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2.3 First Model of the Macroeconomy: Equilibrium and Efficiency

References:
Williamson, Ch. 5.

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Outline

1. Notion of Equilibrium
2. Efficient allocation
3. Equivalence of equilibrium and efficient allocations
4. Some comparative statics results
5. Inefficient equilibrium under distorting taxation

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Equilibrium in our Model Economy

An "equilibrium" of our economy is a collection of
 Endogenous variables: $C, L, NS, ND, T, Y, w, \pi$
 Exogenous variables: G, z, K
 such that the following conditions hold:

1. C, L maximize utility given π, w, T (and $NS = h - L$)
2. ND maximizes profit (π) given w, K
3. Government budget constraint holds, $G=T$
4. Market clearing holds,
 - $NS = ND$ (labor market)
 - $Y = C + G$ (goods market)

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Solving for, analyzing Eq'm

1. Tools
 - a. Algebra
 - b. Computer simulation
 - c. Graphical analysis
2. "Direct" or "indirect" approach
 - a. Brute force using equilibrium conditions (e.g., "supply and demand")
 - b. Utilize equivalence to efficient allocation

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Economic Efficiency

- An "Pareto optimal" allocation solves the "social planner's problem":
 maximize the representative consumer's utility subject to "resource constraints"

$$H = L + N$$

$$Y = zF(K,N) = C + G$$
- Key points:
 1. We are interested in the relationship between equilibrium and efficiency.
 2. The "budget constraint" is conceptually different from "resource constraints"!

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Resource Feasibility: Production Possibilities Frontier

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Solving the Social Planner's Problem

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First and Second Welfare Theorems

1. Equilibrium of an economy is Pareto optimal...
[under certain conditions].
2. A Pareto optimum can be "decentralized" as an equilibrium...
[under certain conditions].

How can we show this!?!

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Q: How do we show that our Pareto optimum is an equilibrium allocation?

A: "Construct" an equilibrium with allocation (C^*, L^*) !

1. Set $w^* = MPN(K, N^*)$, where $N^* = h - L^*$
2. Set $T^* = G$.
3. Verify equilibrium conditions.

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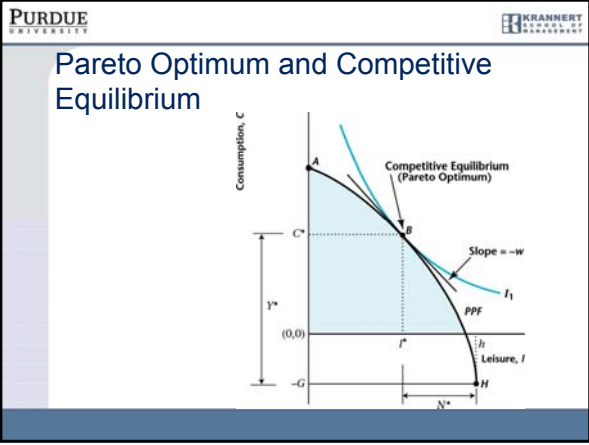
Conclusion: Given (z, K, G) ; $(C^*, L^*, N^*, Y^*, w^*, T^*, \pi^*)$ satisfy eq'm conditions!

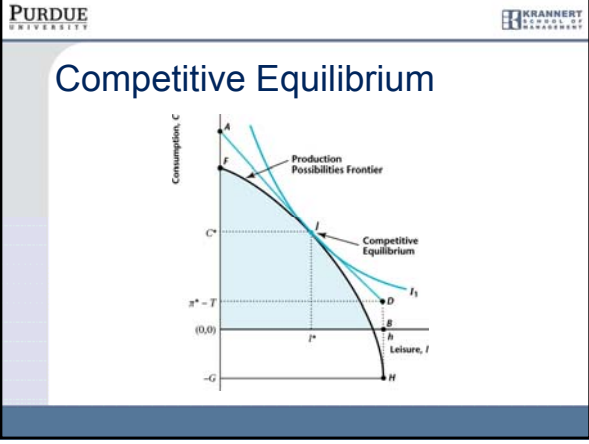
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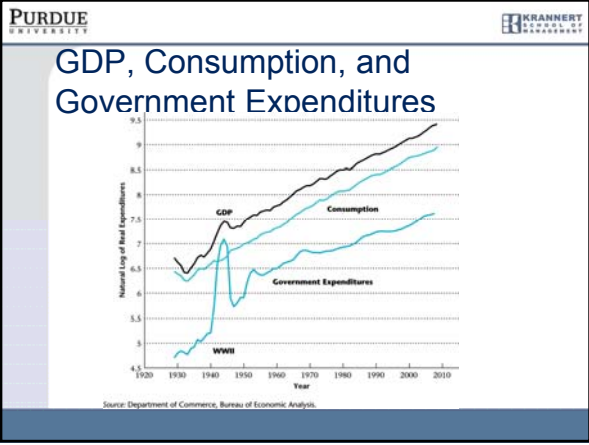


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Effect of a change in Government Spending (say, $\Delta G > 0$)

- Induces a strong income effect, reducing both C and L
- "Crowding out" of private spending (C)
- Results:

Could this be the primary source of business cycle fluctuations?



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Effect of a "productivity shock", $\Delta z > 0$

- Interpretation (short-run or long-run)
- Results:
 - Income effect tends to increase both C, L
 - Substn effect tends to increase C, reduce L
 - $\uparrow C, Y, w$
 - Effect on L (and N) is ambiguous.

