

## Bill Phillips's Big Trade-off

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### Introduction

In a variety of recent publications, Robert Leeson makes a number of strongly revisionist claims questioning the existence of an inflation-unemployment trade-off and stressing the importance of inflationary expectations in Bill Phillips's own work on the Phillips curve. For example, Leeson argues that "Phillips's work came to be confidently misinterpreted as a series of trade-off equilibrium points, a menu of choice from which policy makers could choose" (Leeson 1997a, p. 156) and suggests that "Phillips's work has quite unjustly been denigrated as having neglected...inflationary expectations" (Leeson 1997a, p. 166) He also claims that "[w]hat became known as the Friedman-Phelps critique [of the inflation-unemployment trade-off]...should really be called the Friedman-Phelps-Phillips critique" (Leeson 1997a, p. 166). (See also Leeson 1994, p. 265; 1995, p. 231, p. 236, p. 238, p. 239; 1997a, p. 155; 1997b, p. 52; 1997d p. 500; 1997e, p. 117 for a representative set of examples along similar lines).

This article critically considers his revisionist exercise. To what extent are Leeson's claims valid? What is the textual evidence in Phillips's writings regarding an inflation-unemployment trade-off and inflation expectations? Specifically I survey Phillips's work to answer whether Phillips believed that there existed a stable, significant and exploitable policy trade-off between unemployment and inflation and whether he saw inflation expectations as a factor shifting the Phillips curve.

By examining the logical development of Phillips's published ideas, I shall show that there is a consistent stable trade-off theme running throughout Phillips's theoretical and empirical work on the curve between 1954 and 1962. At the same time, Phillips regularly failed to take inflation expectations into account as a factor shifting the position of his curve. These findings raise serious question marks regarding Leeson's reinterpretation.

Like Leeson I believe "there has been too much reliance on secondary material and too little reliance on what Phillips actually wrote. In particular, Phillips' empirical work has often been presented without reference to his 'theoretical Phillips curve'" (Leeson 1995, p. 232). I therefore place considerable weight in examining Phillips's entire oeuvre, including a discussion of his theoretical curve and interpretations made of it. I also rely on direct quotation from Phillips's published writings - those of his contributions which he considered sufficiently complete and original that he wished to place them on the historical record. This approach minimises ambiguity and allows readers to make their own direct assessments of my arguments. In addition, where I criticise Leeson's arguments in depth I also provide substantial quotations from his work.

### The trade-off in Phillips's theoretical work.

There are three theoretical articles where Phillips discusses what later became known as the Phillips curve (Phillips 1954, 1961, 1962). The 1954 article is largely a word for word

lift from the first three chapters of his PhD thesis (Phillips 1953), while the latter two articles represent post-PhD developments.<sup>1</sup>

In his first published article containing a discussion of the curve Phillips (1954) considers stabilisation policy within a closed economy using a simple Keynesian multiplier-accelerator model with a lagged response of production to real aggregate demand. The policy aim is assumed to be to stabilise desired production using various types of stabilisation rules. What is desired production? Phillips defines it as the level at which:

given the existing productive resources, would result in a certain level of employment, or it may be that which would result in a constant price index of consumers' goods, or the choice may be based on a number of other economic, political or social considerations...the choice of desired production may be considered as given. The difference between the actual production and desired production at any time will be called the error in production. (Phillips 1954, p. 293).

Thus the stabilisation authority targets a normatively chosen level of production which may or may not be associated with stable consumer prices.

A trade-off between actual production and inflation is assumed and plotted graphically, so each level of production corresponds to a given inflation rate (Phillips 1954, pp. 307-308). The trade-off is assumed to be non-linear and convex to the origin because of "the greater rigidity of factor prices in the downward than in the upward direction" (Phillips 1954, p. 308). The position on the Phillips curve depends on the level of real demand:

If aggregate real demand is high enough to make a higher level of production than this [the level resulting in price stability] profitable, entrepreneurs will be more anxious to obtain (and retain) the services of labour and other factors of production and so less inclined to resist demands for higher wages and other factor rewards...factor and product prices will continue to rise this way so long as the high level of demand and production is maintained, the rate at which they rise being greater, the higher the level of demand and production. (Phillips 1954, p. 307).

Phillips also runs through the symmetric argument for aggregate real demand resulting in a level of production delivering deflation. Thus every level of real aggregate demand is associated with a determinate inflation rate - the classic permanent trade-off proposition. There is no indication from Phillips that the trade-off might break down when real aggregate demand is maintained at levels delivering non-zero inflation rates. Furthermore Phillips (1954) does not assume that the zero inflation level of production corresponds to full employment.<sup>2</sup> Rather he points out that the level of production and employment where prices are stable depends on "the bargaining powers of the different groups in the economy" (Phillips 1954, p. 307).

Phillips (1954, p. 308) moves on to assume a particular desired level of production as a target - that resulting in stable prices. Put in context of his previous discussion of desired production, this target may represent either Phillips's "economic, political or social" choice or an illustrative value chosen for the purposes of his (particularly at the time in the absence of personal computers) complex numerical simulation. Phillips does not attempt to justify his choice of target with an argument that alternatives lead to inflation instability or because there are other economic costs of positive inflation. It seems likely that he would have provided such justifications if they were what he believed.<sup>3</sup>

Having outlined this model, Phillips moves on to examine the dynamic stabilisation problem with flexible prices and interest rates in response to a permanent one-off nominal aggregate demand shock. In so doing, in addition to assuming that the target is the zero inflation level of production, Phillips (1954, p. 309-310) points out that when prices are rising or falling there are a number of endogenous "integral regulating mechanisms" changing real

aggregate demand in the opposite direction, thus automatically stabilising the economy at zero inflation. He is able to derive these endogenous stabilisers through making the additional assumption that "the [nominal] quantity of money is less than perfectly elastic" (Phillips 1954, p. 308). Positive inflation increases the transactions demand for money and pushes up interest rates. Higher interest rates reduce aggregate demand, production and hence inflation until it is eliminated. In addition, consumption reductions via erosion of real money balances under positive inflation will also push the economy back to price stability. At the same time, there is a force which may lead to instability in real aggregate demand under a zero inflation production target. This potential source of instability will be examined in detail below.<sup>4</sup>

Thus Phillips both assumes that the target level of production is that resulting in stable prices and shows that under the assumption of a determinate nominal money supply there are endogenous forces pushing the economy towards price stability.

Phillips does not examine a situation where the government maintains the real money supply in order to stabilise real aggregate demand at some non-zero inflation level of production. However, given his earlier discussion of the Phillips curve in terms of a stable trade-off between real aggregate demand and inflation, the prediction the trade-off can be exploited in this way according to other "economic, political or social considerations" is a logical corollary of his model.

Now onto the issue of aggregate demand instability. Leeson (1997a, p. 166; 1997b, 57) draws attention to notions of adaptive expectations developed in the context of the 1954 curve (see Phillips 1954, p. 311). The passage cited by Leeson in this context is, to the best of my knowledge, the only published statement from Bill Phillips on adaptive inflationary expectations in his work on the curve. It is also the only point at which Phillips focuses on dynamic instability of prices.

Unfortunately for Leeson's argument, Phillips (1954, p. 311) argues that inflationary expectations may impact in a destabilising fashion on *aggregate demand* and hence the position of the economy along a *given* Phillips curve. Under certain parameter combinations, higher inflationary expectations raise aggregate demand, lowering unemployment. This then raises inflation which in turn feeds through into higher inflationary expectations, thus further raising de-stabilising aggregate demand. The Phillips curve itself is stable. Consider what Phillips has to say:

Demand is also likely to be influenced by the rate at which prices are changing, as distinct from the amount by which they have changed, this influence on demand being greater, the greater the rate of change of prices. Since the rate of change of prices in turn depends on the error in production, the potential change in demand and production resulting from these relationships will be approximately proportional to the error in production. This sequence of relationships is represented in Fig. 12 by the relationships © [the slope of the Phillips curve], (n) [the response of expenditure to inflation], L3 and LP [lags], the potential feedback being  $cnP$  [P being the deviation of actual from desired production]. If changing prices induce expectations of further changes in the same direction, as will probably be the case after fairly violent and prolonged movements, demand will change in the same direction as the changing prices. That is, n [the response of expenditure to inflation] will be positive, and there will be a positive feedback tending to intensify the error, the response of demand to changing prices thus acting as a perverse or destabilising mechanism of the proportional type. (Phillips 1954, p.311)

There is no indication in this quotation that incorporation of adaptive inflationary expectations changes either the sign or the slope of the Phillips curve (c). Rather adaptive expectations change the way expenditure responds to inflation - n becomes positive. This possible

dynamic instability due to unstable aggregate demand when zero inflation is targeted is a far cry from a model where changes in inflation expectations shift the position of the Phillips curve when a non-zero inflation rate is targeted. Only if inflation expectations impact on the position of the curve is it accurate to suggest Friedman and Phelps displayed unnecessary originality in their critiques of the Phillips curve.

Leeson provides further interpretation of Phillips's 1954 theoretical curve to emphasize instability:

The horizontal axis was expressed in *levels* of production, indicating that the theoretical Phillips curve was not perceived as an intertemporal constant. On the contrary, the curve was a pictorial representation of a system in the process of dynamic growth, i.e. the curve would shift outwards as the level of production increased, or inwards if the economy got stuck in an inflation-devaluation spiral...The vertical axis was expressed in *rates of change* of prices, indicating disequilibrium positions at all values other than zero. These positive values of price inflation were not sustainable, but were not necessarily reversible (i.e. the price level might not fall after a rise). (Leeson 1997a, pp. 158-159, original emphasis).

Much of this commentary on the original curve is flatly contradicted by what Phillips wrote. Non-zero inflation rates are only disequilibrium positions in Phillips (1954) via an additional assumption regarding aggregate demand (assuming a determinate nominal money supply), an assumption only made after the curve describing aggregate supply is introduced and the trade-off discussed in detail. The crucial point here is that non-zero inflation rates generate disequilibrium in nominal aggregate demand in Phillips (1954), rather than disequilibrium of the position of the Phillips curve itself.

Furthermore, Phillips presents no formal equation linking investment with capital accumulation and no labour force growth. Equally, there is no informal discussion of outward shifts in the Phillips curve due to economic growth. Indeed, Phillips's only explicit statement regarding potential supply is to make the simplifying short period assumption that "changes in the quantity and productivity of the factors of production are ignored" in deriving the curve (Phillips 1954, p. 307). Thus, Leeson to the contrary, to Phillips maximum capacity is given. There is no "process of dynamic growth" or anything like it in Phillips (1954).

Finally, there is no indication at any point in Phillips (1954) that an inflation-devaluation spiral will cause the curve to shift inwards in inflation-production space, making positive inflation rates unsustainable. There is not even a suggestion in Phillips (1954) of an inflation-devaluation spiral. By definition there cannot be. A closed economy is explicitly assumed (Phillips 1954, p. 291), Phillips (1954, p. 298, fn 1) states "[i]nternational adjustments are not dealt with in this article", and the title of the article is tellingly "Stabilisation Policy in a *Closed Economy*" (my emphasis).

In summary, there are five key points regarding interpretation of the curve in Phillips's 1954 article which must be emphasised:

- Selection of the desired level of production (and by implication the inflation rate) is assumed to be a normative choice based on "economic, political or social considerations".
- Higher real aggregate demand unequivocally raises the equilibrium level of production and increases inflation in classic trade-off fashion.
- At non-zero inflation rates and with a determinate money supply, disequilibrium arises because nominal aggregate demand is out of equilibrium, not because of disequilibrium in the Phillips curve itself.
- Possible instability generated by price expectations concerns aggregate demand, not the position of the Phillips curve.

- Possible instability of aggregate demand is discussed only under the assumption of a zero inflation target.

Despite injunctions to pay close attention to Phillips's theoretical articles on the curve, Leeson does not consider Phillips (1961) in detail,<sup>5</sup> his next theoretical macroeconomic work on stabilisation. In this article Phillips develops a long run demand driven economic growth model with a stable Phillips curve as a core building block.

The 1961 model remedies some of the weaknesses of the earlier article, especially its failure to consider capital accumulation and economic growth. This weakness in his 1954 model was originally recognised in his PhD thesis, where Phillips acknowledges its crudeness. He goes on to consider possible future developments, suggesting incorporating an equation for capital accumulation to deal with growth issues, pointing out in this context the necessity of making explicit assumptions about the money supply (Phillips 1953, p. 58). In this sense the 1961 article is a thoroughly logical progression from that of 1954.

The Phillips curve in the 1961 model is (using Phillips's notation):

$$p = \beta(x - 1) - y_n + \delta$$

where:

$p$  is the inflation rate

$x$  is capacity utilisation

$y_n$  is the growth rate of normal capacity output, and

$\beta$  and  $\delta$  are positive constants

Note that the rate of capacity utilisation stands in for the rate of unemployment which is used in Phillips's empirical articles on the curve (Phillips 1958, 1959, 1962) and the level of production in his theoretical curve (Phillips 1954). On assuming a constant labour force, the rate of economic growth is a measure of productivity growth (Phillips 1961, pp. 364-365).

Having made certain Keynesian assumptions regarding the consumption and investment expenditure side of the model and technological relationships, Phillips derives the steady state growth solutions for capacity utilisation, capacity growth and inflation. They are respectively (the subscript "s" represents the steady state values):

$$x_s = 1 + (m - \delta)/\beta \quad (1)$$

$$y_{ns} = svx_s \quad (2)$$

$$p = m - y_{ns} \quad (3)$$

where:

$m$  is the policy exogenous rate of growth of the nominal stock of money

$s$  is the given propensity to save

$v$  is the constant normal capital-output ratio

In Phillips's model a higher rate of monetary growth raises the rate of capacity utilisation in the steady state (through equation 1). What about inflation? From equations 1, 2 and 3 the reduced form for inflation in the steady state is:

$$p = m - sv[1 + (m - \delta)/\beta]$$

Thus an exogenous rise in the growth rate of demand has two steady state effects on inflation. First, by directly raising capacity utilisation, it raises inflationary pressures. Second, higher capacity utilisation leads to faster capital accumulation, which in turn raises productivity growth and dampens inflation. The impact on inflation is thus theoretically indeterminate.

However, Phillips (1961, pp. 364-366) believes that reasonable empirical values for the parameters are  $s = 0.1$ ,  $v = 0.25$  and  $b$  slightly less than one for low unemployment rates and as low as 0.1 for higher unemployment rates. Over this range of parameter assumptions Phillips's article articulates a permanent trade-off between inflation and real activity in a fashion consistent with his previous theoretical work. In a steady state growth context, a rise in demand growth both raises capacity utilisation and increases inflation - the classic trade-off model in a growth context.

Phillips (1961, p. 366) also makes the point that the twin maintenance of normal capacity output and price stability under steady state growth is an accident of a fortuitous combination of parameters, not a unique equilibrium position. There are no endogenous forces causing the macroeconomy to converge to stable prices and normal capacity output. Unlike his 1954 model, aggregate demand does not change endogenously to shift the economy back to a particular level of capacity utilisation. But like the 1954 model, the position of the Phillips curve is fixed.

A rather less formal treatment of the trade-off appears in Phillips (1962), an article mixing informal policy discussions, technical material and empirical estimates of the curve. Phillips (1962, p. 10) points out his consideration of a trade-off is long term: "[c]onsideration of the average level of employment brings us to the question of the relations between employment, or unemployment, and inflation and the rate of growth". After discussing various estimates of the trade-off, he again considers it in terms of an permanent menu of policy choice:

If it is true that such a [trade-off] relation holds we are faced with a difficult choice.

Then we can only reduce inflation, for any given rate of increase in productivity, at the cost of higher unemployment. I think such a relation does hold now, and unless it can be changed we shall probably move towards a compromise solution with a rather higher average level of unemployment than in the past few years and a lower, though not zero, speed of inflation. (Phillips 1962, pp. 10-11).

This is not the only place where Phillips (1962) considers the curve in terms of the conventional menu of policy choice. He points out that policy makers can achieve a desired rate of inflation or a rate of unemployment but not both simultaneously:

if some relation holds, in given institutional conditions and on average over a period of years, between the level of employment and the speed of inflation, failure to take account of it may lead to the adoption of inconsistent objectives and to a type of schizophrenic behaviour as attempts are made to attain these inconsistent aims. (Phillips 1962, p. 2).

In other words, Phillips argues that aggregate demand policy cannot be used to simultaneously achieve full employment and zero inflation "over a period of years".

### The trade-off in Phillips's empirical work

There are two papers where Phillips (1958, 1959) focuses on empirical estimates of the Phillips curve and another paper where unpublished estimates are very briefly discussed in the context of work by Samuelson and Solow (Phillips 1962). The most detailed in terms of policy discussion is his short 1959 article on the Australian Phillips curve (the 1958 article was by available accounts a rush job) so it is necessary to pay this work the greatest attention. However all three papers contain consideration of magnitudes of actual trade-offs.

Leeson (1997b, p. 51, original emphasis) acknowledges that:

a casual read of Phillips's articles reveals he describes some of these [higher inflation-lower unemployment] combinations, referring in one instance to a combination

involving 10% inflation. Culling a few quotes may seem to offer support to the long-run trade-off proposition and *Phillips certainly wrote of the trade-off possibilities in the low inflation region* (I have never suggested anything to the contrary). However, complexity beckons. The historical existence of high-inflation-low-unemployment combinations as the business cycle reaches its bust does not imply that such a bust-inducing combination will remain stable if targeted by policy makers.

Leeson's suggestion that Phillips believed that such trade-offs merely reflect historical inflation-unemployment combinations and are only transitory combinations at the bust point of the business cycle are falsified by the evidence in Phillips (1959).

There is a later paragraph in his article where Leeson, possibly unwittingly, concedes the long-run trade-off interpretation. In the process Leeson appears to contradict his own paragraph quoted above. Since it acknowledges that the curve was a long run relationship independent of the business cycle, Leeson's description of what Phillips was doing is worth quoting in full:

It is impossible to precisely "read off" a unique value of wage inflation (the dependent variable) from a given value of unemployment in the data from which Phillips derived his curve because more information is required: the rate of change of unemployment (*in an upswing, wage inflation would be above the curve; in a downswing it would be below the curve*). Thus, the economic reasoning in Phillips' hypothesis included the rate of change of unemployment...*By performing the thought experiment of holding unemployment constant, Phillips was able to set the rate of change of unemployment equal to zero, thus giving his curve a representative value (by cancelling the positive and negative dispersions that occurred during the business cycle)*. (Leeson 1997b, p. 55, my emphasis).

This paragraph, with which I agree, makes it clear that the curve Phillips discusses is directed at long run trade-offs, not merely temporary business cycle blips. The permanent policy nature of the trade-off is clear in Phillips's own words. He makes it plain he is writing of both concrete policy trade-offs and longer run policy outcomes:

since we are interested here in *long-run policy objectives, not in the short-run prediction of wage changes*, we can assume that the fluctuations in export and import prices average out over a long period of years and can therefore be ignored in considering the level of demand for labour at which policy should be aimed. The relations [from Phillips's estimated equation]...between the rate of change of wage rates and the level of unemployment...are shown in Figure 6...at the present level of unemployment of about 2 1/4 per cent....they indicate that *on average over a period of years*, wage rates would rise at a little over 2 per cent [sic] per year...The speed of inflation would increase if the demand for labour were held at a higher level, thus at 1 per cent. unemployment wage rates would rise on average at about 4 per cent. per year...If demand were held at a level sufficient to reduce unemployment much below this level, the speed of inflation would be very greatly increased. Thus with unemployment at about 1/2 per cent, we would expect wage and price changes in the order of 10 per cent. per year. (Phillips 1959, p. 4, my emphasis).<sup>6 7</sup>

When Phillips (1959, Figure 6) graphs his curve, he strips out the disequilibrium dynamics and presents long run combinations of wage inflation and unemployment implied by his estimated dynamic equations. The inflation-unemployment combinations are not historical observations at the bust point of the business cycle. Rather, they are the long run solutions of an estimated econometric equation where government is presumed to set aggregate demand to target unemployment. The numbers Phillips discusses are read directly off the graph of his long run equilibrium curve.

The econometric estimation method in the 1958 article is less conventional than that used by Phillips (1959). However there is no reason to alter the fundamental interpretation. Phillips (1958, p. 290) himself describes the equilibrium nature of his curve thus in outlining his estimation procedure:

Since each interval includes years in which unemployment was increasing and years in which it was decreasing the effect of changing unemployment on the rate of change of wage rates tends to be cancelled out by this averaging, so that each cross gives an approximation to the rate of change of wages which would be associated with the indicated level of unemployment if unemployment would be held constant at this level.

Other have seen Phillips (1958) differently. Regarding the trade-off prediction, Lipsey suggests:

Phillips makes absolutely no mention of it in his 1958 article. The only policy conclusion he draws... is that the Phillips curve cuts the income axes... at a level... consistent with about 2 ½ per cent unemployment in the United Kingdom. This conclusion is, of course, derived from the static solution to the model [where inflation is zero]... and not from its disequilibrium behaviour. (Lipsey 1978, p. 56).

Lipsey's suggestion is inaccurate, for Phillips (1958, p. 299) writes not of simply one equilibrium possibility with stable prices but two possibilities, one with stable prices and 2 ½ percent unemployment, and the other with stable wages and 5½ percent unemployment. Under Phillips's assumption of 2 percent labour productivity growth and mark-up pricing, stable wages delivers price inflation in the order of minus 2 percent. Again, there is no indication from Phillips (1958) that the constant price case is the only equilibrium. Rather the two cases - wage versus price stability - are presented as different possible policy choices. The omission of a sentence or two stating price stability was the unique equilibrium condition would be strange if it accurately represented Phillips' position. On the other hand the omission of such a sentence is readily understandable if both positions co-existed as a menu of policy choice. Moreover, the paragraph that follows also suggests permanence in the non-linear trade-off:

Because of the strong curvature of the fitted relationship in the region of low percentage unemployment, there will be a lower average rate of increase of wage rates if unemployment is held at a given level than there will be if unemployment is allowed to fluctuate about that level. (Phillips 1958, p. 299).

In an attempt to sustain a disequilibrium interpretation Leeson (1997b, p. 161) argues along similar lines to Lipsey regarding Phillips's (1962) brief discussion of his unpublished estimates of a US curve: "[i]t is characteristic that the only surviving reference to his US Phillips curve was concerned with the position of stable prices". This argument is also textually incorrect. In discussing the US curve, Phillips (1962, p. 14) discusses not only the level of unemployment required to maintain stable prices (which he estimates at between 7 and 8 percent) but also 4 percent inflation combined with 4 percent unemployment. "In Germany", Phillips (1962, p. 16) goes on to remark, "the problem of choosing between inflation and unemployment will become acute" - another straight forward pronouncement of the trade-off as a menu of policy choice.

That Phillips's empirical work is also consistent with and should be read in the context of his earlier theoretical work on the curve is plain from the above discussions. Against this must be set any evidence that Phillips believed the trade-off was unstable, as Leeson argues, and breaks down at non-zero inflation rates. This evidence will be considered in detail below.



### Instability in Phillips's work on the curve

In considering the issue of instability generated by ongoing inflation in Phillips's work, I distinguish between instability in the Phillips curve due to inflationary expectations on one hand, and instability because of balance of payments problems due to an appreciating real exchange rate under conditions of fixed nominal exchange rates on the other.<sup>8</sup> I deal first with the balance of payments issues.

A discussion of potential balance of payments difficulties can be found only where Phillips considers the curve in an open economy context. In addition, balance of payments problems are not rigorously discussed. Discussion occupies one paragraph of Phillips (1959) and a page or so of Phillips (1962), hardly suggesting Phillips's central message is that the inflation-unemployment trade-off is undermined in an open economy.

Rather balance of payments problems are seen as a practical issue arising when in attempting to lower unemployment, inflation rates are pushed to levels causing a continuous loss of competitiveness. It is only where the rate of real exchange rate appreciation is sufficient to offset the positive trade balance impact from rising world income that a trade deficit (not fundable by existing capital inflows) causes problems. Furthermore, Phillips (1962, p. 15) suggests the problem is remediable via a simple technical solution involving some limited flexibility in exchange rates.<sup>9 10</sup>

It is difficult to find discussions of instability in Phillips's work. On the other hand, Leeson believes that there is plenty of evidence to suggest that Phillips was strongly aware that his trade-off could break down:

There are several references in Phillips' work to the resulting "wage-price spiral" (for example, Phillips, 1958, p. 285, p. 299, 1959, pp. 4-5). As price movements become more volatile the stability of Phillips' system broke down: a "more rapid rate of change of prices...tend[s] to introduce fluctuations...[t]he system becomes unstable when there is a high degree of price flexibility" (Phillips 1954, p. 313)". (Leeson 1997b, pp. 53-54).

Note Leeson's apparently unwarranted juxtaposition here of two very different types of instability. The first involves price inflation increasing wage inflation and shifting the Phillips curve ever upwards. The second regards the instability of aggregate demand with a stable Phillips curve when a zero inflation level of production is being targeted. These two sorts of instability are very different and should not be conflated. The latter form of instability has nothing to do with instability of the Phillips curve trade-off.

Leeson then goes on to write:

In the Melbourne essay [Phillips 1959] there is a description of the inflation-devaluation spiral that would result from attempting to target high levels of inflation. In that essay Phillips (1959, pp. 4-5) warned that ongoing inflation could lead to policy consequences which would have the effect of "reducing the demand for labour and so increasing the level of unemployment". (Leeson 1997b, p. 54).

The implication is of a lack of stability in the position of the Phillips curve. There are two issues here. The first is whether Phillips (1959) discussed an inflation-devaluation spiral, which implies a continuing depreciation of the currency and a continually rising inflation rate. The second is the implication that if high inflation-low unemployment combinations were targeted, policy makers would have to respond endogenously to higher inflation and push unemployment back up. These two issues will be considered in turn.

There is no description in Phillips (1959, p. 4) of a wage-price spiral.<sup>11</sup> Phillips (1959, pp. 4-5) analyses the argument sometimes advanced that higher money wage inflation increases real wages and is thus good for workers. In opposition to this argument, he argues

that because of profit margin rigidity, workers make no real gain from higher wage inflation. At best, Phillips argues, in an open economy like Australia the real consumption wage may grow temporarily because agricultural goods prices are set in world markets. However the risk of pressures on the trade balance means that the real wage in terms of agricultural goods will also have to be kept constant - by a depreciating exchange rate.

Leeson to the contrary, there is no description of a wage-price spiral, let alone one leading to a cumulative rise in inflation at high rates of inflation in this paragraph. There is no suggestion by Phillips in the one place in the one paragraph where the exchange rate is mentioned of a feedback effect from exchange rate devaluation into higher wage inflation into further devaluation and so on, with wages and exchange rates chasing each other's tails upwards and inflation spiralling out of control.

Now consider the second issue raised - the one of endogenous government policy correction forcing up unemployment. The context in which the issue is raised is in terms of government aiming to increase real wages via squeezing profit margins. Phillips (1959) points out government may try to squeeze profit margins by reducing demand. This policy will also be unsuccessful because profit margins are rigid (Phillips is more Kaleckian than Kaldorian in his implicit theory of income distribution). The policy consequence will simply be higher unemployment, lower inflation and constant real wages - a conclusion entirely consistent with a stable trade-off interpretation. There is no indication in any of this of a warning by Phillips that ongoing inflation leads to endogenous consequences which would increase the level of unemployment at that inflation rate.

Leeson also sees adaptive expectations as an important factor in Phillips's empirical work generating instability of the position of the curve. He argues that:

an awareness of inflationary expectations reappears in his [Phillips] empirical work: Alogoskoufis and Smith (1991, p. 1256), for example, writing in the *American Economic Review*, concluded that "contrary to the conventional wisdom, A.W. Phillips does *not* [emphasis in the text] seem to have been confusing nominal with real wage changes, in putting forward his hypothesis...an expectations augmented version of Phillips's wage equation...is outlined in the first three paragraphs of his 1958 paper." (Leeson 1997b, pp. 57-58).

Leeson does not produce direct quotations or citations from Phillips's work in support of his claims, relying on this one secondary source for support. However, when one contextualises the quotation from Alogoskoufis and Smith, they actually state the opposite of what Leeson believes. Leeson fails to point out that Alogoskoufis and Smith unambiguously write that Phillips (1958) "clearly did not take inflationary expectations into account" (Alogoskoufis and Smith 1991, p. 1256). Rather, what Alogoskoufis and Smith (1991, p. 1256) actually do is to *add* a hypothesis about inflationary expectations to the original Phillips curve to provide a model for econometric estimation. Thus the only quotation Leeson offers to support his conjecture regarding adaptive expectations in Phillips's empirical work provides direct support for the contrary interpretation.

According to Leeson (1997a, p. 165), "Phillips (1958a, p. 283) devoted only one paragraph to the role of expectations of future labour market conditions". However Phillips does not devote any paragraphs to this issue. Phillips's (1958, pp. 283-284) discussion is about cost of living adjustments of wages to retail prices. It contains no mention of expectations and no discussion of future labour market conditions. Furthermore, Phillips (1958, p. 284) argues:

the introduction of cost of living adjustments will have no effect, for employers would be merely giving under the name of cost of living adjustments part of the wage

increase they would in any case have given as a result of their competitive bidding for labour.

The point Phillips wishes to make is that cost of living adjustments can be ignored unless import price inflation exceeds a "critical value of about 13 per cent per annum" (1958, p. 284) which "occurs very rarely except as a result of war" (1958, p. 299). The question is not whether Phillips is correct (it seems to me there are flaws in his analysis). Rather the point is that Phillips believes that cost of living adjustments - which are not identical to inflationary expectations - can generally be ignored.<sup>12</sup>

While Phillips frequently mentions factors which may shift the position of his curve (Phillips 1954, p. 307; 1958, p. 278; 1959, pp. 4-5; 1962, pp. 11-13), they are typically discussed in the context of recommending microeconomic labour market reform to shift the curve and reconcile lower unemployment with price stability. When he writes down a theoretical equation for the curve, the ad hoc shift factors are not included.

Missing in all of Phillips's discussions of forces shifting the curve is any discussion of inflationary expectations, adaptive or otherwise. This is the context in which one must consider Leeson's (1997a, p. 166) claim that Phillips is unjustly accused of ignoring inflationary expectations and that the Friedman-Phelps critique should be called the Friedman-Phelps-Phillips critique.

### Phillips's zero inflation preference

In a policy (normative) sense Phillips (1959, pp. 4-5) wrote of considering two targets - full employment and zero inflation. Phillips was concerned to find a second policy instrument, in addition to aggregate demand, which allow the simultaneous achievement of both targets. If indeed Phillips believed the inflation-unemployment trade-off were unstable in the long run because of adaptive expectations, it is hard to make much sense of his search for additional instruments (Phillips 1959, p. 5). In the long term with adaptive expectations, aggregate demand policy could allow both zero inflation and full employment to be simultaneously achieved without the need for a second policy instrument.

It is true that Phillips generally favoured price stability as a macroeconomic policy target. The reason given by Leeson (1997b, p. 53) for this judgement is:

his [Phillips's] aversion to inflation was couched in the language of the consequences which would follow from the accentuated class warfare between "capitalists" and "workers" struggling irreconcilably over factor shares when average hourly earnings [growth] exceeded average productivity growth (Phillips, 1959, pp. 4-5).

In other words, Leeson argues that Phillips believed that inflation exacerbates class conflict. Zero inflation reduces this conflict. However Phillips's (1959, p. 4) point is that inflation does not solve real distributive conflict, not that it worsens it. Furthermore, he speculates regarding relevance of this conflict theory of inflation that "[i]t is not at all certain, however, that it is the attitude of workers and the power of trade unions that are mainly responsible for wage rates rising at an excessive rate when the demand for labour is high" (Phillips 1959, p. 5; see also Phillips 1962, p. 13).

Thus Phillips's reasons for favouring zero inflation are poorly articulated, particularly for a closed economy (e.g. Phillips 1954, 1961 where they are not discussed). There is little evidence that he saw a long run non-zero inflation rate as creating inflation instability. And there is little evidence of discussions of the costs of inflation in his work. Zero inflation seems a bit like apple pie for Phillips - unquestioningly good in itself but requiring no great further elaboration as a desirable target.

## Conclusion

Phillips put forward the theoretical view that there exists a permanent convex non-linear policy trade-off between levels of activity and inflation in both his PhD thesis and an article deriving from it as a building block for examining dynamic stabilisation policies (Phillips 1954). He made the logical progression from theory to evidence following completion of his PhD by empirically estimating the long run non-linear curve in the UK (Phillips 1958) and Australian contexts (Phillips 1959). Post-PhD he developed his model of dynamic stabilisation in a growth context, a development signalled but not undertaken in his PhD. His growth model is built upon a long run stable trade-off between inflation and capacity utilisation (Phillips 1961). Theory, evidence and policy of the Phillips curve were examined in considered fashion in Phillips (1962) in a manner fully consistent with his earlier theoretical and empirical work on a long run trade-off. From the early 1960s onwards, Phillips lost interest in both stabilisation policy and the curve and does not seem to have published anything more of significance on the topic.

Phillips did not simply write and publish a few random paragraphs in the odd article which suggested that a permanent inflation-unemployment trade-off existed. The notion of a stable trade-off between unemployment (or the level of activity or capacity utilisation) and inflation permeates his published theoretical and empirical macroeconomics between 1954 and 1962.

There are very few occasions where Phillips actively considers issues of instability. Instability is not a central focus. Unstable outcomes are possible but unlikely, and Phillips suggests that balance of payments difficulties are remediable not by a shift to zero inflation but by technical adjustments to exchange rate policy. There is little or no suggestion in his work of instability due to endogenous shifts in the position of the Phillips curve itself. There is no textual evidence in either his empirical or theoretical work that any form of inflation expectations play a role in shifting the position of the curve in response to non-zero rates of inflation. In his most detailed discussion of the issue (Phillips 1954), it tellingly arises out of instability in aggregate demand, not in the position of the Phillips curve, and in a simulation where policy makers are assumed to be targeting zero inflation, not a positive inflation rate.

The evidence drawn out above is enough to provide justification for the ready interpretation by the profession of Phillips's curve as a menu of policy choice, excluding from consideration inflationary expectations. Phillips himself felt no need to even mildly disagree with the profession's spin, despite having the opportunity (e.g. see Phillips 1962, p. 11, pp. 13-14).

It is worth mentioning that Leeson's ongoing programme arguing that Phillips was not a Phillipsian picks up on a resonating theme in the history of macroeconomic thought. As one parallel, various post Keynesian arguments that Keynes was not a Keynesian spring immediately to mind, with the American Keynesians also featuring there as the initial source of misinterpretation. The great irony about casting Samuelson and Solow as villains of the Phillips curve is that their discussion of the curve, including as it does explicit consideration of both adaptive expectations shifting the curve and issues of path dependence, is significantly more sophisticated than that of Phillips himself (see Chapple 1996).

In sum, Leeson's revisionist programme to read into Phillips's work the later criticisms made by Friedman, Phelps and others of the Phillips curve founders on one great rock - a lack of a sufficiently strong and accurately reported base of direct textual support to be historically persuasive.

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## Notes

<sup>1</sup> The bulk of the remaining three chapters of Phillips (1953) were published earlier in Phillips (1950).

<sup>2</sup> Contrary to what is suggested by Lipsey (1978, pp. 49-50). Lipsey (1978, p. 50) also argues that "[t]he relation remained one between the rate of change of prices and the level of output (in relation to 'full employment' output) in his two subsequent articles (Phillips, 1956, 1957)". I have been unable to find any discussion of such a relationship in Phillips (1957). There is the very brief suggestion in Phillips (1956, p. 99) that product prices are positively related to real aggregate demand.

<sup>3</sup> Nor does he see any need to do so in his PhD (Phillips 1953).

<sup>4</sup> In a sense, Phillips adapts the static IS-LM model with a simple Phillips curve and a given nominal money supply first developed theoretically (and indeed with a form of Phillips curve estimated empirically) by Klein (1947) to examine a dynamic stabilisation problem. While others (e.g. Leeson 1997e, p. 145) have seen Klein as one of the co-discoverers of the Phillips curve, they have done so on the basis of his econometric work in the 1950s, not his earlier 1947 article where the curve is integrated with the IS-LM model in a fashion attributed by Lipsey (1978, pp. 51-56) to Phillips (1954). Neither Phillips's published work nor his PhD thesis shows any evidence of having read Klein.

<sup>5</sup> Lipsey (1978) actually ignores Phillips (1961) in coming to his disequilibrium conclusions.

<sup>6</sup> Note Leeson (1997b, p. 55) shies away from the obvious implications of this passage by claiming "since (approximately) these correlations [sic. I think he means observations] had *historically been observed*" (original emphasis) they are merely illustrative and have no more relevance than this. In actual fact, rather than using actually plotted historical combinations, Phillips is reading directly from Figure 6 of his paper where he graphs his estimated curve, without plotting actual observations, in wage inflation-unemployment space. Furthermore, the quotation directly locates them on a policy choice menu rather than in a merely illustrative context. Second, if Phillips had wished to match up his inflation-unemployment numbers with particular historical combinations, he doubtless would have done so by adding dates to both inflation and unemployment rates. He does not do so.

<sup>7</sup> In addition to omitting consideration of his 1961 article, Lipsey's interpretation of the famous curve contains no reference to Phillips (1959). This quote from it contains - if more evidence is indeed needed - evidence against his disequilibrium interpretation.

<sup>8</sup> Recall also a third form of instability considered by Phillips (1954) and discussed above, of aggregate demand under a zero inflation target where expectations are adaptive but do not to shift the position of the curve. This form of instability is unrelated to the position of the Phillips curve.

<sup>9</sup> While pointing out the discussion of the possibility of balance of payments problems in Phillips (1962), Leeson (1997e, p. 144) does not acknowledge Phillips went on to present the solution as a technical adjustment of exchange rate policy.

<sup>10</sup> It is also no surprise that Samuelson and Solow (1960) did not take balance of payments issues into account in their discussion of the US curve (cf. Leeson 1997e, p. 144). As a country highly independent of world trade and the supplier of the world's reserve currency during the 1960s, balance of payments problems were simply not an issue in the US.

<sup>11</sup> Elsewhere Leeson (1997a, p. 160) argues Phillips sought to emphasise the "alarming inflationary consequences" of higher demand. "Alarming" is Leeson's language and not Phillips's own in his rather more sober account (1959, pp. 4-5).

<sup>12</sup> Leeson's citations appear inaccurate on some occasions. Leeson (1996, p. 39; 1997a, p. 160, 1997d, p. 502) quotes Phillips (1959, p. 4) to the effect that a currency depreciation "would offset any initial benefits derived from higher inflation". This quote provides a certain amount of evidence against a trade-off interpretation. I have been unable to locate these words or ones like them on the page in question, on any other page of the short article, or anywhere else in Phillips's published writings. A letter to Leeson has not been successful in clearing up the matter.

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