

## **Inflation Economics**

# ***The Quantity Theory of Money and the Phillips Curve***

### **WHAT YOU WILL LEARN THIS LECTURE**

1. The difference between depression and inflation economics.
2. The application of the quantity theory of money to situations in which there is an excess supply of money.
3. The Phillips Curve
4. Determinants of the “natural” rate of unemployment and of expected inflation.
5. The macroeconomic history of inflation and unemployment in the United States since the Korean War
6. Why inflation is an economic problem worth worrying about.

### **RECAPITULATION**

This time there is no recapitulation. We are starting afresh, with a new topic. We have stopped considering not situations in which there is deficient demand for—excess supply of—currently produced goods and services and thus high unemployment. We are now considering situations in which we are at full or nearly full employment—and in which the problems of the economy are very different. We are considering inflation economics.

### **INFLATION ECONOMICS**

#### ***Excess Demand for Goods and Services***

Let us move into the monetarist framework—inflation economics was, after all, what it was designed for.

Before we considered situations of “depression economics”: in which the money supply was too low for people to hold the liquid cash balances they wanted to hold if they were planning to spend at their normal, full-employment rate and thus buy all the products the economy’s productive capacity could make. The consequence of too little money chasing goods was downward pressure on spending. Since businesses would rather fire a few workers than annoy all their workers by cutting wages, and since businesses cannot cut prices and still make profits if they don’t cut wages, then businesses responded to a slower pace of economy-wide spending and growing inventories by cutting back on production and employment—and incomes would fall, and the multiplier process would roll forward.

## ***The Quantity Theory of Money***

We have an equation to tell us how much the pace of production will fall when there is too little liquid cash money in the economy. It is the “quantity theory of money” equation:

$$Y = (M/P) \cdot V$$

And if we can assume that the velocity of money  $V$  is not changing very much or very fast, it is a useful equation.

Now suppose we have a situation of too much money chasing goods. Suppose households and businesses are not short of cash and hence cutting back on spending in order to build up their cash balances, but speeding up their spending as they try to get rid of their cash balances. In total they cannot: if I pay you in cash, then I don't have the cash but you do—and you are presumably about as willing to spend it as I was. So the same equation holds. The difference is that while businesses in total find it easy to collectively cut back on production and employment—simply fire people—they find it very hard to boost production and employment—you cannot push unemployment below zero. In fact, not since World War II has the U.S. unemployment rate ever fallen below 3½%.

## ***Potential Output***

Let's take our symbol  $Y$  for the pace of production and incomes in the economy, and let's add a \* to it,  $Y^*$ , to stand for the maximum productive capacity of the economy. Vacancies are as low as they can possibly be in that businesses think that it would be worse than useless from a production point of view to fill their current vacancies from the pool of those willing to start work tomorrow. This is largely but not totally true: there is some wiggle room: overtime, extra vacancies, etc.

## ***Inflation Is a Monetary Phenomenon***

Then our quantity equation becomes:

$$Y^* = (M/P) \cdot V$$

And we want to rearrange it to put the price level  $P$  on the left-hand side:

$$P = (M \cdot V) / Y^*$$

This is the core of inflation economics. Production (and economy-wide incomes) won't rise (much) above  $Y^*$ . The velocity of  $V$  won't suddenly fall—or if it does because of a panic we switch back to depression economics. With  $Y^*$  and  $V$  what they are, increases in the economy's liquid cash money stock  $M$  produce proportional increases in the price level.

This is why the late Milton Friedman said that inflation—a persistent and ongoing rise in the price level—is a *monetary phenomenon*. Is the price level rising? Look to what is happening to the economy's liquid cash money stock to see why. Do you want to halt inflation? Then halt the process by which the money stock is growing.

That is the main message of inflation economics

## **INFLATION AND UNEMPLOYMENT**

Now let us return to the wiggle room. The level of production cannot rise above  $Y^*$  for long—but it can rise, as businesses run themselves with more jobs filled by newly-hired and perhaps lower-quality workers than they had wished, and with managers and foremen and forewomen begging workers to take on extra overtime for just one more month.

And, indeed, in situations of inflation economics the level of production and employment has to go up and down somewhat. After all, the willingness of businesses to raise their prices—to create inflation and so bring about the quantity theory's prediction of what an increase in the money stock would do to the price level—is conditioned by the state of the economy. When unemployment is low businesses will find themselves having to pay workers higher wages than they had expected to have to offer in order to fill those vacancies. And when unemployment is low, incomes are high, and spending is high, businesses will be more willing to raise their prices more quickly above what they thought that they would charge.

### ***The Phillips Curve***

These considerations led New Zealand economist A.W. Phillips in the late 1950s to look for what has come to be called a Phillips curve: a relationship between the change in the price level—the inflation rate—and the unemployment rate. In the way that Milton Friedman posed the argument in the late 1960s, every economy has at every particular moment a “natural” rate of unemployment and an “expected” rate of inflation. If the unemployment rate is at its “natural” rate, then there are no surprises. Businesses are not pleased at how strong demand is (and displeased at how much workers are demanding that they raise wages). Businesses are not displeased by how weak demand is (and pleased at how little workers are demanding that they raise wages). When unemployment is at its natural rate, inflation will be at the rate that people had expected it to be.

But what happens when unemployment is below the natural rate? Workers will see more vacancies than usual and fewer potential competitors for their jobs: they will bargain more aggressively for higher wages. Businesses seeing strong demand will accede, and raise prices to cover the higher wages they pay. The actual inflation rate will then rise above the rate of inflation that the economy had “expected.”

And what happens when unemployment rises above the natural rate—when the economy catches a small dose of depression economics, but when workers, managers, and customers still expect some inflation to continue? Workers will see a few fewer vacancies than usual and a few more potential competitors for their jobs: they will bargain less aggressively for higher wages. Businesses seeing weaker demand will bargain harder to keep a lid on wage increases, and will take advantage of the concessions they get to raise prices more slowly. The actual inflation rate will then rise above the rate of inflation that the economy had “expected.”

This is the Phillips Curve:

$$\pi = E(\pi) + \beta(u^* - u)$$

with:

$\pi$ : inflation

$E(\pi)$ : expected inflation:

$$(P(t)-P(t-1))/P(t-1) = \pi(t)$$

$u$ : unemployment rate

$u^*$ : the “natural” rate of unemployment, the NAIRU

This leaves us with two questions: What determines the natural rate of unemployment  $u^*$ ? And what determines the expected rate of inflation  $\pi$ ?

### ***The Natural Rate of Unemployment***

Usually  $u^*$  will be very stable (say, 5% in the U.S. today). Sometimes, however, it will not be stable.

Varieties of “structural” unemployment:

- Sectoral shifts.
- Persistent unemployment turns into structural unemployment.
- Young workers have higher “natural” unemployment rates than older workers.
- Poorly-educated workers have higher “natural” unemployment rates than better-educated workers.

### ***The Expected Rate of Inflation***

What determines expected inflation in our equation:  $\pi = E\pi + \beta(u^* - u)$ ?

- Adaptive expectations: usually  $E(\pi)$  will be just what inflation  $\pi$  was last year.
- Sometimes, however,  $E(\pi)$  will stay constant—“well-anchored” for quite a while, and then move in response to big changes in money growth or in actual inflation
- Sometimes  $E(\pi)$  will shift even in advance of big changes in money growth or in actual inflation. President Mitterrand of France at the start of the 1980s
- Supply shocks—like the tripling of world oil prices in 1973 and 1979—can produce sudden upward jumps in inflation that then get incorporated into expectations of future inflation.

### ***How Well Does This Phillips Curve Work?***

Push the unemployment rate above 7% and keep it there, and we certainly are not going to see inflation rising.

Push the unemployment rate below 5% and keep it there, and we certainly are not going to see the inflation rate falling.

## The Unemployment Rate and the Change in Inflation



# The Phillips Curve: The 1950s

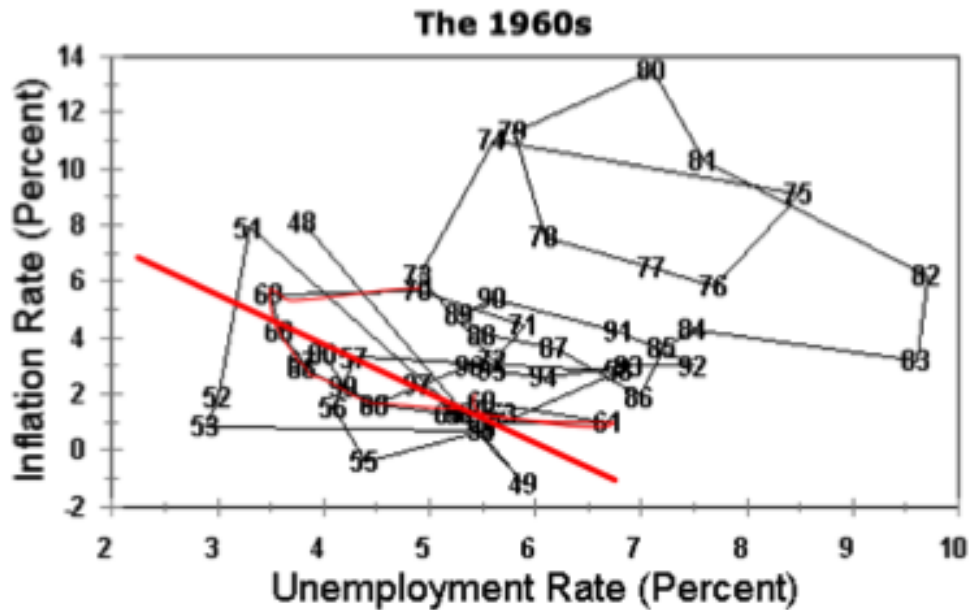


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Courtesy of Kevin Hoover

The Phillips Curve: The 1950s: stable

# The Phillips Curve: The 1960s

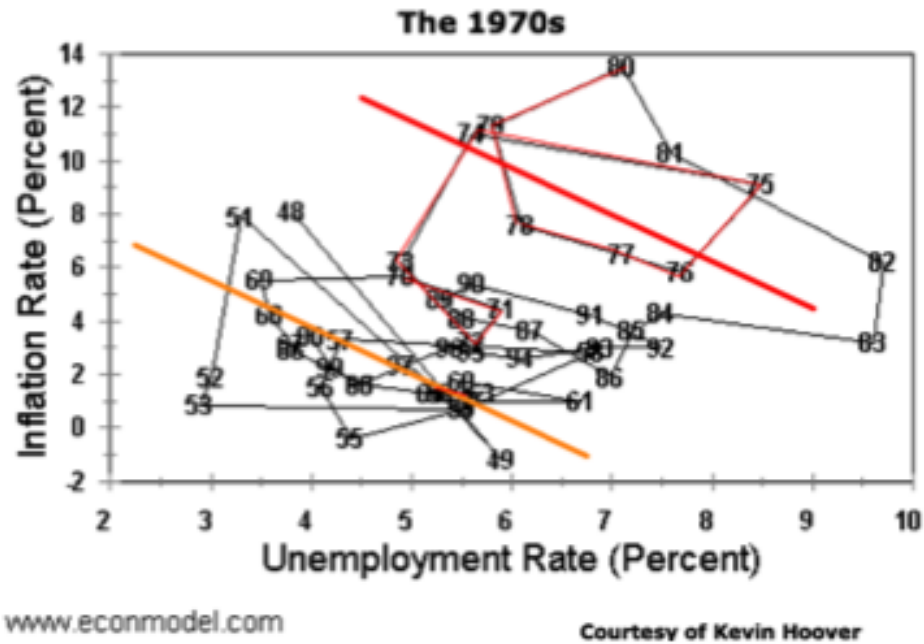


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Courtesy of Kevin Hoover

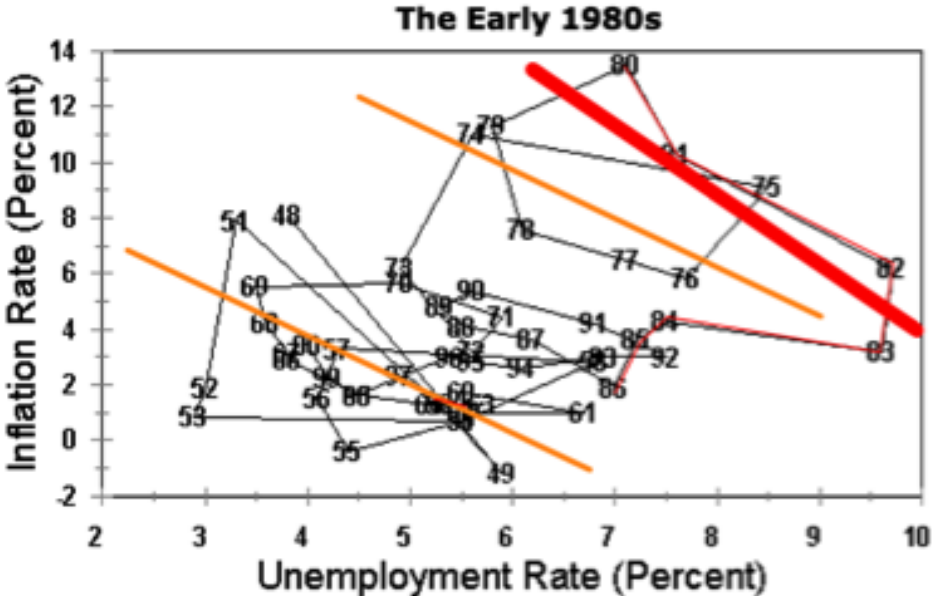
The Phillips Curve: The 1960s: stable

# The Phillips Curve: The 1970s



The Phillips Curve: The 1970s: by 1970-1971 people are expecting higher inflation—and so  $E(\pi)$  has shifted up. And then it shifts up again with a vengeance in the late 1970s.

# The Phillips Curve: The Early 1980s

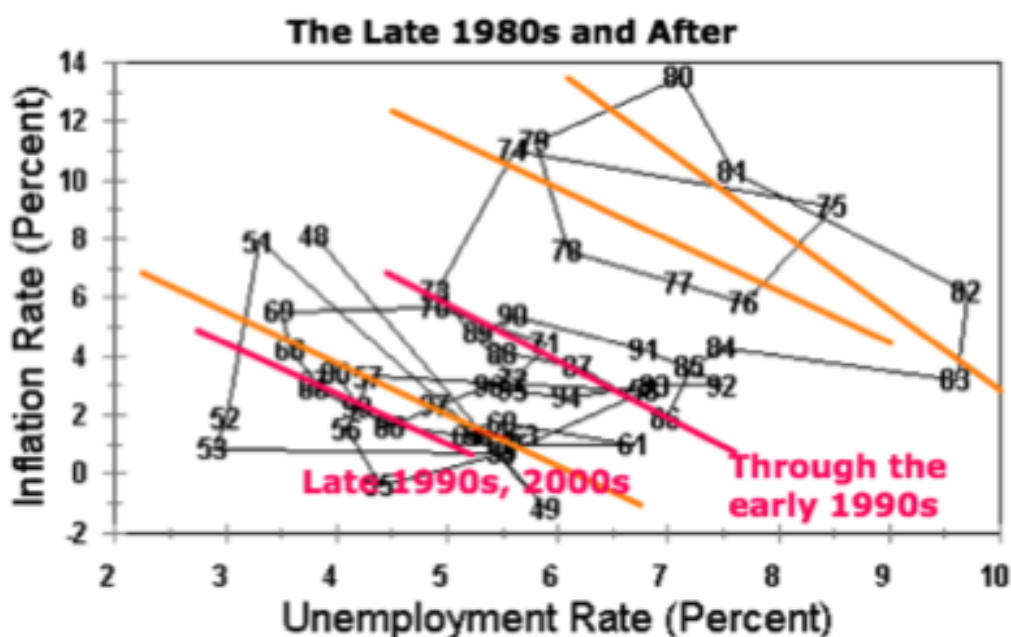


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Courtesy of Kevin Hoover

The Phillips Curve: The Early 1980s: The Phillips curve shifts up again as  $E(\pi)$  rises yet again in the early 1980s—and Paul Volcker decides to cut money growth, to engineer a “monetarist” downturn, to break the cycle of ever-increasing expectations of inflation.

# The Phillips Curve: From the Late 1980s



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Courtesy of Kevin Hoover

The Phillips Curve: From the Late 1980s: And Volcker does so. By 1986, expectations of inflation are most of the way back to their 1950s and 1960s levels. And the Federal Reserve continues to keep inflation under control, so that today our expectations of inflation are even lower than they were in the 1950s and 1960s, and are “well anchored”

## WHY ARE WE WORRIED ABOUT INFLATION, ANYWAY?

### *Inflation Deranges the Price System*

Inflation would seem to simply be a change of units. If everybody's wages double, and if all prices double, then everyone can still buy everything they could before. Why is this a problem?

A market economy works by people using prices to calculate what to do. And a market economy works well when prices reflect actual social values and scarcities.

That is to say, the market works well when low-priced things are “cheap” in the sense that they use up little of our resources; and the market system works well when high-priced things are “valuable” and hence worth making.

Inflation makes these calculations difficult, and error-ridden. There is a fear that even moderate inflation would be a drag on productivity and productivity growth.

### ***Inflation Is Unjust***

A second problem with inflation is, of course, that it is never perfect and even. Some prices and wages rise more than others. And the higher is the rate of inflation, the greater are the divergences in the rates of price increase.

John Maynard Keynes:

Lenin is said to have declared that the best way to destroy the capitalist system was to debauch the currency. By a continuing process of inflation, governments can confiscate, secretly and unobserved, an important part of the wealth of their citizens. By this method they not only confiscate, but they confiscate arbitrarily; and, while the process impoverishes many, it actually enriches some. The sight of this arbitrary rearrangement of riches strikes not only at security, but at confidence in the equity of the existing distribution of wealth. Those to whom the system brings windfalls, beyond their deserts and even beyond their expectations or desires, become 'profiteers,' who are the object of the hatred of the bourgeoisie, whom the inflationism has impoverished, not less than of the proletariat. As the inflation proceeds and the real value of the currency fluctuates wildly from month to month, all permanent relations between debtors and creditors, which form the ultimate foundation of capitalism, become so utterly disordered as to be almost meaningless; and the process of wealth-getting degenerates into a gamble and a lottery. Lenin was certainly right. There is no subtler, no surer means of overturning the existing basis of society than to debauch the currency. The process engages all the hidden forces of economic law on the side of destruction, and does it in a manner which not one man in a million is able to diagnose.

Plus, voters do not like inflation.

## **TEST YOUR KNOWLEDGE**

- What happens to the quantity equation  $Y = (M/P) \cdot V$  when you are at “full employment”, when  $Y = Y^*$ ?
- Why does the Phillips Curve slope down?
- What is the natural rate of unemployment  $u^*$ ?
- How many significant shifts in inflation expectations have there been in the post-WWII U.S.?
- When did they occur?