



Cornell University

The Economics of Obesity

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Usefulness of Economics in Studying Obesity

- Offers widely-accepted theoretical framework for human behavior (constrained maximization)
 - We ask different questions, generate different predictions
- Offers clearly-defined rationales for policy intervention
 - Fix market failures
- Offers useful methods
 - Calculating consequences
 - Determining what works when randomized experiments not feasible: instrumental variables, regression discontinuity
 - Determining what works *best*: Cost-effectiveness analysis

Brief Outline

1. Description of the economic perspective on consumer decision-making
2. Economic rationales for government intervention
3. Effectiveness and cost-effectiveness of anti-obesity policies and interventions
4. New Yorkers' willingness to pay higher taxes to reduce childhood obesity

Economic Framework

- Individuals assumed to maximize their utility (happiness), which is a function of:
 - How they allocate their time
 - Foods consumed
 - Weight; not chosen directly - affected by foods, allocation of time
 - Health; not chosen directly - affected by foods, allocation of time
 - Consumption of all other (non-food) goods
- Preferences influenced by genetics
 - Fats and sugars taste good

Economic Framework

- If resources were limitless,
 - Everyone would be at their ideal weight
 - Everyone would maximize health, lifespan
- But people are constrained
 - Budget constraint: can't afford everything
 - Time constraint: only 24 hours in the day
 - Biology: higher net intake of calories raises weight

Economic Framework

- Those constraints force tradeoffs
 - People trade off health to have other things, to extent it raises their utility
 - Money: must decide between cheap food and more of other goods, or expensive food and less of other goods
 - Time: must decide between work and recreational exercise
 - Biology: “moment on the lips vs. lifetime on the hips...”

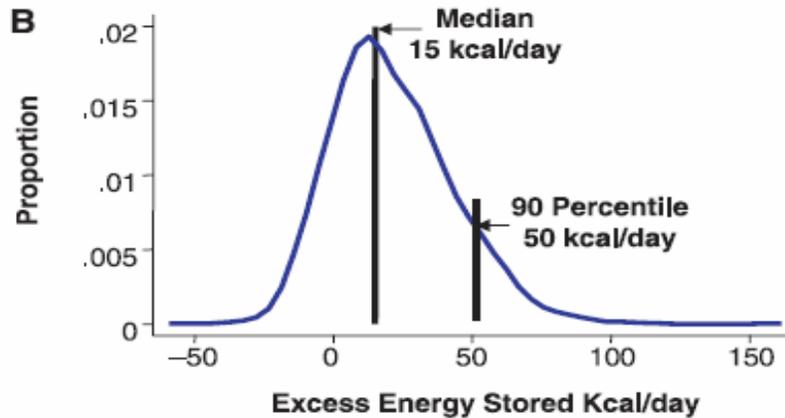
Economic Framework

- Individuals choose to allocate their time and money so as to maximize their utility (happiness) subject to their (financial / time / biological) constraints
- Solution: allocate money and time such that:
 - Last dollar rule: last dollar spent on each good yields equal increment of happiness
 - Last hour rule: last hour spent on each activity yields equal increment of happiness

Implications

- Recent rise in obesity due to changing prices, enjoyment, or constraints:
 - Lakdawalla and Philipson (2002): 40% of recent rise in weight due to lower food prices
 - Cutler et al. (2003): tech change made preserved packaged snacks cheaper, more enjoyable
 - Anderson et al. (2003): increased maternal employment contributes to youth obesity (among high-SES)
 - Chou et al. (2004): higher cigarette prices explain 20% of rise in obesity
 - Fertig, Glomm, and Tchernis (2006): maternal employment raises risk of childhood obesity by increasing TV watching, decreasing # meals
 - Cawley et al. (2007): income does not affect probability of obesity in the elderly
- However, we may never know what caused rise in obesity because it's due to very few extra daily calories

Small Daily Caloric Surplus Caused the Increase in Obesity



Source: Hill et al. (2003) *Science*

Contrast Economics and Public Health

- Public health concerns how people *should* behave in order to maximize health, longevity
- Economics studies how people *actually* behave when trying to maximize utility
- Big differences:
 - Normative vs. positive statements
 - Health vs. happiness as people's goal
 - Paternalism vs. assumption of rationality

Calculating Consequences of Obesity

- By exploiting “natural experiments” economists have been able to estimate causal impact of obesity on outcomes
 - Obesity lowers wages of white females, smaller decrease for other females, no decrease for males (Cawley, 2004)
 - Cannot reject null of no effect of obesity on disability (Cawley, 2000)
 - Obesity lowers probability of employment (Morris, 2006)
- By experimentally varying people’s appearance, document 20% fewer job interviews for obese applicants (Rooth, 2007)

Economic View: Intervene Only in Cases of Market Failure

- Provide public goods
 - e.g. supply information if lacking
- Consumer protection
 - e.g. ban deceptive advertising
- Protect consumers if failures of rationality
 - e.g. children
- Internalize external costs and benefits
 - e.g. tax good if its use harms others

Deceptive Advertising for Weight-Loss Products

- Majority of magazine ads for weight-loss products make at least one statement the FTC considers “facially false” (a red flag); Cawley et al. (2007)
- These ads predominantly appear in women’s magazines
- Estimated effect of FTC request that magazine publishers screen ads for “red flags”:
 - Decreased # of deceptive statements per ad
 - But large increase in # ads implies overall exposure to deceptive advertising for weight loss products increased

“Red Flag” deceptive statements as defined by FTC

LOSE UP TO 2 POUNDS DAILY... WITHOUT DIET OR EXERCISE

"I LOST 44 POUNDS IN 30 DAYS"

"HERE'S THE STORY OF MY LAST DIET"

NEW! EXTRA STRENGTH APPLE PECTIN

BEFORE

AFTER

A WINNING COMBINATION WITH APPLE PECTIN TO LOSE WEIGHT FOREVER

"I LOST 4 INCHES FROM MY OVERALL MEASUREMENTS IN 28 DAYS"

"I LOST 30 POUNDS IN 28 DAYS FOR MY WEDDING"

"I LOST 28 DAYS"

THE EFFECTS OF THE APPLE PECTIN FAT BLOCKER ARE POWERFUL

- Apple Pectin is an emulsified enzyme that can digest up to 500 times its own weight in fat. That's why it's a BARRIERS FAT BLOCKER.
- Apple Pectin attacks fat 24 hours a day, everyday. It's dissolved and expelled through your system day after day to eliminate unwanted bulges.
- The Quick Slim Fat Blocker is 100% natural. Forget about prescriptions. In no way can Apple Pectin harm your health, there's absolutely no side effects.
- The Quick Slim Fat Blocker stimulates fat metabolism weight loss. Some results are:
 - + Jogging 10 miles per week, 40 hours of aerobics per day, +15 hours of swimming or cycling per week.

EMAIL ORDERS: www.quickslimdiets.com

THE EFFECTS OF THE APPLE PECTIN FAT BLOCKER ARE POWERFUL

Yes, I want to lose weight and it's guaranteed!

ORDER 24 HOURS A DAY 1-888-980-DIET (3428)

TREATMENT	STARTS	PRICE	TOTAL
TRIAL 14 DAY	14 days	\$29.95	\$29.95
SAVE 50%	30 days	\$49.95	\$24.98
SAVE 50%	60 days	\$89.95	\$44.98
SAVE 50%	90 days	\$129.95	\$64.98
SAVE 50%	120 days	\$169.95	\$84.98

ADD \$5 shipping & handling \$ 5.00

ADD \$5 for express delivery service \$ 5.00

TOTAL COST

Financial Impact of Obesity

- Adults: direct medical costs = \$92.6 billion (2002 \$) or 9.1% of U. S. National Health Expenditures; Finkelstein et al. (2003)
 - Externalities: half of obesity-related medical expenditures paid by Medicare and Medicaid; Finkelstein et al. (2003)
- Children: direct medical costs = \$124 million; Johnson et al. (2006)
 - But obese children are more likely to become obese adults, so there are long-run medical costs of childhood overweight

Taxes / Subsidies to “Internalize” Externalities

- Politically unattractive to tax body weight
- Can and do subsidize physical activity
 - Unclear extent to which activity is elastic to ease, cost (*Transportation Research Board, 2005*)
- Could tax/subsidize certain foods:
 - Consumption of specific foods is sensitive to price; French and others
 - Food taxes would be regressive
 - How do you define the foods that should be subsidized or taxed?
 - Should diet soda be subsidized or taxed?
 - Should avocados and coconuts (high fat) be subsidized or taxed?

Measuring Effectiveness of Interventions

- More time in physical education increases minutes of physical activity but has no impact on weight or obesity (Cawley et al., 2007)
- Currently evaluating the impact of two school-based anti-obesity programs:
 - Health Corps (NYC) – quasi-randomized design
 - Healthy Schools (nationwide)

Cost Effectiveness

- There are many possible ways to prevent or treat obesity
 - how should policymakers choose between them?
- To make society as well off as possible, choose those that are most cost-effective
 - Provides the greatest benefit for a given budget (most “bang for the buck”)
 - Economic method used by governments to assess policies
- Cost-effectiveness of most anti-obesity interventions has not been assessed
 - Research still at earlier stage: does it have any benefit at all?
 - More sophisticated (and useful) question: what is the cost per unit of benefit? Allows one to compare interventions
 - Unclear whether most cost-effective solution will prove to be prevention or treatment

Cost Effectiveness of Anti-Obesity Interventions

Intervention	Target Population	Estimated cost / QALY	Reference
Planet Health (a school-based intervention to improve nutrition and increase physical activity)	Middle-school children	\$4,305 for females Not effective for males	Wang et al. <i>Obesity Research</i> 2003
Orlistat (anti-obesity drug)	Overweight and obese patients with diabetes	\$8,327	Maetzel et al. <i>Pharmacoeconomics</i> 2003
Bariatric surgery	Middle-aged men and women who are morbidly obese	\$5,400 to \$16,100 for women \$10,700 to \$35,600 for men	Craig and Tseng <i>American Journal of Medicine</i> 2003
Diet, exercise, and behavior modification	Adult women	\$12,640	Roux et al. <i>Obesity</i> 2006

New Yorkers' Support for Anti-Obesity Policies

- Little is known about public's support for policies to reduce childhood obesity, especially if they come at cost of higher taxes
- To fill this gap, I surveyed NYS residents on their:
 - Perceptions of childhood obesity
 - Support for specific policies
 - Willingness to pay higher taxes to reduce childhood obesity

Data: Empire State Poll 2006

- Survey of adults (18+) living in NYS
- Conducted annually by Survey Research Institute at Cornell University
- Sampled using random digit dialing (includes cell phone numbers); every household in NYS has equal probability of being included in poll
- 2006 survey took place Feb 2 – March 19
 - Computer Assisted Telephone Interviewing
 - 800 respondents
 - Only 5% chance that random variations in sample cause the results to vary by more than 3.5 percentage points
- Sample weights used so results generalize to NYS residents as a whole

Youth Obesity a Problem In U.S.?

Based on what you know or have heard, do you believe youth obesity in the U.S. is:

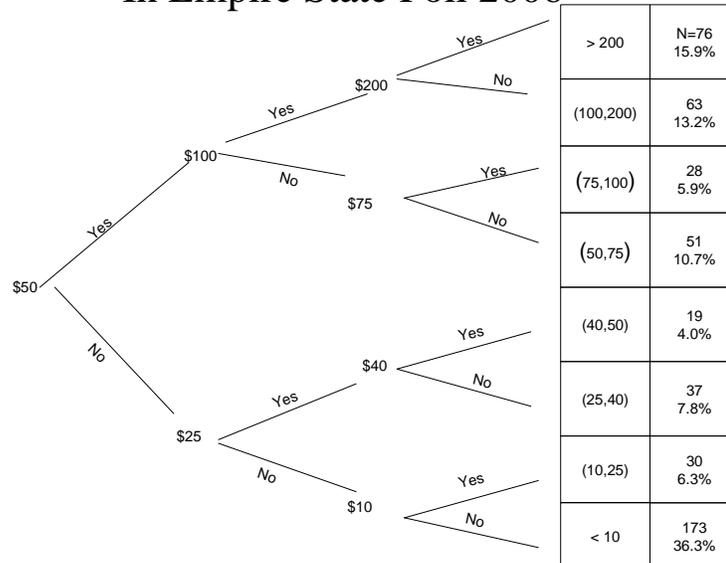
- | | |
|------------------------|-------|
| – A major problem | 81.0% |
| – A minor problem | 12.9% |
| – Not a problem at all | 3.4% |
| – Don't know / Refused | 2.8% |

Willingness to Pay Questions

Suppose there is a new voter referendum in your town. The referendum will enact policies that will reduce youth obesity in your town by 50% (set aside for now how it will reduce youth obesity, but assume it will do so with certainty). If the referendum passes, you and everyone else will have to pay \$X more in taxes every year. Given your current budget, would you vote for or against this referendum?

- FOR
- AGAINST
- WOULD NOT VOTE

Sequence of Contingent Valuation Questions In Empire State Poll 2006



Results

- WTP varies in predictable ways with observables:
 - Higher WTP if:
 - Have more children in their household
 - Have higher household income
 - Perceive childhood obesity as a major problem
 - Liberal or Democrat
 - Lower WTP if:
 - Think childhood obesity is one of the least important problems facing American youth
 - Think obesity is primarily due to individual choices or genetics
 - Disapprove of the current tax situation
 - Republican
- Mean WTP for 50% reduction in childhood obesity is \$47.25
 - Implies a total WTP by New York residents of \$692.3 million
 - Vastly exceeds associated savings to NYS of \$3.8 million



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