We are seeking a seminar room for ECON 4905. We will keep you posted, but please be alert.

Update bio needed for at least one student.

Wall Street
- Scientific method
  - Model
  - Data
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- Economics is a behavioral science
  - Beliefs about beliefs of others
  - Coordination
  - Paper assets and finance amplify this aspect
Scientific method
  ▶ Model
  ▶ Data

Economics is a behavioral science
  ▶ Beliefs about beliefs of others
  ▶ Coordination
  ▶ Paper assets and finance amplify this aspect

Economists
  ▶ Not good at macro-forecasting
  ▶ Good at predicting ”unintended consequences”
  ▶ Somewhat good at using theory and data in place of emotions and tribalism
What is macro-economics?

- **Denotation**
  - Aggregate variables from national income accounts
    - Simon Kuznets, Penn US
    - Richard Stone, Cambridge UK
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- **Denotation**
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- **Conotation**
  - Money and finance
  - Interest rates
  - Intertemporal
  - Expectations
  - Banking
  - Unemployment
  - And more
This course, ECON 4905

Goals:
This course, ECON 4905
Goals:

- Integration of macro-economics, monetary economics, banking, taxation, regulation
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Goals:

- Integration of macro-economics, monetary economics, banking, taxation, regulation
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- Prepare students:
  - to assess and understand policy issues
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  ▶ possibly pursue careers in related fields
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Review: Money Taxes and Transfers
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- \( \omega = (\omega_1, \ldots, \omega_h, \ldots, \omega_n) > 0 \) is the vector of chocolate endowments
x_h = \omega_h - P^m_{\tau_h} \quad h = 1, \ldots, n
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\[ \text{CP} \left\{ \begin{array}{l}
\max U_h(x_h) \\
\text{subject to: } x_h > 0 \text{ and } x_h = \omega_h - P^m \tau_h
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\( P^m \geq 0 \) defines a C.E. if CP holds for \( h = 1, \ldots, n \) and materials balance.
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\text{MB:} \quad \sum_{h=1}^{n} x_h = \sum_{h=1}^{n} \omega_h
\]
Summing over individuals:

\[ \sum_{h=1}^{n} x_h = \sum_{h=1}^{n} \omega_h - P^m \sum_{h=1}^{n} \tau_h \]
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so

\[P^m = 0 \quad \text{or} \quad \sum_{h=1}^{n} \tau_h = 0 \quad \text{or both}\]
Bonafide Taxes and Balanced Taxes

- $\tau = (\tau_1, \ldots, \tau_h, \ldots, \tau_n)$ is said to be *balanced* if we have $\sum_{h=1}^n \tau_h = 0$, i.e., if taxes exactly offset subsidies.

- $\tau$ is said to be *bonafide* if there is at least one CE in which $P^m > 0$. (In other words, $\tau$ is a good faith policy).

- We have shown that if $\tau$ is imbalanced, then $\tau$ is not bonafide. Every bonafide $\tau$ is balanced in this simple finite economy.
Bonafide implies balanced. Is the converse true? That is, are bonafide policies and balanced policies equivalent?
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Define the tax-adjusted endowment
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\tilde{\omega} = (\tilde{\omega}_1, \ldots, \tilde{\omega}_h, \ldots, \tilde{\omega}_n) = \\
(\omega_1 - P^m \tau_1, \ldots, \omega_h - P^m \tau_h, \ldots, \omega_n - P^m \tau_n).
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\]

Since \( \omega > 0 \), for \( P^m > 0 \) sufficiently small, we have \( \tilde{\omega} > 0 \). The CE for this \( \tilde{\omega} \) (without money) yields \( x > 0 \) and \( \sum_h x_h = \sum_h \tilde{\omega}_h = \sum_h (\omega_h - P^m \tau_h) = \sum_h \omega_h - P^m \sum_h \tau_h = \sum_h \omega_h \). Hence there are \( P^m > 0 \) in money-tax equilibrium.
Outside Money Taxation: Examples

\[ l = 1, n = 6, \omega = (\omega_1, \ldots, \omega_h, \ldots, \omega_6) = (100, 90, 10, 10, 10, 10) \]
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**Example 1**

\[ \tau = (20, 20, -10, -10, -10, -10) \]

\[ \sum_h \tau_h = 0 \Rightarrow \tau \text{ bonafide} \]

2 guys (Mr. 1 and Mr. 2) are taxed.
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Mr. 1:

\[
100 - 20P^m > 0
\]

\[
20P^m < 100
\]

\[
P^m < 5
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Mr. 1:

\[ 100 - 20P^m > 0 \]
\[ 20P^m < 100 \]
\[ P^m < 5 \]

Mr. 2:

\[ 90 - 20P^m > 0 \]
\[ 20P^m < 90 \]
\[ P^m < \frac{9}{2} < 5 \]

\( P^m = \left[ 0, \frac{9}{2} \right) \) \( P^m \) is the set of equilibrium money prices
Example 2

\[ \tau = (100, 90, -20, -20, -20, -20) \]

\[ \sum_{h} \tau_h = 100 + 90 + 4(-20) = 110 \neq 0 \]

\( \tau \) not balanced \( \Rightarrow \) \( \tau \) not bonafide

\[ P^m = \{0\} \]
Example 3

\[ \tau = (2, 2, -1, -1, -1, -1) \]

\[ \sum_{h} \tau_h = 4 - 4 = 0 \]

\( \tau \) balanced \( \Rightarrow \) \( \tau \) bonafide

Mr. 1

\[ 100 - 2P^m > 0 \]
\[ 2P^m < 100 \]
\[ P^m < 50 \]

Mr. 2

\[ 90 - 2P^m > 0 \]
\[ 2P^m < 90 \]
\[ P^m < 45 \]
\[ P^m = [0, 45) \]
Example 4

\[ \tau = (0, 0, -5, -5, -5, -5) \]

\[ \sum_{h} \tau_h = 0 - 20 = -20 \neq 0 \]

\( \tau \) not balanced \( \Rightarrow \) \( \tau \) not bonafide

\[ P^m = \{0\} \]
Example 5

\[ \tau = (0, 0, 0, 0, 0, 0) \]

\[ \sum_h \tau_h = 0 \]

\[ \tau \text{ balanced} \Rightarrow \tau \text{ bonafide} \]

\[ \mathcal{P}_m = [0, \infty) \]

\( \mathcal{P}_m \) is indeterminate because there are no money trades at any price.
Money Taxation Take-aways:

- In some cases, the equilibrium allocation $x$ is unique, but generally $x$ depends on consumer beliefs about $P^m$.
- Fundamentals do not completely determine economic outcomes. Beliefs are important: this is a basic source of financial fragility.
- Compare to Ben Stein’s remark.