

Appendix A

T. Elam, *Live Chicken Production Trends*, FarmEcon, LLC (Mar. 2022)

Live Chicken Production Trends



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Introduction

This study presents the results of a 2022 broiler industry survey designed to capture 2021 key live chicken production statistics. The survey was designed by FarmEcon LLC and data were collected from National Chicken Council (NCC) member companies. Conclusions drawn are those of FarmEcon LLC. Statistics collected from the responding companies included:

1. Number of live chicken production farmers;
2. Current contract duration;
3. Farmer tenure;
4. Newly granted contract duration;
5. Farmer age;
6. Farmer family experience in live chicken production;
7. Number of persons on waiting lists for entering live chicken production;
8. Existing farmers wishing to expand current operations;
9. 2021 farmer turnover by major reason for departure and;
10. Variability of average live chicken contract fees compared to beef and pork prices.

In addition, the study summarizes several key trends in broiler production efficiency and returns. Loan quality data for live chicken producers will be discussed.

Studies on broiler farmer returns and loan quality are not revised. There are no updates available for these two studies that this study utilized in 2015. However, more recent USDA 2021 poultry farmer financial returns data were found and are cited.

Survey Results

The survey was collected during early 2022. Twenty companies representing 83% of 2020 top 32 U.S. chicken company production as reported by Watt Publishing responded¹.

1. Companies responding to the survey reported on 8,971 live chicken farmers. The reported farmers held 10,921 production contracts. The 83% response rate implies that the survey is very representative of all 32 top chicken companies.
2. Companies responding reported current contract duration, in years, as shown below.

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The 32% flock-to-flock percentage is 10 points lower than the 42% reported in a 2015 NCC survey done for the prior version of this report. Other contract durations are correspondingly higher than the prior report.

Flock-to-flock contracts have no obligations for either party past the current flock being grown. These contracts have been criticized for not offering farmers long term assurance of live chicken production with their current company. However, long term contracts also can be canceled for poor performance and not meeting contract terms. In reality, a multi-year contract offers little additional assurance over a flock-to-flock contract. Regardless of stated contract duration, both parties need to agree that the arrangement is beneficial if the contract is to continue.

Companies reported that long term contracts are required, and granted, for new construction. In most cases these contracts run for 10 years or longer as required by lenders.

3. Respondents reported on the length of time that their current farmers have been with their company. Results are shown in the graph below.

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More than half the farmers have been with their current company for 10 years or more. Almost three-quarters have been with the same company for 5 years or more. These results are almost identical to the prior version of this report.

4. Companies reported on contract duration for newly granted contracts. Responses fell into two broad categories. For contracts granted on newly constructed houses, whether expansion or for a new farm, contracts are granted to satisfy any lender requirements. That was reported to be generally 10 to 15 years. At the other end of the spectrum, many new contracts were granted on a flock-to-flock basis on existing farms with no lender requirements involved. Several companies also reported new multi-year contracts are granted even without a lender requirement involved.
5. Companies reported on the ages of their current farmers. The results for those who track this data show that the vast majority, 80%, of farmers are 40 years old or older. Only 14 farmers were reported to be under 20 years old. This age structure together with the length of time farmers have been with a company is seen as implying that live chicken production is dominated by experienced live chicken producer owner-operators.

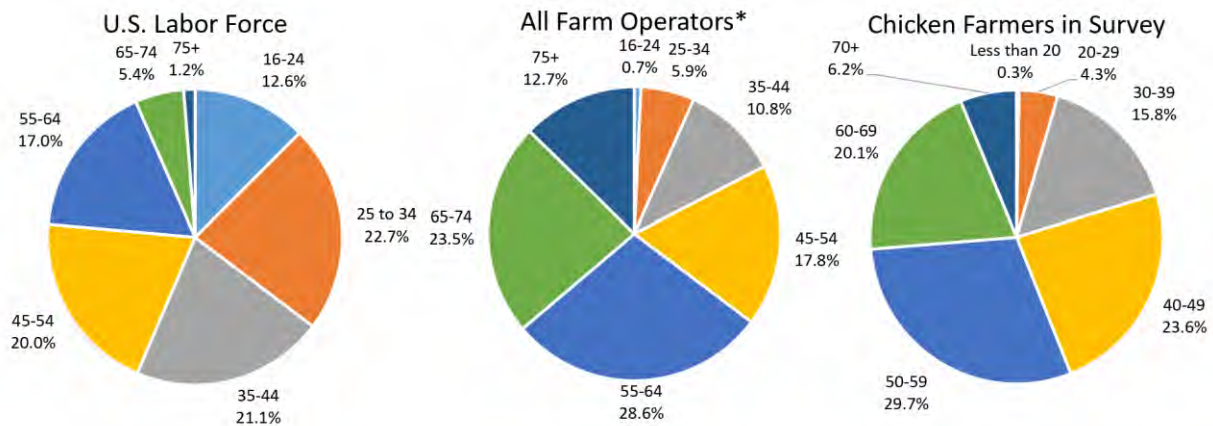
The live producer age structure implies that these farmers are in the business for the long term. It also implies that current farmers are, for the most part, financially sustainable and stable. The relatively few farmers under the age of 30 implies that entry may be somewhat difficult for that age group.

In contrast to the overall U.S. labor force², but in common with all farm operators, chicken farmers have relatively few participants in the under-30 age cohorts. Except for the oldest cohorts, chicken farmers and all farm operator³ ages are much more comparable.

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Ages of chicken farmers indicate that they are generally typical of other farmers but leave chicken farming at a somewhat earlier age. This can be attributed to factors such as ability to finance earlier retirement, time demands of chicken raising, or that farm operators outside chicken farming may remain part-time farm producers longer into their later years. The relative lack of younger people in farming reflects the difficulty of financing a farm at an early age versus obtaining employment in other sectors. It is often the case that entry into farming happens as a result of an aging farm operator within the family of the entering farmer being replaced by a younger family member.

Age cohorts for the overall labor force, all farm operators, and chicken farmers of the surveyed companies are shown in the graphs below.



*Operators whose principal occupation is farming, 2017 Census of Agriculture

- Companies reported on current farmer family experience in contract chicken production. Of the current farmers 26% were reported have to have had a family background in this type of farming.
- Companies reported that they have 1,672 applications from potential live chicken producers who would like to get into chicken production. Those applications are 19% of the current farmers reported. This statistic is an indication of the attractiveness of this type of farming for those not involved in it today.

Also reported were 335 open applications from existing farmers for expansion of their existing operations.

Taken together, these responses indicate active expansion and investment interest on the part of potential and current farmers. Indirectly the interest level shows that a significant number of persons outside and inside live chicken production regard it as an attractive farming option and investment opportunity.

- Companies reported on reasons for 2021 farmer departures. There are many and varied reasons that farmers might leave a chicken company. These, include among others, retirement, financial distress in the farming operation, declining health, farm

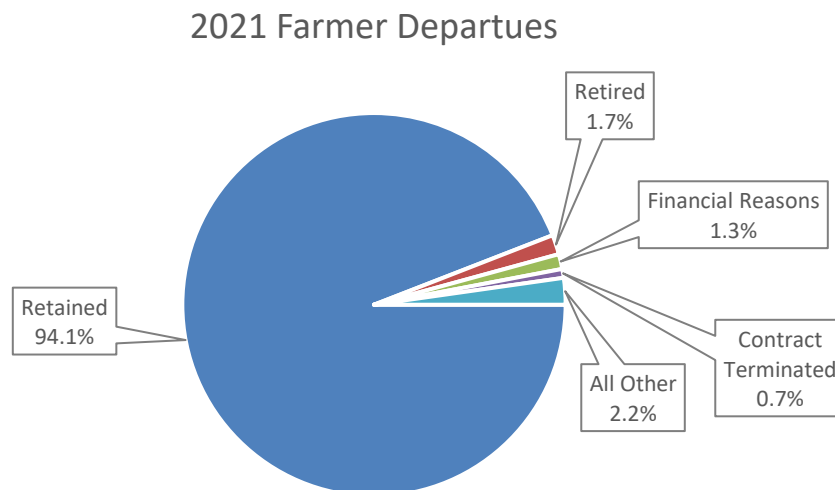
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catastrophes, to take an offer from another company, and contract termination by a company.

9. Unfortunately, as in any business arrangement, not every partnership works out to the satisfaction of both parties. In the chicken farming business, we see both sides of this fact. Producers can and do leave a company for what they regard as a better opportunity with another company. Companies have the right to terminate a farmer that is not meeting their performance expectations or is not otherwise living up to the terms of the contract.

The least likely reason, accounting for only 0.7%, for a farmer leaving broiler production was contract termination on the part of their company. There are several reasons for a contract termination, but the major ones are poor bird performance and failure to adhere to contract terms.

Put into a perspective of the total number of contract producers and reasons for their leaving a company, contract termination was the least numerous in 2021. Results of the survey are presented in the graph below.



In 2021 563, or 6.3%, of live chicken farmers left their company. The “All Other” category includes farmers who moved to a different company. In many cases farmers who left chicken production sold facilities that remained in production after that farmer departed chicken raising. Only if a production facility is so obsolete that it is not financially attractive to keep it in production is it normally abandoned.

Though not directly comparable, employee turnover due to job separations in the overall economy averages 3-4% per month⁴. The 6.3% contract farmer figure is for an entire year, and includes retirements. The major difference between employee turnover and live chicken production is that the chicken farmer has a significant financial

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investment at risk in the business whereas most employees do not. That farm investment makes chicken farmers, and farmers in general, less mobile than employees.

Live Chicken Production Technical Performance

The table below shows selected average live chicken performance trends since 1925⁵.

	Market Age	Market Weight	Average Daily Gain	Feed to Meat Gain	Feed Per Bird	Mortality
Year	Average Days	Pounds, Liveweight	Grams	Pounds of Feed per Pound of Live Broiler	Pounds Feed Per Broiler	Percent
1925	112	2.50	10.12	4.70	11.75	18.00
1935	98	2.86	13.24	4.40	12.58	14.00
1940	85	2.89	15.42	4.00	11.56	12.00
1945	84	3.03	16.36	4.00	12.12	10.00
1950	70	3.08	19.96	3.00	9.24	8.00
1955	70	3.07	19.89	3.00	9.21	7.00
1960	63	3.35	24.12	2.50	8.38	6.00
1965	63	3.48	25.06	2.40	8.35	6.00
1970	56	3.62	29.32	2.25	8.15	5.00
1975	56	3.76	30.46	2.10	7.90	5.00
1980	53	3.93	33.63	2.05	8.06	5.00
1985	49	4.19	38.79	2.00	8.38	5.00
1990	48	4.37	41.30	2.00	8.74	5.00
1995	47	4.67	45.07	1.95	9.11	5.00
2000	47	5.03	48.54	1.95	9.81	5.00
2005	48	5.37	50.75	1.95	10.47	4.00
2006	48	5.47	51.69	1.96	10.72	5.00
2007	48	5.51	52.07	1.95	10.74	4.50
2008	48	5.58	52.73	1.93	10.77	4.30
2009	47	5.59	53.95	1.92	10.73	4.10
2010	47	5.70	55.01	1.92	10.94	4.00
2011	47	5.80	55.98	1.92	11.14	3.90
2012	47	5.85	56.46	1.90	11.12	3.70
2013	47	5.92	57.13	1.88	11.13	3.70
2014	47	6.01	58.00	1.89	11.36	4.30
2015	48	6.12	57.83	1.89	11.57	4.80
2016	47	6.16	59.45	1.86	11.46	4.50
2017	47	6.20	59.84	1.83	11.35	4.50
2018	47	6.26	60.42	1.82	11.39	5.00
2019	47	6.32	60.99	1.80	11.38	5.00
2020	47	6.41	61.86	1.79	11.47	5.00
%1925-2020	-58%	156%	511%	-62%	-2%	-72%

Over the entire 1925-2020 span there was a steady improvement in live chicken performance. In recent years the industry has held average days to market steady and allowed improved ADG performance to be expressed as higher average market weights. The result has been a bird that is 156% heavier than 1925 on about the same amount of feed and in 58% fewer days. This improvement is due to both investments by chicken companies and the financial incentives offered in the contracts between the companies and their farmer partners.

Feed-to-gain improvement has slowed since 1995. This is entirely due to raising birds to ever-heavier weights at a constant 47-48 average days of age. Note that while days to market

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stopped declining, average market weights accelerated. All else equal, as chicken weights increase FCR performance tends to decline. Maintaining FCR at increasing average weights over time is actually a significant performance improvement. As will be shown below, increasing average weights at 47-48 days has also been a significant benefit for chicken farmers.

Death loss declines were rapid until about 1960 but have plateaued at 4-5% in recent times.

The next table translates chicken productivity increases into live pounds per square foot produced in farmer facilities and grower payments in current and 2012 dollars.

Year	Average Grower Payment, Cents/Lb., Current Dollars	Average Grower Payment, Cents/Lb., \$2012	Live Young Chicken Production, 000 Pounds	Total Grower Payments, \$2012, 000	% Change	Live Pounds Per Sq. Foot	Average Grower Payments, Per Sq. Foot, \$2012
1990	4.08	6.33	25,549,696	\$1,617,672	4.8%	33.12	\$2.10
1991	4.11	6.19	27,170,780	\$1,680,540	3.9%	33.44	\$2.07
1992	4.14	6.10	28,997,878	\$1,768,320	5.2%	33.77	\$2.06
1993	4.22	6.08	30,474,243	\$1,851,444	4.7%	34.09	\$2.07
1994	4.23	5.96	32,765,941	\$1,954,314	5.6%	34.77	\$2.07
1995	4.32	5.97	34,352,980	\$2,051,491	5.0%	34.93	\$2.09
1996	4.30	5.84	36,034,815	\$2,104,723	2.6%	34.75	\$2.03
1997	4.46	5.96	37,207,401	\$2,219,110	5.4%	34.87	\$2.08
1998	4.53	5.99	38,054,849	\$2,280,572	2.8%	35.26	\$2.11
1999	4.68	6.09	40,444,167	\$2,463,925	8.0%	36.09	\$2.20
2000	4.78	6.07	41,293,525	\$2,508,363	1.8%	36.23	\$2.20
2001	4.87	6.07	42,335,507	\$2,569,145	2.4%	36.03	\$2.19
2002	4.81	5.89	43,715,247	\$2,575,580	0.3%	34.64	\$2.04
2003	4.90	5.88	44,317,531	\$2,606,601	1.2%	37.22	\$2.19
2004	5.04	5.88	46,109,201	\$2,709,460	3.9%	38.56	\$2.27
2005	5.24	5.92	47,578,696	\$2,814,545	3.9%	39.15	\$2.32
2006	5.39	5.93	48,332,516	\$2,863,716	1.7%	38.97	\$2.31
2007	5.43	5.82	49,089,999	\$2,856,088	-0.3%	38.56	\$2.24
2008	5.64	5.93	50,441,600	\$2,992,748	4.8%	38.84	\$2.30
2009	5.62	5.90	47,752,300	\$2,816,920	-5.9%	38.19	\$2.25
2010	5.67	5.85	49,152,600	\$2,877,597	2.2%	38.48	\$2.25
2011	5.78	5.86	50,082,400	\$2,932,593	1.9%	39.40	\$2.31
2012	5.85	5.81	49,655,600	\$2,883,515	-1.7%	39.07	\$2.27
2013	5.93	5.78	50,678,200	\$2,931,633	1.7%	39.12	\$2.26
2014	6.19	5.94	51,378,700	\$3,053,616	4.2%	39.52	\$2.35
2015	6.27	5.97	53,376,200	\$3,187,929	4.4%	40.03	\$2.39
2016	6.42	6.03	54,259,100	\$3,271,137	2.6%	39.93	\$2.41
2017	6.63	6.10	55,573,900	\$3,390,586	3.7%	39.04	\$2.38
2018	6.84	6.15	56,797,700	\$3,494,614	3.1%	38.31	\$2.36
2019	6.93	6.13	58,259,100	\$3,573,514	2.3%	38.08	\$2.34
2020	7.02	6.13	59,405,600	\$3,644,069	2.0%	38.09	\$2.34
% Increase	72.1%	-3.1%	132.5%	125.3%	NA	15.0%	11.4%

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Farmers have benefited from this improved performance. The investments made in genetics and feeds by their companies have increased the throughput of their facilities, resulting in increased production per square foot of their chicken housing. The table above shows how that increased performance has expressed itself in increased constant dollar farmer payments per square foot of their owned chicken housing⁶. Payments per square foot in 2012 dollars did decline slightly between 2016 and 2020 as companies changed to slightly slower growing breeds.

While average current dollar farmer payments per pound of chicken have increased 72% since 1990, corrected for overall inflation, those payments have declined slightly. However, a 15% increase in average pounds of chicken production per square foot of farmer-owned housing has more than compensated for the decline in inflation-corrected payments per pound. Though declining slightly in recent years, the overall result is that inflation-corrected annual farmer payments per housing square foot have increased over 11.4% since 1990.

The gains reflect both company investments in chicken performance and farmer improvements their housing required to take advantage of that increasing chicken performance capability.

While farmer payments per pound are highly visible to both farmers and their companies, payments per square foot are not. Arguably, payment per square foot is a much better farmer payment and return on investment metric than payment per pound of chicken raised.

Contract farmers and their companies have mutually benefited from the investments that have improved bird performance. Farmers who focus on payment per pound of chicken could be looking at a more meaningful metric that includes both a payment per pound measure and the productivity trend of their housing investment.

Live Chicken Producer Income Stability

Survey data were collected for 2020-2021 monthly average chicken farmer payments per pound of live chicken production. From these data the average, standard deviation and coefficient of variation (CV) were calculated. The average over all months and all companies was 6.76 cents per pound, the standard deviation was 0.11 cents per pound, resulting in a CV of 1.6%. This overall CV is a statistical measure of the variation in monthly average payments relative to the two-year average. It has little meaning unless compared to other CV statistics for similar data.

Spreadsheet data for U.S. average cattle and hog prices were obtained from the Economic Research Service of USDA and CV was calculated for each⁷.

For all slaughter cattle prices reported in the spreadsheet the average was \$1.42 cents per pound, standard deviation \$0.19 and CV was 13%. For hogs the average was \$0.55 per pound, standard deviation \$0.16 and CV 29% .

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Cattle and hog prices represent the payments to producers for each pound of live animal delivered to market. In that respect they are similar to broiler farmer fees received from broiler companies. However, in another respect broiler payments are different. Cattle and hog prices are market-based. Broiler farmer fees are contract-based. Broiler farmer fees paid to individual farmers are subject to variation around the contract average based on terms and conditions that determine premiums and discounts based on broiler performance. However, overall cattle and hog average prices also do not reflect variation in individual producer prices received based on live animal quality that also result in price premiums and discounts.

Also, cattle and hog producers pay for feed and the animals they raise out of their income stream. Broiler farmers receive feed and chicks from their companies at no cost.

The conclusion is that overall average producer payments per pound of live animal produced are much less variable for broiler farmers than payments to cattle and hog producers.

Live Chicken Producer Financial Performance

Statistics on live chicken producer returns are not routinely gathered by USDA or any known university farm records systems. In 2011 USDA did conduct a special financial survey that included live chicken farmers. Results of that survey are detailed in an August 2014 article by USDA economist James MacDonald⁸. This study is reported here for historical context.

The survey showed that farmers who raise broilers under contract generally realize higher average incomes than other farm households and other U.S. households. However, the range of household incomes earned by broiler farmers is also wider than other groups.

MacDonald compared average incomes using the median, at which half earn less than and half earn more. In 2011, the median income among all U.S. households was \$50,504, while the median income among farm households was \$57,050. The \$68,455 median for chicken farmers was significantly higher than both all farm households and all U.S. households. Sixty percent of chicken farmers earned household incomes that exceeded the U.S.-wide median.

In part the higher income spread was due to a wide scale of live chicken production among chicken operations. Larger producers may also be better at raising chickens and receive higher payments per pound based on their higher-than-average performance. Similar to all businesses, those who are most successful at raising chickens will tend to earn more income than those who are less successful.

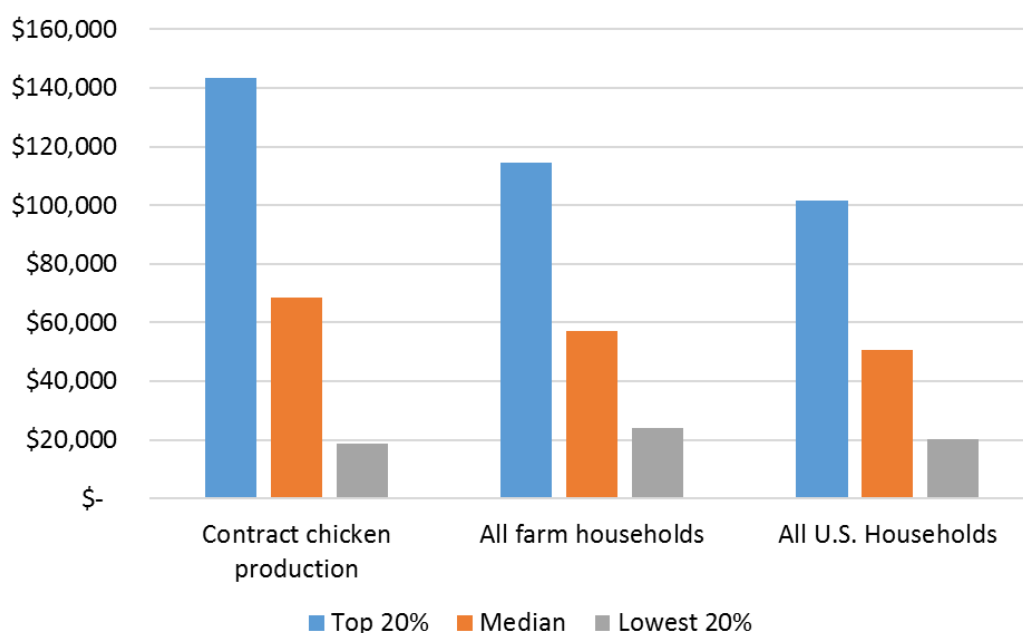
MacDonald also points out that the contracting system has substantially reduced some financial risks borne by contract farmers. Feed, medication and baby chick costs are the responsibility of the chicken company. As MacDonald points out, "These risks are not small; feed prices rose or fell by at least 5 percent in 11 of the 60 months between January of 2009 and December of 2013. Poultry companies also bear production risks that commonly affect farmers. For example,

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if weather or disease affects mortality among all farmers, base payment rates remain the same.”

Comparing the top 20% of live chicken farmer returns to the same statistic for other farm households and all U.S. households shows a significant advantage for top performing contract chicken producers. Median incomes are also higher for chicken farmers, while at the bottom end, the lowest 20% are slightly lower than all farms, but comparable to the U.S. average. Chicken farmer incomes have a wider range than all farms and all households, but this is almost entirely due to the significantly higher level of the top 20% of chicken farmer incomes.

The graph below shows the results for these three income categories.



As this is only one year of data the results need to be viewed with some caution. Farm incomes, especially for farms not selling on contracts, can vary widely from year to year. Still, the results do tell a story about the relative returns of live chicken production. At the top end and on average, well-run chicken farms tend to earn significantly more than both the average U.S. farm and U.S. non-farm household.

Recent USDA data also show that over the last decade poultry farms have on average financially outperformed the average farm. From 2010 to 2021 average poultry farm net farm income was \$59,800 compared to \$38,200 for all farms⁹. The averages cannot be directly compared to the medians reported in the MacDonald report but directionally the conclusion is the same.

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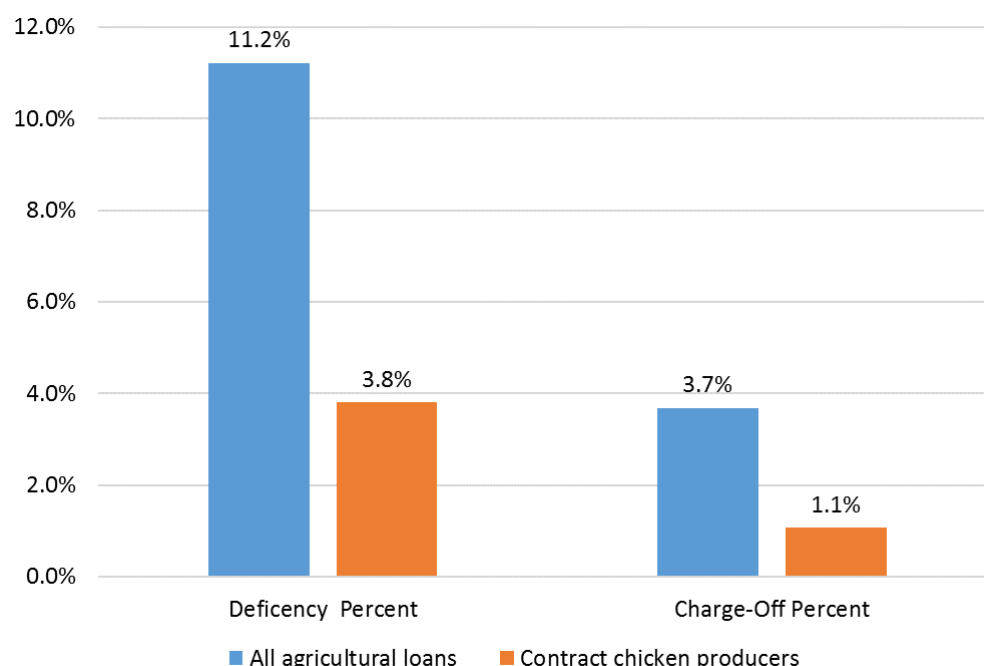
Comparative Live Chicken Production Loan Performance

Available agricultural lender statistics also strongly support the USDA survey showing that live chicken production has favorable returns compared to other farming activities.

In 2015 NCC obtained loan quality data from the Small Business Administration, a significant lender to live chicken producers. The data showed significantly lower charge off and deficiency percentages for chicken producers compared to all agricultural loans.

The deficiency rate for live chicken farmers was about one-third the rate for all agricultural loans, and the charge-off rate was less than 30% of all agricultural loans.

These loan results also support the financial advantages of contract chicken production compared to other types of farming operations. The following graph summarizes an overview of these data¹⁰. The vastly different chicken farmer loan results are largely due to the lower level of cost and income risks that are the result of the specific contracting arrangements between chicken farmers and their companies.



Summary and Conclusions

Data from the NCC survey and evidence from third party sources all show that live chicken production is broadly and generally being run by a group of effective and experienced farmers. Chicken farmers generally have higher incomes compared to all farms and all U.S. households, and have an age structure that is similar to all farm operators. Compared to the entire U.S.

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labor force both chicken farmers and all farm operators tend to be older than non-farm employees. This is seen as a result of the substantial financial investment often required to enter farming.

The 2021 turnover rate of chicken farmers was 6.3%, the majority of which was voluntary or due to external factors beyond the control of companies and farmers.

Responding companies also reported significant waiting lists for those who would like to enter live chicken production or expand existing operations.

An analysis of farmer payment data obtained from Agri Stats showed that inflation-corrected farmer payment rates per square foot of farmer owned housing have increased over time. The increase is due to improved bird daily weight gain performance that has increased with no significant effect on feed used per bird. Chicken companies who furnish the feeds have benefited from the feed efficiency gains. Farmers who furnish live chicken housing have captured the benefits of increased growth rates.

The current contracting system has helped promote the steady improvements in live chicken performance that have benefited chicken farmers, the companies they produce for, and ultimately consumers. Both farmers and their companies benefit from those performance gains.

A USDA farm financial survey shows that broiler producers generally have significantly higher incomes than all other farming enterprises and the average U.S. household. The lowest 20% of contract farmer incomes are only slightly less than the similar statistic for all U.S. households, but lower than bottom 20% of all farm operators.

SBA farm loan data show much lower loan deficiency and charge-off rates for live chicken production than all agricultural loans. These data support the findings of the USDA survey.

Agri Stats data show that inflation-corrected farmer income per square foot of chicken housing has benefited financially from increases in chicken growth rate performance. Higher growth rates are primarily the result of breeding investments made by chicken companies and farmer investments in their own operations that help chickens realize their improving genetic potential. Average daily gains have decreased in the last few years, but have been partially offset by higher payments per pound.

Viewed in totality, live chicken production is a viable, mutually beneficial and attractive farming enterprise for the vast majority of farm families who raise chickens in partnership with the companies they work with.

¹ Watt Publishing. *Poultry USA*. "2020 Top Poultry Companies." March, 2021. Pp 14-50.

² U.S. Bureau of Labor Statistics. Employment database found at <http://www.bls.gov/cps/cpsaat03.htm>. Accessed 2/27/2022.

³ USDA. 2017 Agricultural Census report found at [USDA/NASS Census of Agriculture Chapter 1, Table 52](#). Accessed 2/27/2022.

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⁴ U.S. Bureau of Labor Statistics. Job Openings and Labor Turnover Summary. [Job Openings and Labor Turnover Summary - 2021 M12 Results \(bls.gov\)](#). Accessed 2/28/2022.

⁵ Source: 1925-2020 NCC: <http://www.nationalchickencouncil.org/about-the-industry/statistics/u-s-broiler-performance>. Accessed 12/17/2021

⁶ Sources: Agri Stats bird performance data, obtained 2/1/2022. GDP deflator, 2012=100, obtained from the U.S. Bureau of Economic Analysis at <https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey>. Accessed 2/15/2022.

⁷ USDA/ERS. Historical Livestock Prices Spreadsheet. [LivestockPrices.xlsx](#). Accessed 3/1/2022.

⁸ MacDonald, James. "Technology, Organization, and Financial Performance in U.S. Broiler Production." USDA. Economic Information Bulletin Number 126. June 2014. Found at [Technology, Organization, and Financial Performance in U.S. Broiler Production \(usda.gov\)](#). Accessed 2/1/2022.

⁹ USDA, Agricultural Resource Management Survey. Found at [USDA ERS Reports](#). Accessed 3/7/2022.

¹⁰ Source: NCC. Data obtained from Government Loan Solutions, Inc. 9/11/2015