DAIRY INDUSTRY: NOTES

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Outline

These slides set out brief background notes relating to:

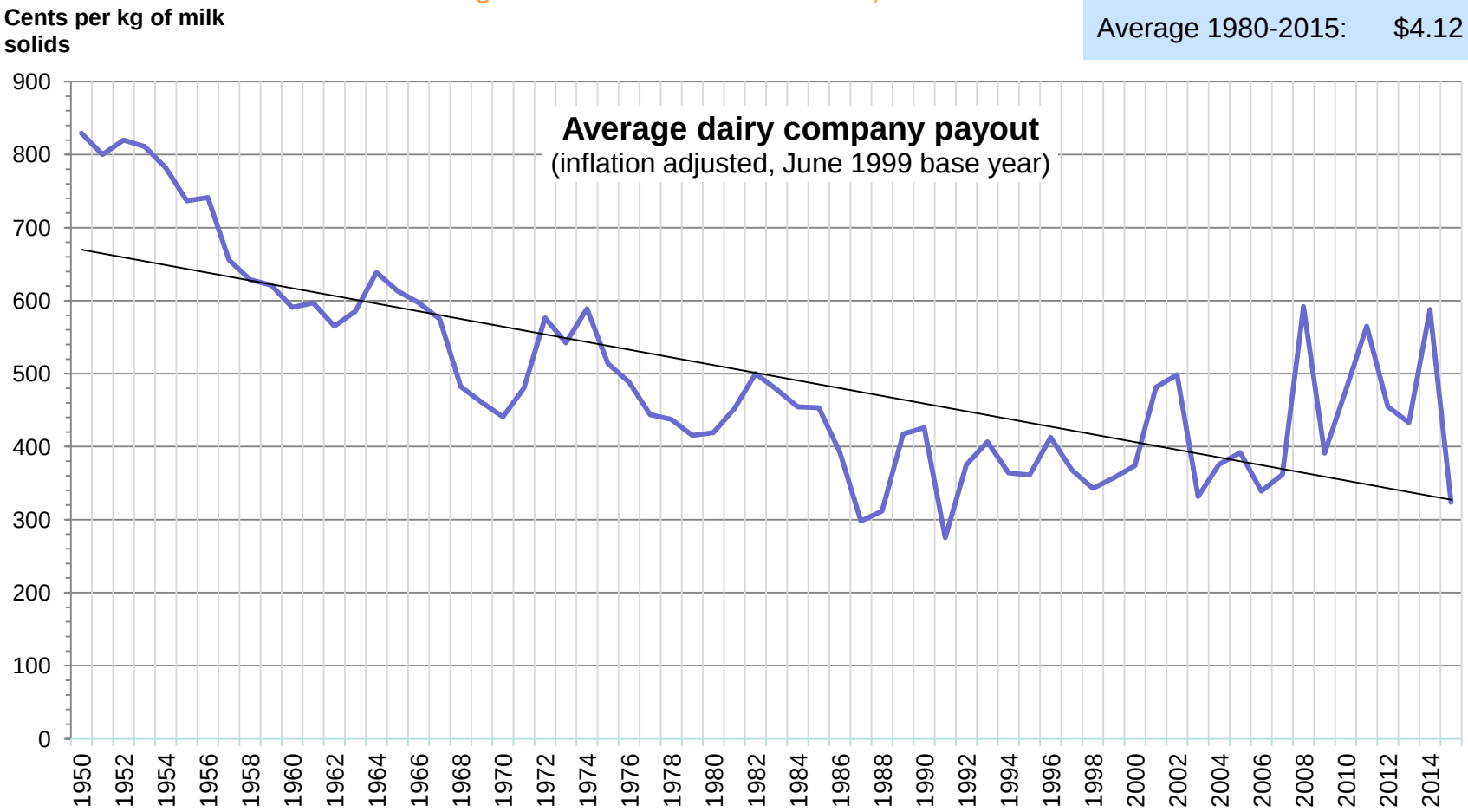
	Slides
• Payout	3 to 4
• Dairy productivity	5 to 8
• Price volatility	9 to 12
• Competitive advantage	13 to 14
• Changes in production	15 to 19
• Monopolies	19 to 22

Dairy payout

This shows the annual average payout for all dairy companies since 1950. Payout includes milk price and any dividends. Payout has been adjusted for inflation with June 1999 as the base year.

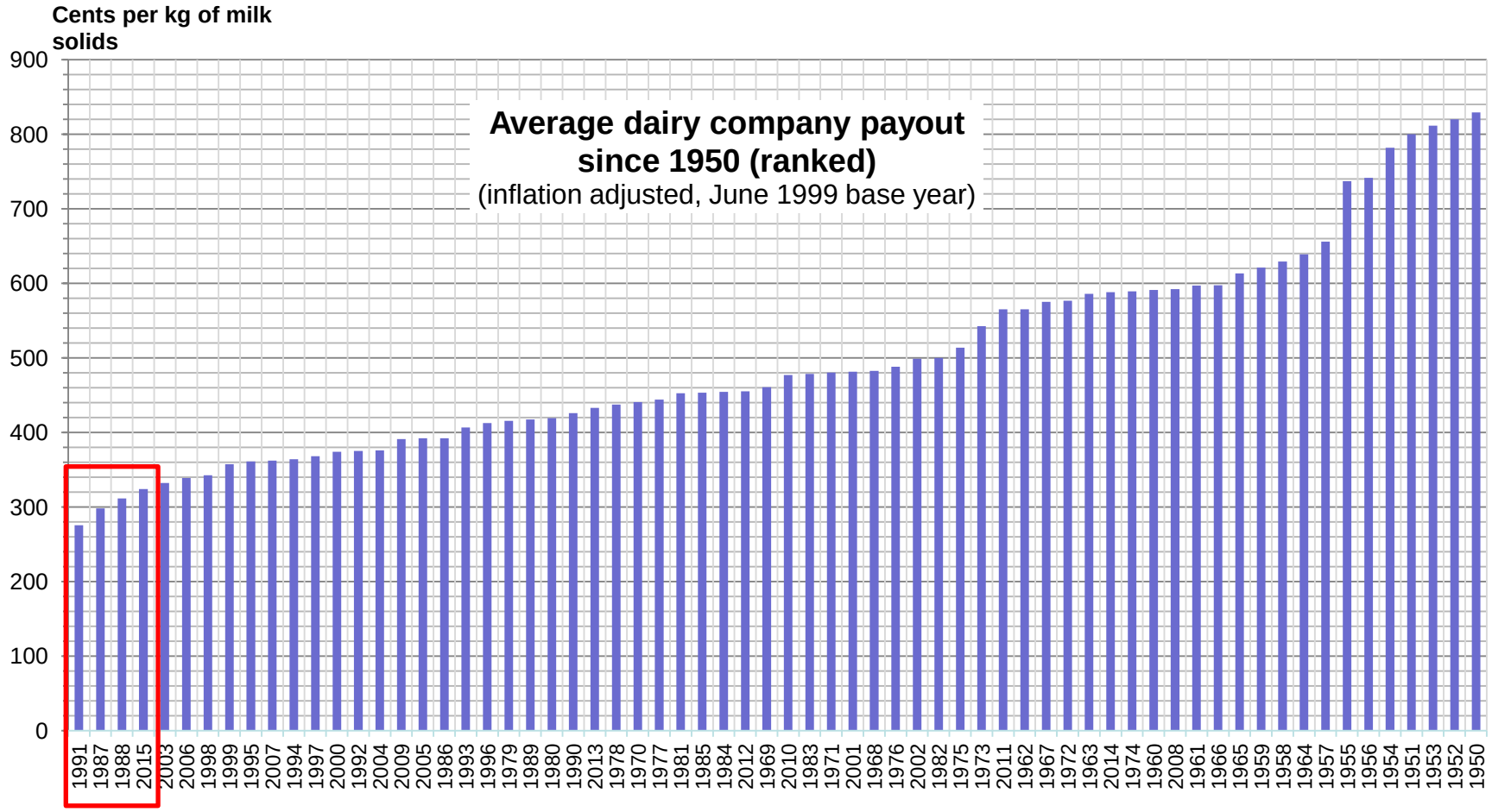
In 1999 dollars:	
Average since 1950:	$4.99
Average 1980-2001:	$3.96
Average 2002-2015:	$4.37
Average 1980-2015:	$4.12

Source: MAF and DairyNZ ($s from 2002 adjusted to June 1999 base using Reserve Bank's CPI calculator)



Dairy payout *(cont'd)*

Last year's payout was about the 4th worst since 1950 when adjusted for inflation



Dairy productivity

- Over the last [40] years, New Zealand's productivity performance has been relatively dismal. We've plummeted from top 5 to around 30th in the international rankings and incurred corresponding falls (followed by a sustained flattening) in our per capita standard of living relative to other OECD countries.
- Until about 10 years ago, dairy was a stand-out in our productivity stakes, delivering gains at a much better rate than most other sectors of the economy. Dairy kept producing higher volumes of milk for the same or less inputs.
- This was underpinned by improvements in pasture and feed management, milking and processing technology, and bovine genetics.
- Over the last 10 years, however, productivity in dairy has been less impressive. Milk production has increased significantly, but much of the growth is likely to have been negative in productivity terms with more inputs used for each unit of output.
- It is also likely to have been uneconomic with the full costs of producing an extra unit of milk greater than the additional income it generated.

Dairy productivity *(cont'd)*

- In 2014, AUT masters student, Xiaoqi Wei, found that only 17% of dairy farms in his sample were operating at their optimal size. Half of the farms could increase their technical efficiency by decreasing their size.
- In another 2014 paper, Economist Peter Fraser and two colleagues suggest that much of growth in raw milk volumes is probably not profitable. They surmise that volumes have been increased as a result of farmers and their advisors taking an average cost rather than marginal cost approach. Fraser concludes that less intensive production is likely to be more profitable for farmers and better for the environment.
- Many farmers, and the environment in which they operate, would probably be better off if milk production were reduced to more optimal levels.
- 'Total factor productivity' is another key performance indicator. In dairy over the last 10 years it has fallen by 7.3%.
- Growth in value-added activities has been weak, even when terms of trade and dairy prices have been strong.
- Participation in global value chains remains low, even when more prosperous firms have been adding different elements of final goods and services in different places to capture gains from specialisation and economies of scale. Meanwhile, Fonterra continues to place high importance on exclusive control from cow shed to customer.

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Dairy productivity *(cont'd)*

Sources:

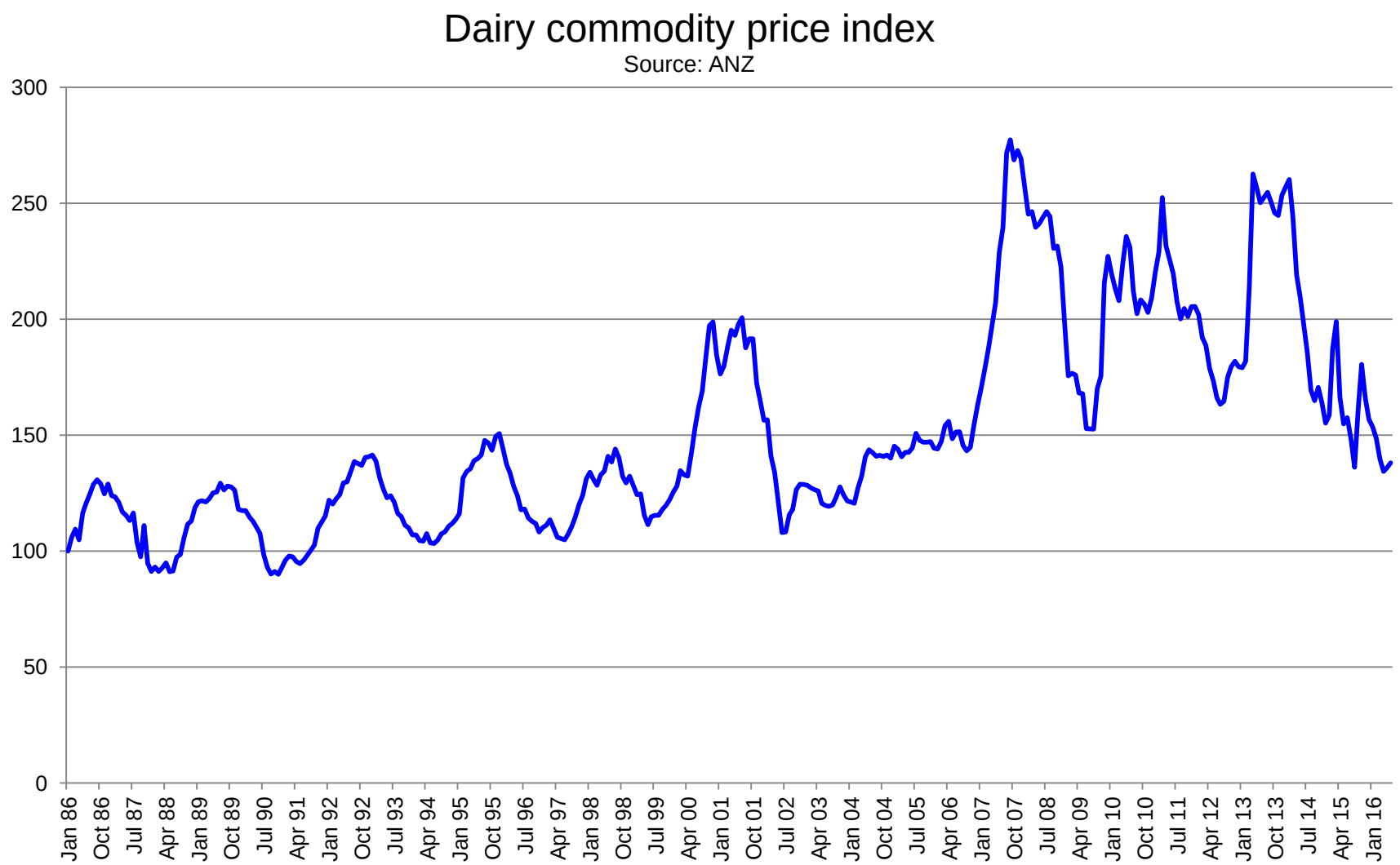
- http://www.treasury.govt.nz/downloads/pdfs/2025tf-2ndreport-nov10.pdf
- Xiaoqi Wei, "Efficiency measurement of New Zealand dairy farms", AUT, 2014, pp 38 and 39
- MPI
- Fraser, Ridler, Anderson. "The intensification of the NZ Dairy Industry – Ferrari cows being run on two-stroke fuel on a road to nowhere?, 2014 - http://www.grazingsystems.co.nz/wp-content/uploads/NZARES-Fraser-The-intensification-of-the-NZ-Dairy-Industry-FINAL.pdf
- Rebecca Macfie, "Milk Tanks", The Listener, April 2016 - http://www.listener.co.nz/current-affairs/business/milk-tanks/
- DairyNZ's 'Economic Survey' - http://www.dairynz.co.nz/media/4291790/dairynz-economic-survey-2014-15.pdf. TFP measures productive value gain over and above changes in inputs like capital and labour – MPI
- A recent OECD paper, indicated that New Zealand was in 30th place in list of OECD countries, with very little improvement in New Zealand's participation from 1995 to 2011 (De Backer and Yamano, 2012). See Professor David Deakins, 15 August 2015, Blog - http://masseyblogs.ac.nz/othersideofbusiness/2013/08/15/is-fonterra-good-for-new-zealand/
- Treasury – Holding On, Letting Go, 2014 - http://www.treasury.govt.nz/publications/briefings/holding-on-letting-go/holg14.pdf. See also Bollard remarks to lecture in Wellington in 2015 and again in 2016

Price volatility

Factors that contribute to volatility in international dairy prices include:

- Overseas markets for dairy commodities are very ‘thin’. Only about [6]% of world production is traded. So very small changes (as little as 1%) in supply and demand in the larger trading regions can have a really big impact on prices.
- Government interventions in the dairy markets around the world tend only to increase price variability.
- The amount of milk produced within a season can’t be readily adjusted, which means supply volumes are somewhat slow to respond to changes in price signals.
- Weather volatility is a crucial factor that hugely influences the amount of milk produced.
- International prices are not well telegraphed. Market platforms for discovering forward prices in dairy commodities are relatively limited.
- Volatility in our exchange rate only exacerbates volatility in the prices that New Zealand receives for its dairy products overseas.

Price volatility *(cont'd)*



Price volatility *(cont'd)*

A range of tools are used to mitigate the adverse effects of price volatility, including:

- '**Right-sizing**' – configuring the farm (including its balance sheet) so its break even point can cope (and flex) with peaks and troughs
- **Self-insuring** – building a reserve of savings to help deal with constraints in a down-turn
- '**Pooling'** – averaging prices across all a large milk pool. (This can delay and blunt market signals from overseas buyers to producers).
- **Forward contracts** – agreeing to sell a physical volume in the future at an agreed price. (It is not clear whether processors will keep offering these contracts).
- **Futures contracts** – derivative contracts, which NZX is now promoting. (These are used in some larger overseas dairy markets, but uptake is relatively low. According to various sources, despite the availability of futures markets in the US for around 20 years, less than 5% of dairy farmers use them directly, and less than 10 percent of total U.S. milk production is hedged).

***Note* – 'Single seller'** – for many years, New Zealand dairy has assumed that selling through a 'single seller' could influence prices and therefore mitigate volatility. Except in rare circumstances, it does not work.

Price volatility *(cont'd)*

Sources:

- http://www.agmrc.org/media/cms/FutDairyUS_7ACAB66094C9A.pdf;
- http://future.aae.wisc.edu/publications/err28.pdf ;
- https://core.ac.uk/download/files/153/7035446.pdf;
- http://www.teagasc.ie/publications/2012/1607/National_Dairy_Conference_2012.pdf#page=91; http://fieldnotes.co.nz/dairy/milk-price-hedge-passes-final-hurdles/; and
- http://ageconsearch.umn.edu/bitstream/211369/2/Bozic-Price%20Discovery%2c%20Volatility%20Spillovers%20and%20Adequacy-1203.pdf

Competitive advantage

- NZ dairy's main competitive advantage is low cost feed (grass) year round.
- Only about 10% of dairy cows in the world have pasture grazing as the major component of their total food intake
- Hay, silage and grains are typically a lot more expensive than grass but are also more energy-rich producing more milk solids per cow.
- Grass is lower energy [10-12] mega joules of metabolisable energy per kg of DM (depending on season and pasture condition). Therefore milk production per cow is relatively low in NZ – on average about 4,200 litres per year (at 2014/15).
- By contrast, in the northern-hemisphere it is about 10,000 litres per cow per year, using higher energy feeds (with high Govt supports) (as at 2004 – updated figures pending)

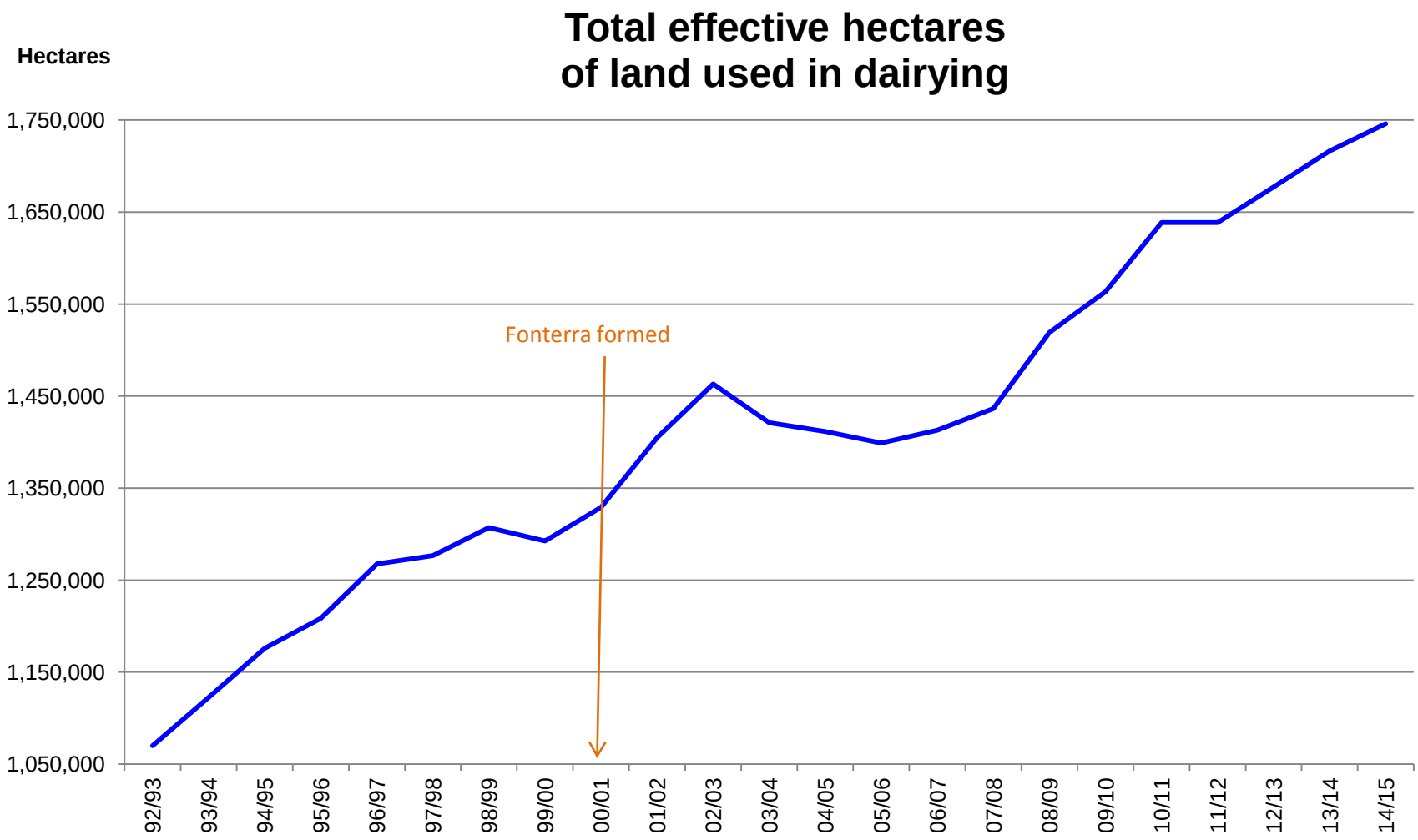
Competitive advantage *(cont'd)*

- Low cost water and electricity has been key to NZ production growth over last 40 years
- Unlike, many competitors, no need for seasonal housing – cows kept outside year round
- Avoid extra labour for feeding and mucking out faced by many competitors
- However, key cost drivers of dairy farm profitability are milksolids produced per hectare, and cost of capital
- Much of the growth in production over recent years relied on higher cost feed and more expensive irrigation, rather than low cost grass feed.

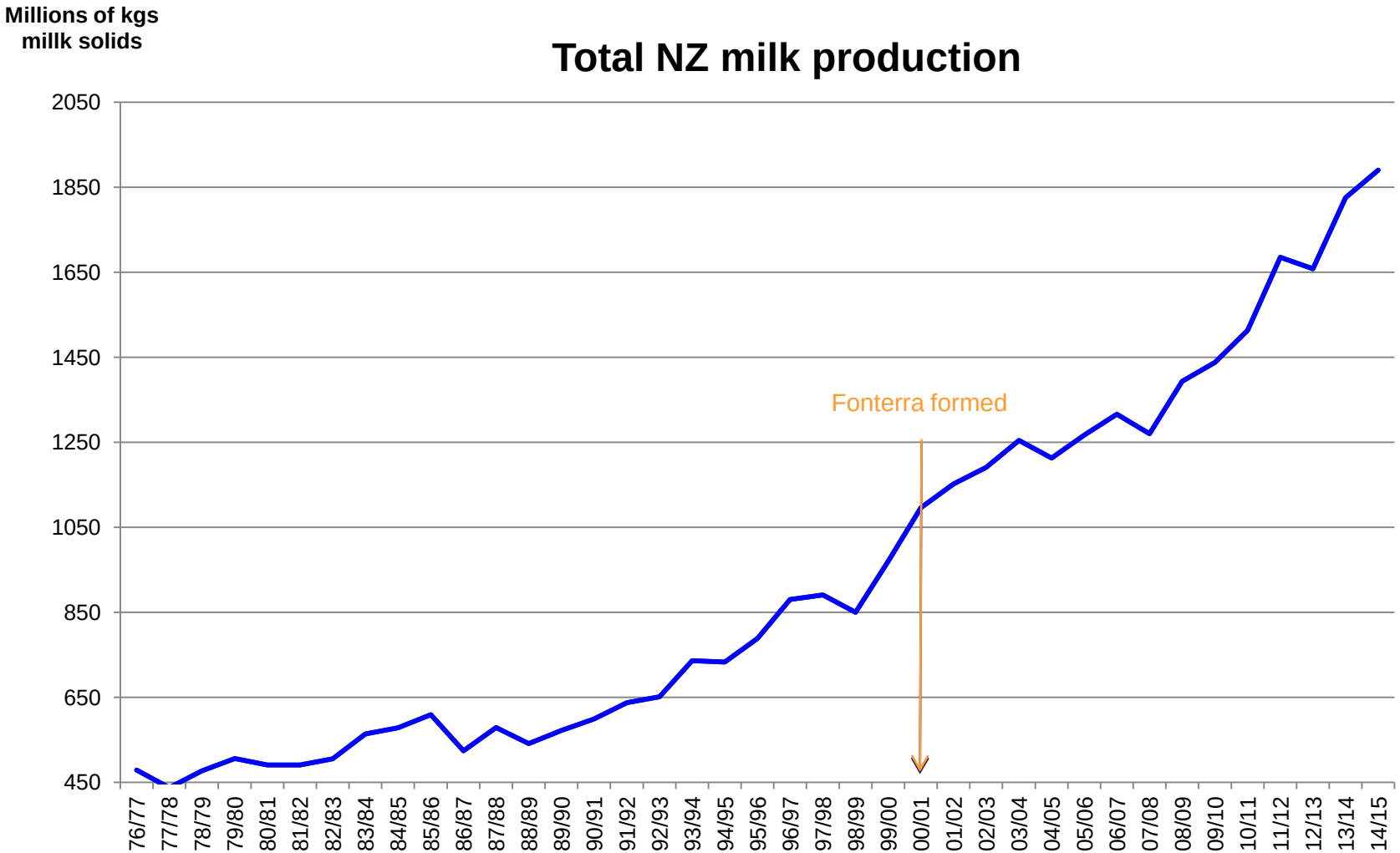
Changes in production

- Since Fonterra was formed in 2001, raw milk production in New Zealand has increased by about 58% (up until mid 2015):
  - More cows (up 33%)
  - More milk per cow (up 21% on average)
  - More land used for dairying (up 22%)
  - More investment in milk processing plant
  - More on-farm plant and equipment
  - More water for irrigation
  - More borrowings. (Dairy debt almost trebled over the past decade to reach $32 billion in 2015)
  - More cow genetics, more pasture management and, of course, more waste

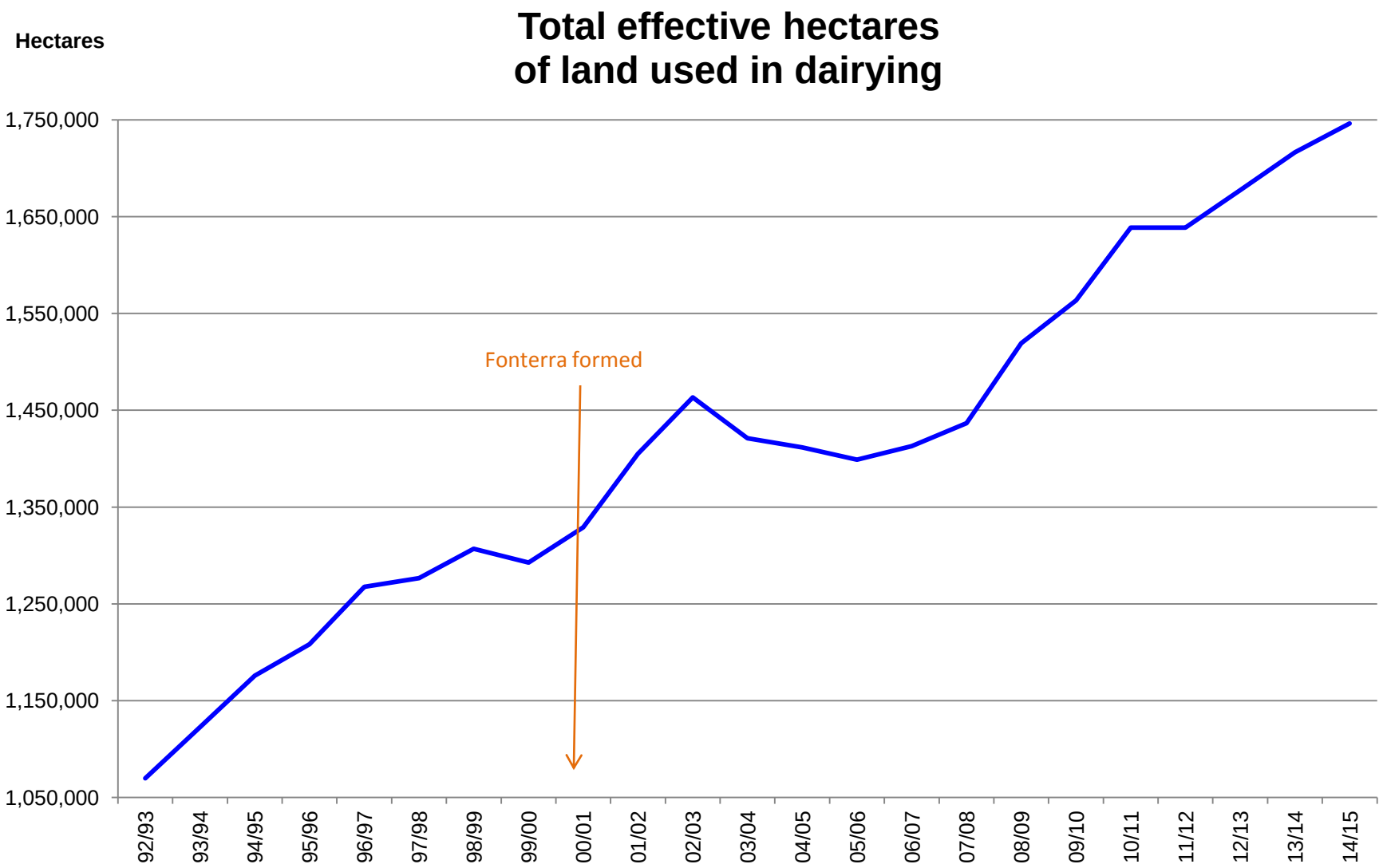
Changes in production *(cont'd)*



Changes in production *(cont'd)*



Changes in production *(cont'd)*



Monopolies

By way of background, it's helpful to understand the role and effects of monopolies in economic terms. The following explanation has been kindly provided by David Pickens, a regulatory economist:

- Monopolies are entities that provide goods or services to consumers who will have little choice but to buy those goods and services from that provider. Typically, it is difficult for consumers to go without that good or service, there are few reasonable substitutes and it is difficult for other providers to set up in competition with the incumbent (the monopolist).

- There are two types of monopolies to think about – natural monopolies and government created monopolies. Natural monopolies exist because the goods or services they provide are most cheaply provided by one provider. A good example is the national grid for electricity (Transpower). While it is feasible to provide another network to operate in parallel to Transpower, carrying electricity from generators (electricity producers) to lines companies (consumers), it is not sensible. It is too costly.

- Monopolies are both good and bad. A useful way to think about the good and bad that might come from a monopoly is economic efficiency.

Monopolies *(cont'd)*

- Economic efficiency is broken into:
  - **Productive efficiency**: This refers to the amount of resource needed to produce a good or service. If less resource is needed to produce a given level of good or service, then inputs are freed up to produce value for the community elsewhere. Where this happens there is an improvement in productive efficiency.
  - **Allocative efficiency**: This is about making sure those things most valued by the community are supplied, and supplied in the correct amounts (formally, where the marginal cost of producing the good or service equals the marginal benefit to consumers of consuming it) to best promote public welfare.
  - **Dynamic efficiency**: This is the change in allocative and productive efficiency that occurs over time. It is commonly described as innovation.
- Pulling the three types of efficiency together, economic efficiency can be described as "providing valued goods and services in the quantities most valued by the community, at least cost, over time."

Monopolies *(cont'd)*

- In economic efficiency terms, monopolies are both good and bad. A natural monopoly can produce goods and services much cheaper by itself than could two or more providers operating in the same market. In these circumstances a monopoly is likely to be the most productively efficient way to produce the good or service. However, this comes at some cost elsewhere.

- First, it is easy for a monopoly to reduce supply (formally, to a point where the marginal cost to the monopoly is less than marginal benefit to the consumer) and force up prices. The reasons a monopoly will do this is to increase the money it gets from consumers, money that will either go to owners in the form of high profits, and or to the inputs used to provide the good of service, for example, higher wages, more expensive supplier inputs or just waste (this is known as gold plating). Natural monopolies tend, therefore, to be allocatively inefficient.

Monopolies *(cont'd)*

- Next, without another provider working to better provide what customers want, and in this way take market share and profits from the monopoly provider, there is little reason for a monopoly to try and produce goods and services more cheaply or that better meet what customers want, or even search out new markets, including value add processing.

- Also, entities (if they are any good) will have a distinct culture and a consistent operating strategy.. No two entities will be the same in this respect. This means in a monopolistic market, by definition, there is less strategic and cultural variety and therefore greater risk of a mismatch with what a range of consumers and potential consumers might want - a bit like having all your eggs in one basket. In short, monopolies will tend to score poorly against dynamic efficiency.

- In summary, economists would tend to expect monopolies to be good for productive efficiency, but bad for allocative and dynamic efficiency. To encourage the good aspects (productive efficiency) and discourage the bad aspects (allocative and dynamic Inefficiency), governments will often allow natural monopolies, but regulate their prices, profits and the quality of their goods and services. Over time, governments try to make monopolies innovate – through applying higher standards and/or by allowing them to make more money.

- Further discussion is required in relation to government-created monopolies.