How much can you consume really?

▶ How many slices of pizza topped with pepperoni, sausage, grilled chicken, olives and red pepper before you start feeling pukish?
▶ How many bottles of soda before you start feeling sick?
▶ How many hours playing video games before you have a really nasty headache?
▶ How many bench-presses before your muscles are sore?
▶ How many glasses of water before you say no more?
▶ There is a limit to what you can consume. You know it. You have experienced it.
▶ For a good, with every extra unit you consume, the Marginal Utility you get, is smaller and smaller.
▶ Ever wondered why indifference curves are downward sloping?
Law of Diminishing Marginal Utility

- Move from point A to B
- You are consuming more Chips at B, and less Fish.
- Slope of IC at any point:
  \[-\frac{MU_X}{MU_Y} = \text{Marginal Rate of Substitution}(MRS_{XY})\]
- \(MU^B_{Chips} < MU^A_{Chips}\)
- \(MU^B_{Fish} > MU^A_{Fish}\)
- \[\frac{MU^B_{Chips}}{MU^B_{Fish}} < \frac{MU^A_{Chips}}{MU^A_{Fish}}\]
- The IC is flatter from left to right.

Law of Diminishing Marginal Utility

Indifference Curves of Mr. Ing Lishman

Bibaswan Chatterjee  ECO 182: Summer 2015  Demand
Law of Diminishing Marginal Utility

- **Law of Diminishing MU**: More you already have of a good, the less you value the next extra unit of that good, which you can consume i.e. the next unit of a good, when consumed, gives you a lower MU than the previous unit.

- Because your marginal utility falls, you wouldn’t want to pay as much as you paid for the next unit as you paid for the last one.

<table>
<thead>
<tr>
<th>Slices of Pizza</th>
<th>MU (measured in $)</th>
<th>Price per Slice ($/slice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
The Law of Demand is an empirical observation.

**Law of Demand**: Everything else remaining the same, as the price of a product rises, the quantity demanded of that product falls.

The theoretical reasons behind this comes from the concept about MU. As your MU decreases with every extra unit you consume, you wish to pay less. You will **never** want to pay more than the MU of the unit you are planning to consume (Look at the last table).
The Quantity demanded falls when the Price rises from $60 to $100. The curve denotes your demand for the good.

Each point on the horizontal axis (under the curve of course) denotes a quantity that you can demand.

Each value of Price corresponding to a value of quantity demanded is the Maximum Willingness to Pay for that quantity demanded.
The demand curve in the last diagram is based on the following equation.

\[ Q_d = 30 - (0.25)P \]

This is called the **Demand Curve**. Remember the *Law of Demand*. The Quantity demanded changes *when* Prices change.

If I give you the price of a good, using the Demand Curve equation (or its graph), you can tell me how much the quantity demanded will be.
The inverse demand curve gives us the Price for each value of Quantity Demanded...in other words, it shows the MWP for each value of quantity demanded.

For the demand curve equation given before the corresponding inverse demand curve will be formally written as:

\[ P = 120 - 4Q_d \]

**Note 1:** These curves are for a consumer in this particular market of the good.

**Note 2:** This curve assumes a bunch of things are unchanged as the Price and Quantity Demanded adjust with themselves...like Preferences, Income, price of other goods that this consumer might like to buy etc. Basically everything that is not plotted on this graph is assumed to be unchanging/given/constant (ceteris paribus).
Example of Diminishing Marginal Utility

If you think MU doesn’t always fall, you are quite wrong. A classic example is with money. People believe that they always want more and more money ... MU must surely therefore not be falling. This is a wrong idea. Consider yourself as the richest person in the world with a net worth of $90 billion. Now, think of another person (call him Paul) who earns $200 per month. Imagine walking down the parking lot, and there is a high wind that blows away the $100 bill in your hand. Who do you think will be more upset? You or Paul?
### Choice under two goods

Price of Soda: $1/bottle; Price of pizza: $2/slice. Income = $12

<table>
<thead>
<tr>
<th>Soda</th>
<th>Q</th>
<th>MU</th>
<th>MU/Price</th>
<th>Pizza</th>
<th>MU/Price(1/2 slice)</th>
<th>MU(1 slice)</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>20</td>
<td>20</td>
<td></td>
<td>15,15</td>
<td>30</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>18</td>
<td>18</td>
<td></td>
<td>12.5,12.5</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12</td>
<td>12</td>
<td></td>
<td>11,11</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>10</td>
<td>10</td>
<td></td>
<td>8,8</td>
<td>16</td>
<td>4</td>
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<tr>
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<td>5</td>
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<td>8</td>
<td></td>
<td>5.5,5.5</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td>-2,-2</td>
<td>-4</td>
<td>6</td>
</tr>
</tbody>
</table>

What is the Rational choice of the goods? What is the demand? What is the demand if income is $11? If income is $13?
Indifference Curve to Demand Curve

- Price of X falls from $6/unit (budget constraint $L_1$) to $2/unit (budget constraint $L_2$)
Shift and Movement along

- Two basic changes in consumption.
- **Change in Demand** or *Shift of the Curve*
- **Change in Quantity Demanded** or *Movement along the curve.*
- Movement along the curve for a good can only happen when the price for that good changes.
- For everything else (pretty much) shift the curve.
- These changes come from the theory of preference and rational choice.
Income Change

- **F to E**: Change in Consumption due to Income Change...causes shift in the curve.
- Prices are unchanged in this case.
- This phenomenon is called *Income Effect*.
- This shifts the demand curve out(to the right)
**Price Change**

- **F to E**: Change in Consumption due to Price Change...causes
  1. Shift in the demand curve: If other’s price changes.
  2. Movement along the demand curve: If own price changes (this Fig.)

- This phenomenon includes both *Income Effect* and *Substitution Effect*.
- When own price fall, you move left to right on demand curve.
Elasticity

- Elasticity is an *unitless* measure of change.
- **General Definition**: A *elasticity of B* = \( \frac{\text{%change in B}}{\text{%Change in A}} \)
- *(own)* **Price Elasticity of demand**: \( \frac{\text{%change in quantity demanded}}{\text{%Change in own price}} \)
- *(other/cross)* **Price Elasticity of demand**: \( \frac{\text{%change in quantity demanded}}{\text{%Change in cross/other good’s price}} \)
- **Income Elasticity of demand**: \( \frac{\text{%change in quantity demanded}}{\text{%Change in Income}} \)
- *own* PED is also the *PED* of the demand curve for a good.
- Arc elasticity PED: \( \frac{P_1+P_2}{Q_1+Q_2} \times \frac{\Delta Q}{\Delta P} \)
- *(absolute)* Point elasticity PED = \( \frac{P}{Q} \times \frac{1}{\text{absolute(slope)}} \)
Some of these values are positive. Some people convert everything to a positive value, to just compare the magnitude of change. So to avoid complication,

- **Flatter demand curve** means more price elastic than **Steeper demand curve**. We will use this terminology henceforth.
Elasticity: Demand Curve...continued

- A vertical Demand curve is perfectly price inelastic; PED = 0.
- A horizontal Demand curve is perfectly price elastic: PED = \infty.
According to preference

Depending on how they react to price and income changes, goods (X and Y) can be classified in the following ways.

- **Substitute**: Price of X rises $\rightarrow$ Qty. Demanded for Y rises
- **Complement**: Price of X rises $\rightarrow$ Qty. Demanded for Y falls
- **Normal**: Income rises $\rightarrow$ Qty. Demanded rises
- **Inferior**: Income rises $\rightarrow$ Qty. Demanded falls
- **Luxury**: 1% rise in Income $\rightarrow$ > 1% rise in consumption
- **Necessity**: 1% rise in Income $\rightarrow$ < 1% rise in consumption
- **Giffen**: Price of X rises $\rightarrow$ Qty. Demand of X rises. (*Violates the Law of Demand*)
According to preference: Elasticities?

- **Normal**: $\text{IED} > 0$
- **Inferior**: $\text{IED} < 0$
- **Luxury**: $\text{IED} > 1$
- **Necessity**: $0 < \text{IED} < 1$
- **Giffen**: (own) $\text{PED} > 0$ (actual value, not absolute)
According to preference: Elasticities...continued
Giffen Goods

Are Giffen goods even real?
"as Sir R. Giffen has pointed out, a rise in the price of bread makes so large a drain on the resources of the poorer labouring families and raises so much the marginal utility of money to them, that they are forced to curtail their consumption of meat and the more expensive ... foods: and, bread being still the cheapest food which they can get ... they consume more ... of it. But such cases are rare...each must be treated on its own merits." Alfred Marshall Principles of Economics (1890)

Giffen goods are a type of Inferior goods. The IE is negative for a Giffen good.