

A Study of Female Workforce and their Employment Composition, with special reference to Madhya Pradesh

@ Amrin Noor #Dr Tanveer Ahmed

@ Assistant Professor, Faculty of Management and Commerce, Jagran Lakecity University, Bhopal, M.P.

Assistant professor Economics Government degree College kilhotran

Abstract

As a developing country, significant transformations have taken place in the structure of female workforce across different segments of employment. This study analyzes the trend of changing structure of female work force and its determinants with empirical evidence from Madhya Pradesh. Identified parameters comprises female labour, workforce participation Rate, unemployment rate, own account worker, unpaid family labour, self-employed, regular wage/ salaried worker and casual labour over the time period. Descriptive and inferential techniques are used for analysis. Regional variations and binary logistics regression model incorporated to analyze the probability of women being employed as own account workers. It is observed that agriculture is the prime employer of women in the rural areas. Overall women's participation is low often due to scarcity of jobs, rural to urban migration. Economic crisis identified as the reason for unemployment fluctuations over the time. The absence of accessible employment to identify their own means of livelihood, that drop the regular wage employment rate in acquiring the secured jobs resultant intricacies of gender equality occurred. The status of religions, age, education and vocational training also shaped the economic differentiation. The study recommends that progressive entrepreneurship policies along additional support for older women. Investment in skill enhancement training programs will accelerate own account work. Implementing policies for family support system, customized interventions for marginalized group can foster inclusive entrepreneurship and reduce gender disparities. This is the foremost study that examines the effects of each selected variables on dynamics of female participation in various employment categories.

Keywords: Workforce, Self-Employment, Multinomial Logistic Regression, Madhya Pradesh

JEL: J210, J24, C31, R50

1. Introduction

The process of female participation in the labour force and access to decent work is deeply federated with economic development and its progression. It is also essential for fostering inclusive and sustainable development in any country. In India, female labour force

participation has witnessed significant changes over the years, which perpetuate socio-economic shifts within the societal fold. Although the female labour force participation rate (FLPR) remains lower than the global average, it has shown notable upward movement in recent decades. However, this growth is not uniform, and a declining trend has been observed particularly in rural areas, despite higher economic growth in the broader Indian labour market. This paradox indicates underlying socio-economic and structural challenges that merit deeper examination.

In this light, the present research attempts to study the changes in the labour force in the state of Madhya Pradesh over a specific time frame, i.e., from 1993–94 to 2022–23. The study also focuses on examining the changing structure of female self-employment and the determinants that influence it across sectors, industries, and skill levels. According to Klasen (2019), the female labour force participation rate in India has declined since the 1990s despite strong economic growth, a fall in fertility rates, expansion in education, and improved access to infrastructure. He identifies FLPR as one of the crucial metrics that drive sustained economic growth. Menon (2019) supports this by asserting that social norms, rather than job scarcity, keep rural married women out of work, reinforcing the view that gendered expectations continue to shape labour market outcomes in India.

Adding to this, the McKinsey Global Institute's report *The Power of Parity: Advancing Women's Equality in Asia Pacific* points out that more than 70 percent of the economic potential in Asia-Pacific could be unlocked by increasing women's participation in the labour force by just 10 percentage points. In this context, Madhya Pradesh must focus on actively encouraging the female population to participate in the labour market by removing institutional and societal barriers.

Over the last few decades, there has been a noticeable decline in the Work Participation Rate (WPR) of women in India. According to the 38th and 68th rounds of the National Sample Survey, the female WPR fell from 29.6 percent in 1983 to 21.9 percent in 2011–12. This downward trend continued, reaching a mere 16 percent according to the Periodic Labour Force Survey (PLFS) 2017–18. Addressing gender discrimination within the labour market and facilitating substantial female participation is not just a question of equity but also of economic necessity. Esteve-Volart (2004) and Tansel (2001) suggest that a greater role for women in the workforce can significantly improve a nation's productivity and growth trajectory. Similarly, Desai and Jain (1994), Kabeer (2012), and Mammen and Paxson (2000)

argue that active female engagement in economic activities enhances women's decision-making power, autonomy, and overall empowerment.

Despite Madhya Pradesh's consistent economic growth, the state appears to lag in translating this progress into gains for the female labour force, particularly in rural areas. Several government programmes have been launched to address this issue. The Ministry of Women & Child Development (2021) lists schemes such as Ujjawala, Beti Bachao Beti Padhao, Pradhan Mantri Janani Suraksha Yojana, Pradhan Mantri Matru Vandana Yojana, and the Swadhar Greh Scheme, which are aimed at improving the conditions of women. As a result of these efforts, female labour force participation in India rose from 235.39 lakh in 1993–94 to 416.79 lakh in 2022–23. However, in numerical terms, this growth still pales in comparison to male participation rates and has shown signs of stagnation in recent years.

From a legal standpoint, the Indian Constitution affirms the principle of gender equality through various provisions such as Articles 14, 15, and 42 (Planning Department, 2021). It also supports affirmative action policies intended to dismantle long-standing discrimination. Notably, the 73rd and 74th Constitutional Amendments have reserved seats for women in local self-governments, thereby enhancing their participation in political decision-making (Hazarika, 2011). These structural changes have positively impacted female labour force participation, as also evidenced by the increasing number of women in various occupational fields (Chand and Singh, 2022).

However, the issue of women's workforce participation is further complicated by the U-shaped relationship between women's education and labour market involvement. While higher educational attainment correlates with increased labour participation, women with moderate education levels often withdraw from the labour market. This trend may be influenced by income effects where women marry into wealthier families and opt out of employment or by a lack of suitable job opportunities for educated women (Chatterjee et al., 2018). Moreover, the recent COVID-19 pandemic has deepened these challenges. Sahai et al. (2023) highlight that young women in both rural and urban India experienced acute job losses and slow recovery post-pandemic, underscoring the fragility of female employment in the face of economic disruptions.

Amidst these multifaceted challenges, the case of Madhya Pradesh presents a crucial opportunity to investigate the micro and macro determinants affecting female labour force participation, especially in self-employment. Despite numerous policy efforts and national

economic growth, the rural female labour market in Madhya Pradesh continues to exhibit structural limitations. By examining sectoral shifts, industrial patterns, and skill-based trends, this research aims to uncover the underlying causes behind the slow progress in female employment. It also seeks to evaluate the efficacy of government schemes and identify gaps that hinder women's integration into the labour market.

Thus, the significance of this study lies not only in tracing employment patterns over the past three decades but also in understanding how socio-cultural, institutional, and economic variables intersect to shape women's participation in the labour force. The insights gained through this research are expected to inform more effective gender-inclusive employment policies, contribute to reducing gender disparities, and support sustainable economic development at both state and national levels.

2. Objectives of the study

Keeping all the above facts in mind the specific objectives set for this study are:

1. To analyze changes in the labour force in Madhya Pradesh during a specific time period to determine the causes of expansion or contraction.
2. To examine the composition of the female workforce, analyzing changes in female employment across sectors, industries and skill levels.
3. To analyze the factors influencing female employment as own account workers in Madhya Pradesh.

This study also offers policy recommendations based on observed labour force changes, unemployment trends and gender specific dynamics, offering guidance for crafting more inclusive and effective labour market policies in Madhya Pradesh. This study attempts a longitudinal, sectorally disaggregated analysis of female labour force participation in Madhya Pradesh between 1993–94 and 2022–23.

3. Review of Literature

An analytical and focused review of the most important studies on female workforce in India as follows that address issues in the process of economic development. A substantial body of literature has emerged in recent decades. It examines various aspects of this intricate matter.

Boserup's (1970), focusing on women participation in economic sectors, not only assessed their contributions but also crystalize on the inherent, biases within development policies.

Golden, C (1995) investigated that during the process of expansion process, both income and substitution effects take place with industrialisation, the higher wages of men lead to an increase in household income, causing a decline in the labour participation of women who then dedicate themselves to child care and domestic work.

In the historical context of India, societal stratification has manifested through the segregation of various social groups (Deshpande, 2001; Government of India, 2006; Kijima, 2006; Gaiha et al., 2007; Gang et al., 2007; Desai and Kulkarni, 2008), delineated by factors such as castes, religions, and ethnic identities, each exhibiting heterogeneous characteristics. Extensive economic disparities based on caste, religion, and ethnicity has been documented in scholarly works. Consequently, it becomes imperative to scrutinize the role of these social variables in elucidating earning differentials among the working-age populace in India.

The 17th International Conference of Labour Statisticians (2003) established criteria for defining informal employment. It encompasses remunerative activities such as wage employment and unregistered self-employment. Workers in the informal sector lack legal regulation without social security, employment guarantees, and worker benefits.

According to Sudarshan and Bhattacharya (2009) and Rangarajan et al. (2011), research indicates a growing trend where more women are opting to abstain from the labour force primarily to fulfil 'domestic duties,' highlighting the noticeable influence of household and nurturing responsibilities on women.

According to Mehrotra (2015), measurement errors and the challenge of differentiating between contributions to the family and household duties are to blame for the significant decline in the number of women in the workforce.

Chatterjee et al. (2018) investigate the U-shaped relationship between women's education and labor force participation in India. They find that moderately educated women are less likely to work, partly due to the "other family income effect," where such women marry into wealthier households. However, this doesn't fully explain the decline. The study also points to a lack of suitable job opportunities and occupational segregation as major barriers for moderately educated women, highlighting the need for further policy and research attention.

According to Bonnet et al. (2019) globally, most men work in the informal economy but in India, it's the opposite. More women in India are involved in informal sectors than men.

Molishree (2020) highlights the need for integrated national and state-level interventions to promote women's entrepreneurship through education, financial support, knowledge-sharing, and networking. Despite growing opportunities, cultural and gender biases continue to limit women's entrepreneurial growth. The study calls for targeted programs that build capacity, support micro and solo enterprises, and scale rural and urban women-led ventures to drive inclusive development and social transformation.

Jadhav (2020) and Srivastava (2020) found that women are particularly affected, as they are more commonly found in unstable occupations such as street vending, waste picking, home-based work, construction, domestic jobs, beauty parlours, gyms, head-loading, and other short-term contracts. According to WIEGO (2020a), women, facing limited access to resources and opportunities, grapple with challenges such as credit, land, technology, savings, and decision-making power compared to men. Nevertheless, a significant number of women engage in this sector, often out-earning their male counterparts while contributing to family support.

Das and Mohapatra (2022) highlight the challenges faced by female agricultural labourers, including wage disparities, long working hours, and dual responsibilities at home and on the farm. Their study emphasizes the need for equal access to resources such as land, finance, technology, and knowledge to ensure gender equity and strengthen the rights of women in agriculture.

Preeti et al. (2022) emphasize that societal awareness is essential for uplifting women's status and achieving inclusive progress. They argue that despite policy efforts, women still face deep-rooted social challenges and gendered expectations that hinder their autonomy, dignity, and equal participation in society.

Business standard (2024), the study found out that how economic activities in which women represent a larger proportion of the work force are also those in which gender gaps are larger. Despite of their overall low labour force participation, certain fields employ high number of women by rural/ urban status. Agriculture is the most favourable employer of working women with apporx. 76 per cent in 2022-23 with the major cause was men tilting towards non- agriculture sector.

Even though such studies were used different parameters to analyse participation of women, those parameters were not enough compatible in the Madhya Pradesh state. So this research is to make an attempt to fill the research gap and provides important avenues for the further research. Therefore, this research will identify and examine the appropriate factors that determine women's participation decisions.

4. Data and Methodology

In exploring the complexities of female workforce engagement and employment categories in Madhya Pradesh, comprehensive data collection is the fundamental building block of this research initiative. The authors identified vital parameters for studying the trend of female workforce which comprised Female Labour Workforce Participation Rate (FLPR), Workforce Participation rate (WPR), Unemployment rate and also its sector wise composition which includes Own Account Worker Employer, Unpaid Family Labour, Self Employed, Regular Wage/Salaried Worker and Casual Labour in Madhya Pradesh over the time period.

The authors collected and calculated data by combining unit level data from different National Sample Survey Organisation (NSSO) rounds of the Employment & Unemployment (E&U) survey and the Periodic Labour, Force Survey (PLFS). This study encompasses multi-decade time frame, spanning from 1993-94 to 2022-23. The historical data from 1993-94 to 2011-12 has been precisely collected from the E&U survey. Recent data spanning from 2017-18 to 2022-23 is sourced from the PLFS survey unit level data.

The tools for analysing the data in this study were both descriptive and inferential (econometrics model) statistical analysis. The basic descriptive statistics are used to present an overview of Female Labour Force Participation (FLFP) trends over the selected time period. The study analyzed regional variations in female employment categories, distinguishing between rural and urban areas to identify disparities and trends. Further a temporal analysis tracks evolution of female employment categories and the factors that have shaped them.

Binary logistic regression is a type of logistic regression, that is used when the dependent variable is dichotomous (two) and the independent variables are of any type (dichotomous, trichotomous, polychotomous, and continuous (Hosmer et al.,1997).The binary logistics regression model is employed to analysis the factors that drive the transition from unpaid work to more advantageous employment categories.

5.1 Model

The binary logistic regression model is essentially a specific form of the broader multinomial logistic regression framework. While both models are suited for qualitative dependent variables, the multinomial model is particularly appropriate when the variable has more than two outcome categories, with the probability of each category being estimated separately (Fávero & Belfiore, 2019). In the present study, the binary logistic regression model was employed to examine the factors influencing female employment as own account workers within a specified region. This model was used to predict the likelihood of women being engaged in own account work based on a set of independent explanatory variables.

The dependent variable is "if female employed as own account worker then 1 otherwise 0". So, in the model equation, this variable represents the outcome which try to predict based on the independent variables:

$$\begin{aligned} \text{Logit(Probability of being employed as own account worker)} = & \beta_0 + \beta_1 \times \text{Age} + \beta_2 \times \text{Age}^2 + \beta_3 \\ & \times \text{Schooling Year} + \beta_4 \times \text{Vocational Training} + \beta_5 \times \text{HH Size (Family Size)} + \beta_6 \times \text{ST Dummy} + \beta_7 \\ & \times \text{SC Dummy} + \beta_8 \times \text{OBC Dummy} + \beta_9 \times \text{Rural Sector Dummy} + \beta_{10} \times \text{Islam Dummy} + \beta_{11} \\ & \times \text{Jain Dummy} + \beta_{12} \times \text{Religion Other} + \beta_{13} \times \text{Survey Year (2018-19)} + \beta_{14} \times \text{Survey Year (2019-} \\ & \text{20)} + \beta_{15} \times \text{Survey Year (2020-21)} + \beta_{16} \times \text{Survey Year (2021-22)} + \beta_{17} \times \text{Survey Year (2022-} \\ & \text{23)} + \epsilon \end{aligned}$$

Where:

1. Logit represents the natural logarithm of the odds ratio,
2. $\beta_0, \beta_1, \beta_2, \dots, \beta_{17}$ are the regression coefficients estimated for each independent variable,
3. Age, Age², Schooling Year, Vocational Training, HH Size, ST Dummy, SC Dummy, OBC Dummy, Rural Sector Dummy, Islam Dummy, Jain Dummy, Religion Other, Survey Year (2018-19), Survey Year (2019-20), Survey Year (2020-21), Survey Year (2021-22), and Survey Year (2022-23) are the independent variables,
4. ϵ represents the error term in the model.

5.2. Limitations of the model

1. The limitation of logistic regression model is the inability to establish causality.
2. The model relies on assumptions, including of multicollinearity, which may lead to biased parameter estimates and inaccurate predictions

3. If the sample is not representative of the population of interest, the result may not generalise well to broader populations.
4. The predictive accuracy may be compromised on the model if it is influencing variables of female employment are omitted from the analysis.
5. The measurement errors in the variables may reduce the reliability of the findings.
6. The Endogeneity or the simultaneous causality presence between variables, may bias the estimated coefficients.

6.1. Results and Discussion

To fulfill the objectives of this study, the analysis focused on the female labour force in Madhya Pradesh. This section presents the key findings. As economies transition from agrarian to industrial structures, a notable decline in female labour force participation often occurs. In Madhya Pradesh, this trend is evident when examining changes between 1993–94 and 2022–23. Table 6.1.1 illustrates a decline in both the Female Labour Force Participation Rate (FLPR) and Work Participation Rate (WPR) from 1993–94 to 2011–12, followed by a gradual recovery in recent years.

This shift is largely attributable to the transformation from cottage-based industries to centralized, large-scale industrial production. In households where women are predominantly illiterate or have limited education, domestic employment opportunities remain scarce. However, with rising family incomes and improved educational attainment among women, their participation in the labour force particularly in non-manual and service-oriented roles has increased. This pattern supports the U-shaped relationship between female labour force participation and economic development as proposed by Goldin (1994).

The study further finds that a significant portion of women's employment continues to reflect traditional household roles, reinforcing the notion that many women engage in work that extends their domestic responsibilities. Supporting this, Das et al. (2015) observe that women's labour force participation in India is highest among the poorest households, driven by economic necessity and often concentrated in unpaid or low-paid care work. As household incomes improve, women tend to withdraw from the workforce, underscoring the deep-rooted influence of gender norms and the complex interplay between economic conditions and societal expectations.

Table 6.1.1: Change in Labour force, Workforce, and Unemployment in Madhya Pradesh

Year	FLPR %	WPR %	Unemployment rate %	Labour force (Lakh)	Workforce (Lakh)	Unemployed (Lakh)
1993-94	45.86	45.29	1.24	236.39	233.46	2.94
2004-05	43.69	43.30	0.89	282.76	280.24	2.52
2011-12	38.85	38.50	0.90	284.96	282.39	2.57
2017-18	41.83	39.97	4.45	337.21	322.21	14.99
2018-19	39.82	38.41	3.54	325.55	314.02	11.53
2019-20	44.07	42.76	2.97	365.33	354.47	10.86
2020-21	45.79	44.90	1.94	384.82	377.34	7.48

2021-22	46.02	45.07	2.06	391.71	383.63	8.09
2022-23	48.38	47.61	1.59	416.79	410.16	6.63

Source: Authors estimation using E&U survey and PLFS survey unit-level data

A sharp increase of 4.45 percent in the unemployment rate in 2017-18 highlights significant economic challenges. The subsequent decline to 1.59 percent in 2022-23 suggests a recovery in the economy, driven by improvements in the labour market according to Ministry of Statistics and Programme Implementation (2023). Complex factors such as global economic trends and local job market dynamics significantly influence these fluctuations in this region, supporting this by Hoover Institution (2023). Directorate General of Employment (2022) argued that in rural areas, there was a growing eagerness among people to move away from underemployment in the agricultural sector, driven by both push and pull factors. Additionally, many rural workers are attempting to escape disguised unemployment in agriculture. Furthermore, the steady growth in the total labour force is indicative of both demographic changes and the broader economic expansion in India MoSPI (2023).

The Table No. 6.1.2 presents, the transformation in the participation of females in labour force in Madhya Pradesh. The proportion of females in the labour force experienced a notable decline from 35.04 per cent in 1993-94 to 20.83 per cent in 2011-12. This trend indicates demographic changes due to the scarcity of jobs and pointing to a less voluntary withdrawal from the labour force than the income effect. Apart from the influence of income changes and measurement challenges, the primary factor behind the decreasing female labour force participation rate is the shift in local job opportunities. Rural-to-urban migration in India, as part of urbanization, reduces farming opportunities in small villages and creates intermediate spaces.

Table 6.1.2: Change of Females in Labour force, Workforce and Unemployment in Madhya Pradesh

Year	Labour force	Workforce	Unemployment
	Share in population (%)		
1993-94	35.04	34.87	0.49
2004-05	31.72	31.63	0.28
2011-12	20.83	20.72	0.53
2017-18	23.39	22.89	2.14
2018-19	20.76	20.42	1.64
2019-20	28.03	27.64	1.39
2020-21	30.25	29.98	0.89
2021-22	30.24	29.97	0.89
2022-23	33.43	33.03	1.20
Year	Number (Lakh)		
	Labour force	Workforce	Unemployment
1993-94	86.22	85.80	0.42

2004-05	97.99	97.71	0.28
2011-12	73.68	73.29	0.39
2017-18	90.41	88.48	1.93
2018-19	81.01	79.69	1.33
2019-20	112.58	111.01	1.57
2020-21	124.00	122.89	1.11
2021-22	125.52	124.40	1.12
2022-23	138.90	137.24	1.66

Source: Authors estimation using E&U survey and PLFS survey unit-level data

Research indicates that women's labor force participation, although typically lower, tends to increase during economic crises, demonstrating its counter-cyclical nature. This finding is consistent with the works of Abraham (2009) and Bansal and Mahajan (2021), who suggest that economic downturns lead to a rise in female labor force participation, particularly in agriculture and other low-wage sectors. In Madhya Pradesh, the percentage of women in the workforce started to recover, reaching 33.03% in 2022-23, as shown in **Table No. 6.1.1**. This follows a period of decline. The unemployment rate also fluctuated during this period, peaking at 2.14% in 2017-18. This spike was largely due to the increase in agricultural employment, as women in rural areas, where agriculture is the primary employer, absorbed jobs in the sector after male workers migrated to the non-agricultural sectors. Following the economic slowdown, the unemployment rate declined to 0.89% in 2020-21, and remained stable at 1.20% in 2022-23, indicating a gradual recovery.

The economic crises had a gendered impact, as reflected in the data, which show that the share of women working in agriculture increased during the pandemic years of 2019-20 and 2020-21, before experiencing a slight decline in 2021-22. This increase in female agricultural employment was temporary, as the improved economic conditions led to a return to non-agricultural work in the following years. These patterns demonstrate that women's labor often serves as a form of economic insurance for poorer households during periods of low income, with women engaging in flexible and low-wage labor during such crises (Klasen, 2019; Mishra & Sharma, 2021). The trends observed in Madhya Pradesh are consistent with findings by Sahai, Abraham, and Jha (2023), who argue that economic necessity drives women into the workforce, often in roles that reflect their traditional domestic duties.

The other objective of the study focused on the changing composition and workforce of females in Madhya Pradesh over a span of several years that has been shown in the Table No. 6.1.3. This indicates a substantial positive change in female entrepreneurship during this

period. The significant marginal growth rate of 13.15 percentages has been observed during the period from 2017 to 2022.

Table 6.1.3: Change in Composition and Workforce of Females in Madhya Pradesh

Year	1: Own account worker	2: Employer	3: Unpaid family labour	Self Employed	4: Regular wage/ salaried worker	5: Casual Labour
Share in total workforce (%)						
1993-94	6.45	0.44	52.69	59.58	3.31	37.07
2004-05	6.91	0.32	50.58	57.81	6.55	35.65
2011-12	10.11	0.01	46.17	56.29	7.34	36.37
2017-18	9.56	0.19	47.85	57.60	10.56	31.83
2018-19	13.94	0.48	44.19	58.61	10.66	30.73
2019-20	12.64	0.13	50.62	63.39	10.42	26.19
2020-21	13.84	0.13	49.44	63.41	8.42	28.17
2021-22	13.71	0.27	54.65	68.63	7.67	23.70
2022-23	17.02	0.29	53.44	70.75	7.67	21.58
Worker by type (lakh)						
1993-94	5.53	0.38	45.21	51.12	2.84	31.81
2004-05	6.75	0.31	49.42	56.48	6.40	34.83
2011-12	7.41	0.01	33.84	41.26	5.38	26.66
2017-18	8.46	0.17	42.34	50.96	9.34	28.16
2018-19	11.11	0.38	35.21	46.70	8.49	24.49
2019-20	14.03	0.14	56.19	70.37	11.57	29.07
2020-21	17.01	0.16	60.76	77.93	10.35	34.62
2021-22	17.06	0.34	67.99	85.38	9.54	29.48
2022-23	23.36	0.40	73.34	97.10	10.53	29.62

Source: Authors' estimation using E&U survey and PLFS survey unit-level data

Whereas, the limited growth in the employer category suggests that changes were relatively stable. This low volatility could be due to challenges and barriers women faced in becoming employers. In addition to it, due to rapid decrease in female involvement in the labour market has led to a significant and swift increase in gender inequalities. This claim is further supported by Mamgain's (2021). However, women's participation in unpaid family labour increased by 5.59 per cent from 2017 to 2022. On the other side regular wages/ salaried workers and casual labour category experienced a decrease of 2.89 percent and 10.25 percent respectively. This suggests a volatile shift away from precarious and daily wage work.

The data under Table No. 6.1.4 suggested that in the rural sector, there was a decrease in the percentage of female employers because Government funding schemes are typically one-time opportunities, but running a business requires on-going financial support, which can pose obstacles in establishing their enterprises, resulting in a marginal percentage decrease of approximately -26.67 per cent in 1993-94 to 2022-23, which was mirrored by a significant

reduction of about -82.69 per cent in the urban sector in the same time period. There was also a noticeable trend towards self-employment among rural females, with a marginal percentage increase of approximately 19.83 per cent from 2018-19 to 2022-23. However, the situation in the urban female workforce remained unchanged.

Despite these improvements, a substantial gender gap in workforce was found. The Madhya Pradesh Economic Survey (2022-23) data reveals that in rural areas, the proportion of women in the workforce is relatively low indicating that gender equality in employment may still persist. Further, the decline in the share of female regular wage/salaried workers in the rural sector reached from 4.67 per cent in 2018-19 to 4.09 per cent in 2022-23 which followed a negative trend. This indicates that there might be limited growth in formal job opportunities in rural areas, which in turn could restrict women's access to stable and well-paying positions compared to urban areas. While the transition from casual labour to self-employment might appear advantageous in certain aspects, it could also signify that women are pushed into establishing their own means of livelihood due to the absence of accessible employment options but it might be riskier and less secure.

Table 6.1.4: Sector-wise Change in composition and workforce of Females in Madhya Pradesh

Sector	Year	Share in total workforce (%)					Worker by type (lakh)						
		1: Own account worker	2: Employer	3: Unpaid family labour	Self Employed	4: Regular wage/ salaried worker	5: Casual Labour	1: Own account worker	2: Employer	3: Unpaid family labour	Self Employed	4: Regular wage/ salaried worker	5: Casual Labour
Rural	1993-94	5.20	0.45	55.46	61.11	1.15	37.70	4.04	0.35	43.12	47.52	0.89	29.31
	2004-05	5.38	0.34	53.36	59.08	3.17	37.75	4.66	0.29	46.24	51.20	2.75	32.71
	2011-12	7.70	0.00	49.87	57.57	2.70	39.74	4.85	0.00	31.39	36.24	1.70	25.02
	2017-18	7.26	0.16	53.37	60.79	4.42	34.78	5.39	0.12	39.64	45.15	3.28	25.83
	2018-19	10.76	0.45	50.23	61.44	4.67	33.89	7.17	0.30	33.48	40.95	3.11	22.59
	2019-20	9.77	0.02	58.33	68.12	4.12	27.77	9.06	0.02	54.11	63.19	3.82	25.76
	2020-21	11.09	0.16	54.69	65.94	3.57	30.49	11.49	0.17	56.64	68.29	3.70	31.58
	2021-22	11.54	0.28	60.79	72.61	2.77	24.63	12.40	0.30	65.30	78.00	2.98	26.46
Urban	2022-23	15.21	0.18	58.24	73.63	3.40	22.97	18.30	0.22	70.09	88.61	4.09	27.64
	1993-94	18.50	0.43	25.92	44.85	24.22	30.93	1.49	0.03	2.08	3.61	1.95	2.49
	2004-05	18.9	0.14	28.77	47.81	33.00	19.18	2.09	0.02	3.18	5.29	3.65	2.12
	2011-12	24.77	0.07	23.72	48.56	35.55	15.89	2.56	0.01	2.46	5.03	3.68	1.65
	2017-18	21.58	0.34	19.00	40.92	42.66	16.42	3.06	0.05	2.70	5.81	6.06	2.33
	2018-19	30.18	0.63	13.31	44.12	41.26	14.62	3.94	0.08	1.74	5.76	5.38	1.91
	2019-20	27.27	0.68	11.47	39.42	42.40	18.18	4.98	0.12	2.09	7.20	7.74	3.32
	2020-21	28.59	0.00	21.25	49.84	34.42	15.74	5.52	0.00	4.10	9.62	6.65	3.04
	2021-22	27.42	0.23	15.77	43.42	38.71	17.87	4.65	0.04	2.68	7.37	6.57	3.03
	2022-23	29.90	1.04	19.23	50.17	38.10	11.73	5.05	0.18	3.25	8.48	6.44	1.98

Source: Authors' estimation using E&U survey and PLFS survey unit-level data

6.2.1 Descriptive summary of Binary Logistic Regression Model

For fulfilling the last objective of the study we applied the binary logistic regression analysis that have been depicted in Table No.6.2.1 which contains the estimate of the binary regression coefficient (β), Standard Error of Estimates {S.E.(β)}, p -value and odds ratio with 95 per cent Confidence Interval (C.I) that were calculated for each of the categorical variables. The overall model performs well, with good predictive accuracy and goodness of fit as indicated by the likelihood ratio, score and Wald statistics. According to the fitted model that aims to understand the variables that influence whether females were employed as "own account workers" or not. An increase in age was associated with a higher likelihood of being employed as an own account worker. The coefficient for age was positive (0.0379), indicating that as age increases, the odds of being in this employment category also increases. Similarly, coefficient of education was positive (0.0434), suggesting that education played a significant role. In addition to it, vocational training was a strong predictor.

Table 6.2.1: Binary logistic regression model results

Parameter	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Dependent variable= if female employed as own account worker then 1 otherwise 0				
Intercept	-0.6983	0.1838	14.44	0.000
Age	0.0379	0.0072	27.62	<.0001
Age ²	-0.0003	0.0001	9.41	0.002
Schooling Year	0.0434	0.0042	107.69	<.0001
Vocational training if yes =1	0.4294	0.0347	153.16	<.0001
HH Size (family size)	-0.1033	0.0081	163.76	<.0001
ST_ dummy	0.1235	0.0585	4.46	0.035
SC dummy	-0.2660	0.0584	20.76	<.0001
OBC dummy	-0.1536	0.0492	9.73	0.002
Rural sector Dummy	-0.9924	0.0393	637.20	<.0001
Islam Dummy	0.5562	0.0715	60.52	<.0001
Jain Dummy	-0.5355	0.2271	5.56	0.018
Religion Other	0.1413	0.2715	0.27	0.603
Survey_year_2018-19	0.0965	0.0635	2.31	0.129
Survey_year_2019-20	-0.0142	0.0587	0.06	0.809
Survey_year_2020-21	-0.0459	0.0572	0.64	0.423
Survey_year_2021-22	-0.0996	0.0564	3.11	0.078
Survey_year_2022-23	0.0476	0.0551	0.75	0.388
Likelihood Ratio	2133.86***			
Score	2237.04***			
Wald	1818.29***			
Per cent Concordant	78.2			

Somers' D	0.568
Gamma	0.57
Tau-a	0.204
C	0.784

Source: Authors' estimation using E&U survey and PLFS survey unit-level data

A larger family size was associated with decrease likelihood of being employed as an “own account worker”. Furthermore, belonging to the Scheduled Caste (SC) or Other Backward Class (OBC) categories reduces the likelihood of being in this employment category (-0.2660) and (-0.1536) respectively in Madhya Pradesh region. However, rural sector residence also strongly associated with a reduced likelihood of being an “own account worker” which reached at (-0.9924). It implies that people in rural areas were less likely to be self-employed compared to those on other location.

Moreover, the Islamic faith was associated with a higher probability (0.5562), this implied that positive association was more likely to be self-employed, while being Jain was associated with a lower likelihood (-0.5355). The economic differentiation constitutes probably the primary source of this distinct status of various religions. This is because the ownership of assets, occupation and income prospects at the household level crucially influences the essential living conditions of women.

These fluctuations are suggesting that external factors or economic conditions specific to certain years may have affected employment patterns. It provides insights into the relative important factors in determining female employment in Madhya Pradesh.

7. Conclusion

The analysis of the labor market in Madhya Pradesh over the past three decades reveals complex factors affecting female workforce participation and employment patterns. The state's shift from an agrarian to an industrial economy has had a noticeable impact. Initially, there was a decline in female labor force participation, followed by signs of recovery. Agriculture is still the main employer of women in rural areas, as male workers have shifted to non-agricultural sectors. Many women opt for home-based work, which suits their domestic duties. This has led to the growth of "ghost work." This makes it difficult to measure market-oriented work versus non-market domestic caregiving tasks.

Formal work options in rural areas have grown slowly, leading to a decrease in women in regular wage employment. As a result, fewer women are seeking secured jobs. There has been a shift towards self-employment in rural areas, while urban areas remain stable. The decrease in female salaried workers and casual labor reflects a move away from precarious wage work. These changes highlight the complexities of gender equality in the labor market.

The counter-cyclical nature of local work prospects has influenced women's decisions to leave the labor sector.

The research also suggests that economic differentiation has shaped the status of various religious groups. Age is a key predictor of changes in employment. The study also emphasizes education and vocational training as important factors in empowering women economically. The growth of the service industry has created more opportunities for female employment. During this process, income and substitution effects have occurred with industrialization in the labor market.

Madhya Pradesh's journey to increase female workforce participation shows both progress and challenges. Policies promoting entrepreneurship among older women may be beneficial, though more support may be needed for them compared to younger women. Investing in female education can help increase their participation in entrepreneurship and self-employment. Vocational training programs tailored to women's needs can improve their skills and confidence. Policies supporting work-life balance, childcare, and flexible work arrangements can encourage more women to engage in entrepreneurship. Targeted interventions for marginalized social or religious groups can promote inclusive entrepreneurship and reduce gender disparities. Ensuring gender parity and social progress requires a comprehensive strategy for steady employment opportunities for women.

Limitations of the study

This study has some limitations. It focuses only on Madhya Pradesh, so the findings may not apply to other states with different socio-economic and cultural conditions. The study mainly relies on secondary data from government surveys. This may overlook informal work, such as home-based or "ghost work," which is not always recorded. The research does not explore the qualitative reasons behind women's employment decisions, which could offer deeper insights.

Suggestions for Future Research

Future studies could overcome these limitations by using primary data collection methods like interviews or surveys. A comparison across different states would help identify key drivers of regional differences in female labor force participation. Research could also focus on the long-term effects of vocational training and entrepreneurship programs on women's empowerment, particularly in rural areas. Exploring the role of digital platforms in providing work and entrepreneurial opportunities for women would offer new perspectives. Longitudinal studies tracking women's participation over time could provide deeper insights into the impact of policy changes and economic shifts.

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