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## Does the Expectations Trap Render the Natural-rate Model Invalid in the Disinflationary Zone?

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## Chapter 5

### **Does the Expectations Trap Render the Natural-rate Model Invalid in the Disinflationary Zone?**

This chapter raises some questions about the epistemological status of the theory underpinning the original Phillips curve formulation, and the correspondence between the empirical data and the textbook (theoretical) representations of the Natural-Rate Expectations Augmented Phillips (N-REAP) curve model. This is no antiquarian investigation, since these curves have dominated applied macroeconomics for over three decades.

Phillips presented the theory underpinning his dynamic stabilisation exercise, in his Ph.D. (1953), and in a follow-up article in the *Economic Journal* (1954). But Richard Lipsey (1960) presented the first labour-market-based theoretical analysis of the Phillips curve. Unfortunately, it contained a theoretical inconsistency relating to the deflation region. In the inflationary zone (wage inflation in Lipsey's model), his curve described the data reasonably well, and visibly represented the theoretical underpinnings provided. But in the deflationary zone, Lipsey's theoretical curve became - like his empirical curve - a wage floor (or, more accurately, a wage change floor), shortly after crossing the horizontal axis. But his theoretical discussion implied a Phillips curve, in the deflationary region, with a slope of minus one - which was clearly an inadequate representation of the empirical data. Yet this internal inconsistency went unnoticed, until Lipsey (1978, 60) reexamined the issue for Phillips' posthumously published *Festschrift*. Thus, during its period of policy influence, the theoretical derivation of the Phillips curve contained a dormant but elementary error.

Phillips pioneered the introduction of adaptive inflationary expectations into this type of macroeconomics; but as is well known, when the trade-off interpretation of the Phillips curve unambiguously broke down, it was replaced, or augmented, by a family of short-run curves, along each of which inflationary expectations were held constant. This intellectual and policy revolution rapidly colonised the textbooks. Robert Gordon's intermediate macroeconomic textbook was the first of many to be organised around the N-REAP model. Under the heading 'Recession as a cure for Inflation', Gordon (1978, 305) explained how policy-induced recessions can shift the short-run Phillips curve and "reduce inflation by any desired amount, to zero or even to a negative number". Gordon then presented a diagram (1978, Fig. 11-1, 307) which has become a standard component of macroeconomics. Policy-induced unemployment creates a divergence between inflationary expectations (held constant along a short-run Phillips curve) and actual inflation. This shifts the short-run Phillips curve

downwards, and unemployment returns to its 'natural' rate, at a lower level of inflation. This is still the standard analysis presented in numerous textbooks.

Milton Friedman devoted substantial portions of his American Economic Association Presidential speech, his Nobel lecture, and his textbook on *Price Theory*, to the N-REAP model. He expressed confidence in the curve as a short-run description of the macroeconomy during the previous century, where inflationary expectations had been constant, and equal to zero (1976, 221-2; 1977, 454). But in one crucial respect the diagram which Friedman presented (1976, Fig. 12.3, 218, reproduced as Fig. 1, below) bears little resemblance to Phillips' scatter diagram.<sup>1</sup> Yet, it is Friedman's Phillips curve (not Phillips' or Lipsey's), which has dominated textbook representations of the short-run Phillips curve.

**Fig. 1.**

**Source: Friedman (1976, 218)**

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<sup>1</sup>. "Phillips translated this analysis into an observable relation by plotting the level of unemployment on one axis and the rate of change of wages over time on the other as in Fig. 12.3" (Friedman 1976, 218).

**Fig. 2**  
**Source: Phillips (1958, 285)**

**Fig. 3**  
**Source: Lipsey (1960, 24)**

Compare the slope of Friedman's short-run Phillips curve to the right of the 'natural' rate, with that of Phillips (Fig. 2) and Lipsey (Fig. 3). Phillips' curve becomes virtually a wage change floor at 5.5 per cent. unemployment. A 5 per cent. increase in unemployment, from 5.5 per cent., to 10.5 per cent., produces approximately a 0.5 per cent. reduction in the rate of change of money wage rates. Phillips (1958, 294) also found that in the six years following the policy-induced recession associated with the return to the gold standard, unemployment rose from 12.5 per cent. in 1926, to 22.1 per cent. in 1932, but wage inflation fell by only 0.6 per cent. per annum. In Lipsey's post-1923 relationship, any increase in unemployment above approximately 4 per cent. produces no apparent reduction in the rate of increase in money

wage rates; there is a wage change floor at +1 per cent.<sup>2</sup> Since Friedman, like Phillips and Lipsey, did not see the translation from wages to prices as being troublesome,<sup>3</sup> this implies that any policy-induced unemployment above 4 per cent. cannot reduce inflationary expectations, because these expectations are not being falsified.

Friedman's diagram (1976, Fig. 12.7, 226, reproduced as Fig. 4, below) became the basis of the subsequently influential N-REAP model. Yet the shape of the (short-run) Phillips curve at higher levels of unemployment has shifted from its original slope of nearly zero (in Phillips' and Lipsey's expositions) to a slope which is clearly negative. The mechanism by which policy-induced recessions can produce beneficial results is crucially dependent on this slope being negative. Yet the empirical curves to which Friedman added inflationary expectations - 'only one wrinkle' (Friedman, 1968, 8) - contained evidence over a long period of data of an *expectations trap*<sup>4</sup> which would thwart the policy.

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<sup>2</sup>. One of the purposes of Phillips' (1958, 283) empirical investigation was to quantify the observation that "workers are reluctant to offer their service 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". Richard Lipsey (1981, 558), in his Presidential address to the Canadian Economics Association, recalled that "neither Phillips nor myself, nor any one else whom I know of in the early Phillips curve tradition, ever drew an empirical Phillips curve which did not display the asymmetry that wages could rise fast in the face of excess demand, and would fall only very slowly in the face of excess supply. Phillips, for example, calculated the asymptotic rate of decrease in U.K. money wages as unemployment went to 100 per cent. as 1 per cent. per annum". A.J. Brown also discovered a wage change floor (1955, 199; see also Haberler 1961, 7). The dominant pre-Keynesian view at the University of Chicago was that wages were highly resistant to downward pressure (Davies 1971, 24-29).

<sup>3</sup>. Friedman (1976, 218) states that he is "very ready [to go] from rates of wage change to rates of price change" .

<sup>4</sup>. I am grateful to James Dean for suggesting this phrase to me. Friedman (1968, 8-9) believed that Phillips' curve was "reasonably stable and well defined" for the hundred years that Phillips examined, because inflationary expectations had been "unshaken and immutable" at a zero value.

**Fig. 4**  
**Source: Friedman (1976, 226)**

The expectations trap does not render the N-REAP model invalid in the inflationary zone (i.e. to the left in the 'natural' rate). Also, if the Phillips curve has a non-zero slope in the disinflationary zone, then *some* divergence between actual and expected inflation may be deemed to exist; thus facilitating the process - at least at the level of textbook theory - by which the N-REAP model may be said to plausibly represent the workings of an actual macroeconomy. The issue then reverts to a question of timing - how long would it take for inflationary expectations, and thereby measured inflation, and measured unemployment to fall? Friedman (1968, 11) calculated that full adjustment would take "a couple of decades".

But there appears to be no ambiguity with respect to that portion of a Phillips curve that has a slope of zero. The existence of a wage change floor implies that no matter how high unemployment reaches, expected inflation (and therefore actual inflation and measured unemployment) cannot fall. It is here - in the disinflationary region - that the expectations trap delivers a fatal blow to the N-REAP model.

Thus in 1978, Lipsey exposed a weakness in the inflation-unemployment thinking of the 1960s; but, simultaneously, textbooks began to elevate another misapprehension concerning

the mechanism by which policy-induced recessions can, with patience, reduce both inflation and unemployment. Measured unemployment ( $U$ ) was now, by definition, identically equal to the 'natural' rate of unemployment ( $U^N$ ), plus any 'unnatural' increment ( $U^{UN}$ ). This unnatural component of unemployment was, and is, perceived to be a function of a 'delusion' variable - the discrepancy between actual inflation ( $\Delta P$ ) and expected inflation ( $\Delta P^e$ ). Unemployment would return to its 'natural' level as soon as this delusion was overcome, and wage contracts ceased to be based on unrealistic calculations of future inflation.

Formally, in the N-REAP model,

$$U = U^N + U^{UN}, \text{ and} \quad (1)$$

$$U^{UN} = f[\alpha(\Delta P^e - \Delta P)], \text{ where} \quad (2)$$

$\alpha$  = the speed of adjustment of incorrect inflationary expectations.

But as measured unemployment increases along a horizontal short-run Phillips curve,  $\Delta P = \Delta P^e$ , thereby frustrating the equilibrating mechanism of the N-REAP model in the disinflationary zone. The existence of an expectations trap, therefore, tends to indicate that the short-run Phillips curve does not offer a privileged description of an economy undergoing the process of a policy-induced recession.

The worst inflationary decade in world history began with what, in retrospect, we know to be an unwarranted confidence in the trade-off interpretation of the Phillips curve. This confidence might have been injured, if not punctured, had Lipsey - or someone else - noticed the inconsistency in the underlying theory that had been provided for it. The painful and uncertain episode of disinflation was accompanied by excessive confidence based, in part, on textbook representations of the N-REAP model. Yet, as Friedman (1953, 42) pointed out, in his famous methodological essay, the short-run dynamics of disinflation were the "weakest and least satisfactory part of current economic theory".<sup>5</sup> His polemical genius helped to create both an environment and a political constituency in which disinflation could be undertaken. But if disinflation remains a twilight zone for economic theory, and also for econometric forecasting - then this, of course, remains one of the strongest motives for preventing the re-ignition of inflation.

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<sup>5</sup>. "The weakest and least satisfactory part of current economic theory seems to me to be in the field of monetary dynamics, which is concerned with the process of adaptation of the economy as a whole to changes in conditions and so with short-period fluctuations in aggregate activity" (Friedman 1953, 42). At the start of the monetarist decade, he wrote "I believe we have a reasonably good dynamic theory [... we now have a more secure grasp on the quantitative magnitudes involved] - what we lack for policy purposes is not the theory but the political capacity to use the theory effectively" (1975, 176, 178).

**NOTES**