

Price Stability and the Origins and Early Impact of the Phillips Curve: Contextual Analysis and New Evidence from the British Archives

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Moving from conflicting opinions regarding the relevance of A.W. Phillips' contribution, and of the Phillips curve in particular, this paper provides a contextual analysis in which Phillips (1958) is seen as part of a wider research effort, aimed at exploring how to reconcile price stability with levels of unemployment that were higher than current rates but politically acceptable. We label this proposal 'reverse trade-off', to mark its distance from standard textbook accounts, which regard the Phillips curve as justifying inflationary Keynesian policies in the 1960s and 1970s. Moreover, our reconstruction suggests that what really mattered with Phillips (1958) was that it provided a quantitative estimate of the unique (and low) level of the unemployment rate which was compatible with price stability. However, even though the British Treasury and the LSE colleague of Phillips F. Paish conducted independent researches along the lines proposed by Phillips, the curve met with early opposition from some prominent British policy and academic circles. At Cambridge, Kahn and Kaldor in particular attacked the neoclassical underpinnings as well as the policy implications of the curve. Parallel to this, Lipsey (1960), while contributing to popularize the Phillips hypothesis within the broad scientific community, had the opposite effect in the restricted academic and top level policy circles within which Phillips' curve article was born and moved its first steps. First, Lipsey's empirical results and rightly cautious attitude weakened the case for bringing the unemployment rate up at the level consistent with price stability. Second, Lipsey (1960) weakened also the belief in the possibility itself of identifying the unique unemployment rate consistent with price stability.

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1. Introduction¹

Textbook histories of the Phillips curve document how Phillips (1958) discovered the existence of a stable inverse relation between unemployment and the rate of change of nominal wages in Britain between 1861 and 1957. This discovery rapidly attracted the attention of academic and policy circles in the UK, the USA and elsewhere. During the 1960s, thanks to Lipsey (1960) and Samuelson and Solow (1960), among others, the Phillips curve became part of the then-dominant orthodox Keynesian paradigm, “implying a stable long-run trade-off which provided the authorities a menu of possible inflation-unemployment combinations for policy choices” (Snowden and Vane 2005, p. 140). In subsequent years, systematic attempts to exploit this menu, together with other factors (e.g. trade union rivalry, distributive conflict and oil shocks), led inflation and unemployment to rise together in many developed countries. This led to doubts about the policy menu interpretation, which Phelps (1967) and Friedman (1968) addressed, by introducing inflation expectations and the notion of a vertical long-run Phillips curve (see also Friedman 1977).

Forder (2014) has challenged this narrative, claiming that “each component of that story is false” (Forder 2014, p. 1). In his opinion, Phillips (1958) – “a wet weekend’s work” – was hardly an integral part of its author’s life work and had very limited impact on the theoretical and empirical literature on inflation in the 1960s. The idea that inflation expectations mattered for wage determination was already well established, in the 1950s and ‘60s, and few believed in the existence of a stable trade-off between inflation and unemployment and in the idea of tolerating inflation, in order to maintain low unemployment. Forder also claims that much of the popularity of the Phillips curve was not due to the curve itself but rather to Milton Friedman choosing it as a strawman against which to level his criticism of the inflationary policies pursued, in the USA and elsewhere, in the 1960s and 1970s.

Another line of research, which includes Wulwick (1989), Laidler (1989, 1997, 2001), Leeson (1996), the essays in Leeson (2000), but also Bollard (2016) and Lipsey (2016), among others, takes an altogether different position. While not denying its methodological limits, these authors agree on regarding Phillips (1958) as part of an important and innovative research programme on macro-stabilization, which deserves to be remembered and honored together with the man who carried it out.

The existence of conflicting opinions regarding the relevance of Phillips’ contribution in the 1950s, and of the Phillips curve in particular, invites further investigation. In this paper, which focuses on the origins and early impact of the Phillips curve, we combine previous research, by others and ourselves, with new archival evidence to weave together a complex and, we hope, interesting story. The primary

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evidence we use, includes papers drawn from the archives of Lionel Robbins, James Meade and Henry Phelps-Brown at LSE and the Memoranda of evidence and recorded oral testimony given by economists in front of the Radcliffe Committee between 1957 and 1958.

As Cristiano and Paesani (2017) recall, focusing on the British debate, no consensus existed among economists, in the 1950s, either on the causes of inflation or on remedies against it. While demand-pull theorists foreshadowed the possibility of an inverse relationship between unemployment and (wage) inflation, cost-push theorists were doubtful about it and hostile to its policy implications. The two sides agreed that wages running ahead of productivity was one of the main causes of inflation, but differed on the explanation of this phenomenon. Demand-pull theorists regarded it as a by-product of over-full employment and excessive demand for goods spilling into the labour market. Cost-push theorists emphasized the role of institutional (e.g. trade union rivalry) and other factors (e.g. impact of devaluation on the price of imported goods). Moreover, while most economists identified distributive conflicts, as relevant in causing inflation, there seems to have been wide agreement on the fact that policy makers could do little about them if not through moral suasion or (indirectly) by influencing aggregate demand.

Our research suggests that Phillips' contribution, far from being isolated, was part of a wider research effort, aimed at exploring how to reconcile price stability with high (if not full) employment. Quantification of the unemployment rate consistent with price stability was part of this effort, especially at LSE where Phillips worked (Bollard 2016, Ch. 8). In this context, claiming to have discovered a stable inverse relationship between inflation and unemployment, as Phillips did in 1958, was doomed to meet with scepticism from one side, possibly with enthusiasm from the other (especially at LSE and in some political quarters as we show below), but certainly not with indifference and this is indeed what happened. Our research also shows that the Phillips' curve, with its policy implications, attracted early criticism from important British policy and academic circles. This, together with other factors, which we explore at the end of the paper contributed to limit its immediate influence.

As we underline in section 2, interest in the nexus between price stability and equilibrium, animated Phillips' research agenda in the 1950s, and this interest drew him to investigate the relationship between unemployment and wages. As Laidler (2001, p. 9) puts it, "[w]hat interested Phillips about his curve was not what it revealed about an inflation-unemployment trade-off that might be exploitable for policy purposes, but what it revealed about the unemployment rate that would rule when the economy was in an inflation-free steady state".

The same problem attracted the interest of other economists, some of them working at LSE alongside Phillips (section 3). These economists recommended monetary (and fiscal) restriction against

inflation, some of them going so far as to propose that unemployment should rise in order to achieve price stability. We label this proposal “reverse trade-off” to mark its antithesis with respect to the opposite idea, i.e. that the Phillips curve served the purpose of computing the additional amount of inflation required to lower unemployment to a given level. It is important to underline, that proponents did not interpret reverse trade-off as a policy menu but rather as a one-off move, that would bring unemployment up to the level at which prices would remain stable. As pointed out in Brittan (1964, pp. 294-99), a radical version of this doctrine existed in which obtainment of this level of unemployment was not only a necessary but also a sufficient condition for price stability. In this way, as we reconstruct in this paper, a concept that in the standard narrative is supposed to appear only at a later stage and in a different version, namely the idea of a unique equilibrium rate of unemployment compatible with price stability, was introduced at a very early stage of the debate.

Having established that Phillips’ research activity was part of a wider context, including prominent economists such as L. Robbins and especially F. Paish, the second part of our research focuses on the early influence of Phillips (1958). In Section 4, we show that while the British Treasury and Paish conducted independent research along the lines proposed by Phillips, the Phillips curve met with opposition from British policy and academic circles from the very start. Forder (2014, ch. 1) points out this fact, but chooses to focus on Phillips’ scarce impact on the econometric literature of the time. Lipsey (2000, pp. 236-237) also recalls the hostility of “British economists with left leanings” (Richard Kahn in particular) but does not expand on this point.

In section 5, we show how the Cambridge Keynesians were indeed opposed to the Phillips curve, focusing their criticism on its neoclassical underpinning and policy implications. We thus add new evidence, some of it hitherto unpublished to the best of our knowledge, to Lipsey (2000) and Forder (2014), showing connections between early institutional and academic opposition to Phillips (1958).

Finally, in section 6, we re-examine the relationship between Phillips (1958) and Lipsey famous 1960 article. We concur with the opinion that “the two essays really formed the unit that made the curve famous” and that “his more orthodox statistical treatment of the curve did quite a bit to still some of the many early criticism” (Lipsey 2000, p. 236). At the same time, however, our reconstruction suggests that, at least initially, Lipsey’s article probably had the opposite effect at least in some prominent British academic and policy circles.

On the one hand, Lipsey’s neoclassical formalization strengthened the opposition of Cambridge Keynesians and cost-push theorists in general to the Phillips curve. On the other, Lipsey’s results and cautious attitude weakened the reverse trade-off argument (which Lipsey himself did not espouse at the time) and the belief in the possibility of identifying the unique unemployment rate consistent with price stability. In our opinion, this contributed to the emancipation the Phillips curve from its

original context, with its emphasis on the nexus between price stability and equilibrium, paving the way, together with Samuelson and Solow (1960) and others, for the policy menu and its subsequent inclusion in the Keynesian policy toolbox (Lipsey 1978). This happened in spite of the fact, which Solow (1978, p. 147) observes and our reconstruction confirms, that “there was little that is specifically Keynesian about the Phillips curve, either historically or analytically”.

The main conclusions emerging from our research are as follows. Phillips (1958) was not an isolated piece of work. It was integral part of Phillips’ research agenda in the 1950s, reflecting his interest in macroeconomic stabilization and price stability in particular. It also had significant connections with the policy debates of the time and the research agendas of other LSE economists, Robbins and Paish in particular. Early attempts to use the Phillips curve as basis of an anti-inflationary strategy in Britain (reverse trade-off argument), however, succumbed to high-ranking institutional opposition and scepticism, which Lipsey (1960) did not contribute to dispel, from prominent Cambridge Keynesians and cost-push theorists in general. This might contribute to explaining why the resonance of the Phillips curve in the early 1960s (and of reverse trade-off) was not as large as it became in subsequent years, in a different theoretical and policy context.

2. Phillips on price stability and equilibrium

As is well known, Phillips (1958) finds an inverse non-linear relationship between unemployment and the rate of change of money wages in the United Kingdom, between 1861 and 1913, which also holds until 1957 and a series of cyclical patterns, whereby wages increase at a faster (slower) pace during cyclical upswings (downswings). Phillips’ main theoretical justification of his findings runs as follows:

“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 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 labor 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”. (Phillips 1958, p. 283)

In addition to market forces, other factors, that may affect the level of wages include the rate of change of retail prices, operating through cost of living adjustment of wage rates, lagged wage adjustment and one-off events (large increases in import prices, wartime disruption). Based on this framework and the assumption that labour productivity grows approximately at 2% annually, Phillips’ estimate lead him to claim that

“if aggregate demand were kept at a value which would maintain a stable level of product prices the associated level of unemployment would be a little under 2.5 per cent. If as is sometimes recommended, demand were kept at a value which would maintain stable wage rates the associated level of unemployment would be about 5.5 percent.” (Phillips 1958, p. 259)

The only policy recommendation that Phillips gives at this stage, and even so very tentatively, at the end of the paper, is that the non-linearity of the curve suggests that stabilizing unemployment around a low level, is superior to letting it fluctuate around the same level, if one wants to reduce the average rate of increase of wage rates.

Based on textual evidence and secondary sources, we tend to interpret the curve as a relationship showing a series of attractors (the crosses on Phillips original diagram), none of them stable enough to deserve the name of equilibrium. The economy fluctuates around these attractors and gravitates towards one or the other depending on what stabilization policy the authorities adopt (if any) and on how serious they are about it. In this sense, a trade-off of a kind (a compromise) is there, but the emphasis is clearly on price stability and the specific level of the unemployment rate consistent with it, as Laidler suggests, and our reconstruction confirms.

Dynamic macro-stabilization was Phillips’ main research interest in the 1950s and this is the context in which the curve should be interpreted, rather than as an isolated piece of work. Phillips (1954[2000]), his first major published work deals with the problem of stabilization in a closed economy hit by one-off nominal demand shocks. This paper contains an important antecedent of the 1958 curve as well as of the mechanism whereby product prices react to changes in flexible factor prices, which in turn depend on the level of aggregate real demand. Phillips (1954) also discusses the possibility that positive feed-back from inflation to aggregate demand may act as a destabilizing mechanism

“If, on the other hand, there is confidence that any movement of prices away from the level ruling in the recent past will soon be reversed, demand is likely to change in the opposite direction to the changing prices [...] and the response of demand to changing prices will act as a normal proportional regulating mechanism” (Phillips 1954[2000], p. 153)

Combining these considerations, with Phillips’ tentative indication about the desired level of production being that which would result in a constant level of product prices and which depends on the bargaining powers of the different groups in the economy (Phillips 1954[2000], p. 150) confirms our impression about the importance Phillips attributed to the nexus between equilibrium and price stability and to the possibility of attaining it by appropriately timed policy measures.

Schwarzer (2012) takes up this point as he explores Phillips' preference towards inflation and unemployment, as they emerge from an unpublished paper, estimating the relation between unemployment and wage inflation for Australia, over 1947-1958 (Phillips 1959 [2000]). On both counts, Phillips appears to distance himself from those who gave pre-eminence to full employment and growth over price stability (e.g. Kaldor 1959). This distance appears even more clearly in his inaugural lecture at the London School of Economics (Phillips 1962 [2000]).

After discussing some general principles of fluctuations and stability and the relative merits of monetary and fiscal policy in reducing fluctuations in employment and economic activity, Phillips (1962 [2000], section 4) delves into the relationship between employment and inflation. In this context, Phillips reiterates the validity of his 1958 estimates, remarking that

“we can only reduce inflation, for any given rate of increase of 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; perhaps about 2 per cent unemployment with about 1 per cent per year rise in prices”. (Phillips 1962, [2000], p. 218)

Here, Phillips endorses, perhaps not enthusiastically, the reverse trade-off argument and goes so far as to propose a compromise between the status quo and the ideal condition of price stability. Based on his analysis of the reasons that lead wages to continue to rise while there is significant unemployment, he also elaborates on the possibility of improving the (wage) inflation/unemployment trade-off by adopting reforms promoting wage flexibility, the geographic and sectoral mobility of labour and moderation in trade union requests (Phillips 1962, [2000], p. 219-20). Phillips' indication of liberalization and labour market reforms as ways of lowering the unemployment rate, without endangering price stability, seems to prefigure the idea of supply side policies, an idea, which also Meade (1958) discusses.

3. The Phillips curve in its context

It has been suggested that, although Phillips had no political axe to grind, his article of 1958 was politically relevant in the context in which it was published. For Brown (2000, p. xiv), the success of the curve “owed much to its timeliness. In 1958 people had (...) started worrying about a new sort of creeping inflation connected with high employment”. In the same volume edited by Leeson, Holt (2000, p. 305) recalled that “To Phillips' surprise the paper generated tremendous interest. Within months the trade-off between inflation and unemployment was being debated by parliament”. Holt

gave no precise reference, but we can document at least one episode confirming that Holt's memory was correct. Hansard reports of a debate at the Commons on 17 December 1958, in which Sir Alexander Spearman referred to "a very interesting article in the last issue of *Economica*, by Professor Phillips".

No more than a curiosity in itself, this episode is revealing of a climate of opinion. Spearman's reference to Phillips was made during a debate on unemployment introduced by James Griffiths, a Labour party MP, who lamented that unemployment had once again become a major issue, at least in some districts. In this context, Spearman used the following argument:

"[Phillips] goes a very long way to destroy what I think is the fallacy of thinking that in order to prevent inflation and rising prices it is necessary to have heavy unemployment. He says that in order to have stable wages – a thing I hope no one would want – it would be necessary to have high unemployment, but that in order to have stable prices, assuming the normal increase in production and no abnormal rise in the prices of raw materials, and on the evidence of the last 100 years, a comparatively small percentage of unemployment would keep prices steady."

Spearman had found in Phillips (1958) the answer to a question that was implicit in many arguments of the same kind – that were also presented to the Radcliffe Committee by Paish, Robbins, Manning Dacey, Gregory and Hawtrey among others – and that are recurrent in the writings of these and other economists during the same turn of years. During a period in which the unemployment rates in the UK reached a relative maximum of only 2.2% in 1959 after a minimum at 1.1% in 1955 (see Allen 2014, p. 243), these economists were popularizing the idea that, as Lionel Robbins put it to the Radcliffe Committee, "to frame a general financial policy on the assumption that anything more than, say, 1.5 per cent. is under-employment is to invite secular inflation in an eventually acute form" (Memoranda, vol. 3, p. 213, §28). In the same vein, Ralph Hawtrey denounced what was for him an "abnormally low unemployment percentage" (Memoranda, vol. 3, p. 121, § 69) and Manning Dacey, former pupil and collaborator of Robbins, blamed inflation on "a climate of opinion ... such that the maintenance of a 99 per cent. full employment is regarded as a reasonable objective of policy" (Memoranda, vol. 3, p. 66, §4). But, while all these economists assumed that current unemployment rates were too low, much more difficult was for them to determine what would have been a normal level. Nonetheless, it was part and parcel with their demand-pull explanation of inflation that unemployment had to rise if inflation was to fall, because "to check inflation it is usually necessary to slow down the rise in incomes, even though this will probably involve at least a temporary check to the rise in output" (Paish 1962, p. 120).

In this context, Robbins and Paish in particular were tentatively groping at a re-definition of full employment in terms of the rate of unemployment that was compatible with stable prices or stable inflation. In a paper written in 1958, later included in Paish (1962), Paish wrote that "If ... political

considerations require government to try to maintain a lower level of unemployment than is consistent with the absence of inflation, the problem of stopping inflation may be insoluble” (Paish 1962, p. 122). In his Radcliffe memorandum, on the other hand, Robbins wrote that the term “full employment” had “highly misleading implications” (§ 29):

“It must surely be agreed that, if it be true that before some reasonable conception of full employment is reached, wage rates inevitably rise more than productivity, or if at the point of full employment the same result follows, then we should indeed be confronted with the dilemma that either we could keep the value of money stable at the cost ... of less production, or we could have more production at the cost of a falling value of money” (p. 214, § 29).

Others had less sophisticated views. J.L. Carr, of the University of Reading, argued that “it is worth risking some temporary setback to production and employment if this is a necessary condition of keeping prices in this country in future more stable than they have been in recent years” (Memoranda vol. 3, pp. 50-1, §§ 4, 6).

Opinions like these, although relevant and not limited to LSE, had to confront other views, which reflected doubts about the possibility of determining the unemployment rate consistent with price stability and the legitimacy of raising one in order to achieve the other. While giving oral evidence, A.J. Brown, pressed by Sayers, went as far as to give an estimate, although “horribly speculative”, of the level of unemployment that could have been compatible with stable prices. Brown put this level “at something like 4 to 6 per cent”, based on pre-war data, and when Sayers suggested a lower estimate (3 to 5%) for the post-war period, Brown admitted that this was possible (see Minutes, Qs. 9174-9175). But all these estimates remained well above the current the equilibrium level pointed out in Phillips (1958).

A.J. Brown was an authority on inflation at least since the publication of Brown (1955). He reported to the Committee that “Some people claim to be able to see some sort of relationship between the pressure of demand ... and the rate of inflation” (Minutes, Q. 9172). Thanks to Wulwick’s and Laidler’s efforts (see Wulwick 1989, p. 173; Laidler 1989, p. 35, n. 9), it has been possible to reconstruct that Brown had Phillips (possibly among others) in mind when he pronounced these words. In the Minutes, however, Brown adds his own informed opinion on the subject. For him no such a relation could be observed – “I just do not see any clear relation at all” – and this entailed an indication for policy that was orthogonal to the one that Spearman derived from Phillips (1958):

“It seems to me that, if one takes this absence of any very clear relation since the war along with such evidence as there is before the war, one probably would not expect the wage and salary

inflation to be checked to any great extent, unless the slackening of effective demand is very much greater than anything we have had since the war". (Minutes, Q. 9172)

Robert Hall's evidence as Director of the Economic Section at the Treasury bears witness that the same question was under strict scrutiny in government headquarters. Hall cited studies that were under way at the Treasury in which attempts were made to give quantitative assessments of the relationship. As far as Hall's minutes permit to understand, these studies consisted of international comparisons:

"We have made such a correlation [between "movement of prices" and "pressure on the labour market"] for the postwar period for this and other countries, and it was not significant. The nearest thing we got was that costs rose faster in the group of countries which were maintaining unemployment at a much lower level. You can broadly divide them into countries which ran it at between 1 and 2 per cent., and countries which ran it at between 4 and 5 per cent". (Minutes, Q. 1396)

The crucial difference between the Treasury view, as expressed by Hall, and Phillips (1958) pertained to the very nature of the relationship. For Hall, this was "indeterminate" and, apparently, not independent of government policy. Echoing Robbins (see above) and replicating the view of the White Paper on The Economic Implications of Full Employment of 1956 (Cmd. 9725), Hall insisted that the two declared objectives of policy, i.e. high and stable employment and price stability, were in fact the two horns of a "dilemma". Moreover, according to Hall, the government choice had systematically fallen on full employment at the expense of price stability (see Minutes, Q. 1376). A consequence of this choice – Hall continued – was that a stable expectation of rising prices had been created, thus providing one of the two elements, the other being the structure of the labour market, that made the relationship between unemployment and wage-inflation indeterminate:

"I think it really follows, from the line which all Governments have taken, that they take the view that in conditions of full employment which everybody believes will be maintained profits will be high enough, and the bargaining power of labour will be strong enough, to result in a structure of costs which, in economic language, is indeterminate" (Q. 1387).

The idea of providing a 'guiding light' to wages, supported by Hall, had been taken into consideration but not yet accepted at the time (see Brittan 1964, p. 206). Afterwards, however, the government began to show a renewed attitude. Parallel to the Radcliffe Committee, in August 1957 the Council on Prices Productivity and Incomes (Cohen Council) had been appointed. After a first report in which inflation was explained in terms of excess demand, in its fourth (and final) report, published in 1961, the Council eventually adopted a cost-push explanation, which supported the subsequent adoption of incomes policy (see Backhouse and Forder 2013, p. 21). Under Selwyn Lloyd's chancellorship, a 'pay pause' was

imposed in the public sector between July 1961 and April 1962, followed by the adoption of a “guiding light” for earnings (fixed within the range of $2 - 2\frac{1}{2}\%$). Parallel to this, the idea of accepting a higher rate of unemployment as the cost to pay in order to curb inflation, became “an influential doctrine” in Treasury circles (Brittan 1964, p. 294) – where for example Sir Frank Lee, who had presented a similar view in front of the Radcliffe Committee as a member of the Board of Trade and was later appointed Permanent Secretary at the Treasury, supported it.

4. Phillips’ early (and controversial) impact on the British policy debate

After 1958, changing Treasury views about inflation and unemployment contribute to create a new climate, propitious to the proposition of the reverse trade-off. As reconstructed by Brittan (1964, pp. 294-99), at least two “variants” of this doctrine were circulating during the early 1960s. One version had been elaborated at the Treasury, while the other one was commonly credited to Paish (1962, ch. 17), who included Phillips (1958), Lipsey (1960) and Dicks-Mireaux and Dow (1959), as empirical works in support.

In both these new elaborations of the reverse trade-off argument quantitative assessments were made of the increase of unemployment that would have been necessary to stabilize prices. In the Treasury variant, the target of unemployment was a bit lower, at around 1.8%, while Paish suggested something just above 2% (see Paish 1962, p. 327), and therefore approximately the same level suggested in Phillips (1958). Another, and probably more important difference, was that only in the Paish variant the attainment of the equilibrium level of unemployment was considered sufficient for stabilizing prices. In the Treasury variant, bringing up unemployment to the equilibrium point was only a necessary condition, to be complemented by an incomes policy (see Brittan 1964, p. 298, fn).

In none of the two variants, therefore, the trade-off was considered as a menu to be exploited according to political preferences. On the other hand, both variants incorporated a unique level of unemployment, higher than the current rate, as a target for policy. Paish’s variant in particular was altogether consistent with Phillips (1958) as well as with Phillips’ wider research agenda on stabilization policies. But a required condition for the success of this more radical variant of the argument, in which a one-shot increase of unemployment was considered sufficient to stabilize prices, was to make it an accepted idea that there existed one rate of unemployment, and only one, that could stabilize prices.

In Paish (1962), acceptance of this scheme was straightforward. Paish distinguished between that part of any change in output which depends on a corresponding change in productive capacity and the other one depending on changes in capacity utilization; then, he assumed that “the most important

factor in determining the rise in money incomes is the proportion of productive capacity currently employed” (p. 310), and deduced from these assumptions that

“there must be some margin of unused capacity at which money incomes will rise at an annual rate equal to that of the growth of productive capacity. If the margin of unused capacity can be permanently stabilised at just this level, with the rate of rise in actual production kept equal to the rate of rise in productive capacity, we have, in a closed system, the necessary conditions for long-term price stability, since output and incomes will always rise at the same rate” (pp. 310-11).

Likewise Spearman in the December 1958 parliamentary debate, Paish noticed that the required increase of the rate of unemployment was after all not so large, thus promoting the political viability of his proposal (see p. 328). And likewise Meade (1958) and Phillips (1962), he suggested that measure could be taken to increase the mobility of labour, thus reducing the average period of individual unemployment. However, all this relied on the hypothesis of a unique equilibrium rate of unemployment being easily accepted. Based on Brown’s objections on empirical ground as put forth in his evidence before the Radcliffe Committee, and on the other objections anticipated by Meade in his correspondence with Phillips (see below, section 5), it was far from probable that this could happen. Paish himself, in chapter 17 of his book of 1962, followed a method of his own, based on the construction of indexes of production and of capacity utilization for the post-1948 period, in estimating the margin of unused capacity and the equilibrium rate of unemployment. Therefore, his assessment of the equilibrium rate of unemployment was consistent with Phillips (1958), but did not depend on it.

Paish was probably aware that Phillips (1958) could not have the last word. Within LSE, another economist who remained skeptical about Phillips’ hypothesis was Henry Phelps Brown. In the LSE oral tradition, Phelps Brown is credited for having stimulated the research which led to the publication of the curve article, providing Phillips with the data that were employed in it (see Lipsey 2000, pp. 234-35). More important than that, at least from the point of view of Paish’s political agenda, was that Phelps Brown found himself in the position of assessing Phillips’ work as a member of the Cohen Council.

This was of no help in promoting the Phillips hypothesis for inclusion in the official view. Scarce enthusiasm about Phillips (1958) was expressed, in a published form, also in Phelps-Brown and Browne (1962, pp. 521-22). But a more refined analysis, and a more thorough criticism of Phillips (1958), can be found in a typescript memorandum for the Cohen Council by Phelps Brown, dated 26 February 1961, which is now extant in the LSE Archives. About five out of ten pages of this memorandum were devoted to dismantling the Phillips hypothesis, the remaining part being in support of the thesis that

the main drive of wages had been, in recent times at least, the institutional mechanism provided by the annual “round” of wage bargaining. Moreover, as a further confirmation that, at least from the perspective of the current policy debate, the crux of the matter was not so much the trade-off as the existence of a unique equilibrium level of unemployment, it was exclusively on this point that Phelps Brown concentrated his attack. As he wrote

“If there were a dependable relation between the level of unemployment and the rate of rise in money earnings, we might expect there to be a level of unemployment at which the rise of money earnings would be low enough to avoid inflation. [...] Such observations have suggested that inflation can be avoided while bargaining goes on just as it does now, if only effective demand can be adjusted so that the pressure on resources does not exceed an intensity indicated by an unemployment rate of, say, rather less than 2 ½ per cent. But there are several reasons for doubting whether there is in fact any continuous quantitative relation, on which the authorities could rely, between the unemployment rate and the rise of money wages” (Phelps Brown’s Memorandum of 26 February 1961, pp. 3-4).

Based on this, any adoption of the radical version of the reverse trade off proposed by Paish was excluded. After all, the empirical study by Dicks-Mireaux and Dow (1959), that Paish (1962, p. 310) cited in support of his proposal along with Phillips (1958) and Lipsey (1960), was more in line with Phelps Brown’s memorandum. As Dow (1964, p. 355) later commented, one of the main conclusions reached in his paper with Dicks-Mireaux was that “there is an unexplained ‘constant’ tendency for wages to rise – which might be explained at least in part to trade union pressure”. In the same vein, Dicks Mireaux (1965, p. 12) singled out Phillips (1958) as the paper in support of the view that an unemployment rate “a little under 2 ½ per cent” would be sufficient to eliminate inflation, but concluded that

“the state of demand in the labour market exerts a positive influence on wage bargains, but not so great perhaps as some studies suggest and almost certainly not so great that an increase in unemployment to a level within the limits of political reality would solve the problem of rising wages and rising prices”. (1965, p. 17)

These objections to Phillips (1958) were not inconsistent with Hall’s view on the structure of costs being “indeterminate” from a strictly economic perspective (see above, section 2). More generally, these views reflected (or supported) the opinion, which was mainstream at the time, that the functioning of the labour market could not be properly understood on a purely economic ground. The institutional factor highlighted by Phelps Brown in his memorandum of February 1961, i.e. “the round”, was only one of them. Hicks (1955) was a plea for adding (although not for substituting) the economic forces to the list of institutional, social, moral and political elements that were supposed to govern the

market for labour. More recently, Backhouse and Forder (2013) have argued that the scarce contribution of pure economic reasoning in support of the case for incomes policy during the 1950s and '60s, even at its most representative levels (e.g. Fellner et al. 1961), is to be explained as reflecting the relatively scarce weight attributed to purely economic factors in any discussion on wages.

5. Cambridge critiques of the Phillips curve and its assumptions

If the objections examined above posed an obstacle to the possibility that the Phillips curve might have a significant policy impact in Britain, further opposition was to be expected from the Cambridge Keynesians. Lipsey (2000, pp. 236-7), for instance, reports that “Richard Kahn was reputed to be giving a series of lectures at Cambridge attacking the curve on theoretical and empirical grounds”.

This is far from surprising. As Schwarzer (2014) has shown, Cambridge Keynesians found it inexpedient to curb inflation by reducing aggregate demand, especially if this involved monetary restriction, with its negative impact on investment and productivity growth, as this would lead unemployment to rise and make it more likely that wages would run ahead of productivity in the future. Maybe for this reason, in a letter Meade sent to Phillips after reading a draft of the curve paper, he warned him as follows:

“You will be criticised in some quarters for assuming (...) that the increase of productivity of 2 per cent per annum is a given fact which is itself unaffected by the level of employment. If it were true that the higher the level of unemployment, the lower the rate of increase in productivity then a much higher level of unemployment might be needed to prevent an increase in money costs and prices. Indeed, if this relationship were so unfavourable that an increase in unemployment reduced the rate of increase in productivity by more than it reduced the rate of increase in wage rates, the inflation of prices and costs would be actually worsened by a growth of unemployment”. (Meade to Phillips, 22 August 1958, LSE Archives, MEADE/4/8)

Along with the remark on productivity, Meade had other two major comments to make. One was on the cost of living. He urged Phillips to “make it clearer” the hypothesis “that cost-of-living increases affect the rate of increase in wage rates only if they are greater than the wage increase which would otherwise have taken place”. The other had to do with “the figures for 1933 to 1940”, that for Meade seemed “very badly out of line”. “I feel – Meade wrote – this wants more explanation than it gets in the text. It is the experience of these years, I suspect, which makes many people apprehensive about the degree of unemployment that might be needed to prevent a continuous inflation of costs and prices”.

In his inaugural lecture at Cambridge, delivered a few months before reading Phillips' draft (Meade 1958), Meade had given much emphasis to the question of determining “how much unemployment

would in fact be necessary in any given circumstances to avoid a cost inflation” (1958, p. 51). Meade’s explanation of inflation was basically a demand-pull theory in which the cost-push element was included. Like Paish, Meade provided an explanation in which the demand element is the main force that pulls the rate of increase of wage rates above the “break-even point” determined by the parallel growth of productivity. Unlike Paish (1958, 1962), Meade admitted that it was possible to reform the process of wage negotiation, introducing an active incomes policy to target price stability and full employment (however this could be defined) at the same time. On policy ground, this put Meade in a midway position between Paish and the Cambridge Keynesians. On purely analytical ground, however, fundamental divergences remained, placing Meade on the side of the controversy occupied by Phillips and against Kahn and Kaldor. These differences of opinion pertained to the analysis of the labour market and the relationship between wage inflation and unemployment.

During the workings of the Radcliffe Committee, shortly before the publication of the curve article, Kahn had insisted on cost-push explanations of inflation. Based on his analysis of the uncoordinated behavior of trade unions in a segmented labour market, Kahn strongly supported incomes policy and the reform of collective bargaining as the best way to deal with rising prices (see Memoranda, vol. 3, pp. 48-50). On the same occasion, Kaldor had expressed doubts about the existence of an inverse relationship between inflation and unemployment that were consistent with the arguments put forth by A.J. Brown. Based on data from a panel of twelve countries, Kaldor (Memoranda vol. 3, pp. 150-1, § 22) saw “little connection” between wage inflation and unemployment, although he admitted that in a few countries (Italy, the USA and Belgium), “relatively high rates of unemployment lends some support to the view that wage increases tend to be rather more moderate with unemployment rates of 3 – 5 per cent. than with unemployment rates of 1 – 1 ½ per cent.

After 1958, Kahn continued to insist on the cost-push theory and on incomes policy, as he did as co-author of Fellner et al. (1961). On his part, Kaldor somehow changed position on the relationships “between the rate of increase in money wages on the one hand and the level of unemployment and the rate of change of unemployment on the other hand” (Kaldor 1959, p. 293), but he rejected Phillips’ explanation of inflation. As he wrote, “I think he [Phillips] has established the existence of these relationships; but I do not believe that they support the particular inference which he draws from them (...) – i.e., the inference that the rise in wages reflects mainly the competitive bidding for labour by employers” (Kaldor 1959, p. 293).

Kaldor was convinced that, in explaining wage inflation as the outcome of competitive bidding for labour, “[t]he demand-pull theory assumes a degree of perfection in the labour market which is unrealistic” (1959, p. 292), but he did not expand on this point. The main point made by Kaldor in the 1959 paper was that his own theory of distribution provided a better explanation of the same

relationships, in which “it is the already attained increase in profits of these industries (...) which governs the increase in negotiated wages” (1959, p. 294).

The question of the unrealistic assumptions in the analysis of the labour market resurfaced in 1961, in a controversy triggered by Meade’s unfavourable reference to Kaldor’s theory of distribution in the preface to the second edition of *A Neo-classical Theory of Growth*. The polemic began with a letter by Kaldor in November, and continued in the correspondence between the two economists well into 1962.

A specific point of disagreement that soon emerged pertained to the effects on wages that would result as a consequence of an increase of aggregate demand. Meade assumed that this effect could be predicted on the basis of the neo-classical model of the labour market, and therefore on the assumptions of perfect competition and wages equal to the value of the marginal product of labour. Meade agreed with Kaldor that these assumptions were far from realistic, but the model was for him robust enough to predict a rise of earnings as a consequence of an increase of aggregate demand. To this Kaldor objected that “if the bidding for additional labour involves the employer in the payment of higher wages he will refrain from doing so so long as the additional profit to be made with the aid of the extra labour is less than the loss of profit due to the payment of higher wages on his existing labour force” (Kaldor to Meade 21 November 1961). The exchange that followed, and which led to Kaldor’s passing reference to Phillips and Lipsey, shed some further light on the methodological differences that existed between supporters and opponents of the Phillips hypothesis. While Meade replied to Kaldor by insisting on the typical conditions that make for a competitive market, Kaldor reaction was that only in these very unrealistic conditions the Phillips-Lipsey hypothesis would apply:

“Suppose that ... there are many buyers, many sellers, a standardised good, full information about the terms of individual bargains, and the possibility of free and costless shift of any individual seller to any individual buyer and vice versa. Each individual buyer could, by offering a price infinitesimally above the price offered by his rivals attract the supply which he wanted. If the price were not rising, there would, therefore, be a negligible difference to him between the current price of the good and the marginal cost to him of acquiring one more unit. His rivals will be in the same position. Each buyer will, therefore, be making attempts to offer a price infinitesimally above any current stable price. The price will not, therefore, be stable but rising at a certain rate” (Meade to Kaldor, 23 November 1961);

“the labour market is ... most unlike a vegetable market, and an employer who employs a large number of workers and has only a certain number of unfilled vacancies is unlikely to offer higher wages unless he can get all the labour he needs by such a small increase in his offer as to make no substantial difference in relation to his existing workers. This of course is quite unrealistic and as I said in my earlier letter it is all the more unrealistic the greater the general shortage of

labour. This is why I do not agree with the Phillips-Lipsey hypothesis concerning the process of inflation” (Kaldor to Meade, 25 November 1961).

6. Lipsey and the emancipation of the Phillips curve from its original reverse trade-off context

Lipsey (1960) pursues four related goals. First, to set out a theoretical model consistent with Phillips’ hypothesis. Second, to quantify Phillips’ results. Third, to provide systematic tests of the various subsidiary hypothesis framed by Phillips in the course of his analysis. Fourth, to test hypotheses that follow from possible alternative models.

Lipsey begins by regressing the rate of change of the nominal wage rate (\dot{W}) on the reciprocal of the unemployment rate (U^{-1}) and the reciprocal squared (U^{-2}), over Phillips baseline period (1862-1913), which also includes the rate of change of the unemployment rate (\dot{U}) and the percentage change in the cost of living index (\dot{P}) to capture systematic adjustment of wages to changes in the cost of living rather than threshold cost-push effects.² Lipsey’s results lead him confirm the existence of the inverse non-linear relation between unemployment and wage inflation, which also responds to changes in the cost of living index (\dot{P}). (Lipsey 1960, p. 11)

$$(1) \dot{W} = -1.21 + 6.45U^{-1} + 2.26U^{-2} - .019\dot{U} + .21\dot{P}$$

Lipsey’s bases his empirical reformulation on a re-elaboration of the neoclassical model of the labour market, which Kaldor criticized (as seen above). In Lipsey’s model the wage rate adjusts linearly to excess labour demand $\dot{w} = \alpha(d - s/s), \alpha > 0$. This, in turn, varies inversely and non-linearly with the unemployment rate u .³

$$(2) \dot{w} = f(u), \quad f_u < 0, \quad f_{uu} > 0 \quad \forall u < a, \quad f_{uu} = 0 \quad \forall u \geq a, \quad f(a) = 0$$

On the assumption that the same relation holds true in every market, the aggregate Phillips curve obtains, which establishes an inverse relation between the rate of change of the national index of wage rates and the percentage of the labour force unemployed.

² Phillips (1962 [2000], p. 218), commenting on the inclusion of inflation in the wage equation by Lipsey and others, agrees that it might be the appropriate approach. At the same time, he adds that “changes in the cost of living are in turn mainly the result of earlier changes in the wage rates and to a lesser extent of changes in import prices. If these two behavior relations are fitted to empirical data we can proceed to eliminate price changes and obtain a single relation expressing wage changes in terms of unemployment and changes in import prices. [...] The relation I obtained is best considered as a prediction relation of this sort.

³ The fact that u cannot fall below zero, implies that as $(d - s/s)$ approaches infinity, u diminishes but less than proportionally so. In case of negative excess demand, instead, $V < U$, u rises linearly above the frictional unemployment a (corresponding to $d = s$) (Lipsey 1960, p. 15).

$$(3) \dot{W} = F(U), \quad F_U < 0$$

The position of the aggregate Phillips curve, which can never lie below the individual market functions (on this see Lipsey 1960, pp. 18-19), depends on the distribution of unemployment between the various markets, which varies over the business cycle. This contributes to the instability of the Phillips curve in the short run,⁴ and evidently weakens the reverse trade-off argument together with the possibility of quantifying the level of the unemployment rate consistent with price-stability.

“Phillips used his curve relating \dot{W} to U to predict the level of unemployment that would be compatible with stable prices and a 2 per cent annual increase in productivity (a little under 2 1/2 per cent. According to Phillips). There are at least three very serious problems involved here. (i) The estimated value can be shifted a great deal by fitting curves of different types, by including additional variables and by excluding particular years. *Thus, although it might be held with a high degree of confidence that a significant and very interesting relation has been discovered, a very low degree of confidence might be attached at this stage to a particular estimate of the parameters.* (ii) The theory [...] suggests that the fitted relation may not be a very good guide to the relation between \dot{W} and U , if U were to remain substantially unchanged for a long time. (iii) A satisfactory theoretical explanation (together with independent tests) would be needed of the high correlation between \dot{W} and \dot{P} ” (Lipsey 1960, pp. 30-31; italics in the original)

This passage marks a significant step in the emancipation of the Phillips curve from price stability and its original reverse trade-off context, a context, which did not accord with the belief in the fact that the economy “contained no full-employment equilibrium. Instead, aggregate-desired expenditure could equal aggregate production at any level of GDP and employment. In modern terms, there were no natural rates of GDP, Y^* , and unemployment U^* ” (Lipsey 2016, p. 416).

As argued above, much of the distance between the original Phillips curve and Keynesianism hinged on the adoption of the neoclassical labour market model and on the related belief in the existence of a single equilibrium point, where price stability and high employment were reconciled for a given rate of increase in labor productivity. Our reconstruction suggests that Phillips believed in the existence of this equilibrium, on the possibility of stabilizing the economy around it by use of appropriately timed macroeconomic tools, monetary policy in particular (Phillips 1954 [2000]), and on the possibility of improving it by means of supply side policies.

⁴ Lipsey tests this model on the 1919-1957 sample, finding that the changes in money wage rates continue to be explained mainly by changes in U , \dot{U} and \dot{P} and that the relative explanatory power of changes in the cost of life index increases, relative to that of other variables contributing to its instability.

Lipsey, on the other hand, de-emphasized the unicity and stability of the Phillips curve and the corresponding equilibrium unemployment level, clearing the way for the policy menu interpretation (Lipsey 1965, Lipsey 1974). Lipsey (1978) clarifies the sense of this transformation, by showing how the Phillips curve can be used to represent the supply side in a simple macroeconomic model, where aggregate demand derives from the IS-LM equilibrium. Lipsey regards this solution as an advancement with respect to the reverse L-shaped supply function, which had prevailed until then as Lipsey (2000) confirms and Forder (2014) disputes.

“The comparative statics of the macromodel closed by the Phillips curve are exactly those of the neo-classical model: there is a unique level of real income and a unique price level for any set of values of the parameters and the exogenous variables. What the Phillips curve does for the model is to provide a possible explanation, absent from the dichotomized model, of the division of the impact effects between real and monetary variables when the model is in disequilibrium”.

(Lipsey 1978, p. 54)

Lipsey is clear about the fact that Phillips regarded the unique equilibrium mentioned above as stable, provided wages (and prices) were flexible enough.⁵ He also insists on the possibility that policy makers permanently maintain the economy on a different (disequilibrium) point, contrasting this view with that provided by the natural rate of unemployment and the expectations augmented Phillips curve. Lipsey’s criticism of these concepts and his defence of inflation-unemployment trade-off are indicative of his eclectic Keynesian approach, the same he adopted in 1960, when he first re-elaborated Phillips’ material and again in subsequent years, as his work continued to kindle interest in Phillips’ original contribution. Belief in multiple equilibrium points appears to be integral part of Lipsey’s approach from the 1960s and 70s to the most recent contributions such as Lipsey (2016).

7. Conclusions

Our paper reconstructs the origins and early impact of the Phillips curve in British academic and policy circles. We argue that the Phillips curve was not an isolated piece of work but rather the product of wide interest, shared by Phillips and his LSE colleagues, into price stability and the possibility of reconciling it with high employment.

In this respect, Phillips (1958) offered a new and potentially path-breaking argument, compatible with the demand-pull theory of inflation and the reverse trade-off argument, i.e. the idea that lowering

⁵ He also insists on the fact that Phillips regarded economic growth and transitory disturbances as leaving the individual markets chasing a moving target, which they never reached, even when the economy was in some sense in macro-equilibrium.

inflation might justify a higher unemployment rate. It seems to us that Phillips' hypothesis, and all its variants, should be understood not as policy menu but rather as an answer to the problem of finding that unique (and low) equilibrium rate of unemployment, consistent with price stability and attainable through appropriately timed monetary and fiscal measures (reverse trade-off).

Our research also shows how early attempts to use the Phillips curve as basis for a policy of this kind, in Britain, succumbed to institutional opposition and scepticism from prominent Cambridge Keynesians and cost-push theorists in general. Only in later years, and in different theoretical context from that, which Phillips belonged to, would reverse trade-off be accepted.

Finally, our research suggests that Lipsey (1960), which was probably a little too ahead for its times, while contributing to the popularity of the Phillips' curve over the long-run probably had the opposite effect initially at least in Britain. On the one hand, as our new evidence confirms, Lipsey's theoretical formulation met with the opposition of Kaldor and Phelps-Brown among others, whose voices were heard in policy circles especially on the Labour side. On the other hand, Lipsey's results (theoretical and empirical) and his cautious attitude weakened the reverse trade-off argument, which at the time Lipsey would not espouse anyway. This contributed to the emancipation of the Phillips curve from its original context, with its emphasis on the nexus between price stability and equilibrium, paving the way for the policy menu interpretation.

We leave it to future research to investigate the role played by James Meade in this story. Our evidence so far suggests that Meade, who had been Phillips' mentor and who was a lynchpin between LSE and Cambridge, both intellectually and personally, shared Phillips' concern with macroeconomic stabilization and more generally with the possibility of improving the inflation-unemployment relationship by resorting to supply-side reforms. The link between Phillips and Paish also deserves further investigation.

References

- Allen, W.A. 2014. *Monetary Policy and Financial Repression in Britain, 1951-59*, London, Palgrave Macmillan
- Backhouse, R. E., Forder, J. 2013. Rationalizing Incomes Policy in Britain, 1948-1979, *History of Economic Thought and Policy*, 1, pp. 17-35
- Bollard, A. 2016. *A Few Hares to Chase: the economic life and times of Bill Phillips*, Oxford, Oxford University Press
- Brown, A. J. 1955. *The Great Inflation, 1939-51*, Oxford, Oxford University Press
- Brown, Arthur 2000. *Forward*, in R. Leeson (2000) (ed.), pp. xii-xv
- Chapple, S. 1998. Bill Phillips' Big Trade-off, *History of Economics Review*, 28, 1, pp. 87-102
- Chapple, S. 1999. The Challenge on Phillips, *History of Economics Review*, 9, 1, pp. 107-110

- Committee on the Working of the Monetary System (Radcliffe Committee), 1960a. *Report*, Cmnd. 827, HMSO, London
- Committee on the Working of the Monetary System, 1960b. *Principal Memoranda of Evidence*, 3 vols., HMSO, London
- Committee on the Working of the Monetary System, 1960c. *Minutes of Evidence*, HMSO, London
- Cristiano, C., Paesani, P. 2016. Unconventional monetary policy *ante litteram*: Richard Kahn and the monetary policy debate during the works of the Radcliffe Committee. Mimeo
- Cristiano, C. Paesani, P. 2017. Monetary policy and price stability in British post-war debate: New evidence from the works of the Radcliffe Committee, paper presented at the 21st annual ESHET Conference, Antwerp
- de Marchi, N. 1988. Popper and the LSE economists, in Neil de Marchi (ed.), *The Popperian legacy in economics*, Cambridge, Cambridge University Press, pp. 139-66
- Dicks-Mireaux, L.A. 1965. *Cost or Demand Inflation?*, London, Woolwich Economic Papers.
- Dicks-Mireaux, L. A. Dow, J. C. R. 1959. The Determinants of Wage Inflation: United Kingdom, 1946-56, *Journal of the Royal Statistical Society*, 122, 2, pp. 145-184
- Dow, J.C.R. 1964. *The Management of the British Economy 1945-60*, Cambridge, Cambridge University Press
- Fellner, W, Gilberts, M., Hansen, B., Kahn, R.F., Lutz, F., de Wolff, P. 1961. *The problem of rising prices*, Organization for European Economic Co-Operation
- Fisher, J.D.M. 2008. Phillips Curve (New Views), in S.N. Durlauf and L.E. Blume (eds.), *The New Palgrave Dictionary of Economics. Second Edition*, Volume 6, pp. 405-409
- Forder, J. 2014. *Macroeconomics and the Phillips Curve Myth*, Oxford, Oxford University Press
- Friedman, M. 1968, The Role of Monetary Policy, *American Economic Review*, 58, 1, pp. 1-17
- Friedman. M. 1977. Nobel lecture: Inflation and unemployment, *Journal of Political Economy*, 85, 3, pp. 451-72
- Harcourt, G.C. 2000. A Left Keynesian view of the Phillips Curve trade-off, in R. Leeson (2000) (ed.), pp. 304-07
- Hicks, J.R. 1955. Economic Foundations of Wage Policy, *Economic Journal*, 65, 259, pp. 389-404
- Hicks, J.R. 1958. *The Future of the Rate of Interest*, Manchester Statistical Society
- Hicks, J.R. 1959, *Essays in World Economics*, Oxford, Clarendon Press
- Holt, C. C. 2000. Interactions with a fellow research engineer-economist, in R. Leeson (ed.) [2000], pp. 308-14
- Kaldor, N. 1959. Economic Growth and the Problem of Inflation, *Economica*, 26, 104, pp. 287-298
- Laidler D. 1989. Radcliffe, the Quantity Theory and Monetarism, in D. Cobham, R. Harrington and g. Zis (eds.), *Money, Trade and Payments*, pp. 17-37
- Laidler, D. 1997. The emergence of the Phillips curve as a policy menu, in B.C. Eaton and R.G. Harris (eds), *Trade, Technology and Economics*, Cheltenham, Edward Elgar, pp. 88-106
- Laidler, D. 2001. Phillips in retrospect, UWO Department of Economics Working Papers, n. 20013,
- Leeson, R. 1994. Some Misunderstandings Concerning the Contributions Made by A.W.H. Phillips and R.G. Lipsey to the Inflation-Unemployment Literature, *History of Economics Review*, 22, 1, pp. 70-82

- Leeson, R. 1996. The Rise and Fall of the Phillips Curve in British Policy-Making Circles. *History of Economics Review*, 25, pp. 232-248
- Leeson, R. 1997. The Trade-Off Interpretation of Phillips's Dynamic Stabilization Exercise. *Economica*, New Series, 64, pp. 155-171
- Leeson, R. 1998. The Demise of the High Inflation Trade-Off Interpretation. A Reply to Chapple, *History of Economics Review*, 28, pp. 87-103
- Leeson, R. 1999a. Keynes and the "Keynesian" Phillips curve, *History of Political Economy*, 33, pp. 493-509
- Leeson, R. 1999b. The Phillips controversy. A further reply to Chapple, *History of Economics Review*, 29, pp. 97-106
- Leeson, R. 2000. The rise of the natural-rate of unemployment model. In R. Leeson, *The eclipse of Keynesianism: The political economy of the Chicago counter revolution*. New York, NY: Palgrave Macmillan
- Leeson R. (ed.) 2000. *A.W.H. Phillips: Collected Works in Contemporary Perspective*, Cambridge, Cambridge University Press
- Lipsey, R.G. 1960. The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957: A Further Analysis. *Economica*, New Series, 27, pp. 1-31
- Lipsey, R.G. 1978. The Place of the Phillips Curve in Macroeconomic Models. In Bergstrom A.R, Catt A.J.L., Peston M.H., Silverstone B.D.J. (Eds) *Stability and Inflation*. Chichester: John Wiley and Sons, pp. 49-76
- Lipsey, R.G. 2000, The famous Phillips Curve article, in R. Leeson, (ed.) [2000], pp. 232-42
- Lipsey, Richard G. 2016. The Phillips Curve and an Assumed Unique Macroeconomic equilibrium in historical context, *Journal of the History of Economic Thought*, 38, 4, Dec., pp. 415-29
- Meade, J.E. 1958. *The Control of Inflation. An Inaugural Lecture*, Cambridge, Cambridge University Press
- Pagan, A. 2000, The optimal control articles, in R. Leeson (ed.) [2000], pp. 130-3
- Paish, F.W. 1962. *Studies in an Inflationary Economy*, London, Macmillan, New York, St. Martin's Press
- Robbins, L. 1958. 'Thoughts on the crisis of 1957', *Lloyds Bank Review* ns 48, as reproduced in *Politics and economics*, Macmillan, 1963, pp. 166-196
- Phelps, E.S. 1967. Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time, *Economica*, New Series, 34, 135, pp. 254-281
- Phelps, E.S. 2008. Phillips Curve, in S.N. Durlauf and L.E. Blume (eds.), *The New Palgrave Dictionary of Economics. Second Edition*, Volume 6, pp. 402-405
- Phelps Brown, E. H. Browne, M. H. 1962. Earnings in Industries of the United Kingdom, 1948-59, *Economic Journal*, 72, 287, pp. 517-549
- Phillips, A.W. 1958. The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957. *Economica*, 25, pp. 283-299. In R. Leeson (ed.) [2000], pp. 243-260
- Phillips, A.W. 1959. Wage Changes and Unemployment in Australia, 1947-1958. In R. Leeson (ed.) [2000], pp. 269-281
- Phillips, A.W. 1961. A Simple Model of Employment, Money and Prices in a Growing Economy, *Economica*, 28, 112, pp. 360-370. In R. Leeson (ed.) [2000], pp. 195-206

- Phillips, A.W. 1962. Employment, Inflation and Growth, *Economica*, 29, pp. 1-16. In R. Leeson (ed.) [2000], pp. 207-223
- Samuelson Paul A., Solow Robert M. 1960. Analytical Aspects of Anti-Inflation Policy, *American Economic Review*, 50, 2, Papers and Proceedings of the Seventy-second Annual Meeting of the American Economic Association (May), pp. 177-194
- Schwarzer, J.A. 2012. A.W. Phillips and his Curve: Stabilisation Policies, Inflation expectations and the 'Menu of Choice". *European Journal of the History of Economic Thought*, 19, pp. 976-1003
- Schwarzer, J.A. 2014. Growth as an objective of economic policy in the early 1960s: the role of aggregate demand, *Cahiers d'économie Politique / Papers in Political Economy*, 67, pp. 175-206
- Sleeman, A. G. 2011. The Phillips Curve: A Rushed Job?, *The Journal of Economic Perspectives*, 25, 1, pp. 223-237
- Snowdon, B. Vane, H.R. 2005. *Modern Macroeconomics. Its Origins, Development and Current State*, Cheltenham, UK - Northampton, MA, USA, Edward Elgar
- Solow, R. M. 1978. Down the Phillips Curve with gun and camera, in D.A. Belsley, E.J. Kane, P.A. Samuelson, R.M. Solow (eds), *Inflation, Trade and Taxes*, Columbus, OH, Ohio State University Press, pp. 3-22
- Wulwick, N. J. 1989. Phillips' Approximate Regression, *Oxford Economic Papers*, New Series, 41, 1, History and Methodology of Econometrics, pp. 170-188
- Wulwick, N. J. 1994. Notes on Reading a Text. A Response to R. Leeson, *History of Economics Review*, 22, 1, pp. 83-93
- Yamey, B.S. 2000. The Famous Phillips Curve Article: A Note on its Publication, in R. Leeson (ed.) [2000], pp. 335-38