The Worker's Dilemma

EC 350: Labor Economics

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Winter 2022

The Worker's Dilemma

Q: Why do we work?

A_1: In pursuit of meaning? For enjoyment? To feel useful?

- Some jobs provide more than compensation.
- Other jobs? Not so much.

A_2: To make money for purchasing goods and services!

- The bills aren't going to pay themselves!

The Worker's Dilemma

Q: What do we give up by working?

A: Time spent doing leisurely† activities!

- Sitting on the couch
- Going on vacation
- Spending quality time with your friends and family
- Exercising
- Raising children
- Studying
- Eating
- Sleeping
- Cleaning your apartment

† In economics, ***leisure*** = *any activity that* ***doesn't involve working for money*** *or other remuneration.*

The Worker's Dilemma

Q: Why must we make choices about spending our time and money?

A: Scarcity!

- **Time is scarce:** There are only 24 hours in a day, and even though human lifespans are increasing, we still must grapple with our **finite** existence.
- **Resources are scarce:** While living standards are increasing, there still **isn't enough** of the things we like to satisfy our unlimited desires.

When resources are scarce, the decision **to do one thing** necessarily implies that **something else doesn't get done.**

Choices

An individual worker's choices are characterized by **observable quantities:**

- Daily earnings, or total income
- Daily hours worked $\longrightarrow$ hours of leisure

Typically, these quantities are all we can see in the data.

- To understand *how* workers make choices, **we need a theory!**

Labor-leisure model

Q: How do workers make **labor supply** decisions?

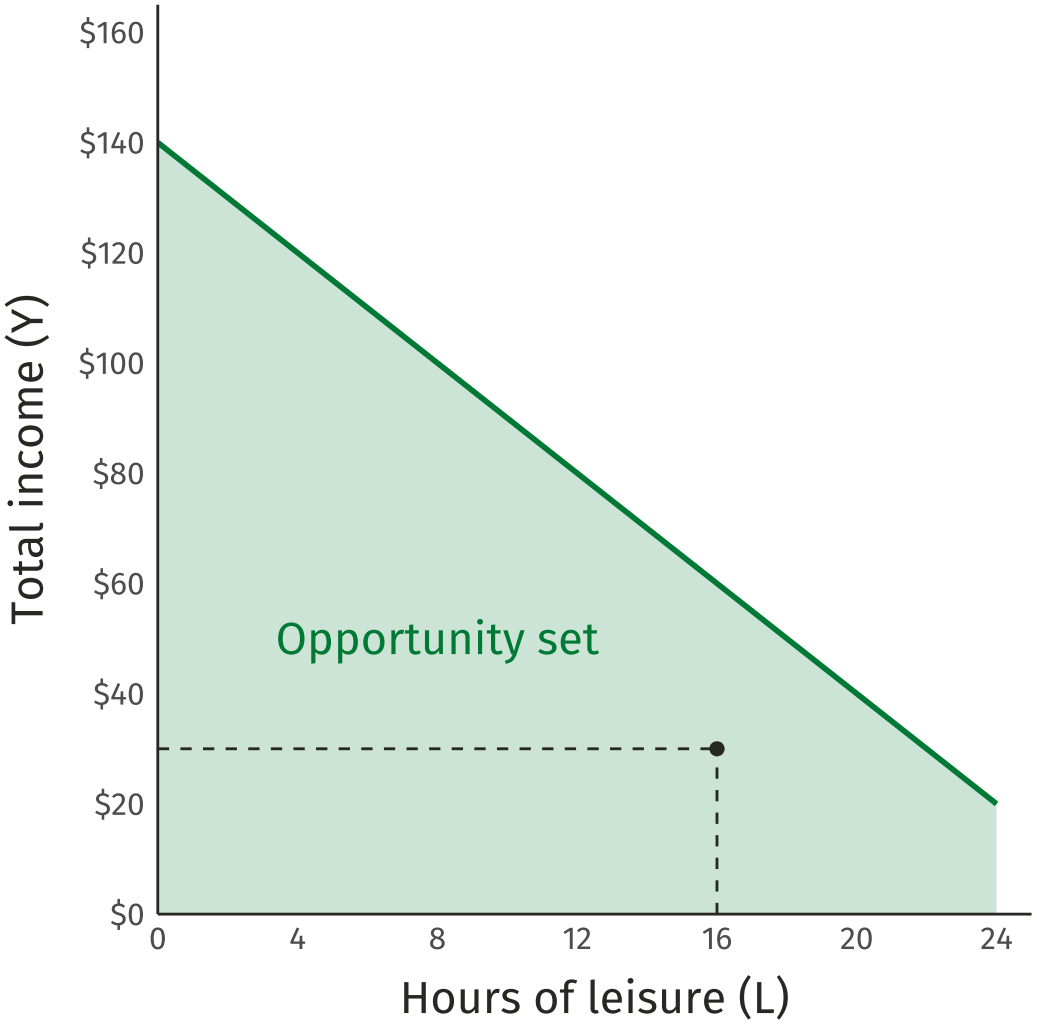
- What factors induce individuals to enter the labor market?
- What factors influence *how much* individuals work once they are in the market?

The **labor-leisure model**[†] examines how workers respond to incentives given information about their ***opportunities*** and their ***preferences***.

- The model allows us to generate **testable predictions** about individual responses to changes in market conditions.

[†] Developed by Gary Becker, an influential economist, in A Theory of the Allocation of Time, *The Economic Journal* (1965).

Opportunities



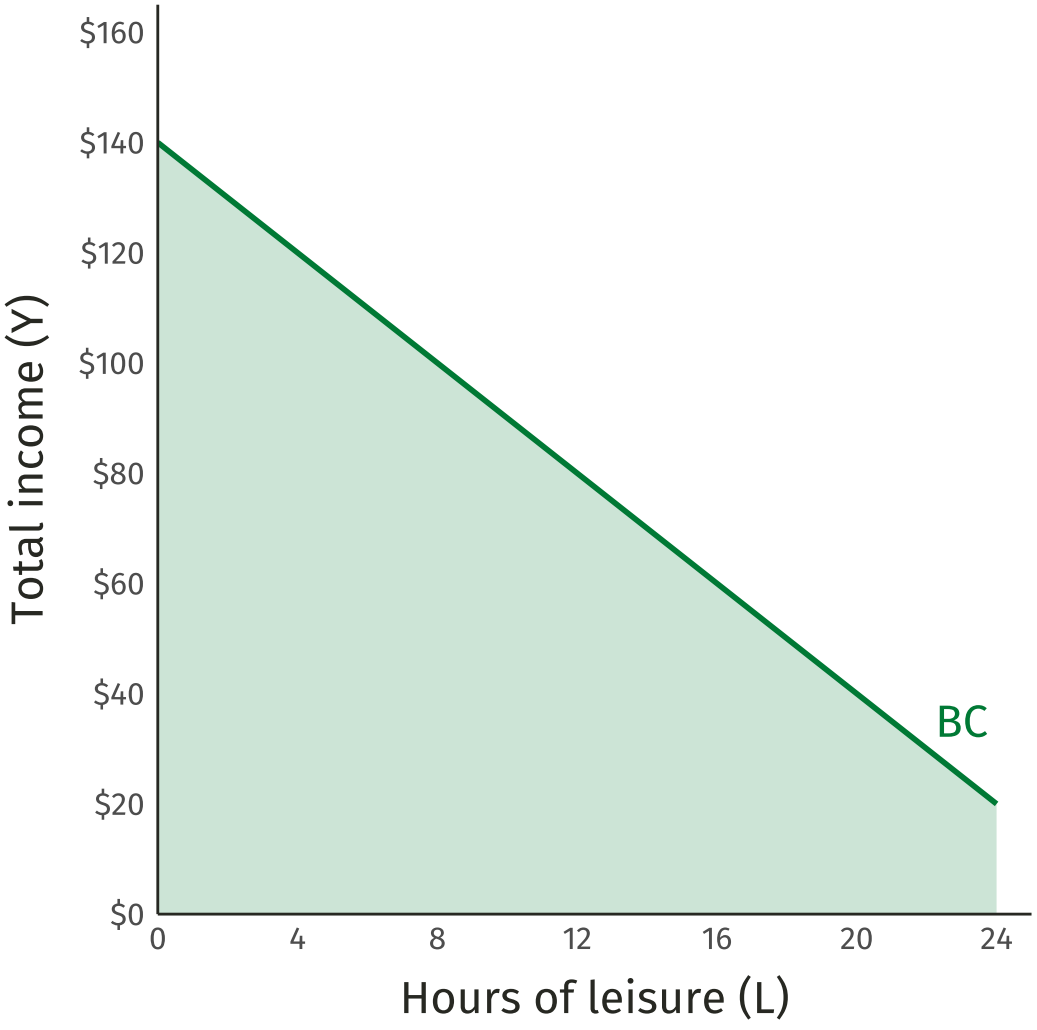
From before, we saw that the worker selected the bundle (L = 16, Y = 30).

- It must have been the case that the bundle was **feasible** for the worker.

Opportunity set

> The set of all possible (L, Y) bundles available to a worker.

Opportunities



Q: What determines a worker's opportunity set?

A: The number of hours in a day and the budget constraint, given by

$$\begin{aligned} Y &= wH + v \\ &= w(24 - L) + v \end{aligned}$$

- H = number of hours worked
- w = best hourly wage available to the worker
- v = non-labor income

Opportunities

Q: What determines a worker's opportunity set?

A: The number of hours in a day and the budget constraint, given by

$$\begin{aligned} Y &= wH + v \\ &= w(24 - L) + v \end{aligned}$$

Example

- w = 6
- v = 15

Opportunities

Q: How will the worker respond if her previous choice is no longer feasible?

A: 🤷‍♀️

- To predict a worker's response to a changes in her opportunity set, we also must consider her **preferences** over available alternatives.

Preferences

Q: Can we measure preferences?

- **A:** Not typically.

Our inability to measure preferences requires us to make assumptions.

- However defined, **preferences do not change** during the course of the analysis.

Four behavioral postulates give us the ability to model labor supply:

1. People have preferences
2. People prefer more over less
3. People are willing to substitute
4. Marginal utility is decreasing

Preferences

Utility function

We can describe a worker's preferences over leisure and consumption using a utility function:

$$U = f(L, Y)$$

- U represents the worker's **well-being** or life satisfaction (higher is better).
- L represents hours of leisure, a "good."
- Y represents total (real) income, which we assume will be spent on goods and services.
- The functional form of $f(\cdot)$ satisfies the four behavioral postulates.

Q: The worker only cares about leisure and consumption? Really?
A: There are many things we could include in the utility function, but to make testable predictions, **we need to abstract away from unnecessary details**.

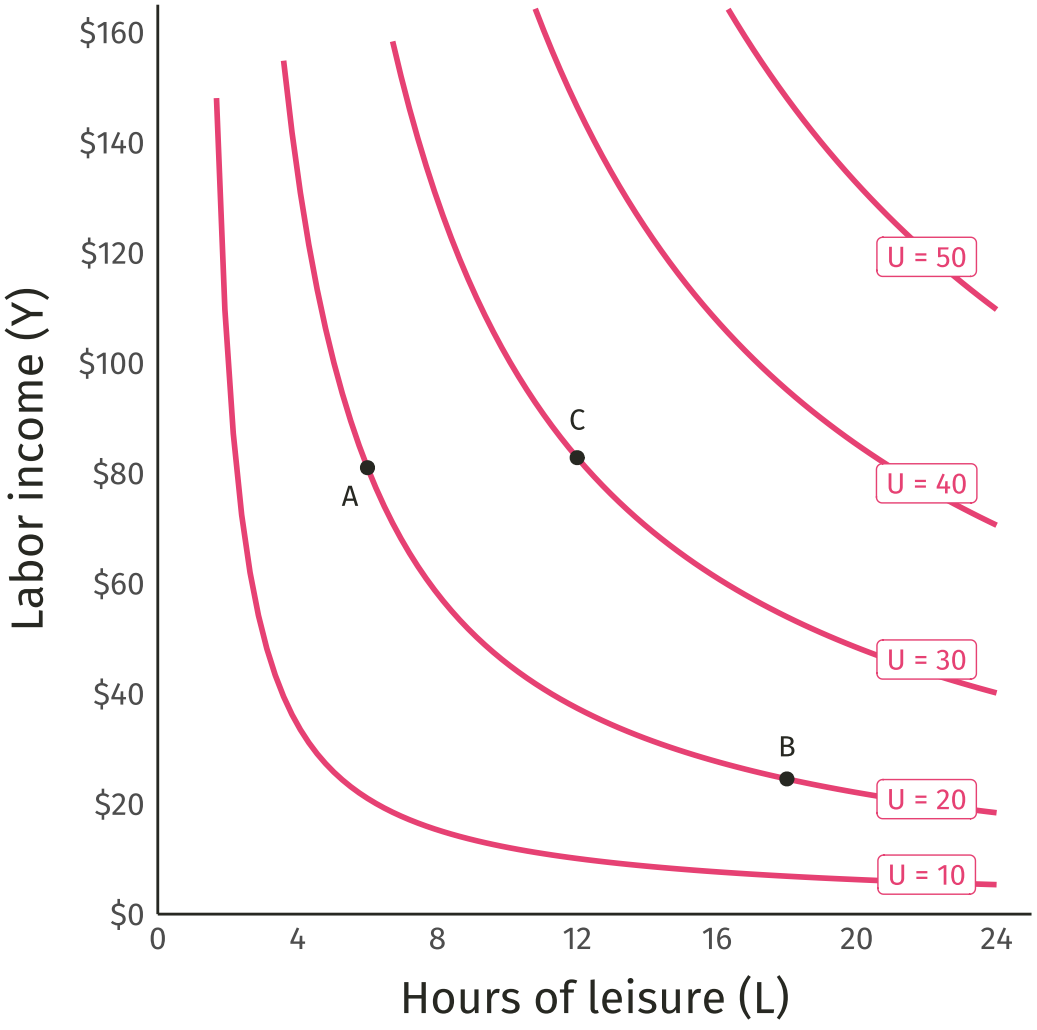
> A theory that explains everything, explains nothing. — Karl Popper

Preferences

Q: How does this **utility function** incorporate the four behavioral postulates?

1. People have preferences?
2. People prefer more over less?
3. People are willing to substitute?
4. Marginal utility is decreasing?

Preferences



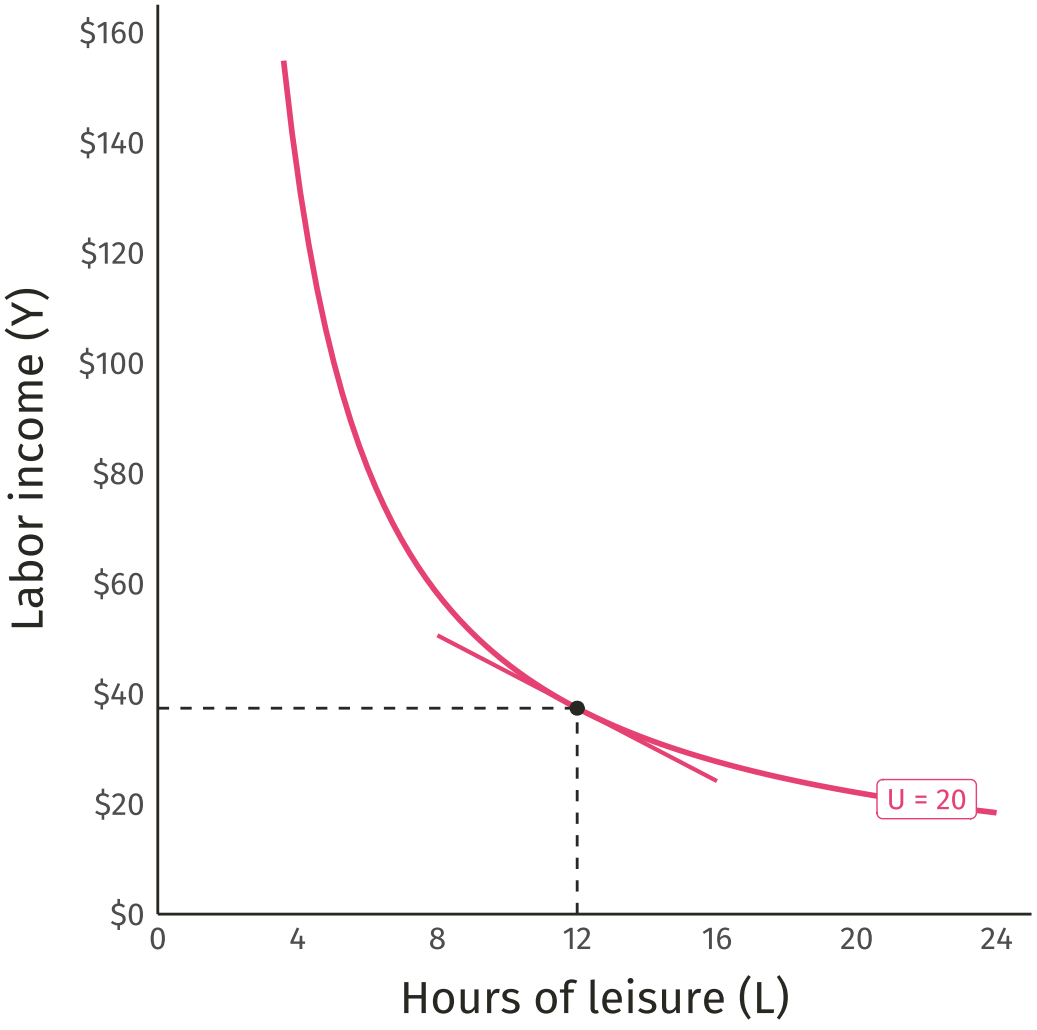
Indifference curves

Each **indifference** curve describes the set of (L, Y)-bundles that yield the **same level of utility**.

- The worker is indifferent between bundle **A** and bundle **B**.
- The worker prefers bundle **C** over **A** or **B**.

The **indifference map** informs us about ***what is desirable*** from the perspective of the worker.

Preferences



Marginal rate of substitution

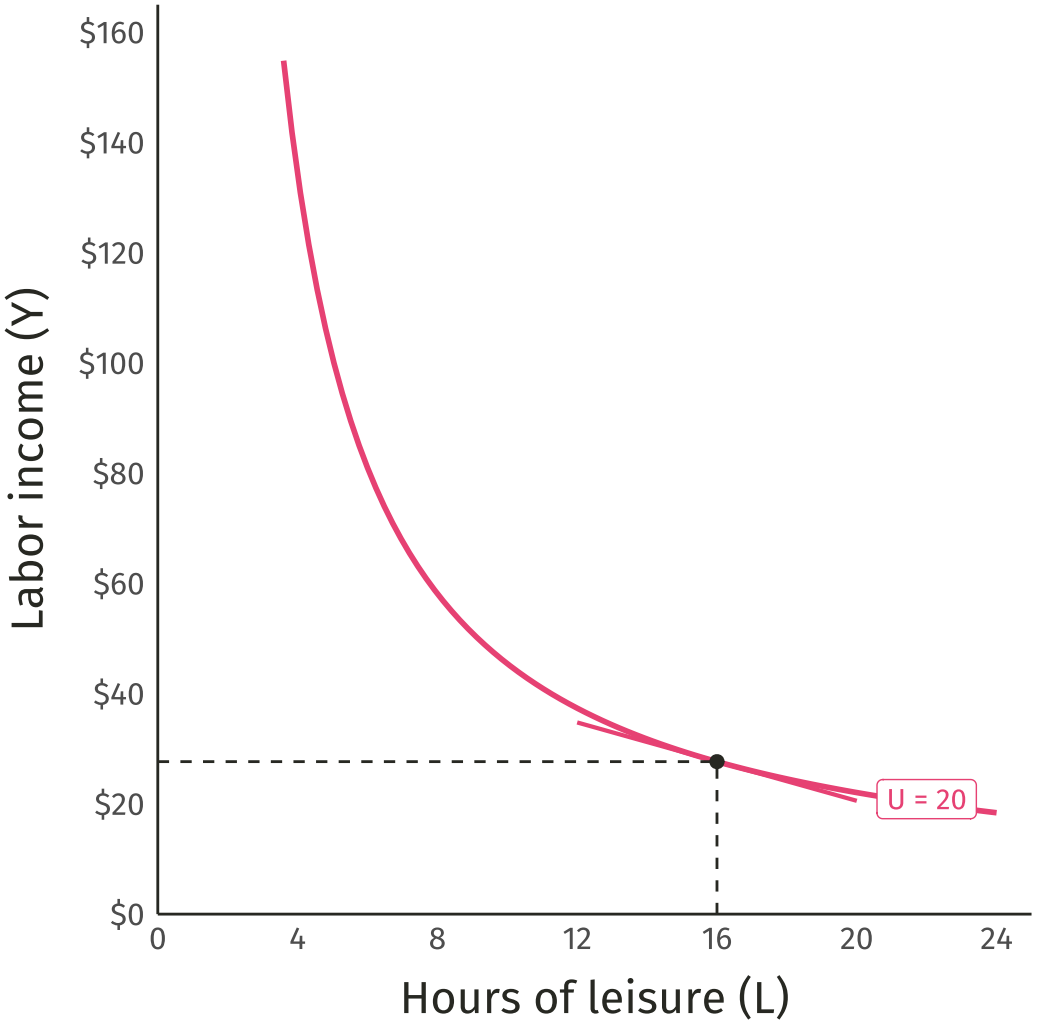
The slope of an indifference curve describes the **marginal rate of substitution of leisure for income:**

$$\text{MRS}_{L,Y} = -\frac{\text{MU}_L}{\text{MU}_Y}$$

- MU_L = marginal utility of leisure
- MU_Y = marginal utility of income

Interpretation: The amount of income a worker would *willingly* sacrifice for an additional hour of leisure.

Preferences



Diminishing marginal rate of substitution

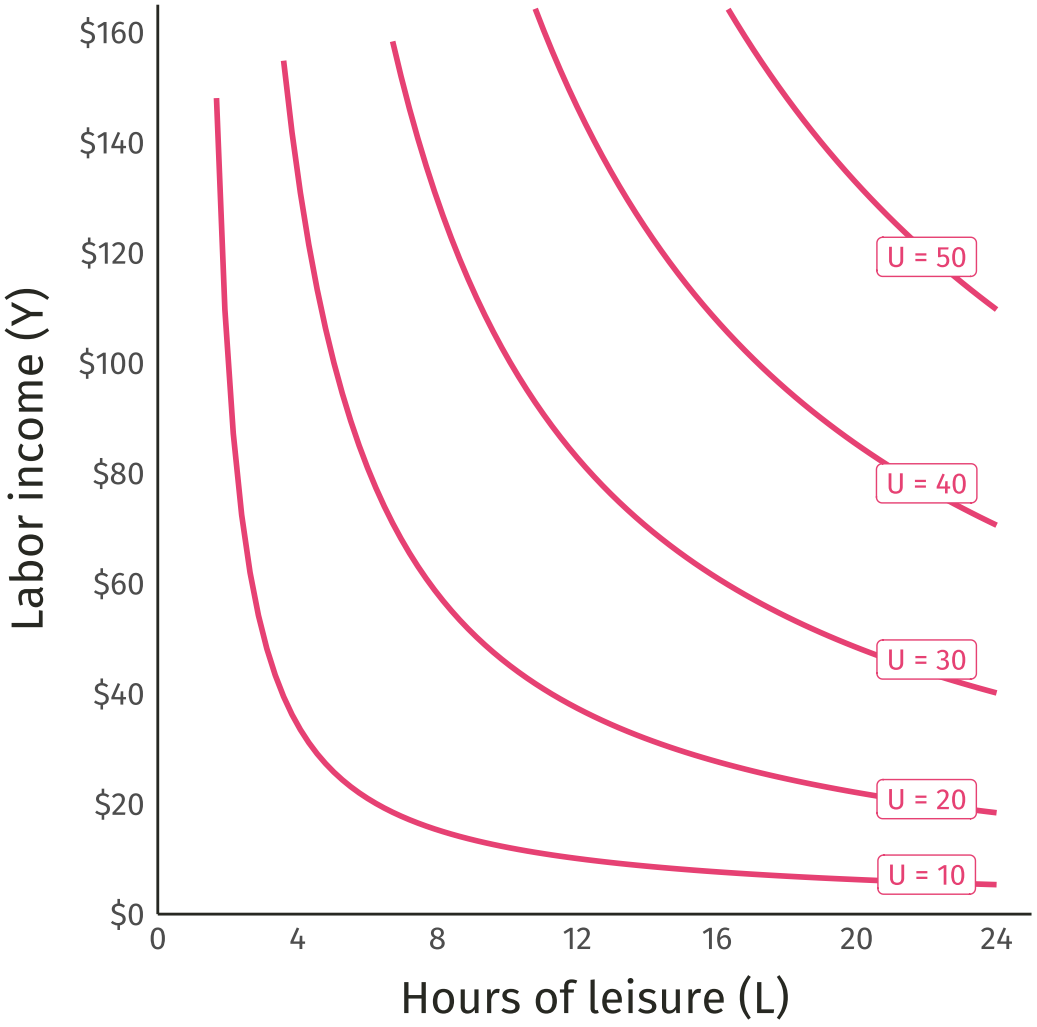
The worker becomes less willing to sacrifice income for leisure as income decreases.

- As Y decreases relative to L, $|\text{MRS}_{L,Y}|$ decreases.

Why? Indifference curves are **convex**.

- An average of two extreme bundles is preferable to either of the extreme bundles.

Preferences



Indifference curve properties

1. Indifference curves have negative slopes
2. Higher indifference curves $\longrightarrow$ higher utility
3. Indifference curves are convex

Preferences

Objective function

We assume that the worker seeks maximize her utility given the set of available opportunities:

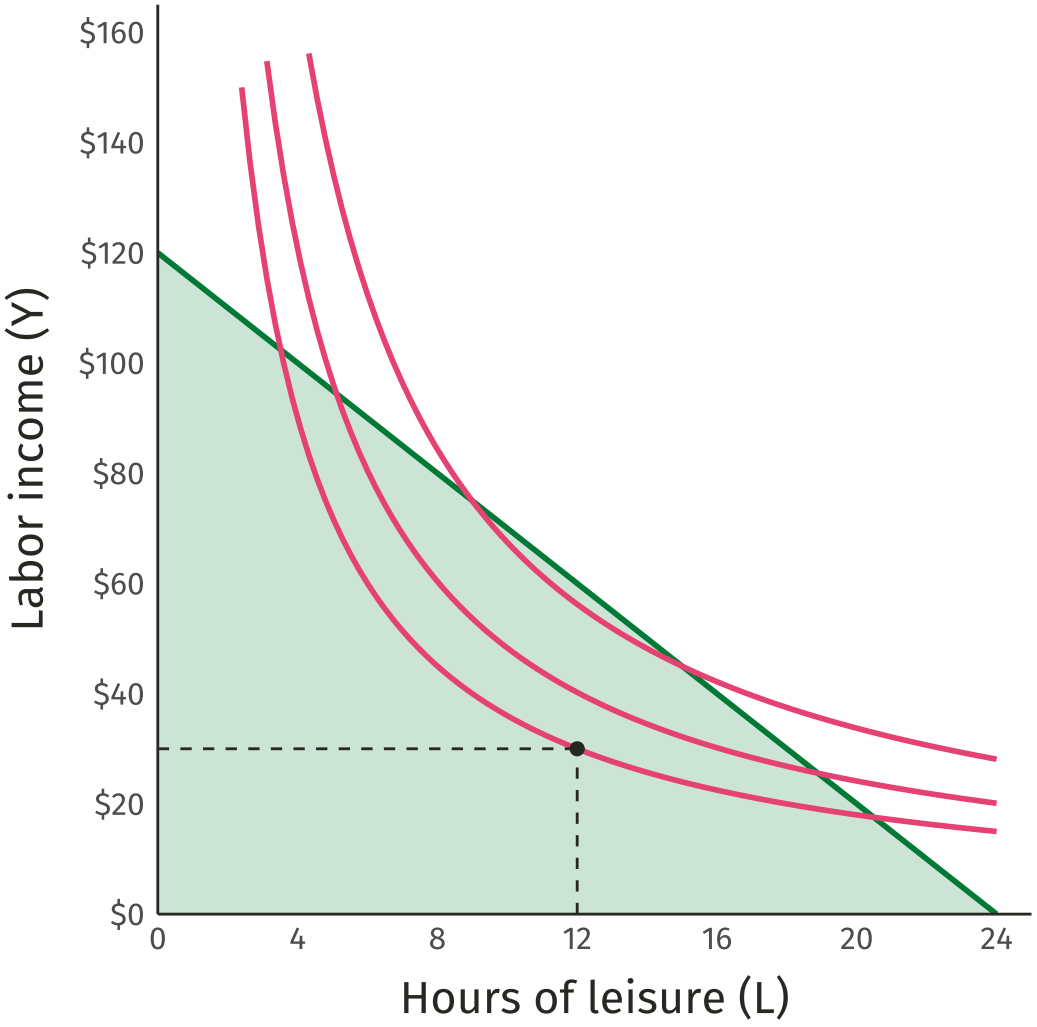
$$\max_{L,Y} U(L, Y) \text{ s.t. } Y = w(24 - L) + v$$

- The worker chooses a feasible bundle (L^*, Y^*) that yields the highest utility.
- In other words, the worker solves a **constrained optimization** problem.[†]

Maximizing your utility $\longrightarrow$ "living your **best** life"

[†] Yet another reason why calculus is useful.

Preferences + opportunities



Q: Has this worker maximized her utility?

A: No!

- **Why?** There are other feasible bundles that yield higher utility!
- In this case, the worker could—without incurring additional cost—increase leisure, income, or both.

Preferences + opportunities

Opportunity cost

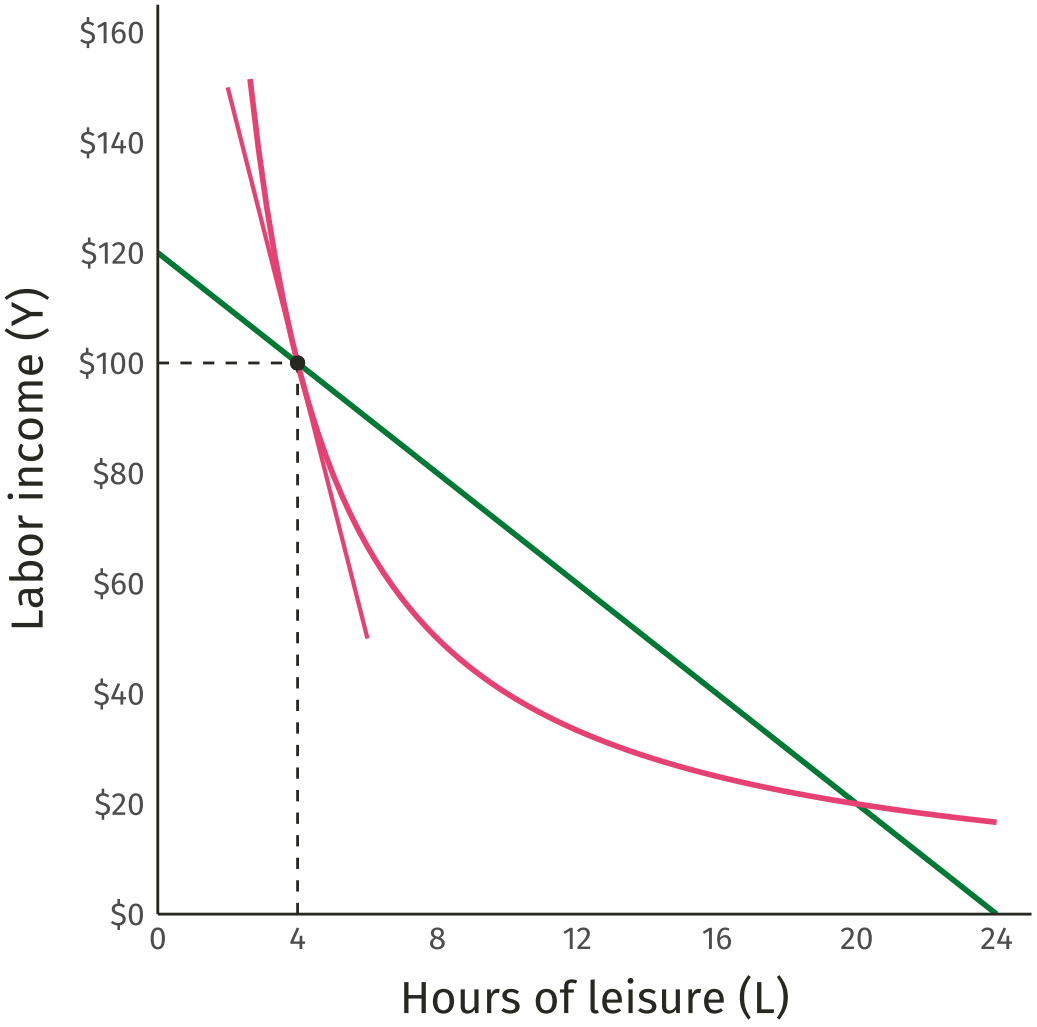
In fact, the worker will **always choose** a bundle somewhere **along the budget constraint**.

For this reason, we can interpret the slope of the budget constraint as the **opportunity cost**† of an additional hour of leisure.

- For each additional hour of leisure, you must sacrifice w dollars.

† *Opportunity cost* = The forgone value of *your* next-best alternative.

Optimization



Q: Has this worker maximized her utility?

A: No. At the current bundle,

- **MRS** = -25
- **Opportunity cost** = -5

The cost of an additional hour of leisure **is less than** the worker's willingness to pay for additional hour of leisure!

Optimization

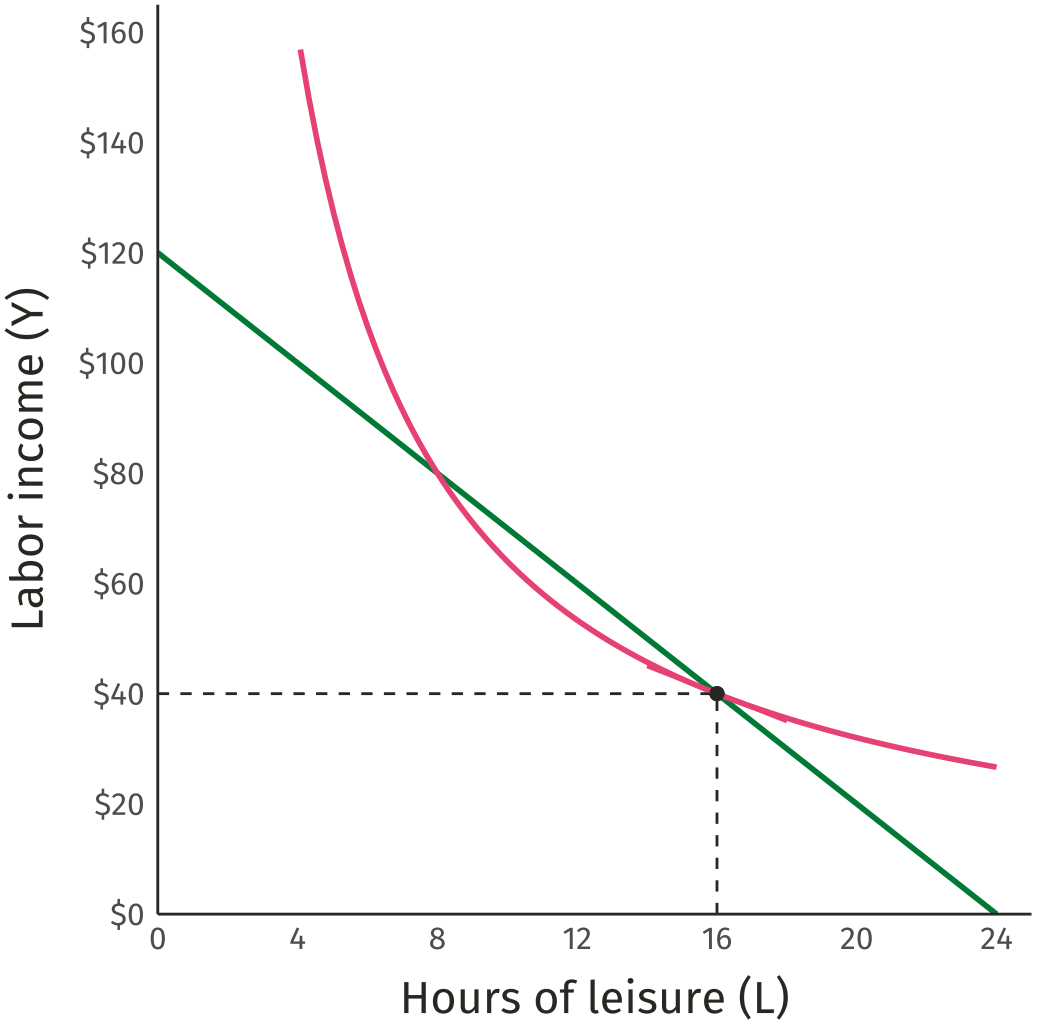
Q: Has this worker maximized her utility?

A: No. At the current bundle,

- **MRS** = -10
- **Opportunity cost** = -5

The cost of an additional hour of leisure **is less than** the worker's willingness to pay for additional hour of leisure!

Optimization



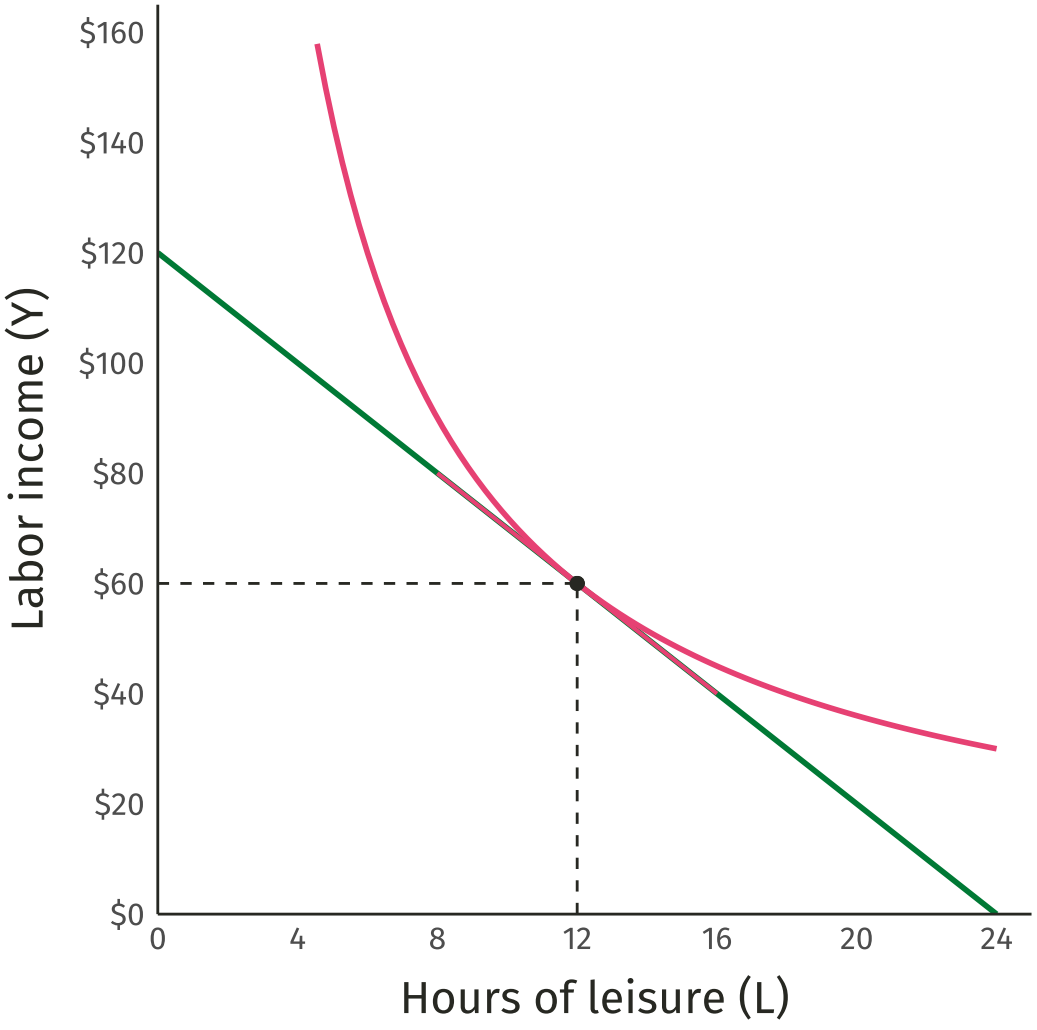
Q: Has this worker maximized her utility?

A: No. At the current bundle,

- **MRS** = -2.5
- **Opportunity cost** = -5

The cost of an additional hour of leisure **is greater than** the worker's willingness to pay for additional hour of leisure!

Optimization



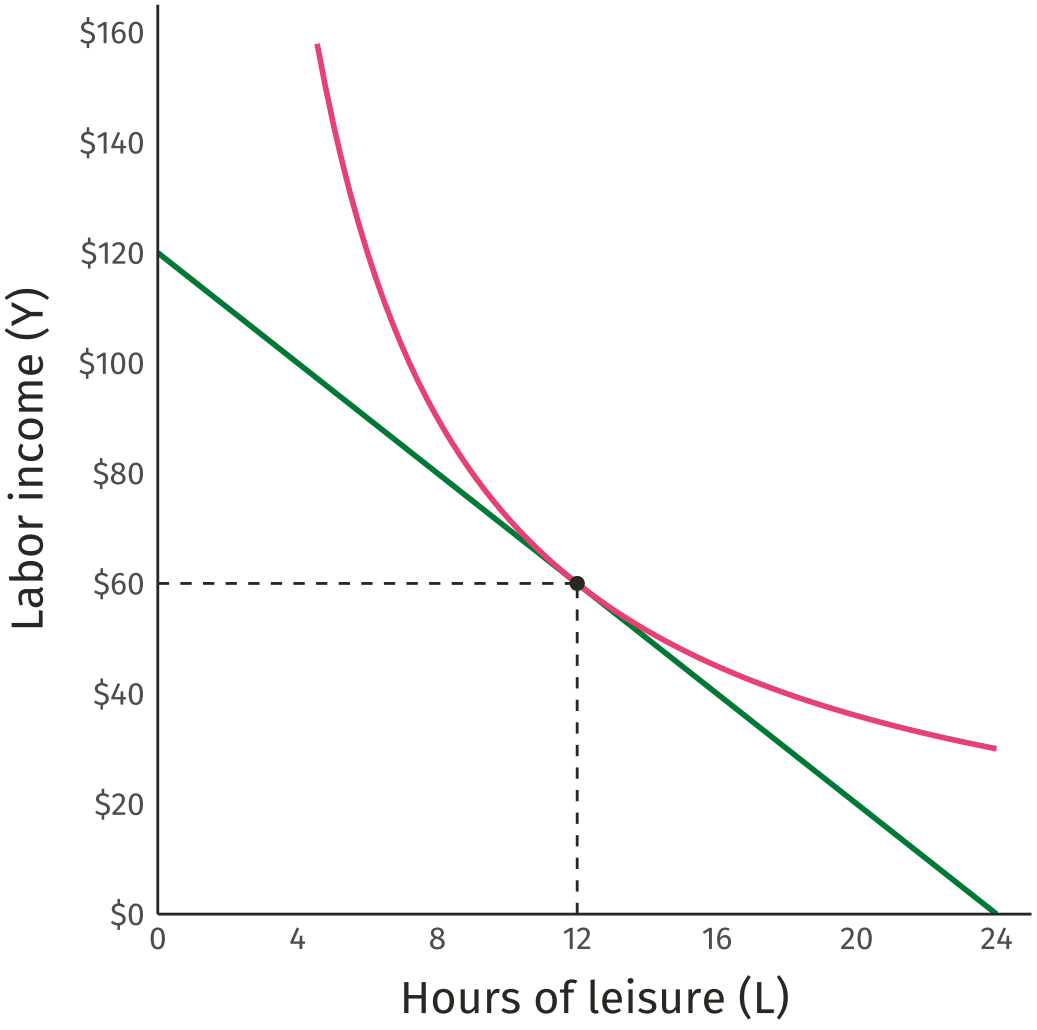
Q: Has this worker maximized her utility?

A: Yes! At the current bundle,

- **MRS** = -5
- **Opportunity cost** = -5

The cost of an additional hour of leisure **equals** the worker's willingness to pay for additional hour of leisure!

Optimization



The worker chooses the optimal bundle (L^*, Y^*) where

$$\text{MRS}_{L,Y} = -w$$

- That is, where the indifference curve is **tangent** to the budget constraint.

Optimization

Intuition?

At the optimal bundle,

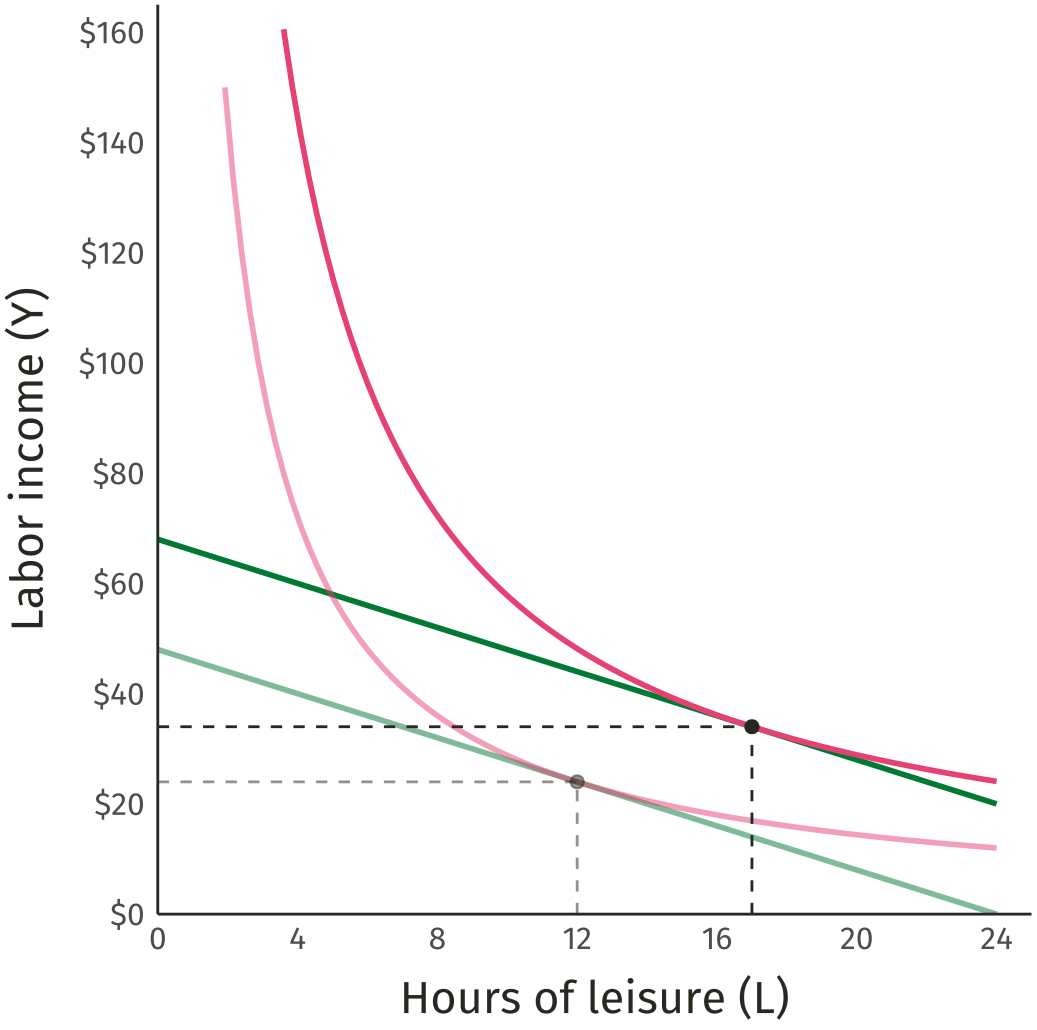
$$\frac{\text{MU}_L}{\text{MU}_Y} = w$$

$$\text{MU}_Y = \frac{\text{MU}_L}{w}$$

- MU_Y = additional utility from spending one more dollar on consumption
- MU_L = additional utility from one more hour of leisure
- $\frac{\text{MU}_L}{w}$ = additional utility from spending one more dollar on leisure

In words? The worker maximizes utility when the last dollar spent on leisure buys the same amount of utility as the last dollar spent on consumption.

Worker responses



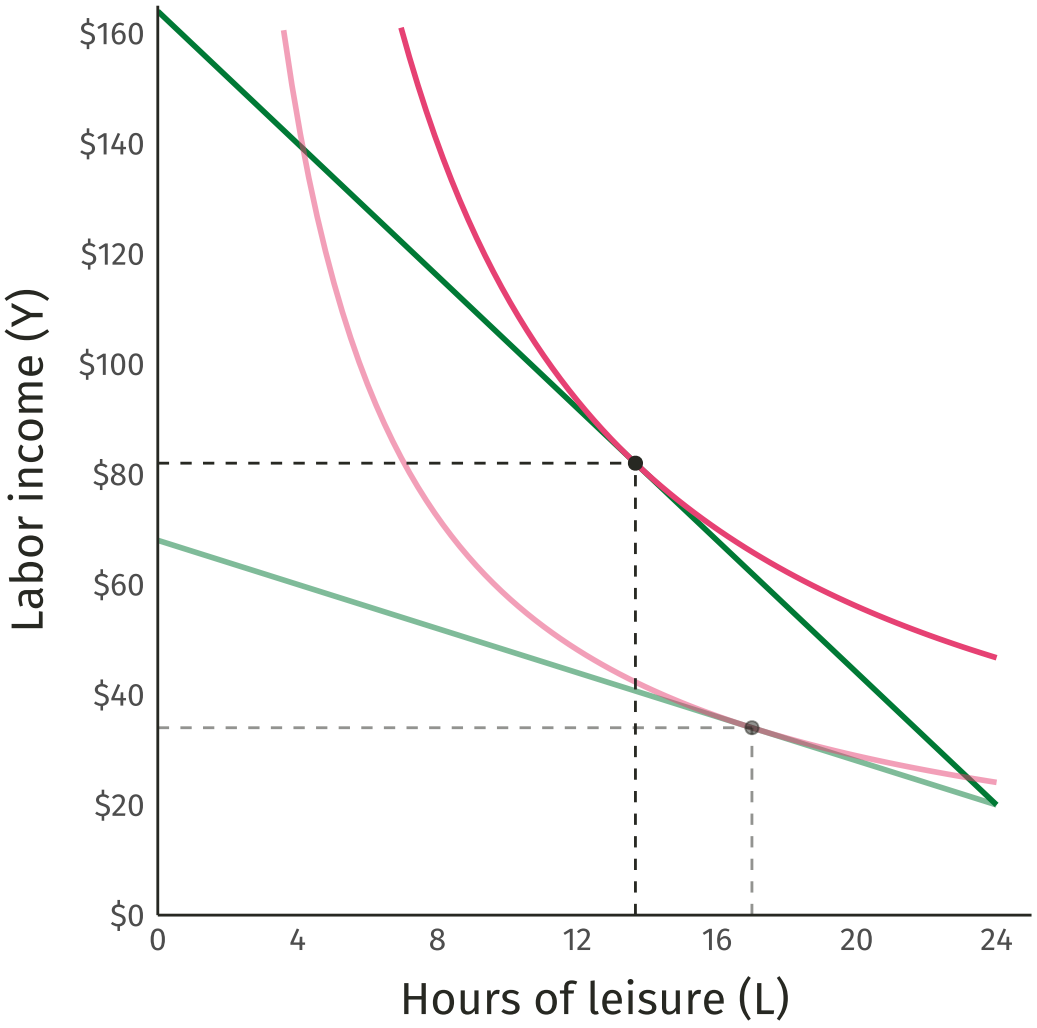
Q: How will this worker respond to an increase in non-labor income?

A: The worker will work fewer hours.

- We will always define preferences such that leisure is a **normal good**.†

† *Normal good* = A good for which consumption increases as wealth increases.

Worker responses

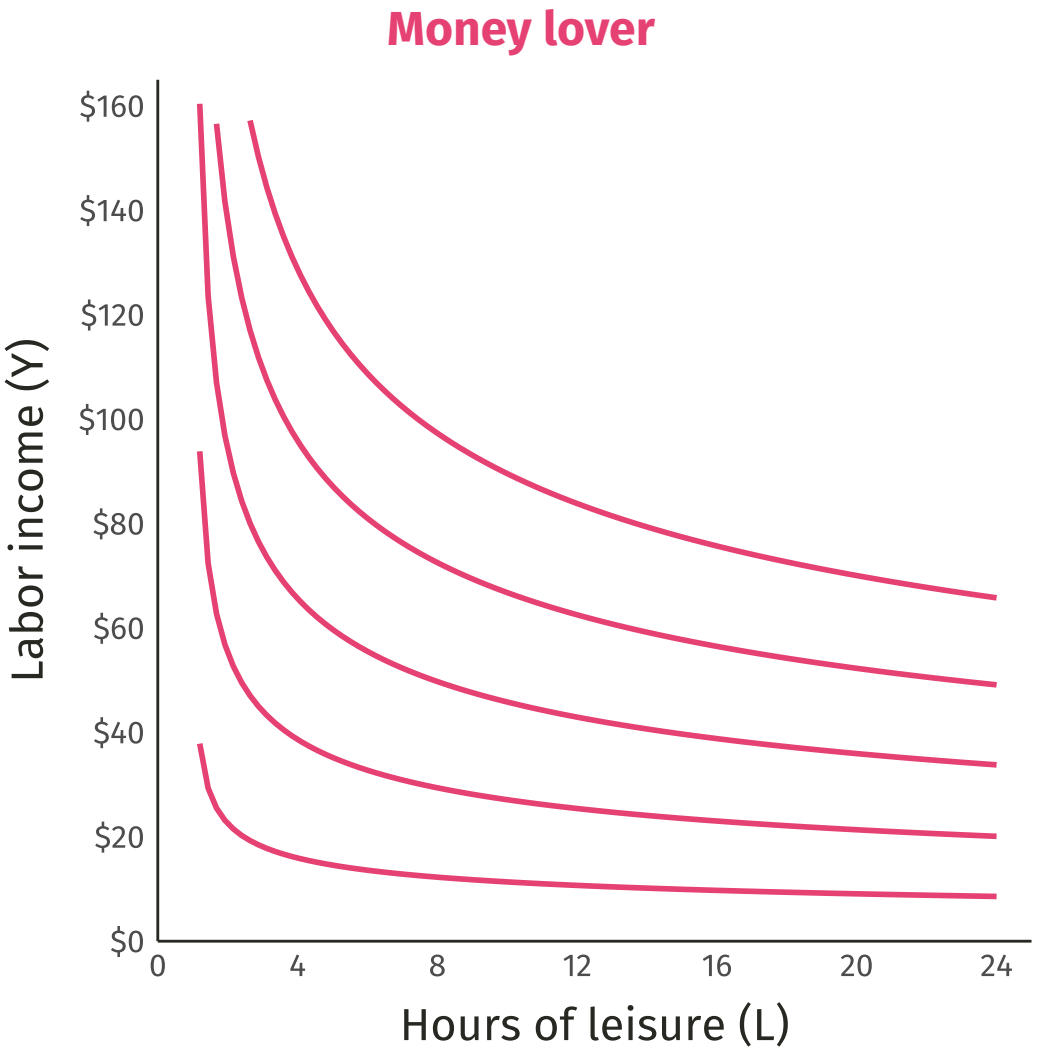


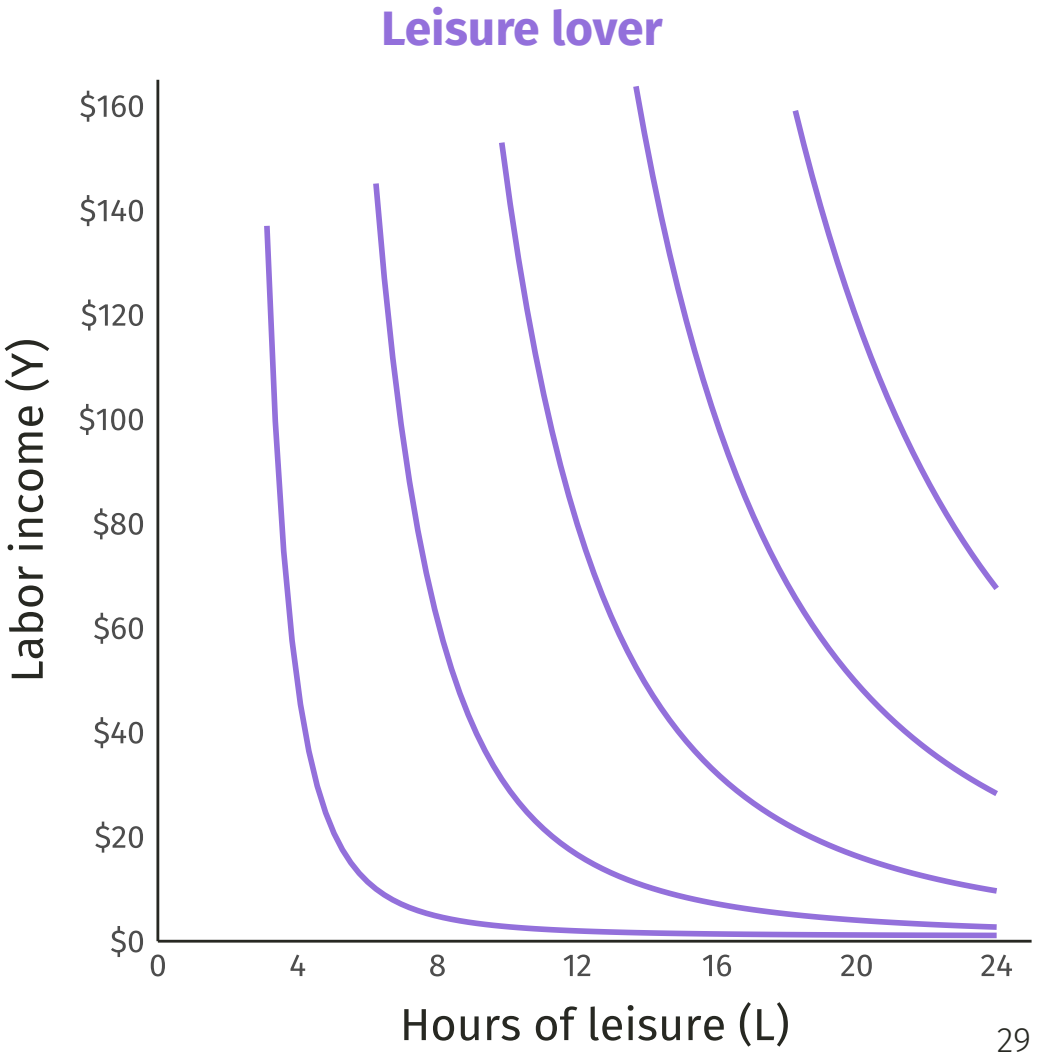
Q: How will this worker respond to an increase in the hourly wage?

A: In this case, the worker will work additional hours.

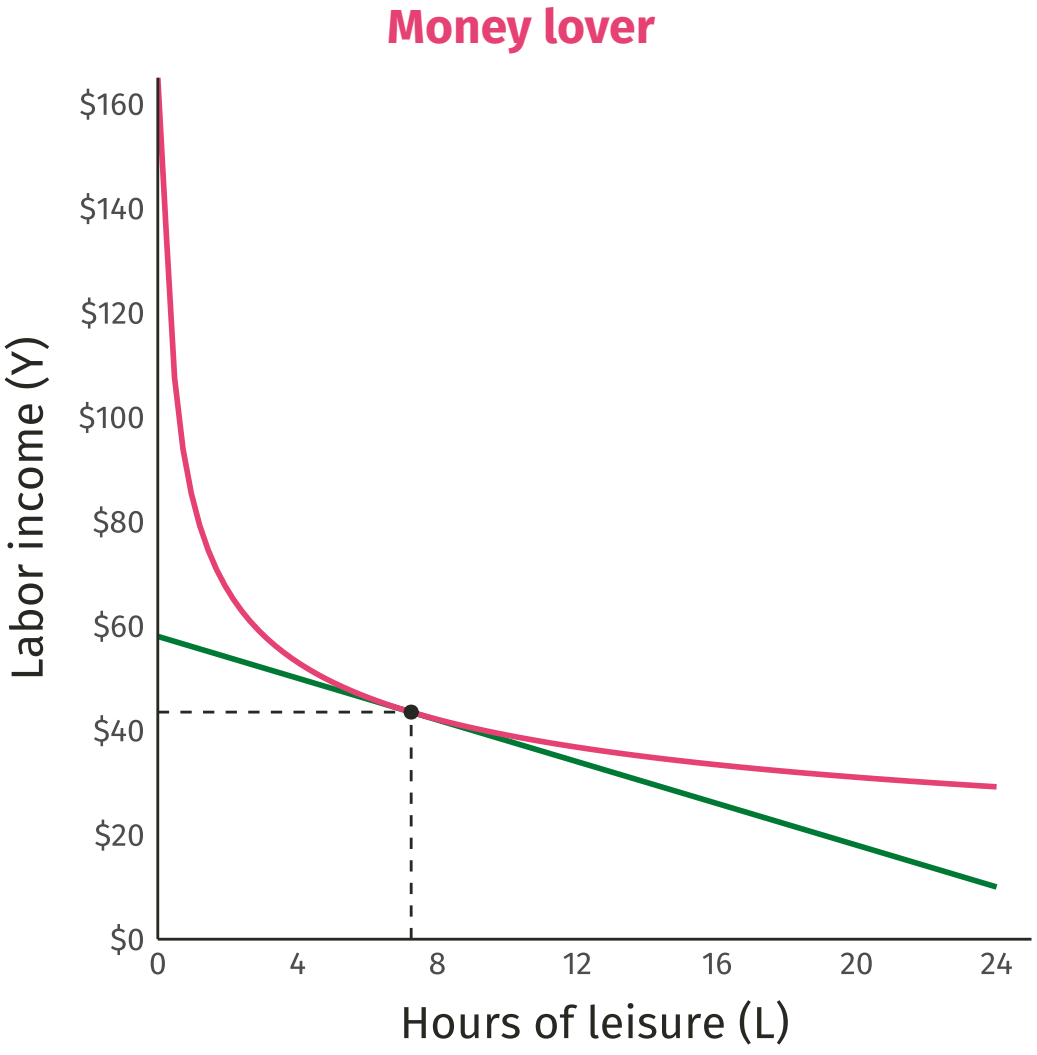
- The direction of the response depends on wealth and substitution effects. (More on this later.)

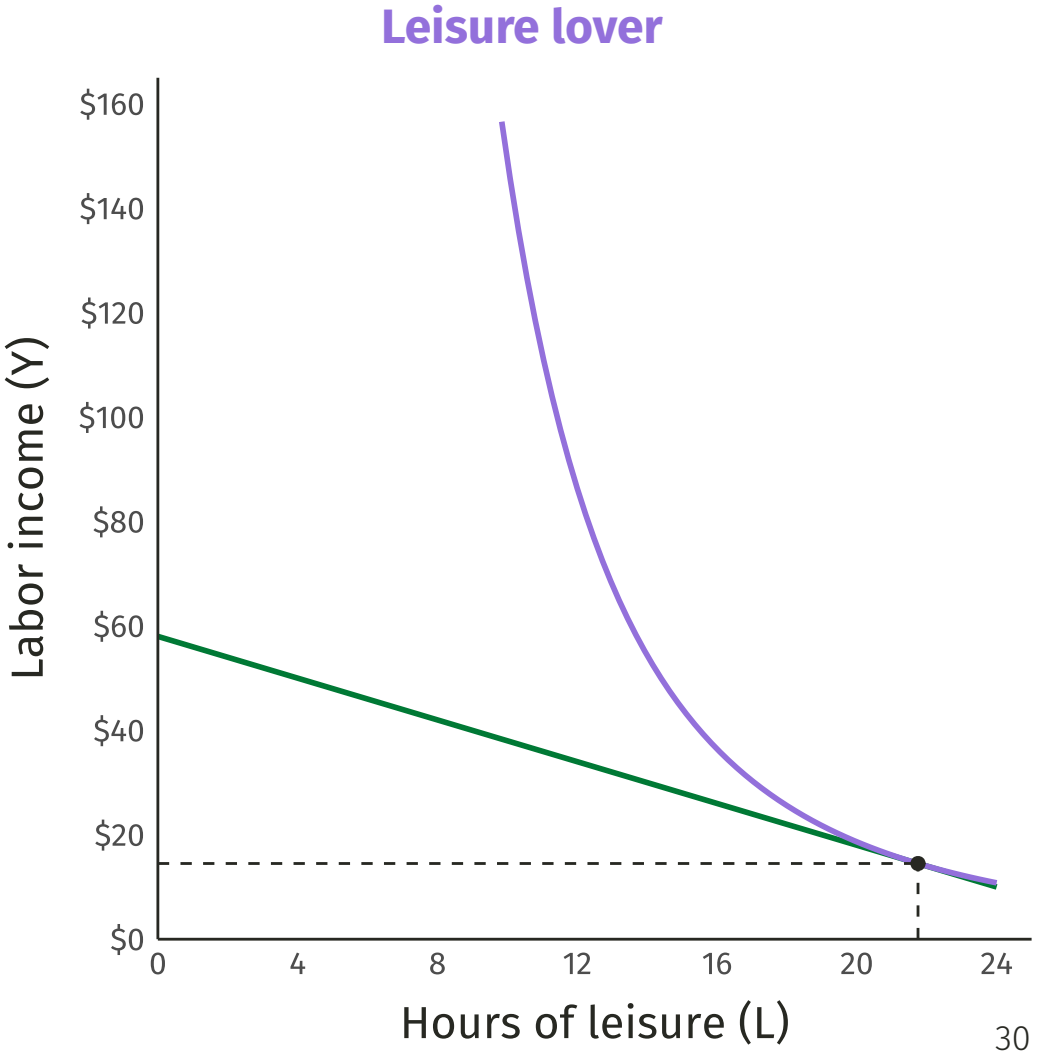
Comparing workers





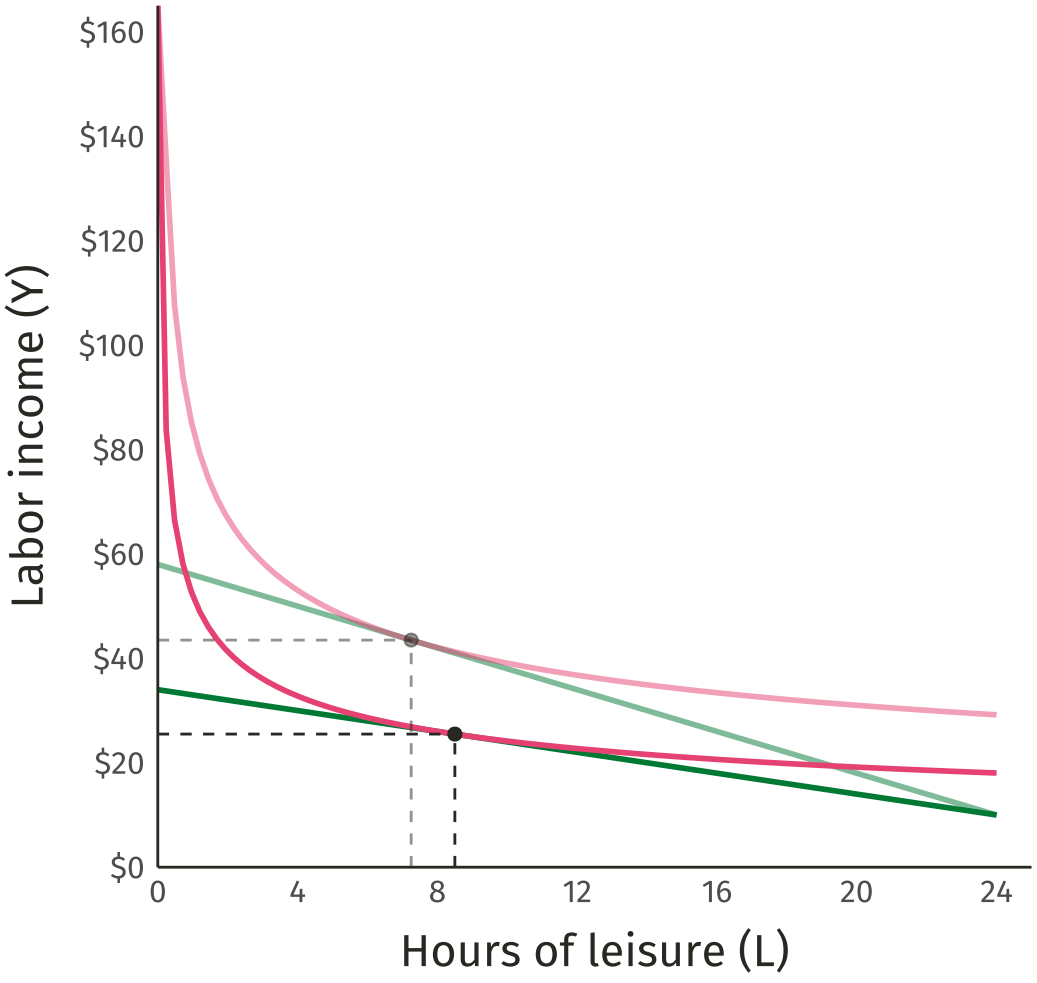
Comparing workers



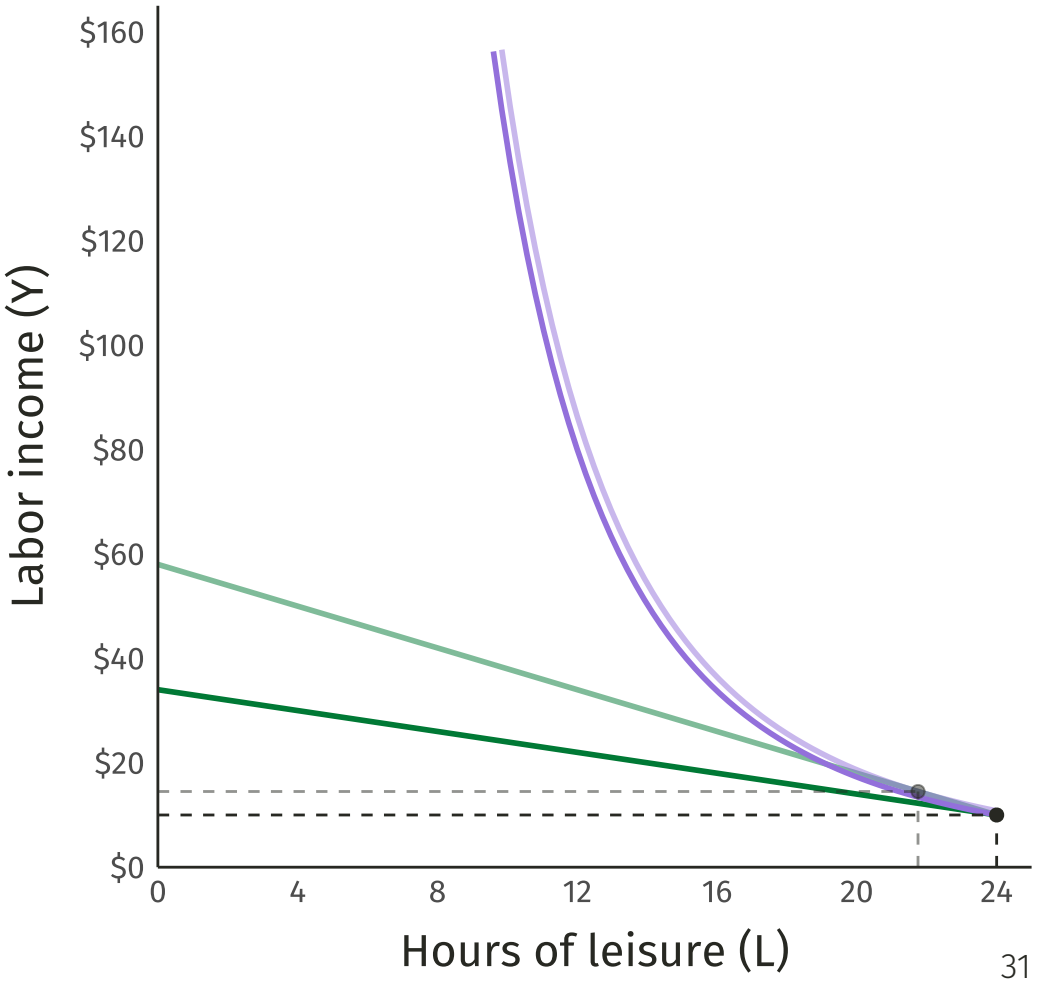


Comparing workers

Money lover



Leisure lover



Implications for policy?

Even in a truly equal-opportunity world[†], **differences in preferences will lead to unequal outcomes** (*e.g.*, earnings).

Q: Is this bad?

A: This is fundamentally a normative question. But **a policy that forces people** with different preferences **to make the same choices** without compensation **will necessarily make someone worse off** without helping anyone else.

- No normative claim here! This is a positive statement (someone *will* end up on a lower indifference curve).

[†] Not this one!

Housekeeping

Assigned reading for Wednesday: Snapping back: Food stamp bans and criminal recidivism by Cody Tuttle (2019).

- Reading Quiz 3 due by Wednesday, January 26th at 12pm (noon).
- Check out the "Learning from Observational Data" lecture before you read the paper!
  - Pay special attention to the "regression discontinuity" section (slide 17, starts at roughly 44:30 in the video).

Assigned reading for Monday: Effective policy for reducing poverty and inequality? The Earned Income Tax Credit and the distribution of income by Hilary Hoynes and Ankur Patel (2018).

- Reading Quiz 4 will open after class on Wednesday and will be due by Monday, January 31st at 12pm (noon).

Problem Set 1 due by Friday, January 28th at 11:59pm.