

Keynesian 1950s-1970s

Aggregate Supply

Some possibilities:

- 1) W 's & P 's always immediately adjust to clear markets, so $Y = \bar{Y}$ at all times.

Justification:

If $Y < \bar{Y}$, $L < \bar{L}$, excess supply in product and/or factor (labor) markets, so $P \downarrow$, $W \downarrow$

Implication:

All observed movements in Y are changes in \bar{Y}

2) Keynesian (1930s-1950s):

W & P fixed in "short-run"

W & P adjust to make $Y = \bar{Y}$ in "long-run"

Implication:

Some (most) observed movements in Y are $Y - \bar{Y}$ caused by changes in M, G, T, π^e

\Rightarrow A theory of business cycles

The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957¹

By A. W. PHILLIPS

I. HYPOTHESIS

When the demand for a commodity or service is high relatively to the supply of it we expect the price to rise, the rate of rise being greater the greater the excess demand. Conversely when the demand is low relatively to the supply we expect the price to fall, the rate of fall being greater the greater the deficiency of demand. It seems plausible that this principle should operate as one of the factors determining the rate of change of money wage rates, which are the price of labour services. When the demand for labour is high and there are very few unemployed we should expect employers to bid wage rates up quite rapidly, each firm and each industry being continually tempted to offer a little above the prevailing rates to attract the most suitable labour from other firms and industries. On the other hand it appears that workers are reluctant to offer their services at less than the prevailing rates when the demand for labour is low and unemployment is high so that wage rates fall only very slowly. The relation between unemployment and the rate of change of wage rates is therefore likely to be highly non-linear.

It seems possible that a second factor influencing the rate of change of money wage rates might be the rate of change of the demand for labour, and so of unemployment. Thus in a year of rising business activity, with the demand for labour increasing and the percentage unemployment decreasing, employers will be bidding more vigorously for the services of labour than they would be in a year during which the average percentage unemployment was the same but the demand for labour was not increasing. Conversely in a year of falling business activity, with the demand for labour decreasing and the percentage unemployment increasing, employers will be less inclined to grant wage increases, and workers will be in a weaker position to press for them, than they would be in a year during which the average percentage unemployment was the same but the demand for labour was not decreasing.

A third factor which may affect the rate of change of money wage rates is the rate of change of retail prices, operating through cost of living adjustments in wage rates. It will be argued here, however, that cost of living adjustments will have little or no effect on the rate of change of money wage rates except at times when retail prices are

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year, an increase of 7.6 per cent. in 1900 and in 1910, and an increase of 7.0 per cent. in 1872. In no other year between 1861 and 1913 was there an increase in import prices of as much as 5 per cent. If the hypothesis stated above is correct the rise in import prices in 1862 may just have been sufficient to start up a mild wage-price spiral, but in the remainder of the period changes in import prices will have had little or no effect on the rate of change of wage rates.

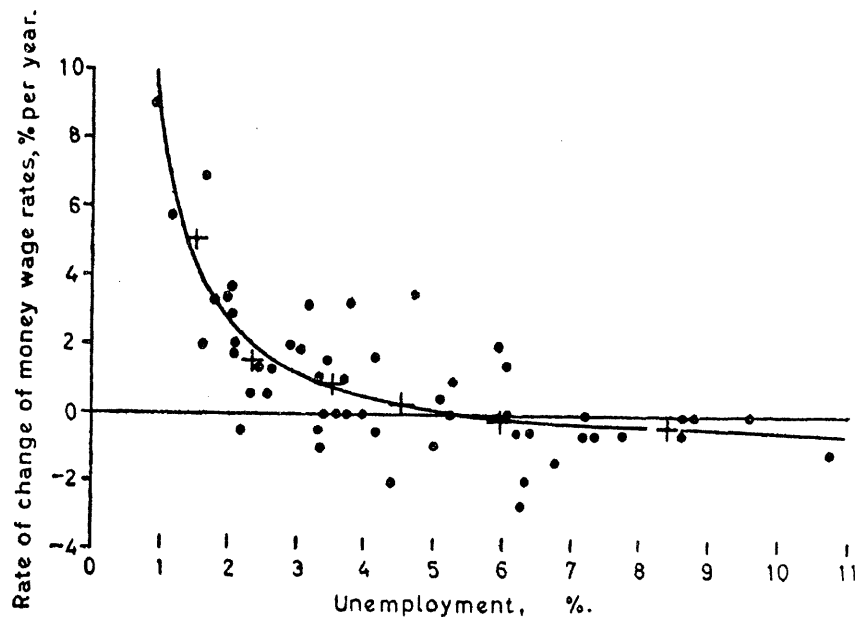


Fig.1. 1861 - 1913

A scatter diagram of the rate of change of wage rates and the percentage unemployment for the years 1861-1913 is shown in Figure 1. During this time there were $6\frac{1}{2}$ fairly regular trade cycles with an average period of about 8 years. Scatter diagrams for the years of each trade cycle are shown in Figures 2 to 8. Each dot in the diagrams represents a year, the average rate of change of money wage rates during the year being given by the scale on the vertical axis and the average unemployment during the year by the scale on the horizontal axis. The rate of change of money wage rates was calculated from the index of hourly wage rates constructed by Phelps Brown and Sheila Hopkins,¹ by expressing the first central difference of the index for each year as a percentage of the index for the same year. Thus the rate of change for 1861 is taken to be half the difference between the index for 1862 and the index for 1860 expressed as a percentage of the index

¹ E. H. Phelps Brown and Sheila Hopkins, "The Course of Wage Rates in Five Countries, 1860-1939," *Oxford Economic Papers*, June, 1950.

PROBLEM OF ACHIEVING AND MAINTAINING A STABLE PRICE LEVEL

ANALYTICAL ASPECTS OF ANTI-INFLATION POLICY

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I

Just as generals are said to be always fighting the wrong war, economists have been accused of fighting the wrong inflation. Thus, at the time of the 1946-48 rise in American prices, much attention was focused on the successive rounds of wage increases resulting from collective bargaining. Yet probably most economists are now agreed that this first postwar rise in prices was primarily attributable to the pull of demand that resulted from wartime accumulations of liquid assets and deferred needs.

This emphasis on demand-pull was somewhat reinforced by the Korean war run-up of prices after mid-1950. But just by the time that cost-push was becoming discredited as a theory of inflation, we ran into the rather puzzling phenomenon of the 1955-58 upward creep of prices, which seemed to take place in the last part of the period despite growing overcapacity, slack labor markets, slow real growth, and no apparent great buoyancy in over-all demand.

It is no wonder then that economists have been debating the possible causations involved in inflation: demand-pull versus cost-push; wage-push versus more general Lerner "seller's inflation"; and the new Charles Schultze theory of "demand-shift" inflation. We propose to give a brief survey of the issues. Rather than pronounce on the terribly difficult question as to exactly which is the best model to use in explaining the recent past and predicting the likely future, we shall try to emphasize the types of evidence which can help decide between the conflicting theories. And we shall be concerned with some policy implications that arise from the different analytical hypotheses.

History of the Debate: The Quantity Theory and Demand-Pull. The preclassical economists grew up in an environment of secularly rising prices. And even prior to Adam Smith there had grown up the belief in at least a simplified quantity theory. But it was in the neoclassical thought of Walras, Marshall, Fisher, and others that this special version of demand determination of the absolute level of money prices and costs reached its most developed form.

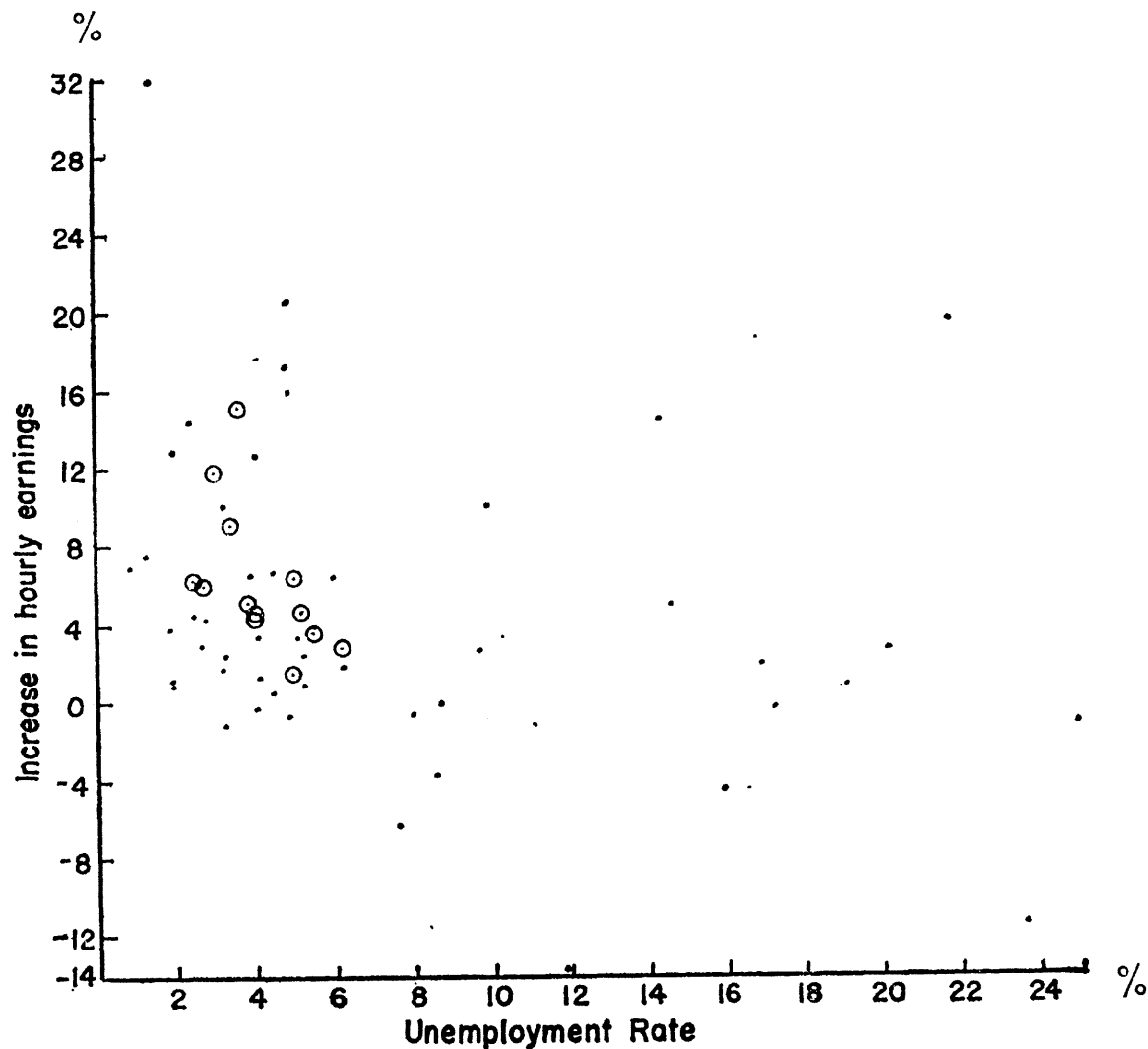


FIGURE 1
 PHILLIPS SCATTER DIAGRAM FOR U.S.
 (The circled points are for recent years.)

simple excess demand in the other sectors. It is probably true that if we had an unemployment rate for manufacturing alone, it would be somewhat higher during the postwar years than the aggregate figure shown. Even if a qualitative statement like this held true over the whole period, the increasing weight of services in the total might still create a bias. Another defect is our use of annual increments and averages, when a full-scale study would have to look carefully into the nuances of timing.

A first look at the scatter is discouraging; there are points all over the place. But perhaps one can notice some systematic effects. In the first place, the years from 1933 to 1941 appear to be *sui generis*: money wages rose or failed to fall in the face of massive unemployment. One may attribute this to the workings of the New Deal (the 20 per cent wage increase of 1934 must represent the NRA codes); or alternatively

against degree of unemployment into a related diagram showing the different levels of unemployment that would be "needed" for each degree of price level change, we come out with guesses like the following:

1. In order to have wages increase at no more than the $2\frac{1}{2}$ per cent per annum characteristic of our productivity growth, the American economy would seem on the basis of twentieth-century and postwar experience to have to undergo something like 5 to 6 per cent of the civilian labor force's being unemployed. That much unemployment would appear to be the cost of price stability in the years immediately ahead.

2. In order to achieve the nonperfectionist's goal of high enough output to give us no more than 3 per cent unemployment, the price index might have to rise by as much as 4 to 5 per cent per year. That much price rise would seem to be the necessary cost of high employment and production in the years immediately ahead.

All this is shown in our price-level modification of the Phillips curve, Figure 2. The point *A*, corresponding to price stability, is seen to involve about $5\frac{1}{2}$ per cent unemployment; whereas the point *B*, corre-

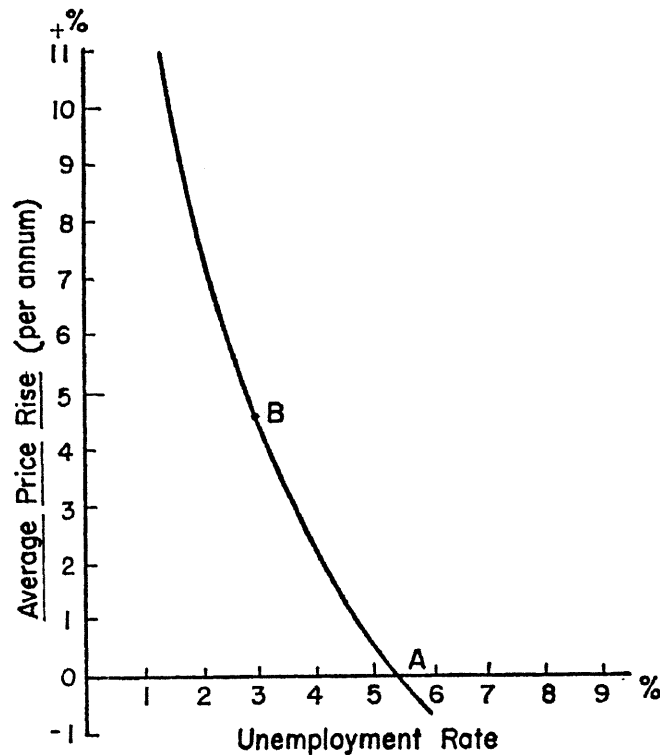
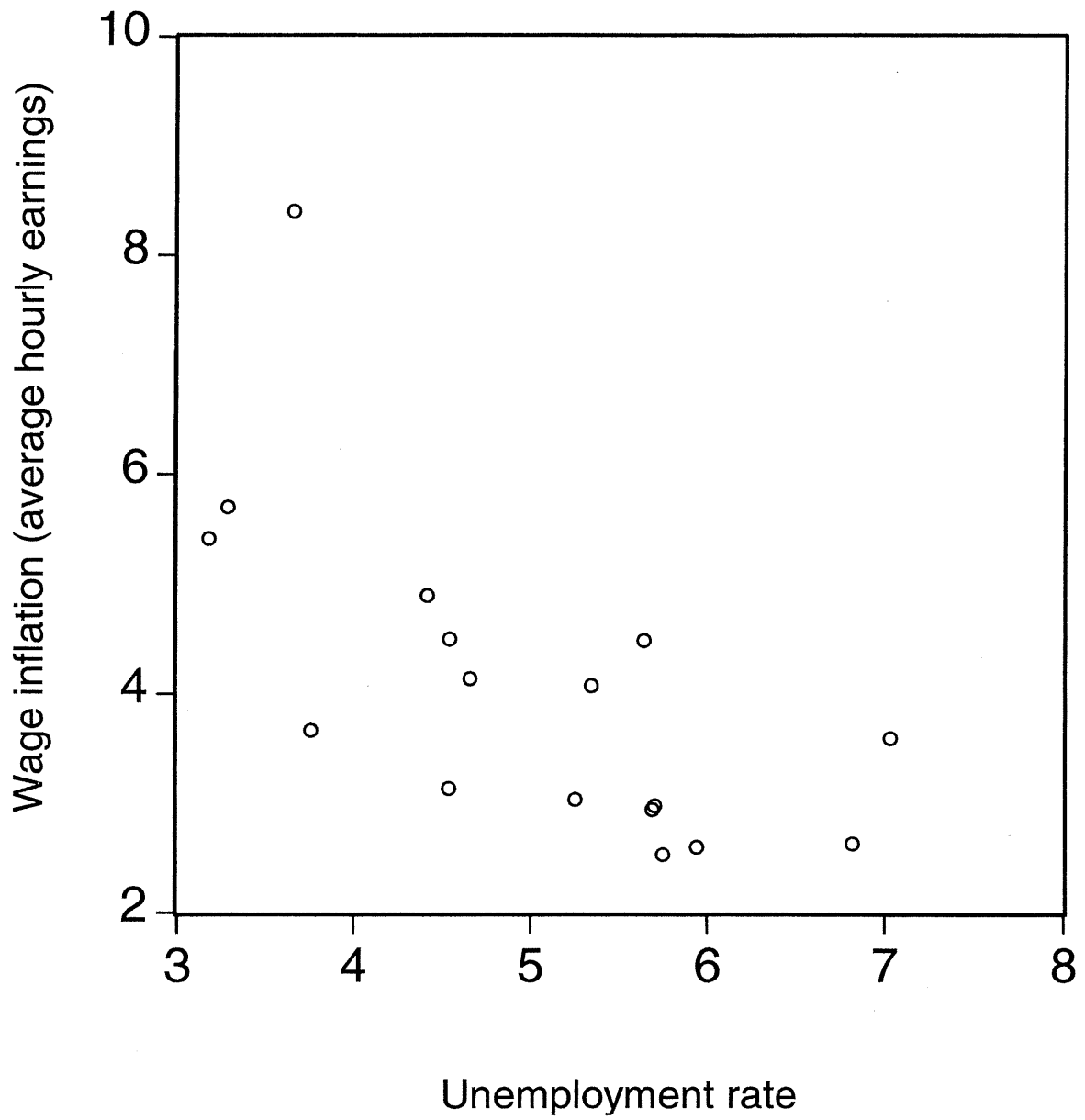


FIGURE 2

MODIFIED PHILLIPS CURVE FOR U.S.

This shows the menu of choice between different degrees of unemployment and price stability, as roughly estimated from last twenty-five years of American data.

1950 - 1965



Aggregate Supply (cont.)

(2)

3) Original Phillips curve

$\pi_t = \lambda (Y - \bar{Y})_t \Rightarrow P_t = P_{t-1} + \lambda (Y - \bar{Y})_t$

$P_t - P_{t-1}$

in logs

price level that makes $Y = \bar{Y}$

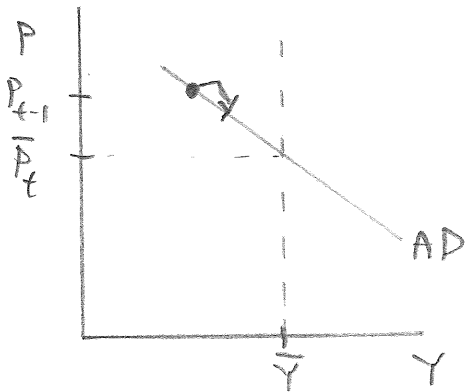
Justification:

Every period, wages or prices adjust part of the way to \bar{P}

$P_t - P_{t-1} = \psi (\bar{P}_{t-1} - P_{t-1})$ where $0 < \psi < 1$

and $\bar{P}_{t-1} - P_{t-1} = \left(\frac{-\partial P}{\partial Y} \right) (Y - \bar{Y})_t$

slope of AD



hence $P_t - P_{t-1} = \psi \left(\frac{-\partial P}{\partial Y} \right) (Y - \bar{Y})_t$

$P_t = P_{t-1} + \underbrace{\psi \left(\frac{-\partial P}{\partial Y} \right)}_{-\lambda} (Y - \bar{Y})_t$

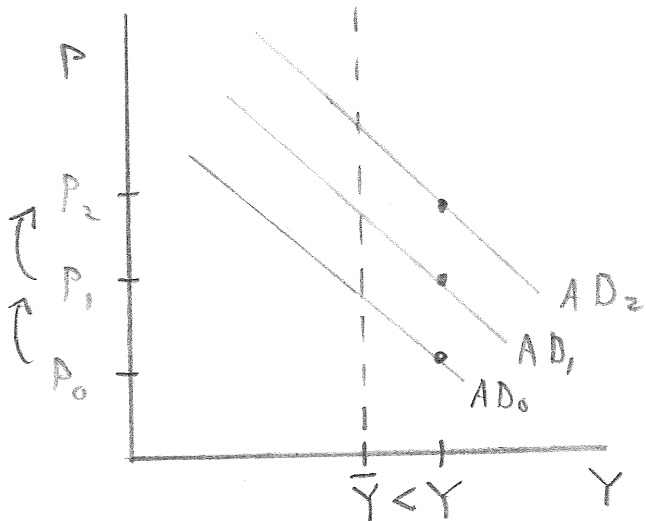
Implication:

You can keep $Y > \bar{Y}$ forever at cost of a little inflation, by making M grow

steadily, keep AD moving up steadily as P rises steadily.

or

"nominal" thing (M growth) can affect "real things" (Y & L) in LRSS as well as "short run."



Aggregate Supply (cont.)

(3)

4) Expectations-augmented Phillips Curve

In 1968, Milton Friedman & Edmund Phelps publish separate papers arguing original Phillips curve must be wrong: true relation is

Natural rate

$$\pi_t = {}_{t-1}\pi_t^e + \lambda (Y - \bar{Y})_t \quad \text{or} \quad \underbrace{P_t - P_{t-1}}_{\pi_t} = \underbrace{{}_{t-1}P_t^e - P_{t-1}}_{{}_{t-1}\pi_t^e} + \lambda (Y - \bar{Y})_t$$

$$\Rightarrow P_t = {}_{t-1}P_t^e + \lambda (Y - \bar{Y})_t$$

Note: if ${}_{t-1}P_t^e = P_{t-1}$ this is equivalent to original Phillips curve

What is ${}_{t-1}\pi_t^e$? Possibilities:

"Adaptive expectations": ${}_{t-1}\pi_t^e = \pi_{t-1}$

"Rational expectations": ${}_{t-1}\pi_t^e$ is optimal forecast of π_t

based on all information available at time $t-1$

published statistics
p's, Y's & L's you see yourself
economic theory?

Either way, you can't have $Y > \bar{Y}$ & steady inflation:

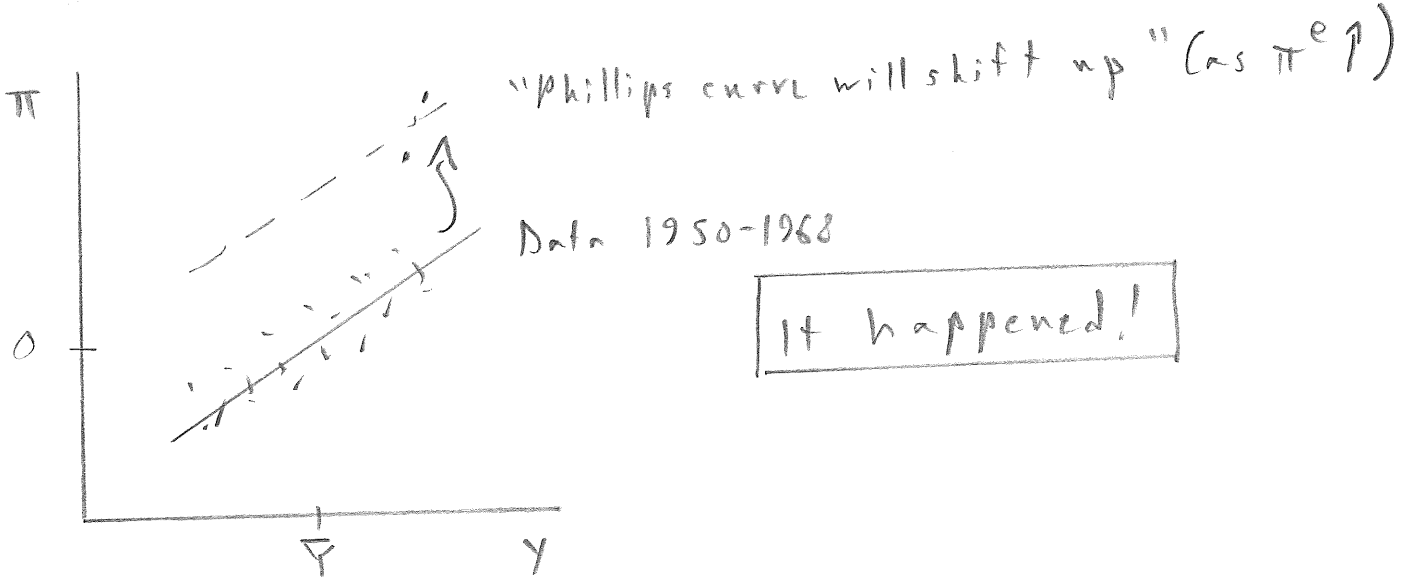
- Under adaptive expectations, π gradually accelerates to ∞
- Under rational expectations, π can jump to ∞

Aggregate Supply

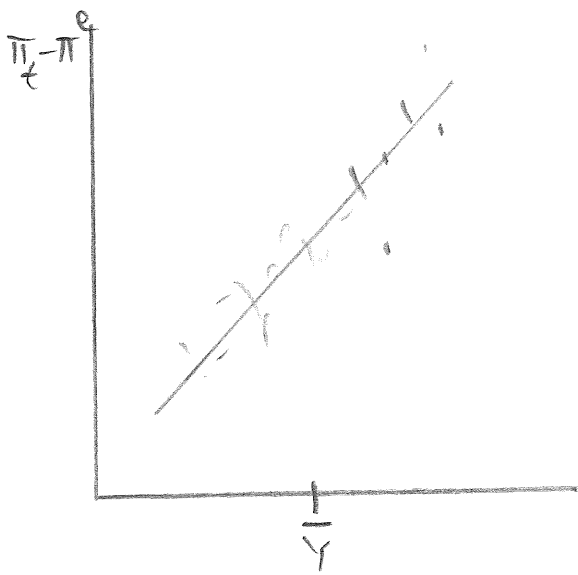
(4)

4) Expectations-augmented... (cont.)

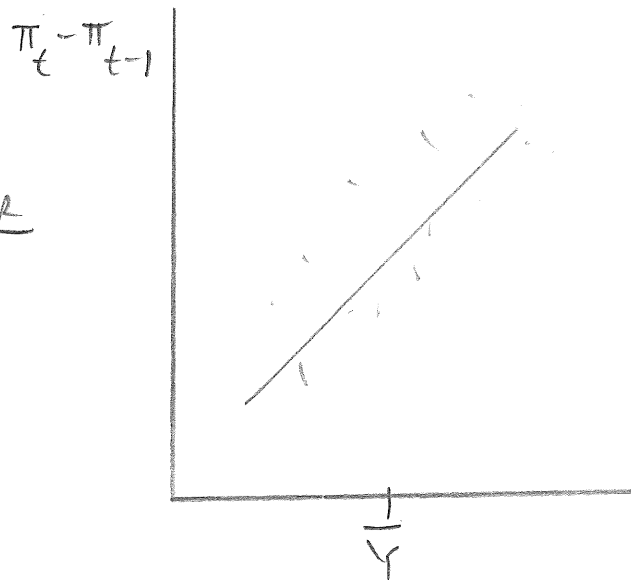
In 1968 Friedman & Phelps forecast:



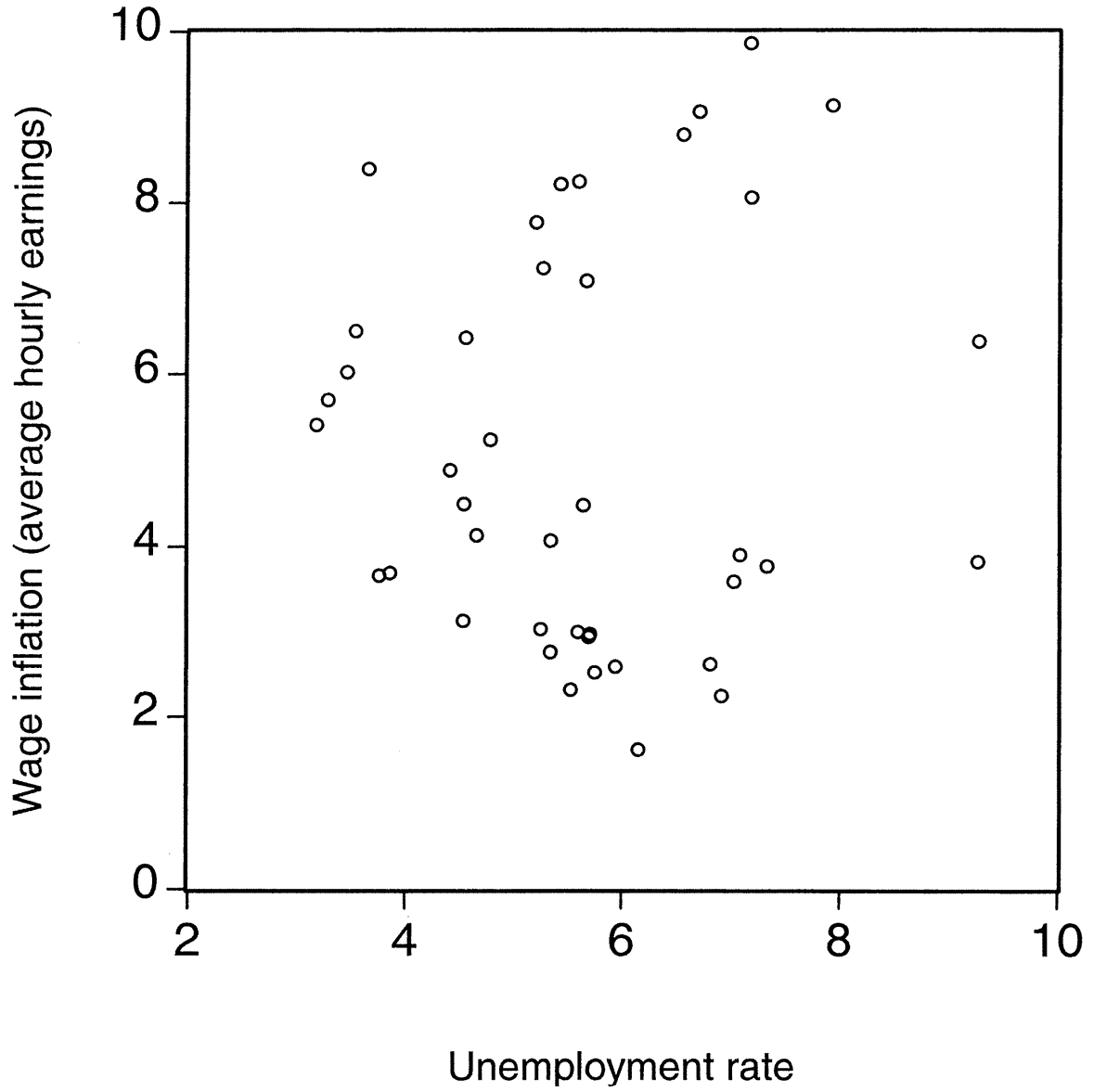
So now we think!



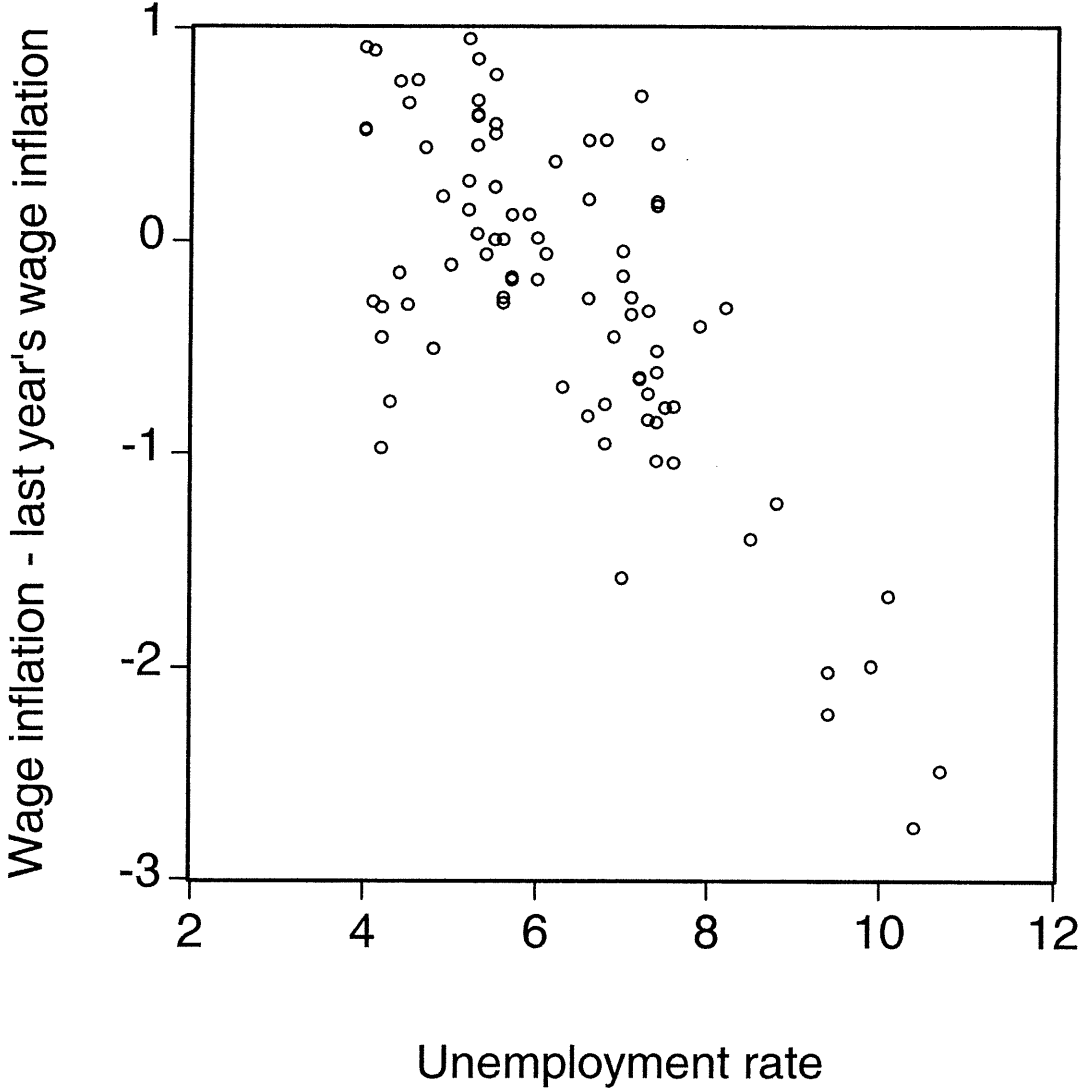
OR



1950 - 1990



Unemployment and acceleration in wage inflation
1981:1 - 2003:3



Aggregate Supply

(5)

Natural rates of unemployment & output

Introduced by Friedman (1968) based on Wicksell

Wicksell (1898) Interest & Prices who

hypothesized that there was a level of r consistent with stable price level.

Friedman p. 8: "The 'natural rate of unemployment' is the level that would be ground out by the Walrasian system of general equilibrium equations"

Y is level of output at this unemployment rate.