SUBCONTRACTING LINKAGES IN THE INFORMAL ECONOMY IN INDIA:
ANALYSIS AND IMPLICATION FOR INCLUSIVE GROWTH

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Abstract

The International Labour Organization’s (ILO) decent work agenda recognizes ‘employment creation, social protection, rights at work, and social dialogue’ as the key elements for promoting sustained and inclusive growth. However, in spite of more than a decade of high economic growth in India, a vast majority of its workforce continues to subsist as self-employed petty producers in the informal sector, without access to social security and decent jobs. In much of the literature on economic modernization, it is expected that growth will create more employment avenues in the formal sector, as well as better growth opportunities for informal firms, thereby bringing about a formalization of the economic structure. In this regard, the role of subcontracting linkages in facilitating a transition of the traditional informal enterprises into larger and more dynamic modern ones has been recognized in the literature. This paper aims to investigate the nature of the subcontracting linkages in the informal own-account manufacturing enterprises (OAMEs), i.e., the family based petty production units, constituting 85 percent of the Indian informal manufacturing sector (IMS), during the high growth decade of 2000-01–2010-11. To capture how these linkages impact the transformational possibilities of the OAMEs, we construct a variable, the net accumulation fund (NAF) retained by the enterprises, which is a proxy for the firm’s ability to accumulate and grow. We use an endogenous dummy
variable model to find that over the decade, the impact of subcontracting linkages on the average NAF retained by an OAME has been largely negative. This casts a doubt on the role of the linkages in facilitating a transition. Further, we find that linkages for about three-fourth of subcontracted OAMEs are of a ‘putting out’ nature, where the parent firm specifies the design and provides the raw material to the subcontracted enterprise, who, in turn, sells its entire output to the parent firm. There is, however, no transfer of technology or machinery/equipments involved, making the subcontracted enterprise merely an appendage to the parent firm. Further, these put out firms characteristically retain a significantly lower NAF than both the non-put out subcontracted OAMEs and the non-subcontracted OAMEs. The analysis shows that even during the period of high economic growth, the subcontracting linkages have not acted as channels for economic transformation in the IMS. The nature of the linkages that have prevailed in the IMS raises doubts about the role of such linkages in achieving the agenda of decent work and inclusive development in India.

Keywords: Dualism, India, Informal manufacturing, Structural transformation, Subcontracting linkages.

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Section 1: Introduction

In spite of the high economic growth in India over the recent years, the informal sector continues to provide livelihood to a vast majority of the working population. Work in the informal economy has been characterized by a “decent work deficit” due to the prevalence of “poor-quality, unproductive and unremunerative jobs” without adequate social protection (ILO, 2002: 4). Following the strand of dualist theories of economic development (for example, Lewis, 1954; Harris and Todaro, 1970), it is expected in much of the literature that overall economic growth will create more employment avenues in the formal sector, as well as better growth opportunities for the informal firms, thereby moving towards a greater formalization of the economic structure. In this regard, the role of subcontracting linkages (i.e., parent firm outsourcing a part of its production to a contracted firm) in facilitating such a transformation to bring about inclusive development has been widely recognized in the literature (Ranis and Stewart, 1999; Chen, 2006; Arimah, 2001; Meagher, 2013). Ranis and Stewart (1999), in their seminal article, argues that if the formal sector exhibits robust growth and develops stronger subcontracting linkages with the informal sector, there would be an eventual crowding out of the traditional segment of the sector by the dynamic modern segment, which, in turn, becomes formalized over time.¹

However, in India, about 86 percent of the non-agricultural workforce (as of 2010-11) continues to be employed in the informal economy (Mehrotra et al., 2012), in spite of the high economic growth experienced over the past decade (2000-01 to 2010-11). Even within the manufacturing sector, which is crucial for the process of transformation given its strong backward and forward linkages (Storm, 2015), around 69 percent of employment remains to be in the unorganised segment. Moreover, the traditional informal enterprises, or the own account manufacturing enterprises (OAMEs), characterised by the family based household production units, account for almost 85 percent of the total informal manufacturing sector (IMS). Further, over the last decade, the incidence of subcontracting in the IMS fell steeply from around 30 percent to 20 percent, with the fall being more pronounced in the relatively larger, modern, enterprises. This raises questions about whether the role of the subcontracting linkages in facilitating a transformation, as envisaged in the literature, has worked out in the Indian context. In this paper, we analyse the impact of the subcontracting linkages on the possibilities of transformation in the Indian IMS over the past decade of high economic growth, i.e., between 2000-01 and 2010-11. We further explore this issue by analyzing how the nature of these linkages has evolved during this period of economic growth.

The rest of the paper is structured as follows: Section 2 engages with the existing literature to problematize the process of transformation in the informal economy via the subcontracting linkages. Section 3 briefly discusses the definitions and data sources used in our study. To capture this possibility of transformation of the IMS enterprises, we construct a variable, the net accumulation fund (NAF). This is the fund retained by the enterprises that they can use for reinvestment and for

¹
further expansion. The construction of this variable, which is central to our analysis, is discussed in section 4. Section 5 provides a descriptive analysis of the evolution of subcontracting linkages over the period of analysis. In section 6, in order to explore the impact of subcontracting linkages on the possibilities of transformation in the informal sector, we carry out a regression using an endogenous dummy variable model to control for the selection bias. In section 7, we further explore the nature of subcontracting linkages and how they have evolved over the past decade. Finally, section 8 provides a conclusion by highlighting the implications of this analysis for understanding the process of transformation through the subcontracting linkages.

Section 2: Subcontracting linkages as channels of transformation

The dual economy model by Lewis (1954) theoretically conceptualized a developing economy to be structurally distinct from a developed one – a developed economy is seen as homogeneously modern, whereas the developing economy is viewed as dual. This dualism explains the coexistence of a traditional subsistence sector – providing employment to a vast majority of the workforce – with a highly productive formal sector (Gollin, 2014). Development, in this context, entails a transformation of the economic structure of dualism through a transition from a ‘traditional/agricultural/pre-capitalist’ sector to a ‘modern/industrial/capitalist’ sector (Tingor, 2014). Central to this process is a shift in the labour force from the traditional to the modern segment, leading to a withering away of dualism (Gollin, 2014). However, in spite of some significant progress towards industrialization coupled with an extended period of economic growth, the dualism in the Indian economy has remained intact.

Over the last few decades, there was a continued expansion of informal economy in countries undergoing economic transition, such that it soon came to be recognized as a feature of economic transition itself. The downsizing of workers in industrialized economies, decentralization of production and cost-cutting technologies like subcontracting lead to a further growth of informal economy where it was least expected. This burgeoning size of informal workers is often characterized by high degree of vulnerability and decent work deficits (Chen, 2002; ILO, 2002). Over the past couple of decades, India and other developing economies also witnessed an increased informalization of the formal sector jobs (Portes and Schauffler, 1993; Bhattacharya et al, 2013; ILO, 2002). From 2000 onwards, the agenda of the ILO mainly focussed towards promoting “decent work along the entire continuum from the informal to the formal end of the economy, and in development-oriented, poverty reduction-focused and gender-equitable ways” (ILO, 2002:4).

It has been argued in the literature that if the informal firms can become more dynamic and productive over time, it would lead to further accumulation and expansion of the informal firms, as well as generate higher income for the vast workforce that earn their livelihood in the informal sector. This can result in a more inclusive nature of growth (Aryee, 1996; Bangasser, 2000; Wilson, 1998).
In this process, the role of subcontracting linkages in providing access to market, better credit facilities, more productive technology, etc., has been widely recognized in the literature. Such linkages, which are anticipated to grow with higher economic growth, are expected to facilitate a transition of the *traditional* informal enterprises into larger and more dynamic *modern* ones (Ranis and Stewart, 1999; Chen, 2006; Arimah, 2001; Meagher, 2013; Ramaswamy, 1999).

However, as pointed out earlier, in spite of the prolonged period of economic growth in India, not only does IMS still majorly consist of traditional family based household enterprises (85 percent of the IMS), the incidence of subcontracting has remained quite low and has even registered a fall over the decade. Further, this fall has been more pronounced in the urban and *modern* segments of the IMS, rather than in the rural and *traditional* ones (discussed in detail in section 5 below). This raises questions about the role of the linkages in facilitating an economic transition in the IMS in India.

The role of subcontracting linkages has been debated in the literature in terms of two divergent perspectives, the *benign view* and the *exploitation view*. The first strand argues that if a growth in the formal sector propels a high growth in the economy, and if the informal sector – particularly, its *modern* segment – develops stronger linkages with the formal sector, the informal economy will become more dynamic and will be able to generate higher income, leading to a process of inclusive growth (see, e.g., Ranis and Stewart, 1999; Arimah, 2001; House, 1984; Bohme and Thiele, 2014). Complementing this strand, it is further argued that if there is a vertical linkage between the formal sector and the *modern* informal sector, then, with trade liberalization, there would be an increase in employment and wages in the informal firms due to a flow of capital from the formal to the informal sector (Marjit, 2003; Marjit and Maiti, 2006). In the Indian context, Moreno-Monroy et al. (2012) finds evidence that, between 1994-95 and 2005-06, there has been a positive relationship between the incidence of subcontracting by the formal sector and the employment generation in the relatively *modern* segment of the informal sector. However, they did not find such a complementary relation in the context of the traditional segment of the IMS. Similarly, Sundaram et al. (2012) finds evidence that there exists, across industries, a strong positive correlation between the formal and informal parts of each industry in terms of employment generated, output produced and value added. This, they argue, can possibly be explained by the existence of agglomeration externalities and the outsourcing of production activities by the formal sector firms to the informal firms.

In contrast to this strand, the *exploitation view* sees these subcontracting linkages as primarily a cost cutting strategy of the larger or formal sector firms in order to take advantage of low wages in the informal enterprises. This view argues that the parent firm is more likely to subcontract to less productive and smaller informal enterprises to take advantage of the asymmetric bargaining power between the parent and the subcontracted informal firms. Further, such subcontracting linkages generally do not involve a transfer of technology or entrepreneurial capabilities from the parent to the
subcontracted firm. Rather, these linkages are mostly exploitative in nature, which further worsen the economic conditions of the subcontracted enterprises (Tokman, 1978; Moser, 1978; Portes, 1994; Sanyal, 2007; Breman, 2010). In the Indian context, using the National Sample Survey Organization (NSSO) data for unorganized manufacturing sector for various time points over the decade of 2000-01 – 2010-11, several studies find that the non-subcontracted family based IMS enterprises performed better than the subcontracted ones in terms of their productivity and income levels. It is also shown that most of the outsourcing in the Indian IMS is done to the home-based workers, implying an increased informalization of the production process of the larger enterprises. Further, due to an asymmetric bargaining power, absence of proper institutional arrangements, and a lack of investment made by the parent firm in the subcontracted firm, such subcontracting relations remain largely exploitative (Bhattacharya et al, 2013; Sahu, 2010; Raj and Sen, 2016)."\textsuperscript{vii}

However, in a recent work, Basole et al (2015) shows that given the inherent heterogeneity in the Indian IMS, the impact of subcontracting has not been homogeneous. Working with the firm-level NSSO data on the IMS for 2005-06, they find evidence to reconcile both the benign and the exploitative views. On one hand, employing a Heckman selection model, they find that the enterprises which are home-based, poorly endowed (in terms of assets availability) and female-headed are more likely to enter into subcontracting linkages. Also, the productivity per worker in subcontracted enterprises is found to be less than that in the non-subcontracted ones, which is primarily explained by a difference in their respective endowments. Further, using the Oxaca-Blinder decomposition method, they also find that the subcontracting is not beneficial for bigger enterprises, those located in urban areas and those in industrially advanced states. However, on the other hand, using this decomposition they also show that the enterprises which are smaller, located in rural areas, and those in the industrially backward states enjoy a subcontracting premium and, thus, are gaining through this process. They attribute this premium to the subcontracted firms being able to get access to capital, markets and product design through the subcontracting linkages.

While the impact of subcontracting on a firm’s productivity has been debated in the context of the Indian IMS, the role of these subcontracting linkages in facilitating the structural transformation of the IMS has been largely missing in the literature. This is a gap that this paper aims to address. It has been argued in some parts of the literature that the entire informal sector can be seen as structurally distinct from the modern growth-oriented formal sector. In the context of Latin America, it has been noted by the International Labour Organisation’s (ILO) Regional Employment Program (PREALC) that the “‘rationality” of production [in the informal sector is] different from that of the modern capitalist economy. According to this view, the economic goal of informal enterprise is to ensure the survival of the individual and his or her immediate family in contrast to the goal of capitalist enterprise, which is to generate and accumulate profits” (Portes and Schauffler, 1993: 39). However, as discussed above, this structure of dualism can also be found within the Indian IMS, in terms of the
co-existence of both the traditional and modern segments. In this regard, the Indian IMS can be broadly classified into two separate sub-sectors: (i) the survivalist sector (S) that consists of traditional enterprises, or, the OAMEs, i.e., the small scale household enterprises carrying out production without any hired worker, and whose logic of operation mainly revolves around the subsistence needs of the household. For these household enterprises, the economic logic of operation of the firm cannot be separated from that of the household; and (ii) the growth-oriented sector (G), which consists of bigger establishments that are relatively modern, are more productive, and employ at least one hired worker. This is the dynamic segment of the IMS, where the economic logic of operation of the enterprises can, to some extent, be separated from that of the household (Bhattacharya et al, 2013; Bhattacharya, forthcoming; Chakrabarti, 2016; Harris-White, 2014). As shown in Table 2.1 below, there exists a stark difference between this modern and the traditional sector in terms of their average productivities of the enterprises, value of assets and other enterprise characteristics, like its location, registration status, and the gender of head of the enterprises. For example, in 2010-11, the median gross value added (GVA) per worker and the median value of assets per enterprise in the establishments were approximately eight times higher than that in the OAMEs. A transformation of this dualist structure of the economy would entail a dissipation of the modern-traditional dichotomy through a transition of the survivalist enterprises to bigger and more dynamic establishments. Such transition might be possible if the OAMEs are able to retain a significant part of their total value added – denoted by the NAF of the firms, as explained in detail later in Section 4 – enabling them to reinvest, accumulate and grow over time.

Table 2.1: Difference in enterprise characteristics between OAMEs and Establishments

<table>
<thead>
<tr>
<th>Characteristics of the enterprises (2010-11)</th>
<th>OAMEs/ Survivalist enterprises</th>
<th>Establishments/ Growth-oriented enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median GVA/worker (in rupees)</td>
<td>19,016</td>
<td>152,128</td>
</tr>
<tr>
<td>Median value of Assets (in rupees)</td>
<td>30,184</td>
<td>258,602</td>
</tr>
<tr>
<td>Percentage of enterprise located outside household</td>
<td>20.13</td>
<td>74.45</td>
</tr>
<tr>
<td>Percentage of registered enterprise</td>
<td>7.48</td>
<td>47.59</td>
</tr>
<tr>
<td>Percentage of female headed enterprise</td>
<td>45.42</td>
<td>5.23</td>
</tr>
</tbody>
</table>

Note: The status of an enterprise in terms of being located outside the household and being registered is understood in the literature as being relatively modern and favourable characteristics of the enterprise. On the other hand, if it is a female headed enterprise, then it is seen to be an unfavorable characteristic of the enterprise, as it may negatively impact the performance of the enterprise (Monroy-Moreno et al, 2014; Chen, 2006).

In this paper, we explore the role and the impact of the subcontracting linkages in facilitating such a structural transformation over the last decade (2000-01 & 2010-11), i.e., the period of high economic growth in India. For this purpose, we focus our analysis on the OAMEs within the informal sector. We construct the variable, the NAF, which provides a direct measure for – or a proxy for the possibility of – a firm to grow and expand over time. We analyze the impact of subcontracting
linkages on the NAF of the OAMEs over the high growth decade to investigate whether there has been a marked tendency towards a transformation of these traditional household firms into larger and more dynamic enterprises. We further extend our analysis to explore the nature of the subcontracting linkages in terms of relative autonomy or dependence of the subcontracted enterprises, and the evolution of these linkages during this period.

Section 3: Definitional issues and data sources

For this analysis, we use the enterprise level data for the unorganized manufacturing sector for the NSSO survey rounds for 2000-01 (56th round), 2005-06 (62nd round) and 2010-11 (67th round). NSSO defines the “unorganized sector” as comprising of the enterprises that employ less than ten workers if they use electricity, and the enterprises that employ less than twenty workers if they do not use electricity (NSSO, 2012). However, the National Commission for Enterprises in the Unorganized Sector (NCEUS) provides an internationally comparable definition of the informal sector in the Indian context: “The unorganized [informal] sector consists of all unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services operated on a proprietary or partnership basis and with less than ten total workers” (NCEUS, 2007, pp. 48). Since the NSSO dataset includes some relatively large enterprises that may not be household enterprises, for our analysis we exclude the enterprises that do not conform to the NCEUS definition of the informal sector.

Following the NSSO classification, the informal manufacturing enterprises can be divided into three different types: (i) OAMEs, which carry out the production using only unpaid family labor and do not employ any hired worker; (ii) non-directory manufacturing enterprises (NDMEs), which employ one to five workers with at least one regular hired worker; and (iii) directory manufacturing enterprises (DMEs), which employ six to ten workers, with at least one regular hired worker. The NDMEs and DMEs, together, are classified as establishments. As noted earlier, the OAMEs are traditional household enterprises, while the establishments are the relatively modern and dynamic enterprises in the IMS. For the analysis in the paper, we mainly focus on these OAMEs in order to ascertain the possibilities of their transition into the larger and more dynamic enterprises.

NSSO defines subcontracting as an “industrial activity whereby one enterprise (big enterprise/contractor) hires/contracts another enterprise (the smaller enterprise/subcontractor) to produce parts, components, sub-assemblies or assemblies, the product of which is marketed by the contractors or marketed to contractors for further value addition.” (NSSO, 2010-11; emphasis in original). While the NSSO clearly identifies the subcontracted enterprises and the characteristics of these enterprises, it does not identify the parent firm or the contractor to whom the enterprises are subcontracted, other than recognizing them as likely to be “bigger units”.
For the analysis in this paper, all monetary values have been deflated or inflated to 2004-05 price levels, using the GDP deflator for the unorganised manufacturing sector.

**Section 4: The net accumulation fund**

In this section we explain the method of constructing the variable, the net accumulation fund (NAF), which, as has been already mentioned, is a proxy for the possibility of an enterprise to grow and expand over time. The NAF is the fund retained by an enterprise after accounting for various costs, after making payments like wage, rent, and interest, and after setting aside an amount as a consumption fund for the working owners and unpaid family labor of the household running the enterprise. This fund can be used by the enterprise to accumulate, reinvest, and to reproduce itself as a productive firm on an expanded scale. NAF for an enterprise can therefore be represented as:

\[
\text{GVA (i.e., receipts minus expenses)} \text{ minus } (\text{wages paid to the hired workers} + \text{rent} + \text{interest} + \text{amount retained for self consumption of the working owners and the non-hired household workers})
\]

The NSSO provides data on all these variables except for the amount retained by the household enterprises for self consumption of the working owners and the household workers, i.e., the workers who are not formally hired and, therefore, for whom no wage payments are reported. A unique feature of the household enterprises (particularly the OAMEs) is that the spaces of production and consumption within the household cannot be separated – or, in other words, there is an overlap in the production space of the enterprise and the consumption space of the household (Sanyal, 2007; Bhattacharya et al, 2013). Therefore, almost all the fund retained by the enterprise, after making various payments, is the net retained earnings of the household. A part of these retained earnings, however, is necessary to meet the consumption needs of the household workers; the remaining can then be used by the enterprise to reinvest and to carry out expansion if possible. To differentiate between the two funds, i.e., the fund for self consumption and that for reinvestment, we estimate the amount used for self consumption by the family labour (working owner and non-hired household workers) by imputing a pseudo wage for these workers. A detailed discussion on the calculation of this pseudo wage is presented in Appendix A1. The total amount of pseudo-wage for the non-hired workers in a household enterprise gives us an estimate of the consumption fund kept aside by the enterprise. This consumption fund is then deducted from the net retained earnings of the household to get the NAF.

Thus the NAF, which provides a proxy for the enterprise’s ability to expand and possibly transition into larger and more dynamic enterprises, can be calculated as:

\[
\text{NAF} = \text{GVA minus rent minus interest minus wage fund for hired workers minus consumption fund for working owners and non-hired family labour.}
\]
For the Indian IMS, we find that there has remained a huge gap between the average NAF retained by the OAMEs and that by the establishments, providing further credence to the dualist character of the Indian IMS.

**Table 4.1: Median NAF retained by OAMEs and establishments (real annual value in INR)**

<table>
<thead>
<tr>
<th>NAF</th>
<th>OAMEs/ Survivalist enterprises</th>
<th>Establishments/ Growth-oriented enterprises</th>
<th>Difference in NAF (Establishments – OAMEs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>3943</td>
<td>23769</td>
<td>19826</td>
</tr>
<tr>
<td>2005-06</td>
<td>2978</td>
<td>25892</td>
<td>22914</td>
</tr>
<tr>
<td>2010-11</td>
<td>6183</td>
<td>44461</td>
<td>38278</td>
</tr>
</tbody>
</table>

**Section 5: Evolution of the subcontracting linkages**

It is interesting to note that the incidence of subcontracting within the Indian IMS has considerably fallen in spite of high economic growth over the past decade – from approximately 30 percent in 2000-01 to 20 percent in 2010-11. Specifically, as seen in Table 5.1 below, the incidence of subcontracting has fallen from 27.6 percent to 23.7 percent in rural areas (with a slight rise in the first half of the decade) and steadily from 37.8 percent to 15.66 percent in urban areas over the decade. Moreover, the fall has been more pronounced in establishments that are relatively larger and modern than in the OAMEs, as well as in the urban enterprises than in the rural ones.

**Table 5.1: Incidence of subcontracting in rural and urban areas (in percentage terms)**

<table>
<thead>
<tr>
<th>Enterprise type</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAME</td>
<td>28.05</td>
<td>31.25</td>
</tr>
<tr>
<td>NDME</td>
<td>21.67</td>
<td>22.35</td>
</tr>
<tr>
<td>DME</td>
<td>20.95</td>
<td>23.15</td>
</tr>
<tr>
<td>All Enterprises</td>
<td>27.62</td>
<td>30.61</td>
</tr>
</tbody>
</table>

Further, the median and the mean NAF retained by the non-subcontracted OAMEs is much higher than that in the subcontracted ones (refer Table 5.2). For example, in 2010-11 the annual median NAF retained by the non-subcontracted OAMEs was Rs 7652, while that for the subcontracted OAMEs was Rs 3206. Over the decade, this difference in the retained NAF has continued to rise at an accelerated pace. The trend has remained quite similar across almost all the quantiles of the NAF distribution of the OAMEs, as shown in the table below.
Further, we find that a higher proportion of enterprises with relatively unfavorable and weaker characteristics are being subcontracted, compared to those enterprises which have relatively stronger and more favorable characteristics. We classify the enterprise characteristics in terms of the following: (i) whether the enterprise is located within or outside the household – if an enterprise is located outside the household, it is considered to be a favourable characteristic of the enterprise, since it has a separate production space and it is likely to have better access to market linkages; (ii) the value of assets held by an enterprise – since the value of assets is an important indicator of the sustainability and stability of the enterprise; and (iii) the gender of the head of the enterprise – if an enterprise is female-headed, it is considered to be a relatively unfavourable characteristic of the enterprise, since such an enterprise is likely to face increased vulnerabilities given the prevalent socio-economic conditions. These favorable and unfavorable enterprise characteristics have been identified in the literature as important indicators that are likely to impact the performance of IMS enterprises (Monroy-Moreno et al, 2014; Chen, 2006; Raj and Sen, 2016; Basole et al, 2015).

As mentioned above, we find that relative to the subcontracted enterprises, a much higher proportion of non-subcontracted enterprises exhibit these favourable characteristics (Table 5.3). For example, in 2010-11, 24.5 percent of non-subcontracted OAMEs were located outside the household, while merely 5 percent of subcontracted OAMEs were similarly located. Also, in 2010-11, while 38.6 percent of non-subcontracted enterprises were female headed, the corresponding figure for the subcontracted enterprises was 69.2 percent. Moreover, the non-subcontracted OAMEs have a much higher median value of assets per worker than the subcontracted ones, with this difference rising steeply over the decade from Rs 1857 in 2000-01 to Rs 5814 in 2005-06 and Rs 16760 in 2010-11. Thus, the subcontracting linkages in the Indian IMS seem to be more aligned with enterprises exhibiting relatively unfavourable characteristics. This provides further credence to the questions about the role of these linkages in facilitating a transformation of the traditional segment of the informal sector.
Table 5.3: Enterprise characteristics of subcontracted (S) and non-subcontracted (NS) OAMEs

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of Female headed OAMEs</td>
<td>21.49</td>
<td>47.90</td>
<td>30.10</td>
<td>65.01</td>
<td>38.63</td>
<td>69.17</td>
</tr>
<tr>
<td>Percentage of OAMEs located outside the household</td>
<td>28.49</td>
<td>10.36</td>
<td>24.92</td>
<td>7.38</td>
<td>24.45</td>
<td>5.05</td>
</tr>
<tr>
<td>Median value of assets per worker (in INR)</td>
<td>9276</td>
<td>7418</td>
<td>11687</td>
<td>5873</td>
<td>30411</td>
<td>13651</td>
</tr>
</tbody>
</table>

Source: Author’s calculations based on NSSO data

Section 6: Regression analysis

To explore the role of subcontracting linkages on the possibilities of transformation in the Indian IMS, we analyze the impact of subcontracting on the NAF retained by the OAMEs, over the past decade of high economic growth. However, as pointed out by Basole et al (2015), the decision of a firm to enter into a subcontracting relation is not completely random, and therefore a regression framework based on ordinary least squares (OLS) would yield inconsistent estimates due to selection bias. Hence, we employ a selection-corrected endogenous dummy variable model to correct for such biases.

Section 6.1: Empirical model

We employ a treatment evaluation framework to infer the causal impact of the subcontracting status, i.e., the treatment, on the NAF, i.e., the outcome. The treatment evaluation involves estimating the change in potential outcome as the treatment status changes. Here, this implies estimating the change in the average NAF of non-subcontracted enterprise if it were to be subcontracted.

Conceptually, let $Y_i$ be the potential outcome, i.e., the NAF for each enterprise. Let the subcontracting status be the treatment variable: $T_i = 1$ for subcontracted enterprises and $T_i = 0$ for non-subcontracted enterprises. The values of $Y_i$ for the subcontracted and the non-subcontracted enterprises are represented as $Y_i(1)$ and $Y_i(0)$, respectively. The impact of being subcontracted may then be calculated as:

$$D = E(Y_i(1) | T_i = 1) - E(Y_i(0) | T_i = 0)$$

However, a problem in this framework may be that some unobservable factors might impact both the NAF as well as the decision of a firm to enter into a subcontracting linkage, resulting in a selection bias. The selection bias would disappear if either (i) the assignment of the treatment is random (which is generally not satisfied for observational data, as in this case), and/or (ii) if one can assume conditional independence (CI). The conditional independence assumption would imply that “participation in the treatment program does not depend on outcomes, after controlling for the variation in outcomes induced by differences in $X$ [i.e., the control set, or the set of independent

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variables other than the treatment variable” (Cameron and Trivedi, 2005: 863). If $Y_i(1)$ and $Y_i(0)$ are the potential outcomes for treatment and control (non-treated) groups, then CI implies:

$$(Y_i(1), Y_i(0)) \perp T_i | X_i$$

This would imply that the program is based strictly on observed characteristics and that there exists no omitted variable.

However, as pointed out by Basole et al (2015), the subcontracting status is not completely random but is itself a result of demand and supply interactions of subcontracting linkages – hence, (i) does not hold. Using an OLS regression in this case would give rise to a selection bias due to the treatment variable (here, the subcontracting status) being correlated with the error term. Further, this correlation may also exist due to some unobservable factors affecting both the treatment status and the potential outcome, i.e., a case of ‘selection on unobservables’. In this case, (ii), i.e., the CI assumption does not hold.$^{xx}$

So, to empirically model the impact of subcontracting on NAF, we employ a special case of the endogenous treatment effects model – the endogenous treatment regression model (also known as the endogenous dummy variable model) – which does not assume conditional independence. It is a linear potential outcome model, which is fully parametric and assumes a specific correlation structure between the unobservables affecting the treatment and the outcome equations (discussed in detail in endnote xx).$^{xxi}$

Formally, let the potential outcome (here, the NAF retained by the OAMEs) be denoted as $Y_i$ and, as mentioned above, the treatment status (here, the subcontracting status) as $T_i$, which takes value 1 if a firm is subcontracted and 0 if a firm is not subcontracted. Let $T_i^*$ be a latent variable which determines the enterprise’s decision to subcontract, such that:

$$T_i = \begin{cases} 1 & \text{if } T_i^* > 0, \text{ i.e., if the firm is subcontracted} \\ 0 & \text{if } T_i^* \leq 0, \text{ i.e., if the firm is non subcontracted} \end{cases}$$

and

$$T_i^* = Z_i \eta + \epsilon_i, \quad (1)$$

i.e., where $Z_i$ is a ‘$k \times l$’ vector of characteristics which affects the OAME’s assignment into being subcontracted (listed in table 6.2.1) and $\eta$ is a ‘$l \times k$’ vector of parameters, and $\epsilon_i$ is a stochastic unobserved error term. The probabilities of being in a subcontracting relation or not, conditional on the enterprise characteristics (vector $Z_i$), are given, respectively, by:

$$\text{Prob} (T_i = 1|Z_i) = \Phi (Z_i \eta) \quad \text{and} \quad \text{Prob} (T_i = 0|Z_i) = 1 - \Phi (Z_i \eta)$$

The outcome/observation equation is given by:

$$y_i = X_i \beta + T_i \delta + \mu_i, \quad (2)$$

where, $X_i$ is a vector of enterprise characteristics (listed in table 6.2.1). Our coefficient of interest is $\delta$, which captures the impact of subcontracting on the enterprise’s NAF.
The error terms in equations (1) and (2), i.e., $\mu_i$ and $\varepsilon_i$, are assumed to be jointly normally distributed, with mean zero and covariance matrix $\begin{bmatrix} \sigma^2 & \rho \sigma \\ \rho \sigma & 1 \end{bmatrix}$. While the model can be estimated either by a two-step estimation or by a maximum likelihood estimation (MLE), we carry out the latter, as the MLE estimators are more efficient. The log likelihood function, following Maddala (1983) and Greene (2011), can be represented as:

$$\ln L_i = \begin{cases} \left\{ \frac{Z_i Y + (y_i - X_i \beta - \delta) \rho/\sigma}{\sqrt{1 - \rho^2}} \right\} - \frac{1}{2} \left( \frac{y_i - X_i \beta - \delta}{\sigma} \right)^2 - \ln \sqrt{2\pi\sigma} & \text{if } T_i = 1 \\
\left\{ \frac{-Z_i Y - (y_i - X_i \beta) \rho/\sigma}{\sqrt{1 - \rho^2}} \right\} - \frac{1}{2} \left( \frac{y_i - X_i \beta}{\sigma} \right)^2 - \ln \sqrt{2\pi\sigma} & \text{if } T_i = 0 \end{cases}$$

Section 6.2 Identification and assumptions

In our regression, the dependent variable is the log of the net accumulation fund and the treatment variable is the subcontracting dummy. Various enterprise characteristics, which are included in vector $Z$ (of the selection equation) and vector $X$ (of the observation equation), are listed in table 6.2.1 below.

[Table 6.2.1 here]
Table 6.2.1: Variables in the model

<table>
<thead>
<tr>
<th>Variables in vectors $X$ and $Z$</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract dummy</td>
<td>Takes value 1 if the enterprise is subcontracted and 0 otherwise.</td>
</tr>
<tr>
<td>Female headed enterprise dummy</td>
<td>Takes value 1 if enterprise is headed by female and 0 otherwise.</td>
</tr>
<tr>
<td>Log total assets</td>
<td>Continuous variable which is the log of value of total assets held by the firm.</td>
</tr>
<tr>
<td>Sector dummy</td>
<td>Takes value 1 if the enterprise is located in urban area and 0 otherwise.</td>
</tr>
<tr>
<td>Operated more than three Years dummy</td>
<td>Takes value 1 if the enterprise has operated for more than 3 years and 0 otherwise.</td>
</tr>
<tr>
<td>Number of workers</td>
<td>Total number of part time and full time workers in the enterprise including all hired and non-hired workers and the working owners.</td>
</tr>
<tr>
<td>Accounts maintained dummy</td>
<td>Takes value 1 if the enterprise maintains accounts and 0 otherwise.</td>
</tr>
<tr>
<td>Registration dummy</td>
<td>Takes value 1 if the enterprise is registered and 0 otherwise.</td>
</tr>
<tr>
<td>Time dummy 2005-06</td>
<td>Takes value 1 if the data is for the year 2005-06 and 0 otherwise.</td>
</tr>
<tr>
<td>Time dummy 2010-11</td>
<td>Takes value 1 if the data is for the year 2010-11 and 0 otherwise.</td>
</tr>
<tr>
<td>Exclusion restriction: Location dummy</td>
<td>Takes value 1 if enterprise is located outside the household and 0 otherwise.</td>
</tr>
</tbody>
</table>

An important identifying condition in this class of models is an ‘exclusion restriction’, which implies that the explanatory variables in the selection equation (vector $Z$) contains at least one variable that is redundant in the outcome equation, after controlling for other explanatory variables there (vector $X$). In other words, there should exist a variable that affects subcontracting but is redundant in terms of its impact on NAF, after controlling for other explanatory variables in the outcome equation. In case this excluded variable does impact the NAF, it will do so only through other variables in set $X$. As an exclusion restriction, we use dummy for location of the enterprise, i.e., whether the enterprise is located outside or inside the household. This implies that while the dummy
for location of the enterprise impacts the enterprise’s decision to subcontract, the location dummy does not impact an enterprise’s NAF retention capacity, after controlling for all other variables in $X$. \textsuperscript{xxxiv} We justify the use of location dummy as an exclusion restriction through the following argument.

The first part of the argument entails an explanation for inclusion of location variable in the selection equation, i.e., why the location of an enterprise might impact its decision to subcontract. A major hindrance that an enterprise without a permanent structure outside the household (i.e., the enterprises that are located within a household) might face would be in terms of accessibility to market – a constraint that can be relaxed if a firm enters into a subcontracting relation (Basole et al, 2015; Sahu, 2010). This dependence on subcontracting linkages for market access is also evident from the fact that most of the subcontracted enterprises supply their output solely to a contractor – the proportion of such enterprises among the subcontracted firms has risen from 80 percent to 90 percent over the last decade. Moreover, the contractor or parent firm may prefer subcontracting to the enterprises located within the household, as these act as sources of relatively cheap labour due to their low bargaining power (Chen et al, 1999; Mitra, 2014; World Bank, 1995; Kantor, 2005; Basole et al, 2015). This justifies the inclusion of location dummy in the selection equation.

In the second part, we argue why it might be redundant to consider the impact of the location variable on a firm’s net accumulation fund, once we have controlled for all other variables in $X$, i.e., why we might expect that the location might impact the NAF only through the variables that are included in $X$. Therefore, we identify the channels via which location might impact the OAME’s retained NAF.

The first channel is the gender of the head of the enterprise. It is argued in the literature that the female headed enterprises are less likely to grow over time and are more likely to be located within the household. The female headed enterprises perform worse and earn lower returns to investment than the non-female headed ones due to lower human capital and prevalent socio-cultural norms (Chen, 2006; Basole et al, 2015). Moreover, due to such norms, women in Indian IMS are more likely to work from within the households, with few market linkages and network contacts, further inhibiting their chances of growth (Sethuraman, 1998; Edwards and Field-Hendrey, 2002; Rani and Unni, 2009; Chen et al, 1999). We find that, on an average, 31 percent of non-female headed OAMEs and only 4 percent female headed OAMEs were located outside the household during the past decade. Therefore, it can be argued that the gender of the head of the enterprise is an important channel through which the location of an enterprise might impact its NAF.

The second important channel through which location may impact the NAF of an enterprise is the value of assets held by it. The average value of assets held by the enterprises located outside the household is usually much higher than those located within the household (Basole et al, 2015;
Moreno-Monroy et al, 2014). We find that, for the OAMEs, this difference has increased steadily from Rs 53306 in 2000-01, to Rs 72400 in 2005-06, and then, further, to Rs 121596 in 2010-11. Further, the value for assets held by the OAMEs located inside the household is likely to be an overestimation. These OAMEs usually report the value of the land and building of the household out of which they operate as a part of the value of assets of their enterprise. This implies that the difference between the value of assets held by the OAMEs located outside the household and those located inside is likely to be much higher than that reported above. The availability of assets is an important determinant of an enterprise’s performance (Basole et al, 2015; Raj & Sen, 2016). Enterprises with better access to machinery, equipments, permanent structure for operation, etc., are likely to be larger and have higher capacity for accumulation and growth.

The two parts of the argument together justify the use of ‘location of the enterprise’ as a plausible exclusion restriction. Therefore, while location of an enterprise is expected to impact an enterprise’s decision to subcontract, the variable ‘location of an enterprise’ is rendered redundant in the outcome equation, after controlling for the gender of the head of the enterprise and the assets held by the enterprise.

Section 6.3: Regression results and discussion

We now employ the endogenous dummy variable model for this regression analysis. The regressions are carried out on independently pooled cross-section of OAMEs over the following three time points – 2000-01, 2005-05, and 2010-11. In the first regression (Model Specification 1), the variable of interest is the contract dummy, which captures the average impact of subcontracting (endogenous treatment variable) on the OAMEs’ NAF. The second regression (Model Specification 2) introduces time interactions of the contract dummy in order to capture the impact of linkages at each of the three time-points. The results of the regressions – coefficient values and robust standard errors for each variable in vector X and vector Z – and other parameters of the model are listed in Table 6.3.1.

In this analysis, we find that all the covariates are statistically significant at one percent level. The estimated correlation between the treatment assignment error and the outcome errors is 0.67. This positive correlation implies that the unobservables, which tend to increase the enterprise’s NAF retention, are likely to occur with variables that increase the chances of being subcontracted. The likelihood ratio test overwhelmingly rejects the null of no correlation between the treatment and the outcome errors, which further provides credence to the use of an endogenous dummy variable model.

The benefit of participation, i.e., the average treatment effect on the treated (ATET), is given by:

\[ E[y_i|T_i=1] – E[y_i|T_i=0] = \delta + \text{selection term} \]
Our analysis shows that being in a subcontracting relation negatively impacts a firm’s NAF retention capacity. The estimated average treatment effect (ATE) for the subcontracting dummy in Model Specification 1 is -1.563 and it is significant at one percent level, i.e., the subcontracted enterprises, on an average, retain approximately 156 percent lower NAF than a non-subcontracted enterprise, ceteris paribus. Here, the ATET is same as ATE since there is no interaction of the contract dummy with any of the covariates of the outcome equation. Results from Model Specification 2 suggest that in 2000-01 a subcontracted firm, on an average, retained approximately 155.7 percent lower NAF than the non-subcontracted firm. This difference in terms of the NAF retained was slightly lower in 2004-05, but in 2010-11 it was even higher than the 2000-01 level. This suggests that, on an average, not only has the subcontracted enterprise retained a lower NAF than the non-subcontracted enterprise at all the three time-points, this gap has risen over the decade. The ATE for Model Specification 2 is -1.568, i.e., on an average, a subcontracted enterprise retains approximately 156.8 percent lower NAF than non-subcontracted one. The ATET for Model Specification 2 is -1.557, which is quite close to the ATE for this specification, indicating that the average predicted outcome for the entire population is similar to the average predicted outcome for the treated (subcontracted) group.

[Table 6.3.1 here]
Table 6.3.1: Regression analysis: endogenous dummy variable model; Dependent variable log (NAF)

<table>
<thead>
<tr>
<th></th>
<th>Model Specification 1</th>
<th></th>
<th>Model Specification 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Selection equation</td>
<td>Observation equation</td>
<td>Selection equation</td>
<td>Observation equation</td>
</tr>
<tr>
<td>Contract dummy</td>
<td>-</td>
<td>-1.5629***</td>
<td>-</td>
<td>-1.5567***</td>
</tr>
<tr>
<td></td>
<td>(0.0015)</td>
<td>(0.0015)</td>
<td>(0.0015)</td>
<td></td>
</tr>
<tr>
<td>Contract dummy#</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0703***</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>(0.0009)</td>
<td></td>
</tr>
<tr>
<td>Time2005-06</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.1031***</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>(0.0009)</td>
<td></td>
</tr>
<tr>
<td>Location dummy</td>
<td>-0.6008***</td>
<td>-</td>
<td>-0.6012***</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(0.0006)</td>
<td>(0.0006)</td>
<td>(0.0006)</td>
<td></td>
</tr>
<tr>
<td>Log assets</td>
<td>0.6306***</td>
<td>-0.4553***</td>
<td>0.6314***</td>
<td>-0.4555***</td>
</tr>
<tr>
<td></td>
<td>(0.0005)</td>
<td>(0.0006)</td>
<td>(0.0005)</td>
<td>(0.0006)</td>
</tr>
<tr>
<td>Sector dummy</td>
<td>0.1509***</td>
<td>0.3927***</td>
<td>0.1514***</td>
<td>0.389***</td>
</tr>
<tr>
<td></td>
<td>(0.0005)</td>
<td>(0.0005)</td>
<td>(0.0005)</td>
<td>(0.0005)</td>
</tr>
<tr>
<td>Operated more than</td>
<td>0.0762***</td>
<td>0.2085***</td>
<td>0.0753***</td>
<td>0.2145***</td>
</tr>
<tr>
<td>three years dummy</td>
<td>(0.0007)</td>
<td>(0.0006)</td>
<td>(0.0007)</td>
<td>(0.0006)</td>
</tr>
<tr>
<td>Number of workers</td>
<td>0.1403***</td>
<td>0.2712***</td>
<td>0.1402***</td>
<td>0.2716***</td>
</tr>
<tr>
<td></td>
<td>(0.0003)</td>
<td>(0.0003)</td>
<td>(0.0003)</td>
<td>(0.0003)</td>
</tr>
<tr>
<td>Registered dummy</td>
<td>0.1017***</td>
<td>0.2517***</td>
<td>0.1017***</td>
<td>0.2497***</td>
</tr>
<tr>
<td></td>
<td>(0.0010)</td>
<td>(0.0008)</td>
<td>(0.0010)</td>
<td>(0.0008)</td>
</tr>
<tr>
<td>Accounts maintained</td>
<td>0.0005***</td>
<td>0.2217***</td>
<td>-0.0001***</td>
<td>0.2269***</td>
</tr>
<tr>
<td>dummy</td>
<td>(0.0016)</td>
<td>(0.0015)</td>
<td>(0.0016)</td>
<td>(0.0014)</td>
</tr>
<tr>
<td>Time dummy 2005-06</td>
<td>-0.0466***</td>
<td>-0.0504***</td>
<td>-0.0426***</td>
<td>-0.0731***</td>
</tr>
<tr>
<td></td>
<td>(0.0005)</td>
<td>(0.0005)</td>
<td>(0.0005)</td>
<td>(0.0006)</td>
</tr>
<tr>
<td>Time dummy 2010-11</td>
<td>0.2737***</td>
<td>0.3068***</td>
<td>-0.2827***</td>
<td>0.3311***</td>
</tr>
<tr>
<td></td>
<td>(0.0006)</td>
<td>(0.0005)</td>
<td>(0.0006)</td>
<td>(0.0005)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0560***</td>
<td>6.2128***</td>
<td>0.05712***</td>
<td>6.2026***</td>
</tr>
<tr>
<td></td>
<td>(0.0017)</td>
<td>(0.0018)</td>
<td>(0.0017)</td>
<td>(0.0018)</td>
</tr>
</tbody>
</table>

Notes: Dependent variable: Log of the net accumulation fund (NAF). Sample size of the firms for this analysis is 256,203. On applying sampling weights, the estimated population size is 42243363. Robust standard errors in parenthesis. ***significant at 1% level, **significant at 5 % level, * significant at 10% level
From the regression analysis, we find that contrary to the arguments made in the literature, the subcontracting linkages have not acted as channels in facilitating a transition of the OAMEs over the past decade of high economic growth. While, there may exist some subcontracting premium for the relatively traditional or backward segment of the informal sector (Basole et al, 2015), we find that, on an average, the impact of these linkages on the OAMEs’ ability to accumulate and grow over time has remained hugely negative throughout the decade. This opens up the questions about the nature of subcontracting linkages in the Indian IMS, an issue that we explore in the next section.

Section 7: Nature of linkages

Some parts of the recent literature argue that the subcontracting linkages might be beneficial for the contracted firm if these subcontracted enterprises enjoy a relative autonomy in their relation with the parent firms. ILO’s Decent Work Agenda argues that in order to ensure access to inputs, market and credit, there is a need for relative autonomy of the subcontracted informal enterprises (ILO, 2002). Similarly, Kantor et al (2006) contend that more autonomous links with contractors and suppliers are beneficial for the self-employed in terms of ensuring ‘decent work’ for them. Meagher (2013) also argues that autonomous linkages should be developed for informal enterprises in order to reduce the exploitative dependent relations in the outsourcing arrangements.

For our analysis, we divide the survivalist segment (S) of the IMS, i.e., the OAMEs, into non-subcontracted S firms ($S_{NS}$) and subcontracted S firms ($S_s$). We identify the $S_{NS}$ as completely autonomous OAMEs. The $S_s$ enterprises can be further subdivided into (i) relatively autonomous OAMEs ($S'_{aS}$), which are the subcontracted S firms that are not completely dependent on the parent firm, and (ii) non-autonomous OAMEs ($S'_{naS}$), which are the subcontracted S firms that are completely dependent on the parent firm. From our analysis in Section 6, we find that the $S_{NS}$ enterprises have performed much better than the $S_s$ enterprises over the last decade. In this
section, we specifically focus on the S₃ enterprises to explore the nature of the subcontracting linkages and their evolution.

We find that, in the Indian IMS, the subcontracted firms are highly dependent on the parent firms/contractors (Figure 7.1). Almost all the subcontracted OAMEs receive raw materials from the contractor (for 95 percent of the firms), have designs of the products specified by the contractor (for 82 percent to 95 percent of the firms over the decade), and supply their entire produce to the contractor (for 80 percent to 91 percent of the firms). We further see that there has been almost no transfer of technology to the subcontracted firms through these linkages – in fact, the proportion of subcontracted OAMEs having equipments supplied by the contractors has drastically fallen to only about 3 percent by 2010-11. Thus, in these relations, almost all the inputs required for production are provided by the parent firm, while only the labour process is carried out by the subcontracted firms. This implies that cheap supply of labour as an input may be the major incentive for the bigger firms to enter into subcontracting relations. This dominant feature of linkages where all the inputs and requirements for production are provided by the contractor, while the subcontracted firms are required to supply the entire produce to the contractor or the parent firm, makes these subcontracting relations akin to a putting-out system of production. In this system, the subcontracted firm almost loses its identity as an independent production unit, becoming like an extension – or a mere appendage – of the parent firm itself, without formally being part of it. While it remains spatially separated from the parent firm, its autonomy over all important aspects of the production process and its major decision making power is taken over the parent firm.

Figure 7.1: Characteristics of subcontracted OAMEs

We consider the firms that (a) procure raw materials from, (b) have designed specified by, and (c) supply the entire output to the parent firm/contractor as the put-out firms. The parent firms may use the product either as inputs in their own production process or as final output for sale. The subcontracted OAMEs which do not simultaneously satisfy all the three criteria of a put-out firm mentioned above are considered to be autonomous subcontracted enterprises (S₃). We find that
more than three quarters of the subcontracted OAMEs could be characterized as put-out firms during the three time points over the last decade – about 75 percent of the S$_3$ firms in 2000-01, 81 percent in 2005-06, and 76 percent in 2010-11. These put-out enterprises, while being organized around the logic of subsistence of the household, are mainly driven by the parent firms’ economic logic. Given that the parent firms are usually bigger firms (NSSO, 2012), they are likely to be either informal establishments, i.e., firms in the growth-oriented sector (G), or formal sector firms. In such cases the subsistence-driven logic of the survivalist enterprises gets subsumed under the accumulation and growth oriented logic of the parent firms.

In terms of their NAF retention capabilities, we find that the average NAF retained by the non-subcontracted OAMEs (S$_{NS}$) has risen from Rs 8214 to Rs 13354 over the last decade (Figure 7.2). As for the autonomous subcontracted OAMEs (S'$_5$), while the average NAF retained has fallen over the decade, it was higher than that in the non-subcontracted OAMEs during 2000-01 and 2005-06. Finally, in the put-out subcontracted enterprises (S'$_{na}$) – which constitute two-third of the total subcontracted enterprises – the average NAF at the end of the decade remained at almost the same level as in the beginning, with a sharp fall during the middle of the decade. Further, we find that the average NAF retained by a put-out OAME (S'$_{na}$) is significantly lower than that in an S'$_5$ enterprise. For example, in 2010-11, the average NAF retained by the S'$_5$ and S'$_{na}$ enterprises were approximately 1.4 times and 2.5 times higher than that in the S'$_{na}$ enterprises, respectively (Figure 7.2). Thus, even though the put-out enterprises (S'$_{na}$) are aligned with the parent firm’s logic of operation, they retain the lowest NAF among all the OAMEs, including the non-subcontracted, non-autonomous subcontracted (put-out), and autonomously subcontracted OAMEs.

Moreover, in 2000-01 and 2005-06, the autonomous subcontracted OAMEs actually retained a relatively higher NAF than even the non-subcontracted ones. Hence it is possible that the impact of subcontracting on the firm’s retained NAF may not always necessarily be negative as we found in the regression analysis; rather, it may depend on the nature of the subcontracting linkages. However, since a vast majority of the subcontracting linkages in the OAMEs (S$_3$) are of putting-out nature, we find that the overall impact of subcontracting in the Indian IMS has been largely negative. In spite of such negative impact, one of the reasons for these put-out firms to enter into such linkages might be that they may not have the ability to survive outside the contractual relations. It might be so that these enterprises can survive only by aligning themselves with parent firms, which ensures a supply of inputs and an assured access to markets. However, such distress-driven subcontracting relations are very different from the kind of linkages that might facilitate transformation.
The analysis in this section introduces another layer of heterogeneity and complexity to the dualistic understanding of the Indian IMS. We find that, on one hand, the put-out enterprises do not have direct control over the inputs and output of the firm and do not exhibit full autonomy over the production process, i.e., they do not exhibit the characteristics of a fully independent enterprise. On the other hand, like a wage worker, they are contracted to carry out production on behalf of the parent firms, without any control over the inputs, the production process, or the final output, while not even being an internal part of the parent enterprise like a worker. These put-out enterprises appear to have become a hybrid of an enterprise and a worker through the process of subcontracting, as has also been noted by Sanyal (2007).

**Section 8: Conclusion**

It has been argued in the literature that the subcontracting linkages are likely to act as channels to facilitate a transformation of the traditional informal enterprises into the larger modern ones. In this paper, we construct a direct proxy – the net accumulation fund (NAF) of an enterprise – to capture the ability of an enterprise to accumulate and grow over time. Using the NAF, we analyze the impact of subcontracting linkages on the possibilities of transition of IMS enterprises in India, over the past decade of high economic growth (2000-01 – 2010-11). Employing an endogenous dummy variable model, we find that the impact of subcontracting linkages on the NAF retained by the traditional family based OAMEs have been largely negative over the past decade. Thus, even during the high growth period, the subcontracting linkages have not acted as channels for economic transformation in the IMS. We further explore the nature of these subcontracting linkages and find that a dominant characteristic of such linkages has been the lack of autonomy and high dependence of the subcontracted enterprises on the parent firms. Most of the subcontracted OAMEs receive all their inputs from the parent firms and supply their entire output back to them, which is akin to a putting out system. Almost three-fourth of the subcontracted OAMEs in the Indian IMS exhibits this kind of
linkages, transforming them into mere appendages of the parent firms. These put-out enterprises, while being organized around the logic of subsistence of the household, are mainly driven by the parent firms’ economic logic. Such enterprises have retained significantly lower amount of NAF compared to the non-subcontracted and relatively autonomous subcontracted (non put-out) enterprises. For 2000-01 and 2005-06, the autonomous subcontracted OAMEs even retained a relatively higher NAF than the non-subcontracted ones. However, given the prevalence of the putting out nature of subcontracting linkages in the Indian IMS, there remain serious doubts about the role of such linkages in achieving the agenda of decent work and inclusive development in India.
Works cited:


Appendix A1

As is discussed above in section 4, the NAF, which provides a proxy for the enterprise’s ability to expand, can be calculated as:

$$\text{NAF} = \text{GVA} - \text{rent} - \text{interest} - \text{wage fund for hired workers} - \text{consumption fund for working owners and non-hired family labour}.$$  

The NSSO provides data on all these variables except for the fund kept aside by working owners and non-hired family workers for their self consumption. In order to calculate this fund, we assign pseudo wages to all working owners and the non-hired workers. For the establishments which employ at least one hired worker, the average wage per hired worker is assigned as the pseudo wage for all working owners and non-hired workers. This average wage per worker is then multiplied by the number of workers in the establishments to get an estimate of their consumption fund. As for the OAMEs, which do not employ any hired workers, we match the OAMEs to a similar NDME and the average wage per hired worker for such an NDME is assigned as the pseudo wage for the OAME workers. The matching is carried out in terms of four characteristics – gross value added (GVA) per worker (which is the output variable), size of the firm, location/sector (rural or urban) and the industry type (based on 2 digit NIC classification). To carry out this matching, the entire data set is divided into cohorts for each of the three time points (2000-01, 2005-06, and 2010-11). Each cohort contains enterprises belonging to a particular sector and a particular industry, therefore forming 50 cohorts (25 NIC * 2 sectors) for each time point. For each cohort, an OAME is matched with an NDME which hires only one worker and is closest to it in terms of the GVA per worker. The average wage per hired worker for that NDME is assigned as the pseudo wage per worker for these matched OAMEs in a particular cohort. After this preliminary match, all those OAMEs which are not matched to any NDME, they are assigned a pseudo wage by extrapolating/interpolating the pseudo wages of the matched OAMEs on the basis of their GVA per worker. This is done separately for each of the cohort. This pseudo wage per worker is multiplied by the number of workers in OAME to get an estimate of the consumption fund for the OAMEs.
Traditional and modern refer to the distinctions made within the Lewisian literature, mainly by Ranis and Stewart (1999). The modern segment is generally driven mainly by the objective of profit maximization and accumulation as opposed to the traditional segment being mainly driven by the subsistence needs of the households owning these enterprises. These modern enterprises are technologically more advanced, relatively more productive, and use a higher value of assets vis-à-vis their traditional counterparts. Refer to Sanyal (2007), Portes and Schauffler (1993) and Berner et al (2012) for a detailed discussion on different logics (growth versus survival) governing these two types of enterprises.

Much of the early works on economic development engaged, though indirectly, with the possibilities of such modernization and transformation through the theories of big push, the critical minimum effort, and balanced and unbalanced growth, etc (Hayami, 1998).

While some literature understood informal economy as a dynamic sector, others viewed it as an economy of the poor, which absorbed excess labour in the economy. Nevertheless, the possibility of including the informal enterprises into the growth process by an improvement in productivity (along with a subsequent technological advancement) has mainly dominated the mainstream literature on the informal economy. There are only some recent literature, in the Indian context, (Sanyal, 2007; Chakrabarti, 2013; 2016; Bhattacharya, 2010; Harris-White, 2012) which depart from this optimism about the inherent possibility of this dualism withering away with the growth process.

This terminology is used by Basole et al (2015) in order to classify various debates on the role of subcontracting in the informal sector.

This argument has been critiqued in terms of its inability in explaining the mechanism of such capital flow (Siggel, 2010).

Uchikawa (2011) also finds evidence in favour of the positive impact of subcontracting, but he shows that most of this subcontracting is limited to organised sector since the unorganised sector enterprises are not technologically developed enough to take advantages of such linkages.

Sahu (2010) shows that the subcontracted firms face exploitation in terms of low wages, stringent quality controls, delayed payments, and rejection or cancellation of orders. Further, the parent firms do not require them to comply with minimum working requirements or safety regulations.
These survivalist enterprises can also be characterised as petty commodity production units, which are the small scale household firms producing commodities for the market as a way of earning livelihood for the household. Usually, in such enterprises, the production is carried out by unpaid family labour, without employing any hired worker. For further elaboration of this concept, refer to Moser (1978), Gerry (1978), Bernstein (1986), Harris-White (2014).

Refer to Berner et al (2012) for a similar classification of the informal enterprises in terms of survivalist and growth-oriented enterprises.

While it may be argued that it would take longer than a decade for a successful transformation to take place, the focus of this paper is to analyse whether there has been a marked tendency towards such a transformation though the channels of subcontracting, as has been argued in the literature discussed above, during the past decade.

The 56th and 62nd round of NSSO survey only the unorganised manufacturing sector, however, the 67th round extends the survey to all unincorporated non-agricultural enterprises (excluding construction) in India. For the purpose of our analysis we only use the data on the enterprises in the unorganised manufacturing sector from the 67th round.

Formally, the unorganized sector is defined as comprising of: “(i) All manufacturing enterprises except those registered under section 2m(i) and 2m(ii) of Factories Act, 19487 and Bidi and Cigar Workers (conditions of employment) Act, 1966. (ii) All manufacturing enterprises except those run by Government (Central Government, State Governments, Local Bodies) / Public Sector Enterprises” (NSSO report 525, 2008, pp. 8).

We find that for the three time points over the decade, around 95 - 98 percent of the estimated population of the unorganized enterprises from the NSSO surveys – and around 92 - 96 percent of the sample – conform to this internationally comparable NCEUS definition.

Due to the absence of any capital-wage labor relation in the OAMEs, they may be classified as non-capitalist firms, whereas due to the presence of capital-wage labor relations in the establishments, they may be classified as capitalist enterprises. This distinction between the capitalist and noncapitalist firms for classifying the OAMEs and the establishments is made by Bhattacharya et al (2013) and Bhattacharya (2010).

In order to identify the subcontracted enterprises from the NSSO data, we rely on the following survey questions for various NSSO rounds: (a) “Did the enterprise undertake any work on contract basis?” from Schedule 2.2 for 56th and 62nd rounds, and (b) “Whether the enterprise has any prior marketing agreement with other units?” from Schedule 2.3.4 for the 67th round. Both these question capture the inter-firm subcontracting linkages. For both these questions, NSSO provides the
same explanations for the enterprises “working on contract”, i.e., “The enterprises in the unorganised sector are mainly small units. In many cases, the enterprises are seen to be working as per orders from a bigger unit. In such cases, certain conditions are put on the servicing unit by the contractor or master unit. Conditions may pertain to sale of products, supply of raw materials, mode of payment etc.” (NSSO, 2012: p 24; NSSO, 2008: p. 12)

xvi This inability to identify the parent firms and to distinguish between the formal-informal and the informal-informal subcontracting linkages are also recognized by Sundaram et al (2012) and Basole et al (2015).

xvii A similar method to calculate the fund for reinvestment purposes within an enterprise was formulated by Bhattacharya (2010).

xviii Another category of classification can be whether an enterprise is registered or not – if an enterprise is registered, it is considered to be a favorable characteristic. For this category as well, we find that a higher proportion of non-subcontracted enterprises are registered relative to the subcontracted ones. However, a very small proportion of informal enterprises are registered, and the proportion is even smaller for the OAMEs. For example, in 2010-11, approximately 9 percent of the non-subcontracted OAMEs were registered, while this figure was only about 4 percent for the subcontracted OAMEs.

xix The discussion on the endogenous dummy variable model is based on various papers and sections from texts, listed as follows: Heckman (1979), Maddala (1983), Greene (2011), Cameron and Trivdei (2005: sections 16.7 and chapter 23), Woolridge (2010: chapter 21), and Khandekar et al (2010).

xx The CI assumption is a prerequisite for using the treatment effects model, which is another kind of regression model often employed in the literature on treatment evaluation (Khandkar et al, 2010). We, however, are not using this model as the CI assumption does not hold in our case.

xxi Basole et al (2015) use a modified Heckman selection model for their analysis, with two observation equations post selection for both treated and non-treated observations, instead of one observation equation with a treatment dummy. This specification, they argue, dispenses with the conditional independence (CI) assumption and captures a selection on unobservables. We, however, capture the impact of subcontracting on the retained NAF by employing an endogenous treatment regression model which allows for the selection on unobservables using one observation equation. Here, a subcontracting dummy is added as an independent variable to capture the average treatment effect of being subcontracted. For further discussion on this issue, refer to Cameron and Trivedi (2005, sections 16.7 and 25.3.4).
One might be sceptical about the distributional assumption of joint normality of error distributions, which calls the generality of this model into question. While there exists some non-parametric estimators to take care of this problem, they are quite limited in the breadth of models they can accommodate. On the other hand, Klein and Spay model develops a non-parametric approach to deal with this issue, but their results differ very slightly from the results based on the assumption of joint normality of the error terms. There exists some non-parametric or semi-parametric specifications as well, but they are not quite operational. Hence, the empirical literature is dominated by the Heckman model – and its further developments – which assume joint normality (Greene, 2011: 786).

The logarithm of the net accumulation fund controls for extreme variations in the data. But it also restricts the data set to only positive NAF observations. However, the firms with negative NAF would anyway have a very bleak possibility of transitioning into larger and more dynamic enterprises.

Basole et al (2015) also use location dummy as the exclusion restriction in their model to capture impact of subcontracting on productivity of the IMS enterprises.

Bhattacharya et al (2013) also view putting out as a dominant feature of the Indian subcontracted IMS enterprises.

We do not include equipments supplied as one of the characteristics to define dependency of contracted firm on the parent firm, since most of these enterprises do not require equipment to carry out production operation. We find that roughly around 70 percent of the dependent subcontracted enterprises (S_{n=2}) do not use any kind of plants and machinery to carry out production, which is also reflective of the labour intensive nature of the subcontracted work.

The corresponding figures for the subcontracted establishments were between 50 percent and 60 percent over 2000-01 and 2010-11.