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THE IMPACT OF CREDIT AND CAPITAL SUPPORTS ON ECONOMIC BEHAVIOR OF FARM HOUSEHOLDS: A HOUSEHOLD ECONOMIC APPROACH

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Abstract

This research aimed at analysing the demand and allocation of credit and capital supports by farm household and impact on production, consumption, and investment. The research was conducted in East Nusa Tenggara Timur (ENT) Province, one of targeted region of credit and capital supports policy of the government. Data collection was conducted from April to June 2013 by sampling for 178 households of farmers in Kupang District and Timor Tengah Selatan (TTS) District. The result of this research showed that the allocation of credit and capital supports caused increaseof cattle production, consumption expenditure, and investment. The usage of credit and capital supports was depend on economical situation of the household itself. The decision of farm household on using credit and capital supports had impact on overall economical behavior of household, i.e. production, consumption and investment behavior. The transmission use was reciprocally interacted. Finally, the policy of credit and capital supports scheme for farmers should be adjusted with the context of farm household economics.

Keywords : *Credit and capital supports, farm household, economic behavior, welfare*

1. Introduction

Credit has a role in increasing farmers' income and welfare through improvement of production and increase in consumption, especially in developing countries. The purpose for extending production credit and capital support is basically to increase agricultural production. Agricultural credit is allocated for production activities, such as purchasing inputs (seed, fertilizers, pesticides and other chemicals), paying labor wage, renting tractors, purchasing capital and other materials (Nuryartono *et al,*. 2005; Adebayo *et al.*, 2008; Nwaru *et al.*, 2011; Saleem, 2011; Muayila, 2012).

However, not all farmers use the credit to purchase production input. Small-scale farmers do not purchase input or other technology, especially to rent a tractor (Olagunju, 2007). In fact, households decide to use and to allocate capital not only for production activities, but also for consumption and investment (Nwaru *et al.,* 2011; Yasmeen *et al.,* 2011).

Numerous studies about the role of credit for farmers have been conducted. However, the focus of these studies were partial, viewing farmers as individuals who are able to make agribusiness decisions on their own and mainly analyze the farmers' external side (Syukur, 2002; Hussein, 2007; Saleem, 2011; Muayila, 2012). Specific studies about farmer households have also been conducted, but they still viewed farmers' households from the pure producer and pure consumer points of view separately (Sawit, 1993; Priyanti *et al*., 2007; Sahara, 2012), while in reality the farmer household is a unit in which production decisions are not separate from consumption decisions; they affect each other (are non-recursive). These are some examples of the studies: the studies by Lambert and Magnac (1994) in Ivory Cost, Skoufias (1994) in India, Sadoulet, de Janvry and Benyamin (1996) in Mexico, Sonoda and Maruyama (1999) in rice-farmer households in Japan, and Kusnadi (2005) and Elly (2008) who studied the economic behavior of farm households in Indonesia.

A preliminary study which was related to credit in a non-perfectly competitive market was done by Lopez (1986) and was continued by Coyle (1994) and was further developed by Bhattacharyya and Kumbhakar (1997). In Indonesia, several studies about the demand and utilization of credit in farm households have been done, but they did not completely analyze the relationship between production decisions and consumption decisions as a farm household economic unit nor did they study credit allocation.

Household economic decisions are influenced by the amount of income household from various income sources, both agriculture and non-agricultural sources, formal and non-formal credit, and other factors such as family characteristics (Caillavet *et al.,* 1994).

The empirical problems most often faced are (a) even though there is credit and agricultural capital support received by the farm households, the production, productivity, income, and welfare of the farm households are still low, (b) there isn't much internal information about farm household behavior in demanding and allocating credit and capital support and the effects on farm household production, income, and expenses, and (c) how does the impact of policy change in agricultural funding through credit and capital support on farm household's welfare.

The purpose of this study is (1) to analyze the farm household's credit and capital support demands and allocation, (2) to analyze the impact of the utilization of credit and capital support on farm household production, consumption, and investment.

2. Methodology

2.1. Time of Study and Types of Data

Data collection was done from April to June 2013. The types of data used were cross sectional and time series data, while the data source were primary and secondary data. Primary data were obtained through direct interviews with respondents, whereas secondary data were obtained from related agencies and published studies.

2.2. Research Site

The target of credit and capital support is poor-household farmers. ENT Province is one of the provinces which are considered poor. Credit and capital support in ENT Province are mainly aimed for livestock agribusiness (69%) and from that amount, 32% is for cattle agribusiness. Kupang and TTS Districts were chosen as the study locations with

considerations that (1) central producing area of cattle production in ENT, (2) the highest number of farm households, (3) central breeding area for Balinese cattle, center for artificial insemination service and forage development, (4) the highest number of target villages in ENT Regional Government program, *AnggurMerah*, in 2011.

The sub-district and village samples were determined using a purposive method based on (1) cattle population centers, and (2) the distribution of credit and capital support providers for cattle agribusiness. The villages chosen were Teunbaun, Buraen, Oesao, Naibonat, and Sillu in Kupang District, Boentuka, Benlutu, and Oebelo in TTS District.

2.3. Household Sampling

Household samples were farmer household which received credit and/or agricultural capital support in the last two years for cattle agribusiness. Based on the sampling frame, the sample households were determined using a simple random technique. For credit and capital support schemes which involved fewer households, a census was done. The distribution of the sample households are presented in Table 1.

Table 1. The Distribution of the sample

Districts	Number of HH sample	Agroecosystem Zone
Kupang	128	dry land: 98 ; wet land : 30
Teunbaun village (sub district Amarasi Barat)	37	dry land
Buraen village (sub district. Amarasi Selatan)	25	dry land
Oesao village (sub district Kupang Timur)	10	wet land
Naibonat village (sub district Kupang Timur)	20	wet land
Sillu village (sub district Fatuleu)	36	dry land
Timor Tengah Selatan (TTS)	50	dry land: 30 ; wet land: 20
Boentuka village (sub district Batu Putih)	10	dry land
Benlutu village (sub district Batu Putih)	20	dry land
Oebelo village (sub district. Amanuban Selatan)	20	wet land
Sum	**178**	dry land: 128; wet land: 50

Source: Primary Data
Note: HH= Household

2.4. Analysis Methods

The economic model of farm households that was developed was an econometric model in the form of a simultaneous equation system which consisted of 43 equations, i.e. 26 behavioral equations and 17 identity equations. The model had gone through model re-specification and re-estimation steps. In order to see the impact of credit and capital support utilization, simulations were performed with the following scenarios: (1) the amount of credit and capital support increased by 25%, (2) the credit interest rate increased by 10%, (3) the amount of credit and capital support decreased by 15%, (4) the amount of credit and capital support + the price of calves increased by 25%, (5) the amount of credit and capital support + the price of calves + the selling price of for cattle increased by 25%.

3. Results and Discussion

3.1. The Characteristics of the Farmers and Household Members

The characteristics of the farmers and household members were explained by the variables of age, formal education, number of family members, and number of family members in laborforce age categorized based on agro-ecosystem zones. The average farmers' age was within the productive age category with a formal education level of junior high school dropouts. The average number of household members was five with four of them categorized as laborforce age. The distribution of farmer and household member characteristics are presented in Table 2.

Table 2. Characteristics of the Farmers and Household Members in ENT Province, Indonesia

Charateristics	Zone											
	Dry Land				Wet Land				ENT			
	Max	Min	Mean	SD	Max	Min	Mean	SD	Max	Min	Mean	SD
Age (year)	72	25	47.58	8.26	74	27	46	8.60	74	25	47.13	8.36
Formal Education (year)	15	3	8.31	2.14	12	3	7.6	2.09	15	3	8.11	2.14
HH Members (people)	7	3	4.95	0.99	7	3	5.16	1.09	7	3	5.01	1.03
Laborforce	7	2	3.57	1.23	7	2	3.52	1.33	7	2	3.56	1.26
Man Laborforce	5	1	1.98	0.88	5	1	2.12	0.94	5	1	2.02	0.90
Woman Laborforce	6	1	1.94	1.09	6	1	2.18	1.49	6	1	1.99	1.22

Source: Primary Data
Note: SD= standard deviation

The data in Table 2 shows that there are relatively similar tendencies between agro-ecosystem zones in several household characteristic measures. The oldest head of household's age has passed the productive age but is still involved in agricultural activities. This is an indication that agricultural activities are important economic activities for their households. The number of family members is relatively low. The number of household members represents the economic burden and the potential laborforce in the family.

3.2. Model Estimation

The credit and capital support received by farm households were allocated to productive activities, consumptive expenses, and investment. The largest allocation was for productive activities, especially cattle agribusiness, both on arid land and wet land agro-ecosystems. Consumption expenses included food and non-food consumption. Investment included productive business investments, household investments, social, educational, health, and savings. Allocation of credit and capital support distribution is presented in Table 3.

Table 3. Credit and Capital Supports Allocation (x IDR 1000)

Zone	Allocations								
	CRBM	AUTS	AUSS	ANON	APRO	APGN	ANPN	AKON	AINV
Dry Land									
Max	24 150	9500	2500	6100	13 700	1000	750	1750	14 000
Mean	4731.84	3542.97	373.44	91.99	4008.40	241.88	69.65	311.52	411.91
%	100	74.88	7.89	1.94	84.71	5.11	1.47	6.58	8.71
SD	3463.97	2427.81	468.37	541.01	2585.30	212.73	111.54	298.13	1774.49
Wet Land									
Max	17 000	8000	1000	2000	9150	500	450	950	10 000
Mean	3763.60	3032.00	173.00	118.50	3323.50	167.00	37.60	204.60	235.50
%	100	80.56	4.60	3.15	88.31	4.44	1.00	5.44	6.26
SD	2653.81	1702.24	287.35	342.44	1811.43	156.04	83.02	215.28	1410.45
ENT (Dry Land + Wet Land)									
Max	24 150	9500	2500	6100	13 700	1000	750	1750	14 000
Mean	4459.86	3399.44	317.13	99.44	3816.01	220.84	60.65	281.49	362.36
%	100	76.22	7.11	2.23	85.56	4.95	1.36	6.31	8.12
SD	3278.67	2254.86	434.07	492.56	2408.18	200.87	105.09	280.93	1678.20

Source: Primary Data

The estimation results of credit and capital support demands are in line with the economic theory, i.e. the interest rate variable and selling price have negative effects, whereas the other variables have positive effects. The negative parameter coefficient means that if this parameter's value increases a certain unit, it will decrease credit and capital support demand at the same value as the coefficient itself (Table 4).

Table 4. Parameters Estimation of Demand and Payment Credit and Capital Supports

Variable	Parameter Estimation	t-value	e	Variable	Parameter Estimation	t-value	e
Demand of credit and capital supports (CRBM)				Payment of credit and capital supports (RCBM)			
Intercept	1747491	2.69***	-	Intercept	1003543	0.49	-
SBKR	-229143	-2.52***	-0.964	WPKR	138931.1	6.82***	0.947
WPKR	146483.5	6.45***	0.385	WPBM	16836.31	1.58**	0.175
WPBM	88382.40	7.83***	0.356	HBKL	-0.36130	0.88	-0.517
RHBS	2.12E-14	1.10*	0.029	PUSS	0.007414	0.08	0.053
BTOS	0.070555	0.54	0.065	PNON	0.090369	0.23	0.171
DUMZ	108940.6	0.27	0.024	DUMZ	503214.2	1.43**	0.292
DUMC	5533430	3.07***	1.240	DUMC	934942.7	0.86	0.543

Source: Primary Data
Note: *= sign 15% , **= sign 10% , ***= 5%, e: elasticity

The credit and capital support demand's response to the changes in the variables above show that they are relatively non-responsive which is signified by the low elasticity value. From all the variables, the one that elicits the most response is the interest rate. This shows that in making the decision to apply for credit and capital support, the household considers the interest rate. On the other hand, the payment period of credit and capital support is responsive to length of the payment period. The agro-ecosystem zone dummy explains that households within the arid land zone receive more credit and capital support and generate

more payment than households on wet land. The elasticity value in the equation for credit and capital support allocation for productive activities is generally non-responsive to changes in the variables above (Table 5).

Table 5. Parameters Estimation of Credit and Capital Supports Allocation

Variable	Parameter Estimation	t-values	e	Variable	Parameter Estimation	t-values	e
AUTS				**APGN**			
Intercept	-155695	-0.29*	-	Intercept	-167440	-0.52	-
JPRS	230374.7	1.62**	0.198	KPBL	0.046715	0.70	0.617
CRBM	0.305722	4.96***	0.358	CRBM	0.022636	2.75***	0.303
RHBS	1.81E-14	1.55**	0.030	PUTS	0.005316	0.57	0.070
TKKS	9302.941	3.81***	0.295	DUMZ	48309.45	1.40**	0.145
DUMZ	248604.8	0.96	0.065	DUMC	31064.07	0.54	0.093
DUMC	206551.2	0.59	0.054				
AUSS				**ANPN**			
Intercept	314677.2	1.48**	-	Intercept	-82753.8	-1.19*	-
TPRT	-0.01814	-1.90***	-0.569	CRBM	0.022782	4.60***	0.649
CRBM	0.052700	3.30***	0.383	PUTS	0.003037	0.63	0.085
LHAN	60562.17	1.45**	0.210	TPRT	-0.00227	-0.72	-0.279
DUMZ	137076.1	1.90***	0.223	PUSS	0.004877	0.77	0.054
DUMC	121882.3	1.18*	0.198	DUMZ	13039.34	0.81	0.083
				DUMC	11089.87	0.48	0.070
ANON				**AINV**			
Intercept	-260138	-1.15*	-	Intercept	-250761	-0.21	-
TPRT	-0.00124	-0.14	-0.066	CRBM	0.19612	2.28***	0.949
CRBM	0.097293	5.12***	1.201	TPRT	-0.06026	-1.11*	-1.259
BTNN	0.031813	0.82	0.128	PUTS	0.092545	1.10*	0.4435
DUMZ	-109780	-1.28**	-0.303	PUSS	0.054114	0.49	0.7288
DUMC	-29130.2	-0.24	-0.080	DUMZ	-258354	-0.93	-0.280
				DUMC	929507.7	2.32***	1.0087

Source: Primary Data
Note: *= sign 15% **= sign 10% ***= 5% e: elasticity

Partially, it can be seen that allocation for cattle agribusinesses and non-agricultural businesses are more responsive to changes in the number of credit and capital support available, whereas allocation for non-cattle agribusinesses are more responsive to the changes in the household expenditure variable. The elasticity value shows that allocation for cattle agribusinesses are more inelastic, followed by allocation for non-cattle businesses, and finally by non-agricultural businesses. This means that if credit and capital support are available, the household's behavior is to first allocate it to cattle agribusiness, followed by non-cattle agribusinesses, and last non-agricultural businesses.

Table 6. Impact of Credit and Capital Supports Policy Changes on the Production, Income, and Household Expenditure

VARIABLE	% Scenario 1	% Scenario 2	% Scenario 3	% Scenario 4	% Scenario 5
CRBM	-	-4.29	-	-	-
AUTS	24.47	-1.91	-12.10	25.78	25.12
AUSS	26.08	-2.80	-12.55	36.24	-13.95
ANON	240.02	-18.13	-118.38	242.29	231.06
APGN	26.27	-2.09	-13.02	24.37	33.47
ANPN	102.14	-8.31	-50.39	102.38	99.91
AINV	123.51	-12.39	-61.03	119.63	132.48
APRO	30.26	-2.41	-14.92	32.35	27.16
AKON	40.42	-3.25	-19.99	38.93	45.86
JPRS	8.95	-0.69	-4.50	6.22	27.64
BTOS	0.55	-0.13	-0.28	24.15	90.48
PUTS	14.59	-1.19	-8.05	13.69	121.32
PRTD	3.28	-0.20	-1.81	3.08	27.29
KPBL	0.23	-0.03	-0.15	0.98	4.76
KONP	1.95	-0.25	-1.15	-4.11	24.58
KOPG	0.14	-0.15	-0.09	0.58	2.82
KONT	0.50	-0.18	-0.29	-0.85	5.54
IPRO	3.53	0.03	-1.82	3.59	16.10
ISRT	5.82	-0.21	-3.21	-5.46	48.41
IPKS	4.53	-0.81	-2.34	1.25	17.47
TPIV	21.93	-1.05	-11.29	7.22	80.20
TABN	45.39	-2.22	-23.20	18.97	145.05
TPRT	10.99	-0.42	-5.67	3.10	42.08

Source: Primary Data

Allocation for food is more responsive to changes in the purchased food consumption expenditure variable. This means that the portion of the households' food expenditure is an indicator of the households' decision in allocating credit for food expenditure. On the other hand, allocation for non-food expenditure is more responsive to changes in the variables of the amount of credit and capital support received. Allocation for investment is responsive to all the variables which components of the equation. Expenditure purposes which are more responsive will react if there is an increase or decrease in the amount of credit or capital support.

From all of the household behaviors in allocating credit and capital support, the household is more responsive (more elastic) to allocations for investment compared to other allocations which are more inelastic. This means that from all the allocation purposes, allocation for investment is the households' last choice in allocating credit and capital support, whereas allocation for the cattle agribusiness is the most inelastic. The

consequences of the elasticity value are that the households' behavior in allocating credit and capital support is mainly aimed at financing the cattle agribusiness, followed by non-food expenditure, food expenditure, non-cattle agricultural expenses, non-agricultural businesses, and lastly investment allocations.

3.3. The Impact of Credit and Capital Support on Household Economic Behavior

The credit and capital support received by the farm households have an impact on households' economic behavior as a whole, on both production and consumption behavior. The transmission of impact caused by credit and capital assistance does not only occur through increases in production and income from the cattle agribusiness as the main purpose of the credit and capital support, but also through the pathway of other household economic decisions.

Data on Table 6 describe the transmission of household economic behavioral changes in response to credit and capital support besides the changes in other economic variables such as interest rate changes, input price changes (the price of calves), and output price changes (the selling price of cattle). Credit and capital support received by farm households will have a non-recursive impact on all the household economic decisions, both production and consumption decisions.

4. Conclusion and Policy implications

The conclusions of this study are:

- Credit and capital support have a role in increasing the welfare of farm households. The increase in credit and capital support will increase cattle production, non-cattle agribusiness and non-agricultural business productions, and household expenditure. Increased household expenditures indicate an increased household welfare.
- The effects of changes in input price such as an increased calf price will decrease cattle production, but if it is followed by an increased amount of credit and capital support and an increased cattle selling price, it will increase household expenditure and household welfare.
- Changes in the amount of credit and capital support have an effect not only on the increased amount allocated for cattle production, but also for non-cattle agribusinesses, non-agricultural businesses, and consumption expenses.

The policy implications: (1) to increase the ability to finance agribusinesses in farm households, more credit and capital support schemes are needed, (2) the utilization of credit and capital support have a non-recursive impact on the economic behavior of farm households, thus credit and capital support policies for farm households must take the household economics concept in account.

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Appendix:

AINV : allocation for investment (IDR)
AKON (APGN + ANPN) : allocation for consumption expenditure (IDR)
ANPN : allocation for non staple food expenditure (IDR)
ANON : allocation for non agricultural activity (IDR)
APGN : allocation for staple food expenditure (IDR)
APRO (AUTS + AUSS + ANON) : allocation for production activity (IDR)
AUSS : allocation for other farm (IDR)
AUTS : allocation for cattle agribusiness (IDR)
BTNN : cost of non agricultural labor (IDR/year)
BTOS : cattle cost production (IDR/year)
CRBM : number of credit and capital supports (IDR)
DUMC : dummy receive of credit and capital supports (credit capital supports =1; other 0)
DUMZ : dummy of zone (dry land =1; other 0)
HBKL : calves price (IDR/head)
JPRS : number of cattle production (head/year)
KPBL : food expenditure (bought food) (IDR/year)
LHAN : area (Ha)
PNON : non-agricultural income (IDR/year)
PUSS : non-cattle agricultural income (IDR/year)
PUTS : cattle agribusiness income (IDR/year).
RCBM : number of payment credit and capital supports (IDR)
RHBS : calves and cattle price ratio (IDR/animal unit)
SBKR : interest rate of credit (%/year)
TKKS : number of family labor for cattle agribusiness (man days/year)
TPRT : number of family expenditure (IDR/year)
WPBM : payment period of capital supports (month)
WPKR : payment period of credit (month)