

Supply chains and markets for red snapper

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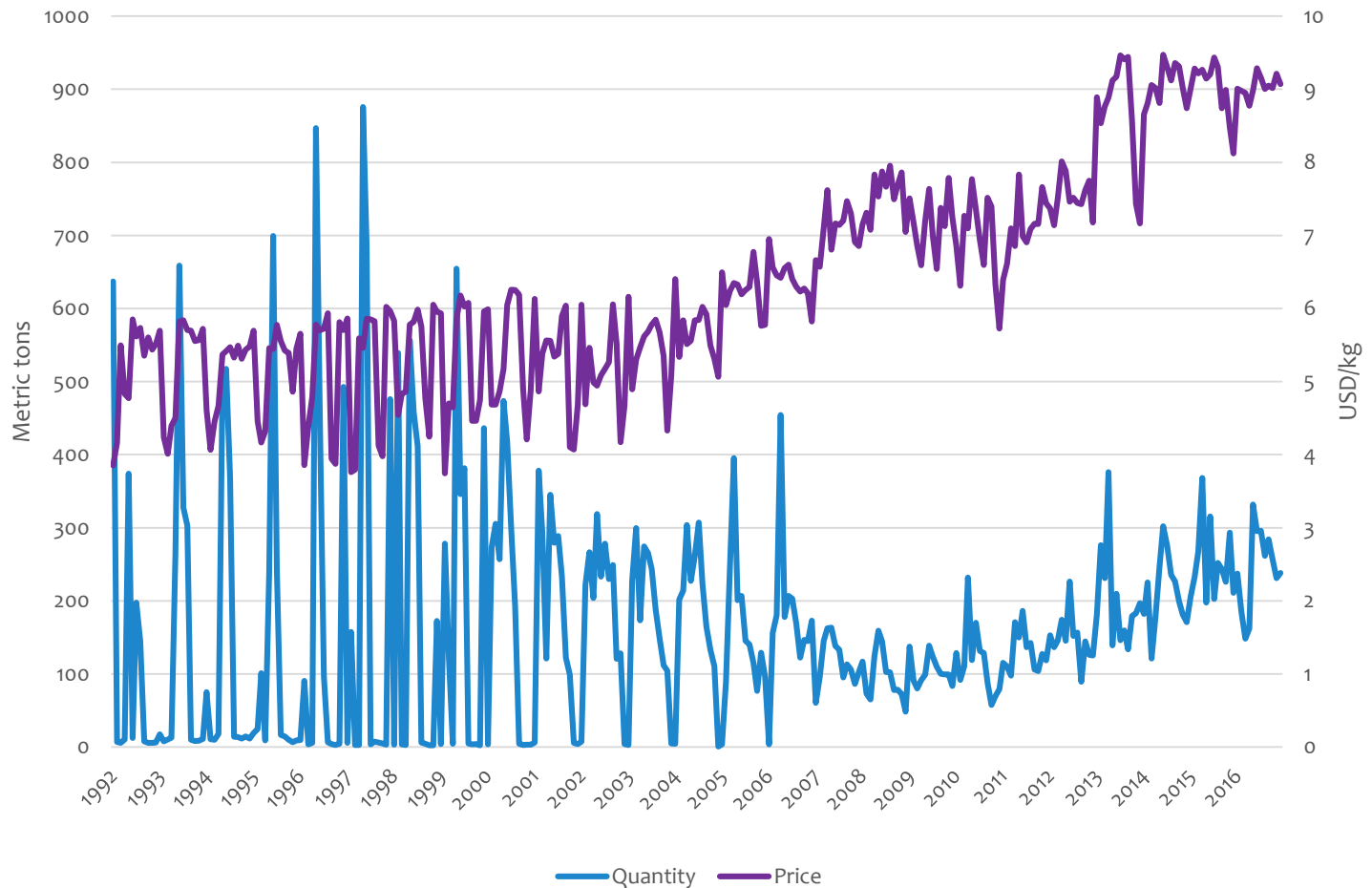
Introduction

- * Red snapper is one of the most important species target by commercial as well as recreational fishers in the Gulf
- * It is one of the most valuable finfish species in commercial fisheries
 - * The price of whole snapper doubles or more from port to retail as retails at about \$10/pound at coastal fish mongers, which increase to about \$25/pound when filleted
 - * What value is created in a restaurant meal is very difficult to assess
 - * Further away from the landing location the price is significantly higher
 - * Significant value is created

Introduction

- * The introduction of catch shares has fundamentally changed the market
 - * Stopping the race to fish has extended the season and facilitated more market oriented efforts
 - * Race to fish reduce quality and prevent delivery reliability
 - * Still, in contrast to many other species, red snapper has always primarily been marketed as fresh
- * Red snapper has several close substitutes
 - * Domestic landings of other snappers
 - * Imports of fresh and frozen snapper
 - * The marketing of these species will try to copy red snapper if it increase their profitability, and any success for red snapper will also benefit these species

U.S. landings and price for red snapper



Source: NOAA

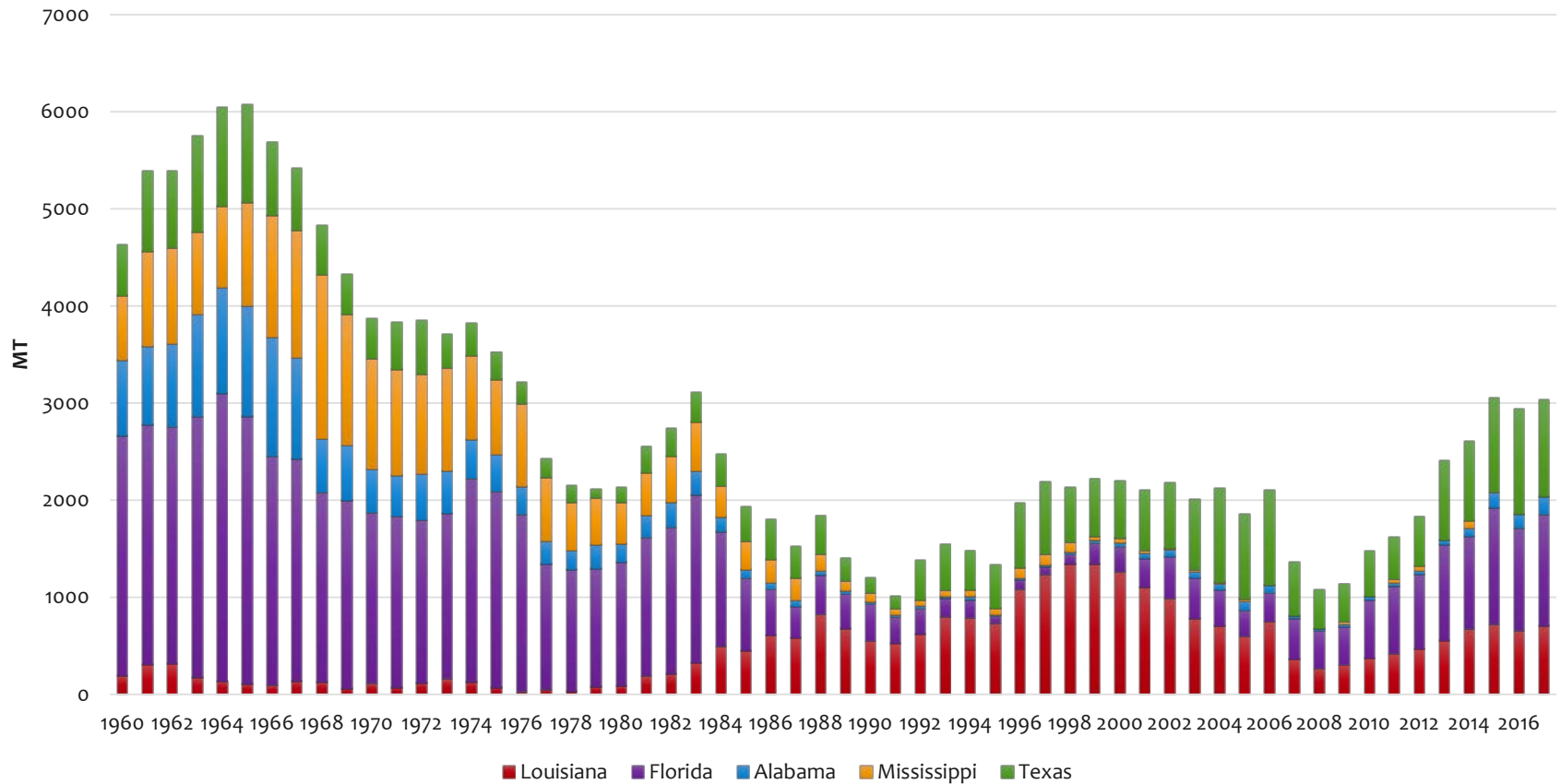
Catch shares

- * The introduction of catch shares fundamentally changed the red snapper fishery
- * A longer season makes landed quantity and prices much more stable, improves economic efficiency and increased price
 - * Agar et al (2014), Sollis et al (2014)
- * The more stable supply profile also facilitate market development and tend to increase demand

Demand growth

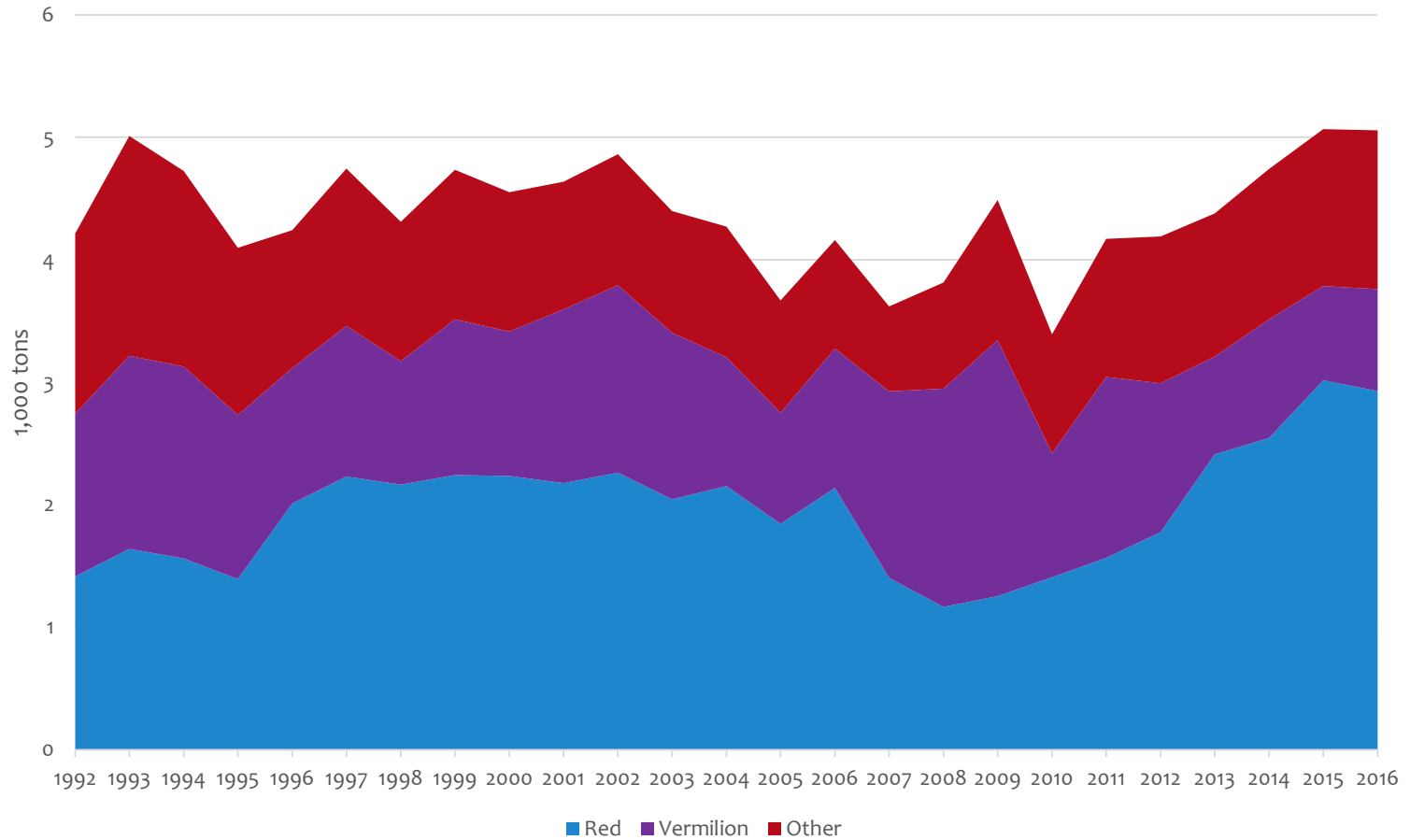
- * Economic theory indicates that if everything else is held constant price needs to be reduced to enable a higher quantity to be sold
- * The fact that both red snapper quantities and prices has been increasing since the mid 2000s strongly suggest that something else has changed
 - * The only way to explain this phenomenon is that demand for red snapper has increased
 - * Interviews indicate that this is at least partly due to access to new supply chains, but also that red snapper can play a more important role in seafood counters because the higher delivery reliability

U.S. landings of red snapper by state, 1960-2017



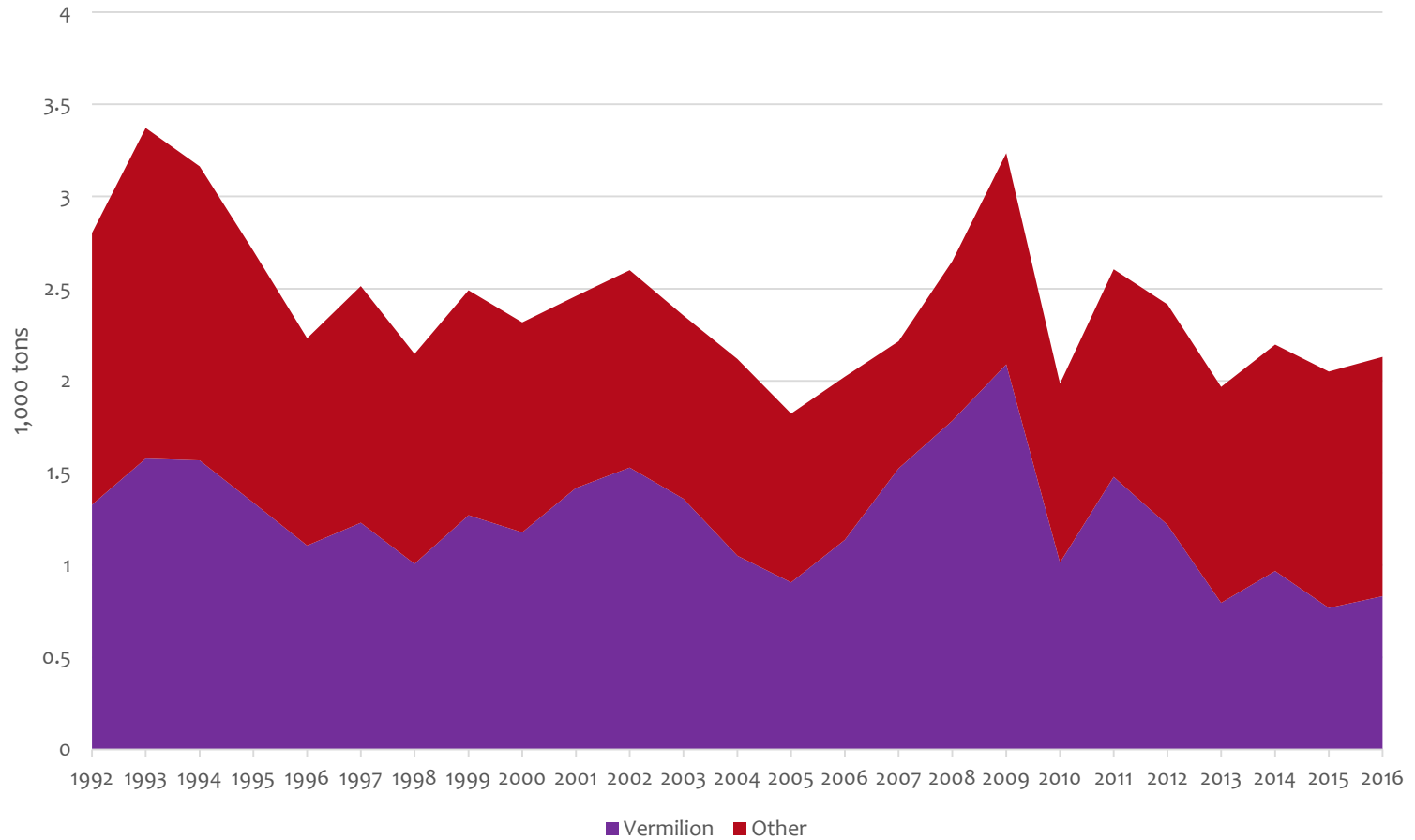
Source: NOAA

U.S. landings of snappers



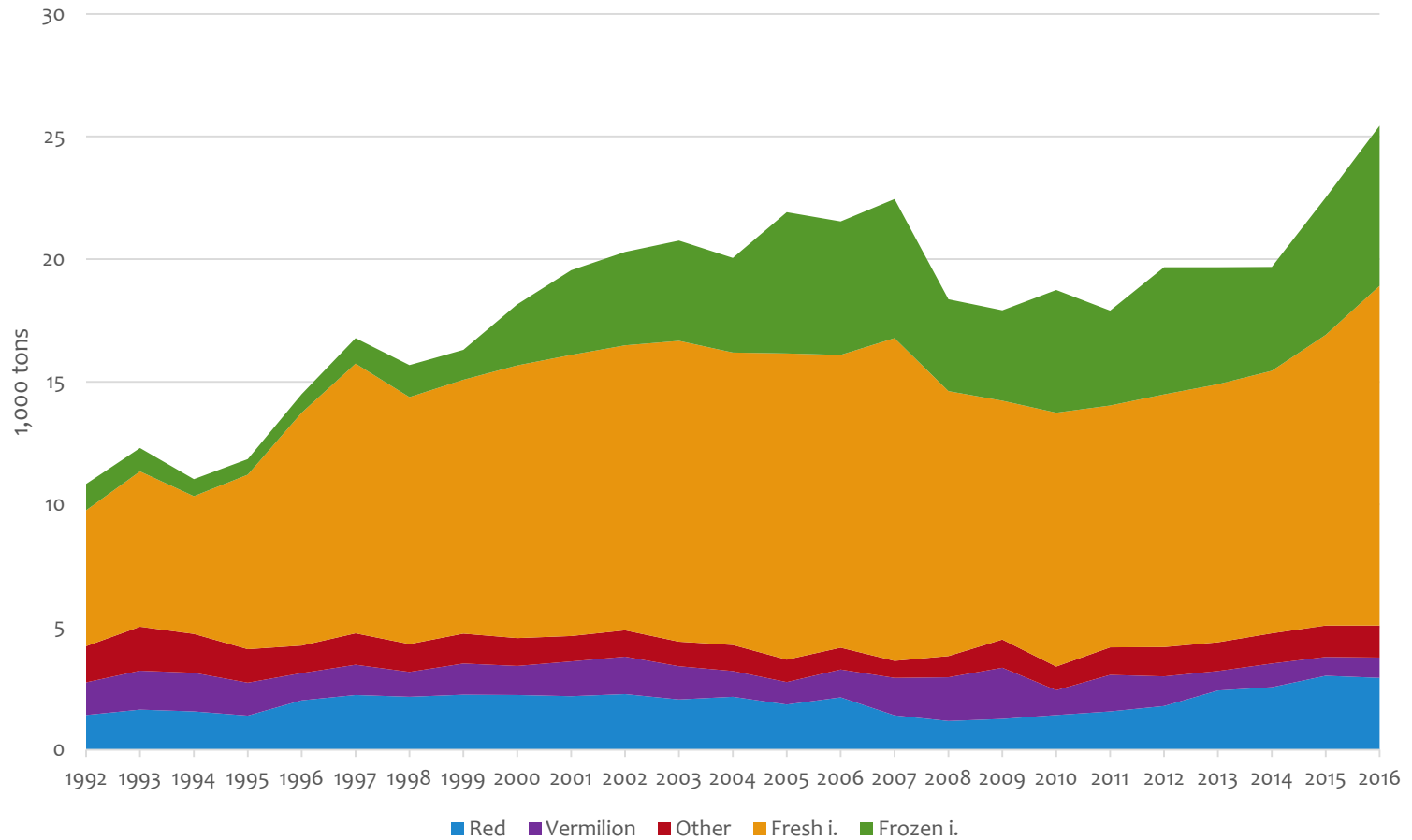
Source: NOAA

U.S. landings of snappers



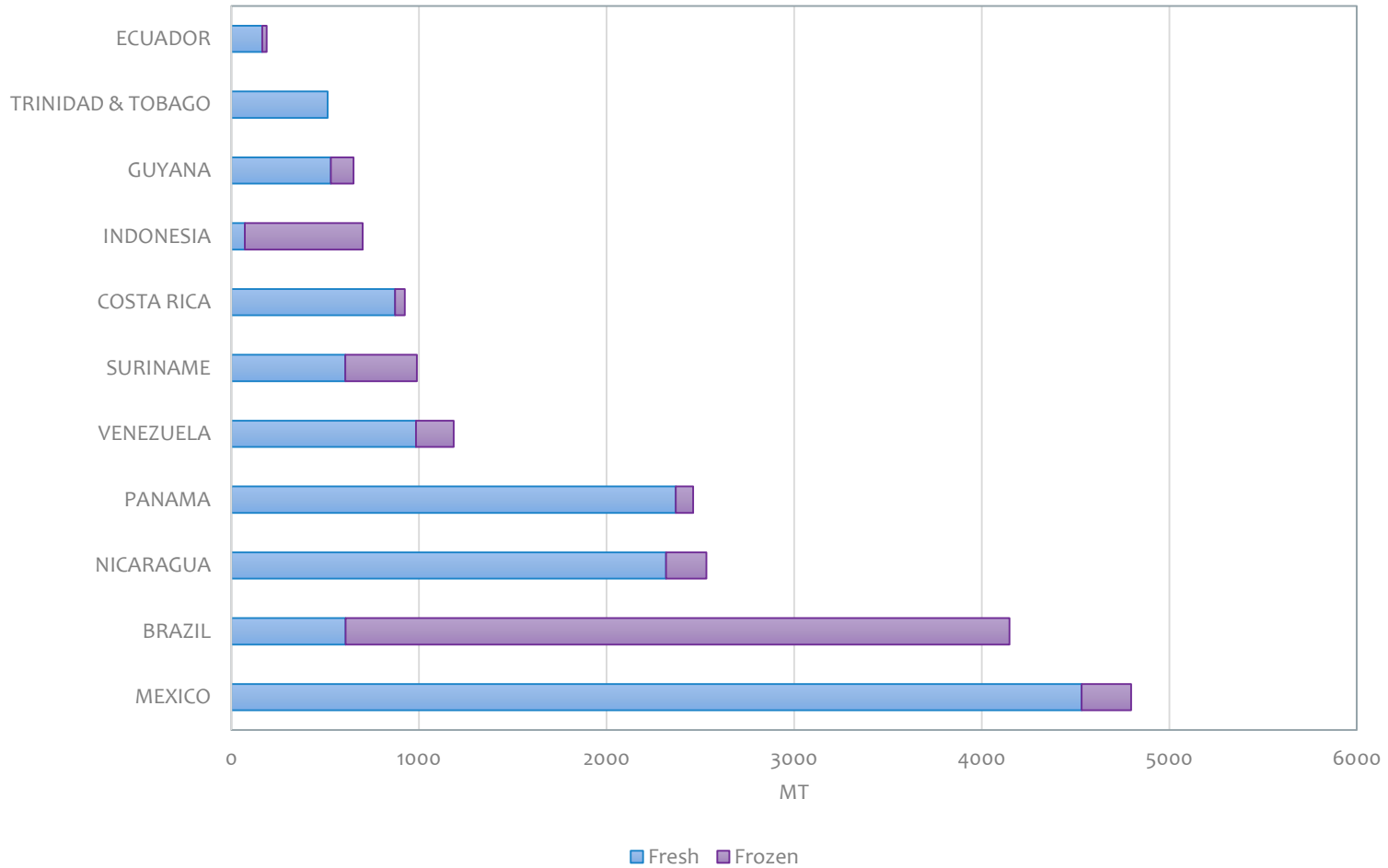
Source: NOAA

U.S. supply of snappers

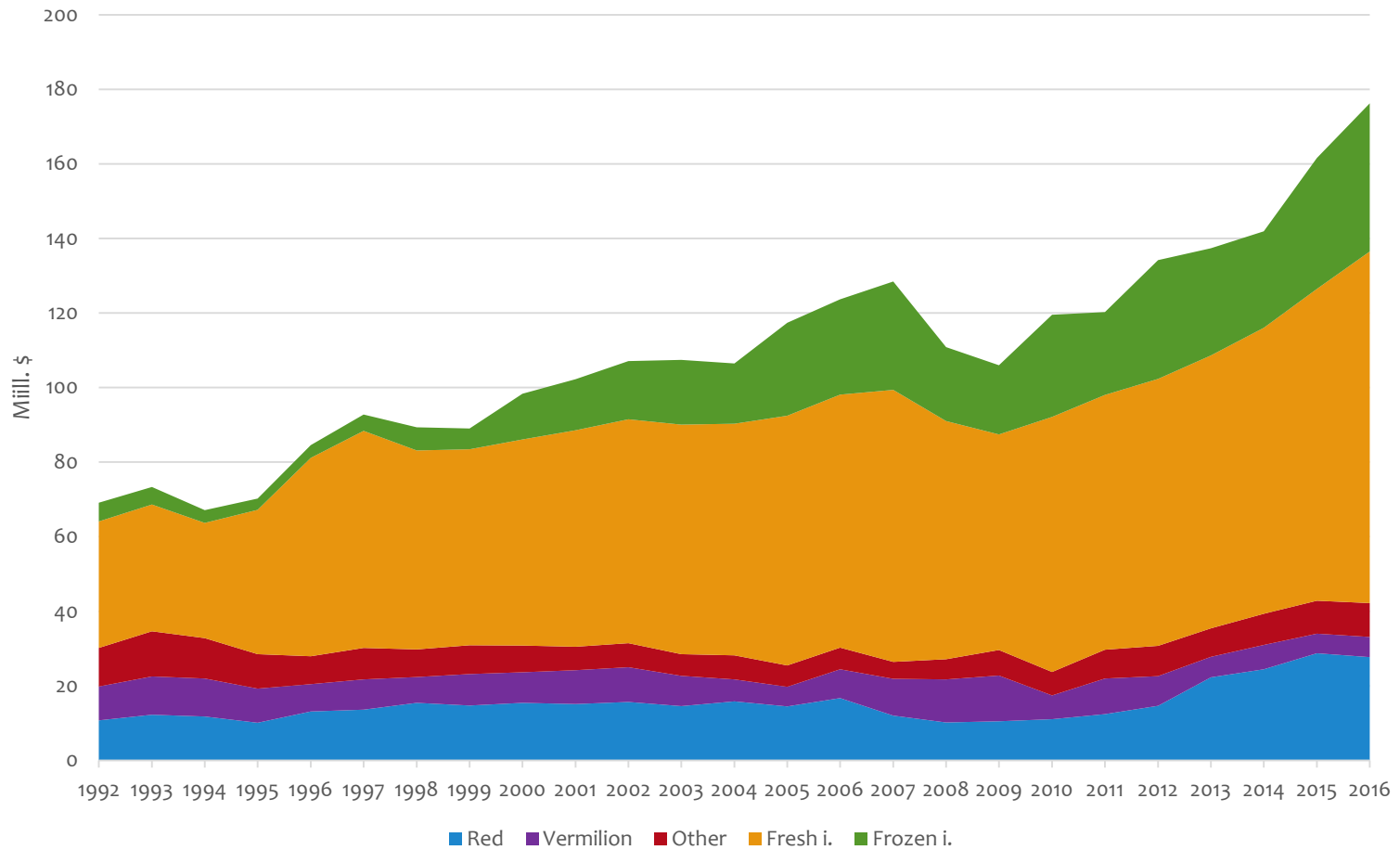


Source: NOAA

U.S. imports of snapper by country of origin in 2018

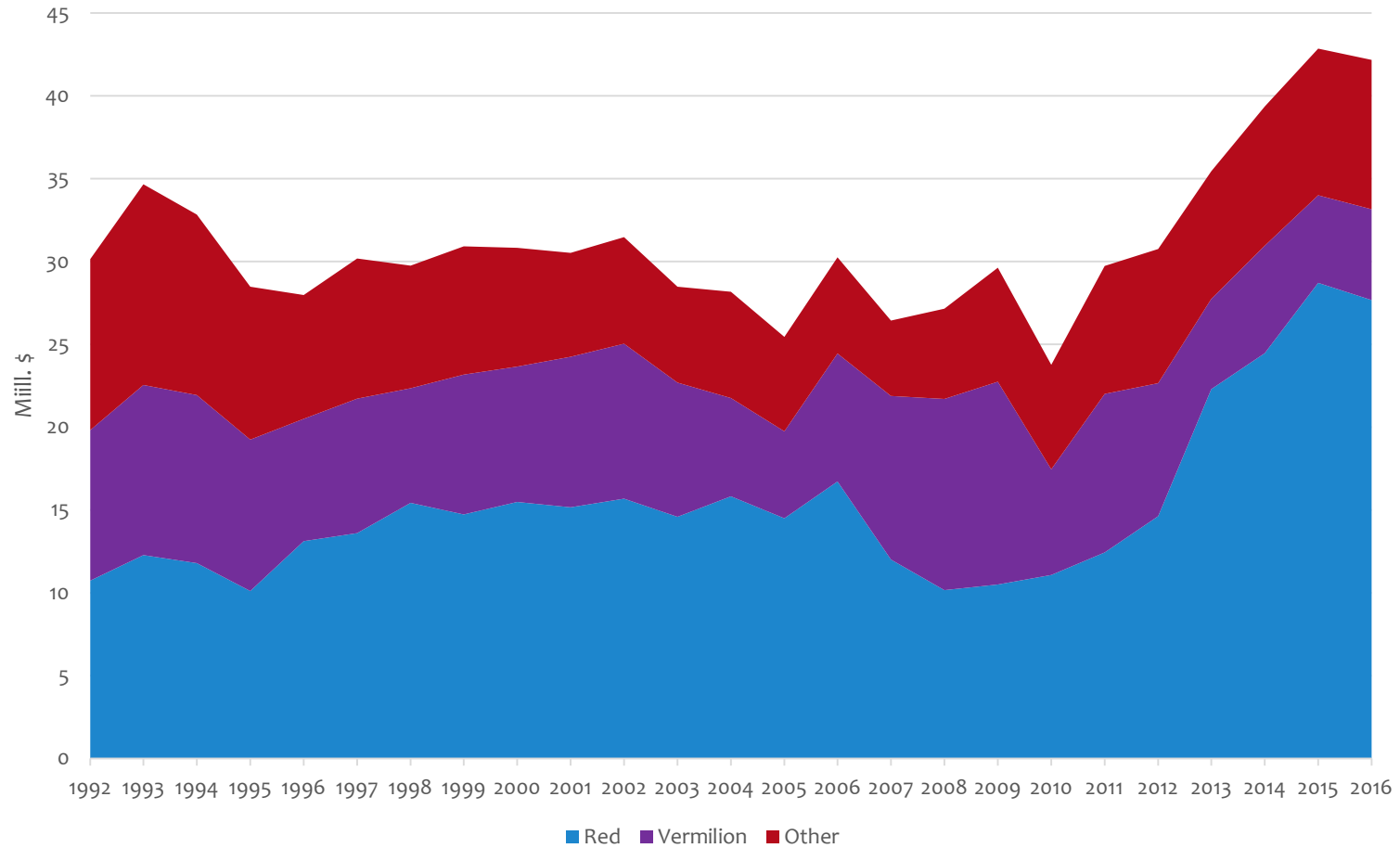


U.S. supply of snappers, real value (2016=1)



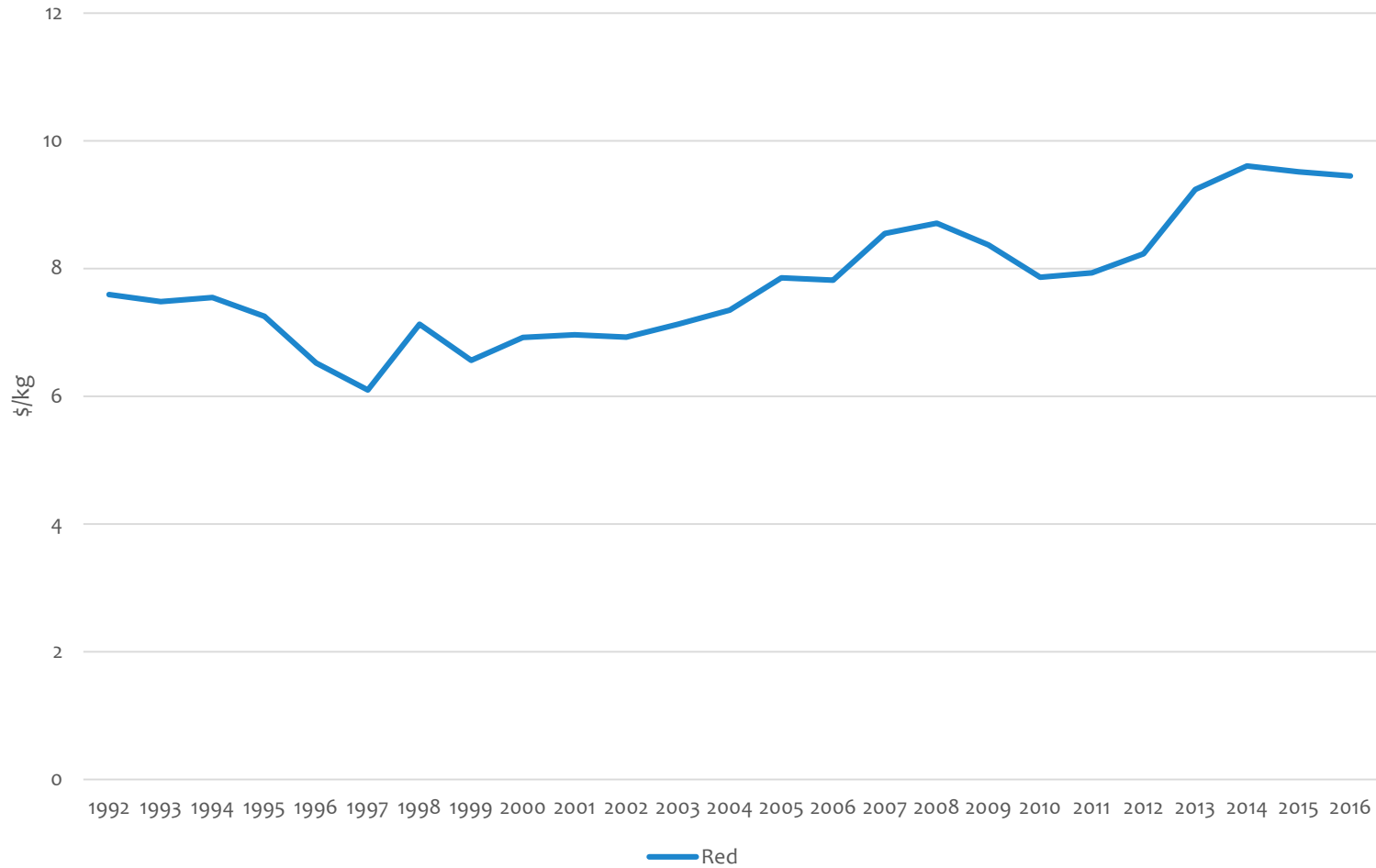
Source: NOAA, BLS

U.S. domestic supply of snappers, real value (2016=1)

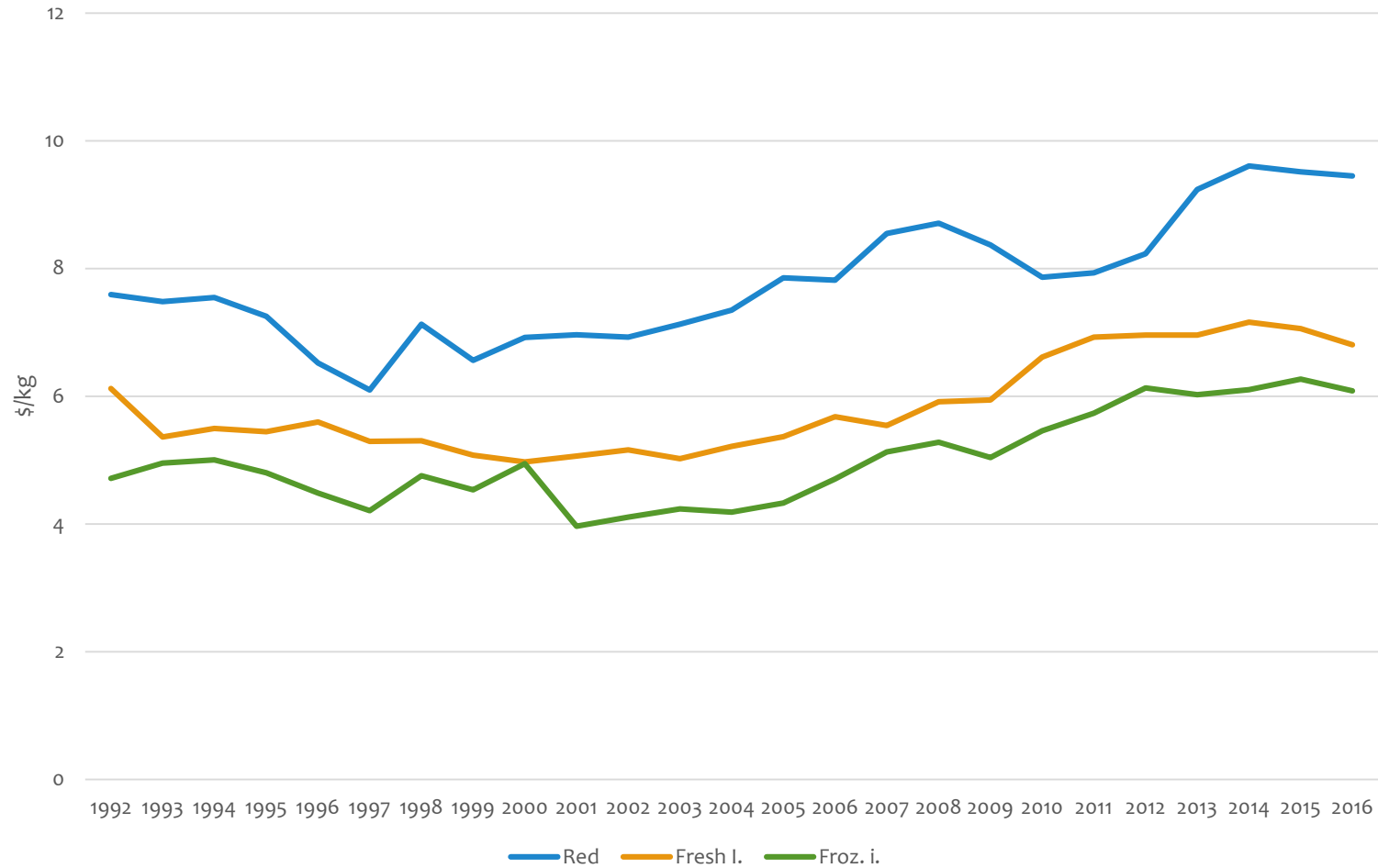


Source: NOAA, BLS

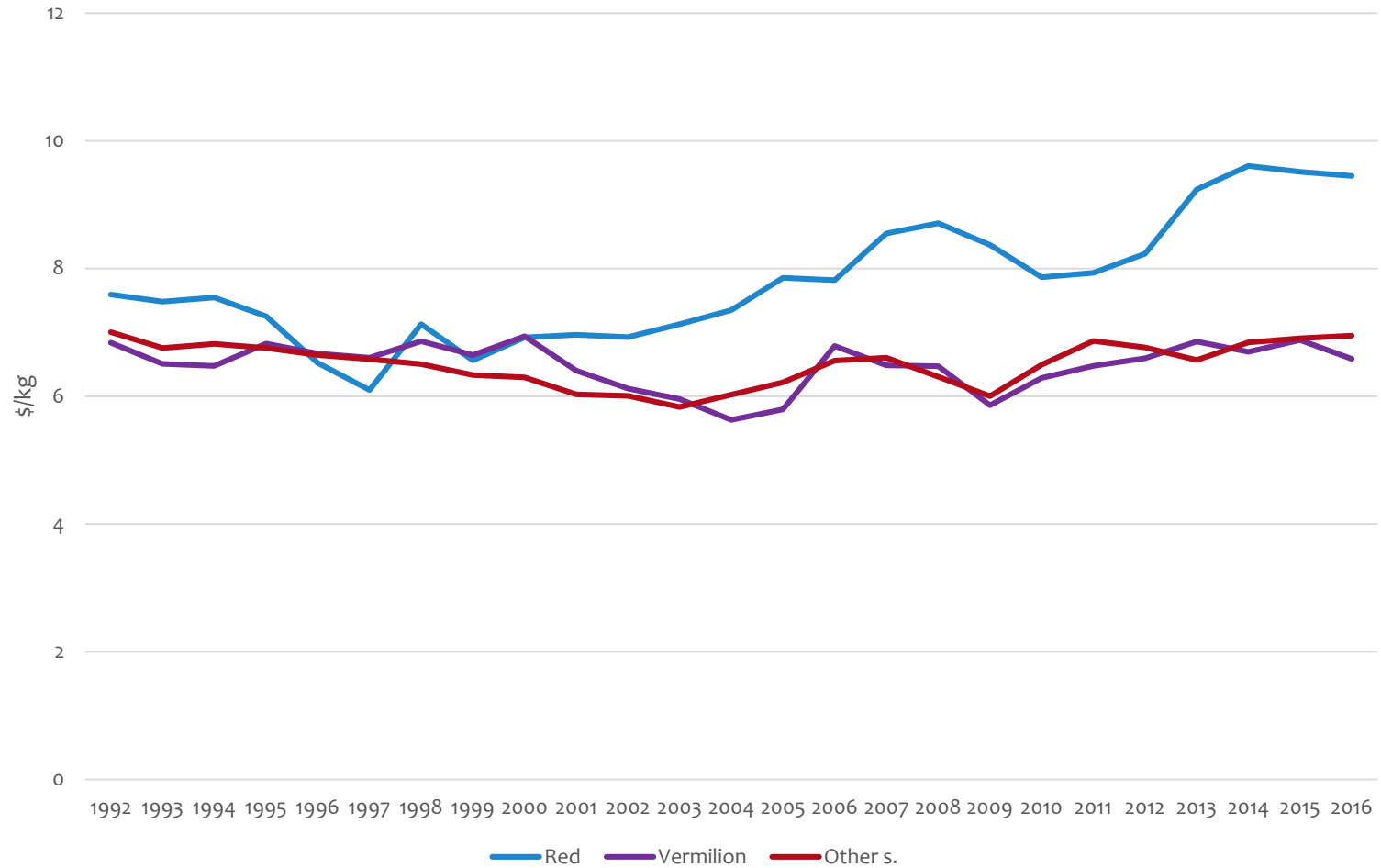
Real snapper prices (2016=1)



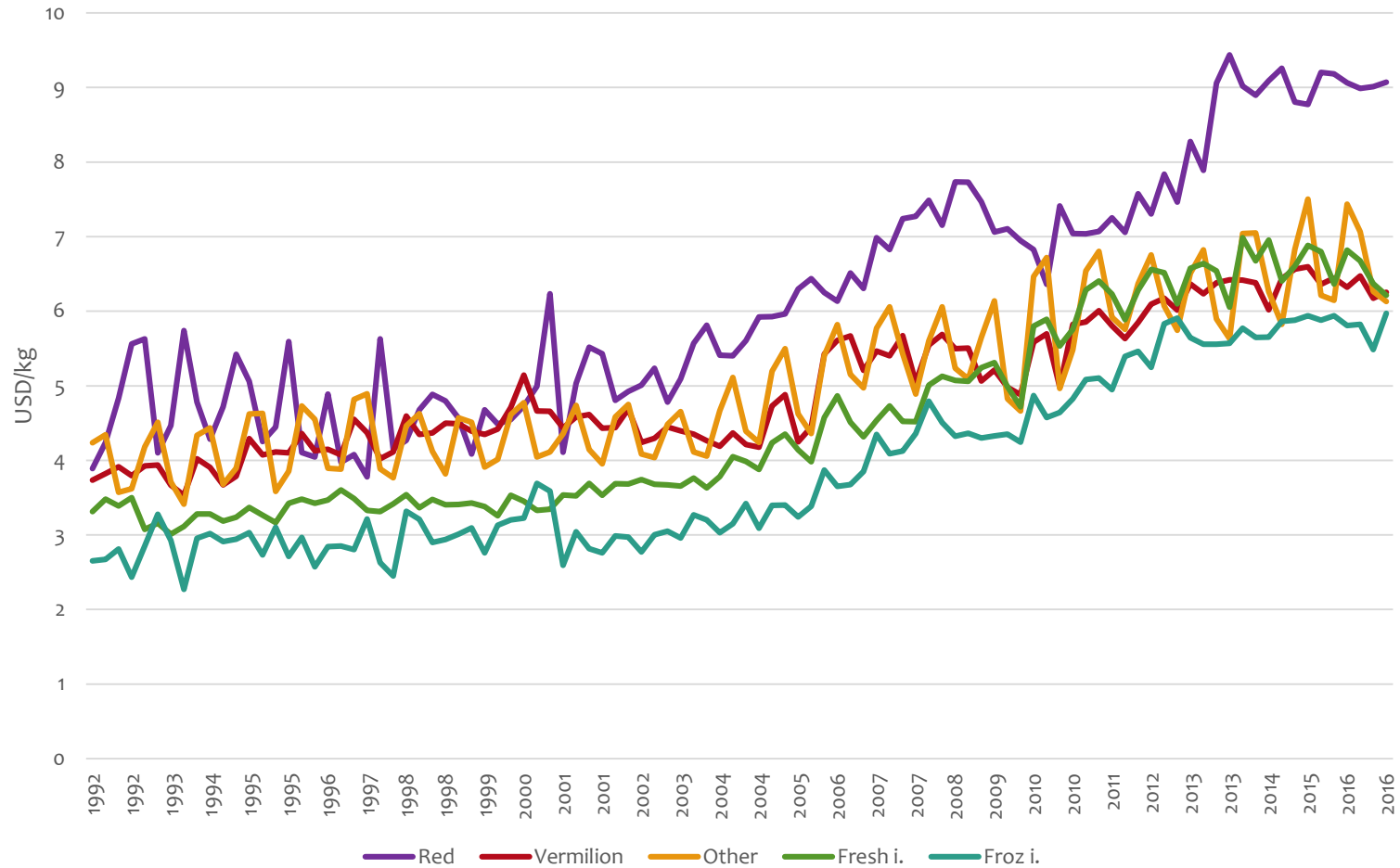
Real snapper prices (2016=1)



Real snapper prices (2016=1)



Quarterly snapper prices in the U.S.



Market integration

- * The first step of the analysis is to investigate the extent to which different snapper species have a common price determination process (and if the grouper complex is a part of that)
- * This analysis is conducted using only prices and is known as market integration analysis

- * The relationship is based on the following equation

$$\ln p^1 = \alpha + \beta \ln p^2 + e_t$$

- * If the prices move in parallel over time ($\beta=1$), the market is fully integrated
- * If $\beta < 1$, the species are imperfect substitutes while if $\beta=0$ there is no relationship
- * Cointegration tests (Johansen)

Market Integration

- * Domestic red snapper and the two import categories are found to be fully integrated
 - * The imports are priced as if they are red snapper of lower quality
- * Vermillion and other snappers are imperfect substitutes
- * The price determination process for snappers are independent of the price determination process for groupers
- * The demand growth for red snapper has benefitted the imports equally much
- * It has also benefitted other domestic snappers, but not to the same extent

Demand analysis

- * To obtain more information about the demand relationships between different snappers, an inverse almost ideal demand system is estimated with five goods
 - * Red snapper, vermillion snapper, other snappers, imported fresh and imported frozen
- * Focus on a structural change in 2007
 - * Find no evidence of change in trends in common with Keithly and Taberstani (2018). However, I strongly disagree that this allows the conclusion that there was no price effect due to the introduction of the catch shares
 - * The demand growth operates through the expenditure term and the effect for each species is determined by the scale flexibility
- * The hypothesis that the flexibilities are equal before and after 2007 is clearly rejected

	Own-price	Scale
Before 2007		
Fresh imp.	-0.704(0.021)***	-1.195(0.037)***
Frozen imp.	-0.277(0.040)***	-0.776(0.128)***
Red snapper	-0.472(0.025)***	-0.038(0.138)
Vermilion s.	-0.307(0.043)***	-1.226(0.082)***
Other snapper	-0.128(0.036)***	-1.355(0.064)***
After 2007		
Fresh imp.	-0.724(0.055)***	-1.177(0.060)***
Frozen imp.	-0.298(0.047)***	-0.883(0.117)***
Red snapper	-0.119(0.163)	-0.749(0.268)***
Vermilion s.	0.099(0.078)	-0.303(0.226)
Other snapper	-0.340(0.130)***	-1.057(0.268)***

A simulation

- * The less flexible (more elastic) demand for red snapper is important together with the demand growth
- * From 2007 to 2016 the red snapper landings increased by 1.5 thousand tons from 1.4 to 2.9 or by 107.1%
- * The price in 2007 was \$3.89/pound and the value of the fishery was \$12 mill
- * With a price flexibility of -0.472 this increased landings would reduce the price by 50.6% or to \$1.92/pound (\$4.24/kg)
- * With a price flexibility of -0.119 this would reduce the price by 12.7% or to \$3.34/pound
- * The price difference implies a welfare loss of \$1.41/pound without the changed elasticities, and with landings of 2.9 thousand tons of \$9.05 mill in total

Estimating demand growth

- * March (2003) developed an index where one based on estimated elasticities and observed prices and quantities can estimate demand growth
- * Using this index, the following estimates was estimated for the snappers

	Red	Vermillion	Other	Fresh I.	Frozen I.
Until 2007	3.7%	5.0%	-20.1%	0.9%	37.6%
From 2007-2016	50.0%	-7.3%	17.3%	0.5%	14.3%

Concluding remarks

- * The total quantity of snappers consumed in the U.S. and their price was in 2016 at their highest level since 1990
- * Strong demand growth, particularly since 2007
- * Relatively to imported snappers, the red snapper price increased significantly after 2007
- * More value is being created based on domestic stocks and particularly red snapper
 - * Partly due to higher prices and partly to higher quantities
 - * The demand structure has also changed
 - * The increased landings would have been highly challenging if demand had not grown
- * Since there is a snapper market, also other species benefit from improved markets for red snapper