Reconciling Hayek’s and Keynes’ views of recessions

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0. Introduction
Recessions

- Recessions often come after periods of rapid accumulation of assets (productive capital, houses, durable goods)
- Two opposite views of economic policy in those recessions
  - Hayek
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Two opposite views

The Liquidationist View
(Friedrich Hayek)

- Recessions are needed to cleanse the economy.
- Gvt spendings, aggregate demand management only delays necessary adjustment

The Aggregate Demand View
(John Maynard Keynes)

- Recessions are periods of insufficient demand
- Activist fiscal policy is needed
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- We show that the two views are not mutually exclusive
- “Over-” (“mal-”) accumulation of physical assets creates the need for liquidation $\rightarrow$ recession
- This liquidation will cause the economy to function particularly inefficiently.
- Some stimulative policies may remain desirable even if they postpone a recovery.
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Main Ingredients

- Environment with decentralized markets & flexible prices.
- Two imperfections:
  - Labor market matching friction in the spirit of Diamond–Mortensen–Pissarides implies unemployment risk.
  - Adverse selection in the insurance market: unemployment risk is not (fully) insurable.
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What we do not do

- We do not propose a theory of why the economy might find itself with a (too) large stock of houses, durables and/or capital goods.
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  - Lax monetary policy
  - Exuberance
  - Perfect foresights limit cycle
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▶ Static version of model (except for a few slides).
▶ Version where “capital” is indeed “durable goods” or “houses” (simpler)
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References

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Roadmap

1. Model setup
2. Equilibrium
3. Interesting Properties of the Static Equilibrium
4. Extensions / Dynamics / Policy Trade-offs
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Roadmap

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4. Extensions / Dynamics / Policy Trade-offs
1. Model setup

Figure 1: Overview: timeline

- Morning
- Afternoon
1. Model setup

Figure 2: Overview: Initial goods

\[ X_j \text{ GIVEN} \]

\[ \text{MORNING} \quad \text{AFTERNOON} \]
1. Model setup

Figure 3: Overview: markets

LABOR (FRICTIONS)

MORNING  AFTERNOON
1. Model setup

Figure 4: Overview: markets
1. Model setup

Figure 5: Overview: markets

- **Labor (frictions)**
  - Morning (durable) good
  - Afternoon (centralized) good

Labor and (non-d.) good
1. Model setup

Figure 6: Overview: firms
1. Model setup

Figure 7: Overview: firms
1. Model setup

Figure 8: Overview: households
1. Model setup

Figure 9: Overview: households
1. Model setup

Figure 10: Overview: households
1. Model setup

Figure 11: Overview: households

- Morning
- Afternoon
- HH works, Buys
- And balances books

aj
1. Model setup

Checklist

- $X$: exogenous amount of good that is already in households hands
- Mass $L$ of households always looking for jobs
- Afternoon is centralized, all the action is in the morning
- Frictions on the morning labor market
- Unemployment risk that is not insured
- No coordination between firms, shoppers and workers
- Shoppers and workers credit/debit a bank account that they will clear in the afternoon.
- Morning good is referred to as “durable” as it will be in the dynamic extension
- Afternoon good is non durable and serves as the numéraire.
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Preferences

\[ U(X_j + e_j) - \nu(l_j) + V(-p_e + I_j w \ell_j). \]

- Initial endowment of \( X_j \) units of durable good.
- Continuation value \( V(a_j) \) given \( (in this talk) \)
- \( I_j = \begin{cases} 1 & \text{if employed} \\ 0 & \text{if unemployed} \end{cases} \)
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Preferences

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Firms

- Vacancy posting cost $\Phi$.
- Decreasing-returns-to-scale production function $F(\ell)$.
- Net production of a firm hiring $\ell$ hours of labor from one worker is $F(\ell) - \Phi$. 
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Matching

- $N = \text{number firms who decide to search for workers.}$
- $M(N, L) = \text{number of matches (CRS).}$
- “Competitive” match surplus split $\leadsto \text{within-a-match hours demand :}$

$$F'(\ell) = \frac{w}{p}$$
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Normalization and Assumption

- Normalization: \( L = 1 \)
- Symmetry: \( X_j = X \)
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Normalization and Assumption

- Normalization: $L = 1$
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1. Model setup
Household morning decisions

- Worker problem:

\[
\max_{\ell_j} -\nu(\ell_j) + V\left(-pe_j + I_jw\ell_j\right)
\]

- Shopper problem:

\[
\max_{e_j} U(X + e_j) + \mu V(w\ell_j - pe_j) + (1 - \mu) V(-pe_j)
\]

\[\mu \equiv M(N, L)/L \text{ job finding probability.}\]
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Household morning decisions

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   Deriving the value function $V(a)$

- Not here...

- $V(a)$ is strictly concave, with the key property that $V'(a_1) > V'(a_2)$ if $a_1 < 0 < a_2$
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Figure 12: The Value Function $V(a)$
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$a_1 < 0$
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$V'(a_1) < 0$

$V'(a_2) > 0$
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Roadmap

1. Model setup
2. Equilibrium
3. Interesting Properties of the Static Equilibrium
4. Extensions / Dynamics / Policy Trade-offs
2. Equilibrium

- Afternoon: $V(a_j)$
- Morning: markets clear and agents optimize
2. Equilibrium

- Afternoon: $V(a_j)$
- Morning: markets clear and agents optimize
The equilibrium is given by the following equations

\[ \frac{1}{p} U'(c) = \frac{M(N, L)}{L} V'(w \ell - p(c - X)) \]

\[ + \left[ 1 - \frac{M(N, L)}{L} \right] V'(-p(c - X)) \]

\[ \nu'(\ell) = V'(w \ell - p(c - X)) w \]

\[ pF'(\ell) = w \]

\[ \frac{M(N, L)}{N} [pF(\ell) - w \ell] = p \Phi \]

\[ M(N, L)F(\ell) = L(c - X) + N \Phi \]
2. Equilibrium
First sub-period

The equilibrium is given by the following equations

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\frac{1}{p} U'(c) = \frac{M(N, L)}{L} V' (w \ell - p(c - X)) \\
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2. Equilibrium
A labor market wedge

\[
\frac{\nu'(\ell)}{U'(c)} \left\{ 1 + (1 - \mu) \left[ \frac{V'(-p(c - X))}{V'(w\ell - p(c - X))} - 1 \right] \right\} = F'(\ell)
\]

1+ labor wedge
0. Introduction
Roadmap

1. Model setup
2. Equilibrium
3. Interesting Properties of the Static Equilibrium
4. Extensions / Dynamics / Policy Trade-offs
Our main goal now is to explore the effects of changes in $X$ on equilibrium outcomes.

- Why and when an increase in $X$ can actually lead to a reduction in consumption and/or welfare?
- Can liquidation periods be socially painful?
- In this talk I restrict the analysis to
  
  $M(N, L) = \min\{N, L\}$
3. Interesting Properties of the Static Equilibrium
Goal and parametric restrictions

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▶ We restrict the analysis to
  $M(N, L) = \min\{N, L\}$
  $V(a) = \begin{cases} 
  (1 + \tau) \cdot v \cdot a & \text{if } a < 0 \\
  v \cdot a & \text{if } a \geq 0 
  \end{cases}$
3. Interesting Properties of the Static Equilibrium
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The value function $V(a)$ is shown in the diagram. The slope at $a_1 < 0$ is given by $(1 + \tau)v$.
Figure 14: The Value Function $V(a)$

\[ V(a) \]

\[ a_1 < 0 \]

\[ a_2 > 0 \]

slope $\nu$

slope $(1 + \tau)\nu$
3. Interesting Properties of the Static Equilibrium
With piecewise linear $V$

$$\frac{\nu'(\ell)}{U'(c)} \left\{ 1 + (1 - \mu) \left[ \frac{V'(-p(c-X))}{V'(w\ell - p(c-X))} \right] - 1 \right\} = F'(\ell)$$
3. Interesting Properties of the Static Equilibrium
Two key parameters (1)
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Two key parameters (2)
Figure 15: Proposition 1: Existence and Uniqueness
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Unique equilibrium
Figure 15: Proposition 1: Existence and Uniqueness

- Unique equilibrium
- Multiple equilibria
Figure 16: Proposition 2: The three regimes
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$0 \quad X^* \quad X$
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Full employment

0 \quad X^* \quad X^{**} \quad X
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- Full employment
- Unemployment
- No employment
3. Interesting Properties of the Static Equilibrium Consumption as a function of $X$

- How does vary equilibrium consumption when $X$ increases?
  - In the full employment regime:
    - Marginal utility of spendings decrease with $X \rightarrow$ less production
    - But less than proportional to the increase in $X$
    - Overall, $c$ increases with $X$

- In the no employment regime:
  - $c = X$
  - $c$ increases one to one with $X$

- In the unemployment regime:
  - “Multiplier > 1”
  - Spendings decrease more than one to one with $X$
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3. Interesting Properties of the Static Equilibrium
Consumption as a function of $X$

- How does vary equilibrium consumption when $X$ increases?
- In the full employment regime:
  - Marginal utility of spendings decrease with $X \rightsquigarrow$ less production
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Figure 17: Proposition 3, Consumption as function of $X$. 

![Graph showing consumption as a function of X with critical points $X^*$, X, and $X^{**}$]
3. Interesting Properties of the Static Equilibrium

Is there deficient demand in the unemployment regime?
3. Interesting Properties of the Static Equilibrium
Is there deficient demand in the unemployment regime?

**Definition**: *Deficient demand* is a situation where
- increased demand by one agent would favor increased demand by other agents,
- a feasible coordinated increased in demand by all agents would leave everyone better off.
3. Interesting Properties of the Static Equilibrium
Is there deficient demand in the unemployment regime?

Definition: Deficient demand is a situation where
- increased demand by one agent would favor increased demand by other agents,
- a feasible coordinated increased in demand by all agents would leave everyone better off.

Proposition 4
When the economy is in the unemployment regime ($X^* < X < X^{**}$), there is deficient demand.
3. Interesting Properties of the Static Equilibrium
Effects of changes in $X$ on welfare
3. Interesting Properties of the Static Equilibrium
Effects of changes in $X$ on welfare

**Proposition 5 (Welfare)**

- *If the economy is the unemployment regime and if $\tau$ is large enough (close enough to $\bar{\tau}$),*
- *then an increase in $X$ leads to a fall in welfare.*
3. Interesting Properties of the Static Equilibrium

Figure 18: Welfare as function of $X$
3. Interesting Properties of the Static Equilibrium
Introducing government spending

- Add a government in the morning
- \( u(X + e + G_n) + \gamma \tilde{u}(G_u) \)
- Government:
  - purchase \( G_n \) that is perfectly substitutable with private consumption
  - purchase \( G_w \) that is useless (\( \gamma = 0 \)), or enters additively in utility
  - Lump-sum taxes
  - Balance budget
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Proposition 6 (Fiscal Multipliers)

- An increase in $G_n$ has no effect
- An increase in $G_w$ increases activity.
- The multiplier $de/dG_w$ is
  - greater than one in the unemployment regime
  - smaller than one in the full-employment regime
3. Interesting Properties of the Static Equilibrium
Introducing government spending (continued)

Proposition 6 (Fiscal Multipliers)

- *An increase in* $G_n$ *has no effect*
- *An increase in* $G_w$ *increases activity.*
- *The multiplier* $\frac{d\delta e}{dG_w}$ *is*
  - greater than one in the unemployment regime
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Introducing government spending (continued)

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Proposition 7 (Fiscal policy and welfare)

- *In the unemployment regime*
- *in the zone where a fall in X would increase welfare,*
- *an increase in $G_w$ will increase welfare.*
0. Introduction

Roadmap

1. Model setup
2. Equilibrium
3. Interesting Properties of the Static Equilibrium
4. Extensions / Dynamics / Policy Trade-offs
4. Extensions / Dynamics / Policy Trade-offs
Relaxing functional-form assumptions

► Results are robust to:
  ❌ Relaxing functional assumptions (matching function)
  ❌ Other ways of splitting the surplus (Nash Bargaining, directed search)
  ❌ Introduction of productive capital
  ❌ Addition of another good in the morning (cf Krugman)

► Simple characterization is not always possible
► but main results hold.
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Information friction: adverse selection.

We can then compute the constrained efficient planner allocations.
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4. Extensions / Dynamics / Policy Trade-offs
Dynamic Setup

- An infinite number of periods $t$,
- Each period consists of a morning and an afternoon
- The only financial trade is between morning and afternoon by assumption

\[ X_{t+1} = (1 - \delta)X_t + \gamma e_t \]

\[ \mathcal{U} = \sum_{t=0}^{\infty} \beta^t \left( U(c_t) - \nu(l_t) + V(a_t) \right) \]
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4. Extensions / Dynamics / Policy Trade-offs

Figure 19: Global Dynamics when $\beta = 0$

\[
-c'(X_t) < \frac{1 - \delta - \gamma}{\gamma} < -c'(X_t) < \frac{2 - \delta - \gamma}{\gamma} < -c'(X_t) > \frac{2 - \delta - \gamma}{\gamma}
\]
When $X$ is high, the economy will converge with the SS with inefficiently low demand on the way.

- Welfare today would be increased by stimulating demand today.
- But this would imply higher $X$ tomorrow,
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- This tradeoff is aimed at capturing the tension between the Keynesian and Hayekian prescriptions in recession.
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- This tradeoff is aimed at capturing the tension between the Keynesian and Hayekian prescriptions in recession.
Proposition 8 (Aggregate demand management is desirable)

- Suppose the economy is in steady state in the unemployment regime.
- Then, to a first-order approximation, a (feasible) change in the path of expenditures from this steady state equilibrium will increase the present discounted value of expected welfare ...
- ... if and only if it increases the presented discounted sum of the resulting expenditure path, $\sum_{i=0}^{\infty} \beta^i e_{t+i}$.
- Aggregate demand management is therefore desirable.
5. Recap
Main Mechanism

▶ If the economy finds itself with an “excess” of accumulated goods (houses, durables and/or capital goods):
  × Consumers and firms will spend less because they already have a lot, *(Hayek view, this is the efficient thing to do)*
  × Firms will hire less as demand is low
  × Consumers will consume less by fear of being unemployed,
  × Spendings will therefore be low *(Keynes view, a (negative) multiplier shows up)*
  × etc...

▶ There is socially excessive precautionary savings

▶ Aggregate demand management (e.g. government spendings) can boost mutually beneficial trades ...

▶ ... but it will postpone the recovery by slowing down the liquidation process *(in the dynamic version of the model)*
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