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Nature and Pattern of Subcontracting Linkages in the Informal Economy in India: Implications for Possibilities of Economic Transformation

Surbhi Kesar¹

Abstract

Subcontracting linkages are seen in the literature as key channels to facilitate a transformation of the traditional informal enterprises into the larger modern ones and such linkages are expected to grow stronger with economic growth. Using nationally representative survey data for Indian informal manufacturing sector (IMS), focusing on the peak growth decade (2001-11), we examine the nature and pattern of subcontracting linkages in the IMS and interrogate whether these linkages have played the expected role of facilitating a transformation of the IMS. We estimate a fund – net accumulation fund – to capture the accumulation possibilities of informal enterprises and examine the impact of the linkages on the possibility of traditional IMS enterprises to accumulate and transition over time. Using this as our motivation, we characterize the nature of subcontracting linkages, examine their pattern of evolution, and investigate whether the nature is of the dynamic kind that is likely to facilitate a transformation. The subcontracting relations in the Indian IMS predominantly appear to be akin to traditional putting out system with very low possibilities to accumulate. Such putout enterprises can be categorized as a hybrid of a worker and an enterprise, which neither have an autonomy over the production processes nor are fully incorporated within the parent firm as a wage worker. The prevailing nature of the subcontracting linkages appear to be driven by distress and raises doubt on the ability of such linkages to enable the accumulation possibilities of traditional enterprises and facilitate an economic transformation of the IMS.

Keywords: informality, subcontracting, dualism, transformation, manufacturing

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1. Introduction

The informal economy in India continues to provide livelihood to the vast majority of working population in the country. Work in the informal economy is generally characterized by low productivity, low-remuneration, and a lack of 'decent work' conditions (Breman, 2010; Chen, 2012). In much of the dualist theories of economic development, following Lewis (1954), it has been expected that overall economic growth creates more employment avenues in the formal sector, as well as better growth opportunities for the informal firms, which become formalized over time. This process is expected to eventually result in a greater formalization of the economic structure. However, despite the high growth experienced by the Indian economy for a sustained period of more than three decades, which particularly peaked in the 2000s, the dependence of its working population on informality has not undergone much change. This is true for the manufacturing sector as well, which is expected to be the driver of the transformation processes on account of its strong backward and forward linkages (Storm, 2015; Tregenna, 2009).

Subcontracting linkages are expected to be one of the most important channels for facilitating a transition of informal firms into larger, more productive, formal firms, by enabling a better access to markets for the informal firms and facilitating a transfer of technology and entrepreneurial capabilities to them (Moreno-Monroy et al, 2014; Ranis and Stewart, 1999). It has been argued 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 low-productive, subsistence-driven 'traditional' segment of the informal sector by the dynamic 'modern' segment, which, in turn, becomes formalized over time.⁰

However, we find that during the decade of high economic growth in the Indian economy over the 2000s, which marked the peak of the Indian growth experience, the incidence of subcontracting in the informal manufacturing sector (IMS) fell from around 30 per cent (2001) to 20 per cent (2011), with the fall being more pronounced

⁰ 'Traditional' and 'modern' refer to the distinct segments that characterize the dual economic structure in the dualist literature (Lewis, 1954; Ranis and Stewart, 1999). The modern segment is argued to be driven mainly by the objective of profit maximization and accumulation, whereas the traditional segment is mainly driven by the subsistence needs of the households owning the enterprises. The modern enterprises are technologically more advanced, relatively more productive, and use a higher value of assets vis-à-vis their traditional counterparts.

for the relatively larger, modern enterprises (discussed in detail later). Further, the subcontracted firms have a lower average productivity than the non-subcontracted ones throughout the growth decade, with the gap widening over this period.

This raises questions regarding the *nature* of subcontracting linkages in the Indian informal sector, how this nature has evolved with economic growth, and whether the linkages are of the dynamic kind that are likely to facilitate a transition of the informal firms. This paper makes a specific intervention in this respect by examining the evolution of the nature of subcontracting linkages in the Indian IMS over the recent high growth decade in India (2001-2011). We specifically focus on the peak growth period (economic growth in India began to falter from 2015 onwards) given the centrality of the growth process in facilitating a dynamic process of transformation in an economy. This analysis is placed in the broader context of the role of informal sector in the process of transformation of India's economic structure.

The rest of the paper is structured as follows: The next section engages with the existing literature on the nature of subcontracting linkages in the informal sector and its expected role in facilitating a transformation of this sector. The following section briefly discusses the definitions and data used in our study. The next section maps the evolution of the incidence of subcontracting linkages and the characteristics of subcontracted enterprises over the growth decade. We then build upon and extend the existing literature to examine the impact of the linkages on the possibility of the IMS to transition over time. We use this extension to motivate our analysis of the nature of subcontracting linkages that we take up in the rest of the paper. We characterize the nature of these linkages, explore its evolution over the growth period, and examine whether the linkages are of the kind that are likely to facilitate a transformation. The final section concludes the paper by highlighting the distress-driven nature of the subcontracting linkages in the Indian informal sector, which is starkly distinct from the dynamic kind that is likely to facilitate a transformation of the traditional informal enterprises into larger modern ones.

2. Subcontracting Linkages and Economic Transformation

Following Lewis (1954), a less developed economy is often characterized by a dual economic structure that manifests itself in terms of the coexistence of a large

traditional subsistence-driven non-capitalist sector, which provides employment to a vast majority of workforce, and a relatively smaller modern productive formal capitalist sector (Gollin, 2014). In this context, development is often visualized as a transformation of such a dual economy into a homogeneously modern one through a transition of the traditional / pre-capitalist / informal sector into a modern / capitalist / formal sector with economic growth, along the lines of the advanced capitalist economies (Gollin, 2014; La Porta and Shleifer, 2014; Tignor, 2004).

The Indian economy, with about 80 percent of its entire workforce, being employed in the informal economy, comprising both informal enterprises and informal wage workers, is often viewed as a classic example of such a dual economy (Basole, 2022; CSE, 2018). There have been long standing debates in the literature on the characterization of the informal economy and its relationship with the growth process. In some parts of the mainstream literature, informal sector is seen as comprising dynamic, micro-entrepreneurial, risk-taking enterprises that can act as drivers of the growth process (De Soto, 1989; Maloney, 2004). Other parts of the literature view the informal economy as distress-driven and backward in nature that absorbs the excess labor force in the economy (Chen and Carré; CSE, 2018). However, both these contending views argue that in the presence of economic growth the productivity and scale of the informal firms can be enhanced, and their transition to larger, formal firms facilitated, by institutionalizing measures such as enabling technology transfer and skills to the informal firms, improving their credit access, and integrating them with the larger, formal firms via subcontracting linkages, etc. (Muralidharan, et al., 2021; Khan, 2019). A distinct and recent strand, following Sanyal (2007), while also characterizing the informal economy to be low productive and distress driven, view it as being governed primarily by a logic of subsistence that is starkly different from a logic of accumulation that drives the formal, capitalist enterprises. Moreover, persistence of informality is seen precisely as an outcome of the contemporary growth process rather than due to a lack of it (Bhattacharya, 2017; Bhattacharya and Kesar, 2020; Chakrabarti, 2016).⁰

However, it has also been noted in the literature that the informal economy in India cannot be characterized to be a homogenous formation (Fields, 1990; Ghose, 2006;

⁰ Sanyal (2007) characterizes the informal sector as the non-capitalist segment, comprising petty commodity production and trading enterprises that organise production using family labour and the enterprise dynamics are embedded within in the household dynamics.

Kesar, 2020). One can identify an economic dualism even within the Indian informal manufacturing sector (IMS) between a traditional segment and a modern segment. The traditional segment comprises the own-account manufacturing enterprises (OAMEs), which are typically low-productive non-capitalist petty-commodity production units that carry out production using only unpaid family labor *without* any hired worker. The modern segment is comprised of the establishments, which are the small-scale capitalist enterprises that are relatively more dynamic, are micro-entrepreneurial in nature, and employ at least one hired worker.⁰ There exists a stark difference between these modern (establishments) and traditional (OAMEs) segments in terms of their average productivities, value of assets, location and access to market, and other enterprise characteristics (Bhattacharya and Kesar, 2018; 2020; Kesar and Bhattacharya, 2020). For example, data from the National Sample Survey Organisation data on unincorporated enterprises in India suggests that the median gross value added (GVA) per enterprise for the establishments in the IMS in 2010-11 was almost eight times higher than that for the OAMEs. Such OAMEs comprise an over-whelming 85 per cent of the IMS, while the establishments comprise the remaining 15 per cent. Studies also find that over the peak growth decade, the economic dualism between these two segments of the IMS has become even more entrenched (ibid).

A dilution of such a dualism is possible if enterprises in the traditional segment of the informal sector are able to grow and transition into more dynamic and productive modern enterprises. The role of subcontracting linkages in facilitating such a transition by providing access to market, better credit facilities, more productive technology, etc., has been widely recognized in the literature. Moreover, such

⁰ The capitalist and non-capitalist enterprises are distinguished in terms of presence or absence of capital-wage labour relationship within the enterprises and the economic logic that governs the enterprises. OAMEs are usually subsistence-driven enterprises that are unable to retain sufficient funds for accumulation and further expansion, whereas establishments are able to retain such funds for accumulation, albeit at a small scale (Bhattacharya and Kesar, 2018; 2020). Furthermore, while, for the OAMEs, the economic logic of the enterprise and the consumption logic of the household owning the enterprise are enmeshed together and cannot be strictly separated, for the establishments, the economic logic of operation of the enterprises, can, to some extent, be separated from that of the household that owns the enterprise (see Berner et al, 2012; Bhattacharya et al, 2013; Chakrabarti, 2016; Harriss-White, 2014; Moser, 1978; Sanyal, 2007 for a characterization of dualism between the traditional and modern economic spaces).

linkages are often anticipated to grow stronger with higher economic growth (Arimah, 2001; Chen, 2006; Meagher, 2013; Ranis and Stewart, 1999).

This view, which has been characterized as the 'benign' view by Basole et al (2015), argues that if there is high growth in the formal sector, and if the informal sector – particularly, its modern segment – has stronger linkages with the formal sector, the informal enterprises will be able to grow and generate higher income (Arimah, 2001; Böhme and Thiele, 2014; House, 1984; Ranis and Stewart, 1999). It has also been argued that if there are vertical linkages between the formal sector and the modern informal sector, then, with trade liberalization, there will 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 et al, 2004; Marjit and Maiti, 2006).⁰ In the Indian context, some studies find evidence of a positive relationship between the incidence of subcontracting by the formal sector and employment generation in the relatively 'modern' segment of the informal sector (Moreno-Monroy et al, 2014), while others find a complementary relationship between formal and informal parts of the industry that can be explained on the basis of the agglomeration externalities and production outsourcing by formal sector firms (Sundaram et al, 2012).⁰

In contrast to the benign view, 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 in order 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 (Breman, 2010; Moser, 1978; Portes, 1994; Sanyal, 2007; Tokman, 1978). In the Indian context, some studies, exploring specific cross-sections of data during the peak growth decade, find that the non-

⁰ This argument has been critiqued in terms of its inability to explain the mechanism of such capital flow (Siggel, 2010).

⁰ Uchikawa (2011) also finds evidence in favour of the positive impact of subcontracting, but it 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.

subcontracted family-based IMS enterprises have performed better than the subcontracted ones in terms of their productivity and earnings (Basole et al, 2015; Bhattacharya et al, 2013; Raj and Sen, 2016; Sahu, 2010). Indeed, some works also find that enterprises in the Indian IMS bearing characteristics that are associated with lower productivity, such as being home-based, poorly endowed (in terms of assets availability), and female-headed, are more likely to enter subcontracting (Basole et al, 2015).

However, given the heterogeneity in the Indian IMS, Basole et al (2015) also find a heterogeneity in the impact of subcontracting, and find evidence for reconciling both the benign and the exploitation views. While they find that the subcontracted firms have a lower productivity per worker, face a significant gender penalty, and have relatively worse enterprise characteristics than the non-subcontracted firms (which explains much of the difference in productivity between the subcontracted and non-subcontracted enterprises), the returns to these enterprise characteristics are higher for subcontracted firms than the non-subcontracted ones. In other words, they find that the firms enjoy a subcontracting 'premium', although the magnitude of the premium is quite small and not homogenous. They argue that subcontracting is not beneficial for bigger enterprises, for those located in urban areas and for those in industrially advanced states, while the enterprises that are smaller, located in rural areas, and those in the industrially backward states enjoy a subcontracting premium and have gained through this process.

The discussion above suggests that, on one hand, when analyzed at specific time points over the decade, the subcontracted firms in the Indian IMS performed worse than the non-subcontracted ones in terms of their average productivities, while, on the other hand, the *impact* of subcontracting on a firm's productivity has been debatable and varies according to firm characteristics. However, this literature does not directly engage with two specific issues that are of particular interest for this intervention. First, the question of the *nature* of subcontracting linkages in the IMS that may explain why subcontracted enterprises perform worse than the non-subcontracted ones and whether the linkages exhibit the dynamism that is likely to facilitate a transition of the IMS remains under-researched. Second, it does not connect the role of these linkages with the debate on dualism and structural transformation.

An investigation into the *nature* of linkages will be the main focus of this work. However, to motivate our analysis on the nature of linkages, we briefly examine whether these linkages have played the expected role of facilitating a transformation of the IMS. While some of the works summarized above, particularly Basole et al (2015), are important interventions in this respect, they remain inadequate for two reasons. First, these studies provide a static analysis at one point in time that may be insufficient to analyze the possibilities of transformation of informal sector with growth. Second, the use of GVA as a proxy for firm's growth potential might not be entirely appropriate. The GVA of family-based informal enterprise comprises two parts: one, the amount that *can* be used by the firm to re-invest and grow, and two, the amount that is retained for the self-consumption of family workers working in the enterprise. Therefore, to capture the informal firm's growth potential, this amount retained for self-consumption needs to be additionally deducted from the value added. We account for this and construct a variable Net Accumulation fund (NAF) that provides a more direct proxy for the ability of the firm to re-invest and grow (discussed in detail in the next section). We use the NAF, instead of the GVA, to examine how the tendencies of subcontracted firms in the Indian IMS to grow and transition have evolved over the peak high growth decade. We take this up in Section IV, and then use this to motivate our analysis on the nature of linkages.

In the next section, we briefly outline the data and definitions used in the work and outline the construction of NAF, which will be a main variable of interest in this work.

3. Data and Definitions

For the analysis, we use enterprise level data for the unorganized manufacturing sector from National Sample Survey Organisation (NSSO) survey rounds for 2000-01 (56th round), 2005-06 (62nd round) and 2010-11 (67th round). We use the internationally comparable definition of the informal sector provided by the National Commission for Enterprises in the Unorganized Sector (NCEUS) 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, p. 48). 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.⁰

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, 2012; emphasis in original).

For the analysis, all monetary values have been deflated or inflated to 2004-05 price levels, using the GDP deflator for the unorganized manufacturing sector. Further, for estimations based on the sample data, we apply the sampling weights provided by the NSSO.

Next, following Bhattacharya (2017) and Kesar and Bhattacharya (2020), we construct the variable, the net accumulation fund (NAF), which, as mentioned above, is a proxy for enterprise’s ability to grow and expand over time. 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:

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

The NSSO provides data on all these variables except the amount retained by the household enterprises for consumption by the working owners and the family labour, i.e., the workers who are not formally hired and, therefore, for whom no wage payments are reported. This implies that for the informal sector enterprises, especially the OAMEs, that mainly operate with working owner and family labour, NAF cannot be directly obtained from the data. Instead, the consumption fund set

⁰ We find that for the three time points over the decade, around 95 - 98 per cent of estimated population (or around 92 - 96 per cent of the sample) of unorganized enterprises from the NSSO surveys conform to the NCEUS definition.

aside for the working owners and family workers needs to be additionally estimated. However, this estimation is not a straightforward one. A unique feature of the household enterprises (particularly the OAMEs) is an overlap in the production space of the enterprise and the consumption space of the household (Bhattacharya et al, 2013; Sanyal, 2007). Given this overlap, the amount retained for consumption by the household workers and that for re-investment in the enterprise cannot be strictly delineated. In other words, the entire fund retained by the enterprise, after making various explicit payments is the net earnings retained by the household. These earnings comprise both the consumption fund for the working owners and unpaid family workers and the fund for reinvestment in the enterprise for possible expansion, and the household can use this amount to augment consumption or to reinvest in varying proportions. Here, to get a potential estimate of the consumption fund, we impute for the family labour and working owners a pseudo wage based on the wages earned by the wage workers working in a 'similar' enterprise that hires wage workers. This imputed wage can be viewed as a return for the work undertaken by the family labour in the household enterprise that the enterprise would have needed to pay as wages if the family workers were hired as wage workers.⁰ A detailed discussion on the calculation of this pseudo wage is presented in Appendix A.1. The total amount of pseudo-wage for the working owner and the non-hired family workers in a household enterprise gives us an estimate of the consumption fund. This consumption fund is then deducted from the net retained earnings of the household to estimate the NAF.⁰ Unlike GVA, which is an overestimation of the informal firm's possibilities to grow, NAF provides a direct proxy for enterprise's ability to expand and possibly transition into larger and more dynamic enterprises.

⁰ We are interested in estimating the amount that the enterprise *can potentially retain* for accumulation after keeping aside the fund for self-consumption of working owners and family labour. This amount can, in reality, be higher or lower than what we calculate. However, we estimate the benchmark based on what the enterprise can retain if they were to pay wages to family labour if they were working in the enterprise as a wage worker. We expect this to be an underestimation of the consumption fund (and hence an over-estimation of the NAF), since estimates based on the nationally representative India Human Development Survey data suggests that, on average, households deriving their primary income from self-employed enterprises is higher than those deriving their primary income from informal wage work (Kesar, 2020). This, as we see later, only makes our results stronger.

⁰ For an enterprise that operates employing only wage workers this issue of delineating consumption and accumulation fund does not arise. For them, the amount left after paying the explicit payments, which includes wages, can be used as accumulation fund (or net profit) of the enterprise since no additional amount needs to be deducted for self-consumption of family labor.

In the following section, we briefly describe the evolution of the subcontracting linkages in the IMS over the decade of high economic growth and, using the NAF, study their role in facilitating a transition of the traditional segments of the IMS. We use this to motivate our analysis of the nature of the linkages.

4. Transformative Potential of the Subcontracting Linkages

4.1 Evolution of subcontracting linkages

As noted above, the incidence of subcontracting within the Indian informal manufacturing sector (IMS) has considerably fallen despite high economic growth over the period of analysis – from 28 per cent in 2000-01 to 24 per cent in 2010-11 in rural areas and from 38 per cent to 16 per cent in urban areas (Table 1). Moreover, the fall has been more pronounced in (modern, capitalist) establishments than in (traditional, non-capitalist) OAMEs, and in urban enterprises than the rural ones.

[Table 1]

Further, we find that a higher proportion of OAMEs associated with relatively unfavorable and weaker characteristics are entering into subcontracting relations, compared to those enterprises that have relatively stronger and more favorable characteristics. Characteristics such as being located outside the household (which provides better access to markets), being headed by a male (given the broader patriarchal socio-cultural structure), and having more assets are understood in the literature as more favorable characteristics of an enterprise and are associated with a higher GVA (Basole et al, 2015; Chen, 2006; Monroy-Moreno et al, 2014; Raj and Sen, 2016; Sethuraman, 1998). We find that in 2010-11, 24.5 per cent of non-subcontracted OAMEs were located outside the household, while merely 5 per cent of subcontracted OAMEs were similarly located (Table 2). Further, while 38.6 per cent of non-subcontracted enterprises were female headed, the corresponding figure for the subcontracted enterprises was 69.2 per cent. 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 INR

1,857 (USD 165) in 2000-01 to INR 5,814 (USD 518) in 2005-06, and to INR 16,760 (USD 1,492) in 2010-11.⁰

[Table 2]

4.2 Subcontracting linkages and possibility of transition

We compare the NAF of the subcontracted and non-subcontracted firms over the peak growth decade and find that the median and the mean NAF of the non-subcontracted OAMEs are much higher than that of the subcontracted ones (Table 3). For example, in 2010 11, the annual average NAF of the non-subcontracted OAMEs is INR 13,554 (or USD 1,207 approximately), while that of the subcontracted OAMEs is INR 5,979 (or USD 532 approximately). Further, over the decade, this difference in the NAF has continued to rise at an accelerated pace. The trend has been similar across the quartiles of the NAF distribution of the OAMEs (Table 3).

[Table 3]

This shows that the subcontracted firms have lagged further behind the non-subcontracted firms during the growth period and indicates that subcontracted firms have a lower ability to grow and possibly transition than the non-subcontracted ones.

To further explore these differentials possibilities to transition over time, we briefly study the evolution of the NAF controlling for other enterprise characteristics over the entire decade of peak growth (2001 – 2011) and use this exercise to motivate our analysis on the nature of linkages. Given that the decision of a firm to enter into a subcontracting relation is not completely random, a regression framework based on ordinary least squares (OLS) to estimate the impact of the linkages could suffer from potential selection bias and yield inconsistent estimates (see Heckman, 1979). Following Basole et al (2015) – that examines the impact of linkages on GVA for a single time point (2005-06) – we employ an endogenous treatment regression model to infer the impact of the subcontracting status, i.e., the treatment, on the NAF of the OAMEs, i.e., the outcome, over the growth decade, and use *location of the enterprise* (i.e., whether the enterprise is located outside or inside the household) as

⁰ All values are reported in Indian Rupees (INR) unless stated otherwise. For reference, the average currency conversion rate at PPP (INR/USD) for the years 2004 and 2005 was INR 11.23 (11.171 for 2004 and 11.282 for 2005) (OECD, 2017). We use this conversion rate for all INR to USD conversions in the text.

the exclusion restriction. This restriction implies that while the dummy for location of the enterprise impacts the enterprise's decision to subcontract, it does not impact an enterprise's NAF retention capacity after controlling for other variables. Other enterprise characteristics that are included as control variables include gender of the head of the enterprise, log of total value of assets held by the enterprise, sector (rural / urban) where the enterprise is based, whether the enterprise has been operational for more / less than three years, number of workers in the enterprise, registration status of the enterprise, whether enterprise maintains accounts, and time controls. The model is estimated using a Maximum Likelihood Estimation.⁰

Basole et al (2015) justify the use of this exclusion restriction by arguing that while location directly impacts the decision to contract, its impact on the performance (GVA or NAF) of the firm happens only through other channels that are controlled for. To justify this, they argue that, on one hand, location of an enterprise impacts the firms' decision to subcontract by providing better access to markets, which might be a constraint for enterprises that are located *within* a household. On the other hand, location of the enterprise affects the performance of the enterprise via two channels that are added as controls: the gender of the head of the enterprise and the asset of the enterprise. 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 (Amuedo-Dorantes, 2004; Sethuraman, 1998). 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 the growth of the enterprise. Similarly, the enterprises with higher value of

⁰ Let the potential outcome (here, the NAF retained by the OAMEs) be denoted as Y_i and 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:

$$T_i = \begin{cases} 1 & \text{if } T_i^* > 0, \text{ i.e., if the firm is subcontracted} \\ 0 & \text{if } T_i^* \leq 0, \text{ i.e., if the firm is not subcontracted} \end{cases}$$

$$\text{and, } T_i^* = \mathbf{Z}_i \boldsymbol{\gamma} + \varepsilon_i, \quad (1)$$

i.e., where \mathbf{Z}_i is a ' $k - 1$ ' vector of characteristics which affects the OAME's assignment into being subcontracted and $\boldsymbol{\gamma}$ is a ' $1 - k$ ' vector of parameters, and ε_i is a stochastic unobserved error term. The probabilities of being in a subcontracting relation or not, conditional on the enterprise characteristics (vector \mathbf{Z}), are given, respectively, by: $\text{Prob}(T_i = 1 | \mathbf{Z}) = \frac{\Phi(\mathbf{Z}_i \boldsymbol{\gamma})}{1 + \Phi(\mathbf{Z}_i \boldsymbol{\gamma})}$ and $\text{Prob}(T_i = 0 | \mathbf{Z}) = 1 - \frac{\Phi(\mathbf{Z}_i \boldsymbol{\gamma})}{1 + \Phi(\mathbf{Z}_i \boldsymbol{\gamma})}$

$$\text{The outcome equation is given by: } y_i = \mathbf{X}_i \boldsymbol{\beta} + T_i \delta + \mu_i, \quad (2)$$

where, \mathbf{X}_i is a vector of enterprise characteristics. Our coefficient of interest is δ , which captures the impact of subcontracting on the OAME's NAF

assets are able to perform better due to higher capital intensity and worker productivity, and the Indian IMS enterprises located outside the households have a much higher value of the assets than the ones located within (Basole et al, 2015). Therefore, once the gender of the head of the enterprise and the assets held by the enterprise are controlled, the location of an enterprise does not directly impact the performance of the enterprise in the outcome equation. It can, however, be argued that this exclusion restriction might not be very robust if location impacts performance via channels that are not controlled for. However, the available data does not allow for a more suitable exclusion restriction than location of the firm. While we recognize this issue, we do not develop it here as this is not the focus of our paper. We rather use this exercise to provide a better sense of how the subcontracted firms have performed in their ability to retain NAF vis-à-vis the non-subcontracted ones during the peak growth decade. We use this to motivate our analysis of the nature the linkages in the following sections.

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 Model Specification 1, the variable of interest is the contract dummy, which captures the average impact of subcontracting on the OAMEs' NAF. 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 clustered standard errors for each variable – and other parameters of the model are reported in Table 4.

[Table 4]

The analysis shows that being in a subcontracting relation negatively impacts a firm's NAF. The estimated average treatment effect (ATE) for the subcontracting dummy – our variable of interest – in Model Specification 1 is -1.563 and it is significant at one per cent level, i.e., the subcontracted enterprises, on an average, retain 79 per cent (or, $100 * [\exp(-1.563) - 1]$) lower NAF than a non-subcontracted enterprise, ceteris paribus. Results from Model Specification 2 suggest that in 2000-01, a subcontracted firm, on an average, retained 78.9 per cent (or, $100 * [\exp(-$

1.557) – 1]) *lower* NAF than the non-subcontracted firm, *ceteris paribus*, without there being any significant change over the subsequent time points.⁰

The analysis developed in this section (based on both the descriptive statistics and the regression exercise) shows that the subcontracted firms in the IMS have continuously lagged behind the non-subcontracted ones in their ability to retain NAF, and, consequently, their possibility to transition into larger enterprises, even during the peak period of high economic growth. This leads us to examine the *nature* of subcontracting linkages in the IMS, its evolution over the high growth decade, and its possible role in facilitating a transition of the ‘traditional’ informal enterprises. We explore these issues in the next sections.

5. Characterizing the Nature of Subcontracting Linkages

Studies argue that subcontracting linkages might be beneficial for informal subcontracted firms if these enterprises have relative *autonomy* in their relationship with parent firms. Such autonomous linkages may ensure that subcontracted enterprises have better access to inputs, markets, and credit (ILO, 2002; Kantor et al, 2006); might lead to ‘decent work’ conditions for the self-employed (*ibid*); and reduce possibilities of exploitative dependent relationship between the parent and the subcontracted firms (Meagher, 2013). It has also been argued that subcontracted enterprises might grow better if they are a part of networks that allow them to strategically participate in the decision-making process (Sacchetti and Sugden, 2003).

The analysis in the previous section shows that over the peak growth decade, the subcontracted OAMEs had less possibility to grow and transition over time than the non-subcontracted ones. While the non-subcontracted OAMEs may be categorized as completely autonomous enterprises, for the subcontracted OAMEs the degree of autonomy may vary depending on the nature of their linkages with parent firms / contractors. We focus on the latter to examine the characteristics of subcontracting

⁰ We run another set of specification to control for state and industry level heterogeneities and find that results are quite similar. We find that the estimated ATE for the subcontracting dummy is -1.402 and it is significant at one per cent level, i.e., the subcontracted enterprises, on an average, retain approximately 75.4 per cent (or, $100 * [\exp(-1.402) - 1]$) lower NAF than a non-subcontracted enterprise, *ceteris paribus*. These results are not reported in the text but are available upon request.

linkages in the Indian IMS in terms of the degree of their autonomy or dependence, and how this dependence has changed during the growth decade.

We find that over the decade subcontracted firms have remained highly dependent on parent firms/contractors (Figure 1). Almost all subcontracted OAMEs receive raw materials from contractors (for 95 per cent of such firms), have designs of the products specified by contractors (for 83 per cent to 95 per cent of the firms over the decade), and supply their entire produce to contractors (for 82 per cent to 92 per cent of the firms). Notably, transfer of technology to subcontracted firms through these linkages has been negligible – in fact, the proportion of subcontracted OAMEs having equipment supplied by contractors has drastically fallen from 10 per cent in 2000-01 to only about 3 per cent by 2010-11 (with an increase during the middle of the decade). In fact, most OAMEs do not use any hired tools and machinery, with about 96 per cent of OAMEs only using their own tools.

Thus, in such subcontracting relations, almost all variable inputs required for production are provided by parent firms, while production and labor processes are carried out by subcontracted firms. Dependence on home-based tools does not result in an upgrading of the subcontracted firm's technology, though it keeps the cost of operation low. Under such circumstances, access to household tools and other resources without any cost, along with availability of unwaged family labour that works in the household enterprises, subsidize the costs for the parent enterprise and are likely to be the major incentive for bigger firms to enter subcontracting relations.

[Figure 1]

This dominant feature of linkages where raw materials are provided by the contractor, while subcontracted firms supply the *entire* produce to parent firms / contractors, make these subcontracting relations akin to a *putting-out* system.⁰ In this system, the subcontracted firm loses its identity as an independent production unit, becoming more like an extension – almost a mere appendage – of the parent firm, without formally being part of it. While the subcontracted firm remains spatially separated from the parent firm, its autonomy over important aspects of the production process (such as quantity of output, design of the product, raw materials

⁰ See Bhattacharya et al (2013) and Basu and Basole (2011) for discussions on putting out arrangements in the Indian IMS.

to be used) are taken over by the parent firm. Given that in our data the parent firms are identified to be “bigger firms”, they are likely to be either informal establishments, i.e., firms in the relatively ‘modern’ segment of the IMS, or formal sector firms. In such cases, the subsistence-driven logic of the ‘traditional’ enterprises (Harris-White, 2014; Sanyal, 2017) gets subsumed under the accumulation and growth-oriented logic of the parent firms.⁰

In the following analysis, we characterize firms that (a) procure raw materials from, (b) have designs specified by, and (c) supply entire output to parent firms / contractors as putout firms.⁰ Parent firms may use the supplied output either as inputs in their own production processes or as final output for sale. We consider those subcontracted OAMEs that do not *simultaneously* satisfy all three criteria of a put-out firm mentioned above as relatively autonomous (non-putout) subcontracted OAMEs. We find that more than three-fourth of the subcontracted enterprises can be characterized as operating under putting-out relations (Figure 2).

[Figure 2]

These putout firms also seem to display other forms of longer-term dependence on parent firms / contractors. Putout firms are more likely than non-putout firms to supply to a *single* contractor, as well as to the *same* contractor for a relatively long period of time. For example, as of 2010-11, while 72 per cent of putout firms supplied to the same unit for the previous three years and 70 per cent supplied only to a

⁰ The critical literature has debated whether the informal firm can be characterized as having its independent autonomous non-capitalist economic logic, or as having some autonomy in the production process while being mainly geared towards satisfying the economic needs of the capitalist segment, or as being completely non-autonomous and subsumed under capital through exchange relations (Bhattacharya, 2014; Harris-White, 2014, 2014). We, however, following Bhattacharya and Kesar (2020) and Kesar et al (2022) cognize the heterogeneity in the informal sector and characterize the different kinds of informal enterprises as follows: (a) independent family-based petty commodity production and trade units that are governed by an autonomous economic logic and are not integrated in the productive circuit of the capitalist enterprises, (b) subcontracted enterprises that while being integrated with the productive circuit of the parent capitalist enterprise via, say, subcontracting linkages, retain some autonomy over the production and sale of the product, and (c) putout subcontracted enterprises who are completely dependent on the parent firms for inputs and raw materials as well as the sale of the final output, virtually transforming the enterprises into disguised wage workers.

⁰ We do not include equipment supplied as one of the characteristics to identify autonomy/dependency of subcontracted firm on the parent firm since most of the dependent subcontracted enterprises (about 70 percent) do not use plants or machinery to carry out their production and, instead, work only with minor tools and equipment. This is reflective of the labour-intensive nature of subcontracted work.

single unit, the corresponding figure for non-putout ones were around 64 and 63 per cent, respectively (Figure 3). Putout firms also tend to be in relatively more precarious subcontracting relations than non-putout ones – 28 per cent of non-putout firms are covered for input price escalation in contrast to 22 per cent putout ones.

[Figure 3]

On one hand, put-out enterprises do not have direct control over their inputs and outputs 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, while they are contracted by the parent firms almost as wage workers to carry out production without any control over inputs, production process, or final output, they do not become an internal part of the parent enterprise as workers. The put-out enterprise, rather, becomes a hybrid of an enterprise and a worker through the process of subcontracting, as has also been noted by Sanyal (2007).

In the following section, we explore how the possibilities of subcontracted OAMEs to grow, accumulate, and transition over time has varied depending on the nature and degree of autonomy of the subcontracting relations.

6. Nature of the Linkages and the Accumulation Possibilities

6.1 How do the accumulation possibilities vary with the nature of subcontracting?

We explore how the ability of subcontracted firms to grow and accumulate (captured by the net accumulation fund – NAF) varies with the different characteristics of the subcontracting linkages. To do this, we compare, at each of the three time points of our analysis, the NAF of firms that depend on the parent firm for a specific subcontracting characteristic vis-à-vis those that do not, for each of the following characteristics separately – receiving raw materials from the parent firm, receiving design specifications from the parent firm, receiving equipment from the parent firm, and supplying *entire* produce to the parent firm. We also use an ordinary least square regression over pooled cross-sections over the peak growth decade, to estimate the average difference between the firms displaying each of these characteristics vis-à-vis those that do not while controlling for other enterprise characteristics as well as other state-and industry-level and time-specific heterogeneity. Note that we do not

make any causal claims here, and only make observations on associations between the firm exhibiting a specific subcontracting characteristic and its NAF.

Furthermore, we do similar exercises to compare the difference in NAF between the putout, i.e., those that *simultaneously* display the following characteristics – receive raw materials and designs from the parent firm and supply the entire produce back to them, and the non-putout firms, i.e., the firms that do not simultaneously display all these characteristics. Through these exercises, we attempt to identify how the NAF of a firm has evolved based on the characteristic of subcontracting relationship that it is involved in.

We find that for every characteristic that we identified above, and for most part of the decade, subcontracted firms that are dependent on the parent firm for *any* of the subcontracting characteristic have a much lower average NAF than the firms that are not. Moreover, this gap has been rising over the growth decade, albeit marginally (Table 5). For example, the average difference in NAF of subcontracted firms who did not receive raw materials from the parent firm versus those who did increased from INR 3552 to 4143 over the decade. Moreover, in 2000-01, even though those that received equipment from the parent firm had a higher NAF than those that did not, this relation reversed over the next two time points over the decade. The overall results hold even after controlling for the other enterprise characteristics as well as other state and industry level and time specific heterogeneities. The OLS regressions with these controls on the pooled cross-sections of the subcontracted OAME over the decade suggests that, on average, the OAMEs that depend on the parent firm for a subcontracting characteristic have a lower NAF than those that are not. The difference is significant for the following characteristics: receiving of raw material, supplying the entire finished product to the contractor, and receiving equipment from the parent firm. For example, the average NAFs of firms receiving raw materials and those supplying entire produce to the contractor are INR 1937 and INR 1779 lesser, respectively, than those that do not. The results are reported in Model 1 (column 2) of Table 6.

[Table 5]

[Table 6]

A comparison between putout firm and non-putout subcontracted firms also reveals similar patterns. Indeed, the NAF retained by a putout OAME is significantly lower than that of the non-putout ones (as well as that of the non-subcontracted OAMEs). This relation remained unchanged over the decade. For example, in 2010-11, the mean NAF retained by the non-putout subcontracted OAMEs (and the non-subcontracted OAMEs) were approximately 1.4 times (and 2.5 times) higher than that in the put-out OAMEs (Figure 4). Further, the OLS estimation on the pooled sample of repeated cross-sections over the decade (Model 2, last column, Table 6) corroborates the results from the descriptive statistics, even after controlling for enterprise characteristics and various state and industry-level and time-specific heterogeneities. On average, over the decade, the putout firms retained around INR 958 (USD 58) lesser NAF than the non-putout ones.

[Figure 4]

In other words, the more closely aligned the subcontracted firm is to the parent firm, lower is the ability of the subcontracted firm to grow and transition. Any form of dependence on the subcontracting linkage, i.e., irrespective of the characteristic for which the subcontracted firm depends on the parent firm, is associated with a relatively worse NAF. This relation between the ability of the subcontracting firm to grow and transition and being in putout subcontracted relations has a notable implication. While the putout firms are most aligned with the parent firm and are governed by the operational logic 'modern' parent enterprise, they have the least possibility, among different types of OAMEs, including the non-subcontracted and the relatively autonomously subcontracted OAME, to themselves grow and transition into 'modern' enterprises.

6.2 Does autonomy in subcontracting relations improve the possibility to accumulate?

The above analysis suggests that (a) the subcontracted firms have a lower possibility to grow and transition than the non-subcontracted ones, and (b) among the subcontracted firms, those aligned to the parent firm either through put-out relations or through other forms of dependence have a relatively lower possibility for further accumulation and growth. However, there is more complexity in this story, and over

the growth decade there have been certain interesting developments in terms of the nature of subcontracting and the possibility of accumulation. The following three features can be discerned.

First, if we look at the set of the non-putout subcontracted enterprises, i.e., those that do not simultaneously receive inputs and supply the entire produce back to the parent firms, and thereby have a relatively higher degree of autonomy, their NAF for the time points 2000-01 and 2005-06 was the highest among the different types of OAMEs, including not just the putout and non-putout subcontracted but also the non-subcontracted enterprises (Figure 4). These non-putout subcontracted enterprises comprise about a quarter of the subcontracting linkages. Their NAF in 2000-01 and in 2005-06 was 1.8 times and 1.9 times the putout subcontracted enterprises and 1.13 times and 1.12 times the non-subcontracted enterprises, respectively. Second, however, over the second half of the decade, the NAF of the non-putout subcontracted OAMEs declined drastically while the NAF of other types of OAMEs increased. This resulted in a drastic narrowing of the gap between the putout and non-putout subcontracting enterprises (with the average NAF of the put-out OAMEs falling to about 1.4 times the putout by the end of the decade), and a reversal in the relation in the NAF between non-subcontracted and non-putout subcontracted firms (with the NAF of non-putout subcontracted firms falling to almost half of the non-subcontracted ones). We also run two separate OLS regressions, one at the beginning (2000-01) and other at end (2010-11) of the growth decade, to estimate how the difference between the putout and non-putout enterprises has changed over the high growth decade, after controlling for other enterprise characteristics and state and industry-level heterogeneities (Specification 1 and 2, Model 2, Table 6). The estimated difference between non-putout and putout enterprises has dramatically narrowed over time, even after controlling for other characteristics, further corroborating the results from the descriptive analysis.

Third, this trend sustains itself irrespective of the type of assistance the non-putout subcontracted firms derive from the subcontracting relation. In other words, whether the non-putout subcontracted firms depend on the parent firm for raw materials, or design specification, or for supplying their entire produce, their NAF is higher than that of the putout firms towards the beginning of the period of analysis and falls over the decade to reach a level either lower or almost equal to that of the putout firms by

the end of the decade. For example, in 2000-01, while the NAF of non-putout firms that received raw materials, those that received design specification, and those that supplied the entire produce back to the contractor was 2.4, 2.4 and 1.8 times that of the putout enterprises, in 2011-11, this fell to 1.1, 0.9, and 1.1 times, respectively. This indicates that the decline in the NAF of non-putout firms is not driven by any one subcontracting characteristic and is a secular trend (Figure 5).

[Figure 5]

The exercise suggests that while it may be possible for subcontracted firms that have some autonomy to grow and accumulate more than even the non-subcontracted firm (and more than the putout firms) as we have seen from the experience of the first half of the growth decade, this possibility had already dimmed by the end of the decade. As noted above, the NAF of such autonomous subcontracted (non-putout) OAMEs has registered a secular decline over the decade, especially when all other types of firms have registered a rise in their average NAF. As a result, despite the depressed performance of the putout enterprises (with their annual average NAF increasingly only slightly from INR 5206 to INR 5480 over the decade), such putout subcontracting relations were no worse than other possible non-putout arrangements by the end of the decade.

Despite this, the firms enter into subcontracting, or even putout, relations because they might not have the ability to survive outside the contractual relations that at least ensures a supply of inputs and an assured access to markets. This reminds one of a predominance of a consumption motive rather than an accumulation motive governing these enterprises. Such enterprises are likely to continue production in such subcontracting relations even if they do not have a possibility to grow and transition if they are able to ensure the economic reproduction of the household owning the enterprise. In some sense, this bears resemblance to the characterization of petty commodity production (PCP) informal units as being subsistence-driven, governed by the consumption logic of the household, as noted by Sanyal (2007). However, unlike the PCP units, the subcontracted enterprises, specifically of the putout type, are not independent and are completely subsumed under the parent capitalist firm's logic of operation, transforming them into a disguised wage worker. Such subcontracting relations in Indian IMS over the peak growth decade, which are seemingly driven by distress, are very different from the

type of subcontracting linkages that are celebrated in the literature as a channel for facilitating growth and transition.

CONCLUSION

Subcontracting linkages are seen in the literature as key channels to facilitate a transformation of the traditional informal enterprises into the larger modern ones and such linkages are expected to grow stronger with economic growth. However, not only has the proportion of subcontracted enterprises in the Indian informal manufacturing sector (IMS) fallen over the peak growth decade in the Indian economy (2000-01 – 2010-11), but the gross value added of the subcontracted enterprises has been much lower than the non-subcontracted ones. This raises questions on the nature of subcontracting relations in the Indian IMS, how it has evolved during the peak growth period, and whether their nature is of the kind that is likely to facilitate a transformation of the IMS via a transition of the subsistence-driven traditional family-based IMS enterprises, i.e., the OAMEs, into dynamics modern ones. In this paper we intervene to address specifically these questions.

Constructing a variable, the net accumulation fund (NAF) of an enterprise – that measures the ability of an enterprise to accumulate, grow, and transition over time – we compare the accumulation possibilities of subcontracted and non-subcontracted OAMEs, as well as that between different types of subcontracted OAMEs. Not only are the non-subcontracting firms able, on average, to retain a higher NAF than the subcontracted ones, the gap between the two has widened over the high growth decade. The subcontracting linkages do not seem to be facilitating better accumulation possibility for the IMS enterprises. To explain this, we focus on the nature of the subcontracting linkages.

Overall, we find that subcontracting linkages in the IMS can be characterized by a high degree of dependence of the subcontracted enterprises on the parent firms, both for receiving inputs as well as for supplying the entire finished product back to the parent firm. In fact, around three-quarters of subcontracted OAMEs are embedded in relations that resemble traditional *putting out* system, whereby firms simultaneously receive all their inputs from the parent firms and supply their entire output back to the latter. Moreover, a very small proportion of subcontracting

enterprises receive any tools or equipment from the parent firm, and often use home-based tools to undertake production. Under such relations, the subcontracted firms are transformed into a mere appendage of the parent firms without having much control over the production process or without being able to technologically upgrade. The parent firms, on the other hand, are able to lower their costs of operation by gaining access to non-commodified household resources through these relations such as unwaged family labor, household tools, space of the household where such subcontracted enterprises are usually based, etc. What is more, the OAMEs operating under such putout relations retain very low amounts of NAF, which is the least when compared with the non-subcontracted and non-putout subcontracted enterprises. This is particularly telling since the putout firms are completely subsumed under the logic of operation of the parent capitalist firm but have the lowest possibility to themselves be able to accumulate and transition. In fact, the NAF of a subcontracted OAME (irrespective of whether it is putout or not) receiving *any* form of assistance from the parent firm is lower than the subcontracted firm that does not depend on the parent firm for that assistance.

Notably, for the first half of the decade, the non-putout subcontracted enterprises performed better than even the non-subcontracted ones. However, the trend reversed in the second half of the decade, with the non-putout firms registering a fall in their NAF. In fact, among the non-subcontracted, putout subcontracted, and the non-putout subcontracted, the latter are the only type of firms that have registered a fall in their NAF. Consequently, by the end of the decade the non-putout firms are not much better than the firms in putout subcontracted arrangements.

The fact that these subcontracted enterprises, despite the low possibilities to accumulate and transition, are reproducing themselves even by entering such kind of subcontracting relationships suggests that it might be driven by their need to reproduce the household in which it is based. Seen from the vantage point of the larger subcontracting parent firm, such putout subcontracted firms do not have an autonomous logic and are, instead, embedded in the production process of the parent firm and subsumed within its accumulation logic. In contrast, from the vantage point of the subcontracted firm, it is the subsistence needs geared towards ensuring the economic reproduction of the household that drives it. This characterization resembles that of a wage worker, who, while being subsumed within the

accumulation-driven firm, is governed mainly by the logic of satisfying the consumption needs of the household. Notably, however, the putout firm is not even fully incorporated into the parent firm as a wage worker. The putout firm emerges as a hybrid of a worker and an enterprise, without the rights of a wage worker or the autonomy in production (or the possibility to accumulate) as an enterprise.

The nature of subcontracting linkages in the Indian IMS appear to mainly be driven by distress, which is starkly distinct from the characterization of the dynamic linkages that are expected to facilitate a transition with economic growth. Given the bleak possibility of subcontracted firms to accumulate, the prevalence of the putting out nature of subcontracting linkages in the Indian IMS, and a secular withering away of the gains associated with other non-putout forms of subcontracting arrangements, there remain serious doubts on the role of these linkages to facilitate a transformation of the IMS.

APPENDIX A.1

As discussed above in section 4, the NAF can be calculated as:

NAF = GVA minus [rent + interest + wage fund for hired workers + consumption fund for working owners and non-hired family labor]

While the NSSO provides data on most of these variables, we need to calculate the fund kept aside for the consumption needs of the working owners and non-hired family workers. In order to calculate this fund, we assign pseudo wages to all working owners and non-hired workers. For an establishment which employs at least one hired worker, the average wage per hired worker is multiplied by the total number of workers (including the unpaid working owners and non-hired workers) in that establishment to get an estimate of the consumption fund. As for the OAMEs, which do not employ any hired workers, we match the OAMEs to a similar establishment, and the average wage per hired worker for such an establishment is assigned as the pseudo wage for the OAME workers. The matching is carried out in terms of four characteristics – GVA per worker, size of the firm, location/sector (rural or urban), and the industry type based on the two digit National Industrial Classification (NIC) codes (25 industry types). To do this matching, for each of the three time points (2000-01, 2005-06, and 2010-11), we divide the entire data set into different cohorts. Each cohort contains enterprises belonging to a particular sector and a particular industry, thereby forming 50 cohorts (25 NIC * 2 sectors) for each time point. For each cohort, we compare the GVA per worker of the OAME with that of the establishment which hires only one worker. If the GVA of the OAME matched with that of the establishment, the average wage per hired worker is assigned as the 'pseudo wage' for the matched OAME. After this preliminary match, all those OAMEs which are not matched to any NDME, 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 total number of workers in an OAME to get an estimate of its consumption fund.

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Tables

Table 1. Incidence of subcontracting in rural and urban areas (in percentage terms)

Enterprise type	Rural			Urban		
	2000-01	2005-06	2010-11	2000-01	2005-06	2010-11
OAME	28.05	31.25	25.01	38.81	34.54	17.48
Establishments	21.51	22.51	9.86	35.24	30.57	9.89
All Enterprises	27.62	30.61	23.7	37.82	33.4	15.66

Table 2. Enterprise characteristics of subcontracted (S) and non-subcontracted (NS) OAMEs

Enterprise Characteristic	2000-01		2005-06		2010-11	
	NS	S	NS	S	NS	S
Percentage of Female headed OAMEs	21.49	47.90	30.10	65.01	38.63	69.17
Percentage of OAMEs located outside the household	28.49	10.36	24.92	7.38	24.45	5.05
Median value of assets per worker (in INR)	9276	7418	11687	5873	30411	13651

Table 3. NAF distribution for subcontracted and non-subcontracted OAMEs across quantiles (real annual values in INR)

OAME	Non-Subcontracted (NS)			Subcontracted (S)			Difference (NS-S)		
	2000-01	2005-06	2010-11	2000-01	2005-06	2010-11	2000-01	2005-06	2010-11
Mean	8214	7926	13554	6222	4711	5979	1993	3215	7575
P10	620	478	1265	356	434	1163	263	44	102
P25	1685	1390	3148	1031	796	1850	654	594	1298
P50	4453	3986	7652	3091	1574	3206	1362	2411	4446
P75	10081	9412	16118	7724	5094	6312	2356	4318	9807
P90	18484	18637	30063	15442	11838	12058	3042	6799	18005

Table 4: Impact of subcontracting linkages on NAF of OAMEs – endogenous dummy variable model – Dependent variable log (NAF)

	Specification 1		Specification 2	
	Observation Equation	Selection Equation	Observation Equation	Selection Equation
Contract dummy (Base category: Non-subcontracted)	-1.563^{***} (0.0813)	-	-1.557^{***} (0.0744)	-
Subcontracted# Time2005-06	-	-	0.0703 (0.0770)	-
Subcontracted# Time2010-11	-	-	-0.103 (0.100)	-
Located outside household (Base category: Located within HH)	-	-0.601 ^{***} (0.0572)	-	-0.601 ^{***} (0.0568)
Female headed enterprise (Base category: Non-female-headed enterprise)	-0.455 ^{***} (0.0785)	-0.631 ^{***} (0.0826)	-0.455 ^{***} (0.0779)	-0.631 ^{***} (0.0823)
Log of value of assets held (in INR)	0.200 ^{***} (0.0289)	-0.105 ^{**} (0.0431)	0.200 ^{***} (0.0287)	-0.105 ^{**} (0.0431)
Urban (Base category: Rural)	0.393 ^{***} (0.0517)	0.151 ^{**} (0.0691)	0.389 ^{***} (0.0522)	0.151 ^{**} (0.0691)
Operated more than three years (Base: Operated less than three years)	0.209 ^{***} (0.0695)	0.0762 (0.115)	0.214 ^{***} (0.0698)	0.0753 (0.114)
Number of workers	0.271 ^{***} (0.0281)	0.140 [*] (0.0725)	0.272 ^{***} (0.0284)	0.140 [*] (0.0723)
Enterprise registration (Base category: Unregistered)	0.252 ^{***} (0.0425)	0.102 (0.0782)	0.250 ^{***} (0.0418)	0.102 (0.0780)
Account maintained by enterprise (Base category: Accounts not maintained)	0.222 ^{***} (0.0496)	0.000549 (0.115)	0.227 ^{***} (0.0510)	-0.0000809 (0.113)
Time dummy 2005-06 (Base category: Year 2000-01)	-0.0504 (0.0864)	-0.0466 (0.0765)	-0.0731 (0.0825)	-0.0426 (0.0762)
Time dummy 2011-12 (Base category: Year 2000-01)	0.307 ^{***} (0.0454)	-0.274 ^{***} (0.0853)	0.331 ^{***} (0.0516)	-0.283 ^{***} (0.0927)
Constant	6.213 ^{***} (0.316)	0.687 (0.544)	6.203 ^{***} (0.316)	0.689 (0.543)
Observations	255781		255781	

Source: Based on 56th, 62nd and 67th rounds of NSSO data

Robust standard errors in parentheses clustered at state level; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4 (continued)	
Model Specification 1	Model Specification 2
Estimator: maximum likelihood	Estimator: maximum likelihood
Log pseudo-likelihood = -86314349	Log pseudo-likelihood = -86296446
Wald Chi ² (10) = 4213.09	Wald Chi ² (12) = 8385.52
Probability > chi ² = 0.0000	Probability > chi ² = 0.0000
rho () = 0.6699 (Robust standard error: 0.0342)	rho () = 0.6698 (Robust standard error: 0.0327)
sigma () = 1.2522 (Robust standard error: 0.0257)	sigma () = 1.2518 (Robust standard error: 0.0249)
lambda (λ =) = 0.8388 (Robust standard error: 0.0580)	lambda (λ =) = 0.8385 (Robust standard error: 0.0553)
LR test (Ho: no correlation between the treatment and outcome errors): Probability > chi ² = 0.0000	LR test (Ho: no correlation between the treatment and outcome errors): Probability > chi ² = 0.0000

Table 5. Average NAF of enterprises with different characteristics

	Subcontracted											
	Received raw materials from parent firm			Design specified by the contractor			Supplying entire produce back to contractor			Equipment supplied by contractor		
	No	Yes	Ratio	No	Yes	Ratio	No	Yes	Ratio	No	Yes	Ratio
2000-01	9591	6039	1.59	8196	6071	1.35	9965	5379	1.85	6108	6835	0.89
2005-06	12590	4303	2.93	4885	4696	1.04	10999	3840	2.86	4962	3746	1.32
2010-11	9978	5835	1.71	7853	5590	1.40	10825	5546	1.95	5987	5708	1.05

Table 6. Difference in NAF retained by subcontracting firms receiving assistance and those that did not (Model 1) and that between put-out and non-putout subcontracted enterprises (Model 2)
Ordinary least square regression for 2000-01 and 2010-11 – (Dependent variable: NAF)

	Model 1	Model 2		
	Pooled	2000-01	2010-11	Pooled
Raw materials provided by the parent firm / contractor	-1936.7** (769.0)			
Design specified by the parent firm / contractor	-109.0 (661.6)			
Supply the entire produce to the parent firm / contractor	-1779.0** (689.2)			
Equipment supplied by the parent firm / contractor	-670.9** (289.6)			
Putting-out dummy (Base: Non put-out)		-833.3* (466.4)	-554.3* (929.1)	-958.3* (404.8)
Located outside household (Base category: Located within HH)	3843.9*** (821.1)	4834.5*** (972.3)	2489.0 (1491.5)	3976.2*** (774.2)
Female headed enterprise (Base category: Non-female-headed enterprise)	-3247.2*** (284.9)	-2843.5*** (352.1)	-3464.1*** (572.2)	-3345.9*** (274.4)
Log of value of assets held (in INR)	935.2*** (123.8)	1086.1*** (276.6)	1140.3** (328.2)	980.9*** (138.5)
Urban (Base category: Rural)	1876.7*** (348.6)	1848.8** (524.8)	1906.6* (893.3)	1883.9*** (347.3)
Operated more than three years (Base: Operated less than three years)	-3.628 (352.1)	-492.8 (681.7)	42.16 (448.5)	-102.3 (383.1)
Number of workers	2566.8*** (352.0)	2377.6*** (200.2)	4046.0* (1565.9)	2521.1*** (346.8)
Enterprise registration (Base category: Unregistered)	4673.8** (1508.4)	3493.6* (1531.1)	4368.3 (2942.5)	4768.6** (1567.7)
Account maintained by enterprise (Base category: Accounts not maintained)	6186.6** (2973.6)	4501.5* (2181.5)	5154.1 (6980.0)	6316.4* (2983.8)
NIC tobacco dummy	Yes	Yes	Yes	Yes

Table 6.2 (continued)				
	Model 1	Model 2		
	Pooled	2000-01	2010-11	Pooled
State zone dummy	Yes	Yes	Yes	yes
Time dummy 2005-06	Yes	-	-	-115.7 (341.7)
Time dummy 2010-11	Yes	-	-	847.6 (469.2)
Constant		-1729.4 (2411.0)	6532.3 (4632.1)	-133.0 (1661.4)
Observations	51557	37655	5087	52215

Source: Based on 56th and 67th rounds of NSSO data

Robust standard errors in parentheses clustered at state level; * p < 0.1, ** p < 0.05, *** p < 0.01

Model 1: R squared= .1038; F(20, 34); Prob>F=0.000

Model 2: Specification 1: R-squared = 0.3127; F(15, 32) = 81.30; Prob > F = 0.000; *Specification 2*: R-squared = 0.1860; F(15, 27) =4499.93; Prob > F = 0.0000; *Specification 3*: R-squared = 0.1027; F(17, 34) =656.60; Prob > F = 0.0000

Figures

Figure 1. Characteristics of subcontracted OAMEs

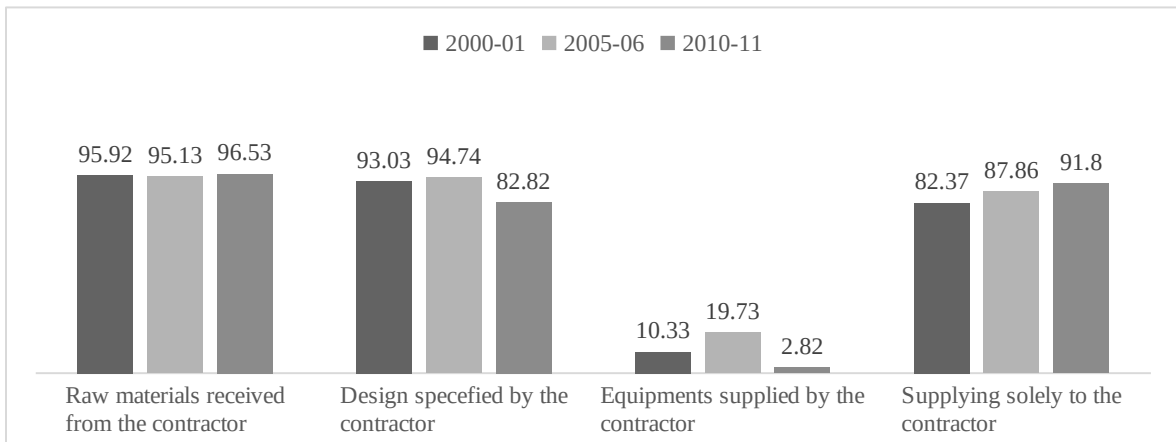


Figure 2. Proportion of put-out and non-putout of subcontracted OAMEs

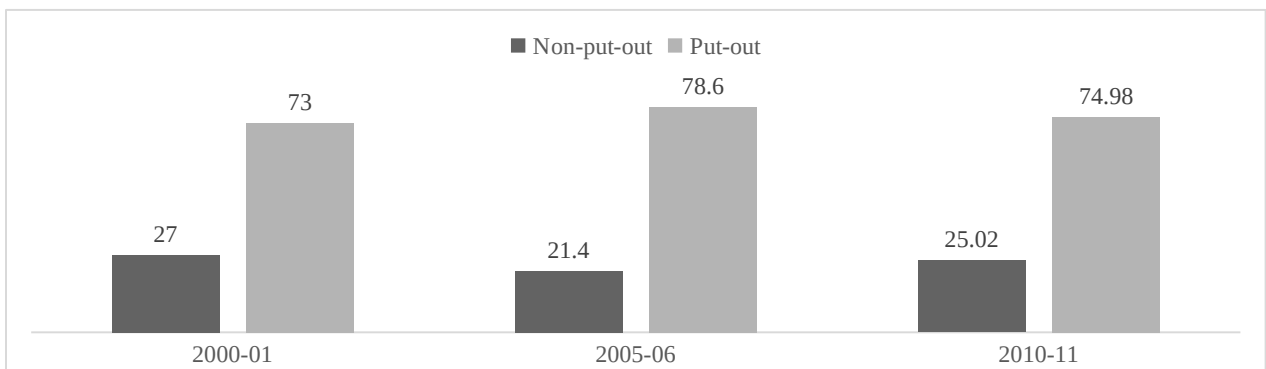


Figure 3: Characteristics of subcontracted enterprises under put-out and non-putout relations (2010-11)

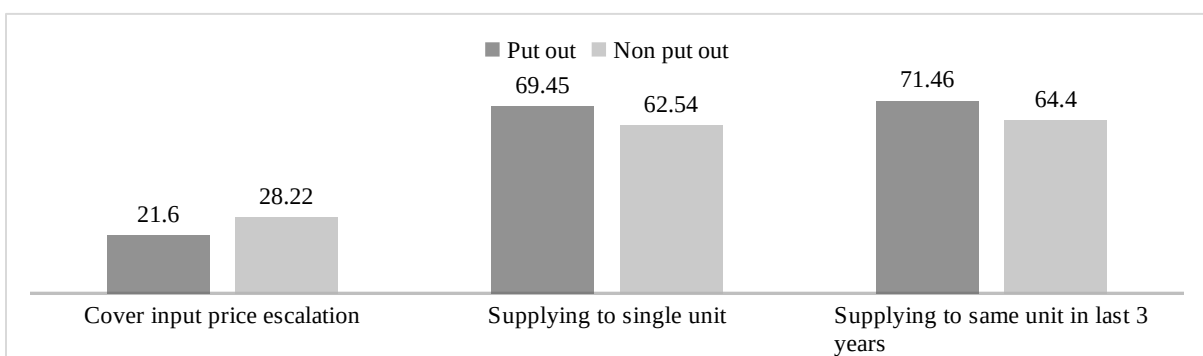


Figure 4. Annual average NAF of putout, non-putout and non-subcontracted enterprises

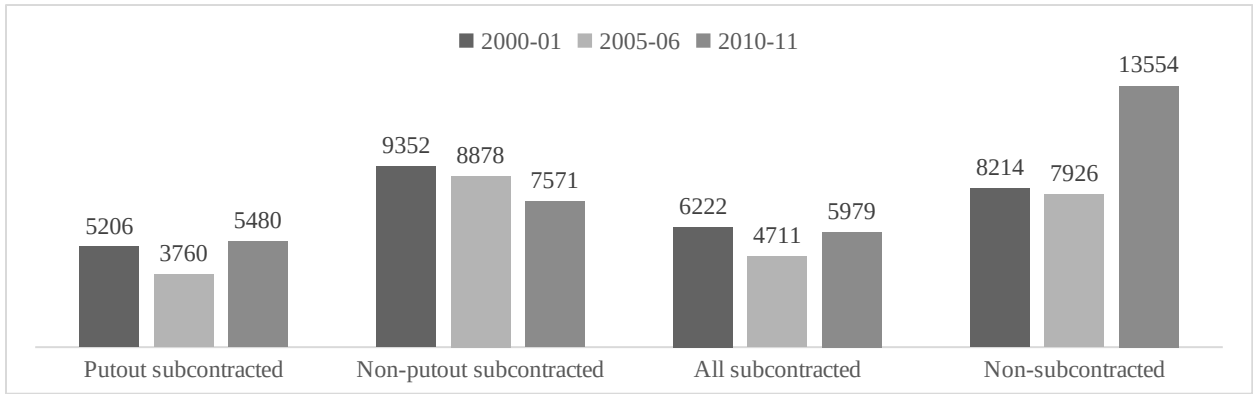


Figure 5: NAF of putout, non-putout and non-subcontracted enterprises

