

EDS 241 Assignment 4

Mia Forsline

3/11/2022

Introduction

We plan to estimate the price elasticity of demand for fresh sardines across 56 points in 4 European countries. We will use monthly data from 2013 - 2019.

Data description

Variables include:

- `country`
- `port`: where the fish is landed and sold
- `year`
- `month`
- `price_euro_kg`: price per kg in Euros
- `volume_sold_kg`: quantity of sardines sold in kg
- `wind_m_s`

Set up

Read in the data

```
data <- read_csv(here("data", "EU_sardines.csv"))

data_clean <- data %>%
  clean_names() %>%
  mutate(year = as.factor(year),
         month = as.factor(month),
         price_euro_kg = as.numeric(price_euro_kg),
         volume_sold_kg = as.numeric(volume_sold_kg),
         wind_m_s = as.numeric(wind_m_s)
  )
```

(a) Estimate a bivariate regression of $\log(\text{volume_sold_kg})$ on $\log(\text{price_euro_kg})$. What is the price elasticity of demand for sardines? Test the null hypothesis that the price elasticity is equal to -1.

```
data_log <- data_clean %>%
  mutate(volume_log = log(volume_sold_kg),
         price_log = log(price_euro_kg))

mdl <- lm_robust(price_log ~ volume_log, data = data_log)
```

Text

Table 1 shows the results of a bivariate regression of log-transformed volume sold and log-transformed price per kg of fresh sardines across 56 ports in 4 European countries from 2013 - 2019.

Table 1: Sardine volume significantly impacts price in Europe

<i>Dependent variable:</i>	
	Log(Price)
Log(Volume)	-0.068*** (0.003)
Observations	3,988
R ²	0.104
<i>Note:</i> *p<0.1; **p<0.05; ***p<0.01	

(b) Like in Lecture 8 (see the IV.R script), we will use `wind_m_s` as an instrument for `log(price_euro_kg)`. To begin, estimate the first-stage regression relating `log(price_euro_kg)` to `wind_m_s`. Interpret the estimated coefficient on wind speed. Does it have the expected sign? Also test for the relevance of the instrument and whether it is a “weak” instrument by reporting the proper F-statistic.

(c) Estimate the TSLS estimator of the price elasticity of demand for sardines using `wind_m_s` as an instrument for `log(price_euro_kg)`. What is the estimated price elasticity of demand for sardines?

(d) Repeat the exercise in (c), but include fixed effects for each year, month, and country. [Hint: you can use the command “`as.factor(country) + as.factor(year) + as.factor(month)`” to the `ivreg` function in R]. Report the estimated price elasticity of demand and the F-statistic testing for relevant and non-weak instruments.