

Informality and Flexible Specialization: Labour Supply, Wages, and Knowledge Flows in an Indian Artisanal Cluster

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WORKING PAPER 2014-07

DEPARTMENT OF ECONOMICS

UNIVERSITY OF MASSACHUSETTS BOSTON



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ABSTRACT

Artisanal industrial clusters, geographical agglomerations of small or micro, ‘flexibly-specialized’ enterprises, are an important component of the informal sector from employment generation, poverty alleviation, as well as export promotion perspectives. Two theoretical paradigms have commonly been employed to analyse such clusters: informality and flexible specialization. The first paradigm emphasizes precarious work, surplus labour, and low wages; the second, skilled labour, agglomeration economies, and fashion-sensitive products. This study brings these two perspectives together to address how informal institutions enable clusters to function and how they shape the distribution of risks and gains that accompany flexible specialization. Focusing on the artisanal weaving cluster in the city of Banaras, in North India, I examine the putting-out (subcontracting) system, the system of family-based apprenticeships, and the transfer of fabric designs between firms. In each case, I show how informality and flexible specialization complement and contradict each other.

INTRODUCTION

The vast majority of the workforce in developing countries is in the informal sector (Vanek et al., 2013). Artisanal industrial clusters, geographical agglomerations of small or micro, ‘flexibly-specialized’ enterprises have been recognized to be an important component of the informal sector from employment generation, poverty alleviation, as well as export promotion perspectives (Das, 2005; Nadvi and Barrientos, 2004; Saith, 2001).¹ Manufacturing specialized and frequently changing products according to fashions trends in diverse markets requires strong institutions of labour training and recruitment, credit, knowledge sharing, and joint action that can promote ‘collective efficiencies’ (Piore and Sabel, 1984; Sabel and Zeitlin, 1985; Schmitz and Nadvi 1999). How family, community or caste-based institutions and networks interact with capitalist production relations to achieve flexible specialization in the absence of formally regulated markets and property rights regimes, to what extent they turn clustering into a disadvantage, and to what extent they can foster dynamism, technical change, and class mobility remain important empirical questions in the field (Chari, 2004; Meagher, 2007; Nadvi, 1999).

Informal clusters combine home-based petty production with subcontracting and wage labour in a complex network of production relations (Basole and Basu, 2011). It has been argued that in a labour-surplus, developing country such as India, caste, kinship, and locality-based informal institutions, while enabling capital accumulation, may also contribute to ‘viscosity of capital,’ precarious working condition, low wages for the working majority, and collective *inefficiencies* (low-road flexibility) rather than the high-road (rising wages, capital-labour accord, joint action, technical dynamism) seen in the clusters of Third Italy (Harriss-White, 2003: Ch.8; Holmstrom, 1993). But relatively few

¹ A large literature emerged in the 1990s on how developing countries could encourage such clusters to foster economic growth and export competitiveness (Nadvi and Schmitz, 1994). See for example, *World Development* 27(9), a special issue on industrial clusters. By the early 2000s promotion of industrial clusters was accepted as a development strategy for developing countries. For instance, India’s Integrated Handloom Cluster Development Scheme (IHCDS) runs support programs in twenty clusters across India. See <http://www.indianhandloomscluster-dchl.net/DiagnosisStudy.asp> (accessed 2 May, 2014).

industrial clusters have been analyzed from this perspective (Knorringa, 1999b; Meagher 2007).

The present study addresses these questions in the context of the weaving industry of the city of Banaras (officially Varanasi) in the Indian state of Uttar Pradesh (Kumar, 1988; Pandey, 1981; Raman, 2010). The industry is several centuries old and has grown many-fold in the last 150 years (Kumar 1988). It currently has an estimated 60,000-100,000 handlooms and 40,000 powerlooms and an annual turnover of Rs. 30,000 million (Varman and Chakrabarti, 2011). Traditionally known for the *Banarasi sari* (six meters by one meter handwoven silk fabric with intricate embroidery worn by women), the cluster has diversified into synthetic fabrics, scarves, stoles, bags, etc. for the local, national and exports market. Handlooms are giving way to powerlooms. The centre-piece of its identity are intricate woven patterns, locally known as ‘designs’ which change rapidly with changing fashions within a traditionally fixed (yet evolving) artistic landscape (Figure 1).

I analyze three institutions of the Banaras weaving industry: the putting-out (subcontracting) system, the system of family-based apprenticeships, and the transfer of fabric designs between firms. In each case, I show how informality and flexible specialization complement and contradict each other. Putting-out enables master-weavers to produce a wide-range of products with minimal overheads, but shifts risks of flexibility on to the artisans. The family-based apprenticeship system ensures a supply of highly skilled labour but contributes to labour surplus by lowering the costs of entry and making exit difficult. Gains from productivity achieved by powerlooms do not accrue to workers given the labour surplus economy. Fabric designs that are central to the industry’s market are not patented and free imitation is the key to innovation. But this entails hyper-competition, conservative changes and quickly dissipating monopoly rents. I suggest that clusters such as Banaras display elements of collective efficiency *as well as* inefficiency, created from the *same* informal institutions and networks. Cluster policy has to be designed taking this into account.

INFORMAL INSTITUTIONS AND ARTISANAL CLUSTERS

Social Embeddedness and Production Relations

A defining feature of artisanal clusters is their social embeddedness (Nadvi, 1999). The firms that comprise such clusters are embedded in a cultural-religious-political matrix, which shapes and is shaped by their economic activity. ‘Social glue’ made up of personal relationships, face-to-face contact, a sense of common interest, and insider status binds the actors together (Porter, 1998). While such social networks have been recognized to be crucial in the operation of many informal clusters (for e.g. Meagher, 2010), in clusters composed of craft communities, the family and caste or ethnic ties assume greater importance, and production of the commodity becomes a ‘way of life’ (Hareven, 2002; Knorringa 1999). As a result, ‘the boundary between the spheres of business and community tends to blur’ (Sengenberger and Pyke, 1992:19). In such clusters almost every aspect of life, viz. childhood, adolescence, marriage, festivals, leisure, architecture of the home, rhythms of the day and so on is shaped by the requirements of commodity production. In turn community and family norms and networks structure the cluster by enabling the production of skilled labour, acting as barriers to entry for newcomers, enabling or retarding technical change, legitimizing exploitative conditions or undermining them, etc.

There is evidence from diverse clusters that subcontracting arrangements of the “putting-out” type are commonly found, with a mixture of home-based and small workshop firms (Knorringa, 1999a; Nam et al., 2010). While the putting-out system enables the artisanal family to retain an appearance of independence and craft pride, the result is that wages paid have hidden costs, such as use of a house or workshop, electricity, equipment maintenance, and cost of learning new designs and techniques (Basole and Basu, 2011: 74; Sengupta et al., 2007:90-1). As Scrase (2003:70) notes, in such systems, flexibility is a benefit for entrepreneurs within the cluster and leads to insecurity for workers. Artisans usually depend on a single or a few related skills, tend to have little formal education, and are unorganized. They are subjected to exploitative work conditions like poor safety, low wages and lack of formal recognition of craft skills.

Family and caste institutions are often closely articulated in such clusters with class relations. Thus, in the Agra footwear cluster, artisans are from the Jatav ('untouchable') community while traders are Punjabi Hindus (Knorringa 1999b). In Banaras, weavers are overwhelmingly Muslim males of the Ansari (weaving caste) community.² Traders or merchants, on the other hand, have traditionally been upper-caste Hindu men (belonging to the Gujarati or Marwari community) though the past few decades have seen the rise of Muslim traders and exporters from the ranks of the Ansari community.

From a welfare perspective, the most important issue in artisanal clusters is the prevalence of low wages. Nadvi and Schmitz (1994:70) mention the important factor of abundant supply of labour as the principal factor behind low wages in developing country clusters while McCormick (1999) mentions "oversupply of labour" as one of the problems that stand in the way of realizing collective efficiency gains in African clusters. An implication of surplus labour is that gains from productivity resulting from technical change are less likely to accrue to workers. Thus there is a divergence between capital accumulation and wages (Lewis, 1954). In such a situation, when productivity gains increase output, piece rates adjust downwards to keep daily or hourly wages constant (Emmanuel, 1972:419; Marx 1867/1992). The present study tests this hypothesis directly in the context of a single artisanal cluster by taking advantage of the fact that a transition from handloom to powerlooms is currently underway in Banaras.

Informal Labour Training Regimes

A striking example of the blurring of boundaries between firm and community is the labour-training regime. Access to *cheap, skilled* labour is one of the key competitive strengths of developing country clusters. Thus the skilling regime is as important as surplus labour in understanding cluster dynamics, but has received less attention. Skill and knowledge are generally passed from father to son, mother to daughter, or along broader caste-based lines such that they add to 'a long-standing cultural heritage for the region' (Pyke and Sengenberger, 1992:70). Thus, while in advanced industrial economies

² Ansaris are *ajlaf*s or converts to Islam from the middle and lower Hindu castes. They are intermediate in social status, lower than the *ashraf*s (Sayyads, Sheikhs, Moghuls and Pathans) but higher than *arzals* (untouchable converts to Islam).

such family and community-based apprenticeships are largely of interest to economic historians (see for e.g. Hamilton, 1996), they remain of crucial importance in understanding contemporary labour markets in developing countries.

With rare exceptions (Biswas, 2005; Biswas and Raj, 1996) development economists studying industrial clusters have left skill acquisition unexplored. Biswas and Raj (1996) focus on ‘skill formation in indigenous institutions’ and analyze the handloom and conch-shell product industries of West Bengal as well as in radio, bicycle, watch and auto repair industries in Delhi. The authors report some basic statistics on years of apprenticeship (1 to 10 years depending on trade), number of apprentices trained per craftsman, and sources of knowledge on new products. While other surveys of contemporary artisanal firms also do reveal the importance of apprenticeships and other ‘hereditary systems’ of skill transfer (Parthasarthy, 1999), the main obstacle in studying them is that such systems of informal knowledge are part of ordinary life and hence require an ethnographic approach to investigate.³ There is not always an identifiable place or time where learning happens. The process is embedded in relations that are perceived as ‘non-economic.’ Further, artisanal knowledge is not only applied in performance but also transferred in performance, i.e. there is a near absence of verbal communication even between master and apprentice (Marchand, 2003). Thus, when questioned, artisans often see nothing worth commenting in the learning process (Wood, 2008).

For these reasons, the significance of contemporary apprenticeship system is often underestimated. Skills are sometimes believed to be acquired ‘in a disorganized, unstructured and highly individualistic manner’ (Ruddle, 1993: 17) and informal labour-force surveys reach the conclusion that the vast majority of the workforce is unskilled (Basole, 2012). In this study, I show how the apprenticeship system in Banaras is crucial

³ Most of our knowledge comes from economic anthropology. Wilkinson-Weber (1999) offers important insights into skill acquisition among Lucknow chikan embroiderers, employing participant observer techniques and Venkatesan (2009) does the same for mat weavers of Pattamadai (Tamil Nadu). Breman (1996) includes some remarks on systems of apprenticeship in the diamond cutting and powerloom industries of Surat, as does Knorringa (1999a) for Agra footwear. However, most of these studies are not concerned with exploring the implications of the skill transfer process for the local labour market and for wages.

to its functioning but also contributes to the creation of an excess supply of labour and keeps wages down. In this way, class and family are brought together to understand distributional dynamics in the cluster.

Inter-Firm Competition and Knowledge Flows

Flexible specialization relies on knowledge-intensive products in the sense that product designs are crucial to product differentiation between firms, and constant innovation in styles, materials, patterns etc. is crucial to preserving or extending markets. Lack of formal intellectual property rights makes it difficult for producers to prevent imitation or to exclude others. It is thus of interest to learn how informal clusters operate within 'open-access' knowledge regimes. This is a comparatively under-explored area in cluster research.

In dense clusters an innovation quickly adds to the current stock of knowledge that is then available to all the other firms without any compensation paid to the innovator. Firms or individuals can earn monopoly rents for an innovation only for the brief period of time that it takes for others to copy their processes. The absence of legal mechanisms via which knowledge-holders may exclude others from gaining access to knowledge leads us to believe that such spillovers may play an important role in explaining dynamism as well as deficiencies of artisanal clusters. For example, Meagher (2010:136) notes, in the context of the garment and shoe clusters in Aba, Nigeria, that producers 'constantly complain about the lack of secrecy which rapidly eroded the gains of a good design through copying and undercutting.' All three informal African clusters studied by Meagher (2007) experienced problems with imitation, copying, and cut-throat competition over designs. Colloredo-Mansfeld and Antrosio (2009:144-5) encountered a similar phenomenon in the acrylic sweater industry in Otavalo, Ecuador where the designing process is 'an unending sequence of mutual robbery.'

In this paper I explore the functioning of the system of creation of fabric designs and patterns, which is a key institutional asset that contributes to the niche enjoyed by

Banaras in a competitive, global textile market. Banaras also offers a lesson in the strengths and limitations of such a system of knowledge organization.

RESEARCH SETTING AND METHODS

Banaras is situated on the banks of the river Ganga in the eastern part of the state of Uttar Pradesh in north India. The city is well known for its Hindu religious significance (Eck, 1998) and is also the site of a large weaving industry composed of largely Muslim artisans (Kumar, 1988; Raman, 2010, 2013). Observers estimate that there are 60,000-100,000 handlooms and 40,000 powerlooms, though handlooms are declining and powerlooms are ascendant.⁴ Counting allied industries, the population connected with the cluster probably numbers in the several hundred thousands. However, given its size and reputation, the industry has been the subject of few scholarly studies.⁵

Like most informal artisanal industries, there is paucity of data on Banaras. This necessitates primary data collection through fieldwork. Further, aspects of the industry such as mechanisms of apprenticeship, wage-setting process, and production of fabric designs are not amenable to a survey-based approach, but rather require qualitative work. This study draws on surveys and interviews, as well as field observations, resulting from fieldwork in Banaras between October 2009 and June 2010.⁶ It consciously adopts a mixed-method strategy combining a quantitative survey with qualitative interviews and field observations.

⁴ Accurate information of the number of looms and workers is not available from official sources. Informed sources such as the Director of the Weaver Service Centre (WSC) in Banaras and Ateek Ansari, a master-weaver, journalist and long-time industry observer estimate that there are around 75,000 handlooms in the city (Field Interviews). Varman and Chakrabarti (2011) report 60,000-100,000.

⁵ Between Kumar (1988) and Raman (2010) there was one government-sponsored report and one NGO-led study dedicated to Banaras (Ahmad, 2007; DCHandlooms, 2008) and one study that includes Banaras among three industrial clusters (Varman and Chakrabarti, 2006, 2011).

⁶ Fieldwork was conducted in the weaver localities in the following areas: Adampura, Jaitpura, Madanpura, and Bazardiha in Banaras city, surrounding areas of Sarai Mohana, Lohata, Cholapur, Chiraigaon, Padav, and Dulahipur, and nearby weaving towns of Mau (100 km north) and Mubarakpur (120 km north-west).

The survey is based on a purposive sample in which effort was made to capture all the major types of weavers and weaver localities (DCHandlooms, 2008). Survey participants were approached via five independent contacts to ensure sample diversity. New participants were also recruited via snowball sampling. In all 104 weavers were surveyed of which 99 surveys were usable. The sample consists of 95 men and 4 women. Women traditionally do not weave in this area but are involved in preparatory yarn-work (reeling the weft on bobbins and related tasks). The exception to this rule is the town of Mau where women operate light powerlooms. Of the usable sample, 74 weavers were urban and 25 were rural; 65 handloom, 27 powerloom weavers and 7 operating both types of loom are included.

A subset of the surveyed weavers were approached for semi-structured interviews. The interviews probed deeper into the apprenticeship process, the putting-out system, and setting of wages. In addition to weavers and ex-weavers (N=26) the following types of actors in the industry were also interviewed: designers or artists who create patterns found on the saris/fabric (N=8); master-weavers (N=11); merchants (N=5); agents who match out of town merchants with local ones for a commission (N=1); and State officials and NGO workers (N=13). Interview data is reported anonymously with only the date of interview and a general description of the person who is being quoted. All interviewees, unless otherwise stated, are Muslim males. I have dealt with women's work in Banaras elsewhere (Basole, forthcoming).

PRODUCTION RELATIONS, TECHNICAL CHANGE, AND WAGES

Traditionally the Banaras weaving cluster has been known for woven embroidery of brocades and other intricate designs which have proved difficult to replicate on machines (Figure 1). These are produced via a putting-out system that makes use of family labour in home-based industry, and traditional apprenticeship systems.⁷

⁷ See Haynes (2012) for the historical role of these institutions in weaving centres of Western India. No comparable study exists for Banaras.

Figure 1. Typical Banarasi Designs



Source: Author

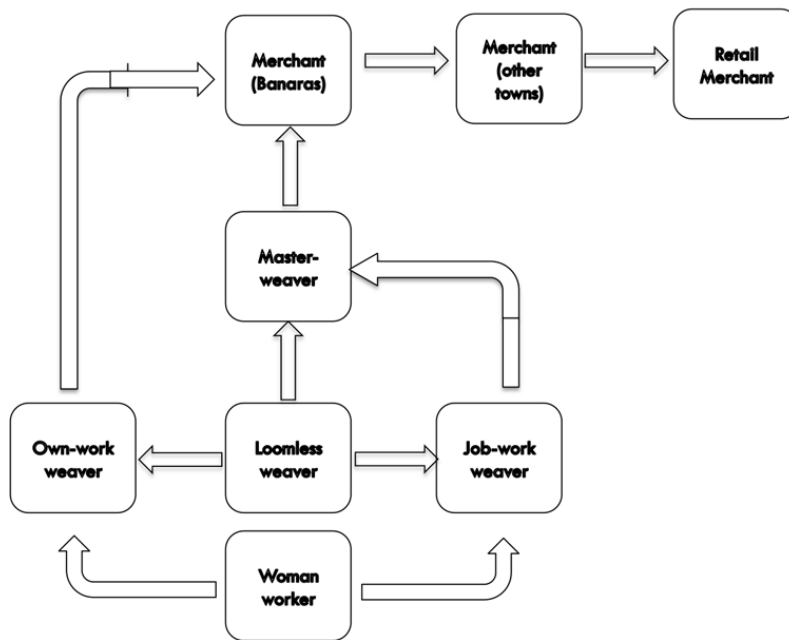
Yet, large changes have also occurred in the cluster since the 1990s, in part as a result of competitive pressures from other weaving centres in India as well as from China. Synthetic fibres are increasingly being used in addition to the traditional silk and a variety of products such as fabric, upholstery, bags, stoles, scarves, etc. are being manufactured in addition to *saris*. Banaras entrepreneurs and merchants have also started using needlework as accompaniment to woven embroidery. Finally, the most significant shift, in terms of productivity, has been the introduction of powerlooms. As with Surat, Malegaon, Bhiwandi and Ichalkaranji in Western India (Haynes, 2012), powerlooms are emerging in Banaras within pre-existing artisanal industry, albeit around seventy years later. Further, it is capital accumulated via handlooms that is being invested in powerlooms by masters. Since handlooms still exist in large numbers, the industry currently offers a unique opportunity to study the transition. Individual weavers sometimes own or operate both types of looms, master-weavers often put-out to both types, and merchants acquire output from both as well.

Economic Organization

Figure 2 is a schematic depiction of the organization of the industry. There are three types of weavers: loomless weavers who weave in the employer's home or workshop, job-workers who work in their own home for a master-weaver (or more rarely directly for a merchant) and typically own their looms, and own-workers who own their looms and

produce for direct sale on the wholesale market in Banaras. Both job-workers and own-workers may also employ a small number of loomless weavers if they have idle loom capacity and if there are demand pressures. While reliable statistics are not available, based on my field observations and interviews with long-time industry observers, job-workers appear to be the most numerous among the three types. Master-weavers, called *girhast* (lit. householder) in local parlance are own-workers with enough capital to produce in-house, as well as put work out to a variable number of job-work weavers and/or employ loomless weavers on their premises. Own-workers as well as master weavers sell finished products to merchants or traders in the wholesale market located in the city centre. Nearly 90% of total production is sold in the city itself (DCHandlooms, 2008). The traders are called *gaddidar* in local parlance. A *gaddidar* usually belongs to a trading caste (e.g. a Hindu *bania*) and only trades, does not put-out.

Figure 2. Organization of the Banaras weaving cluster



Source: Author

The family-based system of training and labour extraction provides merchants and master-weavers with a large, well-trained and disciplined workforce. Weavers often complain that the putting-out system allows master-weavers to exploit the entire family's labour for one person's wage and point out that without the contributions made by

women and children, production would be much more expensive. An ex-weaver turned restaurant-owner in the poor neighborhood on Bazardiha noted,

Without children and women a sari would never be completed. If you are told that we earn Rs. 100 a day, you might think he individually earns that much, but in fact if you account for the whole family's work, it is difficult to earn more than Rs. 50 a day. (Field Interview 2/22/2010 #7)

As expected with a largely home-based production system, the median firm is small in size. Number of handlooms per firm, across own-work and job-work weavers, in my sample was three (Table 1), consistent with the average of 2.4 looms reported for Banaras in other surveys (DCHandlooms, 2008). However, not all small firms are purely family-based. Weavers with as few as four looms are found employing hired workers (generally loomless weavers). Powerloom firms are as small as handloom firms and the vast majority of powerloom weavers (92.6%) in the sample have been trained previously on handlooms. The average powerloom firm in the sample had 2.6 looms.⁸ The figure is consistent with a recent survey of the national weaving industry that reports that the average powerloom firm in Uttar Pradesh has around three looms (Bedi and Verma, 2011). Larger powerloom workshops (or small factories) do exist in the city, but their number and exact size are a matter of speculation since much of this activity is kept hidden to escape labour laws and evade taxes.

The principal sub-contracting relation in Banaras is that between master-weavers and job-workers. The master-weaver's firm can be thought of as a network-enterprise (Capecchi, 1989) that brings together different artisans in a putting-out network. Such an enterprise is well-suited to the demands of flexible specialization. It also integrates comfortably with the existing community of independent artisans who are used to home-based, family-organized production and are specialized in one stage of the production such as dyeing, designing, punching of boards for the Jacquard, post-weaving embroidery and finishing of fabric (Figure 3).

⁸ What little survey data is available on Banaras pertains largely to the handlooms. The present study reports for the first time on powerlooms.

Table 1. Summary Statistics

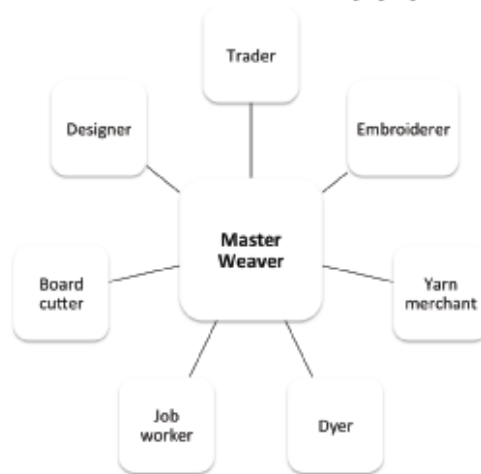
Characteristic	Mean (SE) / Median	N
Num. handlooms per family firm	3*	64
Num. powerlooms per family firm	2.6 (0.3)	26
Num. looms owned by weavers who hire workers	4*	20
Num. looms put-out to by master weaver	60*	35
Income per month (2010 Rupees)	3142 (241)	68
Length of working day (hours)	9.6 (0.2)	57
Years ago powerloom installed	6*	29
% PL workers who worked previously on HL	92.6	27
Age apprenticeship started (years)	10.9 (0.5)	72
Duration of apprenticeship (years)	4.2 (0.4)	54

Source: Field Survey. *- Median values are reported due to presence of outliers.

Flexibility of production is achieved by combining the specialized components as desired (see Vijaybhaskar, 2005 for a similar system in Tiruppur). For example, an inventory of different colour and designs is built up by running the same design in different colours on different looms. In the sample, the median master-weaver put out work to 60 looms. The large difference between this number and the median number of looms typically operated in-house indicates that the preferred mode of expanding an operation is putting-out.⁹ With around 2000 master weavers currently operating in Banaras (Varman and Chakravarti, 2011) this gives a rough estimate of 120,000 job workers. Adding own-work and loomless weavers, we may get a figure of around 200,000 weavers, which is in accordance with other estimates of the weaver population.

⁹ One caveat here is that it is difficult for an outsider to gauge the size of a typical putting-out operation because master-weavers tend to keep the number of looms they put out to a secret. Figures, when quoted, are likely to be underestimates. I adopted the strategy of asking a job-worker for an estimate of the number of weavers who work for his employer. The basis for this is that job-workers often spend time at the master's *gaddi*, the section of the house where business is conducted, and hence have the opportunity to observe how many other job-workers come and go.

Figure 3. The function of the master weaver in bringing together artisanal firms



Source: Author

Labour flexibility is generated via the absence of written and/or long-term contracts. Either party can terminate the relationship at the end of any job period. At one time, typically the job-worker receives yarn for four to five *saris* (roughly thirty meters) in case of handloom and roughly ten times that amount for powerloom. Once he has finished the job, wages and other terms of the oral contract can be renegotiated or the relation can be terminated. In my sample the median duration of association with a master was two years (N=46).

Increased Productivity, Stagnant Wages

Like other weaving centers, in Banaras also, it is former handloom master-weavers who have accumulated enough capital to move into powerlooms and former handloom workers who have started working on powerlooms. While powerlooms are generally identified with production of plain gray cloth from synthetic yarn (Roy, 1998), in Banaras they are increasingly being used to produce patterned, silk fabric. *De jure*, in order to protect the handlooms from powerloom competition, the production of such cloth on powerlooms is prohibited as per the Handloom (Reservation of Articles and Production) Act, 1985. However, *de facto* the law is routinely violated. The rise of powerlooms in Banaras is intimately connected to a raging debate over whether machines should be allowed to produce fabric that has thus far been the provenance of handloom weavers. I have discussed this phenomenon in detail, elsewhere (Basole, 2012).

Piece-wages are the predominant form of wage in the Banaras cluster for job-workers and loomless weavers. Interviews reveal that rates are decided via a bargaining process in which a crucial factor is the time it will take to weave a sari (or a meter of cloth). This is multiplied by a conventional daily wage rate. This practice is in keeping with historical methods of setting piece-wages (Emmanuel, 1972: 419). There is room for disagreement on how long a sari will take to weave. Often a weaver will weave a sample before the wage is set, to get an idea of the work involved. The usual time range for handlooms is between one to twenty days, the key determinants being the type and denier (fineness/coarseness) of yarn, complexity of the design and the number of colours it demands.

In my sample of fifty-nine handloom weavers, the average piece-rate is Rs. 104.75 per meter, while the average productivity is 0.14 meters per hour. For a nine-hour working day (Table 1), this gives a daily wage of Rs. 132 (\$5.28 PPP-adjusted) and assuming a twenty-five day working month, a monthly wage of Rs. 3300 (this is consistent with survey findings on monthly income, see Table 1). For comparison, UP state minimum wages for handloom and powerloom weaving are Rs. 198.51 for semi-skilled and Rs. 220.35 for skilled work.¹⁰ In keeping with low wages, estimates for the production costs of a handloom Banarasi Sari provided by Varman and Chakrabarti (2006) indicate that labour costs are only around ten to fifteen per cent of the final retail price of a sari.

Although powerloom technology is often obsolete (sometimes as old as mid-twentieth century) and electricity supply is erratic, introduction of the powerloom has increased productivity by nearly a factor of ten. Table 2 presents per meter piece-rates, productivity (meters per hour) and hourly wage rates in the handloom and powerloom samples. A powerloom operator can expect to produce on average 1.3 meters of cloth per hour at a piece rate of Rs.10.5 per meter, while on a handloom, productivity is roughly one tenth

¹⁰ Indian Industries Association (Apex Body of Micro, Small, and Medium Enterprises) website (accessed 2 May 2014): http://www.iiainline.in/doc_files/Minimum%20Wages%20in%20Uttar%20Pradesh%20_1%20ap r%20-%2030%20sep,%2012_.pdf

and the average piece rate ten times as much, giving comparable hourly wages for both types of weaving.¹¹

Table 2. Productivity and wages in handlooms and powerlooms

Characteristic	Handloom	Powerloom
Productivity (meters/hr)	0.14 (0.01)	1.36 (0.10)
Piece Rate (Rs./meter)	104.75 (9.26)	10.56 (0.96)
Hourly wage (Rs.)	10.3 (0.50)	13.3 (1.0)
N	62	27

Source: Field Survey

Banaras thus offers a clear example of a labour surplus regime in which the “conventional” or subsistence wage prevails despite technical change, and capital accumulation has increased productivity but not wages. Gains from productivity may, under these circumstances, accrue to master-weavers, merchants, or consumers (or all three) (Heintz, 2006). Addressing this question requires detailed data on the value-chains that is lacking for Banaras. But, this finding does explain the phenomenon of ‘passing-off’ of powerloom cloth as hand-made that is common in Banaras (Basole, 2012). To the extent that powerloom-made fabric can be sold as handloom-made, it is able to command a higher price in the market, ensuring that productivity gains go to master-weavers and merchants as profits rather than to consumers as lower prices.

FAMILY-BASED APPRENTICESHIPS AND LABOUR SUPPLY

It is clear from the low prevailing wage-rate and absence of productivity gains that Banaras is a labour surplus economy. There are well-known macroeconomic or structural reasons for lack of alternative sources of employment in Banaras.¹² Without discounting

¹¹ Since weaving of design cloth requires more attention on part of the weaver, unlike Surat and other powerloom centres of plain cloth, in Banaras, one weaver only operates one or two looms at the time.

¹² The eastern part of Uttar Pradesh, in which Banaras is situated, is the poorer half of one of India’s poorest and least industrialized states (Kozel and Parker, 2003). The lack of formal sector employment is an important cause of poverty, expressed by one 55-year old handloom weaver as follows: If government opens some factories, we will send our children there. The government

these reasons, I wish to highlight an ‘endogenous’ factor that is responsible for excess supply of labour: the system of family-based apprenticeships.

Like many other traditional artisanal clusters, Banaras also displays a robust family-based apprenticeship system. The strength of this training process lies in creating skilled workers who can produce high quality output using simple or rudimentary technology. Despite its widespread prevalence, the system of artisanal apprenticeships has not received much attention in the literature on the informal economy. The typical weaver in my sample has no formal schooling but usually has some religious training and ability to read Hindi and Urdu. Boys typically start learning to weave around age ten and on average weavers report taking around four years to learn the basic skills (Table 1).

But interviews reveal that these numbers do not tell the whole story. Interview data is presented here to make three points regarding apprenticeships in Banaras. First, training is informal in that there are no designated resources, no time or space that is set aside for learning, but yet it is structured in that there is great emphasis on application of the mind and correct practice. Second, there is no clear ‘starting age’ or ‘duration of apprenticeship.’ Third, the family is crucial to organizing the learning process via the structuring of domestic space into work and leisure areas, and controlling the allocation of time for children.

On the formal-informal distinction, one of my respondents, a weaver-turned-carpenter, had this to say:

Our trade is such that, just as a fish is not taught how to swim, our children are the same. They watch and learn. There is no need for any formal studying. In this respect we are very different from you. You will do everything by (formal)

should open factories for the unemployed, give them decent wages according to inflation. There is a lot of space here [in Banaras] but there is no source of employment. (Field Interview 2009 12 22 #1)

studying, and as for us, even if we don't study at all, we will do our work just fine. (Field Interview 02/18/2010 #7)

This study's participants frequently invoked the contrast drawn by this respondent between informal and formal learning. At times attention was drawn to this difference to emphasize the usefulness of practical knowledge in contrast to the futility of 'book knowledge.' At other times the aim was to contrast the different valuations placed by the labour market on the same number of years spent in informal training versus a formal diploma or certificate.

When asked about the age they started learning or how long they had been weaving, many weavers used the phrase *jab se hosh samhala* which roughly translates as 'since I became conscious' or in other words, for as long as one can remember. For most men as well as women, growing up and learning work appropriate to their gender are indistinguishable processes. As with the Zapotec weavers in Oaxaca, so in Banaras, children learn 'by undertaking minor tasks that support the work of weavers and thereby contribute to the economic livelihood of the household' (Wood, 2008:143). Not just work, but play enacts learning also. Children play/practice with shuttles on the warp, as their fathers/brothers weave, or merely 'hang about' in the workshop being acclimatized to the sights and sounds of work. Lave and Wenger (1991), describe such activity as 'legitimate peripheral participation.' In this view, learning is participation in social practice through well-defined social roles.

Boys can weave and girls can do preparatory yarn work as well as needle embroidery work by the time they are young adults. A key consideration during marriage is the ability of the girl to undertake not only household work (reproductive labour and domestic work) but also all weaving-related activity. The stages of apprenticeship are closely intertwined with the process of growing up, and at almost every stage learning and productive work are also intertwined. A 30-year old, handloom master-weaver:

If you ask an Ansari boy how old he was (when he started learning), he will not be able to tell you. The workshop is downstairs, the weaver lives upstairs. When a boy starts walking, his mother says to him 'take these bobbins to the workshops.'

That is how it starts...At that time the child is three years old. When the boy is four years old he is given a small empty shuttle, which he can practice throwing between the warp yarn every time his father uses the treadle to lift the warp and pass the weft yarn through. Whenever he has some free time, (his mother will say) 'son, go to the workshop' just like in educated people's homes the mother says 'son, go and study.' Slowly, in four or five years he starts helping with the sari border on one side, which in our language we call embroidering. In five years time, he has learnt everything, now he has only to wait till his body is big enough. Now his mother prays, 'let my son grow up quickly.' (Field Interview 05/02/2010 #1)

Even though weaving is in the air and is part of the culture, 'learning to weave is the responsibility of the person doing the learning' (Wood, 2008:154). Stress is laid on the role of individual capacity in assimilating knowledge. This was clear in the responses to the question 'How long did it take to become a good artisan?' where often the vague, yet telling response was 'it depends on your mind' [*dimaag ke upar hai*]. One 46-year old handloom job-work weaver with young children elaborated on this theme while lamenting the lack of seriousness among today's youth.

It depends on your interest. You have to have the inclination to solve your own problems. I never called anyone for help. First I tried to figure it out myself. The children are not like that, if something breaks or spoils, they will run away (from work). Everyone's children are the same. (Field Interview 12/24/2009 #4)

Weavers may describe learning to weave as indistinguishable from growing up, but they are also aware that learning is not effortless or 'natural.' The implicit-explicit or purposive-accidental nature of learning seems characteristic of informal knowledge acquisition. There is awareness that this is a preparation for a livelihood (and not some amateur dabbling) but there is also an unconscious or by-the-by quality to the actual process.

It emerges clearly from the foregoing, that skill acquisition is integrated into the life of weaving families. There is no explicit cost of training (such as tuition, books, uniforms

etc.). Typically costs of on-the-job training, such as the apprenticeship system described here, have been thought of as consisting of value placed on the time and effort of trainees and teachers, and the equipment and materials used (Becker, 1962). These are costs in the sense that they could have been used in producing current output if they were not used in raising future output. To the extent that these costs fall, training is cheapened. The opportunity cost of the apprentice's time is low because training starts at a very early age, at which time the child is unlikely to undertake any other economic activity. Thus this cost is lower than it would be if the trainee were older and hence commanded at least an adult unskilled wage in the market. There are some costs associated with the father's or trainer's time spent in instructing the apprentice. However, since all training is on-the-job, the instructor can continue imparting instruction without taking time away from his work. In Banaras, a common method of teaching weaving until recently has been to make the apprentice work as a 'helper' who works on hand embroidering the fabric border at the same time that the weaver weaves. This is a cooperative labour process between the weaver/father and apprentice/son. The cost here is only the foregone production as a result of slowing down of the production process due to the trainee. There is no stoppage of production for training purposes.

In a competitive labour market, a profit-maximizing firm will have no incentive to provide on-the-job training because after having been trained, workers could simply leave the firm for another job. This could be mitigated to the extent that training involves firm-specific skills and/or costs of training can be shifted to the worker (Becker, 1962). But in the Banaras case, training is not being delivered by profit-maximizing firms. In the 'network firm' or putting-out system, masters and merchants do not bear any costs of training and avail free-of-cost of a trained workforce. Rather, it is the family that bears the costs because it is assured the benefits of the future earnings of its member.

So, for an insider in the weaving community (say a child in a weaving family), entry into the skilled labour force is easy due to low material barriers of training but exit is difficult not only because existing skills provide a motive for staying, but also due to structural reasons (lack of alternative employment). Because young people are drawn into the labour force before they can balance risks and rewards, such systems ensure 'a continuing

supply of recruits into industries which, viewed from afar, required discouragingly long-term investments in narrow skills without the compensating prospect of long-term economic security for those who made them' (Sabel and Zeitlin, 1985: 153). Further, strong incentives exist on part of the family to train the son, at least as a fallback option, in case other employment is not forthcoming. This results in an excess supply of trained weavers, lowering wages.

Informal training regimes such as the one found in Banaras thus guarantee subsistence but not much more than that, and contribute to wages remaining at subsistence.

Interviews reveal that weavers appreciate this fact. "No one really likes teaching their children this work any more. One who doesn't know how to do anything else has to do this out of desperation. If he finds a way out, he will leave at once." (Field Interview, 12/23/2009 #3) Indeed, many young men have left for weaving towns in western India, such as Surat and Bhiwandi or have taken up other work such as driving rickshaws or operating small retail stores.

COMPETITION AND INFORMAL KNOWLEDGE FLOWS

The second 'knowledge institution' critical to the functioning of the Banaras cluster, is the system of fabric designs and dissemination. Traditionally, Banaras has created a market niche and a reputation based on these designs and the related technique of brocade embroidery. This is a "knowledge-based" niche that is a feature of many artisanal clusters.¹³ As with labour market institutions, informality is a key feature of the knowledge regime in artisanal clusters. While the cluster literature has acknowledged the importance of skills embodied in workers as well as the rapid diffusion of designs as a key dimension along which firms in the cluster compete with each other, more work is required to identify the strengths and weaknesses of these informal networks and institutions (Beerepoote, 2008; Colloredo-Mansfeld and Antrosio, 2009; Meagher, 2010).

¹³ Such niches are being formally recognized via the granting of Geographical Indications to artisanal clusters. As of January 2014, the Government of India has granted around 215 such GIs to craft clusters all across India. I analyse the GI awarded to 'Banarasi Saris and Brocades' in Basole (2012).

Figure 4 (left panel) shows the steps in the design process. Designs are created by artists (known by the English word ‘designer’ or the Urdu word *naqsheband*) whose work is purchased by own-work weavers and master-weavers. If they can afford to do so, master-weavers employ their own in-house designers. There is no record of the number of designers in Banaras, but according to the weavers and master-weavers interviewed, they number in the hundreds. Many weavers also can sketch designs on the side. Designers are trained via an apprenticeship system similar to weaving in that it is offered free-of-charge and usually takes four to five years. Unlike weaving, one designer usually trains several boys at a time. A designer’s reputation is an important asset, so training of students is also seen as a way to enhance one’s reputation and attract more clients.¹⁴

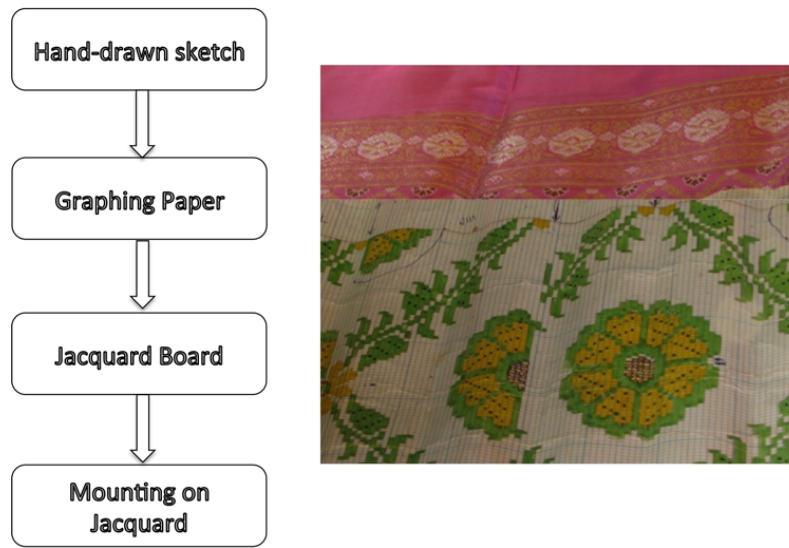
Most master-weavers retain an archive of designs they have commissioned over the years, since fashion cycles may require the revival of an older design. Usually an initial idea is suggested to the designer or an older pattern is shown and a variation is requested. These suggestions are based on the style that the master-weaver is known for, or on particular demands from merchants. The designer improvises to produce a new sketch.¹⁵ Traditionally done by hand, computers are making in-roads into this process as well. The designer is paid a fixed amount per design. The price depends on complexity and the experience and fame of the designer. Usually designers quote a price that includes the value of labour that goes into transferring a sketch on to graph paper (Figure 4). During 2009-2010, this price ranged between Rs. 500-5000. After production the design becomes the property of the person who commissioned it. No copies are kept with the designer.¹⁶

¹⁴ One designer who has been in the trade for over 30 years rationalized the free training system as follows: There is no charge for it. Only the time the students and teacher spend. This is because if I have students, my name will also spread. I have students working as far as Gujarat and Punjab (Field Interview, 02/06/2010).

¹⁵ ‘I start thinking about what is popular in the market right now. I try to open my mind and search for something new along those lines (ibid).’ He noted that inspiration for improvisation also comes from books, magazines and catalogs, and increasingly television as well.

¹⁶ This is changing with the advent of computerized designs. Soft copies can not be stored on the designer’s computer giving rise to a new set of anxieties on part of the commissioning weavers and masters.

Figure 4. The design process (left) and a graphed Banarasi design alongside its woven form (right).



Source: Author

There are counter-veiling forces between the necessity to spread the fixed design costs over as many pieces as possible and the imperative of producing newer types of fabrics. There is intense competition to bring out newer designs whose monopoly rents will accrue to the master-weaver before it becomes generalized via imitation. Master-weavers are also known to share some of these rents with job-workers in the form of higher wages, while the design is doing well. But then, if the demand reduces, they also reduce wages for that product.¹⁷ From the traders and master-weavers the constant refrain is ‘show me something new’ (*koi nai cheez dikhaeeye*). Designers do take pride in their ability to be original and innovative, but are also critical of the pressure to innovate. One designer, who had been in the trade for eighteen years but had recently left due to the recession in the industry, put it thus:

I always thought, what has been sketched already, don’t think about that. If you keep that in mind then one way or another, you will find yourself doing the same thing. Your thought won’t progress. (Field Interview 06/11/2010)

Another was more critical:

¹⁷ One master-weaver also admitted that changing the fabric design can also be a strategy of labour control (Field Interview 2/25/2010 #8). If pressured into raising wages, he noted, masters can simply change the product and claim that the new designs does not pay as much. In the absence of fixed daily or hourly wages, the piece rate system allows this flexibility.

Their [merchants and master-weavers] formula [original in English] is always ‘make something new.’ What new things can we make? And if we do make something the problem is that they will put it in their computer database and start production. It will benefit them, not us. (Field Interview 12/23/2009 #1)

Job-workers for their part point out that each design change results in loss of production time during which the loom has to be reconfigured. No compensation is provided to the weaver for this lost time. The opportunity cost of time lost during design changes is a particularly contentious issue due to frequent changing of fabric design. For example, a powerloom job-worker in the town of Mau complained that his piece-rate of Rs. 30 per *sari* hid the cost of lost production time when the design changed (Field Interview 04/21/2010 #2).¹⁸ Thus, while masters prefer to change designs frequently job-workers prefer long production runs. It is difficult to predict how long a design will be in operation, since this depends on market trends. Some may fail and be scrapped in a matter of months, while others may last years. In my sample the range was from 4 months to 4.5 years (N=26).

The clustering of a large number of relatively small firms none of whom have recourse to formal property rights for their designs results in quick knowledge spillovers. There are two principal channels via which designs propagate, viz. directly via designers who work for more than one master-weaver or indirectly via the market. Thus designs are closely guarded before they are ready for the market and stealing is a constant source of anxiety. One master-weaver from the town of Mubarakpur argued that the only way to remove this anxiety was a system of intellectual property rights:

Say you and I are both master-weavers. I should not be able to copy the design you have made because *Banarasi* is based upon these designs. We both make six meters of cloth. What distinguishes us is the design. If yours is selling more I can steal it. If there is a patent this won't happen. (Field Interview 02/25/2010 #8)

Others were more skeptical about a patenting regime and one designer even laughed at the prospect of trying to implement such a system. Indeed, in the current formal

¹⁸ A handloom weaver in Banaras similarly noted: ‘When a new design comes, we have to study it, implement it on the loom, and learn to weave it. It can take three or four days.’ (Field Interview 12/29/2009 #6)

institutional context in Banaras, where even a relatively simple certification scheme such as the ‘handloom mark’ cannot be implemented successfully to protect handlooms from powerloom competition,¹⁹ it is unlikely that an IPR regime at the firm-level could be instituted. In the absence of patents and copyrights, secrecy is the only option and designers are expected not to divulge designs they are doing for one person to another. Once again the ex-designer:

If I make a design for you, then it is for your eyes only. . . If that design comes out very well and some other *girhast* says make this one for me too, I don’t have the right to betray trust in this fashion. If I do this it is like I am trifling with my livelihood. Good designers don’t do this because whenever they want they can produce a new design.

Two other senior designers with over twenty years of experience expressed similar sentiments. But in actual fact, secrecy is hard to maintain even if it is accepted as an ideal to strive for. Once the fabric is out however, there is no secrecy. One of my principal informants, a 40-year old job-work weaver who used to sell his own products commented, ‘People want to hide things. But eventually the curtain opens.’ (Field Interview 02/17/2010) Banaras has a large local wholesale and retail market, and a stroll through the marketplace can be enough for the trained eye to see what is selling and what is not. One designer noted:

When I go to the market a thousand different designs pass before me. Taking this idea from one, that idea from another, I create a new thing. (Field Interview 06/02/2010 #1)

Every design produced thus adds to the collective store of knowledge that can be drawn upon by other designers to imitate and modify, creating a common-pool resource. It is not an open-access regime because, despite lack of excludability, only community members trained in the *naqsheband* system have thus far been able to avail of it. In this it closely resembles the ‘cultural commons’ of the wool and acrylic sweater weavers of Otavalo in the Ecuadorian Andes (Collredo-Mansfeld and Antrosio, 2009). The strength of such a system is that no resources are devoted to creating a legal system of exclusion and

¹⁹ <http://timesofindia.indiatimes.com/city/varanasi/Handloom-mark-missing-from-products-at-all-38-stalls-of-India-Weaves-event/articleshow/27993730.cms> (accessed 2 May, 2014)

incremental changes are easy to make since no copyright is infringed. Its weakness is that lack of copyright encourages hoarding for as long as possible and changes tend to be conservative. Further, as firms proliferate, competition drives rents down very low.

This last point is becoming more salient with the advent of the powerloom in Banaras. As mentioned earlier, machine-made fabric is increasingly being sold as handmade, using the fact that consumers rely more on designs than on knowledge of production technique to identify *Banarasi saris*. The pace of production is nearly ten-fold on the powerloom, thus increasing the pressure to produce design variations. Further, the computerization of the design process also makes it much easier to duplicate and modify existing patterns making the knowledge truly an open-access resource rather than a governed commons. Several senior designers expressed anxiety over the storage of design in digital databases.

It is unclear how the *naqsheband*-system that has evolved with handloom production in Banaras will adapt to powerlooms and the digital age. One important development with the advent of the powerloom, has been the incorporation of post-weaving embroidery in addition to woven embroidery in designs, which greatly increases the combinatorial possibilities. The proliferation of such embroidery, which has been commented on with disapproval (DCHandlooms, 2008) could be seen, in part, as a strategy to cope with the increased volume of production whose demands of novelty cannot be met within traditional repertoire.²⁰ Any cluster-development scheme for Banaras will need to take into account the importance of this system for the cluster's identity and future.

CONCLUSION

Informal industrial clusters, like the Banaras weaving cluster studied here, are central to the process of industrialization, employment generation and export promotion in developing countries. But more needs to be known regarding labour training regimes and systems of inter-firm knowledge transfer to understand the strengths and weaknesses of community and family-based institutions that enable flexible specialization.

²⁰ There are other important reasons for the change in embroidery techniques on powerlooms such as technical difficulties in reproducing brocade weaving on the powerloom. I deal with these reasons in Basole (2012).

How informal firms share knowledge with each other, how they protect their intangible assets in the absence of intellectual property rights and what effect these strategies have on innovation are questions central to cluster functioning and flexible specialization in developing countries. We see that the lack of a formal patent or copyright system has resulted in a code of ethics among Banaras designers regarding the sharing of designs. However, designs do still spread rapidly across firms once they are out on the market and master-weavers are anxious to continually innovate and capture the rents that accrue for novel designs. While the system has served the cluster well thus far, the coming of powerlooms and computerization of designs (as well as creation of digital databases) threaten to increase competitive pressures to a counter-productive level. The costs of frequent changing of designs are also forced on to the artisans who have to suffer lost production times. Similar institutions may exist in other artisanal clusters and need to be investigated.

This study also demonstrates the importance of the artisanal family to the organization of production as well as the creation of a skilled labour force. Banaras operates with a putting-out system where master-weavers avail of a trained workforce whose costs of training are borne by the artisanal family. For a child in a weaving family entry into the skilled labour force has a low barrier of entry but exit is difficult because existing skills provide a motive for staying and for lack of alternative employment. It has been argued here that the cost structure of apprenticeships and the incentives at the family level to impart skills to children results in an oversupply of skilled artisans, keeping wages low.

We also see that the surplus labour regime in Banaras has prevented job-workers and loomless weavers from sharing in the productivity gains that result from the switch to powerloom production. Technical change is generally considered to be beneficial for cluster growth, but the Banaras case illustrates that for gains from technical change to accrue to workers, effective institutions of worker organization will need to be in place. Without this, capital accumulation and productivity increases will happen without significant welfare gains for the workers. Part of the explanation for low wages in

Banaras resides in the wider political economy of the region that presents inadequate opportunities for workers seeking to leave the industry. But ensuring that growth of the Banaras cluster results in welfare gains for its workers entails building new institutions (such as unions) and reforming existing institutions such as weaver cooperatives (which have not been part of the present study), are also an important component of reform. Future work will engage with the existing mechanism of joint action and collective efficiency such as cooperatives and traders associations as well as mechanisms via which gains from the transition to powerlooms can be shared by artisans.

ACKNOWLEDGEMENTS

This work was funded by fellowships from the American Institute of Indian Studies (AIIS) and the Political Economy Research Institute (PERI). I thank J. Mohan Rao, James K. Boyce, Mwangi wa Githinji, Ananya Vajpeyi, Durba Chattaraj, Rajesh Bhattacharya and Smita Ramnarain for comments. I also thank Sunil Sahasrabudhey, Chitra Sahasrabudhey, Ehsan Ali Ansari, M. Ahmad Ansari, Pradeep Gond, Mohammad Aleem Hashmi, and Shilpi Suneja for their invaluable assistance during fieldwork. Responsibility for errors is mine.

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