

The Economics of Regulations on Hen Housing in California

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Beginning January 1, 2015, conventional cage housing for egg-laying hens is scheduled to be prohibited in California. We consider the economic implications of the new hen housing regulations on the California shell egg industry. Our data show that egg production is more costly using noncage systems than conventional cages. The main result of the new regulations will be a drastic reduction in the number of eggs produced in California, a large increase in egg shipments from out of state, little if any change in hen housing for eggs consumed in California, and little change in egg prices in California.

Key Words: animal welfare regulation, hen housing, egg supply, egg prices, egg costs of production

JEL Classifications: Q11, Q18

The passage of a November 2008 ballot initiative in California resulted in a new law to mandate space requirements for egg-laying hens in the state. Additional regulations on animal agriculture bring a need for increased understanding of the economic implications of specific policy measures. Such economic analysis is useful both for *ex ante* policy deliberations and for understanding *ex post* industry adjustments. This article considers the economic implications of new hen housing regulations on the shell egg industry in California. We first address egg production and the market for eggs in California. We then

outline costs of production of eggs in California and present new data on how production costs differ in different housing systems for egg-laying hens. With this background, we analyze how complying with the new law will affect the quantity and location of eggs produced and consumed in California.

The Proposition and Scheduled New Regulations

In the November 2008 general election, California voters voted two to one for a proposition (known as Proposition 2) establishing the Treatment of Farm Animals Act, which mandates minimum space requirements for confining certain farm animals (veal calves, pregnant pigs, and egg-laying hens). Enforcement of the new regulations is scheduled to begin on January 1, 2015.

Before the end of the 6-year span from the election to the start of enforcement, agricultural producers within California will be required to comply with the law, stated as follows: “In

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addition to other applicable provisions of law, a person shall not tether or confine any covered animal, on a farm, for all or the majority of any day, in a manner that prevents such animal from: (a) Lying down, standing up, and fully extending his or her limbs; and (b) Turning around freely" (California Health and Safety Code Section 25990). As indicated, the parameters that define the mandated minimum space do not constitute a specific measurement but rather are dictated by the ability of the animal to perform particular behaviors. For egg-laying hens confined for the purpose of egg production, "fully extending his or her limbs" is further defined as follows: "Fully extending his or her limbs means fully extending all limbs without touching the side of an enclosure, including, in the case of egg-laying hens, fully spreading both wings without touching the side of an enclosure or other egg-laying hens" (California Health and Safety Code Section 25991[f]).

Egg Supply and Demand in California

This section provides some background necessary to understand the economic situation of the California egg market before the passage of Proposition 2. A few definitions are required to clarify the history and current situation of egg production and consumption in California and the rest of the United States. Hatching eggs are those eggs produced to supply meat chickens to the broiler industry and layer hens to produce eggs. Table eggs include both shell eggs and breakers. Shell eggs are those table eggs marketed in the shell. Breakers are those table eggs marketed in liquid form most often to the food processing or food service.

Large-scale commercial egg production in California began in the 1920s with the development of the artificial incubator, increased availability of commercial feed, and the advancement of flock management techniques. These changes led to development and widespread use of cage housing systems (Rahn, 2001).

By 1971, California's laying hen population reached its maximum at nearly 42 million birds. At this time, approximately 40% of California production was shipped to out-of-state markets (Bell, 1988). In 1971, 59 billion table eggs were

produced in the U.S. with 8.5 billion or approximately 14% of these produced in California. From that point in the early 1970s up to 2008, the combination of California's high feed costs and lower average prices for table eggs shipped out of state led to a decline of approximately 1.4% per year in California table egg production. By 2008, U.S. table egg production increased to 77 billion eggs with 5.2 billion or 6.7% coming from California (U.S. Department of Agriculture [USDA]–Economic Research Service, 2010; USDA–National Agricultural Statistics Service [NASS], 2010). California farms had approximately 19.9 million laying hens and the total value of egg production in 2008 was approximately \$440 million (USDA–NASS, 2009).

Average egg consumption in the United States in 2008 was approximately 248 eggs annually per person (USDA–ERS, 2010). This estimate includes direct consumption of eggs and egg products plus eggs used in processed foods. Applying this national estimate, the 37.7 million Californians consumed 9.2 billion table eggs in 2008. Shell egg consumption in California accounts for roughly 7.4 billion eggs or 80% of total 2008 consumption. Based on information from the industry, almost all of California's egg production is marketed as shell eggs. Therefore, approximately 70% of the shell eggs consumed in California in 2008 came from California production with the remaining 30% of shell eggs and all the nonshell egg consumption coming from out-of-state production. Therefore, in 2008, of total eggs consumed in California, approximately 4 billion eggs or 43% came from out of state.

The 2007 *Census of Agriculture* reports that over 5,000 farms in California had a total of just over 21 million laying hens aged 20 weeks or older. Of these 5,000 farms, 60 reported flock sizes of 20,000 or more laying hens with a combined population of 20.7 million hens or 98.5% of California's total flock. The Census reports 37 of these 60 farms with 100,000 hens or more and these accounted for 19.7 million hens or 94% of the hens (USDA–NASS, 2007). The Census gives no further breakdown, but Watt Poultry (2007), an industry publication, reported that in 2007, four farms in California

had a combined flock of 8.8 million hens, which is 42% of laying hens in California.

Several of the larger operations in California have egg production facilities in other states. For example, Norco Ranch is owned by Moark LLC, which is itself a subsidiary of Land O' Lakes, a farmer cooperative based in Minnesota. Moark LLC has 17 egg production facilities spread across eight states and the company markets eggs from more than 24 million hens (Moark, L.L.C., 2008). It is the third largest egg producer in the country and four of its shell egg facilities are located in California.

Egg Production Costs and Differences in Costs across Housing Systems

This section first discusses the major categories of table egg production costs. This is followed by a comparison, using data from industry sources, of these costs between cage housing systems and noncage housing systems.

Producers' net returns depend on the difference between the egg revenue and the cost to produce those eggs. More than 80% of the variable costs and two-thirds or more of the total costs of egg production can be attributed to two factors: feed and pullets (Rahn, 2001). Feed cost per dozen eggs is equal to the amount of feed used by a laying hen to produce a dozen eggs, known as the conversion ratio, and the cost of feed per unit in the ration. As a result of changes in hen genetics, the conversion ratio has gradually improved over the past few decades (Aho, 2002).

Pullet costs represent the second highest expenditure for most commercial egg producers (Bell, 2002). Cost of pullets is dependent on the cost to raise the chicks into egg-producing hens, the age of the hen when they enter the laying flock, how long they remain in the laying flock, and the productivity of the hen while laying. Most egg producers purchase day-old chicks or ready-to-lay commercial pullets from hatcheries that specialize in raising flocks of up to 200,000 pullets at a time. The initial cost of a pullet is dependent on the price of feed to raise the chick until it enters the laying flock and the age at which the hen begins to lay eggs. If hens come into lay late, there will be a shorter laying cycle,

typically resulting in pullet costs being amortized over fewer eggs. Mortality rates during the period before the pullets enter the laying flock and over the period in which the flock is in the laying facility both affect pullet costs per dozen eggs by affecting the total number of eggs per pullet.

Now let us turn to comparing the costs per dozen eggs for conventional cage systems with the most common noncage systems. We do not explore costs for free range, pasture-raised, or organic eggs. Using evidence from published literature and information provided by California producers, we examine the differences in costs of feed, pullets, and other expenses per dozen marketable eggs.

Research by animal scientists has found that feed use per dozen eggs is considerably higher in noncage systems than in typical cage systems. The greater freedom of movement allowed by the noncage system increases laying hens' physical activity, and the lower stocking density and open space reduce the efficiency of maintaining optimal house temperatures. Both of these circumstances lead to higher feed consumption (Gibson, Dun, and Hughes, 1988; Appleby, Hughes, and Elson, 1992). Data provided by California producers supported these findings (Sumner et al., 2008).

Research indicates that pullet costs per dozen marketable eggs are higher in the noncage system. There are three primary factors for this difference: higher initial cost for the pullet, higher mortality rates (LayWel, 2001–2007; Aerni et al., 2005; Blokhuis, 2008; Elson, 2008; Rodenburg et al., 2008) and lower marketable egg production per hen (LayWel, 2001–2007; Rahn, 2001; Bell, 2002; European Food Safety Authority [EFSA], 2005). Data discussed in Sumner et al. (2008) support this research that mainly comes from Europe.

Some examples of how these factors make pullet costs higher in noncage systems are the following. Pullets for a noncage system tend to be brown breeds as opposed to white breeds typical of a cage system. Brown breeds require greater feed to reach maturity increasing initial cost of the pullet (Sumner et al., 2008). Cannibalistic behavior among hens and greater risk of contracting disease and parasitic infections from exposure to their own droppings lead

to higher mortality rates in noncage systems compared with cage systems (Appleby et al., 2004; EFSA, 2005). Eggs laid outside of the nest box (so-called floor eggs) are a problem in noncage systems, which leads to more uncollectable, downgraded, or unmarketable eggs. Typical floor-laying rates in a noncage system range from 2% to 10% (LayWel, 2001–2007; EFSA, 2005), whereas cage systems eliminate the occurrence of floor eggs. Finally, hens in noncage systems lay eggs, on average, for 60 weeks compared with 80 weeks for hens in a cage housing system. This shorter lay cycle further contributes to lower eggs per hen and higher pullet costs (Sumner et al., 2008).

Labor costs differ between systems and within similar systems depending on the configuration of particular systems. The cage system allows widespread automation of daily tasks performed by egg producers. This leads to lower labor use per egg, because feed and water distribution, manure disposal, and egg collection and packaging are all performed mechanically. Typically, with a mechanized cage system, one worker can oversee more than 100,000 laying hens with labor costs as low as \$0.01 per dozen eggs (Bell, 2002). In comparison, a worker in a noncage operation will typically manage 30,000 hens. Automation of egg collection is possible within noncage systems, but eggs that are not laid in the nest box must be collected by hand. Higher labor costs in noncage systems are also linked with maintaining good litter quality and nest box cleanliness and identifying and catching sick and injured hens. Information from California producers indicates that noncage systems require a substantially greater amount of effort to manage than a cage system.

For conventional cage systems, housing costs are a relatively small part of total egg production costs. Nonetheless, cages represent the durable asset that limits the number of hens and quantity of egg production in the short run (Rahn, 2001). The initial investment per facility involved in constructing a typical cage system is significantly higher than the investment required for a noncage operation (Bell, 2002). However, because noncage operations have many fewer birds per facility, the housing costs per bird or dozen eggs are higher in noncage systems.

In our categorization, housing costs for each system include the cost of the physical structure, the equipment within the structure, the utilities to operate the equipment, and the maintenance, service, and supplies necessary to maintain operations. The complex design and larger space requirements per bird of a modern noncage layer house make this system more expensive to construct per bird. Once constructed, noncage houses take more resources per bird to maintain and service than a cage system. For example, design limitations often make manure collection and removal from a noncage system more complicated and costly.

The range of estimates presented in Table 1 incorporates the experience of California farms that produce eggs using both conventional cage housing systems and noncage systems (Sumner et al., 2008). Recall that these costs apply to noncage systems actually in use and do not include costs for organic or free range systems. These estimates are derived from several farms over the 3-year period 2005–2007. The range in costs reflects differences in the experience of individual flocks with the feed costs that applied during the period examined. Some variation across farms reflects differences in accounting systems in terms of how costs are categorized. All these differences are reflected in the ranges for each cost category.

The general experience is that noncage housing systems have substantially higher cost in each of the main categories. Using the midpoints of the ranges reported, pullet costs per dozen eggs for noncage systems are 55% higher, feed costs are 17% higher, housing costs are 14% higher, and labor costs are 10% higher (Sumner et al., 2008). As Table 1 shows, based on the midpoints of the ranges reported for the four main cost categories, the noncage system's production costs per dozen were 58% higher than those for the cage systems used on these farms. At the midpoints, the sum of itemized costs is \$0.94 per dozen eggs in the noncage systems and \$0.595 per dozen eggs in the cage systems. Based on the midpoints of the reported total costs, noncage system costs of production per dozen eggs were approximately 41% higher than those for the cage systems used on these farms. Total cost at the midpoints is \$1.05 per dozen

Table 1. Comparison of Production Costs Between Cage Production System and Noncage Production System in Cost per Dozen

	Cage Production System Range and Median (\$ per dozen)	Noncage Production System Range and Median (\$ per dozen)	Cost Differential Noncage minus Cage System Using Midpoints	Cost Differential Noncage minus Cage System Using Low Costs
Sum of main cost categories ^a and difference at the midpoints	0.595	0.94	0.345	
Sum of main cost categories ^a and differences at the low costs	0.45	0.65		0.20
Percentage main cost categories ^a difference based on the sum of items			$0.345/0.595 = 58\%$	$0.20/0.45 = 44\%$
Sum of all costs ^b	0.57–0.92 0.745	0.97–1.13 1.05	0.305	0.40
Percentage all cost difference			$0.305/0.745 = 41\%$	$0.40/0.57 = 70\%$

^a Main cost categories include feed, pullet, labor, and housing costs.

^b Sum of all costs constitutes a sum of the main cost categories plus additional costs such as overhead, taxes, and miscellaneous costs.

Source: Authors’ calculations based on data from California egg producers.

eggs for the noncage systems and \$0.745 per dozen eggs for the cage systems.

Another way to use the cost data provided by farms is to consider the low-cost cases with each system. Such a calculation is appropriate if these costs reflect the best production methods within each housing system and reflect disease and feed costs that apply in more “normal” conditions without considering some high-cost cases that raise the median. These calculations using the low-cost cases are reported in the final column of Table 1. Using the low costs for each of the main cost categories under the two systems, the sum of the cost differential is \$0.20 per dozen eggs. That is, itemized costs are approximately 44% higher for the noncage system. Using the low-cost cases for reported total costs, the differential is \$0.40 per dozen eggs. That is, total costs are approximately 70% higher for the noncage system.

We cannot provide precise estimates of each of the cost differences for underlying factors.

The direction and range of magnitudes are well documented, however. For example, average mortality is clearly higher for the noncage systems and this contributed to the higher pullet costs per dozen eggs. The data clearly show higher feed, housing, and labor costs per dozen eggs (Sumner et al., 2008).

Cost Issues and the Impact of California Hen Housing Regulations

As previously discussed, over approximately the past 40 years, California has gone from being a net exporter of eggs to a net importer. The competitive balance among egg-producing regions in the U.S. makes the California egg producers vulnerable to factors that raise California costs relative to costs in other states. The Treatment of Farm Animals Act eliminates the option to house egg-layers in conventional cages for eggs produced in California without limiting production

methods in other states. Data presented show that this will raise California production costs substantially. The increase in costs will take two forms, both of which are important.

First, as shown in Table 1, per unit costs of production are estimated to rise anywhere between 41% and 70%. Underlying these higher costs per dozen eggs are higher feed use per bird, higher cost per pullet, lower average productive life of a hen, higher mortality rates, fewer eggs of acceptable marketability per hen, fewer birds per facility, and higher labor costs per hen and especially per egg.

The second major cost impact of the new regulation is that compliance will require substantial investment in new or retrofitted housing facilities. Based on information provided by farm accountants, a new or converted noncage housing facility costs in the range of \$10–40 per bird. With more than 18 million hens in cage housing in California, approximately 600 new or retrofitted buildings, each housing approximately 30,000 hens, will need to be constructed by January 1, 2015, when the enforcement of the regulations begins. With costs per house between \$300,000 and \$1.2 million, the capital investment required to provide approved housing for those hens is between \$180 million and \$720 million. Producers would also need access to more land and face zoning and other regulations that have limited relocating or expanding facilities for animal agriculture in California.

Naturally, such major investments in new housing facilities would be undertaken only if farms have confidence that the long-lasting investments could be repaid with net returns over the productive life of the investment. However, as established earlier, the regulations will cause California variable costs of production to rise relative to variable costs for out-of-state eggs, where no new capital investment would be mandated.

The California egg industry has made substantial investments in noncage housing systems in recent years to supply eggs to the specialty markets for noncage and organic eggs. The market for eggs from noncage housing systems remains a very small share of the total market for table eggs. Nonetheless, these investments can be profitable for a limited volume of production

when the eggs are marketed to supply specialty egg demand at high prices. Both in-state and out-of-state producers supplying these specialty markets face similarly high costs, and therefore the price of specialty eggs is substantially higher than the price of eggs produced under conventional cage housing systems.¹ It is important to note, however, that there has been no investment in noncage housing facilities by farms with an expectation that they will be able to compete directly with eggs produced using conventional cage housing systems. The lack of such investment is further confirmation that farms in the business of making these investments have not found noncage housing systems cost-competitive unless they are able to supply eggs to a market where other farms are also restricted in the housing systems allowed.

Economic Modeling of Hen Housing Restrictions

Consider three perspectives modeling the economics of Proposition 2 regulations. Figure 1 depicts the market for conventional fresh shell eggs sold in California, which is the submarket in which almost all eggs produced in California are now sold. Figure 1 illustrates the supply and demand situation in this market before and after Proposition 2. In Figure 1, the demand function represents only California consumers of shell eggs. On the supply side, approximately 70% of California consumption is from eggs produced in California (Q shell eggs consumed, California). The production of shell eggs shipped into California is implicit in Figure 1 and makes up the difference between all shell eggs consumed in California and those shell eggs produced in California. The quantity shipped into California can be expanded readily should the California price rise above that shown by the intersection of the demand for shell eggs in California and the exogenous

¹The average national price per dozen eggs in March 2010 for eggs produced in conventional cage systems was \$1.08. The average national price per dozen eggs in March 2010 for eggs produced in noncage systems was \$2.84 (USDA–Agricultural Marketing Service, 2010).

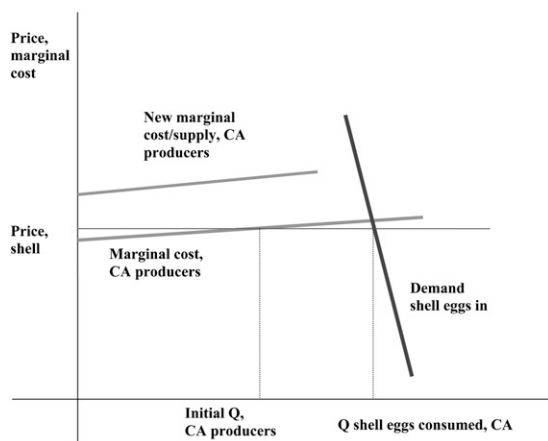


Figure 1. Market Effects of Layer Hen Housing Restrictions in California in the California Market for Eggs

price of shell eggs. With these market conditions, a substantial increase in the marginal cost of production, up to the curve labeled “New marginal cost/supply, CA producers,” would cause production in California to fall to zero. Notice in this illustration that the price of shell eggs in California does not change. A slight increase in the price of shell eggs in the California market would occur if an increase in costs by national suppliers accompanied their expansion to replace eggs formerly produced in California. As noted, we expect any such increase in price to be small because there are no limiting factors that would cause marginal costs to rise much for producers outside of California given that they would have a 6-year adjustment period before the regulations under the initiative would apply and California output would be curtailed.

Next we illustrate impacts of Proposition 2 by considering the market facing California egg production. In Figure 2, the quantity on the horizontal axis is the production of eggs in California and the price is the price received by California producers. The supply functions for California producers are as defined in Figure 1, but now the demand function represents the demand for eggs produced just in California. This residual demand facing California producers is very elastic because eggs produced outside California are almost perfect substitutes

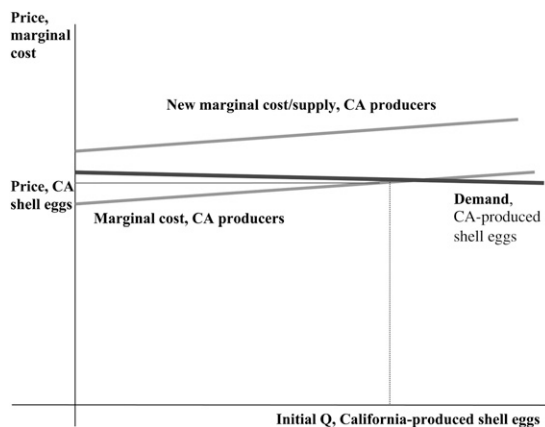


Figure 2. Market Effects of Layer Hen Housing Restrictions in California in the Market for California-Produced Eggs

for eggs produced in California and the supply function for out-of-state eggs is very elastic. The model underlying Figure 1 implicitly assumed, quite reasonably, that most consumers do not identify eggs according to where they are produced. However, in Figure 2, we can allow eggs produced outside California to be close but less than perfect substitutes for eggs produced in California.

As before, California Proposition 2 regulations cause an increase in marginal cost for eggs produced in California. Given a very elastic demand facing California production, this shift up in the marginal function is enough to eliminate egg production in California. The exceptions are small specialized markets in which location is important to buyers or for which production costs do not rise because they are already using noncage housing.

California buyers currently purchase a small percentage of specialty eggs from various noncage systems that may meet the housing regulations implied by the initiative. This production would not be directly challenged by new regulations but may be affected indirectly. Most of the eggs sold in the noncage and organic markets are now produced by the same farms that supply the conventional egg markets that are illustrated here. We have established that this conventional production would be eliminated in California. Much of the infrastructure of feed mills, cleaning and processing facilities, and management

expertise is used for both the noncage and the conventional cage production systems. If conventional cage production is eliminated, firms may choose to move their whole operation out of state or may lose scale economies that make them competitive in the noncage markets. Thus, we may expect a reduction in noncage production in California, although such production would comply with the law.

Now consider California Proposition 2 in the context of the national market for eggs. From a relatively simple set of demand and supply equations in log linear differential form, one can derive the following three expressions:

(1) $\text{dln}P = (\sigma_{\text{cal}}\varepsilon/[\eta - \varepsilon])(\text{dln}C_{\text{cal}})$

(2) $\text{dln}Q^{\text{Cal}} = \varepsilon(\text{dln}P - \text{dln}C_{\text{cal}})$

(3) $\text{dln}Q^{\text{R}} = (1 - \sigma_{\text{cal}})\varepsilon\text{dln}P$

where $\text{dln}Q^{\text{Cal}}$ is the percentage decline in the quantity egg production in California (which cannot be more than 100%), $\text{dln}Q^{\text{R}}$ is the percentage change in the quantity of egg production in the rest of the United States, and $\text{dln}P$ is the percentage change in the price of eggs (which is the same in California and the rest of the nation). The long run supply elasticity for eggs, ε , and the long run demand elasticity for eggs, η , are the same in California and the rest of the U.S. The hen housing regulations raise the marginal cost of production by a percentage amount, $\text{dln}C_{\text{cal}}$. Note that in Eq. (1), the numerator $\sigma_{\text{cal}}\varepsilon\text{dln}C_{\text{cal}}$ is set to σ_{cal} if $|\sigma_{\text{cal}}\varepsilon\text{dln}C_{\text{cal}}| > \sigma_{\text{cal}}$ because the elimination of the entire California egg industry could cause a maximum fall of σ_{cal} (California's share) percent of national production.

From November 2008 to the enforcement date of January 2015, suppliers had approximately 6 years to either cease production in California or make the required adjustments to comply with new regulations. Over this time horizon, adjustments by producers in California and the rest of the U.S. would not be constrained by contractual relationships or fixed capital assets. Therefore, prices of key inputs, feed and pullets, would not fall significantly as a result of falling California production. In part because these are national markets, reductions in California production would be replaced by increases in production outside California. We expect a very elastic long run supply function for eggs because of the long planning horizon and because the egg industry is a relatively small buyer of major inputs, including feed. Thus, marginal cost of production outside California would rise only marginally.

Experience with the unexpected and rapid increase of egg shipments into California after the Exotic Newcastle Disease outbreak in 2003 illustrates the capacity for expanded production outside California, even in response to a short-run shock. With a 6-year horizon, egg-producing facilities in the rest of the U.S. can easily increase production and expand shipments into California.

The retail demand elasticities for eggs generally range from approximately -0.15 to -0.3 in the literature. Representative studies, which vary in relevance of the data and statistical analysis, include the following: Kastens and Brester (1996); You, Epperson and Huang (1996); Huang and Lin (2000); and Yen, Lin, and Smallwood

Table 2. Simulations of Cost-Increasing Hen Housing Regulations on Prices and Quantities of Eggs in California and the Rest of the U.S.

Farm Supply Elasticity	Farm Price Effect (percent)	Quantity Effect in California	Quantity Effect in the U.S. Outside of California (percent)	Quantity Effect Across the U.S. (percent)
5	1.29	Eliminate	6.01	−0.26
10	0.66	Eliminate	6.13	−0.13

Source: Author simulations.
Note: Simulations are based on a demand elasticity of -0.2 in both the California and U.S. markets and a California cost increase of 40%.

(2003). Using the previous discussion, we can assign approximate values to the elasticities and shifters in the reduced form price Eq. (1). Table 2 displays simulations based on Eq. (1), (2), and (3), a California production share of 6.7%, and a demand elasticity of -0.2 . These results show that egg production in California is eliminated with any simulated additional marginal cost increases. Table 2 also shows effects on the price of eggs and quantities produced outside of California and in the U.S. as a whole. We simulate effects for farm supply elasticities of 5.0 and 10.0. Notice that the higher long run supply elasticity reduces the effect on the market price for eggs by half from approximately 1.3% to 0.66%. The quantity supplied by producers outside of California increases by approximately 6% to accommodate the loss of production in California. For the national egg market, the quantity supplied is reduced by less than one-half of 1% as a result of the small demand elasticity.

Concluding Remarks

This article has focused most of its attention to the production of eggs in California after implementation of Proposition 2. Outside of California, producers would face an increase in demand of approximately 7% to account for their opportunity to supply the remaining half of the California market that they do not now supply. We have ignored the potential competition from international imports. International imports are now very small and nothing in the housing rules in Proposition 2 would increase the competitiveness of international shipments into the U.S. relative to the current situation.

We also do not devote significant discussion to the potentially expanding market for noncage specialty eggs. Nothing in the housing regulations indicated by Proposition 2 has a direct effect on the relative demand or the relative price of eggs from noncage housing and conventional cage housing. It is possible that publicity surrounding Proposition 2 could itself shift out demand for noncage eggs. We have not completed initial data analysis to test whether such a shift has occurred in 2009. However, because the new housing regulations are not scheduled to be

implemented until 2015, the short run shifts in demand are not directly relevant.

Our analysis shows that passage of Proposition 2 will likely curtail conventional egg production in California. This result follows from the ability of lower-cost eggs produced outside of California to compete effectively for demand from California buyers.

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