22	32.88	56.41	22.21

Table 3 is a correlation matrix whose statistics show that there is some important correlation among the variables. Growth in value added by industry is negatively correlated with the share in value added, indicating a convergence effect whereby industries with a large share in value grow slower over time. Noteworthy for our analysis, the growth in real value added is negatively correlated with trade unionism suggesting that more unionized industries are less conducive to growth. On the other hand, growth in value added is positively associated with both fixed capital per employee and factory size. These results indicate that higher labor productivity and bigger plant sizes have growth-enhancing effects, the latter presumably owing to scale economies.

Table 4: Correlation matrix

	Growth	Share in value added	Share of banking	Credit/bank office	Credit/NSDP
Growth	1.00				
Share in value added	-0.012 (0.097)	1.00			
Share of banking			1.00		
Credit/bank office				1.00	
Credit/NSDP					1.00

Following from our discussion of the regulatory framework, three variables are chosen as factors influencing industrial growth: the degree of trade unionization (*Union*), monthly earnings per employee (*Earnings*) and factory size (*Size*). With the industry being the unit of aggregation, all data correspond to the two-digit level of aggregation.

As observed earlier, the variable *Union* is defined as the number of employees listed as trade union members divided by the total number of employees in that industry. Since the number of trade union members is reported only from unions submitting returns and submission of these returns is purely voluntary, these numbers could be under-estimates, since it does not take cognizance of the members of non-reporting unions. Notwithstanding this shortcoming, there are compelling reasons to include this variable. Trade union membership is an important constituent of bargaining power, helping workers to steer a negotiation along a planned and formal path.

The variable *Earnings* captures some of the important causes of disputes. A cursory glance at the data in the Indian context (Government of India, various years) tends to suggest that of all the disputes, nearly 30-35 percent are driven by issues relating to workers income. Research in the Indian context (Dutt, 1992; Ghosh and Bhattacharjee, 2003) also corroborates these findings. Accordingly, failure to reach an agreement can seriously jeopardize industrial relations and dampen industrial growth.

The average factory size (*Size*) is obtained by dividing the total number of employees in an industry by the number of factories. The main motivation of this variable is to capture some of the effects of employment regulations discussed earlier. In large firms, workers enjoy both income and employment security through IE and ID Acts and to protect their secure positions, workers in these firms invests in trade unions and legal assistance. To counter this, the employer also hires specialized expertise on disputes and personnel management. Besides, the process of dispute resolution is generally overseen and monitored by government agencies, usually appointed by the concerned state governments. Therefore, it is likely to be the case that disputes will be resolved much more quickly in large than in small firms and consequently, industrial growth will generally be higher in large firms. The study attempts to verify this perception.

VI. Results and Discussion

Tables 5 to 7 present the results of the panel model estimation discussed in Section II. Since the industrial characteristics are benchmarked using Maharashtra (with the highest share of industry over the sample period), it is not included in the panel model estimation. The results of the model show that the coefficient of the interaction between fixed capital per employee and financial structure, as measured by the share of banking and finance in NSDP in that state, is negative and statistically significant at the 1 percent level. The results suggest that industries that have more fixed capital per employee and thus exhibit higher labor productivity tend to grow slower in states that have lower levels of penetration of banking and finance. This, in essence, testifies the

complementarity between the financial and real sectors: paucity of finance can significantly dampen industrial growth. The coefficient for the convergence effect in Model I is negative although on the borderline of significance, which concurs with our earlier perception that an industry with a larger share in a state tend to grow slower over time.

The regression result of Models II and III explores the financial services hypothesis. This hypothesis states that it is the country's financial development and not its financial structure that affects the real economy. We employ two measures of state-level financial development: a financial widening measure, defined as the real credit per bank office and a financial deepening measure, defined as the ratio of bank credit to NSDP. In terms of both measures of financial development, the estimates suggest that the financial services hypothesis is valid. In Model II, the coefficient on the interaction between fixed capital per employee and credit per bank office is negative and strongly significant, suggesting that industries with high labor productivity grow slower in states with lower levels of financial development. Similar results are obtained in Model III as well. Thus, both financial widening as well as financial deepening affects the differential growth of industries.

The results of Model IV offer a solid piece of evidence that financial development does indeed affect the real economy. With interactions included between fixed capital per employee and financial structure on the one hand and between fixed capital and financial widening on the other, the coefficient on the financial widening declines only slightly and is significant and the coefficient on financial structure ceases to be significant. Likewise, when financial development is measured utilizing the financial deepening measure, the coefficient on the interaction between fixed capital per employee and our financial development measure is negative and strongly significant. This implies that as long as states are concerned, it is financial widening and its deepening more than its financial structure that drive the differential growth of industries.

Table 5

Panel model estimation when industry characteristic is fixed capital per employee

Explanatory variable	Model I	Model II	Model III	Model IV	Model V
State dummy	included	included	included	included	included
Industry dummy	included	included	included	included	included
(FS)*(Capital/employee)	-0.0009 (0.0004)**			0.0004 (0.0006)	-0.0001 (0.0006)
(FD)*(Capital/employee)		-0.013 (0.003)***		-0.016 (0.006)***	
(FD1)*(Capital/employee)			-0.00008 (0.00003)***		-0.00009 (0.00004)***
Industry share	-1.923 (1.116)*	-1.915 (1.109)*	-1.699 (1.101)	-1.882 (1.112)*	-1.722 (1.121)
R-square	0.172	0.195	0.182	0.196	0.181
Number of states	14	14	14	14	14
Number of industries	18	18	18	18	18
Sample size	252	252	252	252	252

Standard errors within parentheses.

***, ** and * indicates statistical significance at 1, 5 and 10%, respectively.

Tables 8 and 9 present the regression results of models where industry characteristics are factory size and real wages per employee, respectively. In Table 8, the results are fairly similar to the results with fixed capital per employee as an industry characteristic. This was expected, because the measures of factory size and fixed capital per employee are highly correlated. In other words, both size and labor productivity are important considerations that drive the differential growth of industries in financially developed states.

Table 6

Panel model estimation when industry characteristic is factory size

Explanatory variable	Model I	Model II	Model III	Model IV	Model V
State dummy	included	Included	included	included	included
Industry dummy	included	Included	included	included	included
(FS)*(Factory size)	-0.036 (0.011)***			0.007 (0.017)	-0.005 (0.016)
(FD)*(Factory size)		-0.481 (0.105)***		-0.529 (0.164)***	
(FD1)*(Factory size)			-0.004 (0.0008)***		-0.005 (0.001)***
Industry share	-1.685 (1.102)	-1.609 (1.072)	-1.614 (1.080)	-1.573 (1.078)	-1.639 (1.086)
R-square	0.193	0.231	0.219	0.233	0.219
Number of states	14	14	14	14	14
Number of industries	18	18	18	18	18
Sample size	252	252	252	252	252

Finally, the analysis in Table 7 considers monthly wage per employee as the industry characteristic variable. The analysis in this case seems to suggest that it is only financial deepening that exerts differential effects on the industry growth rate – neither

financial structure nor financial widening - has any significant bearing on industry growth.

Table 7
Panel model estimation when industry characteristic is monthly wage per employee

Explanatory variable	Model I	Model II	Model III	Model IV	Model V
State dummy	Included	included	included	included	included
Industry dummy	Included	included	included	included	included
(FS)*(MW/employee)	-0.625 (0.453)			0.174 (0.258)	0.219 (0.274)
(FD)* (MW/employee)		-0.125 (0.479)		-0.206 (0.291)	
(FD1)* (MW/employee)			-0.088 (0.021)***		-0.272 (0.124)*8
Industry share	-1.339 (1.10238)	-1.343 (1.123)	-1.342 (1.123)	-1.401 (1.128)	-1.405 (1.127)
R-square	0.153	0.153	0.159	0.155	0.163
Number of states	14	14	14	14	14
Number of industries	18	18	18	18	18
Sample size	252	252	252	252	252

In Table 8, we employ trade unionism as the defining industry characteristic. In Model I, the coefficient on the interaction between trade unionism and financial structure is negative and highly significant. This suggests that unionized industries grow slower in states with lower penetration of banking and finance. The analysis also provides support in favor of the convergence hypothesis: industries with higher initial share tend to grow slower over time.

In Model II, the coefficient on the interaction between trade unionism and credit per bank office is negative and strongly significant, suggesting that industries with high levels of unionism grow slower in states with lower financial development. Similar results are obtained in Model III as well. Thus, both financial widening as well as financial deepening affects the differential growth of industries.

The results of Model IV offer a solid piece of evidence that financial development does indeed affect the real economy. With interactions included between trade unionism and financial structure on the one hand and between unionism and financial widening on the other, the coefficient on the financial widening declines only slightly and is significant and the coefficient on financial structure ceases to be significant. Likewise, when financial development is measured utilizing the financial deepening measure, the

coefficient on the interaction between fixed capital per employee and our financial development measure is negative and strongly significant. This implies that as long as states are concerned, unionized industries tend to grow slower in states with lower levels of financial development.

Table 8

Panel model estimation when industry characteristic is trade unionism

Explanatory variable	Model I	Model II	Model III	Model IV	Model V
State dummy	included	included	included	included	included
Industry dummy	included	included	included	included	included
(FS)*(trade unionism)	-0.082 (0.035)***			-0.042 (0.052)	-0.086 (0.341)
(FD)* (trade unionism)		-0.531 (0.289)*		-0.539 (0.252)**	
(FD1)* (trade unionism)			-0.004 (0.002)**		-0.005 (0.001)***
Industry share	-1.317 (0.761)*	-1.311 (0.759)*	-1.318 (0.764)*	-1.314 (0.766)*	-1.321 (0.768)*
R-square	0.171	0.174	0.177	0.178	0.178
Number of states	14	14	14	14	14
Number of industries	18	18	18	18	18
Sample size	252	252	252	252	252

The empirical results thus far have shown that larger industries with higher labor productivity tend to grow slower in states with low penetration of banking. These results, however, do not imply that the reverse is also true: industries with low labor productivity grow slower in states with relatively lower levels of financial penetration. It may very well be that even industries with low labor productivity grow slower (or decline slower) in states with lower financial penetration but the growth differential between states with different financial structures is larger for relatively labor productive industries. Even in this case, the coefficient on the interaction between financial development and industry characteristic would be negative.

To examine this issue, we ranked industries by their fixed capital per employee and take the top five and the bottom five industries. As to states, we divide the sample into two groups, high financial deepening and low financial deepening, by comparing the value of a state's financial deepening variable with the median value for all states. We thus have four groups. Next, we first regress the growth rate of industries on the three variables of industry dummy, state dummy and industry share to control for each

of the three effects. The residual growth rates of the four groups, show that as far as fixed capital per employee is concerned, industries with high labor productivity grow faster [0.09 – (-1.01)=1.10(%)] in states with high financial penetration and those with low labor productivity grow slower [-0.06-(-0.26)=0.20(%)] in states with low financial penetration. Overall, the top five labor productive industries should grow 1.30 percent faster than the bottom five labor productive industries in states with high financial penetration. When the same methodology is applied to factory size, the data shows that states with higher financial penetration exhibit residual growth rates.

IV. Concluding Remarks

The paper applies the empirical methodology innovated by Rajan and Zingales (1998) to examine the relationship between financial structure of sub-national regions and the differential growth rate of industries with different characteristics. Industries are characterized by three measures: fixed capital per employee, factory size and monthly wage per employee. The results suggest that industries with higher fixed capital and bigger factory sizes tend to grow slower in states with lower penetration of banking. More importantly, the findings testify that financial development of states tends to overwhelm their financial structure in influencing industrial growth.

Such evidence provides interesting policy implication for states where governments influence industrial policies. While the economic reforms have reduced the burden of Union government controls on investment activity, there is need for concomitant liberalization at the state-level.

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