Abysmal Science from the Dismal Science: Absurd Estimates of the *Ex Ante* Real Interest Rate

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Abstract

The *ex ante* real rate of interest is one of the most important concepts in Economics. There is, however, a fatal error that pervades nearly all empirical estimates of the *ex ante* real interest rate. Virtually all estimates of the ex ante real interest rate display *negative* values for extended time periods. However, the theory that underlies the *ex ante* real interest rate concept indicates that *negative* values are chimerical—or, put somewhat more provocatively, absurd. Moreover, the procedures generally used to estimate *ex ante* real interest rates were shown to produce biased estimates of the *ex ante* real rate over 25 years ago. Therefore, all macroeconomic models, empirical research and policy discussions that use these flawed *ex ante* real interest rate estimates should be considered questionable, at best.

In this article, we document this puzzling chasm between the theory of the *ex ante* real interest rate and the practice of macroeconomists who continue to generate and use *ex ante* real interest rate estimates that violate the theory from which they are derived. We then provide a speculative explanation of how this problem arose, why it has not been widely recognized and why, unfortunately, it is likely to remain a problem.

Abysmal Science from the Dismal Science:
Absurd Estimates of the *Ex Ante* Real Interest Rate

Lee C. Spector and Courtenay C. Stone[1]

Macroeconomics and macroeconomists are currently under widespread attack both from outside and within the economics profession. In his recent *Wall Street Journal* article, Kaletsky (2010) charges that

> "The greatest embarrassment for academic economics in the 2007-2009 crisis … [is their] failure to provide any useful guidance for politicians and central bankers after the [financial] crisis struck. …What economics did claim to offer was a set of analytical tools to explain reality and suggest sensible responses to unexpected events. It was in this respect that contemporary economics revealed its inadequacy."[2]

Kocherlakota (2010, p. 5), President of the Federal Reserve Bank of Minneapolis provides an even stronger condemnation:

> "… during the last financial crisis, macroeconomists (and I include myself among them) failed the country, and indeed the world. … Macroeconomics should have been able to provide […a systematic plan of attack to deal with fast-evolving circumstances …]. It could not. Of course, from a longer view, macroeconomists let policymakers down much earlier, because they did not provide [them] with rules to avoid the circumstances that led to the global financial meltdown. …
>
> [The] overall debate inevitably leads the general public to wonder: What is the value and applicability of macroeconomics as currently practiced?"[3]

In this article, we suggest that one likely cause for the alleged failures of macroeconomic models and macroeconomists' policy advice is that virtually all estimates of the *ex ante* real rate of interest, one of the most important variables used in macroeconomic and monetary models,

[1] The authors are Professors of Economics at Ball State University, Muncie, IN 47306. We would like to thank James E. McClure and Gary J. Santoni for their helpful comments and suggestions on earlier versions of this paper.
[2] Rachman (2010), writing in the *Financial Times*, states that "… policies … constructed according to the 'laws' of economics have a nasty habit of collapsing."
[3] Amusingly, after his eloquent "mea culpa" for the failures of macroeconomics, he then reassures the public that, actually "… macroeconomics has made important advances in recent years… [that] –coupled with a rededicated effort following this recent economic episode—position macroeconomics to make useful contributions to policymaking in the future." Who said that "irony is dead"?

are theoretically absurd and empirically flawed.[4] It is not surprising that using faulty estimates of key macroeconomic variables yield macroeconomic analyses and policy recommendations that fail to "explain reality and suggest sensible responses to unexpected events."

We begin our study by briefly explaining the crucial role that the *ex ante* real rate of interest plays in all economic decisions. Next, we review the well-known Fisher theory of interest rates that provides the theoretical foundations for the *ex ante* real interest rate used in virtually all macroeconomic models and research. We then demonstrate that Fisher's theory requires *positive ex ante* real interest rates but, in sharp contrast, virtually all estimates of *ex ante* real interest rates used by macroeconomists in recent decades contain *negative* observations over extended time periods. We document that these negative *ex ante* real estimates were shown to be spurious over 25 years ago—but these warnings have been persistently ignored by macroeconomists. Finally, we provide a plausible, albeit speculative, explanation for the failure of macroeconomists to recognize that their *ex ante* real interest rate estimates are theoretically and empirically invalid and why this problem is likely to persist.

The Crucial Role of the *Ex Ante* Real Interest Rate in Economics and Finance

The *ex ante* real interest rate is widely recognized as one of the most important variables in economics and finance. Because it represents the expected tradeoff between present and future goods, it plays a prominent role in almost every decision that people make. Mishkin (1988; p. 1064), for example, summarizes its role as follows:

> "Real interest rates are among the most important economic variables and have been studied extensively. They figure prominently in discussions of the transmission mechanisms of monetary policy and also play a prominent role in explanations of business cycles and particular *business cycle episodes* [authors' emphasis]. Real interest rates are a central element in savings-consumption

[4]This, of course, is an example of the general problem that exists in all sciences between linking the theoretical concepts contained in theories and their empirical counterparts used for testing theories and predicting actual outcomes.

> decisions and in debates about how to encourage savings …. Real interest rates are also a critical explanatory variable for investment decisions since they represent the real cost of borrowing."

Taylor (2000; p. 91) stresses its great importance in macroeconomic modeling and policy as follows: "… [The] nearly universal model … used to explain fluctuations [of real GDP] around the growth trend … can be boiled down to three relationships and three variables" and the *ex ante* real interest rate is one of these three variables.[5]

Fisher's Theory of Interest and the Reasons for Positive *Ex Ante* Real Interest Rates

Over a century ago, Fisher (1896, 1906a, 1906b) began to develop his theory of the determinants of nominal interest rates, culminating in the publication of *The Theory of Interest* (1930). Fisher theorized that the nominal (or market) rate of interest (i) on a specified financial asset is determined by the *ex ante* (expected) real interest rate (r^e) [hereafter, for simplicity, called the real rate of interest] and the expected inflation rate (p^e).

Equation (1) presents the well-known simplified statement of his theory: [6]

$$i_t = r_t^e + p_t^e. \qquad (1)$$

The expected inflation rate (p^e) in Equation (1) represents the anticipated change in a broad price index that incorporates the prices of all assets (new and used), commodities and services.[7] It measures the change in the general purchasing power of money over some specified time period. Since this price index can move up, down or remain unchanged, the associated expected rate of inflation can be positive, negative or zero.

On the other hand, the real rate of interest (r^e) in Equation (1) represents the expected relative price paid for earlier availability of goods and services in real terms—that is, in terms of

[5] The other two variables are real GDP and the inflation rate.
[6] Equation (1) ignores such considerations as risk, taxes and the "cross product" term that, if included, would alter somewhat the right-hand side of the equation but have no affect on our discussion.
[7] See Alchian and Klein (1973) for a detailed discussion of the major differences between the broad price index envisioned by Fisher and the narrower price indices typically used in macroeconomic analysis and models.

the goods and services themselves.[8] Fisher (1930, pp. 61-2) explains that real interest rates, in the world we inhabit, are always *positive* for two reasons: time preference and investment opportunities.

> "… [The] rate of interest expresses a price in the exchange between present and future goods.… [In] the theory of interest, the [real] rate of interest, or the premium on the exchange between present and future goods, is based, in part, on … the marginal preference for present over future goods …called time preference or *human impatience*. The other chief part is the objective element, *investment opportunity*."

The marginal preference for present over future goods is called *positive* time preference. If individuals prefer consuming goods and services sooner rather than later, they require and, therefore, *expect* a *positive* real return for foregoing current consumption of goods and services.[9] In their extensive analysis of time preference, Olson and Bailey (1981, p. 24) conclude that "… the case for positive time preference is absolutely compelling."

Fisher (1930, pp. 191-193) then explains why the existence of investment opportunities also requires *positive* real interest rates:

> " … [a negative real interest rate] … would be true if there were a world in which the only provisioning of the future consisted of carrying over initial stocks of perishable food, clothing, and so forth and if every unit so carried over into the future were predestined to melt away …"

> "In the real world our options are such that if present income is sacrificed for the sake of future income, the amount of income secured is thereby greater than the present income sacrificed … Nature's productivity has a strong tendency to keep up the rate of interest. Nature offers man many opportunities for future abundance at trifling present costs. So also, human technique and innovation tend to produce big returns over costs."

[8] Stockman (1996, p. 705) notes: "Economists define the real interest rate as the relative price of a single good at two points in time." Mishkin (1988, pp. 1068-1071) describes how to calculate relevant real interest rates for the agricultural sector.

[9] Positive time preference can exist for reasons beyond simple "human impatience". Alchian and Allen (1972, p. 176) note that "Some other considerations imply a lower present value of deferred goods. The certainty of death—the certainty that we shall some day *not* be able to enjoy some postponed goods may make us unwilling to give up 1 gallon of gasoline (or anything else) today for just 1 gallon in the future."

Therefore, according to Fisher's theory of interest, both positive time preference and productive investment opportunities mandate *positive* real interest rates.

As Equation (1) indicates, Fisher's theory is designed to explain the level of nominal interest rates measured by the interest rates on selected credit instruments. In contrast, r^e and p^e are theoretical concepts that are neither directly observable nor measurable. Thus, some procedure must be used to generate estimates of, or proxies for, them in order to test the validity of the theory.

Equations (2) and (3) show how real interest rate estimates are typically produced.

$$r_t^e = i_t - p_t^e \quad (2)$$

$$r_t\hat{} = i_t - p_t\hat{} \quad (3)$$

In Equation (2), the Fisher interest rate equation [Equation (1)] is "shuffled" to show, arithmetically, that the real interest rate (r^e) can be thought of as being equal to the nominal interest rate (i) minus the expected inflation rate (p^e).[10] Because p^e is an unobservable, theoretical concept, econometric techniques or survey procedures are used to generate *estimates* of the expected inflation rate, ($p\hat{}$) measured by selected price indices (e.g., the CPI, the Core CPI, the GDP Implicit Price Deflator, etc.).[11] As shown in Equation (3), these expected inflation rate estimates are then subtracted from the nominal interest rate to obtain estimates of the real interest rate, $r\hat{}$.[12]

[10] Of course, it is equally true that the expected inflation rate can be shown to equal the nominal interest rate minus the real rate. However, Equation (2) is used because macroeconomists and econometricians believe that it is easier to estimate the expected inflation rate and, then, solve for the real interest rate than vice versa. However, for an unusual example of the reverse of the usual procedure, see Gavin (2010).

[11] See Abel and Bernanke (2005; pp. 53-54) and Barro (2010, p. 199) for their discussions of three methods generally used by macroeconomists to estimate the expected rate of inflation. Abel-Bernanke and Barro point out various problems with the resulting estimates—but not the one that we discuss later in this paper.

[12] One major problem with this procedure is that there is considerable disagreement among macroeconomists about the best way to generate expected inflation rate estimates and, hence, to calculate estimates of the real interest rate. As Darin and Hetzel (1995, p. 17) comment: "Despite [its] importance …, there is no generally available measure of the real interest rate … Economists who have studied the real interest rate have had to create their own series."

Macroeconomic research in the decades immediately following publication of Fisher's *The Theory of Interest* provided empirical support for Fisher's view that the real rate of interest is positive. For example, Figure 1 shows Yohe and Karnosky's (1969, p. 34; their Chart VII) estimates of the long-term real interest rate from 1961-9. Their alternative real interest rate estimates (which differ due to different estimation procedures) are all positive and range between 2 to 4 percent.

Indeed, the theoretical rationale and extant empirical evidence that real interest rates are always positive was so well accepted that this view appeared prominently in the leading principles of economics textbooks. For example, Alchian and Allen (1972, pp. 176-7) told their readers that:

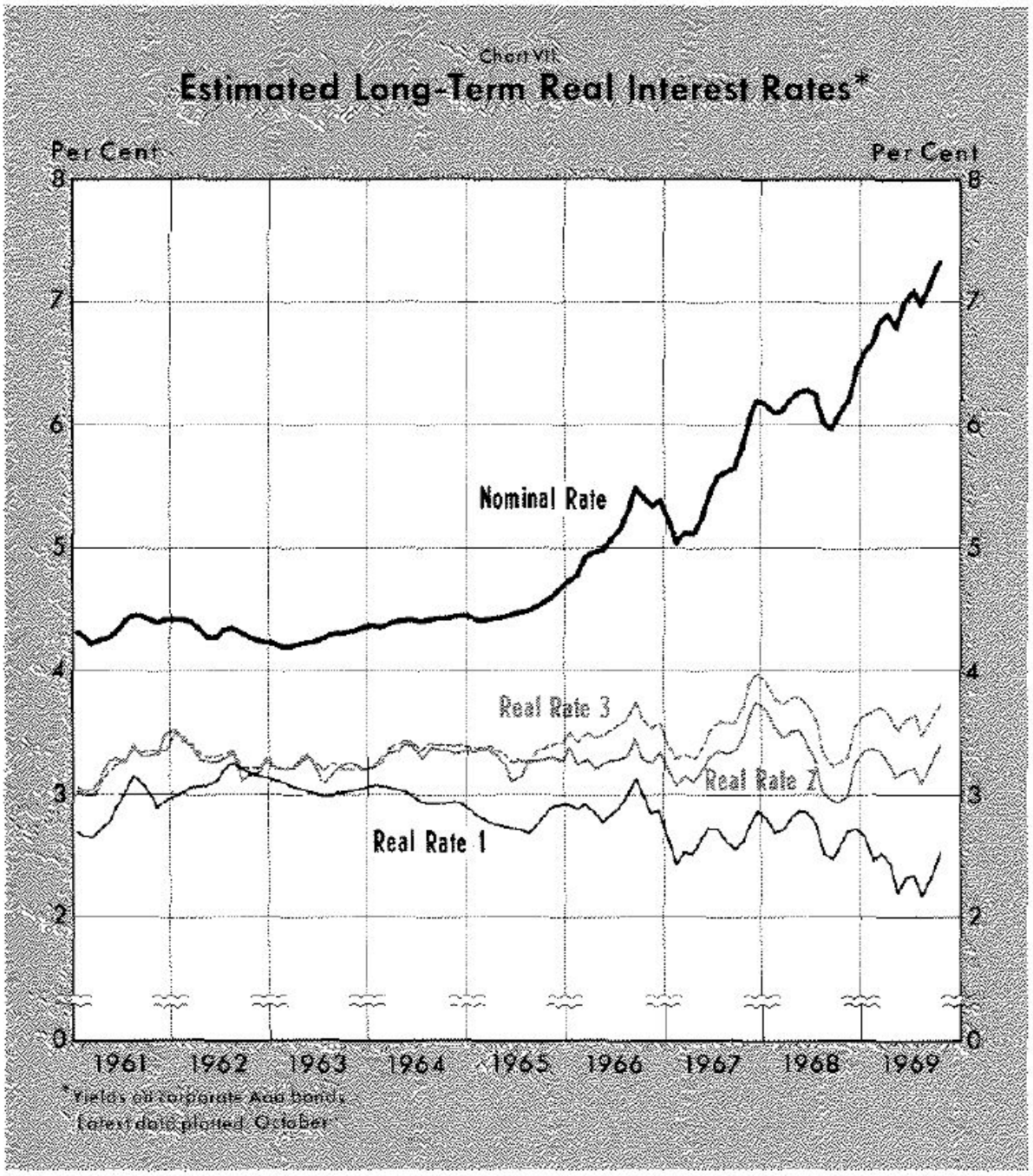
> "The [real] rate of interest, then, reflects: (1) convenience of earlier availability, (2) preference for assured consumption over contingent consumption, and (3) ability to use income to increase total output. *Any* society—capitalist, communist, advanced, primitive, industrial, agrarian, democratic, totalitarian—in which these elements are present will have a *positive rate of interest*—that is, a rate greater than zero."

Similarly, Samuelson (1964, pp. 584-5) explained that:

> " .. as long as any increase in time-consuming processes could be counted on to produce any extra product and dollars of revenue, the yield on capital could not be zero. Also, as long as any land or other assets with a *sure perpetual net income*—and as long as people were willing to give up only a *finite* amount of money today in exchange for an infinitely large amount of income spread over the whole future—then we can hardly conceive of the rate of interest as falling to zero."

Thus, up to the mid-1970s, virtually all economists agreed that, in the "real" world, the real rate of interest must be, and actually is, positive. Then, abruptly, this consensus changed.

Figure 1. Yohe and Karnosky's Estimates of the Real Rate of Interest Rate: 1961-69

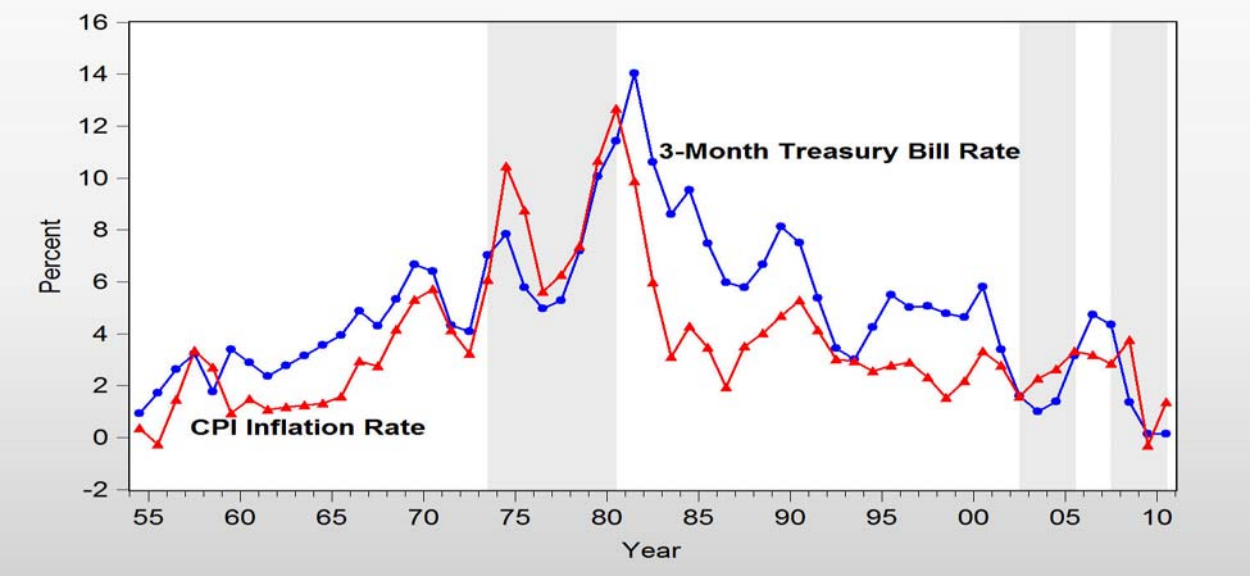


The Mystery of the Negative Real Interest Rate Estimates

Since the late 1970s, virtually all macroeconomic studies have generated positive *and negative* real interest rate estimates, depending on the specified time period. Figure 2 shows the

nominal 3-month Treasury bill interest rate and the *actual* rate of inflation (measured by the movement in the consumer price index for urban workers) from 1954 to the present. It also offers a potential reason for the change in the consensus that the real interest rate is always positive. In Figure 2, the nominal interest rate typically exceeded the actual inflation rate prior to 1973. Of course, the *actual* inflation rate should never be confused either with the *expected* inflation rate in Equations (1) and (2), or various estimates of the expected rate of inflation shown in Equation (3). Yet, the common movement in the interest rate and the inflation rate and the positive difference between them might be taken, somewhat loosely, as confirmation of the Fisher theory of interest and positive real interest rates.

Figure 2. Interest Rates and Inflation: 1954-2010



Then, unexpectedly, from 1973 to 1980 (see the shaded area in Figure 2), the interest rate-inflation rate relationship flipped. Now, the actual inflation rate exceeded the interest rate. This same "inversion" occurred again during the 2000-2010 decade (shaded areas). Thus, during much of the 1970s and the 2000s, the actual inflation rate exceeded the nominal interest rate,

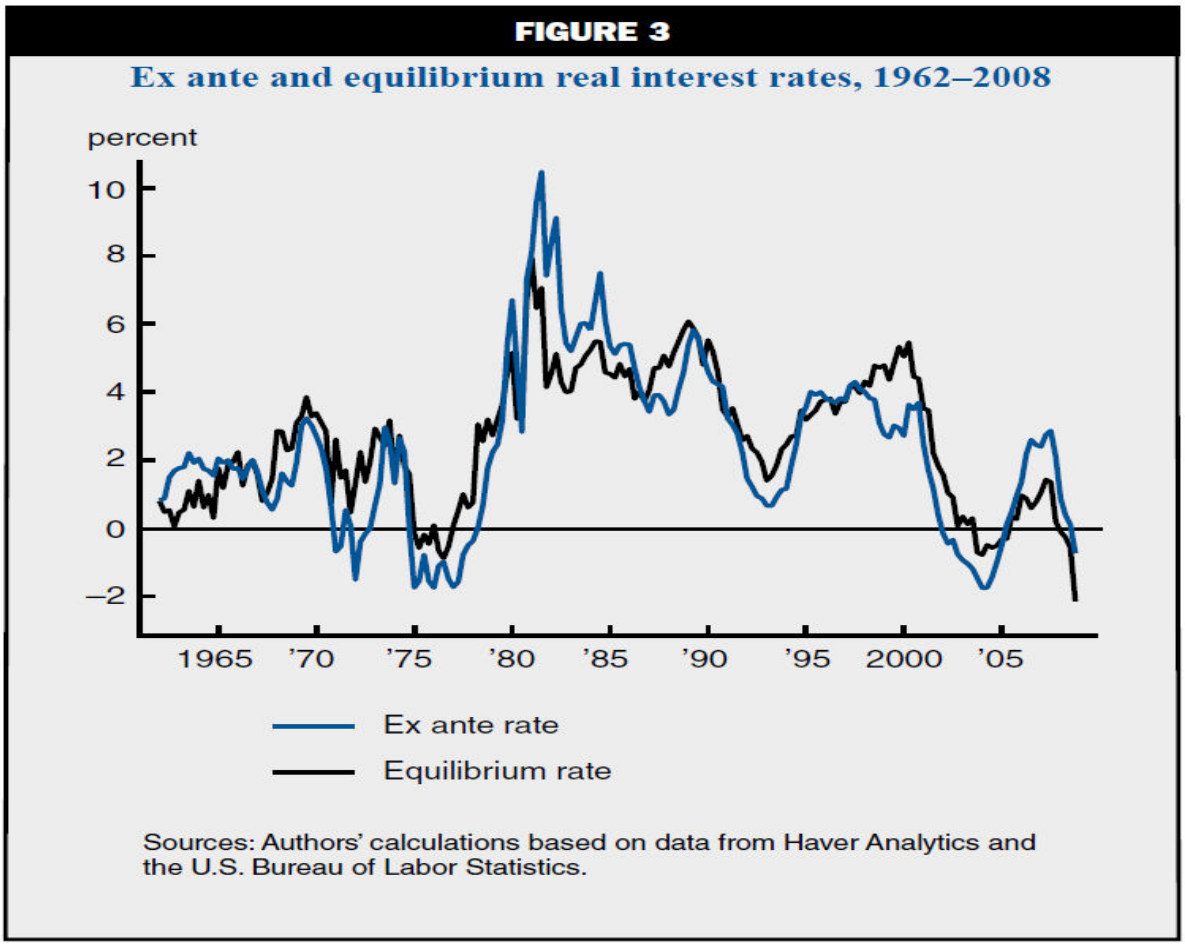
which made the *ex post* real interest rate *negative*. More importantly, macroeconomists' estimates of the real interest rate now turned negative as well for these periods.

We will not attempt to list the hundreds (if not thousands) of articles, books and working papers that have produced and/or used negative estimates of the real rate of interest over the past 35 years. Instead, we will simply cite four examples to illustrate our general theme: *negative estimates for the real interest rate now appear everywhere in the economic literature*.

- In their article intended "… to construct and make available a number of alternative empirical measures of the real rate of interest", Darin and Hetzel (1995, p. 17) compare inflation forecasts from four different sources and generate five alternative monthly estimates of the real rate of interest from November 1965 through December 1994. All five of their series (pp. 37-45) contain negative real interest rate estimates for various months, especially during 1975 through 1977.
- Gavin et al. (2005, p. 633) use "… four monetary general equilibrium models … [that] differ along two dimensions: the monetary authority's policy rule and the nature of price adjustments." They generate 12 alternative response patterns for their selected macroeconomic variables, including the real interest rate, r, when they solve their models for the impact of different "shocks". Seven of their 12 alternative model solutions yield negative real interest rates.

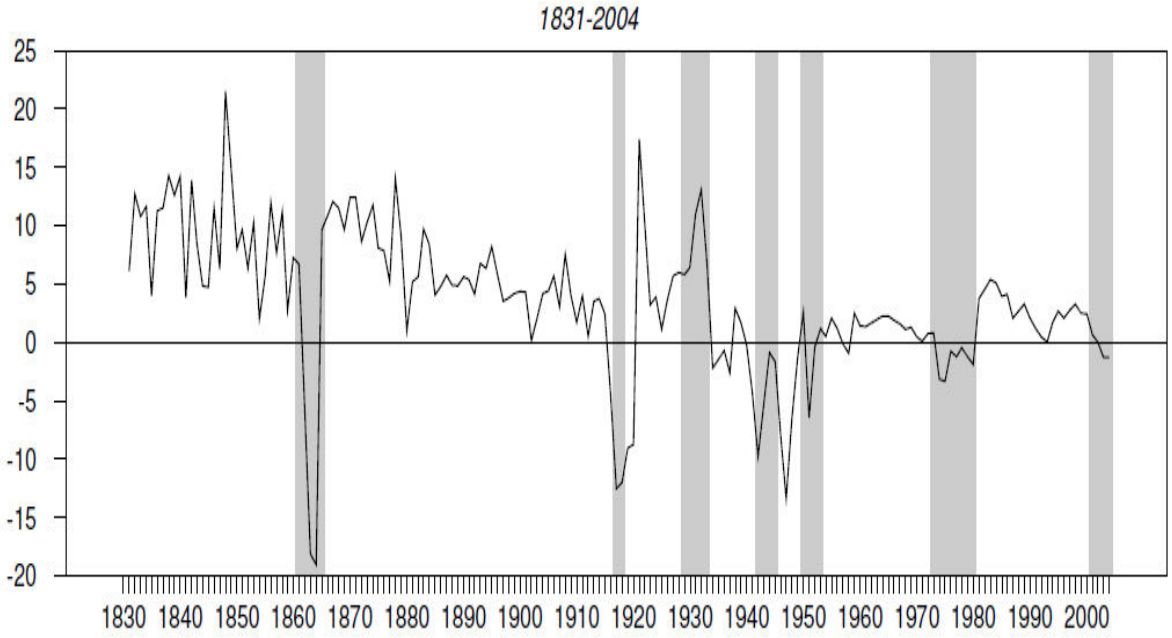
- Figure 3[labeled, coincidentally, Figure 3 in their study] shows real interest rate estimates from 1962-2008 in a recent study by Justiniano and Primiceri (2010, p. 20); their real interest rate estimates are negative during the 1970s and the current decade.

Figure 3: Justiniano and Primiceri's Estimates of the Real Interest Rate



- Figure 4 shows real interest rates estimates from 1831-2004 in a recent study by Weber (2010, p. 8) in which he states that "… negative real interest rates are a key feature of American business cycle history. The real interest rate was negative in 35 years during the 174 years [shown]."

Figure 4: Weber's Real Interest Rate Estimates: 1831-2004



Two Reasons Why Negative Estimates of the Real Interest Rate Are Absurd

There are two reasons why these negative real interest rate estimates are absurd. The first reason, as we have discussed extensively in previous sections, is that Fisher's theory of interest requires positive real interest rates in the world as we know it.[13] If negative real interest rate estimates are considered to be accurate and useful empirical counterparts to the theoretical real

[13]As Schwartz (1993, p. 11) notes "[I]n a market economy, the expected real rate [of interest] cannot be negative…" Similarly, Brown and Santoni (1981, p. 19) comment that "The theoretical possibility of a negative *ex ante* real rate is not at issue here. Casual observation suggests that the preconditions for a negative *ex ante* real interest rate do not now exist, nor did they exist in 1974 and 1975."

interest rate concept in Fisher's theory of interest, then the theory has been falsified. In this event, however, the negative estimates are irrelevant because they were derived from a falsified theory.

Fortunately, there is a second reason to reject negative real interest rate estimates without rejecting the Fisher theory of interest rates. Several decades ago, three articles demonstrated how estimation techniques that use inappropriate price indices to generate expected inflation rate estimates will produce spurious real interest rate estimates. First, Alchian and Klein (1973, pp. 481-2) showed that the price indices commonly used to estimate expected inflation were theoretically flawed.[14]

> "Two commonly cited … price indices [,] the … Consumer Price Index and the …GNP Deflator [,] … often … used … as measures of inflation and …targets and indicators of monetary and fiscal policy [,] … are theoretically inappropriate for the purpose to which they are generally put. …. The analysis in this paper bases a price index on the Fisherian tradition of a proper definition of intertemporal consumption and leads to the conclusion that a price index used to measure inflation must include asset prices."

Then, Brown and Santoni (1981) showed the empirical relevance of Alchian-Klein's theoretical discussion. In response to the initial cluster of published studies that generated negative estimates of the real interest rate in the late 1970s, they demonstrated the measurement problem inherent in these published estimates:

> "First …changes in … commonly used price indices produce biased estimates of actual changes in the general level of prices when the real interest rate is changing. Second, given that it is the *expectations* of market participants concerning the general level of prices that is relevant in Fisher's theory of the nominal interest rate, *estimates* of the real interest rate that employ past changes in a commonly used price index as a proxy for expected inflation will be biased when the real rate is changing." (p. 21)

[14] See Shibuya (1992) and Filardo (2000) for attempts to measure and use Alchian-Klein-type price indices for monetary policy purposes.

In addition, Brown and Santoni (1981, pp. 23-26) compared the prices of less durable (present) goods to those of more durable (capital) goods and showed that changes in these proxies for the real interest rate actually moved *inversely* to the published estimates of the real interest rate. *Thus, not only were the published estimates of the real interest rate biased, they were biased in the wrong direction*.[15]

Finally, Hosek and Zahn (1985) provided additional evidence showing that the negative estimates of the real rate of interest were spurious. They derived estimates of the real interest rate directly from the "real" side of the economy as suggested by Fisher's definition of the real interest rate. Their real interest rate estimates were positive throughout 1954-81, unlike the negative estimates that they derived using the indirect approach shown in Equation (3). They concluded that "The dissimilarities in the statistical properties of the estimates raise serious questions about the appropriate measure of the real rate used to evaluate the impact of economic policy on … aggregate demand." (pp. 220-1).[16]

Abysmal Science, Absurd Estimates of the Real Interest Rate and the Dunning-Kruger Effect

Consider the crisis challenging macroeconomists who use the real rate of interest as an integral component of their models, analysis and policy recommendations. Economic theory suggests that, in the world we inhabit, the real interest rate is always positive. However, empirical estimates of the real interest rate that macroeconomists continue to generate and use in their models are *negative* over extended time periods! What *should* macroeconomists, as social scientists, conclude when they stumble upon negative estimates of the real interest rate derived

[15]Santoni and Moehring (1994) examine the inverse behavior between estimated real returns on assets and estimates of the expected rate of inflation and conclude that this puzzling behavior is explained by using narrow price indices to derive estimates of the Fisherian expected inflation rate. Thus, they expand the analysis of the measurement problem discussed in Brown and Santoni (1981).

[16] In their conclusion (p. 221), they also state that "Although the accuracy of our [real interest rate] estimate relative to the other estimates can not be determined, its reliability as an explanatory variable in the appropriate structural equations of a model, which explains the interactions between the real and monetary sectors, is the subject of our continuing research." Unfortunately, we were unable to discover whether they actually completed this research.

from the universally-used interest rate theory that denies this possibility? It *should* be obvious that either the Fisher theory of interest rates is invalid or their real interest rate estimates are spurious.[17] Resolving such conflicts between theoretical implications and empirical observations is the raison d'être of the scientific process.[18]

If macroeconomists conclude that the theory has been substantially falsified, that decision should trigger an extensive search for a better theory of interest rates. Until they find a better theory, however, they should exercise extreme caution in their continuing use of the Fisher interest rate approach to analyze macroeconomic and monetary policy issues. If, on the other hand, they conclude that the theory is valid, they should spurn their spurious real interest rate estimates and develop alternative estimation methods that yield real interest estimates consistent with the theory.[19] This scientific approach to testing economic theories and advancing our understanding of economic behavior is, presumably, practiced by all economists.

However, in an example of abysmal science that should baffle anyone interested in the methodology of science and the behavior of scientists, macroeconomists chose neither of the above alternatives. Instead, they have continued to use the Fisher interest rate theory and their negative real interest rate estimates as if both are equally valid and equally useful for macroeconomic policy. How can we possibly explain this odd behavior?

One explanation that may provide some insight into this macroeconomic conundrum is known as the Dunning-Kruger Effect. As Dunning explains it (Morriss (2010a, p. 7)):

> "You could think of the Dunning-Kruger Effect as a psychological version of [anosognosia]. If you have, for lack of a better term, damage to your

[17] If the Fisher theory is invalid, the real interest rate estimates are spurious because they are derived from Equation (3), which is derived, in turn, from Fisher's theory of the interest rate [Equation (1)].
[18] Some famous past conflicts, e.g., the "Piltdown Man" and "room-temperature fusion," were shown to be hoaxes. For other interesting examples of the clash between theory and observations, see Begley (2004).
[19] E.g., Hosek and Zahn (1985).

> expertise or imperfection in your knowledge or skill, you are left literally not knowing that you have that damage."

Thus, the Dunning-Kruger Effect suggests that macroeconomists don't know that their negative estimates of the real interest rate are absurd *because they are ignorant of the Fisherian theory of interest itself.*[20] How could this have occurred over the past several decades?

For a possible explanation of this phenomenon, we start about 50 years ago, when Enthoven (1963, p. 422) described the requirements for success in economics as follows:

> "…the tools of analysis that we … use are the simplest, most fundamental concepts of economic theory, combined with the simplest quantitative methods. The requirements for success in this line of work are a thorough understanding of and, if you like, belief in the relevance of such concepts … combined with a good quantitative sense. The economic theory we are using is the theory most of us learned as sophomores. The reason Ph.D.'s are required is that many economists do not believe what they have learned until they have gone through graduate school and acquired a vested interest in the analysis."

However, there has been increasing concern that graduate economic education has deemphasized the "fundamental concepts of economic theory" over the past decades and that Ph. D.'s no longer have either "a vested interest" in, or much familiarity with, these concepts. For example, in their article subtitled "A Dismal Performance from the Dismal Science", Ferraro and Taylor (2005, abstract) comment that

> "One expects people with graduate training in economics to have a deeper understanding of economic processes and reasoning than people without such training. However, as others have noted over the past 25 years, modern graduate education may emphasize mathematics and technique to the detriment of economic reasoning."

Similar criticisms of graduate economic programs have escalated in recent years. For example, Demsetz (2008, p. 4) remarked that

[20] Of course, this suggests that they are ignorant, as well, of the Alchian-Klein, Brown-Santoni and Hosek-Zahn articles cited previously. And, this ignorance must also extend to reviewers and editors who enable publication of studies with negative real interest rate estimates and to readers who fail to notice anything amiss about these estimates.

> "The work I choose to do is not heavily armored with math and econometrics. It is focused on the empirical and policy problems and on the logic of the theory that bears on these. Cold logic, imagination, and exposition by words, simple geometry, and basic statistics are the tools on which I have mainly relied throughout my career. ... Not many young economists adopt this working methodology today …. Economists in training seem to seek a body of data that is appropriate for the exploitation of technical tools rather than one which offers intrinsic economic interest."

Equally critical of graduate economic education, Allen (2010, p. 25) comments that

> "Economics departments continue to grind out numerous bright Young Scientists who are close substitutes for each other …. Few new grads seem to have a strong sense of, or feel for, or interest in the substance and use of traditional Economics at its best. Few see that … achievements of high sophistication are resultants of more than learned mechanics and convoluted techniques."

Of course, innovations in computer technology and econometric software over the past several decades have encouraged the rise of "bright Young Scientists" by making it relatively cheaper to specialize in what Allen might consider "learned mechanics and convoluted techniques." However, these innovations alone should have enabled macroeconomists and others to further extend, develop and test the "fundamental concepts of economics." Instead, critics are concerned that the attention devoted to innovations has displaced or crowded out the study of fundamental economic concepts in graduate schools. For example, Demsetz (2008, p. 4) comments that

> "Today, prospective employers seem to strongly emphasize demonstrable ability in econometrics and mathematics. I suspect that the large degree of specialization across fields of economics explains this, since it is now more difficult to have the knowledge of material in the many fields in which the renderer of judgment is not a specialist. Technical tooling offers a substitute, but heavy attention to these tools often hampers discovering the economist."

It would require detailed examination of changes in graduate economic program curriculums and dissertation topics over the past several decades to determine the validity of this specific

"crowding out" assertion.[21] Unfortunately, while this research is clearly of interest to those interested in the evolution of a particular academic discipline, we know of no such research to date.

However, recent articles by Coelho and McClure (2005, 2008, and 2010) provide some indirect evidence that supports this view. They examine the rise of "mathematical formalism" and the associated decline in empirical hypothesis tests in economic research published in recent decades. Figure 5 (Coelho and McClure (2010, p. 5; their Figure 1) documents the increasing number of articles that emphasize mathematical modeling (i.e., that contain one or more "lemmas") published in economic journals since 1954. The sharp rise in the number of published articles that might be characterized, by some critics, as examples of "learned mechanics and convoluted techniques," over the past decades is evident—not only for the top four economic journals, but for economic journals in general.[22]

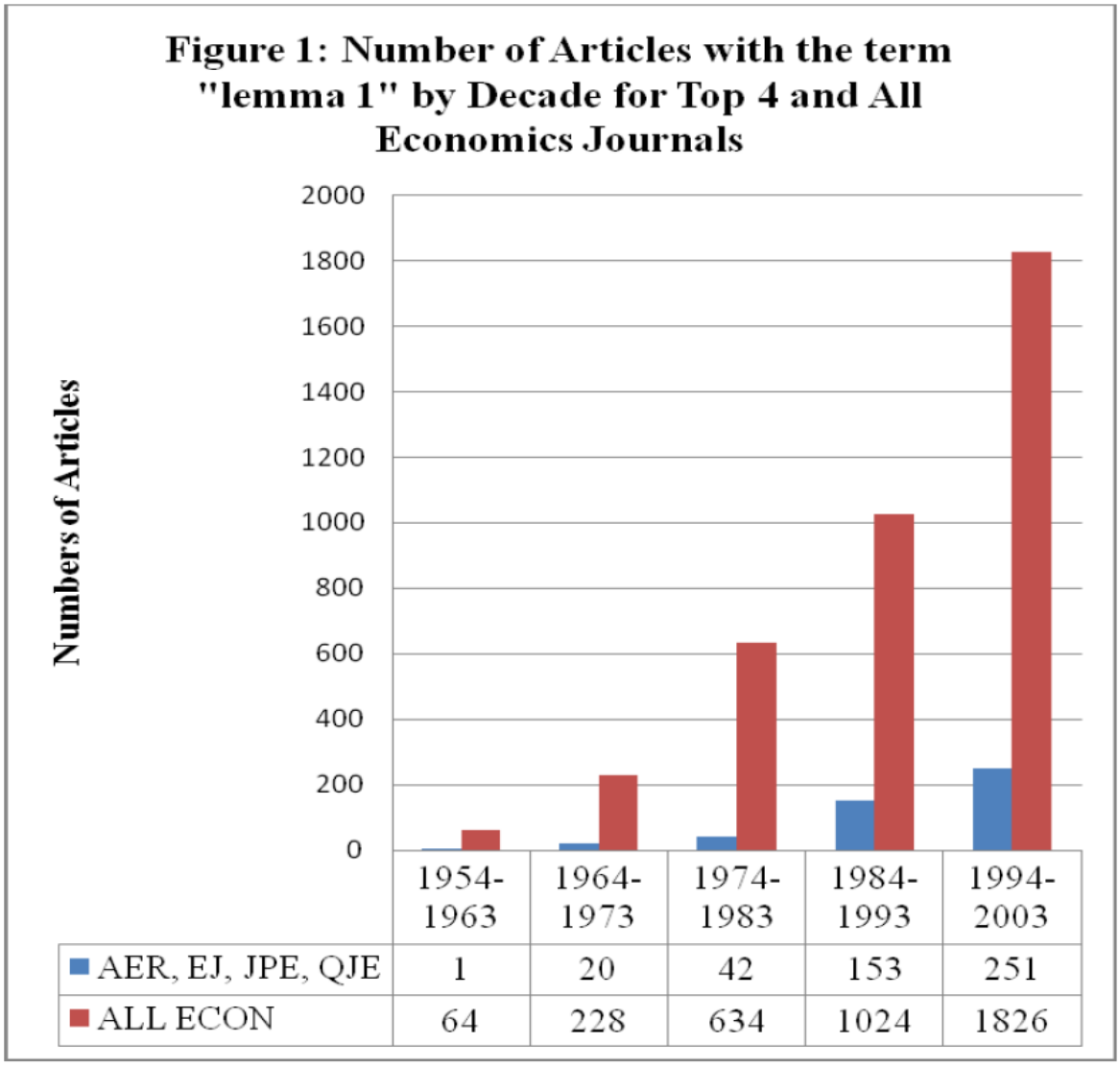
Coelho and McClure's research indicates the extent to which mathematical models have crowded out hypothesis tests in published articles in economics journals.[23] We have shown that, at least with respect to estimates of the real interest rate, published empirical studies have seemingly crowded out attention to one fundamental economic theory: Fisher's theory of the interest rate.

[21] Alternatively, these criticisms might be viewed simply as the nostalgic reminiscences of the older generation of economists—sort of an academic "No Time for Old Men." According to Paul Samuelson, "economics progresses one funeral at a time." (Hirsh (2010).

[22] They show the totals for both the "Big Four" and for all economic journals to partially adjust for the impact of the increased number of economic journals over the period shown on the total number of such articles published.

[23] One physicist, interested in using advanced computer power to map human economic behavior, recently remarked [as cited in (Hirsh (2010)] that "One of the dangerous cultural patterns that economics has fallen into is an excessive emphasis on theorem proof for its own sake rather than what gives you scientific results." Similar comments have been made by Allen (2010, p. 233): "… the [Economics] professional arena now is largely one of gamesmanship in technique" and Krueger et al., (1991), who observed that economic graduate programs produced "… too many *idiots savants*, skilled in technique but innocent of real economic issues."

Figure 5. Mathematical Model-based Articles in Economics Journals: 1954-2003



Perhaps changes in graduate economic programs resulting from computer and software innovations have produced changes in the types of dissertations written and articles submitted for publication in these journals. Or, perhaps, changes in decisions of economic journal editors with respect to the submissions they accept for publication have produced changes in graduate economic programs.[24] We do know, however, that Coelho and McClure's results suggest that the

[24] Allen (2010, p. 219) once asked Milton Friedman whether he should submit his manuscript on Irving Fisher to the *Journal of Political Economy*. Friedman responded that Allen's "manuscript would not receive a fair assessment

Dunning-Kruger explanation may account for the puzzling behavior of macroeconomists who continue to use both Fisher's theory of interest and real interest rate estimates that are denied by the theory used to derive them. Unfortunately, the publishing trends shown in Figure 5 suggest that this puzzling behavior will likely persist over the foreseeable future.

Summary and Conclusions

Keynes (1921, p. v) stated that "The theory of economics is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions." McGrattan (2010) corroborates Keynes' assertion in her recent article on the use of different statistical representations to the same prototypical business cycle model. She asks the question: "How much can business cycle theorists learn from actual time series if they impose very little theory when applying their statistical methods?" Her answer was "very little." (p. 12). Without relevant theories to guide their analyses, economists are extremely unlikely to arrive at correct conclusions about the economy.

This same problem arises when economists misuse the theories that, presumably, are guiding their analyses. Fisher's theory of interest is a cornerstone of macroeconomic analysis. It is universally accepted and extensively used in macroeconomics and finance. As Bullard (2010, pp. 340-1), President of the Federal Reserve Bank of St. Louis, recently stated: "Practically speaking, any macroeconomic model of monetary phenomena will have a Fisher relation as a part of the analysis…" The *ex ante* real rate of interest, as defined in Fisher's theory of interest, is widely recognized as being one of the most important variables in economics and is used in virtually all macroeconomic and monetary models.

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there because it was non-mathematical." Friedman suggested that he send it, instead, to the *Journal of Law and Economics*, which did publish it.

In this article, we suggest that one cause for the alleged failure of macroeconomic models and policy advice is that virtually all estimates of the *ex ante* real rate of interest used in macroeconomic analyses are theoretically absurd and empirically flawed. We point out that this problem should have been recognized long ago—and, was, in fact, discussed in several published articles over 25 years ago that were subsequently ignored by macroeconomists. Finally, we suggest that the Dunning-Kruger Effect might explain why this wide divergence between macroeconomic theory and practice has persisted for so long and why, unfortunately, it is likely to continue to plague macroeconomists and macroeconomics in the future.

References

Abel, Andrew B. and Ben S. Bernanke (2005), *Macroeconomics, 5th Edition* (Pearson-Addison Wesley).

Alchian, Armen A. and William R. Allen (1972), *University Economics, 3rd Edition* (Wadsworth Publishing Company, Inc.; Belmont, CA).

_____ and Benjamin Klein (1973), "On a Correct Measure of Inflation," *Journal of Money, Credit and Banking* (February), pp. 173-91; reprinted in Armen A. Alchian, *Economic Forces at Work* (Liberty Fund, Inc.: 1977).

Allen, William R. (2010), "A Life among the Econ, Particularly at UCLA," *Econ Journal Watch* (Vol. 7, No. 2, September), pp. 205-234

Barro, Robert J. (2010), *Intermediate Macro, 1st Edition* (South-Western Cengage Learning).

Begley, Sharon (2004), "In Physics, Big Errors Can Get the Ball Rolling Toward Big Discoveries," *The Wall Street Journal* (September 3rd), p. A7.

Brown, W. W. and G. J. Santoni (1981), "Unreal Estimates of the Real Rate of Interest," Federal Reserve Bank of St. Louis *Review* (January), pp. 18-26.

Bullard, James (2010), "Seven Faces of 'The Peril'", Federal Reserve Bank of St. Louis *Review*, (September/October), pp. 339-352.

Coelho, Philip R. P. and James E. McClure (2005), "Theory versus Application: Does Complexity Crowd Out Evidence?" *Southern Economic Journal* (Vol. 3, No. 2), pp. 556-65.

_____(2008), "The Market for Lemmas." *Econ Journal Watch* (Vol. 5, No. 1), pp. 78-90.

_____ (2010), "Lotta Lemmata: A Sour Harvest," Forthcoming in *Social Science History*

Darin, Robert and Robert L. Hetzel (1995), "An Empirical Measure of the Real Rate of Interest," Federal Reserve Bank of Richmond *Economic Quarterly* (Volume 81,Winter), pp. 17-47.

Demsetz, Harold (2008), "Succeeding in Economics," *American Economist* (Vol. LII, Fall), pp. 1-5.

Enthoven, Alain A. (1963), "Economic Analysis in the Department of Defense," *American Economic Review*, Vol. 53 (May), p. 422.

Ferraro, Paul J. and Laura O. Taylor (2005), "Do Economists Recognize an Opportunity Cost When They See One? A Dismal Performance from the Dismal Science," *Contributions to Economic Analysis & Policy* (Vol.4, No. 1), Article 7.

Filardo, Andrew J. (2000), "Monetary Policy and Asset Prices," Federal Reserve Bank of Kansas City *Economic Review* (Third Quarter), pp. 11-17.

Fisher, Irving (1896), *Appreciation and Interest* (New York: Macmillan).

_____ (1906a), *The Nature of Capital and Income* (New York: Macmillan).

_____ (1906b), *The Rate of Interest* (New York: Macmillan).

_____ (1930; reprinted in 1965), *The Theory of Interest* (New York: Augustus M. Kelley).

Gavin, William T. (2010), "Deflation and the Fisher Equation," Federal Reserve Bank of St. Louis *Monetary Trends* (October, cover page)

_____, Benjamin D. Keen and Michael R. Pakko (2005), "The Monetary Instrument Matters," Federal Reserve Bank of St. Louis *Review* (September/October), pp. 633-58.

Hirsh, Michael (2010), "Our Best Minds Are Failing Us", *Newsweek* (September 16th) available at http://www.newsweek.com/2010/09/16/our-best-economic-minds-are-failing-us.html

Hosek, William R. and Frank Zahn (1985), "An Alternative Approach to the Estimation of the Real Rate of Interest," *Journal of Macroeconomics* (Vol. 7, No. 2), pp. 211-22.

Justiniano, Alejandro and Giorgio E. Primiceri (2010), "Measuring the Equilibrium Real Interest Rate," Federal Reserve Bank of Chicago *Economic Perspectives* (1st Quarter), pp. 14-27.

Kaletsky, Anatole (2010), "The Benefits of the Bust," *The Wall Street Journal* (June 10).

Keynes, John M. (1921) "Introduction to Cambridge Economic Handbooks", in D. H. Robertson (ed.), *Money* (Cambridge Economic Handbooks: London and Cambridge)

Kocherlakota, Narayana (2010), "Modern Macroeconomic Models as Tools for Economic Policy," The Federal Reserve Bank of Minneapolis *The Region* (May), pp. 5-21.

Krueger, Anne O, Kenneth J. Arrow, Olivier Jean Blanchard, alan S. Blinder, Claudia Goldin, Edward E. Leamer, Robert Lucas, John Panzar, Rudolph G. Penner, T. Paul Schultz, and Lawrence H. Summers (1991), "Report of the Commission on Graduate Education in Economics," *Journal of Economic Literature* (Vol. 29, No. 3), pp. 1035-1053.

McGratton, Ellen R. (2010), "Measurement with Minimal Theory," Federal Reserve Bank of Minneapolis *Quarterly Review* (July), pp. 2-13.

Mishkin, Frederic S. (1988), "Understanding Real Interest Rates," *American Journal of Agricultural Economics* (Vol. 70, No. 5; December), pp. 1064-1072.

Morriss, Errol (2010), "the Anosogosic's Dilemma: Something's Wrong but You'll Never Know What It Is (Part 1)," *The New York Times* (June 20th).

Olson, Mancur and Martin J. Bailey (1981), "Positive Time Preference," *Journal of Political Economy* (February), pp. 1-25.

Rachman, Gideon (2010), "Sweep economists off their throne," *Financial Times* (September 6).

Samuelson, Paul A. (1964), *Economics: An Introductory Text* (McGraw-Hill).

Santoni, G. J. and H. Brian Moehring (1994), "Asset Returns and Measured Inflation," *Journal of Money, Credit, and Banking* (Vol. 26, No. 2), pp. 232-48.

Schwartz, Eli (1993), *Theory and Application of the Interest Rate* (Praeger Publishers).

Shibuya, Hiroshi (1992), "Dynamic Equioibrium Price Index: Asset Price and Inflation," Bank of Japan *Monetary and Economic Studies* (Vol. 10, No. 1), pp. 95-109.

Stockman, Alan C. (1996), *Introduction to Economics* (Dryden Press).

Taylor, John B. (2001), "Teaching Modern Macroeconomics at the Principles Level," *American Economic Review* (Vol. 90, No. 2, May), pp. 90-94.

Weber, Ernst Juerg (2010), "The Role of the Real Interest Rate in U.S. Macroeconomic History," *The B. E. Journal of Macroeconomics* (Vol. 10, No. 1), (Topics), Article 7. Available at: http://www.bepress.com/bejm/vol10/iss1/art7.

Yohe, William P. and Denis S. Karnosky (1969), "Interest Rates and Price Level Changes, 1952-69", The Federal Reserve of St. Louis *Review* (December), pp. 18-38.