

## THE U.S. CATFISH AQUACULTURE INDUSTRY REMAINED STABLE DURING THE PAST DECADE

### ABSTRACT

- This newsletter shows the over-all trends in U.S. catfish aquaculture production and farmgate values.
- U.S. catfish aquaculture data are available from 1980 to 2022.
- Values beyond 2022 are predicted using econometric models developed by Dr. Posadas.
- A scatter diagram shows the relationship between U.S. catfish aquaculture production and deflated farmgate prices.
- There is a significant inverse relationship between deflated farmgate price and domestic catfish aquaculture production.
- Higher unemployment rates tend to reduce domestic catfish aquaculture production.
- Recessions tend to discourage domestic catfish aquaculture production.
- The global pandemic seemed to encourage higher domestic catfish aquaculture production.
- The US-China trade war tends to adversely affect domestic catfish aquaculture production.
- Natural disasters affecting the Gulf of Mexico states seemed to encourage more domestic catfish aquaculture production.

### ACKNOWLEDGEMENT

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## LET US START OUR MODELING EFFORT!

- The NOAA Fisheries and USDA Quick Facts data on catfish aquaculture production are reported in pounds and dollars per year, respectively.
- U.S. catfish aquaculture data are available from 1980 to 2022.
- Catfish farmgate prices are reported in dollars per pound.
- Values beyond 2022 are predicted using econometric models developed by Dr. Posadas.
- A scatter diagram shows the relationship between U.S. catfish aquaculture production and deflated farmgate prices.

## U.S. AQUACULTURE ECONOMIC MODELS

- The Ordinary Least Squares (OLS) models of U.S. aquaculture consisted of the following dependent variables:
  - Aquaculture production (lb/yr)
  - Deflated farmgate value (\$/yr)
- The OLS models of U.S. aquaculture were estimated 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.

## U.S AQUACULTURE PRODUCTION ECONOMIC MODEL

- The OLS model of U.S aquaculture production (lb/yr) assumed that annual production could be explained by the following:
  - year
  - recession, trade war, pandemic, and Gulf natural disasters (1 or 0)
  - unemployment rate and growth in per capita disposable income (%)
  - other variables

## U.S AQUACULTURE FARMGATE VALUES ECONOMIC MODEL

- The OLS model of U.S. aquaculture farmgate values (\$/yr) assumed that annual production could be explained by the following:
  - year
  - aquaculture production (lb/yr)
  - deflated farmgate price (\$/lb)

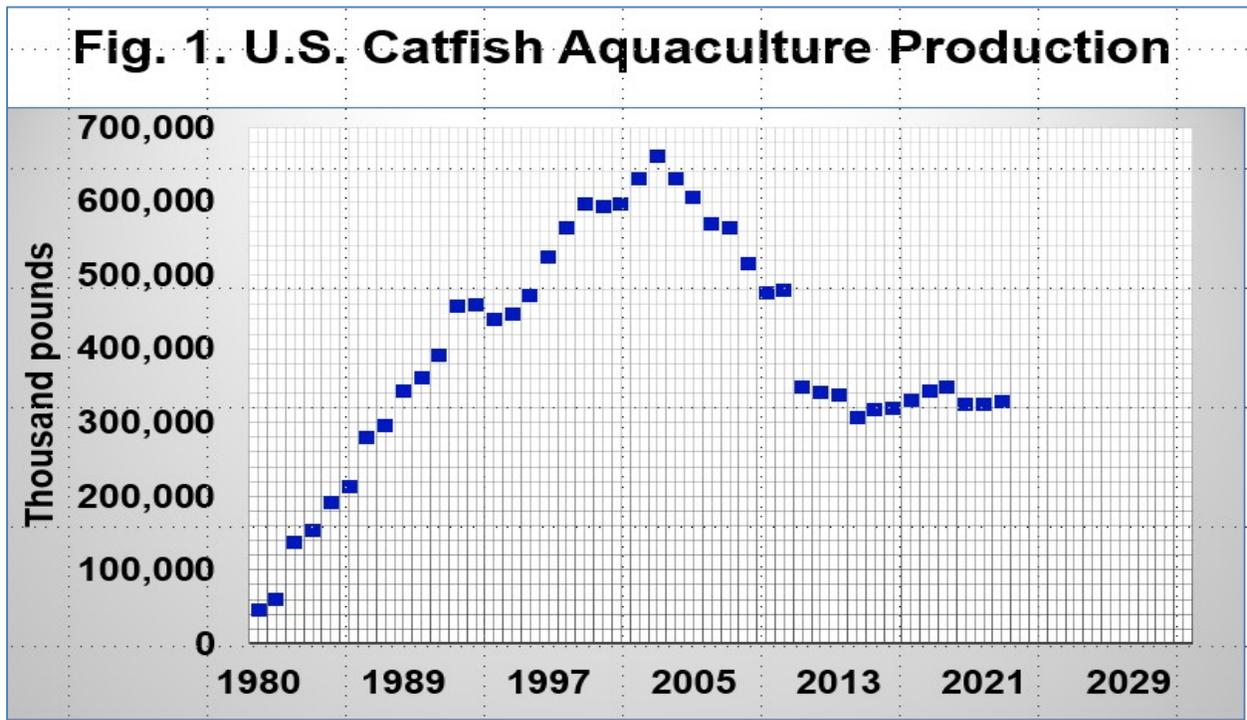
- unemployment rate and growth in per capita disposable income (%)
- recession, trade war, pandemic, and Gulf natural disasters (1 or 0)
- other variables

## U.S. CATFISH AQUACULTURE PRODUCERS

- The U.S. Aquaculture Census estimated that catfish farms numbered 695 farms in 2013 and 531 farms in 2018.
- Total sales reached \$375.8 M in 2013 and \$366.8 M in 2018.
- In number of farms, the top three catfish farming states in 2018 are Mississippi (161 farms), Alabama (96 farms), and Texas (37 farms).
- Annual sales reported during aquaculture census were 1.095 times more than the reported annual sales by USDA Quick facts in 2018 and 1.117 times more in 2013.

## U.S. CATFISH AQUACULTURE PRODUCTION

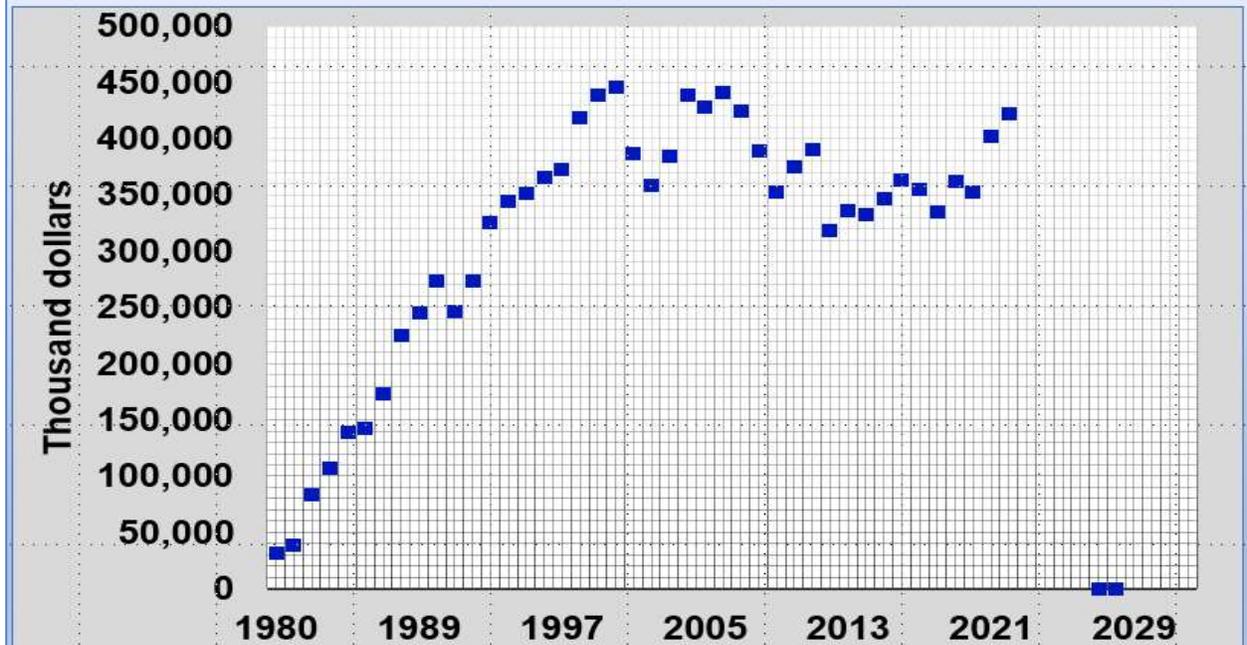
- Annual U.S. aquaculture production since 1980 are shown in Fig. 1.
- The blue dots show annual catfish aquaculture production from 1980 to 2022.
- The U.S. catfish aquaculture production peaked in early 2000. Since then, production declined and remained steady.



## U.S. CATFISH AQUACULTURE FARMGATE VALUES

- Annual U.S. catfish aquaculture farmgate values since 1980 are shown in Fig. 2.
- The blue dots show annual catfish farmgate values reported from 1980 to 2022.
- The 2013 and 2018 values, however, are slightly lower than the Aquaculture Census estimates.

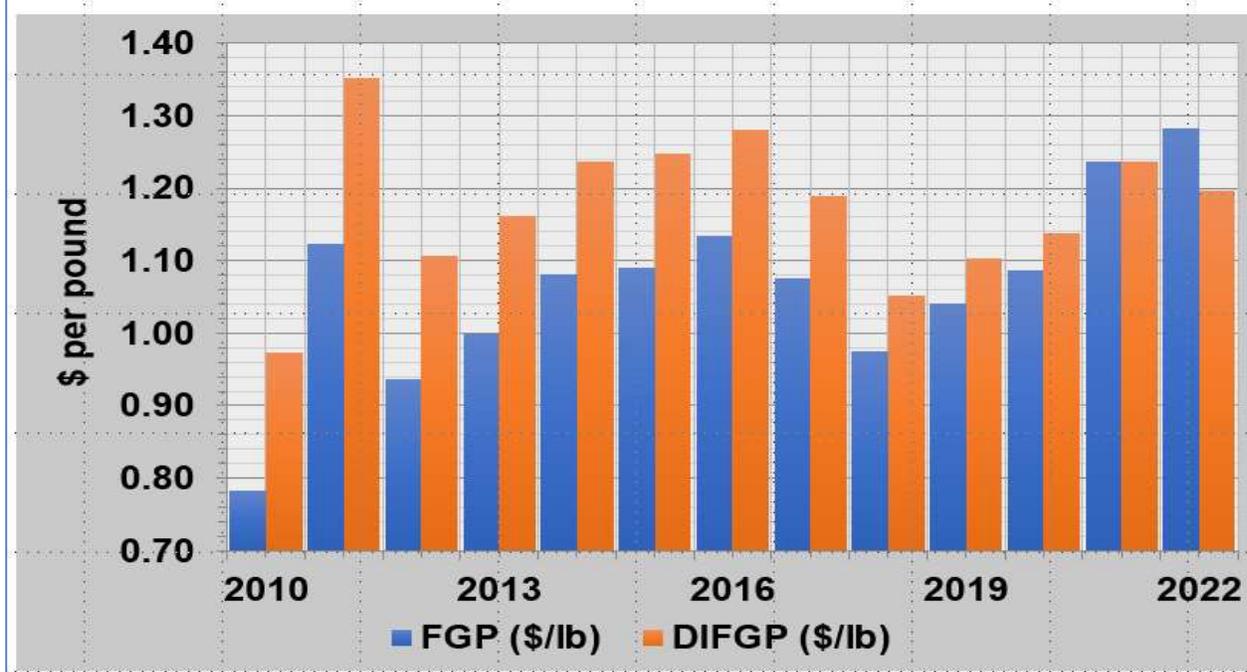
**Fig. 2. U.S. Catfish Aquaculture Farmgate Values**



## U.S. CATFISH AQUACULTURE FARMGATE PRICES

- The annual U.S. catfish farmgate prices from 2010 to 2022 are shown in Fig. 3.
- The blue bars (FGP) show the annual catfish farmgate prices.
- The red bars (DFGP) show the annual catfish deflated farmgate prices.

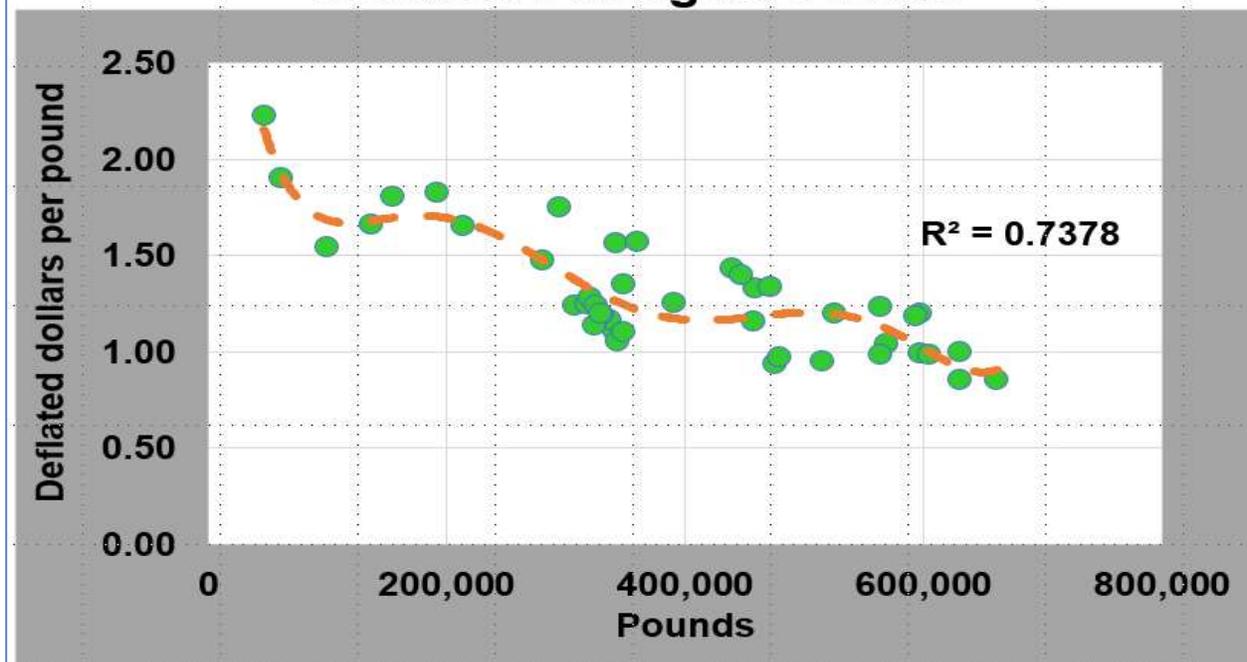
**Fig. 3. U.S. Catfish Farmgate Prices**



### U.S. CATFISH AQUACULTURE PRODUCTION AND FARMGATE PRICES

- The scatter diagram between the U.S. catfish aquaculture production and farmgate prices is shown in Fig. 4 with an R-squared = 0.74.
- The green dots are the deflated catfish farmgate prices at various levels of production from 1980 to 2022.
- The orange dotted curve is the Excel-generated polynomial equation of deflated farmgate prices at various levels of catfish production.
- It seems that lower deflated farmgate prices were observed at higher levels of catfish production during the past four decades.

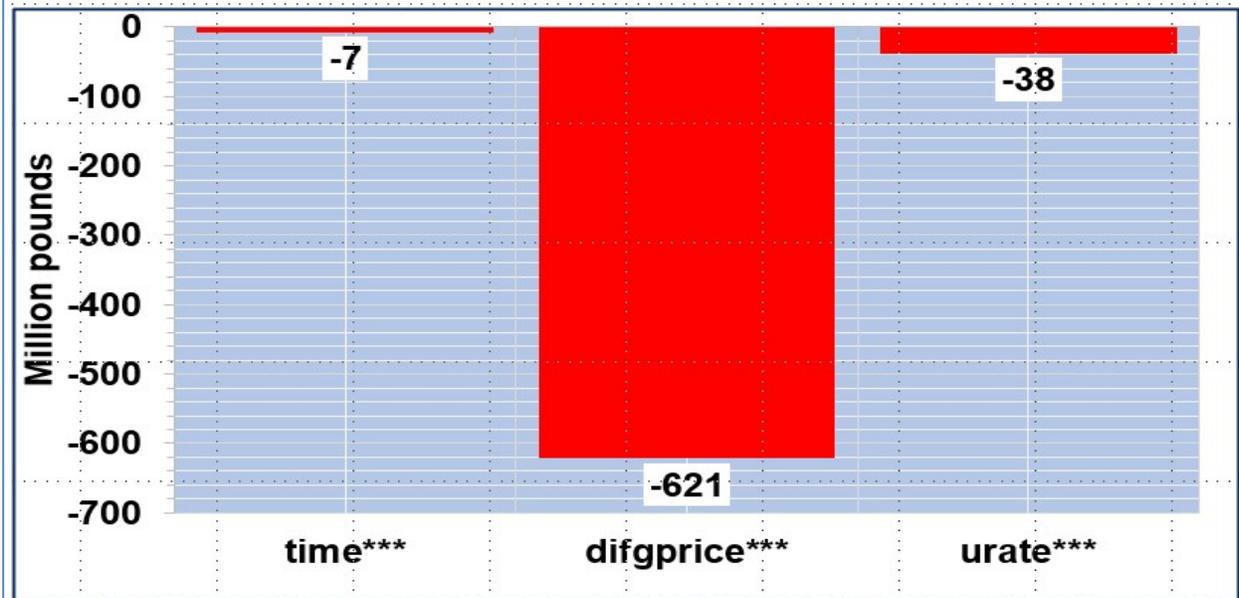
**Fig. 4. U.S. Catfish Aquaculture Production and Deflated Farmgate Prices**



#### **IMPACTS ON U.S. CATFISH AQUACULTURE PRODUCTION BY TIME, PRICE AND UNEMPLOYMENT**

- The estimated OLS equation for domestic catfish aquaculture production is statistically significant and have an R-squared = 0.90.
- U.S. catfish aquaculture production generally declined over time (Fig. 5).
- There is a significant inverse relationship between deflated farmgate price and domestic catfish aquaculture production.
- Higher unemployment rates tend to reduce domestic catfish aquaculture production.

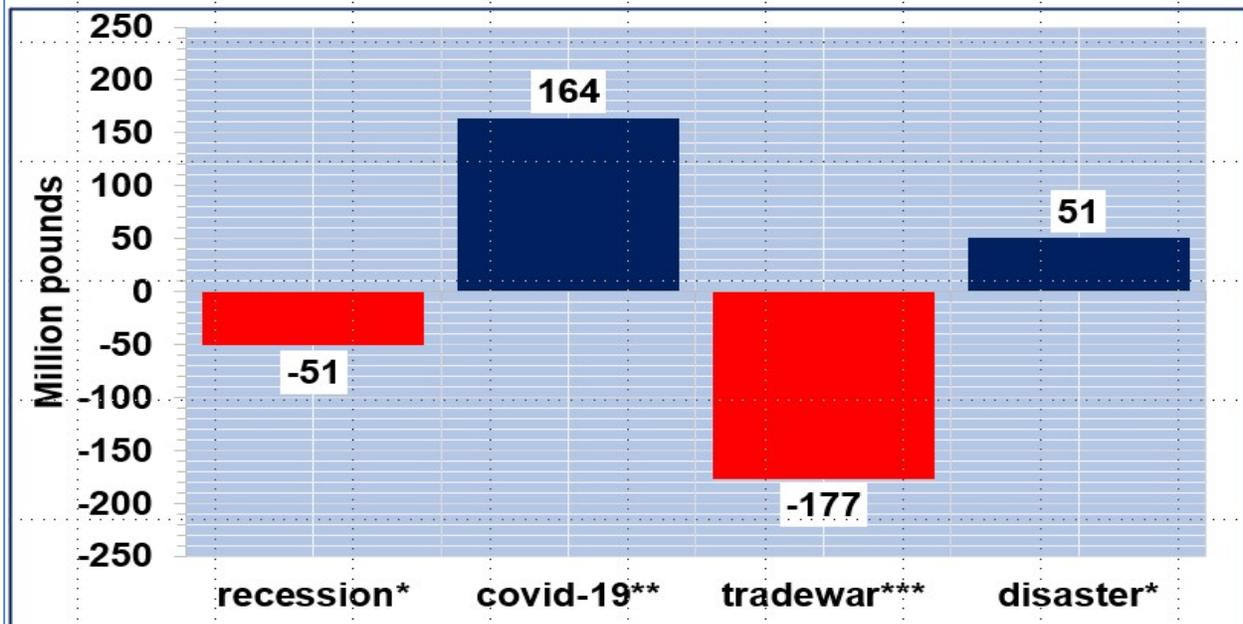
**Fig. 5. Impacts on U.S. Catfish Aquaculture Production by Time, Price and Unemployment**



**IMPACTS ON U.S. CATFISH AQUACULTURE PRODUCTION BY RECESSION, PANDEMIC, TRADE WAR, AND DISASTER**

- Recessions tend to discourage domestic catfish aquaculture production (Fig. 6).
- The global pandemic seemed to encourage higher domestic catfish aquaculture production.
- The US-China trade war tends to adversely affect domestic catfish aquaculture production.
- Natural disasters affecting the Gulf of Mexico states seemed to encourage more domestic catfish aquaculture production.

**Fig. 6. Impacts on U.S. Catfish Aquaculture Production by Recession, Pandemic, Trade war, and Disaster**



#### IMPACTS ON U.S. CATFISH DEFLATED FARMGATE VALUES

- The estimated OLS equation for U.S. catfish deflated farmgate values is statistically significant and have an R-squared = 0.93.
- U.S. deflated catfish farmgate values were not significantly influenced by recessions, pandemic, trade wars and natural disasters.
- Time, deflated farmgate price, and domestic catfish aquaculture production seemed to have significantly enhanced deflated catfish farmgate values.

#### IMPACTS ON U.S. CATFISH DEFLATED FARMGATE PRICES

- The estimated OLS equation for U.S. catfish deflated farmgate values is statistically significant and have an R-squared = 0.93.
- Recessions, pandemic, and trade wars tend to have exerted significant negative influences on U.S. deflated catfish farmgate prices.
- Time, domestic catfish production and the unemployment rate also tend to negatively impacted U.S. deflated catfish farmgate prices.

## MY CATFISH ECONOMICS OUTREACH

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