



## Impact of Women Entrepreneurship Development Project (WEDP) on Women's Empowerment in Mekelle City, Northern Ethiopia

Gebretsadik Gebremedhin<sup>1</sup>, Menasbo Gebru<sup>2</sup>

### Abstract

Regardless of the strenuous efforts that countries have made towards reducing poverty and accelerating economic growth through formulating policies that favor SMEs, there is still a lag in knowledge and empirics regarding the presence of women-focused SMEs projects and the level of development. The objective of this study is to examine the impact of the Women Entrepreneurship Development Project on empowering women's participation in micro and small enterprises in Mekelle city, northern Ethiopia. Women empowerment interventions were expressed in terms of access to loans and capacity building for the target women. Balanced panel data were collected from 300 women entrepreneurs by the Policy Study Institute of Ethiopia and the World Bank in 2014 and 2019 from seven sub-cities of Mekelle city. We applied a difference-in-differences (DID) model to analyze the impact. Results show a positive effect of the project intervention on increasing average yearly profits (62.5%), average monthly sales (83.7%), and in touch more hours in business activities per week (19hrs), and an increase employing additional labor (2) to perform their business compared to those who did not support by the project. These findings emphasize the project's impact on women's economic empowerment, and clearly highlight the need to replicate and expand similar initiatives for women without access to the project. Thus, orchestrated and demand-driven strategies and implementation modalities are quite necessary to empower the core competency of women entrepreneurship of the city, especially in post-war era.

**Keywords:** Women empowerment, micro, small enterprises, difference in difference, Ethiopia

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## 1 Introduction

Ethiopia's economy depends on a very traditional and unimodal rainfed agricultural system that is unable to produce sufficient agricultural production to feed its population. Limited landholding size, along with access constrained to improved agricultural technologies and a missing or imperfect credit market, led to decrease tremendously the marginal productivity of the agricultural labor force. This has resulted in rural unemployment and adversely affected the livelihood of the agricultural society (Amentie et al., 2016). Employment outcomes for a large part of the Ethiopian population remain precarious, and employment remains largely dominated by agriculture and non-wage work. Due to high population growth and rapid urbanization, urban unemployment is also considered a threat to the food security and well-being of major citizens of the country (Amentie et al., 2016). Women and youth are at a significant disadvantage in the labor market, and the intersection of gender and age confers an additional disadvantage (Christina and Wondemagne, 2021; Brixiova & Ncube, 2013). In developing countries, compared to men, women tend to be overrepresented in non-wage employment and underrepresented in paid employment. In Ethiopia, too, the

<sup>1</sup> Civil service consultancy expert, Addis Ababa [gere3500@gmail.com](mailto:gere3500@gmail.com)

<sup>2</sup> Mekelle University, College of Business and Economics [menasbo.gebru@mu.edu.et](mailto:menasbo.gebru@mu.edu.et)



female unemployment rate is almost three times among men, and the urban female unemployment rate is more than double that of urban men's unemployment. Similarly, the urban young women's unemployment rate is nearly three times higher than urban men young unemployment (Wondemagne, 2021).

Economic marginalization of Ethiopian women stems from various perspectives like: limited education, missing of access to finance, limited control over resources, socio-cultural barriers to entrepreneurship and leadership roles (Engida et al., 2017; CSA, 2006; Yimrer and Tadesse, 2025; Nigist, 2019; Mengistie, 2020). On the other hand, the emergence of Micro and Small Enterprises (MSEs) offers Ethiopian women flexible income opportunities, empowering their contribution to finance household and local communities, and asset ownership (Bismark, 2017; Geleta, 2015; Belay, 2022; Ismael, 2022).

Various development efforts have been exerted by the Ethiopian government and developmental partners, including donor agencies, financial institutions, and NGOs to increase urban employment, particularly for women, disadvantaged and marginalized groups (Patel, 2014). Literally, Ethiopia seeks to design a strong and robust strategy to deploy efficiently its labor force. Due to these strong initiatives since the 2000s, the country has paid due attention to the emergence of small and micro enterprises that are able to absorb the massive urban labor force, particularly women and female youth. But limited supply of financial services, and the dominance of unskilled labor and various market hurdles further constrain the growth and hinder the development of micro and small entrepreneurs (Getahun, 2016; Mbiru et al., 2023; Brixiova & Ncube, 2013).

Promoting financial inclusion and addressing gender disparities in access to finance in developing countries are crucial for Ethiopian entrepreneurship's advancement (Ozili et al., 2023). Although microfinance institutions acknowledge their role to supply credit services to the pro-poor and marginalized groups, particularly women, but remain underserved due to an incomplete credit market and other factors (Wassie et al., 2019). Cultural barriers further impede women's access to finance, perpetuating their economic disadvantage (Bullough et al., 2022; Hundie & Tulu, 2023). Recognizing these challenges, the Ethiopian government initiated the Women Entrepreneur Development Project (WEDP), financed by the World Bank in 2012, to empower women-owned or co-owned MSEs (WEDP, 2012). The main role of the project is to enhance the workforce and livelihood of female entrepreneurs through various strategies, including tailored financial and capacity-building services, and partnerships with financial institutions (Audretsch et al., 2022).

The Women Entrepreneurship Development Project (WEDP) provides finance and business support for growth-oriented women entrepreneurs in Ethiopia. WEDP became the first ever women-entrepreneur focused line of credit in Africa in 2013. However, there is a scant empirical work on the impact evaluation of the project visa vis to its stated goal, and hence it is the right time to assess the impact of the project in the selected cities of Ethiopia. Using women entrepreneur panel data collected in 2014 and 2019 from seven sub-cities of Mekelle, this study aimed. First, to assess and feed scientific information to the policy makers and economic planners whether the wellbeing of the economically deprived society especially marginalized women and female youth, is improved through the intervention, and second, to inform the relevance of such intervention on time utilization, capital formation, and employment creation. This is mainly based on comparative analysis to test any sign of increasing returns from the non-intervening program where five- six years have elapsed since the project implementation at the national level.

This study contributes to the existing empirics by providing new insights on the impact of the recently introduced pro-poor project on the welfare of marginalized women and the deprived urban society where limited access to finance and poverty prevalence area. More specifically, the study adds to the existing body of knowledge in three main perspectives.

First, despite the extensive empirical works on the impact of access to finance on the growth of small business enterprises, the project specifically evaluates the impact of financial assistance and capacity building on productivity of time, capital formation, market participation of marginalized women and female youth. This study is the first in its kind in the country.



Second, Wieser and Mesfin (2021) used the 2016 data from cities of Ethiopia, and assessed the impact of the WEDP on women entrepreneur empowerment. Their finding shows relatively women who received loans and training from WEDP make approximately 30% higher profits and hire 50% more employees than matched comparison of women who did not receive loans from WEDP and capacity building services. Our study builds on their finding and uses recent panel dataset to explore how much the existing intervention affects the well-being of the WEDP loan beneficiaries' women in Mekelle city, in particular.

Third, due to the project intervention, Wieser & Mesfin (2021) found that Women entrepreneurs who received a WEDP loan made higher profits and hired more employees than firms that did not receive loans in the medium and long term in the Oromia region, Ethiopia. This study attempts to verify whether this also holds true for the survey periods from 2014 to 2019 in Mekelle, northern Ethiopia.

The remaining section of the paper is organized as follows. The second section deals with the literature review methodology of the study, focused on the description of the study area, sampling design, and data source. This is followed by section three, which deals with the empirical model specifications. Section four deals with results and discussion, and the conclusion and policy implications are discussed in the last section.

## **2 Literature review: Challenges and prospects of women's empowerment**

The social-cultural, religious, and economic variables that challenge women's empowerment in controlling over resources, access to education, finance, participation in leadership decisions and overall social mobilization have received significant attention from a wide range of empirical works (UN, 2011, Jayamohan & Kitesa, 2014). This has been more prevalent in developing countries where males is over represented in decision-making positions at the household level and in different public sectors (Genet and Habtu, 2013). For instance, in Ethiopia during the ear of the Empire Hailesilassie, parliamentary style of government instituted for the first time, the number of men representation in the parliament is fully recognized and decision-making position were totally dominated by men, despite the size and the contribution of women in the society (UNDAF, 2012). The follow-up government was the communist led Derge regime, which promoted equality among citizens with equal rights to elect and to be elected. However, apart from principle, it was far from increasing the number of women in leadership decision-making activities. The study of Hiwot (2017) and Gojjam and Manjit (2016) indicated that exclusively at all levels of decision-making takes place among male participants and prevents females from expressing their ideas, and is underrepresented in leadership positions. Women's empowerment is a global challenge as most women have been relegated to the sidelines and subjected to the control of men as a result of unfair social, cultural, and political structures in many parts of the world. About 70% of the world's poor are women, and about 35.8% female female-headed households in Ethiopia live in absolute poverty (World Bank, 2014; Jayamohan & Kitesa, 2014).

In order to alleviate women from such a miserable life, orchestrated efforts from global societies and local governments have been effective for many decades. The intuition is that improving women is the nucleus of strength for women's rights and enables them to have control over resources and capacity in a sustainable way. Pratiksha and Nittala (2023) emphasized that empowering women and enforcing gender equality is a crucial development effort, and local governments consider gender equality as the mainstream of the nation's growth strategies. The study of Bayeh (2016) revealed that women's empowerment and gender equality are a viable option to the overall development of a country. Educating females enhances the labor market involvement and finds the most in its effectiveness level (Sheena & Naresh, 2017; Cho et al., 2015). Shioyama (2020) addressed the correlation between women's capacity building and entrepreneurial skill, and work performance. This has been manifested in access and control over resources, job opportunities, and the acquisition of decision-making positions in household public sectors.

Government and international communities have developed and implemented various women empowerment mechanisms, where the provision of financial resources and capacity building is widely practiced (World Bank, 2014). Countries like Ghana, Ethiopia, Kenya, Bangladesh promoted the " *Women's Finance* " strategy gives women a greater economic role in savings and credit, managing business, and exhibiting household ownership of properties and assets (World Bank, 2014; Obayelu & Chime, 2020). Such policies have surmounted the



problems among women in developing countries that are potentially like women's empowerment and poverty reduction. Huis et al. (2017) have identified a three-dimensional model for women's empowerment, and the provision of financial services is one among the others. Global experiences show that along with the provision of financial services, entrepreneurship skill development through capacity building is a complementary element in women empowerment. Ventura et al. (2021) studied that women's empowerment and gender equality enhanced their participation in leadership roles and contributed to social sustainability, and created better awareness and were acknowledged by all their societal counterparts are in Eastern Europe and Africa. Supporting the marginalized and pro-poor society, particularly women, through the provision of vocational education and business training increases their participation in the labor market, earnings, self-employment, sales, profit welfare (Chinen et al., 2017). A study from rural Egypt revealed that resuming vocational training to economically marginalized women improve women's business and life skills compared to those who were not part of the intervention (Elsayed & Roushdy, 2017). A similar study conducted in rural Nigeria reflected a higher impact of women's entrepreneurial training on overall women empowerment (Obayelu & Chime, 2020).

Access to control resources frames the gender equality commitment and action in the business environment and at the household level (Ambler et al., 2021). It also provided workplace guidance on empowering women. Pal & Gupta (2022) assessed the impact of individual & household attributes, social and economic attributes, and ownership documents on credit, and its impact on social & psychological empowerment and economic empowerment of women leading to sustainable women empowerment. The women empowerment project implemented in Ethiopia since 2014 has been directed to achieve the goals stated by the above studies elsewhere.

### **3 Methodology of the study**

#### **3.1 Study area**

The study area is Mekelle city, the capital of Tigray regional state, where vibrant socioeconomic transactions have been pronounced since the inception of the market-based economy at the national level. The strong government attention towards the emerging and expansion of the private economic sector brings a significant change in the momentum of the city's socio-economic, especially in industrialization, construction, transportation, commerce, and agro-processing sectors. The city is growing dynamically, especially after the 2000s, and a significant number of urban businesses have emerged and the livelihood of the residents is fundamentally changed. Administratively, Mekelle has seven sub-cities, where about 1.18 million people live, and the majority of the population depends on the government's employment, commerce, and small-scale enterprises. The city administration has vehemently strived to reduce urban unemployment, particularly among the youth and women. The city administration has launched a woman empowerment program so so-called Women Entrepreneurship Development Project (WEDP) funded by the World Bank, and many female-headed households have been engaged in various small business enterprises.

#### **3.2 Study design**

This study is employed to assess the impact of the project (*WEDP*) on empowering women entrepreneurs through providing access to finance and capacity building services for the selected women from the seven sub-cities of Mekelle. The target groups are women who have no other means of acquiring financial assistance and capacity building services, other than from the project. To assess the impact of the project, a counterfactual analysis is undertaken for comparison purposes of women entrepreneurs who have no financial assistance from the project. The treated and control group of women entrepreneurs are spatially distributed in all seven sub-cities of Mekelle, and we give an equal chance of nominating the respondents from the treated and control groups. By definition, access to a specific subset of the project component is given to the treatment group only. It is crucial, however, to tailor the selection of the treatment and the control group to the intervention. This exercise is key in guaranteeing statistical identification of changes that can be causally linked to the intervention. Respondents are selected through a random sampling technique from the treated and the control groups for a detailed interview. This helps to avoid the selection bias problem while selecting the representatives from the two groups. Two round panel surveys were conducted.

The first round is the baseline survey, which was undertaken in 2014 before the implementation of the project, while the second round was conducted in 2019, after the implementation of the project.

### 3.3 3.3 Data

The data used in this article were a panel of 300 women entrepreneurs (150 treated and 150 controlled) groups who were surveyed in 2014 and 2019 budget years from seven sub-cities of Mekelle and resulting a balanced panel of 600 observations. The project was fully implemented in 2016 in Mekelle and continued in the follow-up budget years in other towns of Tigray. The main purpose of using the same respondents in both survey period was to assess among women who have improved their entrepreneurial potential following the intervention of financial assistance and training, compared to women who were not part of the project. The intuition is that the project was introduced in Mekelle in 2014. This enables us to use the difference in-difference method for impact estimation, provided that the 2014 survey is considered as baseline data. The project intervention provides information pertaining to the women's empowerment expressed in terms of capital formation, time utilization, and employment creation that we lack from the non-WDEP beneficiaries. The panel data set also provides the distribution and pattern of the outcome variables among the treated and controlled groups. Respondents in the sample were women with small business enterprises as their main source of livelihood. The business areas of the sample respondents are presented in the following table.

Table 1: Women entrepreneurs participated in the survey by economic sector (2014 and 2019)

S.no	Sector	Treated	Controlled	Pool
1	Service	50	50	100
2	Trade	88	88	176
3	Manufacturing	6	6	12
4	Construction	2	2	4
5	Urban agriculture	2	2	4
6	Cottage/textile	2	2	4
Total		150	150	300

Source: World Bank 2019

To collect the panel data set, a two-stage stratified random sampling technique was used in the first round (2014) and second round (2019) surveys. In the first stage, small business sectors (as presented in Table 1) were selected to have a large variation in participation by women entrepreneurs in seven sub-cities of Mekelle. In the second stage, respondents were randomly sampled from each sector, in which 150 were WEDP financial service beneficiaries (treated) while 150 were non-WEDP financial service beneficiaries (controlled). This study employs data that covers five years interval (2014-2019/), as the WEDP intervention took place across the given time interval. We found 300 women entrepreneurs interviewed in both survey periods, to make balanced panel data by asking the same women in the first and the second survey. In both surveys, nearly the same questions were asked of the respondents, and the attrition rate is zero. The women entrepreneurs were asked whether they have received financial assistance and have capacity building training from WEDP, or not, and if so, to what extent their capacity in market participation, profit making, employment creation, and time utilization has changed in the post-intervention period. The panel data were collected by the Women Empowerment Development Project, funded by the Policy Study Institute of Ethiopia and the World Bank.

### 3.4 Descriptive statistics

The mean and standard error of variables used in the analysis by survey period are presented in Table 2 below. The data set shows equal sample size distribution between the treated and control groups in both surveys. There are no attrite respondents in the second survey round. The 2014 survey is before the implementation of the program, while the 2019 survey is after the implementation of the project. The mean outcome difference between the treated and control group depicted the impact of the intervention. The demographic characteristics of the average respondents from the treated and control groups, such as age in the first survey and the second survey, are about 33 and 38 years, respectively depicts that respondents from

both groups are found in the productive age. While family size distribution looks higher for the treated group in both surveys and the difference is statistically significant at the 1 % level. Comparison of outcome variables expressed by profit, average sales, and employment levels, depicts that project beneficiaries have a higher level compared to the non-beneficiaries, and the difference is statistically significant at the 1 % level.

Table 2: Key firm-level variables by survey period

Variable	Survey period					
	2014			2019		
	Treated	Control	Diff	Treated	Control	Diff
Age of entrepreneur (years)	33(0.600)	33.5(0.663)		38.3(0.602)	38.5(0.666)	
Head education (years)	5.51(0.259)	5.566(0.256)		5.513(0.259)	5.48(0.258)	
Family size(number)	5.51(0.173)	4.58(0.176)	***	7.00 (0.193)	5.393(0.187)	***
Mobile one(1=yes)	1.00(0.000)	1.000(0.000)	*	1.000(0.000)	1.0000(0.000)	
Average sales (Birr/year)	46,537(9767)	18,661(2683)	***	97,916(19611)	188,86(2685)	***
Average working Hours(hr/week)	73.85(1.93)	77.783(1.983)	*	79.22(1.563)	75.34(1.917)	*
Number of customers(number)	34.9(5.874)	20.78(4.121)	**	109.433(7.466)	32.093(3.964)	***
Total employment (number)	2.046(0.316)	0.886(0.163)	***	5.64 (0.301)	1.513(0.144)	***
N	150	150		150	150	

Source: Panel data World Bank, 2019

Table 3 presents the summary statistics of variables by survey period. Many of the variables are used in the regression analysis. On average, the literacy status of the sampled women entrepreneur depicted in the first cycle with six years of schooling. As far as the employment creation of the project is concerned, there is a significant increase in post-intervention (2019, five employees) than pre-implementation (2014, three employees) employed by a woman entrepreneur. This may indicate that project beneficiaries have increased or diversified their business activities and create a crowding in effect for the jobless society through hiring at least one employee. Improving productivity of time is one key element in business performance, and Table 3 shows the effort engaged in running own business has increased from 37 hours per week in 2014 to 69 hours per week in 2019. Increasing working hours clearly show that the operators are in a wide range of producing more products and services, perhaps increasing the size of customers for their products or services. Table 3 witnessed to this hypothesis, and the size of consumers per single entrepreneur has increased from 38 in 2014 to 92 in 2019, on average.

Table 3: Descriptive summary of variables used in the analysis by survey period

Variables	Survey period		
	2014	2019	Pool
	Mean/St.err	Mean/St.err	Mean/St.err
Age (year)	33.029(0.661)	37.9(0.667)	35.504(0.492)
Education (year)	6.210(0.283)	6.116(0.287)	6.163(0.201)
Family size(number)	5.406(0.192)	6.645(0.211)	6.025(0.147)
Total employment(number)	3.188(0.339)	5.138(0.372)	4.163(0.258)
Average working hr/week	37.609(15.67)	69.26(11.969)	53.43(13.145)
Number of customers	38.268(7.359)	92.058(9.049)	65.163(6.043)
Advertisement(1=yes)	0.630(0.041)	0.800(0.000)	0.815(0.023)
House own(1=yes)	0.370(0.041)	0.203(0.034)	0.286(0.027)
Average profit (Birr/year)	75,94(7.102)	13,284(1603)	104,39(9242)
Average sales (Birr/year)	41,579(03.274)	76,46(1611)	59,02(0.590)
N	300	300	600

Source: World Bank, panel data 2019.

### 3.5 Empirical specification

To assess the success of the project (WEDP) in Mekelle City, we used the widely accepted and robust method of impact analysis. The aim of the project is to evaluate the economic and social magnification power of project beneficiaries compared to non-beneficiaries. The intervention modalities are mainly through financial services. However, financial service (loans) is necessarily accompanied by ongoing support services, including training in marketing, finances, and time management to bolster success and address work-life balance concerns.

The treatment for this study is the intervention endorsed by WEDP in terms of access to loans and training. This is also represented by whether the targeted women's business has improved since the intervention of the project. The baseline survey was carried out in 2014 and the second-round survey in 2019; there is five-year difference in between the survey periods. We believe that five years difference is quite enough for some women entrepreneurs to evaluate their business performance in terms of improving profit margin, time utilization (efficiency in their time use), and employment creation among other things, and is expected to change their business status in comparison to non-WEDP beneficiaries.

Therefore, the implementation of the project can be taken as a leverage in the empowerment of the project's loanable and capacitive on women entrepreneurs. The intuition is that the intervention is a social protection placement and targeted women are eligible to access loans, training, and assess the corresponding socioeconomic impacts *visa-vis* to the non-beneficiary of the project. The argument behind this is that the implementation of the project appears to have a gradual positive effect on women's empowerment (one which was boosting entrepreneurship capacity through training and access to loan). Thus, the execution of the project may help in empowering the entrepreneurship skills of WEDP loanable women. We need to verify if this is actually holding true based on regression estimation. In Equation (1) below, we specify women empowerment as a function of whether they have been supported financially as well as capacity building by the project and other control variables that might influence the outcome variable. Our argument here is that if women's entrepreneurial capacity is improved, there will be a possibility for it to affect sales, profit, working hours, and employment creation in contrast to non-WEDP loan women entrepreneurs.

Using the balanced panel data of the 2014 and 2019 surveys and we try to see the impact of access to WEDP loan and training on women's entrepreneurship empowerment. The model for the balanced data based on difference-in-difference analysis is given in equation (1) below. Difference-in-differences (DiD) is a statistical technique used to estimate the causal effect of an intervention by comparing changes in an outcome variable between a treatment group and a control group, both before and after the intervention. It is a simple quasi-experimental design using an observed outcome variable for one group before and after it is exposed to a treatment. The difference in difference impact method of analysis attempts to correct for confounding bias by balancing on variables that are different in the treatment and control group. The merit of the difference-in-difference (DID) method of analysis is its wide applicability in analyzing the impact of programs, policies changes, and its simplicity to address the unobservable heterogeneity problem in the observational data setting through the de-meaning process, just like the fixed effect estimation. The DID model is expressed as follows:

$$W_{it} = \beta_0 + \beta_1 C + \delta_1 T + \delta_2 T \times C + \theta_i X_{it} + U_{it} \quad (1)$$

Where  $W$  is the outcome variable with continuous values of profit, sales, working hours, and employment size during the survey years. Profit and sales values are expressed in terms of log form, while working hours and employment are expressed in terms of level form.  $\beta_1$  is the coefficient that captures the estimated mean difference in the outcome variables between the treated women (women entrepreneurs with access to WEDP loan and training) and the control group (women entrepreneurs non access to WEDP) loan and training service and it is the baseline difference between the two groups.  $\delta_1$  is the coefficient of the year dummy which takes the value of one for the year after the intervention (2019) and zero otherwise.  $\delta_2$  is the DID estimator which shows whether the expected mean change in the women empowerment variables from before and

after the Implementation of the project was different between treated and control group women. The assumption of parallel trend in the DID model depicts that the treatment group, in the absence of the WEDP loan and training service, would have followed the same time trend as the control group (for the outcome variable of interest). Observable and unobservable factors may cause the level of the outcome variable to differ between treatment and control, but this difference (in the absence of the WEDP loan and training in the treatment group) is expected to be constant over time. Moreover, DID is generally more plausible if the treatment and control groups are similar in level before the project's implementation. Based on the hypothesis, we expect that  $\delta_2$  will be positive and statistically significant.  $\vartheta_i$  is a vector of coefficients on the other control variables included in the DID model, and  $U$  is an error term with zero mean and constant variance;  $i$  and  $t$  are individual and time identifiers, respectively. The time variable here (T) is technically nominated as a state-level control variable and uncorrelated with other control variables,  $cov(T, X_{it}) = 0$ .

#### 4 Results and discussion

In this section, we examine how WEDP influences the empowerment of women's entrepreneurship in Mekelle city. When we look at the status of women's empowerment, we have four separate differences in different models as depicted in Table 4 below. Model 1 refers to the yearly average profit outcome variable in log form (*Birr*). Model-2 depicts monthly average sales in log form (*Birr*). Intervention in the form of capacity building improves the working efficiency of the project beneficiary. This is typified by increased working hours per week, and results are depicted by Model- 3. Finally, model 4 is noted for the employment creation potential among the project beneficiaries. The treatment variable of interest in this case is access to the WEDP loan and training service (yes=1; otherwise, zero). Since the outcome variables in the two models of Table 4 are continuous (Model 1 and Model 2), the change in the treatment variable from 0 to 1, expected to have a percentage change in the outcome variables, while a unit change for Model 3 and Model 4, respectively, .

Table 4: Impact of WEDP intervention on women's empowerment

Variables	Model_1		Model_2		Model_3		Model_4	
	Coef.	Std.E	Coef.	Std.E	Coef.	Std.E	Coef.	Std.E
Treatment group difference (after-before)	0.579***	0.215	0.409*	0.211	-2.665	2.856	0.993***	0.367
Year*treated	0.626**	0.301	0.837***	0.296	19.094***	4.001	2.594***	0.514
Business Experience(years)	0.039**	0.018	0.006	0.017	0.231	0.239	0.073**	0.030
Age(years)	0.018*	0.010	-0.000	0.010	-0.445***	0.142	-0.016	0.018
Education Level(year)	0.095***	0.025	0.056**	0.024	-0.100	0.335	0.129***	0.043
Family Size(number)	0.032	0.032	0.049	0.032	-1.595***	0.434	0.088	0.055
Business Plan(1=yes)	0.197	0.181	0.474***	0.178	1.615	2.413	0.965***	0.310
Non WEDP Loan(1=yes)	-0.071	0.177	0.328*	0.175	3.260	2.362	-0.261	0.303
Year dummy=2019	0.076	0.218	-0.035	0.214	2.924	2.899	0.247	0.372
_cons	7.329	0.493	7.926	0.485	98.865	6.551	-0.085	0.842
Prob > F	0.0000		0.0000		0.0000		0.0000	
R-squared	0.1637		0.1578		0.1197		0.3151	
N	600		600		600		600	

Note: \*, \*\* %\*\*\*, 10%. 5% & 1 % level of significance. Source: World Bank Panel, 2019

Assessing the impact of WEDP on the average yearly profits of women entrepreneurs in Mekelle city, the analysis provides clear evidence of a positive effect (Model 1). It is found that women with access to the WEDP loan and training service lead to a substantial increase in average profit compared to those who did not benefit from the project, while other factors remain constant. The marginal effect shows that women entrepreneurs that loan and training beneficiary from the project (the interaction of the treatment dummy variable with year dummy) lead to an increase in the monthly average profit margin by 62.5 % higher than



their counterparts at the 5% level of significance. This depicts the extent to the project creates a conducive business environment for the marginalized women and vehemently improves their livelihoods evidently.

Our result looks similar to a study conducted by Aregawi and Patnaik (2023) in Ethiopia that the effect of government intervention in the form of business development services (access to credit and saving) on the innovation performance proxy by business diversification of small and micro enterprises where women owned business takes the greater share. They found a positive and significant result despite the application of cross-sectional data that lacks to fix the endogeneity issues associated with the selection bias of the government intervention across the small and micro enterprises. Using national representative cross-sectional data, Manex and Woldehanna (2018) assessed the importance of government packages, financial assistance, and training among others on the business performance of small and micro, and medium-sized Ethiopian enterprises. In contrast to our study, they found that support beneficiaries are not at an advantage in investment intensity, and are deterred from improving business activities and lowering their profit margin.

Table 4 addresses the correlation between the project placement and the momentum of goods and services transactions exercised by the project beneficiaries. As we discuss in Table 1, women entrepreneurs have participated in various economic sectors such as manufacturing, construction, agro processing, and alkies, and engaged in the selling of products or services to end users. On average, WEDP loan and training service beneficiaries have performed at a higher level of sales value compared to the control group. *Ceteris paribus*, women entrepreneurs advantageous from the WEDP loan and training service would have increased their annual sales value by about 83.7 % compared to the non-project women entrepreneurs at the 1 % level of significance (Model 2). The result indicates that effective implementation of the project certainly increases the business transactions of beneficiaries' groups and ultimately improves their income. Our result is consistent to the studies in developing countries like India, Tanzania, and Nigeria that access to micro finance (loan service) has enhanced women's economic empowerment proxied by increased control over household resources (Van et al, 2012; Laha, and Kuri.2014; Abiola, 2011). Bismark (2017) using cross-sectional data from six regions of Ghana to assess the effect of 'women's finance' project on Ghanaian women's empowerment, and results depict a positive and significant effect compared to the non-women's finance project.

Literally, empowerment of women entrepreneurs mean improving the core competency or working skills of women. Especially if the loan provision is accompanied by massive mobilization and awareness creation of the beneficiaries, women will invest more of their time for value-added and diversified business activities. Accordingly, the WEDP intervention significantly increased the average weekly working hours of women entrepreneurs by 19 hours compared to non-beneficiaries, keeping the effect of other variables (Model 3). The low p-value of 0.000 scores the statistical significance of this effect, providing strong evidence of the WEDP's impact on weekly working hours for their business. While longer hours may lead to increased income and business growth, they could also disrupt work-life balance, but we fail to see the correlation due to lack of data and suggest to do in future work. The implication of deploying more working hours is typified by the diversification of economic activities. Using the difference in difference method of analysis, Lamichhane (2020) assessed the business diversification of Nepali women after taking a loan service. The study revealed that before taking the loan, 42. 85% of Nepali women were engaged in agricultural activities. However, in post-borrowing, 20% of the women members were engaged in non-agricultural activities. This proves that the rural women, also, if encouraged, can inspire their entrepreneurial skills and change their activities from traditional to non-traditional activities.

Model 4 of Table 4 presents the correlation between the extent of employment creation by project benefited women entrepreneurs. The WEDP has a substantial impact on the average number of employees in women-owned businesses in the study area. Entrepreneurs who received WEDP loans employed an average of 2.6 more citizens compared to non-beneficiaries, *ceteris paribus*. This indicates that participation in the WEDP leads to significant job creation within women-owned businesses.

The study reveals several factors affecting average profit, employee count, sales value, and working hours per week. This suggests that the treatment positively impacts average profit, especially for individuals with more experience and better years of schooling. The strong and positive correlation between education and profit

stands out as better awareness about their business would have a better status in the various activities and exhibit a higher level of profit margin compared to women with limited business awareness.

#### 4.1 Parallel trends assumption.

Literally, the parallel trend assumption in DiD analysis states that, in the absence of the treatment, the trends in the outcome variables would have been similar (or parallel) for both the treatment and control groups. In other words, the groups would have followed the same trajectory had the treatment not been implemented. The common method of testing the parallel trend assumption is using a Placebo test. It is a simulation of a treatment effect in a period before the actual treatment implementation (2014). To test the Placebo assumption, we followed three steps. Firstly, we specify a model using the outcome variable data from the pre-treatment period. In this case, the year 2014 is considered, and the outcome variables presented in Table 4 are derived from this survey period. In a similar way, the lagged outcome in the dependent variable in the DiD model. Second, we run the DiD model as usual (see equation 1). Third, inspect the significance of the treatment variable. If the estimated treatment effect is significant, it suggests a violation of the parallel trend assumption. The result of the parallel trend assumption is presented in Table 5 below. A significant effect with the lagged outcome indicates that the groups were not trending similarly before the treatment, thus violating the parallel trend assumption, except in Model 3.

Table 5: Parallel trend assumption test

	Model 1	Model2	Model 3	Model 4
Treated	0.614**(0.253)	0.49**5(0.237)	2.03 (0.93)	0.775**(0.369)
Age(year)	0.0241(0.018)	-0.005(0.017)	-0.400 (2.53)	-0.008(0.027)
Education(year)	0.071 (0.043)	0.049(0.041)	-0.372 (0.98)	0.077(0.064)
Family size	0.014 (0.060)	0.044(0.056)	-0.750 (1.44)	0.081(0.087)
Business plan	0.431(0.293)	0.616**(0.274)	1.182 (0.47)	1.302*** (0.427)
Birth place(urban=1)	0.103(0.165)	-0.001(0.155)	3.902** (2.72)	0.054(0.241)
_cons	7.329*** (1.311)	8.338*** (1.226)	63.05 *** (5.55)	-0.225(1.909)
Number of obs	300	300	300	300
F(6, 293)	2.73	2.73	3.36	4.62
Prob > F	0	0	0	0
R-squared	0.0864	0.0639	0.0644	0.0529

Note: \*, \*\* %\*\*\*, 10%. 5% & 1 % level of significance. Source: World Bank Panel, 2021

## 5 Conclusions and recommendations

This study examined the impact of the Women's Entrepreneurship Development Project (WEDP) on women-owned micro businesses in Mekelle, Ethiopia. Using balanced panel data on profits, sales, and employment, the study found strong evidence that WEDP helped these businesses grow over time. These findings can inform future efforts to empower women entrepreneurs if orchestrated and systematically designed projects are implemented.

The study emphatically highlights WEDP as a game-changer for empowering marginalized and deprived women in Mekelle City. Beneficiaries led to significant improvements across the board, from profits, sales, working hours, and employee's number. WEDP significantly boosts women-owned micro businesses in Mekelle City, with a notable 62.6% rise in average annual profits and an 83.7% surge in sales. Moreover, a project that supported women entrepreneurs hired an average of 2.6 more employees, indicating broader economic benefits to themselves and to others. Though concerns about work-life balance arise, with project-supported women working more hours (19.1 hours) per week, on average, compared to non-project-supported women. Further research is needed to ensure sustainable practices promoting both economic growth and well-being (work-life balance). Overall, WEDP emerges as a compelling force for empowering women entrepreneurs and fostering economic development in Mekelle city and beyond.



Given the impressive outcomes, several recommendations emerge for the future of WEDP and similar projects: The success of WEDP in Mekelle city calls for its expansion to reach more marginalized and deprived women, magnifying its economic and empowering effects. However, financial aid should be accompanied by ongoing support services, including training in marketing, financial management, and time management to boost success and address work-life balance concerns.

First, flexible loan repayment options, time management training are vital to mitigate default risks. Long-term research is essential to understand the program's enduring effects, while tailored project offerings are crucial to meet the diverse needs of women entrepreneurs across sectors.

Second, continued policy advocacy is necessary to create a supportive environment for women's entrepreneurship in the region, especially in post-war period via addressing issues like limited market access, legal complexities, and gender discrimination. WEDP and similar programs can maximize their impact, ensuring lasting success for beneficiaries and a thriving local economy. To solidify WEDP's impact and guide future optimization, research efforts can be directed towards:

Third, conducting qualitative studies to explore the specific factors behind the observed improvements in profits, sales, and job creation within WEDP. Long-term investigations are needed to assess the program's lasting impacts on income sustainability, business growth trajectories, and potential challenges faced over time.

Fourth, research on the broader societal impacts can explore how WEDP influences gender dynamics within families and communities. Additionally, evaluating the financial sustainability of WEDP and similar projects is crucial for their long-term viability and impact. These research efforts aim to deepen our understanding of WEDP's impact, optimize its effectiveness, and contribute to sustainable projects for women's empowerment and economic development, particularly in Ethiopia.

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