

# Introduction to Keynesian Macroeconomics

## Our models so far

Solow, OLG, RCK, RBC

All variables real, in units of "output" not \$

$Y$  output (in pounds), divided between  $C$ ,  $I$ ,  $G$

$w$  Amount of output a firm pays for  $L$

$$r = MPK - \delta$$

↑ (amount of output a firm pays to rent  $K$ )

$(1+r)$  If I borrow, amount I must pay next period in return for a unit of  $Y$  today

What does this mean? It could mean all

transactions (employment, borrowing/lending, taxes) are actually negotiated in units of stuff

But in reality, we use

Money: medium of exchange

& negotiate nominal (money) wages, prices, rents, interest rates

Introduction to Keynesian (cont.)

M Number of money units in an economy  
(e.g. ounces of gold, number of paper dollars...)

P Price level, Price of unit of Y.

E[P] or P<sup>e</sup> Expected value of future P

W Nominal wage

i Nominal interest rate

(1+i) If I borrow, amount of money I must pay next period in return for one unit of money today

$$\pi = \frac{P_t - P_{t-1}}{P_t} = \frac{P_t^e - P_{t-1}}{P_{t-1}} - 1 \text{ Inflation rate}$$

E[π] or π<sup>e</sup> Expected future...

Nominals & reals

$\frac{W}{P}$  Real wage

$$1+r = \frac{(1+i)P}{P^e} = \frac{1+i}{1+\pi^e} \approx i - \pi^e$$

Why? I get one unit of Y today, borrow P dollars.

Next period, must pay back (1+i)P dollars.

To get (1+i)P dollars, must sell (1+i)P / P<sub>t+1</sub> units of Y

## Introduction to Keynesian (cont.)

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### What our models so far must mean

In our models, real wage &  $P$  follow paths over time.

So if people in the models are using money,  $w$ ,  $P$  &  $i$  must be following corresponding paths.

Note: we need  $P^e$  to behave in the right way, too.  
Realized path of  $P_{t+1}$  must be consistent with  $P_{t+1}^e$  except for unforeseeable errors.

### "Natural rates"

Values of variables that would come out of a model where all deals are made in "real" terms, not "nominal" (money) terms, like in RBC model, we will now call "natural rates"

$\bar{Y}$  Natural rate of output

$\bar{L}$  etc.

$\bar{v}$

Note: using this language, in an RBC model  $Y \downarrow$  means  $\bar{Y} \downarrow$ . A recession must be a fall in "natural rate" of  $Y$ .

## Introduction to Keynesian (cont.)

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### Big idea of Keynesian theory

$w, P, i$  need not follow the paths that allow

$$Y = \bar{Y}, r = \bar{r}, \text{ etc.}$$

When they deviate from needed paths,

$$Y \neq \bar{Y}, r \neq \bar{r}, \text{ etc.}$$

So when  $Y \downarrow$  (recession)

that need not mean  $\bar{Y} \downarrow$  (like in RBC)

it could mean  $Y < \bar{Y}$ .

Specifically,  $w$  &  $P$  do not (cannot) adjust fast enough to always stay on needed paths.

They adjust too gradually, sluggishly.

They are "sticky," "rigid,"

Not perfectly "flexible."

Let  $\bar{P}$  denote price level that lets  $Y = \bar{Y}$ .

$\bar{P}$  changes,  $P$  lags behind,  $P \neq \bar{P}$

While  $P > \bar{P}$  ( $P < \bar{P}$ ),  $Y < \bar{Y}$  ( $Y > \bar{Y}$ ).

Introduction to Keynesian...

History of Keynesian macroeconomics

1920s - 1930s

1920s: Britain adopts fixed exchange rate,  
chosen rate is overvalued  
(requires decline in British  $W, P$  levels)  
result: high unemployment

1929: Great Depression

John Maynard Keynes develops idea,

1936: publishes The General Theory  
of Employment, Interest & Money

John Hicks writes a paper to summarize some  
of Keynes' argument, creating IS/LM model

1937: Econometrica "Mr. Keynes & the Classics"

Note: they both assume the sticky, inflexible  
thing is wage level  $W$  (which means  $P$   
sticky too)

Model defines  $\bar{W}, \bar{P}$  as function of  $M$  (& other stuff).  
Takes  $W, P$  as given, no model of how  $W \& P$   
are determined.

Introduction to Keynesianism

History

1940s - 1950s

Keynesian models still have no component determining  $w$  &  $P$ .

$w$  or  $P$  is fixed in "short run" while  $\bar{P}(\bar{w})$  varies.

In "long run" they equal  $\bar{P}(\bar{w})$ .

Relationships between other variables (e.g.  $C, Y$ ) are not derived from microeconomics (e.g. utility maximization).

Various assumptions about expectations of future variables.

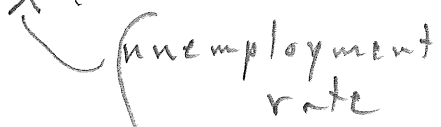
Phillips curve

In 1958 A.W. Phillips publishes empirical study showing that in Britain 1861-1957 wage inflation rate is negatively related to unemployment rate (scatterplot)

In 1960 Paul Samuelson & Robert Solow publish paper showing similar pattern in U.S. 1890-1950's

Propose "Phillips curve" relationship between unemployment & price inflation, too.

$$\pi_t = \text{Constant} - \beta u_t = \text{Constant} + \alpha Y_t$$



# Introduction to Keynesian...

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## History...

### Late 1960s - 1970s

- 1) Milton Friedman & Edward Phelps (1968)  
introduce "expectations-augmented Phillips curve"

$$\pi_t = E\pi - \beta(u - \bar{u})_t = E\pi + \alpha(Y - \bar{Y})_t$$

- 2) "rational expectations" for agents in model

### 1980s New Keynesian

Microeconomic models of sticky prices

### 1990s → New Keynesian

Embed microeconomic model of sticky prices  
into DSGE models