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IMPACTS OF FINANCIAL INCLUSION ON WOMEN EMPOWERMENT AND POVERTY ALLEVIATION: A STIMULATIVE ROLE OF INFORMATION TECHNOLOGY

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ABSTRACT

Purpose- The core purpose of this study is to assess the impacts of financial inclusion on poverty, unemployment, and women's empowerment through empirical evidence. The stimulative role of information technology was ascertained, and the determinants of financial inclusion have also been identified in the study.

Methodology- The statistical analysis is based on the annual data of 217 countries for 25 years (from 2000 to 2024), and the panel least squares technique was applied. The pre-requisite tests to identify the appropriate statistical techniques have been conducted before applying the panel least squares techniques.

Findings- The positive effect of financial inclusion as an important determinant of women's empowerment, creating employment opportunities, alleviating poverty, and encouraging women to participate in the labor market was identified. It was noted that the higher percentage of the population using the Internet enhances the number of borrowers from banks and other financial institutions. It implies that the use of the internet facilitates access to banks and financial institutions by online submission of applications, documents, and other peices of evidence. Similarly, the magnitude of domestic credit from banks and financial institutions indicates the availability of credit, which induces borrowers. The greater availability of credit is itself a cause to attract borrowers.

Conclusion- It was concluded that lending from non-banking financial institutions alleviates unemployment, but borrowing from commercial banks aggravates unemployment. This requires direct intervention of monetary authorities to relate the lending from commercial banks to employment creation in marginalized groups: women, poor peoples, and rural households. It was inferred that the use of the Internet stimulates financial inclusion and enhances the number of borrowers.

Keywords: Financial democratization, financial institutions, lending, poverty, unemployment
JEL Codes: E51, G21, G23

1. INTRODUCTION

Several recent studies have established the links between financial inclusion and the economic prosperity of individuals and households. Krugman (2020), Rogoff (2020), and Mehar (2021) have strongly recommended strategies to enhance financial inclusion and protect marginalised segments of society. The ultimate objective of these recommendations was to protect the vulnerable population. According to Mehar (2025d), financial inclusion denotes a process of appropriate, affordable, and timely access to financial institutions that provide financial services. It comprises access to credit facilities, use of banking channels, insurance policies, fundraising activities, debt financing for long-term projects and business ventures, equity financing, and other financial services. It enables individuals, households, and businesses to establish and grow their businesses and other activities.

Access to financial services provides several socioeconomic advantages, including alleviation of poverty, women's empowerment, creation of employment opportunities, connectivity from remote areas, bringing the rural population into mainstream economic activities, and growth in aggregate national income. It also promotes investment and savings and improves household income.

The revolution in information technology provided a big opportunity to promote financial inclusion, and now the role of information technology has become extremely important in enhancing financial inclusion. It provides inclusive digital financial services, which refer to online accounts, mobile money, and electronic payments. Financial technology, the Internet, and mobile banking are important ingredients of financial inclusion, and without access to these tools, financial inclusion is not possible in the contemporary world. Other than the lack of access to information technology, financial illiteracy is also a barrier to financial inclusion. An offshoot of information technology is financial technology (Fintech), which provides instant,

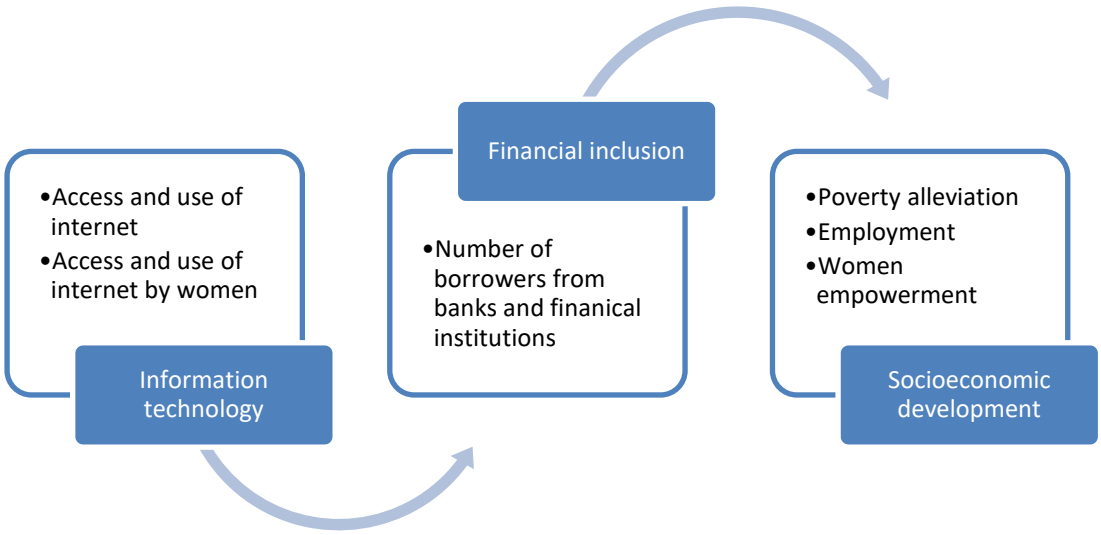
cost-effective, and easy access to financial services in remote areas. Financial technology can provide access to affordable and convenient tools that can help increase economic opportunities or access to credit.

Several studies assessed the role of information technology and concluded that encouraging the use and recognition of information technology by lending institutions can stimulate the incidence of borrowers and clients of financial institutions. Mehar (2024) has recommended encouraging the use and recognition of information technology by lending institutions and focusing on the growth of the number of borrowers to alleviate poverty and unemployment.

In this background, this study is mainly concerned with assessing the impacts of financial inclusion on poverty, unemployment, and women's empowerment. However, the determinants of financial inclusion have also been ascertained in the study. The financial inclusion was measured by the incidence of borrowers from commercial banks and financial institutions. The number of account holders in financial institutions was not considered as an indicator of financial inclusion, because opening an account in the banks can be a mandatory requirement for receiving remuneration or transferring payments. Even if it may be required only for a single payment. Such mandatory account opening cannot affect the socioeconomic conditions of an individual or a household. Instead of the number of account holders, the study considered the number of borrowers as an indicator of financial inclusion. The study assumes that the access and use of information technology strongly improve the incidence of financial inclusion. The links between the access and use of information technology, financial inclusion, and socioeconomic development have been explained in Figure 1.

The next section of this study highlights the previous studies on the topic. Section 3 explains the methodology to test the association between information technology, financial inclusion, and socioeconomic development. It describes the details of data and statistical techniques. The empirical results and statistical analysis are discussed in Section 4, while Section 5 provides some policy implications and limitations of the study.

Figure 1: Determinants and Effects of Financial Inclusion



2. REVIEW OF LITERATURE ON FINANCIAL INCLUSION AND INFORMATION TECHNOLOGY

Several important aspects of financial inclusion have been covered in economic literature. The participation of low and middle income households in economic development, socioeconomic implications of financial inclusion, impacts of financial inclusion on employment and labor productivity, benefits of financial inclusion through trickle-down effects, diversification in lending facilities and its impacts on low income households, and the role of information technology in financial inclusion are included in those aspects which have been broadly discussed in economic literature. According to Mehar (2025b), the direct participation of an individual in corporate ownership through capital markets and receiving their fair share in profits, indirect participation in corporate profits through investment and deposits in financial institutions, and borrowing from financial institutions for business and personal purposes are the important areas of concern, which are described as "Financial democratization" and "Financial inclusion". Based on the USA and UK environment, Ismail et al. (2007) identified some key social preconditions for financial democratisation. It was noted that these conditions are not met because of the confusing context, lack of calculative competence at the individual level, and confusing products. Under these conditions, appropriate outcomes are uncertain for existing middle-class savers and very unlikely for lower-income groups.

Greg et al. (2018) and Donncha (2012) highlighted the problems in the assessment of credit requirements and the role of emotional dimensions in the financial inclusion of low-income families. Greg, Marcus, and Juan (2018), Sarma (2016), Phommachanh, and Otchia (2024), McMurty (1999), Mehar (2011), Mehar (2018), and Yangdol and Mandira (2019) have related the financial inclusion with participation of workers in productive activities and debt financing, while social and human dimensions of financial inclusion are covered by McMurty (1999), Mehar (2023), Mehar (2024), and Yangdol and Mandira (2019).

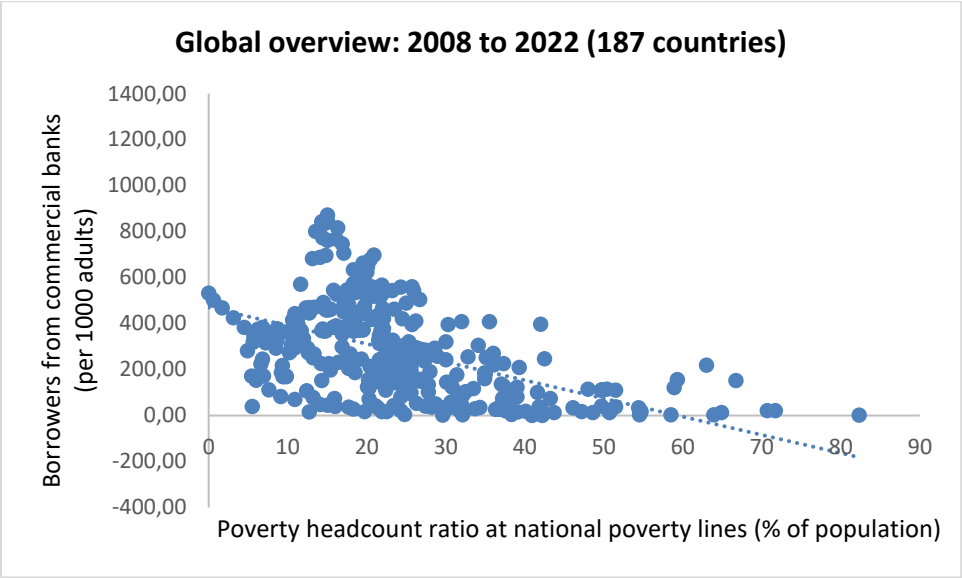
Another aspect of financial inclusion belongs to its relation with the creation of new business entities by middle-income households. According to Alesina and Dani (1994), Duffy and Eberts (1991), and Banerjee and Duflo (2008), the middle class provides entrepreneurs who create employment and productivity growth in a society. Moreover, the middle class drives demand for high-quality consumer goods, which encourages firms to invest in production and marketing. The lending by financial institutions for the creation of new business entities and startups is a way to support low- and middle-income households.

Various studies have concluded that expansion in domestic credit to the private sector alleviates poverty. The growth in credit to the private sector plays an important role in the determination of investment; however, the effectiveness of financial institutions is associated with the utilisation of their lending facilities for the enhancement of existing businesses, the creation of new entities, and financial support to needy individuals. Mehar (2025c) concluded that financial inclusion is an offshoot of the overall financial architecture, which includes monetary policy, structure, and types of financial institutions, supply of credit to the private sector, interest rate structure, and the composition and magnitude of lenders and borrowers. The financial architect may create a blockage in the trickle-down effects of economic growth. The financial institutions can remove this blockage by transferring the benefits of macroeconomic growth to middle and lower-income groups through their lending policies. Mainly, the creation of new businesses supports middle-class households through their contribution to economic activities and creates employment opportunities for poor people.

Mehar (2024) deduced the importance of domestic credit by financial institutions in poverty alleviation, decent employment, and the creation of startups and new businesses. It is confirmed that the creation of new business entities reduces vulnerable employment. A higher level of multi-dimensional poverty can compel people to work in vulnerable conditions, and they accept unfavourable terms and conditions for employment. It has been noted in various economies that the traditional approach of the trickle-down effects of the benefits of economic growth is not enough for the common people. The number of borrowers from banks is an indicator of the incidence of financial inclusion. Contrary to the size of domestic credit, the number of borrowers shows the diversification in the lending portfolio. The large number of borrowers indicates that a large proportion of the population has access to financial resources. It was noted that the impact of the number of borrowers on the creation of new businesses is greater than the impact of domestic credit. Similarly, vulnerable employment is negatively associated with a higher number of borrowers from financial institutions. It argues for financial inclusion and the broadening of the number of borrowers.

To improve the banks' ability to lend, lower rates of interest and allocation of credit to priority sectors cannot ensure the transfer of benefits of monetary policy to the poor and vulnerable population. The inclusion of individuals and firms in the financial system is more important. The incidence of bank borrowers and the number of firms using banks to finance investment reflect the incidence of financial inclusion. It has been confirmed that the number of borrowers and the efficiency of the banking sector are significant determinants of domestic credit (Paresh and Solikin, 2022; Mehar, 2023). The inclusion of individuals and firms in the financial system reflects the fairness and egalitarianism in the system. The diversification of borrowers ensures that credit facilities are not concentrated, which implies that banks do not play a role in creating wealth concentration. The large number of borrowers indicates that credit facilities are not concentrated. Mehar (2022) also inferred that the higher number of borrowers from banks and financial institutions is negatively associated with vulnerable employment. The diversification in a credit portfolio leads to the creation of new business entities. Figure 2 shows the effects of the number of borrowers on the alleviation of poverty. The clear negative association of poverty and the number of borrowers highlight the effect of financial inclusion. The figures are based on the 14-year data of 187 countries.

Figure 2: Effect of Financial Inclusion on Poverty

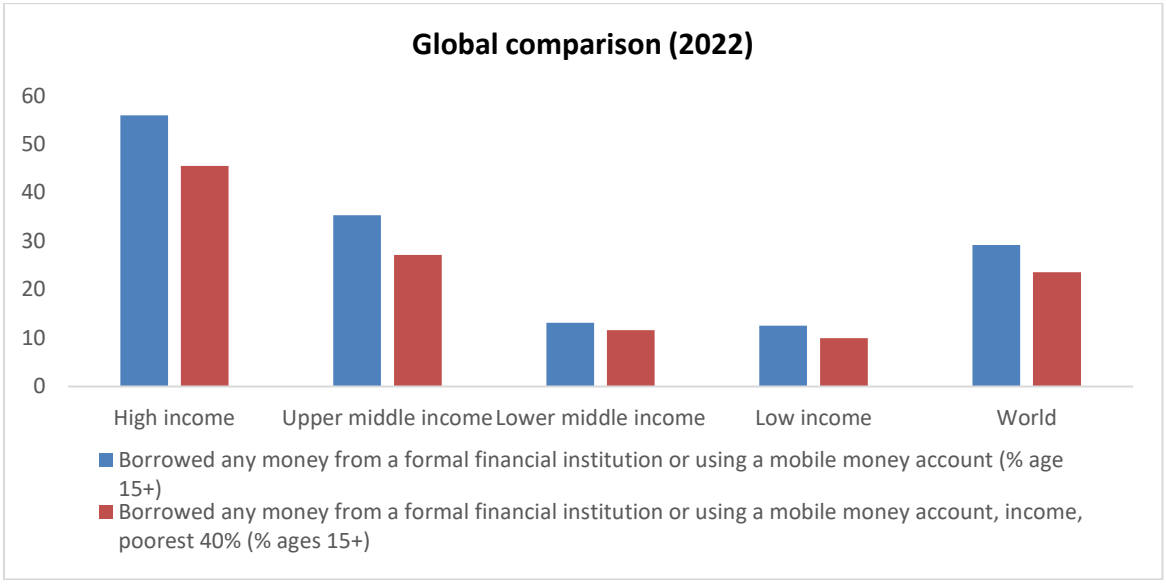


Source: Mehar (2025e)

More than 80 per cent of the population in high-income countries can access the Internet; this ratio is less than 40 per cent in low-income countries. The disparity between the high- and low-income countries is wider in access to financial institutions. According to Mehar (2025e), more than 1.7 billion adults do not have a bank account. This statistical evidence is sufficient to understand the patterns of financial inclusion in the world. The majority of the adults without a bank account are women, poor people in rural areas, and people who belong to vulnerable or marginalised populations. Information technology can play an effective role in bringing the marginalised population into the mainstream of the financial system. No doubt, information technology is one of the ingredients of globalisation. However, because of the disparity in the access and use of information technology, globalisation has enhanced the rich-poor gaps within the countries (Ocampo, 2005). These inequalities have had negative consequences in many areas, including employment, job security, and wages. Van-Phuc (2023) revealed that the use of Internet access increases household income. Similarly, Choi and Yi (2009) have confirmed that the use of the Internet stimulates economic activities. Botolf (2018) has also identified some shards of evidence in favour of the use of the Internet in economic growth.

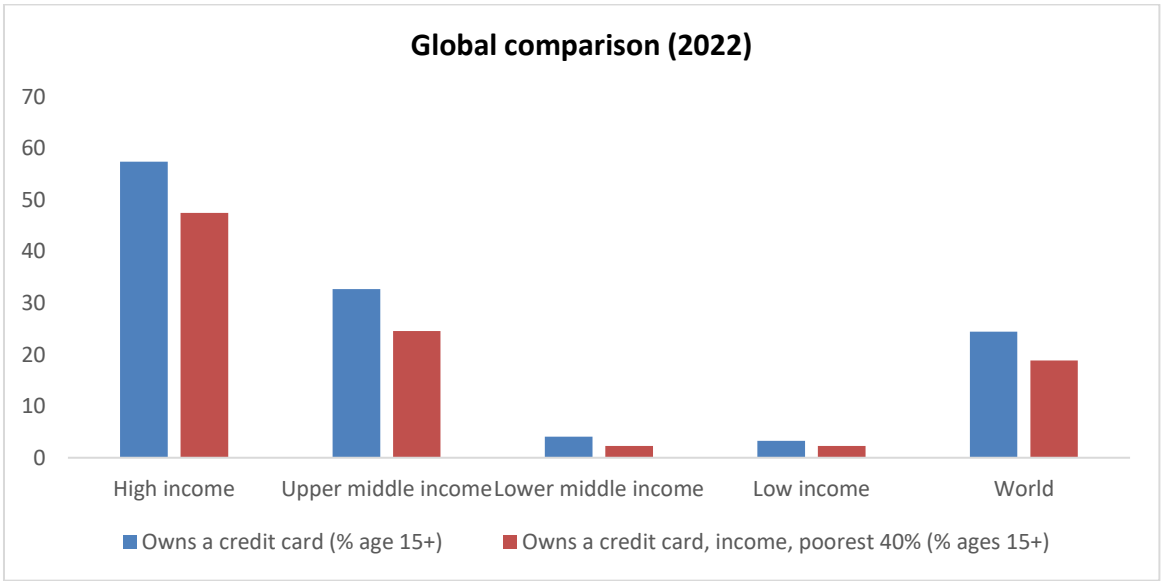
Financial inclusion provides a mechanism for protection in emergencies, when financial requirements become extremely critical. From a socioeconomic point of view, borrowing is more required for poor people. The borrowing is not required only for business and investment purposes. It may be required for shelter, education, medical emergencies, and accidental crises. It is noted that a smaller number of poor people can borrow from financial institutions as compared to rich people. Based on global data, a research study (Mehar: 2023) found that having a credit card is significantly helpful in reducing the fear of unavailability of funds in case of a medical emergency due to a critical disease or accident. The use of electronic payments and credit cards improves people's perception that they can manage money during a crisis. Figure 3 shows the disparities in financial access between high-, middle-, and low-income countries. The lack of assets for mortgage, guarantees, documentation, and their uncertain income in the future to repay the debts are the obvious reasons for their limited access to borrowing. It is mentioned earlier that holding a credit card provides peace of mind to tackle medical emergencies and unexpected crises. However, the poor have less access to credit card facilities. The situation is worse in low and lower-middle-income countries (Figure 4).

Figure 3: Lending to the Poor



Source: Mehar (2025e)

Figure 4: Use of Cards by the Poor



Source: Mehar (2025e)

Table 1: Financial Inclusion and Banking Sector (Top countries in 2021)

Country	Per 100,000 adults			Electronic payments used to (% of peoples age 15+)	Credit card (% age of peoples age 15+)
	Bank accounts	Bank Branches	ATMs		
Saudi Arabia	2732.5	1501	12614	72	25
Colombia	15.9	13	40	42	13
Malta	15.4	24	45	86	42
Croatia	14.7	27	141	75	36
Latvia	12.8	7	58	93	17
Poland	12.7	23	67	91	24
Kuwait	12.5	13	81		
North Macedonia	10.7	22	57	66	22
Israel	10.6	15	131	87	79
Belize	7.9	18	48		

Source: Mehar (2025e)

It is a common perception that the unavailability of banking services, including a lesser number of branches or automated teller machines (ATMs), is a main cause of lower financial inclusion. Table 1 explains that these facilities are much higher in middle-income countries. The top 10 countries according to the number of bank branches do not belong to high-income countries in Europe or North America, nor Australia or Japan (Table 1). However, people in high-income countries have greater access to banks for borrowing and maintaining their accounts.

3. HYPOTHESIS AND METHODOLOGY TO ASSESS THE ROLE OF FINANCIAL INCLUSION

To explain the nexus of information technology, financial inclusion, and improvement in the lives of marginalised segments of a society, this study has established the following hypothesis:

1. Access and use of information technology enhance the incidence of borrowers from banks and financial institutions.
2. The provision of domestic credit from banks and non-banking financial institutions enhances the incidence of borrowers from banks and financial institutions.
3. Access to and use of information technology alleviates poverty.
4. Incidence of borrowers from banks and financial institutions alleviates poverty.
5. Domestic credit alleviates poverty.
6. The rate of unemployment is negatively affected by domestic credit.
7. The rate of unemployment is negatively affected by the incidence of borrowers.
8. Access and use of information technology improve the share of females in the domestic labour force.
9. Domestic credit improves the share of females in the domestic labour force.
10. Access to and use of information technology improves women's participation in major family decisions.
11. The incidence of women in business and law improved women's participation in major family decisions.

The above-mentioned hypotheses are tested through empirical analysis, based on the annual data of 217 countries for 25 years (from 2000 to 2024), which provides 5425 observations. The data for this analysis were extracted from the World Bank (2025). The women's participation (% of women aged 15-4) in major family decisions is based on the following 3 decisions in percentage terms:

1. Own health care,
2. Major household purchases, and
3. Visiting family.

The incidence of women in business and law was measured through an index (scale 1-100) constructed by the World Bank (World Bank: 2025). We suppose that economic prosperity (in terms of per capita income) is also a determinant of poverty, unemployment, and financial inclusion. This variable has been included in the statistical analysis to test the above-mentioned hypotheses. Similarly, the economic development stage of a country can also affect poverty, unemployment, and financial

inclusion. To assess the impacts of economic development, gross domestic product (GDP) was included as an explanatory factor. The descriptions of the explanatory variables are mentioned with the results in Tables 2 to 8.

Two different criteria to measure poverty have been used in this article: the Multidimensional Poverty Headcount Ratio was assessed by an index that quantifies the percentage of households in a country deprived of monetary poverty, education, and basic infrastructure services. This measure uses six indicators (income/consumption, school enrollment, educational attainment, access to safe drinking water, adequate sanitation, and electricity) to provide a more comprehensive picture of human well-being than income-based metrics alone (World Bank: 2025). The second criterion to measure the level of poverty is the poverty headcount as the percentage of a population living below the national poverty line. The headcount is calculated from household consumption or income data, representing the proportion of people unable to meet the standard set by the poverty line.

The panel least squares (PLS) technique was applied to quantify the impacts of explanatory variables. The appropriateness of the panel least-squares technique (PLS) and the selection of its associated methods (fixed effect model, or random effect model) have been determined by the Lagrange Multiplier Tests (Breusch-Pagan, Honda, King-Wu) and Hausman Tests. The model selection criteria are based on the Akaike information criterion, Schwarz criterion, and Hannan-Quinn criterion.

Table 2: Dependent Variable: Number of Borrowers from Commercial Banks (per 1000 adults)
Method: Panel Least Squares (Fixed Effect Model)

Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Constant	37.1295	0.8565	42.4143	0.9729	18.7788	0.3641
Domestic credit to the private sector from the banking sector (% of GDP)	0.9302***	5.8824	0.9039***	5.6931	1.1925***	6.9123
Domestic credit to the private sector from the non-banking sector (% of GDP)	0.9244***	4.9579	0.9148***	4.9166	0.9103***	4.7674
GDP per capita (USD)	0.0030***	5.6913	0.0027***	5.0284	0.0055***	6.0832
Individuals using the Internet (% of population)	1.2676***	13.1047	1.2918***	12.9739	1.6633***	13.4432
Labour participation rate estimated by the ILO	0.7585	1.0842	0.6398	0.9095	0.3631	0.4415
GDP (Billion USD)			0.0246**	2.1774	0.0114	1.0362
COVID-19 (Dummy variable equal to '1' for 2020, and '0' otherwise			-11.7699*	-1.7969	-12.0665*	-1.6729
Rate of inflation (%) based on the Consumer Price Index					0.0311	0.0800
Taxes as % of GDP					0.5652**	2.0265
Overall Significance						
R-squared	0.9296		0.9301		0.9482	
Adjusted R-squared	0.9239		0.9243		0.9428	
F-statistic	162.9275		160.7182		175.6083	
Testing for Fixed/ Random Effect						
Lagrange Multiplier Test: Breusch-Pagan	5770.843***		5686.413***		3115.535***	
Lagrange Multiplier Test: Honda	75.96606***		75.40831***		55.81698***	
Lagrange Multiplier Test: King-Wu	75.96606***		75.40831***		55.81698***	
Hausman Test (Cross-section random Chi-Square)	34.9640***		37.0858***		21.7964***	
Criteria for Model Selection						
Akaike info criterion	10.8790		10.8754		10.7290	

Schwarz criterion	11.2750		11.2790		11.1906	
Hannan-Quinn criterion	11.0271		11.0263		10.9050	
*p < 0.1; **p < 0.05; ***p < 0.01						

Table 3: Dependent Variable: Poverty Headcount Ratio
Method: Panel Least Squares (Random Effect Model) #

Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Constant	44.0328***	28.7179	43.9868***	28.8006	43.0646***	16.2421
Domestic credit to the private sector from the banking sector (% of GDP)	-0.0826***	-4.8801	-0.0807***	-4.7013	-0.0652***	-4.0670
Domestic credit to the private sector from the non-banking sector (% of GDP)	0.0095	0.3637	0.0097	0.3699	-0.0278	-1.1211
GDP per capita (USD)	-0.0004***	-3.9336	-0.0004***	-3.7859	-0.0003***	-3.2499
Number of borrowers from commercial banks (per 1000 adults)	-0.0148***	-3.7813	-0.0146***	-3.7215	-0.0189***	-4.4291
Individuals using the Internet (% of population)	-0.1154***	-6.9146	-0.1161***	-6.9424	-0.1084***	-5.5991
GDP (Billion USD)			-0.0004	-0.6493	-0.0006	-0.9179
Rate of inflation (%) based on the Consumer Price Index					0.0747*	1.6490
Taxes as % of GDP					-0.0273	-0.2218
Overall Significance						
R-squared	0.4313		0.4316		0.4791	
Adjusted R-squared	0.4246		0.4236		0.4662	
F-statistic	65.2113		54.2908		37.2453	
Testing for Fixed/ Random Effect						
Lagrange Multiplier Test: Breusch-Pagan	826.7902***		792.0922***		136.7191***	
Lagrange Multiplier Test: Honda	28.75396***		28.1441***		11.6927***	
Lagrange Multiplier Test: King-Wu	28.75396***		28.1441***		11.6927***	
Hausman Test (Cross-section random Chi-Square)	7.2868		8.0325		9.0627	
*p < 0.1; **p < 0.05; ***p < 0.01 # Panel EGLS: Swamy and Arora estimator of component variances						

Table 4: Dependent Variable: Multidimensional Poverty Headcount Ratio (% of population)
Method: Panel Least Squares (Fixed Effect Model)

Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Constant	19.7368***	13.5727	21.1100***	16.5625	23.9990***	13.2778
Domestic credit to the private sector from the banking sector (% of GDP)	-0.0126	-1.0637	0.0062	0.5946	-0.0071	-0.9601
Domestic credit to the private sector from the non-banking sector (% of GDP)	-0.0620*	-1.6761	-0.0603*	-1.8691	-0.0746***	-3.3990
GDP per capita (USD)	-0.0001	-0.7170	0.0003***	3.5933	-0.0001	-0.9644

Number of borrowers from commercial banks (per 1000 adults)	-0.0009	-0.2740	-0.0041	-1.4433	-0.0100***	-4.6572
Individuals using the Internet (% of population)	-0.1188***	-10.0978	-0.1010***	-9.7105	-0.0504***	-5.7696
GDP (Billion USD)			-0.0232***	-10.2335	-0.0025	-1.0695
Rate of inflation (%) based on the Consumer Price Index					0.0237	1.2050
Taxes as % of GDP					-0.3661***	-4.1286
Overall Significance						
R-squared	0.9833		0.9873		0.9934	
Adjusted R-squared	0.9790		0.9840		0.9917	
F-statistic	229.4766		299.7234		565.1978	
Testing for Fixed/ Random Effect						
Lagrange Multiplier Test: Breusch-Pagan	113.8035***		106.3935***		52.11983***	
Lagrange Multiplier Test: Honda	10.66787***		10.31472***		7.219406***	
Lagrange Multiplier Test: King-Wu	10.66787***		10.31472***		7.219406**	
Hausman Test (Cross-section random Chi-Square)	204.9730***		251.4039***		233.6285***	
Criteria for Model Selection						
Akaike info criterion	4.9566		4.6836		3.8419	
Schwarz criterion	5.7847		5.5214		4.6514	
Hannan-Quinn criterion	5.2841		5.0150		4.1648	
*p < 0.1; **p < 0.05; ***p < 0.01						

Table 5: Dependent Variable: Rate of Unemployment (%) ILO Estimates
Method: Panel Least Squares (Fixed Effect Model)

Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Constant	8.9603***	29.7940	8.9863***	29.8103	10.3839***	19.6500
Domestic credit to the private sector from the banking sector (% of GDP)	0.0446***	7.2911	0.0447***	7.2671	0.0531***	6.7975
Domestic credit to the private sector from the non-banking sector (% of GDP)	-0.0148**	-2.0540	-0.0147**	-2.0491	-0.0249***	-2.9144
GDP per capita (USD)	-0.0001***	-4.2176	-0.0001***	-3.7688	-0.0002***	-5.4333
Number of borrowers from commercial banks (per 1000 adults)	-0.0060***	-5.6059	-0.0058***	-5.4272	-0.0058***	-3.8263
Individuals using the Internet (% of population)	-0.0054	-1.3724	-0.0069*	-1.6977	-0.0048	-0.7897
GDP (Billion USD)			-0.0005	-1.0385	-0.000002	-0.0039
COVID-19 (Dummy variable equal to '1' for 2020, and '0' otherwise			0.4500*	1.8067	-0.0839	-0.2650

Rate of inflation (%) based on the Consumer Price Index					-0.0339**	-1.9780
Taxes as % of GDP					-0.0040	-0.3269
Overall Significance						
R-squared	0.9073		0.9076		0.9054	
Adjusted R-squared	0.8997		0.8999		0.8955	
F-statistic	120.6884		118.6824		91.7475	
Testing for Fixed/ Random Effect						
Lagrange Multiplier Test: Breusch-Pagan	8071.8420***		8068.3750***		4343.5790***	
Lagrange Multiplier Test: Honda	89.8434***		89.8241***		65.9058***	
Lagrange Multiplier Test: King-Wu	89.8434***		89.8241***		65.9058***	
Hausman Test (Cross-section random Chi-Square)	15.8406***		16.4020***		25.8880***	
Criteria for Model Selection						
Akaike info criterion	4.3497		4.3491		4.4894	
Schwarz criterion	4.7458		4.7527		4.9509	
Hannan-Quinn criterion	4.4979		4.5001		4.6654	
*p < 0.1; **p < 0.05; ***p < 0.01						

Table 6: Dependent Variable: Rate of Female Unemployment (%) ILO Estimates
Method: Panel Least Squares (Fixed Effect Model)

Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Constant	10.0065***	28.4272	10.0391***	28.4398	11.4335***	18.6874
Domestic credit to the private sector from the banking sector (% of GDP)	0.0534***	7.4547	0.0537***	7.4547	0.0628***	6.9405
Domestic credit to the private sector from the non-banking sector (% of GDP)	-0.0194**	-2.3053	-0.0193**	-2.2955	-0.0326***	-3.2973
GDP per capita (USD)	-0.0001***	-3.4682	-0.0001***	-3.0698	-0.0002***	-4.4129
Number of borrowers from commercial banks (per 1000 adults)	-0.0074***	-5.9594	-0.0073***	-5.7956	-0.0078***	-4.4426
Female individuals using the Internet (% of female population)	-0.0030	-0.6525	-0.0042	-0.8953	-0.0035	-0.5043
GDP (Billion USD)			-0.0006	-1.1210	-0.00005	-0.0845
COVID-19 (Dummy variable equal to '1' for 2020, and '0' otherwise			0.4035	1.3836	-0.1193	-0.3255
Rate of inflation (%) based on the Consumer Price Index					-0.0256	-1.2908
Taxes as % of GDP					-0.0083	-0.5794
Overall Significance						
R-squared	0.9044		0.9046		0.8992	
Adjusted R-squared	0.8966		0.8967		0.8887	
F-statistic	116.6419		114.5866		85.5724	

Testing for Fixed/ Random Effect						
Lagrange Multiplier Test: Breusch-Pagan	7595.9040***		7608.8350***		4097.5810***	
Lagrange Multiplier Test: Honda	87.1544***		87.2286***		64.0123***	
Lagrange Multiplier Test: King-Wu	87.1544***		87.2286***		64.0123***	
Hausman Test (Cross-section random Chi-Square)	15.2098***		15.4687***		23.7961***	
Criteria for Model Selection						
Akaike info criterion	4.6645		4.6648		4.7824	
Schwarz criterion	5.0606		5.0684		5.2440	
Hannan-Quinn criterion	4.8126		4.8158		4.9584	
*p < 0.1; **p < 0.05; ***p < 0.01						

Table 7: Dependent Variable: Female Labour Force (% of total labour force)
Method: Panel Least Squares (Fixed Effect Model)

Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient	T-statistics
Constant	40.3449***	240.0048	40.3061***	239.6933	41.1067***	160.8890
Domestic credit to the private sector from the banking sector (% of GDP)	0.0158***	4.6339	0.0151***	4.4078	0.0148***	3.9123
Domestic credit to the private sector from the non-banking sector (% of GDP)	0.0001	0.0347	-0.00003	-0.0064	-0.0014	-0.3435
GDP per capita (USD)	0.00001	0.5295	-0.000001	-0.0489	0.0001***	2.9292
Number of borrowers from commercial banks (per 1000 adults)	-0.0004	-0.7523	-0.0006	-0.9938	-0.0003	-0.4569
Female individuals using the Internet (% of female population)	0.0175***	7.9627	0.0178***	7.8811	0.0121***	4.1462
GDP (Billion USD)			0.0007***	2.8280	0.0003	1.1295
COVID-19 (Dummy variable equal to '1' for 2020, and '0' otherwise			-0.1658	-1.1932	-0.0730	-0.4767
Rate of inflation (%) based on Consumer Price Index					0.0277***	3.3376
Taxes as % of GDP					-0.0097*	-1.6220
Overall Significance						
R-squared	0.9832		0.9833		0.9803	
Adjusted R-squared	0.9819		0.9820		0.9782	
F-statistic	722.7911		713.4842		476.1441	
Testing for Fixed/ Random Effect						
Lagrange Multiplier Test: Breusch-Pagan	10189.550***		10207.3900***		4558.7870***	
Lagrange Multiplier Test: Honda	100.9433***		101.0316***		67.51879***	
Lagrange Multiplier Test: King-Wu	100.9433***		101.0316***		67.51879***	
Hausman Test (Cross-section random Chi-Square)	15.0631***		15.8553***		17.9359***	
Criteria for Model Selection						
Akaike info criterion	3.1863		3.1817		3.0359	
Schwarz criterion	3.5824		3.5853		3.4975	

Hannan-Quinn criterion	3.3345		3.3326		3.2120	
*p < 0.1; **p < 0.05; ***p < 0.01						

Table 8: Dependent Variable: Women Participating in Major Household Decisions
Method: Panel Least Squares (Fixed Effect Model)

Variable	Coefficient	T-statistics	Coefficient	T-statistics	Coefficient#	T-statistics
Constant	2.2351	0.2034	2.7697	0.2419	5.1097	0.5785
Domestic credit to the private sector from the banking sector (% of GDP)	0.3072	1.4576	0.3499	1.5814	0.1833	0.9815
Domestic credit to the private sector from the non-banking sector (% of GDP)	0.5897*	1.7138	0.6338*	1.7839	-0.1042	-0.4723
GDP per capita (USD)	0.0032*	1.7638	0.0037*	1.8690	-0.0003	-0.3087
Number of borrowers from commercial banks (per 1000 adults)	-0.1205**	-1.9937	-0.1152*	-1.8620	-0.0084	-0.1886
Female individuals using the Internet (% of female population)	0.2130*	1.8165	0.2222*	1.8512	0.3196***	2.8773
Women Business and the Law Index Score (scale 1-100)	0.6410***	3.6409	0.6180***	3.3419	0.6145***	4.9635
GDP (Billion USD)			-0.0146	-0.8085	0.0073	0.2879
COVID-19 (Dummy variable equal to '1' for 2020, and '0' otherwise			-1.9493	-0.2355	-4.9964	-0.5992
Rate of inflation (%) based on the Consumer Price Index					-0.2842	-1.4455
Taxes as % of GDP					0.2018**	2.4399
Overall Significance						
R-squared	0.9329		0.9342		0.6313	
Adjusted R-squared	0.8482		0.8428		0.5493	
F-statistic	11.0128		10.2219		7.7038	
Testing for Fixed/ Random Effect						
Lagrange Multiplier Test: Breusch-Pagan	14.2981***		10.3990***		4.7577***	
Lagrange Multiplier Test: Honda	3.7812***		3.2247***		2.1812***	
Lagrange Multiplier Test: King-Wu	3.7812***		3.2247***		2.1812***	
Hausman Test (Cross-section random Chi-Square)	11.9465*		13.4820*		15.8193	
Criteria for Model Selection						
Akaike info criterion	6.9223		6.9493			
Schwarz criterion	8.3112		8.3948			
Hannan-Quinn criterion	7.4816		7.5314			
* p < 0.1; **p < 0.05; ***p < 0.01 # Panel EGLS: Swamy and Arora estimator of component variances (Random effect model)						

4. THE RESULTS AND CONCLUSION

The results of statistical analysis are presented in Tables 2 to 8. The significance of parameters has been tested through t-statistics, and the overall significance of the equation is measured through adjusted R-squares and their associated F-statistics. These parameters have also been reported in the concerned tables. To improve the reliability of results, some falsification tests have been applied in the regression analysis. For this purpose, some additional explanatory variables have been added. The

consistency in the signs and negligible changes in the magnitudes of the betas associated with the main variables confirm the robustness and reliability of the results. The descriptions of variables are described in the above-mentioned tables.

The appropriateness of the panel least-squares technique (PLS) and the selection of its associated methods (fixed effect model or random effect model), and the information losses in panel data have also been reported in Tables 2 to 8.

The access and use of information technology in this article was measured by the percentage of the population using the Internet, while for females, it indicates the percentage of the female population using the Internet. The data for these variables were extracted from the World Bank (World Bank: 2025).

The statistical analysis inferred that the use of the Internet induces financial inclusion. The higher percentage of the population using the Internet enhances the number of borrowers from banks and other financial institutions. The use of the internet facilitates access to banks and financial institutions by online submission of applications, documents, and other evidence. It saves time and travelling costs and makes the verification process easier. So, its positive association with financial inclusion is logical. Similarly, the magnitude of domestic credit from banks and financial institutions indicates the availability of credit, which induces borrowers. The greater availability of credit is itself a cause to attract borrowers.

The higher per capita income an economy reflects the appropriateness of individuals for bankability and financial inclusion. The individuals in high-income economies are more used to dealing with banks and financial institutions. So, the magnitude of financial inclusion in high-income countries will be higher. The statistical pieces of evidence confirm the negative association between per capita income and poverty. The alleviation of poverty by higher per capita income is also quite logical. The statistical results are significant and robust.

Surprisingly, per capita income affects the rate of unemployment negatively, which corroborates that in the presence of high salaries or business income, people will be engaged in jobs or businesses. The low per capita income will create more unemployment. To some extent, it contradicts the famous "Wage fund theory" in labour economics, which states that lower wage rates provide more employment.

The access and use of the Internet alleviates poverty. These statistical inferences are valid for both types of poverty: Multidimensional poverty and poverty headcount ratio at the national poverty line. The incidence of borrowers and domestic credit from banks alleviates poverty.

In the determination of unemployment, it is a surprising conclusion that domestic credit from non-banking financial institutions alleviates unemployment, but credit from commercial banks aggravates unemployment. It is against the common intuition. These findings are significant and robust in all alternative scenarios. It is consistent in the case of the overall rate of unemployment and the female rate of unemployment. One of the possible interpretations of this result is the special consideration of marginalised groups in lending from non-banking financial institutions. This consideration alleviates women's unemployment (and also overall unemployment). While commercial banks do not consider the marginalised groups in their lending practices. The lending from commercial banks to the big industrial units and business enterprises may induce the capital-intensive technologies, which can create unemployment.

The use of the Internet promotes the share of women in the labour force, which is an indicator that the use of information technology is a stimulus to empower women and improve their participation in earning activities. Similarly, domestic credit by banks is also an important factor in improving women's participation in household earnings. Interestingly, women's participation in the labour force is enhanced by higher inflation. This reflects that more women prefer to work in times of economic misery created by inflation. In the problematic situation, there is a need for more women's participation in earning activities.

The participation of women in major household decisions is significantly improved by their participation in business activities and their engagement in information technology. All these inferences are important for policymakers and business enterprises.

5. LIMITATIONS AND POLICY IMPLICATIONS

From the policy formulation point of view, policy makers must recognise and encourage the use of information technology. The use of information technology is significant for poverty alleviation. It directly affects the alleviation of poverty, improvement of women's share in the labour force, and women's empowerment. The positive effect of financial inclusion in terms of the number of borrowers from banks and financial institutions is also an important element to create employment opportunities, alleviate poverty, encourage females to participate in the labour market, and women's empowerment.

In light of empirical analysis, it is highly recommended that monetary policy should consider the role of commercial banks in their lending to alleviate unemployment. The GDP growth, creation of new businesses, and controlling inflation are the usual targets of a monetary policy. However, the direct influence of monetary policy on creating employment opportunities should

be incorporated in the lending practices of commercial banks. This policy can help the marginalised groups in a society: women, the poor, and rural households.

The poor infrastructure of financial institutions, unavailability of a financial institution in nearby areas, high costs to opening an account, lengthy and complicated documentation, financial illiteracy, lack of financial capability, and cultural or religious beliefs are the possible barriers to financial inclusion. The removal of such barriers is a big task to achieve a greater level of financial inclusion, which can improve the savings and investment opportunities. However, this study does not incorporate the effects of these factors. It is strongly recommended that these factors be incorporated into future studies. The role of social and political factors varies from country to country. These factors can also be incorporated in a detailed study.

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APPENDIX 1: Descriptive Statistics

Parameters	Mean	Median	Standard Deviation	Kurtosis	Skewness	Range	Minimum
Domestic credit	46.7	36.0	40.3	3.8	1.7	304.6	0.0
Credit from banks	0.7	0.4	19.0	25.8	1.3	308.8	-144.2
Credit from non-banks	50.8	38.0	44.4	2.7	1.6	304.6	0.0
GDP (Billion USD)	9.5	7.1	7.9	9.1	2.3	74.3	0.2
Per capita GDP	66.2	71.8	23.6	-0.3	-0.7	99.3	0.7
Taxes (% of GDP)	41.1	44.5	9.4	1.7	-1.5	48.0	6.8
No. of borrowers	320.8	17.0	1521.1	140.2	10.8	29184.9	0.0
Internet users	6.6	3.5	19.6	351.0	16.3	574.1	-16.9
Female internet users	38.9	32.9	31.9	-1.3	0.3	100.0	0.0
Inflation	60.9	61.3	10.9	0.4	-0.2	65.3	23.1
Women in business	8.8	2.0	17.2	7.9	2.9	88.3	0.0
Women in decision making	197.5	138.9	207.7	2.7	1.6	1167.4	0.0
Labor participation rate	16126.8	5463.6	24926.9	14.7	3.2	256470.9	109.6
Female labor participation rate	24.4	20.6	14.4	1.2	1.3	82.3	0.0
Female unemployment rate	16.9	16.4	7.7	59.2	4.1	147.6	0.0
Unemployment tr ate	8.0	6.1	6.0	2.2	1.4	37.2	0.1
Multidimensional poverty	49.1	50.6	22.3	-0.9	-0.2	86.5	6.3
Poverty headcount	69.7	73.1	18.6	-0.4	-0.5	76.3	23.8

APPENDIX 2: Correlation Matrix

variable	Domestic credit	Credit from banks	Credit from non-banks	GDP (Billion USD)	Per capita GDP	Taxes (% of GDP)	No. of borrowers	Internet users	Female internet users	Inflation (%)	Women in business	Women in decision making	Labor participation rate (%)	Female Labor participation rate (%)
Domestic credit	1.000													
Credit from banks	0.953	1.000												
Credit from non-banks	0.467	0.062	1.000											
GDP (Billion USD)	0.409	0.217	0.564	1.000										
Per capita GDP	0.622	0.615	0.160	0.160	1.000									
Taxes (% of GDP)	0.280	0.304	0.023	0.092	0.260	1.000								
No. of borrowers	0.557	0.566	0.057	0.204	0.612	0.093	1.000							
Internet users	0.605	0.606	0.155	0.199	0.601	0.224	0.645	1.000						
Female internet users	0.345	0.353	0.072	0.108	0.547	0.151	0.327	0.993	1.000					
Inflation	-0.151	-0.160	0.028	-0.039	-0.124	-0.069	-0.097	-0.104	-0.099	1.000				
Women in business	0.447	0.440	0.128	0.155	0.385	0.362	0.374	0.503	0.251	-0.099	1.000			
Women in decision making	0.391	0.384	0.049	0.161	0.407	0.166	0.369	0.388	0.465	0.014	0.402	1.000		
Labor participation rate	0.026	0.030	0.043	0.024	0.123	0.108	0.075	0.015	0.217	-0.007	0.169	0.047	1.000	
Female labor participation rate	0.099	0.078	0.059	0.046	0.092	0.268	0.004	0.063	0.128	0.007	0.594	0.010	0.454	1.000
Female unemployment rate	0.138	0.150	0.015	0.093	0.260	0.048	0.062	0.136	0.162	0.010	0.214	0.155	0.493	0.309
Unemployment tr ate	0.055	0.076	0.018	0.073	0.151	0.181	0.057	0.024	0.146	0.020	0.063	0.198	0.464	0.102
Multidimensional poverty	0.407	0.409	0.086	0.109	0.365	0.234	0.533	0.704	0.571	0.199	0.411	0.680	0.192	0.001
Poverty headcount	0.437	0.421	0.056	0.213	0.424	0.266	0.567	0.609	0.344	0.162	0.420	0.462	0.144	0.178