

# ANALYSIS OF THE PORK AND HOG MARKETS' LIKELY CHANGES IF CALIFORNIA'S PROP 12 IS IMPLEMENTED IN JANUARY 2022

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## KEY POINTS:

- State-by-state pig production volumes, hog slaughter volumes, and pork retail sales volumes are mismatched, leading to bottlenecks and market disruption if one individual state shuts off the interstate trade of pork.
- California's Prop 12 will not effectively influence the welfare of breeding sows in the United States in 2022, but by aiming its regulations at pork sales, it will disrupt every preceding segment of the pork supply chain, spreading back to the values for barrows, gilts, pigs, and sows that are geographically distant from California.
- When the supply of market-ready hogs outpaces the packing industry's capacity to process those hogs and sell their pork, the prices for those hogs collapse. This is the likely outcome for conventionally-raised hogs throughout the United States in the absence of California's current 9% to 15% of nationwide pork demand.
- A recent past example of hog supply gradually outpacing slaughter capacity resulted in a hog-to-pork discount of \$12 per hundredweight, compared to the baseline expected discount of \$5 per hundredweight.
- A recent past example of a sudden cut-off of slaughter capacity (at the same scale expected during Prop 12 implementation) resulted in a hog-to-pork discount of \$21 per hundredweight, compared to the baseline expected discount of \$5 per hundredweight.
- The shortfall of slaughter capacity compared to hog supply during that sudden cut-off (Covid-19 plant closures) is estimated at 3.5 million head, of which 1.8 million head is estimated to have been euthanized.
- The orderly market signals that could have prevented catastrophic market collapse and hog euthanization during Prop 12 implementation have not occurred, and the surplus of lean hogs that will reach the slaughter plants at peak market chaos in December 2021 and January 2022 are already being gestated or nursed in mid-2021.
- In a scenario of gradually building oversupply of pork from conventionally-raised animals, lean hog prices could be expected to fall 10% (or \$10 per hundredweight) in early 2022.
- In a scenario of a sudden shut-off of packer demand for conventionally-raised hogs, lean hog prices could fall 20% (\$20 per hundredweight) or up to 50%, using the Covid-19-related market collapse as a guide.
- Given the most likely scenario of 20% losses in hog values, in early 2022 the projected marked-to-market balance sheet losses to Purdue University's Animal Sciences Research and Education Center's hog inventory is expected to be roughly \$100,000, among other economic losses.
- The state of California, by implementing Prop 12 and damaging the pork and hog markets nationwide, will likely cause a near-immediate economic loss of \$121.2 million to farmers in the state of Indiana, and a projected \$207 million loss in annual income for Indiana's hog producers.

**PROP 12’S LIKELY RESULT: SPLITTING OF U.S. PORK, HOG MARKETS INTO SCARCITY AND GLUT CONDITIONS**

Because California does not raise enough hogs inside its own borders – by any method, neither in conventional farrowing barns nor in facilities that would be compliant with Proposition 12 – to meet its own demand, its consumers must purchase large quantities of pork products processed in states outside California, from hogs raised in states outside California. Therefore, the potential enforcement of Proposition 12 on January 1, 2022 is likely to cause severe disruptions to both the nationwide pork market and the nationwide hog market.

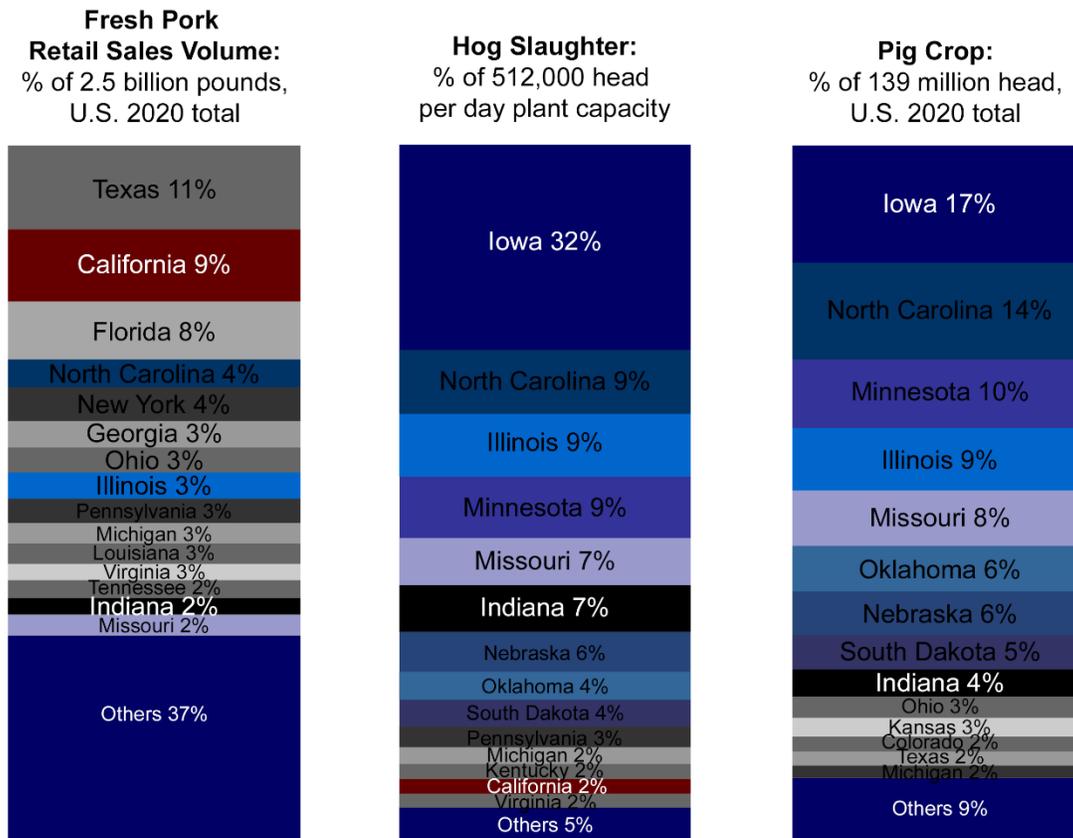


Figure 1: Each state’s share of fresh pork retail sales, hog slaughter, and pig production is unequal, leading to potential bottlenecks and market disruption if individual states are able to shut off interstate trade of certain products. See Appendix A for hog and pork production figures by state. See Appendix B for daily U.S. hog slaughter by plant. See Appendix E for retail pork sales by state.

In order to access the large California pork market with products that can legally be sold in compliance with Proposition 12, U.S. grocery retailers, meat wholesalers, and pork processors will need to split the pork supply chain into two separate classes of product: 1) pork products that are compliant with California's Proposition 12 and destined only for that market, and 2) traditional pork products that make no claims about compliance. This represents a major logistical challenge, to be sure, but one that the meat packing and food retailing industries can presumably achieve, eventually, at some great cost for auditing and certifying both the whole pork meat supply chain and the supply chain of breeding pigs and their offspring.

What the pork industry cannot do, however, is prevent the chaos that is bound to ensue as these two, split-apart pork markets establish new, separate balances of supply and demand. On the one hand, prices for Prop 12-compliant pork inside California will likely skyrocket in conditions of artificial scarcity. Ample pork supplies will still exist within the United States, tantalizingly just beyond California's borders, but until the industry builds up enough Prop 12-compliant capacity to meet California-specific demand (a process which could take years and which has virtually not even started six months before the first enforcement date), those abundant non-compliant pork products won't be available to California's eager consumers.

Therefore on the other hand, the remaining 49 states of the U.S. will experience an artificial glut of oversupplied traditional pork. The current and ongoing production of pork from conventionally-raised hogs will be delivered into a sudden void of demand, when at least 9% of the nation's former pork sales channels become illegal according to Proposition 12 on January 1, 2022. Some estimates suggest California typically represents 15% of the nation's pork demand.

Precise predictions for how pork values will change in these two split-apart supply-and-demand scenarios are impossible to make. For reference, in early June 2021, wholesale values for a 55-56% lean 215-pound

pork carcass have risen above \$130 per hundredweight (cwt). Wholesale loin values are \$127 per cwt; wholesale ham values are \$95 per cwt; and wholesale pork belly prices are \$199 per cwt. This translates into grocery store prices of roughly \$3.50 per pound for pork loin, or \$4.15 per pound for cured, sliced ham, or \$5.00 per pound for smoked bacon. A 2021 study<sup>1</sup> by Dr. Glynn T. Tonsor of Kansas State University and Dr. Jayson L. Lusk of Purdue University compared 51 U.S. retail markets and six pork products, examining them for consumer sensitivity to pork prices. It concluded that “pork purchases are much more sensitive to pork’s own-price than the price of beef or chicken,” and “a 10% reduction in available bacon (loin) would result in 12.02% (8.41%) higher bacon (loin) prices in the Los Angeles market.” Their data further shows that own-price pork elasticity in a Midwestern market such as Indianapolis, Indiana from January 2016 through December 2020 was -1.273, suggesting that a drastic 10% increase in available pork (a very likely post-Prop 12 scenario) would result in 12.73% lower pork prices.

Furthermore, because the hog market and the pork market are closely intertwined, separated only by the value-adding processes of slaughter and meatpacking, confident predictions can be made about how the prices paid for market-weight lean hogs will change *as the price for pork changes*. The prices paid for feeder pigs and sows can also be predicted with similar confidence. Scenarios of oversupply in the hog market have been observed in very recent years, making economically-appropriate comparisons to the likely 2022 scenario possible. **Essentially, when the capacity to process and sell the meat of hogs is mismatched against the constantly-replenishing inflow of market-weight hogs, the prices for those hogs collapse.**

Market-weight hogs are effectively a perishable good – they grow from birth to approximately 6 months of age until they reach 280 pounds, when they are ideally suited for slaughter and processing through

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<sup>1</sup> [TonsorLusk\\_PriceSensitivityReport\\_03-05-21.pdf \(agmanager.info\)](#)

modern meatpacking facilities. If there is no willing buyer for the hogs at the correct time, the hogs can be held off the market only for a very limited time until they grow too big to be accommodated by the facilities' equipment. In an absolute worst-case scenario, hogs that were once market-ready may become worthless and need to be euthanized if there is simply no buyer to take them.

This could become the scenario in the United States in early 2022 if the sudden loss of California's pork sales channels destroys the meatpacking industry's demand for conventionally-raised lean hogs. Even if the meatpacking industry is able to still accept most conventionally-raised hogs for slaughter in 2022 and is able to insulate the hog market from some of the effects of the demand loss by routing excess pork into cold storage or to export customers, past experiences with oversupply scenarios demonstrate the scale of losses that U.S. hog producers can expect if California's Proposition 12 is allowed to disrupt the nationwide pork and hog markets.

### **LEAN HOG MARKET UNIQUELY SENSITIVE TO SUPPLY GLUTS**

Prop 12 will destroy the market for conventionally-raised hogs by shutting off at least 9% of nationwide pork consumption and leading to a scenario when the meatpacking industry will be heavily oversupplied with conventionally-raised market-weight hogs. The industry's ability to keep slaughtering those hogs when they reach their appropriate weight, and to absorb the extra un-consumed non-compliant pork into cold storage or export channels, will only function up to a point. Eventually, packers will have to turn away hogs or discourage their delivery through the economic mechanism of lower prices.

The U.S. hog market has experienced periods of oversupply in the recent past, and these scenarios can be examined to provide evidence about how the industry will be disrupted in the event of Prop 12's

implementation in early 2022. The past scenarios were never as severe or as lasting as Prop 12's shut-off will be. In one instance, the growing hog supply inside the U.S. gradually outpaced the necessary slaughter capacity. In another instance, ready hog supply overwhelmed U.S. slaughter capacity on a catastrophic but temporary basis when the slaughter facilities needed to shut down or slow down lines to keep their workers safe amid the Covid-19 pandemic. Examining the market reactions during these events provides scenario analysis, or case studies, to guide expectations in a potential Prop 12 scenario.

**BASELINE: JANUARY 2013 – JULY 2016**

*Prices paid for hogs tightly adhere to wholesale pork values, minus a margin for the value addition of meat packing.*

AVERAGE PORK VALUE: \$91.23

AVERAGE HOG VALUE: \$85.95

AVERAGE DISCOUNT FOR HOGS VS. PORK: -\$5.28

**SCENARIO A: HERD EXPANSION OUTPACES SLAUGHTER CAPACITY, JULY 2016 – JULY 2018**

*While the packing industry is swamped with oversupply of market-ready hogs, prices paid for hogs reflect glut conditions.*

AVERAGE PORK VALUE: \$79.77

AVERAGE HOG VALUE: \$67.14

**AVERAGE DISCOUNT FOR HOGS VS. PORK: -\$12.63**

**RETURN TO BASELINE: SLAUGHTER CAPACITY CATCHES UP JULY 2018 – APRIL 2020**

*Although wholesale pork values remain moderate, a more balanced supply and demand for market-ready animals allows hog marketers to regain some of their share of the final product's price from the packers.*

AVERAGE PORK VALUE: \$74.11

AVERAGE HOG VALUE: \$65.96

AVERAGE DISCOUNT FOR HOGS VS. PORK: -\$8.15

**SCENARIO B: SUDDEN RESTRICTION OF SLAUGHTER CAPACITY, APRIL 2020 – DECEMBER 2020**

*Wholesale pork prices strengthen amid firm consumer demand, but meat packers, forced to shut down or slow down their plants to keep workers safe amid the Covid-19 pandemic, once again become oversupplied with market-ready animals and drastically drop the prices paid for those animals.*

AVERAGE PORK VALUE: \$78.93

AVERAGE HOG VALUE: \$57.79

**AVERAGE DISCOUNT FOR HOGS VS. PORK: -\$21.14**

**RETURN TO BASELINE: JANUARY 2021 – JUNE 2021**

*Wholesale pork prices soar amid domestic food price inflation and export demand. Slaughter capacity normalizes, and hog marketers are able to recapture a more 'normal' share of the final product's price.*

AVERAGE PORK VALUE: \$94.05

AVERAGE HOG VALUE: \$88.20

AVERAGE DISCOUNT FOR HOGS VS. PORK: -\$5.85

The scenarios are defined based on their supply-versus-demand balance: the availability of market-weight hogs versus the pace of slaughter. This variable – the mismatch of hog supply versus slaughter pace – cannot alone be expected to explain the overall price movement of a commodity market, like the market for pork or the market for lean hogs. Myriad other abstract influences drive overall commodity price levels (e.g. inflation, interest rates and investments, the availability of substitutes, input costs, currency fluctuations, geopolitics, weather), making prices resistant to ever being comprehensively modeled, especially as long-range time-series models, because the underlying economic regime changes drastically from time to time. However, a confident model can be built to explain *not* the overall price level of pork and hogs, but the *relationship between pork and hog prices*. All the unpredictable outside forces affect these two markets simultaneously, and it is their interplay with each other that reflects the influence of this one important variable: **the mismatch of hog supply versus pork consumption / slaughter pace**.

The price of a market-ready hog, quoted in U.S. dollars per 100 pounds (cwt) is typically less than the price of a wholesale pork carcass, also quoted in U.S. dollars per 100 pounds (cwt). This reflects the profit margin required to make hog slaughter and meatpacking an economically viable activity. Packers receive a 280-pound animal and pay \$110 per cwt<sup>2</sup> for that animal (the price as of early June 2021, equivalent to \$308 for one lean hog). Then they must pay for the facilities, labor, energy, and various overhead charges to process that hog, at which point they can sell a final product – a wholesale pork carcass that weighs 215 pounds – at \$134 per cwt<sup>3</sup>, equivalent to \$288 for one carcass. Along the line, 65 pounds of bones, blood, fat, and offal have also been collected and turned into salable products. Higher profit margins are also earned by meatpackers that sell products with additional processing, like smoked bacon or sausage, instead of entire uncut carcasses. Nevertheless, it's clear the pork packing process operates with tight margins and sometimes even pencils out to a loss, as in May 2021 when the estimated pork packing

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<sup>2</sup> [HG216 \(usda.gov\)](https://www.usda.gov/economic-forecasting/tables/hog)

<sup>3</sup> [PK600 \(usda.gov\)](https://www.usda.gov/economic-forecasting/tables/pork)

margin was negative \$29 per head.<sup>4</sup> That calculation is volatile from week to week, however, and the periods of negative margins are generally more than offset by periods of profitable packing margins, as in March 2020 when pork packing margins were estimated at a positive \$44 per head.<sup>5</sup>

Packers' profitability and business motivation is predictable as long as they can predict or lock in prices for the pork they intend to produce. Then they can pass back pork consumers' dollars to hog producers by bidding against each other for the supply of market-ready lean hogs. In that way, lean hog prices tend to adhere closely to wholesale pork prices. The two markets are tightly interconnected.

In fact, there are various mechanisms that directly tie the two markets together. Pork packers sometimes purchase market-ready barrows (male castrated hogs) and gilts (females hogs) by negotiating with a hog producer to set a price on the open market. But more frequently, packers set the prices for barrows and gilts based on a formula calculation that considers either the ultimate value for carcasses or the value of the benchmark lean hog futures contract traded at the Chicago Mercantile Exchange. That benchmark futures price is itself ultimately settled against (and therefore forced to converge with) the CME Lean Hog Index<sup>6</sup>, which is a volume-weighted average price of actual countryside transactions for lean hogs. In December 2020, 48% of hogs sold to meatpacking plants were priced according to a swine/pork market formula agreed upon by the hog producer and the packer, wherein the base price for the hogs may not be fully set at the time of the transaction but is later adjusted with premiums or discounts depending on the measured results of the slaughter. 26% of hogs were sold by producers according to some 'other' purchase arrangement. 13% were sold according to some 'other' market formula. 10% of the hogs sold into packing plants were owned by the packers themselves. Only 2% were sold at prices negotiated between the producers and the packers. Less than 1% were priced according to a negotiated formula.

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<sup>4</sup> [Profit Tracker: Cattle Squeeze Continues, Hog Margins Near Orbit | Drovers](#)

<sup>5</sup> [Profit Tracker: Packer Profits Surge Higher | Drovers](#)

<sup>6</sup> [Livestock - Electronic Platform Information Console - Confluence \(cmegroup.com\)](#)

These formulas therefore cross-check against each other and keep the pork and hog markets related to one another, subject to supply-and-demand forces when one side of the market has more negotiating power than the other.

A comparison of the two markets – the benchmark price of pork and the benchmark price of lean hogs – illustrates the recent timeframes when supply and demand have become imbalanced and the two markets no longer adhere to one another. Leading into 2016, hogs were not oversupplied to the pork packing industry, and the two markets moved in unison according to seasonal demand. Hog prices almost always hit an annual high during June or July and an annual low during November or December, influenced by the volume of slaughter during those timeframes.

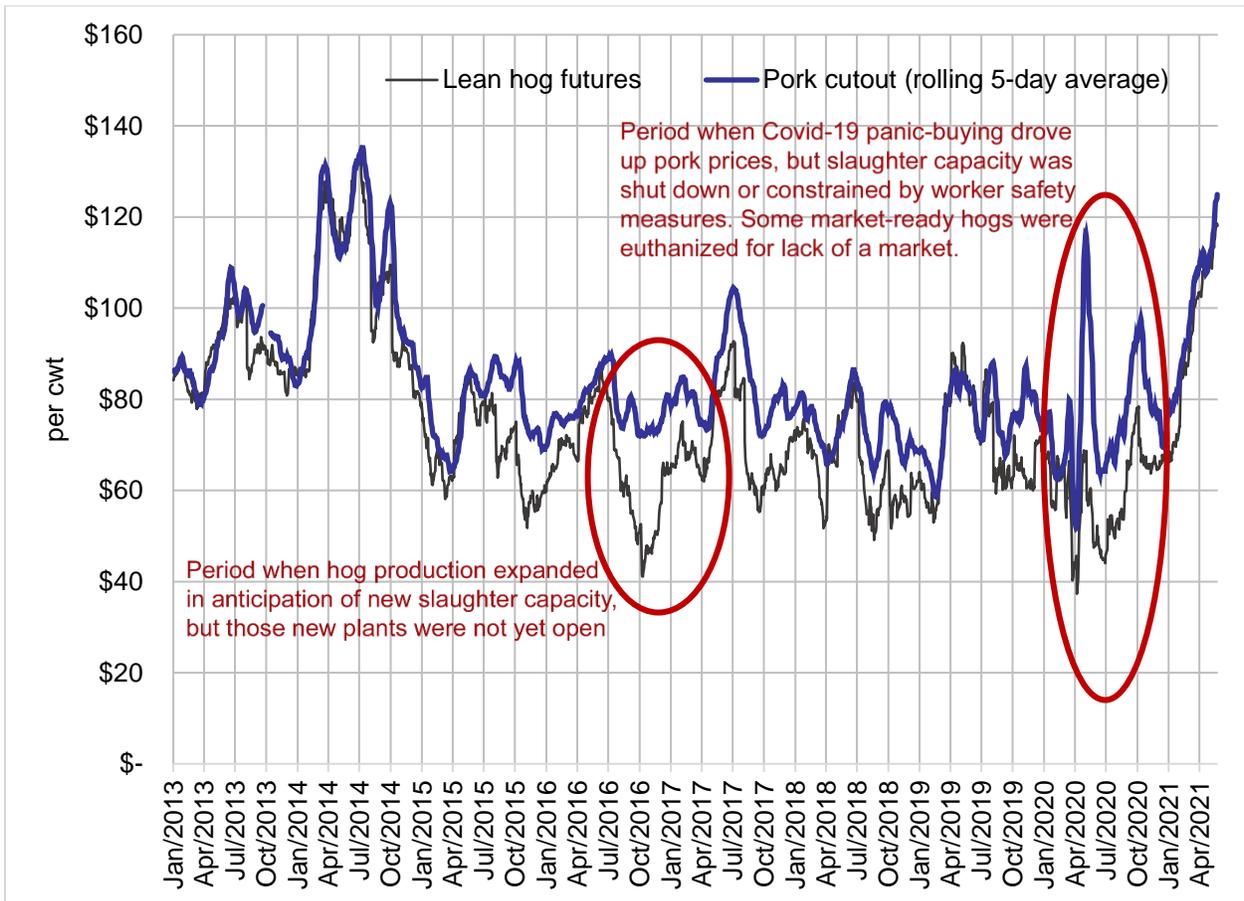


Figure 2: Prices for hogs (barrows and gilts represented by the benchmark CME Lean Hog futures contract) experience unusual weakness in periods of oversupply when market-ready animals outpace the demand and packing capacity of the industry. Source: Elaine Kub analysis of data from DTN ProphetX and United States Department of Agriculture, Agricultural Marketing Service.

Then by 2016, the high price levels of previous years had motivated hog producers to expand their production beyond the capacity of the U.S. pork packing industry. The breeding hog herd size, as measured by the number of sows farrowed, grew 2.5% from 2013 to 2014, then 1.3% from 2014 to 2015, then another 2.5% from 2015 to 2016. Bear in mind that a sow may produce 2.35 litters per year and the average number of piglets per litter grew from 8.19 in 1994 (the previous peak in U.S. breeding hog herd size), to 9.22 piglets per litter in 2007, to 10.5 piglets per litter in 2016, and may be plateauing at about 11 piglets per litter past 2020. This means the previous record sow herd size in 1994 translated to a total pig crop of only 101 million pigs, compared to the post-expansion 2016 pig crop of 126 million pigs. The meatpacking industry did not have the capacity to handle such growth.

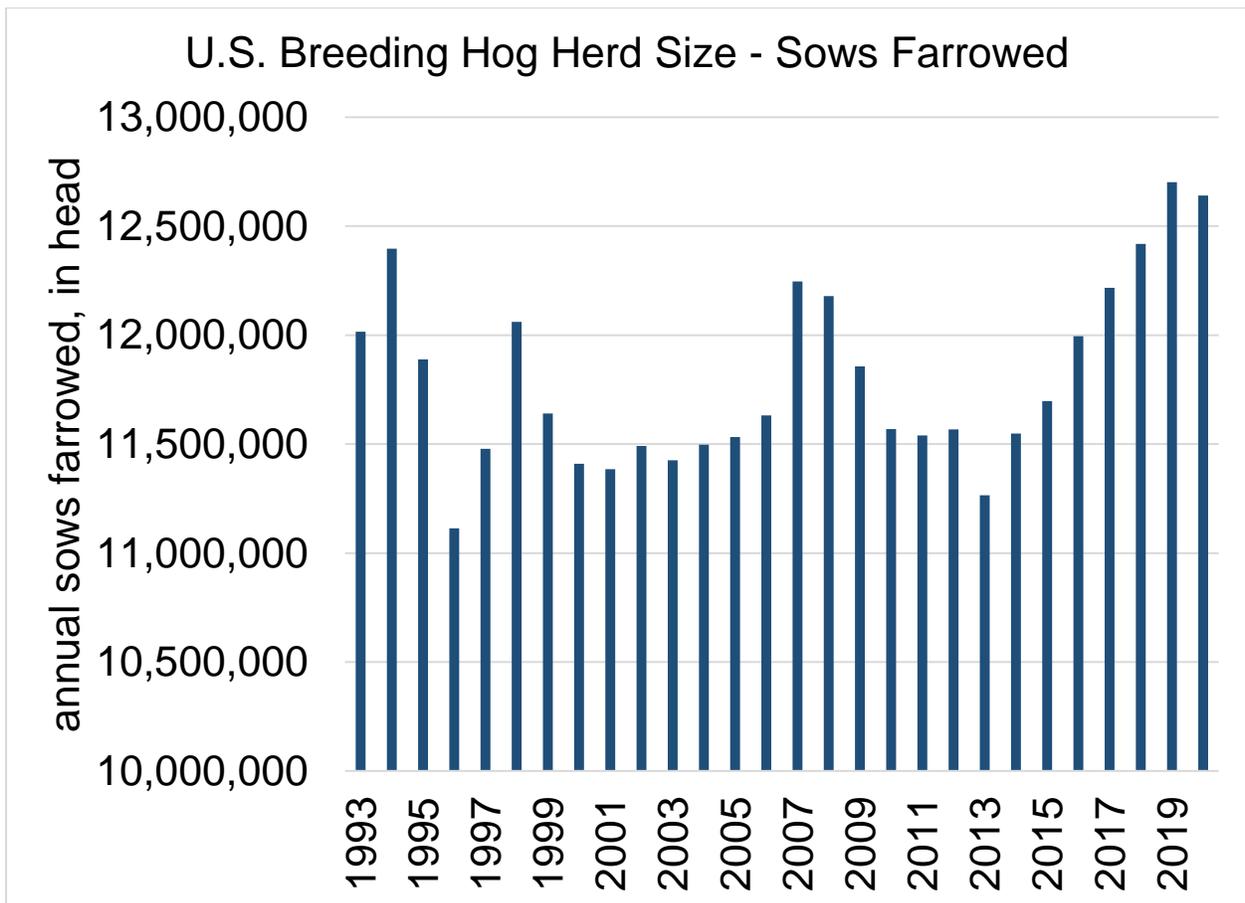


Figure 3 The period leading into 2017 showed the quickest-ever sustained pace of expansion seen in the U.S. breeding hog herd size.

Some of the motivation for producers to expand their breeding herds was the expectation of new slaughter facilities being built to meet the growing global demand for protein, and specifically pork. Finally in 2017, U.S. hog slaughter capacity grew by 8%, from 451,920 head per day in 69 plants to 487,435 head per day in 73 plants. Specifically, the opening of a 20,000-head-per-day packing plant in Sioux City, Iowa in September 2017, and a 12,000-head-per-day packing plant in Coldwater, Michigan relieved the glut of expanded hog production. Other capacity expansion that year included the opening of a 5,100-head-per-day facility in Windom, Minnesota and a 2,500-head-per-day facility in Mt. Pleasant, Missouri, as well as expanded production lines at several already-existing packing plants. After the pace of slaughter was once again matched to the supply of hogs, the relationship of hog prices and pork prices once again stabilized. In the baseline 2013-2016 scenario when hog supply and demand was balanced, the average price of lean hogs tended to trail the average price of pork carcasses by only \$5.28 per cwt, accounted for by pork packers' profit margins. In the 2016-2018 scenario when slaughter pace was too short by approximately 35,000 head per day, the average discount for hogs versus pork fell to \$12.63 per cwt, reflecting the economic conditions of oversupplied hogs and packers needing to push back with lower prices to slow down deliveries. This was a scenario of gradual oversupply.

More troubling scenarios arise when demand for hogs is shut off suddenly, as in the case of the spring 2020 Covid-19 packing plant shutdowns. Beginning in the first two weeks of April 2020, hog slaughter facilities across the United States began to shut down as workers tested positive for Covid-19 and the plants could not risk putting other workers, standing side by side at the lines, in danger. By the end of that month, when an Executive Order was signed<sup>7</sup> to keep meat and poultry processing facilities open during the Covid-19 pandemic, hog slaughter pace had already fallen 29% from the rapid pace it had been pursuing before the pandemic, and was down 15% year over year<sup>8</sup>. **This is essentially the same scale of slaughter slowdown that will have to occur in 2022 when the nation will lose 9 to 15% of the existing demand for pork from conventionally-raised hogs.** Instead of processing the 470,000 head per

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<sup>7</sup> [USDA To Implement President Trump's Executive Order On Meat and Poultry Processors | USDA](#)

<sup>8</sup> Vol. 18, No. 83 / April 29, 2020 [Home \(dailylivestockreport.com\)](#)

day that would have been typical (over 90% of the 512,000 head total daily plant capacity estimated in the United States), by Wednesday, April 29, 2020, daily U.S. hog slaughter had fallen to its lowest level: only 271,000 hogs.<sup>9</sup> Even as plants reopened, changes were made to processing speeds and worker density within the plants, meaning that nationwide slaughter capacity was slow to recover and was still at only 414,000 head per day by the end of May 2020<sup>1011</sup>. By July 2020, a more normal slaughter pace and hog demand was noted at about 470,000 head per day, but the backlog of lean hogs persisted.

During just the two slowed-down months of April and May 2020, total U.S. hog slaughter was approximately 3.5 million head of hogs fewer than would have been seen in normal conditions when the industry was processing animals at its pre-pandemic pace<sup>12</sup>.

Meanwhile, the nation's hog producers had five months ago placed feeder pigs on carefully calibrated feed rations with the expectation of delivering them to packing plants at 280 pounds per hog in late April and early May. When those plants were shut down and unable to take delivery of market-ready hogs, what was supposed to happen to those animals?

In some cases, the hog feeding and finishing operations were able to slow down the growth of the hogs by changing their feed ingredients, delaying by a week or two the moment when the animals would become too big to be processed by the equipment in the slaughter facilities. This sometimes bought enough time for a local packing plant to test and trace its Covid-19 cases and reopen to accept hog deliveries. But of course, those extra-mature hogs then had to compete in the market against the animals coming behind them in the calendar, and the crush of ready supplies was catastrophic to lean hog prices. **The benchmark CME Lean Hog futures contract for May 2020 lost almost half its value from \$68.97 per cwt on March 2, 2020 to a low of \$35.02 on April 14, 2020.** The backlog of market-ready hogs

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<sup>9</sup> See Appendix F

<sup>10</sup> [UPDATE: Indiana Packers to close Delphi facility for 2 weeks | Local News | pharostribune.com](#)

<sup>11</sup> [Logansport facility temporarily to close | Tyson Foods](#)

<sup>12</sup> See Appendix F: Slaughter capacity collapse amid Covid-19 safety measures

persisted for months, and the July 2020 lean hog futures contract ultimately settled at only \$47.49, then the August 2020 lean hog futures contract ultimately settled at only \$54.47 per cwt, at precisely the time of year when hog prices are normally expected to reach their annual peak which, before the slaughter disruption, was expected to be above \$80 per cwt.

In other cases, it just wasn't possible to deliver the barrows and gilts that were ready for harvest right at the wrong time. Fed hogs are effectively a perishable commodity, as perishable as strawberries or cucumbers, because once they grow too large to be handled by a slaughter facility's equipment, there is no willing buyer. And just like wrinkled or moldy strawberries that can no longer be sold to consumers, hogs that have grown too large sometimes tragically must be destroyed. The mental and emotional toll this task takes on the hog producers – who spend their careers husbanding animals and carefully looking after animals' health, safety, and very lives, who in fact chose this career because they love working with animals – cannot be overstated.

Deaths in the swine industry are reported annually<sup>13</sup>, and from whole-year 2020 data, it's clear the hog cull during the Covid-19 slaughter shutdown was severe<sup>14</sup>. The previous five-year average for hog deaths as a percentage of hog marketings was 6.5% (i.e. in a year when 170 million head of hogs would reach the stage of being marketed, 11 million hogs could be expected to be lost to routine death loss). In 2020, nationwide hog deaths reached 7.6%, or 13.6 million deaths compared to 180 million marketings. Normal expectations would have been to see only 11.7 million deaths. **The excess deaths presumed to be due to euthanasia culling when slaughter demand was suddenly slowed down in April and May of 2020 therefore amount to 1.8 million hogs.**

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<sup>13</sup> [Meat Animals Production, Disposition, and Income 2020 Summary 04/29/2021 \(cornell.edu\)](#)

<sup>14</sup> [Millions of healthy pigs euthanized after COVID-19 pandemic closes processing facilities | Fox 59](#)

Any disruption to the expected demand for conventionally-raised hogs becomes a catastrophe, because those expectations were relied upon to precisely plan a schedule for breeding, feeding, and delivering the animals. The hog industry has specialized and fine-tuned and carefully balanced each step of its supply chain, with market signals flowing from the packing plants, which demand 280-pound hogs from the finishing operations, and from the finishing operations, which demand feeder pigs from nurseries four months before that, and from the nurseries, which demand piglets from the sow farrowing barns one and half months before that. A backlog at the end of the chain causes rippling disruption all the way down the supply chain, but with delayed and imperfect communication.

**Pork / Hog Supply Chain & Decision Timeline**

Feb 17, 2021	Jun 11, 2021	Jul 2, 2021	Aug 13, 2021	Dec 11, 2021	Dec 18, 2021	Jan 1, 2022
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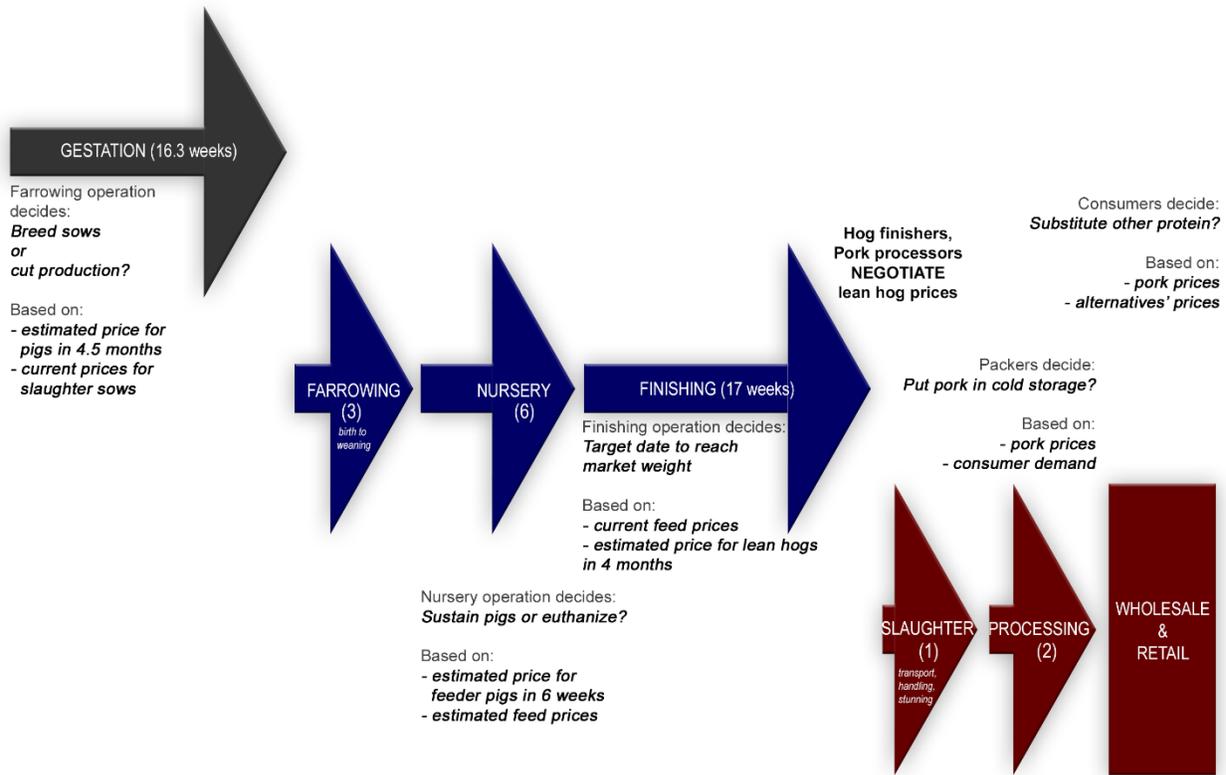


Figure 4 Sources: Life Cycle of a Market Pig – Pork Checkoff, Elaine Kub analysis

This biological timeline means that the pork that will flood the greater U.S. market on January 1, 2022 (because of denied access to the California market) will come from animals that will likely be slaughtered roughly 3 weeks before that, on December 11, 2021. Those animals will have been placed on feed in finishing barns in mid-August 2021. They will be born in early June 2021. Their mothers will have been bred already in mid-February 2021. A number of economic price signals could have been made through the year to achieve an orderly slowdown or cut in conventional hog production, in order to avoid a glut of oversupplied hogs during December's slaughter. However, none of those price signals have happened. Far from being discouraged against conventional hog production, the U.S. swine herd has continued to expand through the first two quarters of 2021, spurred not only by the highest nearby spot prices for lean hogs seen since July 2014, but also by highly profitable upcoming prices currently suggested by the futures market. December 2021 lean hog futures are trading near \$90 per cwt and July 2022 lean hog futures are trading near \$97 per cwt in mid-June 2021. Hog producers are being set up for a calamity.

**HISTORICAL PRICE PATTERNS AND LIKELY MARKET LOSSES IN A PROP 12 ENVIRONMENT**

With the understanding that Prop 12 will destroy 9% to 15% of the nationwide sales for conventionally-raised pork, and thus, will destroy 9% to 15% of the meatpackers’ demand for conventionally-raised lean hogs, and observing how past scenarios of supply-and-demand mismatch have affected prices, it becomes possible to make conservative predictions about likely market effects if Prop 12 is allowed to influence the nationwide pork and hog markets.

<b>Scenario A: Gradually building oversupply of hogs into a Prop 12-constrained pork market</b>	
<p><i>PORK MARKET:</i> A scarcity of Prop-12 compliant pork inside California raises prices for in-state consumers. An accumulating surfeit of pork from conventionally-raised hogs could allow pork prices in the rest of the United States to be mostly unaffected.</p>	<p><i>HOG MARKET:</i> Packers may initially continue to process conventionally-raised hogs at near-capacity levels, until a backlog of unsold pork in cold storage motivates a slowdown. Economic signals eventually trickle back to the markets for lean hogs, feeder pigs, and sows.</p> <p><b>Lean hog prices – down 10% (losses of \$10 per cwt at today’s price levels)</b></p>
<b>Scenario B: Sudden shut-off of demand for conventionally-raised hogs</b>	
<p><i>PORK MARKET:</i> A similar split occurs between the prices of scarce, high-priced Prop 12-compliant pork in California and abundant pork from conventionally-raised hogs outside California.</p>	<p><i>HOG MARKET:</i> Packers refuse to process at their current capacity levels, knowing the market no longer exists for the same amount of pork from conventionally-raised hogs. No longer able to accept delivery of the previous volume of market-ready conventionally-raised hogs, packers will have to set prices that immediately signal for hog producers to cut production, likely through discounts for conventionally-raised hogs.</p> <p><b>Lean hog prices – down 20% (losses of \$20 per cwt at today’s price levels)</b></p>

If the lower price of lean hogs and the oversupplied abundance of pork from conventionally-raised animals meant that grocery shoppers would ultimately pay less for their protein, we might conclude that

these market effects from Prop 12 would be a net benefit to society. Unfortunately, there are no winners in either of the above scenarios. Past scenarios show that in conditions of hog oversupply, packers pay less for hogs but still charge the same stable values for processed pork. The overall protein market – wherein grocery shoppers can choose substitutes like poultry, beef, fish, or plant-based proteins instead of pork – doesn't change just because the hog supply chain has suffered a disruption. And in the case of Prop 12 disruption, even the packers themselves are unlikely to fully benefit from the increased margin between lean hogs and finished pork.

Those margins will likely be eaten up by the packers' increased costs to split their operations into two separate supply chains – one for Prop 12 compliant pork and one for pork from conventionally-raised hogs – as well as the costs of cold storage while the market for pork is disrupted, and the inefficiency that exists because of the uncertainty about the very rules and enforcement of Prop 12. Ultimately, even if enforcement rules become clear, the packers are the parties most likely to bear the costs of compliance: like inspecting hog suppliers to ensure they comply with Prop 12 rules and managing the documentation of the supply chain to prove compliance all the way to the retailer. These costs will be reflected in a more expensive margin between pork and hog prices, and therefore lower prices received by hog producers.

In the gradually-building oversupply scenario, wherein the packers continue to bid for lean hogs in a more or less typical fashion in January 2022, until a backlog in cold storage eventually pushes back through the supply chain over a longer timeframe, the economic pain to the industry will simply be drawn out over a longer span, because the signals for production cuts will just take longer to be felt. The typical baseline discount for lean hog values compared to pork values is 6%. At current price levels, when the average wholesale pork carcass values in the first two quarters of 2021 has been \$94 per cwt, the average lean hog value has been \$89 per cwt. From scenario analysis of a previous recent timeframe (2016-2018) when hog supply gradually exceeded slaughter capacity, the lower limit of Prop 12's effects on forecasted lean hog values would be a 16% discount instead of the baseline 6% (resulting in lean hog prices of \$79 per cwt

instead of \$89 per cwt). Assuming the values for pork from conventionally-raised hogs remain equal and all other variables remain equal, then lean hog values are forecast to fall approximately 10% in this scenario of gradually-building oversupply in a Prop 12-constrained market.

In the sudden shut-off scenario, when packers deliberately cut their production of pork from conventionally-raised animals starting in December 2021 in anticipation of the January 2022 demand losses, the economic signals for hog production cuts will be explicit and large. From scenario analysis of a previous recent timeframe (Spring 2020) when abundant hog supply suddenly experienced a void in slaughter capacity, Prop 12's effects on forecasted lean hog values could be a 27% discount to pork values instead of the baseline 6% discount to pork values (\$69 per cwt instead of \$89 per cwt). Assuming the values for pork from conventionally-raised hogs remain equal and all other variables remain equal, lean hog values are forecast to fall approximately 20% in this scenario of a sudden shut-off of demand due to the Prop 12-constrained market. It's also foreseeable that the lean hog market's price drop could potentially reach 50%, similar to the 50% drop in lean hog values seen during the Covid-19 crisis between March and April 2020, except Prop 12's effects would not be so short-lived.

Therefore a confident prediction can be made that **if Prop 12 is implemented on January 1, 2022, lean hog values in 2022 are likely to fall 10% to 50% relative to prices that would have otherwise been seen.** No attempt is being made to predict whether pork prices will be \$70 per cwt or \$120 per cwt on January 1, 2022, or whether lean hog prices will be \$56 per cwt or \$96 per cwt; overall commodity price levels are subject to too many uncontrollable influences to make any such prediction. But whatever price level consumers pay for pork from conventionally-raised hogs in early 2022, it is predictable that the prices paid for lean hogs delivered to the constrained packing plants will be bearishly pressured lower at greater and greater discounts to the carcass values (calculated by formula contracts), in order to discourage further overproduction as the situation unfolds.

The swine industry is a complex network of inputs and salable products, including not only the finished market-weight ‘lean hogs’ benchmarked with futures contracts traded in Chicago, but also the younger piglets that are placed into finishing barns and fed with corn and soybean meal until they become market-weight barrows (castrated male pigs) and gilts (female pigs), and also the mature breeding stock boars and sows that produce the piglets.

In fact, the most pernicious part of Proposition 12’s effects on the swine industry will be the complexity and unpredictability of market disruption on each of these interconnected markets – first the market for pork, then the market for lean hogs, and ultimately the markets for piglets and sows. **Breeding stock sows housed in farrowing barns inside California are ostensibly the animals whose welfare Proposition 12 intends to address, but the mechanics of the law’s enforcement are far removed from California’s sows. Instead, it intends to disrupt the pork market far down the supply chain from those specific breeding sows, and by aiming at that commodified, untraceable, end-stage segment of the supply chain, Proposition 12 will ultimately disrupt every preceding segment of the supply chain, spreading back to barrows, gilts, piglets, and sows that are geographically distant from California.**

We can make some confident predictions for how severely the markets for barrows, gilts, piglets, and sows will also be affected by the lean hog market disruptions previously discussed. Approximately 96% of federally inspected lean hog slaughter is tracked daily by the USDA’s Mandatory Price Reporting system,<sup>15</sup> which requires packers to submit information about the hogs they process, according to the Livestock Mandatory Reporting Act of 1999 and the Agriculture Reauthorization Act of 2015. Using this data, comparisons between benchmark lean hog futures and the market prices tracked daily by USDA’s Agricultural Marketing Service for barrows and gilts (a weighted average Swine/Pork market formula – carcass basis) exhibit a strong direct link.

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<sup>15</sup> [PUBL054.PS \(congress.gov\)](#)

The positive correlation should be no surprise, because the contract formula used to arrive at a price for these barrows and gilts uses the CME's lean hog futures contract value as a direct input. Nevertheless, to confirm the relationship between these two markets, a linear regression model of the natural logs of the first differences of weekly CME lean hog futures prices and weekly Barrows & Gilts Market Formula prices between October 2013 and December 2020 was tested and confirmed to show a significant ( $p < 0.005$ ) direct relationship between the response and predictor variables.

Similarly, a linear regression model of the natural logs of the first differences of weekly CME lean hog futures prices and weekly Feeder Pig prices (weighted average for 10-12 weight, U.S. Grade 1 & 2, collected by USDA's Agricultural Marketing Service) between January 2020 and September 2020 was also tested and confirmed to show a significant ( $p < 0.025$ ) direct relationship between the response and predictor variables. Therefore, it is reasonable to conclude that the 10% to 50% expected loss in the lean hog market in the likely Prop 12 scenario described above would also translate into a loss of similar scale in the feeder pig market.

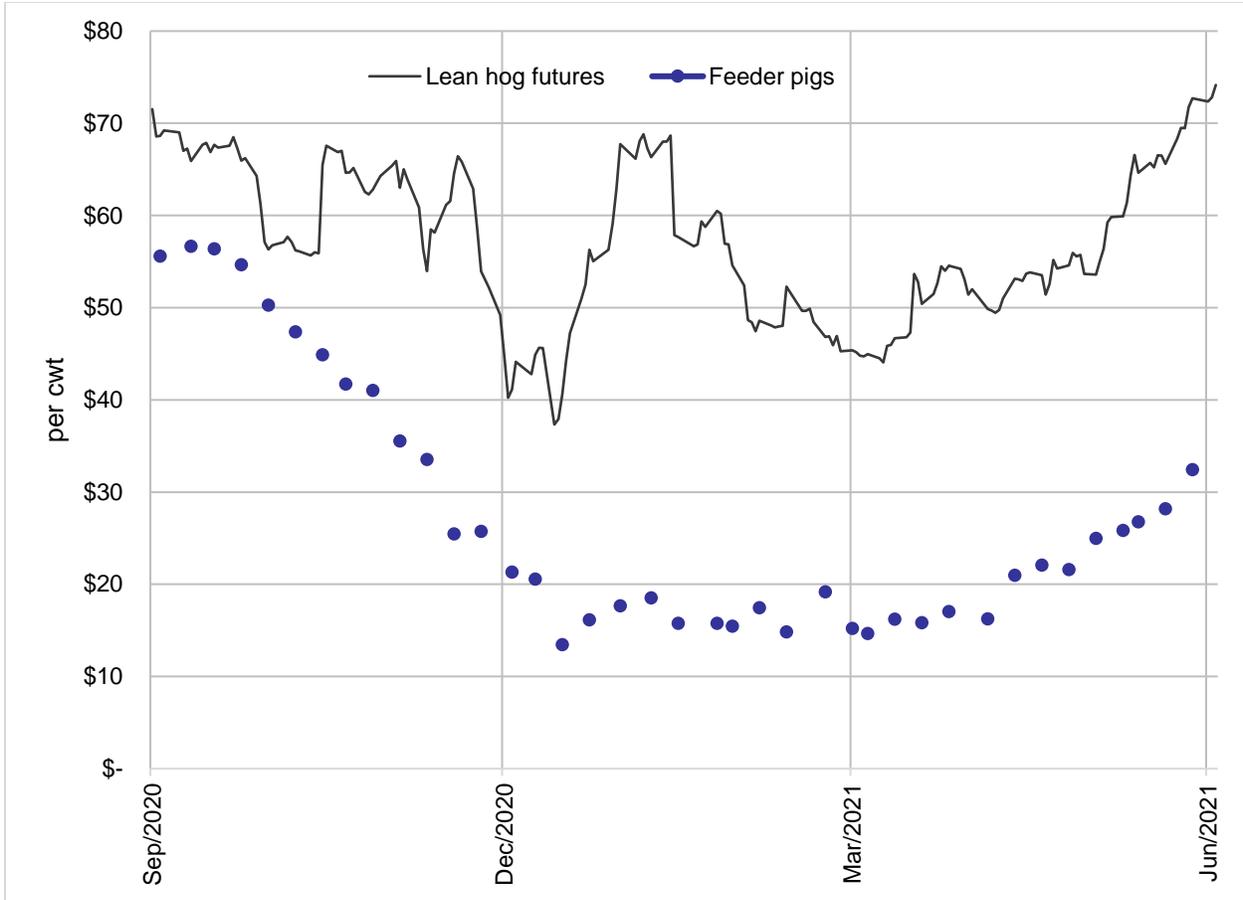


Figure 5: The prices for feeder piglets, the salable products of sow farrowing facilities, have a strong direct influence from the anticipated values for lean hogs in approximately 6 months' time, as well as an inverse influence from the anticipated values for inputs such as corn and soybean meal.

Losses to the feeder pig market may be even more severe, in fact, due to the bearishness of uncertainty.

Hog feeding operations that buy piglets do so based on their expectations for what their finished products – the barrows and gilts of the lean hog market – will be worth in approximately six months' time, tempered by their expectations for what they will have to pay for inputs such as corn, soybean meal, water, energy, and labor. In the event of Proposition 12's lean hog market disruption early in 2022, hog feeders will not be able to confidently predict whether the market will either stabilize in six months or worsen as the supply chain adjusts to oversupply outside California. Without confidence about the market in mid-2022 and beyond, hog feeders may be faced with the terrible decision to cut the numbers of

animals placed on feed, which effectively means they must euthanize piglets that can't be economically raised to market weight.

If piglets are no longer an economically viable product, then their mothers – the sows in farrowing barns far outside California's borders – will no longer have an economic role, either. Although California represents 9% of the nation's fresh pork retail sales volume, its relative contribution to the nation's sow-farrowing and the resulting pig crop is miniscule: only 60,000 pigs farrowed in 2020, or 0.04% of the nationwide 139 million-head pig crop. The majority of sows and their pig crop that ultimately reach the nationwide pork market (including California) come from Midwestern states: Iowa produces 17% of the nation's pig crop, Minnesota 10%, Illinois 9%, and Missouri 8%. Although not in the Midwest, North Carolina is the nation's #2 pig producer, at 14%. Indiana is #9 with 5.3 million pigs in 2020, or 4% of the U.S. total.

Sow slaughter contributes a significant portion of the nation's pork production, with 17 of the nation's 74 hog packing plants primarily focused on harvesting sows<sup>16</sup>. These sows will typically be animals past their most productive years, or animals from operations that need to cut production because of challenging economic conditions, such as the conditions that are likely if Prop 12 is allowed to disrupt the pork and hog markets.

In the Prop 12 scenarios described above, when the feeder pig market is likely to collapse amid economic uncertainty, it's easily foreseeable that farrowing operations will choose to cull large numbers of sows. A crush of sow sales will likely drive down the prices for these animals, as well, further exacerbating the problem of pork oversupply filling cold storage. However, the precise scale of the price losses in the sow market is extremely difficult to predict, because this market sometimes moves opposite to the lean hog market, when, for instance, there is a scarcity of culled sows while the industry focuses on expansion. A

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<sup>16</sup> See Appendix B.

linear regression model of the natural logs of the first differences of weekly CME lean hog futures prices and weekly sow prices (weighted average for 450-499 lb sows, on a negotiated basis, collected by USDA’s Agricultural Marketing Service) between October 2013 and December 2020 was tested but failed to show a statistically significant relationship between the response and predictor variables. Despite that uncertainty, past scenarios suggest sow prices fall to a low of \$20 per hundredweight in the timeframes when the industry is most catastrophically oversupplied (June 2016, late 2020). Compared to today’s sow values, that would cut the value of sow inventory roughly in half.

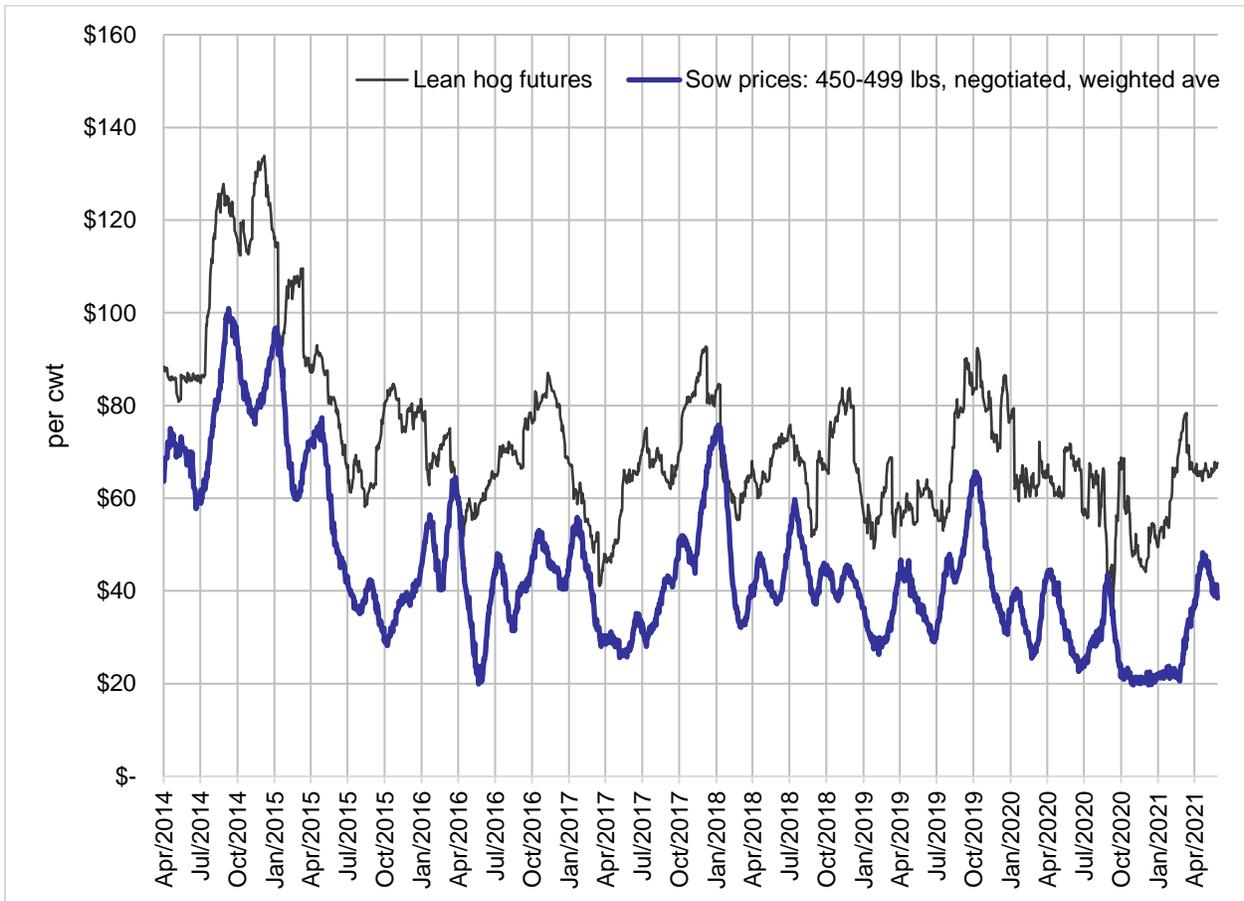


Figure 6: Per hundredweight, sow values (for mature animals sold for slaughter) are lower than the values for lean market-ready hogs, yet even in poor market conditions, they have so far been bounded by sellers’ resistance against accepting less than \$20 per cwt.

As of mid-2021, the swine industry does not appear to be fully anticipating the challenging price scenarios that would occur if Prop 12 is allowed to proceed. Sow slaughter in the United States in 2021 has not exceeded 2020 levels and in early June remained near the previous five-year average pace (approximately 60,000 head per week, or 2.5%<sup>17</sup> of total hog slaughter). **This means the industry has not begun to cut production, and in fact continues to expand<sup>18</sup> by farrowing sows that produce pigs that will ultimately reach the hog market in six months' time – at precisely the moment when the most uncertainty will reign and the most price volatility from Prop 12's effects will hit.**

#### **PROJECTED LOSSES TO PURDUE UNIVERSITY'S ANIMAL SCIENCES RESEARCH AND EDUCATION CENTER**

Projections for losses to the swine industry may seem abstract until they are put in the context of an individual farm or hog production operation. The state of Indiana, through its land-grant university, Purdue University, owns a swine inventory<sup>19</sup> at the university's Animal Sciences Research and Education Center. The market impacts of California's Prop 12 on nationwide hog values will directly damage Purdue University's financial position, and therefore, the state of Indiana.

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<sup>17</sup> [https://www.ams.usda.gov/mnreports/sj\\_ls711.txt](https://www.ams.usda.gov/mnreports/sj_ls711.txt)

<sup>18</sup> Vol. 19, No. 80 / April 28, 2021 [Home \(dailylivestockreport.com\)](http://www.dailylivestockreport.com)

<sup>19</sup> [ASREC Swine Unit \(purdue.edu\)](http://www.asrec.purdue.edu)

**Purdue University's ASREC Swine Unit Inventory Values:**

		Projected value if Prop 12 is allowed to damage nationwide hog markets			Projected marked-to-market balance sheet losses		
		Prices fall 10%	Prices fall 20% (most likely scenario)	Prices fall 50% (most severe scenario)	Prices fall 10%	Prices fall 20% (most likely scenario)	Prices fall 50% (most severe scenario)
	Current value						
Lean hogs	1,250 hogs x 280 lbs x \$1.20 <sup>20</sup> per lb: <b>\$420,000</b>	\$378,000	\$336,000	\$210,000	-\$42,000	<b>-\$84,000</b>	-\$210,000
Feeder pigs	1,250 pigs x \$46.12 <sup>21</sup> per head: <b>\$57,650</b>	\$51,885	\$46,120	\$28,825	-\$5,765	<b>-\$11,530</b>	-\$28,825
Sows	240 x 450 lbs x \$0.4945 <sup>22</sup> per lb: <b>\$53,406</b>	\$48,065	\$42,725	\$26,703	-\$5,341	<b>-\$10,681</b>	-\$26,703
Total inventory	<b>\$531,056</b>						
<b>Total marked-to-market balance sheet losses:</b>					<b>-\$53,106</b>	<b>-\$106,211</b>	<b>-\$265,528</b>
<i><b>Inventory note:</b> Purdue ASREC's Swine Unit owns a breeding herd of 240 sows which farrows 30 litters per month. Their inventory of pigs and hogs consists of staggered maturity stages throughout the year. Here an annual pig crop of 5,000 head with staggered birth dates and kept until 6 months of age is simplified and represented at any one snapshot in time as an inventory of 2,500 head under six months of age, composed of half (1,250 head) early-weaned pigs (less than 21 days) and half (1,250 head) finished hogs.</i>							
<i><b>Sow value note:</b> Purdue ASREC's actual sow inventory includes young, productive animals which would command a premium if sold as breeding stock. Here sow values are conservatively assumed to equal the slaughter prices for culled sows.</i>							

Uncertainty about the “chaos mode” the conventional hog industry will be thrown into by California’s Proposition 12 in early 2022 has prevented the ASREC Swine Unit’s directors from pursuing any changes to their operation in 2021, and it is unlikely they could obtain funding to do so. Dr. Brian Richert of Purdue points out, “The reasonableness is the problem. Equipment lasts 15 years. Even the European standard gave producers 8 years to reach compliance. To do a massive retrofit in 1 year is not possible.” He and Dr. Allan Schinckel have considered the impacts that retrofitting their facilities to become Prop 12 compliant would have on their productivity, and they confirm there would be “significant production losses, at least temporarily,” to change equipment, pens, and barns. They could potentially use gestation space overflow during construction, but they companies who construct swine facilities (e.g. Gestall) are

<sup>20</sup> [CME - FTP \(cmegroup.com\)](http://cmegroup.com)

<sup>21</sup> [National Direct Feeder Pig Report \(usda.gov\)](https://www.usda.gov/national-direct-feeder-pig-report)

<sup>22</sup> [HG234 \(usda.gov\)](https://www.usda.gov/hg234)

already “totally overwhelmed” and couldn’t fit this operation into their schedule. As Dr. Schinckel says, “There is never a good time to bring in a bunch of construction workers and lose 20 percent of your housing.”

If the Purdue ASREC Swine Unit eventually switches to Prop 12-compliant hog production facilities, Drs. Richert and Schinckel predict serious ongoing production losses:

- Higher sow mortality due to fighting while in estrus
- Lower conception rates due to sow fighting
- More embryonic death loss due to mixing sows during days 3-7 post-insemination
- Higher pre-weaning mortality

### PROJECTED LOSSES TO INDIANA’S SWINE INDUSTRY

Although even a relatively small swine farrowing and hog production operation, like the one at Purdue’s ASREC, will experience significant financial losses when Prop 12 damages the nationwide pork and hog markets, a greater proportion of hog sales tend to come from larger operations. Data from the 2017 Census of Agriculture shows that 66% of annual hog sales in Indiana came from operations with greater than 5,000 head of hog inventory.

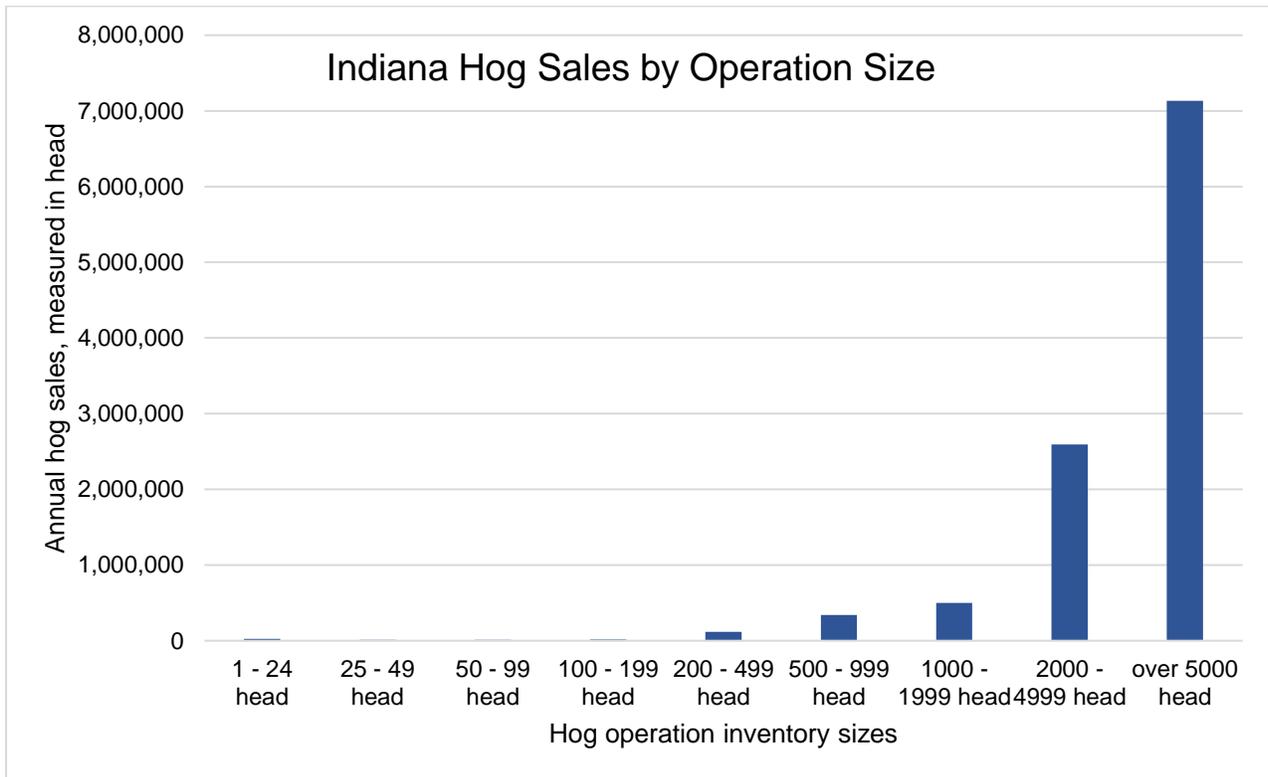


Figure 7: Source: USDA 2017 Census of Agriculture

For one of these larger hog feeding and finishing operations, therefore, the scale of economic losses from Prop 12 obviously grow larger. An operation with 5,000 market swine in inventory, assuming the entire inventory is under 6 months of age and can be simplified and represented as 2,500 early weaned feeder pigs (less than 21 days) and 2,500 finished barrows and gilts, should expect marked-to-market balance sheet losses of between \$95,000 and \$477,000 once Prop 12 damages the market values for lean hogs and feeder pigs. The most likely scenario, a 20% loss in value, would suggest market-to-market balance sheet losses of \$191,000 for a single 5,000-head hog feeding operation in Indiana.

Statewide, Indiana farmers farrowed 490,000 sows in 2020<sup>23</sup>, each generally producing more than 2 litters per year and an average of 10.88 pigs per litter. After accounting for death loss and deliveries to feeding operations in other states, the 5.3 million-head annual pig crop in Indiana can be simplified and represented as an inventory of 2.7 million head of feeder pigs under six months of age at any one snapshot in time, with a total value equal to that of 1.3 million head of early weaned feeder pigs (less than 21 days) and 1.3 million finished barrows and gilts. The following table exhibits the current value of that inventory, and how that inventory value will be damaged by the implementation of California’s Prop 12:

Current value in \$ millions		Projected value if Prop 12 is allowed to damage nationwide hog markets			Projected marked-to-market balance sheet losses		
		Prices fall 10%	Prices fall 20% (most likely scenario)	Prices fall 50% (most severe scenario)	Prices fall 10%	Prices fall 20% (most likely scenario)	Prices fall 50% (most severe scenario)
Lean hogs	1.3 million hogs x 280 lbs x \$1.20 <sup>24</sup> per lb: <b>\$437m</b>	\$393m	\$349m	\$218m	-\$43.7m	<b>-\$87.4m</b>	-\$218.4m
Feeder pigs	1.3 million pigs x \$46.12 <sup>25</sup> per head: <b>\$60m</b>	\$54m	\$48m	\$30m	-\$6.0m	<b>-\$12.0m</b>	-\$30.0m
Sows	490,000 head x 450 lbs x \$0.4945 <sup>26</sup> per lb: <b>\$109m</b>	\$98m	\$87m	\$55m	-\$10.9m	<b>-\$21.8m</b>	-\$54.5
<b>Total marked-to-market balance sheet losses:</b>					<b>-\$60.6m</b>	<b>-\$121.2m</b>	<b>-\$302.9m</b>

Presently, the value of Indiana’s sow, feeder pig, and lean hog inventory is estimated at \$605.8 million. In the most likely price scenario after Prop 12’s implementation, wherein the prices for each of these commodities falls by 20%, the value of Indiana’s swine herd would fall to \$484.6 million. **Therefore, the state of California, by implementing Prop 12 and damaging the pork and hog markets nationwide, will likely cause a near-immediate economic loss of \$121.2 million to farmers in the state of Indiana.**

<sup>23</sup> [USDA - National Agricultural Statistics Service Homepage](#)

<sup>24</sup> [CME - FTP \(cmegroup.com\)](#)

<sup>25</sup> [National Direct Feeder Pig Report \(usda.gov\)](#)

<sup>26</sup> [HG234 \(usda.gov\)](#)

The losses to agricultural producers are only one portion of the total statewide economic losses in Indiana during Prop 12's implementation. Disruption and unpredictable price volatility in the nationwide pork market will also cause losses in the grocery and food distribution sector while businesses set prices to consumers without knowing material costs. Indiana's three hog processing plants, which have a capacity to process 34,000 head of hogs per day, will be burdened with new costs for auditing and certifying the supply chain for Prop 12-compliant pork. An even more burdensome loss for the Indiana packers, amid a scarcity of Prop 12-compliant hogs to slaughter, will be the loss of business volume as they cut production capacity in the sudden void of demand for pork from conventionally-raised hogs. **This diminishment of activity at the packing plants will ultimately lead to job losses in the state of Indiana, and fiscal harm to Indiana as the suddenly unemployed packing plant employees utilize public support.**

Market values will almost certainly change between today's prices and the Prop 12-influenced prices of early 2022, and these marked-to-market balance sheet losses show how an entity's economic position can be wiped out from one such timeframe to another. However, the damage to the swine industry from the implementation of California's Prop 12 will persist well beyond one snapshot in time. If the prices at which Indiana hog producers can sell their hogs remain depressed by 20% throughout an entire year, the total lost income will dwarf the balance sheet losses. In 2020, for instance, gross income from hogs in Indiana reached \$1,033,658,000, and that was in an extraordinarily challenging year of Covid-depressed prices and excess hog euthanasia culling. In mid-2021, benchmark hog prices have risen 154% over those depressed year-ago levels (\$122 per cwt versus \$48 per cwt). Nevertheless, using the 2020 gross income figure as a baseline, losing 20% from that figure would be **a \$207 million loss in annual income for Indiana's hog producers**. For as many years as California's Prop 12 continues to create a backlog in pork from conventionally-raised hogs, those annual losses should be expected to continue.

## **COSTS TO THOSE WHO PURSUE ALTERNATIVE ACCESS TO THE MARKET**

These economic losses will be virtually unavoidable for nationwide swine operations that raise hogs in the conventional manner (including conventional swine operations inside the state of California). The premium prices paid for scarce Prop 12-compliant pork will likely motivate packers to offer a premium to producers who can demonstrate they raised their hogs in compliance with Prop 12's demands, but only producers who undertake expensive facility renovations will be able to demonstrate such compliance and be eligible for potential premiums.

Reaching compliance will be no simple matter. For farrowing operations that currently use traditional gestation pens with an area per sow of 12 square feet (2' x 6'), compliance would require a total teardown of most of a farrowing barn's existing infrastructure, to be replaced by pens that not only halve each barn's production capacity by offering 24 square feet of area per sow, but which also require the expensive technology required to allow aggressive sows to live together in pens without attacking each other and limiting submissive sows' feed and water intake.

For farrowing operations that already use group housing for sows, each barn's production capacity must still fall, because most of today's group housing is arranged to offer 18 to 20 square feet per sow. The teardown and rebuilding of those pens to reach Prop 12's 24 square feet per sow will therefore not only be costly, but will result in a loss of over 20% in production capacity.

Purdue University's Animal Sciences Research and Education Center, if it pursues the strategy of pursuing market premiums for raising Prop 12-compliant hogs, will experience that scale of production capacity loss. Its group housing for sows currently maintains the animals in groups of 10-20, but at the current common industry practice of 20 square feet per sow, rather than the Prop 12 requirement of 24 square feet per sow. **Retrofitting not only these group housing pens but also the breeding pens and electronic sow feeding systems that would be necessary to meet Prop 12 compliance, in a way that is**

**safe for both sows and their human handlers, is estimated to cost far more than the Center could recoup from the retrofitting project by selling into the higher-priced Prop 12-compliant hog market.**

In a 2010 analysis by University of Minnesota economist Brian L. Buhr, the cost for the entire U.S. swine industry to migrate from individual pens for sows to group housing for sows totaled between \$1.9 billion and \$3.2 billion, at that time when construction costs were much lower than in 2021. Analysts at Rabobank, a multinational cooperative banking and financial services company with a focus on the food and agriculture sector, in 2021 estimated that 20% of U.S. sow housing would need to be compliant with Prop 12 in order to meet California's consumer pork demand without disrupting nationwide pork prices, but they estimated less than 4% of current sow housing (among Rabobank's U.S. customers) would currently meet those requirements.

Estimates for barn retrofitting costs are almost impossible to make, not only because of the current volatility in the prices for building materials and construction, but most of all because the actual requirements and procedures for meeting Prop 12 compliance are not yet known. How a farrowing facility will be audited for Prop 12 compliance, without sacrificing each facility's biosecurity, is unknown. Even the facility requirements themselves aren't fully known. A draft Articles of Regulation with proposed livestock confinement standards for pork meat<sup>27</sup> describes that breeding sows' enclosures "shall not prevent a breeding pig from lying down, standing up, fully extending its limbs, or turning around freely" and "shall provide a minimum of 24 square feet of usable floor space per breeding pig" but doesn't provide requirements for breeding pens or nursing pens, leaving those major design constraints presently unknown. Hog operations are unlikely to undertake negative NPV barn projects in this uncertain

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<sup>27</sup> [Proposed Regulations Livestock Confinement Standards \(ca.gov\)](#)

environment, and therefore the nationwide hog supply will continue to consist of conventionally-raised hogs.

Hog producers who responded to a survey described in Buhr's 2010 analysis suggested it would take them between two and ten years to completely transition to group housed sow facilities if the transition was done at normal facility replacement rates, with a resulting "massive productivity decline." Therefore, the wildly different split between the supply-and-demand for Prop 12 compliant hogs and pork, and the supply-and-demand for conventionally-raised hogs and pork, should be expected to persist for years beyond January 1, 2022, and while a gradual share of new farrowing barn construction with Prop 12-compliant pen spaces may eventually catch up to the demand for Prop 12-compliant pork, it is entirely uncertain how long that process will take in the current construction environment.

It is certain, however, that if there is a farrowing operation that uses conventional barn spaces today and wants to reach Prop 12 compliance by January 1, 2022, it would be virtually impossible for that operation to do so, and therefore its 2022 crop of feeder pigs and hogs must be sold into the conventional market that will be damaged by Prop 12.

**APPENDIX A: Selected hog and pork production figures by state**

State	2020 Pig Crop			Current Slaughter Plant Capacity		
	Measured in head	Rank	Percent of Total	Head per day	Rank	Percent of Total
<i>U.S. Total</i>	<i>139,408,900</i>			<i>512,000</i>		
Alabama	159,000	27	0.11%	300	22	0.1%
Alaska	2,800	47	0.00%			
Arizona	278,000	26	0.20%			
Arkansas	885,000	20	0.63%			
California	60,000	31	0.04%	10,800	13	2.1%
Colorado	3,009,000	12	2.16%			
Connecticut	3,900	44	0.00%			
Delaware	40,000	33	0.03%			
Florida	24,000	36	0.02%			
Georgia	281,000	25	0.20%			
Hawaii	12,000	38	0.01%			
Idaho	115,000	29	0.08%	720	21	0.1%
Illinois	12,380,000	4	8.88%	46,000	3	9.0%
Indiana	5,332,000	9	3.82%	34,000	6	6.6%
Iowa	23,981,000	1	17.20%	151,300	1	29.6%
Kansas	3,709,000	11	2.66%	1,100	19	0.2%
Kentucky	966,000	19	0.69%	10,900	12	2.1%
Louisiana	2,700	48	0.00%			
Maine	6,500	40	0.00%			
Maryland	40,000	34	0.03%			
Massachusetts	12,000	39	0.01%			
Michigan	2,465,000	14	1.77%	12,500	11	2.4%
Minnesota	13,703,000	3	9.83%	45,100	4	8.8%
Mississippi	1,283,000	17	0.92%			
Missouri	11,075,000	5	7.94%	34,500	5	6.7%
Montana	767,000	22	0.55%			
Nebraska	8,753,000	7	6.28%	29,500	7	5.8%
Nevada	1,600	50	0.00%			
New Hampshire	3,200	45	0.00%			
New Jersey	5,500	41	0.00%	200	23	0.0%
New Mexico	2,400	49	0.00%			
New York	47,000	32	0.03%			
North Carolina	19,156,000	2	13.74%	46,250	2	9.0%
North Dakota	805,000	21	0.58%			
Ohio	4,369,000	10	3.13%	5,550	15	1.1%
Oklahoma	9,023,000	6	6.47%	20,500	8	4.0%
Oregon	13,000	37	0.01%	1,075	20	0.2%
Pennsylvania	2,410,000	15	1.73%	15,050	10	2.9%
Rhode Island	3,200	46	0.00%			
South Carolina	133,000	28	0.10%			
South Dakota	6,857,000	8	4.92%	19,500	9	3.8%
Tennessee	666,000	24	0.48%	3,950	16	0.8%
Texas	2,726,000	13	1.96%	1,700	18	0.3%
Utah	1,824,000	16	1.31%			
Vermont	5,200	42	0.00%			
Virginia	64,000	30	0.05%	10,290	14	2.0%
Washington	26,000	35	0.02%			
West Virginia	4,900	43	0.00%			
Wisconsin	1,197,000	18	0.86%	2,850	17	0.6%
Wyoming	722,000	23	0.52%			

Source: Pig Crop, measured in head from USDA National Agricultural Statistics Service.

Source: Slaughter capacity information published by Steve Meyer, EMI Analytics, with independent verification and analysis by Elaine Kub

**APPENDIX B: Estimated daily U.S. hog slaughter by plant, in head per day**

Source: Slaughter capacity information published by Steve Meyer, EMI Analytics, with independent verification and analysis by Elaine Kub

Company	Location	State	Plant Capacity (head per day)	Details
Dean Sausage	Atalla	Alabama	300	primarily sow slaughter
Smithfield	Los Angeles	California	7,300	
Yosemite Meats	Modesto	California	1,850	
Jim's Farm Meats	Atwater	California	850	
Olson Meat Company	Orland	California	800	
Independent Meats	Twin Falls	Idaho	720	
Smithfield	Monmouth	Illinois	10,700	
JBS	Beardstown	Illinois	21,000	
Rantoul Foods	Rantoul	Illinois	6,700	
Johnsonville Sausage	Momence	Illinois	1,650	primarily sow slaughter
Pork King Packing	Marengo	Illinois	2,200	primarily sow slaughter
Spectrum Meats	Mount Morris	Illinois	1,600	
Calihan Packing Company	Peoria	Illinois	750	primarily sow slaughter
Peoria Packing	Chicago	Illinois	600	
Dekalb County Packing Company	De Kalb	Illinois	500	
Morris Meat Packing	Morris	Illinois	300	
Tyson Foods	Logansport	Indiana	15,400	
Indiana Packing Co	Delphi	Indiana	17,500	
Tri-Eagle Provision (Vin-Lee-Ron)	Mentone	Indiana	1,100	
Prestage Foods	Eagle Grove	Iowa	10,000	new in 2019
Smithfield	Denison	Iowa	10,000	
JBS	Marshalltown	Iowa	21,000	
JBS	Ottumwa	Iowa	20,000	
Tyson Foods	Waterloo	Iowa	19,500	
Tyson Foods	Storm Lake	Iowa	17,000	
Tyson Foods	Columbus Junction	Iowa	10,100	
Tyson Foods	Perry	Iowa	8,250	
Seaboard Triumph	Sioux City	Iowa	20,000	new in 2017
Sioux-Preme Packing	Sioux Center	Iowa	4,600	
Pine Ridge Farms	Des Moines	Iowa	4,000	primarily sow slaughter
Premium Iowa Pork	Hospers	Iowa	3,150	
Dakota Pork, Inc.	Esterville	Iowa	2,500	
Verschoor Meats	Sioux City	Iowa	1,200	
Johnsonville Sausage	Holton	Kansas	1,100	primarily sow slaughter
JBS	Louisville	Kentucky	10,000	
F.B. Purnell Sausage	Simsonville	Kentucky	500	primarily sow slaughter
Williams Sausage Co.	Union City	Kentucky	400	primarily sow slaughter
Clemens Food Group	Coldwater	Michigan	12,000	new in 2017
Bob Evans Farms	Hillsdale	Michigan	500	primarily sow slaughter
JBS	Worthington	Minnesota	21,000	
Hormel	Austin	Minnesota	19,000	
Prime Pork	Windom	Minnesota	5,100	
Smithfield	Milan	Missouri	10,500	
Triumph Foods	St Joseph	Missouri	21,500	
MoonRidge Pork	Mt. Pleasant	Missouri	2,500	
Smithfield	Crete	Nebraska	11,000	
Tyson Foods	Madison	Nebraska	8,000	
Wholestone Farms	Fremont	Nebraska	10,500	
Dealaman Enterprises, Inc.	Warren	New Jersey	200	
Smithfield	Tar Heel	North Carolina	32,500	
Smithfield	Clinton	North Carolina	10,600	
The Pork Company	Warsaw	North Carolina	1,500	
Martin's Pork Products	Falcon	North Carolina	1,300	
Parks Family Meats	Warsaw	North Carolina	350	
J.H. Routh	Sandusky	Ohio	4,600	
Bob Evans Farms	Xenia	Ohio	500	primarily sow slaughter
Pioneer Packing Company	Bowling Green	Ohio	450	primarily sow slaughter
Seaboard Farms	Guymon	Oklahoma	20,500	
Masami Meat Company	Klamath Falls	Oregon	500	
Carleton Packing Company	Carleton	Oregon	375	
Dayton Meat co.	Dayton	Oregon	200	
Clemens Food Group	Hatfield	Pennsylvania	11,700	
USA Pork Products	Hazellton	Pennsylvania	2,000	
Leidy's	Souderton	Pennsylvania	1,350	
Smithfield	Sioux Falls	South Dakota	19,500	
Tyson Foods	Newbern	Tennessee	2,800	primarily sow slaughter
Swaggerty Sausage Co.	Kodak	Tennessee	850	primarily sow slaughter
Wampler's Sausage	Lenoir City	Tennessee	300	primarily sow slaughter
Fisher Ham and Meat	Spring	Texas	1,200	
Fisher Ham and Meat	Navasota	Texas	500	
Smithfield	Gwaltney	Virginia	10,200	
Gunnoe Sausage	Goode	Virginia	90	primarily sow slaughter
Johnsonville Sausage	Watertown	Wisconsin	850	primarily sow slaughter
Abbyland Foods	Curtiss	Wisconsin	2,000	primarily sow slaughter

**APPENDIX C: Selected 2020 price data for pork, lean hogs, barrows & gilts, feeder pigs, and sows**

Sources: *Pork carcass cutout value, daily, 5-day average, from USDA Agricultural Marketing Service*  
*CME lean hog futures prices, daily, continuous nearby futures contract, from DTN ProphetX*  
*Barrows & Gilts price, daily, weighted average Swine/Pork Market Formula (carcass basis), from USDA Agricultural Marketing Service*  
*Early weaned pigs price, weekly, weighted average for 10-12 weight, U.S. Grade 1 & 2, from USDA Agricultural Marketing Service*  
*Sow prices, daily, weighted average for 450-499 lb sows, negotiated, from USDA Agricultural Marketing Service*

IN U.S. DOLLARS PER 100 POUNDS					
	Pork cutout value	Lean hog futures price	Barrows & gilts price	Early weaned pigs price	Sows price
12/28/2020	69.34	66.50	59.63		41.31
12/21/2020	72.01	65.93	61.10		41.17
12/14/2020	77.32	64.90	64.27		42.51
12/7/2020	76.72	64.50	65.11		46.30
11/30/2020	77.72	67.58	66.21		47.64
11/23/2020	77.03	64.95	66.63		47.32
11/16/2020	81.03	65.15	68.42		44.58
11/9/2020	83.12	65.60	69.93		40.78
11/2/2020	84.80	65.95	71.32		38.01
10/26/2020	94.80	67.75	76.14		36.10
10/19/2020	96.99	71.43	77.51		33.81
10/12/2020	93.27	78.18	77.17		30.05
10/5/2020	92.54	74.75	75.73		25.57
9/28/2020	90.18	72.70	74.80	32.43	21.92
9/21/2020	85.71	65.60	70.62	28.20	22.34
9/14/2020	79.83	64.63	64.02	26.76	23.24
9/8/2020	77.31	59.90	59.99	25.86	22.75
8/31/2020	72.07	53.60	55.46	24.99	23.76
8/24/2020	73.93	54.60	55.36	21.60	22.81
8/17/2020	72.50	53.53	53.77	22.08	22.56
8/10/2020	68.51	53.13	53.03	20.99	22.33
8/3/2020	66.81	49.88	51.35	16.25	21.73
7/27/2020	69.94	54.55	51.02	17.04	21.72
7/20/2020	68.04	50.40	48.45	15.83	22.48
7/13/2020	66.46	46.68	46.03	16.20	22.42
7/6/2020	64.18	44.95	44.89	14.66	21.24
6/29/2020	64.48	45.38	44.19	15.21	21.07
6/22/2020	63.99	46.83	45.06	19.20	21.01
6/15/2020	67.79	52.28	48.04	14.85	21.42
6/8/2020	72.72	48.58	51.71	17.46	21.18
6/1/2020	88.08	54.60	61.22	15.47	22.35
5/26/2020	97.00	60.50	63.72	15.78	23.37
5/18/2020	111.36	57.65	70.40	15.77	21.96
5/11/2020	115.75	66.33	67.39	18.53	23.07
5/4/2020	97.53	67.73	63.29	17.67	23.74
4/27/2020	75.23	56.28	50.36	16.16	28.93
4/20/2020	56.51	40.60	43.82	13.45	33.00
4/13/2020	51.94	44.90	44.14	20.56	39.13
4/6/2020	59.59	41.13	51.99	21.33	43.54
3/30/2020	75.76	53.95	63.70	25.73	41.04
3/23/2020	77.36	64.58	63.45	25.45	33.62
3/16/2020	68.84	53.98	58.73	33.55	31.83
3/9/2020	65.60	63.00	56.09	35.55	31.28
3/2/2020	64.05	62.80	54.59	41.04	30.19
2/24/2020	63.75	64.63	54.62	41.71	28.51
2/18/2020	62.42	65.50	53.42	44.89	27.80
2/10/2020	64.46	56.20	55.10	47.36	24.73
2/3/2020	70.53	56.30	59.24	50.28	25.21
1/27/2020	77.21	65.95	61.06	54.65	24.28
1/17/2020	73.81	67.68	59.26	56.37	25.94
1/13/2020	72.30	65.90	58.22	56.67	26.05
1/6/2020	73.54	68.63	58.43	55.60	27.67

**APPENDIX D: Selected December 2020 plant-delivered purchase data**

Source: Daily Direct Hog Reports, USDA Agricultural Marketing Service, Livestock, Poultry, and Grain Market News

Report Date	Purchase Type			
12/31/2020	Pack. Sold (all purchase types)	35,195		
12/30/2020	Pack. Sold (all purchase types)	19,838		
12/29/2020	Pack. Sold (all purchase types)	24,723		
12/28/2020	Pack. Sold (all purchase types)	45,883		
12/23/2020	Pack. Sold (all purchase types)	25,261		
12/22/2020	Pack. Sold (all purchase types)	28,622		
12/21/2020	Pack. Sold (all purchase types)	44,714		
12/18/2020	Pack. Sold (all purchase types)	27,997		
12/17/2020	Pack. Sold (all purchase types)	31,738		
12/16/2020	Pack. Sold (all purchase types)	17,848		
12/15/2020	Pack. Sold (all purchase types)	36,530		
12/14/2020	Pack. Sold (all purchase types)	37,774		
12/11/2020	Pack. Sold (all purchase types)	37,292		
12/10/2020	Pack. Sold (all purchase types)	23,033		
12/9/2020	Pack. Sold (all purchase types)	26,546		
12/8/2020	Pack. Sold (all purchase types)	30,778		
12/7/2020	Pack. Sold (all purchase types)	46,037		
12/4/2020	Pack. Sold (all purchase types)	29,472		
12/3/2020	Pack. Sold (all purchase types)	31,290		
12/2/2020	Pack. Sold (all purchase types)	27,872		
12/1/2020	Pack. Sold (all purchase types)	23,183	651,626	10.1%
12/31/2020	Prod. Sold Negotiated	8,213		
12/30/2020	Prod. Sold Negotiated	11,003		
12/29/2020	Prod. Sold Negotiated	6,787		
12/28/2020	Prod. Sold Negotiated	10,868		
12/23/2020	Prod. Sold Negotiated	6,531		
12/22/2020	Prod. Sold Negotiated	8,898		
12/21/2020	Prod. Sold Negotiated	6,616		
12/18/2020	Prod. Sold Negotiated	5,296		
12/17/2020	Prod. Sold Negotiated	7,756		
12/16/2020	Prod. Sold Negotiated	10,344		
12/15/2020	Prod. Sold Negotiated	5,884		
12/14/2020	Prod. Sold Negotiated	7,044		
12/11/2020	Prod. Sold Negotiated	7,919		
12/10/2020	Prod. Sold Negotiated	5,838		
12/9/2020	Prod. Sold Negotiated	6,249		
12/8/2020	Prod. Sold Negotiated	8,994		
12/7/2020	Prod. Sold Negotiated	6,424		
12/4/2020	Prod. Sold Negotiated	7,547		
12/3/2020	Prod. Sold Negotiated	6,154		
12/2/2020	Prod. Sold Negotiated	9,336		
12/1/2020	Prod. Sold Negotiated	11,391	165,092	2.6%
12/31/2020	Prod. Sold Negotiated Formula	175		
12/30/2020	Prod. Sold Negotiated Formula	586		
12/29/2020	Prod. Sold Negotiated Formula	338		
12/28/2020	Prod. Sold Negotiated Formula	170		
12/23/2020	Prod. Sold Negotiated Formula	517		
12/22/2020	Prod. Sold Negotiated Formula	745		

12/21/2020 Prod. Sold Negotiated Formula	175		
12/18/2020 Prod. Sold Negotiated Formula	505		
12/17/2020 Prod. Sold Negotiated Formula	504		
12/16/2020 Prod. Sold Negotiated Formula	713		
12/15/2020 Prod. Sold Negotiated Formula	1,341		
12/14/2020 Prod. Sold Negotiated Formula	1,840		
12/11/2020 Prod. Sold Negotiated Formula	504		
12/10/2020 Prod. Sold Negotiated Formula	885		
12/9/2020 Prod. Sold Negotiated Formula	680		
12/8/2020 Prod. Sold Negotiated Formula	674		
12/7/2020 Prod. Sold Negotiated Formula	1,006		
12/4/2020 Prod. Sold Negotiated Formula	671		
12/3/2020 Prod. Sold Negotiated Formula	542		
12/2/2020 Prod. Sold Negotiated Formula	650		
12/1/2020 Prod. Sold Negotiated Formula	827	14048	0.2%
12/31/2020 Prod. Sold Other Market Formula	32,604		
12/30/2020 Prod. Sold Other Market Formula	35,369		
12/29/2020 Prod. Sold Other Market Formula	25,661		
12/28/2020 Prod. Sold Other Market Formula	60,281		
12/23/2020 Prod. Sold Other Market Formula	83,041		
12/22/2020 Prod. Sold Other Market Formula	52,783		
12/21/2020 Prod. Sold Other Market Formula	51,210		
12/18/2020 Prod. Sold Other Market Formula	35,794		
12/17/2020 Prod. Sold Other Market Formula	23,569		
12/16/2020 Prod. Sold Other Market Formula	30,199		
12/15/2020 Prod. Sold Other Market Formula	28,329		
12/14/2020 Prod. Sold Other Market Formula	37,091		
12/11/2020 Prod. Sold Other Market Formula	41,606		
12/10/2020 Prod. Sold Other Market Formula	29,656		
12/9/2020 Prod. Sold Other Market Formula	32,872		
12/8/2020 Prod. Sold Other Market Formula	24,072		
12/7/2020 Prod. Sold Other Market Formula	46,862		
12/4/2020 Prod. Sold Other Market Formula	32,020		
12/3/2020 Prod. Sold Other Market Formula	35,259		
12/2/2020 Prod. Sold Other Market Formula	54,867		
12/1/2020 Prod. Sold Other Market Formula	24,539	817,684	12.7%
12/31/2020 Prod. Sold Other Purchase Arrangement	42,650		
12/30/2020 Prod. Sold Other Purchase Arrangement	59,683		
12/29/2020 Prod. Sold Other Purchase Arrangement	63,312		
12/28/2020 Prod. Sold Other Purchase Arrangement	161,330		
12/23/2020 Prod. Sold Other Purchase Arrangement	56,906		
12/22/2020 Prod. Sold Other Purchase Arrangement	61,878		
12/21/2020 Prod. Sold Other Purchase Arrangement	158,126		
12/18/2020 Prod. Sold Other Purchase Arrangement	60,898		
12/17/2020 Prod. Sold Other Purchase Arrangement	51,821		
12/16/2020 Prod. Sold Other Purchase Arrangement	56,707		
12/15/2020 Prod. Sold Other Purchase Arrangement	62,467		
12/14/2020 Prod. Sold Other Purchase Arrangement	181,447		
12/11/2020 Prod. Sold Other Purchase Arrangement	58,489		
12/10/2020 Prod. Sold Other Purchase Arrangement	57,038		
12/9/2020 Prod. Sold Other Purchase Arrangement	57,795		
12/8/2020 Prod. Sold Other Purchase Arrangement	67,494		

12/7/2020	Prod. Sold Other Purchase Arrangement	176,826		
12/4/2020	Prod. Sold Other Purchase Arrangement	64,470		
12/3/2020	Prod. Sold Other Purchase Arrangement	58,929		
12/2/2020	Prod. Sold Other Purchase Arrangement	56,822		
12/1/2020	Prod. Sold Other Purchase Arrangement	63,173	1,678,261	26.1%
12/31/2020	Prod. Sold Swine/Pork Market Formula	100,786		
12/30/2020	Prod. Sold Swine/Pork Market Formula	117,855		
12/29/2020	Prod. Sold Swine/Pork Market Formula	131,644		
12/28/2020	Prod. Sold Swine/Pork Market Formula	203,793		
12/23/2020	Prod. Sold Swine/Pork Market Formula	120,660		
12/22/2020	Prod. Sold Swine/Pork Market Formula	128,752		
12/21/2020	Prod. Sold Swine/Pork Market Formula	215,205		
12/18/2020	Prod. Sold Swine/Pork Market Formula	157,419		
12/17/2020	Prod. Sold Swine/Pork Market Formula	146,804		
12/16/2020	Prod. Sold Swine/Pork Market Formula	122,574		
12/15/2020	Prod. Sold Swine/Pork Market Formula	138,941		
12/14/2020	Prod. Sold Swine/Pork Market Formula	203,084		
12/11/2020	Prod. Sold Swine/Pork Market Formula	165,582		
12/10/2020	Prod. Sold Swine/Pork Market Formula	135,636		
12/9/2020	Prod. Sold Swine/Pork Market Formula	135,663		
12/8/2020	Prod. Sold Swine/Pork Market Formula	127,475		
12/7/2020	Prod. Sold Swine/Pork Market Formula	204,449		
12/4/2020	Prod. Sold Swine/Pork Market Formula	160,896		
12/3/2020	Prod. Sold Swine/Pork Market Formula	133,416		
12/2/2020	Prod. Sold Swine/Pork Market Formula	132,260		
12/1/2020	Prod. Sold Swine/Pork Market Formula	126,887	3,109,781	48.3%

**APPENDIX E: Retail Pork Sales by State**

Sources: National Pork Board, IRI UNIFY- 2018: CY 2018 Ending 12-30-18, 2019: CY 2019 Ending 12-29-19, 2020: CY 2020 Ending 12-27-20

U.S. Department of Commerce, U.S. Census Bureau

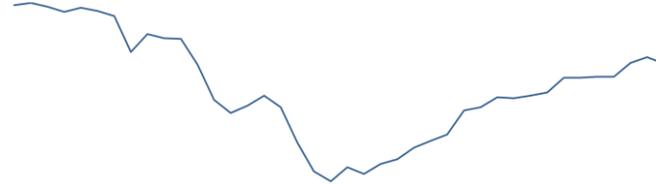
Definitions	
<b>TOTAL PORK</b>	Total Fresh Pork + Total Processed Pork
<b>TOTAL FRESH PORK</b>	All products classified in IRI as PORK and in FRESH Meat Dept.
<b>TOTAL PROCESSED</b>	All fixed weight products within the Processed Meat Dept. with PORK ingredient attributes- fixed weight only (Random weight = -.06%)
<b>MULO</b>	Multi-unit retail sales (not including food service sales)
<b>States Highlighted in Gray</b>	Only Fixed Weight products are reportable in that state. Sales numbers for Fresh Pork are EXCLUDING Random Weight Pork

Geography	TOTAL PORK						FRESH PORK						PROCESSED PORK						Population April 1 2020	Per capita Fresh Pork Retail Sales Volume 2019
	Dollar Sales			Volume Sales			Dollar Sales			Volume Sales			Dollar Sales			Volume Sales				
	2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020		
Total US - MULO	\$18,175,315.951	\$18,508,776.022	\$22,026,612.385	5,483,876.389	5,517,851.680	6,171,085.395	\$6,072,920.989	\$6,079,633.627	\$7,250,324.114	2,275,841,060	2,283,326.524	2,554,257.911	\$12,102,394.962	\$12,429,142.455	\$14,776,288.270	3,208,035.329	3,234,525.156	3,616,827.483	335,110,745	6.8
Texas - MULO	\$1,697,780.367	\$1,747,010.574	\$2,062,245.522	577,376.653	600,779.542	666,543.934	\$557,151.546	\$565,998.139	\$666,902.907	230,513.674	252,180.005	277,165.203	\$1,140,628.820	\$1,181,012.436	\$1,395,342.615	346,862.979	348,590.538	389,378.641	29,145,561	8.7
California - MULO	\$1,451,464.065	\$1,464,688.794	\$1,779,488.733	432,837.705	437,287.846	496,451.901	\$520,403.010	\$525,204.808	\$642,150.375	210,593.683	214,777.007	240,296.045	\$931,061.056	\$939,483.986	\$1,137,258.358	222,520.839	226,150.839	256,155.856	39,538,223	5.4
Florida - MULO	\$1,349,684.152	\$1,385,123.145	\$1,640,590.824	358,698.962	365,190.280	414,192.924	\$525,426.366	\$526,499.063	\$638,623.213	173,086.240	173,955.947	198,350.320	\$824,257.787	\$858,624.082	\$1,001,967.612	185,612.722	191,234.334	215,842.604	21,538,187	8.1
North Carolina - MULO	\$717,033.756	\$726,186.567	\$887,115.009	213,804.006	212,778.211	246,409.837	\$226,604.332	\$229,320.650	\$283,266.798	83,486.208	83,274.575	97,519.413	\$488,429.425	\$496,883.917	\$603,848.210	130,317.707	129,503.636	148,890.424	10,439,388	8.0
New York - MULO	\$705,388.771	\$710,145.377	\$854,179.420	196,412.975	194,950.395	217,957.120	\$264,403.311	\$264,485.668	\$317,254.396	98,672.304	99,065.702	109,928.746	\$440,985.460	\$445,659.709	\$536,925.024	97,740.671	95,884.693	108,028.374	20,201,249	4.9
Georgia - MULO	\$680,722.225	\$691,164.807	\$823,022.199	209,133.847	207,882.084	230,258.766	\$226,255.948	\$223,781.063	\$266,274.296	82,127.680	80,146.177	88,146.215	\$454,466.277	\$467,383.743	\$566,747.903	127,006.167	127,535.907	142,112.551	10,711,908	7.5
Ohio - MULO	\$667,974.250	\$679,920.132	\$804,328.788	203,054.080	202,881.972	225,743.527	\$210,480.791	\$207,987.281	\$247,137.982	75,670.261	73,596.303	83,738.960	\$457,493.459	\$471,932.851	\$557,190.806	127,383.819	129,285.668	142,004.566	11,799,448	6.2
Illinois - MULO	\$651,485,703	\$657,842,433	\$786,492,337	194,739.501	195,712.795	216,932.383	\$210,108.799	\$210,767.423	\$248,215.911	77,489.985	78,758.803	86,791.845	\$441,376.904	\$446,875.011	\$538,276.426	117,249.516	116,953.991	130,140.537	12,812,508	6.1
Pennsylvania - MULO	\$605,297,636	\$609,758,176	\$744,955,689	171,770.688	169,528.499	193,802.860	\$207,706.919	\$207,737.160	\$253,160.577	74,043.354	72,152.540	82,364.734	\$397,590.717	\$402,021.016	\$491,795.122	97,727.335	97,376.959	111,438,126	13,011,844	5.5
Michigan - MULO	\$599,365,174	\$601,628,418	\$717,593,288	174,615.958	173,972,216	195,004.207	\$170,853,849	\$169,629,528	\$195,443,385	65,958.646	64,195.701	71,451.735	\$418,511,324	\$431,998,890	\$522,149,904	108,657,312	109,776,514	123,552,471	10,077,331	6.4
Virginia - MULO	\$521,343,186	\$526,314,357	\$636,314,357	148,465.188	147,538.944	171,538.944	\$166,025,942	\$165,025,942	\$205,399,613	59,786.709	59,786.709	69,798.325	\$348,641,895	\$355,317,245	\$430,914,744	88,642,447	88,728,480	101,740,170	8,631,393	6.9
Tennessee - MULO	\$476,718,174	\$485,950,423	\$570,008,991	149,405.006	148,452.375	165,924.345	\$134,584,283	\$132,710,022	\$160,007,985	48,803.771	47,000.972	54,192.064	\$342,133,891	\$353,240,400	\$410,001,006	100,801,235	101,451,402	111,732,281	6,910,840	6.8
Indiana - MULO	\$464,184,288	\$477,407,471	\$557,123,695	147,201.478	148,399,844	162,897,866	\$140,133,154	\$141,037,806	\$166,278,465	53,705.654	52,519.459	59,389,604	\$324,051,144	\$336,369,665	\$390,845,230	90,495,824	95,880,387	103,508,172	6,785,528	7.7
Missouri - MULO	\$409,484,844	\$422,629,335	\$497,961,901	129,126.696	132,620.567	147,649.066	\$130,864.001	\$128,270,888	\$158,544,417	48,717.068	50,686.245	59,597.047	\$281,213,956	\$291,765.334	\$339,417,484	80,939,628	81,934,321	88,052,039	6,154,913	8.2
Louisiana - MULO	\$423,465,736	\$426,926,566	\$497,887,360	136,654.427	137,189.967	150,107.685	\$152,923,187	\$152,316,545	\$176,489,378	60,618.794	61,627.741	67,631.774	\$270,542,549	\$274,610,031	\$321,397,981	76,035,633	75,562,226	82,475,912	4,657,757	13.2
Arizona - MULO	\$395,655,231	\$411,306,541	\$484,886,361	133,376.083	136,345.683	147,981.540	\$138,315,450	\$139,334,096	\$161,755,462	57,799.354	57,335.021	61,252.288	\$257,334,781	\$272,972,445	\$323,130,899	75,576,729	79,010,662	86,729,253	7,151,502	8.0
South Carolina - MULO	\$394,170,406	\$400,876,809	\$478,532,784	121,055.113	119,483,425	134,915,900	\$134,752,919	\$133,301,525	\$160,175,080	48,596.778	47,040,520	53,106,087	\$259,417,487	\$267,675,284	\$318,357,705	72,458,335	72,442,905	81,809,813	5,118,425	9.2
New Jersey - MULO	\$379,364,164	\$377,060,173	\$466,196,443	108,185.590	106,896,566	122,044,572	\$162,309,562	\$161,883,410	\$197,049,977	61,322.074	61,684,467	68,536,656	\$217,054,602	\$215,176,763	\$269,146,466	46,863,517	45,212,099	53,507,916	9,288,994	6.6
Alabama - MULO	\$391,880,378	\$397,093,015	\$463,840,649	116,770,259	115,740,338	127,188,006	\$106,082,055	\$103,188,483	\$124,898,236	36,151,677	34,242,788	39,239,187	\$285,798,323	\$293,004,531	\$338,942,413	80,618,582	81,497,550	87,949,619	5,024,279	6.8
Colorado - MULO	\$377,618,469	\$388,576,855	\$446,714,755	108,337,514	109,225,377	121,447,228	\$126,621,220	\$125,739,042	\$145,124,975	44,339,283	43,066,137	48,308,811	\$250,977,249	\$262,837,813	\$301,589,779	63,998,231	66,159,240	73,138,416	5,773,714	7.5
Washington - MULO	\$355,556,608	\$362,509,390	\$425,946,491	95,533,888	95,622,123	108,896,235	\$114,034,512	\$114,129,448	\$132,197,658	39,157,844	38,346,444	43,069,337	\$241,519,096	\$248,379,942	\$293,748,833	56,376,044	57,587,008	65,826,898	7,705,281	7.0
Kentucky - MULO	\$332,781,359	\$339,472,888	\$399,497,227	108,123,028	107,311,957	119,424,792	\$93,601,227	\$93,740,611	\$110,807,896	35,661,718	34,233,100	39,092,825	\$239,180,132	\$245,732,277	\$288,689,330	72,461,310	73,078,857	80,332,287	4,505,836	5.0
Maryland - MULO	\$300,376,013	\$302,455,317	\$374,861,827	82,492,810	80,629,123	93,457,835	\$97,305,289	\$95,406,101	\$117,221,567	35,453,104	34,169,360	39,024,976	\$203,070,724	\$207,049,215	\$257,640,260	47,039,706	46,459,754	54,432,858	6,177,224	5.5
Massachusetts - MULO	\$249,828,271	\$251,168,941	\$316,279,908	70,810,802	71,395,830	80,675,480	\$104,609,409	\$104,484,283	\$129,372,424	40,692,739	41,101,381	44,950,088	\$145,218,862	\$146,684,658	\$186,907,484	30,118,063	30,294,449	35,725,392	7,029,917	5.8
Iowa - MULO	\$223,477,913	\$228,694,741	\$263,221,668	75,437,041	78,101,403	80,309,136	\$86,413,854	\$87,602,818	\$101,618,037	36,196,687	38,899,210	38,894,465	\$137,064,059	\$141,091,923	\$161,603,631	39,240,354	39,202,193	41,414,672	3,190,369	12.2
Oregon - MULO	\$200,285,654	\$204,785,588	\$243,992,066	54,874,903	55,918,783	64,006,341	\$64,555,980	\$64,141,783	\$74,164,584	22,487,687	22,038,198	24,519,897	\$135,729,674	\$140,643,805	\$169,827,481	32,387,216	33,879,585	39,576,444	4,237,256	5.2
Kansas - MULO	\$202,461,807	\$209,330,294	\$243,306,484	65,968,625	66,704,554	72,600,941	\$84,972,588	\$86,247,120	\$75,440,766	25,137,461	25,127,789	27,410,453	\$137,489,219	\$143,083,173	\$167,595,717	40,821,164	41,576,796	45,190,488	2,977,880	8.6
Connecticut - MULO	\$176,687,151	\$174,756,086	\$208,685,398	50,770,355	50,536,647	55,832,435	\$72,313,133	\$71,324,989	\$84,401,306	28,241,424	28,334,975	30,809,025	\$104,374,018	\$103,431,097	\$124,284,092	22,528,931	22,201,672	25,023,410	3,605,944	7.9
New Mexico - MULO	\$159,416,088	\$162,233,098	\$197,025,255	51,358,998	50,949,982	58,258,496	\$55,465,950	\$55,361,880	\$66,885,440	21,097,564	20,553,131	23,372,601	\$103,952,118	\$106,871,289	\$130,139,815	30,261,434	30,396,852	34,885,895	2,117,522	9.7
Nevada - MULO	\$157,761,106	\$159,619,559	\$192,008,529	48,172,887	48,554,780	54,818,559	\$55,059,408	\$53,710,811	\$64,765,283	20,655,730	20,870,546	23,334,515	\$102,701,672	\$105,908,748	\$127,243,246	27,517,157	27,675,233	31,484,045	3,104,614	6.7
Idaho - MULO	\$80,647,900	\$84,500,128	\$102,502,881	24,003,529	24,374,899	28,007,191	\$24,866,117	\$25,001,524	\$30,183,381	9,234,254	8,927,604	10,201,876	\$55,781,783	\$59,448,604	\$72,319,500	14,769,276	15,447,295	17,805,314	1,830,106	4.9
Maine - MULO	\$84,069,978	\$87,672,564	\$101,008,791	22,728,816	23,440,586	25,551,608	\$26,183,191	\$26,778,509	\$30,270,620	10,296,690	10,596,777	11,410,976	\$57,886,786	\$61,394,055	\$70,738,171	12,432,127	12,843,811	14,140,632	1,362,359	7.8
New Hampshire - MULO	\$67,137,720	\$69,101,398	\$86,543,838	19,735,876	19,790,592	23,129,291	\$27,719,838	\$27,882,555	\$35,236,000											

**Appendix F: Slaughter capacity collapse amid Covid-19 safety measures**

Source: daily values from USDA Market News

April 1 to May 29, 2020



Date	Estimated Daily Hog Slaughter under Federal Inspection	Shortfall compared to average pace
4/1/2020	485,000	
4/2/2020	488,000	
4/3/2020	483,000	
4/6/2020	477,000	
4/7/2020	482,000	
4/8/2020	478,000	
4/9/2020	472,000	
4/10/2020	428,000	42,000
4/14/2020	450,000	20,000
4/15/2020	445,000	25,000
4/16/2020	444,000	26,000
4/17/2020	413,000	57,000
4/20/2020	370,000	100,000
4/21/2020	354,000	116,000
4/22/2020	363,000	107,000
4/23/2020	375,000	95,000
4/24/2020	361,000	109,000
4/27/2020	318,000	152,000
4/28/2020	283,000	187,000
4/29/2020	271,000	199,000
4/30/2020	288,000	182,000
5/1/2020	280,000	190,000
5/4/2020	292,000	178,000
5/5/2020	298,000	172,000
5/6/2020	312,000	158,000
5/7/2020	320,000	150,000
5/8/2020	328,000	142,000
5/11/2020	357,000	113,000
5/12/2020	361,000	109,000
5/13/2020	373,000	97,000
5/14/2020	372,000	98,000
5/15/2020	375,000	95,000
5/18/2020	379,000	91,000
5/19/2020	397,000	73,000
5/20/2020	397,000	73,000
5/21/2020	398,000	72,000
5/22/2020	398,000	72,000
5/27/2020	415,000	55,000
5/28/2020	422,000	48,000
5/29/2020	414,000	56,000

**3,459,000**