## The Value of Time

- Almost all economic purchases require time to use. This is a cost of the good.

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## The Value of Time

- Almost all economic purchases require time to use. This is a cost of the good.
- Add the time cost, valued at the consumer's wage rate, to the cost of the product; and
- Add the value of time, again valued at the wage rate, to the budget constraint.

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## Hiring A Mowing Service

## Hiring A Mowing Service

| Hiring a Mowing Service |  |  |
| :---: | :---: | :---: |
|  | Wilson | Smith |
| Mowing Service | $\$ 500$ | $\$ 500$ |
| Out of Pocket, Self Mowing | $\$ 100$ | $\$ 100$ |
| Time Cost | $\$ 300$ | $\$ 4,000$ |
| Savings from Self Mowing | $\$ 100$ | $(\$ 3600)$ |

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The Value of Time

## The Formal Model

- Each unit of $X$ takes $t_{x}$ hours;
- Each unit of Y takes $t_{y}$ hours.
- The consumer spends $\mathrm{T}_{\mathrm{w}}$ hours working and has T hours after allowing for sleep.


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t_{\mathrm{x}} \boldsymbol{X}+\boldsymbol{t}_{\mathrm{y}} \boldsymbol{Y}+\boldsymbol{T}_{\mathrm{w}}=T
$$

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$$
\begin{gathered}
\boldsymbol{t}_{\mathrm{x}} \boldsymbol{X}+\boldsymbol{t}_{\mathrm{y}} \boldsymbol{Y}+\boldsymbol{T}_{\mathrm{w}}=\boldsymbol{T} \\
p_{\mathrm{x}} \boldsymbol{X}+\boldsymbol{p}_{\mathrm{y}} \boldsymbol{Y}=w T_{\mathrm{w}}+V
\end{gathered}
$$

The Formal Model

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\begin{gathered}
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## The Formal Model

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## The Formal Model

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\begin{gathered}
p_{\mathrm{x}} X+p_{\mathrm{y}} Y=w T_{\mathrm{w}}+V \\
\boldsymbol{t}_{\mathrm{x}} \boldsymbol{X}+\boldsymbol{t}_{\mathrm{y}} \boldsymbol{Y}+\boldsymbol{T}_{\mathrm{w}}=\boldsymbol{T} \\
\boldsymbol{T}_{\mathrm{w}}=\boldsymbol{T}-\left(\boldsymbol{t}_{\mathrm{x}} \boldsymbol{X}+\boldsymbol{t}_{\mathrm{y}} \boldsymbol{Y}\right)
\end{gathered}
$$

The Formal Model

$$
\boldsymbol{p}_{\mathrm{x}} X+\boldsymbol{p}_{\mathrm{y}} \boldsymbol{Y}=\boldsymbol{w} T_{\mathrm{w}}+V
$$

$$
t_{\mathrm{x}} \boldsymbol{X}+\boldsymbol{t}_{\mathrm{y}} \boldsymbol{Y}+\boldsymbol{T}_{\mathrm{w}}=\boldsymbol{T}
$$

$$
T_{\mathrm{w}}=T-\left(t_{\mathrm{x}} X+t_{\mathrm{y}} Y\right)
$$

$$
\left(p_{x}+w t_{x}\right) X+\left(p_{y}+w t_{y}\right) Y=
$$

$$
w T+V
$$

The Formal Model
$\left(p_{\mathrm{x}}+w t_{\mathrm{x}}\right) X+\left(p_{\mathrm{y}}+w t_{\mathrm{y}}\right) Y=$ $w T+V$

## The Formal Model

$\left(p_{x}+w t_{x}\right) X+\left(p_{\mathrm{y}}+w t_{\mathrm{y}}\right) Y=$ $w T+V$
$F_{x}=p_{x}+w t_{x}$
$F_{y}=p_{y}+w t_{y}$
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The Value of Time
The Value of Time

## An Illustration

| Commodity | Wage <br> Rate | Time | Out of <br> Pocket <br> Cost | Cost |
| :---: | :---: | :---: | :---: | :---: |
| X | $\$ 10$ | 2 hours | $\$ 15$ | $\$ 35$ |
| Y | $\$ 10$ | 3 hours | $\$ 5$ | $\$ 35$ |

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## Some Applications

- Shopping
- Why do senior citizens shop on weekdays and working people on weekends? Different values of time?
$\qquad$


## Some Applications

- Shopping
- Dinner Reservations
- Restaurants that take reservations must charge more
- Thus students will favor restaurants that don't take reservations
- High wage earners will favor a policy of reservations.

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The Value of Time

## Some Applications

- Shopping
- Dinner Reservations
- Automobiles or Mass Transit
- Mass transit is cheaper but slower, hence its appeal to low income households.

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## Some Applications

- Shopping
- Dinner Reservations
- Automobiles or Mass Transit
- Convenience Foods
- Time is money

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