Role of financial inclusion in poverty alleviation in Odisha

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Abstract

Objectives: This study dwells on the role of financial inclusion in poverty alleviation. The alleviation of poverty is implemented by combining direct tools and indirect tools. Traditional solutions have not been as effective and sufficient to tackle poverty. Indirect tools include improving access to credit, promoting savings to the poor.

Methods/Statistical analysis: We use district level branch banking and development indicators data for 30 districts of Odisha during the discrete period 1992 to 2011, since official poverty data for district levels are not released.

Findings: When controlled for PDDP, number of bank branches plays a significant role to reduce poverty. We find that an increase of Rs. 10,000/- in PDDP can cause a fall in poverty by 4%, an increase of 10% in Rice Yield can cause fall in poverty by 1.5%, whereas, an additional 100 number of bank branches can reduce poverty by 4.7% in the districts.

Application/Improvements: The results of this analysis could go further to achieve the millennium development goals in few years.

Novelty: We find the relative ranking of the coefficients of real sector and finance sector variables, that when controlled for other variables, e.g., Rice Yield, No. of Branches and PDDP to negatively impact poverty rates.

Keywords: inclusion; poverty alleviation; banking; NDDP; branches

1 Introduction

Among the direct and indirect tools of poverty alleviation, financial inclusion is considered an effective indirect tool to achieve reduction in poverty. It is the broadening or deepening of financial services that promotes access to quell poverty(1). Access to finance can support the self-employed groups to start their independent business, or expand their human capital to push them away from the state of poverty(2). The access of financial services could reduce the delay in making essential medical visits, and cut down routine consumption during cash crisis. Financial breadth may offer the poor population a viable avenue and streamline their consumption. This study dwells on the role of financial inclusion in poverty alleviation. The alleviation of poverty by direct tools have not been as affordable via the state's budgetary resources. Indirect tools, on the other hand, include improving access to credit, promoting savings to the poor to tackle poverty. In contrast to the outpouring of research on financial development and economic growth, empirical work on the relation of financial access and poverty
reduction has been fairly limited. In comparison, few studies have examined the nexus between financial access and poverty reduction. Besides, such studies seem to produce mixed evidences as to whether financial access actually leads to poverty reduction in developing countries. Furthermore, most previous studies that have focused on namely, Pacific, American and East-Asian countries. These studies have examined such linkages mainly on a bivariate causality analysis to demonstrate the financial inclusion to reduce poverty in studies(3,4). It has been shown to aid in the achievement of growth(5). In spite of the empirical works mentioned above, recent studies have dwelt more on the nature of the relationship and less on the relative importance of direct inclusion. This is in comparison to the effect on income such as, per capita district domestic product (PDDP). The author(6) mentions that agricultural yield can help poverty reduction since higher food yield and its availability could improve access to affordable consumption and so also higher rural income. However, the relative importance of agricultural yield, income effect of PDDP and the financial access is not explored empirically. These studies have not focused on the direct relationships with poverty in Odisha, or the relative importance of per capita income and agricultural yield w.r.t inclusion. Odisha is an agrarian province, where the small and marginal farmers comprise the largest share of over 90% of farming rights(7) in the state. It is against this background that our study attempts to investigate the dynamic linkage between financial access and poverty in Odisha in a simple tri-variate setting. It is intended to extend the framework to uncover the varying degrees of the nature of relationships in individual districts due to their differentiating characteristics of income or dependence on agriculture during the period 1992 to 2011. The causality between financial access, economic growth and poverty reduction is in the state of Odisha is tested using annual data over the period of 1992 to 2011. It incorporates all the 30 districts in Odisha. Further, post delimitation and re-organization of the state into 30 districts after the year 1999, the interrelationships could have changed.

As mentioned, previous works in the nexus(8,9), have covered banking information to show that the poor only needed the branch banking system to benefit from the financial network, or to shows that the poor needed economic growth to escape from poverty. These studies have discussed the barriers that hinder provision to financial services. Capacity barriers include the lack of ATM network, bank branches and centers that offer basic financial services. It was mentioned that the requirement of minimum balance (MAB) for maintenance of deposit accounts by households, are, on average, 12% of per capita GDP(10). We estimate for the largest Indian bank, the state bank of India(11), the gross minimum balance for all the 410 Million savings account holders are maintained at the rate of Rs.1000/- per account comes to Rs. 410 Billion(12) for India taken together. This figure of Rs. 410 Billion is approximately 0.3% of India’s GDP (2018) of Rs. 136,753 Billion at current prices.

Better access to credit by the poor enables them to invest in their human capital. Financial Inclusion can facilitate job searches by lowering the cost of job search which could happen because new employers look for non-delinquent workers, such as transactional evidence(2). The capability of a household is a result of reskilling of the individuals or households. Therefore, inclusion is growth enhancing. The authors(12) demonstrated that geographic coverage strengthened the positive impact of the depth indicator (M3/GDP) in financial on the levels of poverty reduction. The author(10) demonstrated few depth indicators of financial access that impacted poverty and had lowered the degree of inequality in their sample. Further studies(13) that use depth measures, had found that poverty reduction could be curtailed by the banking channel of conduit, as in(1). The branch outreach could reduce inequality in income during the same period since the increased richness and depth of the financial system could act against poverty. Further the authors(14) estimated and related the proportion of households with access to formal finance and compared the poverty levels to the Gini coefficient. The authors used the proportion of Micro Finance accounts and bank accounts, and calculated the average deposit amount and the GDP (per capita) for 160 countries to test the impact. Improving the financial access for small entrepreneurs could be a fruitful mechanism for reducing poverty(14). Further the authors discovered that branch banking had the impact on rise in non-agricultural output in few Indian states(15). In a recent review(16), it was shown that the impacts of banking network on the level of economic activity and found the relationship of bank accounts of female households in Nepal on assets, income and expenditures. The author analyzed the influence of owning bank accounts in Africa and the pacific, by including three countries of (Chile, Uganda, Malawi) (17). The results(17) could not find clear effects on savings or positive outcomes. Later studies detected that higher competition within the banks had enhanced the access of business firms’ access to finance in general in Spain(18,19).

The remaining sections of this paper are arranged as follows Section 2 discusses the problem of inclusion in Odisha. Section 3 discusses the methodology and data, Section 4 discusses the results and discussion, and, Section 5 concludes and summarizes.

The Problem

Although the policies Implemented by Government for Financial Inclusion have attempted to The nationwide program of “Swabhimaan” was launched to promote inclusion in February, 2011 by the Government. Of late, Jandhaan (PMJY, 2014) was a nationwide attempt by the Govt. to generate millions of no frill accounts. The Jandhaan campaign resulted in hundred (100%)
financial inclusion of all households in many smaller states and UT’s viz. (Goa, Pondicherry, Chandigarh, Himachal Pradesh and Kerala) and one could see the negative impact on average poverty for these states post 2014 (20) improved the levels of inclusion in parts of India, they have not been commendable in Odisha.

RFAS (21) indicated that 59% of the rural households do not own a basic deposit account and 70% of such rural households have no access to formal credit sources. Further, RFAS (21) shows that over 51.4% of farming households are not included in either of formal or informal sources of financial inclusion. Among all the farming households, only 27% had access to formal credit, while, only one third of them, borrowed from informal sources (21). The recent financial inclusion report (22) shows that over 51.4% of farming households are not included in either of formal or informal sources of financial inclusion. Among all the farming households, only 27% had access to formal credit, while, only one third of them, borrowed from informal sources (21). The recent financial inclusion report (22) shows that 65% of Indians are financially included and only 42% of the adults are active bank account holders. As per the NSSO data, 45.9 million farmer households (about 51.4%), out of a total of 89.3 million households do not access credit. Hence, over 73% of all farmers in the sample did not have access to any formal credit in Odisha. Historically metro cities, tier I cities and the western states in India, have fared much better than Odisha. The RFAS reported banking accounts penetration rate of 59.5% for Odisha for the period ended 2015-2016 (21). Few other studies have also highlighted the poorer inclusion among rural and other communities in Odisha (23,24).

Table 1. Key banking drivers in Odisha

| Year | No. of branches | Deposits (Rs. Lakhs) | Advances (Rs. Lakhs) | CD Ratio in % | Priority Sector Advances (Rs. Lakhs) | Agriculture Advances | MSME Advance | Education Loan (Rs. Lakhs) | Housing Loan (Rs. Lakhs) |
|------|----------------|---------------------|---------------------|---------------|-------------------------------------|----------------------|--------------|--------------------------|-------------------------|
| 2014 | 3995           | 164101.42           | 127177.12           | 77.50         | 78.18                               | 20572.19             | 19322.06     | 2294.33                  | 9802.86                 |
| 2015 | 4344           | 192865.18           | 133227.95           | 69.94         | 70.60                               | 22989.85             | 20542.00     | 2198.43                  | 10981.45                |
| 2016 | 4889           | 218748.65           | 163733.85           | 74.85         | 73386.15                            | 38463.05             | 28495.25     | 2018.66                  | 11951.49                |
| 2017 | 4918           | 253115.9            | 174539.42           | 68.96         | 84202.78                            | 40883.12             | 27982.21     | 2018.66                  | 11951.49                |
| 2018 | 5013           | 275511.08           | 192113.66           | 69.73         | 91945.78                            | 47431.77             | 35313.4      | 2018.66                  | 11951.49                |

Source: (25) SLBC Odisha 2019

Note: Branch network has grown only 2% since 2017. Education Loan disbursal has fallen since 2016.

The total no. of scheduled banks in India has also come down from 181 in June 2007 to 171 in June 2008 to 21 in 2020 (26). Since then, fewer number of banks in the state, will moderate the plans to achieve inclusion. The total number of branches in the state has grown only 4% to 5450 in 2020 than 5041 in 2017 in Odisha. In Odisha, the targeted efforts of Financial Inclusion under taken by scheduled commercial banks (SCBs) have not been exemplary. The total number of branches has increased from a total of 17,497 in June 2001 to 76,003 in June 2008 (26). The number of scheduled commercial banks (SCBs) has reduced since 2001 because the weaker commercial banks have been merged with other stronger counter parts. The regional rural banks (RRBs) in India, have also resorted to consolidation. From a total number of 196 RRBs, the total number of RRBs has come down to 88 in 2008 which further reduced to 45 in 2019 (26). This indicates that the reduction in rural bank branches during the decades of 90s, did have an effect on the accessibility issue in rural areas. In case of remote rural areas, higher transaction costs are involved to visit a distant branch. In few back ward rural districts, where the distance to closest SBI bank branch may exceed 15 Km from the house.

Table 2. District-wise branches, ATMs & variation in PDDP (Per Capita Rs.)

| District   | No. of Branches | No. of ATMS | Variation in PDDP (Rs.) (1992-2011) |
|------------|----------------|------------|----------------------------------|
|            | 2018 | 2018 | MIN | MAX | MEAN | STD |
| Angul       | 165  | 238  | 11402.00 | 49021.00 | 20823.62 | 7830.17 |
| Balangir    | 145  | 302  | 11402.00 | 49021.00 | 20407.32 | 7123.77 |
| Baleshwar   | 239  | 165  | 11402.00 | 49021.00 | 20557.40 | 7194.12 |
| Barghar     | 141  | 210  | 11402.00 | 49021.00 | 20732.15 | 7258.56 |
| Baudhi      | 43   | 180  | 11402.00 | 49021.00 | 20834.62 | 7366.25 |
| Bhabdak     | 148  | 48   | 11402.00 | 49021.00 | 20995.69 | 7463.76 |
| Cuttack     | 391  | 558  | 11402.00 | 49021.00 | 21181.77 | 7512.00 |
| Deogar     | 38   | 37   | 11402.00 | 49021.00 | 21015.98 | 7606.49 |
| Dhenkanal   | 128  | 149  | 11402.00 | 49021.00 | 21154.39 | 7741.86 |
| Gajapati    | 54   | 105  | 11402.00 | 49021.00 | 21224.18 | 7901.36 |

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Rural literacy rate is 70% in Odisha\(^{(27)}\), out of which the corresponding level of financial literacy is much less than the ordinary literates at 30% only. Unbanked Rural Centres (URC) are the rural location that does not have the office of a bank. For instance, SLBC reports\(^{(25)}\) that about six public banks in Odisha, namely, Andhra Bank, Axis Bank, Dena Bank, Odisha Gramya Bank, Punjab National Bank, Utkal Grameen Bank had jointly covered about 18,680 URCs at the end of March 2018, which is one third of the 53,845 villages in the state. In Odisha, out of a total 1474 unbanked GPs, only 1058 GPs have bank branches opened and remaining only 416 GPs are yet to have banking facilities

### Table 2 continued

| District     | Population | Households | Area (km\(^2\)) | Population density | Agricultural land (ha) |
|--------------|------------|------------|-----------------|--------------------|-----------------------|
| Ganjam       | 401        | 523        | 11402.00        | 49021.00           | 21347.41              |
| Jagatsinghpur| 155        | 201        | 11402.00        | 49021.00           | 21450.14              |
| Jajpur       | 208        | 285        | 11402.00        | 49021.00           | 21407.94              |
| Jharsuguda   | 91         | 132        | 11402.00        | 49021.00           | 21498.11              |
| Kalahandi    | 132        | 147        | 11402.00        | 40729.00           | 20230.60              |
| Kandhamal    | 68         | 61         | 11402.00        | 40729.00           | 20517.37              |
| Kendrapara   | 128        | 164        | 11402.00        | 40729.00           | 20296.02              |
| Kendujhar    | 198        | 232        | 11402.00        | 36128.00           | 20044.57              |
| Khurda       | 690        | 1156       | 11402.00        | 36128.00           | 19825.79              |
| Koraput      | 118        | 146        | 11402.00        | 36128.00           | 19044.09              |
| Malkangiri   | 44         | 39         | 11402.00        | 36128.00           | 18382.16              |
| Mayurbhanj   | 255        | 257        | 11402.00        | 36128.00           | 18372.17              |
| Navrangpur   | 60         | 57         | 11402.00        | 36128.00           | 18785.96              |
| Nayagarh     | 108        | 117        | 11402.00        | 36128.00           | 19117.86              |
| Nuapada      | 55         | 60         | 11694.00        | 36128.00           | 20150.21              |
| Puri         | 212        | 278        | 12100.00        | 36128.00           | 21411.66              |
| Rayagada     | 94         | 122        | 12100.00        | 36128.00           | 22766.93              |
| Sambalpur    | 185        | 228        | 12100.00        | 36128.00           | 23896.76              |
| Subarnapur   | 66         | 70         | 12100.00        | 36128.00           | 22216.43              |
| Sundargarh   | 255        | 348        | 24686.00        | 36128.00           | 29749.14              |

Source: Author’s calculation

2 **Methodology**

The concept of financial inclusion has been treated adequately in the literature by devising indices to encompass three or more dimensions of inclusivity. An implicit assumption that could follow with more moderately involved approaches is to measure the short term impact of changes to poverty rates in presence of short term changes to growth. The hypothesis in the proposed framework, intends to highlight the triangular nexus network of both direct and indirect tools of development. In previous decades, the links were analyzed for the linearity of the relationship), and later allowed for more complex triangular nexus between growth, inclusion and poverty\(^{(28)}\). Could the elasticities of poverty to income is dominated by agricultural yield? Could the elasticities of poverty to income is dominated by banking inclusion?

The earlier models of\(^{(16–18)}\) have attempted linear frameworks and specifications of tests using poverty rates as dependent variable. Following the framework\(^{(28,29)}\), we propose the below model;

\[
Y_{it} = \alpha_i + X_{it} + F_{it} + Z_{it} + e_{it}
\]

where, \(Y\) is the poverty rate (HCR) or poverty measures,
I, index for individual districts,
\(t\) refers to year.
\(\alpha_i\) is the fixed effect.

When the fixed effect is equal across all districts, it gives, \(\alpha_i = \alpha\). The delimitation of erstwhile 13 districts of Odisha, were increased to 30 districts in 1999. Therefore, the increase in number of districts may not reflect the fixed effects accurately (\(\alpha_i = \alpha\)).

Among the three matrices \(F, X\) and \(Z\) outlined in the model, \(X\) contains income parameters, PDDP. \(F\) includes financial access parameters, number of branches and number of ATMs in each district. \(Z\) includes the agriculture yield such as wheat yield and rice yield. All the three parameters are expected to negatively impact poverty.
Data

The branch banking data consists of all 30 districts of Odisha for the period 1992 to 2011. The unit of scale for the variables is quite different from each other. The poverty Headcount rate (HCR) is the incidence of poverty. HCR is expressed in percentages, rice yield (or wheat yield) are denoted in Tons/Hectare (ton/ha). The number of branches and the number of ATMs are the absolute numbers. The per capita income PDDP is expressed in actual Rupees (Rs.). The poverty data is available annually but discreetly for all 30 districts. We can observe that poverty has declined, but the rate of decline is not uniform for all districts. The imbalanced panel (30>7) presents few years for which the data is not available. The estimates of Head Count rate from MPCE (Rs) reported by NSS and DES for various rounds (67th, 62nd). The descriptive statistics are presented in Table 3. The variation of poverty is non-uniform across districts during the entire period, which could rise from a minimum of 14% to a maximum of 92% for some districts for recent years compared to previous years.

Table 3. Descriptive statistics of agricultural yield and PDDP for districts (1992-2011)

| District   | Wheat Yield |                |                | Rice Yield |                |                |
|-----------|-------------|----------------|----------------|------------|----------------|----------------|
|           | MIN MAX MEAN STD | MIN MAX MEAN STD |
| Balasore  | 1.15 4.26 1.84 0.71 | 0.70 2.00 1.19 0.32 |
| Bolangir  | 1.15 4.26 1.84 0.74 | 0.70 2.00 1.17 0.32 |
| Cuttack   | 1.15 4.26 1.86 0.76 | 0.70 2.00 1.18 0.34 |
| Dhenkanal | 1.15 4.26 1.85 0.80 | 0.70 2.00 1.17 0.35 |
| Ganjam    | 1.15 4.26 1.84 0.83 | 0.70 2.00 1.18 0.37 |
| Kalahandi | 1.15 1.90 1.60 0.24 | 0.70 1.38 1.09 0.26 |
| Kandhamal | 1.15 1.90 1.62 0.24 | 0.70 1.38 1.13 0.25 |
| Keonjhar  | 1.15 1.90 1.64 0.26 | 0.70 1.38 1.10 0.25 |
| Koraput   | 1.15 1.90 1.66 0.27 | 0.70 1.38 1.13 0.26 |
| Mayurbhanj| 1.15 1.90 1.66 0.29 | 0.70 1.38 1.16 0.27 |
| Puri      | 1.15 1.90 1.63 0.32 | 0.70 1.38 1.16 0.30 |
| Sambalpur | 1.15 1.90 1.67 0.35 | 0.70 1.36 1.11 0.31 |
| Sundergarh| 1.10 2.07 1.59 0.25 | 0.70 1.94 1.34 0.38 |

Source: Author’s calculation

Table 4 provides the nominal income (per capita DDP) multiplier effect of per Household MGNREGA expenses during the period 2008 to 2011. We find that Per Household MGNREGA expenditure (Rs. Crores/Household) causes a per capita PDDP impact of 0.013 with a deviation of 0.01. This translates to making MGNREGA expense of Rs.79 per household to raise PDDP by one Rupee (1/-) only for the state. We calculate that an average per household MGNREGA expenses of Rs. 79/- is needed to cause a rupee increases in per-capita nominal PDDP for all districts.

Table 4. Variation in poverty rates & per-capita development expenditure

| No. | District   | Min. POVERTY HCR (%) | Max. | Mean | Std. Dev. | Min. PDDP/MGNREGA (Per Capita DDP Rs./ Per Capita MGNREGA Rs.) | Max. | Mean | Std. Dev. |
|-----|------------|-----------------------|------|------|-----------|---------------------------------------------------------------|------|------|-----------|
|     | Period     | 1992-2012             |      |      |           | 2009-2011                                                    |      |      |           |
| 1   | Angul      | 22 84 56 19           |      |      |           | 0.006 0.016 0.010 0.005                                       |      |      |           |
| 2   | Baleshwar  | 30 74 50 16           |      |      |           | 0.001 0.007 0.003 0.003                                       |      |      |           |
| 3   | Bargarh    | 35 70 52 13           |      |      |           | 0.002 0.004 0.003 0.001                                       |      |      |           |
| 4   | Bolangir   | 36 81 60 17           |      |      |           | 0.003 0.005 0.004 0.001                                       |      |      |           |
| 5   | Bhadrak    | 17 71 49 19           |      |      |           | 0.003 0.014 0.009 0.006                                       |      |      |           |
| 6   | Baudh      | 18 85 58 23           |      |      |           | 0.007 0.021 0.013 0.007                                       |      |      |           |
| 7   | Cuttack    | 15 84 50 25           |      |      |           | 0.002 0.015 0.007 0.007                                       |      |      |           |
| 8   | Debagarh   | 33 83 66 17           |      |      |           | 0.034 0.045 0.040 0.006                                       |      |      |           |
| 9   | Dhenkanal  | 36 84 58 22           |      |      |           | 0.003 0.008 0.005 0.002                                       |      |      |           |
| 10  | Gajapati   | 44 92 71 15           |      |      |           | 0.007 0.009 0.008 0.001                                       |      |      |           |
| 11  | Ganjam     | 25 75 51 19           |      |      |           | 0.000 0.001 0.001 0.000                                       |      |      |           |
| 12  | Jagatsinghpur | 17 70 46 16         |      |      |           | 0.005 0.068 0.029 0.034                                       |      |      |           |

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Table 4 continued

|   | District | Mean | SD | Min | Max | Mean | SD | Min | Max | Mean | SD | Min | Max |
|---|----------|------|----|-----|-----|------|----|-----|-----|------|----|-----|-----|
| 13| Jajpur   | 20   | 72 | 46  | 19  | 0.002| 0.004| 0.003| 0.001|
| 14| Jharsuguda| 29   | 64 | 47  | 14  | 0.030| 0.040| 0.034| 0.005|
| 15| Kalahandi| 43   | 87 | 65  | 18  | 0.002| 0.003| 0.002| 0.001|
| 16| Kandhamal| 50   | 93 | 69  | 15  | 0.006| 0.011| 0.008| 0.003|
| 17| Kendrapara| 28   | 86 | 53  | 21  | 0.002| 0.054| 0.022| 0.028|
| 18| Keonjhar | 53   | 83 | 66  | 11  | 0.002| 0.006| 0.004| 0.002|
| 19| Khurda   | 14   | 82 | 50  | 24  | 0.011| 0.088| 0.042| 0.041|
| 20| Koraput  | 52   | 87 | 74  | 13  | 0.002| 0.003| 0.003| 0.001|
| 21| Malkangiri| 40   | 92 | 70  | 17  | 0.005| 0.011| 0.007| 0.003|
| 22| Mayurbhanj| 54   | 91 | 68  | 13  | 0.000| 0.001| 0.001| 0.000|
| 23| Navrangpur| 51   | 91 | 72  | 16  | 0.001| 0.002| 0.002| 0.001|
| 24| Nuapada  | 61   | 86 | 75  | 13  | 0.003| 0.008| 0.006| 0.002|
| 25| Nayagarh | 33   | 84 | 64  | 19  | 0.005| 0.128| 0.050| 0.068|
| 26| Puri     | 18   | 75 | 46  | 22  | 0.004| 0.113| 0.044| 0.060|
| 27| Rayagada | 66   | 82 | 73  | 5   | 0.002| 0.003| 0.003| 0.001|
| 28| Sambalpur| 42   | 70 | 55  | 11  | 0.005| 0.009| 0.007| 0.002|
| 29| Sonepur  | 42   | 73 | 57  | 11  | 0.007| 0.011| 0.008| 0.002|
| 30| Sundargarh| 36   | 81 | 60  | 17  | 0.002| 0.004| 0.003| 0.001|

Source 1. DESS Odisha, 2. Author’s compilation

Note: 1. Per Household MGNAREGA expenditure (Rs. Crores/Household) causes a per capita DDP impact of 0.013 with a deviation of 0.01. This translates to making MGNAREGA expense of Rs. 79 per household to raise DDP by one Rupee (1/-) only.

3 Results and Discussion

Table 5 presents the pooled estimates of poverty rates using pooled OLS estimation for 30 districts of Odisha from 1992 to 2011. We find the negligible and low bivariate correlation among all the independent variables in the sample dataset. The endogenous effects are insignificant in our specification. The presence of endogeneity of PDDP, leading to demand for banking services are not demonstrated in the sample data. The three terms that enter linearly into the specification, access, rice yield and PDDP are significantly negative effect on poverty. The PDDP plays the role of a control indicator since it explains the totality of development caused by industry, agriculture, services and capital formation inside the district. The model shows the rice yield is significant because the variable of wheat yield is insignificant. The ranges of the coefficients of the three variables are dependent on the unit of scale. The PDDP plays the role of a control indicator since it explains the totality of development caused by industry, agriculture, services and capital formation inside the district.

Table 5. Model estimates: Dependent variable: poverty rate (%)

| Description       | Coefficient | t-Value | P-Value | VIF |
|-------------------|-------------|---------|---------|-----|
| Constant          | 94.5        | 16.7    | 0.000   |     |
| PDDP              | -0.0004     | -2.7    | 0.007   | 1.07|
| No. of Branches   | -0.07       | -2.9    | 0.004   | 1.07|
| No. of ATMs       | 0.01        | 1.0     | 0.302   | 1.01|
| Rice Yield        | -15.2       | -4.3    | 0.000   | 1.01|

Model Summary

| Source Error      | Sum of Squares | df  | Mean Square |
|-------------------|----------------|-----|-------------|
| Regression        | 14,986         | 4   | 3746.5      |
| Residual          | 58,535         | 205 | 285.5       |
| Total             | 73,521         | 209 |             |

Source Author’s compilation

Note: 1. VIF is the variance inflation factor for multicollinearity test
2. No. of Branches are significant at 95.8% significance.
3. Absence of endogeneity is implied.
4. No. of ATMs are insignificant.
Odisha is predominantly a rice economy. The variable wheat yield is insignificant, but rice yield is significant. While controlling for Z, the agricultural yield, the unit effect of number of branches (F), are found more than four times of that associated with unit effect of PDDP (X). For example, when Xs and Zs are in control, we find that an increase of Rs. 10,000/- in PDDP (per capita income) can cause a fall in poverty by 4% only. When Xs and Fs are in control, an increase of 10% in Rice Yield (0.1 ton/ ha) is associated with a fall in poverty by 1.5%. This also implies, When Xs and Zs are in control, an additional 100 number of bank branches are associated with poverty reduction of 4.7% in the districts. While controlling for X, the per capita PDDP, the unit effect of Branches (F) is more than three times of that associated with unit effect of agricultural yields (Z). The state may emphasize to raise PDDP rather than establishing number bank branches. In 2011, the total state development outlay stood at Rs. 1475.91 Crores. However, raising PDDP for the entire people of the district is not easy to achieve.

We mentioned that the per Household MGNAREGA expenditure (Rs. Crores/House hold) caused a PDDP impact of 0.013, translated to making MGNAREGA an expense of Rs.79 per household to raise PDDP by one Rupee (1/-) only for the state. Previous studies (13) on the relationship between poverty and finance had found no evidence that reduced levels in poverty could stimulate the demand for financial services. The author (16) had tested the evidence of rise in rural employment from bank branch expansion on economic growth in India. Our results suggest that poverty alleviation requires efforts to emphasize on enhancing rice yield, per-capita income and branch banking in the state. Our results agree with the authors (14) had showed that the branch expansion rules imposed by Government and RBI during 1977-1990, was instrumental in reducing rural poverty headcount from 14% to 17%. Branches provide an environment to their customers to respond, revert, counsel, advice and disburse cash even for illiterates. The branch channel which is an indirect tool for poverty programs directly encourages access to credit within the province and negatively influences poverty. Financial breadth is derived using measures of financial access such number of bank branches and the number of automated teller machines (ATMs), etc. To our knowledge, there are no empirical studies that broadly examine the indirect provisions through which financial inclusion reduces poverty and income inequality.

This finding provides evidence that financial inclusion is not a sufficient factor in itself that can affect the real economy in a similar magnitude; rather, the effectiveness of financial inclusion depends on different economic factors, scenarios, and conditions. The evidence is consistent with previous findings (4,15,16).

4 Conclusions

This study examined the breadth of major dimensional aspects of poverty reduction in a test model. It identified three important variables of rice yield, PDDP and branch banking depth as significant determinants of poverty in Odisha. The relative importance of agricultural yield, income effect of PDDP and the financial access was explored empirically. The comparison of the weights among the three parameters is interesting for policy makers. The poor would need the most basic form of financial provision. In contrast to macro level studies that had used state wise data in India, this paper conducted a micro level analysis.

We highlighted and discussed basic insights on poverty put forth by new-Keynesian or neo-classical approaches. Although all of these studies suggest links between financial inclusion, poverty, and income inequality, they lack a comprehensive understanding of their relationship due to their lack of panel data study and a limited set of variables for constructing a financial inclusion index. This study tries to expand on existing literature regarding impact analysis of financial inclusion on poverty and income inequality with a broad set of variables for financial inclusion index, and a panel data set consisting of a large number of developing countries in Asia, Africa, and Latin America and the Caribbean. Although there are many studies in growth and poverty using state level data, this paper covers the stronger evidence of indirect tools at the district level. There are few limitations in our data hungry approach as regards the implementation issues for most of the developed economies. Poverty data is insufficient at district level in Odisha which is a major challenge. Future research must explore the taluk level analysis to relate to ground realities of poverty with achievements of financial access in the rural vicinity. The panel nature of data with a short time span and missing years of official poverty data, prevent this study from sophisticated econometric models. For this reason, admittedly, it is not possible to fully control for the presence of potential endogeneity bias associated with financial inclusion.

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