Size Dependent Tax incentives, Threshold Effects and Horizontal Subcontracting in Indian Manufacturing: Evidence from Factory and Firm-level Panel Data Sets

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Abstract

India's industrial protection and promotion policies for small-scale enterprises have figured prominently in the literature on industrialization policies in developing countries. These size dependent tax incentives could encourage fragmentation of production and prevent natural up-scaling of firm sizes. The author presents a new empirical application of the idea of threshold burden of tax incentives in India. The study is based on a large unbalanced panel of manufacturing factories in the formal sector spanning the period 1999-2008 and a panel of manufacturing companies covering the period 1990-2010. Average subcontracting intensity was found to be significantly higher in manufacturing factories and firms with sales turnover below the ceiling level set by the tax rules. Econometric tests based on Fixed Effect models supported the hypothesis that firms take advantage of tax incentives by staying below the threshold sales turnover. This is consistent with the idea of threshold effects of size dependent tax incentives.

Keywords: Firm Size, Threshold Effects, Regulations, manufacturing and small-scale enterprises

JEL Code: O14, O17, L60, H32 and H25

Introduction

Industrial and trade policy rules in developing countries provide numerous examples of size and type dependent policies. That is policy and regulatory rules that are dependent on size of the enterprise and type of the enterprise. Regulations with respect to labor retrenchment, health and safety measures, import restrictions, profit repatriation, royalty payments, pricing rules etc. are often dependent on size of the enterprise (workforce size or asset size or sales) and on the type of enterprise defined in terms of different criteria (ownership type-domestic or foreign etc.). They have been considered as important causal factors behind the dualistic nature of size distribution of manufacturing in countries like India, Indonesia and the Philippines. India in particular has attracted much attention as a striking example of policy induced dualism with a large number of small-scale enterprises coexisting with a small number of large enterprises in manufacturing (Mazumdar and Sarkar 2013).This dualistic size structure in manufacturing has been observed to be rather persistent over the last two decades. In Figure 1 the size distributions of factories in the formal sector of Indian manufacturing that covers all factories with above 10 workers for selected years 1977, 1982, 1995 and 2009 are presented. The predominance of small-scale factories is evident. Similarly the distribution of factories with firm size measured by value of gross output for the year 2011-12 is shown in Figure 2 and Figure 3. Figure 2 shows the distribution of factories in terms of actual number of factories and Figure 3 shows the distribution in terms of share of each size class as percentage of the total value of gross output. The number of factories in the size class rupees 20 to 50 million is found to be the highest. One

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could see the sharp fall the number of factories in the next size class, that is, rupees 50 to 100 million. More than 70 percent of factories produce gross value of output of less than 50 million in all the years[1] 1977, 1982, 1995 and 2009 covering the pre-reform and post-reform periods.

Figure 1: Percentage Distribution of ASI Factories by Size of Employment
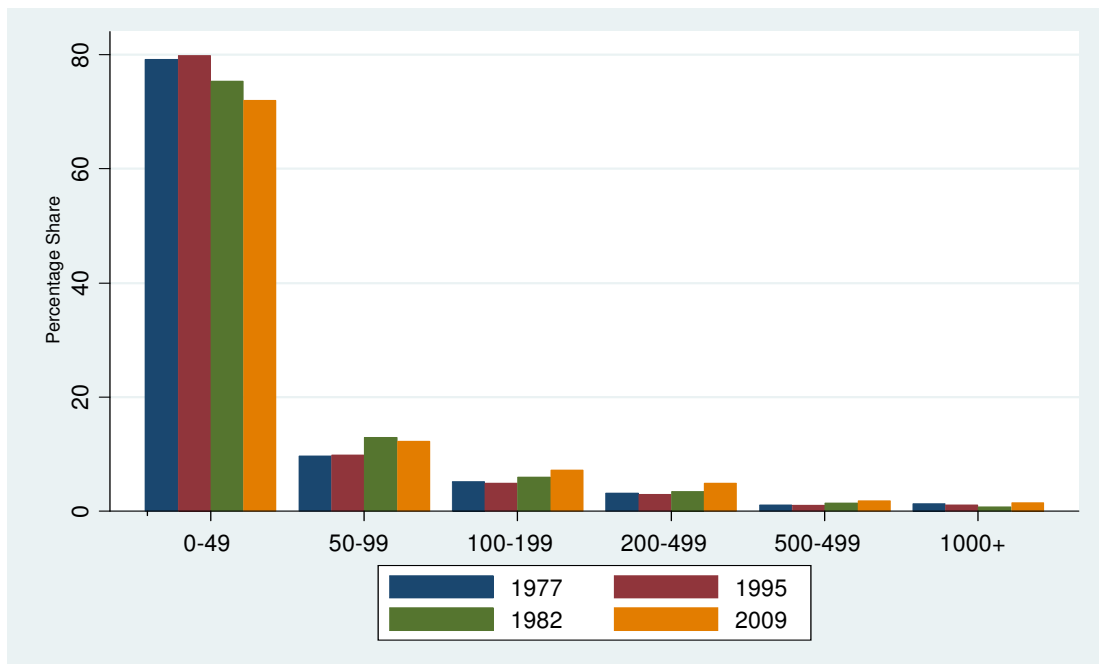
Notes: The vertical axis measures the number of ASI factories in the size class as percentage of the total number of factories in all size classes. The horizontal axis measures the size classes in terms of number of employees.

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[1] The size classes shown in the Figures are as presented in the official statistical report of Government of India

Figure 2: Distribution of ASI Factories by Size of Gross Output in 2011-12
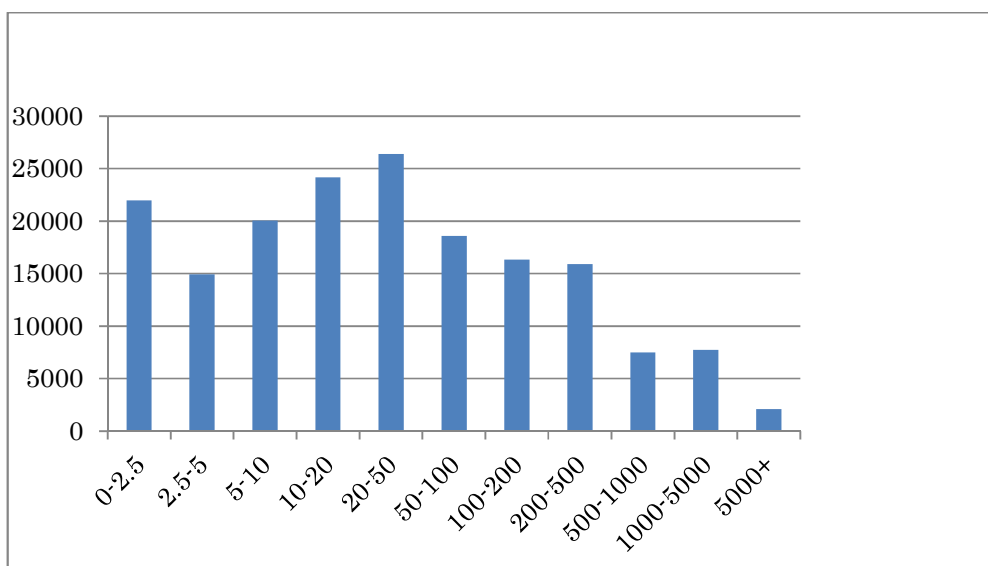
Notes: The vertical axis measures the number of working factories in each size class. The horizontal axis measures the size classes in terms of the value of gross output measured in Million Indian Rupees. Source: Annual Survey of Indian Industry 2011-12: Summary Results, page S9-2 (Statement 16A: Principal Characteristics by Total Output)

Figure 3: Percentage Distribution of ASI Factories by Size of Gross Output in 2011-12

Notes: The vertical axis measures the number of working factories in each size class as percentage of the total number of factories in all size classes. The horizontal axis measures the size classes in terms of the value of gross o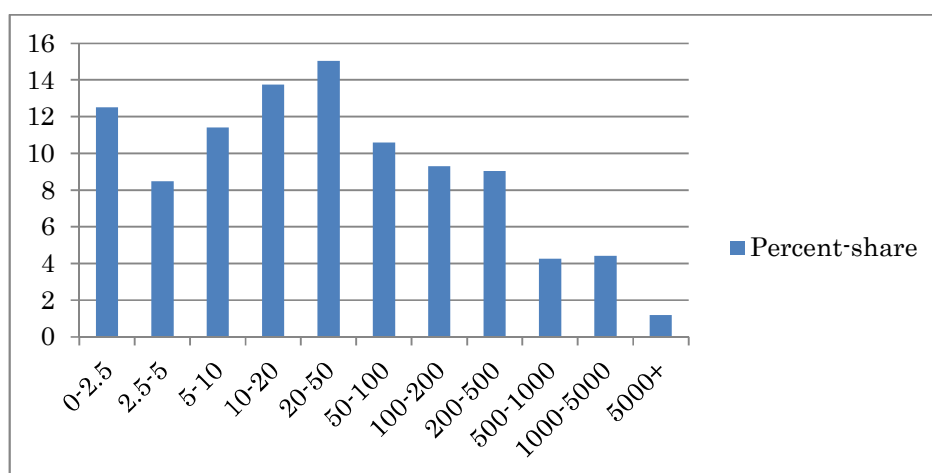utput measured in Million Indian Rupees. Source: Annual Survey of Indian Industry 2011-12: Summary Results, page S9-2 (Statement 16A: Principal Characteristics by Total Output)

Trade and economic reforms since 1991 have brought about far reaching changes in many aspects of industrial structure but the size distribution of manufacturing establishments has not changed much. What explains this phenomenon of dualistic size structure in India? Two widely discussed factors have been (i) employment protection legislation and other labor regulations and (ii) the policy of small-scale industry protection and promotional incentives. Labor

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regulations apply rules with respect to conditions of service, lay-off, retrenchment and closure of firms above a specified employment size. Such regulations would raise labor adjustment costs and create pressures on firms to stay below the legal threshold size. 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" (Gourio and Roys 2012). Second, Indian industrial policy of small-scale enterprise protection that erected barriers to competition from large-scale factories combined with fiscal and financial incentives discouraged size expansion.

India 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 are widely believed to be the factors behind the lack of incentive for size expansion beyond the official definition of small-scale factory[2]. 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 2006). This could create incentives for firms to

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[2].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

stay small, outsource extra output and encourage horizontal growth instead of vertical expansion[3]. This outcome is due to *threshold burden* (Levy 1993).

"Threshold burden is the discontinuity in the structure of costs that results when some fiscal burden is imposed only firms above a minimum size. This discontinuity can lead some to rein in expansion - or to expand inefficiently by creating quasi-independent enterprises, each smaller than the threshold at which the tax and regulatory requirements are imposed" (Levy, 1993, page 74-75). Studies of Indian industrial firms have long maintained that disincentive for scale-expansion of factories has been high given the size-dependent nature of many industrial regulations and fiscal incentives (Little, Mazumdar and Page 1987: Desai and Taneja 1993)[4]. Moreno-Monroy et al. (2012) estimated subcontracting intensity, measured as a ratio of output in the formal manufacturing sector that has gone up sharply from an average of around 8 percent in the first half of 1990s to 15 percent in the years after 1995. Empirical studies of behavioral response to size dependent rules are sparse in the context of India.

In this background the present paper makes a contribution to the literature by studying the effects of size dependent tax incentives on small-scale enterprises in inducing horizontal product subcontracting or capacity subcontracting in India. The study is based on two complementary panel data sets. First, a panel of manufacturing factories or establishments collected by Annual Survey of Industries (ASI) is analyzed. The ASI panel is a nationally representative sample of factories that covers the period between 1998-9 to 2007-8 (hereafter 1999-2008).Second, a panel of manufacturing companies[5] data, based on annual balance sheet and income statements (financial year) of companies compiled by the Centre for Monitoring Indian Economy (CMIE)

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

[4] The flip side of size dependent policies has been the incentive for splitting or sub-division of firms.

[5] A firm or a company covered by the Prowess data may own more than one factory or establishment.

referred to as the Prowess Data base (Prowess hereafter). Prowess covers both publicly listed and unlisted manufacturing and non-manufacturing firms covering the twenty year period 1989-90 to 2009-10 (hereafter 1990-2010). It accounts for more than 70 percent of industrial output, 75 percent of corporate taxes and 95 percent of excise duties collected by the government of India (Alfaro and Chari (2014)[6].

Related Literature

This paper is related to the emerging literature that studies misallocation of resources across firms due to policy induced distortions with aggregate productivity effects. Misallocation of resources could result from restrictions on entry and exit of firms as well as policy rules that discourage scale expansion. Hsieh and Klenow (2009) using plant level data show that total factor revenue productivity (TFPR) increases with size more both in India and China than in the United States. Alfaro and Chari (2014) study the impact of entry deregulation on misallocation and firm size distribution in India. The argument of missing middle in firm size distribution as a source of misallocation in India, Indonesia and Mexico is studied in detail by Hsieh and Olken (2014).

Often the misallocation of resources is due to the size-dependent nature of governmental policies that drive a wedge between firms of different sizes[7]. For example, in Mexico, firms with sales below 2 million pesos paid flat tax of about 2 percent of their sales and were exempt from payroll taxes, income taxes, and value-added taxes. Firms above the 2 million peso threshold were subject to a 15 percent value-added tax, a 38 percent income tax, and a 35 percent payroll tax. In Indonesia those firms with below annual revenue of 600 million Indonesian Rupiah were exempt from paying the 10 percent value added tax. However, Hsieh and Olken (2014) did not

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[6] The features and limitations of Prowess data base are discussed in detail in Alfaro and Chari (2014) and it is used by many other studies like Topalova and Khandelwal (2011) among others.
[7] The examples cited below on Indonesia and Mexico was taken from Hsieh and Olken (2014).

find substantial bunching of firms below these thresholds in these two countries. In contrast Onji (2009) examined the impact of introduction of value added tax threshold in Japan in 1989. He found threshold effects in terms of splitting of corporate firms to take advantage of simplified value added tax scheme and save taxes. The threshold sales value of 500 million yen induced the founding of new small firms through the process of splitting the businesses of large corporations.

In a study of direct relevance to the present study Chatterjee (2011) reported bunching of factories at the threshold of Indian Rupees (INR) 10 million using ASI data that covers formal sector factories for the financial year 2004-05. In that year the excise tax exemption rule permitted 100 percent exemption for all firms whose output was below INR.10 million. The reported finding of bunching as evidence of excise tax effect is not open to straight forward interpretation for several reasons. Firstly, Excise tax exemptions were first offered in India in 1978. No comparable statistics on firm size (output) distribution before the introduction of tax incentive is provided as supporting evidence. Secondly, the sales turnover limit is changing over the years and the stated government argument is not to discourage firms from expanding production capacity. Thirdly, excise taxation does not require registration under the Factories Act, which is based on the number of workers employed. Non-ASI factories are eligible for exemption as long as their turnover value falls below the specified limit. Fourthly, ASI factory data includes both exporting and non-exporting (domestic-market oriented) factories. Output that is exported by factories or firms (excluding the quantity exported to Bhutan and Nepal) is exempt from excise tax by definition. Therefore the specified excise-tax exemption ceiling does not impact export-oriented firms. Bunching could reflect the persistence of small-firm orientation of Indian manufacturing over the years. Large employment industries like garments, leather, and jewelry have been small-establishment oriented industries (Ramaswamy, 1994). It is important

examine the differential impact of excise-tax exemption on production decisions of firms and the strategic response of firms to size dependent tax incentives.

This study is further related to studies of size dependent labor regulations. Labor regulations have been observed to impose compliance costs once firms reach the specified employment size and act as disincentive for natural growth of firms. Tybout (2000) observed that for many developing countries, "…the size distribution exhibits a 'missing middle' because it never pays to be just large enough to attract enforcement". Firms are often observed to use contract workers (secondary workers and labor outsourcing) to stay below the legal threshold size to escape labor regulations (Ramaswamy 2015). Size-dependent regulations that reduce the average firm size have been shown to have output and productivity effects using calibrated growth models (Guner et al 2008; Gourio and Roys 2012). In France firms with 50 employees or more face substantially more regulation than firms with less than 50 and that has been observed to have resulted in many firms with exactly 49 employees (Gourio and Roys 2012). Another important area is that of dual labor markets and production flexibility of industrial firms in developing countries (Moreno-Monroy et al. (2012). Increasing import competition, product differentiation and niche markets exert competitive pressure on firms that look for flexibility in their production organization. A firm will look for two types of flexibility; flexibility in the area of adjusting workforce (labor market flexibility) and flexibility in terms of production. The former involves use of flexible staffing arrangements and use of temps. This has also been an area of intense research in the U.S. (Gramm and Schnell 2001).The latter involves a choice between in-house production and outsourcing production. The firm can decide to outsource output through horizontal subcontracting or capacity subcontracting such that it can avoid up-scaling of production. 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 in formal sector firms. 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.

Evolution of Excise Tax Incentives

In order to encourage small enterprises the Indian tax system exempts them from paying excise tax subject to certain conditions. It started way back in 1978 (Bagchi et al 2009)[8]. Initially a whole host of products were fully exempted from paying excise tax if the products were manufactured without the use of electricity or power. Later a general exemption scheme for manufacturers using power was introduced that invoked certain pre-specified value of investment in plant and machinery in addition to sales-turnover. In 1986 a slab system of concessional rates of excise tax was introduced based on the value of sales. Excise tax was completely exempted up to a sales turnover of INR.3 million and a concession of 10 percent to 5 percent of normal duty for different turnover slabs (GOI, 1997). Excise tax exemption is a form of implicit tax subsidy to small-scale firms that could vary with the level of actual excise tax rate[9]. Later the system of exemption was further rationalized that permitted 100 percent exemption excise tax up to a specified sales value provided the production unit's sales turnover does not exceed the specified maximum turnover limit. This maximum turnover limit has not been inflation adjusted but revised from time to time with the objective of 'not to discourage'

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[8] Initially the central excise tax system was quite complex and tax reforms in the 1990s have simplified the system.
[9] The actual rates varied from 100 percent 10 percent in the 1980s and later tax reforms brought about uniform tax rates in the range of 8 percent to 24 percent.

firms from expanding production. In brief, small-scale factories continue to enjoy excise-tax concessions as long as their sales-turnover does not exceed specified ceiling value of sales. Three discrete jumps merit mention here.

- Between 1989-90 to 1994-95 the 100 percent exemption limit was set at INR.5 million and the corresponding turnover ceiling was set at INR.20 million.

- The 100 percent exemption limit was raised to INR.10 million in 1999-2000 provided the sales turnover is below INR.30 million (INR.40 million in 2004-05).

- The 100 percent exemption limit was further raised to INR.15 million and the turnover ceiling remained fixed at INR.40 million in 2006-07. And this rule continues to prevail in later years. We may note that the tax exempted units having sales-turnover below INR.15 million are not required to register with the government-tax authorities and those factories claiming tax benefits need to file a declaration to the tax-authorities stating that their sales have not crossed the exemption ceiling of INR.40 million[10].

- Firms with sales turnover exceeding the exemption limit paid basic excise duty at normal rates applicable in the corresponding years. For example in 2004-05 the basic excise duty was 16 percent.

- 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 (INR.15 million) is provided to enterprises having annual turnover of up to $1 million (INR.40 million). However, the limits of excise exemptions

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[10] The small-scale unit can avail of the tax credit on inputs under the central value added tax system once it crosses the sales value of INR.15 million as normal duty rates are applied above the ceiling limit.

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…" (The figure in italics added, DCMSME, 2009)[11]. In other words subcontracting intensity could be expected to be higher in relatively small factories, that is, factories with turnover of less than INR.40 million. In other words the tax threshold in this context is INR.40 million and the factories have an incentive to remain below the turnover threshold of INR.40 million with a view to take advantage of excise-tax concessions. 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). Two propositions are tested in the paper: whether subcontracting intensity is greater in excise-tax exemption size group relative to other firms. A related proposition is that subcontracting intensity is higher in domestic-oriented small-scale firms relative to all other firms.

Two Data Sets and Measurement Issues

The source of data is the Annual Survey of Industries (ASI) conducted by the Ministry of Statistics and Program Implementation (MOSPI) of the Government of India. 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

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[11] The indicated turnover limit in US dollars implicitly assumes the then market exchange rate prevailing at that time (April 2009)

preceding 12 months. I utilize unit level panel data spanning the period 1999-2008. 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[12]. Each factory in the data has a 5-digit National Industrial Classification (NIC) code. After implementing standard methods of data cleaning I am left with left a total of 251,856 observations in the panel. My data set contains data on 25 states and 5 union territories (UT hereafter). 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 A1 and A2 respectively.

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 have relied upon the classification used in Hasan and Jandoc (2013)[13] to select the set of labor intensive industries. The labor 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 firm level panel is drawn from the Prowess data base that covers the period 1990 to 2010. The data on purchase of finished goods is available for 30,858 observations. I have dropped observations with zero values on value of sales and net fixed assets that brings down the

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[12] 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.

[13] 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 labor intensive and capital intensive industries. Industries not falling into either of the two categories are classified as others.

number of observations to 30,362. The prowess data follows the NIC 2008 classification and covers 23 three-digit industry groups.

I have defined the term subcontracting as manufacture of goods by one firm (sub-contractor) for another firm (principal) based on latter's specifications[14]. The principal firm sells directly to the consumer.[15] The value of subcontracting activity in a factory can be measured by the value of purchase value of goods sold in the same condition as purchased (purchase of finished goods in terms of Indian company balance sheet accounts terminology)[16]. It is important to note that this component may be regarded as trading 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[17]. 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[18]:

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

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[14] See Ramaswamy (1999) for an early discussion of measurement issues in subcontracting .

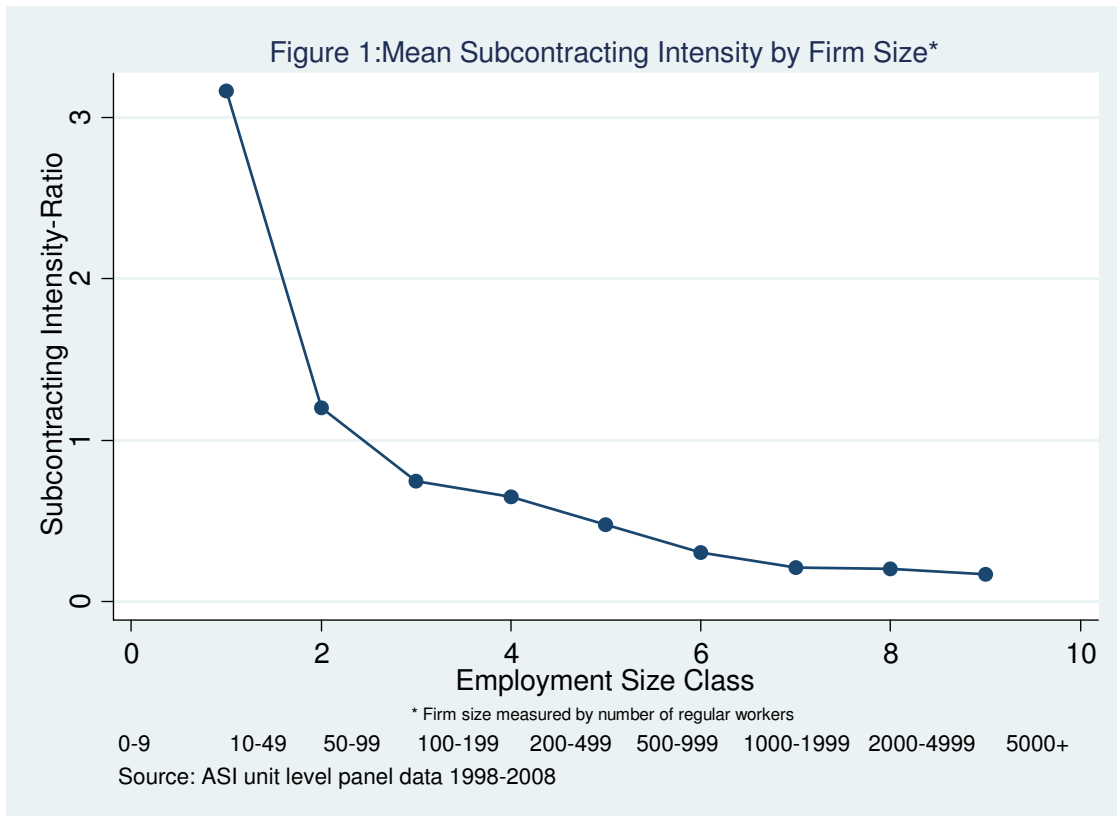[15] This type of subcontracting (horizontal) needs to be distinguished from component or vertical subcontracting between large and small firms that is supposed to have played a positive role in development of a more even size distribution in East Asia noted by Mazumdar and Sarkar (2013)

[16] The other component is contract and commission work done by other firms on materials-supplied. I find that data on the second component is not reported by a majority of firms.

[17] 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.

[18] 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. Intermediate inputs purchased and finished goods purchased could be viewed as substitutes. These measures are highly correlated with partial correlation coefficient greater than 0.86 for alternative definitions.

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The estimated mean contracting intensity for different employment size classes is shown in Figure 1. Small-scale factories clearly emerge as production units with high level of subcontracting activity.

Figure 1: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

Econometric Results: Factory-Level Panel

As observed earlier the incentive of excise-tax exemption is offered to small enterprises or to firms with output below the specified threshold of INR. 30 million and INR.40 million in different years during the time span of 1999-2008. 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 the specified turnover ceiling covered in the study[19]. EtaxG is a turnover-size dummy variable that takes the value 1 if output of the firm falls below or equal to the specified sales value for exemption eligibility and zero otherwise. The aim is to capture the relative behavior of small-scale factories with firm size measured by value of output in nominal terms. 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. In the context of panel data it is important to control for unmeasured firm specific factors (individual specific heterogeneity) that affect subcontracting decisions of firms using a Fixed Effect (FE) model. 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. I have included state-year and industry-year fixed effects in order to account for such factors that may impact the subcontracting intensity of factories. The results of FE model are presented in Table 1.

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[19] 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.

Table 1: Regression of Subcontracting Intensity on Excise-tax-incentive group: Factory-level Panel data and Fixed Effects Model

Dependent variable: Log(Subcontracting intensity)

Etax20G	0.704***
	(12.0)
Etax30 x Period-I	0.576***
	(9.3)
Etax40 x Period-II	0.642***
	(10.1)
Log Employment	-0.176***
	(-6.8)
Firm Fixed Effects	YES
Industry-Year Fixed Effects	YES
State-Year Fixed Effects	YES
Constant	-7.489
	(-0.6)
Observations	58665
R^2	0.03
F(24, 29212)	21.5***

*Significant at 10%, **Significant at 5%, ***Significant at 1%

Period 1=1999-2004 and Period 2=2005-2008

Etax20G= Factories with sales less than INR.20 million
Etax30G= Factories with sales less than INR.30 million
Etax40G= Factories with sales less than INR.40 million
Note: Robust 't' statistics in brackets

Note that firm characteristic is captured by the employment size included as an independent variable. The coefficient of log of employment size has the expected negative coefficient and significant. The period specific effects of higher sales turnover ceiling cut-offs of INR.30 million and INR.40 million are captured by the interaction of size dummies and the two period-specific dummies, namely, Period-I (1990-2004) and Period-II (2005-2008). They are denoted by the interaction dummies Etax30*Period-I and Etax40*Period-II respectively. Both are positive and highly significant. Note that they are significant even in the presence of common output size dummy for small firms with sales less than INR.20 million that should control for

any proclivity for small-firm trading activity common across industries over time. This establishes the significance of threshold effects of fiscal incentives for subcontracting. Excise tax exemption eligible small-scale firms have higher subcontracting intensity is consistent with the conjecture that firms have greater disincentive for vertical growth.[20] In other specifications firms belonging to the labor-intensive industries are found to have higher subcontracting intensity that is consistent with earlier findings (Ramaswamy 1994)[21]. Labor-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 labor intensive group therefore reflects a combination of export-orientation effects and tax incentives.

Evidence from Firm-level Panel Data

Similar analysis is performed using the firm-level panel data using the Prowess data base. The distribution of sample firms by firm size measured by the value of sales is presented in the appendix Table A-3. The firm level panel has a longer time span then the earlier factory-level panel and spans the financial years 1990-2010. A comparison of the mean and standard deviation of two focus variables log of subcontracting intensity and log of wages and salaries, a proxy for employment size not available in Prowess data, with ASI factory panel is presented in Table A4 in the Appendix. It is useful to note that they are broadly similar. I started with the FE model with log of subcontracting intensity as the dependent variable. Three output size dummies

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[20] I have experimented with alternative measures of subcontracting intensity. The econometric results are found to be very similar and not reported to save space.
[21] I have tried interaction of dummy variables excise tax groups in Period 1 and Period 2 with labor-intensive industry group and find that it is statistically insignificant in the presence of excise tax groups. This suggests that subcontracting intensity of labor intensive industries in excise tax groups is not significantly higher than all other firms.

representing the three size-classes of firms representing the sales turnover ceilings are set up. They are INR.20 million, INR.30 million and INR.40 million respectively in the three specified periods. The corresponding three time period dummies are namely, Period-I (1990-2005), Period-II (1996-2004) and Period III (2005-2010) respectively. The interaction of size dummies and the corresponding time–period dummies is the key focus of analysis. The dependent variable is the measured subcontracting intensity measured by the ratio of purchase of finished goods to value of inputs as defined earlier. Three firm specific characteristics were added as controls and along with year-fixed effects following the standard practice. First firm characteristic is total expenditure on wages and salaries of employees or the annual wage bill of the firm. This is a proxy for employment size as the data on number of employees is not available in the Prowess data base. Second is the Capital-Output ratio or the average productivity of capital and it is measured by the ratio of Gross Fixed Assets to Sales. Third is export intensity of the firm measured by the ratio of value of Exports to Sales. Inter firm differences in export-orientation is potentially important variable that could influence the extent of subcontracting activity of Indian firms. Given the uncertainty of international markets a large number of firms undertake capacity subcontracting and outsource finished goods from small manufacturers often in the informal sector in many industries like garments, leather etc. I have estimated partial correlation coefficient between these three control variables and found them to be statistically insignificant. The regression results based on the fixed effects model are presented in Table 2[22].

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[22] As I have defined the dependent variable as logarithm of subcontracting intensity, the STATA software drops all observations with zero values. Because of this I have lost 66 observations resulting in 30296 observations in Table 2 and also in Table 3 below.

Table 2: Regression of Subcontracting Intensity on Excise-tax-incentive group: Firm Level Panel Data and Fixed Effects Model

Dependent variable: Log(Subcontracting intensity)	
Etax10G	0.427***
	(3.4)
Etax20G x Period-I	0.539***
	(3.2)
Etax30G x Period-II	0.378***
	(3.4)
Etax40G x Period-III	0.494***
	(3.4)
Log (Wages and Salaries)	-0.143***
	(-3.8)
Log (Fixed Assets/Sales)	0.302***
	(10.8)
Log (Exports/Sales)	0.096***
	(4.3)
Firm Fixed Effects	YES
Year Fixed Effects	YES
Constant	-2.17***
	(19.3)
Observations	30296
R^2	0.056
$F_{(27, 4600)}$	15.78***
*Significant at 10%, **Significant at 5%, ***Significant at 1% Period-I=1990-1995, Period-II=1996-2004 and period-III=2005-2010 Etax10G= Firms with sales less than INR.10 million Etyax20G= Firms with sales less than INR.20 million Etax30G= Firms with sales less than INR.30 million Etax40G= Firms with sales less than INR.40 million Note: Robust 't' statistics in brackets	

It is important note that in Table 2 all the three interaction dummy variables of direct interest Etax20GxPeriod-I, Etax30GxPeriod-II, and Etax40GxPeriod-III, are positive and statistically significant. They are significant even in the presence of common small-firm dummy for firms with less than INR.10 million (Etax10G). The coefficient of log of Wages and Salaries has the correct expected sign and it is statistically significant. This is consistent with the negative sign of employment size in the factory panel found earlier. Coefficient of Capital-Output ratio is positive

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and significant suggesting that subcontracting firms are on the average have lower capital productivity. In other words the measured productivity is lower in firms with lot of trading activity because of lower manufacturing value addition within the firm. More importantly, the coefficient of export to sales ratio is found to be positive and highly statistically significant consistent with my argument earlier that subcontracting activity is widespread among exporting firms in India. An alternative ways of controlling the impact of inter firm differences in export orientation on subcontracting activity is explained in the next paragraph.

I have tried to sharpen the above analysis by considering a set of domestic-oriented firms. Firms whose main activity is not production for export but production for the domestic markets. Excise tax incentives matter more by definition to firms who are likely to sell in the domestic market. I have defined firms with value of exports of less than 5 percent of total sales as domestic-oriented firms. The objective is to test the hypothesis that domestic-oriented firms falling in the excise tax eligibility size groups will have higher subcontracting intensity. The excise tax rules states that export sales (excluding exports made to Nepal and Bhutan) will not be counted as part of turnover when calculating the sales value for purposes of applicability of excise tax exemption ceiling level. I have created a dummy that takes the value of 1 if exports-to-sales ratio is less than 0.05 and zero otherwise. The interaction of this dummy with the excise tax group dummy defined above (Etax20G etc. for different time-periods) is included in the regression exercise. The results are shown in Table 3. Inter firm differences in export orientation is earlier measured by the control variable exports to sales ratio. I have dropped exports to sales ratio in this regression but the variable capital-output ratio has been retained. The results are along expected lines. The three interaction dummy variables (Etax20G x Period-I x Domestic-Firm-Dummy; Etax30G x Period-II x Domestic-Firm-Dummy; Etax40G x Period-III x Domestic-Firm-Dummy) have turned out to be statistically highly significant with a positive sign. Other included variables

retain their expected signs and statistical significance. The model estimates presented in Table 3 clearly support my proposition that domestic-oriented firms in the tax-eligible-size-groups will have higher subcontracting intensity relative to all other firms. This may be interpreted as threshold excise tax effects on firm behavior.

Table 3: Regression of Subcontracting Intensity on Excise-tax-incentive group of Domestic-Oriented Firms: Firm Level Panel Data and Fixed Effects Model

Dependent variable: Log(Subcontracting intensity)

Etax10G	0.464***
	(3.7)
Etax20G x Period-I x Domestic-Firm-Dummy	0.564***
	(3.1)
Etax30G x Period-II x Domestic-Firm-Dummy	0.389***
	(3.3)
Etax40G x Period-III x Domestic-Firm-Dummy	0.549***
	(3.4)
Log (Wages and Salaries)	-0.118***
	(-3.2)
Log (Fixed Assets/Sales)	0.308***
	(11.4)
Firm fixed Effects	YES
Year Fixed Effects	YES
Constant	-2.10***
	(-18.8)
Observations	30296
R^2	0.048
$F_{(26, 4600)}$	15.8***

*Significant at 10%, **Significant at 5%, ***Significant at 1%
 Period-I=1990-1995, Period-II=1996-2004 and period-III=2005-2010
Etax10G= Firms with sales less than INR.10 million
Etyax20G= Firms with sales less than INR.20 million
Etax30G= Firms with sales less than INR.30 million
Etax40G= Firms with sales less than INR.40 million

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 of tax incentives using two different panel data sets representing manufacturing factories and companies respectively. Different size group of factories and firms was created to capture the threshold effects of excise tax ceiling output imposed by the excise tax rules. The specified ceiling sales turnover and the value of output exemption varied over time during the time period 1989-2010. The tax-turnover limit based firm size group dummy variable was found to have a highly significant impact on subcontracting intensity in both panel data sets. What is revealing is that these threshold size groups were significant in the presence of common small firm dummy variable that controls for propensity for trading activity common among small enterprises in developing countries. I could control for inter-firm differences in export activity that exempts firms from paying excise tax on value of exported output, which is a dominant driver of product outsourcing in Indian manufacturing. My results suggested that tax incentive is an important factor 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. Recently Indian government has initiated fiscal reforms by introducing value added tax system called Goods and Services Tax (GST) that attempts to remove exemptions to small-scale industrial firms and create more level playing field in manufacturing activity. The impact of GST on growth and structure of manufacturing will be an interesting area of future research.

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Table A1: Number of ASI Factories Reporting Subcontracting* in different years,1999 to 2008

Year	Number of Factories	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: Author's Estimate based on ASI unit level panel data 1998-2008

Table A2: Sample Distribution of ASI Factories Reporting Subcontracting by Employment Size*		
Size-Group	Number of Factories	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 A3: Distribution of Sample Observations Value of Sales (INR. Million) for the years 1990 to 2010		
Size Class	Frequency	Percent
S <10	899	2.96
10<S<50	2301	7.58
50<S<100	2169	7.14
100<S<500	9394	30.94
500<S<1000	4700	15.48
1000<S<5000	7647	25.19
5000<S<10000	1641	5.4
10000<S<100000	1450	4.78
S>100000	161	0.53
All Firms	30362	100
Source: Prowess Data (See Text)		

Table A4: Descriptive Statistics of Key Variables			
Variable	Mean	Standard Deviation	No. of Observations
ASI Factories			
Log of Subcontracting Intensity	-2.463	2.372	58665
Log of Employment	4.143	1.637	58665
Prowess Data			
Log of Subcontracting Intensity	-2.524	2.245	30342
Log of Wages and Salaries	3.503	1.909	30310
Source: ASI Unit level Data and CMIE-Prowess. See Text			