SOLVENCY, ENTREPRENEURIAL ACTION AND THE ECONOMIC ENVIRONMENT: LESSONS FROM THE RECENT PAST

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Abstract

Average solvency in South African agriculture deteriorated considerably between 1976 and 1985, improved somewhat from 1985 to 1988 and thereafter deteriorated once again. Considerable interregional differences exist in relative levels of solvency. Entrepreneurial and managerial influences on this are manifested through financial management involving particularly mechanization, choice of financiers and risk acceptance or avoidance. A cross sectional and discriminant analysis was done to explain solvency differences between regions. Solvency was shown to be a function of land ownership, education, percentage established pastures, enterprise mix, financier, type of management and long term average rainfall. The output/input price ratio, enterprise mix and percentage of debt load financed by co-operatives explained the difference between regions with below and above average solvency ratios.

Uittreksel

Die gemiddelde solvabiliteit in die Suid Afrikaanse landbou het aansienlik verswak vanaf 1976 tot 1985, ietwat verbeter van 1985 tot 1988 en daarna weer versleg. Groot verskille bestaan tussen streke ten opsigte van relatiewe solvabiliteitsvlakke. Entrepreneuriale en bestuurs invloede hierop word manifesteer deur finansiële bestuur wat spesifiek betrekking het op meganisasie, keuse van finansierders en risiko aanvaarding of vermyding. 'n Dwarssnit en diskriminant analise is gedoen om die verskille in solvabiliteit tussen streke te verklaar. Daar is getoon dat solvabiliteit 'n funksie is van grondeienaarskap, opleiding, persentasie aangeplante weiding, bedryfsmengsel, finansierder, tipe bestuur en lang termyn gemiddelde reënval. Die uitset/inset prys verhouding, bedryfsmengsel en persentasie skuldlas gefinansier deur koöperasies het die verskil tussen onder- en bogemiddelde streke verklaar.

1. Introduction

According to the Abstract of agricultural statistics of 1993, the solvency ratio (asset/debt ratio) of the South African agriculture declined from 1955 to 1992 from 8,4 to 4,2 thus a decline of 50 per cent. Although on the average, this solvency ratio still reflects a fairly good picture it is well known that this ratio has a rather skew distribution. While the position of many commercial farmers appears to be sound, that of many others is rather unsound; many farmers face financial stress. Several studies, eg. Louw, 1979 and Van Zyl *et al* 1987a, showed that high debt loads are often accompanied by weak financial ratios and eventual insolvencies. Figure 1 shows that the average solvency ratio (total assets to total debt) of the South African agriculture sector declined seriously since 1975, reached a trough in 1985, then improved moderately up to 1988, to deteriorate once again through 1992.

The declining terms of trade as illustrated by Liebenberg & Groenewald (1990) and Van Zyl *et al* (1993) render it increasingly difficult for farmers to lighten their financial burden; from 1975, product prices declined relative to input costs, and from 1983 relative to interest rates.

It is therefore relevant to examine solvency more closely, and especially to identify and quantify factors influencing solvency. The relationship between total debt of agriculture and certain economic parameters was previously analyzed through time series analyses (Van Zyl *et al*, 1987b). Good statistical fits were obtained and elasticities were calculated. The elasticities of debt load with respect to macro-economic variables are as follows: Volume of crop production: -2,68; gross domestic product deflated with the consumer price index: 1,21; interest rates: 2,81; ratio of producer prices to input prices: -2,13. A one per cent increase in the volume of crop production will according to this decrease the debt load by 2,68 per cent.

Solvency ratios are however likely to differ between regions and some more factors may also influence these differences. Data from the agricultural census of 1988 were used to analyze the distribution of solvency among statistical regions. This distribution appears in Table 1. A high variation is evident between regions, as indicated by the high values of the standard deviation and the coefficient of variance. A cross sectional analysis was done to explain the variations.

Table 1: Distribution of solvency ratios between statistical regions in 1988

Item	Mean	Standard Deviation	Coefficient of variance
Solvency ratio	5,92	2,32	39,19

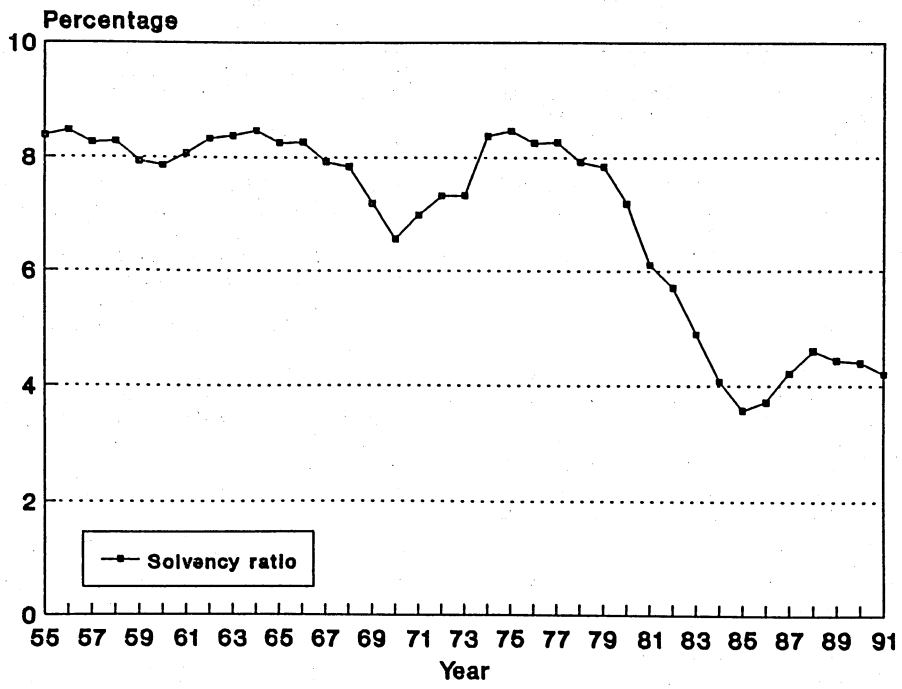

Figure 1: Average solvency ratios (1955 - 1991)

2. Variables used

2.1 Management

There is nothing new in the notion that managerial behaviour is the determining factor that causes a business - including a farm business - to prosper or to fail. A study in Western Transvaal revealed that farmers who have fared poorly financially revealed some serious managerial deficiencies: They had overinvested in medium term assets (particularly machinery), used too much credit relative to their own funds and spent excessively on short term inputs relative to production (Janse van Rensburg & Groenewald, 1987).

The main functions of financial management are planning for, acquiring and utilizing funds in ways that maximize the efficiency of the organization's operation. This requires knowledge of the markets from which funds are drawn, how to make sound investment decisions and how to stimulate efficient operations (Weston and Brigham, 1981). Managerial skills determine the manager's ability to utilise resources profitably and to increase net worth and security over time. It involves an ability to identify opportunities as well as problems, to realise opportunities and to solve problems effectively. Managerial skill includes decision making with a focus on opportunity; a good manager will exploit the right opportunities and will make sound decisions relative to the risks he will accept and those he will avoid. Better managers are more adept at selecting and accumulating relevant knowledge and converting such knowledge into results (Drucker, 1964; Groenewald, 1987). Managerial skill is associated with personal values emphasising productivity, profitability, personnel relationships, success, competitiveness and free thought (England, 1976).

Various factors can influence quality of management. Some of these do not appear in aggregate statistics. In this analysis, four types of intervening factors which were collected in census reports, and which normally affect quality of management were used as independent variables. These variables were broken up in smaller parts to represent different classes or ranges within the same variables. The composite variables are:

(i) **Age**, ranging from younger than 24 years, 25 to 34, 35 to 49, 50 to 64 and 65 or older.

(ii) **Education** was measured by classifying farmers on levels of less than matric, a diploma without matric, matric, matric with a diploma and university graduates.

(iii) **Type of management** was represented by sole proprietorships, partnerships, public companies, private companies and closed corporations as percentage of the total number of farmers in a specific region.

(iv) **Managerial intensity** were represented by the percentage full and part time farmers.

Statistical regions were used as units of observation. The analyses pertain to the 1988 census.

2.2 Risk

Various methods can be followed to reduce uncertainty and risk in agricultural production. The actions of a farmer in facing risk situations are determined by his judgement, capital position and objectives. Certain risks are an inherent part of the farm business. In a well-adjusted farming system, the farmer simply has to take the risk that circumstances could turn against him. Natural resource quality varies considerably in South Africa and is influenced by a number of factors such as the quantity and stability of rainfall and soil qualities that

influence arability. The differences in attainability of favourable prices give rise to differences in price risks. Some regions tend to specialize in products with a high degree of price variability. Farming in these regions is subject to higher financial risk, as is farming in regions with high input/output ratios (both in terms of output and price) and regions with above average indebtedness.

The degree of risk aversion or acceptance was measured by using as proxies the long term average rainfall, price differentials as calculated by Van Schalkwyk (1992) and net income per hectare as measured in the different statistical regions.

2.3 Enterprise mix

Diversification spreads risk over more products; total risk is reduced to the extent that different enterprises may have different risk exposures; the larger the divergence in nature and direction of risk exposure, the higher is the degree of effectiveness in risk reduction (Heady & Jensen, 1955). The cost of diversification lies mainly therein that diversification often leads to a sacrifice in terms of efficiency.

The influence of different farm enterprise mixes on solvency was measured by expressing the share of dominant farm enterprises as percentage of total farm output. Two levels were employed: enterprises dominating the farm systems with 50% and 75% of gross revenue.

2.4 Arability

Certain natural factors determine the inherent agricultural productive capacity of land. Soil fertility may be defined as the plant nutrient concentration and balance of soil within the root zones of the plants, its depth, its structure, erodability, compactibility, its degree of acidity, its water retention capability and its drainage qualities. Soil fertility is also influenced by human action such as tillage and fertilization. Most regions in South Africa identified as having higher resource quality also exhibit more favourable price ratios (Van Schalkwyk and Groenewald, 1991). This phenomenon corresponds with theoretical expectations. Better resource quality leads to higher yields per hectare and larger quantities are produced with the same input. Regions with better land quality are therefore hypothesized to exhibit better solvency ratios. Irrigable land, dry land, established pastures, natural pastures and commercial forestry as a percentage of the total farm land were used to measure arability.

2.5 Land ownership and capital investment

Overindulgence in terms of additional land purchases and over-mechanisation may have increased risk. In the Western Transvaal for example, the farmers realising poorer results during the recent droughts were those who had invested more per hectare of farmland in land and fixed improvements and also more in machinery and equipment. Their fixed costs contributed more to total costs than was the case with farmers who obtained better results (Janse van Rensburg & Groenewald, 1987). A study in Northern Transvaal indicated that financially successful farmers act more judiciously in land purchases (De Wet *et al*, 1992).

Real land prices furthermore declined since 1976 (Figure 2). This should certainly have had a negative effect on solvency ratios and the security of financial institutions who have traditionally secured long term loans with bonds over farm land.

Percentages land owned, rented and sharecropped were used as measurement of land ownership. The animal/machinery ratio and the cost of labour relative to the value of movable assets were taken to present different magnitudes of capital investment in the regions.

2.6 Financier

The different institutions financing agriculture in South Africa follow different credit policies regarding interest rates, security requirements, minimum levels in required financial ratios, objectives, redemption arrangements etc. Therefore, by choosing wrong combinations of financiers or loans, farmers can exercise negative effects on redemptionabilty, liquidity and eventually solvency.

Percentage of the total debt financed by the Land Bank, the state, co-operatives, commercial banks and private individuals were used to measure the effect of different financial institutions' credit policies on solvency ratios.

3. Method of investigation and empirical results

Cross sectional data from the Census of Agriculture of 1988, with statistical regions as units of observation were used in stepwise variable regression and discriminant analysis to analyze the differences amongst different regions.

3.1 Stepwise variable regression

A stepwise variable regression was done on the data with solvency as dependent variable and the above mentioned variables as independent variables. Multicollinearity was eliminated by choosing the stepwise variable selection option of the SAS computer program which automatically omits highly correlated variables which are not unique to the specific variables. Good statistical fits were obtained with the best one shown in table 2 (highly significant with a R^2 of 0,69). The F values for the regression is 21,81 and is significant at $p = 0,0001$

The positive sign of the diploma variable together with the positive sign of the public company variable which also delivered the highest partial R^2 emphasises the importance of management. This is in accordance with Van Schalkwyk *et al* (1993) who concluded that in general, more successful managers have lower fixed investments per hectare, lower farm expenditures per hectare and higher disposable income per hectare. The results furthermore, support the notion that better managers are more efficient and operate bigger farms than less skilled managers. It must be emphasised however that it is superior management that causes superior managers eventually to operate larger businesses (including farms), and not *vice versa*. A large farm, or business, does not in itself render a manager good or successful.

Better managers employing sound financial policies are able to expand and they end up with larger units (Groenewald, 1991; Sartorius von Bach *et al*, 1992; Sartorius von Bach & Van Zyl, 1992; Callow *et al*, 1991). The negative sign of the share cropping variable results directly from high debt loads and low credit worthiness which limit farmers' access to credit. They then have no other alternative but to go into share cropping to lower their risk. The positive sign of the private financier emphasises the importance of strong financial discipline in the use of credit. Private financiers have a different bottom line than state or parastatal institutions and co-operatives who largely handle Land Bank funds, have a lien on crops and have benefitted from state guarantees.

Table 2: Regression results with solvency as dependent variable

Variables	Coefficient	Partial R^2	F	p
Intercept	3,492		15,16	0,0002
Share cropping	-42,205	0,0364	12,03	0,0009
Diploma	42,0211	0,0435	9,62	0,0028
Established pastures	13,0673	0,0190	4,22	0,0436
Public companies	234,234	0,3000	59,63	0,0001
Animal enterprise > 75%	2,297	0,2353	7,49	0,0079
Private financiers	7,437	0,0202	4,71	0,0334
Long term average rainfall	-0,0027	0,0323	9,99	0,0023
Total regression		0,6867	21,81	0,0001

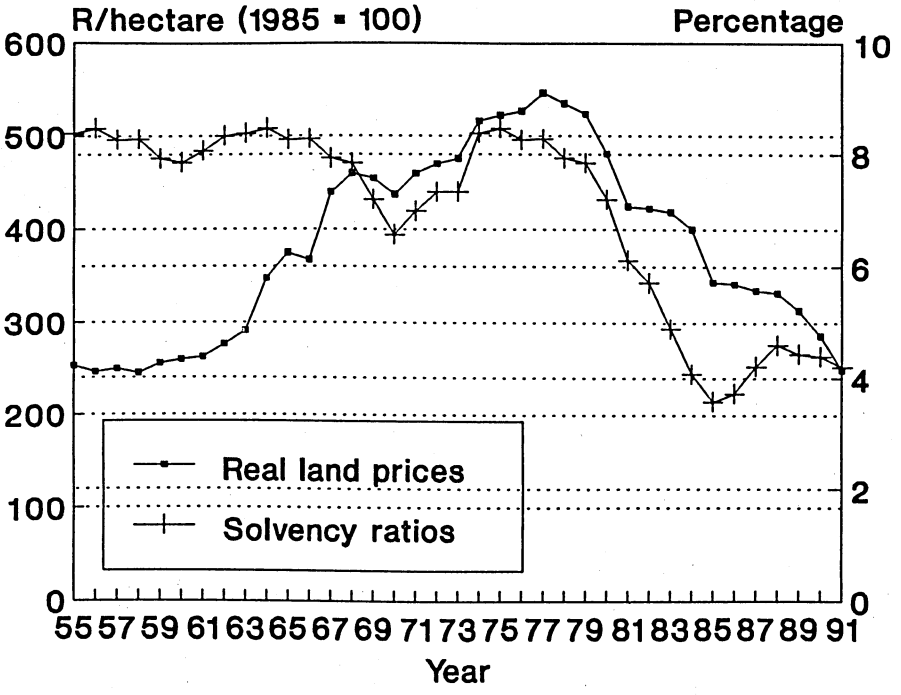

Figure 2: The effect of real farm land prices on solvency (1955 - 1991)

Private financiers (including banks) have to make profits and redeem loan funds to survive or prosper. Farmers who largely use funding from private financiers have thus been subject to stricter financial discipline. They probably started off by being more credit worthy and have started off as, or developed into better financial managers. Both the established pasture and animal enterprise had positive coefficients indicating that farmers specialising in this area have better solvency ratios and are therefore less risky. The long term average rainfall variable gave a small, but significant negative coefficient indicating that higher rainfall regions have lower solvency ratios. Higher rainfall areas are normally areas where cropping takes place. These regions were generally more affected by negative terms of trade (Liebenberg & Groenewald, 1990), tax concessions and subsidies on capital which have since 1976 encouraged capital formation, especially machinery purchases, and therefore the demand for credit. Higher rainfall areas do however also have higher income or redemption abilities and financial institutions can to a certain degree accept lower solvency ratios when granting credit in these areas.

3.2 Discriminant analysis

A discriminant analysis was done to find a mathematical rule, or discriminant function, for predicting the class to which an observation belongs. Two groups of statistical regions were developed for this purpose. The total mean solvency ratio was used as cut off point between the two groups. Regions with mean ratios larger than 5,927 were regarded as regions with good or above average solvency regions and regions with mean ratios smaller than 5,927 were regarded as below average. Forty one regions were accordingly identified as above average and 37 as below average. The model discriminating between above average and below average regions is tabulated in Table 3.

Table 3: Estimated discriminant coefficients for regions with above and below average agricultural solvency ratios

Explanatory variable	Coefficient		Partial	Significance
	Below avg	Above avg	R^2	p
Constant	-10,81	-5,496		
Prices	0,151	0,120	0,0908	0,0086
Crop enterprise > 75%	11,987	6,616	0,0659	0,0242
Forestry enterprise > 50%	-64,65	-20,09	0,0675	0,0234
Percentage of debt load financed by co-operatives	10,392	-3,356	0,3577	0,0001

Table 4: Pearson's correlation coefficients of the independent variables with the dependent variable

Variables	X_1	X_2	X_3	X_4
r	-0,378	-0,338	0,125	-0,506
Significance	0,0006	0,0024	0,2738	0,0001

The following discriminant function has been calculated:

$$y = -5{,}315 + 0{,}031X_1 + 5{,}371X_2 - 44{,}556X_3 + 13.748X_4$$

Where;

y	=	The two solvency groups
X_1	=	Prices
X_2	=	Crop enterprise > 50%
X_3	=	Forestry enterprise > 50%
X_4	=	Percentage of total debt financed by co-operatives

The independent variables were tested for correlation with the dependent variable to explain the signs of the relative coefficients. The correlation coefficients are presented in Table 4.

The price, crop enterprise and percentage of debt financed by co-operatives (X_1, X_2 and X_4) variables gave positive coefficients in the discriminant function and negative correlation coefficients, firstly indicating that higher values in these variables are associated with group one (the below average regions) and secondly, that these variables are negatively associated with solvency ratios.

The negative influence of the price variable results directly from past agricultural policies which favoured some products at the cost of others. These policies led to over-investment in capital, ploughing of marginal land and distorted comparative advantages, which all to some degree influenced solvency ratios negatively (Van Schalkwyk, 1992; Van Schalkwyk *et al*, 1992).

The negative influence of the agricultural co-operatives as financiers can be ascribed to several reasons which may range from controllable to uncontrollable factors. The controllable or managerial factors may include weak credit evaluation practises, state subsidies and state supported collateral securities which psychologically created an erroneous perception of a safer than actual financial environment for co-operative management. Uncontrollable factors include the declining terms of trade and droughts which negatively effected farmers' redemption abilities. It must however be emphasised that other financiers of agriculture face exactly the same risks. One could therefore conclude that many co-operatives' credit management was ineffective. To some extent the system by which farmers could obtain Land Bank funds via production loans extended through co-operatives with crops as lien, turned these co-operatives into financial institutions - a specialised role which they have been ill - equipped to fulfil. It involved a deviation from a principle stressed by management theorists (eg. Drucker,1986) that a firm should stick to its business.

The negative coefficient of the forestry variable indicates that regions with forestry enterprises have better solvency ratios. Forests are adapted only in certain regions and are therefore not present in many parts of the country. This is reflected in the insignificant correlation coefficient of the variable.

4. Conclusion

Decision-making is more complex today than in the past, and will in future become even more complex. This places pressure on managerial practises. Management must be focused on opportunity and not on problems. Risk management ought to be practised within this particular framework. In the balance, the farm producer is the person who should make decisions. The bureaucrat's role is merely to provide an environment that gives the producer space to make his own decisions. The bureaucrat should realise that he himself is exceptionally poorly equipped to be involved with agricultural production and marketing decisions. These should be left to those better equipped - the producer and the businessman.

Creditors should increasingly take cognisance of the personal traits of borrowers before extending large loans. Failure to do so will increase their own risk; if a borrower' position is allowed to deteriorate to a point of sequestration before he is advised to change his management and/or reconstruct his business, then it is a sign of poor management on the part of the creditor himself - particularly in institutions assumed to be involved in the rendering of services.

To conclude "....those who make the error of neglecting future changes - in technologies, markets, and attitudes - that will affect their business and professions, and their personal plans, too, do so at their own peril. On the other hand, those who make a conscious effort to understand the changes that are coming, to anticipate them, and to make use of them, will find new opportunities for gain" (Leon Martell, futurist).

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