

# Impact of demonetization on skill development and income generation: a case study of the industrial cluster of Faridabad, India

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**Abstract.** *Objective:* Demonetization was one of the macroeconomic shocks that occurred in India on 8<sup>th</sup> November 2016, leading to an impact on liquidity for informal laborers. The income of informal laborers declined, which increased poverty and inequality among the informal workers. Therefore, the study aims to comprehend how demonetization affected the informal labor segment of the Faridabad district of Haryana. Furthermore, skill development in this setting is crucial in addressing poverty because it increases laborer's "employability", "productivity", and promotes "equitable growth." Thus, another objective of the study is to understand how the laborer's productivity and employability are related to the enhancement of the skill of informal workers, which can thereafter address the SDGs 1 (Zero Poverty), 5 (Gender Equality), 8 (Economic Growth & Decent Work), 10 (Zero Inequality). *Method:* Regression analysis has been used to assess the causal relationship between the money supply, income creation, and gross domestic savings based on secondary data. This was supported by primary data collected through surveys from informal laborers in a particular Faridabad industrial cluster. Further, the descriptive research (ANOVA) and econometric model will show how skill development among informal workers promotes employability and productivity, and primary data will show how gender, education, and skill affect productivity, respectively. This may further reduce the poverty levels complemented by a national, state-level policy analysis. *Results:* The study revealed a decrease in average income (from INR 10,340 to INR 7,075) and savings (from INR 1,330 to INR -2,092) of informal workers after demonetization. The study also shows that male salaries improve when they receive formal skill development training, that is, by INR 1096.944 (INR 11429) from INR 10332. On the other hand, the average income of female informal workers who have informal training and no primary education comes to be at INR 10332.79. *Originality:* The research is an original mixed-method approach to determine the intuitive and positive links between changes in the Gross Domestic Product (GDP), Money Supply (M3), and household Gross Domestic Savings. It is further supported by primary data that show how demonetization affected informal workers' savings and the effect of skill on their earnings (a proxy variable for labor productivity).

**Keywords:** demonetization, informal sector, savings, skill, formal training

**JEL classification:** C01, J21, J46

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## 1. Introduction

In developed and developing economies, most of the labor force is engaged in the informal sector (IMF, 2021). The majority of the two billion individuals employed in the informal economy are in low and middle-income nations (ILO, 2020). Many of them are underprivileged, and the majority lack employment, health, and social protections, making them exposed and defenseless (ILO, 2020). Further, it is estimated that 1000 million young people will get into the global labor market, with about nine in ten of the new work opportunities in developing countries being restricted to the informal economy (ILO, 2020). The structuralist views supported by the ILO and the IMF consider the informal sector as a source of generating employment opportunities (Debrah, 2007). In India, the informal sector contributes approximately 50-60 percent of the GDP (Pilz & Regel, 2021). India has a sizable informal sector, and accordingly, it employs more than 90 percent of the total workforce (Pilz & Regel, 2021). Workers engaged in small enterprises, casual laborers, unpaid family members, migrant laborers, domestic workers, street sellers, etc., make up India's informal sector. As per ILO (1998), small enterprises with hired employees, home-based enterprises with mostly family labor, and self-employed workers come under the informal units. The rise in casualization is a cause for serious concern since these employees lack access to guaranteed social protection, job stability, and other advantages enjoyed by those employed in the formal sector. Thus, it has an impact on their level of productivity as well as their contribution to economic growth (Harris, 2023). A task force was set up by the "National Commission for Enterprises in the Unorganised Sector (NCEUS)" in 2005 to promote skill formation in the informal sector. The report of NCEUS (2007) has stressed increasing productivity and developing potential for informal workers as there is a need to remove the disparity between the workforce needs and the availability of skilled manpower. The majority of the two billion individuals employed in the informal economy are in low and middle-income nations (ILO, 2020). Many of them are underprivileged, and the majority lack employment, health, and social protections, making them exposed and defenseless (ILO, 2020). Further, it is estimated that 1000 million young people will get into the global labor market, with about nine in ten of the new work opportunities in developing countries being restricted to the informal economy (ILO, 2020). The structuralist views supported by the ILO and the IMF consider the informal sector as a source of generating employment opportunities (Debrah, 2007). In India, the informal sector contributes approximately 50-60 percent of the GDP (Pilz & Regel, 2021). India has a sizable informal sector, and accordingly, it employs more than 90 percent of the total workforce (Pilz & Regel, 2021). Workers engaged in small enterprises, casual laborers, unpaid family members, migrant laborers, domestic workers, street sellers, etc., make up India's informal sector. As per ILO (1998), small enterprises with hired employees, home-based enterprises with mostly family labor, and self-employed workers come under the informal units. The rise in casualization is a cause for serious concern since these employees lack access to guaranteed social protection, job stability, and other advantages enjoyed by those employed in the formal sector. Thus, it has an impact on their level of productivity as well as their contribution to economic growth (Harris, 2023). A task force was set up by the "National Commission for Enterprises in the Unorganised Sector (NCEUS)" in 2005 to promote skill formation in the informal sector. The report of NCEUS (2007) has stressed increasing productivity and developing potential for informal workers as there is a need to remove the disparity between the workforce needs and the availability of skilled manpower.

A low level of skill is one of the characteristics that have always been carried in defining informality. Therefore, skill development becomes necessary for increasing efficiency among informal workers. It also acts as an important criterion to remove poverty, inequality, and unemployment (Iyer & Rao, 2022; Magidi & Mahiya, 2021). Moreover, skill development is an important factor in addressing poverty because it increases "employability," "productivity", and supports "inclusive growth" (Sanghi & Srija, 2015). Along with this, it aims to promote consistent, all-encompassing, and sustainable economic growth, full and productive employment, and dignified employment for everybody (Rai et al., 2019). The United Nations' Sustainable Development Goal (SDG) 4 highlights the importance of skills for improving opportunities for work, respectable employment, and entrepreneurship, particularly for vulnerable citizens (Magidi & Mahiya, 2021). Before moving further, it is imperative to understand what skill is in general terms. A skill is the fundamental capacity to adapt

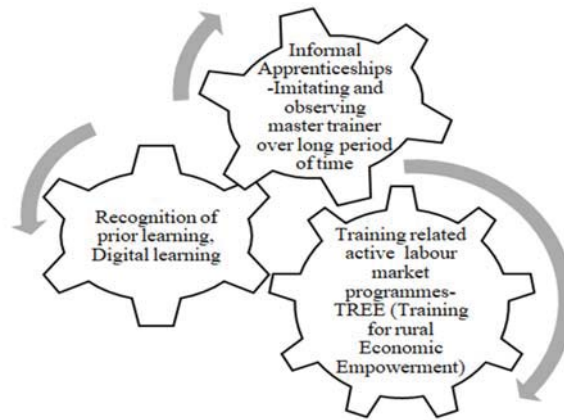
to a certain environment or circumstance in life (Magidi & Mahiya, 2021). It also refers to competence, ability, or excellent performance in a particular activity and fills the gap between knowledge and performance (Magidi & Mahiya, 2021). While skill development involves acquiring the abilities, knowledge, and attitudes necessary to perform a trade or occupation in the labor market, it can also occur through informal, traditional apprenticeships, semi-structured non-formal training, or formal public or private schools, institutions, or centres (Pilz, Uma, & Venkatram, 2015). In India, various skill development courses have been developed to tackle poverty and to give skilled workers to secondary and tertiary sectors (Carswell & de Neve, 2023). Against this backdrop, the implementation of demonetization in India (2016) was one of the macroeconomic shocks that adversely impacted the economy in terms of loss in consumption, income, and employment (Chodorow-Reich et al., 2020). Due to the sudden cash crunch, the workers engaged in the informal sector were affected because they are highly cash-dependent, and most transactions happen in cash. According to the Economic Survey (2017-18), around 90 percent of the labor force is employed in the informal sector, and if they get impacted by cash crunch, then they will not remain on the safer side. Due to the cash crunch, the informal workers were removed from their employment. Therefore, such policy implementation has indirectly affected their skill due to the non-availability of either apprenticeship or formal training. In this milieu, there is a lack of pieces of evidence of the impact of demonetization on their skill development. Therefore, the study intends to understand, by taking primary data, how the productivity of informal workers is related to skill development, gender, and their educational level. The study further investigates how the sudden extraction of money from the economy (demonetization) has impacted their savings. For this study, an industrial cluster located in NHPC Chowk, Faridabad, was taken. The industrial cluster comprises various industries in which the majority of informal workers are employed. The workers engaged in these industries are casually employed and are highly dependent on cash. These workers were on the frontline, bearing the brunt of monetary policy change because of high cash dependency. There are many literature-based pieces of evidence that revealed loss of employment and sudden lay-off of informal workers due to demonetization. Lack of employment security and absence of apprenticeship or quality training make them incapable of bargaining for high wages. Therefore, the study intends to understand the impact of demonetization on their savings, skill development, and income generation and to find empirically whether gender, skill, and education have any significant impact on the productivity of workers. The next section deals with the literature review.

## 2. Literature Review

There is a corpus of literature that focuses on skill development, skill gaps, and formal-informal training for the informal sector. Skill development is an important aspect that promotes not only competencies in the labor market but also increases the efficiency and economic growth of a nation (Sodhi, 2014). The vulnerable section of society is often caught in the continuous circle of low skills and low productive employment due to a lack of access to education and training (Sodhi, 2014). In 1990, an empirical study was conducted to determine the required competencies, capital, and technical skills that could be successfully implemented in the informal sector. The countries engaged in this project were India, Nigeria, Rwanda, Nicaragua, Peru, and the Philippines (Singh, 2000). Many other developed economies have already taken steps to enhance skills, such as the United Kingdom (UK), which stresses imparting technical education via general education. It is not true that the Indian government is not making efforts to improve skills. “Industrial Training Institutes (ITIs)”, “Industrial Training Centres (ITCs)”, and “Craftsmen Training” schemes were established by the government in 1950 to provide vocational education. By 2022, it is predicted that India will have a shortage of skilled workers of approximately 250 million across the country's 21 core industries. Skill gaps in the industry are recognized as a lack of competent (qualified) trained persons from the perspective of the employer (Sodhi, 2014). Therefore, skill development can increase productivity and open up new job prospects for employees. Informal workers have a very varied range of occupations and educational paths. However, accessing and taking part in opportunities for skills and lifelong learning can be difficult for those employed in the informal sector. The barriers to learning opportunities, particularly for females and those living in rural areas, include lower levels of foundational skills compared to formal educational entry requirements, the expense of training, and opportunity costs, such as lost income,

location, and gender-specific factors (ILO, 2020). In addition, the report of ILO (2020) disclosed how workers could be gainfully engaged in skill development and, thus, may reduce the skill gap; this is shown in Figure 1.

**Figure 1. Ways to Skill Development**



Source: ILO (2020)

To address the skill gap, there are various programs or schemes launched by the Indian government to invigorate skills in informal or unorganized sectors (Sanghi & Sensarma, 2014):

1. “Modular Employable Skills (MES)” was implemented to provide employability through imparting vocational training.
2. “Hunar Se Rozgar Scheme”, launched by the Government of India (Ministry of Tourism), aims to fill the skills gap in the hospitality industry with an emphasis on young people from economically disadvantaged groups.
3. “Entrepreneurial Skill Development Programme (ESDP)” was started by the “Ministry of Micro, Small and Medium Enterprises” to ignite entrepreneurial culture.
4. “National Rural Livelihood Mission (NRLM)” is to give efficient and valuable training and capacity building for managing the livelihood of rural BPL youth.
5. “Support to Training and Employment Programme for Women (STEP)” executed by the “Ministry of Women & Child Developments” to focus on disadvantaged urban and rural women who lack assets. This comprises migrant workers, everyday employees who are not paid, households led by women, and wage laborers.
6. “Roshni” as part of the “NRLM/Aajeevika Skill Development Programme” for tribal communities and severely impacted districts by Left Wing Extremism, which involves training for 3, 6, 9, or 12 months.
7. “Seekho Aur Kamao” scheme of the “Ministry of Minority Affairs” for promoting the skills of the minority youth in various modern and traditional vocations.

The Indian government has been implementing several policies and initiatives to support skill development since the early 2000s, focusing on the rural youth who are less educated and economically disadvantaged in the nation. The “National Skill Development Policy” (NSDP) was launched in 2009. Similarly, in 2015, the “National Policy on Skill Development and Entrepreneurship” (NPSDE) was launched. Efforts for skill development have been launched in a variety of industries, including textiles, manufacturing, services, and agriculture. The ultimate goal was to improve livelihoods and pull people out of poverty while simultaneously providing industry and services with a trained workforce to spur national economic growth and productivity. From the perspective of the meaning of skill, it has been seen that there is no single definition of skill, and it has been shaped accordingly by different renowned organizations like the European Commission, ILO, OECD, etc. (Table 1).

**Table 1. The concept of skill by different organizations**

ILO	<ol style="list-style-type: none"> <li>1. Basic skills or Foundation skills include literacy and numeracy.</li> <li>2. Professional skills like honesty, integrity, work ethic, etc.</li> <li>3. Core work skills/ Transferable skills include learning to learn, oral communication, writing skills, solution of problems, and group working skills.</li> <li>4. Technical and Vocational.</li> </ol>
OECD	<ol style="list-style-type: none"> <li>1. Fundamental skills, namely reading and writing, counting, resolving problems, and computer learning.</li> <li>2. Social &amp; emotional skills (persistence, self-respect, and hospitality).</li> <li>3. Professional skills.</li> </ol>
World Bank	<ol style="list-style-type: none"> <li>1. Intellectual skills (analysis and communication)</li> <li>2. Etiquette, like discipline and Technical skills</li> </ol>
USAID	<ol style="list-style-type: none"> <li>1. Soft skills.</li> <li>2. Academic skills and technical skills.</li> </ol>
UNESCO	<ol style="list-style-type: none"> <li>1. Foundation skills</li> <li>2. Transferable skills</li> <li>3. Technical &amp; occupational skills</li> </ol>
Solutions for Youth Employment	<ol style="list-style-type: none"> <li>1. Intellectual skills.</li> <li>2. Technical skills.</li> </ol>
European Commission	<ol style="list-style-type: none"> <li><b>1.</b> Fundamental skills like reading and writing, counting, learning foreign languages, science, &amp; computer skills.</li> <li><b>2.</b> Skills that include entrepreneurial skills, the capability to learn, think critically, problem-solving, and work in a group.</li> <li><b>3.</b> Vocational skills</li> </ol>

Source: Palmer (2017)

Broadly, the concept of skill could be categorized into Technical & Vocational Skills, Foundational Skills, and Transferable Skills (Palmer, 2017). World Employment Report (1998) defined skill as a multidimensional concept since most occupations require a variety of qualities to execute effectively, from physical abilities to mental and social (interpersonal) abilities. Therefore, skills refer to an “acquired” and “practiced ability” or to a “qualification” required to successfully complete a task or employment (NCEUS, 2009). Skill development happens in a variety of institutional contexts and occurs at various phases of the life cycle for various goals. Learning occurs in a variety of contexts, including public and private schools as well as the extracurricular realms of home, community, and business. Learning to do a variety of jobs with varying levels of expertise is how skills are gained. Further, three distinct categories of skills have been identified which are cognitive skills, non-cognitive skills, and technical skills (Adams, Johansson, & Razmara, 2013). Skill development, training, and vocational education have been pressurized since 2000 in Asia, Africa, and North America. As a result, productivity, employment, and wages have shown positive responses with the upgradation of skills (Brown, 2022). At the International forum, skill development signifies easy access to education and preparing the workforce to adapt themselves in response to economic, social, and ecological changes. In India, the last 20 years saw expansion in policy formation and investment towards skills development. Various skills training programs were started to combat poverty in rural areas, enhance human resources, and supply industry and services with a competent workforce (Carswell & de Neve, 2023).

### **Productivity & Employability**

Productivity shows an input-output relationship while employability indicates the ability to initiate, maintain, and get new employment opportunities at any time (Brown, Hesketh & Williams, 2003). Productivity could be a proxy for improved wages, better working conditions, higher profits and dividends for shareholders, environmental protection, and increased tax revenue for governments (Sanghi & Srija, 2015). The rise in productivity can be attributed to several factors that involve advanced and updated technology, modern machinery, improved management techniques, investments in plant and machinery and technology, improvements in work-related safety, an increase in the

workers' skill level, macroeconomic policies, labor market conditions, the business environment, and public expenditure in infrastructure and education (Sanghi & Srija, 2015). The inaccessibility of the skill reduces the efficiency to get new employment opportunities, thus, reducing the employability of the workers (Agrawal, 2014). Skill development of informal workers by way of enhancing their employability and productivity may lead to poverty reduction. High productivity, more employment prospects, income growth, and development are all made possible by it. The availability of trained and healthy labor, technology advancements, creative business practices, and good macroeconomic strategy may all be contributing factors to the rise in productivity. The effects of increasing productivity may be evident in the economy's real gross domestic product growth, businesses' increased profits, and workers' higher pay (Sodhi, 2014). Skill development is not merely a reason, there could be several reasons for the productivity changes. Focussing on skill development and productivity, Sanghi and Sirja (2015) talks about the relationship between productivity and skill development and stressed that the informal economy must also have skilled manpower complemented with certification and recognition. The informal sector is unstructured and the workers have low skills and are trained informally as a result, their productivity is low (Regel & Pilz, 2019). Lack of regulation, registration, social protection, and access to quality training restrict them from acquiring the necessary skills and therefore, they fail to bargain for better wages (Peter-Cookey, M. A., & Janyam, 2017). Thus, the workers engaged in the informal economy are caught in the vicious circle of low skills, low productivity, and low income (Peter-Cookey, M. A., & Janyam, 2017).

**Demonetization and the informal sector's skill development:** Demonetization was declared by the Indian government and went into force at midnight on November 8, 2016 (RBI, 2016). As a result, new INR 500 and INR 2000 banknotes were introduced in place of the withdrawn INR 500 and INR 1000 bills (Lahiri, 2016). Demonetization refers to the loss of the legal tender status of currency when the issuing authority declines the legal promise of accepting the note at its face value. It is not only about breaking promises but it must ensure the backing of currency with the exchange of all such notes into money of equal value, which tends to be acceptable in that economy (Ghosh, Chandrasekhar & Patnaik, 2017). Additionally, it is the process of reducing the amount of money in circulation and a liquidity shock for countries with a significant cash-based economy. Such an act removed 86 percent of the currency from circulation (Lahiri, 2016). However, the sudden removal of cash from the economy caused a major loss to the informal sector.

According to Chodorow-Reich et al., (2020), demonetization and the presence of downward wage rigidity<sup>1</sup> led to a fall in employment, output, and borrowing by the firms. As a result, the informal workers were removed from their employment. Therefore, indirectly such policy implementation has affected their skill due to the non-availability of either apprenticeship or formal training. The informal sector is cash-dependent and was impacted in terms of a fall in demand and production (Chodorow-Reich et al., 2020; Hosain, 2019). All firms require trained managers and workers. The report of the World Bank (2013) revealed the meaning of skills from the viewpoint of the informal and formal sectors. In the formal sector, there are no financial constraints in hiring and retaining skilled staff through on- and off-the-job training. While the informal sector requires a variety of skills, getting this type of training (referred to as "multi-skilling") and being able to pay its cost can serve as barriers to improving skills in the informal sector (Adams, Johansson & Razmara, 2013). Therefore, skill in the informal sector could be differentiated from the formal sector based on the following points:

1. High opportunity cost of training
2. Insufficient funds to finance training
3. High demand for multiple skill
4. Incapacity to recognize training requirements and formulation of training courses.
5. No awareness of the positive advantages of training.
6. A shortage of trainers capacity serving the informal sector

Thus, there is much work that examines the influence of demonetization on the informal sector and there is ample evidence of the meaning of skill and its type. However, there is a dearth of literature

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<sup>1</sup> *Downward Wage Rigidity does not lead to change in wages, especially during recession and as a result employers are forced to reduce employment rather than cut in wages (Matschke, & Nie, 2022).*

relating to demonetization, the informal sector, and skill upgradation. Further, no literature tries to understand how the level of education and skill development through informal and formal training could impact on the productivity of informal workers. The skills of workers could be upgraded either through formal training or informal training. Formal training is intentional, structured, and has prescribed outcomes that are disbursed through official institutions such as schools and colleges (Barber, 2004). While informal training is not structured, the learning rests on learning by doing with no contact with any formal training establishment or accreditation body (Barber, 2004). Lack of certification availability hinders them from using new technology and tools, and such training makes it difficult for them to get into formal sector employment (Barber, 2004). Therefore, the paper intends to understand how skill via formal and informal training and other independent factors like gender and education level is impacting on the productivity of informal workers.

### 3. Methodology and data

The study comprises an analysis of primary and secondary data. The secondary data comprises the data on money supply (M3), Gross Domestic Product (GDP) at market price, and Gross Domestic Savings (GDS). On account of demonetization, the empirical analysis will be about understanding the impact on GDS of households due to change in GDP and change in money supply (M3). The data on money supply has been taken from the official website of the Reserve Bank of India (RBI). The GDP data was taken from the Central Statistics Office (CSO) and Ministry of Statistics & Programme Implementation (MoSPI), Government of India. The data for GDS was retrieved from the official website of the World Bank. In the research study, the GDS of households is a dependent variable because the growth of the nation is significantly influenced by saving. The secondary data was gathered from the years 1999-2000 to 2020-2021 to perform regression analysis. The F test has been used to test the regression model's overall significance. The finding intends to establish whether money supply and GDP have any significant impact in determining the savings of households. Further, the null and alternative hypothesis of the study is shown below:

**H<sub>0</sub>:** There will be no significant impact of GDP and M3 on the GDS of households.

Or

**H<sub>1</sub>:** There will be a significant impact of GDP and M3 on the GDS of households.

For primary data, a survey was conducted in the industrial cluster of NHPC Chowk, Sector 37, Faridabad, Haryana. The sample size for the study is 200 informal workers. The construction workers, street vendors selling fruits and vegetables, self-employed shopkeepers, and informal workers engaged in factories of the Industrial cluster of NHPC Chowk in Faridabad, Haryana are the chosen samples for this study. The questionnaires comprise a set of questions that are designed to know how demonetization has affected their income and savings. The questions were prepared to know their income and savings before and after demonetization. Further, to understand the relationship between the skill, gender, education and productivity of informal workers, the ANOVA (Analysis of Variance) based regression model with dummy variables has been applied. For this, the dependent variable is wage per month which is a proxy of the productivity of workers. However, the independent categorical variables are gender (male, female), skill (formal and informal training), and education level (no primary education, primary education, secondary level education, and higher than secondary level education).

### 4. Research results and comments

#### 4.1. Macro analysis using three-variable regression model

An empirical study has been conducted to assess how changes in the money supply (in India, M3 is the official measure of the money supply) and the Gross Domestic Product (GDP) affect households' gross domestic savings (GDS). Domestic savings significantly contribute to a nation's economic expansion through increased investment, employment, and productivity growth (Kazmi & Bilquees, 1993). There could be other factors that may impact GDS like population growth rates, government expenditure, net import or export but for this study, only two independent variables (GDP and M3) have been taken to understand the impact of demonetization on GDS. Along with this, both developed and developing countries have a major influence of money supply on their economic activity.

For example, due to the fall of the money supply, many African countries have fundamentally been incapable of achieving growth and development (Ogunmuyiwa & Ekone, 2010). For this empirical study, GDS has been taken as the dependent variable. The null hypothesis is tested using the overall significance of the sample, assuming that  $\beta_1$  and  $\beta_2$  are simultaneously equal to zero. F-test has been used to test the overall significance of the regression model. The multivariate regression model has been formed as below to assess the impact of GDP and M3 on GDS.

$$GDS_t = 18.184 + 1.735GDP_t + 0.020M3_t + ut \quad (1)$$

After fulfilling the assumptions of regression analysis like linearity, normality of errors, homoscedasticity, multicollinearity, and autocorrelation, regression results are shown in Table 2, showing a positive and direct effect of GDP and M3 on GDS. This indicates that a 1 percent change in GDP leads to a change in GDS by 1.73 percent, and a 1 percent change in M3 leads to a change in GDS by 0.02 percent. Moreover, the test is significant at a 95 percent confidence level, indicating a significant effect of GDP and M3 on GDS. The accuracy of the predicted value is good as the value is small; hence, estimation is good. The Multiple Coefficient of Determination ( $R^2$ ) is 0.773, which means that the fitted regression line explains 77 percent of the change in the dependent variable. As the value of  $R^2$  is close to 1, it means the model is fit, taking account of the variations. Thus, empirically, it has been shown that the M3 and GDP have a direct impact on savings.

**Table 2. Regression output for demonetization**

Variables GDS (Dependent)	$\alpha$	$\beta_1$	$\beta_2$	$R^2$	Std. error of the estimate	F ( $p$ value= 0.000)
GDP		1.735			3.70	
M3	18.184		0.020	0.773		32.372

Source: Data generated from STATA

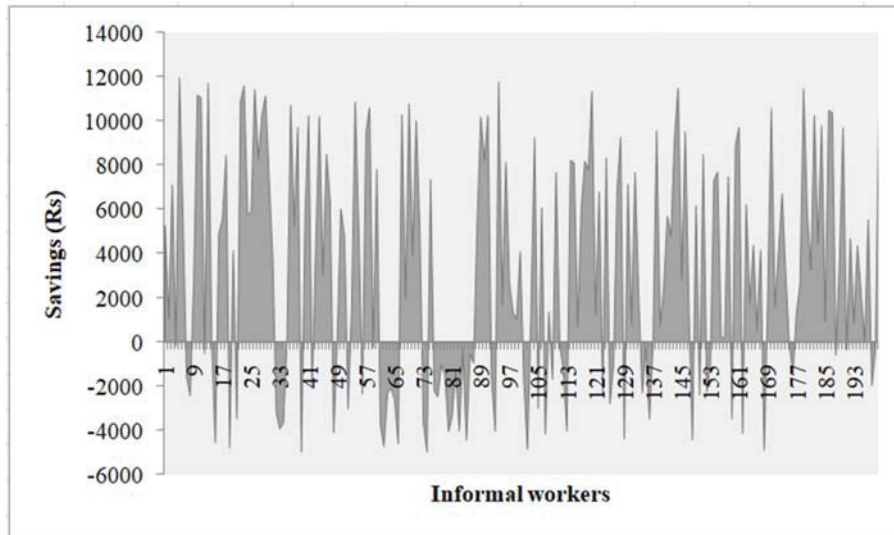
However, GDP has a larger impact on GDS than money supply, which means that sudden contraction of money may not impact savings in large parameters but is indirectly impacted due to a fall in economic activities, production, and investment. This also happens because, in a country like India, a rise in money supply does not necessarily translate to a rise in savings due to institutional and governance related bottlenecks. On the other hand, if the money supply falls, domestic savings do not fall immediately as households do have a tendency of stocking earlier savings and also keep their savings as fixed deposits in post office accounts or convert the savings to capital assets by investing in bond markets, real estate markets. Subsequently, when income will fall due to the contraction of economic activities or services, the declining impact on savings is immediate and faster. Thus, secondary data from the demonetization period support that M3 and GDP do have an immediate, direct impact on the GDS of households. Further, the results also support and generate the need for the use of survey-based data to analyze how demonetization has affected the income and savings of informal workers.

#### 4.2. Savings of informal workers

Saving is an important indicator of economic growth because saving leads to investment and investment stimulates economic growth. Although it is a matter of discussion whether saving leads to economic growth or economic growth leads to more saving, however, one thing is certain; production must not be stopped. Hence, there is a vicious circle of production, income, saving, investment, and economic growth. If any of these gets disturbed, then an economy may face a downturn. Figures 2 and 3 show informal workers' savings pre and post-demonetization for the informal workers residing in the chosen sampled area. The figures indicate that before the declaration of the demonetization policy, most informal workers (except a few who have negative savings) have positive savings. Further, the figure entails that they could save from INR 3000 to INR 12000, which is quite encouraging for their self-development.



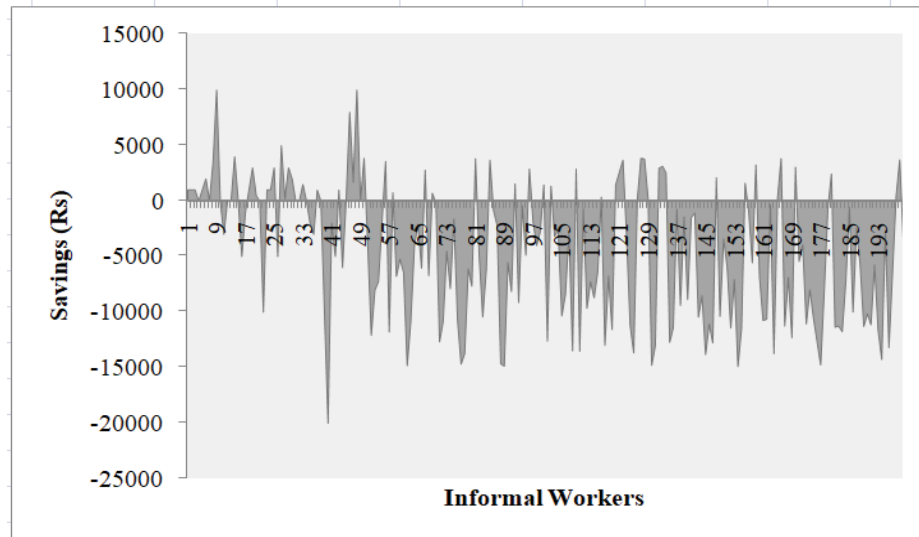
*Figure 2. Savings before demonetization*



Source: Author's Calculation

However, Figure 3 does not depict a good picture because savings are now shifted downward pointing toward negative savings. After the implementation of demonetization, many of them failed to save. Due to the sudden cutback of money, they were left with no cash in hand, which means their savings got degraded abruptly and reached up to -15,000.

*Figure 3. Savings after demonetization*



Source: Author's Calculation

Based on primary data, descriptive statistical analysis has been created which is reflected in Table 3 and it shows a fall in average income and savings of informal workers after demonetization that is income from INR 10,340 to INR 7,075 and savings from INR 1,330 to INR -2,092. Additionally, they were forced to give up 2.5 times their hard-earned savings and 1/3 of their income. The study, therefore, hints that with the induction of skill and vocational and skill development programs, the income could have been increased and savings could have gone up.

**Table 3. Statistical findings of income and savings of informal workers**

Variables	Observations	Mean	Std. Dev.	Min	Max
Income pre-demonetization		10340.82	7992.703	0	30000
Income post-demonetization	200	7075.417	5174.239	0	18000
Saving pre-demonetization		1360.408	3525.203	-5000	12000
Saving post-demonetization		-2092.083	3696.765	-15000	4000

Source: Author’s Calculation

### 4.3. Skill and Productivity

Based on primary data, this section tends to find how productivity is impacted due to gender, education, and skill of informal workers. For this, the ANOVA model, a regression model based on dummy variables, has been taken for empirical analysis. This regression model has regressors that are dummy or qualitative in nature. The dummy variables that represent the presence and absence of attributes are gender (male or female), skills development through formal or informal training and education (primary level, secondary level and higher than secondary level). The following Table 4 gives an overview of dependent independent variables and a benchmark category.

**Table 4. Variables for ANOVA regression analysis**

Dependent Variable	Independent Variables
W=Wage/Income per month (Rs)	$\beta_1$ =Informal female workers having informal training and no primary education (Benchmark category)
	$\beta_2$ DG= Gender; 1=Male 0=Female
	$\beta_3$ DS= Skill; 1= Informal worker with formal training 0=Informal worker with informal training
	$\beta_4$ DE <sub>1</sub> = Education level; 1= Informal worker with education level up to primary level 0= otherwise
	$\beta_5$ DE <sub>2</sub> = Education level; 1= Informal worker up to the secondary level of education, 0= otherwise
	$\beta_6$ DE <sub>3</sub> = Education level; 1= Informal worker with higher than secondary education level, 0= otherwise

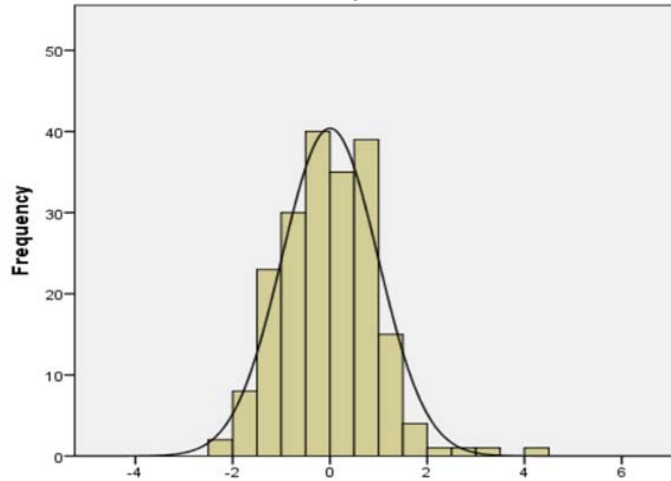
Source: Created by authors

Thus, the ANOVA regression model becomes

$$W_i = \beta_1 + \beta_2 DG + \beta_3 DS + \beta_4 DE_1 + \beta_5 DE_2 + \beta_6 DE_3 + u_i \tag{2}$$

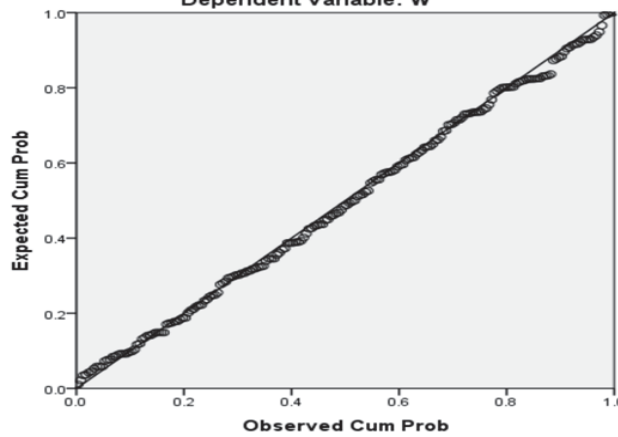
The justification for applying such a model is to compare the differences in the average values and to get the statistical significance of the relationship between dependent (quantitative) and independent (qualitative) variables. Before proceeding, various assumptions of OLS were tested to develop a dummy regression model. All the assumptions were met which entails the properties of the OLS estimator as BLUE (Best Linear Unbiased Estimator). Figure 4 reveals the normal distribution of residual errors.

**Figure 4. Normality distribution of Residuals**



Source: Data generated in SPSS

**Figure 5. Normal Probability Plot of Residuals**  
 Dependent Variable: W



Source: Data generated in SPSS

For testing the presence of heteroskedasticity, the Breusch-Pagan-Godfrey test was applied. The outcome is shown in Table 5, the square of the residual is less than the chi-square stat, at 5 degrees of freedom (df) which shows that there is homoscedasticity that means residuals have the same variance. Further, the assumption of no multicollinearity was also tested to determine whether explanatory variables are correlated to each other. The correlation matrix (Table 6) is given below. All the values in the correlation matrix are not higher than 0.8. The average VIF (variance-inflating factor) value is 1.030 and in each case, it is less than 1.048 (Table 7). Hence, there is no significant correlation between independent variables. Thus, we deal with a very weak collinearity. Table 7 shows the output of the regression model with its coefficients and its probability values.

**Table 5. Heteroscedasticity Test: Breusch-Pagan-Godfray**

Obs*R-squared	9.0306	Prob.Chi-Square (5)	11.70
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Source: Data generated in EViews

**Table 6. Pearson correlation matrix**

	DG	DS	DE 1	DE2	DE3
DG	1	.027	-.027	.078	.002
DS	.027	1	.116	.052	.125
DE1	-.027	.116	1	.004	-.131
DE2	.078	.052	.004	1	-.085
DE3	.002	.125	-.131	-.085	1

Source: Data generated in SPSS

**Table 7. Output of dummy variable regression model (ANOVA)**

Variables	Coefficient	Prob.	Std. Error	VIF (Collinearity statistics)
C	10332.79	0.0000*	602.5773	
DG	1096.944	0.0440*	631.6179	1.007
DS	2635.216	0.0000*	596.6921	1.040
DE1	2861.652	0.0000*	686.0475	1.037
DE2	201.7293	0.8227**	899.2912	1.017
DE3	454.6940	0.7386**	1360.576	1.048

\*  $p < 0.05$ ; \*\*  $p > 0.05$

Source: Data generated in EViews

Now the equation becomes;

$$W_i = 10332.79 + 1096.944DG + 2635.216DS + 2861.652DE1 + 201.7293DE2 + 454.6940DE3 + u_i \quad (3)$$

The result shows that the mean wage of females having informal training with no primary education is INR10332.79. While informal male workers receive higher wages by INR 1096, therefore, the average wage of informal male workers is INR 11430. Even the value of probability is very low; therefore, there is a significant difference in mean wage between females and males. Moving on to the impact of skill, it is apparent that those who have formal training are getting higher pay by INR 2635 with statistical significance. Therefore, the actual mean wage for informal workers with formal training is INR 12967. Further, the informal workers who have acquired education up to primary levels also have higher pay by INR 2862, with significant statistical value. However, those who have secondary and higher than the secondary level of education showed no significant difference with a benchmark value. Thus, formal training along with education (at least primary education) have shown a significant impact on the productivity of informal workers and the rise in wages.

## 5. Conclusions

The study concluded that the sudden withdrawal of the money supply from the economy, resulting in a fall in GDP, caused a major downfall for the workers engaged in the informal sector. Firms started to give reduced wages and even removed them from their job; therefore, they had to bear the loss of income and savings. This is substantiated by field survey findings where the income of informal workers reduced from INR 10,340 to INR 7,075 and the reduction in savings from INR 1,330 to INR -2,092. In these circumstances, skill up-gradation of the informal workforce is crucial not only for their growth but also for promoting economic growth. This is because the imparting of skill may increase the employability of workers where they could get new employment opportunities at any time which may be further added up by an increase in output of an economy. Further, the econometric findings support a positive relationship between the increase in skill via formal training and the increase in wages, a proxy of productivity.

The findings also reveal the prevalence of gender inequality where male workers are getting higher wages than female workers as the mean wage of male workers is INR 11430, a difference of INR 1096 from the mean wage of female workers which is INR 10332. This indicates that there is an existence of inequality in wages between male and female workers and wage equality may be increased by skill impartment. Therefore, for reducing poverty and ensuring positive working conditions for informal workers, the introduction of formal training is crucial. This will ultimately address Sustainable

Development Goal 1 (Zero Poverty), 5 (Gender Equality), 8 (Economic growth and decent work), and 10 (Zero Inequality). Therefore, it is vital to promote skill development through programs and policies like National Skill Development programs in every informal unit for technical and non-technical skills in the backdrop of the declining income and savings resulting from economic shocks like demonetization. Access to education and facilitating social security measures are crucial for reducing wage inequalities between male and female workers and therefore, it will break the vicious circle of low skills and low productive employment and this will further protect them from ensuing macroeconomic shocks.

Further, the outcome has some limitations as the findings are restricted to a survey conducted in a small industrial cluster of Faridabad which could have future scope to extend the research work to a big cluster having different types of informal workers from different areas to derive the generalized findings for the informal workforce of Indian economy. Moreover, the informal workers working in the industrial cluster may be slightly biased toward their employer because of fear of their job security on account of the pressure of job loss. Hence, the informal workers have no choice but to continue with existing employer employability conditions and no power to bargain with employers regarding their facilities and social security benefits. Hence, due to the economic slowdown and employment crises that arose due to macroeconomic shocks, there is an urgent need to work in the direction of skill development and income generation.

#### ***Authors Contribution***

*Introduction, Prasad, A., & Goswami, A.; Literature review, Prasad, A., & Goswami, A.; Methodology and data, Prasad, A., & Goswami, A.; Research results and comments, Prasad, A., & Goswami, A.; Conclusion, Prasad, A., & Goswami, A."*

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