

NATURAL AND NEUTRAL RATES OF INTEREST IN THEORY AND POLICY FORMULATION

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Interest has a title role in many pre-Keynesian writings as it does in Keynes's own *General Theory of Employment, Interest, and Money* (1936). Eugen Böhm Bawerk's *Capital and Interest* (1889), Knut Wicksell's *Interest and Prices* (1898), and Gustav Cassel's *The Nature and Necessity of Interest* (1903) readily come to mind. The essays in F.A. Hayek's *Prices, Interest and Investment* (1939), which both predate and postdate Keynes's book, focus on the critical role that interest rates play in coordinating production plans with consumption preferences. The *General Theory* represents a significant departure from classical (and Austrian) thinking but not because of the title-role status of interest. Rather, the departure stems from the fact that, in Keynesian theory, the role played by a market-determined interest rate is a disruptive one.

In contemporary policy discussions, the interest rate occupies center stage if only because the much-watched federal funds rate is the Federal Reserve's sole surviving policy target. (A quarter-century ago, the Fed lost the ability to target the money supply—or even to identify a distinctly relevant monetary magnitude.) By its very nature an extra-market institution, the Federal Reserve is expected to exert a countervailing force. It is to move against market forces that, presumably, would otherwise be disruptive. In accordance with the Keynesian vision, market interest rates fail to coordinate saving and investment decisions, leaving saving decisions dependent only on incomes and leaving investment decisions dominated by Keynes's "animal spirits." Worse, high rates of interest can stem from fetishistic attitudes toward liquidity and a corresponding deficiency of spending.

The federal funds rate, which is the overnight rate on interbank loans, can be lowered or raised in an effort to control interest rates generally. The Federal Reserve lowers the federal funds rate to stimulate spending and keep the economy from sinking into recession; it raises the federal funds rate to retard

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spending and keep prices and wages from spiraling upward. Given the Keynesian vision and the implied role for central bank policy, the so-called “art of central banking” is to pick the “right” federal funds rate—the rate that wards off both unemployment and inflation.

As theory and policy have developed, the terms “natural rate” and “neutral rate,” though seeming synonyms, provide a contrast between pre-Keynesian and post-Keynesian thinking. Although “natural” and “neutral” are sometimes used almost interchangeably, there is an important conceptual distinction in play: The natural rate of interest is a rate that emerges in the market as a result of borrowing and lending activity and governs the allocation of the economy’s resources over time. The neutral rate of interest is a rate that is imposed on the market by wisely chosen monetary policy and is intended to govern the overall level of economic activity at each point in time. Exploring this distinction and its implications can go a long way toward understanding the current state of Federal Reserve policymaking and the difficulties that a central bank creates for the market economy.

THE NATURAL RATE OF INTEREST

So named by Swedish economist Knut Wicksell, the natural rate of interest is the rate that reflects the underlying real factors. In macroeconomic terms as applied to a wholly private economy, it is the rate that governs the allocation of resources between current consumption and investment for the future. By keeping saving and investment in balance, the natural rate guides the economy along a sustainable growth path. That is, governed by the natural rate, unconsumed current output (real saving) is used for augmenting the economy’s productive capacity in ways that are consistent with people’s willingness to postpone consumption.

In the hands of the Austrian economists, the natural rate became the rate that reflects the time preferences of market participants and allocates resources among the temporally defined stages of production. The output of one stage serves as input to the next in this logical and broadly descriptive representation of the economy’s production process. The temporal dimension of the economy’s capital structure is a key macroeconomic variable in Austrian theory. Time preference is simply a summary term that refers to people’s preferred pattern of consumption over time. A reduction in time preferences means an increased future-orientation. People willingly save more in the present to increase the level of future consumption. Their increased saving lowers the natural rate of interest and releases resources from the final and late stages of production. Simultaneously, the lower natural rate, which translates directly into reduced borrowing costs, makes early stage production activities more profitable. With the reallocation of resources from late to early stages of production, the preferred temporal pattern of consumption gets translated into an accommodating adjustment of the economy’s structure of production.

Movements in the natural rate are also critical to the economy's performance when changes occur in the availability of resources or in technology. Suppose that a technological breakthrough makes a time-consuming production process much more productive than before. Future consumption—even increased future consumption—can now be secured with less of a sacrifice of current consumption. People's choices in the marketplace will determine how much of the technological gain will be realized in terms of current consumption (less saving) and how much in terms of future consumption (in which the availability of a new technology more-than-offsets the effect of reduced saving). A rise in the natural rate during the transition period is portrayed by the Austrian economists as an "interest-rate brake," a term we owe to Hayek (1933, pp. 94 and 179). The interest-rate brake moderates the rate at which the new technology is implemented and thereby allows for increased current consumption even during the period of implementation. Inventories are drawn down in late stages of production and some resources are reallocated toward less time consuming projects.

In summary terms, the natural rate is seen as an equilibrating rate. It is the rate that tells the truth about the availability of resources for meeting present and future consumer demands, allowing production plans to be kept in line with the preferred pattern of consumption. By implication, an unnatural, or artificial, rate of interest is a rate that reflects some extra-market influence and that creates a disconnection between intertemporal consumption preferences and intertemporal production plans. An artificially low rate of interest, which might prevail for some time if the Federal Reserve is targeting a low federal funds rate, translates into the business world as longer planning horizons than are justified by people's actual willingness to save. The policy-induced mismatch between production and consumption activities creates the illusion of prosperity but sets the stage for an eventual market correction, which takes the form of an economywide downturn. This is the essence of the Austrian theory of the business cycle. The mismatch and resultant boom-bust sequence can occur as a result of two different but related policy goals, which can be described as "stimulating growth" and "accommodating growth."

STIMULATING GROWTH

The Federal Reserve might lower interest rates (by targeting a low federal funds rate) in circumstances where there has been no change in the underlying market conditions. With unchanged technology, resource availability and consumption preference, business firms are led nonetheless to take advantage of cheap credit. Production activities, particularly in interest-sensitive sectors of the economy, appear more profitable. The economy is steered by low interest rates onto an unsustainable growth path. The cheap-credit policy, though ultimately harmful to the economy, is politically attractive. A seemingly strong economy always makes an attractive backdrop for office holders

seeking re-election. If the timing is right, the votes can be harvested before the seeming strength is revealed by the market itself to be an actual weakness.

The phenomenon of stimulating growth for political reasons has given rise to a whole literature on “political business cycles.” Whether the emphasis is on the intertemporal misallocation of resources (as the Austrian economists would have it) or on the alternating bouts of inflation and unemployment (as mainstream macroeconomists would have it), political business cycle theory takes the underlying undistorted rate of interest to be consistent with macroeconomic health and the policy-infected interest rates (and money-growth rates) to be responsible for a macroeconomic malady in the form of boom and bust. Business cycles that are roughly aligned with the election cycle have been an integral part of the political landscape for the past half-century. In his *Constitution of Liberty* (1960), F.A. Hayek offered a blend of Austrian macroeconomics and what is now called Public Choice theory to account for these eco-political dynamics of boom and bust.

ACCOMMODATING GROWTH

In periods of technological advance, the Federal Reserve accommodates economic growth by lending freely at whatever rate of interest prevailed before the enhancements in technology occurred. Thus, interest rates are not actually lowered, as in the case of stimulating growth. Rather, interest rates are simply not allowed to rise—as they would have in the absence of Federal Reserve accommodation. In effect, the policy of accommodation overrides Hayek’s interest-rate brake. With given intertemporal preference, people would choose to take only a portion of the gains associated with the technological advance in the form of increased *future* consumption. They would choose to take at least some of those gains in the form of increased *current* consumption. And given the enhanced technology, gains all around are possible. People can save less now and still enjoy more future consumption. During the period that the new technology is being implemented, the natural rate would rise as entrepreneurs compete for investable funds. In this way, the temporarily high natural rate allows the economy to adjust to the new technology at a rate that is consistent with people’s intertemporal preferences.

The policy of accommodation distorts this market process. It overrides the interest-rate brake and allocates resources in a way that, if not countered by market forces, would cause all the gains from the technological advance to be realized exclusively in the form of *future* consumption. But the implied intertemporal pattern of consumable output is at odds with people’s intertemporal consumption preferences. This means that the spending of incomes on consumer goods during the transition period will disrupt the efforts of the Federal Reserve, revealing its policy of accommodation to entail overaccommodation.

Though there may be some political motivation for accommodating technology-induced growth, this policy is more directly linked to the long-discredited real-bills doctrine. The founding documents of the Federal Reserve identify sound lending with self-liquidating loans—loans that finance production, distribution, or retail activities which, in turn, generate the revenues for repaying those loans. Self-liquidating loans contrast with consumer loans or, more importantly, with loans made for speculative purposes. The real-bills doctrine, widely accepted in the early twentieth century, does not include any guidance about the rate of interest at which these loans are made. Tellingly, the accommodating, self-liquidating loans are typically made at the interest rate that prevailed before the perceived need for accommodation arose, i.e., before the technological advance. But as already demonstrated, that rate is too low. It would be just right only in the extreme circumstance in which people preferred to take the entire gain from the technological advance in the form of future consumption. This circumstance, labeled in conventional price theory as a “corner solution,” is distinctly improbable. Of course, at a higher rate of interest, one that reflected some increase in current consumption, the demand for self-liquidating loans (and for other loans, for that matter) would be accommodated by the market itself. The Federal Reserve need only allow the interest rate to rise to its new market-clearing level.

The most historically significant applications of the Austrian theory of the business cycle are instances of “accommodating growth” rather than of “stimulating growth.” The second decade of the twentieth century was a period of technological advance—involving mass production of automobiles and, with electrification, the widespread marketing of household appliances and processed food. The last decade of the twentieth century was similarly dominated by technological advance—this time involving the internet and other aspects of the digital revolution. The policy-infected interest rates during each of these two periods were not necessarily low by historical standards but were low relative to the rate that would have emerged in the absence of growth accommodation. The Austrian theory suggests that in each period, a policy-induced boom rode piggyback on a genuine, technology-driven boom. But because the interest rate was not allowed to rise, i.e., because the interest-rate brake was overridden by the adherence to the real-bills doctrine, the economy was set off on a growth path that could not be sustained. These booms, then, were unavoidably followed by busts.

There is a close and obvious kinship between stimulating growth and accommodating growth. In both scenarios, there is a divergence between the rate of interest defended by Federal Reserve and the natural rate of interest. In one case, the policy-infected rate is driven below the natural rate; in the other case the natural rate rises above the policy-infected rate. The two scenarios can also be distinguished with the aid of the familiar production possibilities frontier—the frontier representing different combinations of consumption and investment, given the economy’s resources and the state of technology. Market forces will keep the economy at the point on the frontier

that is consistent with people's intertemporal preferences. This judgment reflects the pre-Keynesian—and especially the Austrian—vision of the economy. The market-determined interest rate strikes a balance between current consumption and future consumption. The policy of stimulating growth is an ill-fated attempt to move the economy away from the preferred trade-off and toward a point that entails less current consumption and more investment. The policy of accommodating growth is similarly ill-fated but applies when technological advance has shifted the frontier outward. Normal market forces, which would entail a temporary increase in the natural rate of interest, would move the economy to a point on the shifted frontier—a point that represents more consumption and more investment. The policy of accommodating growth at an unchanged rate of interest is an ill-fated attempt to move the economy parallel to the investment axis to a point on the shifted frontier—a point that disallows increased consumption during economy's adjustment to the advance in technology.

In short the natural rate of interest is the rate that avoids booms and busts. With given resources and technology, it is the rate that keeps the economy on a sustainable growth path. With increased resources or enhanced technology, it is the rate that governs the adjustment to the new growth path.

THE NEUTRAL RATE OF INTEREST

From the perspective of Austrian theory, what is remarkable about modern discussions of interest-rate policy is the total absence of any mention of intertemporal preferences and the corresponding trade-off between consumption and investment. Yet, the lack of concern about intertemporal resource allocation is consistent with the development over the past several decades of mainstream macroeconomics. Keynes made a first-order distinction between consumption and investment spending, claiming that the former magnitude is a stable function of income while the latter magnitude, being largely governed by psychological forces (his “animal spirits”), is fundamentally unstable. This consumption-investment distinction and its rationale was central to the Keynesian revolution. The monetarist counterrevolution strongly downplayed the psychological factors that might color investment decisions and, in effect, turned a blind eye to the consumption-investment tradeoff itself. These two magnitudes were combined into an all-inclusive magnitude summarily called output and symbolized by Q in the equation of exchange. This age-old equation, $MV = PQ$, allows no scope for a temporally heterogeneous Q . It focuses attention instead on changes in total spending (PQ) and the division of those changes between price-level changes (ΔP) and changes in the level of real output (ΔQ). In this respect (and in many others), the more recent new classical models in which a representative agent operates in a one-good economy bear a strong family resemblance to monetarism.

The focus on real output puts into eclipse the division of that output between consumption goods and investment goods. Even more deeply into

eclipse is the Austrian construction of a temporally defined structure of production. The very basis on which the natural rate of interest is conceived is simply absent in modern, highly aggregated macroeconomic theorizing.

It is only a short step from theorizing in terms of P and Q to theorizing (and formulating policy) in terms of inflation and unemployment. Taking the relevant benchmark to be “no inflation” and “full employment” suggests a critical distinction between upward and downward demand pressures in the economy. When aggregate demand is too strong, the pushing upward against the benchmark PQ causes prices and wages to rise, the level of output being bound by the full-employment, supply-side constraint. When aggregate demand is too weak, the pulling downward from the benchmark PQ causes the levels of output and employment to fall, prices and wages being “sticky” in the downward direction. (It is this pattern of movements in P and Q that underlies the so-called L-shaped aggregate supply curve that is characteristic of Keynesian constructions.)

If the aggregate pushing and pulling were a strict “either-or” proposition, the policy implications of this mode of theorizing would be clear-cut: If Q is on the wane, as evidenced by an abnormally high unemployment rate, then total spending (MV) should be strengthened (by reducing the federal funds rate). If P is rising, then total spending should be weakened (by raising the federal funds rate). In practice, of course, the two problems of unemployment and inflation are competing with one another for the attention of Federal Reserve’s policymaking committee. The Federal Open Market Committee (FOMC) has to strike a balance between lowering interest rates and raising interest rates. It would actually lower or raise the federal funds target rate if one problem is judged to be more serious or more pressing than the other. Over time, the FOMC’s efforts to fight inflation and fight unemployment gives rise to a sequence of changes in the federal funds rate.

The actual pattern of federal funds rate during the early Greenspan years (1987-1993) is described by a simple equation introduced by John B. Taylor (1993) of Stanford University:

$$r = p + 0.5 q + 0.5 (p - 2) + 2$$

where r is the targeted federal funds rate, p is the inflation rate over the previous year, and q is the percentage deviation of actual output from full-employment output. Taylor himself writes the equation using income (y) instead of output (q), but he defines y in terms of real GDP. In effect, y is a measure of q . The simple equation could be written in a still simpler form:

$$r = 1.5 p + 0.5 q + 1,$$

but the original rendering has more intuitive appeal. It suggests that the implicit goal of the Federal Reserve is “full employment” and “2 percent inflation.” Note that if $q = 0$ (i.e., no deviation from full employment) and $p = 2$ percent, then r would be 4 percent. That is, the targeted federal funds rate

would be 2 percentage points above the (2 percent) inflation rate. The two coefficients of 0.5 give equal weighting to the problems of unemployment and inflation generally. In particular instances, of course, one of those problems may be more severe than the other—as would be indicated by the actual values of p and q . Thus, the targeted federal funds rate r is low with a high and negative q ; it is high with a high p .

The discretion needed for the Federal Reserve to fight the good fight (against unemployment and inflation) stands in contrast to the adoption of a Monetary Rule as advocated by Milton Friedman. According to this rule, the Federal Reserve should increase the money supply year-in and year-out at a slow and steady rate that approximates the economy's long-run growth rate of 2 or 3 percent. In Friedman's judgment, deviations from this Monetary Rule are more likely to do harm than to do good. But modern discussion of Federal Reserve policy suggests that the appropriate federal funds rate is the one that strikes the right balance at each FOMC meeting between fighting unemployment and fighting inflation. If, after a successful fight, the goals of the Federal Reserve are actually achieved, then the neutral rate (of 4 percent in the sample calculation) is the rate that threatens the economy with neither inflation nor unemployment.

Like the natural rate identified by Wicksell and adopted by the Austrian economists, the neutral rate can be described with the aid of a production possibilities frontier depicting combinations of consumption and investment. The dominating concern, in the case of the neutral rate, is not with movements *along* the frontier or with adjustments from one frontier to another. Rather, the concern is with actually staying *on* a given frontier. The concern is with Q and not with its division between consumable output and investment. The economy may lapse into recession or depression, coming to rest in the frontier's interior area. Or it may send itself into an inflationary spiral, with (nominal) movements in spending beyond the frontier. An economy prone to such inward and outward spiraling exhibits movements roughly orthogonal to the frontier. The objective of Federal Reserve policy is to undo any perverse movements away from the frontier and then, by maintaining a neutral federal funds rate, to hold in check any further such movements.

The equation relating the federal funds rate to inflation and unemployment quickly came to be known as the Taylor Rule. But is it really a rule in the same sense as Friedman's Monetary Rule? More broadly, is the Taylor Rule supposed to be descriptive, predictive, or prescriptive? The short answer to that question—and the answer that implicitly underlies many policy discussions is: It's all three. The original 1993 Taylor article provides the basis for this view. According to Taylor (1993 p. 197; emphasis added), his “hypothetical but representative policy rule . . . *describes* recent Fed policy surprisingly accurately” (emphasis added). Taylor tracks the actual federal funds rate for a half dozen years (ending in 1993) and compares the time profile graphically to the Taylor Rule rate. The difference in the two profiles is surprisingly small. The close fit suggests that considerations beyond those concerning inflation

and unemployment are of minor significance. Taylor mentions as the only significant deviation of actual FOMC policy from Taylor-made policy the 1987 episode in which the stock market crashed and the Federal Reserve lowered the federal funds rate to accommodate the high demands for liquidity.

So, barring crashes and consequent high demands for liquidity, the Taylor Rule seems to be a serviceable basis for predicting Federal Reserve policy. But can the rule also be rendered prescriptive, as was the intent of Friedman's Monetary Rule? Here, we need to bridge the Humean is-ought gap, a feat that has stumped philosophers for centuries. But Taylor does not shrink from the task. The relevant passage deserves to be quoted in full. After acknowledging that there will be a learning curve that leads to improvements in the rule, he suggests how description can morph into prescription:

If the policy rule comes so close to describing actual Federal Reserve behavior in recent years and if FOMC members believe that such performance was good and should be replicated in the future even under a different set of circumstances, then a policy rule could provide some guide to future discussions. This may be particularly relevant when the membership of the FOMC changes. Such a policy rule could become a guide for future FOMCs. (Taylor 1993, pp. 208-09)

With this logic, the original Taylor Rule becomes a starting point for a learning-by-doing approach to Federal Reserve policy. And tellingly, the occasional crashes, such as the one in 1987, are taken to be anomalous deviations rather than as evidence that the rule itself may have serious shortcomings.

FRIEDMAN AND TAYLOR IN PERSPECTIVE

Even during the heyday of monetarism, the federal funds rate was very much in play. But in those years, roughly 1979-1982, the rate was varied with an eye toward the volume of bank reserves and, looking one step beyond reserves and currency, toward the most basic monetary magnitude M1. The actual target was the money growth rate, typically an annual percentage change in M1 in the mid-to-high single digits. On the heels of the late 1970s double-digit inflation, the federal funds rate was varied between 10 percent and nearly 20 percent in an effort to keep M1 on its target growth path. That effort, though, was less than heroic. The Federal Reserve never actually adopted and abided by Friedman's Monetary Rule. Instead, it periodically announced a new money-growth target as a range of rates and then persistently missed the range on the high side.

With the failure of the Federal Reserve to hit its money-growth target and with significant changes in the regulatory environment that blurred the distinction between money and earning assets, the monetarist experiment ended. Without a well-defined money supply, money-growth targeting was abandoned in favor of interest-rate targeting. But there was no bona fide Interest-Rate Rule to serve as a counterpart to the Monetary Rule. Discussions at

policy meetings were informed by up-to-date unemployment statistics and the various price indexes, but policy changes had to be made on the basis of market conditions expected to prevail in the future. In practice, the FOMC was dealing with worries and fears rather than data and rules.

It is well known that if the FOMC picks a federal funds target that is too low, there will be worries about inflation; and that if it picks a target that is too high, there will be worries about unemployment. The goal, then became one of balancing the worries. The Federal Reserve had to find the equi-worry federal funds rate. This is what the neutral rate came to mean.

But just whose worries count? Is it the worries emanating from financial markets? Traders in financial markets might worry about interest rates being too low or too high—but mainly because of the implications about future actions by the Federal Reserve. Is the Fed going to raise rates? Is it going to lower them? The neutral federal funds rate, then, is the rate that causes the financial markets to have no net worry about the federal funds rate changing in one direction or the other. But if *this* is the balancing act that underlies Federal Reserve policy, then both the Fed and financial markets are living in a house of mirrors, the actions on each side of the loan market being driven by expectations about actions on the other side. Federal Reserve policymaking and the financial community's Fed-watching interact to produce some interest-rate dynamics akin to the dynamics of Keynes's beauty contest—in which the objective is to pick the winning contestant on the basis of what others are likely to see as true beauty. The modern-day neutral rate is truly neutral only in this sense: it emerges as reflections on reflections and is not otherwise anchored in economic reality.

The Taylor Rule may well describe the temporal pattern of the federal funds rate as the Federal Reserve strives toward neutrality. But to take this description of the past as prescription for the future does not transform the art of central banking into a science. Believing that a seemingly neutral rate will be enduringly so is based on faith rather than on theory and experience.

AN AUSTRIAN PERSPECTIVE

Is there any known market mechanism that causes the neutral rate to be brought into line with the natural rate? That is, is there any reason to believe that equi-worry about inflation and unemployment somehow translates into interest rates that are consistent with sustainable growth? Or is it quite possible that the neutral rate (the equi-worry rate), lies below the natural rate (the rate that is consistent with sustainable growth)? While the Federal Reserve, especially during the Greenspan era, often expressed concerns about sustainable growth, there was no interest-rate rule that would assure that outcome or even nudge markets in that direction. The Taylor Rule is tailored to the inflation-unemployment tradeoff. It deals only with P and Q and not with the division of Q (output) between C (consumption) and I (investment).

The evidence is that the neutral rate not likely to be the natural rate, and hence the equi-worry rate itself is something to worry about. Even when financial markets are expecting neither a rate hike nor a rate cut, the economy may be growing at an unsustainable rate. There is no timely way to distinguish between robust growth and financial bubbles. Bob Woodward (2000, p. 217) makes the point in connection with the 1990s boom. “There was no rational way to determine that you were in a bubble when you were in it. The bubble was perceived only after it burst.” It is this lack of correspondence between neutral and natural that gives the adherence to the Taylor rule its faith-based whistling-in-the-dark character.

Finally, the distinction made earlier between stimulating growth and accommodating growth casts further doubts on the relevance of the Taylor Rule. Two of the most noteworthy expansions since the creation of the Federal Reserve were episodes of accommodating growth and hence periods of little or no inflation. In both the 1920s and the 1990s, technological developments and the implied increase in productivity largely offset the overall price inflation that would otherwise have occurred as a result of the Federal Reserve’s interest-rate—and hence money-supply—policies. Taylor’s p was held in check and his q gave no indication of problems ahead. Interest-rate neutrality in the form of an equi-worry rate was easily maintained—and with little or no worry on either the upside or the downside. Yet, the Austrian theory with its disaggregated Q shows that it is precisely in these circumstances (of growth accommodation as dictated by the fallacious real-bills doctrine) that interest rates are at odds with the natural rate. The excessive future-orientation of the production process is inconsistent with sustainable growth.

The Austrian theory does not offer some Hayek Rule for a natural rate to be recommended over a Taylor Rule for a neutral rate. Rather, it suggests that centralizing the business of banking deprives the market of its ability to find the natural rate.

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