

The Impact of Financial Assistance to Fisherwomen's Income: The Case of Fish Basket Sellers in North Coast of Java



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INTRODUCTION

- The coastal communities livelihood in Indonesia, more dominated by the small-scale fisheries economic activities, is still having serious problems associated with poverty.
- Some coastal areas in Indonesia are known to have experienced such over capacity over the Malaka Strait, Java Sea, Makasar Sea, and Bali Strait. The northern coastal areas of Java, indicated excess fishing capacity by 35% of the optimal capacity (Fauzi and Anna, 2012).
- More over, climate change has exacerbated the economic conditions of coastal communities in Indonesia (Fauzi and Anna, 2010).
- Unfavorable economic conditions, encourage women to help meet the needs of families living, with economic activity.
- One of the economic activities that are promising for fisherwomen in the northern coast of Java is selling fresh fish in a basket. In running the bussiness they have an obstacle of limited financial capability. The need for capital is mostly obtained from small credit cooperatives, rural banks and middlemen.

The Study..

- Outline a comprehensive survey of the impact of micro-credit on earnings and economic efficiency.
- It also incorporate the assessment of different type of financial assistance provides by private institution. These private institutions were overlooked by various studies, especially in the North Coast Java Fisheries.
- This study was carried out using cross-sectional data of fisherwomen who run fisheries small-scale bussiness (fish basket sellers), in the northern coast of central Java. Two fishing locations in the region were chosen namely Pekalongan and Tegal.
- These small scale fisherwomen are those who sell small pelagic fish like Trevalli, scad, tuna, mackerrel, Barramundi, Anchovi, etc, in the baskets.
- Both of these coastal areas are subject to various financial assistances both for fisherman and fisherwomen, and both from government initiatives as well as private and individual financiers/middlemen.



Study Area



Methods..

1st STEP

- ❑ Quantitative approach to assess economic performances of average fisherwomen who sell fish basket of those who receive financial assistance and those who do not.

2nd STEP

- ❑ Quantitative approached by means of regression analysis was used to assess the effect of financial assistance on Income, ROI and Expenditure, in comparison with those fisherwomen who do not get financial assistance.

3rd STEP

- ❑ Quantitative approached by means of regression analysis was used to assess the effect of the amount of financial assistance on Income and ROI

4th STEP

- ❑ Quantitative approached by means efficiency analysis using DEA solver of financial assistance in comparison with those fisherwomen who do not get financial assistance.



..THE MODEL..

Regression Model

- $\ln y = \alpha_0 + \alpha_1 \text{age} + \alpha_2 \text{education} + \alpha_3 \text{experience} + \alpha_4 \text{workhour} + \dots + \alpha_n D + \varepsilon$
- $\ln E = \alpha_0 + \alpha_1 \text{age} + \alpha_2 \text{education} + \alpha_3 \text{experience} + \alpha_4 \text{workhour} + \dots + \alpha_n D + \varepsilon$
- $\ln y = \alpha_0 + \alpha_1 \ln(\text{age}) + \alpha_2 \ln(\text{education}) + \alpha_3 \ln(\text{experience}) + \alpha_4 \ln(\text{workhour}) + \alpha_5 \ln(\text{micro credit})$

Efficiency DEA Model

$$\text{Efficiency} = \frac{\sum_k u_k y_k}{\sum_i v_i x_{i,j}}$$

Where u and v are weights parameter for input x and output y , respectively.

The optimization problem for the equation is:

$$\begin{aligned} \max \theta_0 &= \frac{\sum_k u_k y_{k,j_0}}{\sum_i v_i x_{i,j_0}} \leq \\ \text{subject to } &\frac{\sum_k u_k y_{k,j}}{\sum_i v_i x_{i,j}} \leq 1 \forall_j \\ &u_k, v_i \geq 0 \end{aligned}$$



Descriptive statistics of socio-economic variables

Variable	Non-Recipient				Rural Bank				Cooperative				Middlemen			
	Average	Min	Max	SD	Average	Min	Max	SD	Average	Min	Max	SD	Average	Min	Max	SD
Age	37.61	23.00	52.00	9.61	39.29	23.00	65.00	13.15	37.85	23.00	69.00	12.35	38.08	24.00	62.00	11.33
Education	6.45	1.00	12.00	2.54	5.00	1.00	9.00	2.83	6.75	1.00	12.00	3.45	5.67	1.00	9.00	2.46
Experience	9.58	4.00	17.00	3.31	8.36	5.00	20.00	4.40	10.90	4.00	30.00	6.60	7.75	5.00	12.00	3.22
Work Hours/day	5.70	4.00	7.00	0.65	5.29	4.00	6.00	0.73	5.40	4.00	7.00	0.82	5.58	5.00	6.00	0.51
Income (Million IDR)/month	2.04	0.63	5.63	1.33	1.14	0.61	2.10	0.52	2.21	0.98	4.35	1.03	0.66	0.59	1.05	0.13
Cost of capital /IDR/month	2.44	0.80	5.50	1.71	1.37	1.00	2.00	0.39	2.41	1.20	5.50	1.29	0.95	0.70	1.25	0.15
Expenditure (Million IDR)/month	2.71	1.38	6.63	1.25	2.06	1.11	3.10	0.60	2.97	1.73	4.75	0.95	1.66	1.35	1.93	0.20
Amount of Micro-Credit (Million IDR)	-	-	-	-	1.55	1.00	2.00	0.30	2.41	1.20	5.50	1.29	1.40	1.00	1.50	0.17
ROI	71.86	38.75	112.50	20.80	68.04	32.40	95.67	19.34	83.94	49.76	115.67	16.15	49.64	38.75	68.00	10.85

Regression result for all models: Dummy variable Microcredit



Variable	Model 1 ($Y=\ln income$)		Model 2 ($Y=\ln ROI$)		Model 3 ($Y=\ln Expenditure$)	
	Coef	p-value	Coef	p-value	Coef	p-value
Constant	12.8	0.000	-0.29	0.422	13.7	0.000
Age	-0.000473	0.957	0.001052	0.804	0.00863	0.010*
Education	0.08154	0.026*	0.00795	0.643	0.0569	0.000*
Experience	0.03611	0.029*	0.003418	0.659	0.00733	0.236
Work Hours	-0.03130	0.737	-0.09745	0.032*	-0.0422	0.222
Income	-	-	-	-	0.00000022	0.000*
Rural Bank	0.5046(1.66)	0.011*	0.26553(1.304)	0.005*	0.08472	0.243
Cooperative	0.9122(2.49)	0.000*	0.49087(1.633)	0.000*	0.10564	0.166
Non Recipient	0.7427(2.10)	0.000*	0.50275(1.653)	0.000*	0.03739	0.611
R^2	50.3 %		48.6%		79.6%	
Adj R^2	44.5 %		42.6%		76.9%	
$F_{\text{statistic}}$	8.67		8.11		28.81	
Prob($F_{\text{statistic}}$)	0.000		0.000		0.000	
DW _{statistic}	1.58		1.94		1.64	

*significant at the interval confident 95%





RESULT MODEL FOR MICRO CREDIT

Model	Micro credit	Equation
Model 1 ($y=\ln income$)	Rural Bank	$\ln Y = 13.30 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
	Cooperative	$\ln Y = 13.71 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
	Non Recipient	$\ln Y = 13.54 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
	Middlemen	$\ln Y = 12.8 - 0.00047x_1 + 0.0815x_2 + 0.0361x_3 - 0.0313x_4$
Model 2 ($y=\ln ROI$)	Rural Bank	$\ln Y = 0.02 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
	Cooperative	$\ln Y = 0.20 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
	Non Recipient	$\ln Y = 0.21 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
	Middlemen	$\ln Y = -0.29 + 0.00105x_1 + 0.0080x_2 + 0.00342x_3 - 0.0975x_4$
Model 3 ($y=\ln Expenditure$)	Rural Bank	$\ln Y = 13.78 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$
	Cooperative	$\ln Y = 13.81 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$
	Non Recipient	$\ln Y = 13.74 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$
	Middlemen	$\ln Y = 13.7 + 0.00863x_1 + 0.0569x_2 + 0.00733x_3 - 0.0422x_4 + 0.00000022x_5$

The Comparison Of Odd Ratio Value for Dummy Variable Micro Credit

Dummy Variable	Model 1, Y=Income				Model 2, Y=ROI			
	Rural Bank	Cooperative	Non Recipient	Middlemen	Rural Bank	Cooperative	Non Recipient	Middlemen
Rural Bank	0	0.67	0.79	1.66	0	0.80	0.79	1.30
Cooperative	1.50	0	1.18	2.49	1.25	0	0.99	1.63
Non Recipient	1.27	0.84	0	2.10	1.27	1.01	0	1.65
Middlemen	0.60	0.40	0.60	0	0.77	0.61	0.60	0

Model 1: Cooperative perform the best, model 2 the best perform is for non recipient,

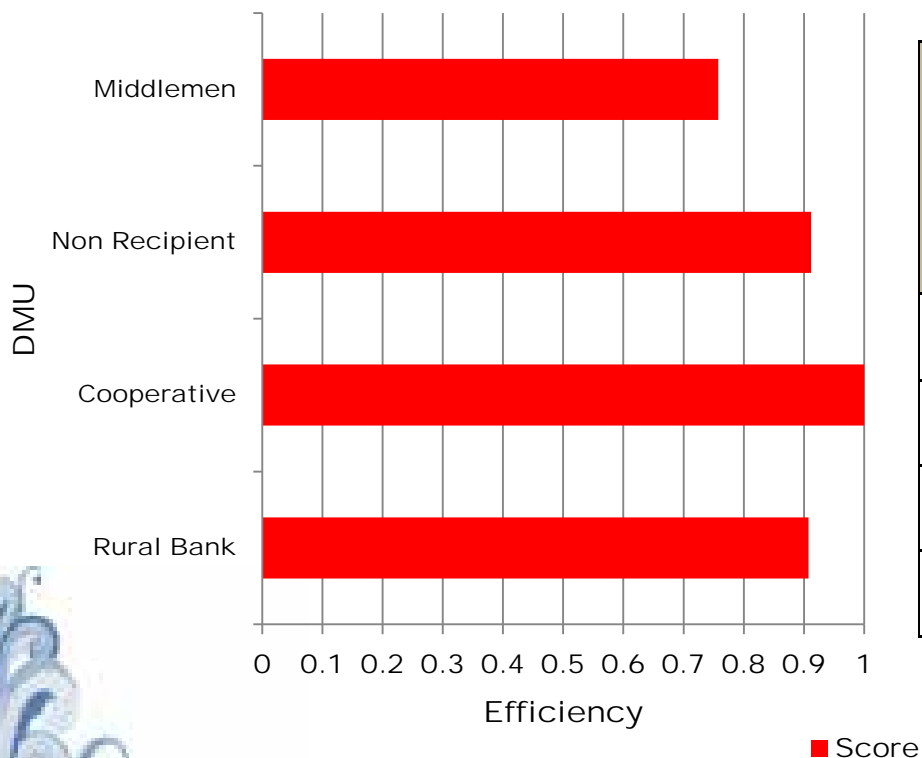
Regression result of impact of the amount of microfinance and other variables to Income

Variable	Coefficient	p-value	VIF
Constant	13.1	0.000	
Age (x_1)	0.0108	0.177	3.227
Education (x_2)	0.0834	0.016*	3.682
Experience (x_3)	0.0227	0.080*	1.648
Work Hours (x_4)	-0.190	0.032*	1.343
Microfinance (x_5)	0.00000044	0.000*	1.252
R^2	70.8 %		
Adj R^2	67.1%		
$F_{\text{statistic}}$	19.37		
Prob($F_{\text{statistic}}$)	0.000		
DW _{statistic}	1.60		

*significant at the interval confident 95%

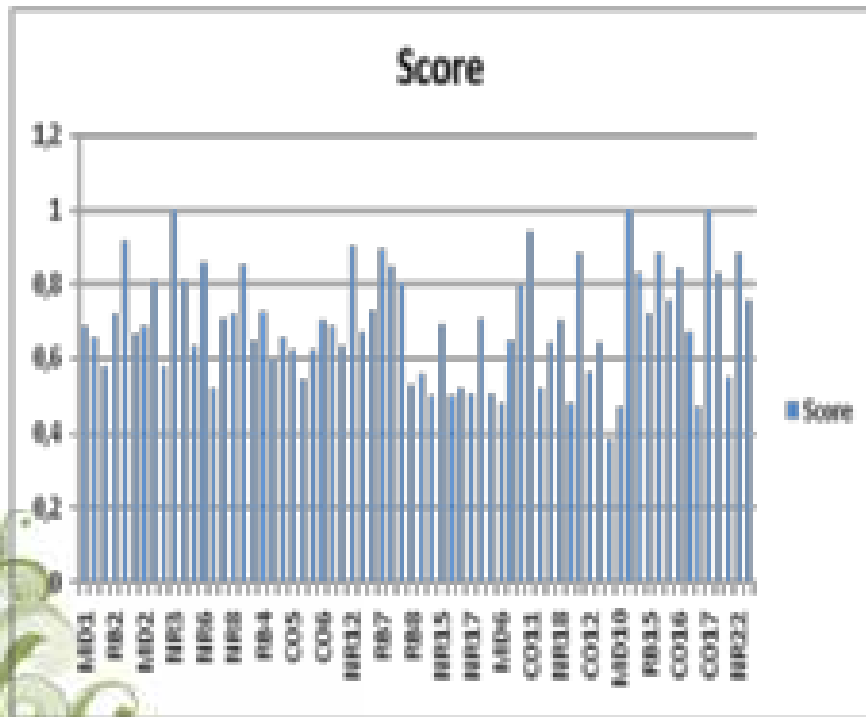


Score of Efficiency and Total Potential Improvement among DMU's Group of Fisherwomen's microcredit



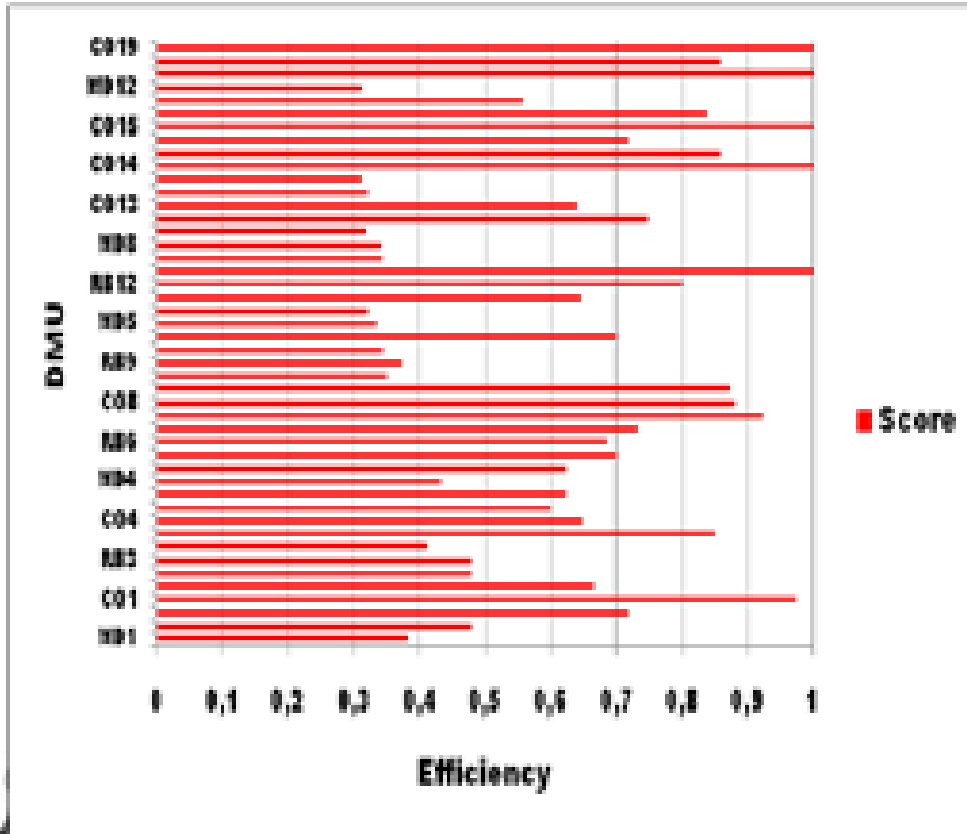
DMU	Efficiency Score (%)	Total Potential Improvement		
		Cost of Capital (%)	Work Hour (%)	Total Revenue (%)
Non Recipient	91.17	-8.83	-13.01	0.00
Rural bank	90.74	-9.26	-47.34	0.00
Cooperative	100	0.00	0.00	0.00
Middlemen	75.76	-24.24	-71.10	0.00

Efficiency score and input output projection for all respondents



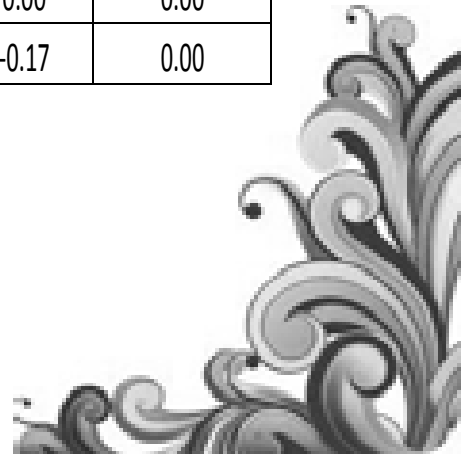
DMU	Score	TR Projection	WH Projection	Cost of Capital Projection
Middle men				
Min	0.47	-0.01	-4.80	-0.53
Max	0.69	0.01	-3.64	-0.22
Average	0.56	0.00	-4.27	-0.43
Rural Bank				
Min	0.38	-0.01	-4.80	-0.77
Max	0.89	0.01	-0.44	-0.22
Average	0.66	0.00	-3.11	-0.45
Cooperative				
Min	0.56	-9.12	-4.06	-2.40
Max	1.00	0.00	0.00	0.00
Average	0.78	-0.48	-1.69	-0.52
Non Recipient				
Min	0.50	0.00	-4.74	-2.48
Max	1.00	0.01	0.00	0.00
Average	0.71	0.00	-2.67	-0.65

Efficiency score and input output projection DEA Analysis Within Micro Credit Recipients



DMU	Score	work hour	micro credit	total revenue
Middlemen				
Min	0.31	-0.80	-0.69	0.00
Max	0.56	-0.65	-0.44	0.00
Average	0.38	-0.76	-0.62	0.00
Rural Bank				
Min	0.32	-0.80	-0.68	0.00
Max	0.92	-0.08	-0.08	0.00
Average	0.60	-0.55	-0.40	0.00
Cooperative				
Min	0.62	-0.68	-0.38	0.00
Max	1.00	0.00	0.00	0.00
Average	0.83	-0.27	-0.17	0.00

Optimal Micro credit for fisherwomen	
Rural bank (reduce on average 40%)	Rp. 900,000
Cooperative (reduce on average 17%)	Rp. 2,000,000
Middlemen (reduce on average 62%)	Rp. 500,000



CONCLUSION

- This study proves that financial assistances for fisherwomen in the form of low interest rate micro credits through different institutional such as Rural Bank, Cooperative and Middlemen was very influential on their economic performance in the fisherwomen economic activity such as their income and ROI.
- Financial assistance in the form of micro credit from cooperative proved to be had a bigger impact to the fisherwomen's income compare to non recipient, Rural Bank and middlemen. Cooperative is also considered to be the most efficient financial assistance based on DEA relative to other schemes analyze in this study.
- Financial assistance from midlemen, is considered to be have a less impact on fisherwomen's economic performance, including its efficiency.
- The study also shows that fisherwomen are basically very disciplined in their borrowing behavior. Fisherwomen's expenditure apparently have nothing to do with the financial assistance they receive through micro credit.



Policy Implication



- The study implies the need for more development of fisherwomen cooperatives, because until now the number of fisherwomen's cooperatives compare to fisherman cooperative is still very small, so the chance of fisherwomen to access microcredit cooperatives, is also very limited.
- The study implies a policy of setting the interest rate of midlemen even lower and also removal of the collateral requirements on financial institutions, so the opportunities for fisherwomen to get financial assistance becomes even greater.
- The goverment should develop a various financial assistance schemes for the development of fisherwomen's economy.

Thank you

