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Judicial quality and regional firm performance: The case of Indian states☆

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ABSTRACT

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Higher quality institutions help a firm to invest in institutional-dependent inputs, which might affect a firm's performance. I use data for Indian manufacturing that matches state-by-state firm-level data with state-by-state data on particularly important institution – Judicial quality. Results show that judicial quality is a significant determinant of higher firm performance – both for exports and domestic sales. My most conservative estimate suggests that a 10% increase in judicial quality of a region helps to increase the sales of a firm by 1–2%. I explicitly control for the 'selection' effect by using a two-step Average Treatment Effect (ATE) procedure. The results also support my initial findings. My results are robust to a battery of robustness checks. *Journal of Comparative Economics* **44**(4) (2016) 902–918. Centre for International Trade and Development, Jawaharlal Nehru University, New Delhi, India.

1. Introduction

Following the seminal work by Douglass North (North and Thomas, 1973; North, (1981, 1994)), there is a growing empirical work, which confirms the connection between institutions and macro-level economic performance[1]. More recently, institutions have been shown to have an effect at the sectoral level in the sense that it influences the composition of national output and thus a nation's comparative advantage (Levchenko, 2007). This connection between sectoral-level performance

☆ This paper was previously circulated as 'Judicial Institutions and Industry Dynamics: Evidence from Plant-level data in India'. I have used 'Governance Quality' and 'Institutional Quality' interchangeably in the paper to denote 'Judicial Quality'. I have used the terms 'sub-national' and 'regional' to denote the states in India. I would like to thank the Editor, Daniel Berkowitz, and two other anonymous referees for comments in improving the draft substantially. I am indebted to Richard Baldwin and Nicolas Berman for their continuous support and guidance. I also thank Bernard Hoekman, Jean-Louis Arcand and Nathun Nunn for extremely helpful discussions and suggestions on earlier versions of the paper. I would also like to thank the conference participants at the 2nd Empirical Trade Conference 2010, Indian Institute of Foreign Trade (IIFT), New Delhi; 2nd Development Therapy Workshop, 2012, Graduate Institute (IHEID), Geneva; 4th International Development Conference – GREThA/GRES – Bordeaux, University of Bordeaux IV, 2012; 15th European Trade Study Group (ETSG) Conference 2013, University of Birmingham; for their comments and helpful suggestions. I acknowledge financial support from the Swiss National Foundation (FNS). Lastly, I would like to thank Chinmay Tumbe for sharing the data with me. The usual disclaimer applies.

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[1] Keefer and Knack (1995, 1997); La Porta et al., (1997 and 1998); Acemoglu et al., (2001, 2002))

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and institutions is given further support by work on combining data on trade flows and judicial quality (Nunn, 2007; Ma et al., 2010). These studies show how contract enforcement act as a source of comparative advantage. In particular, countries with good contract-enforcement specialize in goods that are intensive in relation-specific investments.

My paper follows Levchenko (2007) and Nunn (2007) but takes the institutional connection to the sector and regional level through putting forward the following question – is the quality of institutions, particularly judicial quality, one of the key determinants of firm performance, controlling for various other firm, industry and state-level characteristics? This is the central question of my paper. The goal of this paper is not to create any new theoretical foundations about the effect of judicial quality within a single-country framework, but to empirically explore a theoretical framework through different avenues. To understand this, India's growth performance, both export and GDP, in the last decade and India's judicial system offer an excellent case to explore the effect of judicial quality on a firm's performance - exports (intensive margin of trade)[2] and domestic sales. India's exports grew at around 20% on average between the period 2000 and 2010. The export share in GDP increased from 10% in 2000 to around 30% in 2010. India's merchandise exports share in world exports also increased from 0.7% to 1.6 during this time period. On the other hand, GDP also grew at an average rate of 7–8% during the last decade, except for 2008–09. Quite understandably, there are many studies that have been attempted to understand the reasons behind India's growth, its comparative advantage, and factors affecting firm performance. Ahsan (2013) uses variation in judicial efficiency at the state-level to show that for a 10% point decline in input tariffs, firms in the state at the 75th percentile of judicial efficiency gain an additional 3.6% points in productivity.

On the other hand, India's judicial quality varies significantly across regions. India has a three-tier legal system. The Supreme Court at the centre, followed by the High Courts in each state and finally lower courts at the local level. The President of India appoints judges to the Supreme Court and High Courts after consultation with the Chief Justice of India and the relevant State Governor, respectively. These judges are appointed on the basis of seniority and not on political preferences. On the other hand, the state governments control the administration of the state legal system without much interference from the Supreme Court. As a result of which, significant differences can emerge across states with regard to the speed with which the cases are resolved. Furthermore, the rules and regulations at all the three levels of the legal system in India are outlined by the Code of Civil Procedure, which is uniform across states. Kohling (2000) points out that though the underlying laws are the same, significant differences can emerge as a result of the way in which the rules and procedures are implemented in each state over time. So, differences in state courts can arise because of: (i) differences in the interpretation of rules and procedures, and (ii) differences in quality of the state governments, which control the state courts. In particular, significant difference in judicial quality can arise as a result of the enforcement of the regulations outline in the Code of Civil Procedure. As a result, the efficiency of courts in enforcing contracts can vary significantly across different regions in India. And, this in turn can influence, to a significant extent, the local business climate. Acemoglu and Dell (2010) points out that the variation in regulation implementation and law enforcement within a country really matters. Johnson et al. (1998) finds that inter-regional judicial discretion is particularly large in developing and transition countries.

Using Indian firm-level manufacturing data, I extend Levchenko-Nunn by matching state-level, firm-level performance with region-level measures of judicial quality. The paper explores the link between the judicial quality and firm performance, through the usage of intermediate inputs, at the most disaggregated level. In other words, my identification strategy, following Levchenko (2007), is based on the interaction between firm-level usage of intermediate inputs (a proxy for contracting-intensity) and the region's judicial quality (a proxy for contract enforcement). The most notable finding is that judicial quality matters positively and significantly for firm performance, both for exports and domestic sales. My results also show that firms' in industries that are contract-intensive tend to locate in regions with good contract enforcement. The key novelty of the paper is that this is the one of the very few studies (the others being Feenstra et al., (2013) and Wang et al., (2014) on China) that explores the relationship between the judicial quality and firm performance (both international and domestic) at the most disaggregated level; it uses an important objective measure of the judicial quality and last but not the least, it controls for the endogeneity problem with the state-of-the-art econometric techniques.

The theoretical underpinning of the empirical strategy comes from the contract theory. Grossman and Hart (1986) and Hart and Moore (1990) claims that under-investment may occur when contracts cannot be enforced due to the poor quality of institutions. Therefore, quality of institutions could act as a disincentive for firms or industries, which require inputs of relationship-specific investments. More recently, Antras (2003, 2005) provides us with further theoretical guidance on the micro effect of institutions. These studies show us how contract enforcement has an effect on the business decisions and trade structures of multinational companies.

Applying this to the current context, I argue that higher degree of judicial quality–a crucial element of the overall institutional quality–could reduce the idiosyncratic risk of a firm in setting up contracts and incentive schemes with its intermediate input supplier. This would help the firms in specializing goods, which require institutionally-dependent inputs, thereby maximizing the gains from higher exports or output. That is, the judicial environment of a region might help in addressing the holdup problem regarding the intermediate input suppliers. Higher judicial quality helps in reducing the additional transaction costs, which the firms need to incur, if a holdup problem arises. In economies, where such costs are

[2] I particularly focus on intensive margin of trade following this two pioneering work. The first one is by Evenett and Venables (2002). They use 3-digit trade data for 23 exporters over 1970-1997 and found that about 60 per cent of total export growth is at the intensive margin. Second, Brenton and Newfarmer (2007) using SITC data at the 5 digit-level over 99 countries and 20 years also found that intensive-margin growth accounts for the biggest part of trade growth (80.4%).

high due to poor institutional environment (e.g., low judicial quality or an inefficient legal system), firms will economize on transaction costs by purchasing a limited variety of intermediate goods. Therefore, given the use of substituted improper inputs which may not perform efficiently, it could result in lower output. Before establishing whether judicial quality affects gains from international trade through investment in institutional-dependent inputs, we can get a sense of the importance of the institutional-dependent inputs in a firm's production process and also whether a firm operating in India considers judicial quality to be an important factor for firm performance. While the firm-level dataset I use for this paper does not provide any such information on the relationship-specificity of inputs or their perception about the judicial quality, I use the **World Bank Enterprise Survey 2005** conducted by the World Bank to get a general sense about the idea proposed in the paper. Around 58% of the firms say that they use relationship-specific input or institutional-dependent inputs, whereas, for the exporters, it is as high as 75%. In terms of the percentage of firms who agrees with the idea that judicial system will enforce its contractual or property rights in business disputes, a good 25% of firms tend to disagree. Lastly, I look at the average time period for firms, whose, if any business dispute is solved by the court action. For around 30% of firms, it takes 6 months (24 weeks). And, if we look at the exporters only, the number is even higher. Around 40% of exporters have to wait for 24 weeks in order to solve a business dispute through courts. So, both the judicial system and institutional-dependent inputs are a significant factor for the business operation of firms in India.

Most of the existing empirical studies on contract enforcement or relationship-specific investments attempted to explain the pattern of trade flows between countries on the basis of country-level institutions. These studies mainly suffer from two types of weaknesses. First, the cross-country heterogeneity–history, culture, language, rule of law, etc.–can hardly be controlled by using a country-level dummy. Second, most of the studies are at the sectoral or more aggregate industry-level, which may not sufficiently capture the effect of judicial quality on firm performance. This paper tries to address these concerns by focusing on firm-level performance, dividing into international and domestic and also utilizing variation across India. I study the given relationship across 16 major states of India by focusing on intermediate input consumption by firms across all manufacturing industries between 2000 and 2010, to seek evidence on the micro-level effect of judicial quality on firm performance. One of the goals in this paper is to use data for a single country, which is divided into several regions, in order to capture the impact of heterogeneity involved in the degree of judicial quality within a single-country framework. In this regard, India serves as an interesting example, since each region differs economically, politically, culturally and geographically. In addition to this, the choice of India as a unit of study would help to avoid a lot of un-measureable cross-country heterogeneity. The firm-level and judicial quality data from a single country facilitates me to separate out some of the sources of comparative advantage by using within-nation variance rather than across-nation variance. Also, by using the data for different manufacturing sectors within a single country, I can exploit the heterogeneity involved within different industries located in the same country. In other words, I use Levchenko's (2007) framework in a single-country setting to take advantage of the within-state within-industry heterogeneity.

A crucial element of my identification strategy is the measure for judicial quality. I use Pendency Ratio at the Lower Courts for different states of India as the measure for judicial quality. This objective measure of judicial quality is one of the most important indicators that signify the efficiency of the judicial arm across various states of India, previously used by Chemin (2012) and Ahsan (2013). The measure of judicial quality, which is an important component of the overall institutional or governance indicator, varies over time. Next, I use both exports and domestic sales as the performance indicators of a firm. The reason to use two different performance indicators for a firm is to explore how much the effect varies according to different performance measures. Further, in order to control for the potential endogeneity problem of judicial quality, I use a two-step Average Treatment Effect (ATE) procedure using propensity score matching estimator following Rosenbaum and Rubin (1983) and Hirano et al. (2003).

My results bear substantial evidence of judicial quality being positively and significantly affecting the performance of a firm – even at the regional level, i.e., at the most disaggregated form possible. In other words, I find firms located in regions of lower judicial quality to produce lower output–both exports and domestic sales–and vice-versa. To put it differently, better judicial quality facilitates firms to use a higher proportion of intermediate inputs in their total input usage, i.e., firms could invest more on intermediate inputs due to the reduction of the risk of the holdup problem. My results show that a 10 % increase in judicial quality facilitates a firm's performance by 1–2%. The effect is higher for firms, which belong to industries that are – contract-intensive. The results are very robust to a series of robustness checks and sensitivity results, involving different set of samples, techniques and time periods.

The paper is organised as follows: Section 2 reviews literature concerning the effect of institutional quality on economic performance and the motivation for the current paper. Section 3 describes the data I use. The estimation strategy has been described in detail in Section 4. Section 5 discusses the results from different estimations while Section 6 present a variety of robustness checks and sensitivity analysis conducted. Section 7 provides some concluding remarks.

2. Literature review

My study amalgamates two different but somewhat related strands of literature. The primary one is regarding the effect of institutions on economic outcomes; the other delivers the importance of intermediate input usage in the production of manufacturing goods.

The literature concerning the hypothesis that institutions could matter for economic outcomes, is mostly empirical. However, there are a few important theoretical contributions. Particularly influential is Levchenko (2007). He demonstrates that

if some products rely on institutions more than others, then the quality of institutions could act as an important source of comparative advantage. On a slightly different perspective, both Segura-Cayuela (2006) and Do and Levchenko (2009) by endogenizing the efficiency of institutions, investigates how exposure to international trade could lead to change in efficiency of the institutions. Both these papers conclude that opening to trade may worsen institutions due to the concentration of political power with some handful of people, who might prefer to maintain bad institutions in order to reap a larger share of the benefits accentuated from trade liberalisation.

Empirical work concerning the primary strand includes Costinot (2009), who examine the reasons behind the differences in comparative advantage in international trade across countries, finding that better institutions and higher levels of education are complementary sources of comparative advantage in more complex industries. This is related to earlier papers, such as Hall and Jones (1999), which also points out that significant variation in output across countries originates from Solow residual – due to differences in institutions and government policies. Acemoglu et al. (2001) in an important contribution estimating the effects of past institutions on current income per capita show that historical institutions also matter significantly for future development. Cowen and Neut (2007) by using intermediate goods to measure the 'complexity' of a sector's input structure, show that industries, which have a more complex intermediate goods structure suffered a large loss of productivity in countries with poor institutions. However, all these studies citing institutions to be one of the main reasons for differentiated economic performance focus on either the trade flows or output across countries. In terms of any study, which focuses on the differences in institutions within-country, one could only mention the studies of Laeven and Woodruff (2007) and Wang et al. (2014). The former used cross-sectional firm-level data for Mexico for 1998 to argue that one standard deviation improvement in the quality of legal system is associated with 0.15–0.30 standard deviation increase in firm size through reducing the idiosyncratic risk faced by firm owners. The latter used provincial data from China to investigate the effect of judicial quality on firm-level exports.

Turning to the second strand of related literature, Levchenko (2007) proves that intermediate inputs have higher 'institutional content'. Moreover, Kasahara and Rodrigue (2008) and Halpern et al. (2015) show that firm or industrial productivity increases with increased utilisation of intermediate inputs. The idea, based on contract theory as applied by Levchenko (2007), is that increased usage of intermediate inputs affects the productivity of a firm. This, in turn, affects the output produced by the firm. Taken together, better judicial institutions, by reducing the hold-up problem, help firms to specialise in goods with higher proportion of intermediate inputs. This boost their sales, promote their engagement in trade.

Two papers, which address similar set of issues, also find judicial institutions significantly matters for regional development in India. One is by Chemin (2009). He measures the causal impact of speed of judiciaries on economic activity – credit markets, agricultural development and manufacturing performance. The other one is by Mundle et al. (2012). This study using state-level macro-economic data from India develops several indices of quality of governance to show that there is a strong correlation between the quality of governance and the level development of a state. I use these two papers as background to take a step forward to match the post codes of the firms with the different regions (or states) and investigate, whether higher judicial quality could reduce the risk of a holdup problem in case of relationship-specific inputs, which may help in increasing the firm performance or output, a crucial aspect of the development of a region. To the best of my knowledge, this is the first paper, which uses an objective measure of judicial quality to seek its role on the firm-level performance in case of India.

3. Data

3.1. Firm-level

The firm-level data employed in this paper uses the **PROWESS** database on Indian firms, maintained by the Centre for Monitoring of the Indian Economy (CMIE). The database contains information primarily from the income statements and balance sheets of all the listed companies in the major stock exchanges of India. It comprises of more than 70% of the economic activity in the organised industrial sector of India and account for 75% of corporate taxes and 95% of excise duty collected by the Government of India (Goldberg et al., 2010). The PROWESS database contains information of about 9500 publicly listed companies. I truncate the entire database to concentrate only on the manufacturing sector. This allows me to have around 3500 firms across all manufacturing sectors.[3] The database covers large companies and many small firms as well. Data for big companies is worked out from balance sheets while CMIE periodically surveys smaller companies for their data. However, the database does not cover the unorganized sector. The sample of firms is also reasonably representative of the aggregate picture in terms of activity in international trade (around 30–35%). CMIE uses an internal product classification that is based on the Harmonized System (HS) and National Industry Classification (NIC) schedules. There is a total of 1886 products linked to 108 four-digit NIC industries across the 22 manufacturing sectors (two-digit NIC Codes) spanning the industrial composition of the Indian economy. The size of the dataset, which encompasses 2000–2010, varies by year. The dataset gives details of each year's balance sheet of the firms, thereby providing information regarding total sales, exports, imports, cost, wages, employment, expenditures, and other important firm and industry characteristics. Majority of the firms

[3] There are firms in CMIE database that report zero and negative values for sales, assets, etc. I carefully drop those firms from my sample. I use those firms, which report positive values for sales.

Table 1
Summary statistics.

	Mean	Median	Std. dev	Min	Max
Panel A: firm performance – dependent variables					
Exports	50.11	0	970.89	0	102,656
Domestic sales	307.09	19.87	4286.39	0	315,211.9
Panel B: firm-level determinants – explanatory variables					
Input-Complexity index	0.49	0.08	4.10	0.003	0.86
Capital	209.71	15.65	2280.88	0.29	186,145
Labour	12.36	1.65	61.90	0.07	2382.6
Assets	322.75	25.18	3280.01	5.92	251,249
Age	27.56	20	53.49	6	93
Panel C: industry-level determinants – explanatory variables					
Capital intensity	0.70	0.71	0.09	0.29	0.88
Skill intensity	0.25	0.25	0.07	0.05	0.45
Concentration ratio	18112.94	4674.41	53640.77	26.36	632812.5
Capital employed	43190.71	21745.22	51111.76	457.38	349,389.5
Value-added	4,076,667	2,900,000	3,680,442	15,900	1.50e+07
TFP	0.39	0.38	0.07	0.22	0.77
Input variety	0.99	1	0.03	0.09	1.01
Panel D: state-level determinants – explanatory variables					
Judicial quality	71.59	84.77	24.49	22.61	95.12
Skill endowment	77.09	77.08	6.63	50.28	93.91
Capital endowment	2.23e+07	1.88e+07	1.68e+07	107,800	7.49e+07
Income	31321.18	26603	13606.51	8222.5	62,729
Financial development	0.87	1	0.34	0	1

Notes: 'Exports' and 'Domestic sales' is measured at the firm-level in Million INR. 'Input complexity index' is defined as the proportion of the intermediate inputs used by a firm in total input usage. 'Capital' is the total amount of capital employed by a firm. 'Labour' is the total compensation paid by a firm. 'Assets' is the total amount of assets of a firm. All three are measured in INR Million. 'Age' is the age of a firm. 'Capital intensity' is defined as the one minus wage bill divided by value added for each industry. 'Skill intensity; is the ratio of non-production workers to total employees of an industry. 'Concentration ratio' is the value of output produced per plant in each industry. 'Capital employed' is the amount of capital used by each industry. 'Value added' is the gross value-added of a manufacturing sector. 'TFP' is the total factor productivity measured by Levinshon-Petrin (2003) methodology at the industry level. 'Input variety' is the one minus Herfindahl index of inputs used. 'Judicial quality' is the pendency ratio of total number of IPC and SLL cases at the lower courts of each state in each year. 'Skill Endowment' is the literacy rate of a state. 'Capital endowment' is the sum of fixed, invested and working capital of all manufacturing sectors in a state. 'Income' is the per capita income of a state. 'Financial development' is the indicator for financial development of a state and has been taken from Khandelwal and Topalova (2011). It takes a value 1 for states for which the mean per capita credit is greater than the sample median.

in the dataset are either private Indian firms or affiliated to some private business groups, whereas, a small percentage of firms are either government or foreign-owned. Table 1 puts across the descriptive statistics of all the variables used for the analysis.

I use total exports and domestic sales by a manufacturing firm as the performance indicators. Columns (1) and (2) of Table 2 reports the mean values of exports and domestic sales over all the firms belonging to all manufacturing sectors for each of the major states of India over 2000–2010. In an average Indian state, firms' export around 57 million INR worth of manufacturing products in a year, whereas, domestic sales is around 347 million INR. Next, I use the expenditure on intermediate inputs as the indicator for institutional-dependent inputs. I calculate the expenses of a firm towards its intermediate or production units as a proportion of total input expenditure to be the proportion of institutionally-dependent inputs used by a firm towards the production of the final good. I follow Cowen and Neut (2007) to term this ratio as the "input-complexity" index.

3.2. Judicial quality

The data for judicial quality at the state-level comes from the National Crime Records Bureau (NCRB), which is an agency under Ministry of Home Affairs, Govt. of India, responsible for collecting and analysing crime and judicial quality data as defined by the Indian Penal Code (IPC). I use detailed data from the NCRB's **Annual Crime in India** publication to construct my state-level judicial quality. This is an annual publication from the Ministry of Home Affairs that gives the trends and patterns in judicial quality throughout India. I choose one of the most important indicators which could bring out a true and proper picture of the level of judicial quality of a state – fraction of cases in each state that is pending to all the cases within a year. This is defined as the Pendency Ratio of the lower courts of each state at the end of the year. I use the pendency ratio of courts as a proxy for contract enforcement following Chemin (2012) and Ahsan (2013). Chemin (2012) argues that courts significantly influence the contracting behaviour of firms. That is, proper enforcement as a result of any business dispute could affect the investment behaviour of the firms which may have an impact on their performance. I assume that the higher the pendency ratio of a state is, the lower is the judicial quality of that state. Therefore, focusing on the cross state

Table 2
Average firm performance and judicial quality: state wise.

State	Firm performance		Judicial quality
	Exports (1)	Domestic sales (2)	Pendency ratio (3)
Andhra Pradesh	30.15	149.21	30.87
Assam	2.95	320.87	80.42
Bihar	1.43	91.31	86.80
Gujarat	48.20	194.24	90.96
Haryana	16.22	169.30	79.85
Jammu and Kashmir	0.04	51.30	84.38
Karnataka	126.15	388.26	70.09
Kerela	12.43	92.07	75.06
Madhya Pradesh	15.44	184.19	61.52
Maharastra	105.92	703.94	90.94
Orissa	87.51	233.41	88.74
Punjab	24.48	157.34	78.83
Rajasthan	26.23	143.47	80.05
Tamil Nadu	27.76	199.56	39.75
Uttar Pradesh	25.96	116.64	59.04
West Bengal	21.55	201.30	61.31
Average	56.68	347.36	71.59

Notes: Values in columns (1)-(2) are the mean for all the industries in a particular state over 2000–2010. Values are expressed in INR Millions for columns (1) and (2). Values in column (3) are mean ratios of each state over the period of 2000–2010.

differences in judicial quality within a single country, I would be able to thwart the common problems which arises with the cross-country studies. Ahsan (2013) also uses pendency ratio of courts in India as an indicator of contract enforcement.

Column (3) in Table 2 reports the mean values of pendency ratio (the indicator for judicial quality) across the major states of India. I use pendency ratio of all the cases (IPC plus SLL[4]) at the lower courts for each of the different states in India as the measure of judicial quality. I include the SLL cases, because it comprises the lion's share of all the cases, so focusing only on IPC cases would entail a significant bias on the effectiveness of the judicial quality indicator. An average state solves around 30% of its cases in a year, with Andhra Pradesh being the most efficient where 31% of cases remain unsolved and Maharastra and Gujarat is the worst with only 9% being resolved. Though the NCRB dataset comprises of all the states and union territories of India, I choose to restrict my analysis for the 16 major states of India, primarily due to non-availability of firm-level data for the small states and union territories for this entire period of analysis. Nevertheless, these sixteen major states of India commands over 90% of the population and more than 85% of the total industrial output produced in the country.

However, there are two issues that might be worth mentioning regarding the use of Pendency Ratio as the indicator for judicial quality.[5] First, there is a possibility of a potential aggregation bias, as judicial quality could be different for firms located in different local regions of a state. Unfortunately, the data from **Annual Crime in India** doesn't allow me to use the Pendency Ratio of a lower court, which is within the jurisdiction of a firm. In order to somehow address this issue, I use an alternative measure of 'contract enforcement' from the **Doing Business Survey Report** of the World Bank in Section 6 (Robustness Checks). This dataset reports data for the capital cities of the major states in India. This will help me capture the local legal environment more relevant to a firm's business operations.

Second, the measure of judicial quality, which I use can be driven by both the supply of cases and the ability of the judicial system to clear cases. Thus, it could be difficult to interpret the measure of judicial quality. For e.g., poor performing states may have very few cases because firms prefer to make alternate deals given the delays involved with a formal conflict resolution. On the other side, high performing states may have very large workloads. Therefore, in order to understand the context of the measure of judicial quality better, I ran some correlations with other available measures of good governance. Mundle et al. (2012) uses several indicators (infrastructure service delivery, social service delivery, fiscal performance, law and order, judicial service delivery and quality of legislature) for quality of governance in order to compute an overall

[4] Special and Local Laws

[5] The state-level pendency ratio used in the paper may also potentially be biased from another dimension as it does not include those cases pending in the state High Court of each state and also the cases pending in the Supreme Court of India that are from the same state the firm is operating. As for using the cases pending in the Supreme Court of India would be contrary to the very purpose of the study for the following reasons: (i) the procedure through which the judges appointed in the Supreme Court are completely different from that of lower courts, as President of India appoints judges after consultation with the Chief Justice of India; (ii) my estimations would not pick up the heterogeneity of the pendency ratio across different states, which is the main aim of the paper; and (iii) I need to use a new dataset in order to include the cases for the Supreme Court. Regarding the cases in the High Court of each state, the President of India also appoint judges to the High Court along with consultation of the Governor of each state. This may not reflect the efficiency of the states with regard to the speed and efficiency with which the cases are disposed in lower courts, where the judges are appointed by the respective state governments.

governance performance index for the major states of India. This is a composite index (measured through principal component analysis) and the one used in this paper is a ratio. I, therefore, rank the states based on these two measures and compute a correlation coefficient of the rankings. The correlation coefficient is around 0.6, significant at 5% level. Further, I also checked the correlation of my measure of judicial quality with the indicator 'contract enforcement' from the **World Bank Doing Business** dataset. The result remains the same – my measure of judicial quality significant correlates with the World Bank measure.

4. Estimation strategy

My goal is to test whether judicial quality or contract enforcement serves as a source for comparative advantage for firms specializing in production of goods with higher proportion of intermediate inputs use, at the regional level. I base my empirical estimation on a simple Cobb-Douglas production function, where judicial quality enters as a productive input. The output variable of the production function of a firm is an indicator for its performance. Following Nunn (2007), I define the estimating equation:

$$\ln(x_{ist}) = \alpha_i + \alpha_s + \alpha_t + \theta_1(inputcomp_{ist} * judicialquality_{st}) + \theta_2 X_{ist} + \varepsilon_{ist}$$

where, x_{ist} is either the exports or domestic sales of firm i in state s at time t. I use detailed firm-level manufacturing data in order to estimate the above equation. θ_1 is my main coefficient of interest which would capture the complementarities between the judicial quality of a region and the performance of a firm via the effect on the usage of its intermediate inputs, i.e., between the input structure of a firm and its performance via the effect of judicial quality. In other words, θ_1 tells us whether states with better judicial quality exhibit higher firm performance–participation in international trade or higher domestic sales–in institutionally intensive sectors. I expect θ_1 to be negative. Because, as discussed in the previous section, the higher the pendency ratio of a state is, the lower is the judicial quality, therefore, the firm performance. α_i, α_s, α_t are firm, state and year fixed effects respectively, whereas, ε_{ist} is the idiosyncratic error term. But, the results turn out to be the same. I cluster my standard errors at the firm-level.

inputcomp can be defined as "input complexity" index. It is the share of intermediate inputs in total inputs usage of a firm i at time t. It varies by year and firm. I use the expenditure of a firm towards intermediate or production units as the indicator for institutionally-dependent inputs. A higher ratio indicates a higher-level of intermediate input usage by a particular firm and relatively more institutionally dependent. Intermediate inputs require relationship-specific investments, thereby posing a greater degree of complexity and a holdup problem scenario. Therefore, in order to carry out these types of transactions smoothly, higher judicial quality is of utmost importance.

judicialquality is measured at the state-level across 2000–10. In estimating the equation above, I use Pendency Ratio of the lower-level courts of a state as the perceived indicator. The advantage of using this type of objective measure of judicial quality is that it gives an appropriate picture of the judicial efficiency of a region, rather than the studies which use indices of institutional quality based on some subjective surveys. Though, the number of cases which are pending at the end of the year does not really signify the exact judicial quality in each state, nonetheless, it is one of the best indicators that can give an idea about the contract enforcement situation in each of the state. If the data suggests that state X has higher number of cases pending at the end of a year than state Y, it would mean that the judicial quality is inferior in state X or state X's judiciary is inefficient. I interact my judicial quality variable with the "input complexity" index to estimate whether states having higher judicial quality produces goods of higher institutional dependence.

X_{ist} includes a rich set of control variables – judicial quality, intermediary share, various firm-level, industry-level and state-level characteristics, such as the skill and capital intensity of a firm, age of a firm, age squared, ownership indicator, skill and capital endowment of a state, income of a state, value-added by an industry and several others. The inclusion of these various kinds of controls would help me to check whether my results still hold if I control for other measures of firm-level, industry-level and state-level comparative advantage. However, one should still be careful in interpreting the basic estimates as conclusive evidence about the effect of judicial quality on the dynamics of firm performance because of the following two reasons: (a) reverse causality, and (b) omitted variable bias. I explain the procedure of dealing with these two problems in detail in the following section.

4.1. Addressing endogeneity of judicial quality

As I mentioned before, two kinds of endogeneity problem may affect the results – reverse causality and omitted variable bias. One would expect the use of firm-level input to be a function of the judicial speed. And, if true, this will induce simultaneity bias. In order to control for this, I use a firm's "input complexity" in the first year of the sample. I also use one-period lagged values of judicial quality to further check for the robustness of results. The results remain the same (not reported) in both the cases as compared to my benchmark results.

Another important concern with the estimation strategy is the omitted variable bias. I address this issue by sequentially adding various state characteristics and its interaction with "input complexity" index to my baseline specification. In other words, it can be argued that the differential effect of "input complexity" index on firms in different states may be due to other state factors that are unrelated to judicial quality. Therefore, by adding proxies of alternate state characteristics and its interaction with "input complexity" index, I am able to test whether the performance premium due to more efficient

judiciary is robust to controlling for these additional channels. In addition to these control variables, the inclusion of state fixed effects in the baseline specification will also control for time-invariant state characteristics but not for time-varying unobservable characteristics. For example, it may be the case that a firm's exports or total sales and a state's judicial quality are correlated with the economic and political condition. I also add state-year interaction fixed effects to my baseline specification to examine whether the main results are robust to controlling for time-varying, unobservable state characteristics. The primary result stays the same.

A related and crucial issue is the self-selection problem of firms. The firms may self-select themselves in states which have efficient judiciaries, i.e., if a bigger exporter is located in a state with more efficient judiciary and use a higher proportion of intermediate inputs, then the results of this paper will reflect nothing, but a simple spurious correlation. This could potentially bias my results. Following Ahsan (2013), I compare the exports of firms' in high judicial quality states (judicial quality above the sample median) with the exports of firms' in low judicial quality states (judicial quality below the sample median). I find no evidence to suggest that high performance firms locate in high judicial quality states.[6] I also do not observe any evidence of systematic agglomeration in the data, which could also raise some serious concerns about the identification strategy used in this paper. The industries included in the sample are fairly well spread across various states. Thus, the potential selection of high performing firms in high judicial quality states that also experience higher intermediate input usage, as a likely explanation for the results documented in this paper is bleak.

Nonetheless, in order to be thoroughly convinced that self-selection of firms doesn't play any role in achieving the desired results for this paper; I carry out the following exercise: I estimate the effect of judicial quality on the firm performance using a two-stage Average Treatment Effect (ATE), utilizing the matching estimator technique. The matching estimator technique has been widely used in understanding the effect of institutional or judicial quality on international trade (Nunn, 2007; Ahsan, 2013; Ma et al., 2010). I follow the literature and use the propensity score matching (Rosenbaum and Rubin, 1983) method to generate propensity scores in the first stage and then estimate the ATE of the judicial quality–by weighing with the inverse of a nonparametric estimate of the propensity score rather than the true propensity score–on the performance indicator of a firm. This leads to an efficient estimate of the ATE (Hirano et al., 2003).[7]

To generate propensity scores, I do the following: I first calculate the median (50th percentile) of the pendency ratio over all the states and years. I then use each state's average value of the pendency ratio (averaged over 2000–10) to classify it as having high or low judicial quality. In particular, if a state's average pendency ratio is equal to or greater than the median of the sample, it is classified as a low judicial quality state.[8] If a state's average pendency ratio is below the median, it is classified as having high judicial quality. Next, using this information I construct an indicator variable $judqua_i$, which is one if firm i is in a state at or below the median of judicial quality and zero otherwise. This indicator variable is then used to construct propensity scores by estimating the following probit model:

$$P_i = \Pr\{judqua_i = 1 | Y_{it}, perindic_{it}\} = \Phi\{\gamma_1 Y_{it} + \gamma_2 perindic_{it}\}$$

where $\Phi\{*\}$ is the normal cumulative distribution function, Y_{it} are the control variables including the natural logarithm of age, age squared, government or foreign ownership and size indicator. $perindic_{it}$ is the performance indicator of a firm – exports and domestic sales. Thus, firms are matched based on their characteristics including exports and domestic sales. The propensity scores, P_i, thus generated is the conditional probability of receiving a treatment by a firm given pre-treatment characteristics, Y_{it}. These estimated propensity scores can now be used to estimate the average treatment effects in different ways – nearest matching method, radius matching, kernel matching method and stratification method. I choose the nearest matching method for my purpose. Let T be the set of treated (high judicial quality) units and C the set of control (low judicial quality) units, and Z_i^T and Z_j^C be the observed outcomes of the treated and control units, respectively. I denote C_i as the set of control units matched to the treated unit i with an estimated propensity score of P_i. I now use the estimated propensity scores, P_i, to match each firm in a state with high judicial quality (treated) with its nearest neighbour among firms in states with low judicial quality (control). In other words, for each pair I minimize

$$C(i) = \min\left|\left|\hat{P}_{i,T} - \hat{P}_{i,C}\right|\right|$$

where $\hat{P}_{i,T}$ and $\hat{P}_{i,C}$ are the estimated propensity scores of a firm in a state with high judicial quality and its nearest neighbour in a state with low judicial quality, respectively. This balancing exercise produces a sample of firms that are similar based on a set of observable controls. This difference above is a singleton set unless there are multiple nearest neighbours. In practice, the case of multiple nearest neighbours should be very rare. In particular, if the set of characteristics Y_{it} contains numerous continuous variables, the likelihood of multiple nearest neighbours is further reduced if the propensity score is estimated and saved in double precision.

I use this matched sample weighing by the inverse of the non-parametric estimate of the propensity score to estimate the average treatment effect in the following way. Using the nearest matching method, I denote the number of controls

[6] I do not also find any such evidence for domestic sales as well.

[7] However, using PSM still doesn't entirely solve the problem of identification, since as argued by Angrist and Pischke (2008), PSM is a re-weighted version of OLS. Still, the method used by Hirano et al. (2003) addresses the problem somewhat (to a certain extent), as it is an upgraded version of PSM (it uses a two-step process with ATE in the second stage).

[8] I take the median value of the states in 2000 (base year of the sample) in order to control for further endogeneity, since states may change its position in terms of judicial quality over the period of analysis.

Table 3
Judicial quality and firm performance: benchmark results.

	Ln (Exports+1)			Ln (Domestic Sales+1)		
	(1)	(2)	(3)	(4)	(5)	(6)
JudQua*IntComp	−0.111***	−0.099***	−0.100***	−0.113**	−0.109**	−0.030
	(0.035)	(0.035)	(0.036)	(0.051)	(0.049)	(0.033)
JudQua	−0.153	−0.049	−0.161	1.087***	0.749***	0.808***
	(0.401)	(0.403)	(0.420)	(0.274)	(0.270)	(0.238)
InpComp	2.413*	2.414	1.552	−0.586	−0.341	−3.422
	(1.461)	(1.522)	(1.624)	(2.822)	(2.914)	(2.397)
Capital			74.879***			20.224*
			(12.612)			(10.808)
Labour			323.204***			469.532***
			(15.421)			(13.187)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.89	0.89	0.89	0.95	0.95	0.96
N	27,790	27,790	25,459	27,770	27,770	25,439
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	No	Yes	Yes	No
Year FE	Yes	No	No	Yes	No	No
Industry*Year FE	No	Yes	No	No	Yes	No
State*Year FE	No	No	Yes	No	No	Yes

Notes: 'JudQua' (Judicial quality) is the pendency ratio of total number of IPC and SLL cases at the lower courts of each state in each year. Pendency ratio is defined as the fraction of pending cases to all the cases in a year. 'IntComp' is the "Input-complexity index". It is the proportion of the intermediate inputs used by a firm in total input usage. 'Capital' is the total amount of capital employed by a firm. 'Labour' is the total compensation paid by a firm. All the regressions contain the individual terms of the interactions. Firm controls include age of a firm, age squared, ownership and size indicator. I use total assets of a firm as the size indicator. Numbers in the parenthesis are clustered standard errors at the firm level. Intercepts are not reported.

* denotes 10% level of significance
** denotes 5% level of significance
*** denotes1% level of significance.

matched with observation $i \in T$ (treated units) by N_i^C and define the weights $\omega_{ij} = (1/N_i^C)$ if $j \in C(i)$ and $\omega_{ij} = 0$ otherwise. I estimate the following equation with the inverse of the estimated propensity score to examine the average gains of the treated units accrued from the treatment:

$$\tau^M = \frac{1}{N^T}\sum_{i\epsilon T} Y_i^T - \frac{1}{N^T}\sum_{j\epsilon C}\omega_j Y_j^C$$

where, τ^M is the gain from the average treatment effect due to the nearest neighbour matching method and $\omega_j = \sum_i \omega_{ij}$. I report bootstrapped standard errors (100 repetitions) for the estimates from the average treatment effect.

5. Results

5.1. Benchmark results

Table 3 examines the overall relationship between judicial quality and firm performance. I use two different indicators for firm performance – exports and domestic sales. This is to understand whether there is any categorical difference concerning the effect of judicial quality on domestic sales as compared to international sales. My ordinary least square (OLS) estimates produce negative coefficient for all the cases. It indicates that higher judicial quality leads to higher firm performance through specializing in inputs, which require relation-specific investments, i.e., which are institutionally-dependent. Column (1) regresses natural logarithm of exports of a firm plus one on the interaction of judicial quality and the proportion of intermediate input consumption, controlling for unobservable firm, state and year characteristics. The point estimates suggest that judicial quality significantly influences the exports of a firm. In particular, higher quality of judiciary or contract enforcement is significantly associated with higher total exports of a firm at 1% level of significance. This result suggests that a firm located in a high judicial quality region export goods which relies more on institutional dependent inputs. In other words, higher quality of governance helps the firms to invest in intermediate goods through reducing the idiosyncratic risk involved. Therefore, it can be argued that judicial quality benefits a firm in overcoming the hold-up problem and produce higher level of output and engage in higher level of international trade.

In column (2), I include the interactions of industry and year fixed effects to my baseline specification. These interaction effects would control for unobservable, time-varying industry characteristics that are potentially correlated with "input complexity" index. As the results demonstrate, the inclusion of these interaction effects also does not alter the baseline specification. Column (3) adds the amount of capital and labour use by a firm as additional controls. These are two significant

Table 4
Judicial quality and firm performance: with industry characteristics.

	Ln (Exports+1)			Ln (Domestic sales+1)		
	(1)	(2)	(3)	(4)	(5)	(6)
JudQua*IntComp	−0.110***	−0.112***	−0.106***	−0.112**	−0.113**	−0.111**
	(0.034)	(0.035)	(0.035)	(0.051)	(0.051)	(0.051)
JudQua*CapInt	5.171***			1.829*		
	(1.507)			(1.111)		
JudQua*SkillInt		0.566			1.322*	
		(1.053)			(0.731)	
JudQua*ConRa			1.478***			0.595***
			(0.315)			(0.212)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.89	0.89	0.89	0.95	0.95	0.95
N	27,790	27,790	27,790	27,770	27,770	27,770
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: 'JudQua' (Judicial quality) is the Pendency Ratio of total number of IPC and SLL cases at the lower courts of each state in each year. Pendency ratio is defined as the fraction of pending cases to all the cases in a year. 'IntComp' is the "Input-complexity index". It is the proportion of the intermediate inputs used by a firm in total input usage. 'CapInt' (Capital intensity) is defined as the one minus wage bill divided by value added for each industry. 'SkillInt' (Skill intensity) is the ratio of non-production workers to total employees of an industry. 'ConRa' (Concentration ratio) is the value of output produced per plant in each industry. 'CapInt', 'SkillInt', 'ConRa' are expressed in their logarithm form. All the regressions contain the individual terms of the interactions. Firm controls include age of a firm, age squared, ownership and size indicator. I use total assets of a firm as the size indicator. Numbers in the parenthesis are clustered standard errors at the firm level. Intercepts are not reported.

* denotes 10% level of significance
** denotes 5% level of significance
*** denotes1% level of significance.

inputs of a production function. Capital is defined by the amount of capital employed by a firm, whereas, labour is the total compensation bill. In addition, I also introduce state and year fixed effects. These interactions will control for time-varying state characteristics that are potentially correlated with "input complexity". Using these additional controls doesn't hamper my benchmark result – higher judicial quality of a region significantly increases the exports of a firm. The most conservative point estimates suggest that a 10% increase in judicial quality of a region would help to increase the exports of a firm by 1%. My results are in complete conformity with the standard cross-country results of estimating the impact of a country's institutions on economic performance (Knack and Keefer, 1995, 1997; Hall and Jones, 1999; Levchenko, 2007; Nunn, 2007; Ma et al., 2010). It also draws strong support from a regional study on China, which uses provincial data to find positive impact of contract enforcement on exports (Feenstra et al., 2013; Wang et al., 2014). In columns (4)–(6), I substitute my dependent variable–exports–with domestic sales as the performance indicator. I find exactly the same effect – judicial quality or contract enforcement also significantly affects the domestic sales of a firm. However, the results (in case of domestic sales) are less robust and of lower significance, although the magnitude of the effect is the same.

5.2. Industry and state characteristics

In Table 4, I test the robustness of the above result by including various industry-level characteristics and allowing the effect of judicial quality to vary these additional dimensions. The inclusion of these additional variables address the fact that the performance of Indian firms may be correlated with factors that drive India's patterns of comparative advantage. In columns (1)–(3), I test the effect for exports and in (4)–(6), for domestic sales of a firm. Column (1) adds each industry's capital intensity and its interaction with judicial quality. Capital intensity is defined as $(1 - \frac{wagebill}{value\ added})$. As the result demonstrates, the inclusion of this additional control doesn't alter the coefficient of interest. It continues to be significant at 1% level. In column (2), I add each industry's skill intensity interacted with judicial quality. Skill intensity is defined as the ratio of non-production workers to total employees of an industry. Once again, the primary coefficient of interest remains robust. Next, in column (3), I add each industry's concentration ratio and its interaction with judicial quality as one of the explanatory variables. Concentration ratio is defined as the natural logarithm of output per plant in an industry. The inclusion of this additional control also has minimal effects on the primary coefficient of interest. Even after controlling for several industry characteristics, the magnitude of the effect does not vary much from the initial results.[9] Columns (4)–(6) do the same estimations using the domestic sales of a firm as the outcome of interest. The magnitude of the coefficients

[9] All these three industrial characteristics used are constructed by matching state-wise **Annual Survey of Industries** (ASI) data (described in detail in Section 6) at the two-digit level with the firm-level data. I thank Allcott et al., (2016) for sharing the data with me.

Table 5
Judicial quality and firm performance: with state-industry characteristics.

	Ln (Exports+1)		Ln (Domestic sales+1)	
	(1)	(2)	(3)	(4)
JudQua*IntComp	−0.113***	−0.113***	−0.115**	−0.115**
	(0.035)	(0.035)	(0.050)	(0.050)
SkillInt*SkillEnd	2217.826***	2230.472***	717.933***	688.456***
	(371.156)	(373.617)	(253.187)	(254.923)
CapEmp*CapEnd	81.267***	76.440***	35.741***	38.709***
	(6.856)	(7.883)	(5.065)	(5.810)
Income*VA		10.333		−43.146***
		(19.065)		(13.126)
Firm controls	Yes	Yes	Yes	Yes
R-square	0.89	0.89	0.95	0.95
N	27,790	27,790	27,770	27,770
Firm FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: 'JudQua' (Judicial quality) is the pendency ratio of total number of IPC and SLL cases at the lower courts of each state in each year. Pendency ratio is defined as the fraction of pending cases to all the cases in a year. 'IntComp' is the "Input-complexity index". It is the proportion of the intermediate inputs used by a firm in total input usage. 'SkillInt' (Skill intensity) is the ratio of non-production workers to total employees of an industry. 'SkillEnd' (Skill endowment) is the literacy rate of a state. 'CapEmp' (Capital employed) is the amount of capital used by each industry. 'CapEnd' (Capital endowment) is the sum of fixed, invested and working capital of all manufacturing sectors in a state. 'Income' is the per capita income of a state. 'VA' (Value added) is the gross value-added of a manufacturing sector. 'CapInt', 'SkillInt', 'SkillEnd', 'CapEnd, 'Income' and 'VA' are expressed in their logarithm form. All the regressions contain the individual terms of the interactions. Firm controls include age of a firm, age squared, ownership and size indicator. I use total assets of a firm as the size indicator. Numbers in the parenthesis are clustered standard errors at the firm level. Intercepts are not reported.

* denotes 10% level of significance
** denotes 5% level of significance
*** denotes1% level of significance.

remains the same, though significance decreases marginally. The results show that inclusion of these additional controls at the industry-level doesn't alter the coefficient of interest. The effect remains robust across different specifications.

If the differences in judicial quality are really driven by other characteristics of the states, my results would be biased, if I do not control for them. Table 5 presents a separate set of results controlling for all possible state characteristics and its interaction with industry choice variables. Column (1) introduces both skill and capital endowment of a state and its interaction with the skill intensity and capital employed by an industry, respectively to control for the factor endowments of a state. Skill endowment of a state is measured by the literacy rate of a state, whereas capital endowment is sum of fixed, invested and working capital of all the manufacturing sectors of a state. The primary result of judicial quality positively affecting the firm exports continue to hold at 1% level of significance. Both the factor endowments also play a crucial role in explaining the pattern of export flows.

Next, I control for another important characteristic of a state, which might affect the export performance of a firm. This, if omitted, may bias the estimated importance of judicial quality as a factor of comparative advantage for the production of institutionally-dependent manufacturing goods. I interact the gross value-added of an industry with the income per capita for a given Indian state in column (2) to control for the possibility that the high income regions might specialize in high value-added industries. Gross value-added is defined as total value of output minus the raw material costs. I use gross value-added data from the ASI database at the two-digit level. The per capita income data of a state has been sourced from the Central Statistical Organization (CSO). The coefficient does not produce any evidence of high income regions likely to be a key factor for a firm engaging in international sales. I substitute exports with domestic sales of a firm in columns (3) and (4). The results remain the same. Judicial quality continues to an important factor also affecting the domestic sales of a firm. Skill and capital endowment also continues to be positively affecting the domestic sales of a firm.

To test for further robustness of my results, I extend my analysis to control for several other alternate state characteristics and its interaction with "input-complexity" index in Table 6. Column (1) includes total factor productivity (TFP) growth of an industry as one of the key determinants of comparative advantage of the firm performance. The TFP is calculated using the Levinshon and Petrin (2003) methodology[10] using the ASI dataset. The judicial quality continues to significantly and positively affecting a firm's exports. Following Nunn (2007), I include another important characteristic, the interaction between per-capita income of a state and input variety in column (2) in order to estimate if highly developed regions use different types of inputs. I calculate input variety as one minus the Herfindahl index of input concentration for each industry. This measure increases in the variety of inputs used in production. It is generally used to measure the 'self-containment' of

[10] For details, please see Levinshon and Petrin (2003).

Table 6
Judicial quality and firm performance: with alternate state-industry characteristics and input-complexity.

	Ln (Exports+1)						Ln (Domestic sales+1)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
JudQua*IntComp	−0.085**	−0.102***	−0.079**	−0.100***	−0.110***	−0.101**	−0.056	−0.093**	−0.138**	−0.106**	−0.106**	−0.120**
	(0.034)	(0.034)	(0.032)	(0.036)	(0.035)	(0.042)	(0.048)	(0.044)	(0.057)	(0.051)	(0.049)	(0.051)
TFP*IntComp	−40.973***						−86.811***					
	(11.938)						(25.328)					
InputVar*IntComp		−0.279						−0.063				
		(0.312)						(0.219)				
SkillEnd*IntComp			−52.019***						41.488*			
			(15.121)						(25.030)			
CapEnd*IntComp				−2.049*						−1.203		
				(1.228)						(2.052)		
FinDev*IntComp					3.661						49.398*	
					(9.661)						(28.476)	
Income*IntComp						−3.927						2.677
						(3.087)						(3.503)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.89	0.89	0.89	0.89	0.89	0.89	0.95	0.95	0.95	0.95	0.95	0.95
N	27,790	27,790	27,790	27,790	27,790	27,790	27,770	27,770	27,770	27,770	27,770	27,770
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: 'JudQua' (Judicial quality) is the pendency ratio of total number of IPC and SLL cases at the lower courts of each state in each year. Pendency ratio is defined as the fraction of pending cases to all the cases in a year. 'IntComp' is the "Input-complexity index". It is the proportion of the intermediate inputs used by a firm in total input usage. 'TFP' is the total factor productvity at the industry level. 'InputVar' (Input variety) is the one minus herfindahl index of inputs used. 'SkillEnd' (Skill endowment) is the literacy rate of a state. 'CapEnd' (Capital endowment) is the sum of fixed, invested and working capital of all manufacturing sectors in a particular state. 'FinDev' (Financial development) is the indicator for financial development of a state and has been taken from Khandelwal and Topalova (2011). It takes a value 1 for states for which the mean per capita credit is greater than the sample median. 'Income' is the natural logarithm of per capita income of a state. 'TFP', 'SkillEnd', 'CapEnd' and 'Income' are expressed in their logarithm form. All the regressions contain the individual terms of the interactions. Firm controls include age of a firm, age squared, ownership and size indicator. I use total assets of a firm as the size indicator. Numbers in the parenthesis are clustered standard errors at the firm level. Intercepts are not reported.

* denotes 10% level of significance
** denotes 5% level of significance
*** denotes1% level of significance.

an industry. The backward regions, which have poorly developed infrastructure, tend to specialize in industries that are "self-contained". It is opposite of the measure "input complexity". In other words, regions with high quality of judicial institutions would specialize in complex goods, which will rely heavily on institutions than simple goods. I do not find any such effect.

In columns (3) and (4), I interact the factor endowment variables with the "input-complexity" index in order to control for situations, where higher skill endowment or capital endowment regions might manifest in industries which have a higher dependency on intermediate inputs. I do not find any such evidence. To control for financially developed states, I use a binary measure of financial development following Khandelwal and Topalova (2011) in column (5). The states whose average per capita credit is above the median per capita credit of India are classified as the financially developed states, and otherwise. It could be possible that financially developed regions might specialize in goods with a complex input structure. I fail to find any such evidence. Column (6) interacts the income of a state with the "input-complexity" index. I do not find evidence of high income states specializing more in complex goods which influence the export pattern of a firm. Columns (7)–(12) repeat the estimations of columns (1)–(6) by using domestic sales as the performance indicator. I find two additional results: (a) regions with higher skill endowment experiencing higher sales; and (b) financially developed register a higher volume of sales. My primary result stays the same.

5.3. Industrial classifications – contract intensity of industries

If differences in the judicial quality are really driving the results we observe so far, I should not find any such effect for non-contractive industries. I follow Ahsan (2013) to divide the industries into – contract intensive and non-contract intensive in Table 7. In particular, if certain industries need a higher proportion of intermediate inputs usage, then firms in those industries are more likely to be dependent on quality of judiciary. Contract intensive industries are defined as those which have greater than median "input-complexity" index of the sample, while the remaining as non-contract intensive industries. The results strongly suggest that the complementarities between "input-complexity" index and judicial quality accrue only in contract-intensive industries. These results indicate that the complementarities between judicial quality and gains from either international or domestic sales are strongest for firms in contract intensive industries, i.e., the firms which have a higher usage of intermediate inputs.

Table 7
Judicial quality and firm performance: contract intensity of industries.

	Contract Intensive Industries				Non-Contract Intensive Industries			
	Ln (Exports+1)		Ln (Domestic sales+1)		Ln (Exports+1)		Ln (Domestic sales+1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
JudQua*IntComp	−0.113***	−0.115***	−0.111**	−0.113**	−1.170	0.667	−13.658	−10.298
	(0.035)	(0.035)	(0.051)	(0.050)	(5.161)	(6.657)	(9.417)	(9.118)
SkillInt*SkillEnd		2672.499***		445.390*		−3080.187***		2424.05**
		(399.402)		(261.922)		(1266.667)		(1010.267)
CapEmp*CapEnd		71.579***		40.054***		305.493**		−275.642**
		(7.893)		(5.857)		(153.637)		(107.530)
Income*VA		37.309**		−48.291***		−1025.421***		366.114***
		(18.620)		(13.024)		(174.196)		(114.866)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.88	0.89	0.95	0.95	0.91	0.92	0.92	0.92
N	26,923	26,923	26,909	26,909	867	867	861	861
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: 'JudQua' (Judicial quality) is the pendency ratio of total number of IPC and SLL cases at the lower courts of each state in each year. Pendency ratio is defined as the fraction of pending cases to all the cases in a year. 'IntComp' is the "Input-complexity index". It is the proportion of the intermediate inputs used by a firm in total input usage. 'SkillInt' (Skill intensity) is the ratio of non-production workers to total employees of an industry. 'SkillEnd' (Skill endowment) is the literacy rate of a state. 'CapEmp' (Capital employed) is the amount of capital used by each industry. 'CapEnd' (Capital endowment) is the sum of fixed, invested and working capital of all manufacturing sectors in a state. 'Income' is the per capita income of a state. 'VA' (Value added) is the gross value-added of a manufacturing sector. 'SkillInt', 'CapInt', 'SkillEnd', 'CapEnd', 'Income' and 'VA' are expressed in their logarithm form. Contract intensive industries are the ones which have higher mean intermediary share index than the median of the sample, while the non-contract intensive industries are the opposite. Firm controls include age of a firm, age squared, ownership and size indicator. I use total assets of a firm as the size indicator. All the regressions contain the individual terms of the interactions. Numbers in the parenthesis are clustered standard errors are clustered at the firm level. Intercepts are not reported.

* denotes 10% level of significance
** denotes 5% level of significance
*** denotes1% level of significance.

5.4. Addressing endogeneity of the judicial quality indicator

In this section, I address the concern for the self-selection effect of the firms. That is, the results demonstrated so far in this paper can be biased by the self-selection of the firms' in states with higher judicial quality. The issue is discussed in greater detail in Section 4.1. In particular, I use a matching estimator to match firms based on similar characteristics. I generate a control group of firms in states with low judicial quality that has characteristics similar to firms in states with high judicial quality. I regress the judicial quality indicator (which takes a value 1 for states with high judicial quality, i.e., for states with less pendency ratio than the median) on the various state characteristics and generate propensity scores. I use the inverse of those propensity scores to estimate the average treatment effect of the firms from the treated (high judicial quality) zone on the exports and domestic sales. The results using matched sample are listed in columns (1)–(4) of Table 8. I match the firms based on several firm characteristics like the age, age squared, ownership and size indicator. The coefficients from column (1) suggest that higher judicial quality significantly propels higher exports for firms in states with high judicial quality when compared to firms in states with low judicial quality.

Next, I examine whether this result is biased by time-varying, observable industry and state characteristics that are potentially correlated with the firm exports and the usage of intermediate inputs. In column (2), I use the important factor endowment variables (skill and capital) and the development indicator (income) of a state as the control variables. My two-stage average treatment effect estimate continues to be significant. I do the same for the domestic sales of a firm in columns (3) and (4) to test if the effect is robust to a different performance indicator of a firm. I continue to find significant effect of judicial quality on domestic sales of a firm. So, after controlling for the endogeneity of the selection effect through propensity score matching-ATE estimation, my results seem to suggest that judicial quality is effective for both exports and domestic sales. The results in columns (1)–(4) of Table 8 are based on a restricted sample of firms in states with high judicial quality and their nearest neighbours with low judicial quality. This matching process creates a sample of firms, which are similar based on observable characteristics. While the firms across the treatment and the control groups may differ based on unobservable characteristics, the use of a matched sample is likely to reduce the bias arising due to the self-selection process of the firms into those particular states (Ahsan, 2013). Also, using two-stage ATE increases the efficiency of the estimates by accounting for the unobservable characteristics (Hirano et al., 2003). These results confirm that even when controlling for these differences, judicial quality continues to be an important determinant of comparative advantage.

Table 8
Judicial quality and firm performance: controlling for selection bias – two-stage average treatment effect.

	Two-stage average treatment effect			
	Ln (Exports+1)		Ln (Domestic sales+1)	
	(1)	(2)	(3)	(4)
JudQua*IntComp	−0.200***	−0.056**	−0.076***	−0.090***
	(0.028)	(0.030)	(0.028)	(0.034)
SkillInt*SkillEnd		Yes		Yes
CapEmp*CapEnd		Yes		Yes
Income*VA		Yes		Yes
Firm controls	Yes	Yes	Yes	Yes
N	22,136	20,675	22,127	20,670
Firm FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: 'JudQua' (Judicial quality) is the pendency ratio of total number of IPC and SLL cases at the lower courts of each state in each year. Pendency ratio is defined as the fraction of pending cases to all the cases in a year. 'IntComp' is the "Input-complexity index". It is the proportion of the intermediate inputs used by a firm in total input usage. 'SkillInt' (Skill Intensity) is the ratio of non-production workers to total employees of an industry. 'SkillEnd' (Skill endowment) is the literacy rate of a state. 'CapEmp' (Capital employed) is the amount of capital used by each industry. 'CapEnd' (Capital endowment) is the sum of fixed, invested and working capital of all manufacturing sectors in a state. 'Income' is the per capita income of a state. 'VA' (Value added) is the gross value-added of a manufacturing sector. In columns (1)–(4), I use the inverse of the propensity scores as the instrument for judicial quality. Propensity scores has beeen estimated using propensity score matching method where the treatment variable takes the value 1 for states for which the mean pendency ratio is less than the sample median and 0 otherwise. All the explanatory variables used for estimation are used in their logarithm form. All the regressions contain the individual terms of the interactions. Firm controls include age of a firm, age squared, ownership and size indicator. I use total assets of a firm as the size indicator. Numbers in the parenthesis are clustered standard errors at the firm level. Intercepts are not reported.

* denotes 10% level of significance
** denotes 5% level of significance
*** denotes1% level of significance.

6. Robustness checks

In Table 9, I check the robustness of my earlier results by using alternative methods, sample and dataset. I report the results only in case of exports. The results are similar for domestic sales. In columns (1) and (2), I use the simple Average Treatment Effect (ATE) method.[11] The ATE measures the difference in mean (average) outcomes between the units assigned to the treatment and control group, respectively. Since, ATE averages across gains from units, I use average treatment effect on the treated (ATT), which is the average gain from treatment for those who actually are treated. I utilize the previous classification of firms into high judicial quality states and low judicial quality states as the treatment and the control group, respectively. I estimate the following equation to calculate the gain from 'treatment':

$$\tau_{ATT} = E[Y(1) - Y(0)|W = 1]$$

where, τ_{ATT} denotes the gain received by the firms which belong to the state of higher judicial quality. The expected gain is assumed to be in response to the randomly selected unit (firms) from the population. This is called the average treatment effect of the treated. $Y(1)$ is the outcome with the treatment and $Y(0)$ is without the treatment. The binary "treatment" indicator is W, where $W = 1$ denotes "treatment". Column (1) and (2) uses natural logarithm of exports plus one of a firm as the response variable of a result of the treatment. As previously, I expect the coefficient to be negative, which indicates positive gain for firms in states with higher degree of judicial quality. Everything else being equal, the firms in the high judicial quality regions are supposed to have earnings from both international and domestic sales which are higher than firms of regions of lower degree of judicial quality. That is, relative to the states which are of low judicial quality, high judicial quality states are expected to trade or produce relatively more in institutional-dependent industries. I estimate the above equation by considering a sample of all possible sample pairs.

Column (1) reports the estimates of the ATT, where I match the state pairs only on the basis of unobservable characteristics. The estimates confirm that the higher judicial quality helps a firm to participate in exporting significantly. In column (2), I estimate the same equation by matching high judicial quality and low judicial quality states based on skill intensity, capital employed, value added by an industry, skill endowment, capital endowment and income of a state. The reason I do

[11] The method used in this section is different from the one used in the previous section in the following way(s): (i) in the previous section, what I use is a two-step ATE as opposed to the current method, which is single-step procedure; and (ii) in section 5.4, I first estimate the propensity scores (using matching estimator) based on the classification of states into high and low judicial quality states and then use the inverse of the propensity scores for each state to estimate the ATE in the second stage, which is not the case here. In this case, I classify the states into high and low judicial quality states and use this classification to estimate the ATE.

Table 9
Judicial quality and firm performance: robustness checks the headings of the columns are misplaced. For e.g., 'Drop Maharastra' will start from column (3) and simultaneously every heading will shift one column from the current format.

	Ln (Exports+1)									Ln (Output+1)		
	ATE (1)	(2)	Drop Maharastra (3)	Drop outliers (4)	Drop top 25% (5)	Drop bottom 25% (6)	Nunn's measure (7)	CS Data (8)	DBS WB 2009 (9)	ASI data (10)	(11)	(12)
TreatVar*IntComp	−0.117***	−0.134***										
	(0.039)	(0.039)										
JudQua*IntComp			−0.076***	−0.158***	−0.103***	−0.063***	−8.993***	−0.059***	−1.011**	−0.083***	−0.032***	−0.078***
			(0.024)	(0.036)	(0.030)	(0.023)	(2.149)	(0.007)	(0.518)	(0.015)	(0.012)	(0.013)
SkillInt*SkillEnd		Yes									4.19–09	
											(6.96e-09)	
CapEmp*CapEnd		Yes									−0.002	
											(0.001)	
Income*VA		Yes									0.065***	
											(0.007)	
SkillEnd*IntComp												0.076
												(0.126)
CapEnd*IntComp												0.251***
												(0.052)
FinDev*IntComp												0.001**
												(0.000)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
R-square			0.88	0.90	0.89	0.88	0.45	0.46	0.87	0.32	0.70	0.40
N	27,790	27,790	19,277	26,394	21,899	15,893	30,748	26,951	27,815	1402	1378	1387
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No
Industry FE	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes

Notes: 'TreatVar' is the treatment variable indicating 0 and 1. 'JudQua' is the pendency ratio at the lower courts of each state. Pendency ratio is defined as the fraction of pending cases to all the cases in a year. "IntComp' is the "Input-complexity index". It is the proportion of the intermediate inputs used by a firm in total input usage. 'SkillInt' (Skill intensity) is the ratio of non-production workers to total employees of an industry. 'SkillEnd' is the literacy rate of a state. 'CapEmp' (Capital employed) is the amount of capital used by each industry. 'CapEnd' (Capital endowment) is the sum of fixed, invested and working capital of a state. 'VA' (Value-added) is the gross value-added by a manufacturing sector. 'Income' is the per capita income of a state. 'FinDev' is the indicator for financial development of a state and has been taken from Khandelwal and Topalova (2011). 'SkillInt', 'SkillEnd', 'CapInt', 'CapEnd', 'Income', 'VA', 'SkillEnd' and 'CapEnd' are expressed in logarithmic form. In columns (1) and (2), I use the ATE method. The value is the ATE of the treated. The treatment variable takes the value 1 for states for which the mean pendency ratio is less than the sample median and 0 otherwise. In column (9), I use WB Business Survey indicator. In columns (10)–(12), I use ASI data. The dependent variable is the natural logarithm of the amount of output produced by each industry. All the regressions contain the individual terms of the interactions. Firm controls include age of a firm, age squared, ownership and size indicator. I use total assets of a firm as the size indicator. Numbers in the parenthesis are clustered standard errors at the firm level except for columns (10)–(12), where it is at the industry level. Intercepts are not reported.

* denote 10%, and 1% level of significance.

** denote 5% level of significance.

*** denote 1% level of significance.

this is that – the high and low judicial quality states could be different in ways other than the judicial quality classification, and these differences may be important for comparative advantage, which could bias my estimates. By restricting my sample to matched state pairs, I potentially remove bias that could exist in my estimates if the state characteristics are ignored. The effect remains the same, however, the coefficients increase. This suggests that state characteristics to be significant contributing factors for the gains of a firm, and therefore, not controlling for it can underestimate my coefficients. The results prove that judicial quality continues to a significant factor of comparative advantage for firms' production of goods using institutionally dependent inputs, even when controlling for all the other major differences between regions. The average treatment effect results provide further evidence that judicial quality and institutionally dependent inputs are important and complementary determinants of higher output.

In column (3), I examine whether my results are robust to dropping various states from the sample. In particular, I drop firms located in Maharashtra, a state which includes around 34% of the firms in the sample primarily due to its size and the fact that it is the state where Mumbai Stock Exchange is located. The results are robust to the exclusion of that particular state. Column (4) test if the results are robust to the exclusion of the outliers. Outliers are defined as observations for which the absolute values of studentized residuals are above two. The results indicate that even after outliers have been dropped the interaction between "input-complexity" index and judicial quality remains negative and significant. In columns (5) and (6), I drop states which are at the top and bottom 25% of the judicial quality distribution, respectively. In both the cases, the coefficient remains negative and significant.

In column (7), I use Nunn's (2007) measure of intermediate inputs. He exploits the 1997 US I-O table to identify the intermediate inputs used, and in what proportions, in the production of each final good. Then, he classifies each of the

industry in one of the following three categories: sold on an exchange, reference priced, or neither. He constructs two different indices of contracting intensity: (a) the first one based on inputs, which are neither sold on an organized exchange nor referenced priced and the other (b) on those which are not sold on an organized exchange but is reference priced. I use the former index for my estimation. I use the same value (it is calculated only for the year 1997) for all the years in my analysis (2000–2010) and then interact with the judicial quality of each of the state over the years to estimate the desired effect. The index used by Nunn (2007) is coded according to the classification of the Bureau of the Economic Analysis, U.S. I-O table for different industries. I took this classification to match with the recent National American Industrial Classification System (NAICS 2007) and then to International Standard Industrial Classification (ISIC) Revision 4 and finally to the National Industrial Classification (NIC) of India. The primary result remains the same, whereas the magnitude of the effect increases. In column (8), I use cross-sectional analysis, using the ten-year mean values of the dependent variables as well as ten-year mean measures of judicial quality, and the other covariates. The reason to carry out this exercise is that since I employ annual data, so the identification of the effect of judicial quality depending significantly on year-to-year variation in the judicial quality could be driven by noise. Judicial quality may not change much from one year to the next. So, given fixed costs, location and production decisions made in response to the judicial environment are even less likely to change from one year to the next. However, the results still continue to be significant and positively affecting the exports of a firm.

In column (9), I use the indicator "contract enforcement" from **Doing Business Survey Report** of the World Bank for the year 2009 in order to substitute for the overall judicial quality or governance quality. The report gives a ranking on several indicators related to doing businesses in India of the major cities. I match those cities with the respective states of my database and use it as an indicator of that state itself. I leave out "Jammu and Kashmir" for this analysis as the World Bank report do not contain any information about doing business in any city in that particular state. The data is given only for the year of 2009. I assume the same ranking for all the other years of my sample. I interact the ranking of the states with the respective "input-complexity" index of the firms of those states and estimate its effect on the exports of a firm. The lower the rank is, the easier to do business in that particular place. I expect a negative correlation. The results confirm my expectations significantly.

In columns (10)–(12), I use a different dataset for a different period of time to check, whether my results demonstrated above are robust irrespective of the dataset and the period of analysis. And also, if the results do hold for the firm-level dataset, it should also hold for the industrial level dataset as well. For columns (10)–(12), I use two-digit level manufacturing data from the **Annual Survey of Industries** (ASI) for the major states for the period 1981–1998. The data set is compiled by the Central Statistical Organisation, (CSO), Ministry of Statistics and Program Implementation, Government of India. It is a very comprehensive annual survey of Indian manufacturing plants. The ASI reports data for the organised segments of registered manufacturing under Sections 2 m (i) or 2 m (ii) of the 1948 Factories Act. The ASI sampling population covers factories using power employing 10 or more (permanent and production) workers, and factories without power employing 20 or more workers. It records detail industrial level data at two-digit level. The data reports almost all the principal characteristics[12] at the two-digit industry level for all the manufacturing industries. But, it does not report an industry's activity towards international trade, i.e., either exports or imports. Therefore, I choose to use the total output of an industry as the left-hand side variable or the performance indicator. I continue to use the expenditure incurred by an industry towards intermediate inputs as the indicator for institutionally-dependent inputs.

Column (10) regress the natural logarithm of industrial output on the interaction between the judicial quality and intermediate input usage, controlling for state, industry and year unobservable characteristics. The estimate turns out to be negative and significant, indicating that the judicial quality continues to be positively affecting the industrial performance of a state. Column (11) introduces skill and capital endowment and income of a state in addition to state industry and year fixed effects. The results do not change. Finally, in column (12), I control for further industry and state characteristics by interacting input-complexity index with skill endowment, capital endowment and financial development of a state. The financial development indicator has been taken from Khandelwal and Topalova (2011). However, my primary result does not change. It produces two additional results as well – capital endowment and financial development of a state are also significant determinants of comparative advantage for the industrial output.

7. Conclusion

This paper complements a gap in the literature by addressing the complementarities between judicial quality or contract enforcement and the usage of intermediate inputs on firm performance – exports and domestic sales. It uses a firm-level panel data from India for the period 2000 to 2010 along with objective measures of judicial quality at the state level. Since, India offers sufficient amount of heterogeneity involved among different regions within a single country framework, therefore, it provides an ideal setting to examine the hypothesis posed in the paper. I find judicial quality to be a significant factor for firm performance. The results also seem to suggest that the effect is strongest for firms which belong to industries,

[12] Number of Factories, Fixed Capital, Working Capital, Physical Working Capital, Productive Capital, Invested Capital, Outstanding Loans, Number of Workers, Mandays-Workers, Number of Employees, Mandays-Employees, Total Persons Engaged, Wages to Workers, PF and Other Benefits, Total Emoluments, Fuels Consumed, Materials Consumed, Total Inputs, Rent Paid, Interest Paid, Depreciation, Value of Products and By-Products, Value of Gross Output, Net Income, Profits, Net Value Added, Gross Value Added, Net Fixed Capital Formation, Gross Fixed Capital Formation, Additions to Stock, Gross Capital Formation

which are more contract-intensive, i.e., the ones which require more institutionally-dependent inputs. High skill endowment of a state and financially developed states helps a firm to experience higher sales. The results are robust to using a matching estimator technique to address the self-selection problem of firms into states with high judicial quality. The estimates are also robust irrespective of different samples, different dataset or the period of analysis. Thus, the results confirm that judicial quality is necessary for those firms, which invest in intermediate inputs in order to reap higher benefits from its sales, both international and domestic.

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