Understanding the 'missing middle' in Indian Manufacturing:

The Role of Size-Dependent Labour Regulations and Fiscal Incentives

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Abstract

This paper studies the problem of missing middle in the size distribution of manufacturing plants in India as an outcome of threshold effects of labour regulations defined by employment size and fiscal incentives determined by turnover for small-scale enterprises. Two alternative avenues that firms could use to escape from higher adjustment costs of larger firm size are employment of non-permanent workers and subcontracting output to other firms. These two outcomes are measured by contract-worker intensity and subcontracting intensity. The study is based on a large unbalanced panel of manufacturing plants in the formal sector covering 25 states and 5 union territories of India spanning the period 1998-2008. Contract-worker intensity is found to be higher in size class 50-99 relative to others supporting the proposition that firms use non-permanent workers to stay below the size threshold of 100. Mean contract-worker intensity of factories in size group 50-99 is found to be higher in labour intensive industries located in states categorized as inflexible. Mean subcontracting intensity was found to be significantly high in the size group eligible for excise-tax exemption with turnover below Indian Rupees 50 million. The empirical results supported the threshold effects of size-dependent labour regulations and fiscal incentives.

JEL classification L11, L6 and O1

Key words: employment size distribution, employment protection legislation, labour regulations, contract labour, subcontracting and manufacturing

1. Introduction

Dualistic nature of firm size distribution in manufacturing sectors has been central to many issues of structural transformation and growth in developing countries. India in particular has attracted much attention as a striking example of policy induced dualism with a large small-scale enterprise sector coexisting with a small large-enterprise sector in manufacturing. Dhar and Lydall (1961) were the first to observe missing middle in the data, the thin share of employment size class 50 to 499 in Indian manufacturing employment[1]. A recent comparative study of manufacturing enterprises in Asia observes that the size group of 6-49 workers accounts for more than 55 percent of total non-household manufacturing in 2005 (Mazumdar and Sarkar 2013). The share of large firms[2] with more than 500 workers was close to 20 percent and the remaining 25 percent is the share of size group with 50-499 workers in the same year. Another study estimates that in 2005 nearly 85 percent are employed in enterprises with less than 50 workers if we include own-account/household enterprises in total manufacturing employment (Hasan and Jandoc 2013). This dualistic size structure in manufacturing has remained unchanged over the last two decades. Trade and economic reforms since 1991 has brought about far reaching changes in many aspects of industrial structure but size structure manufacturing establishments has not changed much. What explains this phenomenon of missing middle in employment size distribution in India? Two widely discussed factors have been (i) employment protection legislation and other labour regulations (hereafter labour regulations) (ii) the policy of small-scale industry protection. Labour regulations apply

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[1] A later study by Little, Mazumdar and Page (1987) confirmed the problem of missing middle in Indian manufacturing. See Mazumdar and Sarkar (2008), chapter 9 for a detailed discussion of dualism in Indian manufacturing.

[2] In this study for the sake of convenience I use the terms firm and factory (plant) interchangeably. Firm could own several factories. Analysis is based on individual factory level data.

rules with respect to conditions of service, lay-off, retrenchment and closure to firms above a specified employment size. This is argued to raise labour adjustment costs and create pressures on firms to stay below the legal threshold size[3]. Second, Indian industrial policy has a long history of protecting small-scale enterprises by reserving a large number of products for small-scale units that barred the entry of large factories into these industries (Ramaswamy 1994 and GOI 1997). This policy together with promotional measures like concessional credit for fixed and working capital have been argued to be the factors behind the lack of incentive for size expansion beyond the official definition of small-scale factory[4].More significantly fiscal incentives like excise tax exemption up to a certain sales turnover have been in place in one form or another (Bagchi et al 2010). This could create incentives for firms to stay small, outsource extra output and encourage horizontal growth instead of vertical expansion[5].

In this background the present paper studies the role of size-dependent labour regulations and fiscal incentives for small-scale enterprises in inducing a size distribution of factories with a missing middle in India[6]. My study is based on panel data of factories in the manufacturing sector over a period of 10 years between 1998-9 to 2007-8

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[3] As regulations take effect as firm size grows it generates an implicit tax and regulations are defined with reference to few finite points the literature refers to them as "threshold effects" (see Gourio and Roys 2012)

[4]The official definition was in terms of investment in plant and machinery (original value).The set of products reserved for small enterprises had accumulated over the years and contained more than 1200 products at the beginning of reform in 1991.Periodic industry-specific deletions in this list took place in the 1990s reducing their number over time. It was shown that production of reserved items was not the dominant activity of small-scale sector as the output share of reserved products in small-scale sector output had declined in many industries by the end of 1980s (Ramaswamy,1994). Production of reservation items retained its significance in certain selected industries like hosiery (de-reserved in 2004) and garments (de-reserved in 2001), wood products, leather, chemical and metal products

[5] Mazumdar and Sarkar (2013) emphasize the importance of hysteresis while discussing the role small-scale industrial policy in India

[6] Recently, Krueger (2009) in her paper "The Missing Middle" has emphasized the role of regulations that constrain businesses in the organized sector (firms with more than 10 workers) from hiring unskilled labour in large numbers. This shortcoming it is argued reflects the failure of manufacturing sector as the service sector growth creates demand for skilled and educated labour.

(hereafter 1998-2008). I employ a definition of firm size consistent with labour laws. The key findings are (a) contract intensity is higher in the size class 50-99 relative other employment size groups (b) average contract-worker intensity is relatively higher in labour intensive industries and in inflexible states (c) the relationship between contract worker intensity and firm size is non-linear. Contract-worker intensity first declines, reaches a peak and then declines again. (d) Subcontracting intensity is found to be relatively higher in the output size group of firms eligible for fiscal incentives, in labour intensive industries and in inflexible states.

Including this introduction this paper is divided into 5 sections. Section 2 gives the analytical background and the research strategy followed in the present study. Data base is explained in section 3. Results are discussed in Section 4. Conclusions of the study are presented in Section 5.

2. Analytical Background and Review of Earlier Studies

2.1 Size-Dependent Labour Regulations and Size Distribution

To begin with it may be useful to summarize the key analytical points which relate labour regulations and firm size distribution[7]. Firm size dependent labour regulations are widely used in both developed and developing countries. Labour regulations are applied at different levels of employment size. Small firms (say less than 10 workers) are often excluded perhaps because at the margin their sales revenue cannot accommodate regulatory costs. Size based application results in thresholds of firm size above which the regulations begin to bite in terms of compliance costs. Firms planning to enter an industry or incumbents planning to expand their workforce need to factor in these expected costs before they make their entry or scale-upgrade decision. Alternatively firms already in operation might try ways of evading these regulatory costs through various means. In brief there will be what is referred to as threshold effects of size based regulation. They could act as potential constraint to firm entry and scale expansion that inhibits them from taking advantage of scale and technology. Empirical studies find firm size and productivity are positively significantly related (VanBiesebroeck 2010). Firm size is in turn positively related with wages. From this one could argue that factors that restrict firm size expansion or entry of large firms into industries needs to be understood. An employment size structure with a missing middle suggests potential loss of productivity and welfare gains.

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[7] See Chapter 2 in Mazumdara and Sarkar (2013) for a nice discussion of key determinants of size structure. Many factors could be working behind a particular observed size structure in a given country.

The size distribution exhibits a 'missing middle' because benefits of size expansion are less than costs of regulatory compliance[8]. Labour Regulations are applicable to firms above a threshold size and this is the source of incentive that induces firms to stay below the threshold size. In India firms graduating into the formal sector face different regulatory costs of formality at different employment size levels[9]. First, the Factory Act that contains rules to regulate occupational health and safety of workers if the firm has employed above 10 workers and if they are using electricity or 20 workers if they are not. Second, Chapter V-A of the Industrial Disputes Act (IDA) requires notice and compensation for lay-off, retrenchment and closure if the firm employs not less than 50 workers. Third, Chapter V-B requires notice, compensation and permission from government for lay-off, retrenchment and closure, if it employs more than 100 workers. Others like the Industrial Employment (Standing Orders) Act that lays down terms and conditions of work come into force if the firm employs more than 100 workers or less depending on the state law in which the firm is located. The Chapter V-B of IDA that requires permission from government authority for lay-off, termination and closure has been the most contentious provision in the context of Indian labour market rigidity debate. Labour regulations are widely perceived to raise the expected cost of employment adjustment for Indian firms in response to product market changes. The size thresholds

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[8] Tybout (2000) refers to the model of James Rauch (1991) that formalizes this explanation. In his theoretical model James Rauch distinguishes between size-dualism and labour market-dualism. Labour market dualism refers to wage differential between formal and informal sectors for otherwise identical workers. Size-dualism refers to the existence of size difference between the smallest formal sector firm and the largest informal sector firm. The minimum wage-floor set by regulation, for example, is applied to firms above a size threshold. He shows that when larger firms face higher unit costs due to regulation, the most talented entrepreneurs operate big firms to exploit their productivity advantage and this offsets their higher input costs. Less talented entrepreneurs remain small and informal. Therefore, "missing middle" occurs because "...it never pays to be just large enough to attract enforcement" (page 17, Tybout 2000).
[9] We confine ourselves to certain major Central or Federal government acts. Section 9A of IDA also lays down that 21 day notice to be given for any change in conditions of service. Many other acts like Employee State Insurance Act etc. begin to apply once the factory is registered under the Factories Act.

are defined in terms of number of permanent workers in a given factory whose name appears in its muster roll. In other words, non-permanent workers could be employed to stay below the threshold size. The dominant category of non-permanent workers is the contract workers or workers employed through a contractor. IDA is not applicable to contract workers hence their lay-off or termination does not require notice, compensation or permission. Indian firms are known to have used contract workers to achieve workforce flexibility even in the 1980s well before liberalization that began in 1991[10].Firms are widely observed to pay contract workers wages that are less than that is paid to regular workers and constitute another incentive for employing them.

Compliance capability of firms will vary with firm size and it depends on their marginal profitability relative to marginal adjustment costs. As compliance costs start biting after a legally defined threshold we can expect greater effort on the part of firm to search for flexibility or ways to reduce potential adjustment costs. This aspect can be captured by the concept of contract-worker intensity. Contract-worker intensity is the share of contract workers in total number of workers in a firm.

Given this framework, I look for threshold effects in the following ways;

(i) Whether average contract-worker intensity is higher in the employment size group 50-99 and 100-199.This is expected if the objective of the firm is to stay below the size threshold. Employment size is measured by number of permanent or regular workers in order to be consistent with the definition of IDA and other labour laws[11]. (ii) Is there a non-linear relationship between contract-worker intensity and firm size? Non-linearity

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[10] Indian textile firms have a history of using non-permanent workers as means of adjustment long before the post-independence regulations. See Mazumdar and Sarkar (page 130, 2013) and the references cited there in

[11] Bhattacharjea (2009a) had remarked that studies often used measures of factory size that are flawed in terms of labour law definitions.

could occur because the productivity advantage of size could outweigh compliance costs thus reducing the incentive to hire non-permanent workers. In order to capture economies of scale effect I measure factory size by total employment, a widely accepted measure of plant size.

It may also be argued that adjustment costs imposed by labour regulations would be greater in labour intensive industries[12]. In addition if labour intensive industries are export-market oriented industries and exporting firms are subject to greater demand uncertainty and seasonal fluctuations in demand or market order-size then they are relatively adversely affected by rigid labour laws[13]. Therefore the third proposition follows (iii) contract-worker intensity would be relatively higher in labour intensive industries. Further, compliance costs can be expected to have greater bite in states within India that are supposed to be relatively inflexible in terms of their approach as revealed in the state-level amendments as argued in the literature (Besley and Burgess 2004). This leads us to the fourth proposition (iv) contract-worker intensity would be higher in labour intensive industries in inflexible states.

2.2 Size-Dependent Fiscal Incentives and Subcontracting

Increasing import competition, product differentiation and market demand fluctuations exert competitive pressure on firms that look for flexibility in their production organization. A possible alternative to hiring of non-permanent workers is output subcontracting. The firm can decide to outsource output through horizontal

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[12] See Dougherty et al (2011). Labour intensive industries are those with relatively higher ratio of wages to value added.

[13] Studies of US manufacturing also suggests that sales variability a measure of demand uncertainty and firm size are inversely related. Sales variability and capital intensity are also inversely related (See Mills and Schumann ,1985). These points are not pursued further in this paper.

subcontracting or capacity subcontracting such that it can avoid up-scaling of production.[14] Small firms are often used as buffers by large firms in many industries particularly in those with fluctuating and uncertain demand. At the same time an equally important incentive exists for firms to stay relatively small and avoid vertical expansion or ramp up production to use a popular business expression. This incentive takes the form of excise tax incentive for small-scale enterprises. In order to encourage small enterprises Indian tax system exempts them from paying excise tax subject to certain conditions. It started way back in 1978 (Bagchi et al 2006). The factory is exempted from paying excise tax on output up to INR 5 million if the total turnover of the company did not exceed INR 15 million. This maximum limit has been periodically revised with the objective of not to discourage firms from expanding production. In 2004 the tax exemption limit was raised to INR 10 million and the turnover limit was fixed at INR 40 million. In its overview of small and medium enterprises brought out by the Development Commissioner, Ministry of Small and Medium Enterprises (DCMSME) the following is stated: "Under the General Excise Exemption Scheme, full excise exemption up to turnover of $375 thousand per annum is provided to enterprises having annual turnover of up to $1 million. However, the limits of excise exemptions has encouraged tendency among MSEs is to go in for horizontal expansion (i.e., fragmentation) rather than vertical expansion and upward graduation into medium and large enterprises…" (DCMSME, undated). The indicated turnover limit corresponds to INR 50 million as the exchange rate mentioned in the document was $1=INR 50 (April 2009). In other words subcontracting intensity could be expected to be higher in relatively small factories, that is, factories with turnover of less than INR 50

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[14] The firm can set up another factory with less than the threshold size say 100 workers or purchase the output with give specification from another independent small-scale firms or firms. Observers of Indian industry have long maintained that incentive for fragmentation has been high within the formal sector.

million. My analysis will test whether the size-dependent fiscal incentive will have threshold effects as a driver of subcontracting practices in Indian manufacturing. In order to capture this idea I define subcontracting intensity. Subcontracting intensity is the share of purchased (outsourced) output in total output (see below for precise measures and measurement issues). The testable proposition is whether subcontracting intensity is greater in excise-tax exemption size group relative to other firms. Two related propositions are whether subcontracting intensity is higher in labour intensive industries and in inflexible states.

2.3 Review of Earlier Studies

In this brief review studies that have taken into account firm size or used the data on both large and small factories will be covered[15]. Studies investigating the causes of persistent dualism and possible outcomes in manufacturing have been severely constrained by their lack of access to firm level data. Firm level data was not disclosed due to confidentiality clauses in the collection of statistics act. Only very recently such data with firm identification numbers have been made available to researchers in India.

Fallon and Lucas (1993) were the first to study the impact of labour regulations on large firms in India. Their study used annual observations on 36 industries for the period 1959-82 on census sector that covered factories with more than 50 workers. Their results showed that the amendment to the IDA in 1976 which imposed government permission for firms employing more than 300 workers negatively affected employment. The decline

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[15] A review of studies of labour regulation in India is available in Bhattacharjea (2006, 2009a and 2009b) among others. For studies of firm size based regulation in other countries see Gourio and Roys (2012) and the references cited there in.

in employment was shown to be higher in sectors where the fraction of employees in private sector enterprises with more than 300 workers was higher.

Hasan and Jandoc (2013) have assembled three large establishment level data sets that encompass formal and informal manufacturing to study size distribution over time. They compare firm size distribution across Indian states for three selected years, namely, 1994-95, 2000-01, and 2004-05. They partition Indian states into 'rigid' and 'flexible' labour regulation states after making some modification to the approach of Burgess and Besley (2004). They distinguish five size groups 1-9, 10-49, 50-99,100-199 and firms with more than 200 workers. They do not find a significant difference in how employment shares vary across the different size groups for the two sets of states. In the sub-group of labour intensive industries greater prevalence of larger enterprises in flexible states was observed. In all the three years contract intensity peaked in the size class 50-99 in both labour intensive as well as all industries taken together. However, the size classes are measured by all production workers (regular plus contract) which deviated from the definition used in the context of labour regulations. The difference in mean contract intensity was not subjected to statistical tests.

Adhvaryu et al (2012) used establishment data from ASI for 1987, 1990 and 1994 to test the prediction that the degree of employment response to shocks vary inversely with the degree of employment protection. Their study found that firms adjust to demand fluctuations by making adjustment to labour in flexible states than in inflexible states. In restrictive states firms are found to make adjustments to non-labour inputs in response to shocks measured by variation in agricultural incomes at the district level. However they do not touch upon the mode of adjustment of labour in terms of work-force composition.

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Dougherty et al (2011) study the impact of employment protection legislation on total factor productivity (TFP) and labor productivity using plant level panel data. TFP estimation is carried out using a restricted sample of plants with more than 200 workers and a classification of states based on labour reforms based on Dougherty (2008). TFP gains are found to be more for labour intensive plants in states with lax regulations.

In Figure 1 the trend of average contract intensity and relative wages of contract workers is shown for the manufacturing sector for the years 2000-08. Notice that average daily wage of contract workers is in the range of 50 to 60 percent of average daily wage of male-regular workers. It is slightly higher if we consider the average wage of all-workers that is an average of all male and female workers[16].

Figure 1: Contract Intensity and Relative Wages in Indian Manufacturing

Source: Labour Bureau (2011)

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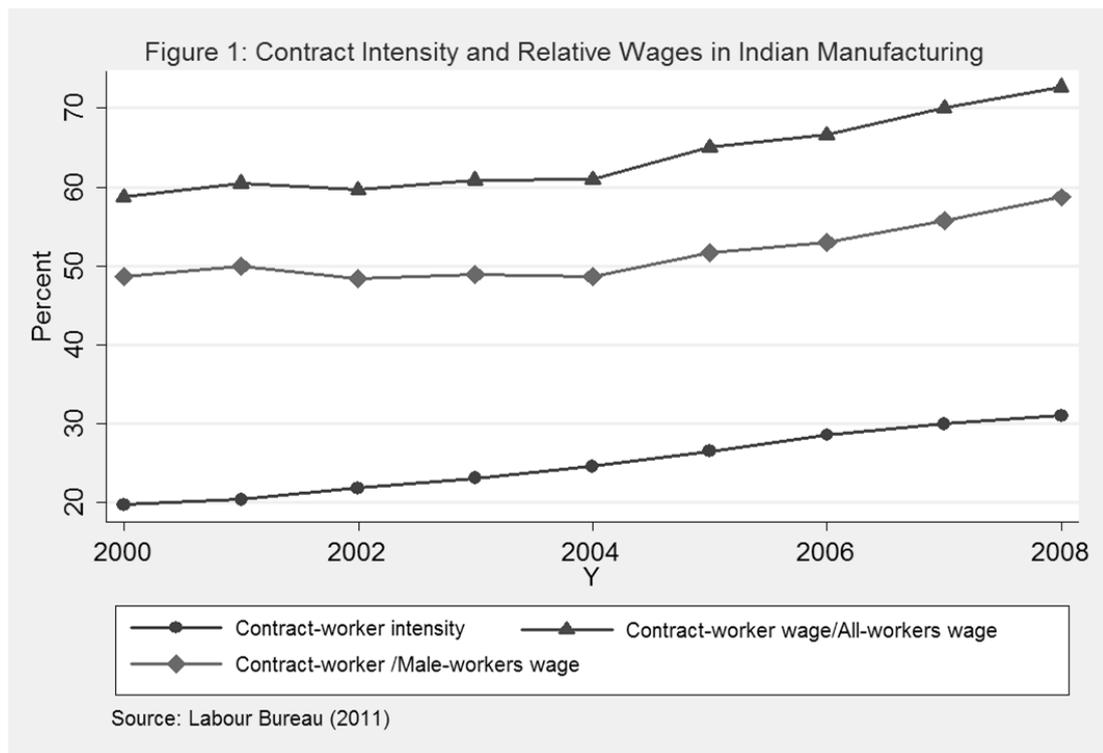
[16] It is important to note that simple difference in wage rates between regular and contract workers does not capture the expected cost of job security regulations.

3. Data and Measurement Issues:

3.1 Data Source and Sample Size

The source of data is the Annual Survey of Industries (ASI) conducted by the Ministry of Statistics and Programme Implementation (MOSPI) of the Government of India. I utilize unit level panel data spanning the ten year period 1998-2008.The advantage is that ASI has recently made available factory identifiers such that an unbalanced panel of manufacturing factories can be set up as the data base[17]. Each factory in the data has a 5-digit National Industrial Classification (NIC) code. Dougherty et al (2011) is another important study that has used a data set that is identical to that of the present study.

We started with raw data that contained 358,036 observations on open factories. All observations (15,080) on non-manufacturing activities are dropped. They are: cotton-ginning and agriculture, recycling, electricity generation and distribution, water, construction, repair of motor vehicles and personal goods, and other business services. Three manufacturing activities Aircraft, Nuclear plants and Fur production are dropped as they contained very few observations (140). For the remaining observations the following criteria was applied after dropping duplicate observations (observations recorded twice for the same factory in the same year). Observations are dropped if data on total output, fixed capital, total employment, total basic inputs and total non-basic inputs are found to be missing. Further those observations with negative fixed capital, zero values for total output, total employment, total basic and non-basic inputs; wrong or missing codes for rural or urban areas, type of organization, type of ownership, state identification and

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[17] I wish to record that confidentiality of the unit level data was maintained and adequate precautions have been taken to avoid disclosing the identity of the units directly or indirectly.

those with initial year of production greater than 2008 have been dropped. This data cleaning has left us with a total of 251,856 observations in the panel.

My data set contains data on 25 states and 5 union territories (UT hereafter). The cleaned data set contains no observation on the following states and UT; Arunachal Pradesh, Lakshadweep, Sikkim, and Mizoram. Observations from the UT of Andaman and Nicobar Islands have been dropped. The frequency distribution in terms of the number of years that a factory appears in our panel is shown in the appendix Table A1. I have 102,076 factories in the panel

Table 1: Sample Size and Percent Lost after Data Cleaning

Year	Original Sample	Used Sample	Deleted	Percent lost
1999	23,693	15,864	7,829	33.0
2000	24,733	17,060	7,673	31.0
2001	31,121	21,950	9,171	29.4
2002	33,461	23,925	9,536	28.4
2003	33,854	24,397	9,457	27.9
2004	45,494	31,951	13,543	29.7
2005	39,760	27,965	11,795	29.6
2006	43,738	30,411	13,327	30.4
2007	43,381	30,597	12,784	29.4
2008	38,801	27,736	11,065	28.5
All	358,036	251,856	106,180	29.6

Source: ASI unit level panel data 1998-2008

The ASI frame is based on the lists of registered factories/units maintained by the Chief Inspector of Factories (CIF) in each State/Union Territory. It includes all factories employing 10 or more workers if using power and if not using power the criterion is 20 or more workers *on any day of the preceding 12 months*. The ASI frame is revised once in three years and further divides the sampling frame into two components, called census

sector and the sample sector. All factories with 100 or more workers were fully enumerated and covered under the census sector and the remaining factories were covered on a sampling basis using an efficient sampling design (Saluja and Yadav, 2008). It is important to note that once a factory is categorized as belonging to census or sample, it remains in the same category unless warranted by change in the number of workers. The definition of census sector changed later as follows. For the period between 1997-98 to 1999-2000 the census sector included (a) all factories with 200 or more workers (b) selected "significant units" with fewer than 200 workers which "contributed significantly to the value of output" in ASI between 1993-94 and 1995-96 and (c) all plants in 12 industrially backward districts and all public sector undertakings. Effective from 2000-01, the definition of census sector was modified to include all factories with more than 100 workers and all factories in the following 5 industrially backward states/union territories; Manipur, Meghalaya, Nagaland, Tripura and Andaman and Nicobar Islands. As a consequence one could observe entry and exit consistently only for factories with at least 200 workers in our data set. This is not a limitation as analysis of plant entry and exit is not the objective of the present study. The employment size distribution of sample units over the time period of the panel 1998-2008 is presented in the appendix Table A2.

3.2 Firm size and Contract-worker Intensity:

I now turn to a discussion of some definitional issues related to key variables used in the study. First is the definition of factory size. Factory size is often measured by number of workers employed. Workers are divided into two categories, regular and contract. Regular workers are those directly employed by the factory and enjoy job-security

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benefits[18]. Contract workers are those employed by the factory through an intermediary, that is a labour contractor or agent and they are not on the muster roll of the factory. Total workers in a factory refer to the sum of regular and contract workers. The threshold limit of 100 workers stipulated by the IDA refers to total number of regular workers. The ASI publishes size distribution of factories that uses total workers employed as the definition of employment size. We need to use total number of regular workers as the definition of firm size as our objective is to measure the impact of labour regulations. In our data set we found that a large proportion of firms has reported only regular workers and have not reported the number of contract workers[19]. The data entered under the category total workers is often found to contain only the figures on regular workers. I have estimated the number of contract workers in each factory in the following way. The time-series data on mean ratio of contract workers to regular workers for the period 1998-2008 for all the 53 three-digit National Industrial Classification (NIC) industries is reported by the Labour Bureau (Labour Bureau 2011). I have estimated the number of contract workers in each factory (factory with a missing observation on contract workers) by applying the mean ratio of contract to regular workers. Wherever both contract and regular workers have been reported we have used the original figures. The total number of workers is re-estimated by adding the estimated number of contract workers to the reported number of regular workers in each factory. Further 13,000 factories have not reported the number of regular workers. They were considered as having only contract workers and zero regular workers. Following this estimation we carried out the estimation of size distribution of factories using regular workers employed as the size

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[18] The official publications use the word direct workers for regular workers in order to distinguish them from those employed through contractors.

[19] Only 30 percent of the observations in our sample (74,341) have data on contract workers

criterion. The key focus variable in our analysis is the ratio of contract to total workers called contract-worker intensity of production. The basic descriptive statistics of the main sample of factories is presented in two parts in Table 2. Part A is based on all observation with estimates for missing data on contract workers and regular workers. Part-B is based on all observation but excluding observations with missing data. Notice that the average number of all three types of workers per factory is lower in Part-A compared to Part-B. However the average number of direct and total workers per factory is very similar.

Table 2: Descriptive Statistics: All Years and All Plants

	A:Using all observations with estimates for missing observations*				
Variable	Observations	Mean	Std.Dev	Min	Max
Contract Workers	251856	56.1	499.5	0	44641
Regular Workers	251856	113.4	492.5	0	49692
Total Workers	251856	169.4	800.7	1	70059
Ratio of Contract to Total Workers	251856	0.30	0.26	0	1
	B:Using all observations after excluding missing observation				
Variable	Observations	Mean	Std.Dev	Min	Max
Contract Workers	74341	133.8	864.9	0	44641
Regular Workers	238553	119.7	505.3	1	49692
Total Workers	251856	152.8	714.4	1	49692
Ratio of Contract to Total Workers	NE	NE	NE	NE	NE

Note: * See text for explanation

NE: Not Estimated

Source: ASI unit level panel data 1998-2008

3.3 Sample Distribution by State and Industry Groups

The distribution of sample observations by states and UT is shown in Table A3 in the appendix. Maharashtra, Tamil Nadu, Gujarat and Uttar Pradesh are the top 4 states in terms of sample observations.

One important approach to measure the impact of labour regulations is take advantage of inter-state variations in labour regulations first suggested by Besley and Burgess (2004).Under the Indian constitution both state and central (federal) government can legislate over subjects under the concurrent list. Labour laws like IDA, Factories Act, and Contract Labour Regulation and Abolition Act (CLRA) etc. are central acts but each state can make amendments to them. Besley and Burgess (BB hereafter) used inter-state variations in IDA to capture inter-state differences in labor regulation. BB classified each state-level amendment to IDA in 15 major states of India during 1949 to 1992. They assigned each amendment in these states a value of -1 (pro-employer), +1 (pro-worker) and zero (neutral). BB used net direction of change if a state was found to have passed multiple amendments in a given year. An index of labour regulation for each state is estimated as cumulated value of its annual scores up to the year 1992.This method yielded an index of labor regulation for each state that indicated the extent of strictness in the stance of a state towards labour regulations (inflexible or flexible). The BB approach has been criticized and evaluated in detail by Bhattacharjea (2006, 2009a and 2009b) and other studies have attempted to make corrections to the original BB index based on his criticism (Ahsan and Pages 2009 and Gupta, Hasan and Kumar 2009).Two important examples are Gujarat and Uttara Pradesh. Gujarat was designated as pro-worker

(inflexible) by BB on the basis of a solitary amendment in 1973 that imposed a penalty on employers for not nominating representatives to firm level joint management councils (Bhattacharjea 2006). Uttara Pradesh was also classified as pro-worker state by BB as "they found that Uttara Pradesh had made no amendments to the central IDA over the entire 35 year period of their study…" (Bhattacharajea, 2006). It was pointed out by Bhatacharjea (2006) that Uttara Pradesh had amended its own 1947 IDA in 1983 and had set the threshold for permission for lay-offs, retrenchment and closure at 300 workers in contradistinction to threshold limit of 100 workers set by the central IDA amendment of 1982. This clearly suggested that a modification of the original BB classification is necessary.

After 1992, there has been very limited state-level amendment activity except in three cases, namely, Gujarat, Uttar Pradesh and Andhra Pradesh. Gujarat in March 2004 amended the IDA as applied to Gujarat by amending section V-D that said chapters V-A and V-B are not applicable to establishments declared to be in SEZ (special economic zones) by the Government of India. This amendment takes worker termination in an SEZ out of the purview of industrial dispute definition as defined by IDA. However such establishments are required to give one month notice and a compensation of 45 days' pay for every year of continuous service. Uttara Pradesh amended the IDA in 2002 by changing the threshold for retrenchment from 300 workers to 100 workers thereby bringing the Uttara Pradesh IDA in line with the central amendment of 1982. By this amendment Uttara Pradesh can be said to have tightened the labour regulations after having maintained the threshold at 300 workers since 1983. Andhra Pradesh in August 2003 amended the CLRA of 1970 by permitting employment of contract labour in a host

of activities that are not considered to be core activity of an establishment. This amendment by Andhra Pradesh is consistent with its classification as a flexible state.

Given this background, I have classified the following six states as flexible states. They are Andhra Pradesh, Gujarat, Karnataka, Tamil Nadu, Rajasthan and Uttara Pradesh. Of this Andhra Pradesh, Karnataka, Tamil Nadu and Rajasthan have been classified as pro-employer by BB and as flexible by Gupta, Kumar and Hasan (2009). Gujarat by the most recent amendment of 2004 can be classified as pro-employer or flexible. Only Uttara Pradesh is somewhat ambiguous as noted above due to its raising threshold amendment of 2002. However, given its record of maintaining higher threshold for 19 years I classify Uttara Pradesh as flexible[20]. In other words, my set of six flexible states has been by and large unambiguous. Of the remaining 24 states and UTs, I classify 14 of them as 'inflexible' and the residual of 6 states and UT have been grouped as 'Others'. This classification is shown in the appendix Table A4 and the corresponding distribution of sample observations is shown in Table A4.1. In the states and UT, included in the inflexible group, state level amendments have been either in the direction of pro-worker or no change[21]. *Econometric analysis is based on observations belonging only to two groups, namely, flexible and inflexible states.*

All observations have a five-digit National Industrial Classification (NIC 2004) code to identify the industry of the sample factory. For the sake of convenience I have collapsed these five-digit industry codes into manageable three-digit industry codes. I

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[20] I have placed Uttarakhand carved out of Uttara Pradesh in 2001 under the category 'Others'

[21] See Gupta, Hasan and Kumar (2009) and Ahsan and Pages (2009). Delhi, Goa and Himachal Pradesh have not been part of the earlier studies. I have classified them as inflexible as no state level amendment to IDA was reported by these three states to the best of my knowledge.

have relied upon the classification used in Hasan and Jandoc (2013)[22] to select the set of labour intensive industries. The labour intensive industries are; Beverages, tobacco, wearing apparel, leather, footwear, saw-milling, wood-products including furniture, glass and glass-products, non-metallic mineral products and others that include watches and sports goods. The remaining 3 digit industry groups are grouped as 'Others'. The distribution of factories under this classification is shown in appendix Table A5.

3.4 Subcontracting Intensity: Measurement

The analysis of subcontracting intensity is performed using a subset of sample observations that have reported data on the value of goods sold in the same condition as purchased. Only 23.9 percent (58,665) of the total sample observations have reported this data and their distribution by year and by employment size is shown in the appendix Tables A6 and A7 respectively. I define the term subcontracting as manufacture of goods by one firm (sub-contractor) for another firm (principal) based on latter's specifications[23]. The principal firm sells directly to the consumer.[24] The value of subcontracting activity in a factory can be measured as the sum of (i) purchase value of goods sold in the same condition as purchased and (ii) contract and commission work done by other firms on materials-supplied. I find that data on the second component is available only for 50 percent of the observations and the remaining 50 percent have reported zero values for this variable. It is important to note that the first component may be regarded as trading

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[22] They have used the criterion of ratio of total employment to net total assets excluding land and buildings as a measure of capital intensity and classified industries into labour intensive and capital intensive industries. Industries not falling into either of the two categories are classified as others.

[23] See Ramaswamy (1999) and Ramaswamy (2003) for further discussion of measurement issues in subcontracting and some preliminary results.

[24] This type of subcontracting (horizontal) needs to be distinguished from component or vertical subcontracting between large and small firms that is supposed to have played a positive role in development of a more even size distribution in East Asia noted by Mazumdar and Sarkar (2013)

activity of a company. In India manufacturing companies are allowed to do both manufacturing and trading activity provided they maintain separate registers for these transactions to comply with rules of excise taxation[25]. Tax credit for input tax under value added tax is applicable to output produced in house and not to output purchased from another unit. I have measured the subcontracting intensity of a factory using the following ratio[26]:

Subcontracting Intensity = Purchase value of goods sold in the same condition as purchased/ Value of Inputs, where,
Value of Inputs=Purchase value of materials +power +fuel+ consumables

It may be noted that job work defined as manufacturing work-done after providing the raw-materials to another manufacturer is widespread in India and should be regarded as subcontracting activity. In this sense my measure of subcontracting intensity will be an underestimate of subcontracting in Indian manufacturing[27].

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[25] This is required for excise tax calculations to claim exemptions for input tax under value added tax. The firm is required by law to maintain a separate register for the value of output manufactured in the company and the value of output purchased from other units for resale. It excludes inputs bought for use in the manufacturing process itself.

[26] Subcontracting intensity could be measured by using the value of output in the denominator if data on contract and commission work done by others on material-supplied is available for all the firms in the subset. Value of inputs purchased is preferred as both numerator and denominator in our definition are purchases by the firm and could be viewed as substitutes. These measures are highly correlated with partial correlation coefficient greater than 0.86 for alternative definitions.

[27] I have experimented with estimates of subcontracting intensity that includes work-done by others as part of the numerator with similar results in the econometric exercise.

4. Empirical Approach and Results

4.1 Descriptive Statistics and Threshold Size Group

As we noted earlier it is important to measure firm size by the number of regular workers to be consistent with IDA definition. Table 3 shows the distribution of sample observations by firm size defined in terms of regular workers and the corresponding estimated median total worker size in each size group. Nine employment size classes have been created. The two size classes of interest to us in terms of threshold effects are 10-49 and 50-99.The median total-worker size in the size class 50-99 is closer to the upper limit of the size class that clearly suggests existence of large number of firms with above 100 workers in this size class. In other words firms are employing contract workers to stay below the threshold size of 100 as per section V-B of IDA. Similarly inference can be drawn that the size-class 10-49 has number of firms above 50 even though the median total-worker size is closer to the mid-point of the size class.

Table 3: Median Firm by Employment Size Group

Size-Class*	Median Firm Size measured by Total Workers**	No. of Observations
0-9	7	54,831
10-49	23	91,814
50-99	78	30,274
100-199	154	31,795
200-499	325	28,391
500-999	705	9,423
1000-1999	1422	3,348
2000-4999	3051	1,626
5000+	11124	354
All	37	251,856

*Size classes defined by Regular Workers
** Total Workers=Regular + Contract-Workers
Source: ASI unit level panel data 1998-2008

Figure 2: Mean Contract Intensity by Firm size*

*Firm size measured by number of regular workers

0-9   10-49   50-99   100-199   200-499   500-999   1000-1999   2000-4999   5000+

Source: ASI unit level panel data 1998-2008
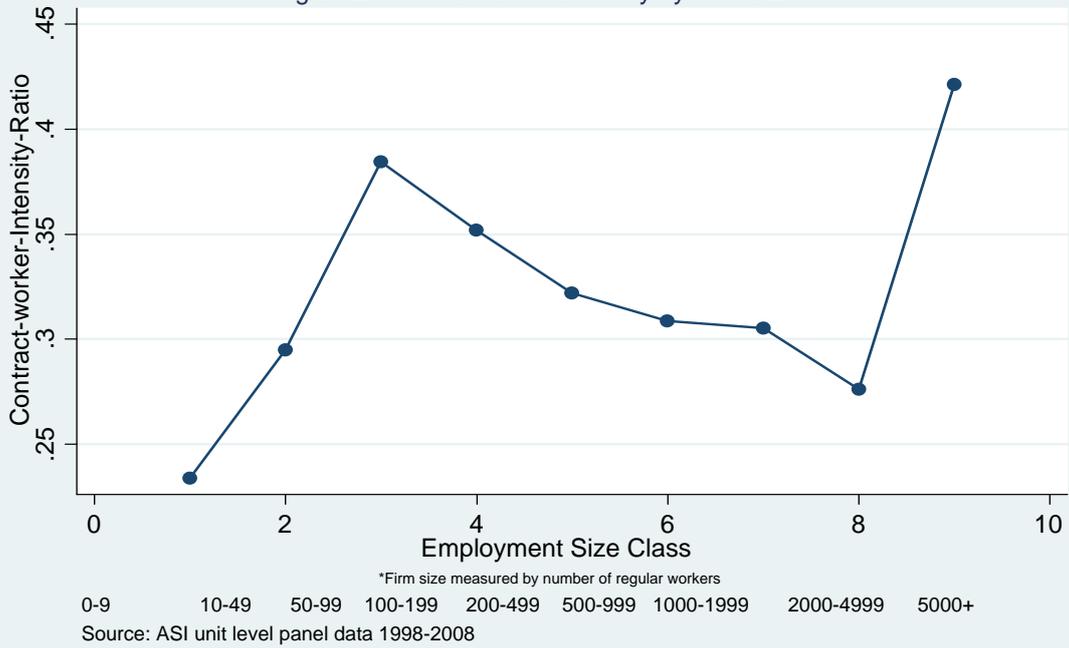
Figure 3:Mean Subcontracting Intensity by Firm Size*

* Firm size measured by number of regular workers

0-9   10-49   50-99   100-199   200-499   500-999   1000-1999   2000-4999   5000+

Source: ASI unit level panel data 1998-2008
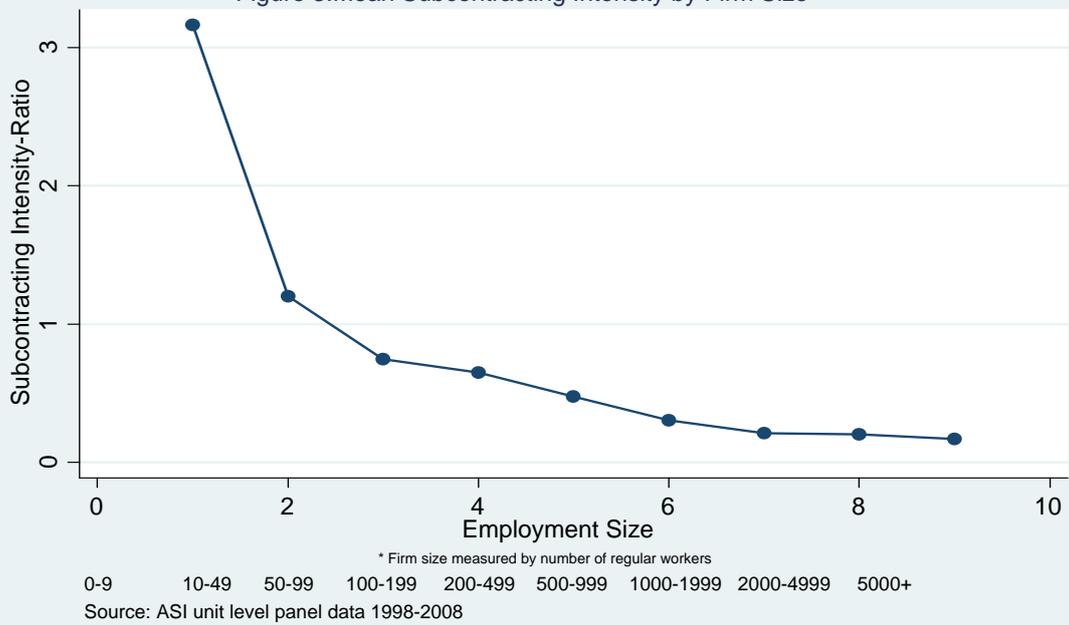
In Figure 1 average contract intensity by employment size classes is graphed. Contract intensity peaks in the size class 50-99 underlining the importance of threshold effect. In contrast, the average subcontracting intensity declines with size (Figure 2). Note that subcontracting is widely practiced as firms across the size range have positive subcontracting intensity but the average intensity apparently peaks in the size group 0-9[28]. Employment size is need not be critical for subcontracting as the excise tax rules (fiscal incentive) are governed by turnover size. In order to capture the fiscal incentive effect I have created a separate size group based on turnover (See Section 4.3 below). The two threshold sizes are required to be tested separately in a regression framework. In addition the impact of differences in factor intensity (labour intensity of the industry) and regulatory stance of the state (flexible v/s inflexible) can be tested after controlling for year-specific effects in the panel data.

4.2 Contract-worker Intensity: Role of Firm Size, Industry-Labour-Intensity and Inflexible-States

A simple dummy variable regression model is estimated for the pooled data with logarithm of contract-worker intensity as the dependent variable. The econometric model takes the form:

$$\ln(CW)_{ikst} = \alpha + \beta_1 (Siz)_{iks} + \beta_2 (Ind)_{ik} + \beta_3 (Flex)_{is} + \beta_4 (S*I)_{iks} + \beta_5 (S*F)_{iks} + \beta_6 (I*F)_{iks} + \beta_7 (S*I*F)_{iks} + \lambda_t.T + \varepsilon_{ikst} \qquad (1)$$

where $\ln(CW)_{ikst}$ is the log contract-worker intensity of the ith firm in k^{th} industry and in s^{th} state in year t. $(Siz)_{iks}$ are size dummies that take the value 1 if the ith firm falls in the

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[28] Mean subcontracting intensity is found to peak in the size group 10-49, with 't' ratio for mean difference significant, apparently indicating the importance of fragmentation within the formal sector but loses its relevance once the fiscal incentive comes into picture.

size group 50-99 and zero otherwise, $(Ind)_{ik}$ are industry-factor-intensity dummies that takes the value 1 if the firm belongs to the category labour-intensive industry and zero otherwise, the state specific labour-flexibility indicators that takes the value 1 for states in the group inflexible-states and zero otherwise are labeled as $(Flex)_{is.}$ $(S*I)_{iks}$, $(S*F)_{iks}$, $(I*F)_{iks}$ and $(S*I*F)_{iks}$ are the four interaction dummies that capture the interaction of size and labour-intensive industry, size and inflexible state, labour intensive industry and inflexible- state and finally the interaction of size, labour-intensive industry and inflexible state. T denotes year fixed effects and ε_{ikst} is an error term that is assumed to satisfy the standard properties. In actual estimation of equation (1) year dummy is interacted with

Table 4: Regression of Contract Intensity on Employment Size-group, Industry Labour-intensity and Flexibility-State-specific Indicators

Dependent variable: log(CW)

Siz (Size-group 50-99)	0.092***
	(11.4)
Ind (Industry-labour-intensity)	0.188***
	(30.8)
Flex (State-specific-labour-flexibility)	0.021***
	(6.1)
Siz x Ind	0.013
	(0.68)
Siz x Flex	0.076***
	(6.7)
Ind x Flex	0.082***
	(9.9)
Siz x Ind x Flex	0.12***
	(4.9)
State-Year FE	YES
Industry-Year FE	YES
Constant	-1.840***
	(-265.3)
Observations	225572
R^2	0.08
F(25,245458)	831***

*Significant at 10%, **Significant at 5%, ***Significant at 1%
Note: Robust 't' statistics in brackets

industry and state dummies to control for industry-year and state-year fixed effects. A positive coefficient of the four dummy variables would indicate that mean contract-worker intensity is higher in their respective groups relative to other excluded groups after controlling for year-specific effects.

In Table 4 the results of estimating equation (1) is presented[29]. The coefficients of three independent dummies are positive and highly significant. The significance of thresh old effects of labour regulations is indicated by the positive coefficient of size group 50-99. Similarly the average contract-worker intensity is significantly higher in labour-intensive industries and in inflexible states relative to the omitted group. Three of the four interaction dummies are significant. The interaction dummy for size group 50-99 and industry labour intensity is positive but insignificant. However, interaction term (Siz x Ind x Flex) is positive and significant that clearly indicates that firms in the size-group 50-99 in labour-intensive industries located in inflexible-states have higher contract-worker intensity. This result is consistent with the threshold effects of labour regulations.

The relationship between contract-workers intensity and firm size could be non-linear as compliance capability varies with firm size. There would be firm specific time-invariant unobserved factors that affect the dependent variable that is contract-worker intensity in our case. With unit level panel data it is possible to test this hypothesis in a fixed effect (FE) model with state-year and industry-year specific effects. It is perhaps reasonable to postulate that contract-worker intensity and firm size takes the form of a cubic function. I estimate the following fixed effect model.

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[29] It may be noted that many firms have zero contract labour and log specification forces them to be dropped.

$$\ln(CW)_{ikst} = \alpha_{iks} + \beta_1 \ln (ES)_{ikst} + \beta_2 (\ln ES)^2_{ikst} + \beta_3 (\ln ES)^3_{ikst} + \mu_{st} + \eta_{it} + \varepsilon_{ikst} \quad (2)$$

Where, $\ln(CW)_{ikst}$ is the log contract-worker intensity of the ith firm in k^{th} industry and in s^{th} state in year t, $\ln (ES)_{ikst}$ is the log employment size of the firm, followed by the square of the log employment size and cube of the log employment size. The signs of the three slope coefficients $\beta_1, \beta_2, \beta_3$ will indicate the curvature of the non-linear relationship between contract-worker intensity and firm size. α_{iks} are firm specific fixed effects that captures time-invariant unobserved heterogeneity that affect the dependent variable. In addition there would be time-variant unobserved factors common to all firms within a state like population growth or urbanization. Similarly, there would be time-variant unobserved factors common to all firms within industries like technological change or access to raw-materials. μ_{st} and η_{it} are the state-year and industry-year fixed effects introduced to account for such factors that may impact contract-worker intensity. ε_{ikst} is the error term with standard properties. Firm size is assumed to be exogenously determined by technology and is not influenced by measured contract-worker intensity that is a behavioural outcome variable.

In Table 5 the estimates of equation (2) are shown. The coefficient of size is negative, size-squared is positive and size-cubed is negative and all the three coefficients are highly significant. This suggests that contract-worker intensity first declines, reaches a maximum and then declines again. This finding is consistent with the expectation that after reaching some level of contract-worker intensity the benefits of size expansion outweighs costs of regulatory compliance decreasing the incentive to hire contract workers.

Table 5: Regression of Contract Intensity on Employment Size, Size-squared and Size-cubed:Fixed Effects Model

Dependent variable: log(CW)

$\ln(ES)_{ikst}$	-0.462***
	(-13.0)
$\ln(ES)^2_{ikst}$	0.138***
	(15.5)
$\ln(ES)^3_{ikst}$	-0.009***
	(-13.2)
State-Year FE	YES
Industry-Year FE	YES
Constant	-0.531***
	(-34.5)
Observations	225572
R^2	0.13

*Significant at 10%, **Significant at 5%, ***Significant at 1%
Note: Robust 't' statistics in brackets

4.3 Subcontracting Intensity, Firm Size and Fiscal Incentives

As observed earlier fiscal incentive of excise-tax exemption is offered to small enterprises or to firms with output below the specified threshold that is INR 50 million. In order to take into account the threshold effects of fiscal policy I have carried out the following exercise. First, I have created a dummy called ETAXG for the sub-group of factories with output below specified turnover limit for fiscal incentive that is INR 50 million[30]. ETAXG is a turnover-size dummy variable that takes the value 1 if output of the firm falls below or equal to INR 50 million and zero otherwise. The aim is to capture the relative behavior of small-scale factories with firm size measured by value of output

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[30] Note that the turnover limit is an indicator of factories that could potentially claim and avail of excise duty exemption (eligible factories). We do not have information on actual value of exemptions received or claimed by different factories. The exemption is available to factories who have not claimed tax credit under the value added tax rules. The general exemption rules under Central Excise Act 1944 are subject to several conditions that have undergone change over time and have been a subject matter of litigation. My limited objective here is to set up a size threshold to capture the behavior of small-scale factories.

in nominal terms[31]. The size cut-off is measured using nominal values because excise tax exemptions (eligibility criterion) are granted by authorities based on reported nominal output value every financial year. Second, the proposition of threshold effects of fiscal incentive is tested by regressing subcontracting intensity on ETAXG as an independent variable along with three interaction dummies. ETAXG is first interacted with industry labour-intensity (Ind) followed by interaction with state-specific labour flexibility indicator (Flex) and finally the combined interaction of the three (ETAXG x Ind x Flex). The results are presented in Table 6.

The results confirm the significance of excise tax incentive effects in inducing higher than average subcontracting intensity in small-scale firms indicated by positive and significant coefficient of ETAXG. Interestingly, the interaction terms are positive significant that carries the implication that small-scale firms in labour-intensive industries and in inflexible states have higher than average subcontracting intensity. Labour-intensive industries are also export oriented industries in which the practice of horizontal subcontracting is quite common by industry observers. For 100 percent export-oriented small firms excise tax incentive has no relevance. The significance of subcontracting in labour intensive group therefore reflects a combination of cluster-network based production effects and fiscal incentives[32]

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[31] Employment size distribution could be different within this segment of factories. It is presented in the appendix Table A8.
[32] See Cawthorne (1995) for the classic Tiruppur case

Table 6: Regression of Subcontracting Intensity on Excise-tax-incentive group and interaction with Industry Labour-intensity and Flexibility-State-specific Indicators

Dependent variable: log(SUB)

ETAXG	1.016***
	(38.1)
Ind (Labour-intensive-industry) x ETAXG	0.130***
	(2.6)
Flex (State-specific-labour-flexibility) x ETAXG	0.259***
	(8.2)
Ind x Flex x ETAXG	0.130*
	(1.8)
Industry-Year FE	YES
State-Year FE	YES
Constant	-3.140***
	(-97.3)
Observations	56294
R^2	0.06
F(22,56271)	184***

*Significant at 10%, **Significant at 5%, ***Significant at 1%
Note: Robust 't' statistics in brackets

Small-scale firms in inflexible states have higher subcontracting intensity is consistent with the conjecture that firms have greater disincentive for vertical growth in inflexible states. In particular those firms in labour intensive industries located in inflexible states have higher subcontracting intensity than all other firms[33]

In the context of panel data it is important to control for unmeasured firm specific factors that affect subcontracting decisions of firms using a FE model. One problem of FE model is that time-constant size dummies like ETAXG cannot be used. However they can be interacted with each year dummy to measure how fiscal effect has changed over time relative to the base year. The results of FE model are presented in Table 7. Note that log of employment size is included as an independent variable along with year specific interaction dummies for ETAXG. The coefficient of employment size has the expected negative coefficient and significant. More important are the coefficients of ETAXG x

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[33] I have experimented with alternative measures of subcontracting intensity. The results are similar as different measures are found to be highly correlated

year. They are all significantly positive and larger in size for years after 2002. This establishes the significance of threshold effects of fiscal incentives for subcontracting. This result complements the regression results that I found for threshold effects of labour regulations.

Table 7: Regression of Subcontracting Intensity on Employment Size and interaction of Excise-Tax-incentive group with Year effects: Fixed Effects Model

Dependent variable: log(SUB)

$\ln(ES)_{ikst}$	-0.227***
	(-8.5)
$ETAXG*2000_{iks}$	0.394***
	(4.9)
$ETAXG*2001_{iks}$	0.545***
	(7.8)
$ETAXG*2002_{iks}$	0.580***
	(8.7)
$ETAXG*2003_{iks}$	0.648***
	(10.0)
$ETAXG*2004_{iks}$	0.629***
	(10.2)
$ETAXG*2005_{iks}$	0.689***
	(10.0)
$ETAXG*2006_{iks}$	0.582***
	(8.1)
$ETAXG*2007_{iks}$	0.691***
	(9.0)
$ETAXG*2008_{iks}$	0.588***
	(7.2)
State-Year FE	YES
Industry-Year FE	YES
Constant	-1.639***
	(-13.6)
Observations	56294
R^2	0.01

*Significant at 10%, **Significant at 5%, ***Significant at 1%
Note: Robust 't' statistics in brackets

5. Conclusions

This paper perhaps for the first time in the literature on Indian manufacturing tested the hypothesis of threshold effects using firm level panel data. The problem of missing middle in the size distribution of firms is argued to be an outcome of labour regulations defined by employment size and fiscal incentive determined by turnover size for small-scale enterprises. Both are size-dependent rules and therefore constitute a basis for threshold effects. Firms could use non-permanent workers to escape from higher adjustment costs of larger firm size. I measured this outcome by contract-worker intensity. Contract-worker intensity is found to be higher in size class 50-99 relative to others supporting the conjecture that firms use non-permanent workers to stay below the size threshold of 100. The average contract-worker intensity of factories in size group 50-99 is found to be higher in labour intensive industries located in states categorized as inflexible. The postulated non-linear relationship between contract intensity and firm size is found to be statistically significant. Empirical results are consistent with threshold effects and supported the link between missing middle and labour regulations.

I found evidence that subcontracting of output has been widely practiced by firms belonging to different employment size groups. A size group of factories was created to capture the threshold effects of excise tax exemption offered to firms with turnover below INR 50 million. The tax-turnover limit based firm size dummy variable was found to have a highly significant impact on subcontracting intensity. My results suggested that fiscal incentive is a dominant source that drives subcontracting practices of small-scale firms in Indian manufacturing. This is consistent with the proposition that fiscal

incentives leads to fragmentation of factory production and prevents size-scale expansion in Indian manufacturing.

In brief the empirical findings are consistent with the widely held belief that size-dependent labour regulations and fiscal incentives work against Indian firms in their vertical growth and their preference to stay small is largely policy driven giving rise to the phenomenon of missing middle in the size distribution of manufacturing firms.

This paper can be extended in several directions for further verification and analysis. First, I have used an unbalanced panel. It may be useful to test using a balanced panel and examine whether firms belonging to different size groups change their behaviour over time. Second, it is important to incorporate a measure of entry of factories to measure the impact of regulations on new entrants into the industry in different states. Third, more direct measures of inter-state differences in income, financial, physical and educational infrastructure could be used as controls in addition to industry and state fixed effects. All these in addition to other limitations will be pursued in the future.

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APPENDIX TABLES

Table A1: Sample Distribution of Factories by Number of Years of appearance in the Data set

Number of Years	Frequency	Percent
1	51,921	50.87
2	17,457	17.1
3	12,017	11.77
4	6,305	6.18
5	3,512	3.44
6	2,551	2.5
7	2,041	2
8	2,235	2.19
9	1,653	1.62
10	2,384	2.34
Total	102,076	100

Source: ASI unit level panel data 1998-2008

Table A2: Distribution of Sample units by Year and Employment Size*

Employment Size class

Year	0-9	10-49	50-99	100-199	200-499	500-999	1000-1999	2000-4999	5000+
1999	3,953	5,640	1,486	1,317	2,219	770	291	142	46
2000	4,421	6,340	1,566	1,240	2,182	832	298	141	40
2001	4,897	7,437	2,690	3,012	2,579	850	295	153	37
2002	4,502	8,610	3,499	3,413	2,617	829	277	143	35
2003	4,317	8,636	3,742	3,659	2,716	853	295	148	31
2004	7,074	12,497	4,102	4,038	2,857	906	304	142	31
2005	6,684	10,034	2,779	3,965	3,017	967	334	155	30
2006	7,050	11,173	3,434	3,892	3,235	1,059	371	167	30
2007	6,708	11,522	3,558	3,632	3,408	1,123	416	197	33
2008	5,225	9,925	3,418	3,627	3,561	1,234	467	238	41
All	54,831	91,814	30,274	31,795	28,391	9,423	3,348	1,626	354

Source: ASI unit level panel data 1998-2008

Note:* Employment size is defined by the number of regular workers in a factory

Table A3: Sample Distribution by State: All Plants and all Years

Sr.No.	State	No.of Observations
1	Jammu & Kashmir	2,534
2	Himachal Pradesh	3,509
3	Punjab	14,585
4	Chandigarh (UT)	1,396
5	Uttarakhand	3,354
6	Haryana	11,222
7	Delhi (UT)	6,977
8	Rajasthan	10,805
9	Uttar Pradesh	20,344
10	Bihar	3,909
11	Nagaland	659
12	Manipur	280
13	Tripura	1,899
14	Meghalaya	403
15	Assam	5,838
16	West Bengal	12,727
17	Jharkhand	4,101
18	Orissa	5,053
19	Chattisgarh	4,176
20	Madhya Pradesh	7,536
21	Gujarat	20,156
22	Daman& Diu (UT)	3,667
23	Dadra & Nagar Haveli (UT)	3,375
24	Maharashtra	28,956
25	Andhra Pradesh	17,397
26	Karnataka	14,330
27	Goa	2,968
28	Kerala	8,680
29	Tamil Nadu	28,162
30	Pondicherry (UT)	2,858
	Total	251,856

Note: UT=Union Territory
Source: ASI unit level panel data 1998-2008

Table A4: Classification of States based on Labour Regulations

Flexible	Inflexible	Others
Andhra Pradesh	Assam	Chandigarh (UT)
Gujarat	Bihar	Dadar NH (UT)
Karnataka	Jharkhand	Daman (UT)
Rajasthan	Delhi (UT)	Jammu &Kashmir
Uttara Pradesh	Goa	Manipur
Tamil Nadu	Haryana	Meghalaya
	Himachal Pradesh	Nagaland
	Kerala	Tripura
	Madhya Pradesh	Pondicherry (UT)
	Chhattisgarh	Uttara Khand
	Maharashtra	
	Orissa	
	Punjab	
	West Bengal	

Note: UT=Union Territory

Source: Authors' classification see text

Table A4.1: Sample Distribution by State Group

State-Group	Frequency	Percent
Others	20,425	8.1
Flexible States	111,194	44.1
Inflexible States	120,237	47.7
Total	251,856	100

Source: ASI unit level panel data 1998-2008

Table A5: Distribution By Industry Group		
Industry-Group	Frequency	Percent
Labour Intensive Industries	57,201	22.71
Others	194,655	77.29
Total	251,856	100
Source: ASI unit level panel data 1998-2008		

Table A6: Sample Distribution of Factories Reporting Subcontracting*		
Year	Observations	Percent
1999	3,813	6.5
2000	3,852	6.57
2001	5,297	9.03
2002	5,787	9.86
2003	5,993	10.22
2004	7,524	12.83
2005	6,790	11.57
2006	6,841	11.66
2007	6,823	11.63
2008	5,945	10.13
Total	58,665	100
*Reporting data on Purchase value of goods sold in the same condition as purchased		
Source: Authors' Estimate		

Table A7: Sample Distribution of Factories Reporting Subcontracting by Employment Size*

Size-Group	Observations	Percent
0-9	9,791	16.69
10-49	18,430	31.42
50-99	7,275	12.4
100-199	8,632	14.71
200-499	8,928	15.22
500-999	3,394	5.79
1000-1999	1,391	2.37
2000-4999	698	1.19
'5000+	126	0.21
Total	58,665	100

*Reporting data on Purchase value of goods sold in the same condition as purchased
Source: ASI unit level panel data 1998-2008

Table A8: Employment Size Distribution of Factories with Output less than INR.50 million (Percentage)

Year	0<ES<9	10<ES<49	ES>+50	All
1999	32.7	49.3	18.0	100
2000	35.2	48.6	16.2	100
2001	32.2	46.0	21.8	100
2002	27.2	48.0	24.7	100
2003	26.6	49.2	24.2	100
2004	32.2	49.8	18.0	100
2005	37.8	46.3	15.9	100
2006	38.6	46.1	15.3	100
2007	37.0	47.9	15.1	100
2008	33.8	49.9	16.3	100
All Years	33.4	48.0	18.5	100

Note: ES=Employment Size
Source: ASI unit level panel data 1998-2008

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