

# The Phillips Curve Revisited: Implications of an Urban Legend for Economics Teaching in South Africa

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## Abstract

In his article, *The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957*, Phillips demonstrates a clear trade-off relationship between the rate of change in nominal wages and the rate of change in unemployment for the period under study. Post-publication, Phillips' article became popular and is widely discussed in first-year economics textbooks. This article analyses the educational implications of the Phillips curve in textbooks prescribed by South African universities. It has been found that in a number of these publications, the Phillips curve is incorrectly illustrated as a trade-off between the level of inflation and the level of unemployment, which is not what the author concluded. A change in the way the Phillips curve is taught at tertiary institutions is therefore required to ensure that students are properly informed about aspects impacting employment. The findings of Phillips in their original format, rather than as misrepresented in some South African textbooks, should be taught to South African students. The research also shows that educators should consult original sources, rather than relying on the interpretation of others, when teaching technical aspects of an academic discipline.

**Keywords:** economic growth; economics; employment; inflation; Phillips curve; unemployment



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## **Introduction**

In 1958, A. W. H. Phillips, a lecturer in economics at the London School of Economics at the time of his research, published an article titled *The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1961–1957*. In this article, Phillips (1958) demonstrates a clear trade-off relationship between the rate of change in nominal wages and the rate of change in unemployment over the period under study.

Since his research was published, it has sparked widespread interest and is presented to first-year macro-economics students at South African universities. This article investigates, by means of *capita selecta*, the analysis and discussion of the Phillips curve as it is presented to first-year economics students at certain South African universities. The trade-off principle illustrated by the Phillips curve is analysed and compared with the way in which it is presented in the economics textbooks prescribed to first-year students at various local universities. The way in which the Phillips curve is explained to students is also analysed.

## **Research by Phillips and Fisher**

Thirty years before Phillips, Fisher (1926) conducted research into the relationship between the rate of change in the value of the American (US) dollar and unemployment in the United States during the period 1915–1925. He equates the change in the value of the US dollar and general price increases — “changes in the purchasing power of the dollar, in other words ... changes in the general level of prices” (Fisher 1926, 497) — to inflation.<sup>1</sup> Fisher (1926, 497), without using any references, explains that “[i]t has likewise been recognized that inflation carries with it a great stimulation to trade and an increase in employment.” He concludes that during the period under scrutiny, a strong relationship existed between the change in purchasing power of the dollar and employment, such that it offered an explanation for the change in employment. Fisher (1926, 498), however, immediately cautions that “[t]he ultimate effects of a long-continued inflation are doubtless bad all round”. Interestingly enough, he comes to the conclusion that the *stability* of the dollar’s purchasing power is the most important instrument to use in warding off unemployment: “We have in our power, as a means of substantially preventing unemployment, the stabilization of

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<sup>1</sup> Inflation is generally defined as “an increase in the general price level” (see, for example, Arnold 2014, 131).

the purchasing power of the dollar” (Fisher 1926, 502). Fisher’s conclusions, by implication, were that a depreciation in the value of a currency cannot be used as a long-term instrument for sustained growth in employment.

In his research, Phillips (1958, 284) attempts to determine whether the rate of increase in nominal wages in the United Kingdom can be explained by the employment level and the rate of change in employment for the period 1861–1957. The premise of his article is based on the general law of economics of demand and supply: “When the demand for a commodity or service is high relative to the supply of it, we expect the prices to rise, the rate of rise being greater, the greater the excess demand” (Phillips 1958, 283).

An additional factor, related to his research, refers to the above-mentioned law of economics (Phillips 1958, 283):

It seems possible that a second factor influencing the rate of change of money wages might be the rate of change of the demand for labour, and thus of unemployment. Thus, in a year of rising business activity, with the demand for labour increasing and the percentage unemployment decreasing, employers will be bidding more rigorously for the services of labour than they would be in a year in which the average unemployment was the same, but the demand for labour was not decreasing.

As a third factor in this regard, Phillips (1958, 283) refers to “the rate of change of retail prices, operating through the cost of living adjustment in wage rates,” but continues by downplaying its importance: “It will however be argued here that cost of living adjustments will have little or no effect on the rate of change of money wage rates except at times when retail prices are forced up by a very rapid rise in import prices.”

By making use of historical data from various sources, he concludes that, with few exceptions, “the rate of change of money wages can be explained by the level of unemployment and the rate of change of unemployment” (Phillips 1958, 283). Phillips clearly did not come to the conclusion that the reverse would also be applicable, yet he did caution that his findings should be regarded

as tentative and that there should be more extensive research on the topic (Phillips 1958, 283). His findings reveal, among others, the following:

- i) No mention is made of a relationship between the *inflation rate* and the level of unemployment/change in employment.
- ii) No mention is made of the possibility that the rate of increase in nominal wages could have an impact on the employment level and the rate of change in employment (the consequence can therefore not be the cause).
- iii) No mention is made of any possible policy implications.

Shortly after the publication of Phillips' (1958) article, Lipsey (1960, 30) warned that, according to an econometric study, "although it might be held with a high degree of confidence that a significant and interesting relation had been discovered, a very low degree of confidence might be attached at this stage to a particular estimate of the parameters." Hall and Hart (2010, 3) mention that "Phillips himself never claimed that his results had significant policy implications, particularly policies designed to reduce unemployment."

The question can thus be asked: Who "published" the "Phillips curve" with the consequential policy implications (trade-off between inflation and unemployment), if not Phillips himself? Samuelson and Solow (1960) were the first to refer to the "Phillips curve" in this way. They used data from the US, obtained from 1934–1958, to create the "Phillips curve." After the publication of their article in 1960, the use of the term "Phillips curve" was apparently attached to Phillips' findings, as was the perception that the unemployment problem can be solved through higher inflation. Samuelson (1961) took up the "trade-off principle" in his locus classicus, *Economics*, which added authority to the principle as an economic policy instrument. With regard to Samuelson, Hall and Hart (2010, 5) mention that "[t]he notion of the Phillips curve as a menu of choices from which policymakers could choose quickly became an important consideration in economic policy."

Again, as is the case with Phillips (1958), the question can be asked whether Samuelson and Solow (1960) really believed in the above-mentioned trade-off principle. Forder (2010, 1), who is of the opinion that this is obviously not the case, states that "[b]y repute, it is the paper that either pointed

to, or anyway was understood as pointing to, the possibility of permanently reducing unemployment by moving round the Phillips curve with inflationary policy. It did not do that.” Forder refers to various writers who ascribe this point of view (mistakenly, according to him) to Samuelson and Solow (1960), and even goes so far as to state that the latter’s core finding is correct. In other words, that the curve, which indicates a relationship between inflation and unemployment, can move (and is, by implication, not stable and therefore cannot be used as a policy instrument). “Clearly, then, there is no case for the view that they say the curve is stable, *whatever later commentators believe or say*”<sup>2</sup> (Forder 2010, 3). He emphatically adds that “[n]o doubt one is inclined to say that, since the things believed about Samuelson and Solow are so plainly false, it is a difficult matter to see why people would start believing them then in 1977, or at any other time” (Forder 2010, 20). Hall and Hart (2010, 5) point out that Samuelson and Solow’s (1960) Phillips curve “... provided no empirical estimates of the Phillips curve ... Instead they simply hand-drew a line they believed fit the data.”

Hall and Hart (2010) did an econometric study using the data that had been available to Samuelson and Solow (1960) as well as the techniques applicable at that time. Their calculated “Phillips curve” (in 1960 Samuelson and Solow drew their curve by hand) differed significantly from that of Samuelson and Solow: “While the estimated curves are similar to the Samuelson-Solow curve in one regard, namely each is negatively sloped over a large range of unemployment rates, all similarity stops there” (Hall and Hart 2010, 7). They conclude that there is no substantial reason for the view that such a trade-off relationship indeed exists between inflation and unemployment and that the relationship could even apply reciprocally: “[i]n addition the upward sloping portion of the estimated curve suggests that when unemployment is low it can be lowered further by *reducing*<sup>3</sup> inflation” (Hall and Hart 2010, 7). Hall and Hart (2010, 9) state that:

In the light of the differences between the estimated Phillips curve and their hand-drawn one, one has to wonder if the path of macroeconomic policy in the United States during the 1960s might have evolved differently had Samuelson and Solow, like A. W. Philips (1958) and Richard Lipsey (1960) before them, statistically estimated the curve. Would they still have argued for the existence of an exploitable trade-off?

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<sup>2</sup> Own emphasis.

<sup>3</sup> Own emphasis.

This analysis, quite correctly, leads one to ask whether there actually is, in older literature on the topic, a finding of a “Phillips curve” showing a possible trade-off between inflation and unemployment. A more in-depth literature review on this aspect, however, falls outside the scope of this article. Sufficient to say that the analysis in this section refutes the existence of a possible trade-off between inflation and unemployment. No theoretical evidence can therefore be provided for the incorrect explanation of the Phillips curve taught to South African students, highlighted in the next section.

### **A Selective Analysis of the Phillips Curve in Economics Textbooks**

In this section, an analysis is provided of the Phillips curve as it is presented in textbooks prescribed for first-year students at South African universities. As indicated above, it is clear that Phillips (1958) never illustrated a trade-off principle between inflation and unemployment.

The ranking of South African universities and economics departments was used as a criterion to select institutions for inclusion in this analysis. The *Academic Ranking of World Universities* (n.d.) lists the universities of Cape Town, KwaZulu-Natal and the Witwatersrand in the top 500 institutions in the world. *QS World University Rankings* (n.d.) lists the universities of Cape Town, KwaZulu-Natal, Rhodes, Stellenbosch, Pretoria and the Witwatersrand, while *Times Higher Education* (n.d.) mentions the universities of Cape Town, KwaZulu-Natal, Stellenbosch and the Witwatersrand. This sample of South African universities is considered too small to reach any meaningful conclusions.

The only ranking of economics departments at South African universities was compiled by Luiz (2009). According to Luiz (2009, 599), the 12 best economics departments at South African universities can be found at the universities of Johannesburg, Cape Town, KwaZulu-Natal, North-West, Pretoria, Stellenbosch, the Free State, Western Cape, the Witwatersrand, the Nelson Mandela Metropolitan University, Rhodes University, and the University of South Africa. The textbooks for first-year economics students prescribed at all these institutions are covered in the review contained in this article, although some of the books are used by more than one institution.

According to Mohr, Fourie and associates (2008, 521),<sup>4</sup> the Phillips curve indicates “an inverse relationship between inflation and unemployment.” The authors further state: “Phillips found that the statistical relationship between inflation and unemployment can be illustrated by means of a curve that slopes downwards from left to right .... According to the Phillips curve, low unemployment levels correspond with a higher rate of increase in the general price levels and *vice versa*”<sup>5</sup> (Mohr et al. 2008, 528). They maintain (without substantiating) that “[t]he Phillips curve was originally regarded as unequivocal proof that there could be a *trade off* or *buy off* between inflation and unemployment” (Mohr et al. 2008, 528).

Naturally, this would point to certain policy implications, namely that the level of the inflation rate should be regarded as a policy instrument. Mohr et al. (2008, 529) do, however, caution that “[v]arious economists ... maintain that there is no trade off between inflation and unemployment in the long term” and, further, “[t]hey<sup>6</sup> argue that a trade off is not possible in the long term (in other words, the long-term Phillips curve is vertical), but that a trade off is possible in the short term” (Mohr et al. 2008, 532). The implication therefore is that, according to Mohr et al. (2008), Phillips (1958) had concluded that, at least in the short term, such a trade-off *could* occur. Since politicians are mainly interested in being re-elected in upcoming elections, such a supposed short-term trade-off would suit them perfectly.

Mohr (2010, 152)<sup>7</sup> alleges that Phillips “published the results of research that indicated that there was an inverse relationship (or trade-off) between inflation and unemployment.” He continues to link the principle of inflation as a policy instrument to achieve higher employment to the Phillips curve, stating that “[t]he Phillips curve implied that one could have low inflation *or* low unemployment, but not both simultaneously. Policymakers therefore had to choose between reducing unemployment ... and lowering inflation. Once this choice had been made, policy measures could then be implemented to attain the desired outcome ... Such trade-off might still

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<sup>4</sup> Prescribed by, among others, the universities of South Africa, North-West, and Rhodes University.

<sup>5</sup> Own emphasis.

<sup>6</sup> With reference to the participants in the debate about the Phillips curve.

<sup>7</sup> Mohr (2010) is prescribed by the University of South Africa and the University of the Western Cape.

exist in the short run” (Mohr 2010, 152). Both Mohr et al. (2008) and Mohr (2010) thus provide incorrect explanations for the Phillips curve.

Arnold (2014, 361)<sup>8</sup> mentions that “[t]he original Phillips curve suggests an inverse relationship between wage inflation and unemployment; it represents a wage-unemployment trade-off” and adds that “(p)olicy makers<sup>9</sup> concluded from the Phillips curve that lowering both wage inflation and unemployment was impossible.” Arnold (2014, 361) further states that “Samuelson and Solow ... showed that the Phillips curve was downward sloping.” Following a discussion on Friedman’s theory about natural unemployment, Arnold (2014, 364) comes to the conclusion that “the short-run Phillips curve exhibits a trade-off between inflation and unemployment, whereas the long-run Phillips curve does not.”

Parkin et al. (2010, 629)<sup>10</sup> refer to “the relationship and the short-run trade-off between inflation and unemployment, a relationship called the Phillips curve — so named because it was first suggested by ... A. W. Phillips.” Parkin et al. (2010, 630) are of the opinion that the phenomenon known as the *short-term* Phillips curve “... shows the relationship between inflation and unemployment at a given expected inflation rate and a given natural unemployment rate.” They therefore do not, in any way, doubt the existence of the trade-off, though they do not explicitly mention the use of it as a policy instrument. Parkin et al. (2010, 635) furthermore use data from the US economy to indicate how the *short-term* Phillips curve has regularly moved since the sixties. When analysing the information used by Parkin et al. (2010, 632), it is clear that it requires a great deal of imagination to come to the conclusion that a relationship exists. It is, in our opinion, a classic example of how economists can persist with professed beliefs and then manipulate information to fit their view.

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<sup>8</sup> Arnold (2014) is prescribed by, among others, Stellenbosch University.

<sup>9</sup> Own emphasis.

<sup>10</sup> Prescribed by the Universities of Johannesburg, KwaZulu-Natal and Venda, as well as the Nelson Mandela Metropolitan University.



Tucker (2014, 741)<sup>11</sup> maintains that “most economists, including Nobel Laureates Paul Samuelson and Robert Solow believed the Philips curve was stable.” Tucker (2014, 741) opines that the trade-off principle had indeed existed in the sixties, and that “[p]olicymakers might choose low inflation and high unemployment, as in 1961. Or they may prefer higher inflation and lower unemployment, as, for example, in 1969.” He does, however, indicate that the supposed use of trade-off as a policy instrument is becoming obsolete. Referring to the seventies, he mentions that “the Phillips curve theory was in shambles ... [p]olicymakers therefore turned their focus away from the Phillips curve” (Tucker 2014, 742). Tucker (2014, 742) further mentions that “[b]y the early 1970s, the Phillips curve was becoming a has-been.”

Mankiw and Taylor (2011, 783)<sup>12</sup> state that “Samuelson and Solow suggested that the Phillips curve offers policy makers a menu of possible economic outcomes” and that “[a]ccording to Samuelson and Solow, policymakers face a trade-off between inflation and unemployment, and the Phillips curve illustrates that trade-off.” They do not draw their own conclusions about the existence of the trade-off principle over the short term but maintain that Milton Friedman and Edmund Phelps “... concluded that policymakers do face a trade-off between inflation and unemployment, but only a temporary one” (Mankiw and Taylor 2011, 790). Mankiw and Taylor (2011, 792) come to the conclusion that “[t]here is no trade-off between inflation and unemployment in the long run.”

Janse van Rensburg, McConnell and Brue (2011)<sup>13</sup> totally ignore the Phillips curve in their discussion on *Economic Growth, Unemployment and Inflation*.<sup>14</sup>

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<sup>11</sup> Prescribed by the University of the Free State.

<sup>12</sup> Prescribed by the universities of Cape Town and the Witwatersrand.

<sup>13</sup> Prescribed by the University of Pretoria.

<sup>14</sup> In Chapter 19 only a brief definition of the Phillips curve is provided at the end of the book under the “Glossary”, where it is incorrectly described as “(a) curve showing the relationship between the *unemployment rate* (on the horizontal axis) and the annual rate of increase in the *price level* (on the vertical axis)” (Janse van Rensburg et al. 2011, 583).

As mentioned previously, a short-term solution is particularly popular in a situation where politicians are unable to fulfil their promises. Should there be even a slight chance of such a supposed short-term trade-off, it would be irresponsible to claim that policymakers (read “politicians”) would *not* attempt to use higher inflation as a policy instrument. The additional “benefits” of higher inflation include the wiping out of existing wealth (such as savings and pensions), with the consequential redistribution of wealth. In this regard, Poole and Wheelock (2008, 1) declare that, in the case of the US, “[i]nflation began to rise in the mid-1960s and it climbed still higher and became more volatile in the 1970s. Higher inflation did not bring about higher employment or faster growth.”

The analysis shows that an implausible notion of the Phillips curve is presented to South African students. The only plausible notion of the Phillips curve is the original analysis of A. W. H. Phillips, namely of a trade-off between the rate of increase in nominal wages and the employment level. This is the explanation that should be presented to students studying the Phillips curve. The incorrect presentation of the Phillips curve jeopardises the value of macroeconomics teaching at first-year level at tertiary institutions, as students are provided with incorrect information purporting to be scientific research with a policy application.

This analysis shows the importance of educators using original sources in teaching technical aspects of disciplines. The theoretical underpinnings of research can be distorted by secondary sources, as is the case in this instance. Teaching these distorted interpretations results in the perpetuation of misinformation, as happens in the case of the Phillips curve.

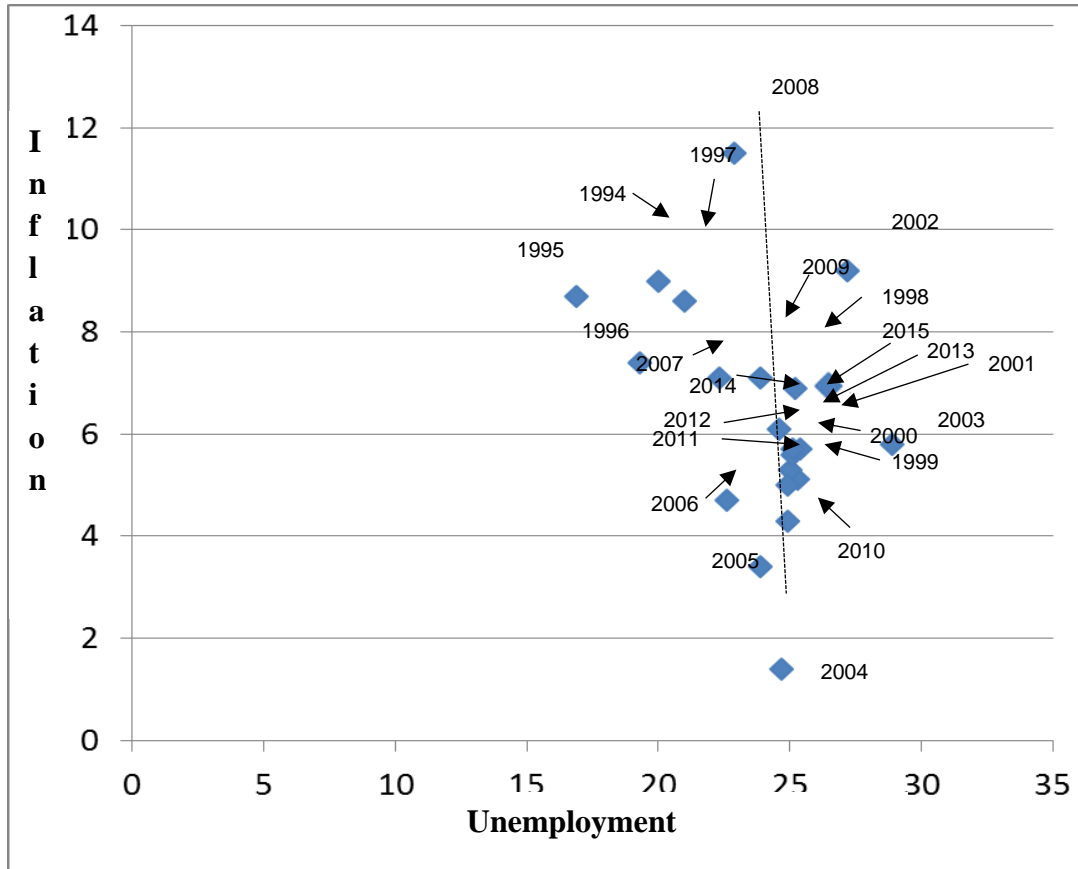
### **South Africa’s “Phillips Curve”**

As pointed out earlier, certain authors have indicated that there is at least a short-term trade-off between inflation and unemployment which policymakers can use to achieve lower unemployment. Despite the fact that Phillips (1958) found no trade-off between inflation and unemployment, in this section we show that we nevertheless tested South Africa’s experience of this relationship. The absence of any “relationship” between inflation and unemployment is clearly shown in the following local data.

**Table 1:** Inflation and unemployment in South Africa, 1994–2015

<b>Year</b>	<b>Inflation (%)</b>	<b>Unemployment (%)</b>
1994	9.0	20.0
1995	8.7	16.9
1996	7.4	19.3
1997	8.6	21.0
1998	6.9	25.2
1999	5.1	25.3
2000	5.3	25.0
2001	5.7	25.4
2002	9.2	27.2
2003	5.8	28.9
2004	1.4	24.7
2005	3.4	23.9
2006	4.7	22.6
2007	7.1	22.3
2008	11.5	22.9
2009	7.1	23.9
2010	4.3	24.9
2011	5.0	24.9
2012	5.6	25.1
2013	5.7	25.1
2014	6.1	24.6
2015	4.6	25.3

Sources: SA Reserve Bank (n.d.); Statistics SA (n.d.)



**Figure 1:** The relationship between inflation and unemployment in South Africa

Sources: SA Reserve Bank (n.d.); Statistics SA (n.d.); own calculation

Figure 1 clearly illustrates that there is no link between the level of inflation and the level of unemployment (as reflected by the unemployment rate) in the South African economy. The placing of a graph on top of the data also shows that there is no clear trend in the relationship between inflation and unemployment. In addition, the trend line shows that there is no trade-off principle.

The lowest unemployment rate of 16.9 per cent was recorded in 1995, at an inflation rate of 8.7 per cent per annum. However, higher inflation rates in three years (1994, 2002 and 2008) coincided with higher (instead of lower) unemployment (20.0%, 27.2% and 22.9%, respectively). Similarly, the highest unemployment rate (28.9%) was recorded at an inflation rate of 5.8 per cent, while lower unemployment rates at a lower inflation rate had also been recorded. Furthermore, inflation of between 6 and 8 per cent per annum, for example, can be associated with unemployment of 19.3 per cent (1996), 22.3 per cent (2007), 23.9 per cent (2009) and 25.2 per cent (1998) respectively.

In a more comprehensive analysis it would, of course, be possible to test for a lag in the relationship between inflation and unemployment in South Africa. Previous research (see, for example, Hodge 2006) never found such a lagging relationship in South Africa's case.

Hodge (2002, 442) states that “[u]nlike the United States, where there is substantial evidence<sup>15</sup> of a negatively sloped Phillips curve and a durable short-run trade-off between inflation and unemployment, the same cannot be said for South Africa.” Hodge also concludes that “[s]hort-run changes in inflation, unemployment and employment in South Africa have been essentially independent of each other. This evidence is thus inconsistent with the trade-off hypothesis” (Hodge 2002, 442).

Burger and Marinkov (2006, 186) use Gordon's so-called triangular model<sup>16</sup> in an econometric study of the South African “Phillips curve” and also come to the conclusion that “the triangular model seems not to apply to South Africa.”

The practical application and the implications for teaching at tertiary level are abundantly clear. At the theoretical level the Phillips curve does not confirm the existence of a relationship that can be used as a policy instrument. At this level the Phillips curve is, at best, “... a significant and interesting relation” (Lipsev, 1960, 30).

The implication for higher education is that the incorrect presentation of the Phillips curve purports to present a policy instrument that can be applied in practice. The actual data, however, refute the existence of a trade-off between the rate of inflation and the unemployment rate in South Africa.

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<sup>15</sup> Hodge (2002) does not, as such, provide a reference for this conclusion, but in his article, he does refer to sources such as Fuhrer (1995), Gordon (1994) and Stiglitz (1997) with reference to the US.

<sup>16</sup> Gordon (1989) opined the established methods according to which the so-called Phillips curve is calculated, produced biased results. Consequently, he made provision in his “triangular model” for the manifestations of hysteresis and inertia in the behaviour of inflation, as well as the influence of changes in the levels of production on inflation.

Academic material should be reviewed to ensure an accurate depiction and description of the Phillips curve.

### **Conclusion**

An improbable notion of the Phillips curve is presented to South African students, namely a trade-off between inflation and unemployment. The implausible conclusion is that inflation is presented as a policy instrument that can be used to reduce unemployment. This is factually incorrect. The only plausible notion of the Phillips curve is the original analysis of Phillips, namely of a link between the employment level and the rate of increase in nominal wages. This is the explanation that should be presented to South African students of the Phillips curve. The incorrect presentation of the Phillips curve at tertiary level of study creates unreasonable and scientifically unfounded expectations of the use of inflation as a policy instrument. The South African assessment clearly shows that no Phillips curve-type trade-off exists between the rate of inflation and the rate of unemployment.

The most important conclusion is that various textbooks indicate that higher inflation can be used as a policy instrument to achieve lower unemployment. This is not what Phillips found. The situation is a classic case of a misinterpretation being elevated to a fact through rewriting. South African universities should stop misleading first-year economics students, as some of them may one day become economic policymakers who base their policy decisions on an incorrect interpretation of the Phillips curve.

Short-term solutions are very popular in situations where politicians cannot deliver on promises. Should there thus be even a slight chance that such a supposed short-term trade-off exists, it would be irresponsible to claim that policymakers (read “politicians”) would not attempt to use higher inflation as a policy instrument. There is, however, no reason to suspect that it would be successful in any way in endeavours to achieve lower unemployment, even as a short-term solution.

The incorrect interpretation of the Phillips curve can lead to an economic policy that attempts to use higher inflation to stimulate economic growth and lower unemployment. This is not what Phillips concluded and such a mistake can have serious consequences for South Africa.

Zimbabwe's economic collapse can be seen as an example and a lesson in this regard. The additional "benefit" of higher inflation is an immediate wiping out of existing wealth (such as savings and pensions) with the consequential redistribution of wealth.

The solution is therefore to include a presentation of the factual Phillips curve, based on the original paper by Phillips (1958) in the curriculum of first-year students at South African universities until the textbooks have been reviewed and the discussion on the Phillips curve has been corrected. Such exclusion will avoid a misrepresentation of the theoretical foundations of the Phillips curve as a possible policy instrument.

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