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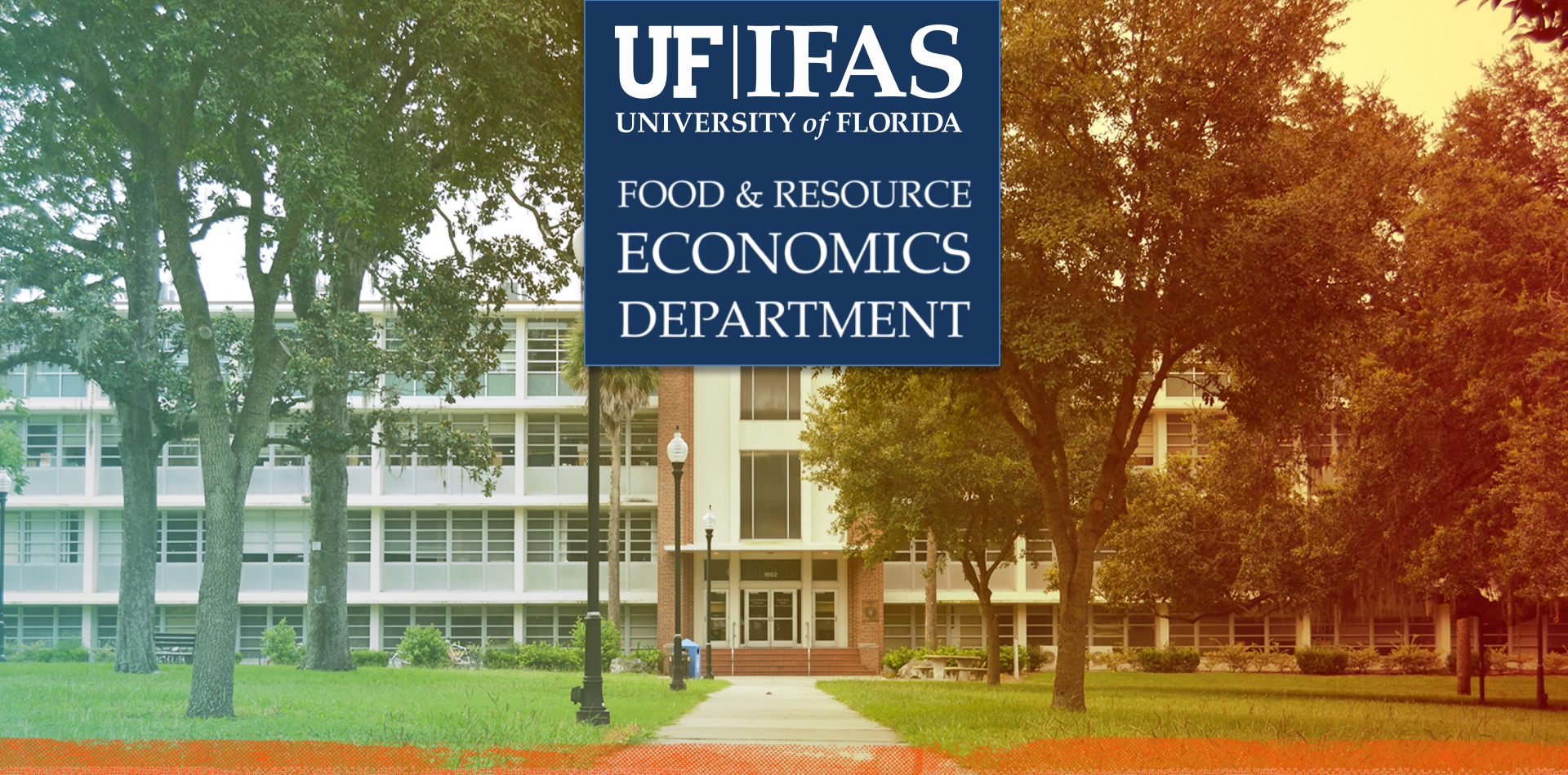

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FOOD & RESOURCE
ECONOMICS
DEPARTMENT

THE IMPACT OF RAISING BROILER WITHOUTH ANTIBIOTICS ON US CHICKEN CONSUMER

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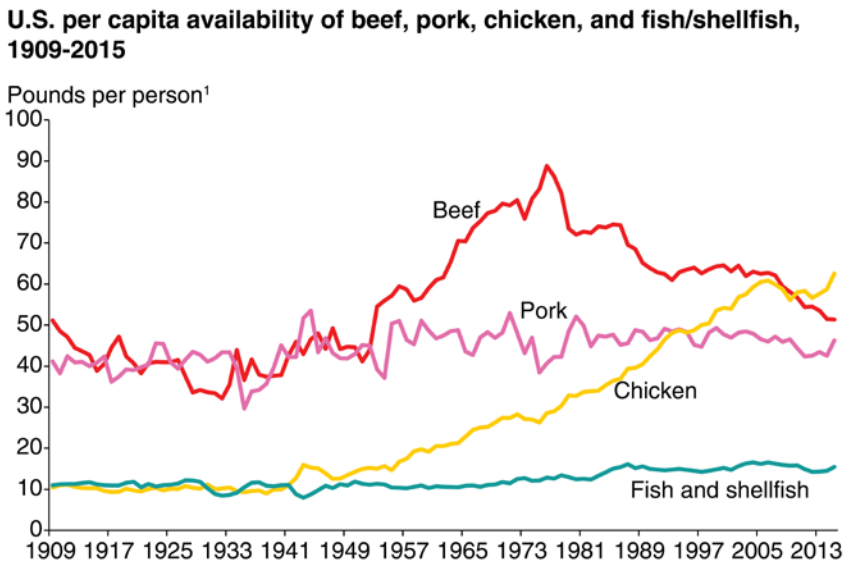
Southern Agricultural Economics Association Annual Meeting
Feburary 5th, 2018
Jacksonville, Florida

Chicken Consumption



[1]Calculated on the basis of raw and edible meat in boneless, trimmed (edible) weight. Excludes edible offals, bones, viscera, and game from red meat. Includes skin, neck, and giblets from chicken. Excludes use of chicken for commercially prepared pet food. Source: USDA, Economic Research Service, Food Availability Data.

- Americans consume more chicken than any other protein
- Chicken availability per person has more than doubled
- US is the largest producer and 2nd largest exporter of poultry

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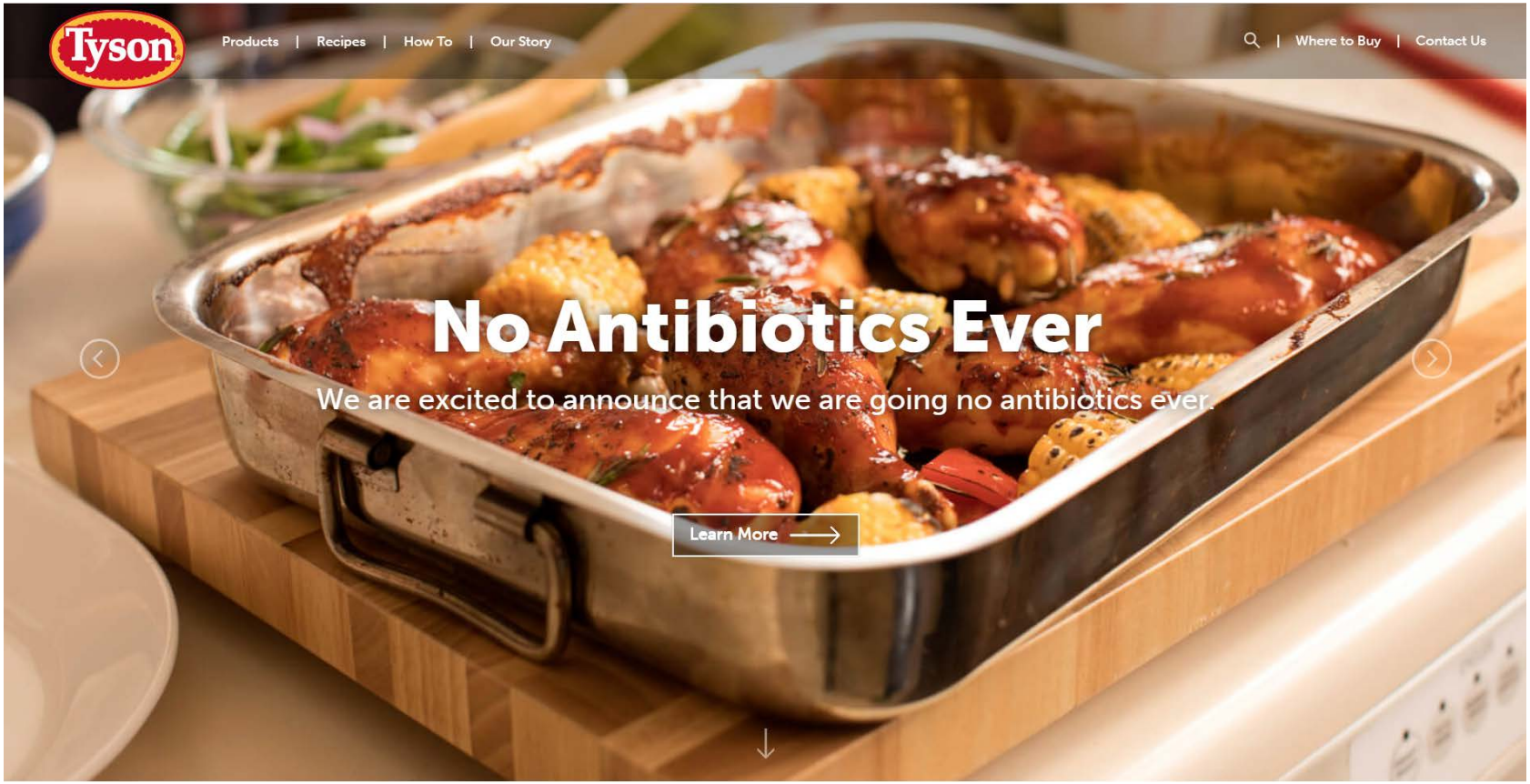
Tyson



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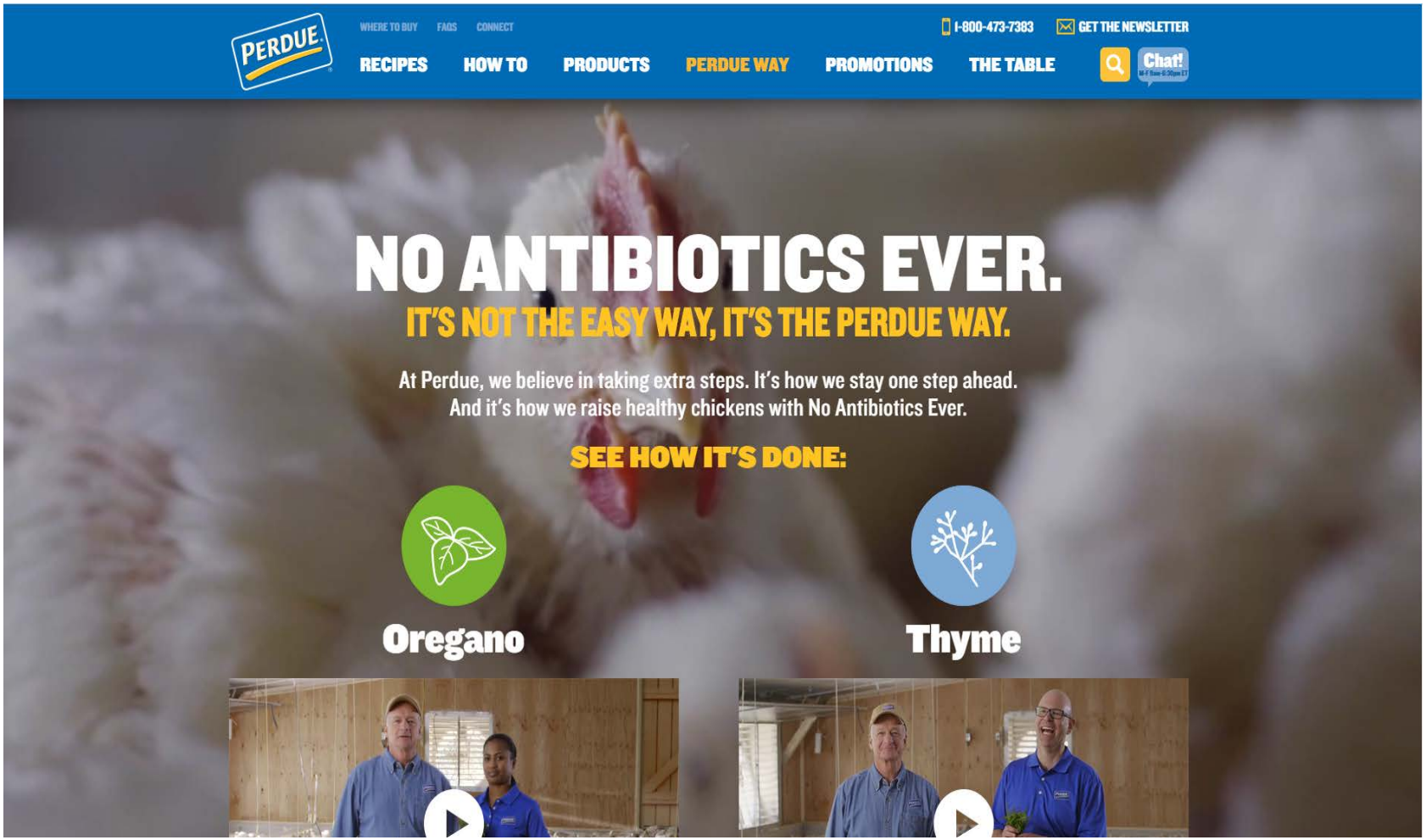
Perdue



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Introduction

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Introduction

- Consumers are demanding and are willing to pay for food which promote animal welfare (Clark et. al, 2017)
- While a percentage of the population considers animal welfare an important factor in purchasing decisions, a much smaller share of consumers actually purchase products that reflect this attribute (Grethe, 2017)

Objective

Explore the “welfare paradox” (Sullivan, 2013) impact on consumer demand using Nielsen Retail Scanner Data

Welfare Paradox posed by consumers who express a strong preference for improved animal welfare in theory, but do not demand heightened animal welfare in practice

Literature Review

- Prior work assesses a consumer's willingness to pay for animal welfare attributes in meat products through the use of choice experiments and conjoint analysis, among other methods(Lagerkvist et al, 2006; Lusk, 2006; Clark et. al, 2017)
- Syndicated data has been used to examine the complementary and substitutability of meats including beef, pork, poultry and fish by cuts (Thompson, 2004; Kinnucan et al., 1997; Eales and Unnevehr,1993)

Data

- Nielsen Retail Scanner Data from Kilts Marketing Center from 2009 to 2015
- Weekly data aggregated to monthly level
- Brands divided into two groups: raised without antibiotics (RWA) and conventional (CNV)

Method

Almost Ideal Demand System (AIDS)

$$w_i = \alpha_i + \sum_j \gamma_{ij} \log p_j + \beta_i \ln(x / P)$$

Where

w_i is the budget share of good i, P_iQ_i/Y

P_j is the price of the commodity

And P is a price index defined by $\ln P = a_0 + \sum_k \alpha_k \ln p_k + \frac{1}{2}\sum_j \sum_k \gamma_{kj} \ln p_k \ln p_j$

To be consistent with economic demand system the adding up restriction, homogeneity and symmetry properties are imposed

Adding Up: $\sum_{i=1}^{n} \alpha_i = 1 \quad \sum_{i=1}^{n} \gamma_{ij} = 0 \quad \sum_{i=1}^{n} \beta_i = 0$

Homogeneity: $\sum_j \gamma_{ij} = 0$

Symmetry: $\gamma_{ij} = \gamma_{ji}$

Method

Estimating Elasticities

Expenditure Elasticity	$1+\frac{\beta_i}{w_i}$	Determine if a good is a luxury, necessity, or inferior good
Cournot Elasticity (uncompensated)	$\frac{\gamma_{ij}-b_i w_i}{w_i}+\delta_{ij}$	Percentage of response in quantity demanded resulting from a 1% change in price, holding **nominal expenditures** constant
Slutsky Elasticity (compensated)	$\frac{\gamma_{ij}}{w_i}+w_j-\delta_{ij}$	Percentage response in quantities demanded resulting from a 1% change in price, holding **real expenditures** constant

Results

		Slutsky Price Coefficent			
	Expenditure Coefficient	Conventional		RWA	
CNV		Breast	Leg	Breast	Leg
Breast	0.002	-0.532***	0.484***	0.049	-0.001
Leg	-0.112		0.058***	-0.106*	0.007**
RWA					
Breast	0.106			-0.106***	0.000
Leg	0.004				0.207***

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Elasticities

		Slutsky Elasticity				Cournot Elasticity			
	Expenditure Elasticity	CNV		RWA		CNV		RWA	
CNV		Breast	Leg	Breast	Leg	Breast	Leg	Breast	Leg
Breast	1.00*	-1.51***	1.23***	0.27***	0.00	-2.03***	0.93**	0.09	0.00
Leg	0.62	2.15***	-2.55***	.373***	0.03***	1.82***	-2.73***	0.26	0.03**
RWA									
Breast	1.59***	0.79***	0.62***	-1.41***	0.00	-0.04	0.14	-1.70***	0.00
Leg	1.87	0.21	2.07***	0.17	-2.45***	-0.76	1.51	-0.17	-2.45**

Conclusions

- There are trade-offs between conventional and RWA chicken products
- Consumers see products as substitutions but tend to stay within the same production method