Integrating PUR Data into Economic Analysis

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What Do Economists Care About?

- Fundamental questions of economics:
  - How do economic entities (firms, individuals, governments, families) allocate scarce resources?
  - What are the outcomes of these allocations?
- What data do economists need to answer these questions?
  - Prices
  - Quantities

  among other things…

PUR Data

- PUR data include
  - Quantities
  - No prices
- How can they be used to answer economic questions?

PUR Data and Economic Analysis

- Defining questions
- Refining models/assumptions
- Answering questions

Generally, PUR data must be combined with other “hard” data to answer economic questions

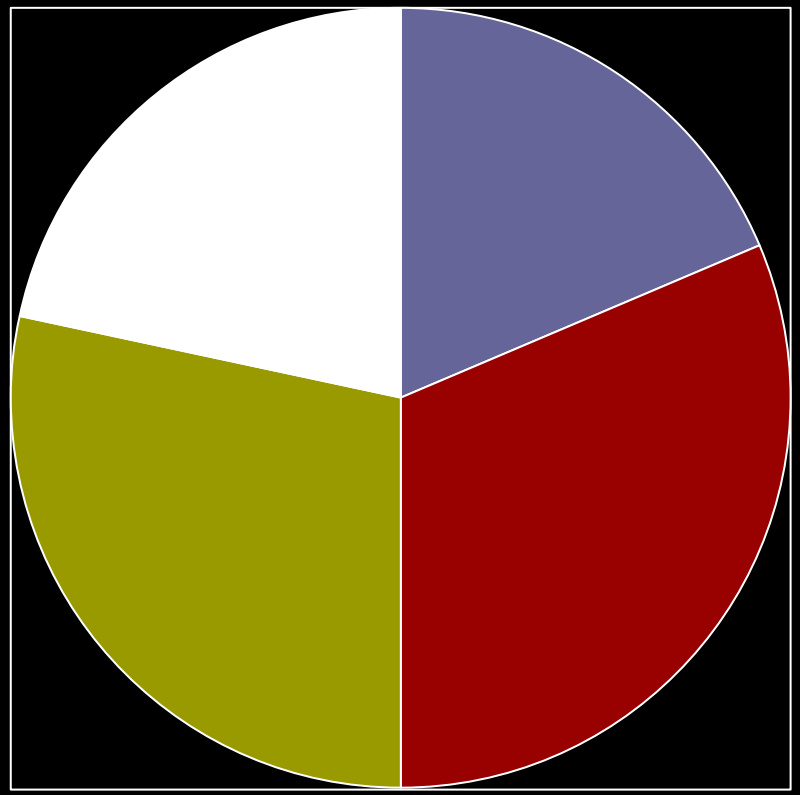
Defining a Question:

- Question: What would be the effects of a regulation requiring emulsifiable concentrate pesticides to have no more than a 20% volatile organic compound (VOC) emission potential?
  - 2005 discussion

- PUR data allow identification of key crop-pesticide pairs
- Combine with value of production, acreage data to identify economically important pairs for further analysis, estimate total value of potentially affected production

http://www.agecon.ucdavis.edu/outreach/update_articles/v8n4_1.pdf

Use of Emulsifiable Concentrate Pesticides with VOC Emission Potentials Greater than 20%: 2003



- Intensive Use, Single Active Ingredient 18.4%
- Intensive Use, All Affected Ecs 31.2%
- Any Affected EC Use 28.1%
- No Affected EC Use 21.6%

Refining a Model

- Acreage allocation model of California agriculture
  - Disaggregated production regions
  - Crops/crop groups
- Available California Agricultural Statistics Service, County Agricultural Commissioner data not always sufficiently disaggregated
- PUR data *can* help (caveats)
  - Example: carrots in the San Joaquin Valley

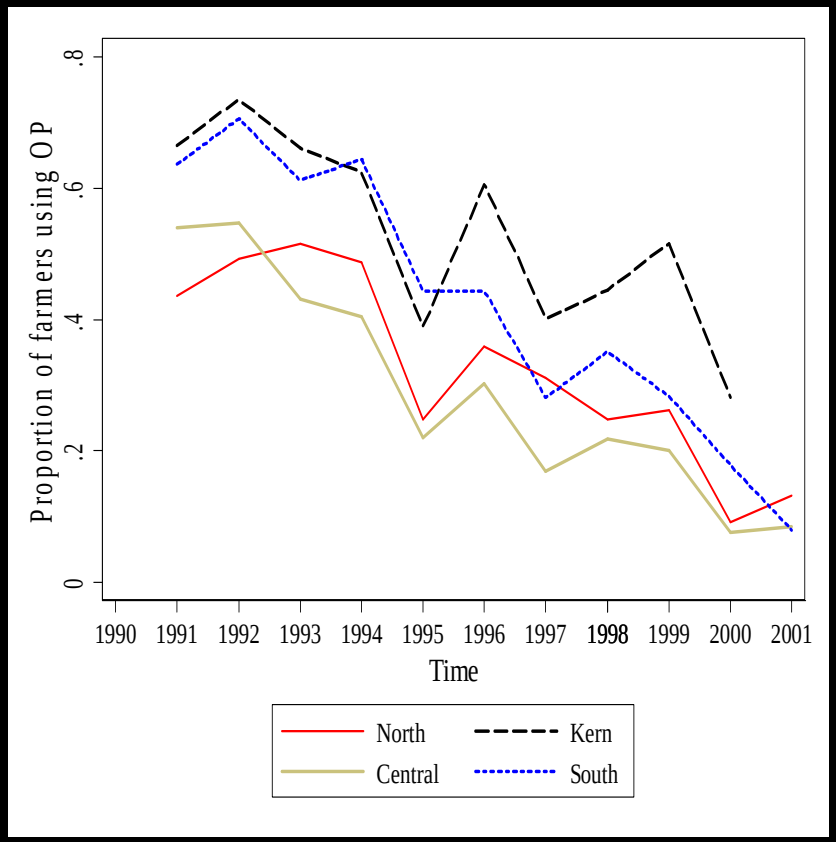
Refining a Model

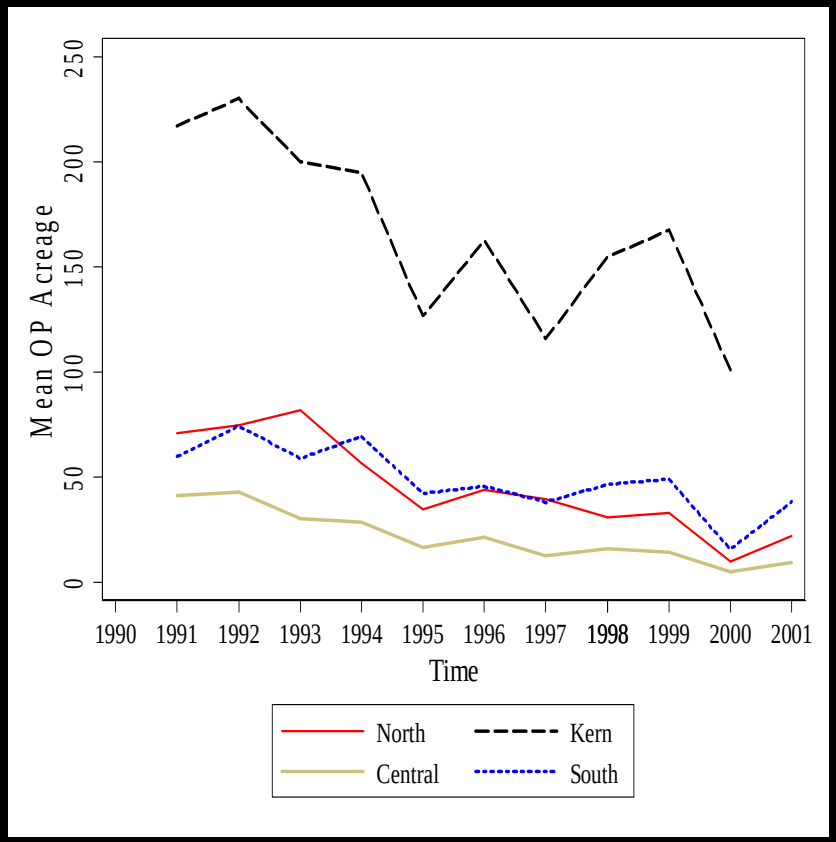
- Heterogeneity across regions may affect model outcomes
- PUR data can aid in identifying and incorporating regional, crop differences
  - Example: effects on VOC emissions of changes in acreage due to changes in fumigant application methods
    - Which fumigants are used by which crops in a region?
    - Do fumigant choices for a given crop vary across regions?
    - Target important uses for further investigation

Answering a Question

- Downward trend in dormant season organophosphate (OP) use in almonds
  - Zhang, Wilhoit, Ross and Geiger (2002)
  - Why?
- Do grower education programs influence pest management decisions?
- Biologically Integrated Orchard Systems (BIOS) program

Trends in OP Use: Share of Farmers and Average Acreage By Region, 1991 to 2001





Did BIOS Reduce OP Use in Almonds?

- Combine grower-level PUR data on use of dormant season OPs and alternatives with
  - weather data,
  - data on prices, production and other economic variables (e.g. inventory).
- At the county level, a BIOS project reduced pesticide use during and after the program
- Effects of other variables generally consistent with theoretical predictions

http://www.agecon.ucdavis.edu/outreach/update_articles/v7n5_4.pdf

Determinants of a Grower Choosing to Use Any OPs

	Coefficient	Standard Error	*Marginal Effects*
Education (Bios)	-1.17054	(3.55)***	-0.23192
OP Price (t-1)	0.2192	(14.11)***	-0.07222
Pyrethroid Price (t-1)	0.02307	(4.64)***	0.00760
Farm Size	0.00019	(6.79)***	0.00006
Weather (Rain inches)	-0.00068	(2.71)***	-0.00022
Percent Culls (t-1)	0.01361	(2.34)**	0.00448
Japan Exports (t-1)	3.89903	(4.98)***	1.28449
Begin. Inventory	0.00290	(10.81)***	0.00095
Almond Production	-0.00220	(6.77)***	-0.00073
Kern	0.58131	(10.37)***	0.21422
Central	-0.14126	(3.91)***	-0.04719
South	0.25176	(5.59)***	0.08732
Trend	-0.00616	(1.35)	-0.00203
Constant	-0.51938	(3.69)***	

Summary

- PUR data can be a valuable component of economic analysis at many stages
  - Defining research questions
  - Refining models and assumptions
  - Answering questions
- Data are particularly useful when integrated with data on prices and other economic variables
- Predict more use of PUR data by economists

Challenges

- PUR “ins and outs”
- Linking PUR data and economic data
  - Specialty crops
    - Strawberries vs. sweet potatoes
- Outside information (best alternatives)
  - Input from other disciplines, including analyses using PUR data
- Aggregate economic significance versus significance for small individual crops