Mississippi MarketMaker Newsletter

MISSISSIPPI STATE UNIVERSITY EXTENSION

U.S. SALMON AQUACULTURE PRODUCTION AND PRICES

ABSTRACT

- This presentation shows the over-all trends in farm production and farmgate values and farmgate, plantgate, import, and retail prices of Atlantic salmon in the U.S.
- Official salmon aquaculture data are available from 1983 to 2019.
- Salmon aquaculture values beyond 2019 are predicted using econometric models developed by Dr. Posadas.

SUGGESTED CITATION:

Posadas, Benedict C. 2022. U.S. Salmon Aquaculture Production and Prices. Mississippi MarketMaker Newsletter, Vol. 12, No. 10. October 18, 2022. http://extension.msstate.edu/newsletters/mississippi-marketmaker.

ACKNOWLEDGEMENT

This virtual presentation is a contribution of the Mississippi Agricultural and Forestry Experiment Station and the Mississippi State University Extension Service. This material is based upon work that is supported in part by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Hatch project under accession number 081730 and NOAA (Office of Sea Grant, U.S. Dept. of Commerce, under Grant NA10OAR4170078, Mississippi Alabama Sea Grant Consortium).

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LET US START OUR MODELING EFFORT!

- The NOAA Fisheries data on national salmon aquaculture and processing production and Urner Barry Comtell data on import quantities are reported in **pounds per year**.
- The NOAA Fisheries data on national salmon aquaculture plantgate and farmgate values and Urner Barry Comtell data on import values are reported in **dollars per year**.
- The national farmgate, plantgate and import prices of Atlantic salmon are imputed from the farmgate, plantgate and import values and pounds produced and imported.
- Salmon aquaculture data are available from 1983 to 2019.
- Values beyond 2019 are predicted using econometric models developed by Dr. Posadas.
- Atlantic salmon plantgate data are available from 1989 to 2020.
- Atlantic salmon import data are available from January 1998 to July 2022.
- Retail prices of salmon and boneless fillets are available from January 2012 to September 2022.

ECONOMIC MODELS

- The **Ordinary Least Squares** (OLS) models of the salmon aquaculture consisted of the following dependent variables:
- Salmon production (lb/yr),
- Salmon deflated farm-gate value ($/yr).
- The OLS models of the salmon aquaculture were estimated by using the **robust variance procedure** of STATA-16.

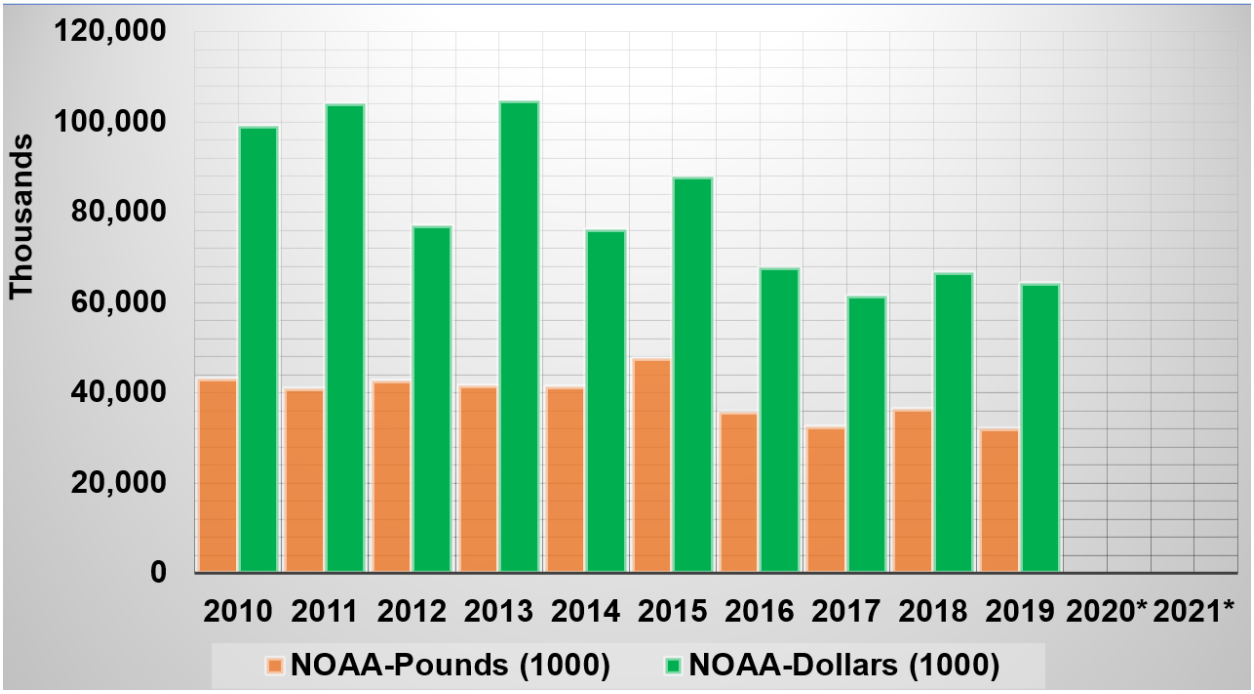
- The **variation inflation factor** was calculated to detect the possible presence of multicollinearity.

- The marginal impacts of disaster events were computed using the **margins procedure**.

SALMON PRODUCTION ECONOMIC MODEL

- The OLS model of salmon production (lb/yr) assumed that annual production could be explained by the following:
  - year and year-squared
  - recession (1 or 0)
  - growth in per capita disposable income (%)

Fig. 1. U.S. salmon production and farm-gate values, 2010-19



SALMON FARM-GATE VALUE ECONOMIC MODEL

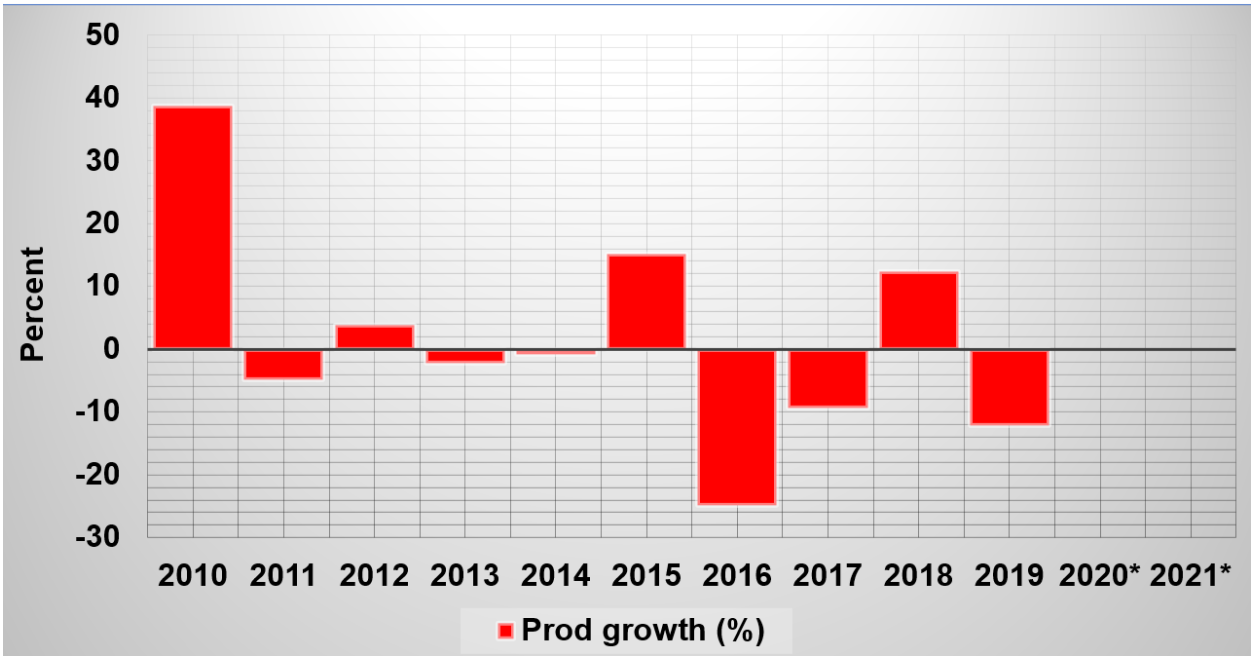
- The OLS model of salmon farm-gate vaLue ($/yr) assumed that annual production could be explained by the following:

- year and year-squared
- recession (1 or 0)
- salmon production
- growth in per capita disposable income (%)

U.S. SALMON AQUACULTURE, 2010-19

- Production (lb/yr)
- Farm-gate values ($/yr)
- Imputed farm-gate prices ($/lb)
- Data were compiled from NOAA Fisheries website and reports.

Fig. 2. Annual growth rates in U.S. salmon production, 2010-19



U.S. SALMON PRODUCTION AND FARM-GATE VALUES, 2010-19

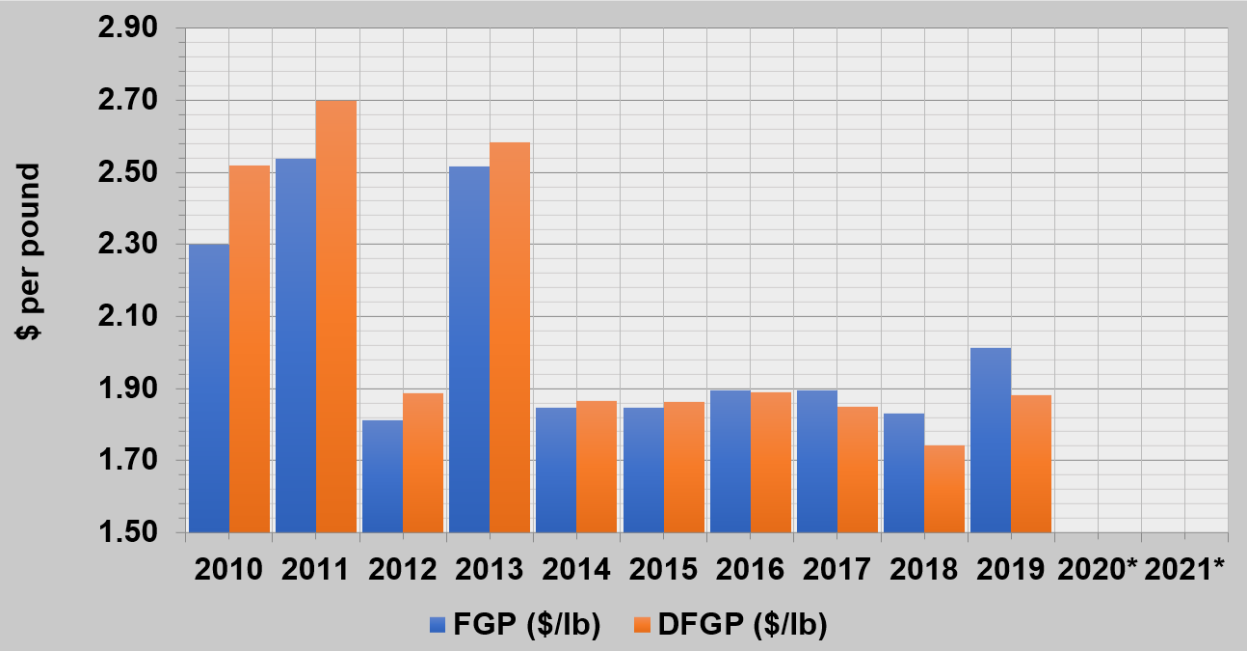
- Salmon aquaculture production and farmgate value from 2010 to 2019 are shown in Fig 1.

- The overall trend in pounds produced and farmgate values is downward.
- During the past decade, annual production averaged 39.3 million pounds valued at $80.8 million.

ANNUAL GROWTH RATES IN U.S. SALMON PRODUCTION, 2010-19

- The annual growth rate in Salmon aquaculture production from 2010 to 2019 are shown in Fig 2.
- The overall trends in the growth in pounds produced was very erratic with negative growth rates in six years and positive growth rates in four years
- During the past decade, annual production grew at an average of 1.6 percent.

Fig. 3. U.S. salmon imputed farm-gate prices, 2010-19



U.S. SALMON IMPUTED FARM-GATE PRICES, 2010-19

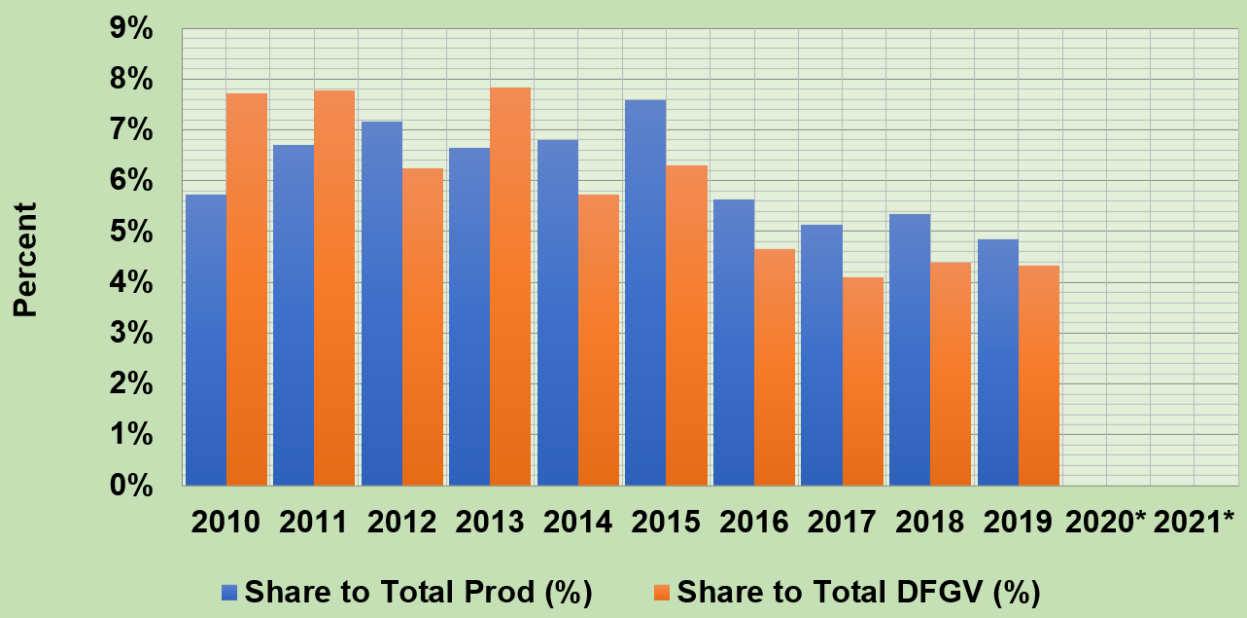
- The imputed average farmgate prices of Salmon aquaculture production from 2010 to 2019 are shown in Fig 3.
- Most of the time, average farmgate prices stayed below $2 per pound.

- During the past decade, the imputed farmgate price averaged $2.05 per pound.

SHARE OF SALMON TO TOTAL AQUACULTURE PRODUCTION AND FARM-GATE VALUE

- The share of Salmon aquaculture to total U.S. aquaculture from 2010 to 2019 are shown in Fig 4.
- The contribution of Salmon to total U.S. aquaculture seemed to have decline over time.
- During the past decade, Salmon aquaculture contributed 6.2 and 5.9 percent to total production and farmgate values, respectively.

Fig. 4. Share of salmon to total aquaculture production and farm-gate value



U.S. SALMON AQUACULTURE, 1983 TO 2021

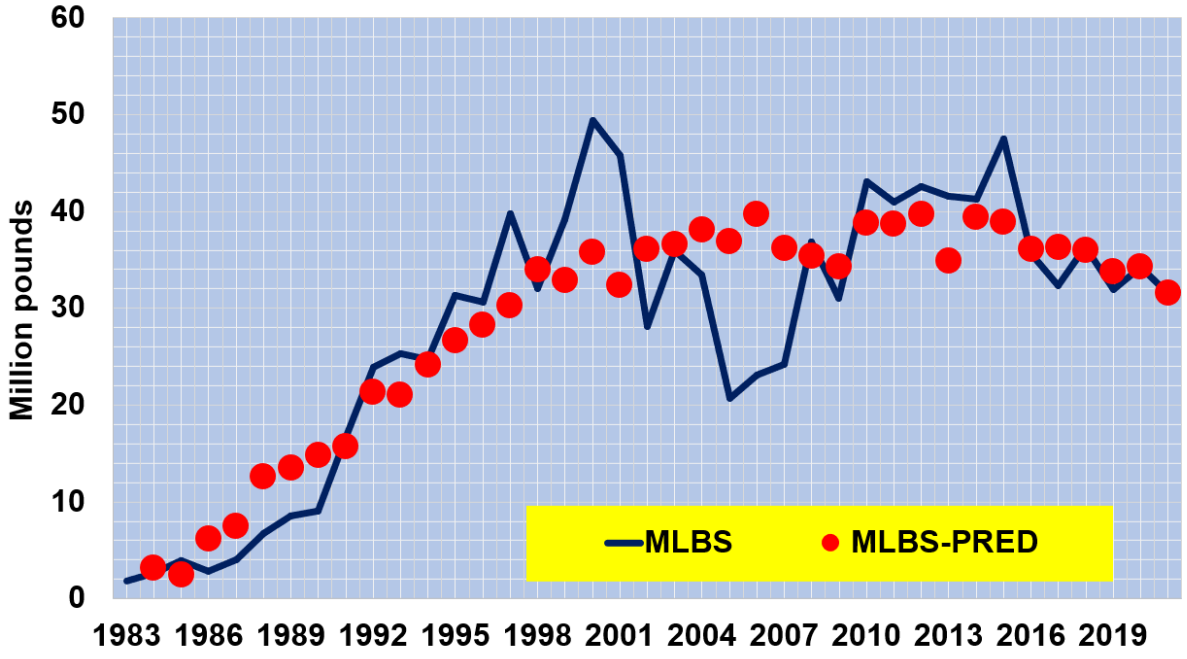
- Production (lb/yr)
- Farm-gate values ($/yr)
- Imputed farm-gate prices ($/lb)

- Data from 1983 to 2019 were compiled from NOAA Fisheries website and reports.
- Values from 2020 to 2021 were predicted using econometric models developed by Dr. Posadas

U.S. SALMON AQUACULTURE PRODUCTION BEYOND 2019

- The actual and estimated Salmon aquaculture production from 1983 to 2021 are shown in Fig. 5.
- The estimated quadratic equation explains 77 percent of the variations in annual salmon production.
- The marginal impact of recession is negative but not significant, led to reduction by over two million pounds per year with reported recession.
- The model predicts that Salmon aquaculture production slightly rose in 2020 and significantly fell in 2021 as compared to 2019 levels.

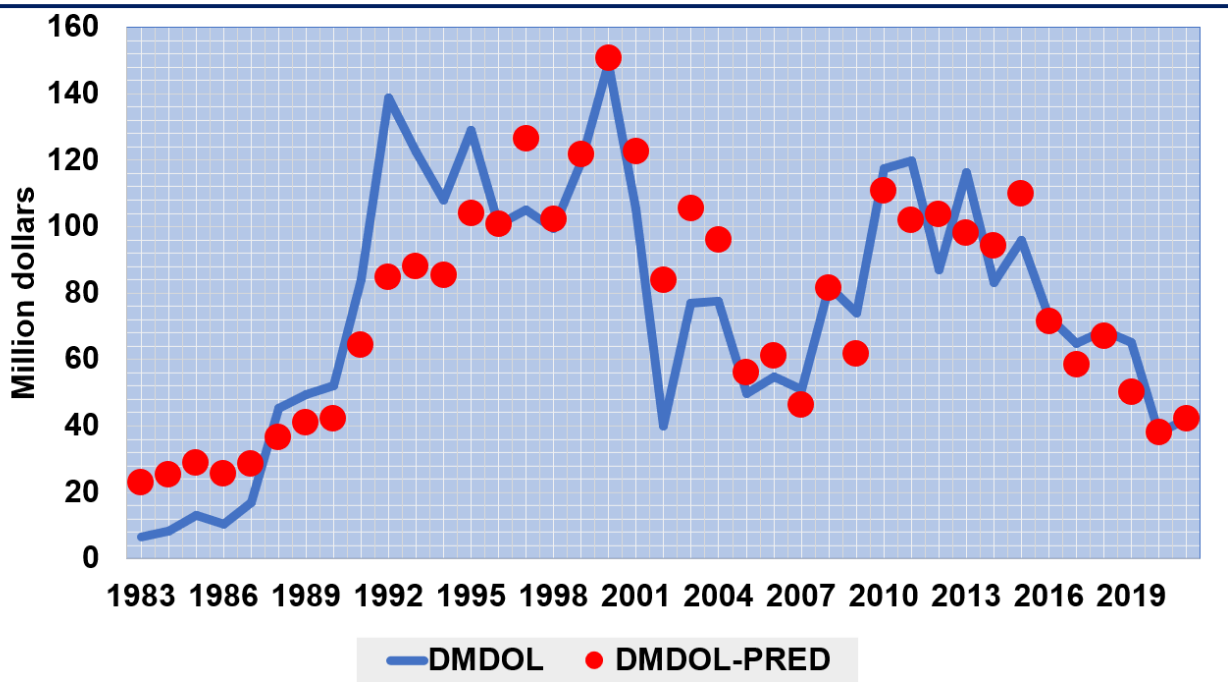
Fig. 5. U.S. salmon aquaculture production beyond 2019



U.S. SALMON AQUACULTURE FARM-GATE VALUES BEYOND 2019

- The actual and estimated Salmon aquaculture deflated farmgate values from 1983 to 2021 are shown in Fig. 6.
- The estimated quadratic equation explains 76 percent of the variations in annual deflated salmon farmgate values.
- The marginal impacts of recession is negative and significant, resulted to reduction by almost $16 million per year with reported recession.
- The model predicts that Salmon aquaculture farmgate values significantly fell in 2020 and 2021 as compared to the 2019 levels.

Fig. 6. U.S. salmon aquaculture farm-gate values beyond 2019



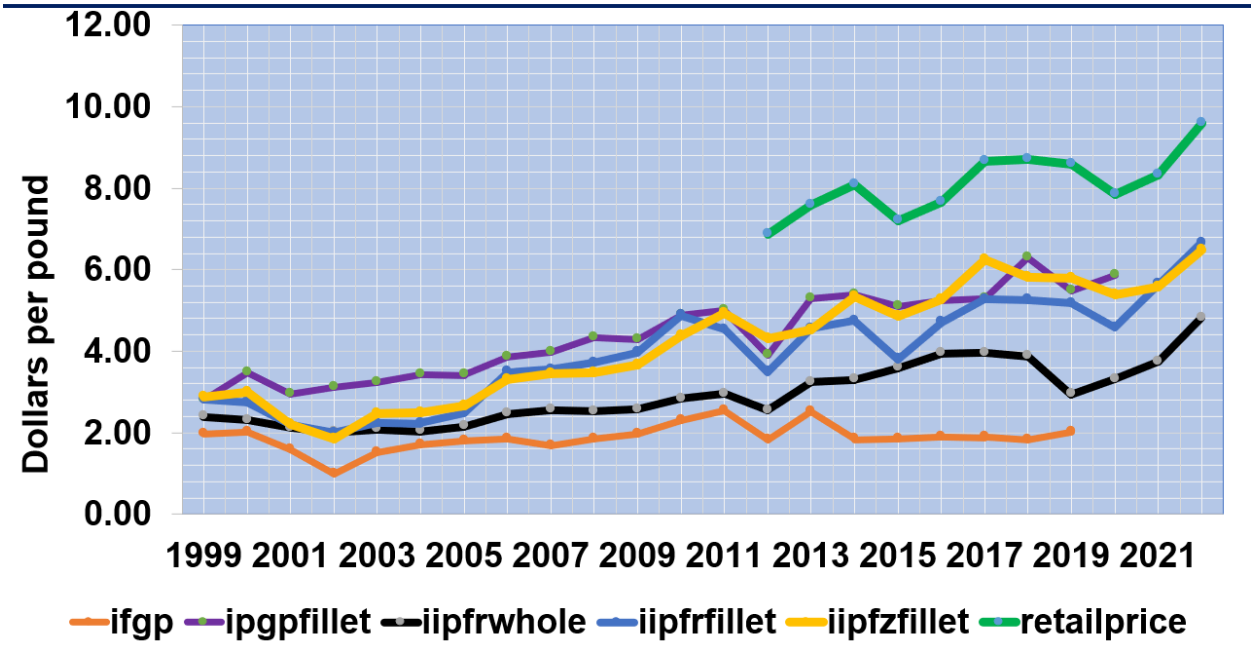
MARGINAL IMPACTS OF RECESSIONS

- Salmon production fell by an average of **-2.4 million pounds per year**, and
- Deflated farm-gate values declined by an average of **-$15.8 million per year**.

U.S. ATLANTIC SALMON FILLET PODUCTION AND IMPUTED PLANTGATE PRICES

- Fillet processing production (lb/yr)
- Fillet processing plantgate values ($/yr)
- Plantgate prices ($/lb) are imputed from processing production and plantgate values.
- Data were compiled from NOAA FISHERIES website.
- U.S. salmon imputed plantgate prices are shown in Fig. 7.
- The imputed plantgate prices (IPGPFILLET) of Atlantic Salmon fillets averaged $5.31 per pound since 2012.

Fig. 7. U.S. salmon imputed farmgate, plantgate, imported and retail prices



U.S. SALMON RETAIL AND IMPUTED IMPORT PRICES

- Salmon boneless fillets ($/lb)
- Import values ($/yr)
- Import quantities (lbs/yr)

- Import prices ($/lb) are imputed from import quantities and values
- Data were compiled from **URNER BARRY COMTELL (https://www.comtell.com/)** website.

U.S. SALMON IMPUTED FARMGATE, PLANTGATE, IMPORTED AND RETAIL PRICES

- The U.S. salmon imputed farmgate, plantgate, imported and reported retail prices are shown in Fig. 7.
- The Salmon imputed farmgate prices (IFGP) averaged $1.96 per pound since 2012.
- The Atlantic Salmon imputed plantgate prices (IPGPFILLET) averaged $5.31 per pound since 2012.
- The imputed import price of Atlantic Salmon fresh fillets (IIPFRFILLET) averaged $4.90 per pound since 2012.
- The imputed import price of Atlantic Salmon frozen fillets (IIPFZFILLET) averaged $5.42 per pound since 2012.
- The imputed import price of fresh whole Atlantic Salmon (IIPFZWHOLE) averaged $3.57 per pound since 2012.
- The retail price (RP) of Atlantic Salmon boneless fillets averaged $8.10 per pound since 2012.

U.S. SALMON PRICE MARGINS FROM FARMGATE, PLANTGATE, AND IMPORTS, AND RETAIL

- The increasing price margins between farmgate and retail prices (%, RP/IFGP) averaged 309 percent.
- The declining price margins between imputed import price of Atlantic Salmon fresh fillet and retail prices (%, RP/IIP-FRFILLET) averaged 68 percent.
- The increasing price margins between imputed import price of fresh fillet of Atlantic Salmon and retail prices (%, IIP-FRFILLET/IFGP) averaged 138 percent.
- The price margins between imputed import price of fresh whole Atlantic Salmon and retail prices (%, RP/IIP-FRWHOLE) averaged 131 percent.
- The price margins between imputed import price of fresh whole Atlantic Salmon and retail prices (%, IIP-FRWHOLE/IFGP) averaged 77 percent.

- The price margins between imputed import price of frozen fillets of Atlantic Salmon and retail prices (%, RP/IIP-FZFILLET) averaged 50 percent.
- The price margins between imputed import price of frozen fillets of Atlantic Salmon and retail prices (%, IIP-FZFILLET/IFGP) averaged 173 percent.
- The price margins between imputed plantgate price of Atlantic Salmon fillets and imputed farmgate price (%, IPGP-FILLET/IFGP) averaged 170 percent.
- The price margins between retail price of Salmon boneless fillets and imputed plantgate price of Atlantic Salmon fillets (%, RP/ IPGP-FILLET) averaged 50 percent.

SUMMARY AND IMPLICATIONS

- Why are annual Salmon production and farm-gate values predicted to be lower in 2020 and 2021?
- Starting in 2020, the global pandemic created disruptions in the marketplace and subsequently the production space.
- The recent overall downward trends, however, reflect the level of competitiveness of the domestic salmon aquaculture industry.
- Entry of new Salmon producers is expected to raise U.S. aquaculture production.
- The imputed farmgate prices of U.S. Salmon aquaculture production hovered at less than $2 per pound. The coefficient of variation (CoV) or the extent of its variability to the mean is 12 percent.
- The rising retail price of Atlantic Salmon boneless fillets averaged $8.10 per pound with CoV of 10 percent.
- The price margins between farmgate price and retail price averaged 309 percent with CoV of 18 percent.
- The rising imputed import price of fresh fillets of Atlantic salmon averaged $4.90 pound with CoV of 18 percent.
- The increasing imputed import price of frozen fillets of Atlantic salmon averaged $5.42 pound with CoV of 12 percent.
- The increasing imputed import price of fresh whole Atlantic salmon averaged $3.57 per pound with CoV of 17 percent.
- The rising imputed plantgate price of Atlantic Salmon fillets averaged $5.31 per pound with CoV of 12 percent.

- The price margins between farmgate price and plantgate price of Atlantic Salmon fillets averaged 170 percent with CoV of 25 percent.

MY RECENT ATLANTIC SALMON ECONOMICS OUTREACH

- Posadas, B.C. 2022. U.S. Salmon Aquaculture Production and Prices. Mississippi MarketMaker Newsletter, Vol. 12, No. 10. October 18. http://extension.msstate.edu/newsletters/mississippi-marketmaker.

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- Posadas, B.C. 2022. U.S. Salmon Aquaculture Production, Farm-gate Values and Prices. HME Outreach. MSU-CREC. http://coastal.msstate.edu/us-aquaculture-production-farm-gate-values-and-employment.