THE ECONOMY-WIDE EFFECTS OF BUNDLING MILK AND NON-MILK RETURNS

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TASMAN ASIA PACIFIC PTY LTD

A.C.N. 007 083 570

(Incorporated in Victoria)

457 Elizabeth Street 3 Hall Street

Melbourne VIC 3000 Lyneham ACT 2602

Telephone: (03) 93268033 Telephone: (06) 2470866

Facsimile: (03) 93268002 Facsimile: (06) 2470876

ACIL ECONOMICS & POLICY PTY LTD

A.C.N. 058 284 521

ECONOMICS, POLICY AND STRATEGY CONSULTANTS

Level 2, 181 Miller Street GPO Box 1322

North Sydney NSW 2063 Canberra ACT 2601

Telephone: (02) 99576363 Telephone: (06) 2498055

Facsimile: (02) 99571805 Facsimile: (06) 2574170

Offices in Brisbane and Perth

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EXECUTIVE SUMMARY

In a 1992 report commissioned by the New Zealand Business Roundtable, ACIL Economics and Policy argued that so-called 'bundling' of farm and processing returns into one payment to farmers had distorted production patterns and incentives for innovation in a way that is detrimental to the interests of those operating in the industries.

The problems with bundling are particularly severe in the New Zealand dairy industry. Because of the Dairy BoardÕs export monopoly, it is virtually impossible to invest in a dairy farming business without also investing in a dairy processing and marketing business. In addition, the returns from farm and processing activities have traditionally been bundled together into one payment to farmers, a feature which prompted one farm leader to observe in 1995 that:

Trying to make investment decisions with bundled returns can be likened to a dairy farmer trying to make selective breeding and culling decisions from the analysis of a whole-herd bulk milk sample.

Bundling disguises market signals received by farmers and encourages over-production of milk. For example, it has been calculated that about 25 percent of the bundled return received by New Zealand dairy farmers in 1992 was a return farmers received on the estimated $3.8 billion they have invested off-farm in cooperatives and Dairy Board assets. Because the processing return received by farmers is based on the level of milk produced, the processing return acts as a subsidy to milk production which encourages excessive milk production.

To estimate what the over-production of milk costs the New Zealand economy, the removal of bundling was simulated in the WEDGE general equilibrium model of the New Zealand and world economies. The simulations involved reducing farm returns for processed milk by 25 percent while initially maintaining income received by dairy farmers.

The WEDGE simulation results indicate that a 25 percent reduction in farm milk returns caused by the removal of bundling would lead to around a 20 percent reduction in output and exports of milk products. This would generate an economic gain to the New Zealand economy of $145 million per annum. To put this gain in perspective, it is more than four times the estimated potential gains from opening trans-Tasman shipping to competition.

The annual gain of $145 million consists of an annual resource allocation gain of $45 million (1993/94 values) and a terms of trade gain of $100 million per annum. The terms of trade gain results principally from higher export prices for New Zealand dairy products brought about by a contraction in exports of New Zealand dairy products.

The $145 million gain from removal of bundling is equivalent to about a third of the potential processing return due to dairy farmers. The gain is available because bundling was found to

dissipate about a third of dairy farmers' potential returns on their off-farm dairy-related investments. The simulation results suggest that income received by existing dairy farmers would rise even though aggregate dairy farm income would probably fall. This would occur principally because lower dairy farm returns would be offset by a higher return received by dairy farmers on their investment in cooperatives and Dairy Board assets. Thus, overall, income received by producers of 'other livestock', which includes dairy farmers, was simulated to rise by $190 million annually.

The national annual gain of $145 million from removal of bundling would be even larger if, instead of being passed to farmers, some returns on farmers' post farm-gate investments are currently being siphoned off beforehand through the adoption of inefficient marketing and organisation structures created by the current statutory marketing controls. Our view is that if existing dairy marketing regulations were repealed, such inefficiencies would soon disappear. For this reason the $145 million annual gain to New Zealand society from removing bundling can be regarded as a conservative estimate.

1. INTRODUCTION

This paper has been prepared by ACIL Economics and Policy Pty Ltd (ACIL) and Tasman Asia Pacific Pty Ltd (Tasman) for the New Zealand Business Roundtable (NZBR). The paper is intended to provide further insights into the agricultural marketing issues raised by ACIL in an earlier report and subsequently developed through valuation work on dairy industry assets by Ireland, Wallace and Associates.

Those earlier reports argued that the types of agricultural marketing arrangements which have emerged in New Zealand — particularly 'bundling' and other forms of systematic cross-subsidies between the economic activities of industry marketing authorities Ñ have distorted production patterns and incentives for innovation in a way that is detrimental to the interests of those operating in the industries.

This paper is about the dairy industry. But the key question addressed is whether bundling in that industry is having significant broader economic consequences. In particular, we look at the extent to which artificially inflated milk returns due to bundling could be attracting resources into dairying from activities that would make better use of those resources from the nation's viewpoint. We also look briefly at the possibility that the potential for inflated returns due to bundling may be offset to some extent by cost padding and wasteful rent-seeking behaviour in dairy industry organisations, and we ask what the flow-on consequences of that activity might be in the rest of the economy. Finally, we use the opportunity when revisiting the bundling issue to correct some misunderstandings about it that have arisen in dairy industry circles since the ACIL report was released and to comment on changes now being made Ñ changes which, despite superficial appearances to the contrary, do not address the fundamental problems created by bundling.

Using the dairy industry as an example, this study seeks to provide fresh insights about bundling to inform the public debate within and beyond agriculture. It flags possible opportunities for industry cooperation in developing better estimates of industry performance and the costs to the industry of bundling — estimates which would be relevant to decisions about the future development of the industry. Both ACIL and Tasman firmly believe that it is in the interests of the New Zealand dairy industry to go to the next step — to confront

objectively the issue of whether the effects of bundling are sufficiently detrimental to justify more substantial changes than are now being made.

Importantly, this paper presents a strong case to suggest that the set of stakeholders in these matters extends well beyond the dairy industry — because the costs of bundling in the dairy industry spill over to produce significant costs across the rest of the economy. The consultants believe that this raises a wider set of issues concerning statutory support for these arrangements than is commonly thought to be involved, and underlines why government policies towards the industry should not be dictated by participants in it.

2. THE ECONOMIC CONSEQUENCES OF BUNDLING

2.1 BACKGROUND

Debate about appropriate marketing structures for New Zealand's agricultural produce has been a feature of New Zealand's policy scene for many years, involving producers and producer organisations, government and other interests. Given the significance of agricultural production and exports to the New Zealand economy, the long history of statutory marketing arrangements, rapidly changing external market conditions and the room for legitimate differences of view about the right strategies, such debate is both predictable and appropriate.

The commissioning by the NZBR of the October 1992 ACIL report reflected an interest in agricultural regulation beyond agriculture itself. The NZBR was concerned about the effects of agricultural marketing arrangements on the performance of the New Zealand economy.

While the report ranged across agricultural industries and its findings in relation to the meat and wool industries have now been largely accepted, its discussion has generated the most controversy in relation to its analysis of dairy industry marketing arrangements. The report questioned the institutional structures of the dairy industry — not just the Dairy Board, but aspects of the dairy cooperatives. The report challenged the presumption that the dairy marketing arrangements had been as successful as was widely believed, a challenge which this study will extend. In the dairy industry, as a result of the ACIL report, the term 'bundling', meaning the pooling of farm and post farm-gate returns, has become part of the common language in policy debate. Bundling is increasingly appreciated as inimical to the interests of dairy farmers *as investors* in the large set of dairy industry assets beyond the farm gate controlled by the dairy companies and the Dairy Board.

As a farm leader said last year:

> Trying to make investment decisions with bundled returns can be likened to a dairy farmer trying to make selective breeding and culling decisions from the analysis of a whole-herd bulk milk sample.

The value of these off-farm assets — in the form of the value of the cooperatives and the assets of the Dairy Board — was not definitively resolved by ACIL, but in its report indicative estimates from published sources were discussed. These suggested 1990/91 values in the vicinity of $2.3 billion *plus* the value of the 'asset' associated with preferential access to the UK butter market and its associated premiums (which gave a sales value advantage of

$120 million in the year 1990/91). On this basis, it was estimated that about 20 percent of the payment for milk consists of a return (assuming a typical rate of return on assets) on the industry's off-farm investments. It should not be interpreted as representing any part of the return on farm level milk production — to do so would involve double counting and must convey a false impression about the profitability of at least one of the farm and the non-farm investments undertaken by dairy farmers.

This said, the ACIL report concluded that payment of this return on the off-farm investment was being made in a form which could be expected to encourage inappropriate (in the sense of being in excess of most profitable) levels of industry milk production. ACIL recommended that the industry pursue a strategy of ÔunbundlingÕ by separation from milk payments of returns on off-farm assets.

The NZBR subsequently commissioned Ireland, Wallace and Associates to undertake an independent valuation of these off-farm assets. Their valuation, based on scrutiny of the Board and cooperative investments and comparisons with overseas food processing and distribution benchmarks, suggested a 1992 value of about $3.8 billion, with the potential, based on current international best practice, to rise to $6.5-$7 billion. Inevitably, the international benchmarks used by Ireland *et al.* were not ideal. They came from the United States, where producers rely heavily on the manufacture of high value branded wet products in which there is limited (but growing) international trade; profits are based primarily on sale into the large US domestic market. It is doubtful that New Zealand, with its small domestic market, could effectively move its product mix and brand presence to mirror those of the US firms. This does not, of course, preclude the creation of significant extra value through changes in product mix and effective brand-based marketing. The valuation by Ireland Wallace and Associates is ambitious and may be difficult to reach, but it is a useful point of departure.

Based only on the *current* rather than suggested *potential* value, about 25 percent of the 1992 milk payout was attributed by Ireland *et al.* to the investment return on the off-farm assets, a somewhat higher figure than had previously been suggested by ACIL.

2.2 THE FEDERATED FARMERS RESPONSE

In 1994, the Dairy Section of Federated Farmers released its own discussion paper. That paper ranged across several issues concerned with the structure and direction of the industry; the issues covered included an assessment of the arguments relating to both bundling and asset valuation. The paper lent broad support to the off-farm asset values proposed and to the associated analysis of bundling in earlier work.

The Federated Farmers discussion paper recognised that good management information is an imperative and suggested that the problem be addressed by splitting payments back to farmers into two components Ñ a payment for milk and a return on off-farm investment. The suggestion has promoted awareness of the industryÕs bundling problems, but as a solution is defective, for two main reasons:

• regardless of whether the farmer receives one cheque or two, as long as the total received is fixed by the present marketing practices to be proportional to milk delivered, the incentives faced by individual farmers to produce milk will be unchanged. The shareholding proposal,

even if translated by cooperatives into separate cheques paid back to farmers, would therefore not alter farmer incentives as long as both payments are linked to milk production. In any case, this plan fails to address the second problem which is that:

• until such time as the processing/marketing system has the discretion to use the price paid for raw milk to influence supply, *no one* in the industry will have the information needed to correctly estimate the *market* price (as opposed to the price paid) of raw milk and the returns from processing and marketing. Simple use of *accounting conventions* to allocate profit between farm and non-farm activities misses the point that the information required for management decisions relates to the *relative* performance of the two sectors. Critical to this is an assessment of the *marginal* costs of milk production, processing and marketing.

These difficulties are not trivial; they are the central concerns ACIL and others have expressed with bundling. The nature of the problem can be illustrated by an analogy. Instead of dairy farmers, think of a crowd at a rugby match. Initially all are comfortably seated. Occasionally a head in front cuts out a part of the view, and this is annoying. This prompts a couple of spectators to stand up to get a better view and, at first, they are clearly better off. Then others start standing because their view is now cut off by those already standing. In a matter of seconds, everyone is standing with no one seeing better than when all were seated Ñ the view is the same and the comfort is less. Everyone realises this but, unless a decision is taken collectively for everyone to resume their seats, any individual spectator who takes the initiative and sits down is made worse off.

That is the kind of problem dairy farmers face. As shown in Box 1, bundling forces farmers to act in a way that is detrimental to individual farmers and the industry. But the knowledge that bundling is costing farmers profits does not, by itself, resolve the problem. Likewise, convincing them that all would be better off if all produced less milk is not enough. Either an enforceable collective decision to produce less needs to be taken or a completely separate means of rewarding farmers for the returns on their equity in processing has to be found. Ending the statutory arrangements may be the best way — a matter we will take up later.

To sum up, bundling is a problem of inadequate and distorted information *and* of constraints on (or disincentives to) individuals to respond, in the industryÕs interests, to any improved information which may become available. Both need to be addressed.

2.3 OVER-PRODUCTION OF MILK AND THE ASSOCIATED ECONOMIC COST

Bundling would not be a problem if production decisions were unresponsive to price. In the end, the responsiveness of production to price changes is a principal factor which determines the level of over-production and consequential losses of industry profitability (Box 1). It also determines the extent to which the dairy industry competes with other industries for the resources to produce the extra milk — and it is through this mechanism (and the depressed profitability of dairying) that the rest of the economy is affected. Understanding the responsiveness of milk supply to price changes is therefore crucial to the balanced assessment of policy alternatives, from the perspectives of both the industry and the rest of the economy.

The primary mechanism through which bundling of returns disadvantages the industry is the manner in which the industryÕs *behaviour* is modified by changes to the bundled returns

received. If the industry is encouraged by higher bundled prices to produce more milk, then there is a problem (Box 1).

Box 1: Simplified supply response under price bundling

Consider, for a moment, a much simplified example in which there is only one dairy product and it uses whole milk. Milk can be produced on-farm for, say, $0.50 per litre, irrespective of quantity. Processing, packaging, marketing and transport add an additional $0.50 per litre in producing and selling a kilogram of product, so total costs are $1.00 per kilogram of product, or $1,000 per tonne.

Suppose also that there are only two markets for the product. One ‘premium’ market pays $2,000/tonne but applies a quota on New Zealand purchases of 10,000 tonnes per annum. A second ‘commodity’ market pays only $750/tonne but will take unlimited quantities.

If the New Zealand dairy industry were really one big, vertically integrated farm/factory then the production/marketing strategy would be obvious Ñ produce only 10 million litres of milk, yielding 10,000 tonnes of product, sell it into the premium market and direct all market development activities at relaxing the quota restriction in this market or building demand (and hence prices) in the commodity market. Profit from this strategy would be $10 million, based on returns of $20 million, farm costs of $5 million and other costs of $5 million. *No production* for the commodity market would be sensible.

Then suppose that a farmer offers to supply an additional 1,000 litres of milk — what would it be worth to the factory? The factory could process it for $500 and sell it for $750, so the milk would be worth $250, or $0.25 per litre — half the cost of producing the milk. The factory would offer no more than this for the milk and the farmer would think about other things to do with his or her land. Supply would be regulated at a level consistent with maximising profitability.

Suppose now that the farmers buy out the factory, insert their own management and decide to operate on a cooperative basis. The factory will take whatever milk is supplied, will process it and market it and any ÔprofitsÕ will be returned to dairy farmers in proportion to the milk supplied. The farmer offering the additional 1,000 litres of milk is now in a very different position. 10,001 tonnes of product can be produced and sold across the two markets for $20,000,750, yielding an average return of $1,999.88/tonne. After deducting processing costs of $500 per tonne, producers can be paid just under $1.50 per litre for their milk, yielding a farm profit of almost $1/litre.

Of course, other producers see this as a pretty good move and seek to expand their production. Some farmers might even try to switch into dairying and if the cooperative is sufficiently generous it will allow them a part of the action. Every extra litre produced will be paid a price which more than covers its production costs *but* the price which the cooperative can afford to pay for all the existing production will fall a little. The fact is that for every extra tonne of production, the industry loses $250 (it costs $1,000 dollars to produce and it is sold into the commodity market for $750). Industry profits are being reduced but still each farmer is being encouraged to produce more milk.

When would this expansion stop? Not until the average profit being distributed back to farmers falls to $500/tonne — by which time the industry is not making any profit. At what level of production would this occur?Ñ 50,000 tonnes.

The simplified example given in Box 1 could be extended by allowing for multiple products, a much more diverse spread of markets and market returns, and non-quota markets which still offer good profits but where prices are sensitive to volumes placed. While these extensions complicate the analysis given in Box 1, they would not change the basic principles embodied in the example. Similarly, production and processing costs are not uniform. Generally, milk production costs per unit will rise with increasing production, reflecting increased supplementation and the progressive introduction of less suitable land and new dairy-specific farm infrastructure. Unit processing costs may fall for a start as greater capacity utilisation of existing factories is achieved, but can be expected to rise as new processing facilities need to be built. Allowing for these realities further complicates the analysis, but the principles stand.

The possibility that considerable over-production is encouraged constitutes a legitimate concern for the entire New Zealand economy. This over-production involves real economic losses, at least in the sense that greater profits could be earned if the resources were used differently. Regardless of whether the greater production is achieved by dairy expanding into areas involved in other forms of agriculture, by dairying purchasing feed grains that could be utilised elsewhere, or by dairying competing for labour and other resources to the detriment of other industries, the result is a loss to the economy.

Against this background, what can be said about the responsiveness of dairy supply in the New Zealand industry? The answer is ‘surprisingly little’ in view of the importance of the issue, but some progress has been made.

MAF has developed a model which in principle is suited to analysing this question, but it has only been applied to the analysis of price shocks, as opposed to *sustained* price movements (such as the effects of a long-term reduction in price, relative to the prices which would otherwise apply as a result of unbundling). Direct application of this model may be justifiable as a next step, but it may be possible without that to gain a feel for the size of the supply response being generated by bundling using information from studies already available.

This was how the Organisation for Economic Co-operation and Development developed supply elasticities for New Zealand agriculture for use in the MTM world agricultural trade model. A review of available studies was carried out by New Zealand economists and on the basis of the review, own and cross price elasticities of supply were estimated for around 14 commodities. An elasticity of supply for fresh milk of around one was suggested.

If this estimated level of supply response were to apply across a reasonably wide range of prices, then it would suggest that bundling in New Zealand may have driven (or, be driving) milk production to levels approximately 33 percent above the most profitable levels. Put another way, the point is that removal of bundling might, over time, lead to a contraction in dairy production of the order of 25 percent from the observed level. But four qualifiers are important:

• the contraction of the industry in response to a 25 percent fall in milk prices may be slow because of the existing capital effectively sunk in dairying and dairy processing. Certainly it would not make sense to force a rapid correction. That said, immediate thought would appropriately be given to ways to put a brake on the recently observed expansion of the capital stock in dairying and dairy processing;

• such a contraction should not be seen as a negative result. It will not occur because incomes have slumped (they are simply being unbundled) but rather because opportunities to increase incomes through other forms of economic activity have been revealed;

• even accepting the assumed level of supply response for a 1 percent price change, the extrapolation to an inference that production might contract 25 percent in response to a 25 percent price reduction is probably an over-estimate. As production declines, product can be expected to be withdrawn from the least profitable (or most unprofitable) markets, so that average returns will not fall as fast as production. The likely outcome would be production stabilising at a level less than current production but probably greater than 75 percent of current production. Even if the production shift were only half this figure, the resources tied up in producing this last 12.5 percent of milk and dairy products in New Zealand would be very considerable; and

• the actual magnitudes of the estimates here are indicative only, but the direction of the effect of unbundling is, in our opinion, quite definite. Given the propensity the industry has shown in recent times to grow when its ‘economics’ improve relative to those of wool and other industries, ACIL and Tasman believe that the actual effect of unbundling on supply is likely to be reasonably large.

2.4 OTHER POSSIBLE EFFECTS OF BUNDLING — COST-PADDING, RENT-SEEKING AND MARKET EFFECTS

The discussion to this point has not contemplated the possibility that, before reaching the farm gate, some of the returns obtained by dairy organisations from milk sales and their assets will be frittered away. In addition, lack of competition may stifle the development of new products, markets and marketing techniques.

2.4.1 Cost-padding and rent-seeking

Economists, and increasingly the public at large, are coming to realise that regulations such as those governing exports of dairy products from New Zealand are bound to create perverse incentives inside the institutions involved. For one thing, in the activities being shielded by legislation from domestic competition (and protective shields are always part and parcel of the rules in place for such measures) there will be less pressure than otherwise to contain costs. Another incentive effect of the marketing rules is that the people they benefit are likely to become a pressure group which devotes significant time and effort to defending the privileges or 'rents' they enjoy. The key insight here is the apparently simple one that actions or rules which might at first seem to merely involve transfers between members or groups in society in fact can involve substantial resource costs.

Both these kinds of phenomena — the absence of pressure to economise, and rent-seeking (or rent-preserving) behaviour by favoured incumbents — will tend to raise organisational costs. They will contribute nothing of real worth to the economy.

Importantly, in the current context, any resources these phenomena absorb will reduce the amount of money available to pass on to milk producers, in a sense mitigating the bundling problem by diminishing the extent to which it results in excess agricultural production. Instead the waste will be observed in other, and we consider more wasteful, forms. As explained in the following section, not all of the ÔexcessÕ returns passed through to farmers are totally lost, whereas virtually all expenditures on cost-padding and rent-seeking in the export processing sector will be.

In the New Zealand dairy context, the kinds of cost-padding and rent-seeking activities which might be expected to be seen in response to the regulatory paraphernalia which support the bundling process would comprise initial and reactive expenditures, mostly within the dairy processing and marketing organisations themselves, but also, to some extent, outlays in the form of self-preserving activities by government officials and dependent private sector agencies. It is to be expected that they will draw resources away from uses which are more genuinely productive from a national standpoint.

Symptoms of such behaviour could include the costs of time spent lobbying to defend the industry's statutory privileges; excessive capital expenditures ('gold plating' of plants); a relative neglect of 'shop-floor' issues compared with external relations issues; unduly generous conditions for executives (such as needless overseas travel); over-expenditure on entertainment; cosy arrangements with industry unions and a slowness to make innovative changes to employment arrangements; and cross-subsidisation across product types to

cultivate the support of well-organised and vocal sub-groups for continuation of the arrangements.

It is much easier to hypothesise how such phenomena might arise than to measure their existence in real life. Indeed, a search of the literature generally suggests that no empirical work on cost-padding and rent-seeking of precisely the type one might expect to see in the New Zealand dairy industry has yet been undertaken in any country.

Evidence on these kinds of phenomena was not sought, for example, in the 1994 study by SER Consulting Economists and others of institutional arrangements for the meat and wool sectors (the SER study). As in the case of ACIL's earlier report on agricultural marketing, the SER report contains some relevant case history. But it does not draw together the evidence on such phenomena or recognise them as a distinct source of social cost.

An interesting observation about the likely source of pressures for rent-seeking has emerged in the wake of the SER study. Comments made in the workshops conducted by the SER team about their report indicate that it was the meat and wool boards' staff, rather than board members, who felt most threatened by proposals for marketing deregulation. On reflection, it is hardly surprising that it is the full-timers who consider the career threat of deregulation to be most serious.

We have not sought in this study to quantify the current level of cost-padding and rent-seeking in the dairy processing sector, nor to measure to what extent and how quickly they would disappear if the existing dairy marketing regulations were repealed. Nonetheless, our view is that, to the extent that these phenomena are currently present, they will both be short-lived in the event of deregulation. The basis for this opinion is as follows. In theory, cost-padding arises from restrictions on entry into activities which provide protection to incumbents. Rent-seeking arises because of the assumption people make that new privileges can be obtained or existing privileges can be kept through expenditure on political lobbying. ACIL's and Tasman's view is that the rationale for both phenomena would be seriously weakened if the legislation supporting bundling were repealed. There would be a shock to all involved — indeed our view is that the perceived commitment to change implied by government action to dismantle such long-standing marketing arrangements would cause a significant shift in the behaviour of those involved in dairy processing, administration and politics.

It is also our view that it would be possible to count virtually the whole of the resources no longer spent on rent-seeking as net gains to New Zealand society. One reason for this conclusion is that in our judgment the resources would not be reallocated to any significant degree to other export-processing sector costs. Another reason is that it seems unlikely that reduced expenditure on rent-seeking would cause any significant loss of value added anywhere else. This may seem to be an extreme judgment, but it is consistent with that expressed by the two analysts most closely associated with refinement of the rent-seeking concept, Tullock and Posner. Their point, essentially, is that the likely outlay on rent-seeking-type mechanisms in a politically competitive environment will be an amount at least as large as the total transfers (or windfalls) at stake. They have reasoned that it will be logical for entrepreneurs, collectively, to spend in seeking to achieve a prize, an amount equivalent to their estimate of the value of the prize itself.

It is on this basis that we believe it is fair to say that each dollar used up in the processing sector, either in slack production practices or in rent-seeking expenditures, will cause more waste than if that dollar is passed through to the farm sector in the milk price.

2.4.2 Effects on markets and innovation

In addition to rent-seeking/cost-padding, further welfare losses may arise from the industry's statutory monopoly, namely dynamic efficiency losses due to the lack of competition and stimulus to innovation in marketing. The exclusion of competitors with linkages to markets, brands and technology may be particularly important factors.

These effects could be so strong that unbundling of industry returns, coupled with deregulation, may result in the drop in dairy production being smaller than anticipated or even completely offset. This is because new entrants with alternative distribution outlets, products, brands, etc, and/or lower costs, could expand demand for New Zealand milk and, as it were, 'validate' the excess level of production.

Without downplaying the potential importance of these issues and the possibility of cost-padding and rent-seeking, these complex matters will be pushed into the background to simplify the analysis and presentation of the more easily quantified bundling issues in the remainder of this study. They will be picked up again only in the summary of the report.

2.5 RAMIFICATIONS IN THE WIDER ECONOMY

The debate about bundling has so far been largely confined to the indications that the dairy industry is 'ripping itself off'. This is understandable, but the commentary above suggests that there may be much wider ramifications. Here, for presentational simplicity we concentrate on the simpler point that current institutional arrangements are encouraging overuse of resources in dairying, and that this will be to the detriment of other industries competing for the land, labour and capital being used for 'surplus' milk production — and, ultimately, to the detriment of New Zealand as a whole.

If all industries were being similarly encouraged to over-produce, the expansionary effects on any one would largely cancel each other out and result in little, if any, misdirection of resources. Specifically, if all industries competing with dairying for resources were obtaining supplementary returns comparable to those being fed through to the dairy farm sector, then the particular arrangements in dairying might be causing little economic damage, other than the costs involved in running such arrangements. This does not, however, mean that all industries could therefore benefit from over-payments. The overall effect of a comprehensive set of over-payments spanning the whole of New Zealand industry would be that no industry would derive any benefits and all industries would share the cost of administering the system.

ACIL and Tasman consider it most unlikely that other industries typically face the same level of distorted production incentives as does dairying. Dairying stands out as relatively more prone to over-production through bundling than other rural industries for some quite specific reasons:

• effectively all milk production is channelled through cooperatives and all exports are controlled by the Dairy Board;

• relative to other rural industries, there is a high level of post-farm value-adding to milk while still within the control and payments arrangements of the cooperatives and the Dairy Board. This is attributable partly to the fact that dairy products suited to export are highly processed and partly to the international marketing and distribution facilities of the Board which entail high levels of vertical integration into international markets. The vertical integration is not unique to dairying, but the combination with high value-adding within a cooperative structure is;

• there is a relatively high level of capital investment in the dairy industry past the farm gate to support the value-adding processes; and

• the earlier review suggested an effective cross-subsidy to farm milk production of the order of one third; this level of 'assistance', if it were to take the form of explicit government assistance measures such as tariffs, bounties or SMPs, would be judged to be very high.

The point is that the concerns with these cross-subsidies would be greatly reduced if legitimate profits from activities undertaken past the farm gate were small or were excluded from the ÔbundlingÕ. For most industries, one or both of these applies. For dairying, neither does.

In the following section, the effects of removing bundling using a general equilibrium model of the New Zealand economy are presented.

3. MODELLING THE REMOVAL OF BUNDLING IN THE NEW ZEALAND DAIRY INDUSTRY

3.1 INTRODUCTION

The impact of removing bundling of farm and processing/marketing returns in the New Zealand dairy industry was examined using the WEDGE multi-country, multi-commodity model of the world economy. The WEDGE model was constructed by the Australian Industry Commission and was used by the Commission to quantify the cost to OECD economies of controlling greenhouse gas emissions. Swan Consultants (Canberra) has also used the model to examine the economic costs of controlling greenhouse gas emissions in New Zealand, to model the impact of outcomes under the Employment Contracts Act 1991 on the productivity of New ZealandÕs meat processing industry and to quantify the gains from reforming trans-Tasman shipping. The WEDGE model is thus a tried and tested policy analysis tool.

The WEDGE model is based on US dollars and on a 1988 database and thus incorporates some changes in New Zealand that have resulted from its significant economic reform programme. The countries and commodities covered by the WEDGE model are detailed in Box 2 and detail on the model's economic structure, parameter settings and database is available in a separate document.

The WEDGE model is particularly well suited to modelling the effects of removing bundling in the dairy industry because:

• it specifically recognises the production of processed milk products;

• it allows for the production of milk on-farm although this activity is included along with other livestock products in the other livestock products industry; and

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Box 2: Regions and industry and commodity groupings contained in the WEDGE model

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Regions

1 Australia

2 New Zealand

3 Canada

4 United States

5 Japan

Industry/Commodity grouping

Agriculture

1 Paddy rice

2 Non-grain crops

3 Wheat

4 Other grains

5 Wool

6 Other livestock products

Resources

7 Forestry

8 Fishing

9 Coal

10 Oil and gas

11 Other minerals

Food products

12 Meat products

13 Milk products

14 Other food products

15 Beverages and tobacco

Manufacturing non-metallic

16 Spinning, dyeing and made-up textiles

17 Wearing apparel

18 Leather, fur and their products

6 Korea

7 European Community

8 ASEAN

9 Rest of the World

Manufacturing non-metallic (*continued*)

19 Lumber and wood products

20 Pulp, paper and printing

21 Chemicals, rubber and plastic

22 Petroleum and coal products

23 Non-metallic mineral products

Other manufacturing

24 Primary iron and steel

25 Other metals and products

26 Transport industries

27 Other machinery and equipment

28 Other manufacturing

Services

29 Electricity, gas and water

30 Construction

31 Trade and transport

32 Other services (private)

33 Other services (government)

34 Other services (ownership of dwellings)

• it keeps track of exports from New Zealand to major overseas dairy markets such as the European Union and the United States.

To model the removal of bundling, farm returns need to be lowered by 25 percent while income accruing to farmers is initially maintained. To achieve these objectives in the WEDGE model, the New Zealand government was assumed to act as an agent whose function was to split existing returns to farmers into that due to milk production and that due to a processing/marketing return. The latter return had to be returned to dairy farmers in a manner which did not encourage increased milk production.

These objectives were achieved in the WEDGE model through a two-step procedure. Step 1 involved introducing into the model's database a 25 percent subsidy on purchases of 'Other livestock products', that is milk, by the Milk products industry.

Step 2 involved dismantling the bundling arrangements by removing the subsidy paid on sales of Other livestock products used by the Milk products industry and at the same time transferring an equivalent amount of income to dairy farmers as a lump sum transfer.

The dismantling of bundling would be expected to lead to a significant contraction in exports of milk products from New Zealand. As New Zealand is a relatively large player in the international dairy market, its actions would be expected to affect world dairy product prices. This is particularly so as several overseas dairy markets restrict access to their domestic markets, particularly the European Union and the United States.

To examine the impact of world dairy market restrictions on the results of removing bundling, two specifications of world dairy markets were employed. These included:

• a restricted international dairy market in which imports of dairy products into the European Union and the United States do not respond to movements in the price of dairy products; and

• a completely free international dairy market in which import volumes in all markets respond to movements in dairy product prices.

Bundling was removed assuming these market conditions and the effects of the removal of bundling were examined in a long-run version of the WEDGE model.

3.2 IMPACT OF REMOVING BUNDLING ON THE NEW ZEALAND ECONOMY

The macroeconomic effects of removing bundling under the two specifications of the international dairy market are summarised in Figure 1 in terms of the main macroeconomic aggregates. No matter what specification of the international dairy market is used, removing bundling is found to expand output of the New Zealand economy and to increase real consumption.

The greatest increase in national output occurs in the simulations in which world dairy markets are assumed to be unrestricted.

In an unrestricted world dairy market, the removal of bundling leads to a relatively large contraction of dairying in New Zealand but relatively small world price impacts for New Zealand dairy products. Because production of dairy products declines significantly, resources are freed up which allows a relatively large expansion in national output. Real consumption also rises reflecting higher export returns for dairy products and higher incomes resulting from an improvement in resource allocation in the New Zealand economy.

Figure 1: Long-run macroeconomic impacts of removing bundling of dairying returns ($m, 1993–94)

Source: WEDGE simulation results.

When world dairy market conditions are restricted, the removal of bundling leads to a smaller increase in national output but a much bigger rise in real consumption. This is because restricting world dairy markets makes the export demand curve, faced by New Zealand dairy exporters, less price responsive. Thus, removal of bundling leads to a higher rise in export prices for dairy products and to a smaller drop in dairy product exports from New Zealand (although total real exports as shown in Figure 1 decline). Consequently, as fewer resources are freed up in the dairy industry, less of an expansion in national output occurs. However, much higher returns are received for New Zealand's exports. Consequently, a bigger increase in real consumption is recorded in the simulation in which bundling is removed assuming restricted international dairy markets.

Because the change in national output is driven principally by the improvement in resource allocation, it does not fully reflect the gains to the New Zealand economy from removing bundling. This is because it only captures the change in quantities produced in the New Zealand economy and does not incorporate any change in the real price at which New

ZealandÕs output is sold. In the bundling simulations the real price of New ZealandÕs output rises because of a strong rise in the price of dairy product exports as New Zealand product is withdrawn. This price rise needs to be taken into account when calculating the net benefits of removing bundling.

The change in income accruing to New Zealanders is a measure which captures the effects of both changes in the level of output and the real price at which this output is sold. Thus, in this exercise, the net benefit associated with the removal of bundling was measured as the change in real income accruing to New Zealanders. As shown in Figure 2, the net benefit to the New Zealand economy of removing bundling is in excess of $NZ100 million with the higher net benefit obtained when bundling is removed assuming a restricted world dairy market.

The components of the net benefit calculations are detailed in Figure 2. In the unrestricted world dairy market simulations, the net benefit gain is principally due to an improvement in resource allocation. In contrast, when world dairy markets are restricted, there is a similar resource allocation gain but a much bigger terms of trade gain so that overall a larger net benefit is obtained.

Figure 2: The net benefits to the New Zealand economy of removing bundling in the dairy industry ($NZ m, 1993–94)

Source: WEDGE simulation results.

To put the gain from removing bundling into perspective, it can be compared to the gains achievable from other potential reforms in New Zealand. For example, Swan Consultants (Canberra) evaluated the economic gains to the Australian and New Zealand economies of removing the so-called ÔMaritime AccordÕ between trade unions in the two countries which restricts most trans-Tasman sea transport to New Zealand- and Australian-crewed vessels. The Accord has encouraged inefficient work practices and raised freight rates. Its removal was simulated to generate a net gain to the New Zealand economy of $A25 million (1992–93 values). Thus, removing bundling would provide more than four times the net gains achievable from reforming trans-Tasman shipping arrangements.

The net benefit measure can be compared to the value of the assumed processing return to calculate that portion of the processing return which is lost due to over-production of milk. These calculations are given in Table 1 and indicate that approximately one third of the processing return is lost to New Zealand through over-production of milk.

Table 1: **Calculation of loss in processing return** ($NZ m, 1993–94)

Processing return provided to farmers (1) 430

Net benefit from removing bundling (2) 145

Percent of processing return lost to New Zealand through bundling (2)/(1)x100 4%

Source: WEDGE simulation results.

3.3 IMPACT ON RURAL AND RELATED SECTORS

The effects of removing bundling on the rural and closely related sectors are detailed in TableÊ2. In an unrestricted world dairy market, the removal of bundling was simulated to lead to a 23 percent reduction in output of milk products and a 26 percent reduction in exports of milk products. This would have led to a similar decline in the demand for farm milk. However, the decline in farm milk sales is masked in the results because farm milk is part of the Other livestock products industry. As sales of this industry to the Meat products industry rose, this offset the decline in farm milk sales so that overall output of Other livestock products only fell by just under 6 percent (Table 2) — well under the 23 percent decline in farm milk.

Table 2: **Impact on agricultural and related industries of removing bundling of dairy products**

Unrestricted dairy market Restricted dairy market

Output Exports Output Exports

% change % change % change % change

Non-grain crops 3.4 4.7 2.6 3.6

Wheat 0.6 0.0 0.5 0.0

Other grains -0.2 0.0 -0.2 0.0

Wool 0.7 3.5 0.6 2.8

Other livestock products -5.9 5.4 -4.8 4.2

Milk products -23.0 -25.7 -18.2 -17.8

Meat products 2.7 2.5 2.0 1.9

Food products 0.1 1.0 0.0 0.5

Source: WEDGE simulation results.

The decline in output of Other livestock products released resources which enabled an expansion in output of other agricultural industries, notably ‘Non-grain crops’, ‘Wheat’, and ‘Wool’. Exports of these commodities also rose.

Similar, but smaller, impacts are observed when removal of bundling was simulated assuming a restricted world dairy market. The smaller output and export results reflect the relatively price inelastic export demand curve faced by New Zealand dairy exporters in this simulation.

The impact of removing bundling on dairy farmers cannot be calculated precisely from the model results as dairy farming is included along with Other livestock products in the WEDGE model. Nevertheless, an indication of the likely consequences for dairy farmer incomes can be gleaned by examining the results for the Other livestock products industry. These results are summarised in Table 3 and indicate that farm income in the Other livestock products industry would fall following the removal of bundling. However, this fall is more than offset by the direct payment of a return to farmers for their investment in the cooperatives and the Dairy Board. Thus, overall, the model results indicate that removal of bundling would be expected to lead to a substantial boost to the incomes received by dairy farmers.

Table 3: **Long-run impact on producers of 'Other livestock productsÕ of removing bundling, restricted market case** ($NZ m, 1993–94)

Fall in farm returnsa 200
Plus initial direct payment for return on cooperative and Dairy Board assetsb 430
Less fall in return on cooperative and Dairy Board assets due to less milk being processedc 40
Net income received by farmers of Other livestock products 190

a Equals returns to land, labour and capital in the Other livestock products industry.
b Assumed initial return received by dairy farmers for the investments in cooperatives and Dairy Board assets.
c Returns on capital in the Milk products industry.
Source: WEDGE simulation results.

4. CONCLUSIONS

Bundling of dairy processing and marketing returns with dairy farm returns has encouraged an over-production of dairy products which have been sold into marginal export markets at returns well below cost. Removing the arrangements is estimated to improve unit export returns and to improve resource use in the New Zealand economy. Together these effects are estimated to result in a net gain to the New Zealand economy of approximately $145 million per annum.

These estimates are conservative. They do not allow for the likelihood that more comprehensive deregulation of the industry will reduce the additional costs to the New Zealand economy which are occurring because of rent-seeking behaviour and losses in

dynamic efficiency arising from the limited competitive pressures to constrain marketing costs and to stimulate innovation.