

# OF HUME, THORNTON, THE QUANTITY THEORY, AND THE PHILLIPS CURVE

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*Having shown that from a static point of view the quantity of money was unimportant, Hume went on to show that from a dynamic point of view changes in the quantity of money could have a very important influence.*

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Many economists no doubt would agree that the strict classical *quantity theory of money* is logically incompatible with the concept of a stable, long-run *Phillips curve tradeoff* between output and inflation. For, according to the quantity theory, equilibrium changes in the money stock alter only prices and have no lasting impact on real variables. By contrast, the Phillips curve hypothesis holds that inflationary money growth can permanently raise the level of real output and employment. How could any economist simultaneously adhere to these two apparently contradictory views?

The foregoing question is central to a current controversy over the contributions of David Hume (1711-1776), the great eighteenth century Scottish philosopher-historian-economist, to monetary theory. Thomas Mayer, for example, argues that Hume implicitly rejected the Phillips curve tradeoff because it was inconsistent with his quantity theory. Thus Mayer states that whereas

The quantity theory was obviously central to Hume's economics. . . . The absence of a long-run tradeoff between unemployment and inflation was also central to Hume because, if such a tradeoff exists, it weakens . . . the quantity theory, since prices then do not rise in proportion to the increase in the quantity of money. [4; pp. 98, 99]

Similarly, Jacob Frenkel cites Hume's belief in the quantity theory's neutrality proposition (according to which a money stock change has no lasting effect on real variables) as evidence of Hume's rejection of the Phillips curve. Says Frenkel:

. . . there is evidence that Hume *did not* believe in a stable, long-run Phillips curve. . . . The overwhelming general tendency of Hume's writings and one of the most important characteristics of his monetary theory has been the proposition concerning the neutrality of money. . . . [which states that] monetary policy exerts no long-run real effects. [2; pp. 490, 492]

Frenkel and Mayer admit, of course, that Hume acknowledged that money could affect output and employment temporarily during a transitional adjustment period. But they contend that he felt that these temporary real effects would eventually vanish, leaving no long-run tradeoff. This view is disputed by Charles Nelson, who claims that Hume did indeed believe in a long-run tradeoff and that he was unique in doing so. Says Nelson,

Hume was clearly of the opinion that the *level* of activity would be raised *permanently* by a steady increase in the quantity of money, prices and wages. Hume was therefore a believer in stable, long-run Phillips curves and perhaps the only serious economist to have so committed himself in print! [5; p. 2. Italics in original.]

The purpose of this article is to show that both of the foregoing interpretations are at least partly mistaken: that, contrary to the contention of Frenkel and Mayer, Hume did believe in both the quantity theory and a stable long-run Phillips curve and saw no inconsistency in doing so; that, contrary to Nelson's suggestion, Hume was not alone in accepting the long-run Phillips curve but was joined by Henry Thornton (1760-1815), perhaps the leading monetary theorist of the nineteenth century British classical school; and finally, that neither Hume nor Thornton contended that the real effects of a steady, sustained rate of money growth were confined to a temporary transition period but thought those effects could persist indefinitely. More precisely, the article shows that both Hume and Thornton distinguished between *levels* and *rates of change* of the money stock, that they held the former to be neutral and the latter nonneutral with respect to real economic variables, and that this distinction reconciles their belief in both the quantity theory and the long-run Phillips curve. The article also shows that, although both

Hume and Thornton believed in the existence of a stable long-run Phillips curve, they differed regarding the desirability of exploiting that relationship for policy purposes—Hume favoring and Thornton opposing such a policy. The views of Hume and Thornton are important not only because they demonstrate that at least two leading classical quantity theorists accepted the Phillips curve, but also because they illustrate how opposing policy prescriptions can derive from the same underlying theoretical framework.

### David Hume (1711-1776)

To demonstrate that Hume and Thornton adhered to both the quantity theory and the long-run Phillips curve, it is sufficient to show

(1) that they stated the quantity theory in terms of its neutrality and equiproportionality propositions, and

(2) that they contrasted the short-run nonneutrality and the long-run neutrality of changes in money stock *levels* with the long-run nonneutrality of *rates of monetary change*.

That is, it must be shown that they distinguished between neutral alternative levels and nonneutral rates of change of the money stock and that they employed this distinction to reconcile their belief in the quantity theory with their belief in the Phillips curve.

First consider Hume, whose contributions to monetary theory are contained in his famous essays "Of Money," "Of Interest," and "Of the Balance of Trade," all originally published in 1752. He starts out by enunciating the quantity theory's equiproportionality and neutrality propositions according to which an equilibrium rise in the quantity of money causes an equiproportional rise in nominal prices and leaves all real variables unchanged. He says:

If we consider any one kingdom by itself, it is evident, that the greater or less plenty of money is of no consequence; since the prices of commodities are always proportioned to the plenty of money, and a crown in HARRY VII's time served the same purpose as a pound does at present. . . . Where coin is in greater plenty; as a greater quantity of it is required to represent the same quantity of goods; it can have no effect, either good or bad, taking a nation within itself; any more than it would make an alteration on a merchant's books, if, instead of the ARABIAN method of notation, which requires few characters, he should make use of the ROMAN, which requires a great many. [3; pp. 33, 37]

Hume realized that these comparative static propositions apply only to equilibrium levels of the money stock after all adjustments have occurred. In Eugene Rotwein's words, Hume "distinguishes between the ultimate effect of a higher absolute quantity of money as such and the effect of the process of change to a larger quantity of money. It is to the former alone that the quantity theory applies." [8; p. lxiii]

Hume notes, however, that during the adjustment from the old to the new equilibrium level, money can temporarily affect real variables. He attributes those real effects chiefly to the existence of two delays or time-lags in the adjustment process. The first is the lag of prices behind money, which, by raising the actual quantity of money relative to the amount required to purchase given output at existing prices, generates a rise in aggregate real demand as people attempt to get rid of the excess money by spending it on real goods and services. The second is the lag of money wages behind prices, which, by lowering real wages, leads to an increase in hiring and hence production. In Hume's view the first lag produces the increased real demand that justifies output expansion whereas the second lag produces the cost conditions that make that expansion profitable. Reinforcing the effect of these lags are several supplementary sources of nonneutrality, including (1) the nonneutral initial distribution of the new money, (2) the fact that the monetary injection and the corresponding new equilibrium price level are at first unperceived, and (3) shifts in the structure of relative prices owing to the failure of all product prices to adjust with equal speed to generalized inflationary pressure. Hume elaborates:

To account, then, for this phenomenon, we must consider, that though the high price of commodities be a necessary consequence of the encrease of gold and silver, yet it follows not immediately upon that encrease; but some time is required before the money circulates through the whole state, and makes its effect be felt on all ranks of people. At first, no alteration is perceived; by degrees the price rises, first of one commodity, then of another; till the whole at last reaches a just proportion with the new quantity of specie which is in the kingdom. In my opinion, it is only in this interval or intermediate situation, between the acquisition of money and rise of prices, that the encreasing quantity of gold and silver is favourable to industry.

Here are the temporary effects of (1) the lag in prices behind money, (2) the perception lag, and (3) the transitory shift in relative prices.

Hume continues, emphasizing the impact of the unequal initial distribution of the new money and especially the employment and output effects of the lag in money wages.

When any quantity of money is imported into a nation, it is not at first dispersed into many hands, but is confined to the coffers of a few persons, who immediately seek to employ it to advantage. Here are a set of manufacturers or merchants, we shall suppose, who have received returns of gold and silver for goods which they sent to CADIZ. They are thereby enabled to employ more workmen than formerly, who never dream of demanding higher wages, but are glad of employment from such good paymasters. If workmen become scarce, the manufacturer gives higher wages, but at first requires an increase of labour, and this is willingly submitted to by the artisan, who can now eat and drink better, to compensate his additional toil and fatigue. He carries his money to market, where he finds every thing at the same price as formerly, but returns with greater quantity and of better kinds, for the use of his family. The farmer and gardener, finding, that all their commodities are taken off, apply themselves with alacrity to the raising more; and at the same time can afford to take better and more cloths from their tradesmen, whose price is the same as formerly, and their industry only whetted by so much new gain. It is easy to trace the money in its progress through the whole commonwealth; where we shall find, that it must first quicken the diligence of every individual, before it encrease the price of labour. [3; pp. 37-38]

But these real effects are temporary and vanish once wages and prices fully adjust to the new higher level of the money stock. As Hume himself put it,

... it is only in this interval or intermediate situation, between the acquisition of money and rise of prices, that the encreasing quantity of gold and silver is favourable to industry. . . . but after the prices are settled, suitably to the new abundance of gold and silver, it has no manner of influence. [3; pp. 38, 48]

In short, a one-time increase in the level of the money stock has no permanent, lasting influence on real activity. That is, a one-time rise in the quantity of money generates only a temporary tradeoff.

### Long-Run Tradeoff

According to Hume, however, the same is not true of a steady succession of such monetary increases. He thought such increases would, if maintained over a continuous series of transitional adjustment periods, exert permanent real effects. That is, he asserted the real significance of a sustained monetary expansion, thereby prompting Adam Smith's remark that "Mr. Hume's reasoning is exceedingly ingenious. He seems, however, to have gone a little into the notion that public opulence consists in money." [9; p. 197 quoted in 7; p. 136] Implicitly assuming that expectations of future inflation would always be zero and therefore would never enter wage and price demands, Hume claimed that a continually expanding money stock would forever march ahead of wages and prices, perpetually frustrating their

attempts to catch up with it.<sup>1</sup> As a result, real cash balances would rise (thus stimulating spending) and real wages would fall (thus stimulating employment). These stimuli would persist indefinitely, allowing a permanent expansion in the level of real activity.

To illustrate how a sustained increase in the quantity of money can permanently raise activity, Hume refers to the observed real growth performance of the nations of Western Europe since the opening of the gold mines in America in the sixteenth century.

... it is certain [he says] that, since the discovery of the mines in AMERICA, industry has encreased in all the nations of EUROPE . . . and this may justly be ascribed, amongst other reasons, to the encrease of gold and silver. Accordingly we find, that, in every kingdom, into which money begins to flow in greater abundance than formerly, every thing takes a new face: labour and industry gain life; the merchant becomes more enterprising, the manufacturer more diligent and skilful, and even the farmer follows his plough with greater alacrity and attention. [3; p. 37]

Note that Hume is here referring to roughly 200 years of monetary expansion. This expansion, he says, has permanently raised the level of real activity. For Hume it is the rate of change of money and not its quantity that matters for real variables—a point he underscores in two additional passages. In the first passage he contrasts the economic performance of two hypothetical nations, the money stocks of which, though identical in size, are changing at different rates. He says, "A nation, whose money decreases, is actually, at that time, weaker and more miserable than another nation, who possesses no more money but is on the encreasing hand." [3; p. 40] That is, whether real activity is permanently raised or lowered depends upon whether the rate of

<sup>1</sup> Hume's omission of inflationary expectations may be explained on at least three grounds. First, he was describing a world metallic inflation rate quite low (1 to 3 percent per year on average) by modern standards, perhaps too low to reach the minimum perception threshold required for the generation of inflation expectations. Second, given a metallic monetary standard, one could argue on profitability grounds that the expected long-term inflation rate is zero. The reason, of course, is that if the stock of monetary metal were initially expanding at an inflationary pace so as to raise the metal price of goods and labor, the resulting fall in the purchasing power of metal combined with the rising labor cost of mining it would induce mineowners to cut back metallic production to noninflationary levels. In other words, the inflationary overproduction of gold would, by lowering its value relative to other goods, render the latter more profitable to produce than gold, thereby automatically checking gold's overproduction. Reinforcing this price-stabilizing production effect would be a shift in the demand for gold from monetary to nonmonetary uses as gold's value as money declines. Third, the discovery of gold and silver mines in the New World could be regarded as random, fortuitous events having an expected value of approximately zero. For these reasons, Hume's implicit assumption of zero expected inflation is perhaps understandable.

monetary change is positive or negative. That rate (and of course the wage/price lag associated with it) is "as pernicious to industry, when gold and silver are diminishing, as it is advantageous when these metals are increasing." Specifically, in the deflationary case of negative money growth, "The workman has not the same employment from the manufacturer and merchant; though he pays the same price for everything in the market. The farmer cannot dispose of his corn and cattle; though he must pay the same rent to his landlord. The poverty, and beggary, and sloth, which must ensue are easily foreseen." [3; p. 40] Here is Hume's stress on the real significance and insignificance, respectively, of rates of change versus absolute quantities of money. This emphasis is also manifest in the second passage, in which he concludes

. . . that it is of no matter of consequence, with regard to the domestic happiness of a state, whether money be in a greater or less quantity. The good policy of the magistrate consists only in keeping it, if possible, still increasing; because, by that means, he keeps alive a spirit of industry in the nation, and increases the stock of labour, in which consists all real power and riches. [3; pp. 39-40]

Regarding this passage, Blaug notes that Hume's "demand for a continual inflow of precious metals amounts to a demand for a continuous series of transitional periods" during which inflationary money growth repeatedly and permanently stimulates trade. [1; p. 20] Here is Hume's adherence to the long-run Phillips curve. Here also is his reconciliation of that concept with his quantity theory. There is no conflict between the two theories, he thought, since the one refers to rates of change and the other to alternative levels of the money stock.

### Henry Thornton (1760-1815)

The preceding has argued that, in Nelson's words,

Hume was careful to distinguish between the effect of alternative *levels* of the quantity of money and the effect of a *changing* quantity of money. He clearly regarded the level to be of little or no real consequence. . . . Hume regarded only the rate of change of money as having real significance, but of such significance as to allow a long-run trade-off between output and inflation. There is nothing in Hume's analysis of monetary dynamics which implies that the trade-off cannot be sustained. . . . [6; pp. 494-495]

This same description applies to Henry Thornton, whose analysis of the quantity theory and the output/inflation tradeoff are contained in his classic *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain* (1802). Like Hume, he defines the tradeoff in terms that are at once succinct and unambiguous:

. . . additional industry will be one effect of an extraordinary emission of paper, a rise in the cost of articles will be another.

Probably no small part of that industry which is excited by new paper is produced through the very means of the enhancement of the cost of commodities. [10; p. 237]

Also like Hume, he distinguished between levels and rates of change of the money stock, holding that only the latter can affect real activity and sustain the tradeoff. This is epitomized in his remark that "it is the progressive augmentation of bank paper, and not the magnitude of its existing amount, which gives the relief." [10; p. 256] In other words, money stimulates activity only when it is continually increasing. For, says Thornton, "While paper is increasing, and articles continue rising, mercantile speculations appear more than ordinarily profitable." But "as soon, . . . as the circulating medium ceases to increase, the extra profit is at an end," and the stimulus vanishes. [10; p. 238] Thus a one-time rise in the money stock cannot sustain the tradeoff. Instead, a continuous increase or "progressive augmentation" is required. Here is the long-run non-neutrality of rates of change of the money stock that underlies Thornton's version of the Phillips curve tradeoff.

As for the tradeoff itself, Thornton, like Hume, attributed it chiefly to a tendency for money wages to consistently lag behind prices. He explicitly stated (1) that inflation stimulates activity, (2) that it does so by reducing real wages and raising real profits, (3) that this output-enhancing redistribution occurs because money wages lag behind prices, and (4) that this wage lag persists as long as inflation is sustained. Neither he nor Hume explained why the lag would persist nor did they allow for the formation of inflationary expectations. Because of this they did not attempt to explain why wages would not eventually catch up with prices once inflationary expectations had fully adjusted to actual inflation. In short, their analysis is largely silent about price anticipations; they did not incorporate inflationary expectations into the Phillips curve.<sup>2</sup>

<sup>2</sup> Thornton's omission of price expectations in his analysis of the labor market is hard to rationalize. After all, he explicitly recognized the role of exchange rate expectations in his discussion of the determination of foreign exchange rates. Moreover, he spelled out a fairly complete theory of the inflation-generating process in an inconvertible paper currency regime. A logical next step would have been to explain how people form expectations of future inflation consistent with that inflation-generating mechanism. Perhaps his omission of price expectations reflected his belief that Britain would return to the gold standard at pre-Napoleonic war prices such that the long-run expected rate of inflation was zero.

## Forced Saving

Thornton did, however, introduce one new element into the analysis, namely the celebrated *forced-saving doctrine*, which later played a leading role in the Austrian business cycle theory of von Mises and Hayek. As enunciated by Thornton, this doctrine refers to the potential rise in the rate of capital accumulation and hence long-term economic growth owing to the inflation-induced redistribution from wages to profit. This forced saving effect, which assumes for its existence that capitalists have a higher propensity to save and invest out of real income than do workers, is described by Thornton as follows:

It must be also admitted, that, provided we assume an excessive issue of paper to lift up, as it may for a time, the cost of goods though not the price of labour, some augmentation of [the capital] stock will be the consequence; for the labourer, according to this supposition, may be forced by his necessity to consume fewer articles, though he may exercise the same industry. [10; p. 239]

He then goes on to allude to the possibility of "a similar defalcation of the revenue of the unproductive members of the society," i.e., fixed-income recipients. [10; p. 239] In suggesting that the rate of monetary growth may influence the rate of capital accumulation, Thornton anticipated a key feature of those modern neoclassical monetary growth models that treat investment as a function of the monetary growth rate.

Finally, like Hume, Thornton also accepted the quantity theory which he reconciled with the Phillips curve by distinguishing between alternative levels and rates of change of the money stock. He states the quantity theory's neutrality and proportionality propositions as follows: Money, he says,

... is an article of such a nature ... that the vast increase of it ... cannot possibly create such a new capital as shall furnish the new paper with employment. There remains, therefore, no other mode of accounting for the uses to which the additional supply of it can be turned, than that of supposing it to be occupied in carrying on the sales of the same, or nearly the same, quantity of articles as before, at an advanced price the cost of goods being made to bear the same, or nearly the same, proportion to their former cost, which the total quantity of paper at the one period bears to the total quantity at the other. [10; p. 241]

## Exploiting the Phillips Curve

The preceding has argued that both Hume and Thornton accepted the Phillips curve and that they reconciled it with their belief in the quantity theory by distinguishing between the nonneutrality of rates of monetary change and the neutrality of alternative levels of the money stock. In these respects at least, they were in perfect agreement.

They differed, however, over the desirability of exploiting the Phillips curve for policy purposes. Hume clearly believed that the policy authorities in the closed world economy should exploit the curve, using monetary gold inflation to stimulate output.<sup>3</sup> He says as much in his advice to the policymaker.

The good policy of the magistrate consists only in keeping it, if possible, still increasing; because, by that means, he keeps alive a spirit of industry in the nation, and increases the stock of labour, in which consists all real power and riches. [3; pp. 39-40]

In contrast to Hume, Thornton was much less enthusiastic about the desirability of exploiting the Phillips curve. Such exploitation involved inflation, which he saw as an unmitigated evil.<sup>4</sup> All inflationary policy, he said, is "attended with a proportionate hardship and injustice." [10; p. 239] Most important, he doubted that the output gains would be large enough to be worth the costs (uncertainty, injustice, social discontent) of higher inflation. In this connection he repeatedly stressed (1) that the economy normally tends to operate close to its full capacity constraint, (2) that the tradeoff is extremely unfavorable at this normal operating point, allowing at best only small increases in output per unit increase in inflation, and (3) that the tradeoff vanishes altogether at full employment. As a result, stimulative policy would almost immediately confront the full employment barrier where

... it is obvious, that the antecedently idle persons to whom we may suppose the new capital to give employ, are limited in number; and that, therefore, if the increased issue is indefinite, it will set to work labourers, of whom a part will be drawn from other, and, perhaps, no less useful occupations. [10; p. 236]

<sup>3</sup> Note that Hume refers to the benefits of *metallic* inflation only. He strongly disapproved of paper money inflation which he believed would be excessive. This was on the grounds that there existed no natural forces to limit the rate of overissue of paper. "I scarcely know," he says, "any method of sinking money below its level, but those institutions of ... paper credit which are so much practiced in this kingdom." [3; pp. 67-68] By contrast, he felt that the rate of metallic inflation would be severely limited by the difficulty and expense of discovering precious metals and extracting them from the earth. For this reason, he believed that the metallic inflation rate would be low, corresponding to the slow, steady accretion of the world stock of monetary gold and silver. On this basis, he concluded that provided inflation was of the metallic kind, higher levels of real activity could be obtained at the cost of only moderate inflation.

<sup>4</sup> Thornton feared inflation more than did Hume because, at the time he was writing (1802), Britain was operating with an inconvertible paper currency and a ceiling bank loan rate of interest pegged below the prevailing profit rate on new capital investment. Such conditions, Thornton noted, created the potential for unlimited hyperinflation. Indeed, he pointed out that France had experienced such hyperinflation during the infamous Assignats episode.

In short, while it is true that "paper possesses the faculty of enlarging the quantity of commodities by giving life to some new industry," the full employment constraint ensures that "the encrease of industry will by no means keep pace with the augmentation of paper." [10; p. 239] On these grounds he concluded that there exist narrow "bounds to the benefit which is to be derived from an augmentation of paper; and, also, that a liberal, or, at most, a large encrease of it, will have all the advantageous effects of the most extravagant emission." [10; p. 236]

### Concluding Comments

This article has documented the following conclusions:

1. Contrary to Frenkel and Mayer, Hume accepted both the quantity theory and the long-run Phillips curve and saw no inconsistency in doing so.
2. Contrary to Nelson, Hume was not alone in accepting the Phillips curve but was joined by Henry Thornton.
3. Both Hume and Thornton reconciled the quantity theory with the Phillips curve by distinguishing between the neutrality of alternative levels and the nonneutrality of rates of change of the money stock.
4. Hume and Thornton differed over the desirability of exploiting the Phillips curve for policy purposes—Hume favoring and Thornton opposing its exploitation. Hume's preference, however, extended only to metallic inflation.
5. Neither Hume nor Thornton advocated paper money inflation. Both feared that such inflation could rapidly accelerate into hyperinflation since no natural forces existed to limit the over-issue of inconvertible paper.

Hume and Thornton attributed the existence of the Phillips curve to a lag of money wages behind prices. Neither, however, attempted to explain why the wage lag persists. Nor did they allow for the formation of price expectations or for the incorporation of those expectations into the Phillips curve. Instead, they implicitly assumed that the anticipated rate of inflation was always zero, thereby omitting a crucial feature of modern Phillips curve analysis, namely the assumption that expectations are formed consistent with the way actual inflation is generated so that those expectations are correct on average. Because of this omission, they could hardly be expected to explain how changes in inflationary expectations

alter the slope of the Phillips curve, rendering it vertical at the natural rate of unemployment. In these respects at least they differed from modern monetarist critics of the Phillips curve.

It should be noted, however, that Thornton's policy analysis was very much in the spirit of these critics. Like them, he did not believe in exploiting the Phillips curve for policy purposes. Like them, he stressed the costs rather than the benefits of inflation. And, though he did not think the curve was vertical at the economy's normal or standard level of output, he did think it was very steeply sloped, allowing little increase in output per unit rise in inflation. For these reasons, although he enunciated the concept of the long-run Phillips curve, he cannot be considered an enthusiastic proponent of it. Similarly, although Hume welcomed gradual metallic inflation, he was unalterably opposed to the kind of rapid paper money inflation that is unfortunately so common today. Thus, were both alive today, they undoubtedly would warn against using over-expansionist paper money policy to stimulate output and employment.

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