

# Giffen Behavior

Jiaming Mao

Xiamen University

Copyright © 2014–2017, by Jiaming Mao

This version: Fall 2017

Contact: [jmao@xmu.edu.cn](mailto:jmao@xmu.edu.cn)

Course homepage: [jiamingmao.github.io/principles-of-economics](http://jiamingmao.github.io/principles-of-economics)



All materials are licensed under the [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).

# Law of Demand

- **Law of Demand:** as the price of a good increases, consumers' demand for that good should decrease.
  - ▶ Based on observation, not in theory.
- In theory, individuals may display **upward-sloping demand** in some cases.

# Giffen Behavior

- One case in which the law of demand *may* not apply is when poor consumers face price increase of inferior goods that are essential to them but have no close substitutes.
  - ▶ If they end up buying more of these goods, they are said to exhibit **Giffen behavior** and such goods are called **Giffen goods**.

## Giffen Behavior: Textbook Example

- A rise in the price of bread can make poor families even poorer, forcing them to curtail their consumption of meat. If bread remains the cheapest food they can get, they would consume more, not less, bread.
  - ▶ Attributed to [Sir Robert Giffen](#) by [Alfred Marshall](#) in *Principles of Economics*, 3rd (1895) ed.
- During the [Irish Potato Famine of 1845-1849](#), as the price of potatoes rose, poor families had to consume more potatoes because they could no longer afford meat and other unnecessary luxuries.
  - ▶ [Paul Samuelson](#), *Economics*, 6th (1964) ed.
- No verified empirical evidence for these examples.

# Giffen Behavior: In Theory

- Consider a poor consumer near subsistence whose diet consists of:
  - ▶ Basic staple food: bread, rice, noodle
    - ★ High calories per unit currency
  - ▶ “fancy” food: meat
    - ★ Low calories per unit currency (but tastes good)
- $P$  (staple food)  $\uparrow \rightarrow$  consumer cannot afford fancy food anymore and has to increase staple food consumption to maintain calorie intake.
  - ▶ Price increase makes the consumer poorer in real terms.
  - ▶ Income effect dominates substitution effect in this case.

# Giffen Behavior: In Theory

## Conditions for Giffen behavior:

- 1 Households are poor so that they can only afford a simple diet that includes a basic staple food and a fancy food.
- 2 The staple food is strongly inferior.
- 3 The staple food comprises a large part of the household's budget, and has no substitute.
- 4 Households cannot be so impoverished that they consume only the staple food.

# Giffen Behavior: In Theory

- Giffen behavior should not be expected at a market level, while it may appear in certain subsets of households:
  - ▶ Normal-
  - ▶ **Subsistence**
  - ▶ Calorie-deprived



# Field Experiment

- Provide randomly selected poor households in two Chinese provinces with price subsidies for staple foods.
  - ▶ Hunan: rice
  - ▶ Gansu: wheat (mo 馍 or noodles)
- Households were randomly selected from those living under the *Di Bao* (低保) poverty line (approximately 100-200 yuan per person per month, or \$.41-\$.82 per person per day).
  - ▶ Below the [World Bank poverty line](#) (\$1.25/person/day)
  - ▶ 90 million individuals lived below the *Di Bao* threshold in China (2007 estimate).

# Field Experiment

- The Experiment was conducted by [Robert Jensen](#) and [Nolan Miller](#) in 2006 and lasted for 5 months.
  - ▶ Sample size: 1,300 households, 3,661 individuals
- Households were given subsidies of .10, .20 or .30 yuan per *jin* (500 g) of the staple good.
  - ▶ Average rice price in Hunan: 1.2 yuan/*jin*; wheat flour in Gansu: 1.04 yuan/*jin*
- Each households received vouchers that average 750g/person/day (twice the average consumption).

TABLE 2—DAILY CONSUMPTION PER CAPITA AND CALORIE SHARES FOR FOOD CATEGORIES

|                       | <i>Hunan</i>     |                  | <i>Gansu</i>     |                 |
|-----------------------|------------------|------------------|------------------|-----------------|
|                       | Consumption (g)  | Calorie share    | Consumption (g)  | Calorie share   |
| Rice                  | 330<br>[125.4]   | 0.64<br>[0.17]   | 35<br>[69.5]     | 0.07<br>[0.13]  |
| Wheat                 | 42<br>[60.2]     | 0.08<br>[0.12]   | 344<br>[134.3]   | 0.69<br>[0.17]  |
| Other cereals         | 1.5<br>[21.3]    | 0.00<br>[0.022]  | 4.2<br>[24.2]    | 0.01<br>[0.050] |
| Vegetables and fruit  | 341<br>[194.6]   | 0.05<br>[0.044]  | 232<br>[141.6]   | 0.07<br>[0.045] |
| Meat (including eggs) | 47<br>[68.6]     | 0.07<br>[0.11]   | 13<br>[30.1]     | 0.01<br>[0.037] |
| Pulses                | 62<br>[102.3]    | 0.02<br>[0.043]  | 36<br>[68.1]     | 0.02<br>[0.056] |
| Dairy                 | 1<br>[7.4]       | 0.00<br>[0.0031] | 19<br>[56.6]     | 0.01<br>[0.039] |
| Fats                  | 26<br>[20.4]     | 0.13<br>[0.095]  | 23<br>[16.3]     | 0.13<br>[0.090] |
| Calories              | 1,805<br>[591.7] | —                | 1,710<br>[517.4] | —               |
| Observations          | 644              | 644              | 649              | 649             |

Jensen and Miller (2008)

- In analyzing the results, households are classified by their **Initial Staple Calorie Share (ISCS)**.
  - ▶ ISCS high but not too high: subsistence level
  - ▶ ISCS very high: calorie-deprived level
  - ▶ According to theory, Giffen behavior is most likely to be observed among the former group.

TABLE 3—CONSUMPTION RESPONSE TO THE PRICE SUBSIDY: HUNAN

|                | <i>Dependent variable: Rice</i> |                     |                     |                     |                    |                     | <i>Dependent variable: Meat</i> |                                      |                               |
|----------------|---------------------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------------------|--------------------------------------|-------------------------------|
|                | Full sample<br>(1)              | Full sample<br>(2)  | ISCS ≤0.80<br>(3)   | ISCS ≤0.80<br>(4)   | ISCS >0.80<br>(5)  | ISCS >0.80<br>(6)   | ISCS<br>0.60–0.80<br>(7)        | Initial intake<br>Full sample<br>(8) | Initial intake<br>>50g<br>(9) |
| %ΔPrice(rice)  | 0.224<br>(0.149)                | 0.235*<br>(0.140)   | 0.451***<br>(0.170) | 0.466***<br>(0.159) | -0.61**<br>(0.296) | -0.585**<br>(0.262) | 0.640***<br>(0.192)             | -0.325<br>(0.472)                    | -1.125*<br>(0.625)            |
| %Δ Earned      |                                 | 0.043***<br>(0.014) |                     | 0.047***<br>(0.016) |                    | 0.024<br>(0.023)    | 0.030<br>(0.019)                | 0.028<br>(0.050)                     | 0.105<br>(0.069)              |
| %ΔUnearned     |                                 | -0.044*<br>(0.025)  |                     | -0.038<br>(0.030)   |                    | -0.058<br>(0.049)   | -0.053*<br>(0.030)              | 0.061<br>(0.079)                     | 0.084<br>(0.104)              |
| %ΔPeople       |                                 | 0.89***<br>(0.08)   |                     | 0.83***<br>(0.09)   |                    | 1.16***<br>(0.15)   | 0.79***<br>(0.14)               | -0.08<br>(0.27)                      | 0.03<br>(0.36)                |
| Constant       |                                 | 4.1***<br>(1.0)     |                     | 5.7***<br>(1.1)     |                    | -1.8<br>(1.7)       | 0.8<br>(1.3)                    | -12.3***<br>(3.1)                    | -49.0***<br>(3.7)             |
| Observations   | 1,258                           | 1,258               | 997                 | 997                 | 261                | 261                 | 513                             | 997                                  | 452                           |
| R <sup>2</sup> | 0.08                            | 0.19                | 0.09                | 0.20                | 0.15               | 0.33                | 0.24                            | 0.09                                 | 0.28                          |

*Notes:* Regressions include *County\*Time* fixed effects. The dependent variable in columns 1–7 is the arc percent change in household rice consumption, and in columns 8–9 it is the arc percent change in household meat consumption. Standard errors clustered at the household level. %ΔPrice(rice) is the change in the subsidy, measured as a percentage of the average price of rice; %ΔEarned is the arc percent change in the household earnings from work; %ΔUnearned is the arc percent change in the household income from unearned sources (government payments, pensions, remittances, rent, and interest from assets); %ΔPeople is the arc percent change in the number of people living in the household. ISCS (Initial Staple Calorie Share) refers to the share of calories consumed as rice in the preintervention period. \*Significant at 10 percent level. \*\*Significant at 5 percent level. \*\*\*Significant at 1 percent level.

Jensen and Miller (2008)

## Results: Hunan

- Strong evidence of Giffen behavior.
- Breaking down households by ISCS shows that Giffen behavior is observed only on those households under subsistence conditions (less than 80% of the calories from the staple).
- Households that are too poor (level of calorie share in staple consumption  $> 80\%$ ) show a non-Giffen behavior.
- The increase in the price of the staple food has another effect: consumers at subsistence levels will consume less of the fancy food (i.e. meat).

TABLE 6—CONSUMPTION RESPONSE TO THE SUBSIDY: GANSU

|                | Full sample<br>(1) | ≤0.70<br>(2)      | >0.70<br>(3)        | ≤0.55<br>(4)      | ≤0.60<br>(5)      | ≤0.65<br>(6)      | ≤0.75<br>(7)        | ≤0.80<br>(8)       | ≤0.85<br>(9)       | ≤0.90<br>(10)       | 0.40–0.60<br>(11) | >50g<br>meat<br>(12) | <50g<br>Substitute<br>wheat<br>(13) |
|----------------|--------------------|-------------------|---------------------|-------------------|-------------------|-------------------|---------------------|--------------------|--------------------|---------------------|-------------------|----------------------|-------------------------------------|
| %ΔPrice(wheat) | -0.353<br>(0.258)  | 0.024<br>(0.366)  | -0.825**<br>(0.357) | -0.245<br>(0.453) | 0.309<br>(0.452)  | 0.128<br>(0.414)  | 0.009<br>(0.326)    | -0.280<br>(0.302)  | -0.321<br>(0.283)  | -0.356<br>(0.268)   | 1.065*<br>(0.557) | 1.327*<br>(0.701)    | 1.106*<br>(0.566)                   |
| %Δ Earned      | 0.079**<br>(0.036) | 0.098*<br>(0.052) | 0.041<br>(0.049)    | -0.048<br>(0.065) | 0.023<br>(0.062)  | 0.064<br>(0.057)  | 0.124***<br>(0.045) | 0.107**<br>(0.042) | 0.100**<br>(0.040) | 0.103***<br>(0.038) | 0.063<br>(0.074)  | 0.139*<br>(0.076)    | 0.156*<br>(0.080)                   |
| %ΔUnearned     | -0.017<br>(0.092)  | -0.048<br>(0.129) | 0.035<br>(0.127)    | 0.023<br>(0.189)  | 0.045<br>(0.173)  | -0.007<br>(0.141) | 0.005<br>(0.112)    | 0.063<br>(0.105)   | 0.034<br>(0.102)   | 0.009<br>(0.093)    | 0.189<br>(0.181)  | 0.059<br>(0.147)     | -0.056<br>(0.172)                   |
| %ΔPeople       | 0.58***<br>(0.22)  | 0.34<br>(0.30)    | 0.80***<br>(0.25)   | 0.18<br>(0.41)    | 0.25<br>(0.34)    | 0.24<br>(0.32)    | 0.40<br>(0.27)      | 0.42*<br>(0.25)    | 0.42*<br>(0.23)    | 0.53**<br>(0.22)    | 0.11<br>(0.32)    | 1.70***<br>(0.23)    | 0.45<br>(0.29)                      |
| Constant       | -26.1***<br>(2.3)  | -20.8***<br>(3.3) | -32.8***<br>(2.9)   | -18.7***<br>(4.5) | -19.5***<br>(4.1) | -20.3***<br>(3.7) | -22.9***<br>(3.0)   | -23.3***<br>(2.7)  | -25.8***<br>(2.6)  | -25.7***<br>(2.4)   | -31.6***<br>(4.4) | 0.82<br>(5.1)        | -26.8***<br>(5.5)                   |
| Observations   | 1269               | 687               | 582                 | 406               | 478               | 563               | 843                 | 995                | 1107               | 1199                | 266               | 107                  | 247                                 |
| R <sup>2</sup> | 0.08               | 0.11              | 0.09                | 0.17              | 0.14              | 0.12              | 0.09                | 0.10               | 0.08               | 0.08                | 0.24              | 0.33                 | 0.22                                |

Notes: Regressions include *County\*Time* fixed effects. The dependent variable is the arc percent change in household wheat consumption. Standard errors clustered at the household level. %ΔPrice(wheat) is the change in the subsidy, measured as a percentage of the average price of wheat; %ΔEarned is the arc percent change in the household earnings from work; %ΔUnearned is the arc percent change in the household income from unearned sources (government payments, pensions, remittances, rent, and interest from assets); %ΔPeople is the arc percent change in the number of people living in the household. Substitute wheat refers to consumption of wheat-based foods such as noodles or bread that are purchased in a prepared form, rather than made at home from wheat flour. \*Significant at 10 percent level. \*\*Significant at 5 percent level. \*\*\*Significant at 1 percent level.

Jensen and Miller (2008)

## Results: Gansu

- For the whole sample, no evidence of Giffen behavior.
- Across different calories shares there is evidence of Giffen behavior, however, results are not very robust or statistically significant.
- Results are less compelling than the case of Hunan. It might be related to the existence of substitutes (pulses) and lower consumption level of the fancy food (meat).

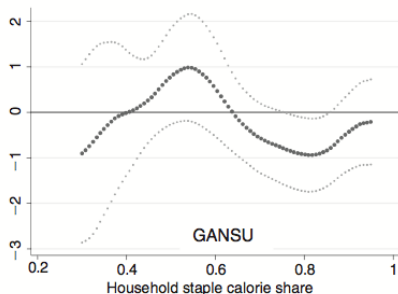
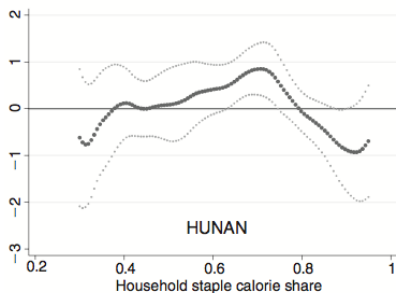


## Results: Gansu

- To adjust the analysis, the researchers focus on households that have an important consumption level of the fancy food (at least 50 grams of meat per person in the initial period).
- Sample reduces considerably. However, there is significant evidence of Giffen behavior among these households: 1% increase in price  $\Rightarrow$  1.3% increases consumption of wheat.

## Behavioral Results

- Let  $y$  = how much people increase their consumption of staple food when price increases.
- Theory predicts an inverted-U shaped  $y$  as a function of staple consumption share.



Jensen and Miller (2008)

# Policy Implications

- Many countries use food subsidies to help the poor with the consumption of basic food and nutrition.
  - ▶ It is typically assumed that providing food subsidies is a more effective way to increase the poor's calorie and nutrition intake than giving cash.
- However, the poor may choose to consume less, not more, basic food when the price of these food is subsidized.
  - ▶ In Hunan, nutrition intake declined in response to the subsidy.
  - ▶ In Gansu, there was little effect on nutrition intake.
- As a result, food subsidies *may* not improve the poor's nutrition.

# Reference



Jensen, R. T. and N. H. Miller. 2008. "Giffen Behavior and Subsistence Consumption," *American Economic Review*, 98(4).