

**A Study of Selective Handloom Clusters of West Bengal:
Progression and Persistence**

**Thesis submitted to the Department of Economics, Jadavpur
University**

For the degree of Doctor of Philosophy in Economics

**by
Rishav Mukherjee
Reg. No.: A00EC11014118**

**Under the supervision of
Prof. Malabika Roy
&
Prof. Tanmoyee Banerjee (Chatterjee)**

**Department of Economics
Jadavpur University
Kolkata, West Bengal
India**

2025

Certified that the Thesis entitled

“A Study of Selective Handloom Clusters of West Bengal: Progression and Persistence”

submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my work carried out under the Supervision of Prof. Malabika Roy and Prof. Tanmoyee Banerjee.

And that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere / elsewhere.

Countersigned by the

Supervisor: *Malabika Roy*
Dated: *18/9/2025*
Co-supervisor: *Tanmoyee Banerjee*
Dated: *18.9.2025*

PROFESSOR
DEPARTMENT OF ECONOMICS
JADAVPUR UNIVERSITY
KOLKATA - 700 032

Candidate: *Rishav Mukherjee*
Dated: *18.09.2025*

Acknowledgements

The journey of pursuing a PhD has been a long and often challenging one—an endeavor that would not have been possible without the unwavering support, guidance, and encouragement of many individuals to whom I owe my deepest gratitude.

First and foremost, I express my heartfelt thanks to my supervisors, **Professor Malabika Roy** and **Professor Tanmoyee Banerjee**, whose constant guidance has been instrumental throughout my doctoral research. Their invaluable insights, thoughtful critiques, and steadfast encouragement have not only shaped the contours of this thesis but also deeply influenced my academic growth. I am especially grateful for the intellectual freedom they offered, which allowed me to explore new directions, and for their patience and reassurance at every stage. Working under their mentorship has taught me much more than academic rigour—it has also shown me how to navigate difficult situations with perseverance and grace.

I extend my sincere appreciation to **Professor Saumya Chakrabarti**, Head of the Department of Economics, Visva-Bharati, for his constructive feedback during Research Advisory Committee meetings. His suggestions helped me refine and strengthen my work. I am particularly grateful for the support he extended during some personally difficult phases, which enabled me to stay on course and complete my degree. I would also like to express my gratitude to **Professor Amit Kundu**, the current Head of the Department of Economics at Jadavpur University, for his valuable contributions as a member of my Research Advisory Committee. His insights have helped shape the final structure of this thesis.

My warmest thanks also go to the faculty members of the **Department of Economics, Jadavpur University**. Their encouragement, generosity, and enthusiasm for research have greatly inspired me. I thank the present and former heads of the department for their administrative support, and I deeply appreciate the excellent infrastructure, seminars, workshops, and academic events that provided a rich platform for scholarly exchange. The kind

assistance of the non-teaching staff and the camaraderie of my colleagues made the department a nurturing space throughout my time there.

I would also like to acknowledge the support of my workplace, the **Agro-Economic Research Centre (AERC), MoA&FW, Visva-Bharati, Santiniketan**, where I have been employed for the past four years. I am grateful for the leave granted during crucial periods of my PhD, and for the access to infrastructure and resources that significantly supported my research.

On a more personal note, my deepest gratitude goes to those closest to me. My mother, **Chandrani Das**, my first and most beloved teacher, has been a pillar of strength throughout my life. Her faith in me has been unshakeable and her encouragement endless. To my wife, **Papiya Khan**, I owe profound thanks—not only for her love and companionship but for creating a space of calm and support at home that allowed me to focus entirely on my research. Even while pursuing her own PhD, she stood beside me, an unwavering source of strength in the most difficult times.

To my sister, **Sohini Mukherjee**, my brother-in-law, **Sunasir Majumder**, and my dearest niece, **Suhasini**, I remain eternally grateful. They have been my anchor and my sanctuary, always radiating warmth, joy, and reassurance. Their unconditional love and steadfast belief in me carried me through the darkest moments and kept me grounded.

Finally, I extend my thanks to all my friends, those who stood by me, listened to me, encouraged me, and lent a helping hand whenever I needed one. Each one of them has contributed, in ways big or small, to this journey.

To all of you, thank you. This thesis is as much yours as it is mine.

Contents

Acknowledgements.....	iii
Contents	v
List of tables.....	vii
Chapter 1: Introduction.....	1
1.1 Introduction.....	1
1.2 Historical Background of the Handloom Sector	2
1.2.1 History of the Handloom Industry in India in a Global Context.....	3
1.2.2 Development of the Handloom Sector in India.....	4
1.3 West Bengal Scenario	6
1.4 Evolution of Handloom Organisational Structures	8
1.5 Present Scenario of Coexistence of Different Organizational Structures in India	9
1.6 Background and Objective of the Study	10
1.7 Hypotheses and Introduction to Methodology	12
1.8 Structure of the present thesis	13
Chapter 2: Review of Literature.....	16
2.1 Introduction.....	16
2.2 Literature on Firm Performance.....	18
2.3 Literature on Gender Gap in Performance	22
2.4 Literature on Credit and Production Plan	27
2.5 Motivation of the Thesis	31
Chapter 3: Sample Design, Data, and Cluster Descriptions.....	33
3.1 Basic Definitions.....	33
3.2 Descriptions of the handloom clusters	35
3.2.1 Dhaniakhali Handloom Cluster (Hooghly)	35
3.2.2 Santipur–Phulia Handloom Cluster (Nadia)	36
3.2.3 Samudragarh Handloom Cluster (East Burdwan).....	38
3.3 Sample Design, Data, and Questionnaire.....	39
3.3.1 Sample Design and Data	39
3.3.2 Description of the structured questionnaire	45
Chapter 4: The Handloom Sector under Different Organisational Frameworks: A Study of Selective Handloom Clusters of West Bengal.....	51
4.1 Introduction.....	51
4.2 Characteristics of the Sample.....	55
4.3 The Methodology	56
4.3.1 Estimation of Revenue, Cost, and Profit.....	56
4.3.2 Determinants of the level of output.....	58

4.4	Results.....	59
4.4.1	Results on mainly-independent handloom unit.....	59
4.4.2	Mainly-cooperative Handloom-units	62
4.4.3	Mainly-subcontracted Handloom-units.....	65
4.4.4	Determinants of Output Level.....	68
4.5	Discussion.....	71
4.6	Conclusion	74
4.7	Limitations of the chapter:	76
Chapter 5: A Decomposition Analysis of Gender Gap in Performance of Weaving Entrepreneurs from Natural Handloom Clusters of West Bengal.....		82
5.1	Introduction.....	82
5.2	The Context.....	85
5.3	Descriptive statistics across Organizational Structures and Gender	86
5.4	Methodology	89
5.4.1	The measurement of total revenue for males and females	89
5.4.2	Methodology of Decomposition Analysis	91
5.5	Results and Discussion	92
5.5.1	Measuring the Gender Gap in the Distribution of Revenue per Annum.....	92
5.5.2	Decomposition Analysis	94
5.6	Conclusion and policy suggestion.....	98
5.7	Limitations of the Chapter	101
Chapter 6: An Analysis of Production Loan and Future Expansion Plan of Handloom Weavers from West Bengal, India.....		103
6.1	Introduction.....	103
6.2	Descriptive statistics of loan status and production plan across organizational structure...	105
6.3	Methodology.....	106
6.3.1	Model 1: Recursive Bivariate Probit regression (RBP)	106
6.3.2	Model 2: Probit equation with binary endogenous treatment variable	107
6.4	Results and Discussion	108
6.4.1	Results of Recursive Bivariate Probit Regression	108
6.4.2	Treatment Effects Analysis	111
6.5	Conclusion and Policy Prescriptions.....	112
Chapter 7: Conclusion and Policy Prescriptions.....		115
7.1	Introduction.....	115
7.2	Conclusion	115
7.3	Policy Prescriptions	117
Bibliography		122
Appendix – 1.....		134

Preface

The handloom sector occupies a distinctive place at the intersection of culture, craft and livelihood. My engagement with this topic grew out of an interest in how traditional artisanal industries adapt (or fail to adapt) to changing market and institutional environments, and in how questions of organisation, gender and finance shape small-scale production. This thesis is an attempt to examine those dynamics empirically in the specific context of selected handloom clusters of West Bengal. It takes as its starting point the proposition that outcomes for weavers reflect not only individual skills and market demand but also the institutional forms through which production is organised and the asymmetric access to assets and finance that different actors face.

The research is grounded in focused fieldwork carried out between August 2019 and March 2020. Building on official cluster lists and district-level records, I adopted a stratified, multi-stage sampling design to generate a micro-level dataset covering eight hundred and thirty-two cotton handloom production units across Dhaniyakhali, Santipur–Phulia and Samudragarh. The empirical strategy combined detailed descriptive analysis with distributional methods and causal-inference tools in order to capture variation across organisational types (independent, subcontracted, cooperative), to decompose gendered differences in revenue across the distribution, and to assess the relationship between credit access and expansion intentions. The choice of methods reflects a deliberate trade-off: a cross-sectional design allowed a deep snapshot of institutional and household configurations, product-mix details and loan histories, while recognizing that longer-term dynamics would require panel follow-up.

This thesis is structured to guide the reader from context to evidence to implication. Initial chapters situate the West Bengal handloom clusters within historical and policy frameworks and review relevant literature on organisation, gender, and credit in artisanal industries. The methodology chapter explains the sampling, questionnaire design, and data-validation

procedures. Empirical chapters present comparative performance by organisational form, distributional and decomposition analyses of gendered revenue gaps, and joint modelling of loan uptake and expansion planning. The concluding chapter draws the threads together and offers policy prescriptions grounded in the ev

List of tables

Table 1.1.1: Number of handloom workers by type	2
Table 1.1.2: Number of handloom workers by gender	2
Table 1.5.1: Number of handloom workers by employment typology in India.....	10
Table 3.2.1: Comparative Notes on Handloom Clusters.....	39
Table 3.3.1: Sampling Design of the thesis	43
Table 3.3.2: Distribution of Weaver Households across the districts	44
Table 4.2.1: Comparison of parameters across weaver households based on their mode of supply of final output.....	55
Table 4.4.1: Estimation of annual Total Revenue and Total cost for Mainly independent Handloom Units.....	60
Table 4.4.2: Output distribution of mainly-independent weavers.....	61
Table 4.4.3: Estimation of Total Revenue and Total Cost for Mainly-cooperative Handloom Unit....	63
Table 4.4.4: Estimation of Total Revenue and Total Cost for Mainly Sub-Contracted Handloom Unit	66
Table 4.4.5: Factors effecting Total Production per Year.....	69
Table 5.3.1: Distribution of Male and Female entrepreneurs across districts and organisational structure.	86
Table 5.3.2: Comparison of Demographic and Production unit related parameters across gender	87
Table 5.3.3: Descriptive statistics of the variables across gender.....	88
Table 5.5.1: Unconditional Blinder-Oaxaca Decomposition of Total Revenue per Year of Male and Female Entrepreneurs for First Quartile, Median and Third Quartile	96
Table 5.5.2: Conditional Blinder-Oaxaca Decomposition of Total Revenue per Year of Male and Female Entrepreneurs	97
Table 6.2.1: Production plan vs. borrowing across organisational structure	105
Table 6.4.1: Joint Estimation Results from the Extended Probit Model for Expansion and Loan Uptake Decisions	109
Table 6.4.2: Estimated Treatment Effects on Probability of Taking a Production Loan	111
Table 7.3.1: Summary: Findings and Policy Prescriptions.....	121

List of Figures

Figure 3.3.1: Map of Survey Areas in Selected Handloom Clusters of West Bengal.....	45
Figure 4.4.1: Predicted Cost, Revenue, and Profit of mainly independent weavers	62
Figure 4.4.2: Predicted Cost, Revenue, and Profit of the weaver under cooperatives	65
Figure 4.4.3: Predicted Cost, Revenue, and Profit of the weavers under the Subcontractor	68
Figure 5.5.1: Estimated unconditional quantile distribution of total revenue per annum (in Rs) of male and female entrepreneurs under the cooperative organizational structur	92
Figure 5.5.2: Estimated unconditional quantile distribution of total revenue per annum in Rs of male and female entrepreneurs under the sub-contracted organisational structure	93

Chapter 1: Introduction

1.1 Introduction

The handloom industry in India is an age-old sector that has provided employment opportunities to millions of people over the years¹. It is a versatile sector with a wide spectrum of product diversification across various states of India. Each state and within the state, each cluster offers a unique product and enjoys a niche market. The same applies to the handloom sector in the state of West Bengal, India. The handloom sector in West Bengal shows some features that need to be closely explored. The sector has a long and checkered history. The sector has survived many threats from competition from imported products and mechanized products. Roy (1998) observed a rapid growth of the power loom sector from traditional handloom weaving from 1940 to 1995. It was indicative of traditional weaving losing ground to mechanized weaving. Still, the handloom sector is the second-highest employment-generating sector after agriculture². The sector employs a large section of skilled artisans. The operations of this industry are primarily household-based. The sector is one of the largest, albeit unorganized, economic activities in the country, providing employment directly and indirectly to millions of people. The handloom workforce in India is predominantly rural, with 86.7 percent residing in rural areas. Weavers constitute the majority, accounting for 77.2 percent of rural workers and 67.8 percent of urban workers, representing 75.9 percent of the total workforce. Allied workers, engaged in activities such as dyeing, warping, and finishing, make up 22.8 percent of rural workers and 32.2 percent of urban workers, comprising 24.1 percent overall³. This indicates that while weaving remains the core activity, the relative share of allied work is higher in urban areas. Additionally, this sector is dominated by female weavers and workers. A brief view is presented below.

¹ Source: Fourth All India Handloom Census 2019 - 20

² Ministry of Textiles, GoI

³ Source: Fourth All India Handloom Census 2019 - 20

Table 1.1.1: Number of handloom workers by type

Type of Worker	Rural	Urban	Total
Weavers	23,56,127 77.2%	3,17,764 67.8%	26,73,891 75.9%
Allied workers	6,97,564 22.8%	1,51,057 32.2%	8,48,621 24.1%
Total	30,53,691	4,68,821	35,22,512

Source: Fourth All India Handloom Census 2019 – 20

Table 1.1.2: Number of handloom workers by gender

Gender	Rural	Urban	Total
Male	7,78,772 26%	1,96,961 42%	9,75,733 28%
Female	22,74,516 74.5%	2,71,769 58.0%	25,46,285 72.3%
Transgender	403 0.0%	91 0.0%	494 0.0%
Total	30,53,691	4,68,821	35,22,512

Source: Fourth All India Handloom Census 2019 – 20

The sector shows a combination of characteristics of formal and informal production structures.

The sector has assumed special importance because, apart from its domestic use, it's not only an export earner but also a labor-intensive industry, which is especially significant for employment generation. The exports of the Indian handloom products are valued at US\$353.9 million in 2017-18, making India the second largest exporter of such products in the world. In the last five years, India has exported over US\$1.8 billion worth of handloom products. Over 125 countries globally purchase handloom products from India⁴.

1.2 Historical Background of the Handloom Sector

In the present section, we discuss the historical background of the handloom sector in India.

The history of the handloom sector in the context of the global economy is discussed in subsection 1.2.1, and the development of the handloom sector in India is discussed in subsection 1.2.2.

⁴ Ministry of Textiles, GoI.

1.2.1 History of the Handloom Industry in India in a Global Context

In tracing the evolution from the prehistoric days of handloom weaving to its modern craft revival, Broudy (1979) provides extensive detail on world developments, specially focusing on India. The history of weaving in India, deeply embedded in the worldwide textile development, still has that special edge due to the early development of cotton and its craft tradition. According to Broudy (1979), weaving existed before the loom; it developed out of ancient basketry and mat-making techniques that appeared all over the continents. While such civilizations as Egypt wove flax, the Near East wove wool, and China wove silk to shape their local loom technologies, India remained the cradle for cotton weaving.

Excavations of the sites of the Indus Valley civilization (c. 2500 B.C.) revealed cotton yarns and cloth that were manufactured, suggesting a mature textile culture. Weaving metaphors are used in the Rigveda (c. 1500–1000 B.C.), showing that the craft was ingrained in the culture from ancient times. In the Mughal era, roughly the 16th to late 18th centuries, Indian weavers had highly developed skills in spinning and could spin yarn so fine that some muslins, when placed on dew-moistened grass, seemed almost invisible. Spinning and weaving were often gender-specific activities, while expensive cloths went into trade networks extending from the Persian Gulf to Southeast Asia.

Prehistorically, Indian looms may have started with simple ground looms and finally evolved into pit-treadle looms still in use today. These looms had heddle harnesses, reeds, and treadles for finer and faster weaving. This adaptation seems in harmony with the worldwide innovations in loom technology, with such examples like warp-weighted looms of Europe or treadle looms of China, but then was contrastingly very Indian because the short-staple cotton fibres required unique methods of spinning and tensioning.

India's textile history also tells profound tales of global interconnectedness. Cotton growing and weaving techniques affected trade and cultural interchanges in Asia and Africa (Broudy, 1979). Since ancient times, Indian cotton has been traded internationally. Archaeological

evidence exists from the Indus Valley dated around 3000 B.C., and it even finds mention in Greek and Roman writings dated between the 5th and 4th century B.C. Its renown was perpetuated through the Hellenistic, Roman, and Islamic eras over the land and from the sea front, only later finding space on European markets through Portuguese and colonial trade. Chinese silk entered the realm of long-distance exchange by the close of the first millennium B.C., making its way west along the routes of the Silk Road from the 2nd century B.C. onward up to the territories of the Roman Empire, valued there in gold-pure grade-weight until Byzantium disrupted the monopoly down the 6th century A.D. Egyptian linen became a staple across the Mediterranean by around 600 B.C., when Phoenicians spread the trade, which was carried on by the Romans. Together, these textiles stand to show how the three great weaving traditions of India, China, and Egypt rose to world eminence at differing but somewhat overlapping periods in history, thereby influencing the ancient and medieval trade superstructures (Broudy, 1979). Just as Chinese silk or Egyptian linen, Indian cotton fabrics grew famous internationally and were part and parcel of trade routes, both ancient and medieval. The movement of loom technology was never linear: while industrialization in the nineteenth century affected weaving in Europe, India's handloom tradition asserted its artisanal identity and cultural symbolism against the backdrop of colonial economic disruptions.

Thus, in the global story of the handloom, India stands out for its continuity of practice, early technological sophistication, and its role as a key node in the historic exchange of textiles, techniques, and designs across civilizations.

1.2.2 Development of the Handloom Sector in India

Handloom weaving in India, with its ancient origins, dates back to early periods and with the earliest records being found in the Indus Valley civilization. Several texts ranging from the Rigveda, Ramayana, Mahabharata, Thalia (by the Greek historian Herodotus), and Kautilya expound on spinning and weaving technologies and praise the wonderful quality of silk and

cotton⁵. According to the Fourth Handloom Census, 2019-20, the export market for handloom products can be traced to the fifteenth century, when Vasco da Gama's arrival in India opened up trade routes to Europe. Besides that, Jean-Baptiste Tavernier's memoirs (1905) also refer to Burhanpur in the seventeenth century as an international trade site that exported to Egypt, Poland, Russia, and the Gulf. Clothing exports accounted for 83% of the trade of the East India Company by the end of the seventeenth century. Daniel Defoe, describing this flourishing trade, remarked that: "Everything that used to be made of wool or silk, relating to either the dress of women or the furniture of houses, was supplied by the India trade."⁶

With the advent of the Industrial Revolution and the growth of cotton mills in Britain, the British pursued a policy of protectionism intended to restrict competition from Indian handwoven cloth imports into British markets. At the same time they flooded the Indian markets with their machine-made industrially manufactured textile produced in Lancashire. Towards the close of the nineteenth century, the cotton textiles had to face difficulties, which ranged from economic recessions to natural calamities. The period from the last decade of the nineteenth century to the first three decades of the twentieth century was a period of time when there was the dumping of British mill products, replacing and destroying Indian hand-woven textiles on one hand, and the mass agitation for Swadeshi goods on the other.

Despite these trials and tribulations, the artisans have survived and continue to uphold the magnificence of Indian textiles. Over time, handlooms have become symbols of India's fine textile art. The range of clothes and designs was shaped by the geographical, religious, and social customs of each region. Different areas have imparted their unique styles to Indian textiles, such as Chanderi muslin, Varanasi brocades, tie and dye of Rajasthan and Orissa,

⁵ Source: Fourth Handloom Census, 2019-20

⁶ <https://scroll.in/article/762471/londons-v-a-tells-the-story-of-how-indian-textiles-conquered-the-world>

Patola sarees of Patan, Himroos of Hyderabad, Phulkari and Khes of Punjab, Daccai and Jamdani of Bengal, and Phenek and Tongam, distinct and old handloom styles of Assamese and Manipuri weaves. Indian handloom styles and weaves are renowned all over the world, thus reinforcing the importance of the preservation of our cultural heritage.

1.3 West Bengal Scenario

Fourth All-India Handloom Census (2019-20) reported the total number of handloom workers in West Bengal to be 5,42,557 with 4,67,728 located in the rural sector and 74,829 located in the urban sector. The state workforce included around 3,66,656 weavers and 2,64,791 allied workers, thus adding up to almost 6.31 lakh handloom workers in total. The industry is essentially located in the rural sector. Following the general national pattern, the sector consists of predominantly female workers. According to the Fourth All India Handloom Census of 2019-20, women make up 72.3% of the national handloom force, while West Bengal marks a distinctly higher female participation rate of 92.5%, suggesting the deep-rooted nature of women-led weaving practices within this state. (Fourth All-India Handloom Census 2019-20). The handloom workforce is female-dominant and women have a majority in rural as well as urban areas⁷. According to the national Fourth All-India Handloom Census (2019-20), a very low percentage of workers are below 18 years.

According to the Fourth All-India Handloom Census (2019–20), the pattern of loom ownership in the handloom sector in West Bengal is as follows. There are approximately 2 lakh looms, with more pit looms (3,95,628 or 73 percent) than frame looms (1,43,412 or 26 percent). Others, such as doobby/computerized looms, power looms, and electric/automatic looms, are fairly rare.

Incomes of the weavers are generally low in West Bengal. Census data reveal that at the national level, two-thirds of handloom households earn less than ₹5,000 per month; West

⁷ Source: Fourth Handloom Census, 2019-20

Bengal is no exception to this trend. Many of the handloom dwellings are kuccha with scanty asset ownership, access to bank accounts, and almost negligible coverage of insurance (Fourth All-India Handloom Census 2019–20).

West Bengal is one of the largest handloom saree producers of the country, contributing 35.3 percent of the national production. It is also the largest producer of towels, napkins, dusters (12 percent share), and "all other fabrics," such as surgical bandages (19.3 percent share). Along with traditional products, the state produces niche products such as Jamdani, Baluchari, and Tant sarees, which are famous throughout the country (Fourth All-India Handloom Census 2019–20).

The state's weavers use a variety of cotton, silk, jute, and specialty yarns. West Bengal accounts for nearly half (49.7 percent) of all the jute yarn users in India. The state is also a major user of extra-fine cotton yarn (>80 count), tussar silk yarn (27.8 percent of national tussar thread-using weavers), and zari threads (20.2 percent) (The Fourth All-India Handloom Census 2019–20).

Cooperatives play a vital role in the state along with independent weavers. In West Bengal, the cooperative network comprises of the state cooperative "Tantuja" along with numerous primary societies. Under central schemes, a Mega Handloom Cluster in Murshidabad (₹72.26 crore sanctioned, GoI share ₹61.12 crore) and 25 Block-Level clusters (comprising approximately 26,793 beneficiaries) have been sanctioned (Press Information Bureau, GoI). The State also runs 49 yarn depots and 3 warehouses that supply yarn at mill-gate prices and under subsidy (Press Information Bureau, GoI, 2022).

Education-wise, the majority of weavers have no schooling or have received Primary education at the most. Very few weavers have received higher education or formal training in design (The Fourth All-India Handloom Census 2019–20).

Most of the products are sold in domestic markets, often through local 'haats' or middlemen. The share of cooperative marketing is small, and participation in e-commerce or export channels remains negligible (Fourth All-India Handloom Census 2019–20).

1.4 Evolution of Handloom Organisational Structures

In its earliest phase, Indian handloom weaving was entirely a household craft. Weavers worked at home with simple looms, and “every household used to prepare cloth in order to be self-sufficient,” with weaving mainly confined to the cottage as a family occupation, all spinning and weaving being done by hand (Soundarapandian, 2002). This decentralised, self-reliant mode persisted into pre-colonial times.

Merchant-led (“mahajan”) systems: With the advent of colonial trade and industrialisation, merchant intermediaries began to dominate production. Mechanised mills and imported yarn undermined the old system, as the spinning jenny and mill yarn supply “struck a mortal blow to the independence of the industry” by replacing hand-spinning. By 1913–14, India had about 150 cotton mills (6.62 million spindles), creating “unfair competition” for handloom weavers. Many weavers became dependent on local traders or *mahajans* (master weavers), who provided yarn and collected finished cloth. These intermediaries created a “wide gulf between the weaver and the consumer” and often exploited both parties (Soundarapandian, 2002). Thus, the purely independent household weaving increasingly gave way to a merchant-dominated production system during the late 19th and early 20th centuries.

Subcontracted/capitalist production: Alongside mahajan domination, the handloom industry came under capitalist pressures. Handloom weaving, still rural and labour-intensive, faced competition from mechanised cotton mills as handloom materials were substituted by cloths produced in cotton mills. By the early 20th century, hand-spun yarn had been largely replaced by mill yarn, and power looms were producing cheaper fabrics. The textile mill sector was “capital intensive” with far greater output, pushing many traditional weavers into subcontracting arrangements—either weaving on commission for merchants or working as wage earners in larger units. This phase embedded handloom production into broader industrial capitalism and marketing systems rather than keeping it within purely household self-production (Soundarapandian, 2002).

Cooperatives and state support: In response, cooperative organisation was promoted from the 1930s onwards. The Royal Commission on Agriculture (1928) recommended developing handlooms on *cooperative lines* to withstand organised mill competition. During 1941–45, the government formed the All-India Handloom Board to improve yarn supply and marketing. After Independence, numerous cooperative weaving societies and state-level handloom corporations were established under the Development Commissioner for Handlooms. However, cooperatives have never truly harnessed this large labour force. By the end of this century, only 30% of all weavers were working under the cooperatives. Many of the weavers work independently from cooperatives or even outside the formal cooperative system, being employed under the master-weaver system today (Soundarapandian, 2002).

In brief, the organizational structure in the Indian handloom sector evolved from self-contained household production, to merchant- or mahajan-led systems during the colonial period, then to subcontracted or capitalist forms under industrial pressures, and finally to modern cooperatives and state-supported institutions, although all these systems still continue to share space in some proportion.

1.5 Present Scenario of Coexistence of Different Organizational Structures in India

The Fourth All-India Handloom Census 2019-20 thus confirms the continued coexistence of the historical organizational forms of handloom production along with state-led cooperatives, such as independent producers, master-weaver (mahajan) systems at the all-India level. With 73.2 percent of all workers (77.2 percent in rural areas and 46.8 percent in urban areas), the independent weaver category stands as the dominant one in India. The master weavers' system, which is a continuation of the merchant-led mode of production, employs 19.4 percent of the workers, whereas the urban share is substantially higher at 38.7 percent as compared to 16.5 percent in rural areas. Cooperative societies employ 6.3 percent of the workforce, with a higher share in urban areas (13.5 percent) than in rural areas (5.2 percent). Khadi & Village Industries

Commission/Board and the State Handloom Development Corporations together account for a marginal share, each engaging less than 1 percent of the workforce. This structure denotes the existence of diverse organizational arrangements nurtured by historical and policy-specific factors, in the manner as discussed by Soundarapandian (2002), with independent household production standing dominant while coexisting with a merchant-dominated organization. Similar patterns go for West Bengal as well.

Table 1.5.1: Number of handloom workers by employment typology in India

Employment type	Rural	Urban	Total
Independent	23,57,648 77.2%	2,19,396 46.8%	25,77,044 73.2%
Under co-operative society	1,60,272 5.2%	63,142 13.5%	2,23,414 6.3%
Under Khadi & Village Industries Commission/ board	13,325 0.4%	1,819 0.4%	15,144 0.4%
Under master weaver	5,02,599 16.5%	1,81,461 38.7%	6,84,060 19.4%
Under State Handloom Development Corporation	19,847 0.6%	3,003 0.6%	22,850 0.6%
Total	30,53,691	4,68,821	35,22,512

Source: Fourth All India Handloom Census 2019 – 20

1.6 Background and Objective of the Study

The present study seeks to analyze the functioning of handloom production units and weavers within selected handloom clusters in West Bengal, with a particular focus on the sector's sustainability amidst various challenges and opportunities. It also seeks to explore the current problems faced by the sector, including gender-related issues, and to assess the future plans of the weavers and units. Drawing on the empirical evidence from renowned researchers like Bottomley (1965), Ho and Huddle (1976), Mies (1981), Cook (1984), Islam (1987), Saith (1987), Jong-II and Lau (1994), Rutten and Baily et al. (1998), we recognize the persistence or expansion of labor-intensive traditional production forms/ organisational structure, particularly within rural areas. This observation highlights the significance of studying the performance of the handloom production units on a micro-level, as it allows us to capture the nuanced interplay that coexist alongside the intensification of capitalist industrialization in developing countries.

To achieve these objectives, the study will identify representative handloom clusters and conduct a comprehensive economic analysis of the sector's potential and long-term viability, based on findings from primary surveys.

Given this background, the study undertook a primary survey to understand the sustainability and the complicated institutional and organisational specificities that shape the performance of handloom units in West Bengal. Within the few natural handloom clusters situated at different districts of West Bengal, there exists a variety of organizational structures within covering the entire gamut from informal to formal. The present dissertation will identify the probable firm and economy-specific factors that explain the existence of particular organizational structures.

Given these broad objectives, my specific objectives are as follows:

The present study investigates the nature of production in the handloom clusters under various organizational structures that define different types of relations of production and exist simultaneously across different locations and even in a particular location. In this context, the study considers how the different organizational structures (firm structures and market structures) perform in relation to different conducts, i.e., profit maximization, revenue maximization, market expansion, survival, and judges the comparative sustainability of handloom units under different organizational frameworks.

Another unique objective of this study is to consider the gender bias in the performance of weavers in the handloom sector. India is a country that is marked with the existence of patriarchy that restricts and controls women's ownership of wealth and other productive assets. This, as a result, negatively affects the women who are also entrepreneurs. The handloom sector is no exception. Our second objective is to identify and understand the nature of gender inequality in the performance of weavers in the handloom sector of West Bengal across various organizational structures.

The growth of any entrepreneurial activity crucially depends upon the availability of working

capital. Supply of credit helps weavers to tackle their regular capital needs for production activities. We probe deeper to understand the impact of credit on the future production plans of handloom units in the context of West Bengal. This objective is very important to understand future progress and persistence of the handloom sector in the context of West Bengal.

1.7 Hypotheses and Introduction to Methodology

In the present section, we briefly discuss the hypotheses and methodology.

Hypotheses

Based on the objectives mentioned above, the empirical analysis undertaken in the dissertation will try to validate the following hypothesis using the primary survey data

Hypothesis 1: Heterogeneous organizational frameworks present in the handloom sector in West Bengal are characterized by varying performance levels in terms of profit and revenues.

Hypothesis 2: Existing organizational structures within handloom clusters exhibit gender inequality in performance.

Hypothesis 3: The availability and utilization of credit within handloom clusters significantly influence production plans and the motive to expand business operations

Primary Survey

Given the objective of this dissertation, a primary survey was conducted based on rigorous sampling methods on three natural Handloom clusters (each cluster consisting of several villages) of West Bengal: the Dhaniakhali cluster of Hoogly district, the Samudragarh cluster of East Burdwan district, and the Santipur cluster of Nadia district. The survey, which was carried out during August 2019 to March 2020, covered 832 cotton handloom production units.

Descriptive and Econometric Analysis

The dissertation used descriptive and econometric tools to test the above hypotheses developed in various chapters. For the first hypothesis, we have estimated revenue, cost and profit functions for different organisational structures and compared them to measure performance across structures. After performing the above exercise, we identify the determinants of the level

of output using a heteroscedasticity-corrected quantile regression model, as the output is a determining variable of revenue and cost. To test the second hypothesis, we have used conditional and unconditional Blinder-Oaxaca Decomposition analysis using Influence Function (IF) and Recentered Influence Function (RIF). And for the last hypothesis, we have used Recursive Bivariate Probit regression (RBP) and the Probit equation with binary endogenous treatment variable. Details of the methodologies are provided in the relevant chapters.

1.8 Structure of the present thesis

The present thesis is organized into seven chapters.

Chapter 1 – Introduction: This chapter presents the overall introduction to the study. It provides the *Historical Background of the Handloom Sector*, traces the *Evolution of different Organizational Structures within the handloom sector*, outlines the *Background and Objectives of the Study*, gives a brief overview of the *Methodology*, states the *Hypotheses*, and concludes with a description of the *Structure of the Thesis*.

Chapter 2 – Review of Literature: This chapter critically reviews the existing body of research relevant to the handloom sector. It begins with a brief *Introduction*, followed by three thematic sections: *Literature on Firm Performance*, *Literature on Gender Gap in Performance*, and *Literature on Credit and Production Plan*. Each thematic section highlights the pertinent findings and identifies the *Research Gaps*. The chapter concludes with the *Motivation of the Study*, drawing on the identified gaps to establish the rationale for the present research.

Chapter 3 – Sample Design, Data, Methodology, and Cluster Descriptions: This chapter provides the empirical foundation of the study. It begins with *Basic Definitions* relevant to the analysis, followed by a detailed discussion of the *Sample Design and Data*. The chapter then presents the *Methodology* adopted for the study and offers detailed *Descriptions of the Selected Handloom Clusters*.

Chapter 4 – The Handloom Sector under Different Organisational Frameworks: A Study of Selective Handloom Clusters of West Bengal: This chapter examines the structure, conduct, and performance of handloom units functioning under different organisational arrangements. It begins with an *Introduction* and a focused *Literature Review*. The chapter then presents the *Characteristics of the Sample* and elaborates on the *Methodology*, including the *Estimation of Revenue, Cost, and Profit* and the analysis of *Determinants of the Level of Output*. The *Results* section is organised into subsections covering *Mainly-independent Handloom Units*, *Mainly-cooperative Handloom Units*, *Mainly-subcontracted Handloom Units*, and the *Determinants of Output Level*. This is followed by a *Discussion* of the findings, a *Conclusion*, and finally the *Limitations of the Chapter*.

Chapter 5 – A Decomposition Analysis of Gender Gap in Performance of Weaving Entrepreneurs from Natural Handloom Clusters of West Bengal: This chapter explores the gender-based disparities in weaving performance across different organizational structures. It begins with an *Introduction* and sets the stage through *The Context*. It then presents *Descriptive Statistics across Organizational Structures and Gender* before moving to the *Methodology*, which explains both the *Measurement of Total Revenue for Males and Females* and the *Methodology of Decomposition Analysis*. The *Results and Discussion* section examines the *Gender Gap in the Distribution of Revenue per Annum* and conducts the *Decomposition Analysis*. The chapter concludes with *Policy Suggestions* based on the findings, followed by a note on the *Limitations*.

Chapter 6 – An Analysis of Production Loan and Future Expansion Plan of Handloom Weavers from West Bengal, India: This chapter investigates the role of credit access in shaping the production and expansion decisions of handloom weavers. It begins with an *Introduction* and provides *Descriptive Statistics of Loan Status and Production Plans across Organisational Structures*. The *Methodology* is then discussed in detail, which includes *Model*

1: Recursive Bivariate Probit Regression (RBP) and Model 2: Probit Equation with a Binary Endogenous Treatment Variable. The *Results and Discussion* section interprets the findings from both the *Recursive Bivariate Probit Regression* and the *Treatment Effects Analysis*. The chapter concludes with *Policy Prescriptions* based on the empirical evidence.

Chapter 7 – Conclusion and Policy Prescriptions: The final chapter synthesizes the key findings of the study and reflects on their broader implications. It begins with an *Introduction* and then presents the *Conclusion* of the research. The chapter subsequently puts forward *Policy Prescriptions*, which include *Strengthening the Cooperative Sector, Bridging the Gender Gap, and Strengthening Credit Access and Financial Inclusion*.

Chapter 2: Review of Literature

2.1 Introduction

Handloom weaving in India is an important economic activity from the perspective of employment generation. It is also a very important part of India's cultural heritage. A significant body of studies, reports, and research exists that tries to understand the features, problems, and prospects of this traditional economic activity.

Currently, the handloom weaving sector is perceived to be in a deep crisis. The handloom weavers are struggling to survive multiple handicaps, which include scarcity of raw materials, weak presence of financial institutions, and marketing linkages. The resilience, which the handloom weavers continue to show, indicates that the handloom sector can still be revived or led to achieve a bright future, depending on a proper strategic policy framework. (NABARD 2002, BIRD 2016).

In the decade of 90s, the incidents of starvation death or suicide of the weavers revealed the disastrous reality of the existing crisis within the handloom sector. Srinivasulu (1994, 1996) tried to identify the root cause of the crisis. According to him, the unequal competition with the growing power-loom industry and the unpredictable and sharp rise in the prices of cotton yarn and dyes, resulting from the New Textile Policy (1985), are the root causes of the crisis of the handloom weaving sector. Along with it, improper implementation of the existing protection policies for the handloom sector complicated the way out of the crisis.

It is important to understand the organization of production within the handloom sector, especially the labour process. Srinivasulu (1994) observed that ineffectiveness and non-functioning of co-operatives and decline in independent weavers due to volatility of the market and inability to compete with power-looms and master weavers ultimately made the master weaver the dominant mode of weaving within the handloom sector.

Based on a field survey on the handloom weaving sector in West Bengal Khasnabis and Nag

(2001) 1, disaggregated the type of ownership into one-loom owner dependent on Mahajan, one-loom owner independent of Mahajan, and multi-loom owner independent of or dependent on Mahajan. They analyzed the concept of alienation of labor primarily through the lens of the Marx-Braverman paradigm, focusing on how capitalist relations, especially in transitional economies, reshape the labour process even in informal sectors like handloom weaving. The authors primarily underscore three dimensions of labour alienation: first, alienation from the labour process, manifested through the separation of planning and execution; second, alienation from the product, shaped by institutional mechanisms such as *dadan*, forward contracts, and the *tana ana* system; and third, economic alienation, rooted in the dominance of usury capital and merchant control, which persists even in the absence of formal wage labour. Also, unlike the condition of deskilling in capitalism, Khasnabis and Nag (2001) showed that alienation of labor exists even when the scale of operation remains low without detailed division of labor and scientific management, even when the weaver owns the means of production, and also when the weaver doesn't work as wage labour.

Kundu (1980), in her significant contribution, discussed the organizational pattern of handloom in Bengal in detail and also pointed out the failure of yarn control, provision of finance, promotion of sales, supply of dyes and other inputs, and problems in the delay of settlement of claims.

Being one of the largest unorganized economic activities and having the ability to absorb a large workforce, the handloom sector demands crucial attention from policymakers and researchers, because of the need to preserve the diverse cultural heritage as well as address the unemployment problems of the country today.

Many researchers pointed out the problem and the prospects of the sector but overlooked the organizational framework and conduct of the firms. In the present thesis, we want to address this particular gap. We want to identify the different organizational structures, and for each organizational structure, we want to evaluate their potential for sustainability and efficiency.

2.2 Literature on Firm Performance

Recent studies find West Bengal's handloom industry truly capable of increasing scale of production yet struggling in earnings. Bhattacharya & Sen (2018) note that West Bengal did retain high loom density and the largest weaver population, despite a 33% decline in weaver population at the all-India level. Their field survey reveals a sector "in crisis" with handloom incomes being meagre, often lower than casual wage rates, and many looms lying idle. Weavers' earnings per sari (Rs. 90 to Rs. 300) often fell below the unskilled wage rates fixed under MNREGA. The paradox- a weaving heartland of India where real incomes are falling- has led the authors to conclude that the standard preservationist policy has indeed failed. At the meta-level, therefore, they propose a labour-oriented strategy of developing the skills of weavers, integrating them into the market, and designing business models. Nag (2015), through anecdotal evidence, reaches similar conclusions, stating that one-loom-weaver households in Bengal operate basically on a subsistence level as family units with very little capital and are highly dependent on the Mahajans for credit and inputs. Consequently, the persistent shortfall in working capital, coupled with chronically low earnings, has compelled many weavers, especially those operating at subsistence levels, to abandon the sector altogether in search of more stable and remunerative employment opportunities, underscoring a structural drift away from traditional artisanal livelihoods.

Performance varies sharply with organizational structures. De, Biswas & Dey (2024) compared West Bengal clusters headed by cooperatives with those headed by private traders and find that privately led clusters stimulate design innovation and new product development and thereby garner higher customer satisfaction. Conversely, after adjustments for demographic and resource variables, weavers in cooperatives display a higher degree of overall entrepreneurial capability. The cooperative set-up improves loom quality, weaver's bargaining power over returns, and the efficiency of financial management. It is noteworthy that cooperative units

were more resilient even during COVID-19 compared to pre-pandemic times, partly by drawing on unpaid female household labour. This, therefore, lends credence to Maiti's (2008) findings for West Bengal. He distinguished among three main forms—*independent*, *tied* (weavers bound to traders/master-weavers), and *cooperative*—and found that *tied* units spearhead innovation post-reform (new loom adoption, exporting) at the cost of deepening artisan dependency. *Independent* weavers have stayed independent over design and market access (retaining all surplus), but they experienced working-capital shortages that deterred technology adaptation. Recent work (Bhowmik & Pramanik, 2024) likewise observes that whereas an “efficient” group of weavers exists in *master* or *traditional* systems due to entrepreneurial dynamism, they are least observed in *cooperative-based* societies, while *cooperatives* win in volume and stability. With this, *private-and-trader-based* regimes seem to push creativity and market-based evolution, whereas *cooperative-based* regimes promote collective bargaining and stability.

Besides institutions, the network and skills of an entrepreneur significantly influence outcomes. Prajapati & Biswas (2011) studied 148 micro-units in a weaving cluster in Gujarat and found that network structure and self-efficacy dominate 56% of performance variance. Bigger, more central networks, with competitive/supportive ties on activities, enhance subjective performance, whereas age, education, and experience have been found somewhat less predictive. They note that, paradoxically, very dense networks can sometimes hinder performance because of information redundancy and competition, whereas a higher level of self-efficacy always engenders success. Bhagavatula et al. (2010) also support this assertion. They claim that for *master-weavers* in India, sparse networks rich in structural holes greatly facilitate opportunity recognition, while dense networks of strong ties are best for resource mobilization. Practically, a weaver acting as a bridge for separated market communities uncovers novel orders, yet a closed local network supplies stable credit and inputs. While

human capital refers to the experience of materials and techniques, other factors matter too: for weavers who speak multiple languages, the ability to enter new markets and discover new opportunities increases.

Case studies highlight regional contrast. Srinivasulu (1994) reports that in 1991–94, liberalization dealt a death blow to handlooms; there was a 50 to 130 percent increase in cotton yarn and dye prices. Since competition from power looms kept fabric prices low, the input shocks remained as shocks to wages. More importantly, in Andhra Pradesh, the system of weavers tied to dominant master-weavers accounted for about 75 percent of output, enhancing the dependence of an artisan. The consequences were disastrous; around 60 percent of cooperative looms went into idleness, and over 100 starvation deaths were reported among handloom weavers. Anurag & Das (2020) view a core-periphery split in Assam's silk handloom pockets. Core-area weavers engage in the production of high-priced silk goods, and they are introduced to productivity improvements, ergonomic looms, collective design centres, etc.- whereas peripheral weavers get stuck with simplistic tasks yielding little value. For instance, new power draw looms and computer-aided designs emanate from urban centers, but inland artisans are bereft of such facilities. Incomes and skills of the peripheral weavers are very dilapidated. According to Anurag & Das (2020), if targeted assistance is not provided at the periphery (infrastructure, credit, etc.), these cluster-wide disparities will continue. Similar technology-adoption clusters have been reported in other regions (like Tamil Nadu, Odisha).

In most cases, the findings converge on certain key points. First, preserving the looms alone is not sufficient. Almost all the studies highlight that unless some improvement in abilities among weavers are implemented, access to capital, and marketing linkages occurs, productivity will remain low. In other words, as noted in West Bengal and elsewhere, weavers are themselves increasingly being drawn out for other work from their occupation, as household earnings are falling. Hence the researchers discourage a "tradition preservation" mindset and instead

encourage a worker-centric approach: weavers who upgrade their skills and integrate into markets. Secondly, institutional and network structures strongly mediate performance. Cooperative and collective models provide stability, bargaining power, and resistance to crisis (as indicated by cooperatives of West Bengal), while market-based model encourages innovation and bigger margins (as well as private clusters and independent/tied weavers). Dense local networks help secure resources, but bridging ties and cognitive resources, such as self-efficacy and language fluency, are essential for new opportunities. Regional case studies also show that external shocks, like liberalization or COVID-19, along with existing social relationships, such as mahajans and cooperatives, can either worsen or lessen crises. Overall, the literature presents a varied handloom sector. Success relies on balancing traditional artisan skills with modern business practices. It also requires customizing support for each type of institution and region. Weavers should be able to expand their operations without sacrificing their livelihoods.

Gap in Literature:

In the context of the handloom sector, and particularly that of West Bengal, the existing body of research has addressed a wide array of themes, including the socio-economic conditions of weavers, the historical evolution of the sector, the role of institutional arrangements such as cooperatives and master-weaver systems, and the challenges posed by market competition, technological change, and policy regimes. While these studies, provide important descriptive information and qualitative assessments, they tend, unfortunately, to be fragmented in analytical scope and sometimes tend to focus on specific sets of issues, such as income trends, occupational diversification, or innovation practices. To the best of our knowledge, none of the studies have conducted a comparative empirical investigation on levels of performance of weavers working under different organisational arrangements, (independently, under cooperatives, or as subcontracted (tied) units under Mahajan or trader) by systematically

evaluating their operations, profitability, and costs. All these aspects have not been investigated in the existing literature on West Bengal handloom sector. This gap leaves unanswered critical questions regarding how organisational form influences efficiency, competitiveness, and long-term viability within the sector.

2.3 Literature on Gender Gap in Performance

Studies document that women cluster in “traditional” sectors while men dominate others. For example, Anna et al. (2000) find that women owning businesses in typically women-centric industries (e.g., apparel, education) have different goals and success aspirations than those in male-dominated fields. Daymard (2015) similarly shows that nearly half of Indian women entrepreneurs with employees work in apparel, education, health, and personal services, industries culturally coded as female, whereas men’s firms are more diverse. Such occupational segregation shapes outcomes: women’s firms in “female” domains tend to be smaller in scale, necessity-driven, and focused on non-pecuniary goals, reinforcing lower performance metrics compared to men’s firms in higher-paying sectors.

A common finding is that female entrepreneurs have poorer access to finance and capital inputs., Chaudhuri et al. (2020) find that in the Indian MSME sector, women-led firms are systematically smaller, less productive, and less likely to get formal credit, even after controlling for size and sector. Daymard (2015) reports that state-level access to bank credit has no measurable effect on the increase in women’s entrepreneurship, suggesting financial markets do not adequately reach women-led microenterprises. Similarly, Fairlie & Robb (2009) quantify that in U.S. women-owned businesses have far less start-up capital than businesses owned by men , explaining roughly 45% of the gap in outcomes.

Other institutional barriers exacerbate women’s disadvantages. Bose (2022) shows that 95% of female-run unorganised manufacturing firms in India operate from home, and that this locational constraint – driven by mobility restrictions and caregiving – accounts for 19–36%

of the productivity gap. Bortamuly et al. (2014) find that female handloom weavers in Assam benefit from education and technology just like men do, but their performance hinges more on proximity to markets and work experience; distance to the nearest business centre significantly reduces women's income. These findings underscore that women often face extra structural hurdles (e.g., regulatory entry costs, lack of collateral or networks) that limit their business growth beyond what raw endowments would predict.

Numerous studies link the lower performance of women-led enterprises to the dual burden of work and home. Hundley (2001) finds that in the U.S., self-employed women's earnings are depressed compared to men by childcare and housework. Women devote more time to domestic labor, which encroaches upon the business hours and productivity. Hazarika (2020) in Assam reports that women's higher risk aversion and weaker financial management (shaped by household constraints) limit their ability to enter the high-value product segments, widening income gaps at higher quantiles. In practice, women entrepreneurs often trade off scale for flexibility. For example, Cowling & Taylor (2001) note that only about 3.6% of female proprietors became employers (job creators) over four years, versus 10% of men, partly because women exit or never expand due to family obligations.

Cultural attitudes further reinforce these burdens. Gupta & Phillips (2021) find that Indian male entrepreneurs typically doubt women's business competence and risk appetite, reflecting pervasive bias, even though many women themselves report confidence in their skills. Suryanarayanan & Ramswamy (2022) illustrate this vividly in Mizoram: even after women complete a handloom vocation course that boosts their income and leadership skills, many still accept traditional roles and even justify unequal treatment by husbands. In short, social norms (regarding gender roles, mobility or violence) often confine women to "helper" roles in family firms and discourage full-scale business growth.

Quantitative decompositions show large unexplained gaps in productivity and income. The

finding by Hazarika (2020), in Assam, confirms that in the weaver population incomes, male weavers earn considerably more than females at every income level, with males having a disproportionately good advantage at the top end. Educations, finances, and technologies could justifiably explain most of the difference; yet women have been found to yield lower returns-to-inputs as well, refusing to admit to that adverse discrimination, such as risk aversion. Deshpande & Sharma (2016) similarly say that Indian female-owned family firms earn far less than male-owned firms do; after controlling for capital and skills, nearly 31% of the gender pay gap escapes explanation, which thereby hints at discrimination or other hidden constraints. Comparable patterns emerge globally. Fairlie & Robb (2009) show U.S. women-owned businesses have only 20% of the sales of male-owned firms and much lower profit rates; their Oaxaca decomposition attributes roughly 45% of this gap to women's lower startup capital and experience, leaving the rest to structural factors. In Germany, Lechmann & Schnabel (2012) demonstrate that self-employed women earn far less than men. Their decomposition reveals that over a quarter of the earnings gap is due to women working fewer hours, and another 13% to human capital differences, but a large residual gap persists – even larger than in wage jobs. Pontarollo et al. (2020) find in Ecuador that measurable endowments (education, sector) favor women slightly, yet the gender wage gap not only remains but is driven mostly by an “unexplained” component. These findings across contexts indicate that gendered performance gaps in microenterprises and informal work are not merely about inputs, but about how rewards to identical inputs differ by gender.

Thus women entrepreneurs have limited scope of development. Cowling & Taylor (2001) observe that women's self-employment is often more transitory: their retention rates are lower and they are less likely to scale up to employer status. Delmar & Davidsson (2000) likewise find that standard predictors of entrepreneurial entry (education, family background, prior experience) reliably identify nascent male entrepreneurs but fail for women; in fact, gender is

the strongest predictor of who will become a new entrepreneur. This suggests that institutional barriers (patriarchal lending, etc.) and social factors impede women's progression.

Attitudes and networks play a big role. Koellinger, Minniti & Schade (2013) argue that males and females have a similar likelihood of business survival, once the sector and size of the business are controlled for. The problem that crosses gender is mainly the start-up rates, driven by women's lower confidence and poorer networks. Similarly, Saridakis, Marlow, & Storey (2014) state that both macro factors (GDP, conditions for granting loans) affect men and women equally; yet female self-employment is in a greater proportion part-time and home-based, limiting growth. In essence, biases in self-appraisal and social capital hold back women from the growth their entrepreneurship skills, provided that their businesses would survive at par with those of male entrepreneurs.

Gender gaps continue even at the macro level. Verheul, van Stel & Thurik (2006) use GEM data across countries to show that most economic factors (income per capita, policy) similarly influence men's and women's entrepreneurial activity, but some variables (like unemployment rates or life satisfaction) have distinct gender effects. They argue that higher entry regulation or the scarcity of informal venture capital often suppresses women's entrepreneurship more than men's. Pontarollo et al. (2020) find that in Ecuador between 2007–2017, improvements in education benefited higher-income workers (mainly men) while the gender wage gap at the bottom actually widened.

Across studies, authors stress the adoption of policies that are gender sensitive. Bortamuly et al. (2014) advocate for improving market access and infrastructure for Assam's women weavers. Bose (2022) highlights the need to address mobility restrictions and unpaid care (for example, via childcare provision or co-working spaces) that force women to locate their firms at home. Daymard (2015) finds that boosting female labor-force participation and education could spur female entrepreneurship since traditional credit and political representation

measures had little effect on existing female firm ownership. Suryanarayanan & Ramswamy (2022) argue that skill training alone would not work unless it is coupled with efforts to challenge gender norms-they advocate for gender sensitization in contexts of vocational training to break these patriarchal constraints. Verheul et al. (2006) opines that policy should clarify whether the goal is merely to have more female entrepreneurs or to have genuine gender equity in entrepreneurship as the two courses of action-expert outreach versus arenas for legal reforms-will be quite different. In conclusion, literature seems to present an unequivocal position regarding the need for multitier interventions-from finance and infrastructure to social norms in narrowing the gendered performance gap in informal and handloom enterprises.

Gap in Literature:

Existing literature in the field of gender and micro-entrepreneurship highlights a host of explanations for the continued performance disparities between men and women. Scholars have identified structural barriers such as differential access to finance and market (Chaudhuri et al., 2020; Bose, 2022), cultural and domestic constraints limiting women's engagement in the labor market (Hundley, 2001; Hazarika, 2020), and occupational segregation, directing women to so-called "female" sectors with low returns (Anna et al., 2000; Daynard, 2015). These studies-that are both from India and abroad- have proven to be fairly consistent in establishing how women entrepreneurs operate at smaller scales, suffer lower productivity, and receive inferior returns for comparable inputs, thereby reversing income gains even after targeted policy interventions. However, what needs to be further examined, particularly in the Indian context and more so in the handloom sector of West Bengal, is how organizational structures mediate this gendered inequity. India and West Bengal have a handloom economy where many institutional arrangements coexist, including independent weavers, weavers under cooperatives, and weavers subcontracted under the master-weaver system, each carrying different kinds of opportunities and constraints for women to participate, bargain, and earn.

While previous studies have looked at gender inequalities in entrepreneurship and sectoral performance in a more general sense, we have not come across any work to systematically connect the organizational structure of handloom production units with gender specific income and financial performance. The present study attempts to fill this gap and thus makes a fresh contribution by analyzing how different organizational structures shape gender specific income trajectories within the handloom sector, thereby bringing together the debate on gender inequality in entrepreneurship with firm-level organizational dynamics.

2.4 Literature on Credit and Production Plan

Access to credit repeatedly emerges in the literature as a central determinant of both current firm performance and future production planning. Sampling these empirical studies across contexts ranging from handloom clusters and household enterprises to manufacturing sectors, they show how finance availability, kind, time, and terms affect whether firms smooth liquidity or actually make strategic investments, scale operations, or absorb technologies that improve productivity. For instance, Chaudhuri et al. (2020) document a pronounced gender gap in formal loan approvals: women-owned enterprises are at 10–12 percentage-point disadvantage in access to formal credit relative to male firms of comparable intensity, and such a credit shortfall is associated with reduced output, employment, and productivity. This finding points to a dynamic “lock-in” effect: when credit markets are biased or less accessible to women, those enterprises not only underperform today but are also constrained in planning and executing future production trajectories.

Closely related evidence highlights the importance of the type of finance. Dey et al. (2023) find that access to bank loans is positively and significantly associated with pure technical efficiency, implying that formal credit enables enterprises to reduce input waste and manage production processes more effectively. Mutsonziwa and Fanta (2021) echo this in Southern Africa: formal credit tends to improve small-business performance, while informal credit—

with higher effective costs and shorter maturities—often undermines profitability and constrains longer-term investment. Microcredit’s impacts appear contingent on program design: Rahmatullah et al. (2010) find that a majority of Grameen-check borrowers directed loans to productive weaving activities, suggesting that microcredit can stimulate production-oriented investment, and Khalily (2004) synthesizes evidence from Bangladesh showing how structured microfinance can facilitate asset accumulation and portfolio diversification. Yet Parvin et al. (2023) show a contrasting result for a government microcredit program in Bangladesh, where limited loan sizes, rigid eligibility criteria, and transaction costs resulted in no significant increase in weaving-related investment; this reinforces the lesson that loan magnitude, flexibility, and transaction frictions strongly condition whether credit supports forward-looking production or merely provides short-term relief.

Institutional and macroeconomic features further mediate who benefits from credit and how it shapes investment choices. Gelos and Werner (2002) show that Mexico’s post-liberalization credit expansion eased constraints mainly for very small firms, while larger firms continued to rely on internal resources; they also emphasize the growing role of collateral—especially real estate—in determining loan eligibility and investment behavior. Raj and Sen (2015) find a parallel in India’s informal manufacturing sector: credit constraints increase the probability that household firms remain small and family-operated, thereby limiting their capacity to hire non-family labor and scale operations. These distributional effects underscore how financial development, collateral markets and liberalization can reconfigure future production trajectories across firm size distributions.

Beyond formal and informal dichotomies, inter-firm and cluster-level credit can be strategically important. According to Liu et al. (2022), commercial credit within manufacturing clusters in China improves total factor productivity by way of better capital allocation and stronger innovation capabilities, so that cluster credit may serve as a signal of creditworthiness

to formal lenders and make more ambitious investments possible, including long-term ones. In an informal, labor-intensive sector such as handloom weaving, when formal lending is sparse, the inter-firm credit relationship may serve a bridging role, though depending on the terms, enforcement, and integration with formal financing, on its ultimate impact.

Crisis episodes and the availability of non-credit liquidity shed additional light on credit's role in sustaining production planning. Meher and Panda (2024) highlight the disruptions caused by the lockdown over the informal handloom sector in Odisha, freezing any financial arrangement with formal credit and any timely and affordable arrangement. Following this, 96.1% of the weavers became reliant on informal credit, which again led to idle looms with delayed raw material procurements and investments. Hertz (2009) reports for Bulgarian family farms that nonfarm incomes (pensions, wages) are often used as substitutes for formal credits to finance working capital and livestock purchases, thus implying that where formal credit may be inaccessible, other sources of liquidity do find their way in influencing production decisions even if these lack scale or stability for long-term capital investments.

Similar results have been obtained in time-series studies at the macro and sectoral level linking credit and output. John and Terhemba (2016) and Ume et al. (2017) show that increases in commercial bank credit are positively associated with manufacturing output in Nigeria, while inflation and higher lending rates adversely affect production, pointing to the sensitivity of investment timing to the cost of credit and macroeconomic conditions. Love and Sánchez (2009) model rural Mexico and demonstrate that pervasive credit constraints lower investment-to-capital ratios and reduce the likelihood of future investment, reinforcing the notion that easing binding credit constraints can materially alter growth trajectories.

Studies focused on the handloom and cottage sectors identify household and institutional determinants of access and their production implications. Parvin et al. (2020) show that family size, work experience, savings and flexible loan conditions increase the likelihood of credit

access among Bangladeshi weavers; Khatoon and Iffat (2021) find low awareness and uptake of India's Concessional Credit Scheme among Uttar Pradesh weavers but highlight the scheme's latent potential to restore raw-material procurement and reduce dependence on exploitative intermediaries if dissemination and design improve. Islam and Hossain (2021), using propensity score matching, report that credit-recipient handloom units operate at higher capacity utilization and invest more in inputs and labor than non-recipients—evidence that credit can causally affect short-term utilization and planning when evaluated with careful matching techniques.

Synthesizing across studies, accessible, appropriately sized, and timely formal credit generally promotes technical efficiency, fuller capacity utilization and forward-looking investment in labour-intensive sectors; informal, high-cost short-term credit frequently constrains strategic planning. Heterogeneities are stark by gender, firm size, and institutional setting: women and household firms stand at a hindrance, and public microcredit programs often do not perform unless calibrated for loan size, flexibility, and transaction costs. It implies that credit products should be designed to suit production cycles, be better disseminated and taken up, and have gender-sensitive access mechanisms (collateral substitutes, simplified procedures); and credit must be coupled with value-chain support so that loans translate into sustained, planned production for the handloom textile sector.

Gap in literature:

In the case of the handloom sector, existing literature has examined a range of critical dimensions such as credit constraints, patterns of credit uptake, and the influence of credit on production outcomes, efficiency, and investment behavior. These studies have provided valuable insights into the ways financial access, or the lack thereof, shapes the overall functioning of the sector. However, a notable empirical void persists. While credit is widely acknowledged as a determinant of capacity utilization and productivity, few, if any, studies

have undertaken a rigorous micro-level analysis of loan uptake and its direct influence on the production planning process or the expansion motives of weaver households themselves. In other words, the weaver's decision-making, whether to consolidate existing operations, diversify product lines, or scale up production, remains underexplored in relation to actual credit usage. This gap is critical, since production planning and expansion motives reflect not only short-term responses to liquidity but also the long-term sustainability and growth trajectories of the sector. By investigating this linkage empirically, the present study contributes an important missing dimension to the discourse on handloom finance.

2.5 Motivation of the Thesis

The motivation for the present thesis stems from several critical lacunae in the existing scholarship on India's handloom industry, with a special focus on West Bengal. Past research has looked at the socio-economic setting of weavers, the historical evolution of the sector, and institutional arrangements, such as cooperatives or master-weaver systems. However, most of these studies tend to be descriptive and fragmented, discussing either income diversification, innovation practices, or market competition. Even so, what remains largely uninvestigated in any systematic fashion is the relative performance of weavers organized under very different organizational forms. Somehow, some pressing questions about how different organizational arrangements impact efficiency, profitability, and long-term survival needed to be put on the table. These issues will be discussed in Chapter 4

The second strand of literature, on gender and micro-entrepreneurship, has consistently emphasized structural barriers, cultural mores, and occupational segregation that work against women. Yet, in the handloom industry in West Bengal, where institutional modes such as independent weaving, cooperative, and subcontracted (tied) production coexist, the critical question of gender-based income differentials across organisational forms has simply gotten lost. This omission is important because organisational forms largely shape women's

opportunities to work, bargain, and be paid, thereby mediating the persistence of income gaps.

This will be the main Focus of Chapter 5.

Thirdly, while several studies have looked into credit access, uptake, and the impact thereof on efficiency and investment behaviour, an important question still remains: How do loan uptake decisions trickle down into production planning and expansion decisions of handloom households? Is credit uptake being transformed into production decisions such as scaling up operations, diversifying product lines, or investing in processes that enhance productivity? The answer to this question is key to understanding whether the sector could support itself and grow. This issue will be discussed in Chapter 6.

Chapter 3: Sample Design, Data, and Cluster Descriptions

In the present chapter, a description of the clusters from which survey units are chosen is presented, along with a discussion of survey design and a description of the data. As outlined in Chapter 1, the present study employs a combination of descriptive statistics and econometric techniques to examine the research questions. The econometric models and estimation techniques specifically relevant to each research question are presented in greater detail in the methodology sections of the relevant chapters. Before delving into the details of the clusters and primary survey design, Chapter 3 first provides some definitions that are relevant to our study.

3.1 Basic Definitions

Household handloom unit

Household handloom units are defined as households where one or more members are engaged in handloom-related activities (weaving, preparatory, and post-loom activities) in the last one year, with or without complete looms in their premises (within or outside the house). Even if handloom-related activities are conducted at a place other than the household premises, it has been considered as a household handloom unit⁸.

Non-household handloom unit

Non-household handloom units include all establishments that are owned by institutions or private owners, such as a master weaver, cooperative societies, handloom development corporations, and undertakings handloom work for commercial purposes. These units may or may not own looms. Looms or other inputs for the production of handlooms can be placed in work sheds in the premises of non-household units, or they can be distributed in the houses of the hired/ member weavers. In some cases, a mixed arrangement can be followed, with some of the looms on the premises and the rest distributed in the houses of the hired weavers. For

⁸ Fourth All India Handloom Census 2019-20

the Fourth census, only those non-household units that have engaged in handloom production-related activities (weaving) during the last 12 months using looms have been considered. Units that are solely into sales/ marketing/ wholesale/ retail have not been included as non-households⁹.

Types of Handloom households

Weaver household: Such a unit is defined as one that has any member of the household who operates a loom in the last one year, either within the premises of the house (classifying the household as a ‘with loom household’) or outside the household premises (classifying the household as ‘without loom household’). A weaver household may or may not have handloom-related allied workers¹⁰:

- Household that owns and operate looms in their household premises.
- Households that own and operate looms at a place other than their household premises.
- Households that don’t own looms but engage in weaving activities and have looms placed in their household premises.
- Households that don’t own looms but engage in weaving activities (outside premises) and are without any loom in the house premises.

Allied worker household

Such a Household that has no weavers or looms, but members undertaking pre-loom and/or post-loom work in the last one year, either within the premises of the house or outside the household premises. These households need not have any members engaged in weaving activity within or outside the premises, nor do they have a loom within their premises. Such workers can also be engaged in allied activities within or even outside their household premises. For this census, the allied activities have been split into two major categories:

- Pre-loom activities like winding, warping, dyeing, tying and dyeing, sizing, loom

⁹ Fourth All India Handloom Census 2019-20

¹⁰ Fourth All India Handloom Census 2019-20

setting, and manual card punching

- Post-loom activities like calendaring

Master weaver household

Usually, in the handloom sector, a master weaver is construed as a non-household unit. But there is also a realization that many weavers have grown to become master weavers and are part of households that have other handloom workers (weavers and allied workers). Hence, for the Fourth Census, a concise definition was used to identify such households. Thus, any household where more than 50% of the handloom workers are hired handloom workers constitutes a master weaver household.

3.2 Descriptions of the handloom clusters

In the present section, we provide a detailed description of the handloom clusters, that were surveyed.

3.2.1 Dhaniakhali Handloom Cluster (Hooghly)

Location & legacy:

Dhaniakhali, in the Chinsurah subdivision of Hooghly district, is among the few surviving centres of traditional Bengali handloom saree weaving after Partition. The cluster is nationally known for durable and superior quality cotton sarees at accessible prices, and it still relies heavily on pit looms.

Institutional set-up:

Historically dominated by *mahajans* (master weavers), Dhaniakhali's weavers organized cooperatives to escape exploitative intermediation. Two societies—Somaspur Union Co-operative Weavers' Society Ltd. and Dhaniakhali Union Tant Shilpi Samabay Samiti Ltd.—now anchor procurement, design, and marketing. Members receive yarn, submit finished sarees, and are paid at piece rates with seasonal bonuses; cooperative showrooms retail with a margin. Independent units exist, but are fewer relative to cooperative-linked weaving.

Products & design:

The product identity rests on cotton sarees consisting of 60×60, 80×80, and 100×100 counts, produced on dobby and jacquard attachments with motifs such as *baluchari*, *jacquard*, *hath-buti*, *dangi-buti*, and *matha*. Standardized dimensions and a distinctive rice-bran selvedge mark (often imitated elsewhere) aid recognition; both grey and dyed sarees are produced.

Production organization:

As the cooperatives supply dyed yarn and designs, household and community labour concentrate on preparatory work (sizing with home starches, pirn/bobbin winding, warping/drumming) and loom dressing (denting & drafting), followed by weaving and calendaring. Labour is primarily family-based, with community specialists for warping and harnessing. The workforce distribution is skewed towards older age, which constrains the speed and volume of production.

Socio-economic profile & market:

Joint families are common; women undertake most pre-weaving tasks while men typically weave. Many households supplement earnings through agriculture, casual work, or petty trade; savings are meagre after routine expenses. Marketing flows chiefly through the two cooperatives, with a smaller independent channel.

3.2.2 Santipur–Phulia Handloom Cluster (Nadia)**Location & composition:**

The cluster includes Santipur Block and Santipur Municipality (locally “Santipur–Phulia”), 90 km north of Kolkata and well connected by rail. Phulia grew with refugee in-migration from the (then) East Pakistan in 1947 and 1971, and the Basak communities are prominent. Surveyed sites included prospering Buincha Basakpara and 52-Bigha, and relatively declining Malipota and Harinadi; Ward No. 2 was covered within the municipality. Terrain, access, and demography vary: e.g., flood-prone Malipota and relatively distant Harinadi (an area mostly

populated by scheduled tribes and Muslims) face transport constraints.

Organization of production. Multiple Structures coexist:

- **Master weavers** source inputs, set designs, pay weaving wages, and sell to traders and local *haats*;
- **Independent weavers** (one or more looms) procure inputs and sell to *mahajans* or in *haats*;
- **Sub-contracted weavers** own looms but tied to master weavers; they produce for master weavers and depend on master weavers for marketing.
- **Wage labourers** (often poor migrants) work on others' looms.

Most weaver cooperatives in this cluster exist only nominally; sub-contracting dominates.

A defining arrangement here is the *tana-ana* system: the master weaver supplies the warped beam (*tana*), often with denting/drafting done, and the weaver returns finished pieces for a per-saree payment (sometimes including harnessing wages). Variants include yarn-supply-for-wage contracts (with pre-weaving costs reimbursed seasonally) and fully independent procurement/marketing by master weavers/ traders; active cooperatives operate on a wage-plus-partial-cost-reimbursement model. Some of the cooperatives that are functioning in this cluster are Rishi Arobinda T S S Ltd, Fulia Vivekanda T.S.S. Ltd, Fulia Mahila Tantubay Samabay Samity LTD, Pubali Weavers Co-Operative Society Limited, etc.

Products & design evolution:

Santipur's historic *Neelambari* (hand-spun yarns of 250–300s counts) established its reputation; contemporary sarees commonly use 68s–80s counts cotton in both warp and weft. With the influx and innovation of Phulia weavers, *Tangail Jamdani*, and the hybrid *Fulia Tangail* styles flourished. The current portfolio spans cotton and mixed/synthetic lines (e.g., soft *Jamdani*, *Mekhla*, linen, *Fulia Tangail*, *Baha*, *Matka*, *Baluchari*, jacquard sarees, *gamcha*, *orna*, and dress materials), with export-oriented, modernized designs and finishing.

Process & labour:

Pre-weaving tasks (*pari-kara*, drumming) are frequently performed by the master weavers or

specialized community labour; women in the household typically handle pirn winding, with readymade bobbins widely available locally. Design selection rests with master weavers, but costly design fitting is borne by weavers. When a new design becomes popular in the market, master weavers introduce the design and direct the weavers to produce it in significant quantities. In such cases, the jacquard mechanism must be altered, and the cost of this adjustment is borne by the weavers themselves rather than by the master weavers. Units combine family and hired labour; the age profile is broader (25–50 years common), with notable in-migration of workers to Phulia (e.g., from North Dinajpur, Cooch Behar, Jalpaiguri, Assam).

Market frictions & risks:

Competition from power loom is intense; payment delays by master weavers and cooperatives are frequent; and irregular *tana* allocation creates multi-month idle spells. In declining pockets (Malipota, Harinadi), many households smooth consumption through serial borrowing, causing chronic indebtedness. Mobility into fully independent weaving is limited by finance and entrenched market hierarchies.

3.2.3 Samudragarh Handloom Cluster (East Burdwan)

Location & trajectory: Samudragarh lies on the alluvial plains about 15 km from Kalna. Post-Partition migration from Bangladesh increased the weaving base; alongside established master weavers there are migrant daily wage workers. Fieldwork here remained partial due to COVID-19 disruptions.

Structure & distinctiveness:

Broadly, the organizational structure resembles Santipur–Phulia—sub-contracting, master-controlled design and input flows, and household/community division of pre-weaving tasks. However, the share of master weavers among weavers of the cluster is notably higher than in Santipur, implying tighter control over *tana* access, design setting, and marketing channels.

Given the curtailed survey, product-mix specifics are not elaborated here; instead, we note that production relations and processes parallel Santipur’s model more closely than Dhaniakhali’s cooperative-centric system.

Table 3.2.1: Comparative Notes on Handloom Clusters

	Dhania Khali	Shantipur -Phulia	Samudragarh
Institutional Anchor	cooperative-led	master-weaver/sub-contracting led	master-weaver/sub-contracting led (Having a higher master-weaver presence)
Technology & labour	Pit-loom tradition and older workforces are more pronounced	Wider age participation and higher reliance on hired/migrant labour	Wider age participation and higher reliance on hired/migrant labour
Product identity	Its brand rests on durable cotton sarees across 60×60–100×100 counts with classic motifs.	diversified, design-forward mix including <i>Tangail Jamdani</i> and export-oriented lines	diversified, design-forward mix including <i>Tangail Jamdani</i> and export-oriented lines

Source: Field survey

3.3 Sample Design, Data, and Questionnaire

The present section discusses the sample design, questionnaire preparation and data.

3.3.1 Sample Design and Data

The data source for the study is primary surveys carried out in three natural Handloom clusters (each cluster consisting of several villages) of West Bengal: Dhaniakhali cluster of Hoogly district, Samudragarh cluster of East Bardhaman district, Santipur cluster of Nadia district. We initially planned to survey 1050 (350 from each cluster) cotton handloom production units, however due to different logistic problems and announcement of nationwide lockdown in March 2020, due to COVID_19 pandemic we could complete our survey on 832 handloom units.

In these primary surveys information were collected on firm-level variables of cotton handloom units. The sampling frame consists of the cotton handloom clusters located in these

three aforesaid districts¹¹. The unit of observation/analysis is cotton handloom firms. 1050 such firm units were proposed to be surveyed following the stratified random sampling technique. From the three above-mentioned clusters, we have surveyed 832 units of handloom units. The proposed number of units could not be surveyed due to the total lockdown situation from March 2020. After the total lockdown, the survey had to be abandoned as in the post-lockdown situation, the samples will be different from the pre-lockdown situation, and hence, the information cannot be combined.

We applied a multi-stage sampling process to identify and select weavers across the natural handloom clusters of West Bengal. In the first stage, we identified the natural clusters from the official website of the Directorate of Textiles, West Bengal (<https://www.westbengalhandloom.org/htm/clusters.html>) and confirmed them through consultations with government officials at the Kolkata office of the Directorate. Based on this exercise, three natural handloom clusters were chosen as survey areas: Dhaniakhali (Hooghly district), Santipur (Nadia district), and Samudragarh (Burdwan district).

After cluster identification, we visited the handloom development offices (HDOs) in each district to collect village-level secondary information on the village-wise population of weavers, their gross production, and their participation in local markets such as *haats* from the *District Handloom Census* and other official records. Based on these data and the insights of the HDO officials, we listed villages according to the concentration of weavers and categorized them into *prospering* (showing growth in weaving activity) and *declining* (showing reduction or stagnation in weaving activity). This classification enabled us to capture the diversity of production and socio-economic conditions.

In the *Santipur cluster*, we first identified villages with contrasting trends. Two prospering villages, *Basakpara* and *52-Bigha*, were selected because of their relatively higher output

¹¹ Information on district-level clusters have derived from <https://westbengalhandloom.org>

volume and better weaving activity, reflected in both the quantity and quality of products offered in the local *haat* markets, as well as the greater time devoted by households to weaving, while two declining villages, *Malipota* and *Harinadi*, were chosen for their stagnation and reduced weaving participation. Additionally, one municipal ward (*Ward No. 2 of Santipur Municipality*) was included in the survey to capture the characteristics of weavers operating in an urbanized setting, where marketing linkages and occupational mobility tend to differ from the rural areas.

In each selected village/ward, we conducted a complete enumeration of weaver households to collect baseline information on loom holdings, gender of members, and decision-making in production¹². The enumerated households were then stratified based on the number of looms held (one loom, two looms, three looms, four looms, and above). Within each stratum, weavers were selected randomly using probability proportional to size (PPS) sampling, so that the distribution of sampled households reflected the population structure of the weaving community. In the context of our data collection, after conducting a complete enumeration of households in each selected village or cooperative, we stratified them according to loom holdings (e.g., one loom, two looms, three looms, four and above). The total number of households in each stratum represented the “size” of that group. We then selected households in proportion to their share in the population. For example, in the Santipur cluster, 36.13% of the households had one loom and 28.57% had two looms. Accordingly, in our sample, we ensured that approximately 36.13% of the selected households were from the one-loom category and 28.57% from the two-loom category, with the remaining share drawn proportionately from households with three and/or more looms.

¹² In the handloom context, the decision maker is the weaver themselves, or the head of the household. He/ She refers to the individual within a household or production unit who holds the authority to determine the production process. This includes decisions regarding the choice of products or designs to be woven, allocation of labour and time, procurement of raw materials, adoption of technology, scale of output, and engagement with markets.

The same sampling strategy was applied in the *Samudragarh cluster*, where two prospering villages (*Samudragarh* and *Hatsimla*) and two declining villages (*Jalahati* and *Bonopukur*) were initially chosen. However, due to the COVID-19 outbreak and subsequent nationwide lockdown, our fieldwork in Samudragarh cluster was interrupted, and the survey could only be completed in the village of *Hatsimla*.

In the case of the *Dhaniakhali cluster*, the prospering–declining classification was not applicable because weaving here is largely organized through cooperative structures rather than village-level concentration. Hence, we selected two of the largest and most dominant cooperatives, *Samaspur Union Co-operative Weavers’ Society Ltd.* and *Dhaniakhali Union Tant Shilpi Samabay Samiti Ltd.*, as survey units. Within each cooperative, member households were enumerated and stratified based on loom holdings, and a proportional random sampling procedure was followed to select weaver households.

However, during the fieldwork, it was observed that the socio-economic and production characteristics of cooperative members were strikingly similar, irrespective of cooperative affiliation. In order to avoid unnecessary duplication, the survey was stopped after covering 202 cooperative members, even though the combined membership of the two cooperatives exceeded 400 households. To ensure representation of the non-cooperative weaving segment, we additionally surveyed 4 independent weavers and 6 subcontracted weavers, who were the only independent and subcontracted weaving households respectively present in our study area. Thus, the final sample from Dhaniakhali consisted of 217 cooperative members, 4 independent weavers, and 6 subcontracted weavers, providing a skewed picture of institutionalized weaving practices in the cluster.

For consistency, we adopted the definitions and classifications of weaving units as per the Fourth All India Handloom Census (2019–20), which are discussed earlier in this chapter (section 3.1). Our study focuses exclusively on weaver household units and master weaver

units, while allied workers, such as helpers or dyers, remain outside the scope of analysis.

The sources of data include micro-firms engaged in cotton handloom activities, supplemented by secondary information from Census reports, local municipalities, *panchayats*, micro-entrepreneur associations, and community-based organizations. Primary data collection relied on structured questionnaires, focus group discussions, and interactions with cooperative officials and master weavers. This mixed approach ensured both quantitative data on production and qualitative insights into household and community-level weaving practices.

Table 3.3.1: Sampling Design of the thesis

Cluster	Village/Unit	Category	Completed Survey	Survey Tenure
Dhaniakhali	Samaspur Union Co-operative & Dhaniakhali Union Co-operative	Cooperative Members	217 members surveyed (out of 400+)	8 th August 2019 to 17 th October 2019
	Not under cooperative Weavers	Independent and subcontracted	10 surveyed (4 independents and 6 subcontracted)	
Santipur-Phulia	Basakpara	Prospering	Yes	
	52-Bigha	Prospering	Yes	19 th October
	Malipota	Declining	Yes	2019 to 8 th
	Harinadi	Declining	Yes	February 2020
	Ward No. 2	Urban (Municipality)	Yes	
Samudragarh	Samudragarh	Prospering	No (Due to nationwide lockdown from 24 th March 2020 for the COVID- 19 pandemic)	10 th February 2020 to 23 rd March 2020
	Hatsimla	Prospering	Partial (only this village covered)	
	Jalahati	Declining	No	
	Bonopukur	Declining	No	

Source: Field survey

A weaver household usually sells or supplies the final products to three outlets: cooperatives, master weavers, or Mahajans for whom the weaver works as a subcontractor, and finally, independently in the wholesale market. Based on how a weaver is disposing of his final product

we have categorized them into three groups: “mainly-independent” who supplies more than 50% of the output to the open market; “mainly-cooperative” who supplies more than 50% of the output to the cooperative society he is registered with; “mainly-subcontracted” who supplies more than 50% of the output to the trader, Mahajan or master-weaver who has contracted him earlier. Based on this classification, Table 3.3.2 presents the distribution of weavers after omitting outliers across these categories within the three surveyed handloom clusters.

Table 3.3.2: Distribution of Weaver Households across the districts

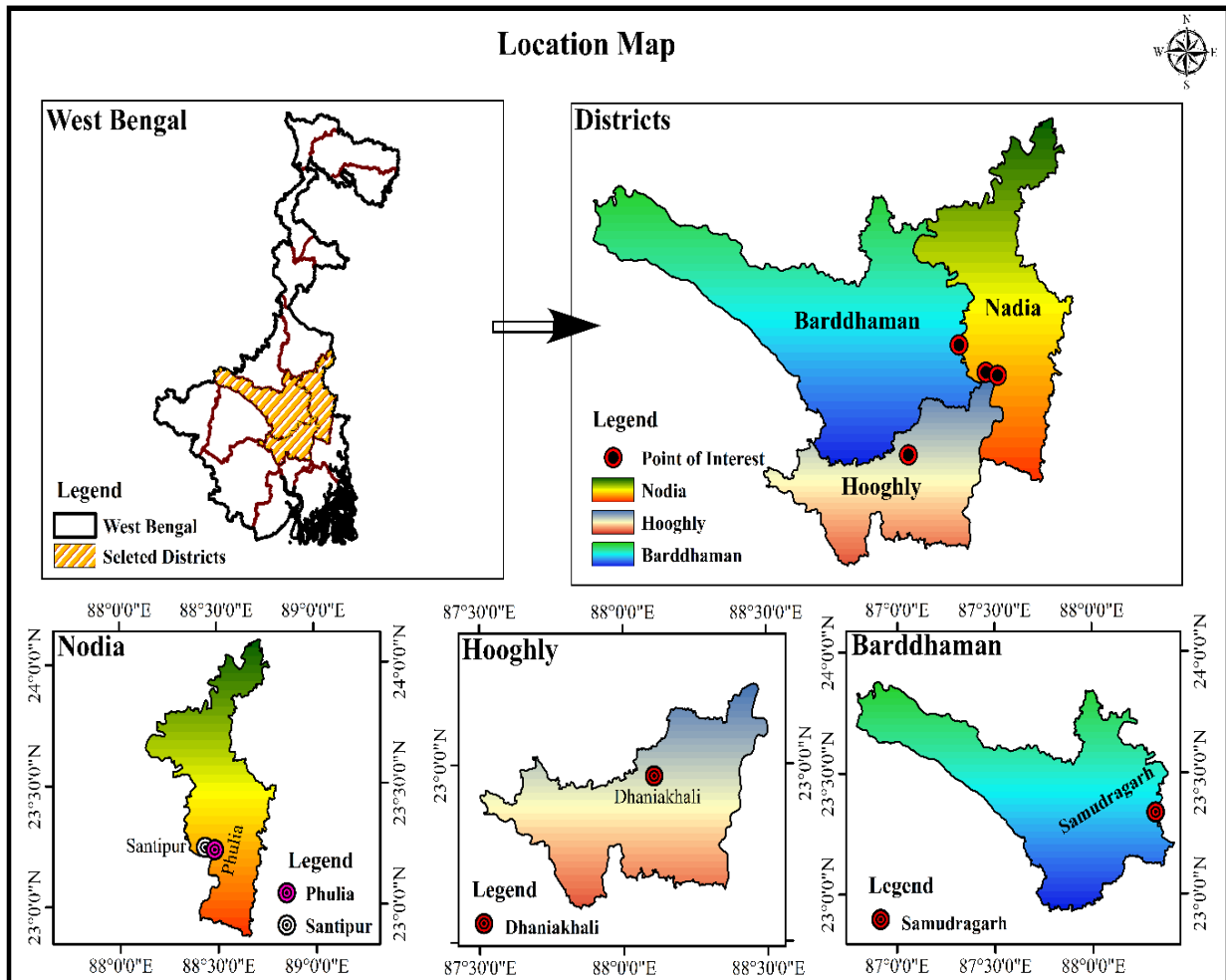
District	Type of Handloom Households	Output Supplier			Total
		Mainly-independent	Mainly-cooperative	Mainly Sub-contracted	
Hooghly	Weaver-household	4	217	6	227
	Master-weaver household	0	0	0	0
	Total	4	217	6	227
Nadia	Weaver-household	11	8	450	469
	Master-weaver household	14	1	34	49
	Total	25	9	484	518
East-Burdwan	Weaver-household	26	0	33	59
	Master-weaver household	9	0	12	21
	Total	35	0	45	80
All Three Districts	Weaver-household	41	225	489	755
	Master-weaver household	27	1	46	74
Total		68	226	535	829

Source: Authors’ calculation based on primary survey.

Table 3.3.2 reveals that the Dhaniakhali cluster is dominated by weaver-households working

under cooperatives. Whereas the other two clusters had the presence of both weaver households and master-weavers, who mostly either supply their products independently to wholesale markets or operate as subcontracted.

Figure 3.3.1: Map of Survey Areas in Selected Handloom Clusters of West Bengal



3.3.2 Description of the structured questionnaire

The primary data collection for this thesis relied on a single, comprehensive structured questionnaire that was specifically designed to capture the multiple sides of handloom production, household endowments, market linkages and financial behaviour. The questionnaire was developed to serve both descriptive and inferential aims: it records production and price information that can be aggregated into monthly and annual flows, documents organizational structures under which the unit operates (independent,

subcontracted, cooperative), and gathers covariate information needed for micro-econometric analysis (for example, regression analysis, gender decompositions and causal credit impact estimations). The questionnaire is modular by design so that related topics are grouped together in a logical order. This arrangement reduces respondent fatigue, streamlines interviewer flow, and facilitates downstream data cleaning and coding. The full questionnaire, including enumerator instructions and coding lists, is included in the end of the thesis (Appendix – 1)

The questionnaire begins with identification fields and administrative markers that allow for sample tracking and revisit logistics. These fields capture the sample serial number, interviewer identity, date, and precise location identifiers (district, block, village/ward, and para). Contact details and brief notes on respondent availability or special circumstances were recorded to support supervisory revisits and to ensure that ambiguous responses could be clarified during data entry. These procedural items, although seemingly administrative, were critical for maintaining the integrity of the fieldwork and for linking questionnaire responses to secondary village-level records obtained from handloom development offices.

Following identification, the questionnaire collects respondent and household-level demographic information. Respondent age, gender, religion and caste are recorded alongside years of schooling, primary and subsidiary occupations and years of experience in handloom work. Household composition is broken down by adult males, adult females and children to construct dependency ratios and to control for labour supply effects in the analysis. Membership of local organisations and cooperatives is recorded together with any benefits received, which enables examination of institutional participation and its association with outcomes. All demographic items are captured using pre-coded categories where feasible, with numeric fields for continuous measures such as years of education and age to facilitate econometric use.

Unit and establishment-level modules document the operational characteristics of the weaving

unit. Ownership structure (individual, partnership or joint family), registration status, years since establishment, typical months of operation per year and average working days are recorded as discrete variables. The location of production (inside household premises versus outside) and the ownership status of the premises (owned, rented or otherwise occupied) are recorded to reflect fixed-cost considerations and the unit's sunk-cost profile. These variables serve both as explanatory covariates in production functions and as controls for heterogeneity arising from formalisation and capital intensity.

A central part of the questionnaire is on the characteristics of the production structure, which itemises the types of cloth and garments produced, quantities manufactured and sold in the reference period, unit prices and buyer types. To minimise recall bias, quantities and prices are collected for the previous month, while annual summaries are solicited to capture seasonality and longer-term trends. Product-level entries allow the construction of turnover, average unit price and product diversity indices. Where appropriate, the instrument prompts interviewers to probe for quality grades and finished-product differentiations (for example, counts of yarn, finishing or additional attachments) so that price differentials and quality-driven market segmentation can be analysed.

Market linkages and contracting arrangements are recorded in detail: buyer identities are coded (local haat, trader/mahajan, master-weaver, cooperative outlet, wholesaler, export intermediary), the number of buyers engaged per period is noted, and the precise nature of transactions (spot sale, forward contract, commission sale, consignment) is captured. The questionnaire also records who sets design, price and delivery terms—whether these are commissioned by the buyer, negotiated, or set by the producer—to permit analysis of market power and monopsonistic relationships. This module further documents whether sales are made on credit, the duration of credit terms, and any price penalties associated with intermediation, which are critical for understanding bargaining asymmetries in subcontracted and tied-production relationships.

Input sourcing and cost modules elicit itemised purchases of raw materials (yarn types, quantities and prices), other variable inputs (dyes, accessories, electricity), and the procurement channels used. The instrument captures whether materials were purchased outright, provided by a master-weaver or cooperative, or supplied on credit by an input trader, and it records any recorded differences in price relative to open-market rates. This level of disaggregation is essential for constructing variable-cost estimates and for identifying input-based dependencies that can translate into indebtedness or market capture.

The assets section inventories productive capital with a focus on looms—their number, type, age, mode of acquisition (own purchase, family transfer, subsidy-assisted purchase), source of financing and current valuation. Enumerators were instructed to record the exact count of looms and to probe whether any accessories or upgrades (for example, dobby/jacquard attachments) were present. Because loom ownership is a key explanatory variable in the thesis, the asset module was emphasised during training and cross-checked against cooperative membership lists where available.

Labour-use questions distinguish household labour from hired labour, disaggregated by gender and age category, as well as by contractual form (regular, casual, piece-rate). For each category, the instrument asks for average days worked per month, hours per day and wage rates (cash or in-kind), enabling calculation of labour intensity, gendered division of labour, and labour cost shares. These variables are used both descriptively and as controls in regression models that estimate the relationship between labour structure and productivity.

The credit module functions as a rolling loan register. Each reported loan is recorded with its source (formal bank, cooperative, moneylender, mahajan), stated purpose (working capital, loom purchase, consumption smoothing), original amount, outstanding balance, interest rate or implicit cost, repayment schedule and whether the loan arrangement conditions the sale of output (for example, forced sales to the lender). This register underpinning the causal analysis

of credit is deliberately granular to allow the construction of treatment variables, timing of loans relative to investment decisions, and indicators for indebtedness-driven lock-in to traders. Accounting and revenue sections solicit monthly and annual aggregates for turnover and itemised costs (material, labour, utilities, transport, rent and loan repayments). Interviewers were trained to reconcile product-level sales with the revenue totals through on-the-spot cross-checks. Where significant discrepancies arose, enumerators used follow-up probes or recorded notes for supervisor review. Questions on profit calculation and net income are framed in a way that allow conversion into consistent concept definitions used in econometric estimations (for example, gross revenue, variable cost, and net revenue).

The questionnaire also contains open-ended sections that capture respondents' perceptions on recent trends, constraints, plans for expansion or exit, and intergenerational transmission of weaving skills. These qualitative responses were coded post-fieldwork to extract common themes, such as yarn-price shocks, difficulties in accessing institutional credit, or motivations for diversifying income, that complement the quantitative analysis and help interpret observed patterns.

From a measurement perspective, most items are closed-ended with predefined response codes to facilitate rapid field entry and consistent coding. Numeric variables (quantities, prices, years of education, loom counts) are captured in dedicated numeric fields. Logical skip patterns are built into the questionnaire to avoid asking inapplicable questions and to minimise respondent fatigue; enumerators were trained to adhere strictly to these patterns. Recall design mixes short windows (previous month) for frequently transacted items and longer windows (annual or since-purchase) for infrequent events such as asset acquisition and major loans.

To ensure instrument validity and data quality, the questionnaire was tested through a pilot survey in the field and iteratively refined. Enumerators underwent thorough training that covered question phrasing, probing techniques, ethical considerations (voluntary participation

and informed consent), and the importance of numerical accuracy. Supervisors conducted spot-checks and immediate feedback loops to correct interviewer errors. Data entry procedures included double-entry for numeric tables and automated consistency checks (for example, verifying that aggregate revenue equals the sum of product-level sales). Discrepancies identified by these checks were routed back to field supervisors for resolution.

The full structured questionnaire used in fieldwork is included in the end of the thesis (Appendix - 1) for transparency and replication.

The next chapter presents an empirical analysis of output and profitability under different organizational structures.

Chapter 4: The Handloom Sector under Different Organisational Frameworks: A Study of Selective Handloom Clusters of West Bengal

4.1 Introduction

The handloom industry in India has been a part of the legacy and tradition of the country's rich cultural heritage from time immemorial. Though predominantly a household industry, the sector is the second-largest employment provider in the rural region, employing more than 3 million people in direct and allied activities¹³. Given the importance of this sector, the present chapter will focus on the profitability and sustainability of handloom units from the state of West Bengal, which is dominated by small-sized 'micro-entrepreneurs' who may optimally seek to remain small in size (Davis et al., 2023).

The handloom sector in West Bengal, India, houses around 3.4 lakhs of weavers¹⁴. Like the rest of the country, the handloom sector of West Bengal is also facing a plethora of problems like fierce competition from the power loom sector, scarcity of raw materials, the weak presence of financial institutions and marketing linkages, uncertain export market, obsolete techniques practiced by the artisans and low adaptability to changing market conditions (Nag, 2015; Roy, 2017; Mishra and Bhattacharjee, 2017; Bhattacharya & Sen, 2018; 2019; Mukherjee et al., 2019), discontinued welfare schemes (Bhowmik, 2019) to name a few. Given this scenario, we conducted a primary survey in three natural handloom clusters from West Bengal to identify the viability of the operation of weavers based on their their financial performance under different organizational structures. As Kundu (1980) pointed out, the organizational structure of the sector depends on the supply chain of yarn, other inputs, working capital, and distribution and marketing channels of the finished product. The study by Kundu (1980) identified that

¹³ Source: The Handloom Export Promotion Council (HEPC)

¹⁴ Source: Fourth Handloom Census, Government of India. 2019-20.

historically this sector was largely controlled by ‘Mahajans’¹⁵ and master-weavers who dominated the small tied weavers. This latter group acted as subcontractors under the Mahajans/ Master-weavers who used to supply raw materials and working capital to the independent weavers. In this process, the small tied producers were extremely exploited by the intermediaries like Mahajans (Nourse, 1922; Mukherjee et al., 2019), which led the emergence of the 'cooperative movement' as a ‘reaction against the abuses or, at least, the rigors of the capitalistic industrial system' (Nourse, 1922). The Cooperative movement in the West Bengal handloom sector formally began with the establishment of the West Bengal State Handloom Weavers' Cooperative Society Ltd. (TANTUJA) in 1954, acting as an apex body for primary cooperative societies (Datta & Agrawal, 2018). The cooperative movement significantly impacted rural industries in West Bengal, particularly in the early post-colonial period. The Industrial Policy of India in the 1950s-1970s provided special assistance and protection to villages and small industries, forming many rural industrial cooperatives¹⁶. Many cooperatives of weavers were formed in West Bengal, and thereby the cooperative system also emerged as a dominant organization in the handloom sector. Following this line of thought, the weavers in West Bengal can be divided into three organizational-structures: independent weavers (weavers who are self-employed and acquire their inputs and working capital by themselves and sell the product in the open market; the master-weavers are included in this category), weavers who are tied to ‘Mahajan’ or master-weavers and work as subcontractors based on the raw materials or money advances provided to them —finally, the weavers who are under cooperatives. Our primary objective in this chapter is to analyze the performance levels of weavers working under the three organizational structures mentioned above.

A huge literature exists on the handloom sector of India and West Bengal. Studies showed that

¹⁵ Mahajans are money lenders and traders.

¹⁶ Ministry Of Cooperation, GoI, [History_of_cooperatives_Movement.pdf \(cooperation.gov.in\)](https://www.cooperation.gov.in/history-of-cooperatives-movement.pdf)

Indian handloom weavers continue to show resilience, can be guided to a bright future if a proper strategic policy framework is adopted (Soundarapandian, 2002; Mishra et al., 2016). D'Costa (2022) argued that the precariousness of India's handloom sector, especially in West Bengal, reflects broader capitalist challenges. Despite supply-side interventions, the sector remains vulnerable. The handloom sector in India embodies both artisanal skills and significant employment generation, creating a tension between preservationist and expansionist approaches (Chatterjee 2015). The study on the handloom industry in India reveals a dynamic and heterogeneous sector in transition, influenced by the late development of power looms (Roy 1998). Instead of becoming a simple narrative of decline, the sector shows historical and contemporary labour mobility and skill acquisition, suggesting the need for a labor-centric approach over a tradition-centric perspective (Bhattacharyya and Sen, 2018; 2019).

The extant literature identified the West Bengal handloom sector as a predominantly skill-intensive informal sector, populated by unpaid household labour, especially female laborers. The sector faces fierce competition from power loom sectors (Chatterjee 2015; Bhattacharyya and Sen, 2018; 2019; Chakraborty, 2019; Mukherjee et al., 2019). Nag (2015) observed handloom sector in West Bengal operates primarily on a subsistence level, with most "one-loom weaver" households relying on family labour and controlled by local merchants, while most struggle with demand constraints and dependence on intermediaries.

Mukherjee et al. (2019) show that in West Bengal, production units in the informal sector, including weaving, do not exhibit a strict capital-labour hierarchy, with owners and workers sharing similar roles and incomes, indicating a non-capitalist nature. While firms face market challenges, including intermediary control, competition, and rising input costs, they are also less inclined to reinvest in growth, prioritizing savings for survival over expansion (Mukherjee et al., 2019).

De et al. (2024) in their study did not detect any discernible evidence that indicates that

organizational structure impacts the overall performance of weavers or the enterprise's performance. They claimed that in the private trader-dominated clusters, weavers excel in product innovation, differentiation, returns, and client satisfaction, while cooperative-dominated clusters are noted for superior product quality and strong bargaining power for weavers. Furthermore, research showed that an entrepreneur's self-efficacy significantly impacts performance, highlighting the importance of confidence in one's capabilities. While competitive networks involving master-weavers or independent weavers may show better entrepreneurial skill positively related to performance, supportive networks did not yield the expected benefits, suggesting that competition fosters innovation and product quality more effectively than cooperation within clusters (Prajapati and Biswas, 2011). Srinivasulu (1994) observed that the decline of independent weavers resulting from ineffective and non-functional co-operatives, volatility of the market, inability to compete with power looms and master-weavers ultimately made master-weavers the dominant mode of production organization within the handloom sector. In contrast, studies showed cooperatives in India balance community-focused and market-driven strategies, fostering democracy, autonomy, efficiency, and organizational profitability (Nath & Arrawatia, 2022). Thus, there is no discernible result on the efficacy of the cooperative sector on the performance of weavers. The subcontracted weavers under master-weavers or traders were extremely exploited by the intermediaries like Mahajans (Nag, 2015). However, they benefit under master-weavers for guaranteed sale of their products, and become more innovative due to the transfer of new designs, entrepreneurial dynamism leading to better financial performance (Bhattacharya and Sen, 2018; Anurag and Das, 2020; De et al., 2024; Bhowmik and Pramanik, 2024).

Operations like managerial efficiency, size, age, leverage, tangibility, and firm growth significantly impact profitability (Bolarinwa et al., 2021). Mishra and Bhattacharjee (2017) highlighted that, independent weavers earn higher short-term profits per product but face long-

term market access and resources challenges caused by rising yarn costs and competition from power looms, earning significantly less annually. However, cooperative weavers gain from better market organization and resource support.

In the case of the handloom sector, especially the handloom sector of West Bengal, though the existing literature identified various aspects of the handloom sector of the state, none of it delved into a rigorous empirical analysis of the performance level of weavers across different organizational structures based on operations, profitability and cost.

The study will uniquely contribute to the present literature by applying a micro-econometric framework to unravel the complicated institutional and organizational specificities that shape these units' operational and financial performance.

4.2 Characteristics of the Sample

In Table 4.2.1, we compare revenues, costs, and other parameters between weaver households based on their mode of supply of final output.

Table 4.2.1: Comparison of parameters across weaver households based on their mode of supply of final output

	Average values of key variables per weaver-household									
Output supplier	Revenue	Cost of Production	Revenue Per Loom	Loom Holding	Labour Working	Adult Males	Adult Females	Male Child	Female Child	Dependents
Mainly-Independent	306449.70	167271.50	112839.20	2.78	3.40	1.83	1.46	0.40	0.48	1.29
Mainly-Cooperative	36311.33	8508.29	33432.38	1.05	2.14	1.83	1.65	0.26	0.25	1.30
Mainly-Subcontracted	88914.03	25561.13	52033.80	1.53	2.17	1.56	1.42	0.51	0.45	1.43

Source: Authors' calculation.

Table 4.2.1 depicts that the mainly independent weaver households enjoy higher revenue, have a higher cost of production and have higher number of looms compared to those who are under

subcontractors or cooperatives. The total cost as well as revenues are lowest for weavers who are under cooperatives, as they hold the smallest number of looms as well.

Before conducting the econometric analysis, we identified and excluded outliers using the box-plot method based on annual output levels. Specifically, we treated outputs above 1000 units for the “mainly-subcontracted” group and above 1500 units for the “mainly-independent” group as outliers. After this adjustment, our final sample for analysis included 824 weaver households.

4.3 The Methodology

4.3.1 Estimation of Revenue, Cost, and Profit

From the survey of handloom units, we collected information on the total revenue earned by each unit and the total cost incurred per annum. Given our data, we tried to discern the shape of the revenue and cost function of each handloom unit. To this end, we first estimated the revenue and cost functions as functions of output levels for the three groups of weavers classified by how they sell their final products: mainly-independent, mainly-subcontracted and mainly-cooperatives. The study concentrated only on saree-weavers; hence total output is the number of sarees produced by each unit in a year. We identify the revenue-maximizing and average cost-minimizing production level for each category of weavers. Then we calculate the profit for each group as the difference between the estimated revenue and the estimated cost function. Next, we identify the profit-maximising output and compare the same with revenue-maximizing and average cost-minimizing output, to check the sustainability of the production unit.

We consider a simple generalized quadratic revenue function. The reason is as follows: during the survey, we observed that each weaving unit tries to make its product unique and different from others. This indicates a monopolistically competitive market structure where each firm has a downward-sloping average-revenue curve (Varian, 2016) or, in other words, a concave total revenue function. This prompted us to assume a quadratic form of the revenue function.

The quadratic revenue equation is given by:

$$R(q) = \alpha + \beta(q) + \gamma(q)^2 + \varepsilon \text{ ----- (i)}$$

where q is the total production of a firm and α , β , and γ are constants and ε is the error term.

We estimate α , β , γ to determine the shape revenue function using the classical linear regression model (CLR) for each group of weavers separately.

Next, we determine the average cost-minimising output of an average weaving unit from each type of organisational structure. To obtain the average cost-minimising output level and to understand whether the weaving unit is showing any returns to scale, we define a cubic cost function, as this type of cost function will depict standard 'U' shaped average and marginal cost curves (Gravelle & Rees, 2004).

$$C(q) = \alpha_0 + \alpha_1q + \alpha_2q^2 + \alpha_3q^3 + \varepsilon \text{ ----- (ii)}$$

Here α_i s are constants and ε is the error term. We assume that the total cost is positive and increasing and can exhibit returns to scale. We estimate the total cost for each group of weavers using the classical linear regression model. We hypothesised the following parametric restrictions: $\alpha_0 > 0, \alpha_1 > 0, \alpha_3 > 0, \alpha_2 < 0$ based on the rationale given below:

$$\frac{dC}{dq} = MC = \alpha_1 + 2\alpha_2q + 3\alpha_3q^2$$

We assume that marginal cost is increasing and convex, that is $\frac{d^2C}{dq^2} > 0$ and $\frac{d^3C}{dq^3} > 0$ implying $\alpha_3 > 0$. If the cost function shows returns to scale, then, at the inflection point

where $\frac{d^2C}{dq^2} = 0$ for some $q > 0$. That requires $\alpha_2 < 0$. The average cost is defined as follows:

$$\frac{C(q)}{q} = AC(q) = \frac{\alpha_0}{q} + \alpha_1 + \alpha_2q + \alpha_3q^2$$

At the average cost-minimising point $\frac{dC}{dq} = \frac{C(q)}{q}$

$$AC'(q) = -\frac{\alpha_0}{q^2} + \alpha_2 + 2\alpha_3q = 0$$

This, in turn, requires $AC''(q) > 0$ or $\frac{2\alpha_0}{q^3} + 2\alpha_3 > 0$

After estimation of cost and revenue function, we will determine revenue-maximizing output and cost-minimizing output for three groups of weavers by setting

$$\frac{dR}{dq} = 0, \text{ and } \frac{d^2R}{dq^2} < 0 \text{ and } \frac{dAC}{dq} = 0 \text{ and } \frac{d^2AC}{dq^2} > 0$$

Next, we calculate the profit for each group of weavers as the difference between estimated revenue and estimated cost, i.e., the profit = $\hat{R}(q) - \hat{C}(q)$ and maximize it to compare profit-maximising outputs. Finally, we determine the average output produced by each group from the data, to compare it with the estimated revenue, cost and profit-maximising output levels to observe the performance and viability of each group.

For a robustness check, we considered two further models on determinants of cost and revenue function where we have controlled for the socio-demographic variables like years of schooling, whether they belong to the general caste and age of the weaver, which are chosen from existing literature.

$$R(q) = \alpha + \beta(q) + \gamma(q)^2 + \delta\vec{X} + \varepsilon \text{ ----- (ia)}$$

$$C(q) = \alpha_0 + \alpha_1q + \alpha_2q^2 + \alpha_3q^3 + \delta\vec{X} + \varepsilon \text{ ----- (iia)}$$

Where, \vec{X} is the vector of Socio-demographic controls.

4.3.2 Determinants of the level of output

After performing the above exercise, we identify the determinants of the level of output using a heteroscedasticity-corrected quantile regression model, as the output data is skewed (2.504941). (See Figure A4.1-1 in Appendix-4.1)

The regression equation with θ quartile is given by,

$$Q_\theta(\text{output per year}_i | \vec{X}_{controls_i}) = \beta_\theta + \zeta_\theta \vec{X}_{controls_i} + u_i \quad \text{Where } \theta = .25, .5, .75$$

The $\vec{X}_{controls_i}$ contains various socio-demographic controls like gender, years of schooling, caste categories, age of Units and organizational structure. We use the above-mentioned explanatory variables that were chosen from the existing literature. The rationale behind the inclusion of these variables and summary statistics is summarized in Table A4.1 in Appendix 4.1. Total

loom-holdings are dropped from the analysis due to high correlation with organizational structures.

4.4 Results

In the present section, we present and analyse the results. Section 4.4.1 presents and analyses the results of mainly independent handloom units. Section 4.4.2 presents and analyses the results of mainly cooperative handloom units. Section 4.4.3 presents and analyses the results of mainly subcontracted handloom units. Section 4.4.4 presents and analyses the results of quantile regression to determine factors affecting the output.

4.4.1 Results on mainly-independent handloom unit

In the sample, mainly independent handloom units operated by self-employed weavers are located in Samudragrah and Shatipur clusters. They are mostly from the 'BASAK' community, who migrated from the Tangail district of present-day Bangladesh before the partition of India, and settled in Katwa, Dhatrigram, Samudragarh in the Burdwan district¹⁷ and Shantipur and Phulia in Nadia District of West Bengal. These weavers who purchase inputs from the open market perform all the work either by themselves or by hiring labourers and sell their produce to wholesale markets. In our data, we included small independent weavers and master weavers in this group. The survey elucidated that either the women of the weaver-households or the local service providers perform preparatory works like separating hanks, sizing, prim winding, etc.

Table 4.4.1 depicts the estimation result for mainly-independent handloom units, which suggests that there exists a positive and nonlinear relationship between annual total production and total revenue for the firm. The total revenue increases at a decreasing rate, with annual total output revealing that the revenue function is concave. This is because the coefficient of Total Production of Firm² (Year) is negative. Replacing coefficients with values of Model-1 in

17 Directorate of Textile, West Bengal, India

equations (i) and (ii) gives the estimated revenue and cost functions:

$$\hat{R}(q) = -81527.7 + 1222.051q - 0.534q^2 \quad \text{iii.}$$

$$\hat{C}(q) = 89579.171 - 701.737q + 2.419q^2 - 0.001q^3 \quad \text{iv.}$$

Table 4.4.1: Estimation of annual Total Revenue and Total cost for Mainly independent Handloom Units

Explanatory Variables	Annual Revenue of the Firm	Annual total cost of the Firm
	Coef. (Robust SE)	Coef. (Robust SE)
Q	1222.051*** (338.508)	-701.737 (474.047)
Q ²	-.534* (.317)	2.419** (0.911)
Q ³	-----	-.001*** (0)
Constant	-81527.7 (55018.063)	89579.171* (53538.926)
R-squared	0.461	0.5460
F-test	30.802	18.174
(P value)	(0.000)	(0.000)
Akaike crit. (AIC)	1762.234	1702.563
Bayesian crit. (BIC)	1768.710	1711.199
Number of obs	64	64

*** $p < .01$, ** $p < .05$, * $p < .1$
Q = Total output of the firm per annum

Source: Authors' Calculation.

Maximising the revenue function yields the following results:

$$\frac{\partial \hat{R}(q)}{\partial q} = 1222.051 - 2 * 0.534 * q \quad \text{Where} \quad \frac{\partial^2 \hat{R}(q)}{\partial q^2} < 0$$

Setting this equal to zero and solving for total production (q):

$$1222.051 - 2 * 0.534 * q = 0 \quad \therefore q^* = 1143.75$$

Therefore, the optimal level of total production that maximises the total revenue for the mainly-independent firm is 1143.75 units per year. However, the mean output of the mainly-

independent units is 509.1538 units (<1143.75 units).

Table 4.4.2 clearly depicts that most of the mainly independent handloom units are producing below their revenue-maximising level. Next, we identify the cost-minimizing output levels. The cost function is convex for output levels below 800 units and becomes concave above output levels of 800 units.

$$\hat{C}(q) = 89579.171 - 701.737q + 2.419q^2 - 0.001q^3$$

$$\widehat{AC}(q) = (89579.171 - 701.737q + 2.419q^2 - 0.001q^3)/q$$

To obtain the average-cost minimising output level, we set

$$\widehat{AC}'(q) = -\frac{89579.171}{q^2} + 2.419 - 0.002q = 0$$

yields the viable root as 179.567, where $\widehat{AC}''(q) > 0$

Thus, the average cost is minimised for quantity level 179.567. Thus, the average cost is falling below $q < 179.567$ and rises thereafter.

Table 7 shows that in the sample, 20.31% of producers produce below the average cost-minimising level, rest are producing output above the average cost-minimising level.

Table 4.4.2: Output distribution of mainly-independent weavers

Output-level	% of mostly independent weavers
Below revenue-maximising	57(89.06%)
On or above revenue-maximising	7(10.94%)
Below average-cost minimising	13 (20.31%)
On or above average-cost minimising	51 (79.69%)
Total	64

Source: Authors' calculation.

The estimated profit function of the independent units is obtained by subtracting the estimated cost function from the revenue function.

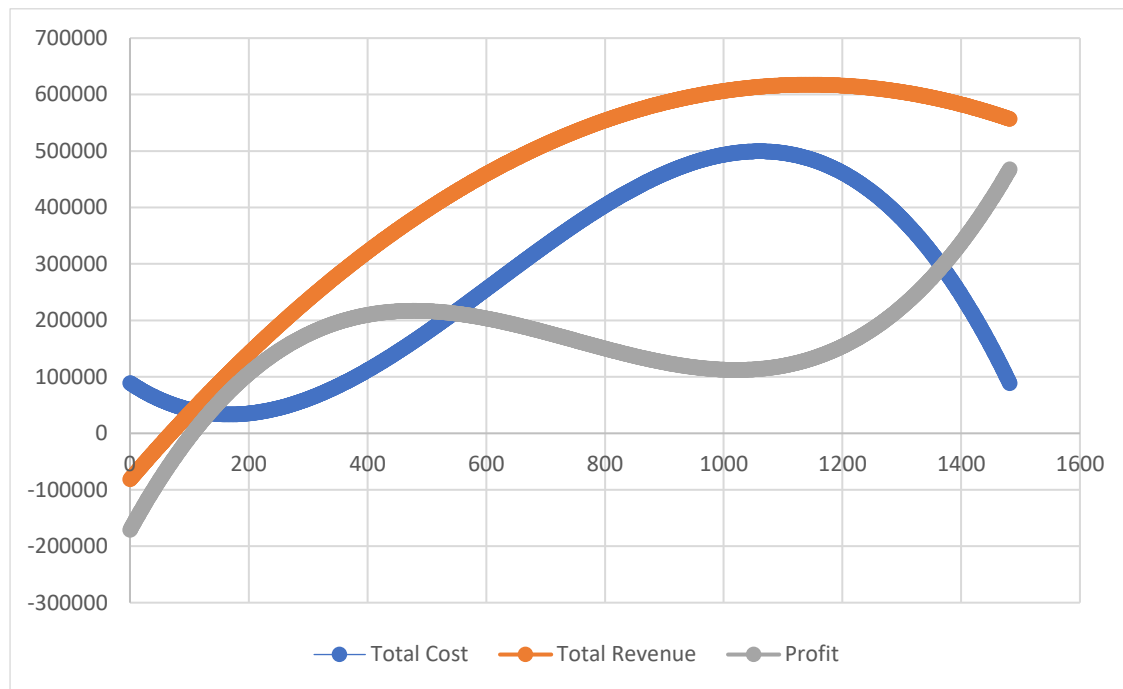
$$\pi(q) = R(q) - C(q) = -171106.871 + 1923.788q - 2.953q^2 + 0.001q^3.$$

The profit-maximising output is found at $q = 412.648$ units with $\pi''(q) < 0$, where the

maximized profit is around Rs. 211000 per annum.

Thus, the analysis shows that the mean output of the mainly independent units is 509.1538 units, which is slightly higher than the profit-maximisation output. Figure 1 depicts the cost, revenue, and profit scenario of mainly independent weavers.

Figure 4.4.1: Predicted Cost, Revenue, and Profit of mainly independent weavers



Source: Author's drawing.

Figure 4.4.1 depicts that independent handloom weaving units are mostly enjoying a positive profit.

4.4.2 Mainly-cooperative Handloom-units

The exact origin of the time of the handloom activities in Dhaniakhali natural cluster cannot be identified due to the unreliability of data. The Dhaniakhali handloom industry faced the problem of raw materials after the Second World War due to political issues. During this period the “Somaspur Union Co-operative Weavers Society Limited” and also “Dhaniakhali Union Tant Shilpi Smabay Samiti Limited” were formed in 1946 to supply quality materials to the weavers (Sarkar, 2015). The cooperatives provided a stable organizational environment where small weavers escaped exploitation and became insulated from market volatility and received benefits like medical support, festival bonuses. The information from the focus group

discussion showed that the weavers with one or two operating looms are dependent on the two cooperatives for raw materials to carry out their weaving processes. The cooperative members are required to produce at least 22 sarees per year to continue the membership. However, due to medical ailments, if they could not meet this target, they received allowances from the cooperatives. Also, in Dhaniakhali, the cooperatives perform pre-weaving steps like dyeing the thread, design drawing, before providing the thread (raw materials) to the weavers. The rest of the production process is carried out by the weavers with the help of family labour and paid community labour, and they mostly weave at least 22 sarees per annum to remain a cooperative member.

Table 4.4.3 represents regression results corresponding to cooperative handloom units.

Table 4.4.3: Estimation of Total Revenue and Total Cost for Mainly-cooperative Handloom Unit

	Annual Revenue of Firm	Annual total cost of Firm
	Coef. (Robust SE)	Coef. (Robust SE)
Q	364.5202*** (64.51496)	159.1321*** (26.56164)
Q ²	0.3112974*** (0.0840484)	-0.4854623*** (0.1127469)
Q ³	-----	0.000443*** (0.0001004)
Constant	-5269.567 (5767.944)	-5027.348*** (1531.945)
Mean dependent var	33679.639	7256.725
SD dependent var	25164.408	7266.535
R-squared	0.456	0.477
F-test	18.492	51.860
(P value)	(0.000)	(0.000)
Akaike crit. (AIC)	5066.589	4500.559
Bayesian crit. (BIC)	5076.838	4514.223
Number of obs	225	225

*** $p < .01$, ** $p < .05$, * $p < .1$

Q = Total output of the firm per annum

Source: Authors' calculation.

The regression model for mainly cooperative units suggests that there is a concave relationship between annual production and annual revenue of a weaving unit.

The estimated revenue function is as follows:

$$\hat{R}(q) = -5269.567 + 364.5202 q - 0.3112974 q^2$$

The output level that maximises the estimated revenue function for cooperative units is $q^* = 585.485455$ units per year. However, the average output of the cooperative units is 130.5956 units (<585.485455 units), which is much lower than the revenue-maximising output level.

From Table 4.5.3, we can write the estimated cost functions of the cooperative weavers. The cost function is:

$$\hat{C}(q) = -5027.348 + 159.1321 q - 0.4854623 q^2 + 0.000443 q^3$$

Further, the cooperative members' average cost is

$$\widehat{AC}(q) = (-5027.348 + 159.1321 q - 0.4854623 q^2 + 0.000443 q^3)/q$$

$$\widehat{AC}'(q) = -0.4854623 + 0.00886q + \frac{5027.348}{q^2}$$

Setting $\widehat{AC}'(q) = 0$ yields

$$\hat{q}_1 = 114.40567 \quad \text{where } \widehat{AC}''(q) < 0$$

$$\hat{q}_2 = 527.53751 \quad \text{where } \widehat{AC}''(q) > 0$$

Thus, the average cost is minimum for $q = 527.53751$.

Interestingly, the cost function is concave for output levels below 365.28 units per year, implying a falling average cost of production below this output level. The predicted average cost for cooperative units is minimised at $q = 527.5375$. The sample shows that 98% of weavers produce far below this output level, with a mean output per year of 130.6.

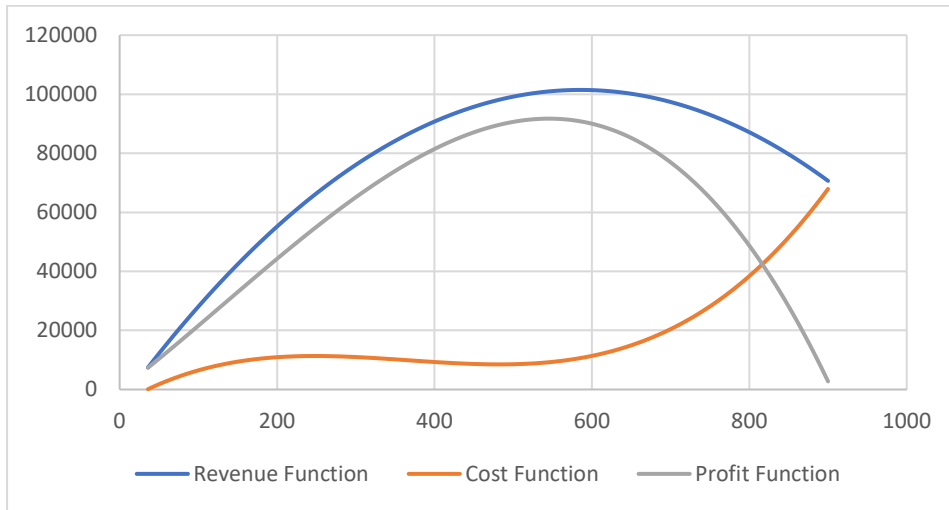
The profit of the cooperative units can be derived as

$$\pi(q) = R(q) - C(q) = -242.219 + 205.3881q + 1.741649 q^2 - 0.000443 q^3$$

The predicted profit-maximizing output level is 545.4 units, which is far above the average output of cooperative units in the survey area. The annual maximised profit level is also around

Rs. 91320. However, the actual average profit enjoyed by this group is Rs. 26422.91. Thus, cooperative units are producing at a low scale with a meager positive profit. Thus, for this group, weaving is not a sustainable means of livelihood. Figure 4.4.2 depicts the cooperative weavers' predicted cost, revenue, and profit scenario.

Figure 4.4.2: Predicted Cost, Revenue, and Profit of the weaver under cooperatives



Source: Author's own drawing.

4.4.3 Mainly-subcontracted Handloom-units

In this subsection, we analyse the operational structure of weavers who work as subcontractors under master-weavers or Mahajans. In our sample, these respondents are mostly from the Shantipur cluster. Santipur has historically evolved as a natural cluster with the characteristics of predominance of independent weavers, as said before. In regions where master-weavers are present, it is evident that 'contract workers' will also be found. They depend on master-weavers for raw materials or looms to earn their livelihood (Kundu, 1980). In recent times, independent weavers with high loom holding act similarly to master-weavers in this area and outsource products from sub-contracted weavers. Table 4.4.4 presents the result.

Table 4.4.4: Estimation of Total Revenue and Total Cost for Mainly Sub-Contracted Handloom Unit

	Total Revenue of Firm (Year)	Total Variable Cost of Firm (Year)
	Coef. (Robust SE)	Coef. (Robust SE)
Q	500.206*** (135.616)	-384.665*** (132.969)
Q ²	-0.135 (.21)	1.599*** (.418)
Q ³	-----	-.001*** (0)
Constant	-25945.179 (16438.671)	30310.489*** (10937.355)
Mean dependent var	88914.028	25561.129
SD dependent var	108862.118	59279.218
R-squared	0.320	0.285
F-test	56.845	27.957
(P value)	(0.000)	(0.000)
Akaike crit. (AIC)	13726.528	13105.460
Bayesian crit. (BIC)	13739.375	13122.589
Number of obs	535	535

*** $p < .01$, ** $p < .05$, * $p < .1$ Q= Total output of firm per annum

Source: Authors' calculation.

The estimated revenue function for the Sub-contracted units is:

$$\hat{R}(q) = -25945.179 + 500.206 q - 0.135 q^2$$

The revenue function is concave everywhere. However, the coefficient of the output square γ is insignificant, effectively making the revenue a linear function of output. The first derivative of the revenue function (the marginal revenue) with respect to total production is:

$$\frac{\partial \hat{R}(q)}{\partial q} = 500.206 - 2 * 0.135 * q$$

We observe that for the relevant output levels under our data set (i.e., $q < 1000$), the estimated revenue function for subcontracted units is always increasing. From the above regression table, we can write the estimated cost function of the sub-contracted units of handloom. The cost

function is

$$\hat{C}(q) = 30310.489 - 384.665 q + 1.599 q^2 - 0.001 q^3$$

$$\widehat{AC}(q) = (30310.489 - 384.665 q + 1.599 q^2 - 0.001 q^3)/q$$

$$\widehat{AC}'(q) = -\frac{(30310.489)}{q^2} + 1.599 - 0.002q = 0 \text{ is obtained when}$$

$$\tilde{q}_1 = 153.2224 \text{ where } \widehat{AC}''(q) > 0$$

$$\text{and } \tilde{q}_2 = 774.2164 \text{ where } \widehat{AC}''(q) < 0$$

The interesting observation is that the cost function is convex for output levels less than 533 units per annum, where the average cost-minimising output level is 153.2224 units per annum.

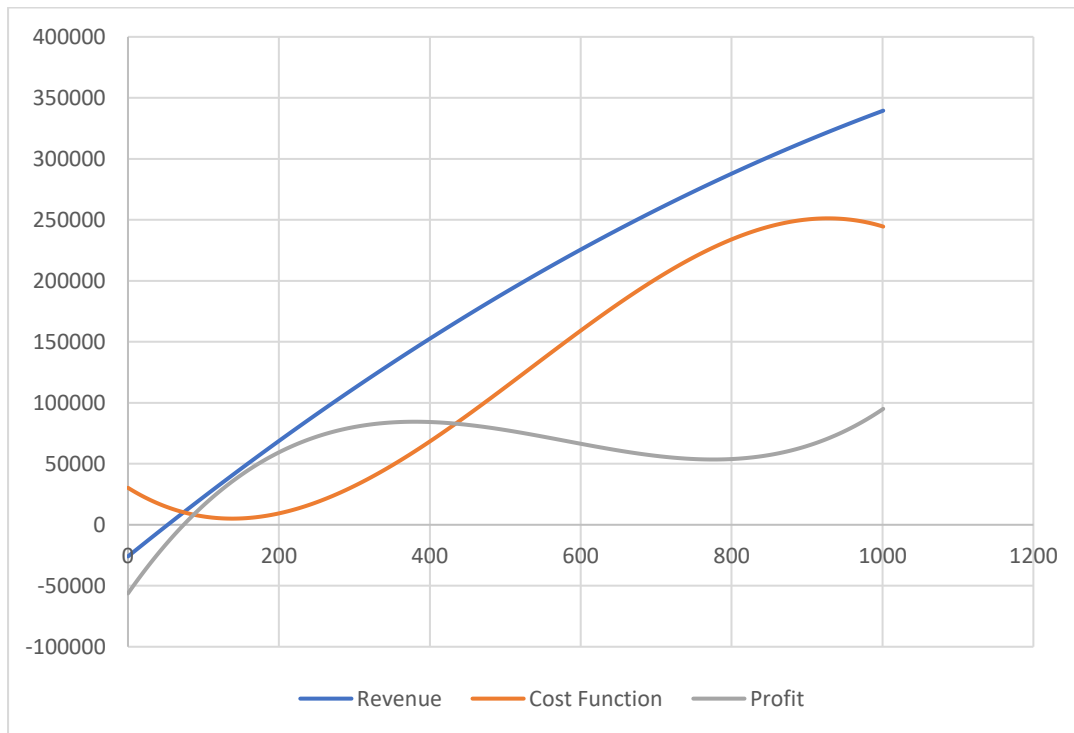
Our survey results reveal that 28.44% (152 weavers) of sub-contracted weavers produce below the average cost-minimising level. However, the rest produce on or above this level. The estimated profit function of the mainly sub-contracted units is

$$\pi(q) = R(q) - C(q) = -56255.668 + 884.871 q - 1.734 q^2 + 0.001q^3.$$

In this case, $\pi'(q) = 884.871 - 3.468 q + 0.003 q^2$ and $\pi''(q) = -3.468 + 0.006q$.

Solving $\pi'(q) = 0$ gives $q = 380.19$ and $\pi''(q) < 0$ for all q values. Therefore, the optimal quantity for profit-maximisation is $q = 380.19$ units with a profit level Rs. 84477.71. We observe that 442 (around 83%) of subcontracting-weavers are producing on or below this output level. Figure 4.5.3 depicts the predicted cost, revenue, and profit of the subcontracted weavers.

Figure 4.4.3: Predicted Cost, Revenue, and Profit of the weavers under the Subcontractor



Source: Authors' drawing.

Finally, we also estimated the above three models while controlling for various socio-demographic variables. The results are presented in Appendix 4.2 and corroborate the same relationship between output level and total cost and revenue of the firms.

4.4.4 Determinants of Output Level

Finally, we aim to determine the factors that affect production levels. We recognize that production is a fundamental driver of revenue, cost, and profit in an economic setting. By understanding the determinants of production, we can gain insights into how changes in these factors influence the financial outcomes of a business or economic entity.

Table 4.4.5: Factors effecting Total Production per Year

Total Production per year (q)		Coef.	St. Err. [Bootstrapped]
Explanatory Variables		Q25	
Total own loom holding by the unit		76.418***	7.192
Age of the respondent		-.33	.295
Education	Years of schooling	2.505***	.892
Caste	Base: SC & ST		
General		19.78	12.428
OBC		32.703**	13.292
Organisational-structure	Base: Mainly-independent		
Mainly-cooperative		-56.703***	11.861
Mainly Sub-contracted		13.187	12.211
Constant		41.934**	18.801
		Q50	
Total own loom holding by the unit		89.975***	3.611
Age of the respondent		-.63*	.375
Education	Years of schooling	1.679	1.054
Caste	Base: SC & ST		
General		16.827	11.789
OBC		29.914**	12.657
Organisational-structure	Base: Mainly-independent		
Mainly-cooperative		-74.938***	19.174
Mainly Sub-contracted		22.086	19.474
Constant		99.185***	24.436
		Q75	
Total own loom holding by the unit		97.333***	7.862
Age of the respondent		-3.28e-14	.302
Education	Years of schooling	2.667*	1.443
Caste	Base: SC & ST		
General		32*	18.679
OBC		38.667***	14.505
Organisational structure	Base: Mainly-independent		
Mainly-cooperative		-261.333**	106.804
Mainly Sub-contracted		-120	108.065
Constant		262.667**	109.856
Mean dependent var	237.931	SD dependent var	193.907
Number of obs	824	.25 Pseudo R2	0.2153
.50 Pseudo R2	0.2868	.75 Pseudo R2	0.3357

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Authors' calculation.

Own-loom holdings demonstrate a significant positive impact on production levels across all quantiles. At the 25th percentile (Q25), the coefficient is 76.418 (Level of Significance (LS)

1%), indicating that an additional loom owned by the unit increases production by this amount. This impact grows as we move to higher quantiles, with coefficients of 89.975 at the 50th percentile (Q50) and 97.333 at the 75th percentile (Q75), both highly significant. Thus, loom ownership is a key driver of production, and its influence strengthens with higher production levels.

Education, measured by years of schooling, also positively influences production across quantiles. At Q25, an additional year of schooling is associated with a production increase of 2.505 units (LS 1%). At Q75, the coefficient of education is 2.667 (LS 10%), highlighting the importance of education, particularly on lower and higher-level production scales, where more educated individuals tend to have better production outcomes.

Caste plays a notable role in production outcomes, particularly for the Other Backward Classes (OBC). At Q25, OBC units produce 32.703 units more (LS 5%) than SC/ST units. This advantage continues at Q50 and Q75, with coefficients of 29.914 and 38.667, both significant. General category units also outperform SC/ST units, though their effect is significant only at Q75, with the coefficient of 32.000. These results suggest that caste influences production outcomes, with OBC and General category units consistently performing better than SC/ST units.

Age shows a small and mostly insignificant effect on production across quantiles, suggesting that the age of weavers plays a minimal role in production outcomes.

Organizational structure, particularly cooperative units, has a significant negative effect on production. At Q25, units operating as cooperatives produce 56.703 units less than independent units, significant at the 1% level. This negative impact becomes more pronounced at higher quantiles, with a coefficient of -74.938 at Q50 and a substantial -261.333 at Q75, significant at the 1% level. Sub-contracted units do not show significant effects at any quantile. These findings highlight the inefficiencies associated with cooperative organisational structure,

especially at higher production levels.

In summary, loom holdings, education, caste, and organizational structure significantly affect production outcomes.

4.5 Discussion

We observe that in West Bengal, the independent group of weavers are operating sustainably. During the survey, we conducted focus group discussions among weavers. As already mentioned, the weavers under this organizational structure sell in the open market, so they face intense competition from handloom and power loom weavers within West Bengal as well as other states of India, and handloom products from Bangladesh. As a result, they have constantly upgraded their design, and sometimes use low-cost Chinese or Korean bumper yarn or viscose or nylon yarn to minimise their cost to retain the profit. They earn more profit than the cooperative units (Mishra and Bhattacharjee, 2017). The open market competition induced them to indulge in the improvement of designs and cost-minimising techniques (Prajapati and Biswas, 2011; De et al., 2024) and hence they operate profitably.

Our results on cooperative weavers show that scale of operation for these weavers is very low. Further, their final output is directly supplied to the cooperatives against fixed payments; as a result, they are insulated from market competition and operate in a protected environment. Hence, the motivation for the upgradation of designs and product quality is almost absent. Our survey revealed that the weavers are considering weaving as a subsidiary occupation with a small scale of production and an assured meagre income. Most of the weavers supplement their small income from weaving with other activities like agriculture, trading, hawking and other types of employment. As a result, in this area, we observed the prevalence of women as unpaid family labour in the weaving process. On the whole, cooperative weavers are caught in a stagnant environment lacking dynamism. They produce low output and earn lower profit, and are efficient only at a small scale of production, as evident from the estimated cost function.

This cooperative system, even if it provides various benefits to its members, actually fosters inefficiency (Prajapati and Biswas, 2011). Following Davis et al. (2023), we can recommend that the skill development of weavers, along with better management practices, can improve their conditions. Also, Maiti (2008) identified that ‘tied units’ or sub-contracted units are becoming more prevalent, while cooperative units are declining.

Our survey revealed that the prevalence of the ‘Mahajan’ system in Shantipur Cluster, with subcontracted weavers, where ‘Mahajans’ supply yarns and designs to weavers. Even though most of the tied-weavers under subcontractor are working efficiently, they face various problems. The weavers supply their products to ‘Mahajans’. However, as the product design is chosen by Mahajan/ master-weavers, the fitting of the design, done by skilled labour, is costly and borne by these weavers. These weavers depend on Mahajan for the continuity of their work. In many cases, they took loans from the Mahajans perpetually for various consumption and production needs, which in turn led them to a vicious circle of borrowing. As a result, a large part of their income is spent on repaying their old loans to Mahajan. Thus, they continue to work as subcontracted weavers. This observation goes with the findings of Davis et al. (2023), who identified credit constraint as one important barrier for small ‘micro entrepreneurs’ that compels them to operate in a small scale.

While estimating the cost and revenue function with a set of socio-demographic controls¹⁸ we observed that there are no female weavers among independent weavers and for cooperatives and subcontractors, women are earning significantly lower levels of revenue compared to males at all quantiles. Hazarika (2020) obtained similar result, who depicted the presence of a significant gender income gap in favour of males among micro-handloom entrepreneurs in Assam. Our data also suggests that female weavers hold a lower number of looms than their

¹⁸ Results are presented in Appendix 4.2.

male counterparts¹⁹. During the survey, we observed that women in the family silently participate in different stages of production, mostly as unpaid family labour or secondary labour, which corroborates the findings of Chakraborty (2019), who observed that male weavers participate in paid weaving activities, whereas the females are engaged in non-remunerative allied activities in the weaving process. Under the patriarchal family system, males mostly take the production and sales-related decisions, and women weavers remain at the background. Thus, when women are operating independently as the head of family handloom activities, they are underperforming. This result needs to be explored in the future. This also leads us to consider the importance of special women-centric policies for female weavers.

Determinants of output level showed that loom ownership is a key driver of productivity, with larger loom holdings associated with more efficient production. This relationship intensifies at higher production levels, indicating economies of scale. Also, the results indicate that more educated weavers are likely to be more productive, especially at lower to mid-level production scales. The findings suggest that caste plays a role in production, with OBC and General category weavers generally performing better than SC/STs across all levels of production. Similarly, Deshpande and Sharma (2016) found significant earnings gaps between businesses owned by Scheduled Castes and Tribes (SC & STs) and non-SC & ST businesses, while SC & ST businesses earned less.

In summary, loom holdings, education, caste, and organizational structure are significant determinants of production, while age shows no significant influence. Loom ownership and education both positively affect production, particularly at higher quantiles, while cooperative and subcontracted organisational structures are associated with significantly lower production levels. The influence of caste is evident, with OBC and General category weavers consistently

¹⁹ $t = 6.4306$ with $df 823$. It is significant at 1% LS

outperforming SC/ST weavers across quantiles. These insights point to the importance of loom ownership and efficient organisational structures in enhancing production outcomes.

4.6 Conclusion

Our analysis sheds light on the performance of weavers under different organizational structures. The study reveals that the large independent weavers are operating profitably, while most of the weavers under cooperatives are operating at a small scale with insignificant profit. The study also reveals that most of the weavers under the cooperative system have alternate occupations to supplement their meagre income from weaving. This result indicates that even if the cooperative weavers receive benefits from cooperative societies and were insulated from market volatility, they are operating inefficiently. On the other hand, the subcontracted weavers who are under the mercy of master-weavers and Mahajans perform more efficiently to continue their livelihoods. Thus, the organizational structure plays an important role in establishing the viability of handloom units. Another matter of concern is that handloom units operated by women are producing much lower revenues than their male counterparts.

Our analysis on determinants of production level per year also corroborates the above finding that the independent weavers are producing much higher output, followed by the subcontracted weavers. The study also established the importance of the education of the weavers as the educated weavers produce more output

Based on the study, we strongly feel the need for some policy prescriptions. Firstly, there is a strong need to reconsider the efficacy of cooperative system in the handloom industry in its present form.. Our study indicated that cooperatives are inefficient in terms of operation and financial indicators.

The objective of the cooperative system was to end any kind of exploitation faced by small artisans and to improve their social and economic conditions. Since the 1980s, in India the

cooperative movement has faced challenges, including managerial corruption and political favouritism, leading to a decline in membership and ability for effective intervention. (Srinivasulu 1994; Baviskar, 1995; Maiti, 2008). The decline of cooperatives has contributed to the rise of tied units, where artisans work under traders or master enterprises, reflecting a shift from institution-led to market-driven delegation (Maiti 2008). A more democratic environment should be created for efficient weavers, who have better managerial and marketing skills, to participate in board elections. Our study revealed that in the Dhaniakhali cluster, weavers under cooperatives are enjoying many social benefits and they are insulated from the market volatility. This has some negative impacts as well. Our study observed that this cooperative system has fostered inefficiency among weavers in terms of low-scale of production. Our analysis indicated that loom ownership significantly affects the output level. Thus, to improve the operational performance of cooperative weavers, subsidized finance should be provided to them to acquire new looms. Secondly, with secured income, the weavers are less willing to improve designs to face market competition. The protected environment and lack of competition have led to a small-scale production system with a meagre income. Thus, to raise the scale of output of cooperative weavers, a performance-based incentive scheme should be implemented. A performance-based bonus system can be implemented such that the weavers who do better design or dyeing combination, relevant to the present market demand, will be awarded. The management of cooperatives must be more market-oriented, without which the sector lacks dynamism and constant upgradation of designs. Effective government monitoring on raw material procurement and distribution and design upgradation can lead the cooperative system towards more dynamic performance. The weavers should be trained in computer-aided designing tools and the government should develop software like Digibunai²⁰ for Bengal handloom sarees also. There should be training sessions/seminars for weavers to

20 <https://digibunai.dic.gov.in/>

apprise them of the latest market designs. The scale of output can be increased by raising the demand for products sold by the cooperatives. The marketing of cooperative goods must be given more importance. Weavers must be encouraged to join exhibitions to sell their products. Cooperative societies must open outlets/showrooms in market centres and shopping malls to showcase their products. Hence, the policies should be redesigned to make cooperatives more viable. Finally, we feel that government policies should be aimed at reducing the exploitation of tied/subcontracted weavers by Mahajan or master weavers. Focus group discussion brought out the fact that subcontractors are still heavily dependent on Mahajan or master weavers for credit. As a result, due to continuous indebtedness, they remained under the clutch of Mahajan or master weavers. Thus, the government should focus on providing easy financial assistance to the subcontractors for production as well as consumption purposes. Also, direct marketing of their output will help them to get better prices for their product. Policymakers should opt for developing a regulated wholesale marketplace/Haat where small weavers can sell their output directly. Also, the adoption of comprehensive social security measures by policymakers for weavers will alleviate their reliance on Mahajan or master weavers for loans. Further, to counter rising yarn prices, input subsidies should be provided to small weavers.

4.7 Limitations of the chapter:

The study has certain limitations. Our Primary objective was to survey 1050 handloom units. However, due to the COVID-19 pandemic and nationwide lockdown, we could complete a survey of only 832 handloom units. Economic conditions in handloom units can vary significantly depending on the season. This survey was conducted at a specific time and may not capture the full range of seasonal fluctuations. The respondents had been provided with yearly data by recalling.

Appendix – 4.1

Table A4.1-1: Rationale behind the inclusion of Explanatory variables in regression on determinants of output level for the weavers.

Variable name	Rationale behind the inclusion of this variable	Related reference
Gender	Gender of the entrepreneur is an important variable for the determination of output because of its probable influence on production organisation and input-output market access.	Gang et al., 2022 and Bose, 2023
Education is measured as years of schooling	The level of education of the owner affects the skill of the owner and also the organisation of the firm and hence, it positively affects the overall productivity and output of the firm.	Raj & Sen, 2015
Caste	Historically, skills acquired as intangible cultural heritage, access to finance, access to education, access to initial endowment, etc. differ across social groups and hence affect output differentially.	Rai, 2022
Age	With age of owner, we hypothesize that the owner and sometimes also the workers become more skillful and acquire knowledge about technology, markets, production organisation, etc., and hence the productivity and overall output of the firm increase.	Majumdar, 1997
Organisational-structure	The organisational structure of a firm directly affects total factor productivity and hence the overall output of a firm.	Maiti, 2008

Source: authors' compilation

Table A4.1-2: The summary statistics of the variables.

Estimation sample regress	Mean	Std.Dev.	Min	Max
Number of observations = 825				
Total Production per year (q)	238.864	195.635	24	1440
Education measured as years of schooling	5.177	3.706	0	19
Cast	Base: General			
OBC	0.319	0.466	0	1
SC & ST	0.371	0.483	0	1
Age of Units	25.315	13.845	1	75
Organisational-structure	Base: Mainly-independent			
Mainly-cooperative	0.274	0.446	0	1
Mainly Sub-contracted	0.648	0.478	0	1
Total looms owned by the respondent	1.340992	1.108977	0	10

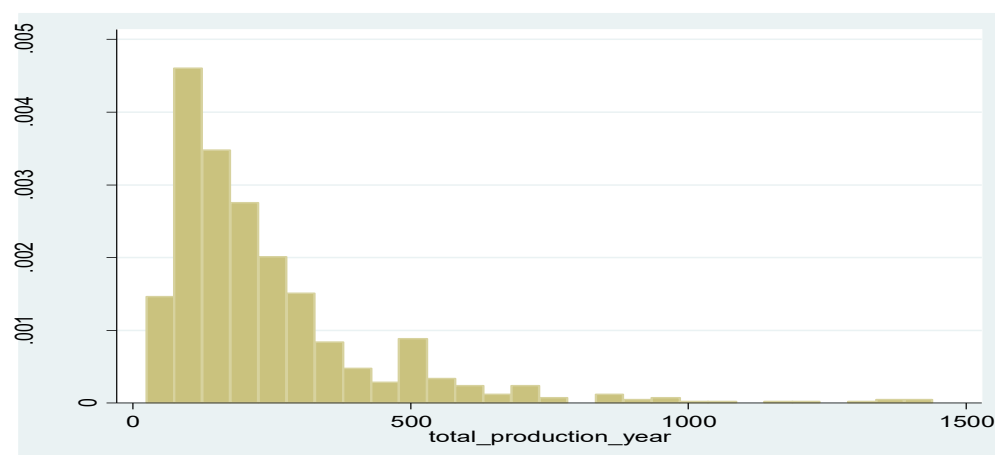
Source: Authors' calculations

Table A4.1-3: Pairwise association between the variables

Variables	Total own loom holding by the unit	Age of the respondent	Education	General (caste dummy)	OBC (caste dummy)	Independent	Cooperative	Subcontractor
Total own loom holding by the unit	1.000							
Age of the respondent	0.102	1.000						
Education	0.044	-0.085	1.000					
General (caste dummy)	0.127	0.206	0.137	1.000	-----			
OBC (caste dummy)	-0.191	0.088	0.065	-----	1.000			
Independent 4	0.380	0.0320	0.1185	0.1240	_____	1.0000		
Cooperative 8	-0.227	0.3915	0.2513	0.1129	0.2396	_____	1.0000	
Subcontractor 3	-0.000	-0.3836	-0.3010	-0.1749	-0.1892	_____	_____	1.0000

Source: Authors' calculations

Fig. A4.1-1: Distribution of total production per year.



Source: Authors' drawing

Appendix – 4.2

Table A4.2-1: Estimation of Total Revenue and Total cost for Mainly-independent Handloom Unit

Explanatory Variables	Total Revenue of Firm (Year)	Total Variable Cost of Firm (Year)
	Coef. (Robust SE)	Coef. (Robust SE)
Total Production of Firm (Year)	1194.15*** (326.727)	-832.259* (458.384)
Total Production of Firm ² (Year)	-0.503* (0.297)	2.637*** (0.875)
Total Production of Firm ³ (Year)	-----	-.001*** (0.0004)
Education	-3054.971 (7044.011)	1147.971 (4544.222)
General (caste dummy)	-32793.075 (49866.035)	-38765.882 (36535.5)
Age of the respondent	-7977.794** (3219.915)	-3836.409** (1656.622)
Constant	341777.18* (198861.03)	306417.99*** (114405.8)
Mean dependent var	309737.969	168554.489
SD dependent var	302236.624	203310.164
R-squared	0.545	0.602
F-test	13.544	10.609
(P value)	(0.000)	(0.000)
Akaike crit. (AIC)	1757.419	1700.155
Bayesian crit. (BIC)	1770.372	1715.267
Number of obs	64	64

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Authors' estimation

Table A4.2-2: Estimation of Total Revenue and Total cost for Mainly-cooperative Handloom Unit

Explanatory Variables	Total Revenue of Firm (Year)	Total Variable Cost of Firm (Year)
	Coef. (Robust SE)	Coef. (Robust SE)
Total Production of Firm (Year)	384.109*** (61.748)	157.12*** (21.033)
Total Production of Firm ² (Year)	-0.37*** (0.074)	-0.464*** (0.085)
Total Production of Firm ³ (Year)	-----	0.0004*** (0.00007)
Age of the respondent	-357.915*** (128.035)	-58.397** (28.92)
Education	-215.258 (403.764)	-163.57* (85.539)
Total family member	1138.328* (641.829)	146.588 (141.928)
General (caste dummy)	2811.615 (2298.626)	783.48 (739.137)
Total own loom holding by the unit	15527.812** (6915.741)	3512.936*** (1208.492)
Main occupation dummy (If main occupation weaving = 1 Otherwise = 0)	3334.126 (2171.867)	483.488 (610.994)
Gender (dummy)	-10271.218*** (2936.399)	-1139.836 (763.687)
Constant	-6843.417 (13580.144)	-5158.994** (2412.654)
Mean dependent var	33679.639	7256.725
SD dependent var	25164.408	7266.535
R-squared	0.545	0.524
F-test (P value)	10.323 (0.000)	24.822 (0.000)
Akaike crit. (AIC)	5040.354	4493.307
Bayesian crit. (BIC)	5074.515	4530.884
Number of obs	225	225

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Authors' estimation

Table A4.2-3: Estimation of Total Revenue and Total cost for Mainly Sub-Contracted Handloom Unit

Explanatory Variables	Total Revenue of Firm (Year)	Total Variable Cost of Firm (Year)
	Coef. (Robust SE)	Coef. (Robust SE)
Total Production of Firm (Year)	237.225** (103.324)	-241.881** (115.537)
Total Production of Firm ² (Year)	0.002 (0.169)	0.784** (0.368)
Total Production of Firm ³ (Year)	-----	-.001 (0.0003)
Share of HH labour out of total labour	-2365.744*** (465.197)	-1843.192*** (212.957)
Age of the respondent	96.031 (254.773)	217.053 (146.683)
Education	1416.83 (1000.472)	1242.077* (632.989)
General (caste dummy)	-4692.802 (9288.626)	-6137.929 (5418.663)
OBC (caste dummy)	-23851.404*** (6897.027)	-7101.999 (4726.309)
Main occupation dummy (If main occupation weaving = 1 Otherwise = 0)	14763.351*** (4912.712)	2957.023 (2834.151)
Gender (dummy)	-34849.802*** (6169.843)	-6090.071* (3672.39)
Constant	244606.95*** (52736.261)	197631.89*** (24113.987)
Mean dependent var	88914.028	25561.129
SD dependent var	108862.118	59279.218
R-squared	0.511	0.559
F-test (P value)	35.617 (0.000)	22.124 (0.000)
Akaike crit. (AIC)	13564.212	12860.110
Bayesian crit. (BIC)	13607.035	12907.215
Number of obs	535	535

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Authors' estimation

Chapter 5: A Decomposition Analysis of Gender Gap in Performance of Weaving Entrepreneurs from Natural Handloom Clusters of West Bengal

5.1 Introduction

The handloom sector in India, a vital part of the rural economy, employs millions of people²¹. Women, who constitute over 70% of all weavers and allied workers, play a significant role in this sector²². However, numerous studies observed that income distribution is heavily skewed against female weavers. Research suggests that the income of female micro-entrepreneurs might be comparable to that of their male counterparts when controlling for the nature and types of activities. However, a significant gender income gap persists, with female micro-entrepreneurs typically earning less than their male counterparts (Hundley, 2001; Leung, 2006; Álvarez *et al.*, 2009; Fairlie and Robb, 2009; Lechmann and Schnabel, 2012; Bortamuly *et al.*, 2014; Hazarika, 2020). While the gender wage gap in the labour market is well-documented, the gender income gap in entrepreneurship, particularly in rural informal micro-enterprises, is less understood (Lechmann and Schnabel, 2012).

Female micro-entrepreneurs in India, especially in rural areas, often face constraints such as low-value businesses, limited scale of operation, credit and marketing constraints, and low technology adoption. Studies show that men and women manage businesses differently, focusing on various aspects and goals, and shaping their businesses uniquely (Web *et al.*, 2013; Saridakis *et al.*, 2014). This difference is understudied in female-dominated industries, where there are many female workers but fewer female business owners. Women's business strategies are influenced by their social experiences and networks (Koellinger *et al.*, 2013), leading to different business growth expectations. Women may start businesses out of necessity more often than men (Brush *et al.*, 2012).

²¹ Source: Fourth Handloom Census, Government of India. 2019-20.

²² Source: Fourth Handloom Census, Government of India. 2019-20.

Education is a critical factor in entrepreneurship, but its impact varies across genders. Some studies suggest that women entrepreneurs have less education (Boden and Nucci, 2000), while others argue they are well-educated (Cowling and Taylor, 2001). Women are less involved in high-tech businesses (Anna *et al.*, 1999; Bortamuly and Goswami, 2012, 2015; Hazarika *et al.*, 2015) and are less inclined to start a business (Delmar and Davidsson, 2000). However, smaller families and shorter marriages might encourage women to work more (Mincer, 1985). According to some studies women generally have less managerial and entrepreneurship experience (Boden and Nucci, 2000; Millán *et al.*, 2012). Experience has a complex relationship with starting a business (Jones-Evans *et al.*, 2011). Wealth, income, and technology positively affect entrepreneurship (Carree *et al.*, 2002; Verheul *et al.*, 2006), with new technology creating more opportunities (Wennekers *et al.*, 2002). However, high unemployment can signal fewer business opportunities (Verheul *et al.*, 2006). The literature indicates that the gender income gap in India's handloom sector is a complex issue influenced by various factors, including access to education, financial services, and technology. The gap is more pronounced at higher income levels, suggesting that interventions must be tailored to address specific barriers female entrepreneurs face.

The present paper will investigate the issue of the gender gap in revenue earning in the context of handloom clusters from West Bengal. A recent study by Hazarika (2020) examined the gender income gap in rural informal micro-enterprises, specifically in Assam's handloom industry. It reveals a substantial income disparity between male and female micro-entrepreneurs. In this study, differences in productive characteristics, such as education, financial literacy, risk attitude, SHGs membership²³, and technology adoption, contribute significantly to the income gap, favouring male entrepreneurs. The findings suggest that reducing risk aversion, improving management skills among females, and encouraging

²³ SHG membership stands for Self-Help Group membership.

technology adoption could help narrow the gender income gap, especially at higher income levels. However, this study did not shed any light on the effect of organizational structure on the issue of the gender gap in performance in terms of revenue earned from weaving. As Maiti (1980) pointed out, the organizational structure of the sector depends on the supply chain of yarn, other inputs and working capital, and distribution and marketing channels of the finished product. In light of this fact, weavers in West Bengal can be divided into three organizational structures: 'independent units', 'subcontracted units', and 'cooperative units'. Cooperatives, such as those under state government, provide a platform for weavers to work collectively, potentially empowering women through shared resources and support for entrepreneurship. Subcontracted weavers are heavily dependent on independent master weavers for raw materials and working capital and often struggle with limited access to markets and welfare schemes, exacerbating gender inequality. Finally, the independent master weavers who employ small weavers face the challenges of the market and require significant managerial and entrepreneurial skills to handle their production process. Given the interplay of different agents in the handloom clusters, the present study underscored the effect of the existing organizational structures on gender inequality, if any, in the context of three handloom clusters from West Bengal, India.

The chapter's results indicate the severe gender gap in revenue from handloom units, where female entrepreneurs from major handloom clusters in West Bengal are lagging behind their male counterparts. The revenue gaps become more pronounced as we ascend along revenue quantiles and it depends crucially on the organisational structure of the handloom sector. Existing literature on the handloom sector pertaining to India and West Bengal did not pinpoint the association between organisational structure and the gender gap in financial performance, which is a notable contribution of the present study.

5.2 The Context

India, a culturally diverse country with several different ethnicities, has a massive population base from which to single out entrepreneurial personalities (Dana, 2000). Furthermore, India's diverse social structure, including its caste system, has historically defined the types of entrepreneurial activities undertaken by different communities (Kanitkar and Contractor, 1992; Dana and Sharma, 2021).

India's handloom sector, particularly in the state of West Bengal, reflects the country's rich cultural diversity and deep-rooted entrepreneurial traditions. India is the largest producer of handwoven textiles in the world, and states like West Bengal play a crucial role in maintaining this global leadership (Ministry of Textiles, 2021). West Bengal, a major hub of handloom production, is renowned for its distinct handwoven fabrics, which are highly sought after globally (Chatterjee, 2020). As a nation with many ethnicities and social groups, India draws from a vast population base to nurture diverse entrepreneurial talents across various communities (Dana and Sharma, 2021). This diversity is especially evident in the handloom industry, where different social and ethnic groups have developed specialized skills and unique weaving techniques that appeal to both domestic and international markets (Debnath, 2021). Despite challenges from machine-made textiles and international competitors, such as Bangladesh and China, West Bengal's handloom sector has preserved its distinctive market position by focusing on products that highlight its rich cultural heritage and skilled craftsmanship (Bhattacharya and Sen, 2018).

A greater part of the weavers of the handloom sector in India, as well as in West Bengal, is constituted by women and mostly the production units or businesses of this sector are run by households.²⁴ Despite advancements in education and employment equality, women's contributions to family businesses often remain undervalued, largely due to male dominance and traditional conservative norms (Tyagi et al., 2021; Bose, 2023). Tyagi et al. (2021) argued

²⁴ Source: Fourth Handloom Census, Government of India. 2019-20.

that women in family firms typically adopt a distinct 'feminine' management style, which can offer substantial benefits for operational efficiency and relationship management. However, women in these firms are predominantly positioned in second-tier managerial roles, underscoring the need for enhanced support and recognition of their contributions. Given the critical role of the MSME sector in India's GDP, increased involvement of women in family businesses holds significant potential for both economic and social progress. However, due to fewer opportunities for managerial roles in rural micro-entrepreneurship, studies show women generally have less managerial and entrepreneurship experience (Boden and Nucci, 2000; Millán *et al.*, 2012). As highlighted in the introduction, various scholars have debated the factors contributing to the gender gap in micro-entrepreneurship. Despite these discussions, a notable income disparity between genders remains, with female micro-entrepreneurs consistently earning less than their male peers. In subsequent sections, we plan to elucidate this issue in greater detail.

5.3 Descriptive statistics across Organizational Structures and Gender

In Table 5.3.1, we observe the absence of female entrepreneurs/weavers in the sample, operating under an independent organizational structure. This absence is noteworthy as the mainly independent weavers are mostly master weavers involved in large-scale weaving processes, and they employ small weavers for their production process. This group needs to exercise managerial and entrepreneurial skills to sustain itself in the business environment. The complete lack of women entrepreneurs in this organizational structure indicates towards extreme form of gender disparity.

Table 5.3.1: Distribution of Male and Female entrepreneurs across districts and organisational structure.

Weavers	Districts				Organisational Structure			
	Hooghly	Nadia	East Burdwan	Total	Mainly Independent	Mainly Cooperative	Mainly Sub-contracted	Total
Male	195	357	76	628	64	194	370	628
Female	32	161	4	197	0	32	165	197
Total	227	518	80	825	64	226	535	825

Source: Authors' calculations based on primary survey.

Next, in Table 5.3.2, we present the gender differences in socio-demographic variables and key variables corresponding to production performance.

Table 5.3.2: Comparison of Demographic and Production unit related parameters across gender

Types of Variables	Variables	Overall	Male	Female	Difference	t-value
Demographic Variables	Average Age	46.49	49.19	37.88	11.31	11.563***
	Years of Schooling	5.18	5.53	4.05	1.49	4.9814***
	Average Adult Males in HH	1.66	1.70	1.52	0.19	2.7717***
	Average Adult Females in HH	1.49	1.51	1.41	0.01	1.6295*
	Average Male Child in HH	0.43	0.40	0.53	-0.12	-2.4385
	Average Female Child in HH	0.40	0.38	0.45	-0.07	-1.2934
	Average Dependents in HH	1.38	1.39	1.34	0.06	0.6147
Production Unit Related Variables	Average output per annum in terms of the number of sarees weaved	238.86	252.199	196.3553	55.8437	4.4031***
	Average Revenue from Prod. Unit per annum	90973.10	108018.30	36636.20	71382.1	6.4184***
	Average Cost of Prod. Unit per annum	31631.95	39676.81	5986.39	33690.42	4.9677***
	Average Revenue Per Loom	51565.22	57837.00	31571.94	26265.06	7.474***
	Average Loom Holding	1.49	1.61	1.10	0.51	6.4306***
	Average Labour Working	2.25	2.50	1.45	1.05	11.5552***
	Average Age of the Production Units	25.32	27.72	17.64	10.08	9.3702***
	Average Experience in Weaving of the Respondent	28.55	31.46	19.26	12.21	11.9577***

Source: Authors' calculations based on primary survey. *** pvalue<0.01; ** pvalue<0.05; *pvalue<0.1

Table 5.3.2 underscores the existence of gender disparity in the performance of weavers in West Bengal, as the average output per weaver, average and annual revenue and cost are all lower for women weavers in comparison to the male weavers. The average revenue per loom is significantly higher for males (₹57,836.996) than for females (₹31,571.939). This indicates a gender disparity in income from weaving. The reason for this disparity is also highlighted in Table 5.3.2. The table also focused those women weavers are lagging behind their male counterparts in terms of endowments, which is a common phenomenon in the Indian patriarchal structure. We find that factors like education level, experience, number of loom holdings, and age of production units are all lower for women weavers compared to males. The patriarchal

society dictates stereotypical gender roles where women are confined within the households as the primary caregivers in the families. Due to the custom of patrilocal marriages (where couples reside in the groom’s house) and dowry system in India, very often, families treat girl children as a burden and are reluctant to invest in their education and skill enhancement. As a result, daughters are denied their basic rights, including access to education and autonomy (Srinivasan, 2005). The cultural and religious traditions that foster gender subjugation are a cause behind the high mortality rate of girl children and they restrict women’s economic independence, decision-making autonomy and access to resources and public spaces (Sekher & Hatti, 2007; Kaur & Kumari, 2017). Studies by Daymard (2015), Gupta and Phillips (2019), and Chiplunkar and Goldberg (2024) pointed out that women entrepreneurs in India face various socio-cultural and legal biases and male prejudices stemming from existing gender norms, which cause hindrance to their growth and development. Education plays a role in determining income, particularly for entrepreneurs around the median income level (Suryanarayanan and Ramswamy, 2022). Table 5.3.2 depicts that our sample is no exception. In our sample, the average education level is lower for women, who are endowed with fewer looms and years of experience. These crucial factors may cause the gender gap in the weaving income, which is the main focus of the study.

Table 5.3.3 provides descriptive statistics of some key variables.

Table 5.3.3: Descriptive statistics of the variables across gender

Variable	All (825)		Male (628)		Female (197)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Occupation dummy: If the main occupation is weaving = 1 Otherwise = 0	0.798	0.402	0.874	0.332	0.553	0.498
Years of schooling	5.177	3.706	5.532	3.787	4.046	3.187
Registration dummy If the entrepreneur is registered = 1 Otherwise = 0	0.29	0.454	0.33	0.47	0.162	0.37
Total family members	3.981	1.583	4.003	1.65	3.909	1.348
Age of the unit of production	25.315	13.845	27.721	13.968	17.645	10.203
Product Variety	1.367	0.482	1.417	0.493	1.208	0.407
Total number of looms	1.491	0.998	1.613	1.1	1.102	0.335

Source: Authors’ calculation based on primary survey

Table 5.3.3 shows that a higher proportion of males (87.4%) have weaving as their main occupation compared to females (55.3%). This suggests that weaving is more likely to be the primary source of income for males in this sample. On average, males have more schooling (5.532 years) than females (4.046 years). Education can influence economic outcomes, and this difference may contribute to the observed revenue disparity. A smaller percentage of female entrepreneurs (16.2%) are registered compared to male entrepreneurs (33%). Registration can be associated with formalization, which may lead to better business opportunities and legal benefits. The average number of family members is slightly higher for males (4.003) than for females (3.909). This could affect the labour supply for the weaving business, as family members often contribute to household enterprises. Male-owned production units are older on average (27.721 years) than those owned by females (17.645 years). Older units may have more established business practices and customer bases, potentially leading to higher revenues. Males offer a greater variety of products (1.417) compared to females (1.208). Product diversity can attract a wider customer base and lead to higher sales. Males have more looms on average (1.613) than females (1.102), which could correlate with higher production capacity and, consequently, higher revenue. These inferences suggest that there are significant gender-based differences in the industry's economic outcomes. Factors such as education, business registration, and access to resources like looms may contribute to these disparities.

5.4 Methodology

5.4.1 The measurement of total revenue for males and females

The present chapter applied the unconditional quantile regression proposed by Firpo *et al.* (2009). This methodology is an improvement over the conditional quantile regression method developed by Koenker and Bassett (1978). The conditional quantile regression has a drawback in that the estimated quantiles are conditional upon the given set of explanatory variables. A change in the explanatory variables may change the estimated level of quantiles. To overcome this issue, Firpo *et al.* (2009) proposed the method of unconditional quantile regression that

estimates the τ th quantile for all observations in a sample, unconditional on the control variables. In the present study, the unconditional quantiles are obtained for male and female weavers to discern the possible existence of a gender gap.

Let R be the vector of observed yearly revenue of handloom units with the presence of a set of covariates Z . We assume R and Z are jointly distributed. Let F be the unconditional distribution function of R . Following Firpo *et al.* (2009) we will gauge the impact of a minute increase in the location of the distribution of Z on the τ th quantile of the unconditional distribution Q_τ of R . To estimate unconditional quantile regression (UQR) we use an Influence Function (IF) and Re-centered Influence Function (RIF). An IF is an analytical tool to measure the impact (or ‘influence’) of removing/adding an observation on the value of a statistic (say, Q_τ), without having to recalculate that statistic (Borah & Basu, 2013). A Re-centered Influence Function (RIF) is obtained by adding the statistic to its IF. The RIF of the dependent variable, which is widely used in robust estimation (Fang & Sakellariou, 2016), is usually written as:

$$RIF(R, Q_\tau) = Q_\tau + IF(R, Q_\tau)$$

$$RIF(R, Q_\tau) = Q_\tau + \frac{\tau - I(R \leq Q_\tau)}{f_R(Q_\tau)}$$

Here Q_τ is the τ th quantile of the unconditional distribution of R . $f_R(Q_\tau)$ is probability density function of the variable R evaluated at Q_τ . $I(R \leq Q_\tau)$ is an indicator variable to denote whether an outcome value is less than Q_τ or not. Next, the equation measures the influence of an observation on a specific distributional statistic, say Q_τ . Firpo *et al.* (2009) have shown that when the conditional expectation of RIF ($R; Q_\tau$) is modeled as a function of explanatory variables, the RIF regression can be viewed as a UQR. Thus, the next step of unconditional quantile regression involves estimating an OLS regression of the generated RIF variable on covariates. If the specification of unconditional quantile regression is linear,

$$E\{RIF(R, Q_\tau) | Z\} = RIF(\widehat{R}, \widehat{Q}_\tau) = Z\beta_\tau \quad \text{----- (1).}$$

Here β_τ is the unconditional effect of covariate X on τ quantile of revenue distribution.

In the present study, Z includes the following variables: Whether the main occupation is weaving, years of schooling, registration dummy, number of family members, age of the handloom unit, whether the unit produces different varieties of products dummy and total number of looms. We separately estimate revenue quantiles for male and female weavers to compare across gender groups. The descriptive statistics are already presented in Table 5.3.3.

5.4.2 Methodology of Decomposition Analysis

We use unconditional quantile regression-based decomposition analysis to understand the existence of a gender gap in the earnings of the weavers. Following studies by Hazarika (2020), Pontarollo *et al.* (2023) and Jemmali (2023), we apply Blinder Oaxaca decomposition analysis under unconditional quantile regression. This is an extension of Oaxaca-Blinder's (1973) decomposition analysis on re-centred influence function (RIF) based unconditional quantile regression as demonstrated by Firpo *et al.* (2009). The difference in the distribution of estimated revenue of male and female weavers at τ th quantiles can be given using equation (1)

$$\text{as } \hat{R}_{M\tau} - \hat{R}_{F\tau} = RIF(\widehat{R}_M, Q_\tau) - RIF(\widehat{R}_F, Q_\tau) = \bar{Z}_M \widehat{\beta}_{\tau M} - \bar{Z}_F \widehat{\beta}_{\tau F} \quad \text{----- (1)}$$

Here \bar{Z}_M and \bar{Z}_F are the vector of covariate averages for the male and female group; $\widehat{\beta}_{\tau M}$ and $\widehat{\beta}_{\tau F}$ are the estimated coefficients obtained from RIF-OLS regression for the male and female groups. The Difference can be decomposed in the following way (Fortin *et al.*, 2011; Firpo *et al.*, 2018).

$$\bar{Z}_M \widehat{\beta}_{\tau M} - \bar{Z}_F \widehat{\beta}_{\tau F} = (\bar{Z}_M \widehat{\beta}_{\tau M} - \bar{Z}_F \widehat{\beta}_{\tau M}) - (\widehat{\beta}_{\tau M} - \widehat{\beta}_{\tau F}) \bar{Z}_F \quad \text{----- (2)}.$$

The first term of the RHS of equation (2) gives the contribution of the differences in distributions of characteristics (endowments) of male and female weavers to the revenue differentials at the τ th unconditional quantile. It is also called the endowment effect (explained part). The second term measures the unexplained covariate effects or the differences in revenues of male and female groups due to differences in returns of households' characteristics

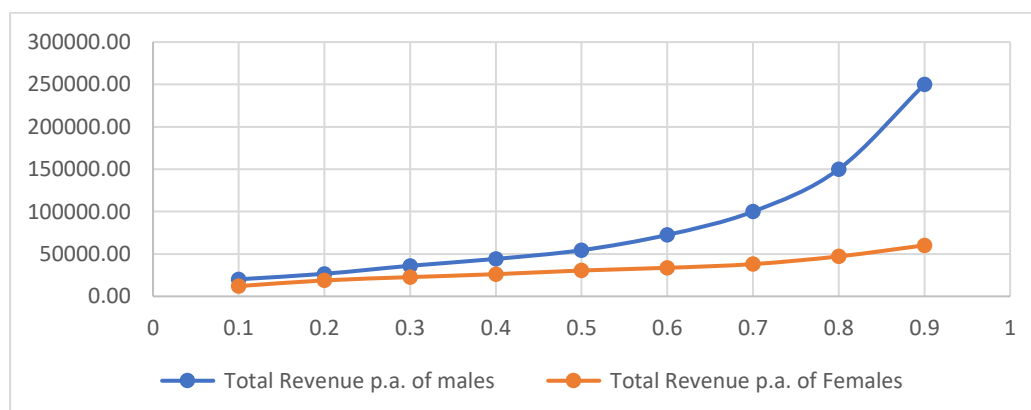
at the τ th unconditional quantile. The decomposition analysis using unconditional quantile based on re-centred influence function (RIF) is an improvement on OLS-based decomposition analysis. It will help us to identify the controls that widen the gender gap in different unconditional quantiles instead of only for conditional means, which are assumed to be linear in parameters.

5.5 Results and Discussion

5.5.1 Measuring the Gender Gap in the Distribution of Revenue per Annum

We first diagrammatically present the result of unconditional quantile regression on the distribution of revenue for male and female weaver groups in Figure 5.5.1 and Figure 5.5.2 while controlling for the following variables: whether the main occupation is weaving, years of schooling, registration dummy, number of family member, age of the handloom unit, whether the unit produces different varieties of products dummy and total number of looms.

Figure 5.5.1: Estimated unconditional quantile distribution of total revenue per annum (in Rs) of male and female entrepreneurs under the cooperative organizational structure

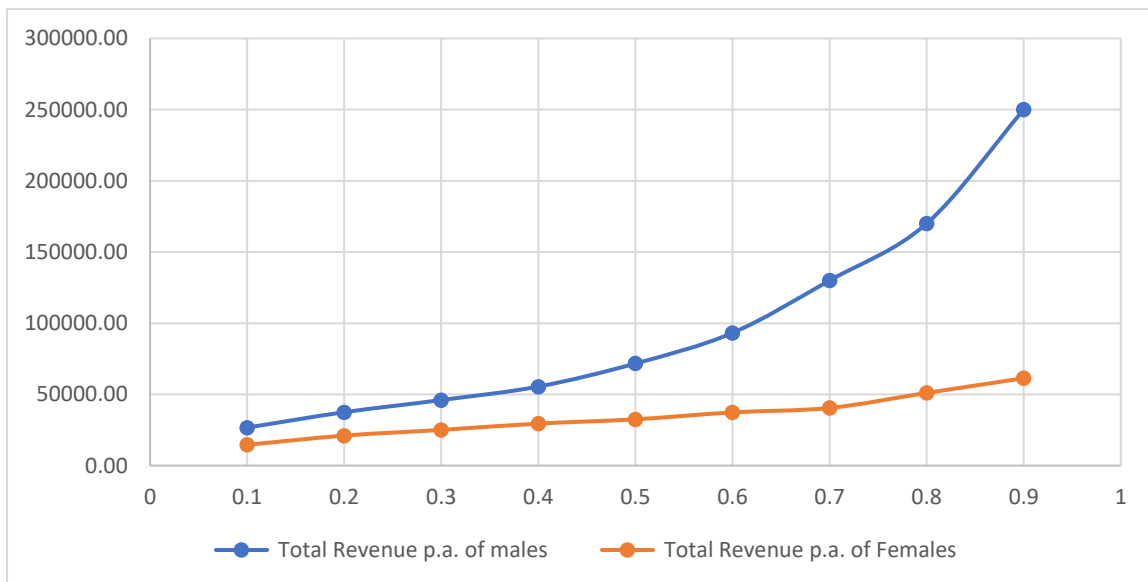


Source: Authors' estimation based on unconditional quartile regression. The number of observations of males was 194 and females: 32

In Figure 5.5.1, the distribution of revenue for female entrepreneurs remains consistently below the male revenue distribution throughout all quantiles. This indicates that female entrepreneurs, on average, earn less than male entrepreneurs at similar output levels. There is a notable spike in the total annual revenue of males at the highest quantile, which points to a substantial increase in earnings among the top-performing male entrepreneurs. This disparity becomes

significantly pronounced at higher quantiles, suggesting that the top-performing male entrepreneurs in cooperative structures earn considerably more than their female counterparts. The graph indicates underlying economic or structural inequalities within cooperative organizations. Despite the cooperative model's emphasis on equitable and collective business practices, the data suggest that male entrepreneurs may have advantages that lead to higher revenues, especially at the upper end of the output spectrum. This could be due to factors such as differential access to resources, networks, or markets.

Figure 5.5.2: Estimated unconditional quantile distribution of total revenue per annum in Rs of male and female entrepreneurs under the sub-contracted organisational structure



Source: Authors' estimation based on unconditional quantile regression. The number of observations of males was 370 and females: 165

At the outset, in the lower quantiles, the revenues of male and female entrepreneurs are closely matched. This parity suggests that at the initial levels of output, the subcontracted environment provides a relatively level playing field for both genders. As we ascend to the median quantile, a subtle yet noticeable revenue gap begins to surface. Male entrepreneurs start to surge ahead, hinting at potential advantages that may accrue with increased output — advantages that seem less noticeable for their female counterparts.

The narrative takes a dramatic turn in the upper quantile. Here, the revenue gap widens significantly, with male entrepreneurs surpassing females by a considerable margin. This divergence could be indicative of systemic barriers that disproportionately affect female entrepreneurs in scaling their operations within the subcontracted framework.

In the complex environment of the handloom industry in West Bengal, economic outcomes are not only a product of skill and tradition but also a reflection of the underlying social variables.

5.5.2 Decomposition Analysis

Table 5.5.1 provides a comprehensive Unconditional Blinder-Oaxaca Decomposition of Total Revenue per annum for male and female handloom entrepreneurs for the first quartile, median and third quartile. This analysis is essential in understanding the gender gap within the handloom sector, particularly within the context of our study. From the table, we can identify several significant variables that contribute to the gender gap in the revenue of male and female weavers. Most importantly, we observed the set of explanatory variables explain 43.61%, 61.59% and 79.24% of the gender gap in revenue of weavers in the first quartile, median and third quartile, respectively. The occupation dummy variable, that is, the main occupation is weaving, significantly and positively influences the gender gap in revenue at all quartiles. Around 87% of male weavers have weaving as their main occupation, whereas it is only 55.3% for female weavers. Since the respondents with weaving as the main occupation are outperforming compared to the rest group, this variable significantly raises the gender gap in revenue. The years of schooling variable is significant and positively affects the gender gap in revenue at the 50th quantile, where in our sample, males have significantly higher years of schooling vis à vis female weavers. Thus, this education gap raises the gender gap in revenue in favour of males. The registration dummy variable, which indicates whether the entrepreneur is registered, is significant at all quantiles. Interestingly, this variable has a negative impact on the gender gap in revenue, suggesting that the gender gap reduces among registered

entrepreneurs. Data explorations revealed that registered weavers earn less than their unregistered counterparts (t-test gives the following result: $t = 9.9901$, assuming unequal variances, Satterthwaite's degrees of freedom = 772.573; p value=0.00) and among the registered weavers, around 87 percent are male and 13 percent are female. Williams and Kedir (2016) showed that enterprises that started unregistered and remained so longer, experienced higher sales, employment, and productivity growth than those registered from the start. Delaying registration offers productivity gains, as businesses save on taxes, fees, and compliance costs, enabling greater reinvestment. Operating informally allows flexibility, faster decision-making, and adaptability. Additionally, avoiding registration helps businesses evade corruption and bribery in weak institutional environments. Further, we observed that registered entrepreneurs/weavers are mostly associated with cooperatives (more than 90 percent); again, this observation indicates the gender sensitive nature of cooperative memberships, where women have less access to formal organizations like cooperatives. Operating within the cooperative framework, our study observed that the weavers have a lower output level and lower revenue compared to weavers operating in other organizational structures²⁵. Hence, we found the results that registration dummy actually narrows the gender gap in revenue, as male weavers operating under cooperatives are underperforming. The poor performance of cooperative weavers is also documented in other studies. Srinivasulu (1994), Bhagavatula (2009), Bhagavatula et al. (2010), and Prajapati and Biswas (2011), under different Indian contexts, observed that cooperative weaving organizations underperform compared to other organizational weaving structures. Finally, the total number of looms contributes significantly and positively to gender gaps in revenue per annum at all quantiles. Basically, male entrepreneurs have a greater number of looms compared to their female counterparts and earn higher revenues. Hence follows the result. To check the robustness of our result, we also

²⁵ Table A1 in Appendix 5.1

computed standard Oaxaca-Blinder decomposition at the mean of the gender gap in revenues of handloom weavers for the full data set as well as for the case where independent handloom weavers are excluded from the sample. The results presented in Table 5.5.2 are similar to those presented in Table 5.5.1. There is also an unexplained portion of the gap, which could be attributed to factors not captured in the model, such as gender roles, social discrimination or unobserved entrepreneurial skills. Our results differ in different respects from the results highlighted by Hazarika (2020) using samples from the state of Assam. According to Hazarika (2020), gender differences in accounting practices and the use of technology-driven weaving machines contribute significantly to the gender income gap. Also, SHG membership of women helps them to bridge the gap in gender income. In our sample, we did not observe the prevalence of SHG membership and we strictly restricted our survey to traditional handloom weaving units. We observed the nonexistence of female weavers in the independent organisational structure. The size of the loom holding that signifies the scale of operation, full-time involvement in weaving increases the gender gap in revenue in favour of males.

Table 5.5.1: Unconditional Blinder-Oaxaca Decomposition of Total Revenue per Year of Male and Female Entrepreneurs for First Quartile, Median and Third Quartile

Model : Blinder-Oaxaca RIF-decomposition			
Type : Reweighted			
RIF : q(25), q(50), q(75)			
Scale : 1			
Group 1:	gender = 0 $x_1 * b_1$	Number of observation	group 1 = 628
Group c:	$X_1 \rightarrow rw \rightarrow X_2$ or $x_2 * b_1$	Number of observation	group C = 628
Group 2:	gender = 1 $x_2 * b_2$	Number of observation	group 2 = 197
Total revenue per year	q(25) Coef. [Std. Err. (Bootstrapped)]	q(50) Coef. [Std. Err. (Bootstrapped)]	q(75) Coef. [Std. Err. (Bootstrapped)]
Overall			
Group_1	30440*** (1931.754)	54457.5*** (2556.463)	124900*** (8248.9)
Group_c	26516.44*** (1628.148)	40428.72*** (1939.328)	58485.11*** (2207.851)
Group_2	21442.63*** (2134.859)	31678.91*** (2369.476)	41085.71*** (2328.295)
Total difference	8997.375*** (2879.114)	22778.59*** (3485.673)	83814.29*** (8571.281)
Total Explained	3923.558 (43.61%) (2510.781)	14028.78*** (61.59%) (3532.695)	66414.89***(79.24%) (10531.08)

Total Unexplained	5073.818 (4659.921)	8749.809* (5087.369)	17399.39*** (4864.221)
Explained			
Total	3923.558 (2510.781)	14028.78*** (3532.695)	66414.89*** (10531.08)
Pure explained	5271.758 (4376.377)	19611.6*** (4415.182)	75912.48*** (12209.7)
Specific error	-1348.2 (4451.462)	-5582.816 (4993.843)	-9497.585 (11907.28)
Pure explained			
Occupation dummy If the main occupation is weaving = 1 Otherwise = 0	6886.773** (3127.131)	9021.302*** (2901.241)	11813.1* (6567.658)
Years of schooling	1844.404 (1179.5)	3308.042** (1545.683)	6507.691 (4140.605)
Registration dummy If the entrepreneur is registered = 1 Otherwise = 0	-6015.81*** (1486.528)	-8144.86*** (1871.444)	-12100** (5786.118)
Total family members	43.755 (112.502)	-36.891 (114.046)	20.716 (309.782)
Age of the unit of production	-1382.633 (2409.997)	1601.005 (2582.685)	5848.149 (7299.054)
Product Variety	194.447 (1166.458)	2443.966 (1663.37)	3115.675 (6904.273)
Total number of looms	3700.821*** (1052.663)	11419.03*** (2231.011)	60673.4*** (9644.149)

Source: Authors' estimation. *** p value<.01, ** p value<.05 * p value<.1

Table 5.5.2: Conditional Blinder-Oaxaca Decomposition of Total Revenue per Year of Male and Female Entrepreneurs

	Overall		Excluding Independent output suppliers	
	Blinder-Oaxaca decomposition Group 1: gender = 0 Group 2: gender = 1 explained: (X1 - X2) * b1 unexplained: X2 * (b1 - b2)	Number of obs = 825 Model = linear N of obs. 1 = 628 N of obs. 2 = 197	Blinder-Oaxaca decomposition Group 1: gender = 0 Group 2: gender = 1 explained: (X1 - X2) * b1 unexplained: X2 * (b1 - b2)	Number of obs = 761 Model = linear N of obs. 1 = 564 N of obs 2 = 197
Total revenue per year	Coef.	Std. Err. (Bootstrapped)	Coef. (Bootstrapped)	Std. Err. (Bootstrapped)
overall				
group_1	108000***	6196.464	85128.1***	4496.443
group_2	36636.2***	2471.713	36636.2***	2471.713
difference	71382.07***	6671.247	48491.9***	5131.02
explained	50784.15***	7917.153	32173.34***	5725.136
unexplained	20597.92***	7805.136	16318.56***	5669.224
explained				
Occupation dummy If the main occupation is weaving = 1 Otherwise = 0	5088.212	4477.349	5069.483	3166.819

Years of schooling	7708.622***	2316.618	3317.907**	1422.809
Registration dummy If the entrepreneur is registered = 1 Otherwise = 0	-6238.839**	2719.566	-5961.158**	2373.201
Total family member	-419.459	579.325	-156.08	299.26
Age of the unit of production	-3299.781	3462.107	-2420.466	2600.813
Product Variety	1400.842	2610.524	2690.969	2236.684
Total number of looms	46544.56***	5090.331	29632.69***	3763.727

Source: Authors' estimation. *** p value<.01, ** p value<.05 * p value<.1

5.6 Conclusion and policy suggestion

A significant portion of the revenue gap is explained by differences in attributes between male and female entrepreneurs. This includes factors such as main occupation, years of schooling, registration status, family size, age of the unit of production, product variety, and the number of looms. Being primarily engaged in weaving and highly educated contributes to the revenue gap at all major quantiles. Being a registered entrepreneur is associated with lower revenue, which is counterintuitive and suggests that registration may not provide the expected economic benefits. This happens because the entrepreneurs associated with cooperatives are all registered and operate at a lower level of output with a single loom. The number of family members does not significantly affect the revenue gap. Older production units do not significantly contribute to the revenue gap. The number of looms is a significant contributor to the revenue gap, indicating that having more looms is strongly associated with higher revenue.

The data suggests that structural factors, such as access to education and productive assets like looms, play a significant role in the gender gap in revenue in this sector. The negative coefficient for registration status indicates that most of the registered weavers/entrepreneurs are associated with cooperatives and are operating inefficiently. Since more males are engaged in cooperatives than female weavers, this variable narrows down the revenue gap in favor of women. The unexplained portion of the gap could indicate the presence of gender bias or other unmeasured factors affecting income. Interventions aimed at reducing the gender gap in

revenue should consider these structural factors and address the unexplained disparities that may arise from social or institutional biases.

Our analysis of the gender gap in revenue of handloom units clearly showed that women weavers have less endowment compared to their male counterparts. Intensity of gender discrimination is highest for independent weavers, as we did not have a single female who works as an independent weaver in the sample. Women weavers from cooperative structure and subcontracting structure have lower educational achievements than the male weavers and also, they own a lower number of looms. These two factors are significantly crucial for the low revenue earned by women. To tackle the low education level of women, adult continuing courses, bridge courses through distant modes for the enhancement of entrepreneurial skills can be introduced. Opportunities like distance education courses relevant to handloom weavers, with subsidies for SC, ST, BPL, and female weavers, provided by the Ministry of Textiles, Government of India, should be heightened and extensive. Also, women weavers should be trained in bookkeeping and basic accounting skills to facilitate the smooth functioning of their business. Last but not least, the success of weaving activities crucially hinges on adopting new designs and attractive colour combinations of treads. This requires training on design making and its adaptation. In the present digital era, weavers should be trained in the application of computer-aided designing that will help them to create more attractive patterns and motifs in beautiful colours. For example, Digibunai²⁶ is a designing software developed by the Ministry of Electronics and IT, Government of India, for pre-weaving motif and pattern creation for Banarashi sarees. A similar kind of software should be developed for cotton handloom sarees from West Bengal. Weavers should be trained to use these kinds of design tools to improve the pre-loom process. These kinds of training can be more easily implemented through institutions like cooperatives. This, in turn, requires higher cooperative memberships for women. Also,

²⁶ <https://digibunai.dic.gov.in/>

cooperatives should function more efficiently to optimize their potential to improve the conditions of weavers. For weavers working as subcontractors, training can be implemented through collaborations between stakeholders like Non-Government Organizations (NGOs), local self-governments and the Handloom Directorate.

The positive effect of the total number of looms on income highlights the importance of resources in determining income. This suggests that policies aimed at promoting entrepreneurship should consider providing resources or support (like Hathkharga Samvardhan Sahayata (HSS) that provides subsidies for upgraded looms and accessories to improve productivity and fabric quality, provided by the Ministry of Textiles, Government of India) to help entrepreneurs, especially women entrepreneurs, acquire necessary equipment or tools.

Further, the results show that the type of occupation significantly affects the revenue of handloom entrepreneurs. This suggests that policies aimed at promoting entrepreneurship in the case of the handloom industry should consider the type of occupation as a key factor. The Directorate of Textiles (Handlooms, Spinning Mills, Silk Weaving & Handloom Based Handicrafts Division) in West Bengal has implemented several schemes like Skill Upgradation and Training, Design Development and Product Innovation, Yarn Depot and Common Facility Centres, Weavers' Credit Cards (WCC), MUDRA Scheme for Weavers, 10% Price Subsidy on Hank Yarn, Integrated Skill Development Training (ISDS) to encourage weavers to take up weaving as their primary occupation²⁷. The weavers, whose main occupation is weaving, are generating more revenue. This implies that woman-centric policies are required where women will take up weaving as a primary occupation instead of considering it as a subsidiary one.

In many societies, traditional gender roles and expectations can limit the opportunities available to female entrepreneurs (Bose, 2023). For instance, women may be expected to prioritize family responsibilities over entrepreneurial activities, which can limit their ability to invest

²⁷ Directorate of Textile, Government of West Bengal

time and resources into their businesses. This societal expectation can intersect with economic variables such as total revenue, as women may have less time to devote to their businesses, leading to lower income levels.

5.7 Limitations of the Chapter

Cultural and societal factors can significantly impact the economic outcomes of female entrepreneurs. These factors intersect with economic variables in complex ways, shaping the gender gap in entrepreneurial performance. Understanding these intersections is crucial for developing effective policies and interventions to promote gender equality in entrepreneurship. Further research is needed to explore these intersections in more detail and to develop strategies to address the cultural and societal barriers faced by female entrepreneurs.

Appendix - 5.1

Table A5.1-1: One-way ANOVA Table showing mean Differences in output and revenue across different organisational structures

Organisation Structure of Handloom Unit	Output level per annum			Revenue level per annum		
	Mean	Sd	Frequency	Mean	Sd	Frequency
Mainly Independent weavers	487.1094	383.5896	64	309738	302236.6	64
Mainly Co	134.4779	118.9783	226	33896.35	25318.9	226
Mainly Su	253.2636	153.3922	535	88914.03	108862.1	535
Total	238.8642	195.6353	825	90973.1	139472.6	825
F-statistic with p-value	107.07***			127.78***		

The author's calculation, based on primary data. *** pvalue<.01

Chapter 6: An Analysis of Production Loan and Future Expansion Plan of Handloom Weavers from West Bengal, India.

6.1 Introduction

The handloom sector in India holds immense cultural, economic, and social significance, serving as a vital source of livelihood for over 3.5 million artisans, with a predominant participation of women²⁸. Rooted in tradition, handloom weaving is not only a craft but a reflection of India's rich heritage, offering sustainable employment across rural and semi-urban areas.

Despite modernization, the sector remains an essential livelihood option, especially for marginalized communities; over 66% of households earn less than ₹5,000 per month, emphasizing the vulnerability and economic dependence on weaving²⁹. Research in this field is crucial for informing policy, improving working conditions, and enabling sustainable growth. Understanding the dynamics of socio-economic patterns within these weaving units, as well as production motives and credit roles, can support targeted interventions and ensure the sustainability of this sector.

Handloom weavers are regarded as small-scale entrepreneurs in India. Many researchers have observed that the main constraint on the potential growth of small and medium-scale enterprises in developing countries is a lack of working capital to purchase adequate raw materials and adopt new technology or skills (Gelos & Werner, 2002; Hertz, 2009; Love & Sánchez, 2009; Mukherjee et al., 2019). In the case of handloom weavers of India, due to irregular and low income, they cannot accumulate a fund for working capital resources. Sufficient credit availability to scale up is largely absent from village clusters. So, when credit comes at short notice and high cost from an informal source, the weavers stick to small-scale

²⁸ Source: Fourth Handloom Census, Government of India. 2019-20

²⁹ Source: Fourth Handloom Census, Government of India. 2019-20

production rather than expansion (Bhattacharya & Sen, 2019). Similarly, Kundu (1980) observed limited formal finance, steep informal borrowing rate, and liquidity squeezes that constrain production planning and expansion. Although various government schemes are available, it is difficult for the less educated weavers to understand and access these schemes (Das, 2021).

Studies reveal that formal credit has a positive impact on the output of both formal and informal manufacturing sectors in developing countries. Ensuring adequate, affordable, and timely credit can unlock growth in these sectors (Su & Sun, 2011; Raj & Sen, 2015; Iorember & John, 2016; Ume et al., 2017; Mutsonziwa & Fanta, 2021; Liu et al., 2022). Although the informal manufacturing sector, such as the handloom sector, is suffering from credit constraints during the transition, studies recommend that access to credit may help weavers' groups sustain their livelihoods (Parvin, Fatema, & Hauque, 2020; Meher & Panda, 2024).

Now, we can see in the existing literature how access to credit impacts the production outcomes or decisions of the handloom weavers. Studies showed access to credit impacts the production outcomes or decisions of the weavers positively (Rahamatullah et al., 2010; Islam & Hossain, 2021; Khatoon & Iffat, 2022; Dey, Paul, & Das, 2023). Moreover, it is also argued that if the credit could be used properly and invested in handloom activities, it would be profitable (Rahamatullah et al., 2010). On the contrary, a study found that government microcredit had no significant impact on borrowers' investment in their business in the context of the handloom business, whereas credit received from sources other than the government had a significant negative effect (Parvin, Birner, & Nahar, 2021). It has also been found that these weavers took loans and used them for consumption purposes (Nag, 2015).

In the case of the handloom sector, especially the handloom sector of West Bengal, India though the existing literature identified various aspects such as credit constraints, credit uptake impact of credit on production outcomes, investment decisions or efficiency of the handloom

sector, none of it delved into a rigorous empirical analysis on loan uptake and its effect on production plan or expansion motive of the weaver’s community.

Given the interplay of different agents in the handloom clusters, the present study will focus on the impact of the credit taken by production units on the production plan or motivation to expand their business in the context of handloom clusters from West Bengal, India.

6.2 Descriptive statistics of loan status and production plan across organizational structure

Table 6.2.1 presents the distribution of weavers across these three categories in the handloom clusters surveyed, alongside information on their loan uptake for production-related purposes. Before the econometric analysis, we applied the box-plot method to identify and remove outliers based on annual production levels. Specifically, we excluded outputs exceeding 1000 units for the “mainly-subcontracted” group and 1500 units for the “mainly-independent” group. Following this refinement, the final analytical sample comprises 825 weaver households.

Table 6.2.1: Production plan vs. borrowing across organisational structure

	Production Plan vs Loan Status			
	No loan taken		Loan taken	
	No plan for expansion	Plan for expansion	No plan for expansion	Plan for expansion
Mainly Independent	43	-	17	4
Mainly Cooperative	189	1	35	1
Mainly Sub-contracted	294	53	144	44

Source: Field survey

Table 6.2.1 shows significant patterns. Among "mainly independent" weavers, those who had credit, 19.4 percent reported plans to expand, while the great majority without loans had no such plans. The "mainly subcontracted" weavers, on the other hand, reported more expansion plans. Interestingly, 23.4 percent of "mainly subcontracted" weavers with a loan have a plan to expand their operation, whereas the percentage is 15.27 among the non-borrowers. In contrast, "mainly cooperative" weavers had negligible proclivity toward expansion, regardless of loan status, indicating that growth aspirations are constrained by factors other than access to credit

(e.g., institutional stiffness or absence of market incentives). Overall, the evidence points to a facilitating role for access to credit in motivating expansion, especially among independent and subcontracted weavers, who might be less constrained in their ability to take advantage of market opportunity.

6.3 Methodology

This chapter uses two econometric models: (i) a Recursive Bivariate Probit (RBP) regression to jointly estimate credit access and production plan, and (ii) a Probit model with a binary endogenous treatment variable to account for selection bias and endogeneity in treatment assignment.

6.3.1 Model 1: Recursive Bivariate Probit regression (RBP)

This study investigates two interrelated decisions made by production unit owners: (i) whether to expand operations and (ii) whether to take a loan for production purposes. Here, the hypothesis is that weavers who borrow for production purposes are more likely to expand in the future. However, the decision to borrow is also endogenously determined. Hence, we consider a structural model with two equations. In the first equation, we estimate the determinants of the probability of expansion while considering the likelihood of borrowing as an endogenous regressor. In the second equation, we estimate the determinants of the probability of borrowing by the weaver for production purposes. To tackle this issue, the Recursive Bivariate Probit regression (RBP) (Marra, Papageorgiou and Radice, 2013; Mourifié and Méango, 2014; Filippini et al., 2018) has been applied. Here we have bivariate probit regression as the normally distributed equation errors terms of two equations are correlated. The model is recursive as the binary dependent choice of one equation appears as an explanatory variable in another equation. The system of equations that we have used is as follows:

$$Pr(\text{expansion} = 1) = \Phi(\beta_0 + \beta \text{loan taken} + \gamma X > 0)$$

$$Pr(\text{loan taken} = 1) = \Phi(a_0 + aZ > 0)$$

Here, we assumed error terms of both equations are correlated, and the binary variable showing loan status (loan taken) appears as an explanatory variable in the first equation. Here, X is the vector of exogenous regressors. The second equation identifies the variables that determine the probability of borrowing for production purposes, where Z contains the set of explanatory variables. The following explanatory variables are included in both equations: gender, total family members, education in years of the respondent weaver, age of the production unit, and total number of looms. Further, the equation determining the probability of borrowing for production purposes includes two instruments: caste dummies and registration of the weaver dummy. We have performed Rao's score test (Lagrange multiplier test) to test the validity of the instruments.

6.3.2 Model 2: Probit equation with binary endogenous treatment variable

For a robustness check, we have considered the borrowing for production purposes as an endogenous treatment variable (T_i) and considered its impact on the future expansion plan of the weaver as an outcome variable (P_i) (Lokshin & Sajaia, 2011; Carrasco, 2012).

Here $T_i = 1$ if $aZ_i + u_i > 0$

And $T_i = 0$ if $aZ_i + u_i \leq 0$

Let P_{ji}^* be a latent variable corresponding to the possibility of future expansion, and if $P_{ji}^* > 0$, then only the observed outcome variable $P_{ji} = 1$ and zero otherwise for $j=1, 0$.

We assume $P_{1i}^* = \gamma_1 X_{1i} + \varepsilon_{1i}$ $P_{1i} = I(P_{1i}^* > 0)$

$P_{0i}^* = \gamma_0 X_{0i} + \varepsilon_{0i}$ $P_{0i} = I(P_{0i}^* > 0)$

Observed P_i is defined as

$P_i = P_{1i}$ if $T_i = 1$

$P_i = P_{0i}$ if $T_i = 0$

Or $P_i = P_{0i}(1 - T_i) + P_{1i}T_i$

That is for the borrower group who are considered as the treatment group, the observed

outcome variable is whether expanding in the future or not is P_{1i} , whereas the same is P_{0i} for the non-borrowing control group. The vectors X_1 and X_0 contain the set of exogenous variables for treatment and control groups, respectively, and the vector Z contains the set of variables that determine whether one individual will be in the control group or in the treatment group. Also, $(\alpha, \gamma_1 \text{ and } \gamma_0)$ are vectors of parameters and u_i, ε_{0i} and ε_{1i} are error terms. The model assumes that the error terms are jointly normally distributed with zero mean vector and the covariance matrix given as

$$\Lambda = \begin{pmatrix} 1 & \rho_{\varepsilon_0 u} & \rho_{\varepsilon_1 u} \\ & 1 & \rho_{\varepsilon_0 \varepsilon_1} \\ & & 1 \end{pmatrix}$$

Here P_{1i} and P_{0i} cannot occur simultaneously, hence we cannot find the joint distribution of ε_{0i} and ε_{1i} , hence $\rho_{\varepsilon_0 \varepsilon_1}$ cannot be estimated (Lokshin & Sajaia, 2011). The model is estimated assuming $\rho_{\varepsilon_0 \varepsilon_1} = 1$ (Lokshin & Sajaia, 2011). We estimated the model assuming X_1 and X_0 contain the same set of explanatory variables.

The estimated results will present the Average treatment on the treated (ATT) and Average treatment effect (ATE).

$$ATT = \frac{1}{N_{treated}} \sum_{i=1}^{N_{treated}} (\Pr(P_{1i} = 1 | T_i = 1, X = x_i) - \Pr(P_{0i} = 0 | T_i = 1, X = x_i))$$

$$ATE = \frac{1}{N} \sum_{i=1}^N (\Pr(P_{1i} | T_i = 1, X = x_i) - \Pr(P_{0i} | T_i = 0, X = x_i))$$

Both Model 1 and Model 2 are solved using STATA 16.

6.4 Results and Discussion

6.4.1 Results of Recursive Bivariate Probit Regression

This section presents the results from the recursive bivariate probit model examining the determinants of two interrelated binary outcomes: (i) whether the production unit owner plans to expand their operations, and (ii) whether the owner has taken a loan for production purposes,

where the second variable appears as an endogenous explanatory variable for the first variable. The model accounts for the correlation between the unobserved determinants of these two decisions, and estimates were obtained using robust standard errors. Table 6.4.1 presents the results.

Table 6.4.1: Joint Estimation Results from the Extended Probit Model for Expansion and Loan Uptake Decisions

Recursive Bivariate Probit regression		Number of obs	= 825	
Log pseudolikelihood = -728.14988		Wald chi2(6)	= 114.68	
		Prob > chi2	= 0.0000	
			Coef.	Robust Std. Err.
Production Plan	Gender	If Female = 1 Male = 0	-0.503***	0.147
If the owner is planning to expand = 1 Otherwise = 0	Total family members		0.007	0.031
	Education	Years of schooling	0.007	0.016
	Age of the production unit		-0.025***	0.005
	Total looms		-0.028	0.055
Endogenous regressor	Loan status	If the owner took a loan for production purposes = 1 Otherwise = 0	1.435***	0.187
	Constant		-0.847***	0.222
Loan status	Gender	If Female = 1 Male = 0	0.393***	0.122
If the owner took a loan for production purposes = 1 Otherwise = 0	Total family members		0.022	0.030
	Education	Years of schooling	0.020	0.014
	Age of the production unit		-0.006	0.004
	Total looms		-0.061	0.054
Instrument	Schedule caste (SC) or Schedule tribe (ST) dummy	If the owner is SC or ST = 1 Otherwise = 0	0.614***	0.126
Instrument	Other backward caste (OBC)		0.235**	0.119
Instrument	Registration dummy	If the owner is registered = 1 Otherwise = 0	-0.461***	0.126
	Constant		-0.759***	0.215
	Corr (e. loan status, e. Production plan)		-0.641***	0.094

*** p value < .01, ** p value < .05 * p value < .1

Source: Authors' calculation

Note: The Rao Score (Lagrange Multiplier) test for the inclusion of caste and registration dummies yields a chi-squared statistic of 43.76 ($p < 0.001$), confirming their joint relevance

in explaining loan behaviour³⁰.

In Table 6.4.1, the regression results for the production plan equation indicate that gender, age of the production unit, and loan status have a significant influence on the likelihood of planning for expansion. Female owners are significantly less likely to plan expansion, possibly reflecting structural constraints such as limited access to networks, risk aversion, or a lack of control over capital (Watson and Robinson, 2003; Chaudhuri, Sasidharan, & Natarajan Raj, 2020). Older units are less likely to plan expansion, which may reflect a tendency toward operational stability or saturation. Weavers who have taken a production loan are significantly more likely to plan expansion, supporting the hypothesis that access to finance is a key enabler of growth. Other variables, including education, the total number of family members, and the total number of looms, were not statistically significant in this equation.

The second equation models the determinants of loan uptake. Female owners are more likely to have taken a loan, a finding that contrasts with their lower propensity to plan expansion. This suggests that loans may be used for purposes other than business scaling or that women face barriers in converting credit access into growth. Belonging to Scheduled Castes or Scheduled Tribes significantly increases the likelihood of taking a loan, as does membership in Other Backward Classes. Similarly, while marginalized caste groups have greater access to loans, their ability to translate this into business growth may be hindered by other unobserved barriers. This likely reflects targeted credit outreach or limited asset holdings among these groups.

Registered units are significantly less likely to take loans, suggesting that formality may be associated with better internal capital or access to non-credit inputs. Education, family size, age of the unit, and number of looms were not statistically significant in this equation.

The estimated correlation between the error terms of the two equations is -0.641 and statistically significant at the 1% level and validates the choice of our model. This negative

³⁰ Rao Score test for SC/ST, OBC & registration dummies: $\chi^2(3) = 43.76, p < 0.001$, confirming instrument relevance.

correlation suggests that unobserved factors that increase the likelihood of taking a loan are negatively associated with those that increase the likelihood of planning for expansion. This result implies that, beyond observed factors, loan-taking may be driven by financial distress rather than by investment motives alone.

The results reveal a complex interplay between access to credit and production planning. While loan access significantly boosts expansion intentions, the negative correlation between the two decisions' unobserved components indicates that borrowing may also be a response to financial constraints. It is seen in the existing literature that the weavers take loans to meet their consumption in financial distress due to distress sales to master weavers or money lenders to run their business (Nag, 2015). Khalily (2004) notes that borrowers often have a tendency to spend credit on non-productive purposes, including household consumption of both food and non-food items (such as expenses related to medicine or education), particularly when the gestation period is short.

6.4.2 Treatment Effects Analysis

Table 6.4.2 reports the estimated endogenous treatment effects for the likelihood of taking a production loan. Both the Average Treatment Effect (ATE) and the Average Treatment Effect on the Treated (ATET) are statistically significant at the 1% level.

Table 6.4.2: Estimated Treatment Effects on Probability of Taking a Production Loan

Outcome variable	ATE (Std. Err.)	ATET (Std. Err.)
Loan status (1 vs 0)	0.388*** (0.075)	0.194*** (0.050)

*** p value<.01, ** p value<.05 * p value<.1

Source: Authors' calculation

The ATE of 0.388 implies that, on average, if the entire population were to receive the treatment (access to credit), the probability of taking a production loan would increase by approximately 38.8 percentage points relative to a scenario with no treatment. This represents a substantial increase, indicating that the treatment has a significant impact on loan uptake decisions.

The ATET is estimated to be 0.194, which means that for the subpopulation that received the

treatment, the likelihood increases by 19.4 percentage points relative to if they had not been treated. Notably, the ATE (0.388) is almost double the ATET (0.194). This discrepancy might point to treatment effect heterogeneity in the population. One plausible interpretation is that the treatment has an even stronger effect on those who might inherently be less inclined to take a production loan (i.e., the untreated weavers). In contrast, among the treated, who may have self-selected into the program because they already possessed a higher propensity for loan uptake, the marginal impact of the treatment is lower. This also indicates that taking loans by the weavers may be driven by financial distress because those who are not taking loans may be more financially self-sufficient to run their business. However, access to production loan for all weavers will significantly improve the future health of the weaving sector.

6.5 Conclusion and Policy Prescriptions

The results for West Bengal's handloom units show that access to production credit can be a possible constraint for forward-looking expansion: loan-recipient units are significantly more likely to report concrete plans for expansion than observationally similar non-recipients. This micro-evidence aligns with studies that link formal credit to higher efficiency and strategic investment (Dey et al., 2023; Islam & Hossain, 2021), and with broader findings that easing credit constraints raises output and investment propensities (Love & Sánchez, 2009; John & Terhemba, 2016; Ume et al., 2017). The negative association between unit age and planned expansion is consistent with technological obsolescence and sunk organizational routines that dampen marginal returns to new investment—echoing evidence that collateral, internal funds, and legacy assets shape post-reform investment behaviour (Gelos & Werner, 2002).

Distributional patterns also matter. Female proprietors are more likely to obtain loans but less likely to plan expansion, indicating frictions in translating finance into growth—consistent with gender disparities in how credit access maps into performance trajectories (Chaudhuri et al., 2020). Higher loan uptake among SC/ST/OBC owners is consistent with active financial-

inclusion efforts, but the observed negative association between formal registration and loan uptake suggests bureaucratic costs or a continued tilt of credit intermediation toward informal units. At the meso level, the literature shows that local credit architectures—cluster credit and commercial inter-firm finance—can relax constraints and even signal creditworthiness to banks (Liu et al., 2022), while crisis-era liquidity gaps, as during COVID-19, depress production continuity when timely formal credit is absent (Meher & Panda, 2024). Microcredit impacts remain heterogeneous and design-sensitive: well-structured programs can support productive use (Rahmatullah et al., 2010; Khalily, 2004), whereas small, rigid, or costly products may fail to lift investment in weaving units (Parvin et al., 2023) or be crowded out by expensive informal borrowing (Mutsonziwa & Fanta, 2021; Hertz, 2009).

Causal estimates using ATE and ATET strengthen the interpretation that “treatment” (credit-support intervention) shifts behavior on both margins. The ATE implies that scaling treatment beyond current beneficiaries would unlock sizable latent demand for production loans, while the ATET shows that even among already-inclined weavers, treatment further raises adoption. Methodologically, this mirrors the literature’s emphasis on heterogeneity and selection (Raj & Sen, 2015; Islam & Hossain, 2021): policy needs precision targeting to reach high-return subgroups without neglecting excluded segments.

Taken together, the thesis contributes micro-evidence that (1) production credit causally raises the probability of planned expansion in West Bengal handlooms; (2) gender, caste identity, and formality mediate the conversion of credit access into forward-looking plans. These insights foster the need for crafting a policy that is inclusion-sensitive and instrument-specific.

From a policy viewpoint, these findings provide a very strong empirical basis for enhancing financial inclusion of the handloom sector through targeted and context-sensitive interventions. Since it was found in the existing literature that credit is a binding constraint for expansion decisions, policy measures should prioritize the easier and wider dissemination of institutional

credit. Different schemes can be collateral-free loans-to-the-weaver MUDRA Scheme, Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGTMSE), and Pradhan Mantri Mudra Yojana (PMMY), but disbursal in the handloom clusters of West Bengal has so far remained quite less known by the weavers due to cumbersome procedures and inadequate awareness (Harpanahalli et al., 2023). Removing procedural hiccups, supporting credit facilitation through handloom-focused societies at the cluster level, as well as creating credit awareness-promoting programs, will help in lowering these barriers.. The results indicate that financial inclusion attempts have already been made, particularly for socially disadvantaged (SC, ST, and OBC) groups, but there needs to be continued emphasis on capacity building via design training and marketing support so that credit becomes a tool for productivity growth instead of becoming merely a cycle of debt. For women, who are more likely to access loans but less likely to plan expansion, financial products must be combined with business mentoring, digital literacy, and collective platforms for scaling enterprises, thereby enabling gendered credit access to contribute directly to entrepreneurial growth (Mehrotra, 2019). The negative association between registration and loan uptake also signals the need to integrate credit policies with formalization incentives, such as linking Udyam registration to priority credit access, subsidized inputs, and export facilitation. Moreover, the estimated ATE and ATET highlight the necessity of designing schemes that both meet the untapped demand for finance and maximize marginal responsiveness among those already inclined toward adoption. This calls for two-fold approaches: wide-ranging financial literacy and inclusion campaigns on the one hand, and fine-tuned intervention and identification and facilitation to potential units with expansion plans. on the other. To this end, the National Handloom Development Programme (NHDP) and Comprehensive Handloom Cluster Development Scheme (CHCDS) could do much more and cement their linkages with credit to technical training, digital marketing, and common facility centres.

Chapter 7: Conclusion and Policy Prescriptions

7.1 Introduction

The handloom sector of West Bengal, one of the oldest household-based industries in India, continues to provide livelihoods to a large number of rural households while preserving an invaluable cultural heritage. Yet, despite its historical importance, the sector faces structural and institutional challenges that threaten its sustainability. The present thesis has analysed the sector across three natural clusters, Dhaniakhali, Santipur, and Samudragarh, using primary survey data to examine organisational structures, determinants of performance, gender gaps, and access to credit.

This chapter consolidates the findings of the earlier empirical analyses and presents the overarching conclusions. It also sets out policy prescriptions derived from the evidence. These prescriptions aim to address institutional inefficiencies, gender disparities, and credit bottlenecks, while proposing pathways for enhancing productivity, market linkages, and inclusivity. The discussion underscores that the handloom sector cannot thrive merely as a protected traditional activity; instead, it requires carefully designed, evidence-based policies to ensure its long-term viability in a competitive market environment.

7.2 Conclusion

This thesis aims to examine the performance, challenges, and future prospects of handloom weaving units in West Bengal, with a focus on three natural clusters: Dhaniakhali, Santipur, and Samudragarh. By analysing organisational structures, determinants of output, gender disparities, and access to finance, the thesis provides micro-evidence on the dynamics of handloom production and its constraints.

The comparative analysis across organizational structures revealed significant differences in the performance of the handloom units. Independent weavers, operating on their own terms, were found to be profitable and enjoying increasing returns to scale, while subcontracted weavers, despite being dependent on master-weavers or Mahajans, performed better than

cooperative weavers in sustaining livelihoods. Cooperative members, in contrast, produced at a small scale with meagre profits, often requiring alternative occupations to supplement household income. This suggests that while cooperatives provide insulation from market volatility and social protection, they have fostered inefficiency in production, design innovation, and marketing. These findings corroborate earlier studies highlighting the decline of cooperatives in India due to weak governance and political capture (Srinivasulu, 1994; Baviskar, 1995; Maiti, 2008).

The gender analysis adds another dimension. Female entrepreneurs consistently earn less than males across the revenue distribution. At lower quartiles, as shown in Chapter 5, male and female outcomes are relatively close, especially under subcontract. However, the gap widens sharply at higher quartiles, particularly under cooperative structures, indicating systemic barriers to women's capacity to expand scale of operation. Decomposition results show that this gap is partly explained by structural factors: men are more likely to treat weaving as their primary occupation (87% vs. 55.3% for women), have higher educational attainment, and command larger loom holdings. Registration status narrows the gender gap, but only because registered weavers are overwhelmingly cooperative members, and cooperatives underperform relative to other structures. Beyond these observable variables, an unexplained portion of the gender gap persists, which may reflect discrimination or unmeasured entrepreneurial skills.

The analysis of production plans and credit use, in Chapter 6, highlights another paradox. Access to production loans significantly increases the likelihood of planning expansion, confirming the enabling role of finance. Yet the negative correlation between loan uptake and expansion intentions at the unobserved level indicates that borrowing is often driven by financial distress rather than entrepreneurial vision. Treatment-effect estimates reinforce this: expanding credit access to currently excluded weavers would substantially increase uptake, but existing borrowers often use loans for consumption smoothing rather than productive

investment, echoing earlier studies (Nag, 2015; Khalily, 2004). Moreover, female weavers are more likely to access loans but less likely to plan expansion, suggesting that credit access alone cannot overcome deeper structural barriers.

Taken together, these findings demonstrate that performance in the handloom sector is shaped by the interaction of organizational specificities, gendered inequalities, and financial conditions. Independent weavers thrive, subcontracted weavers survive under dependency, and cooperative weavers stagnate. Within this structure, women are disadvantaged at higher levels of output. Our study also suggests access to credit, while necessary, is insufficient in itself, indicating the importance of a link to productive capacity and institutional support.

7.3 Policy Prescriptions

The analysis in the present thesis highlights how organizational structures, gendered inequalities, and access to finance together shape the performance of handloom entrepreneurs in West Bengal. Independent weavers demonstrate comparatively higher profitability and dynamism, subcontracted weavers manage to sustain livelihoods under dependency on master-weavers or *Mahajans*, while cooperative weavers remain trapped in small-scale production with meagre profits. Within this framework, women entrepreneurs face consistent disadvantages, particularly at higher output levels, where their revenues fall substantially behind their male counterparts. At the same time, access to credit significantly improves expansion plans, but loans are frequently taken in response to financial distress rather than as a means of business growth. Taken together, these results indicate that organisational inefficiencies, structural inequalities, and financial bottlenecks are central to the challenges of the sector. The findings provide a strong empirical basis for targeted and context-sensitive policy interventions.

Reforming Cooperative Structures

The study clearly shows that cooperative weavers, while provided social protection and

insulation from market volatility, perform poorly in terms of production and revenue generation. This indicates Cooperatives have fostered inefficiency by creating a protected environment in which weavers are less motivated to improve design, scale up output, or compete in the market. This is consistent with existing literature, which documents the decline of cooperatives in India due to governance failures and weak incentives (Srinivasulu, 1994; Baviskar, 1995; Maiti, 2008; Bhagavatula, 2009; Bhagavatula et al., 2010; Prajapati & Biswas, 2011). To revive their potential, cooperatives must be restructured around performance-based systems, where incentives are tied to innovation, productivity, and market responsiveness. This would involve rewarding weavers who adopt new design techniques, improve dyeing combinations, or increase output quality. Cooperative governance should also be democratised to allow skilled weavers with managerial and marketing abilities, including women, to participate in decision-making. Furthermore, the marketing dimension of cooperatives must be strengthened through exhibitions, permanent showrooms, and digital platforms to increase visibility and demand for cooperative products. Design and technology upgrading are essential. Training on computer-aided design (CAD) tools and the development of Bengal-specific software similar to DigiBunai™ should be promoted.³¹

³¹ DigiBunai™ is India's first open-source CAD software designed for Jacquard and Dobby weaving, with a special focus on Banarasi sarees. It enables weavers and designers to digitally create, simulate, and transfer textile designs directly to looms, supporting both handloom and power loom techniques. The software offers tools for motif creation, fabric simulation, yarn consumption calculation, and garment layout visualization, including a unique Garment Viewer. Customizable in local languages and design libraries, DigiBunai™ promotes design reuse and market integration³¹³¹. Without such reforms, cooperatives risk perpetuating inefficiency and limiting the potential of their members.

Bridging Gender Disparities

The gender analysis shows that women entrepreneurs are consistently disadvantaged, with the revenue gap widening considerably at higher levels of output. This gap is partly explained by observable structural differences: women are less likely to treat weaving as their main occupation, have fewer years of schooling, and own fewer looms. At the same time, women are underrepresented in formal institutions such as cooperatives, which further limits their access to resources and networks. Addressing these disparities requires policies that support women in treating weaving as a primary occupation rather than as a subsidiary activity. Adult education, distance-learning bridge courses, and targeted training in accounting, marketing, and design skills would help raise women's entrepreneurial capacity. Providing subsidised access to looms and accessories is equally important, since loom ownership strongly predicts revenue levels. Women's membership and leadership in cooperatives should be actively promoted, enabling them to benefit from collective resources and institutional support. The government should organise awareness about women-centric schemes like 100% subsidy to women weavers for the construction of work sheds, skill development (SAMARTH), financial assistance, and marketing support that reach a significant number of women beneficiaries under the National Handloom Development Programme (NHDP)³². Importantly, women-centric programmes should not stop at finance but also provide mentoring, digital literacy, and market access platforms. Such measures would reduce the barriers that prevent women from scaling their enterprises and narrow the revenue gap across quantiles.

Strengthening Credit as a Growth Enabler

The results confirm that access to production loans significantly increases the likelihood of expansion planning, underscoring the importance of finance as a growth enabler. At the same time, the negative correlation between loan uptake and expansion decisions at the unobserved

³² Ministry of Textiles, GoI

level suggests that many weavers take loans out of financial distress rather than with entrepreneurial intent. This aligns with earlier evidence that credit is often diverted to consumption, particularly when households face short-term shocks (Nag, 2015; Khalily, 2004). To overcome this, credit provision must be designed and monitored in ways that promote productive use. Simplifying the disbursement of existing schemes such as MUDRA, Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGTMSE), and Pradhan Mantri Mudra Yojana (PMMY) through cluster-level facilitation desks would reduce procedural barriers and expand access. Linking loans to production plans with phased disbursements would discourage diversion of funds to non-productive uses. Outreach should prioritise excluded groups, particularly women and weavers belonging to marginalised caste, because treatment-effect results, in Chapter 6, show that new beneficiaries have the greatest potential to respond positively. For women, who are more likely to access loans but less likely to expand, financial products should be complemented with business mentoring, collective marketing platforms, and digital skills training to ensure that credit translates into growth. In this way, credit can shift from being a coping mechanism to becoming a driver of long-term productivity.

Enhancing Productivity and Scale

Finally, the structural role of loom ownership and scale of operation points to the need for targeted support for capital acquisition. Subsidised loan-financing schemes, such as the Hathkargha Samvardhan Sahayata, should be expanded with a special focus on women and small-scale producers. The scheme Hathkargha Samvardhan Sahayata (HSS) is designed to support handloom weavers by providing large-scale assistance for the purchase of looms and accessories. Its primary objective is to facilitate technological upgradation, thereby improving both the quality of fabrics and overall productivity. Under this scheme, the Government of India bears 90% of the cost of approved technological upgradation items, while the remaining

10% is contributed by the beneficiary weaver³³. Access to modern looms and accessories would directly raise output and fabric quality. In parallel, regulated wholesale markets or *haats* should be developed where small producers can sell their products directly, thereby reducing dependence on master-weavers and middlemen. Design training and exposure to evolving consumer preferences should also be prioritised to diversify products and raise demand. By combining asset support with institutional reforms and training, these measures would enable weavers to increase scale and improve competitiveness in both domestic and global markets.

Table 7.3.1: Summary: Findings and Policy Prescriptions

Key Finding	Policy Prescription
Independent weavers profitable; subcontracted weavers survive under dependency; cooperative weavers underperform	Restructure cooperatives with performance-based incentives, democratic governance, and stronger marketing systems.
Cooperative membership narrows gender gap only because cooperatives underperform overall	Reform cooperatives to reward efficiency and productivity, while expanding women's membership and leadership.
Female entrepreneurs earn less across quantiles; gap widens sharply at higher levels of output	Support women in making weaving a primary occupation; provide education, training, loom subsidies, and collective support.
The education gap between men and women increases revenue inequality	Expand adult education, bookkeeping, and design training for women.
Loom ownership is strongly linked to higher revenues	Provide subsidised loom-financing schemes, prioritising women and small-scale weavers.
Loans increase expansion likelihood but are often distress-driven	Simplify access to credit, link disbursement to production plans, and monitor use for productive purposes.
Female entrepreneurs more likely to access loans but less likely to expand	Pair credit with mentoring, digital literacy, and collective platforms to ensure growth.
Marginalised caste groups more likely to take loans but face barriers to growth	Complement financial inclusion with training, marketing, and asset-building support.
Registered units earn less due to cooperative inefficiency	Couple registration with incentives for productivity, such as export facilitation and subsidised inputs.

³³ <https://www.myscheme.gov.in/schemes/hss>

Bibliography

- Álvarez, G., Gradín, C. and Otero, M.S. (2009) '*Self-employment in Spain: Transition and earnings differential*', Working Paper No. 0907.
- Anna, A.L., Chandler, G.N., Jansen, E. and Mero, N.P. (2000) '*Women business owners in traditional and non-traditional industries*', in *Journal of Business Venturing*, Vol. 15, No. 3, pp.279–303.
- Anurag, P., Das, K. (2020). Inclusion and Innovation Challenges in Handloom Clusters of Assam. In: Raina, R., Das, K. (eds) *Inclusive Innovation. India Studies in Business and Economics*. Springer, New Delhi. https://doi.org/10.1007/978-81-322-3929-1_4
- Bain, J. S. (1951). Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-1940. *The Quarterly Journal of Economics*, 65(3), 293–324. <https://doi.org/10.2307/1882217>
- Bain, J. S. (1956). *Barriers to new competition: their character and consequences in manufacturing industries*. Harvard University Press.
- Baviskar, B.S. (1995). *Finding The Middle Path: The Political Economy Of Cooperation In Rural India* (1st ed.). Routledge. <https://doi.org/10.4324/9780429047244>
- Bhagavatula, S. (2009). *Weaving Social Networks*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam].
- Bhagavatula, S., Elfring, T., Van Tilburg, A., & Van De Bunt, G. G. (2010). How social and human capital influence opportunity recognition and resource mobilization in India's handloom industry. *Journal of Business Venturing*, 25(3), 245-260.
- Bhattacharya, R., & Sen, S. (2018) '*Pride and Prejudice: The Condition of Handloom Weavers in West Bengal*', Centre for Sustainable Employment, Azim Premji University. Retrieved from <http://cse.apu.edu.in>
- Bhattacharya, R., & Sen, S. (2019). Handloom in West Bengal: Decline or dynamism? In S.

- Bandyopadhyay & M. Dutta (Eds.), *Opportunities and challenges in development* (pp. 367-386). Springer, Singapore. https://doi.org/10.1007/978-981-13-9981-7_17
- Bhowmik, M. R. (2019). Fourth Handloom Census: Government's Claims Belie Ground Reality'. *Economic and Political Weekly*, 54(49).
- Bhowmik, M. R., & Paramanik, R. N. (2024). Role of entrepreneurship in social enterprises and master weaver enterprises: case of handloom weaving industry, India. *International Journal of Entrepreneurship and Small Business*, 51(1), 86-105.
- Boden, R.J. and Nucci, A.R. (2000) 'On the survival prospects of men's and women's new business ventures', in *Journal of Business Venturing*, Vol. 15, No. 4, pp.347–362.
- Bolarinwa S. T., Akinlo A. E., & Onyekwelu U. L. (2021). Determinants of firm profitability in Africa. *Global Business Review*, 09721509211046336.
- Bortamuly, A.B. and Goswami, K. (2012) 'Factors influencing wage structure of handloom workers in Assam', in *Journal of Rural Development*, pp.139–150.
- Bortamuly, A.B. and Goswami, K. (2015) 'Determinants of the adoption of modern technology in the handloom industry in Assam', in *Technological Forecasting and Social Change*, Vol. 90, pp.400–409.
- Bortamuly, A.B., Goswami, K., Hazarika, B. and Handique, K. (2014) 'Do different determinants affect differently across gender and location in handloom entrepreneurship development?', in *Journal of Small Business & Entrepreneurship*, Vol. 27, No. 5, pp.427–449.
- Bose, S. (2023). The penalty of work from home: gender gap in productivity of unorganised manufacturing firms in India. *Small Business Economics*, 60(1), 351-369.
- Bresnahan, T. (1989). Empirical Studies of Industries with Market Power, *Handbook of Industrial Organization*, vol. II. Elsevier, Amsterdam.
- Bresnahan, T. F., & Schmalensee, R. (1987). The Empirical Renaissance in Industrial Economics: An Overview. *The Journal of Industrial Economics*, 35(4), 371–378.

<https://doi.org/10.2307/2098578>

Brush, C.G., Duffy, S. and Kelley, D. (2012) 'ICSB-WEC webinar report on women's entrepreneurship: Insights from the GEM 2010 Women's Report', in *International Journal of Gender and Entrepreneurship*, Vol. 4, No. 3, pp.337–339.

Carrasco, R. (2001). Binary choice with binary endogenous regressors in panel data: Estimating the effect of fertility on female labor participation. *Journal of business & economic statistics*, 19(4), 385-394.

Carree, M., Van Stel, A., Thurik, R. and Wennekers, S. (2002) 'Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976-1996', in *Small Business Economics*, Vol. 19, pp.271–290.

Chakraborty, S. (2019). Contribution of the unpaid family labour in the handloom sector of textile industry in West Bengal. *The Indian Journal of Labour Economics*, 62, 693-713.

CHATTERJEE, A. (2015). India's Handloom Challenge: Anatomy of a Crisis. *Economic and Political Weekly*, 50(32), 34–38. <http://www.jstor.org/stable/24482525>

Chatterjee, A. (2020) 'Handcrafting A Sustainable Future', in *India International Centre Quarterly*, 47(1/2), 38-70.

Chaudhuri, K., Sasidharan, S., & Raj, R. S. N. (2020). Gender, small firm ownership, and credit access: some insights from India. *Small Business Economics*, 54(4), 1165-1181. <https://doi.org/10.1007/s11187-018-0124-3>

Chiplunkar, G., & Goldberg, P. K. (2024). Aggregate implications of barriers to female entrepreneurship. *Econometrica*, 92(6), 1801-1835.

Cowling, M. and Taylor, M. (2001) 'Entrepreneurial women and men: two different species?', in *Small Business Economics*, Vol. 16, pp.167–175.

D'Costa, A. P. (2022). Capitalist Progress and Moral Economy: Sustaining Employment in India's Handloom Sector. *Journal of Asian and African Studies*, 57(2), 269-288.

Dana, L. P. (2000) 'Creating entrepreneurs in India', *Journal of Small Business Management*, 38(1), 86.

Dana, L.-P., & Sharma, N. (2021), 'India', In L.-P. Dana (Ed.), *Organising entrepreneurship and MSMEs across India* (pp. 1-30). World Scientific.
https://doi.org/10.1142/9789811212741_0001

Darji, I.S. and Dahiya, S. (2023), "Financial performance of the textile industry in India: the case of Haryana", *Research Journal of Textile and Apparel*, Vol. 27 No. 1, pp. 36-53. <https://doi.org/10.1108/RJTA-06-2021-0083>

Datta, D. B., & Agrawal, B. (2018). A study on the economic impact of handloom co-operatives on weavers. *SMS Journal of Entrepreneurship & Innovation*, 5(Issue-1), 109-121.

Davis, A., Hsu, E., & VanVuren, M. (2023). Self Employment, Micro-Entrepreneurship, and Development. *STEG Pathfinding Paper 12*.

Daymard, A. (2015), "Determinants of Female Entrepreneurship in India", *OECD Economics Department Working Papers*, No. 1191, OECD Publishing, Paris,
<https://doi.org/10.1787/5js4rfh5gtbq-en>.

De, I., Biswas, S. N., & Dey, D. (2024). Micro-entrepreneurship, Institutional Environment and the COVID-19 Pandemic: A Comparison of Weaving Clusters in West Bengal, India. *The Journal of Entrepreneurship*, 33(1), 59-87.

Debnath, S. (2021) 'Sustainability, Culture and Handloom Product Diversities with Indian Perspective', In: Gardetti, M.Á., Muthu, S.S. (eds) *Handloom Sustainability and Culture. Sustainable Textiles: Production, Processing, Manufacturing & Chemistry*. Springer, Singapore. https://doi.org/10.1007/978-981-16-5665-1_2

Delmar, F. and Davidsson, P. (2000) 'Where do they come from? Prevalence and characteristics of nascent entrepreneurs', in *Entrepreneurship & Regional Development*, Vol. 12, No. 1, pp.1–23.

- Deshpande, A., & Sharma, S. (2016). Disadvantage and discrimination in self-employment: caste gaps in earnings in Indian small businesses. *Small Business Economics*, 46, 325-346. <https://doi.org/10.1007/s11187-015-9687-4>
- Dey, B. K., Paul, U. K., & Das, G. (2023). Are handloom micro-enterprises in India efficient? Estimation based on DEA and bootstrap truncated regression approach. *Research Journal of Textile and Apparel*, 27(3), 452-471. <https://doi.org/10.1108/RJTA-09-2022-0105>
- Fairlie, R.W. and Robb, A.M. (2009) 'Gender differences in business performance: evidence from the Characteristics of Business Owners survey', in *Small Business Economics*, Vol. 33, pp.375–395.
- Filippini, M., Greene, W. H., Kumar, N., & Martinez-Cruz, A. L. (2018). A note on the different interpretation of the correlation parameters in the Bivariate Probit and the Recursive Bivariate Probit. *Economics Letters*, 167, 104-107.
- Firpo, S., Fortin, N.M. and Lemieux, T. (2009) 'Unconditional quantile regressions', in *Econometrica*, Vol. 77, No. 3, pp.953–973.
- Gelos, R. G., & Werner, A. M. (2002). Financial liberalization, credit constraints, and collateral: investment in the Mexican manufacturing sector. *Journal of Development Economics*, 67(1), 1-27. [https://doi.org/10.1016/S0304-3878\(01\)00175-4](https://doi.org/10.1016/S0304-3878(01)00175-4)
- Gravelle, H., & Rees, R. (2004). *Microeconomics*. Pearson education.
- Gupta, P., & Phillips, R. (2019). Factors influencing female entrepreneurship in India. *Journal of Asia Entrepreneurship and Sustainability*, 15(2), 69-108.
- Harpanahalli, V., Meesala, A., & Reddy, D. S. (2023). *The handloom industry: A study on credit, marketing and sustainability issues of handloom industry in and outside cooperative sectors* (NABARD Research Study No. 39). National Bank for Agriculture and Rural Development. https://www.nabard.org/auth/writereaddata/tender/0102240127NRS39_A-Study-on-Credit-Marketing.pdf

- Hazarika, B. (2020) '*Gender income gap in rural informal micro-enterprises: an unconditional quantile decomposition approach in the handloom industry*', in *Eurasian Business Review*, Vol. 10, No. 3, pp.441–473.
- Hazarika, B., Bezbaruah, M.P. and Goswami, K. (2016) '*Adoption of modern weaving technology in the handloom micro-enterprises in Assam: A Double Hurdle approach*', in *Technological Forecasting and Social Change*, Vol. 102, pp.344–356.
- Hertz, T. (2009). The Effect of nonfarm income on investment in Bulgarian family farming. *Agricultural Economics*, 40(2), 161-176. <https://doi.org/10.1111/j.1574-0862.2009.00367.x>
- Hundley, G. (2001) '*Why women earn less than men in self-employment*', in *Journal of Labour Research*, Vol. 22, No. 4, pp.817–829.
- Iorember, P. T., & John, E. (2016). Commercial bank credit and manufacturing sector output in Nigeria. *Journal of Economics and Sustainable Development*, 7(16).
- Islam, M. K., & Hossain, M. E. (2021). *Impact of credit support on efficiency of handloom weaving units operating in Kushtia District: A propensity score matching approach*. *JnU Journal of Economics*, 3(1), 77–88. https://jnu.ac.bd/journal/assets/pdf/3_1_417.pdf
- Jemmali, H. (2023) '*What drives regional economic inequalities in Tunisia? Evidence from unconditional quantile decomposition analysis*', in *The Journal of Economic Inequality*, Vol. 21, No. 4, pp.955–970.
- Jones-Evans, D., Thompson, P. and Kwong, C. (2011) '*Entrepreneurship amongst minority language speakers: The case of Wales*', in *Regional Studies*, Vol. 45, No. 2, pp.219–238.
- Kanitkar, A., & Contractor, N. (1992). *In search of identity: The women entrepreneurs of India*. Entrepreneurship Development Institute of India.
- Kaur, K., & Kumari, V. (2017). Sociocultural factors affecting sex ratio and health deprivation of girl child in India: A review. *Indian Journal of Health & Wellbeing*, 8(4).
- Khalily, M. B. (2004). Quantitative approach to impact analysis of microfinance programmes

- in Bangladesh—what have we learned?. *Journal of International Development*, 16(3), 331-353. <https://doi.org/10.1002/jid.1081>
- Khatoun, S., & Iffat, A. (2022). AatmaNirbhar Bharat Abhiyan: a tool to revive Uttar Pradesh handloom sector. *Research Journal of Textile and Apparel*, 26(4), 468-484. <https://doi.org/10.1108/RJTA-05-2021-0061>
- Koellinger, P., Minniti, M. and Schade, C. (2013) 'Gender differences in entrepreneurial propensity', in Oxford Bulletin of Economics and Statistics, Vol. 75, No. 2, pp.213–234.
- Koenker, R. and Bassett, G. (1978) 'Regression quantiles', in *Econometrica*, Vol. 46, No. 1, pp.33–50.
- Kundu, A. (1980). Pattern of Organization of the Handloom Industry in West Bengal: Part Two. *Social Scientist*, 9(2/3), 41–52. <https://doi.org/10.2307/3516924>
- Lechmann, D.S. and Schnabel, C. (2012) 'Why is there a gender earnings gap in self-employment? A decomposition analysis with German data', in *IZA Journal of European Labour Studies*, Vol. 1, pp.1–25.
- Leung, D. (2006) 'The male/female earnings gap and female self-employment', in *The Journal of Socio-Economics*, Vol. 35, No. 5, pp.759–779.
- Liu, T., Kou, F., Liu, X., & Elahi, E. (2022). Cluster commercial credit and total factor productivity of the manufacturing sector. *Sustainability*, 14(6), 3601. <https://doi.org/10.3390/su14063601>
- Lokshin, M., & Sajaia, Z. (2011). Impact of interventions on discrete outcomes: Maximum likelihood estimation of the binary choice models with binary endogenous regressors. *The Stata Journal*, 11(3), 368-385.
- Love, I., & Sánchez, S. M. (2009). Credit constraints and investment behavior in Mexico's rural economy. *World Bank policy research working paper*, (5014). Retrieved from <https://core.ac.uk/download/pdf/6319582.pdf>

- Maiti, D. (2008). The organisational morphology of rural industries and its dynamics in liberalised India: a study of West Bengal. *Cambridge Journal of Economics*, 32(4), 577-591.
- Majumdar, S. K. (1997). The impact of size and age on firm-level performance: some evidence from India. *Review of industrial organisation*, 12, 231-241.
- Marra, G., Papageorgiou, G., & Radice, R. (2013). Estimation of a semiparametric recursive bivariate probit model with nonparametric mixing. *Australian & New Zealand Journal of Statistics*, 55(3), 321-342.
- Mason, E. S. (1939). Price and Production Policies of Large-Scale Enterprise. *The American Economic Review*, 29(1), 61–74. <http://www.jstor.org/stable/1806955>
- Meher, A. K., & Panda, P. K. (2024). The Employment and Livelihood Challenge Among the Informal Handloom Weavers During COVID-19 and Lockdown in Odisha, India. *Management and Labour Studies*, 0(0). <https://doi.org/10.1177/0258042X241238819>
- Mehrotra S (2019). *Informal employment trends in the Indian economy: persistent informality, but growing positive development*, Employment Policy Department, International Labour Office, <http://hdl.voced.edu.au/10707/529245>.
- Millán, J.M., Congregado, E. and Román, C. (2012) ‘Determinants of self-employment survival in Europe’, in *Small Business Economics*, Vol. 38, pp.231–258.
- Mincer, J. (1985) ‘Intercountry comparisons of labour force trends and of related developments: an overview’, in *Journal of Labour Economics*, Vol. 3, No. 1, Part 2, pp.S1–S32.
- Ministry of Textiles, Government of India. (2019). Fourth All India Handloom Census 2019–20.
- Ministry of Textiles. (2021) ‘Annual report 2021-22’. Government of India. Retrieved from <https://www.ministryoftextiles.gov.in>
- Mishra, S. K., Srivastava, R., & Shariff, K. I. (2016). Study report on problems and prospects

of handloom sector in employment generation in the globally competitive environment. *Bankers Institute of Rural Development*.

Mishra, V., & Bhattacharjee, M. (2017). Sustainability of handloom value chain-a case study of Nadia district in West Bengal. *Int J Econ Res*, 14(3), 277-288.

Mourifié, I., & Méango, R. (2014). A note on the identification in two equations probit model with dummy endogenous regressor. *Economics Letters*, 125(3), 360-363.

Mukherjee, A., Saha, N., Datta, P.K., Chakrabarti, S. (2019). Informal Sector: Progression or Persistence?. In: Bandyopadhyay, S., Dutta, M. (eds) Opportunities and Challenges in Development. Springer, Singapore. https://doi.org/10.1007/978-981-13-9981-7_7

Mutsonziwa, K., & Fanta, A. B. (2021). Small business performance: is it access to formal or informal credit that matters?. *Journal of African Business*, 22(4), 550-563. <https://doi.org/10.1080/15228916.2020.1826854>

Nag, P. (2015). Economic Dynamics of a Subsistence Economy: Handloom Industry in Nadia District. *The Indian Economic Journal*, 63(2), 255-273.

Nath, S., & Arrawatia, R. (2022). Trade-offs or synergies? Hybridity and sustainable performance of dairy cooperatives in India. *World Development*, 154, 105862.

Nourse, E. G. (1922). The Economic Philosophy of Co-operation. *The American Economic Review*, 12(4), 577–597. <http://www.jstor.org/stable/1804796>

Parvin, M. T., Birner, R., & Nahar, A. (2023). How well does government microcredit serve the investment needs of small and medium enterprises? An impact analysis on handloom weavers in Bangladesh. *South Asian Journal of Business Studies*, 12(2), 242-268. <https://doi.org/10.1108/SAJBS-07-2020-0260>

Parvin, M. T., Fatema, K., & Haque, S. (2020). Factors determining the credit accessibility by the small-scale entrepreneurs: A case of handloom weaving in Bangladesh. *International Journal of Business and Management*, 15(8), 93-100.

Piore, M. J., & Sabel, C. F. (1984). *The second industrial divide: possibilities for prosperity*. Basic books.

Pontarollo, N., Segovia, J. and Orellana, M. (2023) '*The multifaceted dimensions of the wage gap in Ecuador*', in *Estudios de Economía Aplicada*, Vol. 41, No. 2.

Prajapati, K., & Biswas, S. N. (2011). Effect of Entrepreneur Network and Entrepreneur Self-efficacy on Subjective Performance: A Study of Handicraft and Handloom Cluster. *The Journal of Entrepreneurship*, 20(2), 227-247. <https://doi.org/10.1177/097135571102000204>

Rahmatullah, N. M., Begum, R., Nahar, K., & Sultana, R. (2010). Effect of Microcredit on Handloom Weavers of Grameen-Check Producers of Sirajganj District of Bangladesh: A Case Study in Six Selected Villages. *Journal of Experimental Sciences*, 1(4). Retrieved from [https://www.researchgate.net/profile/Noor-](https://www.researchgate.net/profile/Noor-Rahmatullah/publication/304861610_Effect_of_Microcredit_on_Handloom_Weavers_of_Grameen-Check_Producers_of_Sirajganj_District_of_Bangladesh_A_Case_Study_in_Six_Selected_Villages/links/577c7d5f08ae213761cac095/Effect-of-Microcredit-on-Handloom-Weavers-of-Grameen-Check-Producers-of-Sirajganj-District-of-Bangladesh-A-Case-Study-in-Six-Selected-Villages.pdf)

[Rahmatullah/publication/304861610_Effect_of_Microcredit_on_Handloom_Weavers_of_Grameen-
ameen-
Check_Producers_of_Sirajganj_District_of_Bangladesh_A_Case_Study_in_Six_Selected_Vi
llages/links/577c7d5f08ae213761cac095/Effect-of-Microcredit-on-Handloom-Weavers-of-
Grameen-Check-Producers-of-Sirajganj-District-of-Bangladesh-A-Case-Study-in-Six-
Selected-Villages.pdf](https://www.researchgate.net/profile/Noor-Rahmatullah/publication/304861610_Effect_of_Microcredit_on_Handloom_Weavers_of_Grameen-Check_Producers_of_Sirajganj_District_of_Bangladesh_A_Case_Study_in_Six_Selected_Villages/links/577c7d5f08ae213761cac095/Effect-of-Microcredit-on-Handloom-Weavers-of-Grameen-Check-Producers-of-Sirajganj-District-of-Bangladesh-A-Case-Study-in-Six-Selected-Villages.pdf)

Rai, S. K. (2022). Communities of skill in the age of capitalism: Handloom weavers in twentieth-century United Provinces, India. *Modern Asian Studies*, 56(4), 1183-1221.

Raj, R. S., & Sen, K. (2015). Finance constraints and firm transition in the informal sector: Evidence from Indian manufacturing. *Oxford Development Studies*, 43(1), 123-143.

Rajesh S. N. Raj & Kunal Sen (2015) Finance Constraints and Firm Transition in the Informal Sector: Evidence from Indian Manufacturing, *Oxford Development Studies*, 43:1, 123-143. <https://doi.org/10.1080/13600818.2014.972352>

Robertson, P.L. (1996) '*Entrepreneurship and Business Culture: Studies in the Economics of*

Trust, in *Business History*, Vol. 38, No. 4, pp.121–123.

Roy, C. (2017). The silk handloom industry in Nadia district of West Bengal: a study on its history, performance & current problems. *New Man International Journal of Multidisciplinary Studies* (ISSN: 2348-1390), 4(7), 50-66. Available at SSRN: <https://ssrn.com/abstract=3013957>

Roy, T. (1998). Development or Distortion? “Powerlooms” in India, 1950-1997. *Economic and Political Weekly*, 33(16), 897–911. <http://www.jstor.org/stable/4406668>

Saridakis, G., Marlow, S. and Storey, D.J. (2014) ‘Do different factors explain male and female self-employment rates?’, in *Journal of Business Venturing*, Vol. 29, No. 3, pp.345–362.

Sarkar, S. (2015). An overview of cotton textile industry at Dhaniakhali block of Hooghly district. *IOSR Journal of Humanities and Social Science*, 201(11), 50-56.

Sekher, T. V., & Hatti, N. (2007). Vulnerable daughters in a modernising society: From son preference to daughter discrimination in rural South India. *Watering the neighbour’s garden: The growing demographic female deficit in Asia*, 295-323.

Soundarapandian, M. (2002). *Growth and prospects of handloom sector in India*. Mumbai: National Bank for Agriculture and Rural Development.

Srinivasan, S. (2015). Between daughter deficit and development deficit: Situation of unmarried men in a South Indian community. *Economic and Political Weekly*, 61-70.

Srinivasulu, K. (1994). Handloom weavers' struggle for survival. *Economic and political Weekly*, 2331-2333.

Su, J., & Sun, Y. (2011). Informal finance, trade credit and private firm performance. *Nankai Business Review International*, 2(4), 383-400. <https://doi.org/10.1108/20408741111178816>

Suryanarayanan, S. and Ramswamy, R. (2022) ‘Women’s Empowerment through Skill Education and Entrepreneurship Development in the Handloom Sector in Mizoram’, in *SEDME (Small Enterprises Development, Management & Extension Journal)*, Vol. 49, No. 3,

pp.235–252.

Tyagi, N., Shukla, G., & Singh, P. (2021) '*A woman's perspective of entrepreneurship in MSME family businesses*', In L.-P. Dana (Ed.), *Organising entrepreneurship and MSMEs across India* (pp. 87-107). World Scientific. https://doi.org/10.1142/9789811212741_0005

Ume, K. E., Obasikene, A. C., Oleka, C. D., Nwadike, A. O., & Okoyeuzu, C. (2017). The relative impact of bank credit on manufacturing sector in Nigeria. *International Journal of Economics and Financial Issues*, 7(2), 196-201.

Varian, H. R. (2016). *Intermediate Microeconomics with Calculus: A Modern Approach: Ninth International Student Edition*. WW Norton & Company.

Verheul, I., Stel, A.V. and Thurik, R. (2006) '*Explaining female and male entrepreneurship at the country level*', in *Entrepreneurship and Regional Development*, Vol. 18, No. 2, pp.151–183.

Watson, J., & Robinson, S. (2003). Adjusting for risk in comparing the performance of male and female controlled SMEs. *Journal of Business Venturing*, 18(6), 773–788. [https://doi.org/10.1016/S0883-9026\(02\)00128-3](https://doi.org/10.1016/S0883-9026(02)00128-3)

Webb, J.W., Bruton, G.D., Tihanyi, L. and Ireland, R.D. (2013) '*Research on entrepreneurship in the informal economy: Framing a research agenda*', in *Journal of Business Venturing*, Vol. 28, No. 5, pp.598–614.

Wennekers, S., Uhlaner, L. and Thurik, R. (2002) '*Entrepreneurship and its conditions: a macro perspective*', in *International Journal of Entrepreneurship Education (IJEE)*, Vol. 1, No. 1, pp.25–64.

Williams, C. C., & Kedir, A. M. (2016). Business registration and firm performance: Some lessons from India. *Journal of Developmental Entrepreneurship*, 21(03), 1650016.

Appendix – 1
Questionnaire RUSA 2.0 Project
A micro-econometric study of sustainability of handloom clusters in
West Bengal

Sample serial No.:

Name of the Interviewer: _____ Date of the interview: __

District:

City/Town/Village:

Locality/ Para:

Contact No:

1. General Information of the respondent

a. Name of the respondent		
b. Respondent age		
c. Respondent educational level (years of schooling)	Education _____	Years of schooling _____
d. Religion	Hindu/ Muslim/ others _____	
e. Respondent caste (Tick)	SC / ST / OBC / General	
f. Respondent gender (Tick)	Male/Female/ Transgender/ Others _____	
g. Respondent occupation*	Main: _____ Subsidiary: _____	
h. Total number of family members	Adult Male: _____ Adult Female: _____ Male children _____ Female children _____ Total: _____	
i. No. of dependents		
j. No. of years of experience in Handloom		
k. Are you a member of any group/society/institutions?	Yes/No. If yes, group/society name _____ If yes, then benefit received:	

* **Code:** Weaver – 1, Allied Handloom worker – 2, Self-employed in Agriculture – 3, Agricultural labour

– 4, Self-employed in household industry – 5, Self-employed in services – 6, Non-agricultural wage labour

– 7, Salaried work – 8, Pensioner – 9, Other – 10 (... ..)

2. General information of the Unit

A. Type of ownership:	(1) Individual	(2) Partnership	(3) Joint Family	
B. OUTPUT TO BE SUPPLIED [1/2/3]				
Type	Master weaver	Independent weaver	Co-operative	Sub-contracted Unit
Rank				
C. INPUT TO BE PURCHASED [1/2/3]				
Type	Independent unit	Co-operative	Sub-contracted Unit	
Rank				
D. Age of the unit	Years		Month	
E. Whether you have trade license?	1. Yes		2. No	
F. Is production unit Registered?	1. Yes		2. No	
G. Duration of operation:	(a) How many months in a year:		(b) How many days a month:	
H. Workpremises:	(a) Inside HH (with shatak / sq.ft):		(b) Outside HH (with shatak / sq ft):	
I. Whether work premises are (Put ✓ in the box)	(1) Owned	(2) Rented	(3) Occupied	
	a. If Owned, then imputed rent/month (Rs):	b. If Rented, then actual rent/month (Rs):	c. If Occupied, then any cost like hafta / payment to police/ local political leader, etc./month (Rs.) and to whom:	

3. Product Information Details:

Sl. no.	What type of products you produce		How many products you produced?	How many products you sold?	Revenue
	Broad category	Price range			
1.			Last month	Last month	
2.					
3.					
4.					
5.					
6.					
7.					
8.					

4. Output Market details:

Sl. No.	Name of the products	Who is the major buyer? (A)	How many buyers? (Per month)		Price difference with local market		If you get lower price compare to market, then why are you selling to them? (B)	How the following are set? (only one) (C)					
			Non-Contract / Floating (Approx)	Export	Yes	No		Quantity	Price	Quality	Design		

- A. **(1)** wholesaler; **(2)** Individual buyer; **(3)** Market near the production area; **(4)** Sub-Contractor (money lender) **(5)** Sub-Contractor (output dealer); **(6)** Sub-Contractor (raw material supplier); **(7)** Sub-Contractor (machine supplier); **(8)** Co-operative; **(9)** Any other similar type of combination **(specify):**.....
- B. **(1)** Guaranteed sale; **(2)** Immediate payment **(3)** Monopsony; **(4)** Long-term contract; (specify....) **(6)** Financially dependent (specify.....) **(7)** Lack of time; **(8)** Other **(specify)**.....
- C. **(1)** Written Rule; **(2)** Convention; **(3)** Bilateral Bargaining; **(4)** Set by the producer; **(5)** Set by the buyer; **(6)** Years of contract-relation; **(7)** Timely Payment; **(8)** Community Collaborative Contract; **(9)** Class-group bargain; **(10)** Political people-party; **(11)** Open market; **(12)** Consistent Demand; **(13)** Sub-contractor/Co-operative **(14)** Anything else? Describe.....

5. Raw materials and other input costs:

Sl. No.	Name	Quantity (last Month)	Buying/collecting from including self-collection / self-production / imported (D)	Average (Modal) Buying price / unit (Mention)	Cost (Rs.)		Is there any price difference from open market		If it is more costly than open market, then why are you buying FROM THE PRESENT SOURCE? (E)	Method of setting (F)		
					Month		Yes, then how much	No		Quantity	Price	Quality
1	Water											
2	Electricity											
3	Loan repayment (P+I)											
4												
5												
6												
7												
8												
9												
10												
11												
12	Technology / Design											
13	Other variable inputs											

- D. (1)** Direct producer; **(2)** Wholesaler; **(3)** Retailer; **(4)** Govt./Public units; **(5)** Market near the production area; **(6)** Sub-Contractor (money lender) **(7)** Sub-Contractor (output dealer); **(8)** Sub-Contractor (raw material supplier); **(9)** Sub-Contractor (machine supplier); **(10)** Co-operative; **(11)** Any other similar type of combination (**specify**):
- E. (1)** Nearby; **(2)** Guaranteed material supply; **(3)** Monopsony **(4)** Long-term contract; (specify ...) **(5)** Financially dependent (specify) **(6)** Lack of time; **(7)** Other (**specify**).....

- F. (1)** Written Rule; **(2)** Convention; **(3)** Bilateral Bargaining; **(4)** Set by the producer; **(5)** Set by the supplier; **(6)** Set by the buyer of the product; **(7)** Years of contract-relation; **(8)** Input quality; **(9)** Community Collaborative Contract; **(10)** Collective-group bargain; **(11)** Political people-party; **(12)** Open Market; **(13)** Consistent Supply; **(14)** Supply on Credit; **(15)** Government; **(16)** Standard Quality; **(17)** Anything else?
Describe.....

6. Assets & Tools for firm only [Land, Building, Machinery (major & minor) etc.]

Sl. No.	Items	Own			Whether the item is collected/bought in the current period? [Yes/No =1/2]	Hired		Nature of contract with the seller/ lender (H)	
		Bought / provided by whom (fund source) (G)	Whether the item is bought by taking loan (Source) [Yes/No =1/2]	If taken loan to buy the asset/tool, then amount (Rs.)		Current valuation (Rs.)	For how many days	Price	Price
M1									
M2									
M3									
M4									
M5									
M6									
M7									
M8									
M9	Bike (mainly used for the firm)								
M10	Other vehicle (mainly used for the firm)								

- G. (1)** Govt.; **(2)** Money lender; **(3)** Sub-Contractor (money lender); **(4)** Sub-Contractor (output dealer); **(5)** Sub-Contractor (raw material supplier); **(6)** Sub-Contractor (machine supplier); **(7)** Bank; **(8)** Others (Specify).....

- H.** (1) Written Rule; (2) Convention; (3) Bilateral Bargaining; (4) Set by the producer; (5) Set by the supplier; (6) Set by the buyer; (7) Years of contract-relation, (8) Input quality; (9) Community Collaborative Contract; (10) Collective-group bargain; (11) Political people-party; (12) Open Market; (13) Consistent Supply; (14) Supply on Credit; (15) Anything else? Describe.....

7. Employment particulars of the enterprise during the reference period

Number	(1) Household worker (2) Hired worker/ (3) Community worker	Nature of Work (1)	(1) Male/(2) Female / (3) Child (below 14 yr)	(1) Full time/ (2) Part-time	Average Days of Work / Month	Avg. Work hour / Day	Wages in cash per (if necc, Convert aptly from other units) (any one)			Imputed wage per month (if in kind)	Nature of Contract (F)	Years in Job (Same / Similar Job)
							Month	Day	Hr.			
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

I. (1) Managerial; (2) Skilled; (3) Unskilled; / any combination (mention)

J. Nature of Contract: (1) Permanent; (2) Temporary; (3) If permanent: 3(a) any written contract, 3(b) accidental insurance, 3(c) social security benefit

8. Loan fund:

Sl. No.	Purposes	Source of fund (L)	Amount (Rs)	Nature of contract with the lender? (M)	Volume of repayment (P+I)		Remaining Loan at present	Determinants (N)		
					Month	Year		Getting fund	Payment Schedule	Rate of repayment
1	Purchase of Input									
2	Labor Payment									
3	Purchase of Machinery / Fixed input									
4	Consumption									
5	Others									

L. (1) Own; (2) Non-Institutional Credit (Moneylender); (3) Institutional Credit (Public Bank/Private Bank/NBFC's); (4) Govt. Subsidy with interest; (5) Govt. Subsidy without interest repayment, (6) Sub-Contractor (7) Friend/Family

M. (1) Annual repayment; (2) Monthly Repayment; (3) Weekly Repayment; (4) One-Time Repayment with Interest; (5) Selling Output to the lender (Sub-contractor) at lower price; (6) Selling output to the lender (Sub-contractor) at just price; (7) Cash-Credit

N. (1) Written Rule; (2) Bilateral Bargaining; (3) Set by the producer; (4) Set by the lender; (5) Years of contract-relation; (6) Input quality; (7) Community process; (8) Class-group bargain; (9) Political people-party; (10) Open market; (11) Anything else? Describe.....

9. Net Revenue-Expenditure Accounts:

Sl. No.	Income distribution	Month (Rs.)	Rank according to need	Year (Rs.)	Rank according to need
1	Household purpose (Consumption) *				
2	Education purpose				
3	Medical purpose				
4	Total Investment**				
5	Transport Expenditure				
8	All Variable Costs (K)				
9	Savings				
10	Others (Specify)				

* Includes Average food and non-food expenditure, etc.

** Includes expenditure on land, construction, tools, machinery

K. All Variable Costs: Labour, Raw Materials, Electricity, Water, Rent, Loan Repayment, transport cost (10) Others Specify.....

10. Trends of output, turnover, cost and net income (respondent's response) Put ✓ in the boxes

	Expanding	Static	Fluctuation	declining
A. Trend of output price during last 3 years:				
B. Trend of yearly average turnover during last 3 years:				
C. Trend of annual total cost during last 3 years:				
D. Trend of yearly average net income during last 3 years:				

11. Do you plan to A. Expand/ B. Continue at the present scale/ C. Contract operation?

12. (A) If Expansion

Reason for expansion (O)	Nature of expansion (P)	Is the next generation training/ looking for a different profession? (Yes/No =1/2)	At whose decision?	If yes, why, (U)	If no, why, (V)

(B) If Contraction/ static

Reason for contraction/ static (Q)	Whether there is any plan for diversification in terms of (Yes/No =1/2)	If there is any attempt for business diversification, the reasons are (R)	If yes, how (S)	If there is no attempt for business diversification, the reasons are (T)	Is the next generation training/ looking for a different profession? (Yes/No =1/2)	At whose decision?	If yes, why, (U)	If no, why, (V)

- O. Reason for expansion:** (1) To earn more for consumption (specific reason.....) (2) To reinvest in business/ to expand business (3) Potential for expansion due to: To meet increased demand of the product due to the existence of lesser number of unorganized units. (4) Change in tastes and preferences of buyers. (5) To become big businessman (6) Profit is attractive (7) Creative Satisfaction
- P. Nature of Expansion:** (1) Producing new item without changing facility. (2) New cost to expand existing facility for the existing product. (3) Opening a new facility for producing new commodity.
- Q. Reason for contraction/ static:** (1) The present business is not able to support consumption (specific reason.....) (2) No access to skilled labor (3) More competition from unorganized units. (4) More competition from organized units. (5) Change in tastes and preferences of buyers: Towards alternative product produced in other producers in unorganized unit itself. (6) Financial problem, such as: Own fund problem. (7) Satisfied with the present situation: As consumption needs are satisfied. (8) Problem with administration: (9) Physical problem (10) Lack of unskilled/ general labor (11) Land problem (12) Decreased demand (13) Competition from power loom products (14) Competition from domestic mill products (15) Competition from foreign products
- R. If there is any attempt for business diversification the reasons are:** (1) To earn more for consumption (specific reason.....), (2) Attractive returns with potential for expansion of the diversified business due to easy access to skilled labour due to existence of lesser number of unorganized units. (3) Change in tastes and preferences of buyers: Buyers are preferred the diversified product compared to the products produced by other producers (modern product) in organized sector. (4) Market for present product is contracting (5) Financial problem, such as: (6) Competition from power loom products (7) Competition from domestic mill products (8) Competition from foreign products
- S. If yes, then how (1) Producing new item without changing facility. (2) New cost to expand existing facility for the existing product. (3) Opening new facility for producing new commodity.**
- T. If there is no attempt for business diversification the reasons are:** (1) Present business is not sustainable to support consumption & long-term needs (specific reason), (2) Present business is not viable to increase savings. (3) Problems with potential for expansion of the diversified business due to: Not accessible of raw materials due to the existence of greater number of organized units. (4) Problems with potential for expansion of the diversified business due to: Decreased demand of the product due to existence of greater number of organized units. (5) Change in tastes and preferences of buyers: Buyers are not preferring the diversified product as they prefer other products produced by other producers in organized sector itself. (6) Financial problem, such as, (7) Want to expand the present business not to diversify into other businesses. (8) Lack of Knowledge (9) Lack of time (10) Land problem
- U. If yes, why?** (1) Next generation feels income is inadequate (2) Next generation is not interested as they think this is not a proper job; (3) Next generation is training for a different profession; (4) For guaranteed income; (5) More competition from unorganized units. (6) More competition from organized units. (7) Changing tastes and preferences of buyers: Towards 'Modern Products' produced by organized units. (8) Financial problem (9) Decreased demand (10) Competition from power loom products (11) Competition from domestic mill products (12) Competition from foreign products
- V. If no, why?** (1) Present business is able to support consumption & long-term needs (specific reason.....); (2) Present business is able to increase saving. (4) More competition from unorganized units. (5) More competition from organized units. (6) Change in tastes and preferences of buyers: away from handloom towards unorganized Mill production due to lower price. (7) Financial problem, such as: (9) Lack of knowledge (10) Lack of time

13. Problems faced by the firms.

--

Problems (Explain in brief after coding): (1) Local problems/ harassment; (2) Competition from larger units; (3) Non-availability of labor as and when needed; (4) Fuel not available or available at exorbitant price; (5) Non-recovery of service charges/ fees/ credit; (6) Lack of other infrastructure facilities; (7) Erratic power supply/ power cuts; (8) Non-recovery of financial dues; (9) Shortage of raw materials; (10) Shrinkage /fall of demand; (11) Labour disputes and related problems;

(12) Non-availability / high cost of credit; (13) No specific problem; (14) Others (specify in the space provided)

<p>(1) Total turnover /month (Rs):</p> <p>(2) Total Cost/month (Rs):</p> <p>(3) Net Income (from this business) / month (Rs):</p> <p>(4) Income from other sources/month (Rs.):</p> <p>(5) Income from other sources/year (Rs.):</p>	<p>To be filled after calculation.</p>
--	--

Countersigned by the

Candidate: 

Dated: 18.09.2025

A Study of Selective Handloom Clusters of West Bengal: Progression and Persistence

ORIGINALITY REPORT

5%

SIMILARITY INDEX

PRIMARY SOURCES

1	mafiadoc.com Internet	197 words — 1%
2	dspace.cus.ac.in Internet	194 words — 1%
3	link.springer.com Internet	83 words — < 1%
4	www.ficciflo.com Internet	81 words — < 1%
5	old.iariw.org Internet	47 words — < 1%
6	www.researchgate.net Internet	46 words — < 1%
7	eurchembull.com Internet	41 words — < 1%
8	Borah, Bijan J., and Anirban Basu. "HIGHLIGHTING DIFFERENCES BETWEEN CONDITIONAL AND UNCONDITIONAL QUANTILE REGRESSION APPROACHES THROUGH AN APPLICATION TO ASSESS MEDICATION ADHERENCE : DIFFERENCES IN QUANTILE REGRESSION APPROACHES", Health Economics, 2013.	35 words — < 1%

Certified
Tanmoy Banerjee
PROFESSOR
DEPARTMENT OF ECONOMICS
JADAVPUR UNIVERSITY
KOLKATA - 700 032
18/9/20

Certified
Malalika Ray
PROFESSOR
DEPARTMENT OF ECONOMICS
JADAVPUR UNIVERSITY
KOLKATA - 700 032
18/9/20