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# Food Marketers and Consumers: Implications of Rationality Asymmetries for Food Choice and Health

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# Food Choice and the Rational Man

? Food policy is often designed based on the idea that individuals use information efficiently

§ The consumer will use available information

§ Can weigh the various consequences of their actions

§ Gives appropriate weight to vague or narrow information

? Individuals make more than 300 food related decision each day

§ Paying close attention to each would be a waste of time

§ We naturally fall back on heuristics, habits and rules of thumb

# The Implications of Heuristic Choice

- ? Heuristics are at best approximations
  - § They are subject to serious error under the wrong conditions
  - § E.g., clean plate rule can be reasonable under some circumstances and not in others
  - § May represent misperceptions
- ? The implication
  - § The consumer makes systematic errors
  - § The consumer could be better off
    - ? Cognitive costs are prohibitive

# Some Examples

## ? All-you-can-eat

§ Pay more, eat more

§ Like it less, eat more

## ? Framing the size

§ Willing to pay more for a 12oz “regular” than a 12oz “small”

§ Leave more on their plate for a 1.5 cup “double” than a 1.5 cup “regular”

## ? Taxes and subsidies

§ Even with the same prices, “tax” draws attention to taxed foods, “subsidies” to subsidized foods

# The Role of Marketing

- ? Individuals control some of the important factors
- ? Food manufacturers, retailers and marketers control the majority of factors
- ? Hence, consumption decisions (food and amount) are the result of a game between manufacturers and consumers
  - § Consumers are not entirely aware of their behavior
  - § Marketers are!
    - ? Or maybe just behave 'as if'
- ? This is like a mechanism design problem

# Example 1: Taxing the Distracted

? The consumer problem can be represented as

$$\max_{q \in Q_s, s \in S} U = \alpha \phi u_c(x) + (1 - \alpha) u_d(q) - q(s) - p_s$$

? Where  $\alpha$  is the level of cognitive resources

§ The individual isn't aware of how their actions affect it

§ Distractions, emotions, etc.

? The variable  $s$  is an external cue that influences choice, like portion size

? The variable  $q$  is the choice variable (e.g., quantity) that influences utility (taste and health)

# Food Manufacturers/Retailers

- ? Food sellers wish to maximize profits
  - § To do this they choose the available cues ( $S$ ), prices and the available choices ( $Q_S$ )
  - § Of course sellers may respond to heuristics also
- ? I assume that over time they happen upon the profit maximizing choice sets
  - § They behave as if they know the consumer's active preferences

# A Model of Food Transactions

? The producer solves

$$\max_{q_s, \{Q_s\}, \{p_s\}, \phi} \sum_s p_s k(q_s, s, \phi)$$

subject to

$$\sum_{q \in Q_s, s \in S} U_c(q, s) - \sum_s (u_c(q, s) - q(s) - p_s)$$

? Here k is the unit for which the individual is charged

§ Package size, or quantity consumed, etc.

# Is it Always Better to be Rational?

- No
  - In some cases,  $U^* - u_c^* < 0$
  - Then being rational will lead to higher prices and reduce consumer surplus to zero
- Consumption may diverge from the cognitive optimum (ignoring price)
  - If consumers pay  $pq$ , costs are monotonic in  $q$  and  $s$  is costless ( $\sim$  denotes fully rational eq)
    - Depends on the relationship of

$$\frac{\partial U}{\partial c} ? U^* - U^{\sim} \quad u_c^* - c^* - \frac{\partial U}{\partial c}$$

# Portion Size

? As a simple example, suppose we consider the portion size problem

§ Suppose ? is quasi-fixed (can impact in the long run)

$$\max_{s,p} p - c(s)$$

? Subject to

$$\phi u_c(mq \{i s^*(n p), \}) + (\mu - \phi) m_a(-is \{n p^*(, s), \}) p > \underline{U}$$

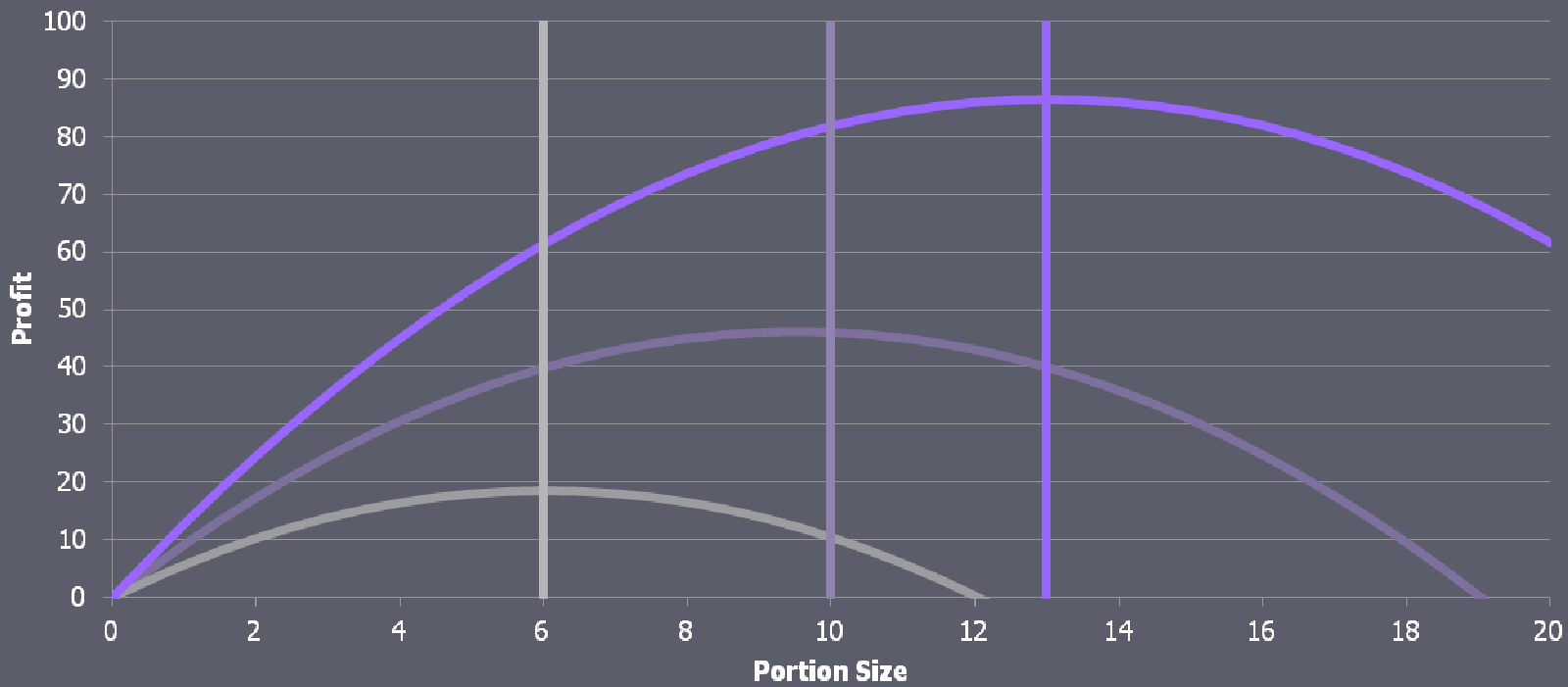
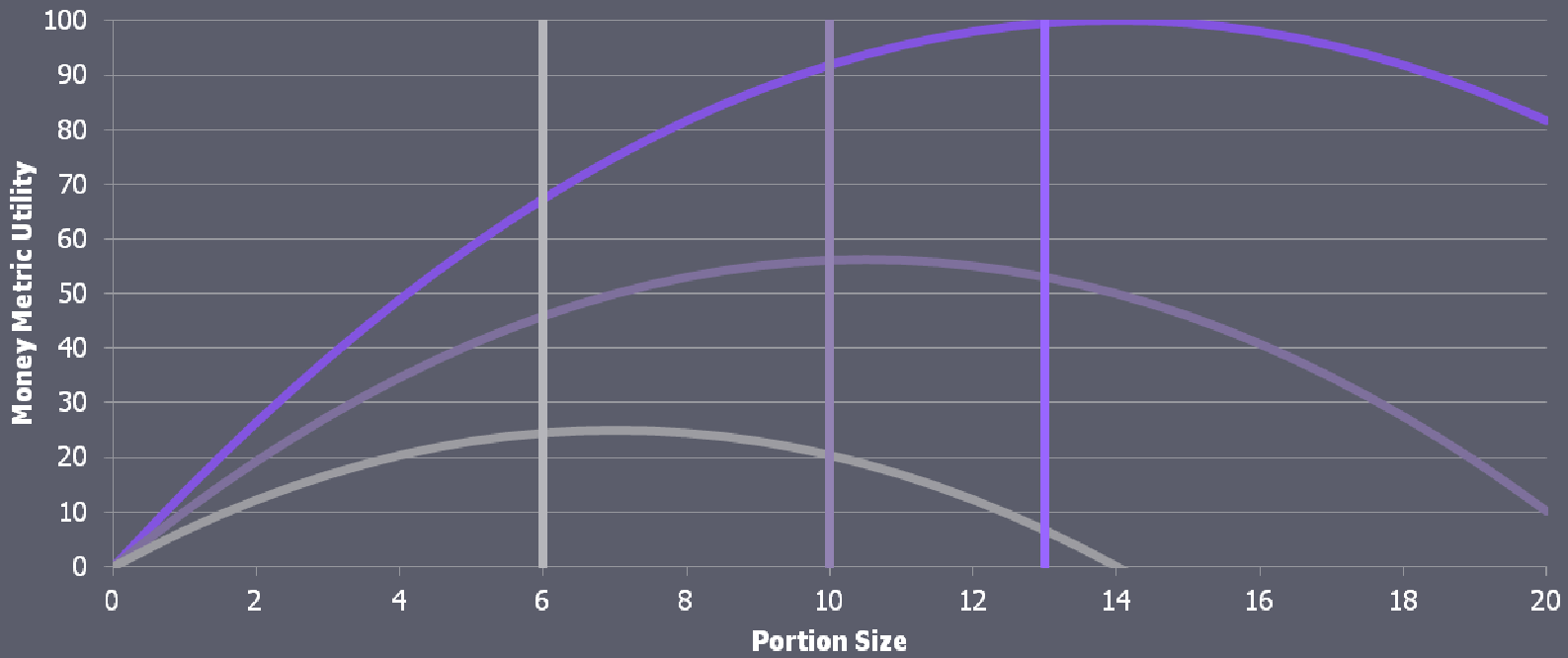
# Sin and Virtue

? This leads us to define two different types of foods

§ Virtuous  $u_c'(s) > \frac{\partial}{\partial q} s_a(\cdot | s) + \frac{\partial}{\partial s} s_a(\cdot | s)$   
(marginal affective utility lower)

§ Sinful  $u_c'(s) < \frac{\partial}{\partial q} s_a(\cdot | s) + \frac{\partial}{\partial s} s_a(\cdot | s)$   
(marginal affective utility higher)

? Consumers over consume sinful foods and under consume virtuous foods



# Taxing Size

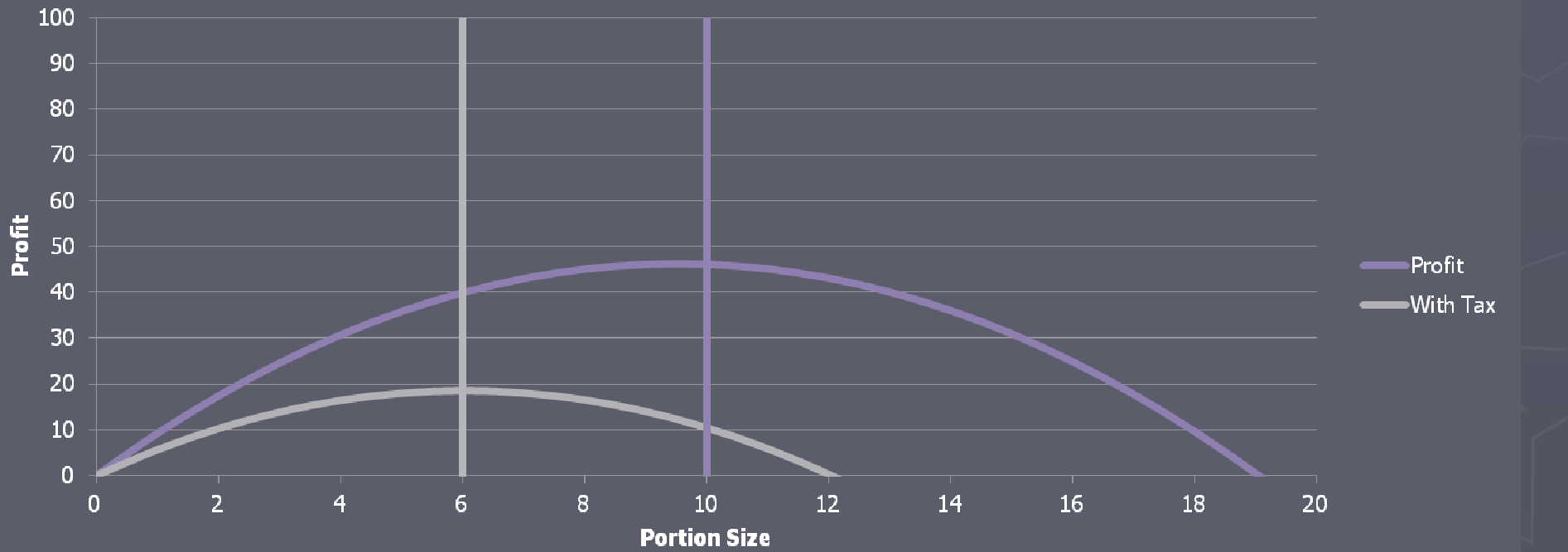
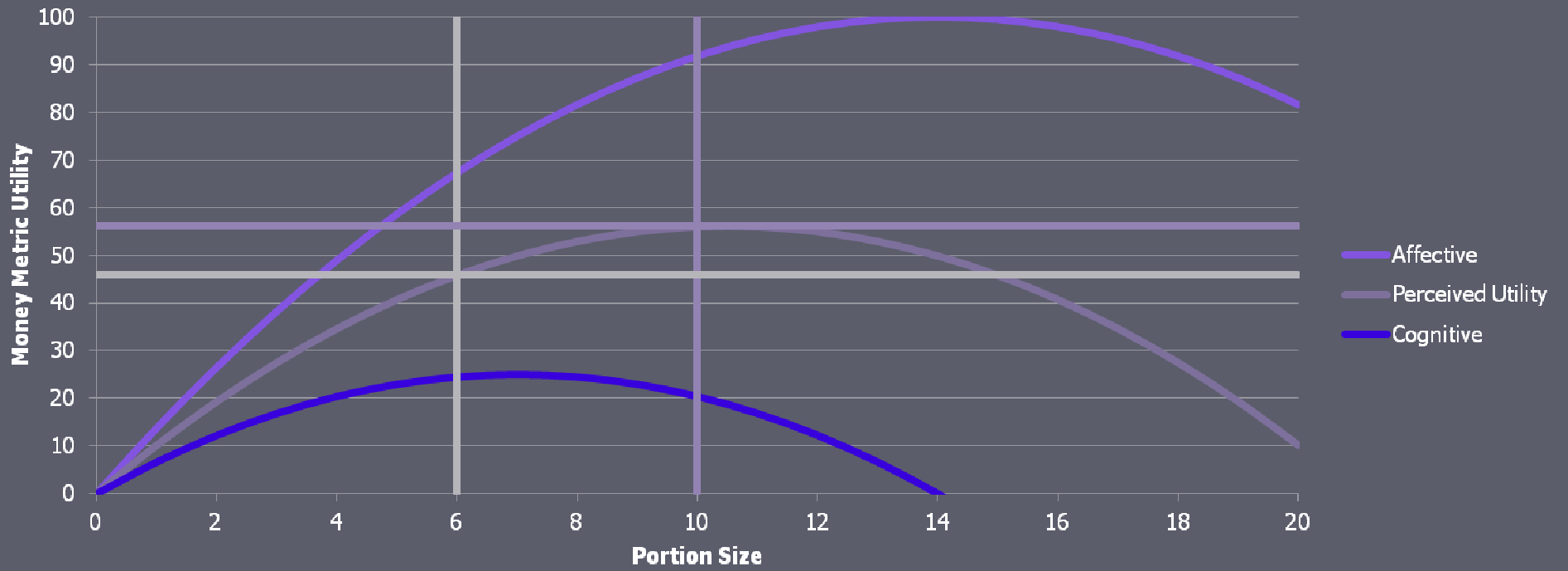
▶ The constraint now becomes

$$\phi u_c(m, \{i, s^*(n, p), s\}) + \psi(1 - \phi)m_a - \lambda(p - p^*(s, s)) - t - s > \underline{U}$$

▶ In equilibrium,  $\frac{ds}{dt} = \frac{1}{SOC} < 0$

▶ Producers lose out on profit

▶ Consumers welfare will improve if sinful,  
and  $\Delta u_c > \Delta p + ts$



# Welfare: Taxing Large Portions

- ? Producers will always perceive a loss of Profit
- ? Consumers will too if any surplus shared
  - § This will be unpopular with all involved in the transaction
- ? May or may not increase consumer welfare
  - § Depends on how sinful the food is
  - § Reactance can also either increase or decrease welfare
- ? Incentive to reduce cognitive resources persists
  - § If they can influence this at some cost, the equilibrium will be lead closer to the free market equilibrium
  - § The effect of the tax is eroded

# Welfare: Subsidizing Large Virtuous Portions

- ? Profits to the firm increase
- ? Consumers may also if surplus is shared
  - § Thus this may be a very popular program with all involved in the transaction
- ? Will always increase consumer welfare
- ? Food may go to waste if subsidy exceeds decline in perceived utility
  - § Incentive to increase cognitive resources may increase

# Example 2: Marketing Healthy Goods

- ? Suppose a new good  $x$  is introduced that is similar to good  $y$  already in the market
  - § Has much better health qualities than  $y$
  - § Consumer cannot perceive a difference between  $x$  and  $y$  unless they are told

? Consumer solves

$$\max_{x,y} U(x,y) \text{ s.t. } w \geq p_x x + p_y y$$

? And receives true benefit

$$V(x^*, y^*)$$

$$V(x, y) \geq V_y(x, y) \quad \forall x, y$$

# Differentiation

? Suppose that the marketers differentiate the products

§ Draw attention to the health differences

? Likely to distort the perceived health effect

§ WTP more than the good is worth

? May stigmatize the product

§ Consumer will not realize the health benefits

? Without differentiation, the consumer will purchase the lowest priced item

# The Producer Decision

- ? If differentiate, the market will segment
  - § Price discrimination
  - § Price for each good: cost + adjustment
    - ? Adjustment dependent on relative elasticities of demand and size of markets
    - ? Positive for good with most inelastic demand
    - ? Negative for the other good
- ? Likely to lead to higher priced healthy goods that appeal primarily to health conscious
  - § Health conscious pay too much, may consume too much
  - § Mainstream benefit from lower prices, but may be worse off if purchase more of the less healthy item

# Conclusion

? Ignoring behavioral economics won't make it go away

§ Even very traditional policies may interact with behavioral cues

? Could make policies ineffective or even self defeating

? Regulators may be able to use behavioral cues to create much more promising policy options

§ Policies that potentially improve profits and welfare

§ Such creative solutions have proven to be very effective in some contexts

? Caution: This is not a panacea