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FACTORS AFFECTING COOPERATIVE PERFORMANCE IN THE PHILIPPINES, MALAYSIA AND INDONESIA

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Abstract

The objective of this study is to identify the influence of human resources factors, namely members and capital from cooperatives on performance, namely the volume of cooperatives in the Philippines, Malaysia and Indonesia. The research gap that is seen is the scarcity of multi-country research especially in cooperatives. The results of this comparative study can also be used in the development of cooperatives in Indonesia. The method used is a nonlinear function equation. Data were taken from three countries, namely Malaysia, the Philippines and Indonesia with a total of 64 provinces. The results of the study from the three countries show that human resource development is almost rigid or ineffective in increasing the volume of cooperatives, but the increase in volume occurs simultaneously from the role of human resources and capital or increasing returns to scale in several countries studied. For Indonesia, member and capital factors, both individually and collectively, are not effective against volume, resulting in a decreasing rate of return. Therefore, management improvement is very necessary, both member management and capital management in order to increase the volume of cooperatives in Indonesia, when compared to Malaysia and the Philippines. The originality of this study is about the nonlinear production function in the field of cooperatives which is global in nature by comparing 3 ASEAN countries, namely the Philippines, Malaysia and Indonesia, which is a study that is still rare.

Keyword: *Cooperatives, members, capital, multi countries, nonlinear*

Introduction

       A collective organizing process aimed at fulfilling shared needs gives rise to cooperatives. More specifically, they are entities that provide democratic management and control of resources and facilitate collective action (Bianchi & Vieta, 2020). A local community may be understood as a social space marked by a hierarchy of power and resource use (Ostrom, 2021). A cooperative is a business model that enables its members to member collectively fulfill mutual needs via teamwork and democratic governance. In a cooperative, capital consists of savings and equity. (Bourdieu, 1985). The human resources of a cooperative comprise its members and the staff tasked with its management. Businesses can use the nonlinear equation to make rational decisions regarding the quantities of various inputs to use in order to minimize production costs and maximize profits (Kumar & Haradhan, 2021). The nonlinear equations, which includes human, capital, and output, can be used to measure the elasticity of each input factor and output volume by taking logarithms of both sides to linearize the function (Cobb & Douglas, 1928). This can then be analyzed through regression analysis to determine the coefficients of elasticity and inelasticity (rigidity) for the company's input factors (Wang et al., 2021). The elasticity of the production process enhances the growth of volume that originates from production factors, both as inputs and outputs. Nonetheless, the influence of various fields on elasticity and growth differs (Reichel, 2022),

       The equation for the general production function, expressed with exponents, is as follows:

$$f(x) = A \prod_{i=1}^{n} X_i^{\alpha_i}$$

Where: f(x) = output, A and α = constant, X = production variable, i = number of variables.

       A more specific production function model is written as follows (Cobb & Douglas, 1928), (Varian, 2010)

$$Q = AL^{\alpha} K^{\beta}$$

Where Q= volume, A constant, L = human resource (members of cooperative), K = capital of the cooperative, α = human resource as members constant and β = capital constant.

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When the members constant $\alpha < 1$, the production function exhibits inelasticity or rigidity, meaning that adding members do not result in increased output proportionally. Wen $\alpha > 1$ then members factor is elastic, an increase in member has an impact on increasing output (Varian, 2010), (Mansfield, 1975). When the capital constant K is set to $\beta < 1$, the production function exhibits inelasticity or rigidity, meaning that adding capital does not result in increased output proportionally. When $\beta > 1$, capital is elastic; an increase in capital affects higher output growth (Varian, 2010; Mansfield, 1975). When $\alpha+\beta>1$, the production function shows increasing returns to scale; when $\alpha+\beta<1$, it shows decreasing returns to scale; and when $\alpha+\beta=1$, it shows constant returns to scale. Increasing returns refers to the phenomenon where a rise in all inputs results in a greater increase than that of the output. Diminishing returns refers to the phenomenon where increasing all inputs results in a lesser increase than that of the output. When there are constant returns to scale, output rises in direct relation to the proportional increase of all inputs: a rise in all inputs results in a proportional rise in output (Ricardo, 1817), (Samuelson & Nordhaus, 2009), (Arrow et al., 1961), (Ume et al., 2021), (Delgado, 2022).
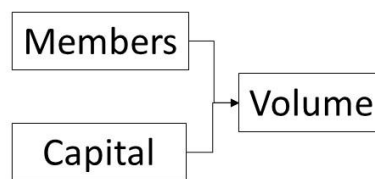

Figure 1
Research Diagram of Nonlinear for Cooperative

The nonlinear function diagram in the Figure 1, consists of three variables, namely human resources in the form of members, capital and output as volume. From this diagram in Figure 1: Research Diagram of Nonlinear for Cooperative, it can be developed into 9 hypotheses.

Method

The research objects are all provinces in Malaysia (15 provinces), the Philippines (50 provinces) and Indonesia (34 provinces) with total of 64 provinces as samples. Understanding the demographic profile or country and financial and members performance will be very helpful in the research. Therefore, the research here was conducted in several countries or three countries, namely Malaysia, the Philippines and Indonesia in ASEAN as a comparison (Azman et al., 2022). The quantitative data is secondary that obtained from the web and processed with a non-linear production function from Cob Douglas.

From previous research, it appears that the member, capital and volume factors show inconsistent results, so this is an opportunity to formulate hypotheses and develop research. The elasticity of the production process increases the volume growth derived from production factors as input and output factors. However, not all fields have the same impact on elasticity and growth (Reichel, 2022).

Other studies show that in human resources the inelasticity (rigidity) of the function to output volume in Uzbekistan (Maratovna, 2020). Other studies also show that the function by human resource as members is rigid to volume (Ogundele & Adeyemo, 2023), , (Nakana et al., 2021), Capital in the function increase volume output and are elastic in Nguyen, Vietnam (Chi & Nguyen, 2023). However, different results in other studies, namely the production function by including the loan factor shows its inelasticity (rigidity) to volume output in Indonesia (Hasan et al., 2023). Likewise, other studies show similar results (Entezari et al., 2021), (Akpan & John., 2020)(Ahado et al., 2021),. There seems to be inconsistency in capital development against volume. Various studies show that the production function by including training and loans is rigid to volume (Siti Badriah et al., 2022), (Madžar, 2022), (Emokaro & Ekunwe, 2021), (Poudel et al., 2021).

For Malaysia 3 hypotheses were developed that are as follow. Hypothesis 1. There is rigidity of cooperative members towards the volume of the cooperative. Hypothesis 2. There is rigidity of cooperative capital towards the volume of the cooperative. Hypothesis 3. There is decreasing return to scale on members and capital towards the volume of the cooperative. For the Philippines, 3 hypotheses were developed, namely as follow. Hypothesis 4. There is rigidity of cooperative members towards the volume of the cooperative. Hypothesis 5. There is rigidity of cooperative capital towards the volume of the cooperative. Hypothesis 6. There is decreasing return to scale on members and capital towards the volume of the cooperative. Finally, for the Indonesia 3 hypotheses as follow. Hypothesis 7. There is rigidity of cooperative members towards the volume of the cooperative. Hypothesis 8. There is a rigidity of cooperative capital to the volume of the

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cooperative. Hypothesis 9. There is a decreasing return to scale on members and capital to the volume of the cooperative.

Results and Discussions

Cooperative performance appears in various quantitative methods carried out statistically. Quantitative research on cooperative performance in this topic is related to financial variables, workforce, training and output in the form of volume and profit. Cooperative performance can be measured by financial variables with several techniques, not only qualitative analysis (Bernardi et al., 2022), but also quantitative which includes linear statistics (Azman et al., 2022),. Measurements and calculations are also carried out logarithmically (Bangun, 2020).

Furthermore, cooperative performance in member variables is also measured using a quantitative model statistically (Buthelezi & Zondo, 2022), (Chawviang & Kiattisin, 2022). Research is also conducted simultaneously between finance and member which can be seen from previous studies statistically (Juma, 2022), (Hussain, 2022) logarithmically. Training factors measured in improving performance are carried out using linear logarithmic statistics (Bangun, 2018), (Cai et al., 2022) and logistic equations (Hando et al., 2022).

Cooperative data from Malaysia based on 15 provinces can be seen in Table 1: Cooperative of Malaysia by Province, in the form of cooperative member data, capital and volume of the cooperative. This data is then transformed into the form of natural logarithm. Data from Malaysia for human resources only contains of members.

The production function equation in logarithmic will be as follows
$$Q_s = AL^\alpha K^\beta$$
$$ln\ Q_v = \ln A + \ \alpha\ Ln\ L + \beta\ Ln\ K$$

Where LnMm = logarithmic naturalist of Member of Malaysia of cooperatives. LnCm = logarithmic naturalist of Capital of Malaysia of cooperatives and LnOm = logarithmic naturalist of Output of Malaysia of cooperatives.

Furthermore, Table 1: Cooperative of Malaysia by Province of data containing variables that have been transformed into natural logarithm form.

Table 1: Cooperative of Malaysia by Province

No	Province	Members	Capital	Output	LnMm	LnCm	LnOm
1	Ibu Pejabat	917,269	125,212.07	34,405.52	13.729	11.738	10.446
2	Johor	463,067	1,355.22	714.89	13.046	7.212	6.572
3	Kedah	285,487	755.52	322.61	12.562	6.627	5.776
4	Kelantan	319,050	2,027.16	463.94	12.673	7.614	6.140
5	Melaka	177,909	514.12	105.17	12.089	6.242	4.656
6	Negeri Sembilan	186,304	365.73	164.34	12.135	5.902	5.102
7	Pahang	302,884	1,653.28	970.17	12.621	7.411	6.877
8	Perak	357,390	1,564.08	535.54	12.787	7.355	6.283
9	Perlis	63,216	131.71	31.27	11.054	4.881	3.443
10	Pulau Pinang	167,339	1,019.65	361.47	12.028	6.927	5.890
11	Sabah	350,368	915.25	569.71	12.767	6.819	6.345
12	Sarawak	310,125	647.49	392.59	12.645	6.473	5.973
13	Selangor	613,251	2,315.82	464.43	13.327	7.748	6.141
14	Terengganu	238,844	633.37	498.61	12.384	6.451	6.212
15	Wilayah Persekutuan	2,560,209	20,497.34	5,502.05	14.756	9.928	8.613

Source: (Suruhanjaya Koperasi Malaysia, 2023) and processed.

Table 1, then processed using SPSS software. The results are shown in the table 2: Coefficient of Cooperative Members of Malaysia.

Table 2: Coefficient of Cooperative Members of Malaysia

Coefficientsᵃ						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.457	2.675		-0.919	0.376
	LnMm	0.203	0.273	0.106	0.745	0.47
	LnCm	0.847	0.138	0.873	6.125	0

a. Dependent Variable: LnOm

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From Table 2: Coefficient of Cooperative Members of Malaysia, the member constant of α = 0.203 <1 with a significance of 0.47 > 0.05 it is not so strong and the capital constant β = 0.847 <1 with a significance of 0.000 < 0.05 means that capital is significant correlated to output in the production function. The production function equation is as follows. For the calculation of return to scale α + β = 0.203 + 0.847 = 1.05>1 means increasing return to scale. As the result for Malaysia. Hypothesis 1. There is rigidity of cooperative members towards the volume of the cooperative, accepted. Hypothesis 2. There is rigidity of cooperative capital towards the volume of the cooperative. Hypothesis 3. There is increasing return to scale on members and capital towards the volume of the cooperative, rejected.

Furthermore, Table 3: Cooperative of Philippine by Province of data containing variables that have been transformed into natural logarithm form.

Table 3: Cooperative Philippine by Province

No	Region	Membership	Capital	Output	LnMp	LnCp	LnOp
1	Ilocos (Luzon)	0.5	18.3	0.6	-0.693	2.907	-0.511
2	Cagayan Valley (Luzon)	0.7	18.6	0.6	-0.357	2.923	-0.511
3	Cordillera A R (Luzon)	0.4	17.7	0.8	-0.916	2.874	-0.223
4	Central Luzon	0.8	25.7	1.4	-0.223	3.246	0.336
5	National Capital Region	1.5	104.9	8.1	0.405	4.653	2.092
6	Calabarzon	0.9	34.8	3.6	-0.105	3.55	1.281
7	Bicol	0.3	7.5	0.2	-1.204	2.015	-1.609
8	Western Visayas	0.6	21.4	0.9	-0.511	3.063	-0.105
9	Central Visayas	1	35.9	2.4	-	3.581	0.875
10	Eastern Visayas	0.5	10.3	0.3	-0.693	2.332	-1.204
11	Zamboanga (Mindanao)	0.8	8.4	0.2	-0.223	2.128	-1.609
12	Northern Mindanao	1.1	30.8	1.4	0.095	3.428	0.336
13	Davao (Mindanao)	0.7	28.2	1.1	-0.357	3.339	0.095
14	Soccsksaregn (Mindanao)	0.3	13.7	0.6	-1.204	2.617	-0.511
15	Caraga	0.3	6.3	0.4	-1.204	1.841	-0.916

Source: (Jones & Barbara, 2019) and processed.

Where LnMm = logarithmic naturalist of cooperatives member of Philippine. LnCp = logarithmic naturalist of cooperatives capital of Philippine and LnOp = logarithmic naturalist of Output of Philippine of cooperatives. LnLm = logarithmic naturalist of Member of Philippine of cooperatives.

Table 4: Coefficient of Members of cooperative Philippine

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.828	0.728		-6.635	0
	LnMp	-0.39	0.248	-0.258	-1.57	0.14
	LnCp	1.512	0.207	1.2	7.297	0

a. Dependent Variable: LnOp

It appears in Table 4: Coefficient of Members of cooperative Philippine that the value of the members constant α=-0.39 <1 which means that there is member rigidity to volume in the expanded production function, with a significance of 0.014>0.05, and the value of the capital constant β=1.512>1 means that there is a capital rigidity to volume with a significance of 0.000 <0.05. For the calculation of return to scale α + β = - 0.39+1.512 = 1.22>1 means increasing return to scale. Result for the Philippines as follows. Hypothesis 4. There is rigidity of cooperative members towards the volume of the cooperative, accepted. Hypothesis 5. There is rigidity of cooperative capital towards the volume of the cooperative, rejected. Hypothesis 6. There is decreasing return to scale on members and capital towards the volume of the cooperative, rejected.

Furthermore, Table 5: Cooperative of Indonesia by Province of data containing variables that have been transformed into natural logarithm form.

Table 5: Cooperative Indonesia by Province

No	Province	Members	Capital (Rp)	Output (Rp)	LnMi	LnCi	LnOi
1	Aceh	45,972	349,966,339,173	22,449,276,030	10.736	26.581	23.835
2	Sumatera Utara	818,698	3,971,155,671,300	182,196,399,955	13.615	29.010	25.928
3	Sumatera Barat	172,058	2,151,690,568,792	106,660,943,191	12.056	28.397	25.393
4	Riau	224,905	1,856,092,779,370	174,320,776,037	12.323	28.249	25.884
5	Jambi	35,142	172,651,945,470	20,521,974,634	10.467	25.875	23.745
6	Sumatera Selatan	80,808	662,795,445,891	34,453,498,458	11.300	27.220	24.263
7	Bengkulu	33,490	423,261,562,693	18,470,701,435	10.419	26.771	23.639
8	Lampung	812,792	2,833,281,680,721	141,180,370,851	13.608	28.672	25.673

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9	Bangka Belitung	37,491	171,247,626,197	10,815,982,994	10.532	25.866	23.104
10	Kepulauan Riau	25,131	112,433,872,986	9,911,388,111	10.132	25.446	23.017
11	DKI Jakarta	1,871,469	2,889,613,682,175	256,112,108,127	14.442	28.692	26.269
12	Jawa Barat	999,672	7,047,771,623,186	342,231,254,785	13.815	29.584	26.559
13	Jawa Tengah	1,811,913	6,935,613,214,039	181,740,843,602	14.410	29.568	25.926
15	Jawa Timur	1,110,296	8,838,334,042,748	320,579,198,227	13.920	29.810	26.493
16	Banten	401,472	1,988,764,620,554	140,254,812,182	12.903	28.319	25.667
17	Bali	197,143	3,228,852,701,382	72,173,411,150	12.192	28.803	25.002
18	NTB	209,037	787,035,865,035	55,405,622,623	12.250	27.392	24.738
19	NTT	267,214	1,180,839,114,363	44,894,442,421	12.496	27.797	24.528
20	Kalbar	680,536	3,213,654,190,808	76,417,064,740	13.431	28.798	25.059
21	Kalteng	31,262	319,231,864,639	47,777,394,814	10.350	26.489	24.590
22	Kalsel	136,173	806,278,834,809	88,026,999,235	11.822	27.416	25.201
23	Kaltim	106,776	1,106,968,588,191	67,029,237,231	11.578	27.733	24.928
24	Kalut	4,849	17,943,930,825	3,857,344,510	8.487	23.611	22.073
25	Sulawesi Utara	18,839	70,040,866,108	7,286,358,954	9.844	24.972	22.709
26	Sulawesi Tengah	1,280,862	305,842,158,401	34,922,049,324	14.063	26.446	24.276
27	Sulawesi Selatan	168,964	1,374,172,907,742	182,637,035,667	12.037	27.949	25.931
28	Sul Tenggara	9,965	52,910,921,970	5,640,886,553	9.207	24.692	22.453
29	Gorontalo	9,177	42,006,485,921	4,431,805,442	9.124	24.461	22.212
30	Sulawesi Barat	11,732	57,360,200,240	7,195,412,298	9.370	24.773	22.697
31	Maluku	5,925	16,376,081,354	1,444,839,908	8.687	23.519	21.091
32	Papua	5,310	34,934,680,148	6,326,785,632	8.577	24.277	22.568
33	Maluku Utara	16,482	22,844,349,682	5,345,145,606	9.710	23.852	22.399
34	Papua Barat	110	3,081,005,950	1,220,814,450	4.700	21.849	20.923

Source: (Koperasi, 2016), (KOPERASI & MENENGAH, 2022), processed.

Where LnMi = logarithmic naturalist of Member of Indonesia of cooperatives. LnCi = logarithmic naturalist of Capital of Indonesia of cooperatives and LnOi = logarithmic naturalist of Output of Indonesia of cooperatives dan LnLi = logarithmic naturalist of Member of Indonesia of cooperatives.

Table 5, then processed using SPSS software. The results are shown in the Table 6: Table 6: Coefficients of Members of Cooperative Indonesia

Table 6: Coefficients of Members of Cooperative Indonesia

Coefficientsᵃ						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.044	1.644		3.067	0.005
	LnMi	0.054	0.09	0.074	0.603	0.551
	LnCi	0.693	0.095	0.898	7.294	0

a. Dependent Variable: LnOi

It appears that the value of the members constant $\alpha=0.054 <1$ which means that there is member rigidity to volume in the expanded production function, with a significance of $0.551>0.05$, and the value of the capital constant $\beta=0.693<1$ means that there is a capital rigidity to volume with a significance of $0.000 <0.05$. For the calculation of return to scale $\alpha + \beta = 0.054 + 0.693 = 0.747<1$ means decreasing return to scale. Finally, for the Indonesia, the result as follow. Hypothesis 7. There is rigidity of cooperative members towards the volume of the cooperative, accepted. Hypothesis 8. There is a rigidity of cooperative capital to the volume of the cooperative, accepted. Hypothesis 9. There is a decreasing return to scale on members and capital to the volume of the cooperative, accepted.

A summary of the hypothesis can be seen in Table 7: Recapitulation of Hypothesis Results
Table 7: Recapitulation of the Hypothesis Results

Factor	Malaysia		Philippines		Indonesia	
α	0.203<1 (0.470>0.05)	H1 Accepted	-0.390<1 (0.140>0.05)	H4 Accepted	0.054<1 (0.551>0.005)	H7 Accepted
β	0.847<1 (0.000<0.05)	H2 Accepted	1.512>1 (0.000<0.05)	**H5 Rejected**	0.693<1 (0.000<0.005)	H8 Accepted
α+β	1.05 >1	**H3 Rejected**	1.122 >1	**H6 Rejected**	0.747 <1	H9 Accepted

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From the results of this study, it can be seen that cooperative members in Malaysia, the Philippines and Indonesia are rigid, because $\alpha<1$, so that the increase in members has not increased proportionally or increased the performance of the cooperative's volume even more, so that cooperative members have not played a very important role in the development of the cooperative yet. Furthermore, due to the sig >0.05 in the three countries, the role of members of cooperative also not significant. This is similar in the past research that the participation of citizens specifically of Indonesia who become members of new cooperatives is only 8.41% (Herman, 2021). This figure is still below the global average of 16.31% (Herman, 2021). Other data states that 21% of the British population are members of cooperatives (ICA-EU Partnership, 2020). 30% of the American population are members of cooperatives (IWDC, 2024).

Furthermore, the results of this study it can also be seen that the cooperative capital in Malaysia, and Indonesia is also rigid, so that the increase in capital has not increased proportionally or increased the performance of the cooperative volume even more, so that the cooperative capital has not yet appeared to effectively play a very important role in the development of cooperatives. On the other side, capital is elastic to volume in the Philippines, For comparison, the average cooperative capital in the Philippines is IDR 8,707,807,571 per cooperative (Jones & Barbara, 2019). While in Indonesia it is very low, namely the average capital is IDR 257,855,730 per cooperative (Koperasi, 2016).

The findings of this study also indicate that in Malaysia and the Philippines, the members and capital of cooperatives are elastic. This means that member participation and additional capital contribute effectively to improvements in cooperative volume performance or an increasing return to scale. Therefore, cooperative development should involve a simultaneous enhancement of both member participation and capital contributions. In Indonesia, however, the effectiveness of members and capital in increasing the volume of cooperatives still needs to be enhanced.

Conclusions

Nonlinear equation can be used to measure cooperative performance through human resources or members, capital, and volume factors. The analysis of the three countries, Malaysia, the Philippines, and Indonesia, reveals that various factors require enhancement. The equation of the production function clearly shows the factors that require improvement in terms of both members and capital, as well as output effectiveness. The variables of rigidity and return to scale in the production function are utilized with programs implemented in various countries, yet improvements are necessary. This includes enhancing human resources of the members by increasing competence through education and training, as well as improving capital effectiveness by developing financial institutions for cooperatives, as outlined in the results of the research analysis above. Although members and capital are each inelastic or ineffective to volume performance in Malaysia, cooperatives in Malaysia have succeeded in managing both so that there is an increasing to scale together to volume performance. While cooperatives in the Philippines, capital management is very elastic or effective, but members are not elastic or ineffective to output, but together there is effectiveness in increasing volume or increasing of return. For Indonesia, member and capital factors, both individually and together, are not effective to volume so that there is a decreasing rate of return. Therefore, improving management is very necessary, both member management and capital management in order to increase the volume of cooperatives effectively in Indonesia, when compared to Malaysia and the Philippines.

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