



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

A business performance index model that measures wealth change in Australian farm businesses

Clive A Sefton and RJ Cox

Charles Sturt University, Faculty of Science and Agriculture, Orange NSW 2800 Australia
sefton-c@hwy.com.au

Contents

Introduction
Method
<i>Correlation analysis of self-efficacy</i>
Results
<i>Evaluating the statistical reliability of respective measures</i>
<i>Which measure best reflects wealth change?</i>
<i>Which measures best reflects self-efficacy scores?</i>
<i>How do farmers respond to the components of the BPI model?</i>
Discussion
Conclusions
References
Appendix

Abstract. This paper presents an evaluation of a farm-business assessment model that uses financial performance measures and tracks 'wealth change' to evaluate performance trends over time, and ranks the relative business performance of commercial participants. Its core component involves the use of comparative analysis, which is structured as an introductory rapid-assessment model, together with a ranking system that has been designed to differentiate the relative performance levels of farm businesses. The system has been labelled as the Business Performance Index (BPI) model to reflect its performance-ranking role that explores the relationships, if any, between farmer attitudes and business performance. The BPI model is discussed within the context of the debate as to the role and shortcomings of comparative analysis and benchmarking methods. The data collection method and the analysis have been field tested across 200 farm families throughout Victoria and New South Wales. During the interviews, data were collected from financial statements, supporting documents and farmer comments. The model's results have been statistically compared to results obtained from two other 'aggregate score' methods of assessing business performance.

Keywords: wealth change; performance evaluation; business performance; farm modelling

Introduction

This paper contains the results of an evaluation of a farm-business assessment model that uses financial performance measures and the tracking of both farm and off-farm net worth to produce a Business Performance Index (BPI). The model was originally designed as an initial stage farm business analysis tool and is based on a set of financial analysis ratios and averaged data.

The method used to collect the data for the above categories was modified in response to the specific research needs of a study investigating the linkages between attitudes and farm business performance (Bone et al. 2003). The researchers required a device to rank business performance, which because of their study into the linkages of attitudes and performance, also needed to reflect the farmers' perceptions of how well their respective business was performing.

A specific concern of the researchers related to the reliability of business performance measures obtained from financial statements prepared for taxation purposes. The concern about the use of taxable profit as a reflector of business performance is shared by Blackburn & Ashby (1995, ch. 5, p.1) who pointed out that most farmers rely on actual

cashflow and taxable profits to indicate business performance and that 'tax profit' is an unreliable indicator of business performance.

A basic premise of the model is that business performance indicators based solely on profits or a family's spending capacity fail to adequately reflect the farmer's perception of their financial capacity and wellbeing (Bone et al. 2003). This premise also reflects the writings of Kiyosaki (1999) who emphasised the point that an individual's ability to generate income does not in itself reflect their wealth generating skills and their perceptions of the world, its risks or its rewards.

A further premise of the model is that results that reflect a farmer's perception of the performance of their business are more likely to be recognised as relevant and therefore to be accepted and used in stimulating management change - as proposed by Bone et al. (2003). In the case of the research conducted by Bone et al. (2003), farmers' perceptions of business performance were reflected by their respective self-efficacy scores. It is for this reason that one of the evaluation criteria used in this paper is the degree of correlation between an individual's self-efficacy score and the respective

business performance measure being investigated.

The use of the untested BPI to evaluate business performance is placed in context by initially reviewing perceptions of Australian farm business performance, exploring the debate in relation to benchmarking and comparative analysis models and discussing the linkages between the measurement of performance and farmer perceptions.

The results from the BPI are compared to those obtained from 'Disposable Income per Family' (Hutchings et al. 1996) which is frequently reported in Australian literature and with 'Adjusted Cash Income' (Jolly 1999) which is a model reported in literature from the USA.

Overview

Farm business performance in Australia has been facing severe challenges over an extended period (Australian Agribusiness Services Pty. Ltd. 1997; Synapse Consulting Pty Ltd 1998; Tanewski, Romano and Smyrniotis 2000).

This challenge is reflected in Synapse Consulting Pty Ltd (1998, p. vii), which reports that since the 1950s the farm sector has been characterised by poor economic performance. In a similar vein Australian Agribusiness Services Pty. Ltd. (1997) suggest that broadacre agriculture is failing to provide the returns necessary to attract and retain investment capital and that return rates are a meagre 1.05 percent and are therefore hindering the development of the entire nation.

The predominant issue is how can farmers adjust to the economic forces driving the decline that over many years has led to reduced capacity for self-reliance, poorer living standards and increased population drift to urban areas (Alston 1995; Cook, Edwards and Ronan 1994; Kilpatrick et al. 1999; Salmon 1980; Shearer 1996).

Kilpatrick et al. (1999, p.8) point out that a key finding of the Rural Adjustment Scheme Review by the Department of Primary Industries and Energy was that the ability of farmers to manage was central to their ability to manage change. The issue of business performance and financial management skills discussed by Tanewski, Romano & Smyrniotis (2000, p.2) indicates that a significant proportion of farmers do not believe that they gain either immediate or genuine benefits from business planning. Despite these expressed beliefs, the literature frequently links business analysis to business planning and the capacity to react to changing circumstances (Boehlje et al. 1999; Cook, Edwards and Ronan 1994; Purdy and

Langemeier 1995; Tanewski, Romano and Smyrniotis 2000; van Blokland 1987).

Business performance, financial management skills and perceptions as to the value of training relate to this paper's evaluation of the BPI model, due to the model's premise that results that are seen by farmers as relevant are more likely to initiate the management change required to address poor performance and skill levels.

The question of what constitutes farm business analysis is highly contentious and subject to debate, especially in Australia (Ferris & Malcolm 1999; Makeham & Malcolm 1991; Malcolm 2001; Ronan and Cleary 2000).

Ronan and Cleary (2000, p.7) maintain that farm business analysis must focus on the financial performance of separate or individual business units, and in so doing, by definition, they propose the exclusion of any consideration of the intertwining of on-farm and off-farm income generation capacity. This definition is effectively challenged by the development of alternative ways of assessing performance such as the use of 'Key Business Indicators' (Newman & Chapman 2001), 'Disposable Income per Family' (Hutchings et al. 1996; Australian Agribusiness Services Pty. Ltd. and Farm Management 500 1997a) and 'Adjusted Cash Income' (Jolly 1999). In these measures, off-farm income is used in addition to the farm income, or else the combined business operations of various farm entities owned by the family are aggregated. Furthermore, Malcolm (2001, p.21) advocates a more problem-oriented approach to farm management economics with a call for key economic and technical detail to be transparent for decision-makers so that they believe results and thereby are inclined to take effective action.

Bone et al. (2003) support the above position by pointing out that performance measures are often divorced from the farmers' understanding of their business. Tanewski, Romano and Smyrniotis (2000) observed that the farm management literature concentrates on the theory of farm management and not the actual practice that leads to success or failure. Jenkins (1996) reminds us that records that are not understood tend not to be used, and therefore make no contribution to successful farm management. Ronan and Cleary (2000) and Malcolm (2001) present similar arguments. However the issue of what is successful management and how the individual responds to that perception has a significant bearing on management styles and the financial performance of their respective businesses (Newman and

Chapman 2001; Vanclay 1992; Vanclay, Mesiti and Howden 1998; Walter 1997).

The process encompassed in the term 'farm business analysis' can be conceptualised in three questions defined by both Jenkins (1996, p.4) and Millier and Jones (2002, p.1) as being 'where are we?', 'where do we want to be?', and 'how do we get there?'. For many farmers under significant financial stress an important additional question could be 'how did we get here?' It is in the process of answering the "where are we?" and the "how did we get here?" that the 'acceptance' and 'recognition' aspects of decision-making are placed in context.

It is in attempting to answer these questions that the use of 'benchmarking' and 'comparative analysis' has evolved. There is strong debate as to the value of comparative analysis and benchmarking, so given that the BPI model represents a form of comparative analysis this debate is also briefly reviewed.

Although both are measures of comparison, Ronan and Cleary (2000, p.2) propose the following distinctions between comparative analysis and benchmarking:

- Comparative farm analysis is based on aggregate measures of whole farm's physical and financial performance, such as yield, efficiency, gross margins and farm profit.
- Benchmarking is an enterprise or activity-based approach that focuses on the physical technical processes used by a farmer to enact his enterprise plan and the consequences of those processes in terms of unit revenue and costs, enterprise efficiency and enterprise profitability.

Worsley and Gardner (2000), Ronan and Cleary (2000) and Malcolm (2001) report that confusion abounds as to the boundaries and differences between 'comparative analysis' and 'benchmarking' and that in numerous instances misnaming has occurred where comparative analysis models have been called benchmarking. They also report that in other cases there has been a fusion of the two processes into a single unit that is then given the generic name of 'benchmarking'.

Ferris & Malcolm (1999, p.8), although generally critical of present comparative analysis and benchmarking practices, acknowledge the benefits of the former to a limited degree. They concede that selected ratios and collections of ratios can be beneficial in understanding the changes that have occurred within a given farm unit over time. Their reservations are summarised by the proposition that 'comparative analysis activities stop where the real decision making

action gets started....'(Ferris & Malcolm 1999, p.7).

Malcolm (2001), Ferris and Malcolm (1999) and Ronan and Cleary (2000) point to benchmarking practices straying away from the central core of measures based on accepted farm management theory. Similarly 'Disposable Income per Family' has been criticised by Malcolm (n.d. cited in Ronan and Cleary 2000) for utilising off-farm income in the calculation of the measure. An example of the extension beyond the core measures can be seen in the work of Newman and Chapman (2001) who report on the use of 'Key Performance Indicators' (KPI) that encompass productivity, people, pecuniary (financial reward) profitability and property (sustainability issues). The development of the Key Performance Indicators, in part appears to be a response to the farmers' need for relevance as achieved by measures that reflect their perceptions of what is important in measuring business performance.

The confusion as to the benefits and functions of benchmarking has led to relatively low numbers of farmers being involved in benchmarking groups (Worsley and Gardner 2000). Anschaw (n.d.) indicates that there may be essential ingredients missing from the process. Is it just poor marketing and presentation of benchmarking and comparative analysis, or can it be that the very basis of such models lack credibility in the eyes of many farmers?

At one level benchmarking is identified as the 'learning from others' (Spendolini 1992, cited in Ronan and Cleary 2000), at another level it may be an attempt to identify management changes required to enhance performance, as discussed by Ronan & Cleary (2000). Or it may be an attempt to identify performance potential by comparison to assumed best practice as suggested by Newman and Chapman (2001).

Another level of debate relating to farm business analysis and benchmarking is the question of whether or not to include off-farm income in the assessment process.

Malcolm (n.d. cited in Ronan and Cleary 2000), Malcolm (2001), Ferris and Malcolm (1999) and Ronan and Cleary (2000) all point to the need for theoretically sound means of assessing business performance. The question arises as to whether the domestic viability of a family unit (including the farm business) is to be subverted in preference to obtaining a theoretically acceptable measure of only the farm's business performance.

The relevance of the debate is placed in context when there are considerable and growing numbers of farm families dependent

on off-farm revenue (Synapse Consulting Pty. Ltd. 1998) while at the same time there is another segment of larger family farms focused on business profit generation (Ronan & Cleary 2000).

Ronan and Cleary (2000) acknowledge that a major challenge facing farm business analysis in Australia is how to accommodate the diversity of income sources for farmers. Such a move is supported by the F.A.S.T. Project's use of 'Disposable Income Per Family' (Hutchings et al. 1996; Newman and Chapman 2001; Australian Agribusiness Services Pty. Ltd. and Farm Management 500 1997a). In calculating Disposable Income /Family it is the 'household income' or combination of net farm income and personal income that is used to assess the level of disposable income. Similarly, Tanewski, Romano & Smyrniotis (2001) use the definition of total farm income as including off-farm sources. An opposing view is presented by Malcolm (n.d. cited in Ronan & Cleary 2000), who in discussing the F.A.S.T. measure of Disposable Income per Family criticises such a move as an unnecessary departure from the theoretical base of business analysis.

Off-farm income is used in two of the sixteen standard measures employed by the Farm Financial Standards Council of the USA. Off-farm income is also used in calculating 'Adjusted Cash Income' (Jolly 1999; Jolly 2001a; Jolly 2001b) which is effectively the same as the before tax measure of Farm Financial Standards Council's 'Capital Replacement and Term Debt Repayment Margin'. van Blokland (1987) implies that the inclusion of non-farm income in assessing business performance is a standard practice in the USA.

Other than the use of 'Disposable Income per Family' and 'Key Performance Indicators' very little attention has been paid in the Australian farm management literature to the measuring of a farm family's domestic financial viability.

Method

The method consisted of six steps. First, the BPI was determined for each property. Second, the correlation between Taxable Income and various measures of performance, including BPI, was estimated. Third, an attempt was made to improve the BPI. Fourth, the various performance measures were tested for statistical robustness. Fifth, the relationship between wealth and performance measures was examined, and finally correlation between self-efficacy and performance measures were estimated.

The data were collected during interviews held in conjunction with the Bone et al.

(2003) study that investigated the linkages between farmer attitudes and business performance. The project was divided into two distinct parts, with the intention of the pilot study to interview the management teams on 40 selected farm units and then the major study to interview a further 200 randomly approached farm units. Time restraints and logistics meant that the analysis was based on data from 37 pilot study respondents and 163 main study respondents to provide a total of 200 respondents across both groups. The pilot study and main study used identical questions, process and methods unless otherwise noted.

The pilot study investigated the validity of using the research design and method for data collection in relation to the main research project being conducted. Researchers for the main project needed to know that the financial analysis procedure was capable of accurately representing the financial performance for the full spectrum of business performance. The pilot study specifically sought out 20 farm families with a business performance in the top 20% of producers and 20 families with a business performance in the bottom 20% of producers as determined by the referral agents introducing the potential respondents. The pilot study was conducted in the first quarter of 2001.

The main study called for the interviewing of available management team members of owner managed properties that had been approached from a randomly selected list of potential respondents. The intention was to achieve proportional representation from across enterprise types and geographical regions from all of New South Wales and Victoria. The Australian Bureau of Statistics data was tabulated to determine the number of interviews required in each state in order to achieve proportional representation for each state and enterprise type, assuming that 200 business units were to be interviewed.

Axiom Databases provided the stratified randomly generated names and telephone numbers for the 3000 potential respondents from a combined database of 67,184 business units throughout New South Wales and Victoria. Given that the Australian Bureau of Statistics report for 2000 indicated a total of 80,040 farm units for the two states, the Axiom database provided the potential of including 83.4% of all farms represented.

The final format and weightings applied to the BPI components were used for both the

pilot study and main study results (Table 1 - Appendix).

An additional measure of "Changes in 'liveable business scale/liveable area'" was recorded. 'Liveable business scale' or 'liveable area' being defined as the scale of business operations required to provide an average sized household with sufficient profits to meet both household and business needs, given modest debt levels, moderate management performance and normal current average market and seasonal conditions.

The inclusion of an estimation of 'liveable business scale' may be seen by some as weakening the accounting theory basis of the overall BPI model. However, the concept picks up on issues related to increases in productive capacity, changed economic conditions facing the industry and management refinement that cannot be measured by accounting means yet have a large bearing on business capacity and the respondent's perceptions.

The need to simplify the BPI led to the use of only the five-year average values of the respective financial indicators and the absolute values of both the 'Nominal Wealth Change %' and the 'Change in liveable area or business scale /10years %'.

The BPI was calculated for each property, then sorted, charted and analysed. The same procedure was followed for the 'aggregate score' measures of Disposable Income per Family (DI/F) and Adjusted Cash Income (ACI) and also for the frequently used measures of 'Return to Capital' and 'Taxable Profits'. After initial assessment by the use of descriptive statistics, coefficient of variation and charting, attempts were also made to improve the BPI model by reducing components with low correlation to the BPI score and by replacing the 'Business Return' component with 'Net Farm Income'. Unless otherwise stated all charting, descriptive statistics and correlations have been conducted using the Data Analysis and Charting options within Microsoft's Excel program.

The experimental nature of the BPI model created the need to compare the results with other assessment processes in order to achieve corroborative evidence. The BPI, Disposable Income Per Family and Adjusted Cash Income scores were intended to identify whether the respective measures produced consistent results in comparison to the universal measure of Taxable Profits. Correlation analysis was conducted for the BPI results to determine linkages, if any, with each of the following:

- Primary Respondent's 'Self-Efficacy' Score (described later).
- Farms averaged 'Self Efficacy' Score.
- Averaged Taxable Profits.
- Averaged Gross Taxable Turnover.
- Averaged Earnings on Capital.
- Averaged Return to Capital.
- Averaged Net Farm Income.
- Current Gross Assets.
- Current Farm Assets.
- Nominal Wealth Change (over the five years of data collection).
- Disposable Income per Family.
- Adjusted Cash Income.
- BPI model using Net Farm Income instead of Business Return.
- BPI model with minor components removed.
- BPI model with the wealth change component removed.

The construction of the BPI model could not accommodate the use of the dollar value of wealth changes due to the remainder of the index being composed of percentages and ratios. All but the very last stage of analysis has been conducted using the percentage change in nominal wealth over the five-year period in question. The final correlation tables bring together the results so that the respective measures in evaluating business performance are then assessed against both the '\$ Wealth Change' and the '% Wealth Change'.

The Adjusted Cash Income measure was chosen for comparison to the BPI as it represented an international example that was a straightforward method of assessing the financial capacity of the combined farm and family units. The Disposable Income per Family measure was also chosen for comparison to the BPI as it represented a method that is frequently used in Australia. The combination of farm and family finances as used in both these measures shares the concept that supported the original development of the BPI methodology.

Correlation analysis of 'self-efficacy'

The underlying premise of this paper is that the business performance indicator that best reflects a farmer's perceptions of their respective business is the one most likely to be accepted as accurate and therefore acted upon in making business decisions. The proposition being that, of the indicators available within the limitations of the research design, it is the 'self-efficacy' score that most closely corresponds with a farmer's perceptions of their business performance.

The method for obtaining self-efficacy scores is reported by Bone et al. (2003). Correlation analysis was conducted on both the pilot study and main study results to investigate the linkages, if any, between the 'self-efficacy' score of each respondent and key business performance indicators obtained for the respective business. Due to the potential distortions created by those business units where a number of people were interviewed, all correlation analyses were conducted using only the farm average self-efficacy score or the self-efficacy score of the primary respondent. In each case the basis of the self-efficacy score in use is clearly identified.

Results

The results were derived from the combination of the pilot study (37 properties) and the main study (163 properties). These closely matched the proportional representation of enterprise groupings indicating that the respondent population closely matched the research population.

The BPI results were initially reviewed and the characteristics of Disposable Income Per Family, Adjusted Cash Income, Averaged Taxable Profits, and Return to Capital were also analysed.

To place the results for the respective measures into context, they were compared to a range of various indicators and commonly used benchmarking activities as discussed in the agricultural economics literature. Due to the ready availability of financial statements and the standardisation of the information, Taxable Profits for the five-year period being investigated were used as the standard against which the other indicators were compared.

Each measure was subjected to correlation to determine the degree of relationship, if any, with Taxable Profits. The correlation analysis results are displayed in Table 2 - Appendix.

The BPI scores displayed the lowest correlation to Taxable Profits out of each of the indicators except for the other measures of 'Farm Assets' and 'Five-year Nominal Wealth Change'. The low correlation for the BPI reflects its composition built around the nominal wealth change, debt loading, business profit generation and asset utilisation within the business. The above results indicate that although drawing in the 'wealth change' component, the BPI model remains well related to broadly accepted business accounting methods.

The full evaluation of the potential to improve the BPI model is beyond the scope of this paper. However, three examples of potential change are briefly explored in order to identify if major result changes occur when components of the BPI model are either

removed or replaced by different measures (Table 3 - Appendix). Table 3 demonstrates that '% Off-farm assets', 'Debt to Income Ratio' and 'Finance Costs/Income %' were those components of the BPI with the lowest correlation to the final score, indicating the potential to remove those components so as to strengthen the correlation between the BPI score and the self-efficacy score.

The weakly correlated components of the BPI model were temporarily removed from the BPI score to produce what has been labelled 'short BPI'.

The BPI score was also recalculated with the wealth change component removed and labelled as 'Abridged BPI'. In order to identify if the use of a different profit evaluating measure improved the BPI model, the Business Return to Capital component of the model was replaced with Net Farm Income/Capital. The other components of the BPI were left unchanged and so the new measure was labelled as 'BPI (NFI)'.

Evaluating the statistical reliability of respective measures

In reviewing the following results it needs to be recognised that the measures vary widely in how closely they match normal distribution patterns and also their ability to differentiate results as represented by their Coefficient of Variation.

In Table 4 – Appendix the measures are placed in order of decreasing ability to differentiate between the results, based on their coefficient of variation. Skewness figures approaching and beyond a value of 3.0 place the reliability of the measure into question. Also, the further a measure is above a kurtosis value of 4.0, the less reliable it is perceived to be. Using the GenStat program a Chi-square test of normality was completed. The critical chi-square value with 11 degrees of freedom is 19.68, so a chi-square value above this is significant and indicates a departure from normality. Note that given the nature of business performance and the imperative for a business to remain viable, the results can be expected to be truncated at the lower end of the range.

Based on results from Table 4 - Appendix, Taxable Profit, Disposable Income/Family, Adjusted Cash Income, Net Farm Income, Gross Annual Turnover and Total Farm Assets are all of questionable value due to either departures from normal distribution patterns or due to a poor ability to differentiate between the relative performance of the business units.

Return to Capital displays the closest fit to a normal distribution curve based on a low chi-squared value (30.69), a low slightly negative

skew (-0.10) and kurtosis that is very close to 4.0 (4.05). However Return to Capital has a much lower coefficient of variation (298.2) than does the BPI (646.6) and so is less likely to be able to differentiate the relative performance of respondent businesses. Given the above, the BPI, the BPI derivatives of Abridged BPI, short BPI, BPI (NFI) and Return To Capital are the only measures that combine adequate chi-square values, skewness, kurtosis and a degree of result separation.

Which measure best reflects wealth change?

A basic concept behind the use of the BPI model is the premise that wealth growth should be more readily recognised as a primary measure of business performance.

Given the difficulty of including the '\$ Wealth Change' figure in the calculations for BPI it has been excluded from all calculations and discussion to this point has led to the required use of '% Wealth Change' in BPI calculations. This exclusion has simplified the presentation of information without the loss of the final results, for Table 5 - Appendix shows the correlation of the various business assessment measures with both the '\$ Wealth Change' and the '% Wealth Change'.

The marked difference between the '% Wealth Change' and '\$ Wealth Change' results is a reflection that small scale businesses have a high capacity to make large percentage changes to their wealth in either direction, whereas the same dollar change would be insignificant in percentage terms to a very large business. The reverse applies to '\$ Wealth Change', for it is difficult for small businesses to generate a \$0.5million profit, whereas a business with \$10million in assets finds it easier to generate both profits and benefit from the capital appreciation enjoyed during periods of buoyant stock and land prices.

The strongest correlations for both '\$ Wealth Change' and '% Wealth Change' belong to the derivatives of the BPI and the BPI model itself. Based on the combination of correlation to both '\$ Wealth Change' and '% Wealth Change', the coefficient of variation, skew, kurtosis and chi-square, the measures can arguably be placed in order with BPI as top, short BPI as second and BPI (NFI) as third.

Which measure best reflects self-efficacy scores?

In order to assess the contribution of each component of BPI in building a score that better reflected self-efficacy, the component parts of BPI were subjected to correlation analysis against the primary individual's

efficacy score and the farm's average efficacy score (Table 6 - Appendix).

BPI and its derivatives occupy the first five places when it comes to matching results to the self-efficacy of the respondent. Both Gross Annual Turnover and Adjusted Cash Income have been challenged as valid measures, while all the remainder show poor correlations to efficacy.

How do farmers respond to the components of the BPI Model?

General discussions about the financial printouts immediately followed the interview with concentration on the results and the interpretation of them. Comments were not recorded, but the vast majority were complimentary and expressed high acceptance of the suite of measures used in the printouts and the charting of results in concise format with the trend for each measure clearly identified. Negative comments related to the lack of enterprise-specific detail that reflected localised industry performance comparison or to the lag between the end of the last recording period and the date of the interview.

Discussion

The results clearly show that of the eleven measures tested, the BPI model and its derivatives were, on balance, the most statistically robust and best reflectors of business wealth growth and respondent self-efficacy.

The BPI model was devised to reflect a combination of indicators relating to wealth change, productive asset growth, economic performance, utilisation of assets, debt loading and proportion of off-farm assets. The premise being that the combination of measures reflected a broad cross-section of business performance indicators likely to impact on the capacity to accumulate wealth and also reflect the respondent's perception of the business as identified by their respective self-efficacy score.

The universal availability of taxation returns and the standardised method of data presentation provided a rapid and readily recognised comparison for the other measures. Return to Capital is widely reported in the farm management and agricultural economics literature; its use therefore provided a highly creditable yardstick for comparison.

Although Taxable Profit was the indicator against which all other measures were initially assessed, it displayed characteristics that indicated it is a poor measure of business performance, has little relationship with the operator's self-efficacy and within this study was weak from a statistical

perspective. Taxable Profit displayed no discernible linkage to either the capacity of business to grow wealth or the perceptions of the operator as measured against the respondent's self-efficacy. Taxable Profit did display a moderate ability to differentiate between respondents as reflected by the coefficient of variation, but given the other characteristics of the measure, its reputation as a poor reflector of actual business performance appears to be supported.

How does one measure business performance? The active debate in the Australian agricultural economics literature suggests that the question cannot be asked in isolation but should be accompanied with a plethora of associated questions as to the 'when, where and why' of the process. A critical question that frequently appears in the literature is 'How can we ensure the results are meaningful to those charged to act upon them?'

A theme repeated in the farm management literature is that the provision of financial analysis information does not necessarily bring about change in behaviour and improvements in management or financial performance. Ronan and Cleary (2000 p.12), Anschaw (n.d. p.1) and Worsley and Gardner (2000, p.2) point to low utilisation of benchmarking being partially due to the lack of meaning in the benchmarking figures and a lack of support for farmers attempting to use this method.

Ronan and Cleary (2000), Malcolm (2001) and Ferris and Malcolm (1999) call for practical and functional measures that are meaningful in promoting reasoned decision making through the use of theoretically acceptable processes.

The literature indicates that the Farm Financial Standards Council in the USA has helped bring clarity to the topic that is still lacking in Australian practice. However in the development of such core measures the process cannot involve only the economists and accountants active in the field. The farming community needs to take charge of the process if they want the development of a practical and versatile set of core measures that are capable of being built-on to achieve creative and practical uses.

Kiyosaki (1999) explores the relationship between income generation and wealth accumulation, pointing out in very clear terms that profits and income do not in themselves generate wealth. It may therefore be argued that an analysis tool that reflects wealth growth is essential in understanding how successful farmers achieve that wealth growth, be it via the generation of profits or by other less poorly identified mechanisms.

The evolution of business measurements derived from accounting systems based on taxation law means that the majority of measures tend to represent the income stream and profit part of the spectrum, and very little analysis covers the wealth growth and productive capacity growth of a business. Even the standardized farm management accounting measures, such as those used by the Farm Financial Standards Council in the USA, are profit focussed.

Clearly, profits are one of the major precursors to the potential for wealth growth as commented on by Kiyosaki (1999). However, capital growth, expansion of productive capacity, appreciation in the value of assets and differing skill levels for wealth accumulation also play significant parts in determining the wealth outcome for a family. The very nature of Capital Gains Tax recognises that many people are adept at generating significant wealth without the making of significant profits.

Establishing a measure of a family's financial capacity, when interwoven with multiple individuals, diverse income streams and business entities may be problematic from a theoretical point of view. Analysis of the 'core' business may well indicate poor performance, or the lack of 'business viability', yet the multiple sources of income from across the family unit may provide strong 'domestic viability' as evidenced by full debt servicing capacity, asset expansion or increased productive capacity. It is common for farm families to have multiple business entities and income derived from various personal and business sources, or for contributions being made from a number of family members. The 200 farmer businesses interviewed for this study operated a total of 563 farm businesses or asset owning entities, to average 2.8 per farm when different land owning entities were included in the number. The number of business entities recorded was in addition to the private income sources from wages or off-farm investments. Given such figures, the reliance on analysing the performance of the core business unit as discussed by Ronan & Cleary (2000) leaves a major portion of the business and family story untold. Equally untold by most business analysis models is the nature and extent of wealth change as experienced by the farm family. The 200 farm businesses interviewed for this study reported that over the five years analysed their 'nominal wealth change' increased by a total of 34%. The top 20% sorted on '% wealth change' achieved a 113% increase in nominal wealth, while those in the bottom 20% had a 6.3% decrease in nominal wealth.

It needs to be recognised that the total financial capacity or 'domestic viability' of a family unit and their perceptions of 'wealth change' does impact significantly on the farmer's reaction to government policy, industry group expectations, research questions and to the options placed before farmers by consultants and rural counsellors. To dismiss the domestic viability issue as mere cashflow considerations and irrelevant to theory potentially leaves a major gap in the fundamental understanding of farm business practicality as lamented by Tanewski, Romano & Smyrniotis (2000).

The restrictive nature of the data source, the failure to measure the 'domestic viability' of the family unit and reliance on measuring the profit based performance of the core business means that the results are often not seen by the farmer as being an accurate reflection of the business. The lack of relevance means that it is common for those supplying the data to be disappointed when the farmer concerned does not change behaviour in response to the numbers provided. It is recognised that numerous psychosocial and economic factors are involved in changing behaviour (Chaiken & Eagley 1993; Sharpnel & Davie 2000; Vanclay et al. 1992; Vanclay, Mesiti & Howden 1998). However, if the initial information supplied by financial analysis is not accepted as being relevant, the other factors that may bring about change are not initiated and change does not occur.

Millar & Jones (1998) report on a hierarchy of measures and benchmarks that they call Standardised Performance Analysis. The hierarchy advances through four levels, commencing with broad 'overall measures' and ending at level four, where gross margin data is broken into 'critical factors' such as reproductive performance, product quality and marketing efficiency. In a similar vein, Worsley & Gardner (2000, p.3) identify the Top Crop model as focussing on promoting the farmers' understanding and interpretation of benchmarking data so as to stimulate management change.

The core part of the BPI model squarely sits in the lowest level of the Standardised Performance Analysis hierarchy and is intended to act as the first step toward implementing changes, by presenting information that is accepted by farmers and by being both accurate and relevant. Given that the BPI model primarily measures the performance of a business over time, it is a comparative analysis device of the type that has received wide criticism in the agricultural economics literature.

The BPI model deviates from accepted theory in that it focuses on wealth generation as a

primary reflector of business performance. Whilst the initial part of the model does use measures well grounded in theory, they constitute a form of comparative analysis and therefore suffer the same criticisms as other forms of comparative analysis. The second part of the model is likely to be held up as being empirical in that it uses both the wealth change measure and also aggregates a variety of measures to generate the BPI score for the ranking of business performance. Whilst the literature does not show the effective use of such models, the BPI model did evolve as a result of observations and experience during working with farmers experiencing financial difficulties. The results obtained from the BPI model suggest that there may be benefit in challenging the established practice in business performance analysis.

Conclusions

The debate in relation to farm business analysis in Australia centres on the theoretical acceptability of processes, as much as it does on the value of analysis in initiating positive changes to management. The theoretical merits and weaknesses of benchmarking and comparative analysis appear to have taken precedence over focussing on identifying how farmers synthesise the information presented and what is actually needed in order to help in the stimulation of rational and informed business management decisions.

The focus of business analysis on reporting profit and profit-derived ratios relating to the core business unit fails to identify the capacity of the farm family to service debts, increase productive capacity and grow wealth. Kiyosaki (1999) points out that wealth accumulation utilises clearly different skills and attitudes than does the capacity to simply generate profits or income. To some extent the development of the Business Performance Index attempts to recognise that difference, as it reports on both standard profit based performance indicators and on the wealth accumulation performance of the family unit.

The Business Performance Index (BPI) model is composed of a 'core component' designed as a 'rapid initial assessment model' that is a form of comparative analysis, and a 'ranking component' designed to rank relative business performance for research purposes.

The core component of the model quickly identifies past performance, the trends of key indicators and nominal wealth change. Its focus is on the presentation of the results in a simple and visual format that relies heavily on charts instead of numeric representation.

The ranking component of the BPI model was designed solely as a research tool to rank the relative business performance of respondents across a number of business issues and in a manner reflecting the respondent's perceptions of that business.

The BPI model was tested against the widely reported 'Disposable Income per Family', the USA measure of 'Adjusted Cash Income' and the commonly used indicators of Taxable Profits, Return to Capital, Net Farm Income, Total Farm Assets and Gross Annual Turnover. It showed itself to be the most reliable measure based on proximity to normal distribution patterns and in producing a spread of results to differentiate between respondents. The BPI also demonstrated a significantly superior relationship with '% wealth-change' and 'self-efficacy' scores, with correlation coefficients for self-efficacy being double those achieved by the other measures.

The BPI design premise was that performance indicators that are closely correlated to the individual's perception of business performance are more likely to be accepted as relevant and therefore more likely to stimulate management change. In the absence of specific research questions asking respondents to identify their perceptions of business performance, the paper has made the assumption that the individual's 'self-efficacy' score is a legitimate reflector of those perceptions. Despite the design premise and the superior performance of the BPI model in achieving higher correlation results there is no direct evidence of a cause/effect relationship between self-efficacy and actual respondent perceptions of business performance. The further development of the BPI model or other models intended to reflect farmer perceptions will require the testing of that relationship or the use of specific questions designed to identify how the respondent perceives the performance of their business.

The model has a number of departures from standard business performance measures with 'wealth change' being used as a primary indicator. It focuses on the gap between profit generation and wealth accumulation (Kiyosaki 1999) and in so doing questions the nature and usefulness of many profit-based business analysis systems. The BPI model was developed in an attempt to provide a measure that reflected the perceptions that farmers held about their business' relative performance given personal aspirations and the limitations of financial and physical restraints experienced by their enterprise.

The comparative analysis component of the model uses annual results and the five-year

trends of given ratios to indicate the overall business performance and key areas requiring detailed analysis in a form that is readily accepted by a broad cross section of farmers. The ranking component of the model is effectively an 'aggregate score' of various business performance indicators to provide an index score. This system displays theoretical weaknesses, but the evaluation conducted in this paper points to the potential to develop the model further to better understand the difference in farmers' perceptions of performance to those used in more traditional models.

The strength of the BPI results and those of its derivatives suggests the model is robust and versatile with potential for refinement. Further work needs to be conducted to identify the relationships between each of the components and to determine if removing components, introducing other components or the changing of relative weightings of the components will improve not only the correlation results but also the relevance and validity of the model.

References:

- Alston M 1995, *Women on the Land: The Hidden Heart of Rural Australia*, University Press, Sydney.
- Anschaw E n.d., *Why Benchmark your Farm Business*, Holmes Sackett & Associates, online <http://www.hs-a.com.au/benchmarking.htm>.
- Australian Agribusiness Services Pty. Ltd. and Farm Management 500 197a, 'Financial Performance of Australian Broadacre Agriculture', *RIRDC Research Paper No 97/40* Rural Industries Research and Development Corporation, Barton, ACT.
- Australian Agribusiness Services Pty. Ltd. and Farm Management 500 197b, '*Sustainability Indicators For Agriculture: Introductory Guide to Regional National Indicators and On-Farm Indicators*', Rural Industries Research and Development Corporation, Barton, ACT.
- Blackburn A and Ashby R 1995, *Financing Your Farm* - 3rd ed, Australian Bankers Association, Melbourne.
- Boehlje M, Dobbins C, Miller A, Miller D and Barnard F 1999, *Measuring and Analysing Farm Financial Performance*, Purdue Extension, Purdue University, West Lafayette, USA.
- Bone Z, Henry E, Hunt E and Sefton, C 2003, *Attitudes and family farm business performance: A report to the Rural Industries Research and Development Corporation*, RIRDC Project USO/2A, Rural Industries Research and Development Corporation, Barton. ACT.
- Cook V, Edwards K and Ronan G 1994, *A positive Approach to Farm Adjustment*, Primary Industries, Adelaide, South Australia.
- Ferris A and Malcolm B 1999, '*Sense and nonsense in dairy farm management economic analysis*', paper 31, Agribusiness Perspectives,

- Agribusiness Online, University of Melbourne, Parkville.
- Hutchings T, O'Callaghan P, Rendell R and Clarke N 1996, *Families Farming & The Future – Fast Project - FM500 and Sustainable Technology Business performance indicators for farming systems in southern NSW*, Neil Clarke & Associates, Bendigo, Victoria.
- Jenkins LC 1996, *Farm Business Analysis: Key to Pennsylvania Farm Profitability*, Extension Circular 375, Pennsylvania State University, University Park, Pennsylvania.
- Jolly RW 2001a, 'Changes to Iowa Farm financial performance and structure (1997 – 2001)', *AgDM Newsletter*, November 2001, Iowa State University, Ames, Iowa, online accessed 151004
<http://www.extension.iastate.edu/agdm/article/s/jolly/JollyNov01.htm>.
- Jolly RW 2001b, 'Changes In Farm Financial Performance and Structure Between 1997 and 2001', Extension paper FM1869, October 2001, Iowa State University, Ames, Iowa.
- Jolly RW 1999, 'The survivability and competitiveness of Iowa's commercial farm businesses', *AgDM Newsletter*, April 1999. Iowa State University, Ames, Iowa., online accessed 141004
<http://www.extension.iastate.edu/agdm/article/s/jolly/JollyApr99a.htm>
- Kilpatrick S, Johns S, Murray-Prior R and Hart D 1999, *Managing Farming: How Farmers Learn*, RIRDC 99/74, Rural Industries Research and Development Corporation, Barton ACT.
- Kiyosaki R 1999, *Rich Dad, Poor Dad*, TechPress Inc., Arizona.
- Malcolm B 2001, *Farm Management Economic Analysis: A Few Disciplines, a Few Perspectives, a Few Figurings, a Few Futures*, paper 42, Agribusiness Perspectives, Agribusiness Online, University of Melbourne, Parkville.
- Malcolm B n.d., *Analysing Farm Businesses: F.A.S.T. or a Slow? Some Notes on the Farming and Sustainable Technology (FAST) Business Health Benchmarks*, prepared for Farm Management Economics students, unpublished cited in Ronan, G & Cleary, G 2000, *Best Practice Benchmarking in Australian Agriculture: Issues and Challenges*, paper 39, Agricultural Perspectives, Agribusiness Association of Australia, Sydney.
- Newman P and Chapman G 2001, *Grazing Benchmarks and Management in eastern Australia*, RIRDC publication No. 01/35, Rural Industries Research and Development Corporation, Barton, ACT.
- Purdy BM and Langemeier MR 1995, *Measuring Farm Financial Performance*, Kansas State University Agricultural Extension Service, Manhattan, Kansas.
- Ronan G and Cleary G 2000, *Best Practice Benchmarking in Australian Agriculture: Issues and Challenges*, paper 39, Agricultural Perspectives, Agribusiness Association of Australia, Sydney.
- Salmon P 1980, *A psychological investigation of farm management education: a personal construct theory approach to agricultural extension*, School of Agriculture and Forestry, University of Melbourne, Melbourne.
- Shrapnel, M and Davie J 2000, *The influence of personality in determining farmer responsiveness to risk – a paper presented to the International Workshop on Farm Management Decisions With Climatic Risk 17th–19th April 2000*, unpublished.
- Shearer C 1996, *The financing of Australian agriculture –past, present and future – a paper presented to the Rural Finance Summit 1996*, Australian Bankers Association, Melbourne.
- Synapse Consulting Pty Ltd 1998, *Farmer education and training: issues for research and development*, RIRDC 98/26, Rural Industries Development Corporation, Canberra, ACT.
- Tanewski GA, Romano CA and Smyrniotis KX 2000, *Determinants of Australian family farm growth – the role of owner characteristics and strategic planning*, RIRDC 00/131, Rural Industries Development Corporation, Canberra, ACT.
- van Blokland PJ 1987, *Introducing farm business analysis: circular 655*, University of Florida, Gainesville.
- Vanclay F 1992, *The social context of farmers adoption of environmentally sound farming practices, in agriculture, environment & society: contemporary issues for Australia*, MacMillan Australia, South Melbourne, p. 94-119.
- Vanclay F, Mesiti L and Howden P 1998, 'Styles of farming and farming subcultures: appropriate concepts for Australian rural sociology?', *Rural Society*, 8(2):85-107.
- Walte, G 1997, 'Images of success: how Illinois farmers define the successful farmer', *Rural Sociological Society*, 62(1)48-68.

Appendix

Table 1: Final format of Business Performance Index components and respective weightings

Descriptor	Units	Weighting
Change in net wealth (nominal)	Percent	0.5
Change in business size/ recognised liveable area	Percent	1
Average - Turnover on assets	Percent	1
Average - Earnings on capital	Percent	5
Average - Debt to Income ratio	Prefix	-1
Average - Operating costs/Income	Percent	-1
Average - Finance cost/Income	Percent	-1
Net off-farm assets/total assets	Percent	0.5

Table 2: Correlation analysis results

	Taxable Profit	BPI	Disposable Income per Family	Adjusted Cash Income	Turnover	Return to Capital	Net Farm Income	Farm Assets	5yr Wealth
Taxable Profit	1.00								
BPI	0.41	1.00							
Disp Income/Family	0.89	0.39	1.00						
Adj Cash Income	0.66	0.53	0.67	1.00					
Turnover	0.60	0.52	0.59	0.87	1.00				
Return to Capital	0.50	0.48	0.42	0.50	0.38	1.00			
Net Farm Income	0.88	0.56	0.84	0.87	0.78	0.60	1.00		
Farm Assets	0.40	0.42	0.43	0.69	0.73	0.33	0.59	1.00	
5yr Wealth	-0.02	0.55	0.02	0.11	0.09	-0.03	0.06	0.03	1.00

Table 3: Correlation analysis of BPI components

	BPI	5yr Wealth	% Change Scale	Turnover	Bus Return to Capital	Debt: Inc Ration	Op Costs %	Fin Cost %	Off-farm Assets %
BPI	1.00								
5yr Wealth	0.55	1.00							
% Change Scale	0.60	0.01	1.00						
Turnover	0.40	0.35	0.06	1.00					
Bus Return to Capital	0.42	-0.17	0.11	-0.04	1.00				
Debt: Inc Ration	0.06	-0.12	-0.11	0.06	0.29	1.00			
Op Costs %	0.43	-0.01	-0.10	0.06	0.51	0.07	1.00		
Fin Cost %	0.31	-0.04	0.01	0.19	0.36	0.48	0.21	1.00	
Off-farm Assets %	-0.01	-0.04	-0.10	0.11	0.03	0.26	-0.05	0.16	1.00

Table 4: Summary of statistical characteristics

Measure – descending order on Coefficient of Variation	Kurtosis	Skewness	Chi-square	Coefficient of Variation
BPI	4.29	1.32	44.99	646.6
Abridged BPI	5.20	0.83	43.44	532.7
Short BPI	4.78	1.45	40.01	366.0
Return to Capital	4.05	-0.10	30.69	298.2
Taxable Profit	17.6	1.65	164.65	258.6
Disposable Income / Family	13.6	0.81	171.95	205.2
BPI (NFI)	4.32	1.36	34.40	197.0
Adjusted Cash Income	15.0	3.37	127.72	181.1
Net Farm Income	12.5	2.37	137.03	170.0
Gross Annual Turnover	22.0	4.02	213.14	119.3
Total Farm assets	4.35	1.90	97.61	82.8

Table 5: Correlation analysis of wealth change against other major business indicators

	\$Wealth Change	%Wealth Change
Disp Income/Family	0.29	0.02
Adj Cash Income	0.55	0.11
Tax Profit	0.29	-0.02
Turnover	0.54	0.09
Return to Capital	0.20	-0.02
Net Farm Income	0.42	0.06
Total Farm Assets	0.66	0.03
Short BPI	0.44	0.57
BPI (NFI)	0.39	0.60
Abridged BPI (-wealth)	0.33	0.00

Table 6: Summary of sorted self-efficacy correlations

Measure	Primary Respondent Self-efficacy	Farm Average Self-efficacy
Short BPI	0.28	0.25
BPI (NFI)	0.28	0.26
BPI	0.27	0.25
5-year wealth change %	0.22	0.22
Abridged BPI	0.20	0.16
Gross Annual Turnover	0.19	0.14
Adjusted Cash Income	0.16	0.13
Net Farm Income	0.13	0.11
Return to Capital	0.12	0.11
Farm Assets	0.11	0.05
Taxable Profit	0.05	0.05
Disposable Income Per Family	0.03	0.04