THE STRUCTURE OF SOUTH AFRICAN MILK PRODUCTION TECHNOLOGY: A PARAMETRIC APPROACH TO SUPPLY ANALYSIS.

by

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ABSTRACT

THE STRUCTURE OF SOUTH AFRICAN MILK PRODUCTION TECHNOLOGY: A PARAMETRIC APPROACH TO SUPPLY ANALYSIS.

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A parametric approach was used in this study to analyse milk production and supply systems based on farm level production cost data from a cross-section of dairy farms in South Africa for the 1997/1998 production year. Both single equation and system estimation techniques were applied to Normalised Quadratic, Normalised Translog and standard Translog specifications of the profit and derived output supply and input demand functions. Estimated functions were evaluated for adherence to structural properties. Results showed that convexity of the profit function in all prices holds in South African milk production. Uncompensated and compensated price elasticities of supply and demand were calculated. The results indicated that milk production and livestock trading activities are complements in the production activities of the observed multi-input, multi-output dairy farms. Both activities were intensive in the use of purchased and self-produced feed inputs, with a higher intensity in purchased feed use. The variable inputs are gross complements in the long-run and net substitutes in the short term. The long-term expansion effects overshadow short-term substitution between inputs.

The data provided details on input use, output and input prices and herd structures. However, the sample was too small, for a cross-sectional sample, to allow for a high degree disaggregation in inputs. Consequently, aggregate price and quantity indices had to be constructed for some variables.

The results from this study suggest that dairy producers in South Africa are rational profit maximisers who use resources efficiently to the point where the marginal returns are zero. They allocate bought and self-produced feed components as substitutes in the short-run but treat both inputs as complements in the long-run. The intensity of purchased feed use is higher than that of self-produced feed use. This has implications for the animal feed sector in terms of confirming dairy farmers' preferences for scientifically formulated feed components. It also suggests increased pressure on the international competition for already limited natural animal protein sources (fish meal, bone meal, etc.).

Milk supply shows an inclination to contract over time. This study's results suggest that increased milk prices will not stimulate expansion of the industry. Very useful information can be obtained if similar analysis is conducted for different production regions (given the high geographic diversity) and different groups of producers (based on technology preferences or size of operations) to establish what effects input and output price changes might have on short and long term production dynamics.

Supply analysis, as it was performed here, provides testable hypotheses about producer behaviour, and a basis from which supply and demand elasticities for dairy products can be computed for policy simulation and analysis, thus enabling the dairy sector to be proactive in its response to international and local economic stimuli.

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I serve a great, big, wonderful God who has shown His faithfulness to me – to Him be all the praise!

Psalm 121 verses 1, 2, 7 and 8:

"I lift my eyes to the hills – where does my help come from?
My help comes from the Lord, the maker of heaven and earth.
The Lord will keep you from all harm –
He will watch over your life;
The Lord will watch over your coming and going
both now and evermore".

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