An Economical Business-Cycle Model

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Objective of the paper

develop a tractable business-cycle model to analyze monetary policy with

- variable slack (unemployment + idle labor + idle capacity)

- stable inflation
Slack and inflation in the US

idle capacity (Census)

idle labor (ISM)
Slack and inflation in the US
Slack and inflation in the US
Overview of the model

start from money-in-the-utility-function model of Sidrauski [AER 1967]

- add matching frictions on market for labor services as in Michaillat & Saez [QJE 2015]
- add utility for wealth as in Kurz [IER 1968]
Behavior of households

\[
\max_{c,m,a} \int_{0}^{+\infty} e^{-\delta \cdot t} \cdot \left[ \frac{\varepsilon}{\varepsilon - 1} \cdot c^{\frac{\varepsilon - 1}{\varepsilon}} + \phi(m) + \omega(a) \right] \, dt
\]

\[
s.t. \quad \frac{da}{dt} = f(x) \cdot k - \left[ 1 + \tau(x) \right] \cdot c - i \cdot m + r \cdot a + s
\]

c = consumption; m = real money; a = real wealth;

x = market tightness; 1 - f(x) = unemployment rate;

\tau(x) = matching cost; i/r = nominal/real interest rate;

k = supply of services; \delta = discount rate; s = seignorage
Utility for real money

$\phi(m)$

real money $m$

money bliss point
Utility for real wealth

\[ a = m + b = 0 \]

no aggregate wealth
Steady state \( \{a, m, i, c, x, \pi\} \)

- no real wealth in aggregate: \( a = 0 \)
- monetary policy sets real money \( m \)
- IS curve (consumption Euler equation)
- LM curve (demand for money)
- AS curve (supply and matching process)
- **inflation** \( \pi \) is a fixed parameter
IS curve with utility of wealth

\[ c^IS(i, \pi, x) = \left( \frac{\delta + \pi - i}{(1 + \tau(x)) \cdot \omega'(0)} \right) \]

nominal interest rate \( i \)

consumption \( c \)
IS curve without utility of wealth

\[ i = \pi + \delta \]
LM curve away from liquidity trap

\[ c^{LM}(i, m, x) = \left( \frac{i}{(1 + \tau(x)) \cdot \phi'(m)} \right)^\epsilon \]
LM curve in liquidity trap

consumption \( c \)

nominal interest rate \( i \)

\[ i = 0 \]
IS & LM determine AD and $i$
AD curve

\[ c^{AD}(x, \pi, m) = \left[ \frac{\delta + \pi}{(1 + \tau(x)) \cdot (\phi'(m) + \omega'(0))} \right]^\epsilon \]
$c_{AS}(x) = \frac{f(x)}{1 + \tau(x)} \cdot k$
AS curve

- Overheating economy
- Efficient economy
- Slack economy

market tightness $x$

consumption $c$
AS & AD determine $c$ and $x$
AS & AD determine output

output $f(x)k$  capacity $k$

matching cost

market tightness $x$

consumption $c$
AS & AD determine unemployment

output
capacity

unemployment
= idle labor
= idle capacity

market tightness $\chi$

consumption $c$
Increase in money supply

market tightness \( x \)

consumption \( c \)

output
capacity

low tightness and output

depressed AD
Increase in money supply

AD increases

nominal interest rate \( i \)  
consumption \( c \)
Increase in money supply

market tightness $x$

output  capacity
efficient tightness

AS
AD
consumption $c$
Money supply in a liquidity trap

Very low tightness and output

Very depressed AD
Money supply in a liquidity trap

![Diagram illustrating the money supply in a liquidity trap with IS and LM curves.]
Money supply in a liquidity trap

In a liquidity trap, the money supply is inefficiently low, and the market tightness x is such that the AD curve intersects the AS curve at a point with inefficiently low output and capacity.
Extensions in the paper

- policies to stimulate IS curve: tax on wealth
  + helicopter drop of money
- inflation and tightness dynamics from directed search and price-adjustment cost