RESEARCH NOTE: THE DEMAND FOR AND MARGINAL PRODUCTIVITY OF FINANCE CAPITAL IN THE SOUTH AFRICAN AGRICULTURE.

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Abstract

The efficient and productive use of capital as an input into the South African agriculture are investigated in this research. Shifts in demands for long term, cooperative and bank credit were larger and probably more frequent than the respective supplies, resulting in dominant and relative price elastic supply functions. Cooperative credit is a substitute for long term credit, while bank credit is complements to other credit types. The marginal productivities of equity and medium term credit show operation in irrational production phases. Equity had an increasing marginal productivity indicating insufficient usage, while the negative marginal productivity of medium term credit indicates over meganization.

Uittreksel

Die effektiwiteit en produktiwiteit van finansiering in die Suid-Afrikaanse landbou word in die navorsing ondersoek. Verskuiwings in die vraag na langtermyn-, koöperasie- en bankkrediet was groter en moontlik meer gereeld as verskuiwing in die aanbod daarvan, wat gelei het tot dominante en relatiewe prys-elastiese aanbodfunksies. Koöperasie finansiering is 'n substituut vir langtermyn finansiering, terwyl bankkrediet komplementêr tot die ander finansieringsvorme is. Die marginale produktiwiteite van eie- en mediumtermyn kapitaal dui op aanwending daarvan in irrasionele fases. 'n Stygende marginale produktiwiteit van eie kapitaal dui op onderbenutting terwyl oor-meganisasie aangedui word deur 'n negatiewe marginale produktiwiteit van meduimtermyn kapitaal.

1. Introduction

Efficiency and productivity of finance capital usage in the South African agriculture is a growing concern. Measures of efficiency and productivity are usually based on the optimum combination of operating inputs and the output performance of investments. The productivity of capital and labour both increased during the past decade, but the effectiveness of applying appropriate financing principles are concerns (Louw & Mostert, 1990). Returns to capital in South Africa are low and depend on inflation, conservative debt ratios and interest rates (Van Zyl *et al*, 1987). Low profitability and increased financial risks are to some extent also blamed on natural environmental hazards such as droughts. It is however possible that the absence of sound financing principles, agricultural support policies, agricultural financing structures and fiscal policies may also have contributed towards the present financial crisis in agriculture.

It is hypothesised that finance capital (credit) are variable over the long term irrespective of the type of credit. Long, medium and short term capital may thus be regarded as substitutes or complements concerning their supplies and demands. This assumption is for example supported by the relatively permanent nature of overdrafts, continuance of past production loans (cooperative credit), irreversible investments in agriculture. Disregard by farmers of academic financing principles to match investment period and credit type may be an indication of the need to substitute credit types freely. Demand/supply substitution and marginal productivity of capital as a production input are investigated in this paper.

2. Variables, data and methods

Different types of finance capital (long term, medium term, cooperative, commercial bank and equity) were used as response variables in "demand" functions and as inputs in production functions. Net farm income (NFI) was used as the response variable for Cobb-Douglas type production functions, while prices (interest rates) and return on total investment (ROI) were used as predictor variables in "demand" estimations. Data for these variables were obtained from the SAAU. Functions were fitted with stepwise and ridge regression procedures using OLS on log-transformed data.

3. Results

Figure 1 shows the production surface for combinations of long term and cooperative credit. Substitution exists for combinations of small or large amounts of both inputs, flat surfaces indicate supplementary relationships and high/low combinations signify complementing and dependency. Table 1 shows declining marginal products (MP's) for both inputs. Isoquants and isoclines are shown in Figure 2. The MP's for equity and medium term credit show operation in irrational phases. The MP's for equity increase (applied too little) and those of medium term credit are negative (applied too much).

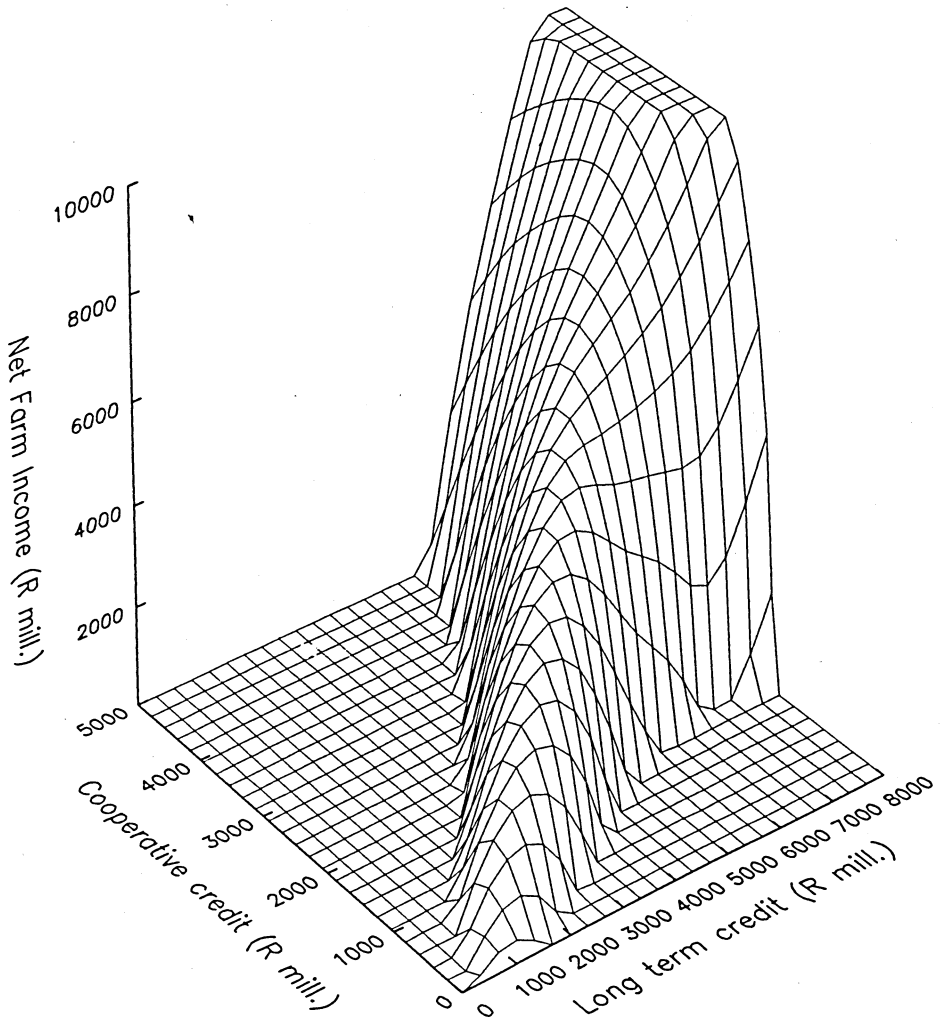

Figure 1: Response of Nett Farm Income (NFI) to long term and cooperative credit

The MP's for bank credit decline, which demonstrate a rational (but probably non-optimal) application. Table 1 shows relative price-elastic "demands" for long term, cooperative and bank credit. Positive own price signs signify that supply curves were actually traced out. Shifts in the demand for credit are thus larger (and probably more frequent) than supply shifts. Cooperative credit is a substitute for long and medium term credit, while in reverse a complement of long term credit. Bank credit is a complement for all the other credit types (reversible for long term credit). The supply of medium term credit is not significantly influenced by its price.

4. Discussion

The supply of agricultural credit is price sensitive, signifying a captivated and dependent market. This sensitivity is larger for state subsidised/guaranteed loans or credit. Consolidation of debt was usually accompanied by redeeming some cooperative or state production loan facilities and bank overdrafts (substitution) but in the process created capacity to expand short term credit. The "erroneous" use of bank overdrafts to finance medium and long term investments or using long term loans to redeem short term obligations is common practice among farmers. These practices are generally regarded as "unsound financing", but other than a finance "squeeze", they may also be based on credit price relatives for rational financing behaviour. Excessive demand for credit and the use of an over-valued asset base resulted in competition for security cover among financiers rather than in competition for credit substitution. This explains the price-elastic supply of credit. Rigid Reserve Bank monetary policies and circular interdependence of financial institutions caused similar and inflexible interest rate policies. This, accompanied by an inflexible and protected state financing structure, intensified these discrepancies. Substitution of credit inputs were promoted by the state debt consolidation schemes that favoured substitution of short and medium term credit long term credit. The carry-over of cooperative production loans, in turn made short term credit a long term nature.

Table 1: Summary of regression results for credit demand/supply and production functions

Predictor/ Response variables	Supply/ demand functions				Production Functions	
	L_term	Coop	Bank	Med	NFI	NFI
Intercept	12.946***	-36.950***	14.412***	10.561***	-	-5.525***
	(0,418)	(1.302)	(0.390)	(0.966)	-	(0.820)
L_Int	1.54***	0.472*	1.871***			
	(0.316)	(0.238)	(0.246)			
B_Int	1.655***	1.805***	1.014***	6.865***		
	(0.416)	(0.337)	(0.200)	(1.529)		
C_Int	-1.213**	2.085***		-2.845*		
	(0.553)	(0.413)		(1.622)		
ROI	0.402*		0.445**			
	(0.206)		(0.199)			
Year		10.460***				
		(0.808)				
L_term					0.622***	
					(0.207)	
Coop					0.335***	
					(0.122)	
Equity						1.229***
						(0.194)
Med						-0.097**
						(0.041)
Bank						0.198**
						(0.090)
F_{model}	94.19	526.43	239.27	66.01	415.60	503.36
R^2_{adj}	92.55	98.59	95.97	81.25	96.51	98.05

N = 31 observations. Significance levels: * = P < 0.10, ** = P < 0.05, *** = P < 0.01.
L = Long term, Coop = Production loan from cooperative, Bank = overdraft, Med = Medium term, NFI = net farm income, Int = interest rate, B = Bank.

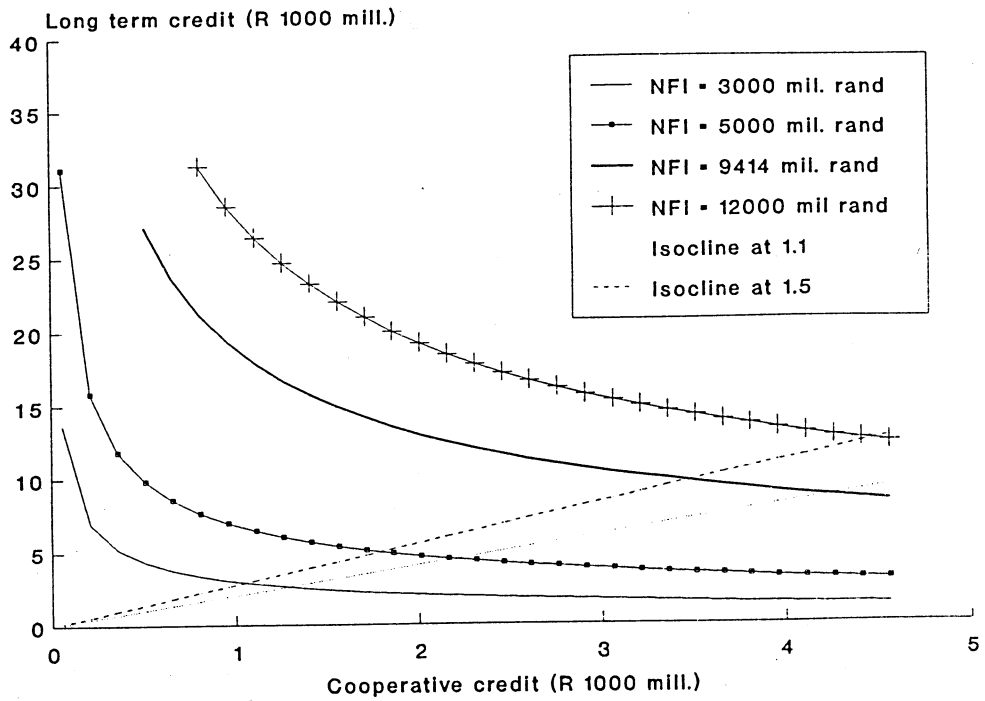

Figure 2: Isoquants and isoclines for long term and cooperative credit

Profitability considerations were less important in the supply of credit. Over mechanization, the use of labour saving technology and cooperatives' involvement in trading and financing of mechanization resulted in negative MP's for medium term credit. Similar results exist on a regional bases (Van Schalkwyk & Groenewald, 1992).

State financial support policies limited substitution between cooperative and long term credit, enforced virtual dependency and strengthened the permanent nature of these credit types. Since 1982 marginal rates of substitution (0,9 in 1991) were constantly lower than associated price ratios (1.1 in 1991). Security based financing limited expansion prospects and optimal credit use, which increased financial risks and probably contributed to the current financial crises.

It is suggested that farmers use credit for enterprises or investments on the basis that the price ratio (P_{credit}/ROI) equals the marginal productivity of credit rather than on a basis of investment lifespan. This may imply an ability to freely substitute between credit types if price differentials for different types of credit exist. Such a practice will inevitably reduce the farmers financial risk, but may require a different security base for financial institutions. Convertible securities, or security quotas based on asset inflexibility differentials may be employed. The larger emphasis on ability to repay loans and interests rather than guarantees of debt covered by assets currently used as financing criteria by financial institutions already supports credit substitution.

5. Conclusion

The optimum use and combination of finance credit is restricted by policies of financial institutions and government. The relatively high price-elasticities of supply and limited competition of substitute financing resulted in "erroneous" credit use and larger financial risks. This is probably the result of interest rate policies, security based financing and other factors such as tax concessions and the use of an inflationary asset base for debt covering.

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