

# THE INTEREST COST-PUSH CONTROVERSY

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In business circles, and even in political discussions, the question is very often raised, how the rate of interest affects the prices of commodities. The practical business man is perhaps most often inclined to believe that an increase in the rate of interest is bound to increase the cost of all products and therefore to enhance prices, and he finds it very confusing when he hears a scientific economist or a representative of a central bank proclaim that the rate is increased in order to force prices down. It is obviously the duty of economic science to remove this confusion . . . .

GUSTAV CASSEL [1, p. 329]

Whenever the Fed seeks to fight inflation with restrictive monetary policy, a debate erupts between *tight-money proponents* and members of the so-called *interest cost-push school*. The former group argues that higher interest rates associated with tight money are necessarily anti-inflationary because they help choke off the excess aggregate demand that puts upward pressure on prices. The latter contingent, however, insists that higher interest rates are inherently inflationary because they raise the interest component of business costs, costs that must be passed on in the form of higher prices. According to the latter view, lower, not higher, interest rates are consistent with lower prices. Low interest rates, the argument goes, would lead to lower interest costs and therefore to lower prices of final products. Long-time Congressman Wright Patman of Texas was perhaps the best-known proponent of this view.<sup>1</sup>

Missing from the debate is a careful and systematic attempt to refute the interest cost-push doctrine. Few economists today regard the doctrine as important enough to warrant rebuttal. As Professors Lawrence Ritter and William Silber note in their widely-used textbook *Money* [5, p. 100], most professional economists today simply refuse to take the doctrine seriously and therefore typically tend to dismiss it out of hand.

<sup>1</sup> The pure interest cost-push doctrine should not be confused with the related argument that low interest rates help restrain inflation by encouraging capital formation that enhances labor productivity, lowers unit labor costs, and increases potential output. Unlike the interest cost-push doctrine, which asserts that interest rates affect prices *directly* through costs, this latter argument holds that interest rates affect prices *indirectly* through their prior impact on capital formation. Both arguments, of course, are advanced by modern proponents of low interest rate easy-money policies.

For the definitive refutation of the interest cost-push doctrine, it is necessary to go to the late 19th- and early 20th-century writings of the great Swedish economist Knut Wicksell, particularly his critique of the monetary doctrines of Thomas Tooke. Tooke, a formidable British monetary controversialist, leader of the so-called Banking school, author of the monumental six volume *History of Prices* (1838-57), and foremost collector of price and monetary data in the 19th century, had advanced the interest cost-push argument that high interest rates cause high prices and low rates low prices. Wicksell responded by exposing the fallacies in Tooke's argument and by demonstrating with the aid of a simple macroeconomic model that, contrary to Tooke's contention, high interest rate tight-money policies are inherently anti-inflationary whereas low interest rate easy-money policies are inflationary. In so doing, Wicksell established the theoretical foundations of the tight-money view.

This article examines the Tooke-Wicksell controversy and shows how Wicksell's analysis effectively answers the contentions raised by the interest cost-push school. The Tooke-Wicksell controversy is important not only because it produced the first clear statement of the interest cost-push doctrine as well as the first rigorous and systematic attempt to disprove it, but also because it helped establish the case for tight money and because it introduced the prototype of the analytical macroeconomic model that most monetary authorities use today in designing anti-inflationary monetary policies.

**Thomas Tooke and the Emergence of the Interest Cost-Push Doctrine** The controversy began with Tooke's 1844 attack on what he called "the commonly received opinion" that low money rates of interest raise prices and high rates depress them. [8, p. 77] Tooke emphatically rejected this conventional view, arguing instead that a lowering of loan rates tends to reduce, not raise, prices. Focusing solely on the cost aspects of interest and ignoring the influence on prices of interest-induced increases in borrowing, lending, the money stock, and spending, he asserted that a reduced loan rate "has no . . . tendency to raise the prices of commodities. On the contrary, it is a

cause of diminished cost of production, and consequently of cheapness." [8, p. 123] He then proceeded to elaborate this point in a passage that Representative Wright Patman would have heartily endorsed.

A general reduction in the rate of interest is equivalent to or rather constitutes a diminution of the cost of production . . . in all cases where an outlay of capital is required . . . [T]he diminished cost of production hence arising would, by the competition of producers, inevitably cause a fall of prices of all the articles into the cost of which the interest of money entered as an ingredient. [8, p. 81]

Written in 1844, these passages are virtually identical to Patman's 1952 assertion that "the more interest that business must pay for the capital it uses the more it adds to the cost of doing business. To that extent, increases in interest rates are inflationary." [3, p. 735] Tooke's statements, like those of Patman, embody all the essentials of the interest cost-push doctrine, namely (1) the notion that interest rates influence prices chiefly through costs, (2) the idea that movements of interest rates and prices are positively correlated, (3) the denial that low interest rates are inflationary, and (4) the contrary assertion that low rates in fact tend to reduce prices rather than to raise them. Tooke believed that these propositions, particularly the last, were amply confirmed by the facts.

And the presumption accordingly is [he writes] that the very reduced rate of interest which has prevailed within the last two years must have operated as one of the contributing causes of the great reduction of prices . . . which has occurred coincidentally with reduction in the rate of interest. [8, p. 81]

To Tooke, at least, it was obvious that a policy of pegging interest rates at arbitrarily low levels would not produce inflation.

**Wicksell's Critique of the Interest Cost-Push Doctrine** Tooke's interest cost-push doctrine went largely unnoticed for more than 50 years until Knut Wicksell challenged it in the closing years of the century. Wicksell's extensive comments on the doctrine—comments that Arthur Marget described as "the clearest statement we have on the subject" [2, p. 248]—may be found in his *Interest and Prices* (1898) and in the second volume of his *Lectures on Political Economy* (1905). In these works he criticized the doctrine on several grounds.

**Confusion of Relative Prices and Absolute Prices** First, he argued that the interest cost-push proposition confuses relative prices with the general level of prices.

. . . the proposition that prices of commodities depend on their costs of production and rise and fall with them, has a meaning only in connection with *relative* prices. To apply this proposition to the general level of money prices involves a generalization which is not only fallacious but of which it is in fact impossible to give any clear account. It can be concluded then that . . . Tooke's proposition must be regarded as *false*, both in theory and in practice. [9, pp. 99-100]

In particular, Tooke fails to perceive that interest rate movements cannot possibly influence the price level if, as he assumes, total spending and real output remain unchanged. With these magnitudes fixed, interest rate changes will affect only relative prices but not the absolute level of prices. The latter variable, Wicksell argued, is determined by aggregate demand and supply. Therefore interest rate movements cannot affect it unless they alter either aggregate demand or aggregate supply. In terms of the equation of exchange  $P = MV/Y$ , where  $P$  is the price level,  $M$  the money stock,  $V$  its velocity of circulation, and  $Y$  real output, interest rate movements will not affect  $P$  unless they alter  $MV$  (i.e., total spending) or  $Y$  (i.e., real output). If these aggregates remain unchanged, the price level also will remain unchanged. Interest rate movements in this case will affect *relative* prices, to be sure. Some prices will rise and some will fall, but the average of all prices will remain unchanged. For example, a rise in the market rate of interest would tend to raise the particular prices of interest-intensive goods, i.e., goods in which interest accounts for a significant portion of total costs. Confronted with the price increases, purchasers would demand fewer of these goods, thereby leading producers to cut back output and lay off labor and other factor resources. The resources released from the interest-intensive industries would seek employment in the noninterest-intensive industries tending to drive down wages and prices there. The net result would be a change in the *structure*, but not the overall level, of prices.

To summarize, Wicksell held that, given the level of total spending and real output, interest-induced changes in the prices of specific commodities would be offset by compensating changes in the prices of others, leaving the aggregate price level stable. In this regard he noted that a fall in the rate of interest would tend to lower the specific prices of capital-intensive goods, thereby reducing the outlay required to purchase those items and increasing the amount available for spending on other goods. The resulting increased spending on these latter items would bid up their prices enough to offset the drop in the prices of the former items, thereby leaving the average of prices unaltered. As Wicksell put it

A fall in the rate of interest . . . thus causes fluctuations in the relative prices of both these groups of commodities, but cannot exercise a depressing influence on the general price-level except in so far as it increases the actual volume of goods, the [quantity] of money remaining stable, and possibly gives rise to a slower circulation of money. [10, p. 180]

Since Tooke says nothing about the monetary, output, or velocity effects of interest rate changes he cannot explain how such changes affect general prices.

**Behavior of Noninterest Elements of Cost** Wick- sell also criticized the interest cost-push doctrine's tendency to assume that all noninterest components of costs remain unchanged when interest rates change. If this assumption were true, costs and prices would, as Tooke asserts, fully register underlying changes in the interest rate. Wicksell, however, denied the validity of this assumption. Noninterest cost elements, he argued, would not remain fixed in the face of interest rate changes. Instead they would vary and in so doing would offset or nullify the impact of interest rate changes on total costs. More precisely, a fall in the rate of interest would tend to result in compensating rises in wages and rents, leaving total costs unchanged. As Wicksell expressed it:

[Tooke's] argument is based on the inadmissible, not to say impossible, assumption that wages and rent would at the same time remain constant, whereas in reality a lowering of the rate of interest is equivalent to a raising of the shares of the other factors of production in the product. [10, p. 183]

The mechanism whereby a fall in the interest rate raises the relative shares of the other factors is as follows: The fall in the interest rate initially reduces costs relative to prices, thus giving profit-seeking entrepreneurs an incentive to expand their operations. To expand operations, however, entrepreneurs must hire more land and labor. Assuming those resources are already fully employed, the resulting increased competition for them only serves to bid up their prices, thereby raising the rent and wage components of total costs. In this manner the fall in the interest component of business costs is counter- balanced by rises in the wage and rent components with the aggregate level of costs and prices remaining unchanged.

**Interest Rates, the Balance of Payments, and Gold Flows** Wicksell's third criticism of the high-interest-rates-cause-high-prices argument is that it is in apparent "conflict with the well-accredited fact that a *rise* in the rate of interest has always

shown itself to be the appropriate method of checking an unfavorable balance of payments and of instigating a flow of bullion from abroad." In other words, the doctrine cannot explain why rises in the bank rate tend to correct trade balance deficits and reverse gold outflows. For according to the interest cost doctrine, such rises should, by pushing up domestic prices relative to foreign ones, *worsen* the trade balance instead of improving it.

If Tooke's view were correct we should be confronted by the curious situation . . . that in order to improve the discount rate and the balance of trade, the banks would take steps which, on his theory, would lead to higher costs of production and higher prices and to a further restriction of the already too limited export of goods. [10, p. 186]

Conversely,

the opposite case of a *favorable* balance of payments leads to equally absurd consequences. A favorable balance would cause an inflow of bullion, and this clearly would . . . bring about a lowering of the rate of interest. The result according to Tooke would be a still further *fall* in domestic prices . . . so that the balance of payments would become more and more favorable and money would flow in on an ever-increasing scale. [9, p. 99]

In short, the interest cost-push doctrine implies, contrary to fact, that the foreign trade balance is perpetually in unstable equilibrium, with trade deficits or surpluses becoming progressively larger and larger in a monotonic explosive sequence.

**Credit Market Instability** Wicksell also pointed out that Tooke's doctrine implies that money and credit markets are likewise in a state of dynamic instability. For if it were true that a fall in interest rates produces a drop in prices, then a lower money rate of interest would lead to reductions in borrowing, lending, and money creation and thus to further downward pressure on money rates. That is, with lower prices, less money and credit would be required to finance the same level of real transactions. The demand for loans would therefore contract and money would flow into the banks. In an effort to expand loans and reduce excess reserves, banks would lower the rate of interest still further causing a further drop in prices and a further decline in the demand for loans. Via this sequence the rate of interest would eventually fall to zero. Conversely, a rise in the interest rate would, according to Tooke's theory, produce a rise in prices that leads, via a rising demand for loans, to further increases in the interest rate and prices and so on in an explosive upward spiral. "In other words, the money rate of interest would be in a state of unstable equilibrium, every

move away from the proper rate would be accelerated in a perpetual vicious circle." [10, p. 187]

In actuality, however, money and credit markets are not in unstable equilibrium. This fact, Wicksell writes, is clearly a stumbling block for Tooke's theory and is sufficient reason for rejecting it. [10, p. 186]

### Natural Rate Versus Market Rate of Interest

Finally, Wicksell criticized the interest cost-push doctrine for failing to distinguish between the *market* and *natural* or equilibrium rate of interest. The former of course is the loan rate or cost of money. The latter, however, is the expected marginal yield or internal rate of return on newly-created units of physical capital. It is also the rate that equilibrates desired real saving with intended real investment at the economy's full-capacity level of output. Or what amounts to the same thing, it is the rate that equates aggregate demand for real output with the available supply. This latter definition implies that the natural rate is also the interest rate that is neutral with respect to general prices, tending neither to raise nor to lower them. In other words, if the market rate were at the level of the natural rate, price stability would prevail.

On the basis of the foregoing analysis Wicksell held that price movements are generated by the differential between the two rates and not, as Tooke claimed, by the absolute level of the market rate alone. In other words, the level of the market rate per se is irrelevant, contrary to Tooke's theory. The market rate, whether high or low, rising or falling, cannot affect general prices as long as it remains equal to the natural rate. For if the two rates are equal, intended capital formation equals intended real saving, aggregate real demand therefore equals aggregate real supply, and price stability results. Only if the market rate deviates from the natural rate would price changes occur.

**Wicksell's Model** The foregoing summarizes Wicksell's purely negative criticism of the interest cost-push doctrine. His positive contribution consists of a theory of how interest rate movements influence prices not through costs but rather through excess aggregate demand supported and financed by money growth. His theory concludes, contrary to the interest cost-push doctrine, that high interest rate tight-money policies are anti-inflationary while low interest rate easy-money policies are inflationary. He reached these conclusions via the following route.

First, he argued that the excess of investment over saving at full employment is determined by the differ-

ence between the natural and the market rates of interest. As previously mentioned, the natural rate is the rate that equilibrates real investment and real saving. As long as the market rate is equal to the natural rate, saving will equal investment and the economy will be in equilibrium. But if the market rate should fall below the natural rate there will be an excess of desired investment over desired saving. The explanation is straightforward. Given the natural rate, a fall in the market rate lowers the cost of capital relative to its yield thereby stimulating investment. At the same time, the fall in the market rate lowers the reward to thrift thereby discouraging saving. Investment expands and saving contracts producing an excess of the former over the latter.<sup>2</sup> The opposite happens when the market rate is raised above the natural rate, i.e., desired saving exceeds desired investment. The relationship between the investment-saving gap and the natural-market interest rate differential may be expressed as

$$(1) \quad I - S = a(\bar{R} - R)$$

where  $I$  is investment,  $S$  saving,  $\bar{R}$  the exogenously-determined natural rate of interest,  $R$  the market rate, and  $a$  is a constant coefficient relating the interest rate differential to the investment-saving gap.

Second, Wicksell assumed that the gap between investment and saving generates a corresponding expansion in the demand for bank loans, i.e.,

$$(2) \quad \dot{L}_d = I - S$$

where  $\dot{L}_d$  is the change in the demand for bank loans, the dot signifying the rate of change (time derivative) of the attached loan demand variable. This equation states that when the investment demand for loanable funds exceeds the funds supplied by voluntary saving, there will be an expansion in the demand for bank loans to cover the difference.

Third, Wicksell assumed that the banking system accommodates the extra loan demand with a corresponding expansion of loan supply, i.e.,

$$(3) \quad \dot{L}_s = \dot{L}_d$$

where  $\dot{L}_s$  is the expansion in the supply of bank loans. This equation implies a perfectly elastic supply of loans and thus corresponds to Wicksell's statement that

<sup>2</sup> "If the banks lend their money at materially lower rates than the normal [i.e., natural] rate . . . then in the first place saving will be discouraged . . . . In the second place, the profit opportunities of entrepreneurs will thus be increased and the demand for [investment] goods . . . will evidently increase . . . ." [10, p. 194]

With a pure credit system [in which the money stock consists entirely of demand deposits and no reserve constraint exists to limit loan expansion as when the central bank stands ready to provide unlimited reserves to the banking system in order to prevent market rates from rising] the banks can always satisfy any demand whatever for loans and at rates of interest however low . . . . [10, p. 194]

Fourth, he maintained that money growth exactly matches bank loan expansion dollar for dollar. In his own words, "bank deposits and bank loans must always march together." [10, p. 86] This condition can be expressed as

$$(4) \dot{M} = \dot{L}_s$$

where  $\dot{M}$  is the expansion of the money stock. The money stock expands identically with loans because new loans are granted in the form of increases in the checking deposits of borrowers and these deposits are part of the money supply.

Fifth, he held that growth in the money stock is accompanied by corresponding increases in aggregate demand (total spending) for an exogenously-given full capacity level of real output. Given this level of real output—which Wicksell treats as a fixed constant throughout his analysis<sup>3</sup>—the increased spending manifests itself in the form of excess demand in the commodity market. In this way money growth converts the excess *desired* demand implicit in the investment-saving discrepancy of Equation 1 into excess *effective* demand. The relationship between money growth and excess demand may be expressed as

$$(5) E = \dot{M}$$

where  $E$  is excess demand. This equation states that excess demand cannot occur without an identical amount of money growth to support and finance it.

Finally, he argued that prices are bid up by excess demand, with the rate of price rise being roughly proportional to the level of excess demand.<sup>4</sup> The

<sup>3</sup> Regarding the full employment assumption Wicksell states that "we are entitled to assume that all production forces are already fully employed, so that the increased monetary demand . . . leads to an . . . increased demand for commodities, [and] to a rise in the price of all . . . goods . . ." [10, p. 195] Note also that he dismisses as unimportant the possibility that an interest-induced rise in capacity output might work to lower prices. This price-reducing output effect, he said, would be "very small." More important, it would "occur only once and for all" and thus would be swamped by the cumulative (i.e., continuous) rise in prices stemming from the interest rate differential. [9, pp. 142-3]

<sup>4</sup> Note his assertion that "This increased demand . . . necessarily results in a rise in all prices—a rise which it is simplest to regard as proportional to the increase in demand." [9, p. 144]

relationship between the rate of price change and the level of excess demand can be expressed as

$$(6) \dot{P} = bE$$

where  $\dot{P}$  is the rate of price rise, the dot signifying the rate of change (time derivative) of the attached price level variable, and  $b$  is a constant coefficient relating excess demand to price changes. According to the equation, prices will rise when excess demand is positive, fall when excess demand is negative, and stabilize at a constant level when excess demand is zero.

Taken together Equations 1-6 constitute a simple macrodynamic model in which a decline in the market rate of interest below the natural rate results in excess demand that bids up prices with the money stock simultaneously expanding to accommodate and validate the price increases. The model can be condensed to a single reduced form equation by substituting Equations 1-5 into Equation 6 to yield

$$(7) \dot{P} = ab(\bar{R}-R)$$

which says that the ultimate cause of price level changes is the differential between the natural and market rates of interest. According to the equation, prices rise if the market rate is below the natural rate, fall if the market rate is above the natural rate, and remain stable—i.e., neither rise nor fall—if the market rate equals the natural rate. Similar equations can be derived for the money growth and excess demand variables showing that they too are determined solely by the interest rate differential.

On the basis of Equation 7 Wicksell reached several conclusions contradicting Tooke's interest cost-push doctrine. First, given the natural rate, a policy of pegging the market rate at arbitrarily low levels will produce a cumulative rise in prices. As Wicksell himself put it, if the banks "were to lower their rate of interest, say 1 percent below its ordinary [i.e., natural] level, and keep it so for some years, then the prices of all commodities would rise and rise and rise without any limit whatever." [11, p. 547] In other words, contrary to Tooke's doctrine, a low interest rate cheap-money policy is inflationary.

Second, if prices are rising, the market rate is too low and must be raised to slow and ultimately stop the inflation. This will require a reduction and eventually a cessation of money growth. Therefore a higher interest rate tight-money policy is inherently anti-inflationary, contrary to the interest cost-push doctrine.

Third, a rise in the market rate above the natural rate will produce an absolute decrease in the price

level. In Wicksell's own words, if "the rate of interest is maintained no matter how little *above* the current level of the natural rate, prices will fall continuously and without limit." [9, p. 120] Thus, far from being inflationary as Tooke claimed, higher interest rates may well be exactly the opposite, i.e., deflationary.

To summarize, given the natural rate of interest, the rate of price increase varies inversely, not directly, with changes in the market rate. Thus lower rates are inflationary and higher rates anti-inflationary, contrary to Tooke's interest cost-push doctrine.

**Tooke Versus Wicksell on the Gibson Paradox**  
 Finally, Wicksell used his model to counter Tooke's claim that the statistical data offered strong empirical support for the interest cost-push doctrine. Tooke's own empirical studies had established that historically interest rates and prices tend to move up and down together—a phenomenon that Keynes was later to call the Gibson paradox. On the basis of these studies, Tooke had argued that the coincidental movements of interest rates and prices constituted strong empirical proof that high interest rates cause high prices and low rates low prices. Wicksell, however, disagreed. He denied that the positive correlation between movements in interest rates and prices implied that the former caused the latter. Instead, he argued that both rising interest rates and rising prices stemmed from a common cause, namely exogenous shifts in the natural rate—due to technological change, innovation, and other external developments—followed by corresponding lagged adjustments in the market rate.<sup>5</sup> He explained how the lag in the adjustment of the passive market rate to the active natural rate could result in coincidental rises in interest rates and prices. The lag, he said, meant that while the market rate was rising it was still below the natural rate, thereby causing excess aggregate demand and hence a continuous rise in prices.

The price rise itself he held to be the key component of the process by which the market rate adjusts itself to the natural rate. Specifically he maintained that under a metallic monetary system a rising price level affects market interest rates through its prior impact on bank reserves. He explained that rising prices produce two kinds of gold drains that threaten the depletion of banks' gold reserves. One is an external drain to cover an adverse trade balance stemming from the domestic inflation. The other is an internal drain of gold into hand-to-hand circula-

<sup>5</sup> What follows relies heavily on Patinkin's analysis of Wicksell's cumulative process. See [4, pp. 587-97].

tion and into nonmonetary industrial uses. To halt these drains and protect their reserves banks are forced to raise the loan rate until it eventually equals the natural rate. In this way rising prices serve as the connecting link between the natural and market rates of interest. This link may be expressed by the relationship

$$(8) \quad \dot{R} = c\dot{P}$$

where  $\dot{R}$  is the rate of change of the market rate of interest and  $c$  is a coefficient relating price changes to changes in the market rate.

The foregoing equation, which states that interest rate changes are proportional to price level changes, reconciles Wicksell's theoretical model with Tooke's empirical findings of a positive correlation between movements in interest rates and prices. The equation shows that interest rates and prices rise and fall together. Yet, within the context of Wicksell's entire model, the equation does not imply that higher interest rates produce higher prices. On the contrary, the model states that both the rise in prices and the rise in the interest rate are caused by that interest rate being too low relative to the natural rate. In sum, Wicksell held that an initial rise in the natural rate relative to the market rate generates the price increases that feed back into the market rate causing it to rise toward the natural rate.<sup>6</sup> Thus, contrary to Tooke's contention, a positive correlation between interest rates and prices constitutes no disproof of the proposition that low interest rate easy-money policies are inflationary and high interest rate tight-money policies are deflationary. To disprove these propositions one would have to demonstrate that price movements are positively correlated not with the market rate alone but rather with the *differential* between that rate and the natural rate. Tooke did not do this. Hence his empirical correlations constitute no proof of the interest cost-push doctrine. Nor do they constitute disproof of the rival tight-money view.

<sup>6</sup> Wicksell assumed that the market rate in a metallic monetary system would converge smoothly on the natural rate without overshooting. In terms of his model, the convergent behavior of the market rate can be described by substituting Equation 7 into Equation 8 to obtain  $\dot{R} = abc(\bar{R} - R)$  and then solving this differential equation for the time path of the market rate. The resulting expression for the time path of the market rate is

$$R(t) = (R_0 - \bar{R})e^{-(abc)t} + \bar{R}$$

where  $t$  is time,  $e$  is the base of the natural logarithm system, and  $R_0$  is the initial disequilibrium level of the market rate. This expression states that the market rate will converge smoothly on the natural rate providing that the product of the coefficients  $a$ ,  $b$ , and  $c$  (i.e., the multiplicative term  $abc$ ) is positive, i.e., larger than zero.

**The Current Relevance of Wicksell's Model** The preceding sections have described Wicksell's model of price level movements. It remains to show how his analysis helps answer current and recent complaints that high interest rates cause high prices. According to Professors Ritter and Silber, the best answer to these complaints is that high interest rates accompanied by monetary expansion are indeed inflationary whereas high rates associated with tight money—defined by them as zero or negative money growth—are not. High rates, they claim, are incapable of producing inflation without an accommodative expansion of the money stock. Without this monetary expansion, further increases in the price level would be difficult to finance. At that point the higher interest rates would prevent further spending and the inflationary process would grind to a halt. In short, higher interest rates are not inflationary unless ratified by monetary growth. The key factor, they conclude, is the behavior of the money stock and not the high interest rates themselves. [5, pp. 102-3]

The Ritter-Silber conclusion is fully consistent with Wicksell's analysis. In his model too the behavior of the money stock distinguishes cases where high interest rates are inflationary from cases where they are not. This can be shown by substituting Equations 1-3 into Equation 4 to yield

$$(9) \quad \dot{M} = a(\bar{R} - R)$$

which states that money growth is directly related to the natural rate-market rate differential. Taken together, Equations 9 and 7 state that if the money stock is growing, then high market rates are indeed producing higher prices. For the positive growth of the money stock indicates that the market rate, no matter how high, is nevertheless below the natural rate and is thus generating the monetary expansion that supports a continuous rise in prices. Contrariwise, if the money stock is constant or falling, then the market rate of interest, no matter how high, is noninflationary or deflationary. For when money growth is zero or negative the market rate is equal to or above the natural rate and is thereby tending either to stabilize prices or to reduce them. Thus,

contrary to the contentions of the interest cost-push school, high interest rates associated with tight money are noninflationary.

**Conclusion** This article has reviewed the Tooke-Wicksell controversy concerning the influence of interest rates on prices. The article shows that neither the anti-inflationary tight-money view nor its rival, the interest cost-push doctrine, are new. In particular, the article disproves the recent claim that "one of the first economists to concern himself with the cost-push effect of interest rate changes was John Kenneth Galbraith." [6, p. 1049 n. 1] Contrary to the foregoing assertion, the interest cost-push doctrine long predates Galbraith's 1957 version, having been enunciated by Thomas Tooke more than 100 years earlier.

The article also disproves the allegation that professional economists are not even interested in answering the interest cost-push doctrine, i.e., that they simply "refuse to take it seriously and typically dismiss it out of hand." [5, p. 100] Whether or not this charge applies to modern economists, it certainly does not apply to Knut Wicksell. For, as documented in the article, Wicksell took the doctrine seriously enough to attempt to refute it rigorously and systematically. In so doing, he provided the definitive critique of the doctrine. He also developed an analytical model that established the theoretical foundations of the tight-money view and that provided a framework for anti-inflationary monetary policy. His model supports the current case for tight money just as Tooke's views constitute a key argument underlying the opposite case for easier money and lower interest rates. In short, the ideas and arguments advanced in the Tooke-Wicksell debate continue to survive and flourish in current discussions of monetary policy. For better or worse, the interest cost-push doctrine refuses to die, thereby supporting George Stigler's contention that economic theories—no matter how fallacious—never perish. The survival of the doctrine in the face of Wicksell's criticism aptly illustrates Stigler's dictum that "there is no obvious method by which a science can wholly rid itself of once popular theories." [7, p. 201]

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