Productivity Improvement through Subcontracting and Unorganized Indian Textile and Garment Enterprises: An Impact Evaluation [1]

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Abstract

Recent withdrawal of important protective measures and the announcement of the Textile Policy 2000 have marked a shift away from government support and policy-guided improvement in the performance of the unorganized Indian Textile and Garment enterprises. The new policy regime has laid greater emphasis on market-driven large-small linkages in enhancing these small firms' performance through various pre- and post-production supports from the large. In this context the paper seeks to assess the new policy orientation critically by examining its effectiveness in supporting the intrinsically heterogeneous unorganized section. Motivated by the findings from a previous work which highlighted that different segments of these enterprises that represent diverse organizational types and operate under varied demand conditions face different structural constraints in accessing such market-linkages as subcontracting, the paper attempted to assess the precise impact of participation in these contract jobs on the participants even when there is no participation constraint. With the help of a propensity-score *matching* analysis we identified the comparable groups to estimate the marginal effect of subcontracting on the outcome variable and observe that the contract-agreement is not an effective treatment to any segment of the unorganized subcontracting firms. It rather worsened the performance in most of the cases. The findings suggest the need for designing more effective intervention strategies by incorporating unobserved heterogeneity explicitly in the framework of policy formulation.

Key words: Unorganized Textile & Garment Firms in India, Organizational Characteristics, Textile Policy, Subcontracting, Propensity-Score *Matching* Analysis
JEL Classifications: C31, L22, L25, L52, L67

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1. Introduction

Textile policies before 1985 aimed at addressing the small textile producers' disadvantages in terms of scale, technological backwardness and isolation from market through specific and direct protective measures against these units' participation in the market (Mukund and Syama Sundari 2001, Little, Mazumdar and Page 1987). By the first half of 1980s it was felt that this type of support did not enable the most vulnerable section of textile producers to take off and grow independently; it perpetuated their dependence on such protection (Little, Mazumdar and Page *op cit.*, Goswami 1985). The new policy-thinking got reflected in 1985 textile policy and subsequent interventions in the textile sector. These involved gradual and simultaneous removal of measures protecting the small and withdrawal of restrictions on the large-scale units (in terms of expansion of capacity for existing operations and in areas where they were earlier prohibited to operate) in the post-liberalization period (Kathuria and Mamta 2012, Galab *et al.* 2009, Niranjana and Vinayan 2001, Roy 1996, 1998b, Srinivasulu 1996). Specifically, the unorganized[3] Textile and Garments (T&G, hereafter) sector has experienced a few important changes in recent years. On the one hand the Textile Policy 2000 de-reserved[4] the growing garments segment (both knitted and woven). The period of economic reforms on the other hand, has seen increased emphasis on market-driven incentives like subcontracting agreement with large firms for improvement in performance of the small unorganized enterprises (Sahu 2011, Maiti 2008, Raj 2006, Teewari 1999, 2000). This created a pro-competitive environment offering new risks as well as opportunities for the small units.

The underlying idea of such a changed policy orientation was that a pro-competitive environment rather than protection from competition would ensure the enhancement of performance of small-scale textile units and of the industry as a whole. The unorganized textile and garments enterprises were to benefit from complementary inter-linkages like sub-contracting or marketing agreement between large and small firms. Such agreements while improving the

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[3] Manufacturing firms not registered under the section 2m(i) and 2m(ii) of the 1948 Factories Act are officially considered the Unorganized Manufacturing units.
[4] Production of garments for the domestic market was earlier earmarked only for small-scale decentralized units.

smaller units' access to assured supply of raw materials and to market were expected to help them shift to the segment of higher value-added products through technological spillovers (Liebl and Roy 2001, 2003, Teewari 2000). Government policies simultaneously focused on creating an enabling environment to ensure that small and unorganized producers could participate in such networks on more favorable terms than before (Government of India 2006, Ganesh 2002, Hussain 1997) and could benefit the most from such market-driven opportunities.

However, as we learn from the existing literature that Indian T&G industry is an intrinsically heterogeneous sector[5] consisting of segments operating with diverse structural constraints as well as displaying varying degrees of responsiveness to both market forces and policy interventions. In the absence of protective measures the unorganized segment has to primarily depend on linkages with the organized or relatively big units within the same subsector for improving their relative performance (and sometimes for mere survival). Enterprises in the unorganized segment may be differently prepared to utilize the emerging opportunities of market participation or to handle the risks associated with it in the changed context. This may lead to a continuous series of restructuring and further differentiation within the set of unorganized firms once again giving rise to differential access (and different types of hidden costs associated with it) to such market-led opportunities depending on what product-market they are catering to or the enterprise-type they belong to. How the mean-targeting policies based on equalization principle of the market for improving production efficiency can attend to this structurally ingrained heterogeneity – both observed and unobserved - is a pertinent question here. In this context, the paper seeks to assess the new policy orientation critically by examining effectiveness of market incentives such as subcontracting in supporting the diverse unorganized section.

A substantial volume of literature has debated on the possible impact of subcontracting on productivity-related performance and growth of informal sector firms in developing countries. One strand of research on this issue argued that (i) the bigger firms subcontract work to relatively modern and dynamic segment of the informal sector; (ii) these firms have greater capability to benefit from technical and organizational innovations associated with the subcontracted work;

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[5] The industry can be classified in terms of alternative modes of organization (organized/unorganized or mills/decentralized), by different production techniques (mechanized/artisanal or mill/powerloom/handlooms), by the constitutive functions in the value chain (spinning/weaving-knitting/processing/garment-making) and enterprise-types (OAME/NDME/DME) within the unorganized.

and (iii) subcontracting may even have a beneficial transformational impact on the informal sector as a whole (Maiti and Sen 2010, Arimah 2001, Ranis and Stewart 1999). The other school of argument on possible impact of subcontracting on informal firms rests on the unequal power relation between the subcontracting and subcontracted units. This group of writings predicts a retarding impact on the growth potential of informal units as the asymmetric bargaining power of the informal firm will result in appropriation of the surplus generated in production by the formal sector enterprise (Mehrotra and Biggeri 2007, Moser 1978).

Utilizing the unit-level NSS data on firm-characteristics Basole, Basu and Bhattacharya (2014) demonstrated that the debate cannot be settled clearly in favour of one argument or the other. The impact of subcontracting on subcontracted firm's productivity will rather greatly vary across firms classified by different organizational characteristics (ibid.). Sen & Majumder (2014) evaluated the impact of MA through outsourcing and sub-contracting in enhancing labour productivity of unorganized T&G enterprises for the year 2011 and lent support to the latter observation. It was argued that the ability to gain from subcontracting opportunities depended on location of the segments with respect to binding structural constraints. Whether the participation incentives designed to encourage enhancement of connectivity between the large and the small are effective for the unorganized units, however, is not that obvious. Here one needs to assess the ultimate impact by comparing the comparables.

In order to assess the effectiveness of these market instruments we need to estimate the marginal contribution of such market incentives as subcontracting to the enhancement of productivity. Given the heterogeneity in the concerned firms' background characteristics we cannot ascribe the observed improvement in outcome (performance on labour productivity here) of any unit exclusively to the participation/non-participation in subcontracting agreement. Specifically, there is a possible presence of selection bias in our dataset. Thus, we need to make sure that the same increase cannot be traced back to difference in the enterprise characteristics or to any spillover effect enjoyed by the non-subcontracting units from the subcontracting firms' participation in that arrangement. The issue of comparing only the comparables comes in here, which in turn involves the problem of counterfactual. Ideally it would require us to compare the outcome difference of the same firm between the two situations: a real one when it has a prior contract agreement and the hypothetical one in which it does not participate in any such subcontracting

arrangement. Given that we cannot observe the outcome for the same firm both within and outside subcontracting relation at the same time, we try to match each subcontracting unit with one or more statistically similar non-subcontracting firm based on observed pre-participation characteristics. In our analysis we apply the non-experimental technique of propensity-score-based *matching* and after controlling for such pre-treatment variables we estimate in the matched set the expected average value of the average SC-NSC or MA-NMA difference in productivity values for the subcontracting units [i.e., average treatment effect on the treated (ATT)].

Organization of the paper

The rest of the paper is arranged as below: the next section (Section 2) describes the data source followed by a brief exploratory analysis on incidence of subcontracting as well as the dominant type of subcontracting arrangements prevailing in the segments under consideration. In section 3, we discuss the general idea of propensity-score *matching* as a non-experimental technique of impact evaluation and the specific algorithm followed in this work while estimating the average treatment effect of contract agreement on the subcontracting firms. This section ends with a brief description of the pre-treatment variables used in *matching* analysis and an exploration of the mean difference of subcontracting and non-subcontracting firms before *matching* with respect to these variables. Findings from the *matching* based on propensity-scores are presented in three subsections of the next section (section 4) along with the regression results obtained after controlling in each segment the same set of pre-participation variables used in respective best matches. The subsections respectively contain the findings from matching analysis in (i) segments based on product-market and organizational characteristics, (ii) groups classified by the size of fixed assets held by each firm, and among subcontracting firms by (iii) types of contract. Section 5 concludes the paper.

2. Data-source and Type of Subcontracting

To address the problem of counterfactual we need considerable information on enterprise background – not particularly affected by the firm's behaviour with respect to subcontracting. Successive rounds of NSS reports from the survey of unorganized manufacturing enterprises in India provide such detailed information. For example, it gives information on (i) enterprise characteristics (such as size, labour-hiring behavior, nature of operation and so on); (ii)

background features of the enterprise-owner or the major decision-maker (gender and social group of the owner); (iii) production-related statistics (expenditure, receipts, composition of total employment, assets and loans); (iv) production & marketing-related contracts – linkages with other units. The first two groups of items give us the pre-treatment characteristics which form the basis of p-score *matching*. Appropriate performance outcome variables are computed using information in the third category. The last group provides detailed information on various aspects of the contract with the other unit.[6] Thus, our research question can be reasonably addressed with the help of the NSS data. For the present paper, we have used the unit-level NSS 67th round 2010-11 survey data on 'Unincorporated Non-Agricultural Enterprises' – the latest round of data available on this sector. The data related to a time-point ten years after the Textile Policy 2000 – announcing and initiating important protective measures for the unorganized - and five years after the complete abolition of Multi Fiber Agreement (MFA). Some of the effect of restructuring in search for productivity improvement and export competitiveness - especially following the de-reservation of the garment sector – is expected to have manifested itself by the selected year under study.

Now, NSS 2010-11 data used the term 'marketing agreement' (MA) in its questionnaire schedule[7] to refer to the arrangement of contract work that a smaller firm undertakes for one or more larger units. Firms with or without subcontracting are termed MA/SC firms and NMA/NSC units respectively. Although the agreement commits support in terms of marketing, it retains the provision for independent sales by the smaller subcontracting unit as well. Thus, the unorganized unit with MA can produce exclusively for the parent unit or it can produce independently for its own customer base, or can combine the two options. For a clearer understanding on the impact of such MA contract on firm productivity, we have considered firms operating only within MA mode.

The same data also gives information on the aspects of assistance from the parent unit covered by the agreement. For example, it mentions whether the bigger unit provides support in terms of

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[6] The survey data however does not distinguish between contract works within the unorganized segment or between the smaller unorganized firms and the organized enterprises. Given the higher than average incidence of large-small contract work in the unorganized Indian T&G segment we surmise that much of the linkage categories reported are between organized and unorganized segments.

[7] The term 'contract work' was used in the original report however. In this paper we have used contract, subcontracting, marketing agreement etc. interchangeably (although contract-work and marketing agreement seem to be a broader category than subcontracting – as explained before).

raw-material or technical assistances such as design-specification or plant and machinery, equipment etc. From available literature on the unorganized T&G firms we know that these firms typically suffer from shortage of finance, especially of working capital and hence from lower ability to buy raw-materials. Additionally, these units face the problem of availability of raw material at a reasonable price, in the required quantity and of the desired quality. The other problem that this otherwise generally skilled segment often confronts is in terms of poor connectivity to market and resulting lack of awareness of latest popular designs in demand. In a market characterized by fast-changing tastes and preferences as well as a shift towards more customized production, such isolation from the market poses as an obstacle to performance improvement. The contract works, as surveyed and reported in successive NSS reports also cover these two areas of unorganized firm's subcontracting operation.

Table 1
Different types of Marketing Agreement of Unorganized T & G Enterprises

Support in terms of RM/DA		Design-related assistance (DA)	
		Yes	No
Raw materials (RM)	Yes	2280	600
	No	125	73

Source: Author's Calculation.

To get an idea of the dominant MA types in different segments of the unorganized firms we classified the MA contracts into certain broad categories on the basis of the aspects under coverage. A profile of the agreement types for the unorganized T&G segment as a whole in Table1 shows that most of the MAs involve raw-material support.[8] Some of these cover only raw-material support ('Raw material only' or RMO) and a substantial number of firms receive technical assistance in addition. A few studies has mentioned that designing capability of the producer unit is an important determinant of its bargaining strength *vis-à-vis* the intermediaries and the former's potential earnings (Khasnabis and Nag 2001, for example). Incorporation of design support in MA in such a context is expected to help the MA firm to be placed favourably

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[8] This is true for the unorganized manufacturing sector as a whole. Most of the unorganized producers work with their own equipment on raw material supplied by the bigger unit as per the latter's design specification (NSS 56th and 62nd unit level data on unorganized manufacturing sector & NSSO 2002, 2007).

in the large-small linkage[9] and also to benefit more than in the case when the agreement does not include design-support. Thus, our aim here is to evaluate the extent of design support prevalent in different segments within the unorganized T&G. Accordingly, we classified the entire set of MA firms into four types: MA with RMO, MA with 'Design assistance only' (DAO), MA with RM-Design combination, and others.

The upper-left cell represents firms, which receive both raw material and design, while the other cell in the top row indicates firms with RMO. Relatively lower number of units receives only design-related support. Thus firms getting assistance in terms of raw material and non-design technical help are shifted to the right lower cell as a residual category. This last cell clubbed together two groups of MA firms together – the first group (9 units) receiving raw-material and technical assistance other than design and the second group (64 firms) for which no specific information on coverage-aspects is available.

Segments considered

The heterogeneity referred above can be approached from both demand as well as supply sides. Viewed from the demand side, firms may face different structural constraints based on which product market they are producing for. On the other hand, firm's preparedness in a changed context and its responses when new challenges and new opportunities arise may differ according to respective organizational characteristics. So we have tried to capture the difference in outcome responses for firms categorized across product- groups (and the markets catered by them) by studying segments: garments, power-driven textile units (PDUs) and hand-made textile units (HMUs). The latter two-groups are distinguished by the criterion of power consumption (expenditure on power as a percentage of total output by each production unit). Following NCAER (2009) we treated units spending up to one percent as HMUs and those spending above this as PDUs. And the segments considered by the criterion of organizational type here are OAMEs, NDMEs and DMEs[10] (i.e., firms grouped by enterprise-type – a proxy of size). Thus there are nine segments under study: Garment OAME, Garment NDME, Garment DME, Power-

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[9] While the firms having MA with RMO may have better skill or designing ability, presence of 'Design assistance' in contract agreement may signify some kind of skill-development through MA work.
[10] Own Account Manufacturing Enterprises, Non-Directory Manufacturing Establishments and Directory Manufacturing Establishments respectively;

driven (PDU) Textile OAME, PDU Textile NDME and PDU Textile DME, Handmade (HMU) Textile OAME, HMU Textile NDME and HMU Textile DME.

Following series of cycle-pie charts demonstrates the positional difference of the segments under study with respect to participation in marketing agreement contract and aspects of assistance covered by each contract. We can make the following observations:

(a) for similar organizational types, textile sub-sector experienced a greater participation in MA than garments;

(b) MA participation in garment and HMU textile units is seen to be positively associated with enterprise size; incidence of subcontracting is very low among the garment OAME, which slightly increases in NDME, but the rise is significant in the DME; the rise in MA participation is relatively more uniform among HMU textile units from OAME to NDME and further to DME group; this change across organizational types is not that pronounced in PDU textile segment;

(c) Within textile group MA participation is higher among PDUs than among the HMUs, except for DME; for the latter enterprise-types, PDUs go for independent operation, to a higher extent than HMUs possibly owing to its greater access as supplier to the growing garment segment;

(d) Design assistance is the dominant type of support committed by the large unit in the subcontracting agreement; 'design only' is the dominant mode mainly in textile (especially DMEs among HMUs), but smaller units there have less exposure to this, expressing their higher dependence on outside agents for supply of raw materials;

(e) The coverage type in MA varies perceptibly across organizational types in the textile segment, but remains almost invariant within the garments;

Thus, we find heterogeneous responses in terms of MA participation as it varies across product groups as well as organizational types. More importantly, large-small linkage like subcontracting is increasingly relied upon as appropriate market instruments that can help the 'small' improve its productivity without compromising the market efficiency of the T&G sector as a whole. But the charts here make it clear that relatively smaller units participate less in the mechanism expected to facilitate that improvement. Thus using a proper impact evaluation technique, we need to examine whether the mechanism actually delivers the expected result.