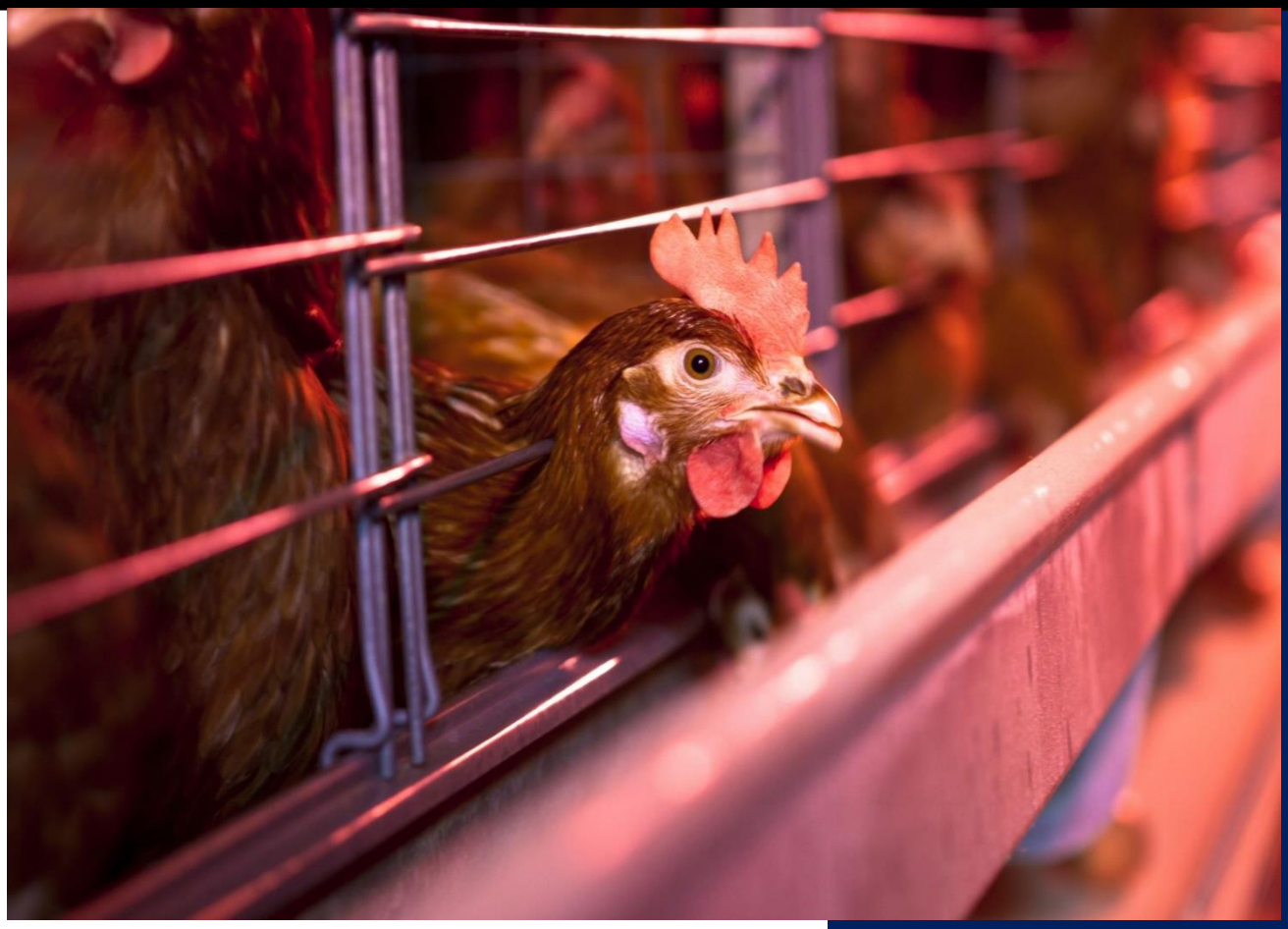
Pegasus Economics

Economic Cost of Transitioning away from Battery Cages



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Pegasus Economics is a boutique economics and public policy consultancy firm that specialises in strategy and policy advice, economic analysis, trade practices, competition policy, regulatory instruments, accounting, financial management and organisational development.

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Introduction

Pegasus Economics has been commissioned by RSPCA Australia to report on the cost of transitioning away from conventional battery cages for laying hens in Australia and their replacement by furnished cages, as well as advise on the efficacy of providing structural adjustment assistance to assist egg producers in making the transition.

Laying Hens and Eggs

The Australian egg industry is primarily based on eggs and egg products produced from laying hens (Food Standards Australia New Zealand, 2009, p. 2).

An egg consists of shell, membrane, albumen or egg white and yolk (Food and Agriculture Organization of the United Nations, 2003, p. 29).

Eggs are a good source of high quality protein (Food and Agriculture Organization of the United Nations, 2003, p. 32). They provide important sources of iron, vitamins and phosphorus. As a nutritional source of vitamin D, eggs rank second only to fish liver oils.

Commercial Egg Production Systems

In Australia, three main systems are used in the commercial production of eggs:

- the battery cage system where birds are housed in small wire cages, typically with several other birds
- the barn ('barn-laid' or 'cage-free') system where birds are housed in sheds, which have provision for nest boxes and perches across one or more levels or 'tiers' within the shed
- the free-range system where birds have access to an outdoor area and sunlight, as well as a shed with nest boxes and perches (Productivity Commission, 1998, p. 1).

Battery cages are constructed of welded wire, including the floor, and typically house between 3 and 5 birds, depending on cage size (Productivity Commission, 1998, p. 30). Each hen is provided with approximately 550cm^2 in floor space. The cages are arranged in identical rows and columns in a unit like in an artillery battery, hence the name (Dharni, 2018).

Furnished cages (also referred to as enriched or modified cages) are similar to battery cages but provide more space (typically 750cm^2 per hen) and height and contain a range of additional elements intended to enable hens to perform some natural behaviours (Pickett, 2007, p. 8). They usually include perches, enclosed nests, some substrate, and scratching areas (RSPCA Australia, 2016, p. 5). They come in a range of sizes, with smaller ones housing fewer than 10 birds, whilst larger versions may house up to 60 or more birds (Pickett, 2007, p. 8). Furnished cages are currently not used widely in Australia (RSPCA Australia, 2016, p. 5).

Barn systems consist of open sheds with curtained sides or closed sheds with controlled environments and have perches, feed and water on one or more levels (Productivity Commission, 1998, p. 31). There is also provision for nest boxes and space for stretching or running.

Free-range systems involve hens having access to an open paddock during the day with a central shed or small number of sheds spread over the paddock for shelter at night (Productivity Commission, 1998, p. 31). Typically, the sheds are similar to those used to house hens in the barn system and provide for nest boxes, perches and food and water supply (Productivity Commission, 1998, pp. 31-32).

Commercial Egg Production and Distribution

On commercial egg farms, eggs are collected at least once a day and they are transported to a high-tech room called a grading floor where they are cleaned and checked for quality (Australian Eggs Limited, 2020). Grading involves classifying eggs according to interior and exterior quality and size (Australian Egg Corporation Limited, 2010).

After being cleaned and checked for quality, every egg is stamped with a unique code that identifies the farm where it was laid (Australian Eggs Limited, 2020). This allows eggs to be traced back to the farm of origin if necessary.

Eggs are automatically weighed and sorted into different size cartons, such as 600, 700, or 800 gram packs (Australian Eggs Limited, 2020). The cartons then get stacked onto pallets and are taken to a refrigerated room where they await loading into a delivery truck.

Special refrigerated trucks back up to the cool room and create a seal so there is no temperature change between the cool room and the truck (Australian Eggs Limited, 2020). The eggs get loaded into the truck and remain cool all the way to their delivery location.

The main egg market in Australia is the shell egg market with the remaining eggs sold as processed egg products, including a range of value-added products such as egg pulp, liquid white, liquid yolk, dried egg yolk, dried white, boiled eggs, peeled eggs, omelette mix and scrambled egg mix (Tim Harding & Associates, 2006, p. 3).

During grading, eggs are checked for cracks and cracked eggs are diverted for making into pulp (Food Standards Australia New Zealand, 2011, p. 6). Pulp is also made from intact shell eggs.

The egg industry supply chain is made up of a number of national producers and marketing organisations (Tim Harding & Associates, 2006, p. 3). These organisations buy shell eggs in ungraded form from egg farmers or supply their own eggs in the case where they are vertically integrated and then, test, grade, pack, distribute and market eggs to:

- the 'trolley market' where the eggs are sold in shell form to grocery supermarkets and other retail outlets
- the 'box market' where the eggs are sold in either shell or pulp form to food service providers such as restaurants, catering companies, bakeries, airline companies, hospitals, and other institutions
- the 'food processing market' in pulp form to food processing manufacturers (Tim Harding & Associates, 2006, pp. 3-4).

Whole shell-on eggs for human consumption are not permitted for importation into Australia under quarantine rules (Department of Agriculture, Water and the Environment, 2019). However, imports of shell-off egg products are permitted into Australia provided they meet certain conditions. Egg powder and liquids account for most processed egg product imports coming into Australia (Reeves, 2020, p. 24). As a consequence, the Australian egg industry is not highly trade exposed.

In 2018-19, there were almost 355 million dozen eggs commercially produced in Australia for human consumption from 16.3 million laying hens from commercial producers (Australian Bureau of Statistics, 2020).

The egg industry, through the auspices of Australian Eggs Limited (2019), also publishes estimates of the number of eggs produced and the number of laying hens.[1] However, the industry estimates on

[1] Australian Eggs Limited (2020a) is a member owned not-for-profit company providing marketing and research and development (R&D) services for the benefit of Australian egg producers. It is funded through statutory levies, collected under the *Egg Industry Service Provision Act* 2002 (Cth) and Australian Government funds for the purposes of approved R&D. Australian Eggs Limited was previously the Australian Egg Corporation Limited but changed its name in around May-June 2017 to Australian Eggs Limited.

the number of eggs produced and the number of laying hens differ significantly and provide much higher estimates than that provided by the Australian Bureau of Statistics (ABS) in its *Rural Environment and Agricultural Commodities Survey*.

Commercial egg production and distribution is highly concentrated and dominated by three large firms. These large firms operate a mix of cage and non-cage production systems, some of whom operate in more than one jurisdiction (BG Economics, 2018, p. 9). The large firms are vertically integrated, with a controlling interest in or exclusive supply arrangements with many smaller farms (Reeves, 2020, p. 27).

Welfare Issues with Battery Cages

In a natural environment, hens spend much of their time foraging for food (Pickett, 2007, p. 5). Hens will walk considerable distances searching for food and are also able to fly short distances. Hens congregate in small groups that have a complex social organisation based on a pecking order or hierarchy. Trees are used for roosting at night and to escape from predators. Prior to laying, hens will seek out a secluded spot and build a nest to lay their eggs in. They also perform regular maintenance behaviours including preening and dustbathing.

Professor Bernard Rollin (2004, p. 959) of Colorado State University has observed that whereas in traditional agriculture animals had to be kept in environments for which they had evolved, they can now be kept in environments contrary to their natures but beneficial for increased productivity. The Productivity Commission (1998, p. 45) has stated that:

> *Much of the literature on hen behaviour suggests that dust-bathing, nesting and perching are important behaviours for hens, and that a production system that does not allow their appropriate expression is flawed.*

Concern for the welfare of layer hens in battery cages has probably attracted more debate than any other intensive husbandry system (Freire & Cowling, 2013). Both nationally and internationally, concern has led to calls by animal welfare groups for greater consumer awareness about the conditions of battery caged hens, stricter codes to alleviate perceived cruelty to layer hens and, in some cases, the abolition of the intensive battery cage system (Productivity Commission, 1998, p. 2). Consequently, the general public, led by animal welfare non-government organisation (NGO) campaigns, have called for alternative husbandry systems for laying hens that are more animal welfare-friendly, offering animals more space and freedom to express natural behaviour (van Asselt, Ekkel, Kemp, & Stassen, 2019, p. 294).

A 2017 survey undertaken on behalf of RSPCA Australia (2017) of 1,000 Australians, revealed that 84 per cent of the Australian public are concerned about the welfare of hens in battery cages, and that 8 in 10 want to see battery cages phased out.

The Productivity Commission (1998, p. 50) has previously stated that if it could be established that the broad community regarded battery egg production as cruel, it would suggest a ban. Animal welfare groups have argued that the majority of the community do not support cage egg production (Select Committee on the Use of Battery Cages for Hens in the Egg Production Industry, 2019, p. 15) and would be willing to pay more for eggs produced to higher animal welfare specifications (Animals Australia, 2018, p. 17).

Regulation of Battery Cages in Australia

Concern regarding animal welfare issues in relation to cage egg production systems has usually been addressed through legislation/regulation imposing minimum standards often based on scientific assessment (Trewin, 2001). This has been the case across other advanced economies.

Internationally, by the early 2000s, many countries had recognised the inherent welfare problems with battery cages and had introduced prohibitions on their use.

In 1999, the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (now the Primary Industries Ministerial Council) initiated a national review of layer hen housing systems (Sharman, 2008, p. 53). At its meeting in March 2000, ARMCANZ agreed upon the 'desirability' of abolishing battery cages (Animals Australia, 2018, p. 2n). ARMCANZ further agreed to consult widely with industry, animal welfare groups and the community with a discussion paper to be circulated (Trewin, 2001).

The review considered a proposal to ban battery cages, but rejected the proposal, citing the financial costs to the egg industry, and noting that no battery cage bans had yet been implemented anywhere in the world at that stage (Standing Committee on Agriculture and Resource Management Working Group, 2000; Scrinis, Parker, & Carey, 2017, p. 794).

Instead, in August 2000, ARMCANZ made decisions on layer cage housing which were incorporated into the 4th Edition of the *Model Code of Practice for the Welfare of Animals – Domestic Poultry* that required:

- That all new cage systems commissioned from 1st January 2001 must provide a floor space of 550 cm^2 per bird including the baffle
- Cages commissioned prior to 1 January 2001 had until 1 January 2008 to meet the 1995 standards and may be stocked with a minimum space allowance per bird of 450 cm^2 (3 or more fowls (<2.4kg) per cage) for 20 years from the date they were commissioned or until 1 January 2008, whichever was later (Tim Harding & Associates, 2006, p. ii).

Since the decision by ARMCANZ to essentially leave it to the market to sort out the situation with battery cages, a significant shift has taken place in the consumer and retail market towards non-cage eggs (Select Committee on the Use of Battery Cages for Hens in the Egg Production Industry, 2019, p. 48). There has been a rapid rise in free-range egg production since the early 2000s, which now constitutes over 50 per cent of the shell-egg market (Scrinis, Parker, & Carey, 2017, p. 784).

Australia's major supermarket grocery chains responded to their reading of consumer sentiment regarding cage egg production by making "free range" choices more available and affordable (Parker, Brunswick, & Kotey, 2013, p. 170). Australia's largest supermarket grocery chains in Woolworths, Coles and Aldi have all committed to phase out cage eggs by 2025.

The push by the major supermarket grocery chains has been highly successful in boosting sales of free-range eggs at the expense and subsequent decline in sales of cage eggs.

It appears that the sale of cage eggs through major supermarket grocery chains peaked in 2016-17 and are now in decline accounting for approximately 40 per cent by volume and 30 per cent by value in 2018-19.

Transitioning away from Battery Cages

Publicly available barcode data on egg sales only covers a select group of grocery supermarkets in Woolworths, Coles and IGA. It does not cover Aldi nor other supermarkets and other retailers. As a consequence, egg sales through grocery supermarkets are much higher than is reported based on the reported barcode sales data alone.

Based on the relative position of Aldi in the grocery sector compared to Woolworths, Coles and IGA (Roy Morgan (2019; 2020), we estimate that during 2018-19, Aldi was selling somewhere in the order of 40.5 million dozen eggs. This means that in 2018-19, Woolworths, Coles, Aldi and IGA were responsible for selling around 271.3 million dozen eggs, accounting for around 76.4 per cent of total Australian egg production in 2018-19.

Even though it is difficult to forecast the future, if one assumes the grocery supermarket chains are able to achieve their commitments to only retail cage-free eggs by 2025, then this suggests that

cage-free eggs retailed from grocery supermarket chains will account for somewhere in the order of 73 per cent of Australian egg production for human consumption.

Data is not available on the supply and demand for eggs from the remaining distribution channels. However, if one further assumes that Costco is also able to procure only cage-free eggs by 2025, then this could add at least another 1 per cent of Australian egg production that is cage free.[2]

In turn, this leaves the remaining egg distribution channels:

- the remainder of the egg trolley market composed of retailers such as other grocery supermarkets, specialist retailers and green grocers that are not included in the collection of barcode data
- the box market where eggs are sold in either shell or pulp form to food service providers
- the food processing market.

If one assumes that cage eggs make up just over three quarters of the remaining egg distribution channels, then this suggests that non-cage eggs will account for around 80 per cent of egg production by 2025, with cage eggs accounting for the remaining 20 per cent.

If one extrapolates on the growth trend in egg production for the last 5 years based on ABS data[3], then this suggests egg production will be somewhere in the order of 399.7 million dozen by 30 June 2025. Assuming that cage egg production still accounts for 20 per cent of egg production in 2025, then this suggests that cage egg production will still be in the order of 79.9 million dozen.

We have estimated the cost of converting the remaining egg production from battery cages in 2025 over to furnished cages. The one-off costs of converting existing battery cages to furnished cages as well as constructing new furnished cage facilities and the associated land acquisition would in total be in the order of $166.6 million, with possible ongoing costs arising from business fragmentation in the order of $2 million per annum.

The timeframe over which the industry can transition away from the remaining battery cages should take into account the effective economic life of a battery cage and the date on which the current infrastructure was installed.

The Australian Egg Industry Association, the former peak representative body for the egg industry, commented in a submission to the Productivity Commission (1998, p. 69) that the indicative economic life of equipment in a battery cage system was 20 to 25 years. The New Zealand National Animal Welfare Advisory Committee (2012, p. 14) factored in an average lifespan of around 18 years for battery cages.

The Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) decision in August 2000 established an economic life for cages of 20 years from the date the cages were commissioned (Tim Harding & Associates, 2006, p. ii). The then Australian Bureau of Agricultural and Resource Economics (ABARE) proposed that, because of the increased risk of disease and reduced production efficiency over time of using a cage system, that 20 years is seen as an appropriate benchmark for the 'typical' economic life of cages (Tim Harding & Associates, 2006, p. 27). A 20-year economic life is also referred to in the current *Model Code of Practice for the Welfare of Animals – Domestic Poultry*.

Assuming there has been little new investment in battery cages since 1 January 2008, this would suggest that the effective economic life of the existing stock of battery cages would be exhausted by the end of 2027. On this basis, a regulatory decision to transition away from battery cages by the

[2] This assumption should be treated with caution as there is no publicly available information on the volume of egg sales from Costco.
[3] See ABS (2020).

beginning of 2028 would allow the majority of cage infrastructure to live out its economic life and limit capital redundancy costs.

A 20-year economic life for battery cages implies that most of the existing stock of battery cages will need to be replaced before 2028. In turn, this suggests that existing cage egg producers will need to incur costs to upgrade their egg production systems in any event before 2028, thereby mitigating the cost that can be attributed to any proposed regulation requiring a transition away from conventional battery cages.

Structural Adjustment Assistance for Transitioning away from Battery Cages

The question as to whether battery cage egg producers deserve structural adjustment assistance revolves around the question as to whether their battery cages would be forced into premature scrappage or redundancy ahead of their effective economic life.

If battery cages were forced into redundancy ahead of their effective economic life through a regulatory mandate, then battery cage egg producers could legitimately claim they have been subject to a regulatory taking on the part of government and would have reasonably strong grounds on which to pursue compensation.[4] In this event, battery cages would become stranded assets.[5]

Applying an economic life of 20 years and assuming there has been little new investment in battery cages since 1 January 2008, this would suggest that the effective economic life of the existing stock of battery cages would be exhausted at the end of 2027. On this basis, a regulatory decision to transition away from battery cages by the beginning of 2028 would not warrant any compensation on the part of most battery cage egg producers. The only exception to this being in relation to any egg producers who installed their battery cages following 1 January 2008. In this case, compensation could be considered on a case-by-case basis. However, given potential moves to examine the feasibility of phasing out battery cages has been on the policy agenda since at least 2000, grounds for compensating for egg producers who installed battery cage systems after January 2008 would also be arguably weak.

Conclusions

Market-driven initiatives have so far proven to be highly effective in reducing the market penetration of cage eggs in the trolley market. However, there are probably limits to a market-based approach in regulating animal welfare in relation to the production of cage eggs.

The one-off costs of converting existing battery cages to furnished cages as well as constructing new furnished cage facilities and the associated land acquisition is estimated to be in the order of $166.6 million, with possible ongoing costs arising from business fragmentation of $2 million per annum.

Given most existing battery cage egg systems were installed prior to January 2008 and the effective economic life of a battery cage system is around 20 years, a regulatory decision to transition away from battery cages by the beginning of 2028 would not warrant any compensation on the part of most battery cage egg producers.

[4] A regulatory taking is a valid government action that reduces the value of a private owner's property (Ulen, 1998, p. 570).

[5] Stranded assets' are assets that have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities. (Caldecott, Tilbury, & Carey, 2014, p. 2)

1. Introduction

Pegasus Economics has been commissioned by RSPCA Australia to report on the cost of transitioning away from conventional battery cages for laying hens in Australia and their replacement by furnished cages, as well as advise on the efficacy of providing structural adjustment assistance to assist egg producers in making the transition.

2. Laying Hens and Eggs

2.1 Laying Hens

The term *poultry* includes all species of birds that can be consumed for food (Wakenell, 2016, p. 550). Traditional poultry species are the layer hen, meat chicken, turkey, duck, and goose. Other species such as pheasants, quail, chukar partridges, pigeons, guinea fowl, and ratites (such as emus and ostriches) have variable popularity dependent on cultural tradition, geographic location, and availability.

The commercial poultry industry is split into meat (meat chickens or 'broilers', turkeys, ducks, and geese) and egg-laying (table-egg and breeder) types of birds (Wakenell, 2016, p. 550).

It is generally assumed that domestic chickens (layer hens and meat chickens) descended from either one or all four species of jungle fowl inhabiting South East Asia (Wood-Gush, 1959, p. 321). The red jungle fowl is the closest to domestic chickens by its morphology and gives fertile offspring after crossing with domestic chickens, whereas crossing between domestic chickens and any of the three other wild species yields very poor hatchability and chick survival (Tixier-Boichard, Bed'hom, & Rognon, 2011, p. 198).

The red jungle fowl is found in the foothills of the Himalaya Mountains in the north of India to tropical Southeast Asia (Webster, 2002, p. 72) and the domesticated bird can be regarded as a subspecies (Scientific Committee on Animal Health and Animal Welfare of the European Commission, 2000, p. 8).

The Australian egg industry is primarily based on eggs and egg products produced from laying hens (Food Standards Australia New Zealand, 2009, p. 2). Other egg-producing avian species, such as ducks, quails, pigeon and guinea fowl form a minor part of the egg industry.

Layer chicks begin their lives in a rearing or breeding unit (Productivity Commission, 1998, p. 28). They are hatched and then housed either in deep litter or a rearing cage. Day-old chicks are sorted into males and females, with the males being killed (because they cannot lay eggs). Young female chicks are called pullets (Wakenell, 2016, p. 550). Pullets are most commonly reared under artificial lighting conditions to manipulate the natural seasonal influence (Food Standards Australia New Zealand, 2006, p. 36).

Point-of-lay hens (aged around 16 to 20 weeks) are transported to the relevant production system and typically housed there for about one year (Productivity Commission, 1998, p. 28). Flocks of laying hens are kept separate to avoid disease transmission between flocks (Productivity Commission, 1998, pp. 28-29). The industry's 'all-in all-out' policy means that a shed, or even an entire site, is completely cleared of birds, and then cleaned and disinfected before the arrival of the next cohort (Productivity Commission, 1998, p. 29).

Laying hens are maintained in production sheds generally from 17 until 74 weeks of age (Food Standards Australia New Zealand, 2006, p. 36). At around 72 weeks of age, egg production numbers decline and average egg weights increase (Productivity Commission, 1998, p. 29). Egg quality also falls (for example, there are more broken eggs due to thinner shells and more watery albumen or egg white).

Induced moulting (i.e. artificially induced feather loss and replacement) may occur in some flocks at around 50 to 60 weeks of age and then brought back into production until up to approximately 100 weeks of age (Food Standards Australia New Zealand, 2006, p. 36). Egg quality and number can be improved after induced moulting so that in some cases birds are kept in production after 72 weeks (Productivity Commission, 1998, p. 29). However, after 12 months of egg production, 'spent hens' are generally removed from the production system and either all killed on farm or transported to an abattoir for processing into lower-quality ingredients for soups and stocks, or pet food (Food Standards Australia New Zealand, 2006, p. 36).

2.2 Eggs

An egg consists of shell, membrane, albumen or egg white and yolk (Food and Agriculture Organization of the United Nations, 2003, p. 29). The shell of an egg has a rigid yet porous structure. The porous shell has great resistance to the entry of micro-organisms when kept dry and considerable resistance to the loss of moisture by evaporation. The colour of the shell, which may be white or brown depending on the breed of the laying hen, does not affect quality, flavour, cooking characteristics, nutritional value or shell thickness.

Inside the shell, there are two membranes (Food and Agriculture Organization of the United Nations, 2003, p. 29). The outer membrane is attached to the shell, the inner membrane is attached to the albumen. These two membranes provide a protective barrier against bacterial penetration.

An air space or air cell is a pocket of air usually found at the large end of the egg interior between the outer membrane and the inner membrane (Food and Agriculture Organization of the United Nations, 2003, p. 29). This air cell is created by the contraction of the inner contents while the egg cools and by the evaporation of moisture after the egg has been laid. The air cell increases in size as time passes.

The albumen of the egg is composed of the outer thin albumen and the inner firm or thick albumen (Food and Agriculture Organization of the United Nations, 2003, p. 31). The outer thin albumen spreads around the inner firm albumen. The inner firm albumen in high quality eggs stands higher and spreads less than the outer thin albumen.

The chalazae are twisted, cord-like strands of egg white that hold the yolk in position (Food and Agriculture Organization of the United Nations, 2003, p. 31). Prominent thick chalazae indicate high quality and freshness.

The yolk is almost spherical and is surrounded by a colourless membrane (Food and Agriculture Organization of the United Nations, 2003, p. 31). The colour of the yolk varies with the type of feed given to the laying hen. If the laying hen is fed on maize, for example, the yolk will become a bright yellow. The colour of the yolk does not affect the nutritional content.

Eggs are a good source of high quality protein (Food and Agriculture Organization of the United Nations, 2003, p. 32). They provide important sources of iron, vitamins and phosphorus. As a nutritional source of vitamin D, eggs rank second only to fish liver oils. Eggs are low in calcium, which is discarded in the shell, and contain very little vitamin C.

3. Egg Production Systems

3.1 Commercial Egg Production Systems

In Australia, three main systems are used in the commercial production of eggs:

- the battery cage system where birds are housed in small wire cages, typically with several other birds
- the barn ('barn-laid' or 'cage-free') system where birds are housed in sheds, which have provision for nest boxes and perches across one or more levels or 'tiers' within the shed
- the free-range system where birds have access to an outdoor area and sunlight, as well as a shed with nest boxes and perches (Productivity Commission, 1998, p. 1).

Battery cages are constructed of welded wire, including the floor, and typically house between 3 and 5 birds, depending on cage size (Productivity Commission, 1998, p. 30). Each hen is provided with approximately 550cm^2 in floor space. The floor slopes downward towards the front so that any egg rolls out of the cage. Access to food is through the front of the cage and water is provided through drinkers in the cage. The cages are arranged in identical rows and columns in a unit like in an artillery battery, hence the name (Dharni, 2018).

Furnished cages (also referred to as enriched or modified cages) are similar to battery cages but provide more space (typically 750cm^2 per hen) and height and contain a range of additional elements intended to enable hens to perform some natural behaviours (Pickett, 2007, p. 8). They usually include perches, enclosed nests, some substrate, and scratching areas (RSPCA Australia, 2016, p. 5). They come in a range of sizes, with smaller ones housing fewer than 10 birds, whilst larger versions may house up to 60 or more birds (Pickett, 2007, p. 8). Furnished cages are currently not used widely in Australia (RSPCA Australia, 2016, p. 5).

Barn systems consist of open sheds with curtained sides or closed sheds with controlled environments and have perches, feed and water on one or more levels (Productivity Commission, 1998, p. 31). There is also provision for nest boxes and space for stretching or running. Typically, a part of the floor is covered by a layer of litter (such as wood shavings or rice hulls) which provides opportunities for scratching and dust bathing behaviours.

Free-range systems involve hens having access to an open paddock during the day with a central shed or small number of sheds spread over the paddock for shelter at night (Productivity Commission, 1998, p. 31). Typically, the sheds are similar to those used to house hens in the barn system and provide for nest boxes, perches and food and water supply (Productivity Commission, 1998, pp. 31-32).

Data on farming system share of commercial egg production is not regularly available (Australian Eggs Limited, 2019a). There has been sustained growth in free-range egg farming since the early 2000s giving rise to an industry transition away from battery cages. This is outlined in Table 1 below.

Table 1: Percentage of Commercial Egg Production by Production System

Production System	2002	2006	2010	2016	2019
Cage Eggs	92.0	79	68	55	49
Barn Eggs	5.5	15	7	9	12
Free Range	2.5	6	25	36	39

Sources: Tim Harding & Associates (2006, p. 62), Australian Eggs Limited (2019a).

3.2 Other Egg Production Systems

In the backyard sector most poultry are kept only to produce eggs for the owner's personal consumption (Scott, Turner, Bibby, & Chamings, 2009, p. 54). The majority of birds in backyard flocks come from specific pullet producers and through the sale of spent hens from commercial flocks.

It was estimated back in 1992 that 7 per cent of households kept backyard poultry (Scott, Turner, Bibby, & Chamings, 2009, p. 54). It was further estimated that the average flock size was between two and ten birds per flock. Not included in these figures were the 2,000 pure breed 'fancy' flocks which average 50 multi-age breeder birds per flock for exhibition.

The size of the Australian backyard poultry flock has previously been estimated at:

- between 100 000 and 200 000 owners of backyard poultry with a flock size of between two and ten laying hens, with an estimated population of around 1 million birds
- between 3000 and 5000 owners of small flocks (up to 500 birds) for meat and egg production (Scott, Turner, Bibby, & Chamings, 2009, p. 54).

Meat chicken breeder birds each produce approximately 150 hatching eggs during their one-year production life (Scott, Turner, Bibby, & Chamings, 2009, p. 55). Of these, a percentage are non-settable eggs sold as consumer eggs or sold on to commercial egg laying grading floors for pulping. Total egg numbers have previously been estimated to be between 0.5 and 1.5 million dozen per annum.

4. Commercial Egg Production and Distribution

4.1 Chain of Production and Distribution

Some eggs are still gathered by hand on smaller commercial eggs farms, however, there are automated collection belts in most commercial egg production facilities used to collect eggs (Australian Eggs Limited, 2020). After an egg is laid by a hen, the egg gently rolls out of the nest box and onto a conveyor belt where it gets automatically carried out of the shed and into a separate room.

Following egg collection, an initial sorting of shell eggs is conducted on farm to remove eggs that have no commercial value (e.g. eggs that are cracked, crushed or too dirty to clean) (Food Standards Australia New Zealand, 2011, p. 2). Each farm usually has at least a packing floor where eggs are placed on egg flats (Scott, Turner, Bibby, & Chamings, 2009, p. 56).

On commercial egg farms, eggs are collected at least once a day and they are transported to a high-tech room called a grading floor where they are cleaned and checked for quality (Australian Eggs Limited, 2020). Grading involves classifying eggs according to interior and exterior quality and size (Australian Egg Corporation Limited, 2010). Grading takes place on-farm for the larger, more vertically integrated, producers (Productivity Commission, 1998, p. 57). For other egg producers, grading floors are operated by egg marketing organisations. Grading floors may grade 30,000 dozen or more eggs per week.

Once graded, eggs are given a more thorough internal and external examination (Productivity Commission, 1998, p. 57). On the grading floor, the eggs are inspected by a series of machines (Australian Eggs Limited, 2020). Modern egg grading equipment uses bright lights to inspect the internal quality of the egg. This process is called 'candling' as the light makes the eggshell transparent so the grader can look inside the egg to assess its quality without breaking it (Australian Eggs Limited, 2020; 2010). Automatic candling technology is often used where machines do light spectrum analysis of the inside of the egg (Australian Eggs Limited, 2020). If any internal defects are noticed, the eggs are removed and sent down a separate lane away from the first quality eggs.

Quality control on the grading floor also involves checking for tiny cracks that might not be visible to the human eye and measuring the height of the albumen (egg white) and shell thickness (Australian Eggs Limited, 2020). Automatic acoustic crack detectors contain lots of small probes that gently tap the eggs at very fast speeds as they pass through the machine. If there is a crack in the eggshell, no matter how small, the tapping energy will be absorbed, resulting in a duller sound.

Eggs are categorised as one of three qualities:

- first quality, which are suitable for marketing as shell eggs (by far the majority of eggs)
- second quality, which are suitable for consumption after processing
- reject eggs, which are disposed of (Productivity Commission, 1998, pp. 57-58).

In Australia, all commercial eggs are cleaned either through dry cleaning or through wet cleaning (washing) (Australian Eggs Limited, 2020). A slightly dirty egg can be brushed with an egg brush or rubbed with a sanding sponge, loofa, paper towel and plastic scourer (if stained) with a gentle rubbing motion (Department of Primary Industries Food Authority, 2015, p. 5).

As egg shells are porous, washing can allow microorganisms to enter through the pores of the shell (Department of Primary Industries Food Authority, 2015, p. 5). If eggs are washed as soon as they are collected, this limits the opportunity of contamination and loss of interior quality. For this reason, some egg producers choose to wash all eggs in warm water and gentle sanitiser liquid as soon as they are collected (Australian Eggs Limited, 2020).

After being cleaned and checked for quality, every egg is stamped with a unique code that identifies the farm where it was laid (Australian Eggs Limited, 2020). This allows eggs to be traced back to the farm of origin if necessary.

Eggs are automatically weighed and sorted into different size cartons, such as 600, 700, or 800 gram packs (Australian Eggs Limited, 2020). The cartons then get stacked onto pallets and are taken to a refrigerated room where they await loading into a delivery truck. Egg cartons display a wide variety of information including the name of the supplier, the use-by-date, recommendations for storage, content information (including the egg size, the number of eggs in the container and the address of the supplier) and indications of the production system, such as cage eggs, barn laid eggs or free-range eggs (Productivity Commission, 1998, p. 58).

Special refrigerated trucks back up to the cool room and create a seal so there is no temperature change between the cool room and the truck (Australian Eggs Limited, 2020). The eggs get loaded into the truck and remain cool all the way to their delivery location.

4.2 Commercial Eggs Markets

The main egg market in Australia is the shell egg market with the remaining eggs sold as processed egg products, including a range of value-added products such as egg pulp, liquid white, liquid yolk, dried egg yolk, dried white, boiled eggs, peeled eggs, omelette mix and scrambled egg mix (Tim Harding & Associates, 2006, p. 3).

During grading, eggs are checked for cracks and cracked eggs are diverted for making into pulp (Food Standards Australia New Zealand, 2011, p. 6). Pulp is also made from intact shell eggs. Eggs are pulped as whole liquid egg or separated into yolks and egg whites to produce liquid egg white and liquid egg yolk (Food Standards Australia New Zealand, 2011, p. 2). Ingredients such as salt or sugar may be added (depending on the intended use of the liquid egg) and the liquid egg is heat-treated and either dried, chilled or frozen, prior to storage and distribution. Some businesses make pulp at the egg-laying establishment and send it, chilled or frozen, to a processor for heat treatment.

The egg industry supply chain is made up of a number of national producers and marketing organisations (Tim Harding & Associates, 2006, p. 3). These organisations buy shell eggs in ungraded form from egg farmers or supply their own eggs in the case where they are vertically integrated and then, test, grade, pack, distribute and market eggs to:

- the 'trolley market' where the eggs are sold in shell form to grocery supermarkets and other retail outlets
- the 'box market' where the eggs are sold in either shell or pulp form to food service providers such as restaurants, catering companies, bakeries, airline companies, hospitals, and other institutions
- the 'food processing market' in pulp form to food processing manufacturers (Tim Harding & Associates, 2006, pp. 3-4).

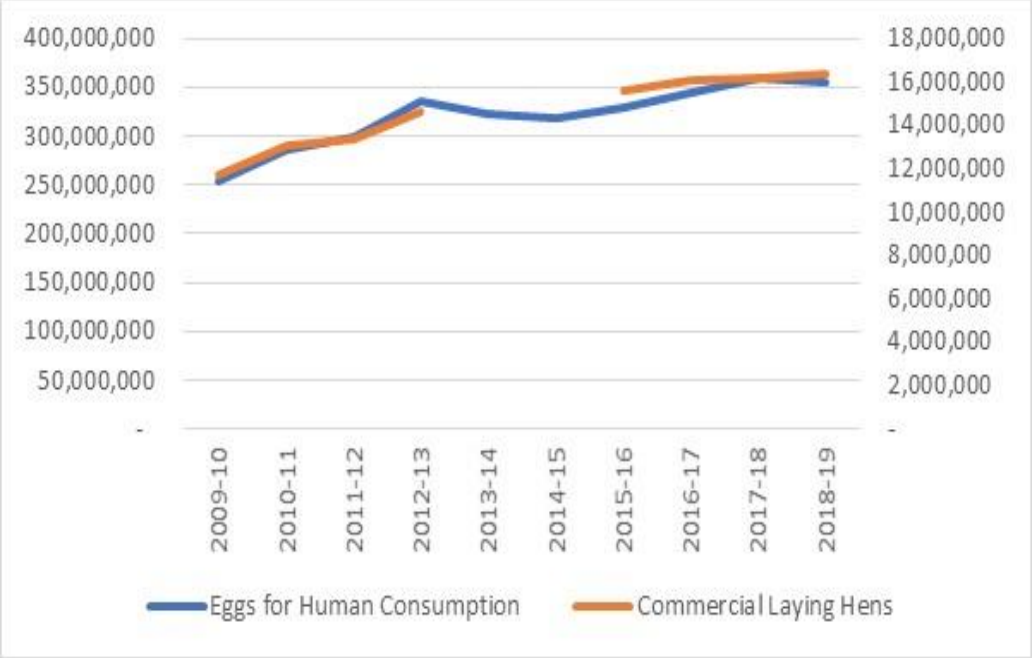
Whole shell-on eggs for human consumption are not permitted for importation into Australia under quarantine rules (Department of Agriculture, Water and the Environment, 2019). However, imports of shell-off egg products are permitted into Australia provided they meet certain conditions. Products containing greater than 10 per cent egg are required to undergo assessment prior to importation (Food Standards Australia New Zealand, 2009, p. 5). Egg powder and liquids account for most processed egg product imports coming into Australia (Reeves, 2020, p. 24). As a consequence, the Australian egg industry is not highly trade exposed.

Even if it were possible to import fresh shell eggs into Australia, it is not clear that this would be a commercially attractive proposition in any event (Productivity Commission, 1998, p. 18). Eggs are a relatively bulky, low value product and thus transport costs would serve as a significant cost impediment.

4.3 Commercial Egg Production

In 2018-19, there were almost 355 million dozen eggs commercially produced in Australia for human consumption from 16.3 million laying hens from commercial producers (Australian Bureau of Statistics, 2020). The amount of commercially produced eggs for human consumption and the number of laying hens in commercial operations since 2009-10 until 2018-19 is outlined in Figure 1 below.

Figure 1: Commercially Produced Eggs for Human Consumption (dozen) and Number of Commercial Laying Hens – 2009-10 to 2018-19



Source: Australian Bureau of Statistics (ABS) (2020).

Notes: The ABS only reports on agricultural producers with an estimated value of agricultural production of $40,000 per annum, that changed from the former cut-off of $5,000 in 2015-16. For 2013-14 and 2014-15 the ABS did not provide a separate estimate for the number of commercial laying hens and only reported on the total number of commercial laying hens with laying pullets together.

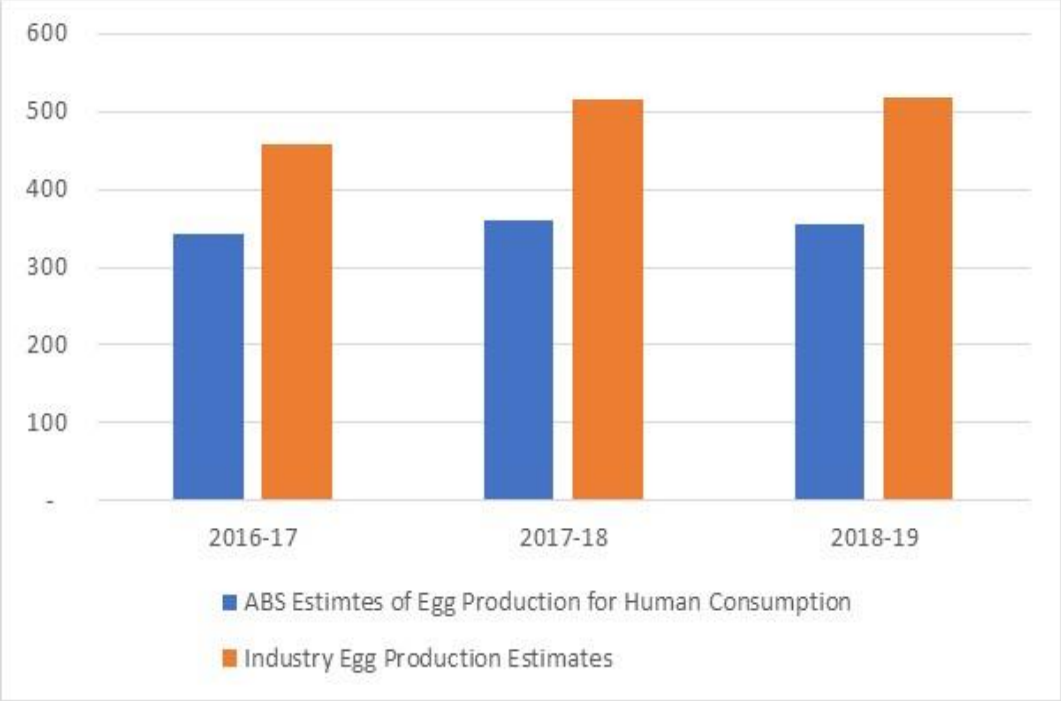
Figure 1 generally reveals a close correlation between the production of eggs and the number of commercial laying hens. The correlation coefficient (r) between the production of eggs for human consumption and the number of commercial laying hens is 0.97, while the coefficient of determination (r^2) is 0.95.[6]

The egg industry, through the auspices of Australian Eggs Limited (2019), also publishes estimates of the number of eggs produced and the number of laying hens.[7] However, the industry estimates on the number of eggs produced and the number of laying hens differ significantly and provide much higher estimates than that provided by the Australian Bureau of Statistics (ABS) in its *Rural Environment and Agricultural Commodities Survey*. The disparity in the estimates between the ABS and the egg industry is outlined in Figure 2 and Figure 3 below.

[6] Correlation refers to how closely two variables are related to each other. A correlation coefficient puts a value on the relationship and can range from 1 to -1. A "0" means there is no relationship between the variables, "-1" means there is a negative relationship (one goes up while the other one goes down, while "1" refers there is a positive relationship (they both increase or decrease in unison). A correlation coefficient of greater than 0.8 or less than -0.8 is generally referred to as a strong correlation. The coefficient of determination (r^2) is the square of correlation coefficient and gives the proportion of the variance (fluctuation) of one variable that is predictable from the other variable.

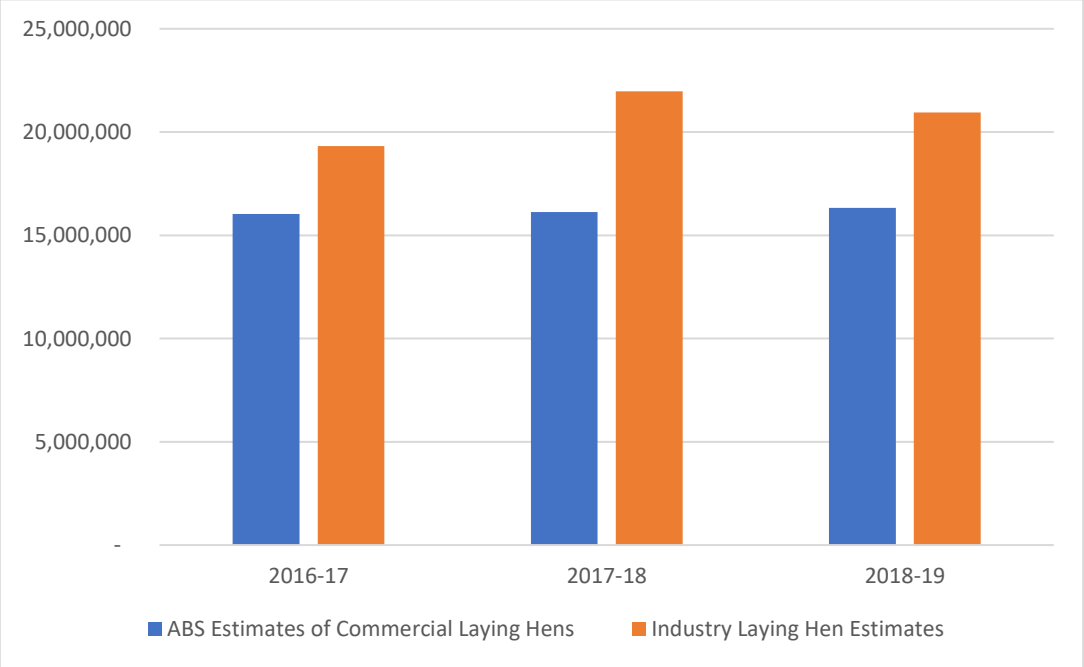
[7] Australian Eggs Limited (2020a) is a member owned not-for-profit company providing marketing and research and development (R&D) services for the benefit of Australian egg producers. It is funded through statutory levies, collected under the *Egg Industry Service Provision Act* 2002 (Cth) and Australian Government funds for the purposes of approved R&D. Australian Eggs Limited was previously the Australian Egg Corporation Limited but changed its name in around May-June 2017 to Australian Eggs Limited.

Figure 2: Comparison of ABS and Australian Eggs Limited Estimates of Australian Egg Production – 2016-17 to 2018-19 (million dozen)



Sources: ABS (2020) and Australian Eggs Limited (2019).

Figure 3: Comparison of ABS and Australian Eggs Limited Estimates of the Number of Australian Laying Hens – 2016-17 to 2018-19



Sources: ABS (2020) and Australian Eggs Limited (2019).

The Australian Egg Industry Association, the former peak representative body for the egg industry, previously suggested in a submission to the Productivity Commission (1998, p. 74) that the ABS under enumerated domestic egg production by about 25 per cent.[8]

We are unable to ascertain the exact reason for the disparity in the estimates of egg production and the number of laying hens between the ABS and the egg industry. However, it appears that industry estimates for both laying hens and egg production are based on hatchings.[9] Industry estimates may also include other egg production systems outside of the commercial system (e.g. backyard poultry) that were discussed in subsection 3.2 above. As we cannot establish the veracity of industry data collection methods, we will rely on the official estimates provided by the ABS instead. This is in keeping with the approach previously adopted by the Productivity Commission (1998, p. 74).

4.4 Market concentration

Commercial egg production and distribution is highly concentrated and dominated by three large firms. These large firms operate a mix of cage and non-cage production systems, some of whom operate in more than one jurisdiction (BG Economics, 2018, p. 9). The large firms are vertically integrated, with a controlling interest in or exclusive supply arrangements with many smaller farms (Reeves, 2020, p. 27).

The estimated national production of the major firms and others is as follows:

- Sunny Queen Australia Pty Ltd (35.4 per cent)
- Alimfresh Pty Ltd (30.5 per cent)
- Farm Pride Foods Limited (8.2 per cent)
- others (25.9 per cent) (Reeves, 2020).

Sunny Queen Australia Pty Ltd is a privately owned Australian company that distributes and markets eggs and egg products nationwide and is based in Queensland (Reeves, 2020, p. 33). Alimfresh Pty Ltd is the controlling entity for Pace Farm, a family-owned business that operates out of its head office in Sydney (Reeves, 2020, p. 34). Farm Pride Foods Limited is an Australian publicly listed company that produces, packs, processes and distributes eggs and egg products and is headquartered in Melbourne (Reeves, 2020, p. 35).

Rising consumer demand for organic, free-range and locally grown eggs have allowed some scope for smaller, independently owned companies, such as Manning Valley Free Range Eggs, to gain market share (Reeves, 2020, p. 27). As a consequence, the extent of industry market share concentration has declined over the past five years.

5. Welfare Issues with Battery Cages

5.1 Background

In a natural environment, hens spend much of their time foraging for food (Pickett, 2007, p. 5). Hens will walk considerable distances searching for food and are also able to fly short distances. Hens congregate in small groups that have a complex social organisation based on a pecking order or hierarchy. Trees are used for roosting at night and to escape from predators. Prior to laying, hens will seek out a secluded spot and build a nest to lay their eggs in. They also perform regular maintenance behaviours including preening and dustbathing.

[8] The Australian Egg Industry Association represented the various state-based egg farmer associations (Scrinis, Parker, & Carey, 2017, p. 794).
[9] See Australian Egg Corporation Limited (2015, p. 14).

The 1965 UK government's *Report on the Welfare of Animals kept under Intensive Livestock Husbandry Systems* (Brambell, et al., 1965, pp. 18-19) was the first time concerns were raised on animal welfare grounds regarding battery cages:

> *First, it must be noted that the degree of confinement to which the battery hen is subjected is extremely close and imposes strict limitation of the normal behaviour pattern of the bird. Cages containing two or three birds and measuring 12-14-inches wide and 17 inches deep are commonly used. Under such circumstances the birds cannot stretch their wings, move without touching one another or stand fully upright at the rear of the cage. …*
>
> *Much of the ingrained behaviour pattern is frustrated by caging. The normal reproductive pattern of mating, hatching and rearing young is prevented and the only reproductive urge permitted is laying. They cannot fly, scratch, perch or walk freely. Preening is difficult and dust-bathing impossible. On the other hand, it has been represented to us that in the conditions of controlled environment, ample food supply, and freedom from predators and external parasites the bird does not need or desire to behave in this way. We do not find this an entirely convincing argument. We accept the view that domesticated strains in general, and certain strains in particular, are much better adapted to caging than their wild ancestors would be, and doubtless suffer correspondingly less frustration, but we believe that the basic behavioural urges are there, though they may not be so compelling and the stimuli that would normally evoke them may be eliminated to a large extent. The caged bird, which is permitted only to fulfil the instinctive urges to eat and drink, to sleep, to lay and to communicate vocally with its fellows, would appear to be exposed to considerable frustration.*

Professor Bernard Rollin (2004, p. 959) of Colorado State University has observed that whereas in traditional agriculture animals had to be kept in environments for which they had evolved, they can now be kept in environments contrary to their natures but beneficial for increased productivity. Professor Rollin (2004, p. 958) has further commented:

> *With technological "sanders" – hormones, vaccines, antibiotics, air-handling systems, mechanization – we could force square pegs into round holes and place animals into environments where they suffered in ways irrelevant to productivity. If a 19th century agriculturalist had tried to put 1000,000 egg-laying hens in cages in a building, they all would have died of disease in a month; today, such systems dominate.*

The Productivity Commission (1998, p. 45) has stated that:

> *Much of the literature on hen behaviour suggests that dust-bathing, nesting and perching are important behaviours for hens, and that a production system that does not allow their appropriate expression is flawed.*

5.2 Public Opinion on Battery Cages

Concern for the welfare of layer hens in battery cages has probably attracted more debate than any other intensive husbandry system (Freire & Cowling, 2013). Both nationally and internationally, concern has led to calls by animal welfare groups for greater consumer awareness about the conditions of battery caged hens, stricter codes to alleviate perceived cruelty to layer hens and, in some cases, the abolition of the intensive battery cage system (Productivity Commission, 1998, p. 2). Consequently, the general public, led by animal welfare non-government organisation (NGO) campaigns, have called for alternative husbandry systems for laying hens that are more animal welfare-friendly, offering animals more space and freedom to express natural behaviour (van Asselt, Ekkel, Kemp, & Stassen, 2019, p. 294).

A 2017 survey undertaken on behalf of RSPCA Australia (2017) of 1,000 Australians, revealed that 84 per cent of the Australian public are concerned about the welfare of hens in battery cages, and that 8 in 10 want to see battery cages phased out.

The Productivity Commission (1998, p. 50) has previously stated that if it could be established that the broad community regarded battery egg production as cruel, it would suggest a ban. Animal welfare groups have argued that the majority of the community do not support cage egg production (Select Committee on the Use of Battery Cages for Hens in the Egg Production Industry, 2019, p. 15) and would be willing to pay more for eggs produced to higher animal welfare specifications (Animals Australia, 2018, p. 17).

6. Regulation of Battery Cages in Australia

6.1 Regulatory Scrutiny Over Battery Cages

Concern regarding animal welfare issues in relation to cage egg production systems has usually been addressed through legislation/regulation imposing minimum standards often based on scientific assessment (Trewin, 2001). This has been the case across other advanced economies.

Internationally, by the early 2000s, many countries had recognised the inherent welfare problems with battery cages and had introduced prohibitions on their use. In Switzerland, cage systems for laying hens were prohibited in 1992 (RSPCA Australia, 2016, p. 36). In Sweden in 1989, egg farmers were given a period of 10 years to phase out battery cages, which was later extended, and battery cages were no longer used from 2002. In Austria, battery cages were prohibited in 2009. In the European Union, the adoption of Directive 1999/74/EC prohibited housing laying hens in battery cages, effective from 1 January 2012.

In 2012 in New Zealand, an independent scientific review of layer hen welfare led by the National Animal Welfare Advisory Committee (NAWAC) resulted in a legislative phase-out of battery cages by 2022 (RSPCA Australia, 2016, p. 36). In 2016, Canada announced a phase-out of battery cages by 2036.

In Australia, throughout the 1980s and 1990s, a range of animal welfare advocacy groups continually sought to draw the attention of the public to the suffering of hens in battery cages, through media statements, direct protest action, and the publication of photographs and detailed descriptions of conditions inside battery cage egg farms of the time (Parker, Carey, De Costa, & Scrinis, 2017, pp. 374-375). In the late 1990s, animal welfare groups such as RSPCA Australia and Animals Australia campaigned for a ban on battery cages for layer hens (Scrinis, Parker, & Carey, 2017, pp. 793-794).

However, the Australian Egg Industry Association, the former peak body for the egg industry, opposed a ban on battery cages on the basis that the welfare needs of hens were met by battery cages, and they claimed a ban would deny the choice and needs of the majority of consumers at the time who purchased cage eggs (Scrinis, Parker, & Carey, 2017, p. 794). The Australian Egg Industry Association was also "not keen" on placing labels for battery eggs on its cartons, arguing that it was up to niche markets to distinguish themselves (Alcorn, 1999).

In 1999, the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (now the Primary Industries Ministerial Council) initiated a national review of layer hen housing systems (Sharman, 2008, p. 53). At its meeting in March 2000, ARMCANZ agreed upon the 'desirability' of abolishing battery cages (Animals Australia, 2018, p. 2n). ARMCANZ further agreed to consult widely with industry, animal welfare groups and the community with a discussion paper to be circulated (Trewin, 2001).

The review considered a proposal to ban battery cages, but rejected the proposal, citing the financial costs to the egg industry, and noting that no battery cage bans had yet been implemented anywhere in the world at that stage (Standing Committee on Agriculture and Resource Management Working Group, 2000; Scrinis, Parker, & Carey, 2017, p. 794).

Instead, in August 2000, ARMCANZ made decisions on layer cage housing which were incorporated into the 4th Edition of the *Model Code of Practice for the Welfare of Animals – Domestic Poultry* that required:

- That all new cage systems commissioned from 1st January 2001 must provide a floor space of 550 cm^2 per bird including the baffle
- Cages commissioned prior to 1 January 2001 had until 1 January 2008 to meet the 1995 standards and may be stocked with a minimum space allowance per bird of 450 cm^2 (3 or more fowls (<2.4kg) per cage) for 20 years from the date they were commissioned or until 1 January 2008, whichever was later (Tim Harding & Associates, 2006, p. ii).

Although accepted by ARMCANZ in May 2002 as part of an updated Model Code of Practice, it was up to each state to implement these standards through legislation (Padula, 2011).

By deciding not to recommend a ban on battery cages, ARMCANZ effectively delineated the increment in animal welfare above its designated minimum standard in relation to battery cages as a merit good.[10] Merit goods are those whose consumption the State judges to be 'positive' and, therefore, considers it appropriate to encourage it (Gómez-Barroso, 2019, p. 1379).

Eggs produced in higher welfare production systems become merit goods if cage eggs are still available because farm animal welfare is in the nature of an externality – an economic value that is not adequately handled through the normal market processes surrounding livestock farming (McInerney, 2004, p. 4). This is because people not directly involved in the production or consumption of a livestock product can nevertheless feel unease or a loss of benefit if animals are not treated well.

6.2 Market Reaction to Battery Cages

Since the decision by ARMCANZ to essentially leave it to the market to sort out the situation with battery cages, a significant shift has taken place in the consumer and retail market towards non-cage eggs (Select Committee on the Use of Battery Cages for Hens in the Egg Production Industry, 2019, p. 48). There has been a rapid rise in free-range egg production since the early 2000s, which now constitutes over 50 per cent of the shell-egg market (Scrinis, Parker, & Carey, 2017, p. 784).

[10] See McInerney (2004, p. 4).

Australia's major supermarket grocery chains responded to their reading of consumer sentiment regarding cage egg production by making "free range" choices more available and affordable (Parker, Brunswick, & Kotey, 2013, p. 170).

In January 2001, Australia's second largest supermarket grocery chain, Coles, launched a new barn-laid egg brand that was accredited by RSPCA Australia (Packham, 2001). At the time, Coles brand development manager Dennis Moore said barn-laid eggs already accounted for more than 10 per cent of the market, and sales were growing at about 35 per cent per year.

Australia's largest supermarket grocery chain, Woolworths, pledged to reduce cage egg lines from 20 to 11 in 2009 as well as signalled the potential of phasing out cage eggs altogether (Gettler, 2009 as cited by Parker, Brunswick, & Kotey, 2013, p. 170). In 2010, Coles announced plans to drop prices of free-range eggs to $4 per dozen immediately and remove its generic cage eggs brand from shelves by 2013 after an online 'Coles Mum's Panel' survey revealed that 95 per cent of 2,500 customers would switch to free range if the price was lower (Parker, Brunswick, & Kotey, 2013, p. 170).

In 2012 and 2013, Australia's two largest supermarket chains announced plans to improve animal welfare standards for a range of products, particularly own brand eggs as a response to their reading of consumer demand for higher welfare standards (Parker & Serinis, 2014, p. 324). In October 2012, Coles (2012 as cited by Parker & Serinis, 2014, p. 324) announced:

> *We know that many Australians want to feel good about the food they eat. So we're proud that all Coles brand eggs are cage free; they are now either barn laid or free range. Barn laid and free range hens are free to roam around, perch and dust bathe; all of which are natural behaviours. This initiative means that 350,000 hens will now never be caged.*

In October 2013, Woolworths (2013) announced:

> *As part of the partnership, Jamie Oliver has been working with Woolworths on a number of significant changes that are already underway.*
>
> *These include phasing out all cage eggs sold in-store by 2018, including those used in Own Brand products.*

Woolworths (2020) stopped selling cage eggs under the Woolworths brand in 2015, although it has pushed back the start-up date on its commitment to becoming cage free in relation to all supplier branded eggs and moving towards using only cage-free eggs as ingredients in its own brand products to 2025. In its *2019 Sustainability Report*, Woolworths (2019, p. 34) declared:

> *Since 2015, all Woolworths branded eggs are cage-free; laid by hens free from close confinement. We are continuing our work towards using only cage-free eggs as an ingredient in Own Brand products by 2025.*
>
> *We are also committed to be cage free by 2025 in relation to all supplier-branded eggs and in the year to date we have seen a 6.7% decline in caged egg sales.*
>
> *We are proud to report that we have been awarded the Compassion in World Farming (CIWF) Good Egg Award in 2019 for our commitment to ending the sale of caged eggs and caged egg products in our stores.*

Coles has committed to phase out cage eggs from stores in all states by 2023 (Sinclair, 2019). Coles stopped selling cage eggs in WA from 1 March 2019 and replaced its home brand cage eggs with home brand cage-free eggs "from hens free to socialise and perch in a big barn" (Brammer & Relph, 2019). In its 2019 Sustainability Report, Coles (2019, p. 36) reiterated its commitment to cage free eggs:

> *All our Own Brand shell eggs are cage-free; and, in FY19, we became completely cage-free across proprietary and Own Brand shell eggs in Western Australia. By the end of 2023, Coles aims to be cage-free for all shell eggs and eggs as ingredients in Own Brand.*

Coles has also committed that in 2023 all Own Brand products with eggs as an ingredient will be sourced from cage-free systems (Select Committee on the Use of Battery Cages for Hens in the Egg Production Industry, 2019, p. 54).

ALDI (2020) has also committed to phase out cage eggs by no later than 2025, for its range of exclusive-brand eggs, as well as any other shell egg brands offered in its stores. Selected IGA supermarket outlets have also made a commitment to phase out cage eggs (RSPCA Australia, n.d.).

According to Costco (2019):

> *Costco is committed to procuring cage-free eggs and continues to increase the percentage of cage-free eggs its sells worldwide …*
>
> *The transition to cage-free eggs will continue to increase with added availability and capacity of cage-free production.*

In 2019, 72.4 per cent of egg purchases from Costco (2019) in Australia were of cage-free eggs. Other smaller grocery retailers that have also committed to only retail cage free eggs include Harris Farm Markets (n.d.) that operate in NSW and Romeo's (2020) that operate in South Australia and NSW.

Other retailers have also made commitments to phase out cage eggs in their product offerings, or already completed their transition to cage-free eggs. This includes some large and high profile food service caterers, such as Sodexo, Compass Group, Spotless and food service distributor Bidfood. Quick service restaurant chains, such as McDonald's, Hungry Jacks, Starbucks, SUBWAY, Oporto, Grill'd, Nando's, The Coffee Club, and IKEA. Major food manufacturers such as Arnott's, Nestle, PepsiCo, Kraft Heinz, Allied Pinnacle, George Weston Foods, Goodman Fielder, Simplot, Unilever, Mars and McCain Foods.

In the hotel sector the vast majority of international hotel chains have global commitments to use cage-free eggs, such as Best Western, Four Seasons, Hilton, Hyatt Hotels, InterContinental Hotels, Marriott-Starwood Hotels, Radisson Hotel Group, Wyndham Hotel Group. As well in the tourism sector, both major cruise companies Carnival Corporation and Royal Caribbean have made commitments to use cage-free eggs.

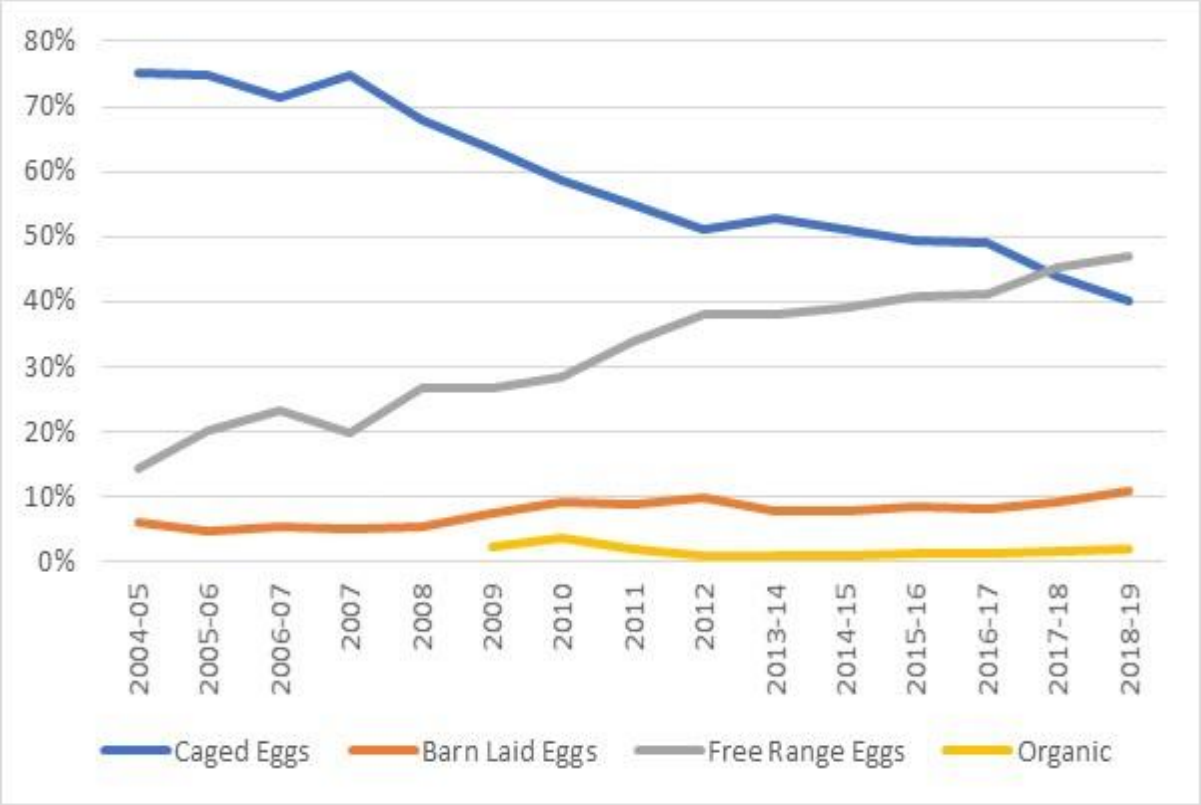
6.3 Market Trends in Egg Sales

The push by the major supermarket grocery chains has been highly successful in boosting sales of free-range eggs at the expense and subsequent decline in sales of cage eggs. The Egg Farmers of Australia (2019) have complained about their forced transition from battery cages to non-cage production systems in the following terms:

> *In mid-2014 retailers maneuvered the market into non caged egg production with the threat to stop selling caged eggs by 2018. Most farmers responded again and have now fully overstretched capacity to finance to meet this threat. Those same supermarkets, while claiming now they have aspirational targets for non-caged eggs, are still demanding caged egg supply.*

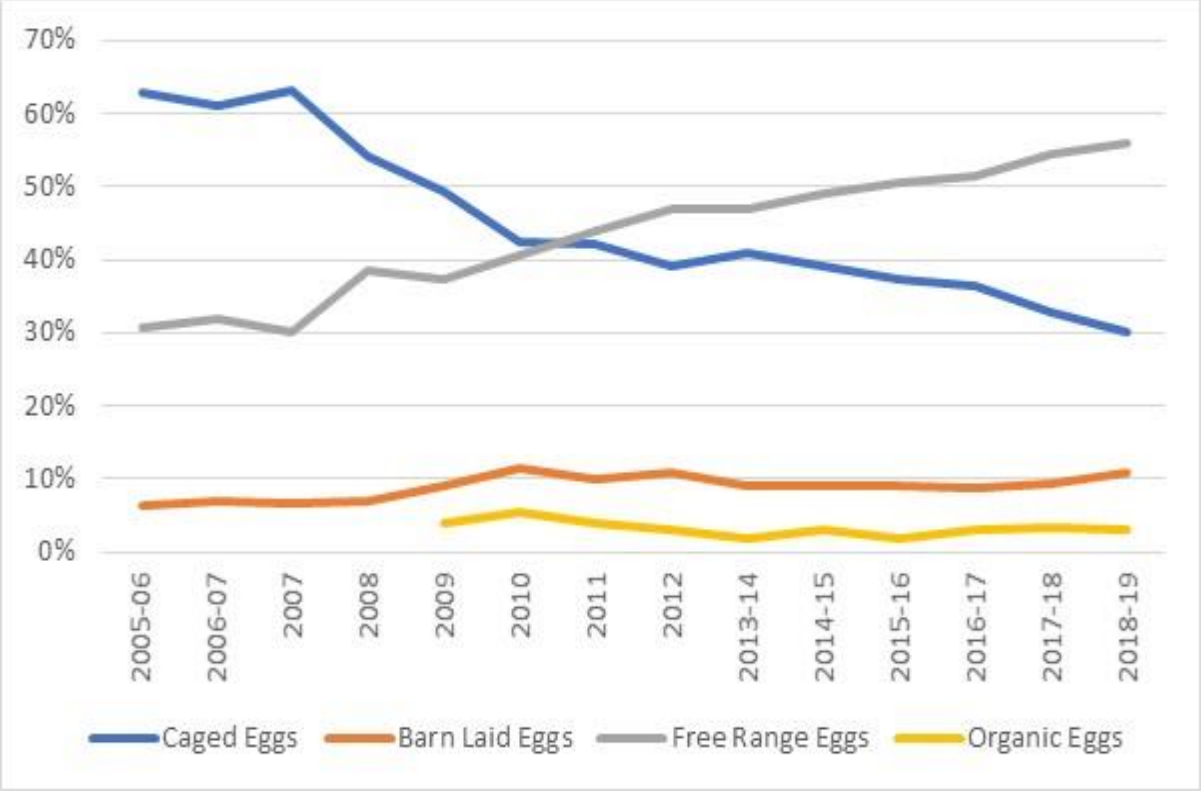
The sale of free-range eggs has now overtaken cage eggs in terms of both volume and value through the grocery sector, as outlined in Figure 4 and Figure 5 below.

Figure 4: Egg Production System and Market Share of Grocery Sales by Volume (percentage)



Source: Australian Eggs Ltd (2019).

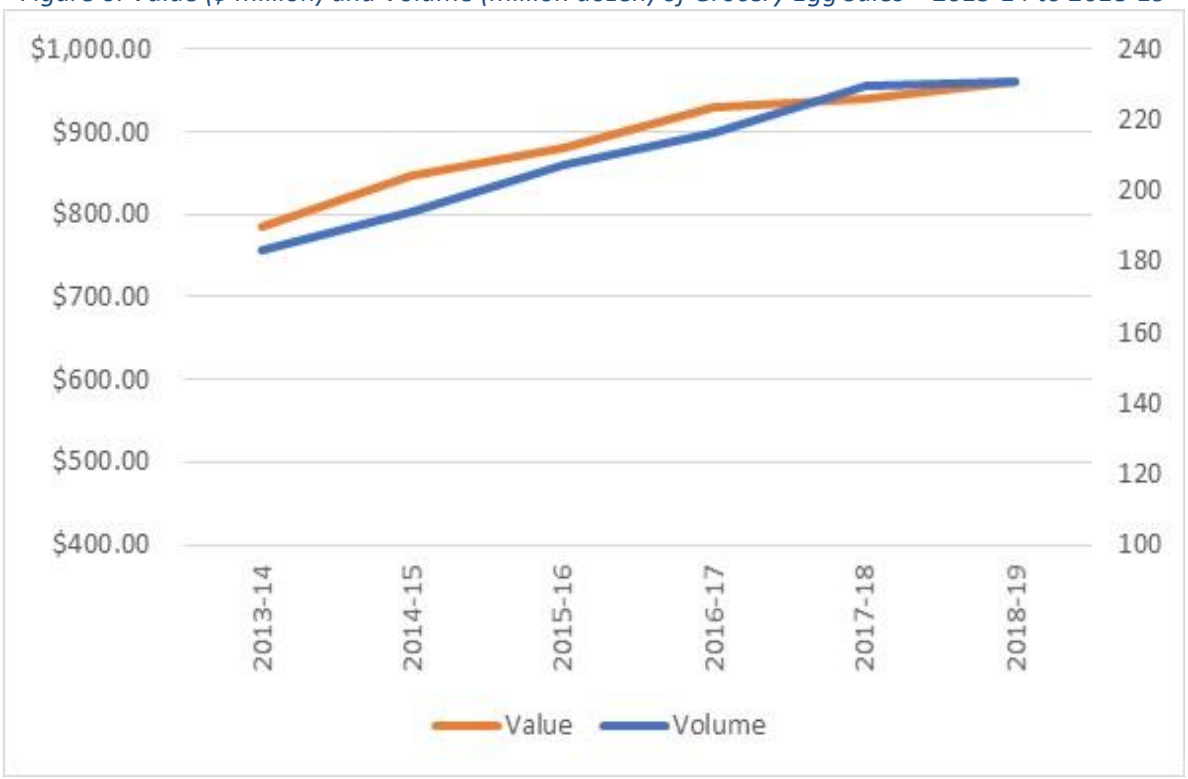
Figure 5: Egg Production System and Market Share of Grocery Sales by Value (percentage)



Source: Australian Eggs Ltd (2019).

As the relative level of sales for cage eggs in the retail grocery sector has declined, both the volume and value of egg sales has continued to rise, as outlined in Figure 6 below.

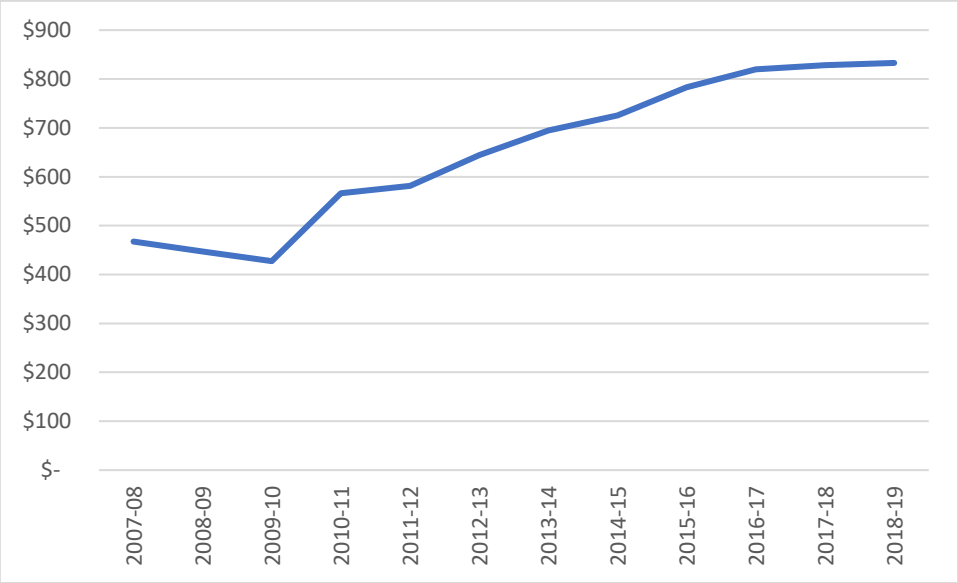
Figure 6: Value ($ million) and Volume (million dozen) of Grocery Egg Sales – 2013-14 to 2018-19



Source: Australian Eggs Ltd (2019).

While the production of cage eggs has been in relative decline, the gross value added of egg producers has continued to increase.[11] This is outlined in Figure 7 below.

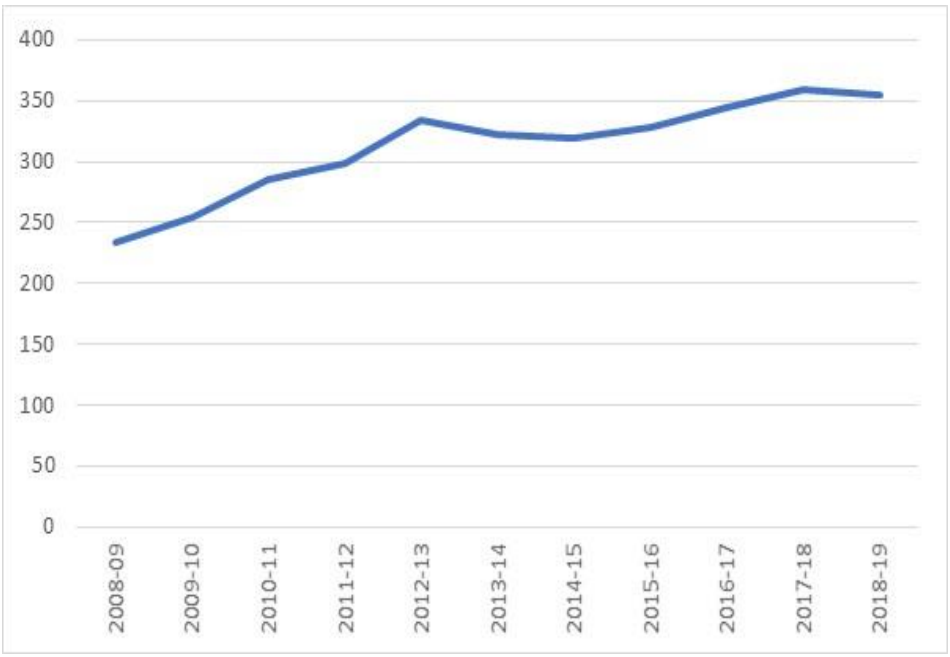
Figure 7: Gross Value Added of Egg Producers – 2007-08 to 2018-19 ($ million)



Source: ABS (2020c).

While the production of cage eggs has been in relative decline, egg production has been trending upwards, even though overall production dipped slightly in 2018-19. This is outlined in Figure 8 below.

Figure 8: Volume of Australian Egg Production – 2008-09 to 2018-19 (million dozen)



Source: ABS (2020).

[11] Gross value added is the difference between output and intermediate consumption for each institutional unit and thereby measures the value created by production. Value added represents the contribution of labour and capital to the production process.

In early 2017, the Managing Director of the Australian Egg Corporation Limited (now Australian Eggs Limited), Rowan McMonnies, commented:

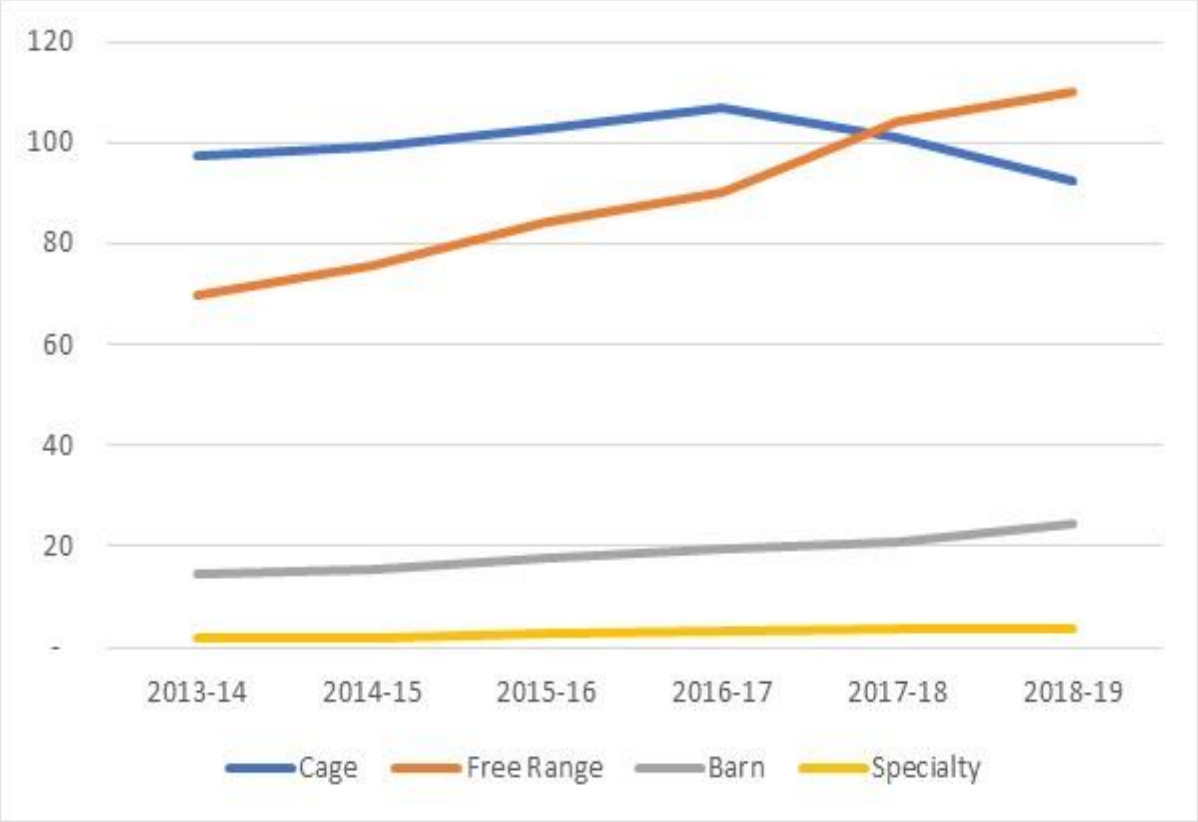
> *I would say a 49.5 per cent [market share of caged egg sales] is a significant proportion, a very high number, and while the trend is undeniable, the category is growing. (Han, 2017)*

Reflecting this sentiment, a 2017 regulation impact statement similarly observed:

> *There has been a steady trend in growth of non-cage eggs over the last 10 years, predominantly as a result of growth in free range egg supply. However, when conventional cage eggs are viewed in isolation, the available evidence indicates that conventional cage eggs are not a disappearing category and have in fact grown in key segments. IRi grocery scan data indicates that conventional cage egg sales reached record levels in terms of volume in 2016 … (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 140).*

While the above statements indicate that cage eggs were not disappearing as a category of egg sales back in 2017, this is no longer the case. It appears that the sale of cage eggs through major supermarket grocery chains peaked in 2016-17 and are now in decline. This is demonstrated in Figure 9 below.

Figure 9: Egg Production System by Volume of Grocery Sales (million dozen)



Source: Australian Eggs Ltd (2019).

Some parts of the egg industry have characterised the push by the grocery supermarket chains to phase out battery cages as not being driven by consumers, but rather being driven by animal welfare groups and the major retailers themselves.[12]

[12] See Spencer (2018, p. 36).

However, according to Professor Christine Parker (2019, p. 2) of the University of Melbourne:

> *A very high proportion of consumers … buy free range and barn eggs when given the opportunity in supermarkets. This clearly indicates that a majority of Australians are very concerned about the cruelty of barren battery cages and are prepared to pay more to ensure that they are not buying eggs that come from such systems.*

Other parts of the egg industry have accepted the change that is being imposed upon them by the grocery supermarket chains and are moving to transition their egg production systems accordingly. The Chairman of Farm Pride Foods, Mr Peter Bell, commented in August 2019 that:

> *The business continues to invest in developing its cage free offer, and to this end, is engaging new contract farms and will also add new company operated farm capacity in the new-year. Farm and flock capacity increases will be in line with business awarded to Farm Pride and to remain ahead of the supermarkets' timetable to convert from cage to cage free eggs over coming years. (Farm Pride Foods Ltd, 2019a, p. 2)*

The Chief Exective Officer of Farm Pride Foods, Mr Daryl Bird, commented at its 2019 Annual General Meeting that:

> *Supermarket retailers will continue to push from cage to cage free eggs. Momentum will build steadily over the next 2-3 years. Farm Pride, as with other major suppliers in the industry, will need to continue to invest new farms and infrastructure to support this transition. (Farm Pride Foods Ltd, 2019)*

Earlier this year the Chairman of Farm Pride Foods commented further:

> *It remains a challenge not just for our Company, but for the industry as a whole, to manage the investment required in new cage free infrastructure and the bird flocks necessary to meet the demands of our customers. Improving wholesale pricing and receiving a fair return for our products and services from our key retail customers remains the most critical long-term challenge. Farm Pride and the industry must meet rising costs of business, offset the impact of drought and most importantly provide the necessary funds to permit the appropriate investment required to meet the timetable and logistical challenges for transition from cage to cage free. Farm Pride continues to support efforts at this level and is also working closely with our major customers in seeking to understand and solve this challenge. (Farm Pride Foods Ltd, 2020)*

While market driven initiatives have so far proven to be highly effective in regard to reducing the market penetration of cage eggs in the trolley market, Emeritus Professor John McInerney (2004, pp. 51-52) of the University of Exeter has suggested that there are probably limits to a market-based approach in regulating animal welfare, particularly in relation to cage eggs:

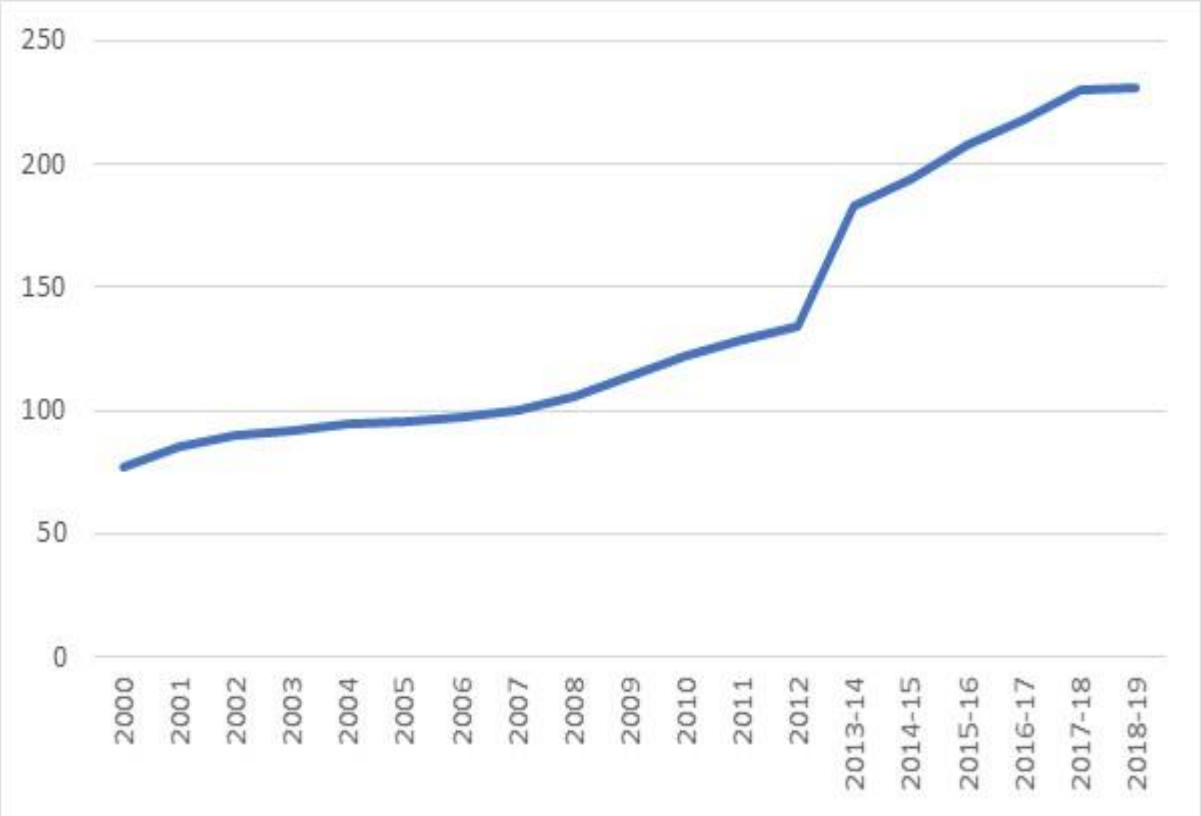
> *Higher hen welfare as a merit good will not find much uptake among those to whom its merit is neither recognised nor valued, and who continue to select the lowest priced eggs that are made available. Further, provision via product markets can only work effectively where welfare quality characteristics are directly associated with simple, definable features of animal production systems that are widely recognised by consumers so they can become a focus for choice; they must also be presented explicitly and certifiable as product characteristics. This very much limits the scope of a demand-driven approach to animal welfare improvement, and will tend to emphasise the putative inputs to welfare (and a restricted set of those) rather than outcomes.*

7. Transitioning away from Battery Cages

7.1 Market Share of Grocery Supermarket Chains

In its annual report each year, Australian Eggs Limited publishes figures on the volume of egg sales from grocery supermarket chains obtained from barcode data. The total volume of sales from grocery supermarket chains based on barcode sales data is provided in Figure 10 below.

Figure 10: Supermarket Grocery Sales of Eggs by Volume – 2000 to 2018-19 (million dozen)



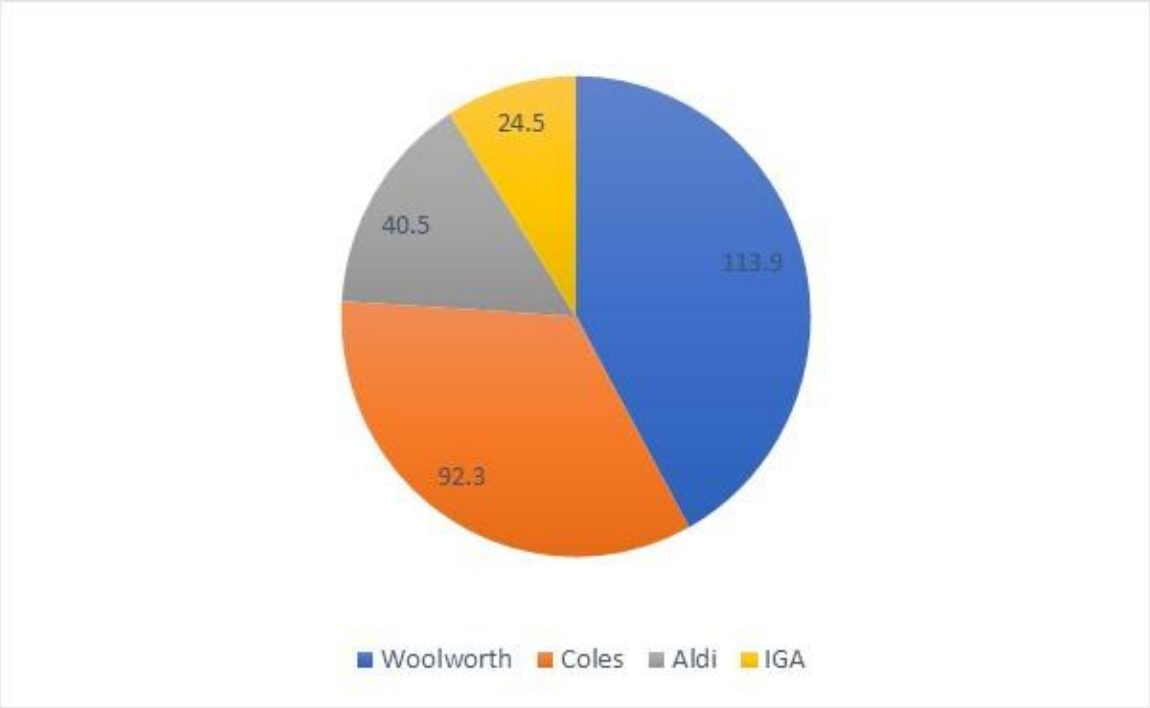
Sources: Australian Egg Corporation Limited (2011) and Australian Eggs Ltd (2019).

However, the barcode data only covers a select group of grocery supermarket chains in Woolworths, Coles and IGA. It does not cover Aldi nor other supermarkets and other retailers. As a consequence, egg sales through grocery supermarkets are much higher than is reported by Australian Eggs Limited based on the reported barcode sales data alone.

The fact that barcode data under-reports the total number of egg sales by grocery supermarkets is not new, with a presentation to the 20th Australian Egg Corporation Limited Forum by Martin Kneebone of Freshlogic suggesting that grocery supermarkets were retailing 228 million dozen eggs per annum (Australian Egg Corporation Limited, 2015), when the Australian Egg Corporation Limited (2015a) was reporting annual grocery supermarket sales in the order of 188 million dozen in the 2014 calendar year. This suggests that barcode data is under-reporting egg grocery supermarket sales by more than 20 per cent.

Based on the relative position of Aldi in the grocery sector compared to Woolworths, Coles and IGA (Roy Morgan (2019; 2020), we estimate that during 2018-19, Aldi was selling somewhere in the order of 40.5 million dozen eggs. This suggests that in 2018-19, Woolworths, Coles, Aldi and IGA were responsible for selling around 271.3 million dozen eggs, accounting for around 76.4 per cent of total Australian egg production in 2018-19. Our estimate of egg sales by major grocery supermarket chains in outlined in Figure 11 below.

Figure 11: Estimate of Egg Sales by Major Grocery Retailers in 2018-19 (million dozen)



7.2 Extrapolating Future Egg Supply and Demand

Even though it is difficult to forecast the future, if one assumes the grocery supermarket chains are able to achieve their commitments to only retail cage-free eggs by 2025, then this suggests that cage-free eggs retailed from grocery supermarket chains will account for somewhere in the order of 73 per cent of Australian egg production for human consumption. This is based on the following assumptions:

- Woolworths, Coles and Aldi fulfil their commitments to only retail cage free eggs by 2025
- The split between the sale of cage versus non-cage eggs across IGA supermarkets is 50-50 by 2025.

Data is not available on the supply and demand for eggs from the remaining distribution channels. However, if one further assumes that Costco is also able to procure only cage-free eggs by 2025, then this could add at least another 1 per cent of Australian egg production that is cage free.[13]

In turn, this leaves the remaining egg distribution channels:

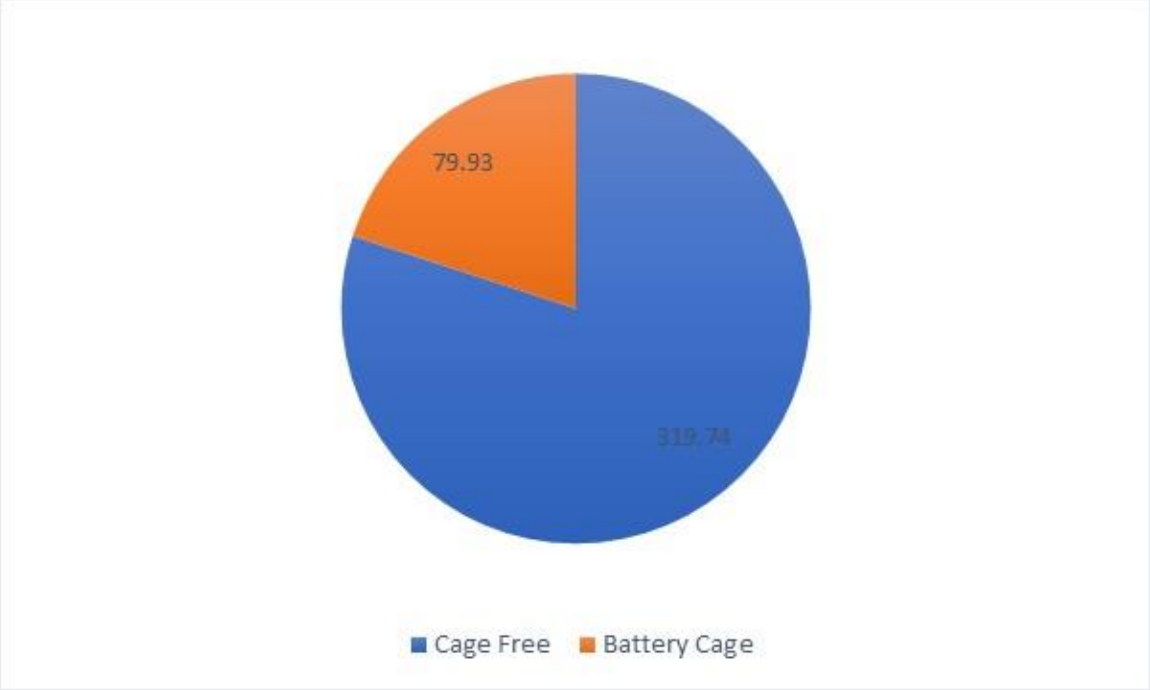
- the remainder of the egg trolley market composed of retailers such as other grocery supermarkets, specialist retailers and green grocers that are not included in the collection of barcode data
- the box market where eggs are sold in either shell or pulp form to food service providers
- the food processing market.

Anecdotal evidence suggests that demand for cage eggs in the box market and food processing market is higher than that in the egg trolley market (Select Committee on the Use of Battery Cages for Hens in the Egg Production Industry, 2019, p. 50). While a number of major food retail chains and food manufacturers are only using cage-free eggs or are transitioning to only using cage-free eggs, a significant proportion of eggs used in food manufacturing come from conventional battery cage systems (NSW Department of Primary Industries, 2019, p. 9).

If one assumes that cage eggs make up just over three quarters of the remaining egg distribution channels, then this suggests that non-cage eggs will account for around 80 per cent of egg production by 2025, with cage eggs accounting for the remaining 20 per cent.

If one extrapolates on the growth trend in egg production for the last 5 years based on ABS data[14], then this suggests egg production will be somewhere in the order of 399.7 million dozen by 30 June 2025. Assuming that cage egg production still accounts for 20 per cent of egg production in 2025, then this suggests that cage egg production will still be in the order of 79.9 million dozen. Our projections on egg production in 2025 by production system is outlined in Figure 12 below.

Figure 12: Projections on Egg Production in 2025 by Production System (million dozen)



[13] This assumption should be treated with caution as there is no publicly available information on the volume of egg sales from Costco.
[14] See ABS (2020).

7.3 Costs of Converting Battery Cages to Furnished Cages from 2025

As part of the development of new national animal welfare standards for the poultry industry, the additional or incremental cost of transitioning away from battery cages was estimated in a consultation regulatory impact statement (RIS) in 2017 (Tim Harding & Associates and Rivers Economic Consulting, 2017). The cost of transitioning away from battery cages in this RIS were broken up into the following components:

- existing facility conversion costs
- existing facility conversion downtime costs
- new facility infrastructure costs
- new facility land costs
- new facility ongoing business fragmentation costs (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 134).

We have estimated the cost of converting the remaining egg production from battery cages in 2025 over to furnished cages employing a similar methodology as outlined in the consultation regulation impact statement, while also noting where we have departed from the approach previously adopted. Important differences to note are:

- We have assumed the changes announced by the grocery supermarket chains and others to go cage free are fully implemented by 2025
- We have taken egg production figures provided by the ABS rather than those provided by the egg industry.

Because hens are less productive in furnished cages than hens in battery cages (349 eggs per hen over 62 weeks in battery cages compared to 343 eggs per hen over 60 weeks in furnished cages), the total number of laying hens needs to increase in order to be able to maintain the same volume of egg supply.[15]

Using the egg productivity data from Table A3.1 of the RIS (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 130) in relation to the number of eggs produced per hen housed (343) and the week housed (60 weeks in production and 1 week of down time), and converting this to an annualised figure, we estimate there will need to be 3.28 million laying hens in furnished cages to produce 79.9 million dozen eggs.

Taking account that there will be a capacity loss in moving from battery cages to furnished cages means that converting conventional battery cage farms over to furnished cages will not be able to house the entire 3.28 million laying hens required to make up for the loss of egg production from battery cages. Based on the estimated capacity loss associated with moving from a battery cage system to a furnished cage system based on Table A3.1.1 of the RIS (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 131), only around 75 per cent of the 3.28 million laying hens will be able to be housed in converted battery cage sheds, or only around 2.46 million laying hens can be housed in converted facilities. In turn, this means that around 818 thousand laying hens will need to be housed in entirely new furnished cage production facilities.

The RIS estimated the cost per hen from converting existing battery cage facility to a furnished cage was $40.50, while the cost per hen from constructing a new furnished cage facility was $68.08 on average (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 133). As these figures were provided in 2016-17 dollar, they have been deflated by the consumer price index to bring them up to current prices of $42.06 and $70.70 respectively as of the end of June 2020.[16]

[15] See Tim Harding & Associates and Rivers Economic Consulting (2017, p. 130).
[16] See ABS (2020a).

This suggests that the cost of converting existing battery cage facility over to furnished cages as well as constructing new furnished cage facilities will be in the order of $161.4 million.

In addition, new land may need to be acquired for the construction of new furnished cage facilities. The RIS used the estimate that 50 hectares of land was required per 80,000 laying hens (taken for colony cages) (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 138). On this basis, around 511 hectares would be required to house 818 thousand laying hens.

The RIS used land cost per hectare of $9,759 (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 137). Deflating this by the consumer price index brings this amount up to a current price of $10,126 per hectare as of the end of June 2020.

This suggests the cost of new land acquisition required for the housing of new furnished cage facilities would be in the order of $5.2 million.

The RIS also assumed that additional ongoing costs per hen would be incurred due to business fragmentation (management, transport/logistics) where some farms would have to be split into multiple sites due to constraints on expanding existing farms in relation to buffers and council requirements (Tim Harding & Associates and Rivers Economic Consulting, 2017, p. 138). This cost was put at $2.37 per hen in furnished cages, that converts to $2.46 as of the end of June 2020. Applying the costs of business fragmentation to laying hens in new furnished cage facilities suggests there would be ongoing costs in the order of $2 million per annum.

There would also be costs arising from downtime associated with converting existing cage egg facilities to furnished cage facilities, although those costs appear to be relatively minor compared to the costs of conversion, the construction of new facilities and the acquisition of land, and have not been estimated.[17]

The one-off costs of converting existing battery cages to furnished cages as well as constructing new furnished cage facilities and the associated land acquisition would in total be in the order of $166.6 million, with possible ongoing costs arising from business fragmentation in the order of $2 million per annum. A summary of the various cost components is provided in Table 2 below.

Table 2: Summary of Battery Cage Conversion and New Facility Costs

Category of Costs	**Cost $ million June 2020**
One-off Capital Costs	
Existing facility conversion costs	$103.6
New facility infrastructure costs	$57.8
New facility land costs	$5.2
Total Capital Cost	**$166.6**
Annual Costs	
New facility business fragmentation costs	$2.0
Total annual cost	**$2.0**

[17] See Tim Harding & Associates and Rivers Economic Consulting (2017, p. 138).

7.4 Transition timeframe from 2025

The timeframe over which the industry can transition away from the remaining battery cages should take into account the effective economic life of a battery cage and the date on which the current infrastructure was installed.

The Australian Egg Industry Association, the former peak representative body for the egg industry, commented in a submission to the Productivity Commission (1998, p. 69) that the indicative economic life of equipment in a battery cage system was 20 to 25 years. The New Zealand National Animal Welfare Advisory Committee (2012, p. 14) factored in an average lifespan of around 18 years for battery cages.

The Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) decision in August 2000 established an economic life for cages of 20 years from the date the cages were commissioned (Tim Harding & Associates, 2006, p. ii). The then Australian Bureau of Agricultural and Resource Economics (ABARE) proposed that, because of the increased risk of disease and reduced production efficiency over time of using a cage system, that 20 years is seen as an appropriate benchmark for the 'typical' economic life of cages (Tim Harding & Associates, 2006, p. 27).

A 20-year economic life is also referred to in the 2001 *Model Code of Practice for the Welfare of Animals – Domestic Poultry* which states that:

> *Cages meeting all 1995 standards … have a life of 20 years from date of manufacture, or until 1 January 2008 whichever is later, when they must be decommissioned or modified to meet standards applying at the time. (Primary Industries Standing Committee, 2002, p. 3)*

Assuming there has been little new investment in battery cages since 1 January 2008, this would suggest that the effective economic life of the existing stock of battery cages would be exhausted by the end of 2027. On this basis, a regulatory decision to transition away from battery cages by the beginning of 2028 would allow the majority of cage infrastructure to live out its economic life and limit capital redundancy costs. The potential for compensation for businesses that invested in battery cages following 1 January 2008 is considered in subsection 8.3 below.

A 20-year economic life for battery cages implies that most of the existing stock of battery cages will need to be replaced before 2028. In turn, this suggests that existing cage egg producers will need to incur costs to upgrade their egg production systems in any event before 2028, thereby mitigating the cost that can be attributed to any proposed regulation requiring a transition away from conventional battery cages.

8. Structural Adjustment Assistance

8.1 Egg Industry Position on Transitioning away from Battery Cages

Cage egg producers are generally opposed to phasing out battery cages. According to the peak industry body for egg producers, Egg Farmers of Australia (2017, p. 1):

> *Suggestions that a phase out of cage production is manageable overlook the incremental reform the industry has achieved since 2002. After the last model code review the industry spent $500 million upgrading its cage systems. We made a sizeable transition from battery cages to conventional systems.*

> *A phase out of cage egg production will make a carton of eggs up to $1 per carton more expensive and will force Australians to pay up to $200 million more for eggs. This increase in cost will be not be shouldered evenly across Australia; it will be borne by those in Australia that currently rely on the most affordable protein source available in the form of cage eggs. In addition, the industry will consolidate and retract, and some family farms will be forced to shut down.*

It is undoubtedly the case that the transition away from battery cages will impose compliance costs on cage egg producers who wish to remain in the industry, and an eventual ban on battery cages may increase the cost of the cheapest category of eggs. However, the price differential may be much less than $1 at some retail outlets, particularly as the difference between the cost of producing a dozen battery cage eggs ($1.61) and a dozen furnished cage eggs ($1.66) is relatively minor.[18]

Egg Farmers of Australia (2017, p. 20) have also warned that transitioning away from battery cages would reduce the international competitiveness of the Australian egg industry:

> *Any move to phase out all cage farming in Australia would make Australian egg farmers the least internationally competitive egg farmers.*

Egg Farmers of Australia (2017, p. 20) have further warned that any move to transition away from battery cage egg production would make the Australian egg industry internationally uncompetitive, threaten industry stability, create egg shortages and increase the price of protein. Given the Australian egg industry is not significantly trade exposed due to the ban on shell egg imports and exports of egg products are relatively low, there is limited substance behind claims regarding a loss of international competitiveness.[19]

However, consideration will be given as to whether any regulatory decision to transition away from battery cages should facilitate structural adjustment assistance on the part of battery cage egg producers.

8.2 Policy Grounds for Structural Adjustment Assistance

Structural adjustment refers to changes in the size and make-up of an economy in terms of the distribution of activity and resources among firms, industries and regions (McColl & Young, 2005, p. iii). These changes occur from the interaction over time of a wide variety of natural, social and economic forces within the economy. The more obvious responses are resource shifts among industries and regions, and in the development of new products and processes.

Where product and factor prices adjust immediately and resources can be reallocated without cost there is no need to provide any structural adjustment assistance (Nsouli, Rached, & Funke, 2005, p. 741). However, in the real world, resources cannot be reallocated instantaneously without incurring costs. In particular, factors of production such as labour and capital may be sector specific and not readily transferable between sectors.

[18] See Tim Harding & Associates and Rivers Economic Consulting (2017, p. 130).
[19] See ABS (2020b).

The Productivity Commission (2001, pp. 12-13) has identified several costs associated with structural adjustment:

- Adjustment costs which arise because a policy change requires workers, firms and consumers to engage in adjustment related activities.
- Redundancy costs that comprise output or consumption forgone where a policy change gives rise to unemployment or underemployment of labour and capital.
- Compliance and administration costs. This includes cases where changes in regulations require individuals and firms to undertake various tasks to comply with their provision.

There appears to be no widely accepted economic analytical framework for the provision of structural adjustment assistance. According to Professor Glenn Withers (1999, p. 243) of the Australian National University:

> *... structural adjustment, to my mind, remains a category of ad hoc policy measures still searching for an analytical framework.*

While some policy measures designed to assist with structural adjustment within the labour market can be justified on economic grounds, other selective policy measures that target assistance towards particular groups or regions arguably reside on a less firm policy footing.

The Productivity Commission (2001, p. XVIII) has expressed the view that the social safety net mainly provided through the social security system and generally available adjustment measures such as those provided through labour market programs will in principle usually be the most appropriate vehicles for assisting the process of adjustment and moderating any adverse distribution impacts arising from policy-induced or market-based structural adjustment. In its deliberations on what circumstances warrant additional structural adjustment assistance, the Productivity Commission (2001, p. XIX) has concluded that the case is likely to be strongest where a proposed policy change:

- imposes a clear and sizable burden on a specific group in the community (particularly if the affected group is relatively disadvantaged)
- delivers benefits mainly to relatively advantaged groups in the community
- involves a largely unanticipated and material change to a well-defined and defensible property right.

While assistance designed to *'buy-off' opposition* to a policy change may appeal on pragmatic grounds, it is fraught with difficulties and carries considerable risks (Productivity Commission, 2001, p. XIX). According to Professor Wolfgang Kasper (1999, p. 140) of the University College at the Australian Defence Force Academy, "policy makers committed to the common good and long-term productivity growth should be extremely cautious about any form of compensation." Similarly, Cliff Walsh (1999, p. 221) from the South Australian Centre for Economic Studies takes a cautious approach to the provision of structural adjustment assistance, arguing "*compensation* for change — whether market-driven or policy-induced — is generally undesirable, other than in truly exceptional circumstances". However, Walsh observes that just what constitutes exceptional circumstances is open to debate.

8.3 Do Battery Cage Egg Producers Deserve Structural Adjustment Assistance?

The question as to whether battery cage egg producers deserve structural adjustment assistance revolves around the question as to whether their battery cages would be forced into premature scrappage or redundancy ahead of their effective economic life.

If battery cages were forced into redundancy ahead of their effective economic life through a regulatory mandate, then battery cage egg producers could legitimately claim they have been subject to a regulatory taking on the part of government and would have reasonably strong grounds on which to pursue compensation.[20] In this event, battery cages would become stranded assets.[21]

As discussed at 7.4, applying an economic life of 20 years and assuming there has been little new investment in battery cages since 1 January 2008, this would suggest that the effective economic life of the existing stock of battery cages would be exhausted by the end of 2027. On this basis, a regulatory decision to transition away from battery cages by the beginning of 2028 would not warrant any compensation on the part of most battery cage egg producers. The only exception to this being in relation to any egg producers who installed their battery cages following 1 January 2008. In this case, compensation could be considered on a case-by-case basis. However, given potential moves to examine the feasibility of phasing out battery cages has been on the policy agenda since at least 2000, grounds for compensating for egg producers who installed battery cage systems after January 2008 would also be arguably weak.

9. Conclusions

Market-driven initiatives have so far proven to be highly effective in reducing the market penetration of cage eggs in the trolley market. However, there are probably limits to a market-based approach in regulating animal welfare in relation to the production of cage eggs.

The one-off costs of converting existing battery cages to furnished cages as well as constructing new furnished cage facilities and the associated land acquisition is estimated to be in the order of $166.6 million, with possible ongoing costs arising from business fragmentation of $2 million per annum.

Given most existing battery cage egg systems were installed prior to January 2008 and the effective economic life of a battery cage system is around 20 years, a regulatory decision to transition away from battery cages by the beginning of 2028 would not warrant any compensation on the part of most battery cage egg producers.

[20] A regulatory taking is a valid government action that reduces the value of a private owner's property (Ulen, 1998, p. 570).

[21] Stranded assets are assets that have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities. (Caldecott, Tilbury, & Carey, 2014, p. 2)

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