REPORT

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Nutrition, health and related claims

A benefit cost analysis

Prepared for:

Food Standards Australia New Zealand

Centre for International Economics
Canberra & Sydney

March 2008

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Summary

Seven potential market outcomes are likely for any given food product if FSANZ Proposal P293 on Nutrition, Health and Related Claims results in the gazettal of a new Standard. The proposed Standard will relax some existing restrictions on health claims and introduce new criteria and conditions for making certain claims.

The seven potential market outcomes are:

1. new products are developed to make use of new opportunities to make health claims;
2. existing products are re-marketed to make use of new opportunities to make claims;
3. existing products are not affected by the changes (no change);
4. existing products require small label changes to ensure compliance with the changed rules;
5. existing products require changes to their existing marketing strategies due to changed criteria;
6. changes to the formulation of existing products are made to meet changed criteria; and
7. existing products are removed from the market as they are no longer viable under the proposed changes.

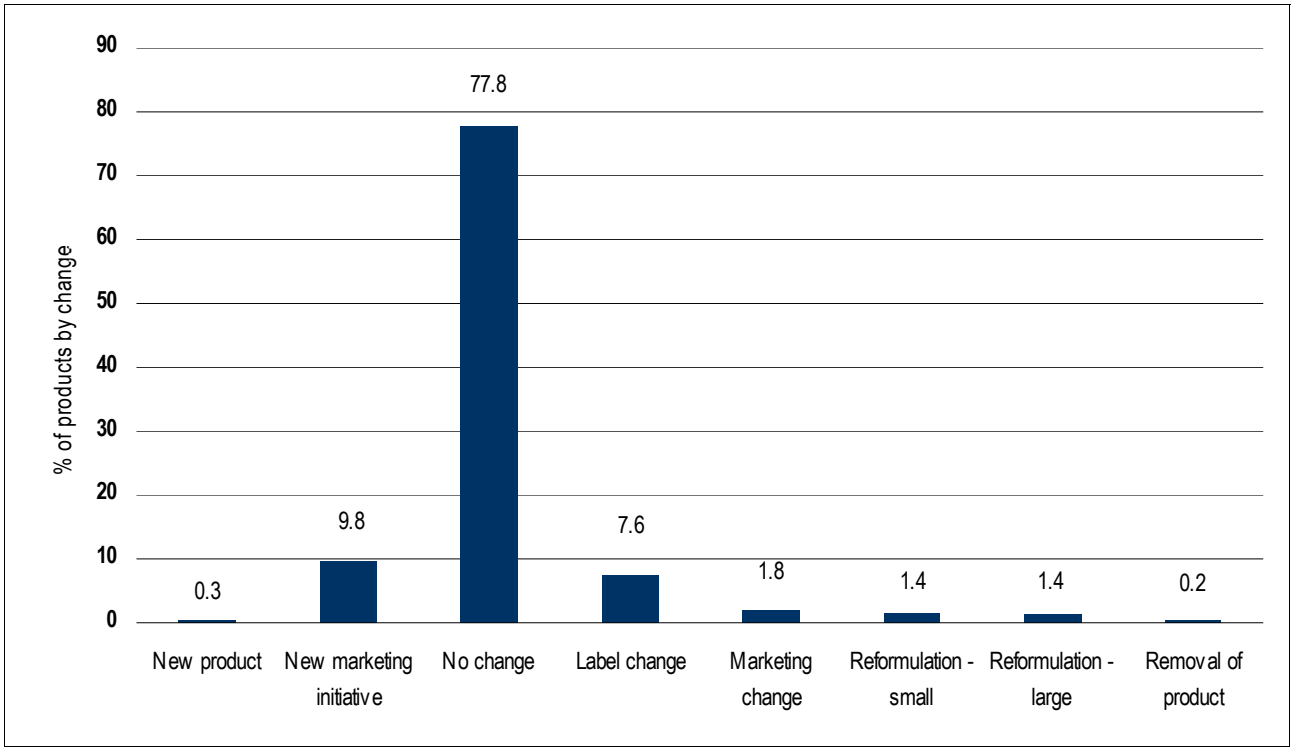
Incidence of market outcomes

Consultations with food companies were carried out to assess the expected incidence of the seven potential market impacts. The results are set out in chart 1.

The results indicate that almost 80 per cent of products are expected to be unaffected or non-impacted. Around 10 per cent of products will be eligible to make new claims and therefore provide new marketing opportunities. However, negative impacts in total will affect about 12 per cent of products. In these cases, food companies will probably elect to make label changes, marketing changes or product reformulations. The incidence of

the proposed regulatory changes leading to new products is low at 0.3 per cent, while the removal of products is 0.2 per cent.

1 **The majority of products will not be affected by the proposed changes**



Data source: CIE consultations.

Potential benefits and costs to food suppliers and consumers

The seven potential market outcomes will create benefits and costs for food suppliers and consumers. Food suppliers may profit from new opportunities but incur costs due to lost opportunities or increased costs of compliance. Consumers might gain from the supply of new and better products, but lose if products are removed or their price is increased due to rising costs. In economic parlance, improved consumer satisfaction from new and better products is known as an improvement in consumer welfare.

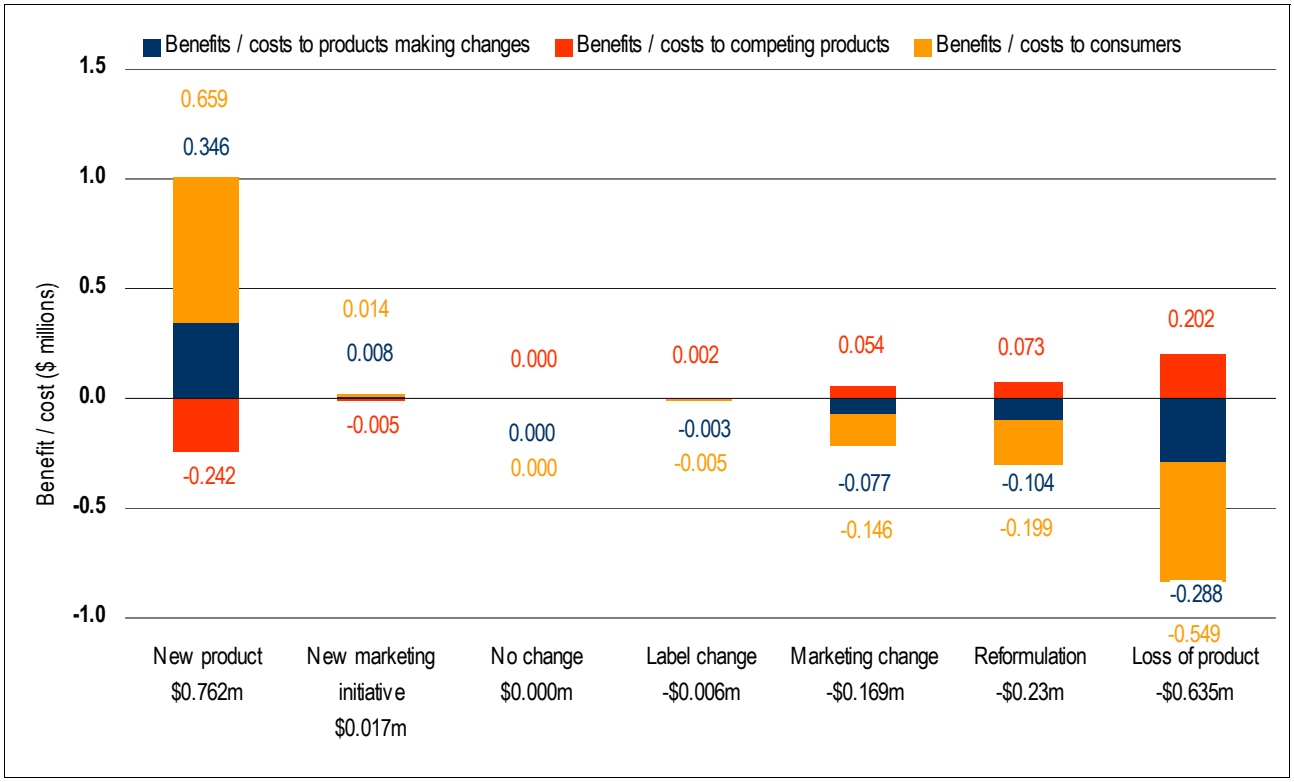
The estimated benefits and costs to food suppliers and consumers are presented in chart 2 for each of the seven potential market outcomes for a generic product with $5 million in wholesale sales per year. These have been estimated using:

- a detailed activity/financial model of a representative food manufacturing firm to estimate direct benefits and costs to food suppliers:

  - the model is based on data collected from industry consultations;
  - the incidence of market impacts is estimated from a comprehensive survey conducted of industry which obtained about 55 per cent coverage of total Australian food sales;
  - distribution of benefits and costs is highly skewed with new products providing large relative benefits, and withdrawal of products providing corresponding large costs;

- an economic model of changes in consumer preferences due to health and nutrition claims in an important Australian food market segment, to estimate consumer and indirect food supplier benefits and costs:
  - if new products or information are introduced, consumers stand to gain value over and above what they actually pay for the product, however when they substitute away from an alternative, old, product:
    - … the same consumers will lose some value, so it is the net increase in value that needs to be estimated by the model;
    - … food suppliers whose product is abandoned indirectly lose profits, so this is a cost that needs to be accounted for in addition to direct food supplier benefits (or costs) estimated using the activity/financial model;
  - if an existing product is withdrawn from the market as a result of a change in the regulation of health and nutrition claims, the opposite impact to the introduction of a new product occurs and these can be determined from the model.

2 **Consumer and food supplier impacts on a typical $5 million product**

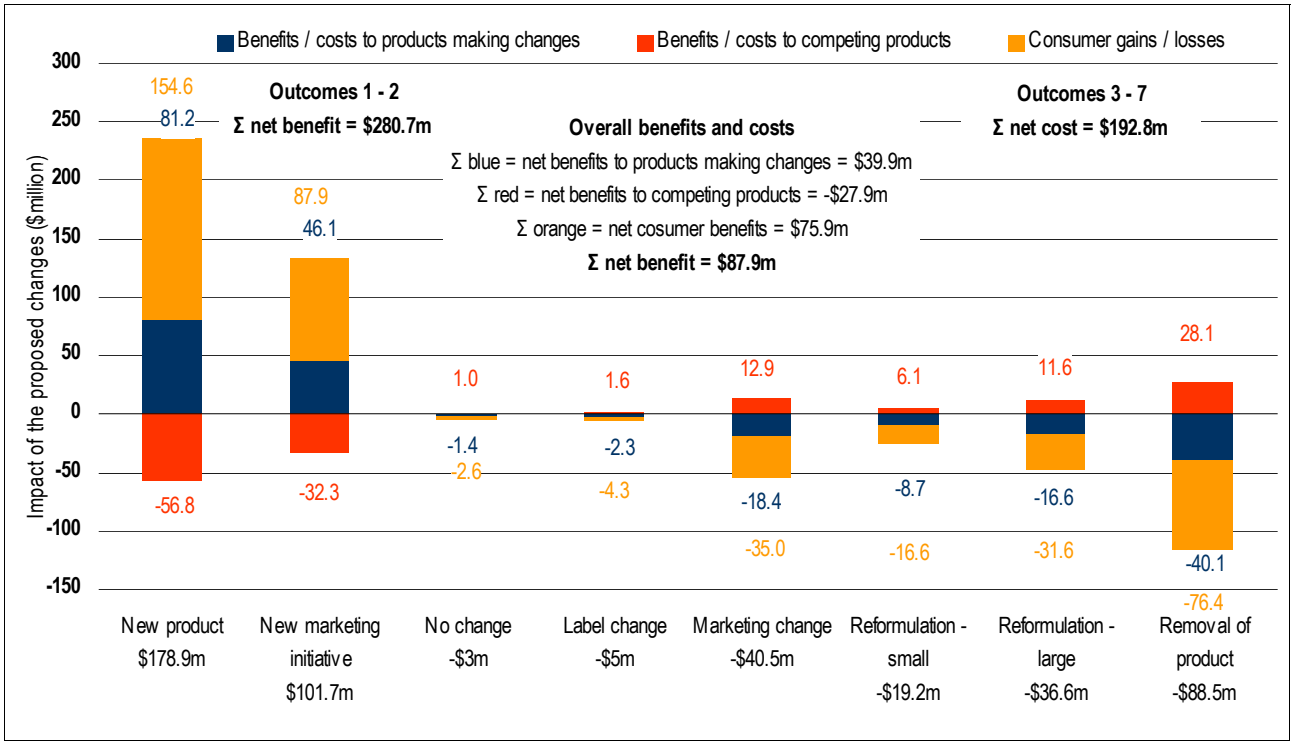


Data source: CIE calculations.

Overall economic impact for Australia

Multiplying the incidence of impacts to industry (chart 1) by the benefits and costs to industry and consumers per market outcome (chart 2) calculates the financial impact on Australian food suppliers and consumers from the FSANZ proposal (chart 3).

3 **Total net present value benefits by market outcome ($m)**



Data source: CIE calculations.

The present value benefits from high level and general level health claims which promotes new products and new marketing initiatives (outcomes 1 and 2) are large, at $280.7 million in aggregate. This is comprised of:

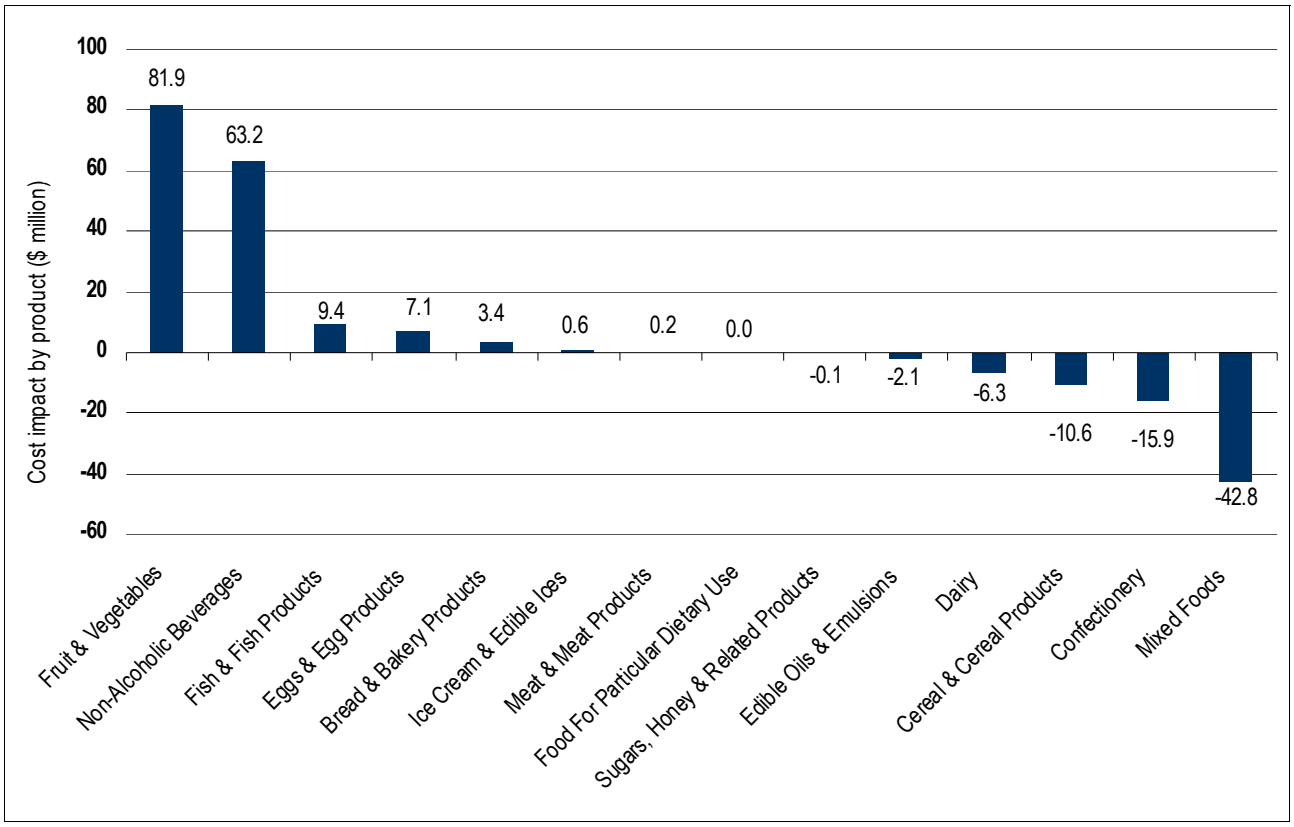
- direct benefits to consumers of $242.5 million (154.6 + 87.9);
- direct benefits to food suppliers of $127.3 million (81.2 + 46.1); and
- indirect losses to competing food suppliers of $89.1 million (-56.8 + -32.3).

For outcomes 3 to 7, the proposed Standard will result in net present value costs of $192.8 million. Food suppliers that need to change products or marketing initiatives face costs of $87.5 million. This has flow-on impacts to consumers of $166.5 million, while competing food suppliers gain by $61.2 million. For the 80 per cent of products not affected by the proposed Standard it still carries a $3 million cost due to firms having to inspect all products to ensure compliance with the changes.

Overall, the proposed Standard provides net present value benefits of $87.9 million. However, these benefits are not evenly distributed by food type (chart 4). Based on consultations with industry, the largest benefits of the proposed changes were expected to be for fresh produce including fruit

and vegetables. Implicitly, this is based on the perceived healthy aspects of these foods. Under the proposed changes, suppliers of these foods will now be able to further emphasise and market their produce using general level and high level claims. This result also reflects the large proportion of food expenditure dedicated to fruit and vegetables.

1. **Total net benefits of the proposal by sector ($m)**



Data source: CIE calculations.

Sensitivity testing

Sensitivity testing reveals that the results are most sensitive to changes in the number of new products, the removal of products and the extra gain in consumer value from changing patterns of consumption caused by the proposed Standard. These also happen to be the most uncertain factors affecting the results.

Nonetheless, the results indicate there is over an 87 per cent probability the benefits will exceed the costs. The range of net present value benefits is reasonably narrow with an estimated 90 per cent chance the net benefit lies between $-46.7 and $178.3 million. The most likely situation leading to a net cost being imposed is where the number of new products generated is much smaller than estimated.

Impact including New Zealand

Results are based on Australian food company data only. Although no specific information on New Zealand firms was received, companies operating in both jurisdictions did not expect there to be significant differences between the two countries. Further, a comparison of the patterns of consumption between both countries reveals they are very similar.

New Zealand food consumption is equal to about 14.5 per cent of Australian food consumption. When the net benefits are scaled up to include New Zealand the net benefit increases from $88 million a year to $101 million. Net benefits to New Zealand are around A$12.8 million or NZ$14.1 million.

Conclusions

After allowing for enforcement costs, the combined Australian and New Zealand net present value benefit of the proposed Standard is estimated at $94.7 million. On this basis, it appears that the proposed Standard may provide a benefit-cost ratio of 1.4:1. Over a four year period, a benefit-cost ratio of 1.4:1 represents a rate of return of about 9 per cent per year over and above the cost of capital – a reasonable commercial rate of return.

Because the sensitivity analysis indicates that the results are highly sensitive to the number of new products and the indirect consumer benefits from new products likely to be enabled by the proposed Standard, it is worth noting the following.

- Food companies indicated that very few new products are likely to be generated as a result of the proposed Standard due to the stringency of restrictions on some products.
- However, it is conceivable that new products and the indirect consumer benefits from them could be up to double those estimated for the most likely case.
- Model results indicate that were:
  - the number of new products doubled the benefit-cost ratio would rise from 1.4:1 to 2.4:1;
  - the net indirect consumer and producer benefits to also be doubled, the benefit-cost ratio would rise from 2.4:1 to 3.3:1.

Although it is highly likely that returns will be positive, the net benefits are not large. A net benefit of $95 million represents less than a quarter of one per cent of the value of food sales in Australia and New Zealand on an annualised basis.

The relatively small overall impact reflects that:

- most products (80 per cent) are unaffected by the proposal;
- net benefits from new products and new marketing initiatives are largely offset by net costs of changes on other products:
  - provisions in the proposed Standard to allow use of high and general level health claims appear to promote the introduction of new products/marketing initiatives;
  - changes required under the proposed Standard to food eligibility criteria and implied claims appear to require label changes, marketing changes, product reformulation and product removals;
- the incidence of new products and removed products, which have relatively high benefits and costs per product, are low at around 0.5 of one percent of all products;
- the scope for gains from new products, while relatively large per product, are limited by the mature nature of the food sector:
  - consumers already have an immense number of products to choose from;

if consumers do not get a particular attribute they value from one product they can easily switch to a range of alternatives, so any new attribute, additional information or new product needs to be revolutionary to add much to consumer welfare and results here confirm this.

1 Background

Food Standards Australia New Zealand has released a Draft Assessment Report (FSANZ 2005) and a Preliminary Final Assessment Report for Proposal P293 — Nutrition, Health and Related Claims (FSANZ 2007a). These reports assess options for the development of a regulatory framework for nutrition, health and related claims together with the proposed Standard 1.2.7 — Nutrition, Health and Related Claims.

The Centre for International Economics (The CIE) has been engaged by FSANZ to undertake the quantitative benefit-cost analysis that will form one part of the comprehensive Regulation Impact Statement (RIS) to be provided by FSANZ in the Final Assessment Report for Proposal P293 -Nutrition, Health and Related Claims. Other components that will inform the RIS are previous benefit-cost analysis, consumer research and enforcement cost estimates.

The proposed change

Currently in Australia and New Zealand claims on food labels (encompassing content and health claims) are regulated by various means. Some claims are not permitted under the Australia and New Zealand Food Standards Code (the Code); others are permitted and regulated under the Code, while others still are permitted with guidance for industry on their use set out in an industry code of practice on nutrient claims (CoPoNC) (in Australia only). At present, the Code prohibits health claims on food labels (except for claims relating to folate and neural tube defects). Some types of claims are not directly regulated under any of the above arrangements (such as function claims), but are also arguably not explicitly prohibited. These, like all claims made on food labels, must abide by fair trading legislation in relation to making false or misleading statements

The proposed changes will lift some of the existing restrictions on claims and introduce new criteria and conditions for making certain claims. Specifically, there are four elements to the proposed changes to nutrition, health and related claims:

- relaxing the restrictions on making high level health claims, subject to the high level health claims being pre-approved by FSANZ;
- relaxing the restrictions on making general level health claims subject to the general level health claims undergoing substantiation by the supplier of the food;
- introducing nutrient profiling scoring criteria for products carrying a general level or high level health claim; and
- incorporating aspects of the voluntary CoPoNC into the Code and updating the criteria for some elements currently regulated by the Code, noting that the majority of the claim criteria in CoPoNC have been reviewed and some modified.

The proposed changes will apply to food for retail sale only (they will not apply to food not intended for sale to the public) such as food supplied to caterers or manufacturers for further processing. Exemptions from the requirements of the proposed Standard are provided for delivered meals organisations, hospitals and similar institutions.

In effect, the changes will tighten the criteria a product needs to satisfy before a nutrition content claim or a function claim is able to be made.

For nutrition content claims, the qualifying criteria that apply to a particular attribute of a food that forms the basis of a claim have shifted from being affected by a code of practice to being regulated. In some cases new criteria will have to be met. However, generally there will be no compositional criteria that disqualify a particular food from making a content claim. For example, a 'low fat' content claim must meet the criteria for being low in fat, but the claim can be carried by any food that meets the qualifying criteria.

In the case of health claims, in addition to meeting the qualifying criteria for an attribute of the food, the proposed Standard requires the food to meet a set of nutrient profiling criteria. Criteria apply not only to the attribute that underpins the health claim, but the food that delivers the benefits must fit a nutrient profile to be permitted to carry a health claim.

Specific details of the proposed changes are set out in the Proposal P293 Preliminary Final Assessment Report (April 2007) (FSANZ 2007a) and Draft Assessment Report (December 2005) (FSANZ 2005).

The proposal is for nutrition, health and related claims to be classified into three categories:

- *nutrition content claims* are claims referring to the presence or absence of a property of a food;
- *general level health claims* are claims that refer to a relationship between a food or a property of a food and a health effect, but do not directly or indirectly refer to a serious disease or biomarker; and
- *high level health claims* are claims that refer to a relationship between a food or a property of a food and a health effect which directly or indirectly refer to a serious disease or biomarker.

Benefit-cost analysis and regulation impact statements

New regulation or changes to existing regulation that could have significant impacts on competition or impose significant compliance costs on business require a regulation impact statement (RIS). The purpose of a RIS is to ensure that the benefits and costs of the changes are understood, to ensure that the changes deliver the intended objectives and do not unduly create adverse consequences.

Rationale for government intervention in nutrition and health claims: benefits

The main economic rationale given for government intervention in health and nutrition labelling of food relates to what economists call 'asymmetric information flows'. The argument suggests that left to its own devices, the market will provide more information about positive nutrition and health attributes than negative attributes. Government intervention can help achieve more balanced flows of information so consumers can make more-informed purchasing decisions. This will allow them to make purchasing decisions that better match what they want. Better information may also help government make other health programs work more efficiently and thereby assist in achieving public health outcomes (positive externalities). This rationale is summarised in chart 1.1.

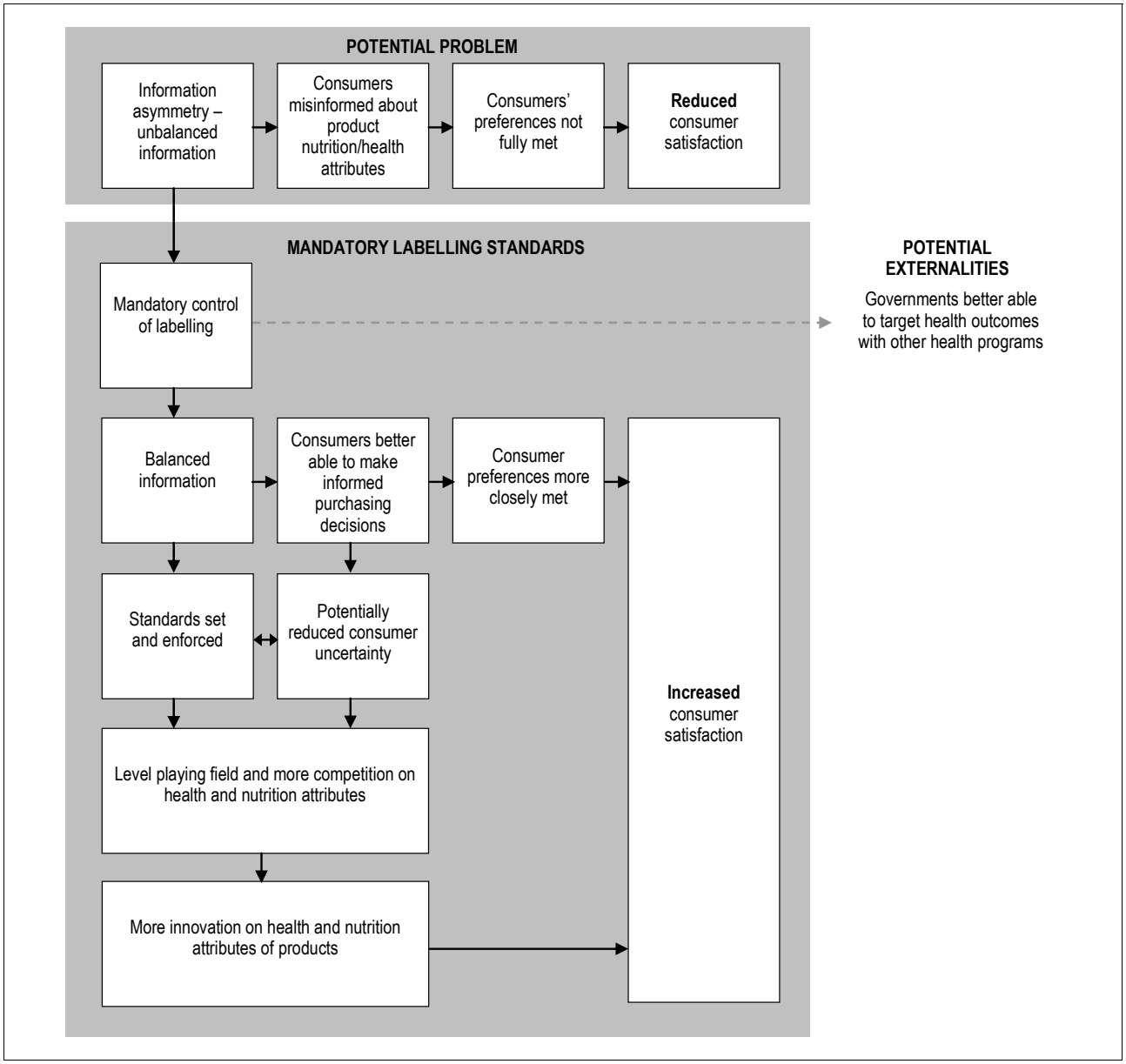
Reasons for government intervention

The potential asymmetry in information flows depicted in chart 1.1 arises because choosing what information to place on food labels is complex. There are trade-offs forced by the limited space available to include information. Including one piece of information excludes others. There is also a trade-off between the amount of information and its legibility and ease of comprehension.

- Food suppliers want to include information about attributes appealing to consumers.
- Consumers want to know both attractive and unattractive attributes so they can make informed decisions and closely align their pattern of purchases with their preferences. Consumers may apply influence to obtain this information through their purchasing decisions, but they may also seek to apply their influence through political channels.

Governments have an interest in responding to consumers' political influence and in seeing that balanced, credible information flows occur so that food markets work efficiently to deliver what consumers want. Part of this is to ensure that false and misleading claims are not made and that competition is fair and undistorted. Fair and strong competition might be expected to promote innovation in developing products that consumers want. Governments' role here is to ensure markets work efficiently to provide as many private benefits to consumers as possible.

1.1 Rationale behind government intervention in health and nutrition claims



Source: The CIE.

Governments may also have wider agendas relating to achieving social goals aimed at delivering health benefits. Governments may wish to influence consumers' diets in an attempt to increase the general health of the population. Although it may be difficult to argue that health and nutrition claims alone will drive health outcomes, they may help those consumers respond to health issues and other government health programs to better achieve a particular dietary goal. This may be seen as providing what economists call positive externalities to citizens other than those consuming a product.

Scope of this analysis

Assessing whether there are any positive health externalities likely to occur as a result of mandatory nutrition and health claims is problematic. They may be a necessary but not sufficient condition to achieve any positive outcome. Much will depend on the success of other health programs which in turn will depend on many uncertain scientific, social and economic variables (see for instance Golan 2001). Labelling alone (as a tool of health policy) can not be rigorously linked to better diets and improved health outcomes.

Such uncertainties and the indirect connections to public health outcomes make it difficult to quantify these effects, or even to hypothesis about the magnitude of their potential benefits or costs. Given these unknowns, we have not considered these impacts in the analysis. Accordingly, in this study we limit our analysis to measuring direct benefits relating to increases in consumer welfare arising from consumers being able to better align their purchasing patterns with their consumption preferences. Some of these benefits may be captured by food suppliers in the form of increased profits.

Rationale for proposed changes to Australia and New Zealand's labelling

The increasing number and sophistication of food products being made available to consumers is raising food supplier and consumer interest in the nutritional and health properties of food. It would appear that consumers value health and nutrition information.

- Loureiro et al (2006) found consumers in Spain were willing to pay about 11 per cent more for a box of cookies with a nutrition label than one without.
- Ippolito and Mathios (1990) found that health claims on cereal boxes change consumer behaviour and result in significant product innovation.
- In Australia the introduction of Hi-maize™ (a resistant starch that gives white bread some of the nutrient status of wholemeal bread) in one brand of bread increased the white bread market by 7 per cent and the total bread market by 2 per cent. It also has delivered an 8 per cent price premium to the manufacturer. Being able to promote the high-starch properties of the product were important to its success for both the food supplier and consumers.

Potentially, existing constraints on the use of health and nutrition claims may be holding back innovation in this area, especially for companies not prepared to risk legal action against them from using non-compliant measures. Moreover, if the new standard is not appropriately enforced, loss of credibility and reputation of the standard may reduce any potential gains from mandatory requirements around claims (that is, the things that improve the integrity and reliability of the claim).

Given the two concerns above it would appear that there are potential inefficiencies (government failures, not market failures) with the existing regulation of health and nutrition claims.

Costs and scope

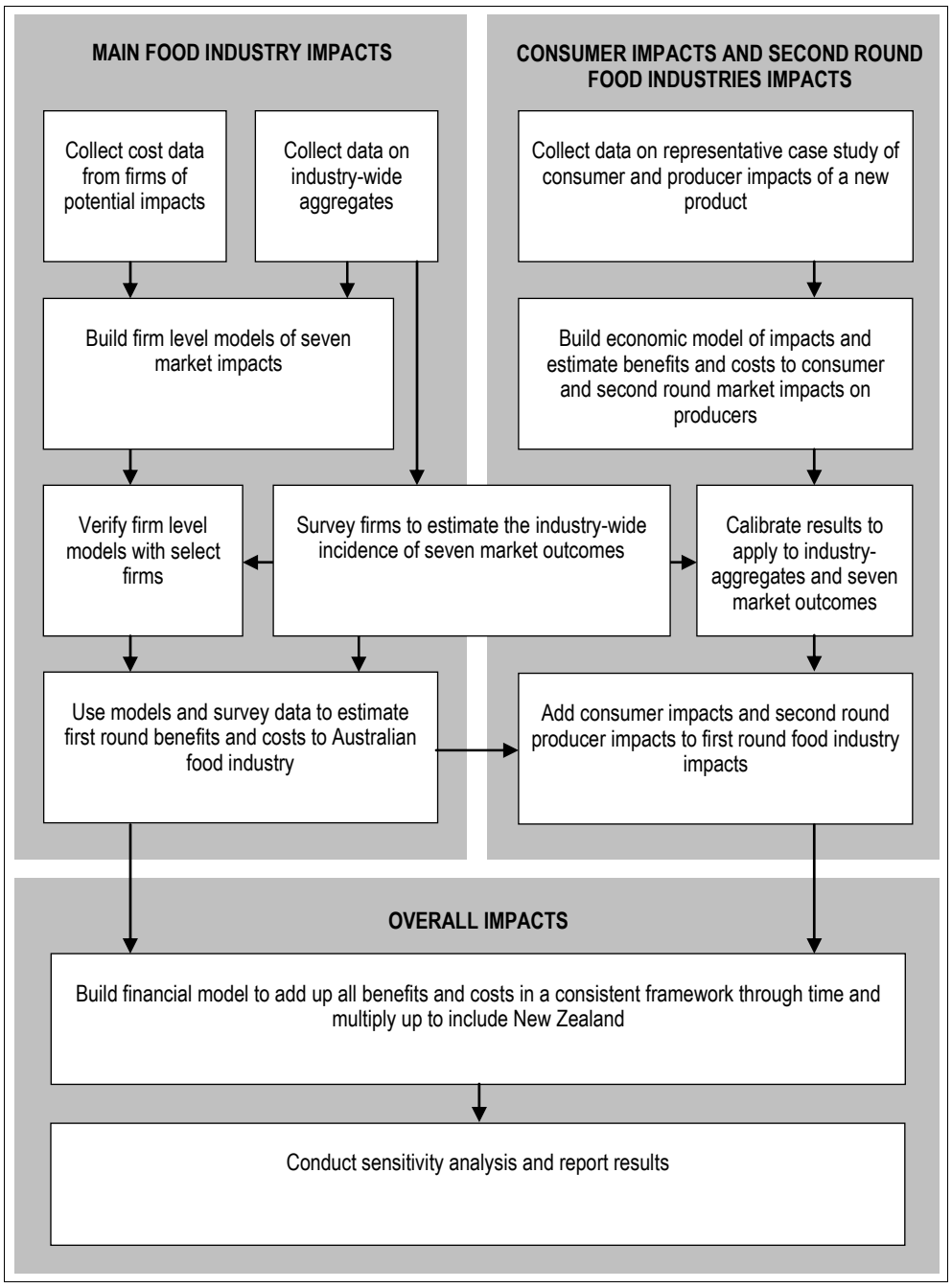
As well as delivering potential benefits to consumers, the criteria required to make nutrition and health claims will impose costs on food manufacturers. They can lead to label changes, reformulations of products, new marketing initiatives or even withdrawal or loss of sale of some products. To the extent that regulation of labelling promotes competition and product innovation, it may be claimed that it also may bestow some benefits on successful manufacturers.

The benefit–cost analysis conducted here seeks to estimate the direct private benefits to consumers and food companies against the costs imposed on those companies and consumers.

Approach to determining and measuring benefits and costs

Chart 1.2 outlines the approach taken to estimates benefits and costs.

1.2 Approach to measuring benefits and costs



Data source: TheCIE

The approach involves the development and use of three economic/financial models and industry survey data.

- The main firm level impact have been estimated using purpose built, representative activity/cost models of food suppliers responses to the seven expected market impacts (seven separate models).
- Consumer impacts and second round profit impacts on food suppliers have been estimated from an economic model representing market

changes caused by the introduction of a highly successful, but representative new product.

  - If new products or information are introduced, consumers stand to gain value over and above what they actually pay for the product, however when they substitute away from an alternative, old, product, the same consumers will lose some value, so it is the net increase in value that needs to be estimated by the model.
  - If an existing product is withdrawn from the market as a result of a change in the regulation of health and nutrition claims, the opposite impact to the introduction of a new product occurs and these can be determined from the model.
  - Main firm level impacts are first round impacts on profits and costs to the firms immediately affected by the proposed Standard.
  - Second round profit impacts are caused indirectly by some firm's losing market share when consumers substitute away from an existing product to a new product. These need to be accounted for.

- Overall aggregate industry and market impacts have been estimated using a dynamic financial model to combine individual model results through time with survey data on the incidence of the seven expected market impacts. Sensitivity analysis on the results is conducted at the aggregate level.

Determination of potential costs involved consultation with a representative range of large Australian food companies or industry organisations. Approximately 30 Australian companies or industry organisations were spoken to with data collected from 20. Many of these also conducted business in New Zealand. The information obtained covered approximately 55 per cent of total Australian food sales, and as such covered all major food categories.

In chapter 2, direct food supplier benefits and costs are discussed and estimated. In chapter 3, the broader market gains to consumers and losses to competing food suppliers are discussed and estimated. Chapter 4 brings the estimates in chapters 2 and 3 together with industry data to quantify the overall incidence and benefits and costs of the proposal. Sensitivity analysis is conducted on these estimates in chapter 5. Chapter 6 concludes.

2 *Impact on food suppliers*

Changes to the nature and type of health and nutrition claims able to be made by food manufacturers may provide new label and marketing opportunities. It may also impose additional labelling and compliance burden. That is, for food manufacturers, there will be a range of benefits and costs as a result of the change.

These costs and benefits can be thought of as the private costs of the proposal, and importantly, are distinct from the public costs of the potential requirements. Public costs will relate to policy formulation, testing and enforcement. At the private level, firms will need to change manufacturing processes, management procedures, the management and development of product packaging and labels, as well as placing additional requirements on the sourcing of primary ingredients. Such costs will apply to varying degrees across different parts of a firm and a firm's product range.

Seven potential market outcomes

The CIE undertook consultations with key industry representatives, including manufacturers and retailers, to identify the possible impacts of the proposed changes. Based on these consultations, seven potential market outcomes for any given product were identified:

1. new products are developed to make use of new opportunities to make claims;
2. existing products are re-marketed to make use of new opportunities to make claims;
3. existing products are not affected by the changes (no change);
4. existing products require small label changes to ensure compliance with the changed rules;
5. existing products require changes to their existing marketing strategies due to changed criteria;

6. changes to the formulation of existing products are made to meet new qualifying criteria; and
7. existing products are removed from the market as they are no longer viable under the proposed changes.

Each of these outcomes will have market/consumer (demand) and cost (supply) implications.

The first two outcomes are voluntary and will relate to firms taking advantage of the lifting of restrictions on high level and general level health claims. Because they are voluntary, products that fall within the first two outcomes will likely deliver net benefits.

The no change outcome will be largely commercially neutral. This relates to products that are not affected by the proposed changes, because no claim is currently being made and will not be made after the introduction of the proposed Standard, or because a claim is currently being made and will continue to be made after the changes.

The others will have a net commercial cost to industry; however they may deliver positive outcomes to consumers in terms of better knowledge about the product. The net benefits/costs for each outcome will vary by product and stock keeping unit (SKU).

Most costs and benefits relating to FSANZ Proposal P293 will occur at the product level rather than the SKU level. Accordingly, here we evaluate the changes at the product level. Each product may be sold as several SKUs.

1. New products

A manufacturer or retailer that chooses to voluntarily develop a new product or significantly modify an existing product to take advantage of the proposed changes will face a large number of upfront costs. For example, this could range from placing a new ingredient in an existing product in order to take advantage of a health claim, or creating a new product (including importing the concept from overseas partners) that is able to make health claims.

It is highly probable that the size of these costs will vary according to the product type and level of claim being made (high level health claim, general level health claim or nutrition content claim). However, the types of costs faced will likely be largely similar. These may include:

- initial product concept and development costs, including:

  - market research;
  - product testing; and
  - product refining in response to market research and product testing;
- developing a relevant marketing strategy;
- implementing the marketing strategy in media (where relevant) and designing and printing product labels and packaging;
- ensuring the product:
  - meets the requirements of a nutrition content claim, general level health claim or approved high level health claim; or
  - undergoes scientific testing and subsequent pre-approval by FSANZ to allow a high level health claim is able to be made;
- undertaking on-going compliance checking of the product to ensure that it meets the relevant criteria and conditions for the relevant high level or general level health claim.

In addition to the cost elements of product development etc there will need to be benefits that offset the costs of developing and marketing the new product, as this is a voluntary decision by the manufacturer. This will require some level of consumer demand, coming from related competing products and/or other consumers attracted to the market segment by the claims allowed to be made under the proposed changes.

2. New marketing initiatives

This outcome will require similar supply side responses to the 'new products' outcome above. Products that may fall into this category are existing products that would be able to make a new health or nutrition content claim but that do not require any reformulation. For example, this could include an existing milk product that is able to make a health claim around the existing calcium content.

Specifically, firms that choose to undertake a new marketing strategy for an existing product would be required to:

- develop a relevant marketing strategy;
- implement the marketing strategy in media (where relevant) and design and print product labels and packaging;
- ensure the product:
  - meets the requirements of a nutrition content claim, general level health claim or approved high level health claim; or

  - undergoes scientific testing and subsequent pre-market approval by FSANZ to allow a high level health claim to be made;
- undertake on-going compliance checking of the product to ensure that it meets the relevant criteria of the relevant high level or general level health claim.

This outcome will need to have similar demand side responses to the 'new products' outcome. That is, a positive demand side response is required in order to induce manufacturers into undertaking the revised marketing initiative.

3. No change

This outcome is based on the premise there is no supply side or demand side shock as a result of the proposal. This outcome does not require a specific model to be built.

However, it is possible that products in the category may still have a change in the quantity or revenue from sales as alternative products become more or less attractive.

4. Small label changes

The proposed changes may also require firms to make minor changes to existing products' labels. For example, this would include a product that is required to make a small word changing to an existing claim in order to make the label compliant. However, this change would not substantially change the products marketing strategy or claims.

While small, there are a number of elements to these costs. Specifically, minor label changes would require firms to determine:

- the number of products that fall into this category; and
- the extent to which the affected products' labels have to change in order to meet the new requirements.

These costs are likely to be one-off costs, and may be minor. It is important to note that this may still results in a change to market share as alternative products become more or less competitive.

The CIE has previously examined the costs of Country of Origin Labelling (CoOL). In that study, costs of CoOL were estimated to be 1.4 per cent, with one-off label changes estimated at around 1.1 per cent.

5. Changes to existing marketing initiatives

The introduction of the new criteria may mean that products that currently make general level health claims or nutrition content claims will no longer be able to do so. This could be because the claim being made meets the current CoPoNC but would not meet the claim criteria under the proposal.

Where the marketing of the product is based on its health or nutrition claim, the removal of the ability to make the claim may reduce demand for the product. In order to maintain the market share of an affected product, firms may choose to re-market the product with a new marketing strategy. This would impose additional costs on the firm, and may cut into the profit margin on the product. There is also the risk that the new marketing strategy does not succeed in maintaining the product's market share.

6. Changes to existing products

In order to maintain a product's market share, revenue and profits, a firm may choose to reformulate the product in order to be eligible to make a current health claim. Products that fall into this category could be products that are currently making a health claim and that, because of the changes, would no longer be able to with the current product formulation. For a product that is marketed as a 'healthy' product, the manufacturer may choose to reformulate the product so that it is eligible to make a claim.

This may include relatively minor changes to the formulation of the product in order to pass the criteria without significantly altering the marketing initiative of the product. Alternatively, firms may choose to make larger changes to the product's formulation in order to meet the criteria and to make additional health and nutrition content claims. Large re-formulations may also require undertaking a new marketing strategy.

7. Removal of the product

The introduction of the new criteria will mean firms may choose to no longer produce and sell a particular product. This may be because a products' existing health claim is critical to the products' identity and that a revised marketing initiative and product reformulation are not feasible options.

In this situation, firms and consumers lose the benefit they would otherwise gain from selling and consuming the product. There may also be flow-on effects to related products produced by the same firm that are offered in conjunction with the affected product.

The product life-cycle

As the seven market outcomes impact at different stages in the product life cycle, identifying and costing these components is vital in determining the costs of each of the market outcomes.

From the consultation process, three main components relating to the development and manufacturing of a new product were identified:

- initial product development;
- on-going marketing; and
- product manufacturing.

In quantifying the components of the life-cycle, we began with Australian Bureau of Statistics data on cost structures, revenues and profits which was refined through discussions with food companies.

These three major life-cycle categories are affected to varying degrees by each of the seven market outcomes. To varying degrees, these costs vary by absolute and relative size depending upon the product size.

Product development costs

To get a product to market, a number of processes are involved. These processes have implications for internal staff workloads and the operation of manufacturing equipment. In addition, external skills and tests are also required to be purchased.

Product concept and formulation

Developing a new product requires substantial internal staff workloads.

- *Market analysis* – the first step in developing a new product involves undertaking an analysis of the target market. This is necessary to ensure that any proposed product meets the needs of consumers. This involves analysing the existing market to determine size (value and quantity) as well as the profile of consumers. Additionally, judgments must also be made on the viability of new products in competing with existing products.
- *Head office formulation* – following the market analysis, the desired product needs to be formulated, or 'cooked'. The specific recipe may be brought in from an overseas partner, developed from an existing idea, or freshly developed. This entails two stages:

  - the sourcing of raw and processed inputs, undertaken by research and development staff, with the assistance of administration staff to ensure that on-going large scale supply is possible; and
  - the development and refinement of the specific recipe to be used in the product, undertaken by research and development staff.

- *Market and taste testing* – once the product recipe is developed, market and taste testing is undertaken, with the analysis of the findings undertaken by research and development staff. Taste and market testing is undertaken to ensure the product's *mouth feel* (taste and texture) meet market requirements. Taste testing may be undertaken either internally or externally, depending on the expected value of the product. Taste testing may involve more than one round of testing, with iterative recipe changes tested against audiences. Additionally, managing and co-ordinating taste testing requires administration staff input to liaise between the testing agency and the manufacturing firm.
- *Factory formulation* – following taste testing of the product, a mass production formulation needs to be developed based on the final marketable formulation. This is required to ensure that the product is able to be manufactured as efficiently as possible on existing manufacturing equipment, as well as identify any additional capital items required. There is also the need to identify existing products that are similar in their production, in order to determine when to schedule production of the specific product within the broader production pattern of the manufacturing firm. These steps are undertaken by research and development staff. In developing the factory formulation, existing production lines need to be temporarily shut down as the formulation is tested against the equipment, imposing an opportunity cost equivalent to the value of lost production.
- *Technical testing* – in conjunction with product development and following the final factory formulation, products need to undergo a range of technical tests in order to meet labelling and other requirements. These tests include:
  - shelf life tests;
  - vitamin content tests;
  - fat, sugars, carbohydrate and fibre tests;
  - Glycemic Index tests; and
  - other nutrient content tests.

  The cost of specific tests varies broadly, from around $30 for calcium, sodium or potassium tests, to approximately $6 000 for a Glycemic Index test, with the average test costing $636. We have assumed that a

small value product ($5 million in sales) will have a minimum of 10 tests.

- *Management and legal oversight* – overlaying the *product concept and formulation* stage is the need for general management oversight and legal advice. For a small value product, the steps involve will require upwards of 5 management staff days. While legal advice will not be required on all products, there will be a small number of products where significant advice is required. We have assumed that on average, each product will require 0.5 days of legal advice.

Marketing development

New products require a marketing strategy to be developed in conjunction with the technical formulation. This involves a number of distinct stages.

- *Marketing concept development* – in conjunction with the initial market development undertaken above, the strategic marketing concept needs to be developed. This includes determining the product's marketing message and general labelling colours and packaging images, if any. Based on discussions with manufacturers, potentially 10 marketing staff input days are required for this process.
- *Advertising development* – depending on the expected sales of the product, firms will invest differing amounts on advertising. Major options include print or television options. Costs associated with advertising development, regardless of medium, include marketing staff times as well as the fixed costs associated with producing the advertisement, for example undertaking a photo shoot. For a typical $5 million product, we have assumed that firms invest 30 marketing staff days, with a further $25 000 spent on media advertisements and $50 000 spent on television advertisements. It is plausible that the amount spent on advertising is related to the expected sales revenue of the product. That is, the larger the expected sales, the larger the amount spent on developing the television or print media.
- *External advice on labelling possibilities* – a number of consultancy agencies provide advice to food manufacturers on potential health and related claims a product may be able to make. One such agency is the National Centre for Functional Foods based at Wollongong University. While the vast majority of products under development would not have external advice obtained, based on consultations, up to 1 per cent of all new products may obtain external advice on potential label claims.

- *Strategic price determination* – every new product requires a competitive price to be determined. This price needs to consider the input and product development costs associated with the product as well as the price of competitors products. In determining the strategic price, we have assumed one management and one marketing staff day would be required per product.
- *Strategic location determination* – associated with determining the strategic price is the need to determine the strategic location to market the product: which retailers the product will be sold to; which locations the product will be sold in; and which retailer distribution centres will be targeted. We have assumed one management and one marketing staff day would be required per product.
- *Management and legal oversight* – similar to the *product concept and formulation* stage, management oversight and potential legal advice on marketing development is required for the *marketing development* stage. For a small value product, the steps involve will require upwards of 5 management staff days. For legal advice we have assumed that each product will require 1 day of legal advice on average.

Packaging development

Developing a new product requires substantial internal staff workloads.

- *Packaging development design for each SKU* – using the corporate and product colours developed during the *marketing concept* development phase, designs for each stock keeping unit (SKU) need to be developed. With the bulk of the work already undertaken, packaging design per SKU would require 0.5 a marketing staff day.
- *Plate development* – following the design of each SKU, printing plates are needed. With two plates required per SKU, this costs $3 000 per SKU. With an average of 3 SKUs per product, this costs $9 000 per product.

On-going marketing costs

On-going marketing costs relate to the roll-out of the marketing strategy. Additionally, for existing products there may also be additional costs related to:

- the roll-out of a revised marketing strategy, which would require the write-off of existing labels; and

- the roll-out of a revised product formulation, which would require adjusting the manufacturing process.

Marketing roll-out

Rolling-out the marketing strategy requires a number of ongoing stages.

- *Competitor monitoring and strategic pricing* – in order for the product's SKUs to remain competitive once in the market, food suppliers need to monitor competitors' prices and promotions and if required adjust prices accordingly. Monitoring of competitors would require a total of 1 marketing staff day per product per year (approximately 10 minutes per week). Responding to price changes requires an additional 2 marketing staff and 2 management staff days per year.
- *On-going advertising roll-out* – once the marketing strategy and advertisements have been developed, firms will have to dedicate resources to purchasing print and television space as well as updating advertisements through time. While the exact expenditure will vary product by product, it is likely that expenditure will be related to the value of the product's sales. On average, we have assumed that 2.5 per cent of the sales value of a product is dedicated to purchasing print media and 10 per cent dedicated to television media. In addition, marketing and administration staff time is required to oversee the ongoing purchasing and development of the advertisements.
- *Strategic location transportation costs* – once strategic location and distribution centres have been identified, food manufacturers are typically responsible for paying the costs of getting food products to a distribution centre. The exact size of these costs is uncertain, and depends on a broad number of variables. However, for the purpose of this analysis, we have assumed that firms dedicate 5 per cent of a products value to strategic transportation costs, $250 000 on a $5 million product.
- *Management oversight* – once a product is in the market, there will be on going management oversight. Over a year, we have assumed that management dedicate 5 days per product, or approximately 6 minutes per product per week.

Label write-offs

Following the revision of a marketing strategy or a revision of a product's labels, the pre-existing labels become redundant, and need to be written off, imposing costs on manufacturers. While manufacturers will try to reduce

the loss of labels by running stocks down before changing, there may be times when there is no possibility to delay the change. On average, we have assumed that a change over of labels requires writing-off 5 per cent of the annual label expenditure, equivalent to 18 days worth of labels.

Manufacturing adjustment

When changing from one product formulation to another, the manufacturing production line must be temporarily halted to prepare the equipment for the new formulation. This is the opportunity cost associated with lost sales from those products not produced during this time. We have assumed that the change over of a product requires 0.25 days of a manufacturing plants time. Note that this cost only applies to those products that have a revised product formulation.

Product manufacturing costs

The costs of manufacturing a product are a function of the raw inputs that make up the product, the cost of packaging materials as well as other labour and formulation costs.

For the purpose of simplicity, we have assumed these costs are a fixed proportion of the overall manufacturing costs (table 2.1)

2.1 **Manufacturing costs**

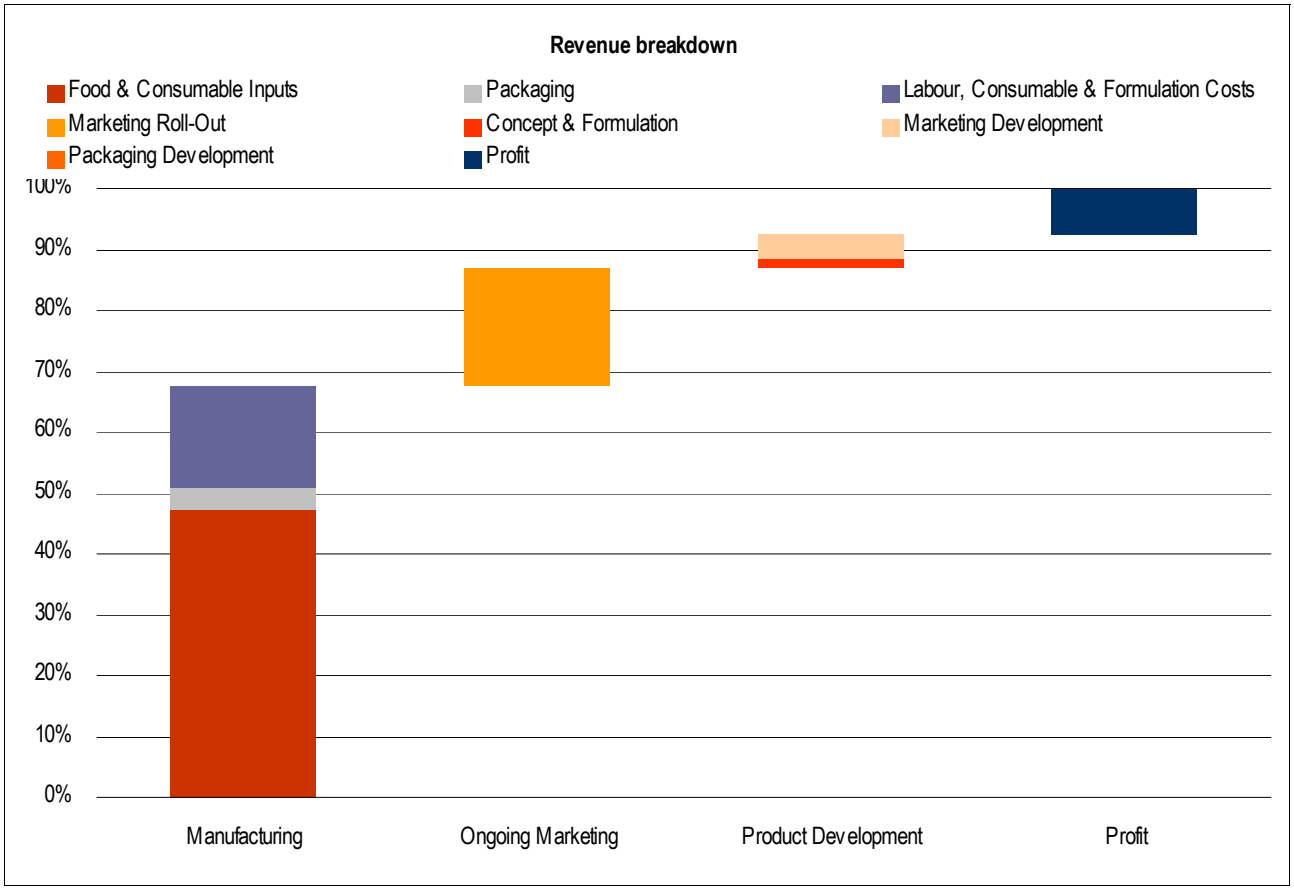
Production input	***Proportion of production costs***
	%
Food and consumable inputs	
Raw food inputs	30
Processed food inputs	25
Other inputs (e.g. water)	5
Formulation costs (e.g. electricity)	10
Packaging costs	
Packaging costs	5
Labour and capital costs	
Labour costs	20
Depreciation costs	5
Total manufacturing costs	**100**

Source: CIE consultations.

Costs vary by product size

Product values can range between $1 million and up to $50 million. Using a $5 million product value as an example, with a life expectancy of four years, 68 per cent of the product's revenues are spent on manufacturing costs, while a further 19 per cent is spent on on-going marketing. The product development costs of $537 000, once averaged over the two year life expectancy, account for 5 per cent of sales revenue. In total, annualised costs account for $4.6 million. With sales of $5 million, profit is $0.4 million, or approximately 8 per cent of revenue (chart 2.2).

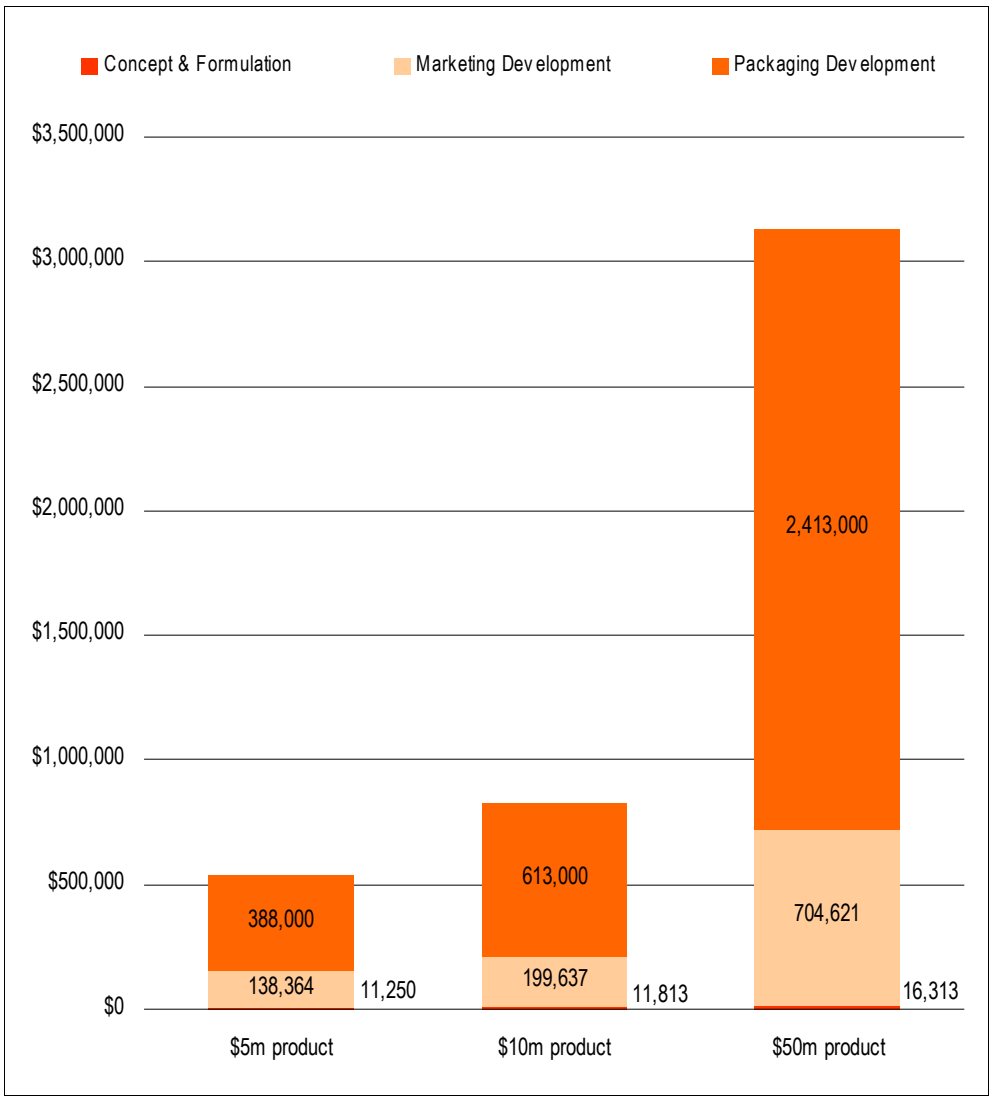
2.2 **Cost and profit components on a typical $5 million product**



Data source: ABS (2006) and CIE consultations.

For a $5 million product, approximately $388 000 is spent on marketing development costs, $138 000 is spent on the concept and formulation and $11 000 spent on packaging development. These costs increase for larger value products. For example, a $50 million product has $2.4 million spent on marketing development and $705 000 on concept and formulation. A further $16 000 is spent on packaging development costs (chart 2.3).

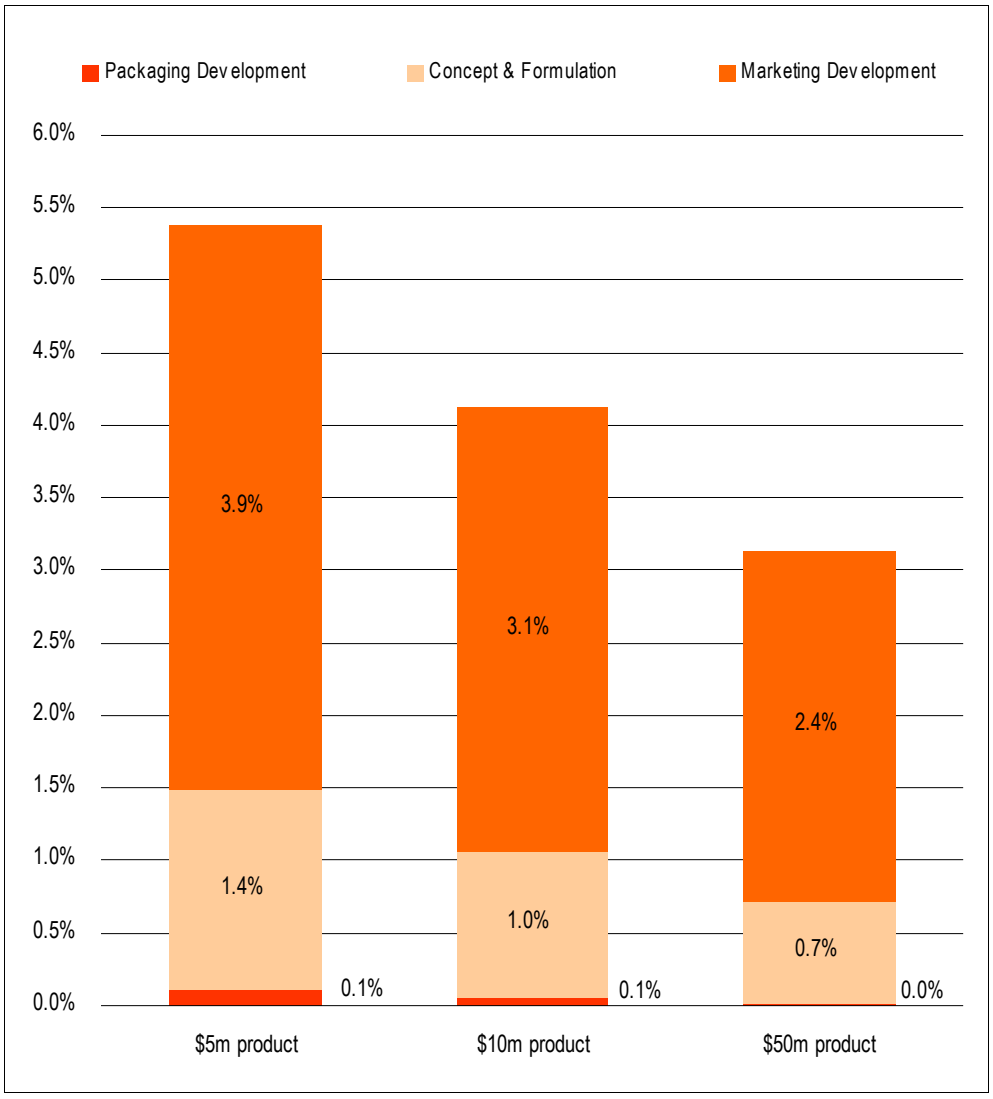
2.3 **Development costs**



Data source: CIE consultations.

While costs are absolutely higher the larger the sales of the product, initial product development costs are smaller as a share of revenue. This is due to the fixed cost component of the product development costs. A $5 million product has for example a initial product development costs equal to approximately 5.4 per cent of annual sales (chart 2.3 and 2.4). Meanwhile for a $50 million product, initial development costs are approximately 3.1 per cent of annual sales.

2.4 **Product development costs as a proportion of annual sales**



Data source: CIE consultations.

Quantifying the product life cycle into seven models

Using the product life cycle, we have constructed financial activity models that track how the seven market outcomes impact on the activities of manufacturers across each of the three stages of the product life-cycle. The key elements of the activity model are the identification of the compliance tasks required, who performs them, how long each task is likely to last, and the labour and other costs associated with these tasks.

In essence the financial activity model used is equivalent to the Business Cost Calculator, recommended by the Office of Best Practice Regulation for evaluating RISs (OBPR 2006), in that activities are specified and costed out

according to their inputs. That is, the approach uses a 'bottoms-up' process to identify the required activities and elements associated with the proposed changes. The financial activity model used here however, exceeds the capabilities of the Business Cost Calculator in its ability to undertake extensive sensitivity analysis as well as its ability to handle opportunity costs and other more complex economic relationships.

Additionally, the benefits and costs calculated using the activity model are tested using detailed sensitivity analysis to ensure that the findings are significant against a broad range of data inputs.

With the financial activity model developed here we can estimate how specific changes in activities will impact on costs. It brings together the interaction of all variables and assumptions and provides a consistent framework for the reporting of results. The model provides the capacity to ask 'what if' questions about a number of important economic parameters affecting the food manufacturing and retailing sectors and provides an understanding of the implications of changes to regulations.

A breakdown of the specific calculations for the benefits and costs the product life cycle calculations, including cost categories matching the Office of Best Practice Regulation's Business Cost Calculator, are set out in appendix A.

The benefits from a new product or a new marketing initiative are perpetual. Likewise, the lost profit from removing a product from market is also perpetual. The financial imperative requiring products to pay for their development costs over a relatively short time frame (up to 4 years) implies that the required internal rate of return is close to 20 per cent. This means that the gains from outcomes 1 and 2 and the losses from outcome 7 need to be discounted through time at this rate of return.

The remaining four outcomes, no change, label change, marketing change and reformulation, are one-off costs – once undertaken, affected firms do not carry on bearing the burden of the proposal. As these are one-off costs, these do not need to be summed through time.

As market outcomes 1 and 2 are voluntary and are related to a benefit, we assume that firms undertake these outcomes soon after the introduction of the proposal (on average 6 months after being allowed), while the costs imposed by outcomes 4, 5, 6 and 7 are delayed for as long as possible (on average 1.5 years after the introduction of the proposal).

Model 1 – new product

Model 1 is associated with the voluntary development of a new product in response to the opportunity to make a health claim. From the product life-cycle, a new product will involve all three stages. As this is a voluntary action by manufacturers, on average firms will expect to earn the typical profit rate on all expenses.

All up, the costs associated with developing a new product, assuming a two year life expectancy of the product are approximately $4.6 million. With total sales of $5.0 million, profit on the new product gained is $0.4 million per year (table 2.5). This is equal to the 8.2 per cent profit margin Australian food manufacturers earn on average (ABS 2006).

2.5 **Cost and profit breakdown associated with a new product (model 1)**

Production cycle elements	*Initial expense*	*On-going expense*	*Annualised expense*
	$	$	$
Costs			
Product development			
Concept and formulation	142 920		35 730
Marketing and development	388 000		97 000
Packaging development	11 250		2 813
Ongoing marketing			
Marketing roll-out		968 500	968 500
Label write-offs	0		0
Manufacturing adjustment	0		0
Manufacturing costs			
Food and consumable inputs		2 461 921	2 461 921
Packaging costs		175 851	175 851
Labour and capital expenses		879 257	879 257
Production costs			**4 621 072**
Value of sales			**5 000 000**
Profit on sales			**378 928**
Profit on sales (taking account of discounting)			**345 912**

Source: CIE consultations.

Model 2 – new marketing initiative

Model 2 quantifies the benefits to manufacturers from implementing a new marketing strategy to highlight a health benefit in response to the FSANZ

changes. This would have implications for the stages one and two of the product life cycle. As this is a voluntary action by manufacturers, on average firms will expect to earn the typical profit rate on all expenses.

The additional costs associated with developing a new marketing strategy are approximately $101 000. In order to justify the expense, firms would expect sales of $109 000 per year, implying additional profits of $8 000 (table 2.6).

2.6 **Additional costs associated with a new marketing strategy (model 2)**

Production cycle elements	*Initial expense*	*On-going expense*	*Annualised expense*
	$	$	$
Additional costs			
Product development			
Concept and formulation	0		0
Marketing and development	388 000		97 000
Packaging development	11 250		2 813
Ongoing marketing			
Marketing roll-out		0	0
Label write-offs	3 333		833
Manufacturing adjustment	0		0
Manufacturing costs			
Food and consumable inputs		0	0
Packaging costs		0	0
Labour and capital expenses		0	0
Additional production costs			**100 646**
Additional sales to justify costs			**108 899**
Additional profit on sales			**8 253**
Profit on sales (taking account of discounting)			**7 534**

Source: CIE consultations.

Model 3 – no change

Outcome 3, 'no change', does not need an explicit model to quantify the benefits. However, outcome 3 is not costless. Because of the extensive nature of the proposal, food manufacturers will need to examine all products in their range to determine whether or not the proposal affects them. Were this to take a maximum of 1 hour of marketing staff members' time, the proposal imposes $188 cost on all products in outcome 3.

Model 4 – small label change

Model 4 quantifies the costs to manufacturers due to a small label change due to the FSANZ changes. This would have implications for the stages one and two of the product life cycle, affecting packaging development and label write-offs. This change is not voluntary. As such, all costs are borne by the manufacturer with no increase in sales.

The additional costs associated with a minor label change are relatively small at $3 600 (table 2.7).

2.7 **Additional costs associated with a small label change (model 4)**

Production cycle elements	*Initial expense*	*On-going expense*	*Annualised expense*
	$	$	$
Additional costs			
Product development			
Concept and formulation	0		0
Marketing and development	0		0
Packaging development	11 250		2 813
Ongoing marketing			
Marketing roll-out		0	0
Label write-offs	3 333		833
Manufacturing adjustment	0		0
Manufacturing costs			
Food and consumable inputs		0	0
Packaging costs		0	0
Labour and capital expenses		0	0
Additional production costs			**3 646**
Additional sales to justify costs			**0**
Additional profit (loss) on sales			**-3 646**
Profit on sales (taking account of discounting)			**-2 773**

Source: CIE consultations.

Model 5 – changes to existing marketing initiatives

Model 5 evaluates the impacts of a mandated marketing change. Similar to model 4, the changes would be undertaken in order to maintain market share, with no increase in sales to justify to increased costs. This outcome would have implications for the stages one and two of the product life cycle, requiring a new marketing strategy to be developed, new packaging

required and a write-off of existing labels. As this is an involuntary action by manufacturers, profits will be reduced as costs rise.

The additional costs associated with developing a new marketing strategy are approximately $101 000 (table 2.8).

2.8 **Additional costs associated with a revised marketing strategy (model 5)**

Production cycle elements	*Initial expense*	*On-going expense*	*Annualised expense*
	$	$	$
Additional costs			
Product development			
Concept and formulation	0		0
Marketing and development	388 000		97 000
Packaging development	11 250		2 813
Ongoing marketing			
Marketing roll-out		0	0
Label write-offs	3 333		833
Manufacturing adjustment	0		0
Manufacturing costs			
Food and consumable inputs		0	0
Packaging costs		0	0
Labour and capital expenses		0	0
Additional production costs			**100 646**
Additional sales to justify costs			**0**
Additional profit (loss) on sales			**-100 646**
Profit on sales (taking account of discounting)			**-76 564**

Source: CIE consultations.

Model 6 – changes to the formulation of existing products

Model 6 quantifies the impacts of a mandated formulation change. Similar to models 4 and 5, the changes would be undertaken in order to maintain market share, with no increase in sales to justify to increased costs. This would require reformulating the product, developing a revised marketing strategy, producing new SKU labels and writing off pre-existing labels. This would also affect the production of other products as production is halted during the change-over from one product to the next. This outcome would have large implications across stages one and two of the product life cycle. As this is an involuntary action by manufacturers, profits will be reduced as costs rise.

The additional costs associated with a full reformulation of an existing product are approximately $137 000 (table 2.9).

It is important to note that the exact cost of a reformulation will vary according to the degree of reformulation required. Discussions with industry revealed that a small reformulation may cost approximately 50 per cent of the cost of a large reformulation. This is equal to approximately $52 000.

2.9 **Additional costs associated with a large reformulation (model 6)**

Production cycle elements	*Initial expense*	*On-going expense*	*Annualised expense*
	$	$	$
Additional costs			
Product development			
Concept and formulation	142 920		35 730
Marketing and development	388 000		97 000
Packaging development	11 250		2 813
Ongoing marketing			
Marketing roll-out		0	0
Label write-offs	3 333		3 333
Manufacturing adjustment	2 849		712
Manufacturing costs			
Food and consumable inputs		0	0
Packaging costs		0	0
Labour and capital expenses		0	0
Additional production costs			**137 088**
Additional sales to justify costs			**0**
Additional profit (loss) on sales			**-137 088**
Profit on sales (taking account of discounting)			**-104 286**

Source: CIE consultations.

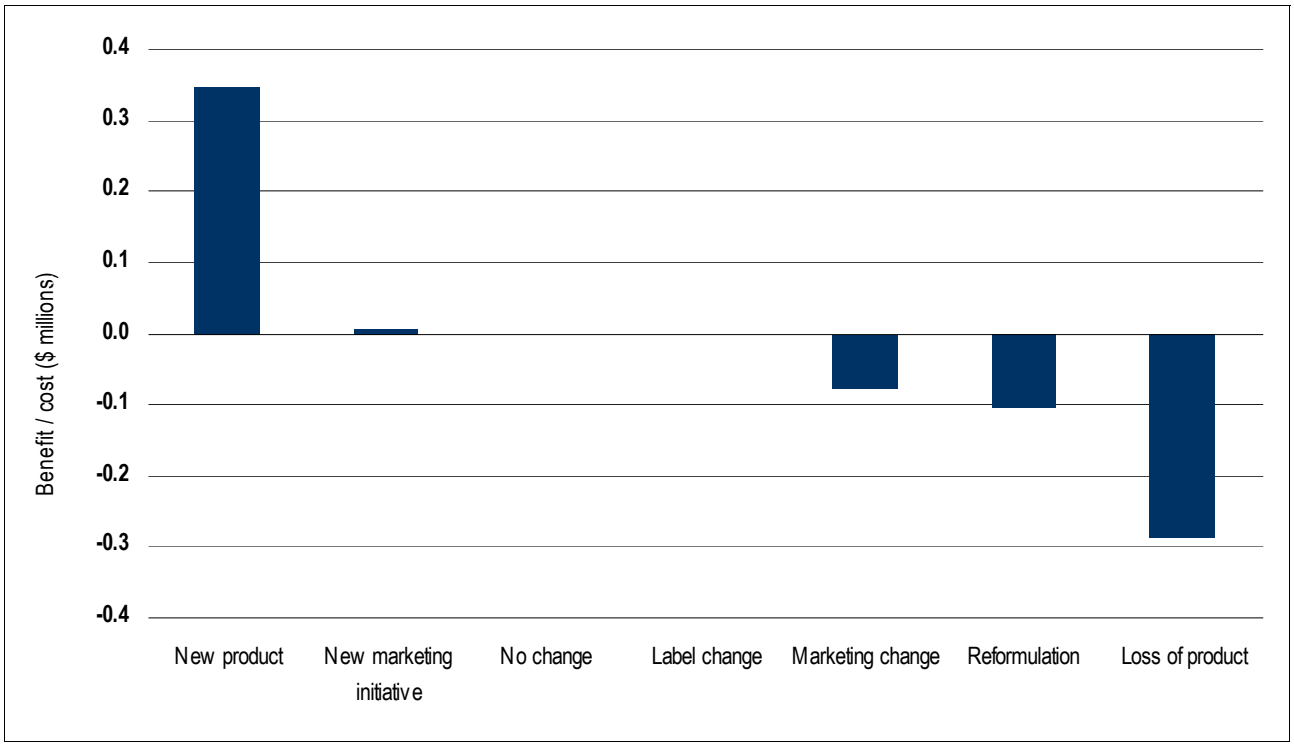
Model 7 – the removal of a product from market

The cost of removing a product from market, outcome 7, is the lost profit associated with the product. Assuming no product is created by the specific manufacturer to replace it, the entire cost of withdrawing a $5 million product is $379 000 per year.

The seven market outcomes in aggregate

The seven market outcome costs and benefits identified above relate to a generic product with $5 million in wholesale sales per year. For the seven models, benefits range from $379 000 for outcome 1 through to a loss of $379 000 for outcome 7 (chart 2.10).

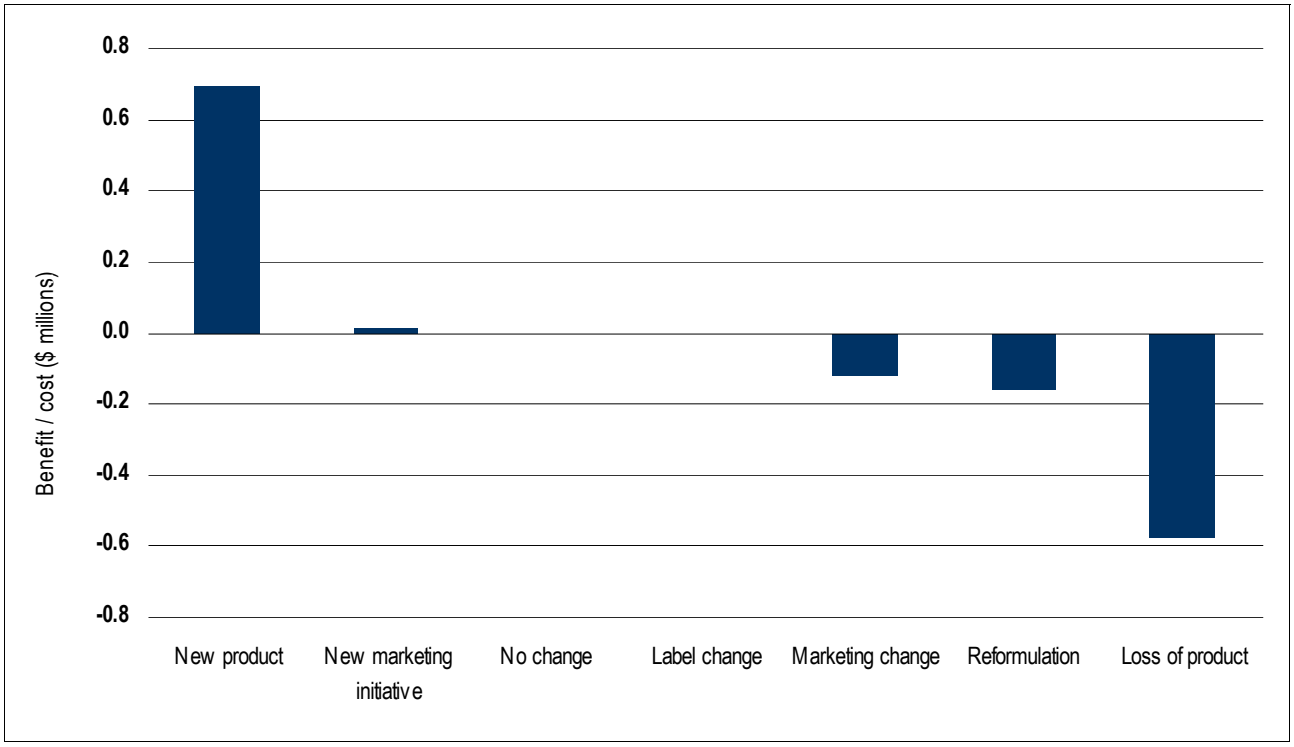
2.10 **Benefits and costs of the seven market outcomes for a $5 million product**



Data source: CIE consultations.

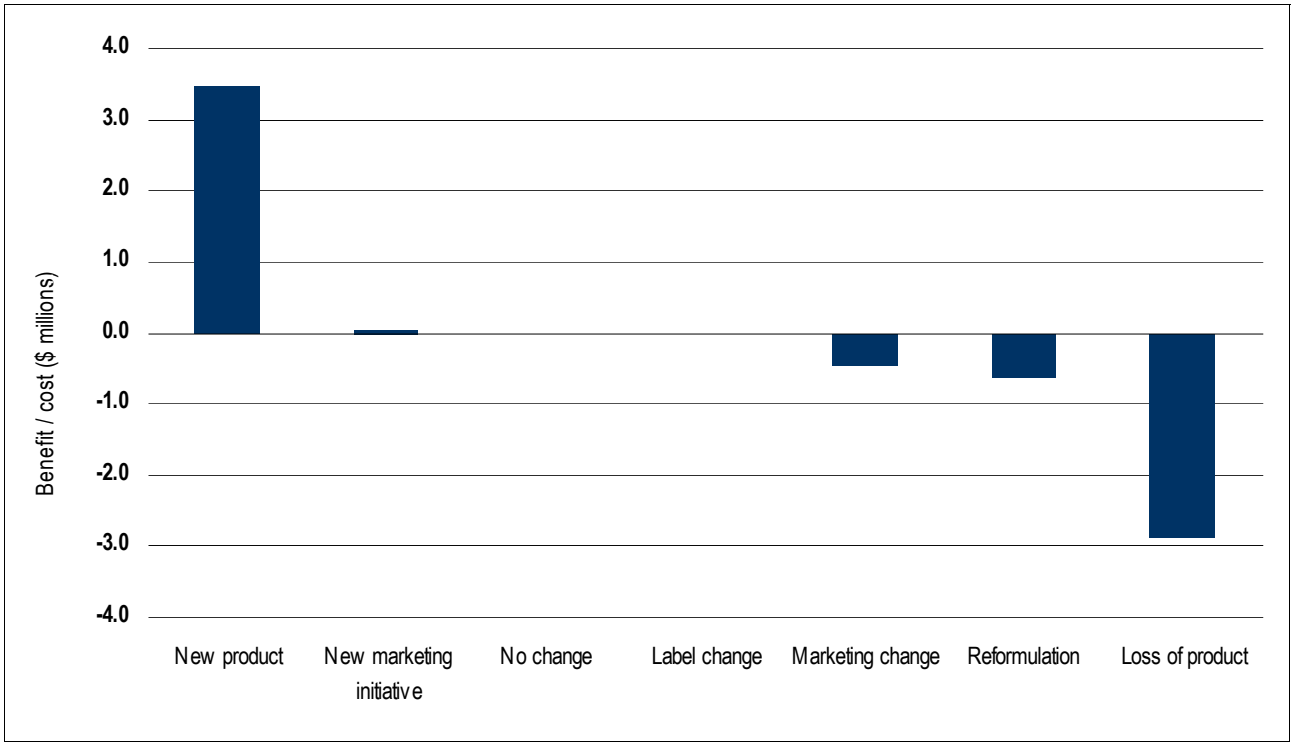
Interestingly, the cost of a reformulation (outcome 6) is approximately 70 per cent of the cost of removing a product from market (outcome 7) (chart 2.10). However, for a $10 million product, the costs of a reformulation are relatively smaller than for a $5 million product (chart 2.11). This is due to the fixed cost component of a reformulation. The same is also true for a $50 million product (chart 2.12).

2.11 **Benefits and costs of the seven market outcomes for a $10 million product**



Data source: CIE consultations.

2.12 **Benefits and costs of the seven market outcomes for a $50 million product**



Data source: CIE consultations.

3 *Impact on consumers*

For changes to the regulation of nutrition and health claims to have value to consumers they must:

- provide consumers with additional information that allows them to change their patterns of spending to more closely reflect their preferences; or
- result in new products that consumers value more highly than products they currently consume, leading to substitution in spending patterns.

Consumers will switch consumption from one product to another where they perceive it delivers them better value for their shopping budget. Measuring consumers' willingness to pay to make such a change provides an indication of the potential value of FSANZ Proposal P293 to consumers.

Willingness to pay depends on substitution between products

Where consumers see that a new product (or new information) provides attributes of value to them that they cannot get from other, existing products, they may switch to buying the new product. The value of the switch will depend on the value they derive from the new product relative to the value they lose from not consuming an existing substitute product. The net gain in value will be the increased value of the nutrition and health attributes less the extra taste or other value they derived from the abandoned product. The net gain in value will be embodied in consumers' willingness to pay to make the switch.

- Willingness to pay reflects consumers' strength of demand for a product. It reflects their preference for a particular product relative to all others.
- Willingness to pay is the extra value, over and above the market price, that consumers would be willing to spend on the product if forced to.
  - Consumers who highly value the attribute will be willing to pay the most.

- Consumers who value it only marginally may only be prepared to pay the market price and no more.

Consumers' willingness to pay for a food product will reflect their preferences for many attributes: for taste, texture, mouth-feel, appearance, smell, safety, convenience, entertainment, variety, fashion, and nutrition and health. Nutrition and health are only two of many attributes and they are unlikely to be the most important for many consumers.

The more products consumers have to choose from the more likely they are to be able to find those that best suit their preferences and the less likely it will be that large gains in consumer welfare can be achieved from switching. Further, the more information they have about each product the more likely they are to be able to make choices that best suit them and the less likely it is that new information will provide much additional value.

- Consumers already have tens of thousands of food products to choose from. Usually, within any product category, there are many very close substitutes to select between. From the vast array of food products available, consumers will select a combination of products that best suit their taste, convenience, variety, diet and nutrition and health needs.
- Many foods (43 per cent of packaged foods according to FSANZ 2006) already carry labels with nutrition and health information. Further, the nutrition and health credentials of much unpacked produce (fruit and vegetables, meat and fish), which makes up over 30 per cent of consumer spending, is largely unambiguous. In addition, many consumers will learn about the nutrition and health properties from other non-label sources such as doctors, health professionals, magazine articles, television programs, school and advertisements.

Given the vast number of products and information already available, the proposed changes to nutrition and health claims might be expected to provide only a marginal change in the factors likely to affect purchasing decisions. Brynjolfsson, Yu and Smith (2003) show that the higher the rate of substitution between brands and products, the lower the consumer gains will be from switching. And, the more products and sources of information there are, the more likely it is that rates of substitution are high. Nonetheless, although potentially small, if Proposal P293 leads to voluntary changes in purchasing patterns, there must be some gain to induce consumers to switch. Moreover, changes in mandatory requirements for nutrition and health claims can be expected to favour some foods over others by changing the information available on some products.

One very good example of how consumers might value products with additional nutrition and health attributes is provided in the example of the introduction of Wonder White bread in Australia. Wonder White is a good example because:

- it was unambiguously successful suggesting it was a genuinely new and unique product that had new features valued by consumers;
- it was unambiguously associated with nutrition and health and backed by solid science;
- the market impact and degree of switching was unambiguously large, so it provides a robust estimate of the size of increase in net willingness to pay required to induce a big switch in a significant and representative food market:
  - few new products achieve such success;
  - its success might suggest that an estimate of the net increase in willingness to pay can be regarded as an upper bound of the sorts of gains that might be achieved;
  - an upper bound estimate provides a less ambiguous benchmark than a middle of the road estimate might;
- the products consumers substituted away from are identifiable;
- the data is available and verifiable.

Wonder White: a case study in willingness to pay

Buttercup Wonder White bread from Goodman Fielder Milling and Baking with natural Hi-maize™ is a big success.

- It is a white bread that has at least as much fibre as whole grain bread and brown bread.
- It solves a problem parents have in trying to encourage their children to eat whole grain and brown breads to receive the health properties of fibre.
- It provides the benefits of fibre without altering the taste, look, and feel of white bread that children (in particular) like.

Wonder White was marketed and labelled to extol the health benefits of Hi-maize™. Success was immediate.

- Wonder White grew from nothing to take 14.5 per cent of the white bread market by volume and 15.7 per cent by value, implying it commanded an 8 per cent price premium over other breads.

- It expanded the total bread market by 2 per cent and increased the white bread segment by 7 per cent, presumably by displacing some brown and whole grain breads.

Consumers only made these shifts in their pattern of consumption because they believed it was to their advantage. The value to them of consuming bread increased in total although the value of consuming whole grain and brown breads probably declined.

The value to consumers and their willingness to pay for nutrition and health

By using an economic model of the bread market, it is possible to estimate what the introduction of Wonder White might have been worth to consumers. Appendix B sets out such a model.

The model includes the supply and demand for Wonder White, other white breads, brown breads and an aggregate 'other goods' commodity encompassing all other food and non-food items making up household expenditure. Separate prices for each product are determined within each product market. The three bread markets are closely connected with consumers being able to easily substitute between different types of bread. Other white breads are regarded as perfect substitutes for each other. Substitution with other foods and other products is more constrained. Households face a budgetary constraint equal to average after-tax household disposable income.

The model is used to replicate the introduction of Wonder White, the market share it obtained and the price premium it commanded. The value consumers placed on consuming Wonder White and the value they lost by then not consuming other products (other bread and non-bread), is then derived. This is done by measuring how high the price of Wonder White would need to be increased to eliminate all sales of the product. The rise in price is an indicator of consumers' willingness to pay for Wonder White[1]. From this the value to consumers from the introduction of Wonder White can be determined.

Consumer willingness to pay for Wonder White: results

The results show that the introduction of Wonder White might have been valued at around $56 million by consumers in terms of their 'extra

[1] More strictly, it is the amount of money consumers would need to have taken away from them in order to be as well off as they were before the introduction of Wonder White.

willingness to pay' for the new product. However, the availability of Wonder White decreased consumers' willingness to pay for other types of bread by around $39 million, suggesting a net gain to consumers of around $17 million a year. In addition to the consumer gains, food suppliers of Wonder White are estimated to have gained around $9 million in profits a year, but other bread makers lost profits of over $6m, to leave a net food supplier gain of $2.6 million a year.

As a proportion of the value of sales of bread, the increased consumer value is less than one per cent. This is not great. Moreover, all the increase in value cannot be attributed to the additional nutrition and health attributes of the product nor to making a nutrition claim. Even without the claim the product may have achieved some proportion of its success. If we assume that half of the success was due to the claims made, this would suggest that the gain might be around one third of one per cent of total bread sales.

Despite its apparent advantages, uniqueness and success, Wonder White only captured about 7 per cent of the bread market and an 8 per cent price premium. This suggests other breads are reasonably close substitutes for the new product and consumers' preferences are diverse. Were other breads less substitutable for Wonder White (were it more unique), the manufacturer who holds a patent on the product might have faced incentives to charge more than the 8 per cent price premium commanded.

Consumer gain is small because choice is already so large

Consumers' net increase in willingness to pay for any particular attribute or product feature is not high because consumer choice is so immense already, across brands, products and food attributes due to the highly competitive and mature nature of the food sector. Demand is said to be highly elastic under these conditions. If consumers do not get a particular attribute they value from one product they can easily switch to another brand, product, or combination of products. As well as existing labels and knowledge about nutrition and health, consumers have many alternative sources of information on nutrition and health. As a result, those consumers who value the information highly will seek it from another source.

Consumers typically do not value one item much above any other based on its particular set of attributes or set of information provided on the label. Because of the immense variety of products and information already available, consumers are already close to having optimised their patterns of consumption according to their preferences.

In the case of Wonder White, 85 per cent of white bread consumers did not change their preferences, and about 93 per cent of bread consumers did not change their preferences. Even among those that did, they could have received the same nutrition and health attributes from consuming brown or wholemeal bread or indeed from different classes of product. So, although Wonder White was a big commercial success, its overall economic impact in the bread and food market was small because it is only one of an immense number of food products available. This is probably true in most food categories given the immense variety available nowadays.

Applicability to other products

Given the vast array of brands and food products, high levels of substitution among other food products might be expected as well. If so we can probably fairly safely generalise from the Wonder White results. The results show that for every $1m in sales from a new product whose success can be attributable to being able to make a health claim, we might expect:

- $84 000 of net increased consumer value from consumers being able to switch to a new preferred product to better satisfy their preferences;
- $44 000 of increased food supplier profit; and
- $30 500 of decreased profits to food suppliers who lose market share as a result of the new product.

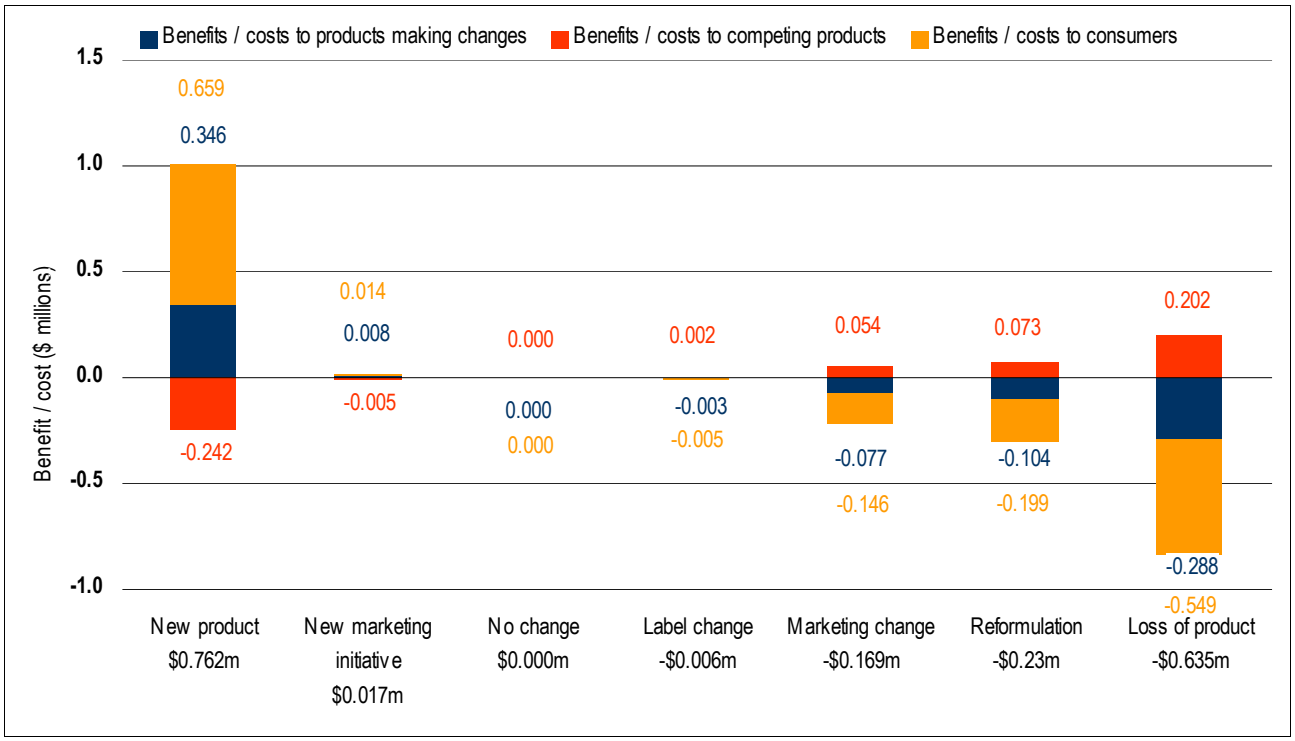
Although the Wonder White estimates might provide a basis for considering consumer and food supplier gains, they should be treated cautiously. There are reasons to believe they may be over-estimates.

- Using more conservative mathematical functional forms for measuring consumer gains from new products (see Brynjolfsson, Yu and Smith 2003), a lower estimate of consumer gain is derived ($10 million compared with $17 million above).
- Gourville (2005) points out that new products fail at significant rates because consumers have many close substitutes and are not prepared to pay extra – Wonder White may be an exceptional outcome.
- Siebert (2003) points out that often when firms introduce new products they withdraw old ones which reduces consumer choice and reduces consumer gains from new products compared to those estimated in the Wonder White story.
- Luo, Kannan and Ratchford (2007) point out that retailers play an important role in the acceptance of new products. More retail space for one product may mean less for others.

Although the Wonder White example provides an estimate of possible benefits arising from a successful new product, the results probably have applicability to other market outcomes that might be caused by the FSANZ Proposal P293. The changes in consumer value relate more generally to any changes in purchasing patterns. Voluntary new marketing initiatives are undertaken with the expectation of an increase in profit and sales. Forced changes in marketing and product reformulation come at a cost to the firm, but they also come at a cost to consumers. The product they previously demanded has undergone a change consumers will perceive as detrimental. They have had product features or information removed. Some reduction in demand may be expected. This will result in loss of consumer value. Similarly, if a product is withdrawn from the market where it becomes unviable as a result of the changes, the opposite of the Wonder White example will occur.

As these benefits and costs have not been fully accounted for in the estimates made in chapter 2, chapter 2 results need to be adjusted. Applying these adjustment to the results derived in chapter 2 would alter the expected benefits and costs as indicated in chart 3.1.

3.1 **Chapter 2 estimates adjusted for consumer gains and competing food supplier losses for a typical $5 million product**



Data source: CIE calculations.

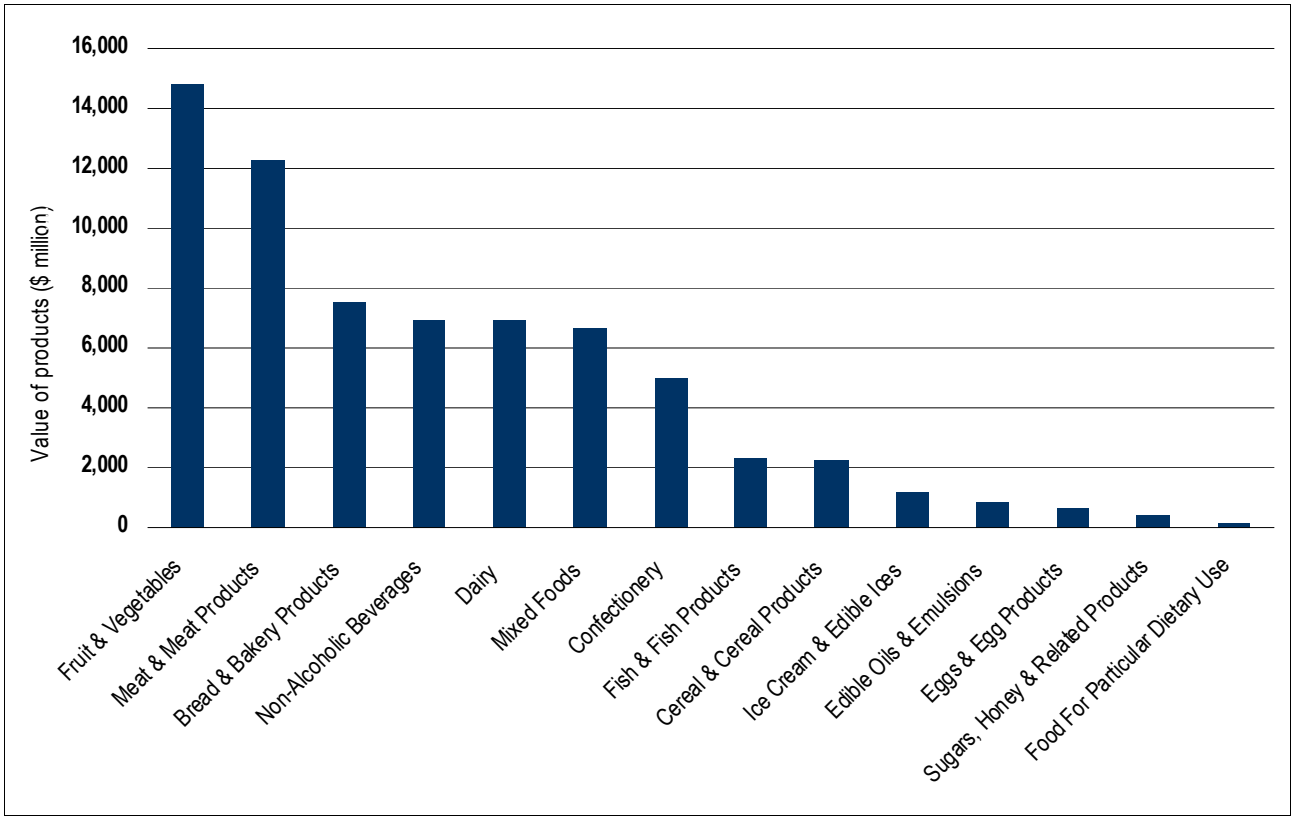
4 *Market outcome results*

To quantify the impacts of the proposed Standard, the incidence of the seven market outcomes across the product range of Australian and New Zealand firms must be determined. This requires specific information on the size and composition of food consumption, and the number of products that fall within each market outcome, broken down by food category. Using these breakdowns, the impact of the proposed FSANZ changes can be quantified by applying the consumers and food supplier benefits and costs discussed in chapters 2 and 3.

Sales of food categories

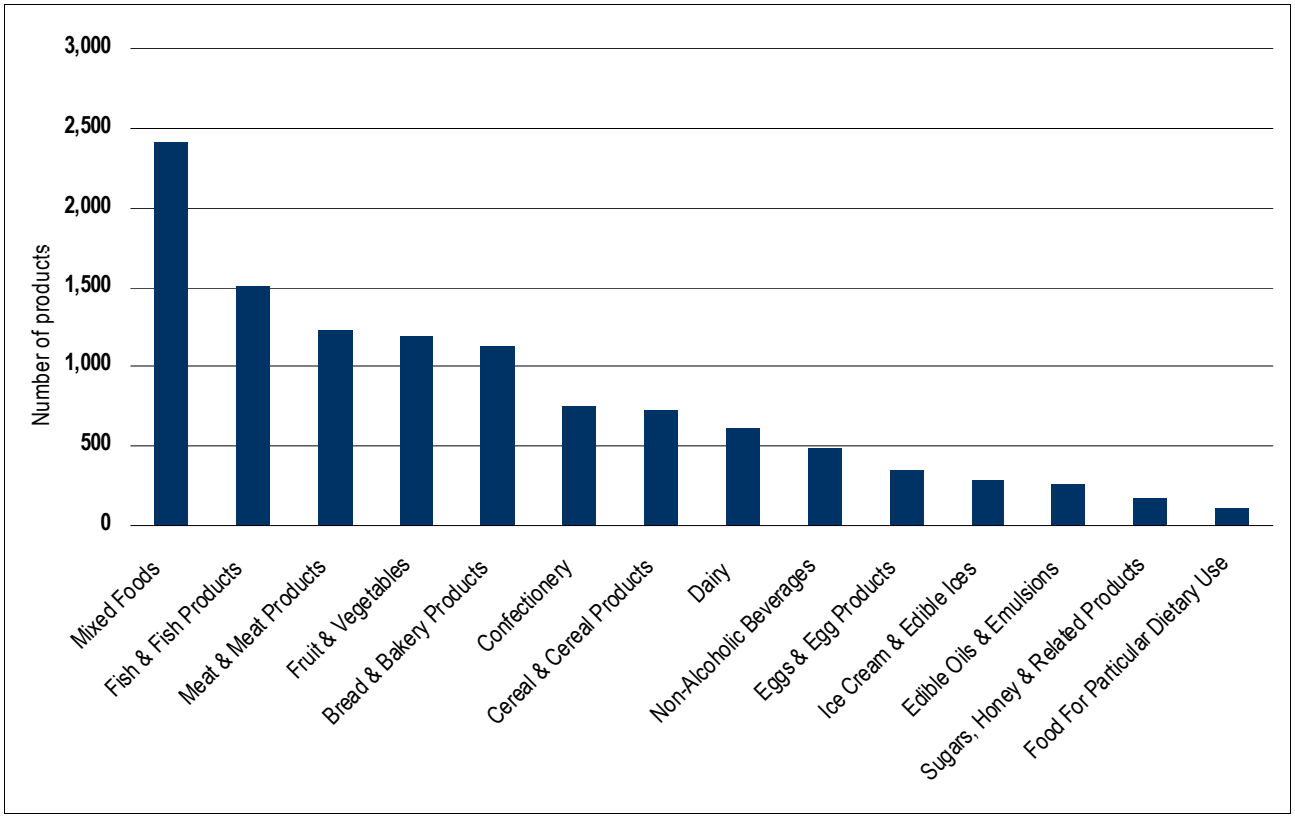
The retail value of sales of food in Australia is around $67 billion a year. Chart 4.1 sets out the distribution of household spending by food categories in Australia. Fruit and vegetables and meat — produce — makes up around 40 per cent of sales. Most of these products are fresh, or largely unprocessed. Processed foods make up around 60 per cent of sales with these being dominated by bread and bakery products, non-alcoholic beverages, mixed foods — sauces, jams, spreads, flavourings — and dairy. The number of products in each category varies widely as does the average value of sales per product (charts 4.2 and 4.3). The specific breakdown of the food contents of each food category are set out in appendix C.

4.1 Households spend most on fruit and vegetables (by value)



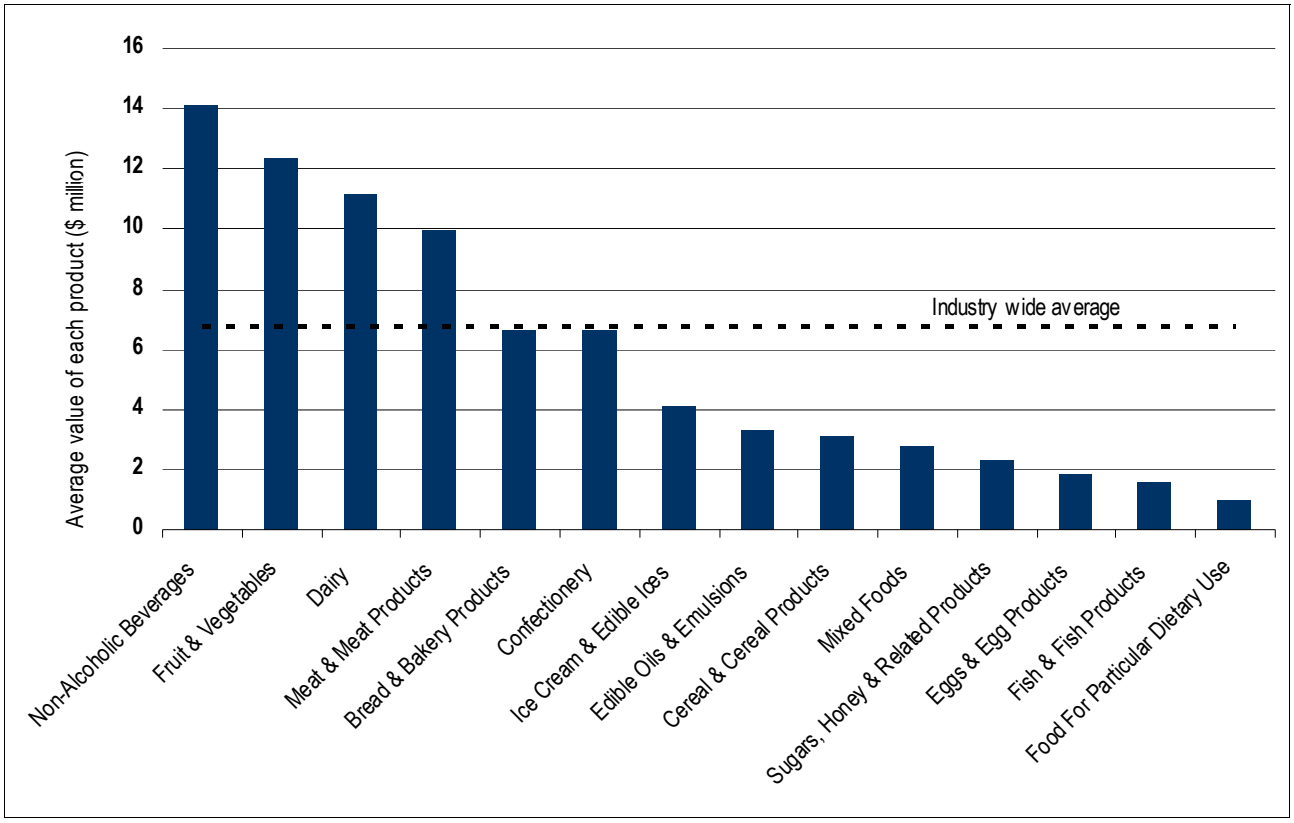
Data source: ABS (2006).

4.2 Mixed foods account for over 20 per cent of the products on supermarket shelfs



Data source: ABS (2006) and CIE consultations.

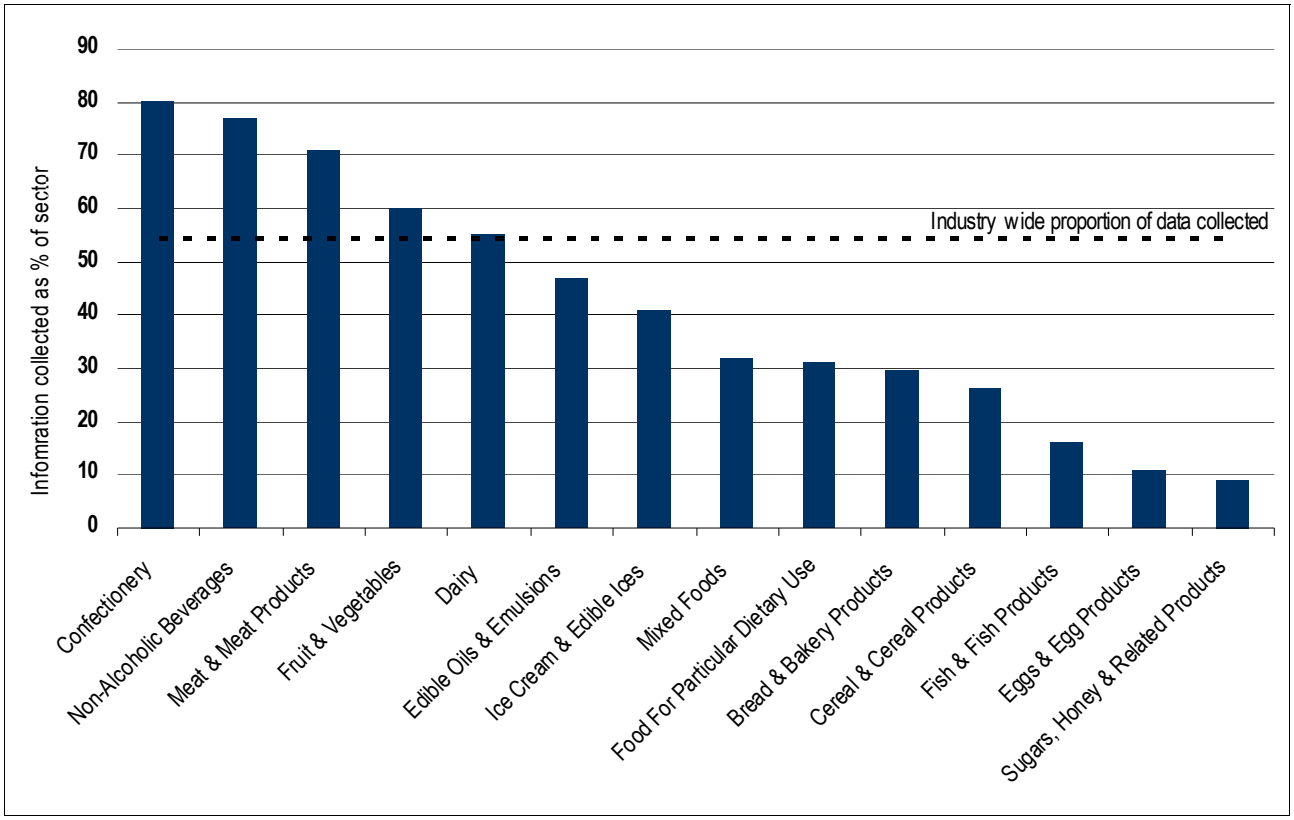
4.3 **Non-alcoholic beverages are the largest value products on average**



Data source: ABS (2006) and CIE consultations.

Information was sought from Australian and New Zealand food companies responsible for most food manufacturing and retailing activity in their sectors. In all, approximately 30 organisations were spoken to with data received from 20 companies. In quantifying the incidence of impacts, we have married together wholesale and retail data in a framework that is consistent with industry wide and data avoids double-counting. The information obtained covers approximately 55 per cent of total Australian food sales. Within specific sectors, the majority of sales data in the confectionary, non-alcoholic beverages, meat products, fruit and vegetables and dairy sectors was collected (chart 4.4).

4.4 **Data collected as a proportion of each sector**

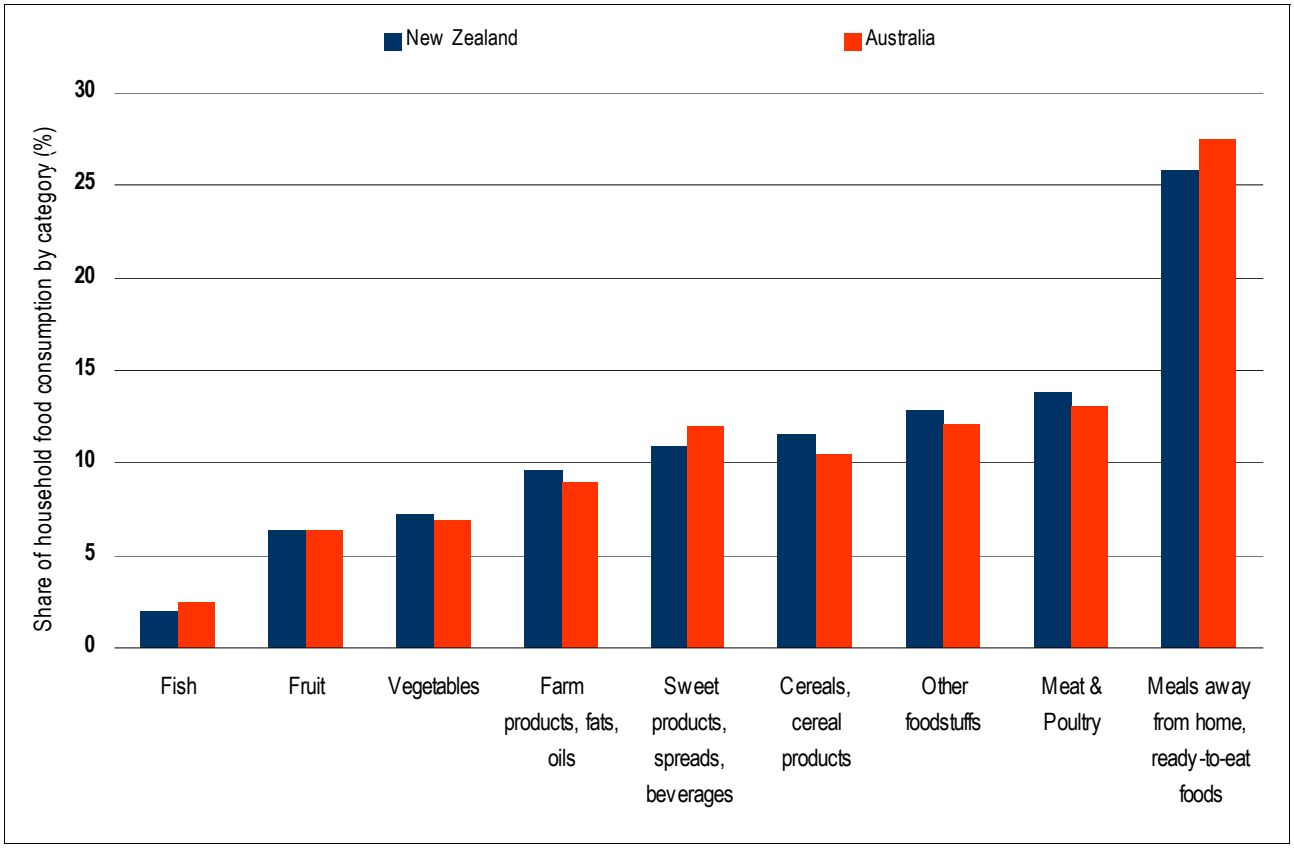


Data source: CIE consultations.

While not accounting for 100 per cent of sales data in the sector, the survey results do provide a good representation of the Australian industry.

It should be noted that specific information on the impacts of the proposed Standard was obtained from analysis of Australian food manufacturers and retailers. No specific information on New Zealand firms was received. However, companies operating in both jurisdictions did not expect there to be significant differences between the two countries. Further, a comparison of the patterns of consumption between both countries as shown in chart 4.5 reveals they are similar.

4.5 **Patterns of food consumption in Australia and New Zealand are virtually the same**



Data source: ABS (2006) and Statistics New Zealand (2004).

As such, the following discussion maps out the benefits and costs to Australia only. With total New Zealand food expenditure (not including meals away from home or ready to eat food) of NZ$10 893 million (or A$9 902 million[2]), representative results for New Zealand manufacturers and consumers can be calculated by scaling the Australian results by 14.57 per cent, are able to be calculated ($9 902m/$67 959m=14.57 per cent).

The incidence of the proposed changes

The proposed Standard will have a broad range of positive and negative impacts on existing products. Furthermore, industry expects the proposed change to also make feasible a number of new products that are not currently in production. Industry has given a broad number of reasons for these changes.

In general, industry indicated that the ability to use high level and general level health claims, Glycemic Index and dietary fibre were reasons for new

[2] Using an exchange rate of A$1 = NZ$1.1.

products and new marketing. Changes to the food vehicle eligibility criteria, and implied claims are main reasons given by industry for market outcomes four to seven (table 4.6).

4.6 **Specific elements of the FSANZ proposal driving the seven market outcomes**

Market outcome	*Use of a high level claim*	*Use of a general level claim*	*Food vehicle eligibility criteria*	*Changes to implied claims*	*Changes to dietary info*	*Changes to Glycemic Index*	*Changes to energy and diet*	*Changes to dietary fibre*	*Changes to saturated and TFA*	*Other reasons*
1. New product	√	√			√					
2. New marketing initiative	√	√	√	√	√	√		√		Protein claims
3. No change										
4. Label change			√	√	√	√	√	√		Vitamin claims
5. Marketing change			√	√	√		√	√		
6. Reformulation			√	√	√					
7. Removal of product			√	√	√					

Note: √ indicates a reason for a change.

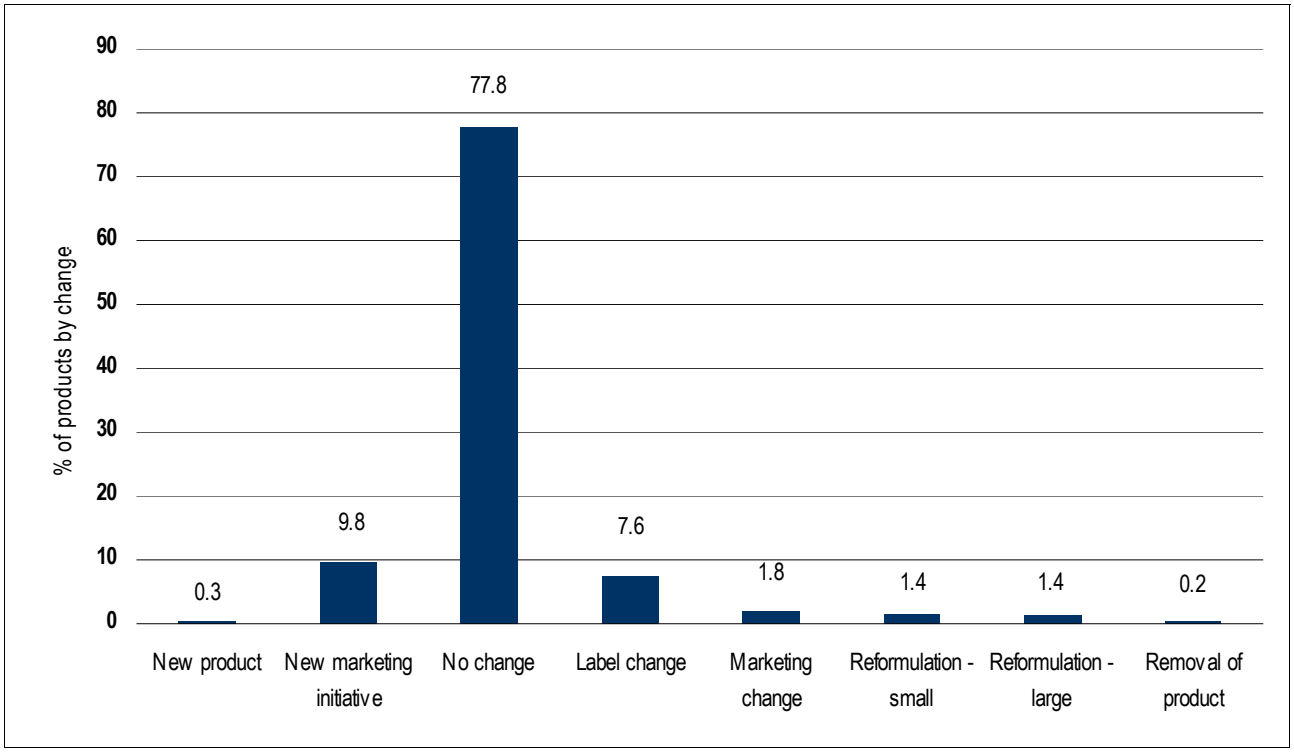
Source: CIE consultations.

Most of the expected new products and new marketing initiatives are as a result of the changes to high level and general level health claims.

In general, the introduction of nutrient profiling criteria, regulation of implied claims are driving outcomes 3 to 7. These changes are impacting negatively on the food sector due to firms having to change existing labels, products and marketing initiatives to ensure they are compliant with the proposed changes.

Chart 4.7 sets out the expected incidence of the seven potential market impacts based on information received from firms. It indicates that almost 80 per cent of products are expected to be unaffected or non-impacted. Around 10 per cent of products will qualify to make new claims and therefore providing new marketing opportunities. However, negative impacts in total will affect about 12 per cent of products. In these cases, food companies will be forced to make label changes, marketing changes or product reformulations. The incidence of the proposed regulatory changes leading to new products is low at 0.3 per cent, while the removal of products is 0.2 per cent.

4.7 **The majority of products will not be affected by the proposed changes**



Data source: CIE consultations.

Multiplying the incidence of impacts to industry by the benefits and costs to industry calculated in chapters 2 and 3 (and summarised in chart 3.1) calculates the financial impact on food suppliers from the FSANZ proposal.

Quantifying the proposed regulatory changes by market impact

To simplify the analysis, below we examine the direct food supplier impacts, the indirect competitor food supplier impacts and the consumer impacts separately. These are then combined into a total welfare measure.

Direct food supplier benefits from the proposed changes

Multiplying the data calculations behind chart 2.10, 2.11 and 2.12 and chart 4.7, and allowing for the on-going discounting, yields total food supplier impacts of $39.9 million in present value terms (table 4.8). Note that the gains from new products, new marketing initiatives and the removal of products from market (outcomes 1, 2 and 7) last in perpetuity. However, due to discounting (taking account of the opportunity cost of capital) and short product life-cycles, most of the gains (and losses) are incurred in early years. For all other outcomes, the costs are one-off.

4.8 **Total direct food supplier gains and losses for those directly impacted by the FSANZ proposal**

Year	*Outcome 1*	*Outcome 2*	*Outcome 3*	*Outcome 4*	*Outcome 5*	*Outcome 6a*	*Outcome 6b*	*Outcome 7*	*Total*
	$m	$m	$m	$m	$m	$m	$m	$m	$m
Year 1	13.5	7.7	-1.1	-1.9	-15.3	-7.3	-13.8	-6.7	**-24.9**
Year 2	11.3	6.4						-5.6	**12.1**
Year 3	9.4	5.3						-4.6	**10.1**
Year 4	7.8	4.5						-3.9	**8.4**
Year 5	6.5	3.7						-3.2	**7.0**
Year 6	5.4	3.1						-2.7	**5.8**
Year 7	4.5	2.6						-2.2	**4.9**
Year 8	3.8	2.1						-1.9	**4.1**
Year 9	3.1	1.8						-1.6	**3.4**
Year 10	2.6	1.5						-1.3	**2.8**
Year 11	2.2	1.2						-1.1	**2.3**
Year 12	1.8	1.0						-0.9	**2.0**
Year 13	1.5	0.9						-0.8	**1.6**
Year 14	1.3	0.7						-0.6	**1.4**
Year 15	1.1	0.6						-0.5	**1.1**
Year 16	0.9	0.5						-0.4	**0.9**
Year 17	0.7	0.4						-0.4	**0.8**
Year 18	0.6	0.3						-0.3	**0.7**
Year 19	0.5	0.3						-0.3	**0.5**
Year 20	0.4	0.2						-0.2	**0.5**
Total [a]	**81.2**	**46.1**	**-1.4**	**-2.3**	**-18.4**	**-8.7**	**-16.6**	**-40.1**	**39.9**

[a] Totals have been calculated into perpetuity by dividing the undiscounted value by the discount rate, and not by summing the 20 year calculations.

Note: figures have been discounted at a 20 per cent rate of return.

Source: CIE calculations.

It is possible that rates of adoption and use of new claims may be higher than those reported by the food industry. Evidence from the US's experience with nutrition claims suggests that the use of nutrition claims increased immediately following the introduction of claims (Allens 2004). However, this followed a larger reduction in the proportion of products making claims in the years leading up to the changes. As such, it is problematic to draw any strong conclusions from this data:

- firstly, the data period does cover an extended time period following the introduction of the changes – as such it is difficult to make statements about long terms increases and rates of increase with the limited data; and
- secondly, a single snapshot of data does not identify any broader issues that may be altering the use of health claims.

Further, due to the length of time industry have known about this proposal, it is plausible to consider that the industry will bring in almost immediately any new products or claims.

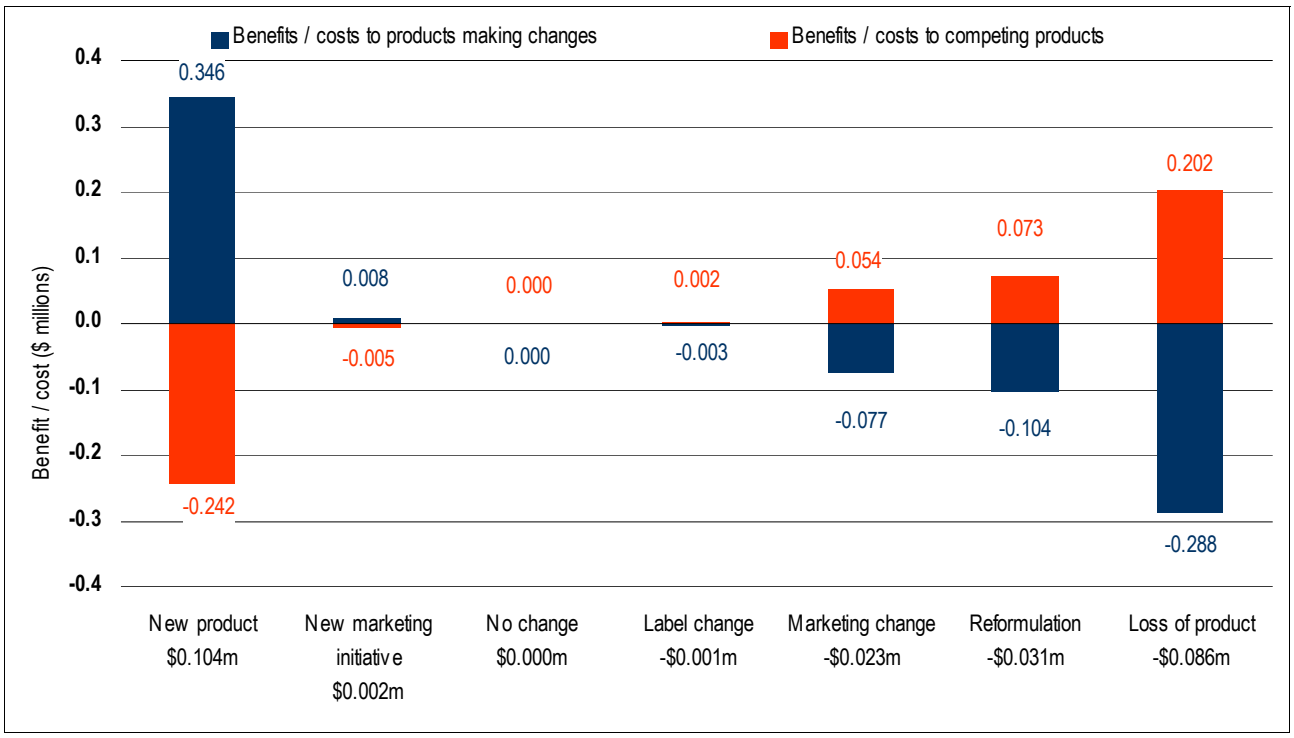
Indirect food supplier (competitor) benefits from the proposed changes

As discussed above, outcomes 1 and 2 provide benefits to those food suppliers that provide a new product or new marketing initiative. However, competing food suppliers lose out as consumers switch from their products taking advantage of the changes. The exact change in market share is difficult to explicitly quantify. Discussions with industry were indefinite however the general consensus was that the change in market share would not be more that 1 per cent in either direction.

On a representative $5 million product, for outcome 1 new food suppliers gain $346 000 (as indicated in chapter 2), while competing food suppliers lose $242 000 (in line with the adjustments discussed in chapter 3). In this case the net gain is $104 000. Similarly, for outcome 7, the removal of a product from market, the firm that removes the product loses $288 000, while competing firms gain $202 000 as consumers switch to their products. In this instance, the net loss from the proposal for is $86 000 for a $5 million product (chart 4.9).

Applying these calculations to the food supplier gains in chart 4.7, provides indirect competitive food supplier losses from the FSANZ proposal of $27.9 million.

4.9 **The direct and indirect food supplier benefits and costs on a representative $5 million product**

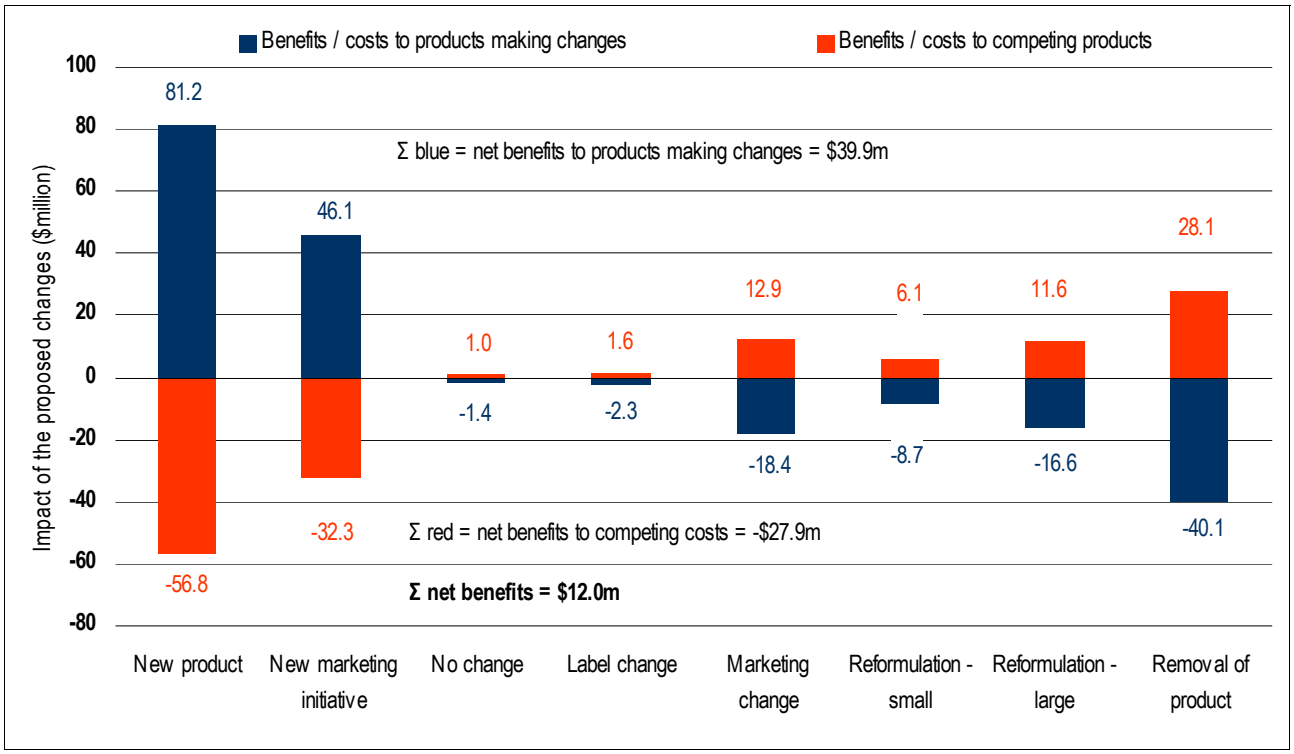


Source: CIE calculations.

Total direct and indirect food supplier benefits

While industry expect there to be 0.3 per cent new products, this relatively small number multiplied by the relatively large net food supplier gains from outcome 1 yields a total net benefit of $24.3 million. This compares to a net food supplier loss of $12.0 million resulting from the removal of a product (outcome 7). Overall, the net gain to food suppliers from the proposed Standard is $12.0 million (chart 4.10).

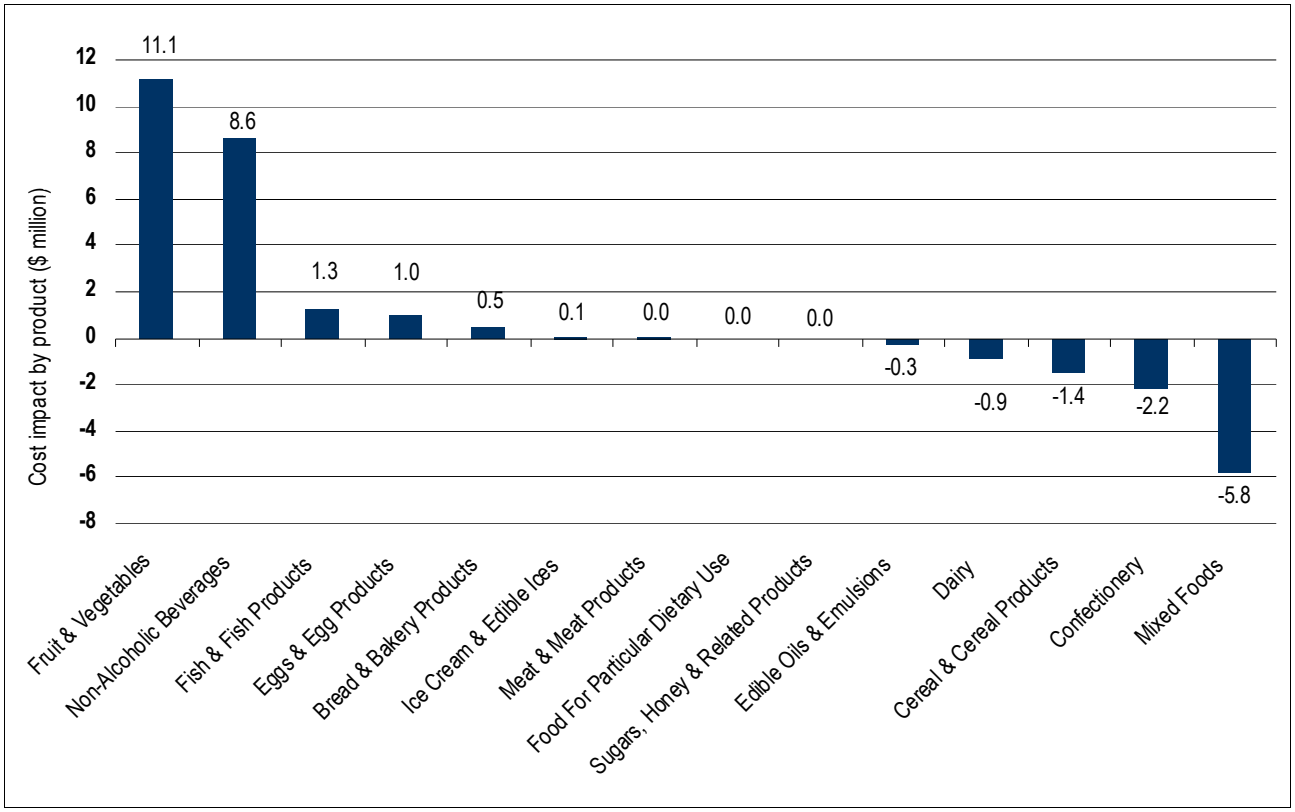
4.10 **Total food supplier gains and losses for those directly impacted by the FSANZ proposal**



Data source: CIE calculations.

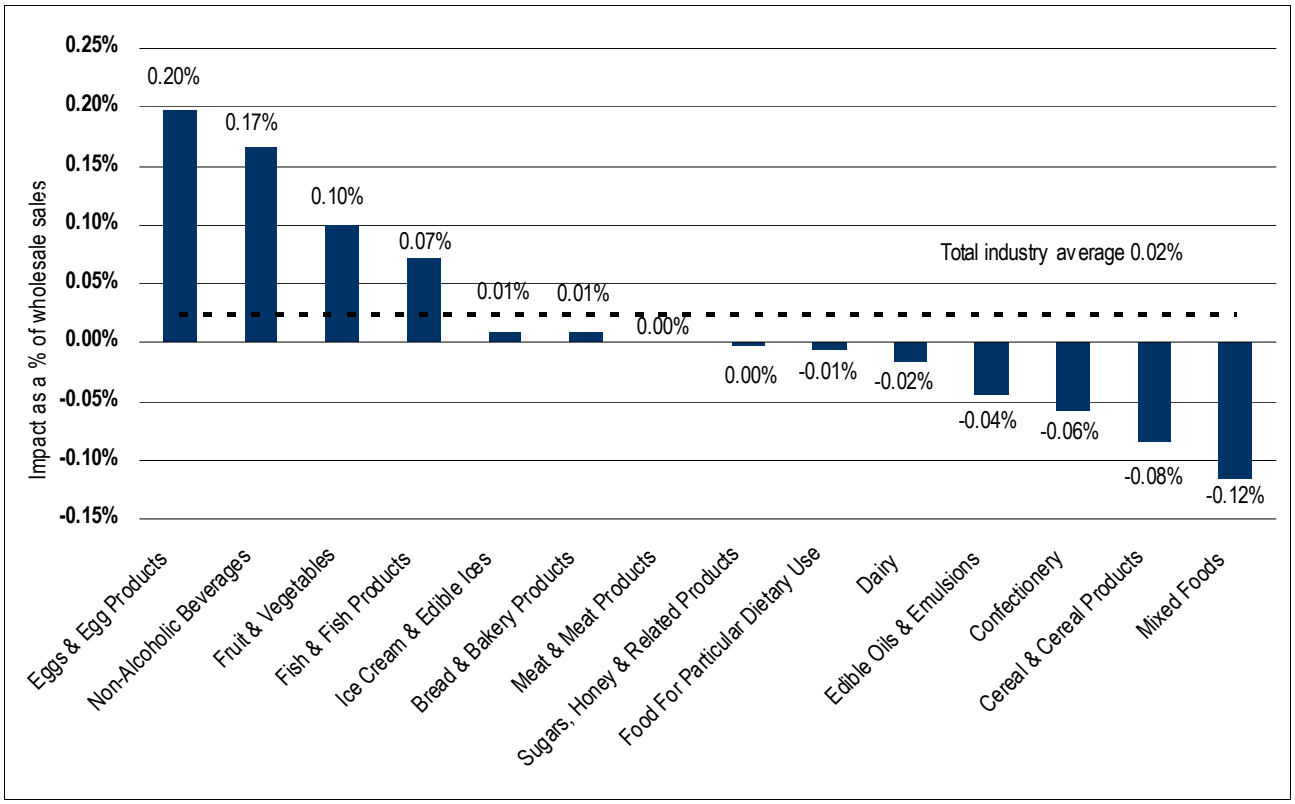
The impact of these changes is not uniform across food groups. The fruit and vegetable sector has the largest net food supplier benefit, with gains of $11.1 million, followed by non-alcoholic beverages ($8.6 million). The mixed foods (generally processed combinations of food types) sector suffers the largest cost, with net losses of $5.8 million (chart 4.11). For fruit and vegetables, this result is driven by the large proportion of food expenditure dedicated to the sector. However, relatively, fruit and vegetables, non-alcoholic beverages and egg products gain the most, with the net food supplier benefit equal to approximately 0.20 per cent of sales. This compares with an industry wide average benefit of 0.02 per cent (chart 4.12).

4.11 **Food supplier impacts by sector ($m)**



Data source: CIE calculations.

4.12 **Food supplier impacts as a proportion of sector size**

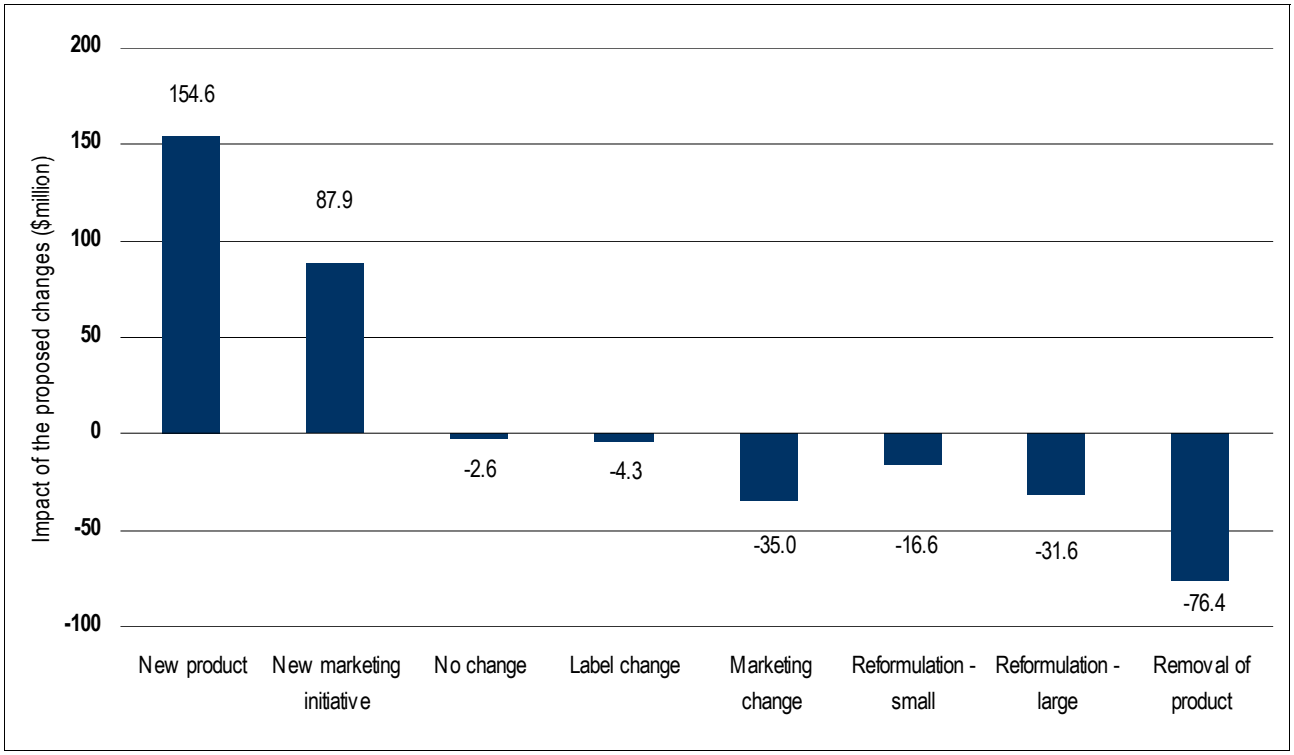


Data source: CIE consultations.

Consumer gains from the proposed changes

As discussed in chapter 3, outcomes 1 and 2 provide consumers with products they value more highly. By consuming these, consumers gain an economic benefit. Likewise consumers are worse off when products are removed from market (outcome 7) or prices increased on goods they consume (outcomes 3 to 6). Combined, the net benefits from outcomes 1 and 2 are $242 million, while the cost of outcomes 3 to 7 is $167 million. In total, the consumer benefit from the proposed changes is $76 million (chart 4.13).

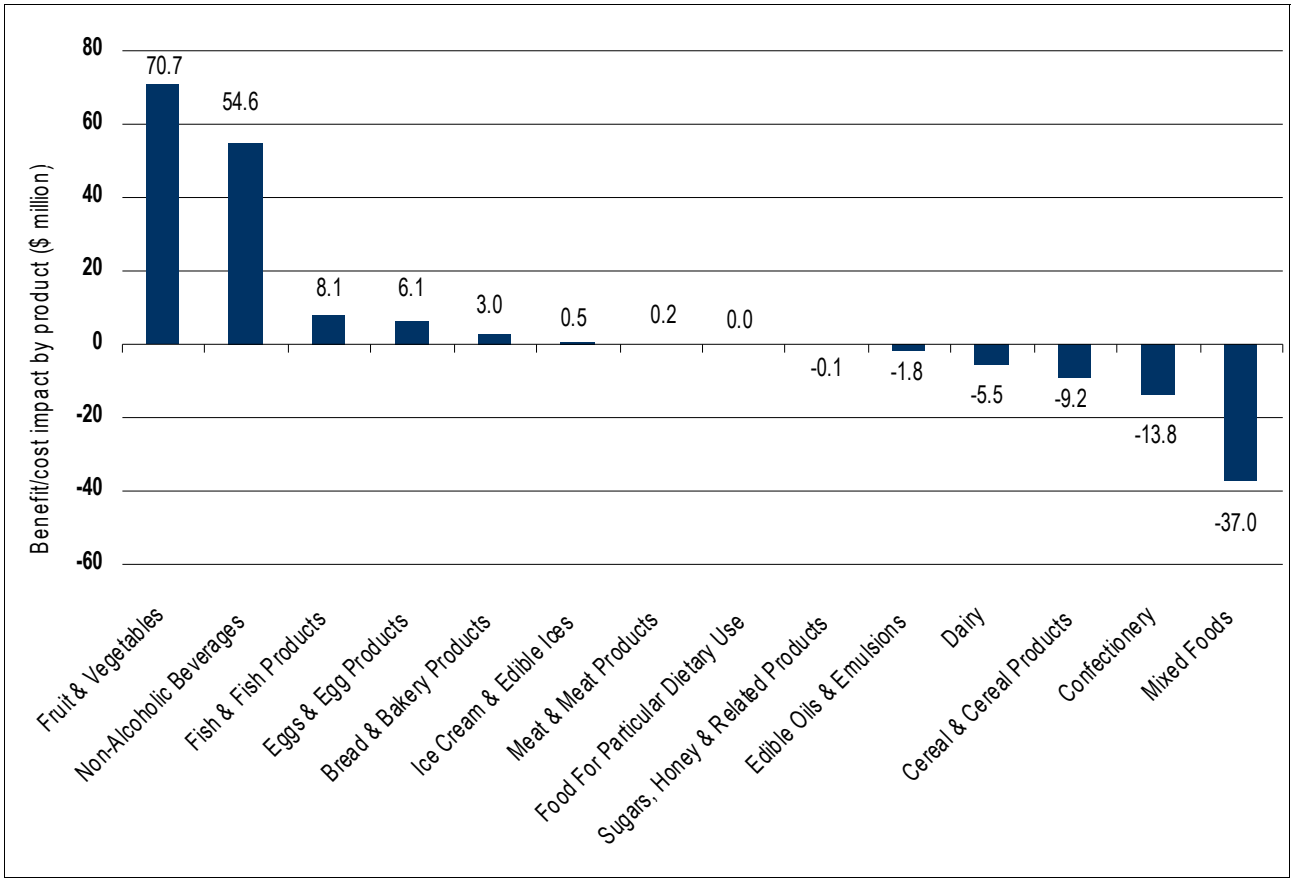
4.13 **Benefits and costs to consumers from the proposed changes**



Data source: CIE consultations.

By sector, consumers of fruit and vegetables and non-alcoholic beverages gain the most, while those consuming confectionary and mixed foods lose the largest (chart 4.14).

4.14 **Benefits and costs to consumers from the proposed changes**

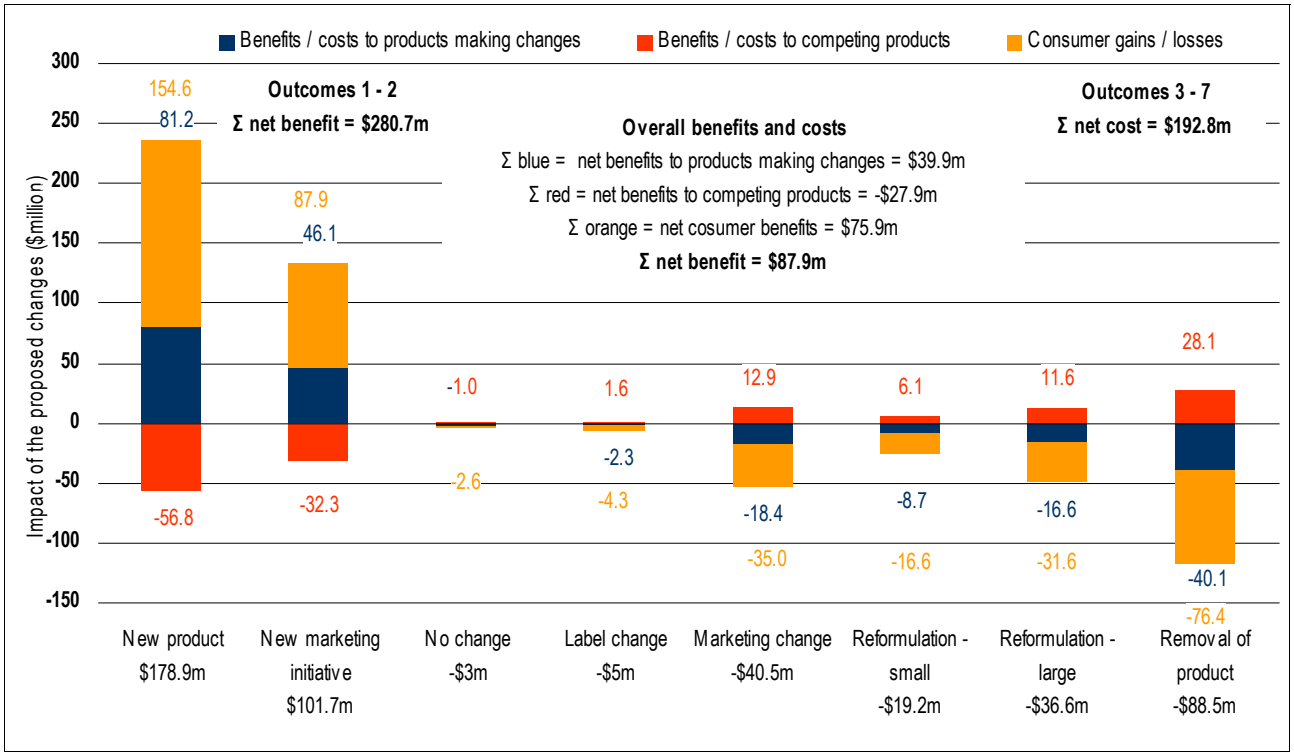


Data source: CIE consultations.

Net consumer and food supplier gains from the proposal

Combined, the benefits from the proposed Standard come to $87.9 million in perpetuity, or around $20 million a year for the first 4 years, with the majority of the benefits attributable to the food supplier and consumer benefit gained on new products ($179 million). It is worth noting that the cost to food suppliers and consumers of the 80 per cent of products not affected by the proposal still carry a $3 million cost due to firms having to inspect all products to ensure compliance with the changes. The cost of removing products from market is estimated to be $88 million (chart 4.15).

4.15 **Total net present value benefits of the food supplier by market outcome**

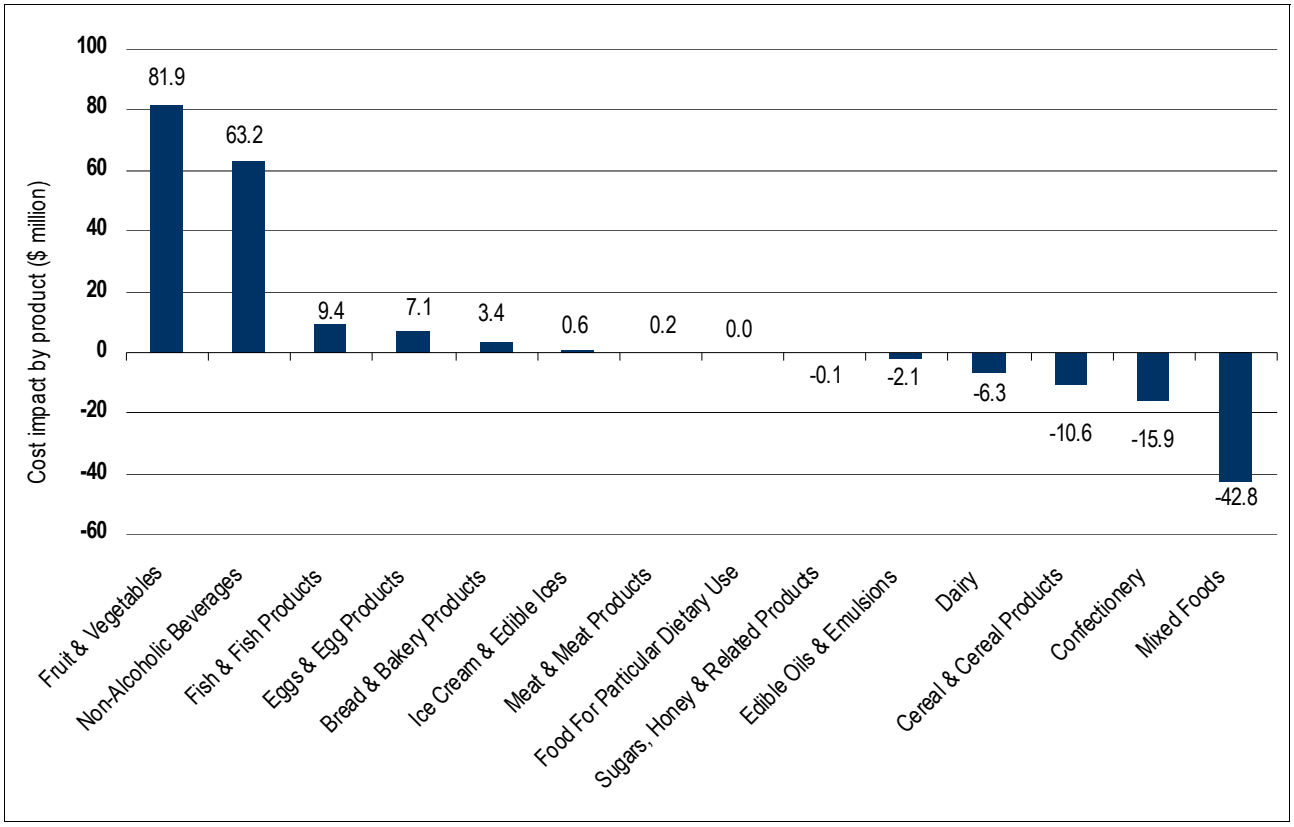


Data source: CIE calculations.

By sector, consumers and food suppliers of fruit and vegetable and non-alcoholic beverages gain the most from the proposal, earning $125 million combined. This amount, however, is offset in part by the $43 million cost felt by the mixed foods sector. The majority of sectors have a total net impact of $10 million each (chart 4.16).

The $88 million (or around $20 million per year) benefit is very small relative to the $67 billion is annual sales of food. This represents an economic gains of only 1 thirtieth of one per cent of sales.

4.16 **Total net benefits of the proposal by sector ($m)**



Data source: CIE calculations.

5 *Sensitivity testing*

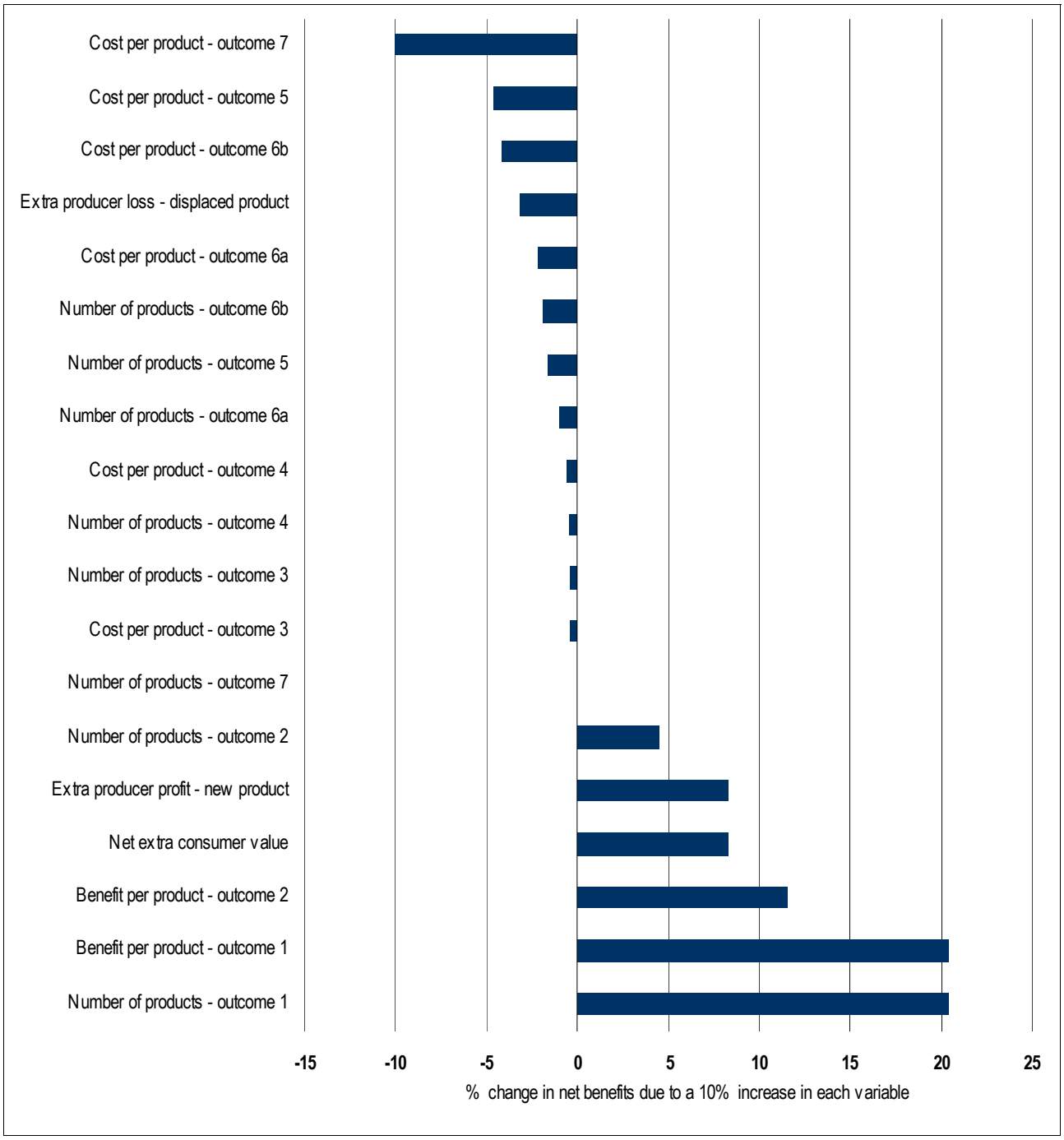
Although estimates of benefits and costs were provided in chapters 4, considerable uncertainty surrounds the estimates. As such it is important to determine the robustness of the results. This is known as a 'sensitivity analysis'. The software program @Risk (version 5.4.3) was used to undertake this sensitivity analysis.

Most sensitive variables

Chart 5.1 highlights the impact that a 10 per cent change in a particular variable has on the overall result. For example, a 10 per cent increase in the number of new products leads to a 20.4 per cent increase in the net benefit.

The results are most sensitive to estimates of the benefit of a new product and the number of new products that are developed. Note that these are both benefit side parameters (an increase in the parameter leads to an increase in the net benefit). On the downside, a 10 per cent increase in the cost of removing a product from market will decrease the net benefit by 10 per cent.

5.1 **Parameter sensitivity analysis**



Data source: CIE calculations.

Robustness of the results

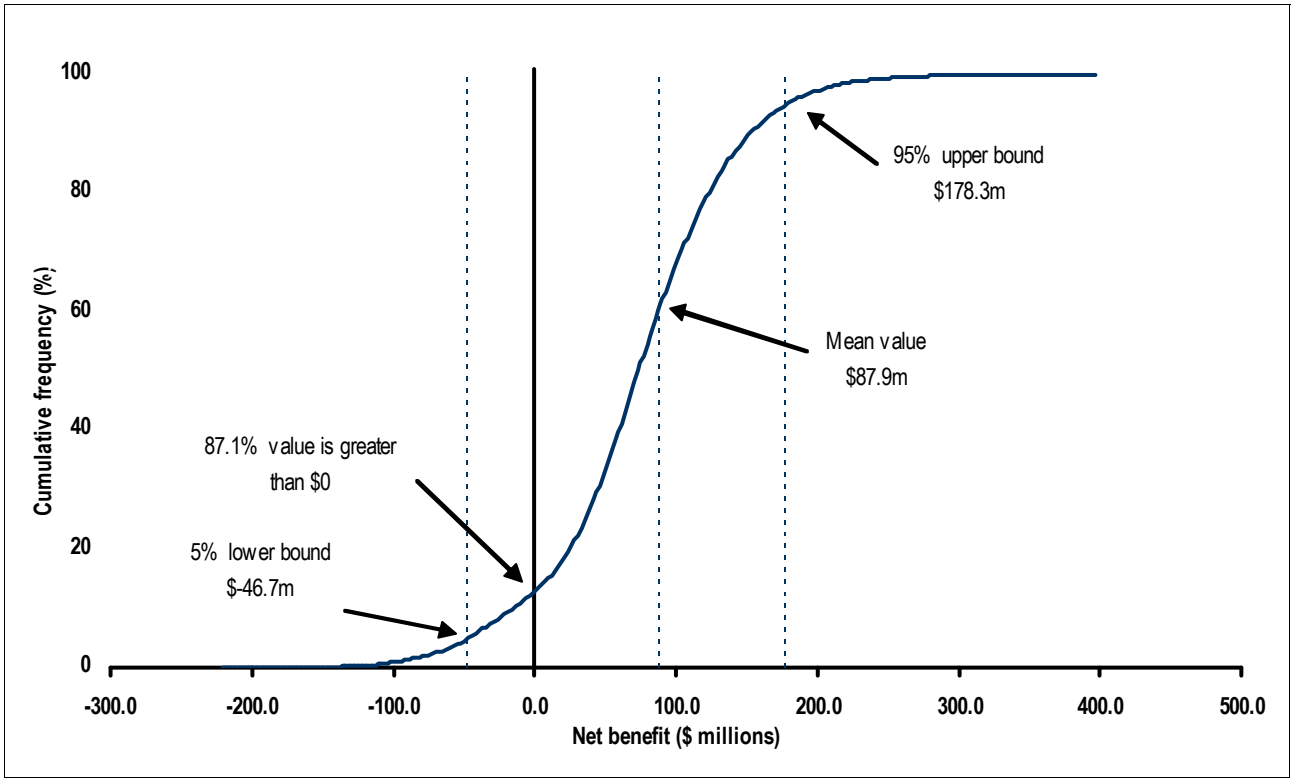
In analysing the robustness of the results, key parameters were varied simultaneously around their mean values and the benefits and costs recalculated to identify the sensitivity of the results to these changes. The specific benefit and cost elements tested are identified in chart 5.2.

The distribution for each parameter has been determined based on data received during the consultation process and our understanding of the variability of the parameters. The most uncertain variables are:

- the number of new products that might arise from the introduction of the proposed Standard which could conceivably range from zero to double the number indicated;
- the extra gain in consumer value from changing patterns of consumption which could range from half that estimated to one and a half times estimated; and
- the number of products that could be withdrawn from the market which could conceivably range from zero to double.

As well as being the most uncertain variables, chart 5.2 indicates that these variables are among the most influential to the results. However, despite these uncertainties, results indicate that the estimated benefits and costs are fairly robust across a broad range of assumptions.

5.2 **There is a high probability that benefits exceed the costs**



Data source: CIE calculations.

The results of the sensitivity analysis indicate there is over an 87.1 per cent probability the benefits will exceed the costs. The range of net present value benefits is reasonably narrow with an estimated 90 per cent chance the net benefits lies between $-46.7 and $178.3 million. The most likely situation leading to a net cost being imposed is where the number of new product generated is zero or very small.

Further evidence of the two most critical variables

Underlying the robustness of these results are the assumptions that the number of new products may be up to double those indicated here and that the benefits from new products might be as much as 50 per cent higher.

Number of new products

The number of new products indicated by survey result was equal to around 0.3 per cent of all products. This is small and subject to considerable uncertainty. However, it does appear to be credible when verified against alternative sources of data (see appendix D).

- In a paper on the extent of penetration of health enhancing foods, the World Bank (2006) point out the following.
  - Globally the market for health enhancing foods may be worth $31-$61 billion and be perhaps 1 to 3 per cent of the food market (by value) and they may have the potential to rise to 5 per cent.
  - Currently (2006), in Japan consumers spend US$126 per person annually on such foods. In the United States, the comparable figure is US$68, in Europe it is $51 and in other Asia it is $3 only.
  - Were Australians to spend $50 each a year on such foods, that would be 1.5 per cent of annual per capita expenditure on food ($50/$3237).
    - … However, if such foods command high premium prices, the volume share of these foods may be considerably less.
    - … If the foods on average were to command a 100 per cent premium, they might make up only 0.75 per cent of the Australian market by volume now.
    - … CIE survey data which suggests an increase in such products arising from Proposal P293 equal to 0.3 per cent of all food products by volume would raise this number from 0.75 per cent to 1.05 per cent, suggesting a 40 per cent increase in such products.

- A paper by the National Centre of Excellence in Functional Foods titled *Functional Foods for the Australian industry: definitions and opportunities (2005)* points toward similar numbers.
  - Australia's share of the global functional food market was estimated at AU$1 billion in 2003 and is growing at a rate between 8-14% per annum.
  - This is, $1 billion in a $67 billion market, representing 1.5 per cent of sales by value. If price premiums are 100 per cent, then by volume, sales are about 0.75 per cent.
  - If sales are growing at 8-14 per cent, say 11 per cent, then over four years they would grow by 0.75X0.11=0.0825X4=0.33 per cent. Again this is similar to CIE survey results.

Nonetheless, it remains difficult to be precise about the number of new products. If the market globally for health enhancing foods is estimated at between 1 and 3 per cent by value, the estimate for Australia given above at 1.5 per cent is at the lower end of the range. Were Australia at the top end of the range (3 per cent instead of 1.5 per cent), then it is conceivable that the estimated number of new products used in this study might also be doubled. A doubling in the number of new products would add about $180 million to estimated benefits from P293.

Benefits of new products

The benefits of new products were estimated from a case study on one successful new health related product: *Wonderwhite*. In that case study it was found that rates of substitution with other existing products tended to limit the potential consumer benefit and cause a decrease in the profits of producers whose product was displaced.

It might be argued that some health related products do not easily substitute with others. Margarines fortified with phytosterols which are claimed to lower cholesterol absorption have been popular among some consumers. In Australia phytosterols were introduced to Australian consumer through a margarine product called Pro-Activ. Sales of Pro-Activ do not appear to have displaced normal margarine sales by much. Rather, because ProActiv has been one of the only sources for concentrated phytosterols in Australia, consumers wanting phytosterols have had to purchase it in the form of margarine. This has grown the margarine market by around 5 per cent. Moreover, the product sells at a large premium to other margarines. Partly this reflects the high costs of the phytosterols included in the product and the product development costs.

Although highly successful, Pro-Activ has achieved only about a third of the value of sales of Wonderwhite, perhaps reflecting that it is not as substitutable with existing products. If the net benefits are modelled in the same way as was done for Wonderwhite, indirect benefit to consumers and indirect costs to displaced producers may be more than four times higher than for Wonderwhite: $250 000 per $1m in sales compared with $54 000 for Wonderwhite (see appendix E).

Consumer benefits vary depending on how substitutable a new product is for another that it displaces. The more substitutable it is, the greater the market share it is likely to command, but the smaller is the additional consumer benefit likely to be per $1m of sales. Wonderwhite is an example of a new product that substituted for a relatively large share of the bread market, taking 14.5 per cent by volume and valued at $183 million in annual sales. Pro-Activ with phytosterols is an example of a new product that substituted for a lesser share of the margarine market (it is less substitutable), 4.5 per cent by volume and valued at $66 million in annual sales.

Model estimates suggest that:

- Wonderwhite might have delivered around $84 000 dollars of additional benefit to consumer per $1 million of sales, or around $16 million.
- Pro-Activ might have delivered around $260 000 dollars of additional benefit to consumers per $1 million of sales, or around $14 million.

The two products also had different effects on food producers whose products were displaced. The more substitutable product caused greater loss of profit to producers whose products were displaced than the less substitutable one. Wonderwhite cost displaced food producers an estimated $30 000 per $1 million in sales, while Pro-Activ cost displaced food producers an estimated $10 000 per $1 million in sales. The net indirect impact was $54 000 for Wonderwhite ($84 000 for consumers less $30 000 for food producers) and $250 000 for Pro-Avtiv.

If a weighted average of the Wonderwhite and Pro-Activ net indirect benefits to consumers and displaced food producers is calculated, this might suggest net indirect benefits of $110 000 per $1 million of sales rather than $54 000 used in the model.

On this basis it is conceivable that indirect benefits could be around double those estimated. A 100 per cent increase in indirect benefits would raise the net benefits of P293 by around $180 million to estimated benefits from P293.

Other variables

CIE survey results show that about 12.5 per cent of products will be adversely affected by P293. These are products falling into market outcomes 4, 5, 6 and 7. Sensitivity results show that were there a 10 per cent increase in the number of products falling into these categories, it could collectively lower the net benefit by around 5 per cent.

Products currently falling into categories 4, 5, 6 and 7 due to P293 will be required to change their label, change their marketing, reformulate their product or even remove their product from the market. Stricter qualifying criteria attaching to P293 could increase the number of products falling into this category. Were the Nutrient Profiling System extended to be applied to nutrient content claims (as has been proposed by some jurisdictions) FSANZ estimate that 14.4 per cent of foods would be disqualified from making nutrient content claims (see appendix F). Some of these foods may be the same foods in the 12.5 per cent of products already adversely affected by P293. However, were 12.5 of the 14.4 per cent additional products that would be adversely affected, sensitivity results indicate that a doubling in the number of products adversely affected could lower the net benefit by around 50 per cent, or $44 million.

6 *Overall impact: Australian and New Zealand*

As quantified in chapter 4, it appears that introducing the proposed Standard may provide a benefit-cost ratio of 1.45:1 before consideration of costs of enforcement to jurisdictions.

Accounting for New Zealand

The Australian benefits are $87.9 million. As discussed in chapter 4, these calculations are for Australia only. Including New Zealand, net benefits would increase by A$12.8 million (NZ$14.1 million) to a total benefit of A$100.7 million. The benefit-cost ratio in New Zealand is the same.

Accounting for enforcement costs

Based on data collected from government enforcement agencies, FSANZ estimates that the initial costs of enforcement in Australia could be around A$140 000 with on-going enforcement costs of A$490 000 per year[3]. New Zealand enforcement costs are estimated to be A$28,000 with ongoing annual costs of A$98,000. It should be noted that these cost estimates are broad indications of extra enforcement resources that will be required. Using a discount rate of 10 per cent, these costs have a net present value of $6.0 million. This reduces the net benefit to $94.7 million and the benefit-cost ratio to 1.41 to 1.

Rate of return

The benefit-cost ratio has been calculated over a four year period – the four years immediately after introduction of P293 and representing the normal life-cycle of a product. Achieving a benefit-cost ratio of 1.4 over four years

[3] Data were collected by FSANZ in 2007 for inclusion in the Proposal P293 Final Assessment Report.

implies a 9 per cent rate of return per year over and above the cost of capital. This is a reasonable commercial rate of return.

Additional benefits and costs may be incurred beyond the initial four years. P293 may facilitate the marketing of other new products beyond four years. However, it will also restrict the development of others. Benefits and costs are likely to be earned and incurred in similar proportions beyond the four years, so here it is assumed that the benefit-cost ratio will remain roughly the same – that is 1.4:1.

Benefits in perspective

The net present value benefit of $92.7 million on an annualised basis is less than a quarter of 1 per cent of the value of food sales (at the retail level) in Australia and New Zealand (see chart 4.12).

The relatively small overall impact reflects that:

- most products (80 per cent) are unaffected by the proposal;
- net benefits from new products and new marketing initiatives are largely offset by net costs of forced changes on other products:
  - typically new products and marketing initiatives are promoted by provisions in the Proposal to allow use of high and general level health claims;
  - typically, changes in labelling, marketing, product reformulation and product placement are a result of introducing nutrient profiling scoring criteria and regulation of implied claims; and
- the incidence of new products and removed product, which have relatively high benefits and costs per product, are very low at around 0.5 of one percent of all products;
- the scope for gains from new products, while relatively large per product compared with other market changes, is still limited by the relatively low extra value provided to consumers of new products in a mature sector such as food:
  - consumers already have tens of thousands of food products to choose from and typically there are many very close substitutes to select between within each product category;
  - if consumers do not get a particular attribute they value from one product they can easily switch to another brand, another product, a combination of products, so:

… consumers are likely to have already nearly optimised their patterns of consumption according to their preferences; and

… any new attribute, product feature, additional information or new product needs to be revolutionary to add much to consumer welfare and results here confirm this.

Sensitivity testing

Although the most likely scenario indicates a benefit-cost ratio of 1.4 to 1, sensitivity analysis indicates that the results are highly sensitive to:

- the number of new products likely to be promoted by the proposal;
- estimates of consumer benefits from new products.

In chapter 5 it was shown that it is conceivable that that both factors could be up to double those estimated for the most likely case.

Model results indicate that were:

- the number of new products doubled the benefit-cost ratio would rise from 1.4:1 to 2.4:1;
- the net indirect consumer and producer benefits to also be doubled, the benefit-cost ratio would rise from 2.4:1 to 3.3:1.

Appendixes

A Product life-cycle calculations

A.1 Underlying data and assumptions for the life-cycle costs

Element	*Units*	*Cost*
Company Wide Elements		
Profit Rate On Typical Product	%	8.2
Management Overheads As % Of Revenue	%	8.2
Total Value Of Company Sales	$m / year	0.0
Number Of Production Factories	number	500.0
Number Of Products	number	10
SKU's Per Product	number	100.0
Life Expectancy Of Typical Product	years	3
Product Development Costs Per Product	$m	4
Number Of Products Development Per Year	number	0.5
		25.0
Staffing Costs		
Management Person	$ / day	2,000
R&D Person	$ / day	1,500
Marketing Person	$ / day	1,500
Admin Person	$ / day	1,000
Legal Person	$ / day	2,000
Factory Details		
Factory Production	$m / year	50.0
Days Operating	days / year	360
Factory Profit	$ / day	11,389
Product & SKU Details		
Sales Value Of Typical Product	$m / year	5.0
Sales Value Of Typical SKU	$m / year	1.7
Sales Value Of Each Unit	$ / unit	1.50
Number Of Units Shipped	millions / year	3.3
Product Development Costs of Typical Product	$m / year	0.14
Marketing Costs of Typical Product	$m / year	0.97
Variable Costs Of Typical Product	$m / year	3.52
Profit On Typical Product	$m / year	0.38
Cost Input Elements		
Raw Food Inputs	%	30.0
Processed Food Inputs	%	25.0
Other Inputs (E.G. Water)	%	5.0
Product Formulation (I.E. Depreciation Of Equipment)	%	10.0
Consumable Costs (E.G. Electricity)	%	5.0
Labour Costs	%	20.0
Formulation Costs	%	5.0

A.1 **Underlying data and assumptions for the life-cycle costs** continued

Element	*Units*	*Cost*
Label Costs		
Cost Of Each Label	$	0.02
Product Label Costs	$m / year	66,667
Test Costs (Preliminary + Validation Cost)		
Average Cost	$	636.26

Source: CIE consultations.

A.2 **Product life-cycle costs for a typical $5m product**

Item	*Units*	*Value*	*Rate ($)*	*Result ($)*	*Cost category*
Product Development				542,170	
1A. Concept & Formulation				142,920	
Management Oversight					
Management Person - fixed	days	5	2,000	10,000	Education
Management Person - variable	days	5	2,000	10,000	Education
Market Analysis (Target, Size, Value)					
Marketing Person - fixed	days	5	1,500	7,500	Other
Marketing Person - variable	days	5	1,500	7,500	Other
Head Office Formulation					
Sourcing Inputs					
R&D Person - fixed	days	3.75	1,500	5,625	Purchase Cost
R&D Person - variable	days	1.25	1,500	1,875	Purchase Cost
Admin Person - fixed	days	1.5	1,000	1,500	Purchase Cost
Admin Person - variable	days	0.5	1,000	500	Purchase Cost
Formulation					
R&D Person - fixed	days	7.5	1,500	11,250	Purchase Cost
R&D Person - variable	days	2.5	1,500	3,750	Purchase Cost
Taste Testing					
Setting Up Taste Testing					
Admin Person - fixed	days	1	1,000	1,000	Purchase Cost
Admin Person - variable	days	1	1,000	1,000	Purchase Cost
Testing Company - fixed	number	0.5	40,000	20,000	Purchase Cost
Testing Company - variable	number	0.5	40,000	20,000	Purchase Cost
Analysis & Response Of Findings					
R&D Person - fixed	days	5	1,500	7,500	Purchase Cost
R&D Person - variable	days	5	1,500	7,500	Purchase Cost
Factory Formulation					
Head Office Side					
R&D Person - fixed	days	1.5	1,500	2,250	Purchase Cost
R&D Person - variable		0.5	1,500	750	Purchase Cost
Factory Side					
R&D Person - fixed	days	1.5	1,500	2,250	Purchase Cost
R&D Person - variable		0.5	1,500	750	Purchase Cost
Equipment Time Required - fixed	days	0.375	11,389	4,271	Purchase Cost
Equipment Time Required - variable		0.125	11,389	1,424	Purchase Cost
Technical Testing					
Outsourced Tests - fixed	number	10	636	6,363	Other
Outsourced Tests - variable	number	10	636	6,363	Other
Legal Management					
Lawyer Days - fixed	days	0.5	2,000	1,000	Other
Lawyer Days - variable	days	0.5	2,000	1,000	Other

A.2 **Product life-cycle costs for a typical $5m product** continued

Item	*Units*	*Value*	*Rate ($)*	*Result ($)*	*Cost category*
1B. Marketing Development				388,000	
Management Oversight					
Management Person	days	5	2,000	10,000	Education
Advice On Labelling Applicability					
Probability Of External Advice Being Used	%	1.0%	150,000	1,500	Other
Marketing Person	days	5	1,500	7,500	Other
Legal Management					
Lawyer Days	days	1	2,000	2,000	Other
Marketing Development (Concept)					
Marketing Person	days	10	1,500	15,000	Other
Advertising Development					
Print Media					
Marketing Staff	days	15	1,500	22,500	Other
Fixed Cost Of Ad Development	amount	1	25,000	25,000	Other
Variable Cost Of Ad Development	%	0.5%	5,000,000	25,000	Other
Television Media					
Marketing Staff	days	15	1,500	22,500	Other
Fixed Cost Of Ad Development	amount	1	50,000	50,000	Other
Variable Cost Of Ad Development	%	4.0%	5,000,000	200,000	Other
Strategic Price					
Marketing Person	days	1	1,500	1,500	Other
Management Person	days	1	2,000	2,000	Other
Strategic Location					
Marketing Person	days	1	1,500	1,500	Other
Management Person	days	1	2,000	2,000	Other
1C. Packaging Development				11,250	
Developing Product Concept					
Marketing Staff Per Product - fixed	days	0	1,500	0	Purchase Cost
Marketing Staff Per Product - variable	days	0	1,500	0	Purchase Cost
Management Staff Per Product - fixed	days	0.0	2,000	0	Purchase Cost
Management Staff Per Product - variable	days	0.0	2,000	0	Purchase Cost
At The Sku Level					
Marketing Staff Per Sku	days	0.5			
Skus Per Product	number	3			
Marketing Staff - fixed	days	1.1	1,500	1,688	Purchase Cost
Marketing Staff - variable	days	0.4	1,500	563	Purchase Cost
Printing Plate Development					
Number Of Plates Per Sku	number	2			
Number Of Skus Per Product	number	3			
Life Expectancy Of Plates					
Number Of Plates Needed	number	6	1,500	9,000	Purchase Cost
1D. Label Write-Offs				3,333	
Label Write-Offs					
Cost Of Writing Off Old Labels	%	5.0%	66,667	3,333	Purchase Cost
1E. Manufacturing Adjustment				2,847	
Factory Adjustment					
Equipment Time Required	days	0.25	11,389	2,847	Purchase Cost

A.2 **Product life-cycle costs for a typical $5m product** continued

Item	*Units*	*Value*	*Rate ($)*	*Result ($)*	*Cost category*
Ongoing Marketing				968,500	
2A. Marketing Roll-Out				968,500	
Management Oversight					
Management Person	days	5	2,000	10,000	Other
Competitor Monitoring					
Internal Marketers	days	1	1,500	1,500	Other
Strategic Price					
Marketing Person	days	2	1,500	3,000	Other
Management Person	days	2	2,000	4,000	Other
Advertising Development					
Print Media					
Marketing Staff	days	15	1,500	22,500	Other
Admin Person	days	15	1,000	15,000	Other
External Expenditure As % Of Product Value	%	2.5%	5,000,000	125,000	Other
Television Media					
Marketing Staff	days	15	1,500	22,500	Other
Admin Person	days	15	1,000	15,000	Other
Expenditure As % Of Product Value	%	10.0%	5,000,000	500,000	Other
Strategic Location Transportation Costs					
Costs As % Of Unit Value	%	5.0%	5,000,000	250,000	Other
Manufacturing				3,517,030	
3A. Food & Consumable Inputs				2,461,921	
Raw Food Inputs					
Input As % Of Manufacturing Costs	%	30.0%	3,517,030	1,055,109	Other
Processed Food Inputs					
Input As % Of Manufacturing Costs	%	25.0%	3,517,030	879,257	Other
Other Inputs (E.G. Water)					
Input As % Of Manufacturing Costs	%	5.0%	3,517,030	175,851	Other
Formulation Costs					
Input As % Of Manufacturing Costs	%	10.0%	3,517,030	351,703	Other
3B. Packaging				175,851	Other
Consumable Costs (E.G. Electricity)					
Input As % Of Manufacturing Costs	%	5.0%	3,517,030	175,851	Other
3C. Labour, Consumable & Formulation Costs				879,257	Other
Labour Costs					
Input As % Of Manufacturing Costs	%	20.0%	3,517,030	703,406	Other
Product Formulation (I.E. Depreciation Of Equipment)					
Input As % Of Manufacturing Costs	%	5.0%	3,517,030	175,851	Other

Source: CIE calculations.

B *Model of the benefits of a new bread variety*

The quantification of the benefits to consumers and food suppliers of the introduction of Wonder White was undertaken using a small, highly aggregated model of consumer demand combined with constant elasticity supply functions for the products consumed.

Consumers

Consumers were represented as consuming two goods — bread and other goods — so as to maximise a Stone-Geary utility function, given the prices of the two goods and a fixed budget constraint. So consumer demand for these two commodities was specified by a linear expenditure system (LES). Bread was modelled as an aggregate commodity formed from three bread types — Wonder White, other white bread and brown bread — combined together by a constant elasticity of substitution (CES) utility function. The composition of this aggregate bread commodity was chosen so as to maximise this CES utility function subject to the prices of the three bread types and the spending allocated to total bread consumption by the LES.

The model of consumer behaviour requires two types of data before it can be used for computations – parameters specifying the responsiveness of consumer demands to changes in prices, and the initial allocation of household consumption between the goods.

The parameterisation of the LES expenditure system is implied by the choice of income elasticities — by what percent the demand for each commodity changes when the household budget is increased by 1 per cent — and what is called the Frisch parameter. Only the income elasticity for bread is needed for the current model, as that for other goods is then implied by the Engel aggregation and the initial allocation consumer spending between bread and other goods. An income elasticity of 0.284 was chosen for bread. This is of similar magnitude to the income elasticities used in CGE models, such as TERM (Horridge, Madden and Wittwer 2005), for a broad 'other food' category that includes bread. The value chosen for the Frisch parameter, again guided by the value used in CGE models, was -1.82.

It was assumed that all bread types are highly substitutable with each other, so a substitution elasticity of 20 was used in the CES utility function determining the expenditure on the three different bread types.

In 1998 consumer purchases of bread were $2.4 billion. ABS national accounts data gives total consumption in the 1998-1999 financial year as $360 billion. This can be used to calculate the shares of bread and other goods in total consumption. It is assumed that the white and brown bread markets are of roughly equal size (that is, $1.2 billion each). As stated in chapter 3, Wonder White captured 15.7 per cent, by value, of the white bread market. Thus the initial allocation of the household budget between the four goods ultimately purchased — three bread types and other goods — is determined.

Food suppliers

A very simple specification of food supplier behaviour is used. Each of the three bread types is assumed to be produced with a constant elasticity of supply of 20, while other goods are assumed to be available at a constant price (that is, in perfectly elastic supply). For such constant elasticity supply curves the food supplier surplus is equal to $V/(1+s)$, where V is the food supplier's revenue and s is the supply elasticity.

The policy experiment

As the initial data set of the model represents the situation after the introduction and establishment in the market of Wonder White, we calculated the effect on consumer and food supplier welfare of the elimination of Wonder White. This was achieved by introducing into the model a tax on sales of Wonder White and increasing the size of this tax until the Wonder White market contracted to virtually zero (declined by more than 99 per cent).

For this policy experiment, preference shifts were also introduced into the consumer demand function to make sure that it replicated the (reverse of the) observed changes in total bread sales (2 per cent) and white bread sales (7 per cent) observed after the introduction of Wonder White. The preference shifts were carefully specified so as to be welfare-neutral in their own right. That is, an increase in the benefit that the consumer derived from one commodity was offset by a reduction in the benefit that the consumer derived from another commodity. It is to be expected that, in such an aggregate (and consequently lacking in detail and inter-food substitution possibilities) specification of consumer demand, some such

preference-shifting mechanism would be needed to reproduce what was observed.

It is useful to mention one aspect of the policy experiment results in regard to understanding the implications of some of the parameter values chosen. A high substitution elasticity between bread types of 20 has been used. This implies an own-price demand elasticity of close to 20 for Wonder White (the elasticity is 20 times one minus the market share of Wonder White) across the entire range of the policy experiment. Nevertheless, a large increase in the Wonder White price (of nearly 50 per cent) is needed to induce a decrease in demand of about 99 per cent. This is much larger than might be expected from a simplistic calculation (such as required price increase =100/20=5) that effectively combines the elasticity with a straight line demand curve.

Calculation of welfare effects

The calculation of the change in food supplier surpluses for the three bread types is straight forward. Note that there is no food supplier surplus for other goods as it is in perfectly elastic supply (that is, has a horizontal supply curve).

No accounting for tax revenue need be made in the welfare calculations, as it is virtually zero, since the policy experiment is to drive the tax base (that is, Wonder White production) to virtually zero.

The change in consumer surplus – or, more correctly, the compensating variation – is calculated by applying Roy's identity and using the computational apparatus of the GEMPACK software (Harrison and Pearson and 2002), which solves the non-linear equations of the model by a sequence of small linearised steps. Roy's identity implies that for a small change in prices, with total household consumption fixed, the compensating variation is $-Vp$, where V is total household consumption and p is the relative change in the CPI, defined as a household expenditure share weighted sum of the relative changes in the prices of individual commodities. For a large change in prices (such as for our policy experiment of eliminating Wonder White) the compensating variation is calculated by accumulating these $-Vp$ terms generated at each step of the model solution procedure.

The welfare effects of the introduction of Wonder White will be the negative of the simulated welfare effects of its elimination.

C *Product categories*

C.1 List of product categories

Major category	*Minor category*
Dairy	
1.1	Milk
1.2	Cream
1.3	Dried Milk
1.4	Cheese
1.5	Dips
1.6	Yoghurt
Edible Oils & Emulsions	
2.1	Edible Oils
2.2	Butter
2.3	Margarine
2.4	Dairy Spreads
Ice Cream & Edible Ices	
3.1	Ice Cream
3.2	Ice Confectionery
3.3	Frozen Yoghurt
Fruit & Vegetables	
4.1	Canned Fruit
4.2	Fresh packaged fruit
4.3	Fresh packaged vegetables
4.4	Canned Vegetables
4.5	Nuts & Seeds
4.6	James & Spreads
4.7	Herbs & Spices
4.8	Dried/Candied Fruits
4.9	Dried Vegetables
4.10	Pickled Fruit
4.11	Pickled Vegetables

C.1 **List of product categories** continued

Major category	*Minor category*
Fruit & Vegetables continued	
4.12	Frozen Fruit
4.13	Frozen Vegetables
4.14	Unpackaged fruit and vegetables
Confectionery	
5.1	Chocolate & Cocoa Products
5.2	Sugar Confectionery
5.3	Chewing gum
Cereal & Cereal Products	
6.1	Unprocessed cereals
6.2	Flours
6.3	Processed cereals
6.4	Cereal bars
6.5	Noodles & pasta
Bread & Bakery Products	
7.1	Breads
7.2	Biscuits
7.3	Cakes & muffins & pastries
Meat & Meat products	
8.1	Processed whole meat products
8.2	Comminuted meat
8.3	Canned meat
8.4	Unprocessed meat
Fish & Fish products	
9.1	Packaged processed fish & fillets
9.2	Semi preserved fish & fillets
9.3	Preserved fish
Eggs & egg products	
10.1	Eggs &egg products
Sugars, Honey & Related Products	
11.1	Sugar
11.2	Honey
11.3	Tabletop sweeteners

C.1 **List of product categories** continued

Major category	*Minor category*
Sugars, Honey & Related Products continued	
11.4	Royal jelly
11.5	Icing & frosting
Food for particular dietary use	
12.1	Infant formula
12.2	Food for infants
12.3	Supplementary foods for children
12.4	Formulated meal replacements
12.5	Formulated supplementary foods
12.6	Formulated supplementary sports foods
Non-alcoholic beverages	
13.1	Waters
13.2	Fruits & vegetable juices
13.3	Fruits & vegetable juice drinks
13.4	Soft drinks
13.5	Formulated caffeinated beverages
13.6	Cordials
13.7	Electrolyte drinks
13.8	Electrolyte drink base
13.9	Coffee
13.10	Tea
13.11	Herbal infusions
Mixed Foods	
14.1	Mixed non-alcoholic drinks
14.2	Desserts
14.3	Mayonnaise & salad dressings
14.4	Sauces
14.5	Soups
14.6	Meat products
14.7	Pre-prepared meals
14.8	Pizza
14.9	Snacks

Source: FSANZ (2006).

D Rates of introduction of new products

In a paper on food product innovation prepared for the Food and Agricultural Organisation (FAO), Winger and Wall (2006) point out the following.

- Supermarkets in Australia and New Zealand have up to 25 000 food and beverage stock keeping units (SKUs) on their shelves.
- Each year Australasian supermarkets are offered between 5000 and 10000 new products, but only around 10per cent are accepted to be displayed on shelves.
  - Typically less than 1 per cent will still be around in 5 years' time.
  - Product failure rates are high (75 per cent are considered failures).
  - Only a very small proportion (1-2 per cent) of new food products are radically different from products that already exist (that is 'novel' or 'creative').
    - … Around 75 per cent differ little from products previously released.
    - … Most are 'me-too' products: line extensions, repositioned products, new forms of existing products, reformulated products or involve new packaging.
  - Introduction of a new product invariably leads to discontinuation of another.
  - Consumers already have a vast array of products available (>25 000 SKU), yet most households get 80-85 per cent of their needs from 150 items.
    - … Most consumers have relatively stable purchasing patterns.
    - … Only 26 per cent of consumers buy a wide variety of foods or brands.

New food products with health dimensions (Europe)

In a paper on trends in the European food and drinks industry, the CIAA (2006) point out that:

- globally around 22 per cent of food industry R&D and innovation relate to health, with a range of 17 per cent for Europe and 32 per cent for the United States;
- most innovative sectors are dairy (11 per cent of total), drinks (7 per cent), frozen foods (7 per cent), biscuits (6 per cent) with all other sectors being less than half as innovative as dairy.

Rate of introduction of novel products in Europe

In a paper on EU novel food regulation, Brookes (2007) argues that:

- most novel food products probably fall into categories of health and fitness;
- in the ten years between May 1997 to March 2007 there were 22 novel foods or ingredients authorized for use (table D.1) in the European Union from 61 original full applications for approval (26 remain under review as at March 2007, 5 were refused authorisation and 8 withdrew).
- the average time for the novel food/ingredient to complete the process of authorization has been 35 months compared 3 months in the United States.

D.1 **Novel food authorizations in the European Union**

Company	Product/ingredient	Time taken to authorise (months)	Date applied for authorisation	Date authorisation granted
Belovo	Phospholipides from egg yolks	25	23-01-1998	22-02-2000
Unilever	Phytosterols in yellow fat spreads	26	22-05-1998	24-07-2000
Bioresso	Trehalose	16	25-05-2000	25-09-2001
Danone	High pressure pasteurization for fruit products	29	03-12-1998	23-05-2001
Purocur	Dextran from bacteria in bakery products	21	02-04-1999	30-01-2001
Avebe	Coagulated potato protein & hydrolysates	21	25-05-2000	15-02-2002
Morinda	Noni juice	26	25-04-2000	12-06-2003
Mortox Bioscience	Oil rich in DHA (from micro algae)	28	13-02-2001	12-06-2003
Danisco	Salatrim	53	28-06-1999	13-12-2003
ADM	Phytosterols & phytostanols in various products	28	02-11-2001	31-03-2004
Pharmaconsult Oy	Phytosterols & phytostanols in various products	30	24-09-2001	31-03-2004
Unilever	Phytosterols in yoghurts	19	06-08-2002	31-03-2004
Tenaka	Phytosterols & phytostanols in various products	34	15-05-2001	31-03-2004
Novartis	Phytosterols & phytostanols in yoghurts	30	-7-09-2000	12-11-2004
Cargill	Isomaltulose	18	30-10-2003	04-04-2005
Sudzucker	Isomaltulose	18	04-03-2004	25-09-2005
Pharmaconsult Oy	Phytosterols & phytostanols in bakery products (subsequently changed to rye bread only)	56	24-09-2001	24-01-2006
Karl Fazer	Phytosterols & phytostanols in bakery products (subsequently changed to rye bread only)	56	21-09-2000	24-01-2006
Laboratores Pharmascience	Maize germ oil high in unsaponifiable matter	60	24-10-2001	24-10-2006
Laboratores Pharmascience	Rapeseed oil high in unsaponifiable matter	60	24-10-2001	24-10-2006
Vitatene antibiotics	Lycopene from blakeslea trispora	36	30-10-2003	23-10-2006
ADM	Diacylglycerol oil in oils, fats, spreads, bakery products and yoghurts	54	17-04-2002	23-10-2006
Average		35		

Source: Official Journal of the European Countries

Possible rate of new health related product innovation in Australia due to FSANZ Proposal P293

One interpretation of the FAO and CIAA data above is the following.

- Of 5000-10000 new food products being offered each year to Australasian supermarkets about 500-1000 (or 10 per cent) will be accepted for shelf-trial.
- Of these, perhaps 22 per cent, or 110-220 might be health-related.

- Of these perhaps, only 1-2 per cent, or between 1 and 4 products, are radically different from products already on the market.
- Assuming that only radically different foods are likely to be prevented from market entry due to current restrictions on health and nutrition claims, 1 to 4 new products a year might potentially be affected by Proposal P293.
- Were half these products likely to be limited entry under current health and nutrition claims regulations, but permitted under Proposal P293, then up to 2 new products a year might actually be attributable to P293.

Another interpretation is that the low percentage of radically new products (1 to 2 per cent) may be a bit subjective and that P293 may also affect some other not quite as novel or radically different foods.

- Siriwongwilaichat (2001) found that around 9 per cent of new foods introduced in Thailand could be classified as 'innovative products'. That said, Thailand is a developing country where the introduction of innovative products might be expected to be higher than in Australasia.
- Were we to assume that 5 per cent of new food product introduction in Australasia might be innovative then the number of new products potentially affected might be as high as 10 per year (if 2 per cent equals 4 products, 5 per cent equals 10). However, this is still before considering that not all products will be affected by the changes caused by P293, nor does it properly take account of the fact that 75 per cent of products will fail not long after release.

Which ever way the FAO and CIAA data is cut, it points toward very low numbers of new products per year being attributable to P293. Indeed, the data may point to numbers considerably lower than was indicated from survey data collected by the CIE. Survey data indicates about 100 new SKUs resulting from Proposal P293. That said, the CIE survey numbers potentially pick up a back-log of new products that have been prevented from coming to market. Moreover, they are assumed to come to market over a 4 year period.

One interpretation of the EU data (Brookes 2007) is that the EU novel foods regulation approval process has resulted in an average of 2.2 new health related products being introduced per year (22 over 10 years).

Current penetration of health enhancing foods

In a paper on the extent of penetration of health enhancing foods, the World Bank (2006) point out the following.

- Such products influence specific body functions and offer benefits for health, well-being or performance over and above their normal nutritional value.
  - They result from technological innovations: cholesterol lowering spreads, xylitol-sweetened chewing gums and dairy products fermented with specific lactic acid bacteria.
  - They can also originate from naturally functional foods such as soy or oats.
  - Retail prices of such foods are typically 30 to 500 per cent above the prices for comparable conventional foods.
- Globally the market for these foods may be worth $31 billion to $61 billion and be perhaps 1 to 3 per cent of the food market (by value) and they may have the potential to rise to 5 per cent.
  - Currently (2006), in Japan consumers spend US$126 per person annually on such foods.
  - In the United States, the comparable figure is US$68, in Europe it is $51 and in other Asia it is $3 only.
  - Were Australians to spend $50 each a year on such foods, that would be 1.5 per cent of annual per capita expenditure on food ($50/$3237).
    - … However, if such foods command high premium prices, the volume share of these foods may be considerably less.
    - … If the foods on average were to command a 100 per cent premium, they might make up only 0.75 per cent of the Australian market by volume now.
    - … CIE survey data which suggests an increase in such products arising from Proposal P293 equal to 0.3 per cent of all food products by volume would raise this number from 0.75 per cent to 1.05 per cent, suggesting a 40 per cent increase in such products.
- A paper by the National Centre of Excellence in Functional Foods titled *Functional Foods for the Australian industry: definitions and opportunities (2005)* points toward similar numbers.
  - Australia's share of the global functional food market was estimated at AU$1 billion in 2003 and is growing at a rate between 8-14% per annum.

  - This is $1 billion in a $67 billion market, representing 1.5 per cent of sales by value. If price premiums are 100 per cent, then by volume, sales are about 0.75 per cent.
  - If sales are growing at 8-14 per cent, say 11 per cent, then over four years they would grow by 0.75X0.11=0.0825X4=0.33 per cent. Again this is similar to CIE survey results.

- In a paper by Mellentin of the Centre for Food and Health Studies (2006) titled Innovation: reducing the risks and increasing the chances of success – a very short guide (2006) it is argued that:
  - Just 1.4 per cent of new food products in Europe are innovative.
  - Failure rates of new products are 80 per cent.
  - In Europe there has been a substantial decline in the number of innovative new food/beverage product launches since 1998 – from 149 in 1998 to 10 in 2005. If 80per cent of all new products are failures, this suggest only around 2 new innovative products a year may make it to market. In the United States and Japan comparable numbers appear to be higher at between 60 and 176.

E *Phytosterols and Flora Pro-Activ*

- Upon launch onto the Australian market in July 1999, Flora Pro-Activ attained an immediate 8.7 per cent value share of the non-dairy spreads category, and a 3.8 per cent volume share of said category.
- Following the release of a television advertisement the following year, this figure rose to 10 per cent.
- The release of Flora Pro-Activ grew the market volume of the non-dairy spreads category to 4.2 per cent at the end of 2000, reversing the decline of -5.3 per cent in the category pre-launch.
- Flora Pro-Activ 500g spread currently sells for $8.49, compared with $2.99 for Flora Original 500g spread – a price premium of 185%.
- Raw material and manufacturing costs for the Flora Pro-Activ spreads range of products are approximately five times the costs of the equivalent Flora range of products.
- In Ireland, Flora Pro-Activ holds over 8 per cent value share of the $130 million Irish "yellow fats" market (i.e. including butter). In Australia Flora Pro-Activ holds a 10.2% value share of the $AUS 600M total spreads (including butter) market.
- Frost & Sullivan estimate the European Phytosterols market in 2005 to be $103.9 million, rising to $196.7 million by 2012 at an average annual growth rate of 9.6 per cent.
- Total retail yellow spreads is at 105,000 tonnes, which is declining at around 3 per cent per year in volume terms. Butter is at about 35,500 tonnes (34 per cent) and margarine is at 70,000 mt (66 per cent). But in value terms, the market is expanded between 2001-2006 at an average annual rate of 1.3 per cent in real dollar terms. The leading company in the oils and fats market in 2006 was Goodman Fielder Ltd. he second-largest player was Unilever with Fonterra in third place. Unilever markets Flora Pro-Activ.

Phytosterols' place in the food market

Phytosterols are cholesterol-like molecules found in all plant foods, with the highest concentrations occurring in vegetable oils. They are absorbed only in trace amounts but inhibit the absorption of intestinal cholesterol including recirculating endogenous biliary cholesterol, a key step in cholesterol elimination.[4]

Natural dietary intake varies from about 167-437 mg/day. Attempts to measure biological effects in feeding studies have been impeded by limited solubility in both water and fat. Esterification of Phytosterols with long-chain fatty acids increases fat solubility by 10-fold and allows delivery of several grams daily in fatty foods such as margarine. A dose of 2 g/day as the ester reduces low density lipoprotein cholesterol by 10 per cent.[5]

The first Phytosterols-ester enriched margarine was released in Europe in the mid-1990s under the brand name Benecol. In Australia, however, Unilever released a fortified spread called Flora Pro-Activ in 2000.

In Europe, there have been releases of milk, yogurt, and other specific drinks that contain Phytosterols. However their introduction does not appear to have expanded overall consumption of Phytosterols. Rather it cannibalised other Phytosterols-products. The European example may explain why other Phytosterol-products have been slow to come to market in Australia. That said, in 2007:

- National foods launched a yoghurt and milk containing phytosterols;
- Devondale launched a UHT milk containing phytosterols;
- Goodman Fielder launched a yoghurt containing phytosterols.

Calculating welfare effects

The same approach that was used to calculate welfare effects for Wonderwhite in appendix B were used to estimate indirect benefits from Pro-Activ. The major differences were that the market share data for Pro-Activ were used and instead of a high substitution elasticity between bread types of 20 used for Wonderwhite, here lower substitution elasticities of 5 were used, implying an own-price demand elasticity of close to 5. As a result, a very large increase in the Pro-Activ price (of nearly 500 per cent) is needed to induce a decrease in demand of about 99 per cent to simulate the

[4] Phytosterols in human nutrition – Ostlund RE Jr. 2002

[5] Phytosterols in human nutrition – Ostlund RE Jr. 2002

market returning to the situation it was in before the introduction of Pro-Activ.

Further references for phytosterols can be found at:

http://www.australianoilseeds.com/__data/assets/file/1214/Consumer_Trends_and_Usage_of_Fats_and_Oils.pdf

http://www.homeshop.com.au/search.asp?keyword=flora

http://www.bandt.com.au/news/d2/0c0058d2.asp

http://www.marketresearch.com/product/display.asp?productid=1397684&xs=r&SID=66496796-401783707-335811207&curr=USD&kw=&view=abs

http://209.85.173.104/search?q=cache:ZFgoatv5Ob0J:www.checkout.ie/MarketProfile.asp%3FID%3D59+Flora+Pro-Active+market+share&hl=en&ct=clnk&cd=3&gl=au

http://www.marketresearch.com/product/display.asp?productid=1548193&xs=r

Phytosterols in human nutrition – Ostlund RE Jr. 2002 – found at – http://www.ncbi.nlm.nih.gov/pubmed/12055357

F *Current food labelling*

Data used here has been collated by analysing the data from the Label Monitoring Survey in Australia and New Zealand against ~10 000 foods in the Nutrient Profiling System database as detailed below.

The Label Monitoring Survey was undertaken as a part of a review of the regulatory framework with regard to the use of nutrition, health and related claims on food labels in 2005. The survey found that Forty-two percent of labels collected in 2005 in Australia and New Zealand carried nutrition or health claims. Of the labels which carried claims, 96% of featured nutrition content claims[6].

All labels collected were divided into 14 different food categories, and the proportion of labels within each food category that carried nutrition content claims was defined (table F.2)

6 Food Standards Australia New Zealand 2007, ON-GOING FOOD LABEL MONITORING SURVEY IN AUSTRALIA AND NEW ZEALAND: Report on the Assessment of 2005 Labels for Nutrition, Health and Related Claims Evaluation Report Series No 16

F.1 **Predicted percentage (%) of food products that currently have nutrition content claims and their eligibility of making such claims**

Food Category	Total No of food products within the food category in NPSC database (a)	Eligibility for NCC as determined by NPSC	Predicted % food products making content claims (LMS data) (b)	Predicted % food products that fail/pass/uncertain passing profiling system (c)	Predicted No of food products with content claims that pass/fail/uncertain passing profiling system (a x b x c)	Predicted % food products with claims that pass/fail/uncertain passing profiling system (a x b x c x 100) / a / 1
Dairy *(Milk, cream, dried milk, cheese, dips, yoghurt)*	***708***	***Fail***	66	33	156	**22**
		Pass	66	53	248	35
		Uncertain	66	9	41	6
		not profiled	66	5	21	3
Edible Oils and emulsions *(edible oils, butter, margarine, dairy spreads)*	***154***	***Fail***	60	44	40	**26**
		Pass	60	56	52	34
		Uncertain	60	0	0	0
Ice Cream and edible ices *(ice cream, ice confectionery, frozen yoghurt)*	***362***	***Fail***	42	83	127	**35**
		Pass	42	8	12	3
		Uncertain	42	8	13	3
Fruit and vegetables *(Canned, fresh, dried, pickled, frozen fruit and vegetable, candied fruit, nuts and seeds, herbs and spices)*	***1866***	***Fail***	34	6	39	**2**
		Pass	34	84	530	28
		Uncertain	34	10	64	3
Confectionary *(chocolate & cocoa products, sugar confectionery, chewing gum)*	***774***	***Fail***	17	99	79	**17**
		Pass	17	1	1	0
		Uncertain	17	1	1	0
Cereal and cereal products *(unprocessed cereals, flours, processed cereals, noodles and pasta)*	***661***	***Fail***	68	18	83	**13**
		Pass	68	64	287	43
		Uncertain	68	16	72	11
		not profiled	68	16	74	11
Bread and bakery products *(breads, biscuits, cakes, and muffins and pastries*	***1472***	***Fail***	46	68	462	**31**
		Pass	46	23	154	10
		Uncertain	46	6	42	3
Meat and meat products *(processed whole meat products, comminuted meat, canned meat)*	***1169***	***Fail***	14	39	64	**5**
		Pass	14	57	94	8
		Uncertain	14	3	5	0
Fish and fish products *(packaged processed fish and fillets)*	***842***	***Fail***	21	17	30	**4**
		Pass	21	82	146	17
		Uncertain	21	1	1	0

Continued

F.1 **Predicted percentage (%) of food products that currently have nutrition content claims and their eligibility of making such claims** continued

Food Category	Total N.o of food products within the food category in NPSC database (a)	Eligibility for NCC as determined by NPSC	Predicted % food products making content claims (LMS data) (b)	Predicted % food products that fail/pass/uncertain passing profiling system (c)	Predicted N.o of food products with content claims that pass/fail/uncertain passing profiling system (a x b x c)	Predicted % food products with claims that pass/fail/uncertain passing profiling system (a x b x c x 100) / a 1
Egg and egg products *(eggs and egg products)*	***45***	***Fail***	25	24	3	**6**
		Pass	25	73	8	18
		Uncertain	0	0	0	0
Sugars, honey and related products *(sugar, honey, tabletop sweeteners, royal jelly, icing &frosting)*	***233***	***Fail***	21	83	41	**17**
		Pass	21	9	4	2
		Uncertain	21	7	4	2
Food for particular dietary use *(infant formula, food for infants, supplementary foods for children, formulated meal replacements, supplementary foods and sports foods)*	***0***	***Fail***	0	0	0	**0**
		Pass	0	0	0	0
		Uncertain	0	0	0	0
Non-alcoholic beverages *(waters, fruits and vegetable juices and juice drinks, soft drinks, formulated caffeinated beverages, cordials, electrolyte drinks and drink base, coffee, tea, herbal infusions)*	***745***	***Fail***	50	49	181	***24***
		Pass	50	47	177	24
		Uncertain	50	4	14	2
Mixed foods *(mixed non-alcoholic drinks, desserts, mayonnaise & salad dressings, sauces, soup, meat products, pre-prepared meals, pizza, snacks)*	***2148***	***Fail***	36	39	304	**14**
		Pass	36	43	331	15
		Uncertain	36	18	138	6

F.2 **Food categories within Label monitoring Survey showing the proportion of labels within each food category that featured nutrition content claims**

Food Category	Proportion of labels within each food category that featured nutrition content claims (%)
Dairy	66
Edible oils	60
Ice Cream	42
Fruit and Vegetables	34
Confectionary	17
Cereals	68
Bakery products	46
Meat Products	14
Fish products	21
Egg products	25
Sugar, honey and related products	21
Foods for particular use	83
Beverages	50
Mixed Foods	36

Source: Food Standards Australia New Zealand 2007, ON-GOING FOOD LABEL MONITORING SURVEY IN AUSTRALIA AND NEW ZEALAND: Report on the Assessment of 2005 Labels for Nutrition, Health and Related Claims Evaluation Report Series No 16

The data collected in table E.1 was then analysed against ~10 000 food products within the Nutrient Profiling Scoring System database that had been assessed as eligible (pass), not eligible (fail) or uncertain of being eligible (uncertain) to make health claims. The results only indicate a *predicted* percentage of food products that would be eligible, not eligible or uncertain of being eligible to make claims, and are by no means absolute values.

There are a number of limitations to the data collected as indicated below:

- If the predicted percentage of foods with Nutrition content claims that would be eligible, not eligible or uncertain of being eligible of making claims was carried out on the subcategories within the 14 major food categories, the results would likely be significantly different. This is due to the variance of nutrition profiles within the subcategories. For example, whilst most milks pass the profiling calculator, the majority of cheeses, cream and dips would fail as a result of high energy, sodium and saturated fat content, yet these food types were all classified under the major food category of dairy. A similar situation was seen in the

bread and bakery products which included the subcategories cakes, muffins and pastries; and in non-alcoholic beverages and mixed foods. The latter contained a wide range of foods including mixed non-alcoholic drinks, desserts, mayonnaise, sauces and salad dressings, soups, meat products, pre-prepared meals, and convenient foods.

- In addition recent changes have been made to the Nutrient profiling System to benefit industry by allowing a wider range of products to be eligible to make claims. Such changes included a) the increase in the baseline tipping point to allow points to be calculated for protein, b) moving milks from category 2 to category 1, and c) increasing the sugar tipping point from ≤ 4.5 to ≤ 5. These recent changes have not been reflected in the data collected above, and may therefore change the results.

Bibliography

ABS (Australian Bureau of Statistics) 2006, Household Expenditure Survey http://www.abs.gov.au/ausstats/abs@.nsf/mf/6535.0.55.001, Accessed 20 June 2007.

Allen Consulting Group, 2004, *Benefit-Cost analysis for Proposal P293 – Nutritional, Health and Related Claims*, Melbounre.

Baltas, G. 2001, "Utility-consistent Brand Demand Systems with Endogenous Category Consumption: Principles and Marketing Applications", *Decision Sciences*, Vol. 32, No. 3, USA, Summer 2001.

Bolton, R.N. 1989, "The Relationship between Market Characteristics and Promotional Price Elasticities", *Marketing Science*, Vol. 8, No. 2, pp. 153–169, The Institute of Management Sciences/Operations Research Society of America, Spring 1989.

Brynjolfsson, E., Yu, J.H. and Smith, M.D. 2003, "Consumer Surplus in the Digital Economy: Estimating the Value of Increased Product Variety at Online Booksellers", *Management Science*, Vol. 49, No. 11, pp. 1580–1596, November 2003.

Caswell, J. A and Padberg, D.I. 1992, "Toward a More Comprehensive Theory of Food Labels", *American Agricultural Economics Association*, pp. 460–468.

Cereals International 1997, *The best thing since sliced bread*, Ingredient Focus Dietary Fibres.

Flinders Medical Centre (undated), *Resistant Starch and Dietary Fibre, How your diet can help prevent bowel cancer*, pamphlet by Natural Hi-maize.

FSANZ 2005, *On-going Food Label Monitoring Survey in Australia and New Zealand*, Report on the Re-assessment of 2003 Labels for Nutrition, Health and Related Claims (phase 2, part C), Draft Report, December 2005.

—— 2006, *On-going Food Label Monitoring Survey in Australia and New Zealand*, Report on the Assessment of 2005 Labels for Nutrition, Health and Related Claims, Evaluation Report Series No.6.

—— 2007a, *Preliminary Final Assessment Report – Nutrition, Health and Related Claims*, April 2007.

—— 2007b, *Consumer responses to nutrition content claims and health claims*, Draft for comment, August 2007.

Golan, E., Kuchler, F. and Mitchell, L. with contributions by Greene, C. and Jessup, A. 2001, "Economics of Food Labeling", *Journal of Consumer Policy,* Vol. 24, pp. 117–184, Kluwer Academic Publishers, Netherlands.

Gourville, J. 2005, "The Course of Innovation: A Theory of Why Innovative New Products Fail in the Marketplace", Harvard Business School Working Papers, No. 06–014, September 2005.

Harrison, W.J. and Pearson, K.R 2002, *GEMPACK Documentation*, Centre of Policy Studies and Impact Project, Melbourne.

Horridge, M., Madden, J. and Wittwer, G. 2005, "The impact of the 2002-2003 drought on Australia", *Journal of Policy Modeling*, Vol. 27, Issue 3, pp. 285-308.

Ippolito, P.M and Mathios, A.D. 1990, "Information, advertising, and health choices", *Rand Journal of Economics*, Vol. 21, pp. 459–480.

Krishnamurthi, L. and Raj, S.P. 1991, "An Empirical Analysis of the Relationship between Brand Loyalty and Consumer Price Elasticity", Marketing Science, Vol. 10, No. 2, pp. 172–183, The Institute of Management Sciences/Operations Research Society of America, Sprint 1991.

—— 1988, "A model of Brand Choice and Purchase Quantity Price Sensitivities", *Marketing Science*, Vol. 7, No.1, pp. 1–20, The Institute of Management Sciences/Operations Research Society of America, Winter 1988.

Loureiro, M.L., Gracia, A. and Nayga, R.M.Jr. 2006, "Do consumers value nutritional labels?", *European Review of Agricultural Economics*, Vol. 33 (2), pp. 249–268, Oxford University Press and Foundation for the European Review of Agricultural Economics.

Luo, L., Kannan, P.K and Ratchford, B.T. 2007, "New Product Development Under Channel Acceptance", *Marketing Science*, Vol. 26, No. 2, pp. 149–163, The Institute of Management Sciences/Operations Research Society of America., March–April 2007.

Mitra, A. and Lynch J.G. Jr. 1995, "Toward a Reconciliation of Market Power and Information Theories of Advertising Effects on Price Elasticity", *The Journal of Consumer Research*, Vol. 21, No. 4, pp. 644–659, The University of Chicago Press, March 1995.

Natural Hi-maize, Case Study (undated), A partnership of success – Buttercup Wonder White & Hi-maize™.

Office of Best Practice Regulation (OBPR) 2006, *Best Practice Regulation Handbook*, Productivity Commission, Canberra.

Ostlund RE, Jr. 2002, *Phytosterols in human nutrition,* http://www.ncbi.nlm.nih.gov/pubmed/12055357

Siebert, R. 2003, "The Introduction of New Product Qualities by Incumbent Firms: Market Proliferation versus Cannibalization", WZB Markets and Political Economy Working Paper No. SPII 2003–11, August 2003.

Statistics New Zealand, 2004, Household Economic Survey http://www.stats.govt.nz/store/2006/06/household-economic-survey-yejun04-hotp.htm, Accessed 20 June 2007.

Tellis, G.J. 1998, "The Price Elasticity of Selective Demand: A Meta-Analysis of Econometric Models of Sales", *Journal of Marketing Research*, Vol. XXV, pp. 331–41, November 1998.

Williams, P.G., Yeatman, H., Ridges, L., Houston, A., Rafferty, J., Roeasler, A., Sobierajski, M. and Spratt, B. 2006, "Nutrient function, health and related claims on packaged Australian food products – prevalence and compliance with regulations", Faculty of Health and Behavioural Sciences – Papers, University of Wollongong.