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A Dual Signal Approach to Cooperative Performance Measurement
Rethinking Prices and Profits in the European Dairy Industry

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Preface

This discussion paper addresses several weaknesses of the performance measurement procedures that are normally found in dairy cooperatives in the Western world. We further suggest an alternative approach that can ameliorate some of the inherent incentive problems and measurement problems that tend to plague many dairy cooperatives. We hope our thoughts – although presented here in a preliminary form – can add to a necessary debate on dairy cooperative reform. The research work was carried out by Dr. Onno-Frank van Bekkum, senior researcher at the Netherlands Institute for Cooperative Entrepreneurship (NICE), Universiteit Nyenrode, and Dr. Svein Ole Borgen, senior researcher at the Norwegian Agricultural Economics Research Institute (NILF). The research was financed by the Research Council of Norway, grant no. 147847/110. NILF was the contracting party with the Research Council.

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Outline

Abstract

The discussion paper suggests a novel procedure for measuring performance in dairy marketing cooperatives. Conventionally, performance in these cooperatives is evaluated through a single measure; i.e. the price of raw milk. This "single signal" measurement procedure is reasonable in a situation where the level of capitalization of the cooperative is ignorable. But this condition does not hold true in current European dairy markets. We suggest an alternative performance measurement procedure, the core idea of which is to separate milk content from dairy product value. This enables a distinction between monetary returns to milk from monetary returns to invested capital. This "dual signal"-approach represents a more transparent picture of dairy cooperative performance, provides members with purer on-farm (production) and in-cooperative investment incentives and equips them with performance data that enable them to exercise better control over their cooperative.

1   Introduction

Conventionally, cooperatives are oriented towards paying highest possible prices to the members` raw products. This objective is inherently linked to cooperative business, and tends to be explicitly stated in by-laws and mission statements. There are at least two good reasons for this: (i) First, farmers want to be paid now rather than later for liquidity reasons and because they want to make sure that residual surpluses from the cooperative's business flow to them, rather than remain stuck in the organization. (ii) Second, the tax system plays a role. While tax systems differ between countries, it's generally true that surpluses distributed to members as integral part of the milk price is tax exempt at cooperative level. Milk is simply treated as a 'cost' as seen from the cooperative's perspective. In absence of anything like a market price for milk, this practice often represents a relatively soft tax regime.

It's therefore not surprising that most empirical research on dairy cooperative performance tends to be based on the assumption that "all that matters is the milk price" or alternatively that "cooperatives are just like any other businesses". The first assumption leads to the popular study of milk price tables of various kinds found in farmer magazines and websites (e.g. the European milk price table produced by LTO in the Netherlands, the UK milk price watchdog www.milkprices.com, the Irish KMPG Audit of milk prices, the German ZMP-Milchpreisvergleich, the Netherlands annual *Boerderij* milk price review etc.). The second assumption is expressed through comparisons of profitability ratios between cooperatives and investor-owned firms (IOFs). But the problem is that both assumptions are inherently deficient. It is true to say that if cooperative benefits are expressed in terms of milk prices only, farmers are likely to watch the

fluxes of the raw milk prices in order to assess their cooperatives' performance. And it is also true to claim that cooperatives and IOFs are basically subject to the same set of competitive rules, so that it is relevant to compare their performance. But none of these two approaches do justice to the complex reality of dairy cooperatives. Alternative approaches to performance measurement and incentives structures in cooperatives are called for. The purpose of this discussion paper is to contribute to this highly necessary debate.

More specifically, the first objective is to explore the weaknesses of the two conventional "single signal" performance measurement models that are commonly found in real-life; i.e. the raw milk price and the EBITDA (Earnings before interest, taxes, depreciation and amortization); both as directly reported in the Profit and Loss Accounts of the cooperative in question. The second objective of our discussion paper is to propose an alternative procedure, more suited for dairy cooperatives that are under increasing capitalization.

The discussion paper is structured as follows: In chapter 2, we take a deeper look into the shortcomings of the conventional performance measurement procedures that for decades have been institutionalized in most cooperatively owned dairy businesses in Europe particularly. We make a distinction between two types of performance measurement errors, and three different types of incentive problems. In chapter 3, the underlying calculation procedure of the conventional performance measurement model is briefly presented, followed by a brief introduction to the alternative we suggest here; referred to as the "dual-signal" performance measurement model. In chapter 4, some illustrations of the twin procedures are presented, based on data from nine European dairy cooperatives. Conclusions are drawn in chapter 5.

2 A deeper look into the shortcomings of conventional performance measurement

Nowadays, dairy value creation tends to be less oriented towards raw milk, and more oriented towards milk processing. While there is a tendency to start differentiating alternative milk streams, by and large, milk is milk. Milk production requires on-farm investments. But research and development, product innovation, branding and the like have over decades created a wedge between (i) milk as an industry input and (ii) dairy products as an industry output. This wedge tends to be widening over time. Of course, dairy production still depends strongly on the milk content, but the contribution of capital factors becomes increasingly important. This development has not been reflected in the performance measurement procedures in most European dairy cooperatives. Milk has its value and capital has its value. The dairy cooperative needs both. But the two categories of resources are very different, and should be conceptualized and measured differently. The unclarities related to performance measurement further lead to blurred

incentives for members and other stakeholders. Dairy farmers` investments on their own farms are to a large extent based on the raw milk price. In addition, the farmers need clear signals as to the monetary value of their cooperative investments. This value corresponds to the residual value of dairy production beyond the raw milk content and additional company costs. In order to decide between these two alternative investment opportunities (on-farm vs. in-cooperative), cooperative members must receive appropriate and reliable price signals. In a situation where capital plays a more dominating role in manufacturing of dairy products, assessing the relative performance of dairy cooperatives on the basis of milk prices alone is insufficient and fallacious. Still, this is what commonly happens in dairy cooperatives throughout Europe. The problem is particularly accentuated in dairy cooperatives that use a pooling approach to their income accounting and distribution. This is a common approach among the leading European dairy cooperatives, but to a lesser degree applied in US dairy cooperatives as well.

Clearly, cooperative members are directly influenced by blurred milk price signals. In addition, other players may be affected more indirectly. Dairy cooperatives commonly act as price leaders in their industry, due to their efforts to pay members highest possible milk prices. In particular, this holds true in cases where large and strongly performing cooperatives follow an open membership policy. Subsequently, investor-owned firms (IOFs) must source their raw milk at a so high price that it erodes their ability to generate profits and dividends at the level their shareholders demand. As a result, the IOFs may attract raw milk from other areas, move processing capacity to those regions, or divest dairy business altogether. Alternatively, if these IOFs pay lower milk prices to their suppliers, they might fail to secure the supply base they need.

The measurement problems that plague cooperatives are not ameliorated by mimicking the standard profitability ratios that are typically used for measuring the performance of IOFs. The cooperatives` mission is not to accumulate high profits at company level. Dairy cooperatives aim at maximizing financial returns to its primary users; i.e. the farmer-members who supply milk. This basic fact is well established even in the long-aged scholarly literature on cooperatives; cf. for instance the classical contribution of Robotka (1947). Profitability is a precondition to secure the cooperative's continuity and growth, but is balanced with the objective to offer the owners satisfactory raw product prices. Straightforward performance comparison of cooperatives and IOFs – and even between cooperatives themselves insofar as they differ in their capital retention policy – on the basis of reported profit figures is therefore erroneous and misleading. Yet this approach appears to be widespread in the scholarly literature (e.g. Parliament et al. 1989, Lerman and Parliament, 1990 and 1991; Gentzoglanis, 1997; Zwanenberg, 1997; [Baourakis] et al., 2003). As we suggest, even the cooperative research community hasn't been of service in providing cooperative leadership and members with reliable information and tools to evaluate their cooperative performance.

To summarize the discussion, we can distinguish between two types of performance measurement errors, and three types of incentive errors that plague conventional performance measurement in cooperatives (cfr. Figure 2.1 below).
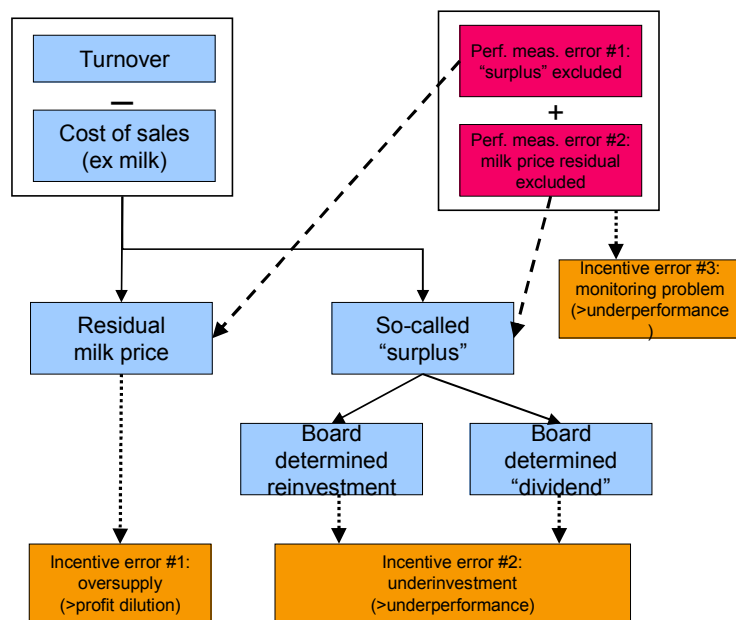

Figure 2.1   The five interrelated weaknesses of conventional cooperative pricing

- Performance measurement error # 1: Milk league tables fail to include in their analysis any non-price returns to members, as well as of cooperative level retentions. To the extent that capital structures and retention policies differ, this leads to incomplete findings and hence erroneous messages. For cooperative-IOF performance comparisons the mistake is that of excluding profits distributed through the milk price.
- Performance measurement error # 2: Conventional profitability ratio analysis disregards profits distributed to members through the milk price in the 'cost of goods sold' item in the P&L Account. Dividends paid to IOF shareholders, and indeed to cooperatives with share-based capital structures as well, *are* included, in cooperative-IOF comparisons, making these comparisons erroneous.
- Incentive error # 1: The cooperative farmer receives a milk price that reflects both returns to milk and, increasingly, positive returns from margins on processing and marketing activities and profits on non-member, international and non-dairy activities. As a result he will tend to overinvest at farm-level, leading to oversupply at cooperative firm level and hence a dilution of cooperative profits in absolute terms (as marginal milk is sold in the low end of the market where often margins are negative) as well as per kg of milk supplied.
- Incentive error # 2: Again because of cooperative milk prices reflecting returns on (collectively) invested capital, members will tend to underrate the value of their cooperative investment, potentially threatening the cooperative's capital raising ability and hence its strategic investments, ultimately leading to underperformance.

- Incentive error # 3: Because of profit distribution through the cooperative milk price, the use of profit-based ratio analysis tools becomes quite meaningless, limiting the cooperative's leadership ability to properly assess the performance of its management at a corporate and divisional level and hence making it difficult to exercise effective control, again potentially resulting in underperformance.

The fact that these weaknesses of conventional cooperative pricing is intimately related, may lead to a vicious dynamics over time. The effect of erroneous incentives in year 1 can be read off in wrong performance measurement in year 2, and vice versa.

3 From "single-signal" to "dual-signal" performance measurement

We have now briefly presented the major incentive – and performance measurement errors that are inherent in the conventional model. The model is commonly referred to as "cooperative pricing". The alternative title we suggest here is the "single-signal"-performance model, since the model attempts to measure all aspects of the cooperative's economic reality into one and only signal. As clarified above, the economic reality of most cooperatives is nowadays so complex that this single signal is "overloaded". The idea that the raw milk price provides all necessary information, is outdated. Here, we shall suggest an alternative approach to performance measurement, which stands up to the demands for reliable information for highly capitalized cooperatives. In order to do so, we shall first sketch the inherent logic of the single-signal model, and apply this a frame of reference for the alternative model we advocate here; referred to as the "dual-signal performance measurement model".

The logic of the single-signal model

The logic of the single-signal model is presented in Figure 3.1 below. The arrows of the figure denote the flow of price signals (i.e. incentives) from the market, via the cooperative to the farmer. The flow of products through the value chain follows the opposite direction. Point Ã refers to the costs of raw milk off-farm (i.e. the milk price). Point B refers to all other costs incurred by the cooperative (i.e. transportation, processing, R&D, marketing, etc.). Point C refers to the cooperative's market returns to dairy products in output markets (i.e. its total turnover). In the conventional "single signal performance model" of cooperatives, performance (P) is measured as the value of C less the value of B. The milk price is a residual price and is commonly taken as a measure that reflects the profitability of the cooperative. In other words, members of a dairy cooperative typically evaluate the performance of their cooperative in terms of the milk price they are
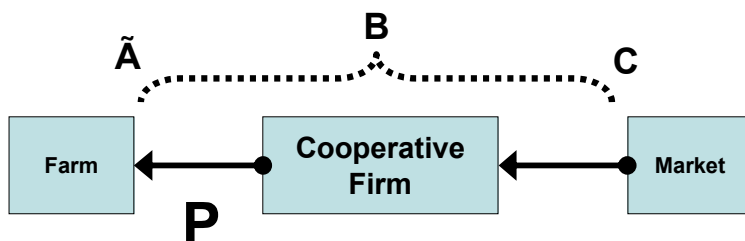
$$P = \tilde{A} = C\text{-}B$$

Figure 3.1   The "Single signal" cooperative performance measurement model: P = Ã = (C-B)

offered. In many European dairy cooperatives, capitalization of the cooperative predominantly takes place through price deductions of members` input ('retained earnings'), and no other financial instruments are applied. Capital returns are therefore channelled from the cooperative to the members through the price of raw milk. In principle, therefore, the raw product price should be central in the farmers' minds when it comes to investment decisions and exercising of control.

The logic of the dual-signal measurement model

Figure 3.2 below presents the alternative approach we suggest here, referred to as the "dual signal" performance measurement model. In this model, members receive the two type of signals they need: (1) a price reflecting the value of milk, and (2) a residual reflecting the value of the cooperative capital in a broad sense (i.e. financial capital, human capital, brand image, infrastructure etc.). The latter signal may also be referred to as the 'cooperative dividend'.
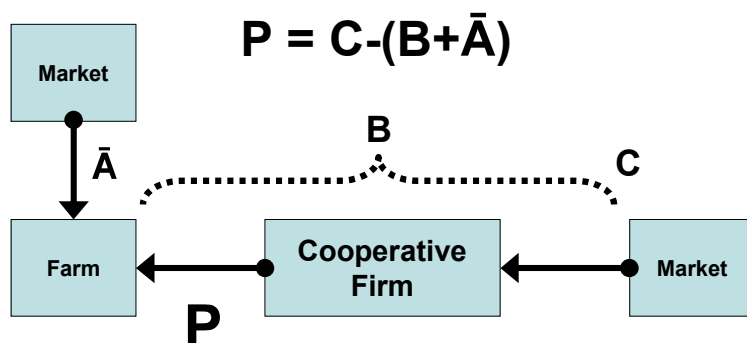

Figure 3.2   The "dual-signal" cooperative performance measurement model: P = C-(A+B)

Like in Figure 3.1, the arrows denote the flow of incentives through the value chain. Point Ā refers to the costs of raw milk, which are now based on some kind of external

measurement and in that respect is 'fixed' and not influenced by internal cooperative factors. The reason is that the milk price should reflect the real value of the raw material supplied by the members. The crucial difference as compared to the "single signal"-model is that the milk price does not serve as a mechanism for paying the members their residual claims. Point B refers to all other costs incurred by the cooperative from milk collection to the distribution of dairy products. Point C refers to the total turnover of the cooperative. This measurement approach should be operationalized in the following steps:

1. Calculate the dairy value normalized at industry level through the returns of a fixed basket (index) of dairy *commodities* based on fixed milk solid (i.e. fat and protein) content (measured at point C). Deduce normalized industry costs of milk collection, processing and marketing of these dairy commodities. Recalculated into singly liters is the standardized milk price, which is to be interpreted as a proxy for market price.

2. Arrive at a company-specific milk price by substituting the fixed milk solid contents by the company's actual milk solids content supplied by members on average (measured at point A)

3. Recalculate profit (P) of the cooperative firm as the residual of total turnover, minus production and other organization costs (B) *and* member milk purchases ($\bar{A}$) : i.e. P=C-(B+$\bar{A}$). In other words, adapt the cost of sales component in the profit and loss account to reflect the standardized milk price, rather than the average milk price actually paid out.

4. Distribute dividends to members on the basis of collective and/or individualized member investments per 100 kg.

The "dual signal"-approach presupposes that the real value of milk can be determined through a logical and transparent procedure. Here, we follow the so-called "dairy value"-procedure developed initially by the Dutch Dairy Produce Council and later followed up by Campina.

The dairy value calculates the value of a basket of fresh skim milk, cheese, butter, skim milk powder, whey powder, and caseinates, using prices of relevant quotations of European commodity markets. It then makes various deductions to account for processing and other industry costs based on 'efficient' production assumptions. What remains, is the value of milk fat and protein. The "dairy value" is then published on a per liter volume and based on standardized milk contents (3.7% fat and 3.4% protein).

4 What difference does our measurement procedure make? Illustrations from leading European dairy cooperatives

There are three major advantages of the "dual signal"-approach as compared to the "single signal"-approach: First, it represents a more transparent picture of dairy cooperative performance, as well as a more reliable basis for ranking cooperatives according to performance. Second, members are equipped with data that can enable them to exercise their control functions more effectively. Third, it informs members better with respect to their investment decisions; i.e. the trade-off between on-farm and in-cooperative investments. These advantages are particularly important for dairy cooperatives that increase their level of capitalization, which is a normal situation for the majority of dairy cooperatives in the current competitive climate.

Whether or not these advantages are evaluated as significant by the beneficiaries, may of course vary. But our general hypothesis here is that it makes a difference to measure performance in terms of the dual-performance approach as compared to the single-signal approach. Our recommendation is for cooperatives to develop their performance measurement procedures and incentive structure in accordance with the dual performance measurement approach. For illustrative purposes, we have here compared performance measurements of eight European dairy cooperatives; i.e. Arla Foods, Friesland Foods, Campina, Nordmilch, Glanbia, Valio, First Milk and Milcobel. They are all included in the top-20 ranking of European dairy cooperatives; (www.nyenrode.nl/nice). The selection of cooperatives was further made on the basis of two criteria: (1) availability of consolidated annual accounts for the year 2003; and (2) inclusion in the monthly milk price tables produced by Netherlands' farmers union LTO (www.milkprices.nl). The dairy cooperatives in question differ substantially with respect to pricing structure, capital structure and incentive structure; as summarized in Table 4.1 below. The pricing structure refers to the procedure by which the level of raw milk price is determined. The capital structure refers to the manner by which the cooperative finance their activities; including the issue of membership finance. The incentive structure is the core question of our discussion; i.e. whether cooperative performance is measured by means of a single-signal procedure (raw milk price) or by means of a dual-signal performance measurement.

Table 4.1   Different pricing structure, capital structure and incentive structure of selected European dairy cooperatives

	Pricing structure for raw milk	Capital structure	Incentive structure
Arla Foods*	'Cooperative pricing'.	Financed almost entirely on the basis of collective reserves. A distributable reserve was introduced in 2004.	Single signal.
Friesland Foods	A non-weighted average of milk prices paid by five other cooperatives in neighboring countries, historically indexed.	Collectively held A-shares and individually held (certificates of) B shares, traded voluntarily at an internal bimonthly exchange facilitated by an external party. Both shares accrue dividends, B (cash dividend) at least twice as much as A (milk price bonus), being maximized at state bonds with a premium.	Dual signal: milk price vs. performance related capital benefits. 40% of profits are distributed to A and B shares on a 1:2 ratio. The other 60% are added to share reserves. In theory, the certificate price at the bimonthly exchange reflects expected future company earnings.
Campina	'Cooperative pricing'; Ownership of participation units entitles to a fixed milk price surplus	Collective reserves; obligatory participation units purchased in proportion to current milk delivery volumes; and an externally (informally) tradable bond distributed to members as part of the milk price.	Single signal. Profits are reflected in the milk price. Participation units reflect a minor portion of the annual book value increase of the company resulting from additions to general reserves. Bonds generate a dividend which is fixed at 1% above 4–5 year state bonds and hence their trading value is independent from company value.
Nordmilch	'Cooperative pricing'.	Collective reserves, cooperative shares linked to production volume (one share per 1000 kg) deduced from the milk price over time, not receiving dividends, and redeemed upon exit at nominal value.	Single signal.
Glanbia	Based on other milk prices paid in the market and taking into account pressure of farmer-shareholders as well.	*Cooperative shares* voluntarily tradable twice a year, redeemed at nominal value and ~fixed dividend bearing. *Redeemable C share fund*, € 0.28c per liter redeemed with 50% bonus after five years and 'interest' bearing in the meantime.	Dual signal: market based milk price vs. performance related capital benefits, though the latter isn't really visibly performance based.
Valio*	'Cooperative pricing'.	Federated cooperative with shares held by regional cooperatives, being collectively owned by members. Also collective reserves at central level.	Single signal.
First Milk*	'Cooperative pricing', which is basically the passing on of the 'pool' price as negotiated with various parties after deduction of costs.	General reserves and insignificant membership based shares. Members also pay into a production-linked, subordinated, non-interest bearing 'Member Investment Account'.	Single signal.
Milcobel*	'Cooperative pricing'.	Collective capital and production linked cooperative shares, paid up digressively during 12 years, with a dividend maximized at 6%, and redeemed at nominal value.	Single signal.

As shown in Table 4.1 above, two of the cooperatives in our sample—Friesland Food and Glanbia—already practice a kind of dual-signal performance measurement, in the form of a cooperative share system that are redeemable and tradable. The other cooperatives in our sample employ a single signal incentive structure only.

In Table 4.2 below, the results from our calculations are summarized. For each cooperative, the following variables are listed: (a) Turnover, (b) Their reported milk price (from their Profit&Loss-accounts, (c) The milk price standardized on fat and protein content (from LTO International Comparison of producers prices for milk), and (d) Their reported EBITDA. Then, the data of column (b) is subject to the Failure 1 mentioned above, whereas the data in column (d) is subject to failure 2.

The remaining columns contain data that are calculated according to the "dual-signal"-procedure explained earlier. Column (e) presents their re-calculated milk prices, taking into account the returns of a fixed basket (index) of dairy commodities based on standardized milk solid (i.e. fat and protein) content. Column (f) contains the recalculated total EBITDA in absolute terms, whereas column (g) shows the final point of our recalculation; i.e. EBITDA per 100 kilo milk.

Table 4.2   Comparison of alternative performance measures (2003)

Coop-erative *	(a) Turn-over (2003; € mio)	Single signal performance measurement			Dual signal performance measurement		
		Failure 1		Failure 2			
		(b) Reported milk price from P&L-accounts (€/100kg)	(c) Standardized milk price (LTO) (€/100kg) †	(d) EBITDA (€mio)	(e) Adapted milk price (milk basket price) (€/100 kg)	(f) Adapted EBITDA#	(g) Adapted EBITDA (€/100 kg)
Arla Foods (SW)	5,469	33.41	31.77	375.481	30.06	584.9	9.36
Friesland Foods (NL)	4,575	32.00	30.41	300.00	31.30	337.3	6.37
Campina (NL,DE, BE)	3,655	32.35	30.11	144.700	30.91	194.4	5.62
Nordmil ch (DE)	2,140	26.39	27.34	46.097	28.37	-15.1	-0.35
Glanbia (IR)	2,041	26.39	28.60	131.281	27.99	112.9	9.86
Tine (NO)	1,588	42.01	-	90.606	29.72	275.1	18.32
Valio (FI)	1,566	37.80	35.69	63.100	30.08	206.9	11.11
First Milk (UK)	822	26.62	24.43	11.403	28.88	-44.7	-2.03
Milcobel (BE)	572	29.76	29.61	17.743	29.25	21.3	3.11

† Milk prices taken from "LTO international comparison of producer prices for milk 2003". Prices are based on standardized fat and protein contents and identically sized farms and may thus differ from milk prices reported by the respective companies.
‡ Source: Calculations based on Annual Reports
* Company notes:
   ▪ Arla Foods: Milk price in Denmark; EBITDA year ending September 2003; currency conversion at book year ending.
   ▪ Glanbia: carried extraordinary restructuring losses of € 90m, i.e. the year 2003 wouldn't seem to be a particularly representa-tive year; they did pay a dividend of € 15m over pre-exceptional profits of € 67m, further adding to its 'loss absorbed'.
   ▪ Valio: Milk price based on Kymppi milk price
   ▪ First Milk: Year ending March 2004; currency conversion at book year ending.
   ▪ Milcobel: Milk price of its predecessor Belgomilk

An in-depth interpretation of the results is beyond the scope of this article. However, some observations that may be highlighted from this specific sample of eight coopera-tives are the following:

● Arla Foods pays out a relatively high milk price (in Denmark and in Sweden, though not for about one-third of its milk supplies in the UK). It also performs relatively well in terms of profitability. Compared to industry competitor Nestlé with an EBITDA to turnover ratio of some 15% its score is still quite modest. However, among its cooperative peers it must be concluded that Arla Foods is doing well.

- Profitability is also relatively high in the cases of Friesland and Glanbia. This is not surprising given the capital ownership structures of both companies. Both companies express their performance in paid out dividends. In case of Friesland, shares are held by members on a voluntary basis. At Glanbia, shares are traded at the stock exchange. Friesland's shareholders also take an interest in the milk price, leading us to expect that they would have negotiated a 'better' milk price formula. This explanatory variable behind the milk price differentiates between the two cooperatives.
- Campina and Valio may be argued to be more 'classical' in terms of their ambition to pay out high milk prices. Profitability levels are relatively low, while in the case of Valio this ratio has been sacrificed in order to pay out a high milk price.
- Milcobel has a very similar ambition to pay out high milk prices as Campina and Valio. And given its relatively high corporate tax rate and considerable freedom to pay out milk prices above 'market price', it makes sense to focus on price rather than profitability. As it seems, however, it is simply not performing as well in the market place.

The major point we want to make in the discussion paper is that a more reliable platform for signaling and benchmarking is needed, and that the innovative procedure we suggest .here do makes a difference. The nature and causes of the differences that are revealed in Table 4.2 is a subject for in-depth investigations. The table invites to analysis and reflections associated with the concrete underlying economic realities of each and one cooperative. If the cooperative is an "over-reporter" (adapted EBITDA is significantly below the reported EBITDA), the good news for beneficiaries is that the cooperative is more profitable than normally registered and expected if the cooperative is an "under-reporter" (adapted EBITDA is significantly lower than the reported EBITDA), it's time to investigate the underlying causes. Which factors are under the control of management, and what factors accrue to conditions beyond the control of management?

The dual-signal approach is motivated by virtue of its capacity to inform us about the true performance of the cooperatives. One aspect of this is whether or not the milk price that the cooperatives report (and presumably pay out to their farmers) resembles the "milk basket price". We argue that the latter more correctly signals the real value of the farmers' raw milk. Do the cooperatives actually pay out "too much" or "too little" as compared to this milk basket price? The graph below (Figure 4.1) compares the average milk price paid out by nine cooperatives as presented in their annual reports, with the 'milk basket price' calculated on the basis of the cooperative's average milk contents and standardized valuations of protein and fat. Added on top of the milk basket price is a performance indicator that signals the value of invested capital. It has been calculated as a percentage of EBITDA per kg of member milk, after correction of the cost of sales entry in the cooperative's Profit and Loss account for 'cooperative pricing'. The 50% is arbitrary, but is included because EBITDA differs from actual 'dividend' paid. Whether or not and how the member actually pockets the capital value signal depends on the ownership structure and capital instruments of each specific cooperative.
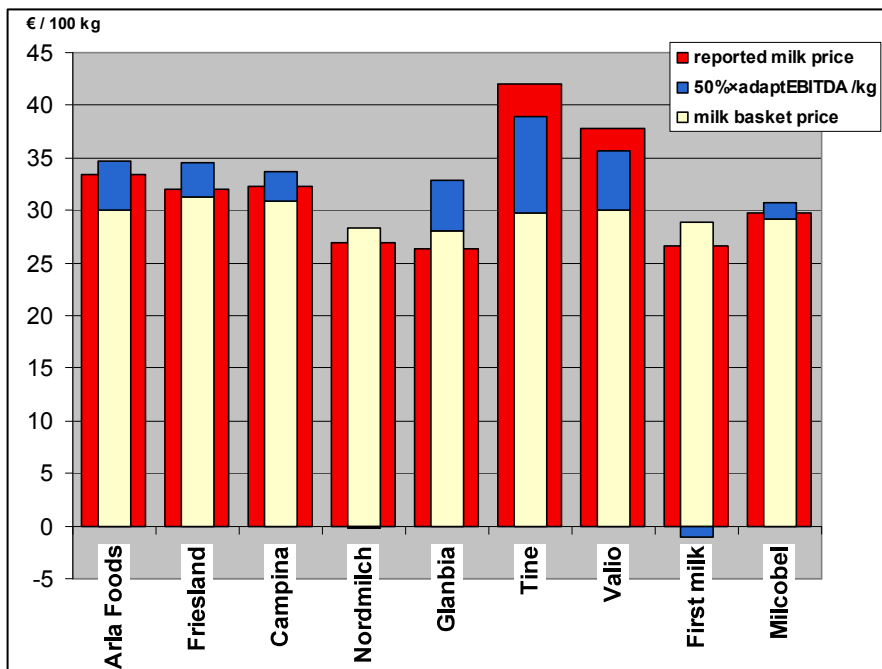
Figure 4.1   Comparing the reported milk price to the milk basket price

Note: Friesland additionally pays a dividend to its supplier members, which has equaled 0.9% of the milk price (ex VAT) during the past five years on average.

Based on Figure 4.1, our observations and reflections are as follows:

1) In the year under review (2003), six cooperatives paid higher milk prices than their 'milk basket price'. Tine and Valio stand out as "extreme" cases, followed to a lesser extent by Arla Foods and Campina. We can indicate multiple possible explanations for this variation; among others:

   - Cross-subsidization of the milk price with positive returns on non-dairy activities (Glanbia: nutrition and agribusiness; Friesland: beverages);
   - Idem with returns on non-member milk-related transactions (Arla Foods: UK; Friesland: Asia and Nigeria; Campina: Russia; Glanbia: USA);
   - Idem with returns from member-milk related value-adding activities (nearly all);
   - Product portfolio's differing from the 'basket' used combined with presence in markets with a generally high consumer price index (e.g Arla Foods in Denmark and Sweden; Tine in Norway; and Valio in Finland)
   - Significant retail market power (e.g. Arla Foods in Denmark; Tine in Norway);
   - "Cannibalization" of company reserves;
   - Higher efficiency than was assumed in the basket price calculations.

2) Three cooperatives paid lower milk prices than, based on the milk basket, they should have been able to: Nordmilch, Glanbia and First Milk. This might be attributable to factors such as;

   - Operational inefficiency and/or weak marketing.
   - Investor rather than farmer orientation.
   - Insignificance of market power.

3) Three cooperatives paid out high prices, whereas in fact they should have paid high capital rewards: Tine, Valio and Arla Foods.

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Such observations of the empirical reality are presented here for illustrative purposes, and not explored in-depth. Our indicative explanations might be contested by the cooperatives in question. Our main purpose is to illustrate how the use of a non-conventional performance measurement approach can support cooperatives and their members to address fundamental questions and suggest innovative answers as to the actual performance of dairy cooperatives.

5   Summary and conclusion

The first objective of our discussion has been to address the weaknesses of the two conventional "single signal" performance measurement procedures; i.e. the raw milk price and the EBITDA. The weaknesses have been summarized in form of two performance measurement problems and three incentive problems. These five problems are held to be intimately related, and may generate a problematic development over time for the cooperative and their members.

To ameliorate such weaknesses, we have advocated an alternative approach to performance measurement; referred to as the "dual signal" performance measurement. This enables a distinction between monetary returns to milk (i.e. referring to the member's on-farm investments) from monetary returns to capital (i.e. referring to the members` in-cooperative investments). We claim that this "dual signal"-approach to a larger degree than the conventional "single signal"-approach reflects the underlying economic realities of dairy cooperatives. Members are better informed with respect to their optimal investment decisions; i.e. the trade-off between investing on their farm or in their cooperative. Members are also equipped with data that enables them to exercise their residual ownership control of the cooperative more effectively. A further advantage is that the dual-signal performance measurement procedure lays a reliable basis for any type of cooperative benchmarking that involves raw milk price and/or profitability. The true gap between the performance of diverse cooperatives is revealed.

Our empirical illustrations based on a sample of eight European dairy cooperatives confirm that the alternative performance measurement approach makes a difference. According to this example, some of the cooperatives in question actually paid a milk price that was "too high" as compared to the calculated dairy value. Other cooperatives seem to pay a milk price that was "too low", as compared to the calculated dairy value. It should be kept in mind, however, that our purpose here has not first and foremost been to interpret these substantial results in any depth. Other samples of cooperatives would have given other substantial results and stimulated other specific questions with respect to the underlying causes and dynamics. Our objective is to motivate that the dual-signal approach to performance measurement is a useful innovation for dairy and similar co-

operatives that offer a more reliable measurement of the value of their raw milk and capital.

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