

GOLD STANDARD UNIVERSITY

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Monetary Economics 102: Gold and Interest

Lecture 1

THE NATURE AND SOURCES OF INTEREST

•Hoarding and Disharding • Marginal Saving • Marketability • The Marginal Utility of Gold • Critique of Existing Theories • Propensity to Hoard and the Rate of Interest • Dichotomy False: Present vs. Future Goods • Dichotomy True: Income vs. Wealth • Principle of Capitalizing Incomes • Structure of Capital Markets • The Square Model Featuring the Annuitand, Annuitant, Entrepreneur, and Inventor • The Pentagonal Model Featuring the Capitalist • The Hexagonal Model Featuring the Investment Banker • The Concept of Interest • The Propensity to Save and the Rate of Interest • Gold Standard, the Stabilizer of the Economy • Disequilibrium Theory of Price Formation • Disequilibrium Theory of the Formation of Interest Rates • The Gold Coin and the Rate of Interest • A Tale of Two Schools • The Gold Coin and the Rate of Interest • Interest under the Regime of Irredeemable Currency • The Ratchet and the Linkage • Between Scylla and Charybdis •

Hoarding and Dishoarding

In this course I set out to develop a new theory of interest. Very little of what I have to say can be found in the existing literature. Here I make a new departure in introducing interest as the obstruction to gold hoarding that would be unlimited in the absence of interest, since the marginal utility of gold is constant. (Recall that, by contrast, the marginal utility of a non-monetary commodity does decline, setting a limit to hoarding). In this sense interest is analogous to a parking meter on a busy street which limits the demand for parking space that would be unlimited otherwise.

The cyclical nature of the physical and biological universe has prompted acting man to hoard the means of sustenance since time immemorial. While some animals also hoard (such as bees, squirrels), they do so instinctively and may 'forget' the size and location of their hoards. Man does hoard consciously and systematically. As shown in the *Genesis* through the example of Joseph (41: 34-36), hoarding is necessary during the seven fat years in order to provide the wherewithal through dishoarding during the seven lean years that are bound to follow. Today it is customary to ridicule the innate hoarding habits of man as being primitive and atavistic, pointing out that savings denominated in irredeemable currency are far superior, and they can be used for the same purpose with good effect. However, man can ignore the Biblical admonition only at his own peril.

Marginal Saving

As gold hoarding has been discouraged and sometimes severely punished by the powers-that-be, the theory of interest must also include a more general treatment of the hoarding of marketable goods which we shall call marginal saving. It is a proxy for gold hoarding and it has, for better or worse, survived to this day. The fact is that people always have saved in the form of hoarding marketable goods, regardless of the availability of gold and the attractiveness of fiduciary forms of savings and, probably, they always will. As we shall see, this residual hoarding or marginal saving influences, and is influenced by, the rate of interest. Unlike gold hoarding, marginal saving could not be prevented through coercion. No sooner does the government outlaw the hoarding of one marketable commodity than people will start hoarding another.

Marketability

The twentieth century witnessed the dismal failure of governments to provide an honest and reliable currency to serve as the common denominator for savings. Savers are continuously plundered as their savings are siphoned off through currency depreciation and debasement. One can hardly fail to see in this the ultimate incentive to hoard marketable commodities as marginal saving. However, it is important to see that even under the most stable monetary system marginal saving is present. For example, under the gold standard provident and thoughtful people found it necessary, natural, and prudent to keep a hard core of their savings in the form of various highly marketable goods. Their foresight was justified by later developments, as unprincipled governments have resorted to surprise devaluations combined with the criminalization of the ownership of gold, in order to prevent savers from using the monetary metal as a prophylactic against plunder through currency debasement.

It is therefore logical and necessary that an investigation into the phenomenon of interest should start with the problem of marketability and its two variants, salability and hoardability -- those qualities that were instrumental in promoting gold as monetary metal. Theory and history show that as a result of an evolution lasting for centuries if not millennia, gold has become the most saleable as well as the most hoardable asset. Demonetization in 1971 did nothing to change that fundamental fact. In particular, the value of gold, unlike the value of all other goods, is objective -- as witnessed by the enormous size of the stores of gold (relative to current production) that private and public holders are willing and eager to carry in the balance sheet *without any promise of return to capital*, far in excess of their possible need for it. This is what makes gold the monetary metal *par excellence*. By contrast, the value of other goods is subjective. Of course, ultimately, the objectivity of the value of gold also has subjective roots. It has to do with the superb confidence of countless individuals (both living and deceased) in the reliability of gold as a store of value. Out of this subjective judgment has grown the objective fact that the store of gold in the world today is a high multiple of annual flows (at the present rate of output the stores-to-flows ratio for gold is in the order of 80, meaning that the stores of gold in the world are equivalent to eighty years of production). By contrast, for other goods the stores-to-flows ratio is a small fraction (in the case of copper, for example, it is about 0.25, meaning that the stores of copper in the world are equivalent to three months' production). If the stores-to-flows ratio for copper approached that of gold, then the value of copper would approach zero in the manner of that of drinking water, due to copper's declining marginal utility. Under these circumstances it is hardly reasonable to suggest that a theory of interest could ignore the fact of gold hoarding.

The Marginal Utility of Gold

According to Carl Menger, subsequent units of a commodity are valued less by the economizing individual than units acquired by him earlier. This is known as the Axiom of Declining Marginal Utility. If we rank commodities according to the rate of this

decline, then we shall find that the marginal utility of one of them declines more slowly than that of any other. The commodity with this property is none other than gold. In fact, the marginal utility of gold declines so slowly that it is practically constant. It follows that gold hoarding must be limited by something other than declining marginal utility so that the demand for gold may not become arbitrarily large, and gold coins may stay in circulation. The fact is that the demand for gold is limited by the positive rate of interest channeling gold into monetary circulation, away from hoarding.

Ludwig von Mises in *Human Action* denies that the marginal utility of gold is constant (op.cit., p 404). His reasoning is that constant marginal utility would mean infinite demand, which is contradictory. Thus, then, Mises failed to grasp the connection between gold and interest. Elsewhere in his book (p 205) Mises denies that it is possible to construct a unit of value because two units of a homogeneous supply are necessarily valued differently, according to the Axiom of Declining Marginal Utility. Yet gold has successfully furnished the unit of value for thousands of years to many a flourishing civilization including our own. Later we shall see that our theory of interest departs from that of Mises in a number of other respects, too.

Critique of Existing Theories of Interest

Implicit in this approach is a critique of existing theories of interest. While they recognize that hoarding has been a primitive form of saving in earlier times, existing theories tacitly assume that in an advanced industrial society with well-developed capital markets hoarding is non-existent or, at any rate, not being practiced by intelligent and informed people, and so it can be safely ignored. However, as a little thought will show, marginal saving is present even in the most advanced modern economies. The objects of hoarding are as varied as the means are ingenious. The latter include inventory padding both at the level of input and output of production, as well as the deliberate use of leads and lags in warehousing. It also includes cutbacks in production quotas of marketable goods (such as crude oil, lumber, gold, etc.) which have been utilized for the same purpose in recent times with dramatic effect, as well as the slowing of the movement of goods in the pipelines by distributors. The list of marketable goods that are both hoardable and consumable is endless. It includes such items as salt, spices, spirits, sugar, tea, coffee, fragrances, drugs, etc., not to mention grains, energy carriers, and metals.

It would be an impossible task to estimate, however tentatively, the size of existing stores of marketable goods. Even if such estimates were available, it would be impossible to decide which parts of these stores were held for impending consumption and which were considered marginal saving by their owners. The only way to grasp the hoarding habits of people is through theoretical understanding.

Propensity to Hoard and the Rate of Interest

The owners of stores of marketable goods periodically revise their quota of stored values held specifically for purposes of marginal saving. Various considerations will enter into their calculations, some of which obviously has to do with conditions prevailing in the markets where their surpluses can be traded. But there is one general and overwhelming consideration that invariably enters into their calculations and may move them to change the size of their hoards, always with the same signature uniformly for all marketable goods. This is none other than the height of the market rate of interest. If lower than the floor and falling, then people tend to increase; and if higher than the ceiling of the natural range and rising, then they tend to decrease their quota of marketable goods held for purposes of marginal saving (as distinct from hoards held for consumption).

The inescapable conclusion is that a relationship exists between the propensity to hoard and the rate of interest. If the latter is too high then there is a damping, and if it is too low then there is a buoyant effect on hoarding. The converse is also true: a change in the propensity to hoard does directly or indirectly influence the rate of interest through its effect on the relative prices of marketable goods on the one hand, and on that of bonds on the other.

Dichotomy False: Present vs. Future Goods

Part of the difficulty that a comprehensive theory of interest must face is due to the way the problem has traditionally been stated. It can be formulated as a question: *What happens when a man with present goods to spare but who is in need of future goods meets another with future goods to spare but who is in need of present goods?* I shall discard this as an unsuitable basis for the theory of interest. The bargaining positions of these two men are so different that no fair exchange can be expected to result from the encounter. Not surprisingly, it has always been in this context that usury was condemned by both criminal and canon law. We must look around for a more reasonable basis on which to construct a theory of interest.

Dichotomy True: Income vs. Wealth

It has never occurred to philosophers and moralists nor, for that matter, to most economists, that the nature and the sources of interest could be better grasped if the

problem was presented in the form of a different question: *What happens when a man with income to spare but who is in need of wealth meets another with wealth to spare but who is in need of an income?* Fair exchange is indeed possible in this case. Just why the problem of converting income into wealth and wealth into income is important follows from the fact that man is mortal and he knows it. As he grows old, his former surplus of mental and physical energy will inevitably turn into a deficit. If he has failed to accumulate wealth in his prime years, then his twilight years are likely to be miserable. His needs would overwhelm his resources. He would lack the means to have the diseases plaguing him treated. To add insult to injury, he would be wide open to humiliation. However, if he has wealth, then he will be in control of his destiny despite his declining strength. He will be in a strong bargaining position: he can exchange a portion of his wealth for an income that will keep him in comfort and safety for the rest of his life.

That wealth is not everything becomes clear as soon as conversion into income is denied to the individual, so vividly portrayed in the comedy of King Midas and in the tragedy of King Lear. The importance of such conversions could under certain condition be a matter of life and death.

Irreducible Form of Credit

The exchange of a present good for a future good is not an irreducible form of credit. Nor is a loan from *A* to *B*. These exchanges fall short of capturing the essence of interest. They could be viewed as the combination of two exchanges. For example, the loan from *A* to *B* is an exchange of the income of *B* for the wealth of *A*, later followed by the return of the wealth to *A* in exchange for restoring the income to *B*. Accordingly, we shall view the exchange of income and wealth as the irreducible form of credit to which all other credit transactions can, and must, be reduced. This also has the advantage of including the conversion (as distinct from exchange) of income into wealth through hoarding, and wealth into income through dishoarding, as a limiting case.

Principle of Capitalizing Income

Whenever provision for deferred consumption is made, it is done through converting income into wealth as a first step, to be followed by a second, converting wealth back into income. In this view income is perishable: 'use it or lose it', and conversion into wealth is the way to conserve it. The question of optimizing the conversion of income into wealth and wealth into income arises naturally. The answer can be found in the agency of credit and exchange. As I have observed already, in traditional accounts the

most primitive form of credit is the exchange of a present good for a future good. I have discarded this view and replaced it with a more natural one that can be considered as the irreducible form of credit: the exchange of income and wealth. This represents a leap in the efficiency of direct conversion of income into wealth through hoarding, and that of wealth into income through dishoarding. We shall see that interest appears as the measure of the efficiency of exchange (as compared with that of direct conversion).

Exchanging income and wealth is possible because incomes, although perishable, can in fact be capitalized. As history and logic suggest, income is primary and wealth is derived (secondary). This was formulated by the American economist Frank A. Fetter as the Principle of Capitalizing Incomes. Early on scholastic philosophy recognized the importance of exchanging income and wealth for the benefit of society. In 1414 at the Council of Constance the principle was upheld that exchanging income for wealth involved no usury *per se*. Even earlier, St. Thomas of Aquinas (1225-1274) declared that a moderate discount on short-term commercial credit is not usurious and is therefore admissible. He justified the discount as a risk-premium and a compensation for lost income.

Structure of Capital Markets

From the point of view of mortal man income and wealth are distinct categories independent of one another. When he converts income into wealth, he merely obeys the law of the biosphere according to which all living things survive by saving their substance. There is no other way to go through the fat-year/lean-year cycle. In addition, the economizing individual must provide for his and his spouse's old age, as well as for the education of his offspring.

We have discarded the idea of exchanging present goods for future goods as the basic problem of interest, and replaced it with the irreducible form of credit: exchanging income and wealth. Unlike the former, the latter arises out of identifiable, immediate, and concrete human needs, having to do with mortality and the problem of growing old. By contrast, the concept of exchanging present goods for future goods is barren. It is not grounded in any immediately identifiable human need. Insofar as it arises at all it is always in the context of complementing exchanges of wealth and income. Our innovation of considering the exchange of wealth and income as basis for the theory of interest will pay rich dividends when we classify the various types of capital formation, and study the structure of capital markets.

The Square Model Featuring the Annuitand, Annuitant, Entrepreneur, and Inventor

The formation of the rate of interest is usually explained in terms of a diagonal model of the capital markets featuring two participants: the supplier and the user of 'loanable funds'. This model is woefully inadequate as it blots out the time element between the raising and repayment of the loan and, more fundamentally, the crucial process of capital formation. It ignores the Principle of Capitalizing Incomes. Our theory presented in this course will involve a step-by-step refinement of the diagonal model into a square, a pentagonal and finally a hexagonal model of the capital markets. The square model has four participants: the annuitand (the man who is accumulating capital to support his future annuity), the annuitant (the man who is already drawing an annuity), the entrepreneur and, finally, the inventor. They are distinguished by their respective needs that they bring to the capital market to satisfy as follows. The annuitand needs to convert income into future wealth; the annuitant needs to convert wealth into income; the entrepreneur needs wealth in order to convert it into future income; and the inventor needs income in order to convert it into future wealth. The square model has the merit of clearly identifying the ultimate sources of supply and demand for wealth and income.

The four corners of the square represent the annuitand and the inventor plus the annuitant and the entrepreneur. Two kinds of partnership arise: that of the first pair represents the formation of R&D (research and development), and that of the second the formation of entrepreneurial capital. Often these partnerships are concealed under family bonds. The father is the annuitand (later, annuitant) and the sons the entrepreneur (or inventor). The family is the primitive social unit furnishing a framework for capital accumulation (for exchanging income and wealth).

Notice that there is another way to form partnerships by pairing the annuitand with the annuitant, and the entrepreneur with the inventor. The former is a partnership to supply credit, and the latter is one to utilize it. It is highly important to note, however, that the bargaining position of the two partnerships fails to be symmetric. The providers of credit: the annuitand and annuitant do not depend on the exchange in order to reach their ultimate end, unlike the users of credit: the entrepreneur and the inventor, who do. Zero interest means the denial of incentives to proceed with the exchange of income and wealth. Given this denial, the providers of credit would abstain from the exchange and fall back on direct conversion. The annuitand would convert his income into wealth through hoarding; the annuitant would convert his wealth into income through dishoarding. It would be absurd for the annuitand to exchange his income for less future wealth than he could himself accumulate through hoarding; and for the annuitant to exchange his wealth for a smaller income than he could himself generate through dishoarding. The same is not true for the entrepreneur and the inventor. In the case of zero interest they are helpless. For them, zero interest is an un-surmountable obstacle to capital formation. The entrepreneur's potential income could not be generated in the absence of entrepreneurial capital. The inventor's potential wealth would not be realized in the absence of R&D capital. The square model of the capital market reveals that the exchange of income and wealth is inherently asymmetric. The annuitand and the annuitant could still satisfy their need to convert should the exchange fail; the

entrepreneur and the inventor could not. For them it is no exchange - no conversion. The impaired bargaining power of the latter pair could be assuaged somewhat by admitting the capitalist as the fifth participant of the pentagonal model of the capital markets.

The Pentagonal Model Featuring the Capitalist

The partnership of the entrepreneur and the inventor is net long of future wealth and net short of present wealth. In order to make the partnership viable we introduce a fifth participant who is net long of present wealth and net short of future wealth. He is none other than the capitalist specializing in the exchange of present wealth for future wealth. This brings out the importance of the trinity of the entrepreneur, the inventor, and the capitalist. In the words of Ludwig von Mises, they represent the three most progressive elements in capitalist society, who benefit the non-progressive majority in every possible way. The particular combination of talent, brain and will-power represented by the threesome heralds a new epoch of progress, far beyond the capabilities of individual talents if employed in isolation.

The Hexagonal Model Featuring the Investment Banker

A final refinement is the hexagonal model of the capital markets and the introduction of the sixth and last protagonist of the drama of capital accumulation: the investment banker. The refinement is made necessary by the fact that no two annuities are alike. Yet trading them will still be possible if the differences are bridged over by the gold bond. The investment banker's function is clearing and brokering. He matches the varied demands thrown upon the capital market from its other five corners. He must be prepared to enter into partnership with the annuitant, entrepreneur, inventor, or the capitalist, as the case may be, through his specialized instruments of annuity and mortgage contracts. At the same time he will balance his net liability or asset resulting from this activity through the purchase or sale of the standardized instrument, the gold bond.

The hexagonal model of the capital market brings about a great increase in scope for the most successful combination of capitalist production: the triangle of the entrepreneur, the inventor, and the capitalist mentioned earlier. From now on they can form their partnership even if unbeknownst to one another. The inventor need not waste time in seeking out a congenial entrepreneur, nor does the entrepreneur in finding a suitable inventor. Neither of them is at the mercy of the capitalist. If the invention is good and the enterprise is sound, then they could immediately start production on the most favorable

terms through the good offices of the match-maker, the investment banker. Nor does the capitalist have to remain wedded to the same inventor and entrepreneur for the entire duration of the project. Through buying and selling gold bonds he can always go after the project that appears most promising to him. The problem of forming optimal triangles can safely be left to the bond market.

The Concept of Interest

Interest is an income in perpetuity which exchanges for the unit of wealth. The rate of interest is measured as a percentage of the unit of wealth that accrues to the beneficiary of the income in each one-year period. Thus, if the unit of wealth is one gold dollar and it exchanges for an income in perpetuity amounting to one gold cent per quarter, then the rate of interest is four percent per annum. Of course, an income in perpetuity is an abstraction. The bond is a contract drawn up for a finite period. It involves two exchanges, with the second to reverse the first at the same rate of interest, so that the income flow becomes finite. In earlier times perpetual bonds (called consols by the British) were also offered to the saving public. Consols represented interest in its purest form. The British government defaulted on consols before defaulting on bonds, and withdrew the issue.

The Propensity to Save and the Rate of Interest

There is a mathematical relation between the market price of the bond and the rate of interest, called the Bond Equation, that I shall discuss in a future Lecture. The bond equation makes it possible to define the rate of interest in terms of the bond price. Thus we must regard the bond market as the place where the formation of the rate of interest takes place. The bond equation shows that the rate of interest varies inversely with the bond price. The reciprocal movement of the two we can compare to the seesaw: as the rate of interest goes up, the bond price comes down, and vice versa. This is a mathematical, not a statistical law, tolerating no exceptions. The seesaw can be paraphrased by saying that the rate of interest and the propensity to save are in an inverse relationship with one another: the higher the propensity to save the lower will be the rate of interest and vice versa. The seesaw plays a fundamental role in our analysis of the formation of the rate of interest.

It is important that only gold bonds may enter these considerations. A bond payable at maturity in irredeemable currency is a promise that is fulfilled by making another irredeemable promise. In effect, it is a promise to defraud in exactly the same way as the

promise of Charles Ponzi to pay interest at the rate of 100 percent per annum has been. No serious student of interest can take such bonds for anything but a cruel joke on the public. The Criminal Code calls for severe punishment for deliberately defrauding the public through confidence games and Ponzi-schemes. The issuance of irredeemable promises to pay, be it interest-bearing such as a bond or non-interest bearing such as a bank note, fully exhausts the concept of fraud. Governments have interfered with the justice system by blocking citizens and creditors who wanted to sue it in court. Not only are injured parties denied justice, they are also denied a public hearing of their case. Worse still, irredeemable currency violates the monetary provisions of the American Constitution. We are witnessing the shameful corruption of the justice system and trampling on the Constitution. For this not only the politicians but also jurors and legal scholars must share the responsibility. The day of reckoning will come when the economic system based on the house of cards of irredeemable currency will collapse causing the people to suffer excruciating economic pain.

The Gold Standard as the Stabilizer of the Economy

One of the cardinal points about the gold standard as it is remembered today is that it was an attempt to stabilize the price level -- an attempt that has failed. But it would be closer to the truth if the gold standard were remembered as an attempt to stabilize the interest rate structure -- an attempt that has succeeded. While interest rates had their ups and downs as part of the long-wave economic cycle under the 19th century gold standard, these undulations were minuscule in comparison to the wild gyrations displayed after the link between currencies and gold was severed in the fourth quarter of the 20th century.

Stabilization of prices is neither possible nor desirable. Price changes are part of the signaling mechanism of the economic system that regulates both production and consumption. By contrast, the stabilization of interest rates is both possible and desirable. Unstable interest rates lead to general economic instability, including that of prices, production, saving, and investment -- all to the detriment of economic welfare. At worst, they could trigger uncontrollable resonance between commodity prices and interest rates. That would create a runaway vibrator, bringing about economic collapse in the form of hyperinflation (with the economy succumbing to infinite interest) or deflation (with the economy succumbing to zero interest).

The stabilization of interest rates would benefit everybody. It was a tragic mistake to discard gold from the monetary system in complete disregard for the damage it would do to the stability of the interest rate structure. The extreme volatility of interest rates has been plaguing the world economy since 1971. In spite of appearances, current low rates don't spell stability. They are the quiet just before the approaching storm.

Disequilibrium Theory of Price Formation

I conclude this Lecture with a preview of the follow-up course Monetary Economics 202 on the formation of the rate of interest. Carl Menger revolutionized economics by throwing out the equilibrium theory of price formation to replace it with a disequilibrium theory. He observed that the market quotes not one but two prices, a higher asked price and a lower bid price. Transactions may take place anywhere within the range determined by these two. We have to study two independent market processes, one responsible for the formation of the asked price, and another for that of the bid price. It turns out the asked price is the outcome of the competition of the consumers, while the bid price has to do with that of the producers.

Competition takes the form of arbitrage. Being the combination of a sale and a purchase, arbitrage is the most comprehensive form of human action. The market price is not the result of supply/demand equilibrium, but the outcome of a convergence process whereby it is confined to an ever-narrowing range determined by the vanishing spread. Disequilibrium, or a lower state of coordination is being replaced by a higher one which, however, still reflects disequilibrium and calls for further adjustments. The disequilibrium theory of price formation is superior to the equilibrium theory as it does away with the spurious notions of supply and demand. It reflects reality more closely. It shows that the price is not a state but, rather, the outcome of a convergence process.

In more detail, the asked price is formed through the horizontal arbitrage of the marginal consumer, and the bid price is formed by the vertical arbitrage of the marginal producer. The marginal consumer is the first to refuse to buy the uptick in price, and horizontal arbitrage means that he is ready to buy a cheaper substitute. The marginal producer is the first to refuse to sell the downtick in price, and vertical arbitrage means that he is ready to buy cheaper substitutes for the producer goods at his input. We see that the asked price is determined by marginal utility. It can be characterized as the lowest price at which consumers can buy as much as they want without haggling -- explaining how the asked price earns its name. The bid price is determined by marginal profitability. It can be characterized as the highest price at which producers can sell all they have without haggling -- explaining how the bid price earns its name. The spread between the asked and bid prices is closed by the arbitrage of the market makers. To recapitulate:

The asked price of a consumer good marks the point where the opportunity cost of buying an additional unit becomes critical to the marginal consumer. He is the first to refuse to buy the uptick, in view of his opportunity to buy a substitute.

The bid price of a consumer good marks the point where the opportunity cost of selling an additional unit becomes critical to the marginal producer. He is the first to refuse to sell the downtick, in view of his opportunity to substitute a new producer good at his input.

Disequilibrium Theory of the Formation of the Interest Rate

The rate of interest, no less than prices, is a market phenomenon. Once again we find ourselves in disagreement with Ludwig von Mises. He postulated in *Human Action* that "the loan market does not determine the rate of interest, but adjusts it to the rate of ordinary interest as manifested in the discount of future goods" (op.cit., p 527). For us, the formation of the rate of interest is the result of a market process, analogous in every detail to that responsible for the formation of prices.

Our starting point is the observation that the bond market also quotes two prices, the higher asked and the lower bid price for bonds. In view of the seesaw, the asked price corresponds to the floor, and the bid price to the ceiling, of the range to which the rate of interest is confined. Bonds may change hands anywhere within the range determined by the asked and bid price. We have to study two independent market processes: one responsible for the formation of the asked price for bonds (or the floor for the rate of interest), and the other responsible for that of the bid price (or the ceiling for the rate of interest). It turns out that the former is the outcome of the competition of bondholders, while the latter is the outcome of the competition of entrepreneurs.

Competition takes the form of arbitrage. Bondholders engage in arbitrage between the bond market and the gold market; and entrepreneurs between the bond market and the stock market. In more details, the asked price for the bond is formed by the horizontal arbitrage of the bondholders, and the bid price by the vertical arbitrage of entrepreneurs. Bondholders won't let the bond price go sky high. They will take profit in selling the bond and stay invested in gold until bond prices come back to earth. Entrepreneurs won't let the bond price to keep falling forever. They will step in and buy the bond out of the proceeds of selling their stock. Thus the floor for the rate of interest is determined by marginal time preference. It can be characterized as the highest rate of interest which savers still refuse to accept. The ceiling for the rate of interest is determined by the marginal productivity of capital. It can be characterized as the lowest rate of return on capital that entrepreneurs will still accept before they go out of production and invest the proceeds from the sale of their capital goods in bonds. The spread between the floor and ceiling is closed by the arbitrage of the market makers in bonds. To recapitulate:

The floor for the rate of interest marks the point where the opportunity cost of holding the bond becomes critical to the marginal bondholder. He is the first to sell his bond upon the next downtick in the rate of interest, in view of his opportunity to carry his savings in the form of a present good, gold, instead of a future good, the bond.

The ceiling for the rate of interest marks the point where the opportunity cost of owning capital goods becomes critical to the marginal entrepreneur. He is the first to buy the

bond upon the next uptick in the rate of interest, in view of his opportunity to sell his stocks and carry earning assets in the form of bonds rather than capital goods.

I urge my audience not to get discouraged if this material appears to be too concentrated to digest at once. After all, this is a synopsis of a future course, *Monetary Economics 202: The Bond Market and the Formation of the Rate of Interest*. We shall treat this subject in much greater details in future Lectures.

A Tale of Two Schools

Our new theory of interest can be described as a synthesis between two well-established schools: the time preference and the productivity school of interest. They are competing, antithetical schools, and a fratricidal war between their adherents has long retarded theoretical progress.

According to the time preference theory of interest a time premium exists, and is incorporated in the price of present goods over that of future goods. This time premium is a category of human thought in much the same way as our concepts of space and time are, and it exists independently (and even in the absence) of production. By contrast, the productivity theory of interest insists that it is the marginal productivity of capital that determines the height of the rate of interest, regardless whether capital is provided by nature or by savings. On the face of it irreconcilable antagonism exists between the two positions. Yet a synthesis between the two opposing schools is possible, as our disequilibrium theory of the formation of the interest rate shows.

The Gold Coin and the Rate of Interest

To conclude, gold furnishes the mechanism whereby savers could have input in the formation of interest. If dissatisfied because rates were too low, they could force the banks to take their marginal time preference into consideration. The mechanism had teeth. Gold hoarding was effective. Not only was it a symbolic protest vote against credit policies suppressing the rate of interest to unreasonably low levels; it did bring about the desired changes. Since gold coins served as bank reserves under the gold standard, by withdrawing their deposits and converting their notes into gold coins savers could force the banks to contract outstanding credit. Moreover, a continuing squeeze on bank reserves could not help but alert legislators that people were unhappy with profligate government spending financed through the banking system. They could amend their ways by eliminating wasteful spending. The system of checks and balances worked well during

the first 150 years of the American Republic. Not government bureaucrats but the saving public regulated the rate of interest. Regulation was for the benefit of everybody, not just for the benefit of a small minority, however influential. The tool of this regulation was the gold coin.

It is not surprising that the gold standard was unpopular with governments, for it has been a fetter on buying votes through public spending. Governments couldn't perpetuate their power by promising pie in the sky. Frugality was a virtue and profligacy a vice, especially when it came to the public purse. The electorate could express its displeasure with government spending and throw profligate governments out of power. Not only did it have the ballot paper, the electorate also had the gold coin with which to vote. And vote it did, on every business day. If it did not like the credit policies of the banks and the government the whip, gold hoarding, was at hand. It was not only the politicians with whom the gold standard was unpopular. Economists did not like the gold standard either. They looked at it as you would at a naughty child who blurts out embarrassing truths.

The first attack on the gold standard came from the British economist David Ricardo (1772-1823). In 1819 he proposed his 'bullion plan' according to which gold coins should be withdrawn from circulation. Gold should be held by banks in bullion form for the purpose of redeeming notes and deposits, the required minimum being the standard gold bar of 400 oz, or approx. 12.5kg . Clearly, this plan was designed to short-circuit gold's role in the regulation of the rate of interest. The marginal bondholder would be frustrated whenever he wanted to protest the artificially low rate of interest. Of course, he could sell his bond, but in doing so he would be jumping from the frying pan into the fire. He would have to hold bank notes, so that he would get zero interest in place of the low rate of interest he wanted to protest. The marginal bondholder was denied the gold coin he would need in order to make his protest effective.

Interest under the Regime of Irredeemable Currency

The synthesis between the time preference and the productivity theory of interest assumes that there is no government interference in credit relations. Our theory of interest is only a first approximation to the problem, as it is valid only under the regime of the gold standard. However, it can be extended to the regime of irredeemable currency which is characterized by massive intervention of the government and its central bank in the credit markets.

Since time immemorial governments have been predisposed to intervene on behalf of the debtors and to the prejudice of the creditors. There may have been ideological motivation for this, but it is more likely that governments were pursuing self-serving policies. They were debtors themselves. They wanted easy money in order to aggrandize and perpetuate their own power. They have done all they could to compromise the sovereignty of the

saver. Through various measures such as fomenting credit expansion or inflation, and through obstructing the free flow of gold, they have tried to undercut the importance of saving and to promote the cause of spending. The regime of irredeemable currency must be seen as the fulfillment of those early aspirations.

The Ratchet and the Linkage

Recall that when access to gold is inhibited or denied, as it has been with increasing frequency and intensity throughout the entire history of the gold standard, gold hoarding is superseded with similarly increasing frequency and intensity by the hoarding of marketable commodities. People would increase their marginal savings. This hoarding can also be characterized as 'inventory inflation' financed through the liquidation of bond holdings in response to artificially low interest rates. As I have pointed out, hoarding bank notes would be counter-productive. It would be practiced by simpletons only.

My notion of inflationary and deflationary spirals is very different from that of mainstream economics. It goes back to the Swedish economist Knut Wicksell (1851-1926). The initial impetus of credit expansion pushes the market rate of interest below that of marginal time preference, making the propensity to hoard increase. It triggers a first round of purchases of marketable goods for hoarding purposes with the proceeds from the sale of bonds. Marginal savings grow. While selling pressure on bonds increases interest rates, buying pressure on goods increases the price level. The higher price level will increase marginal time preference. When prices are expected to rise, the marginal saver will demand compensation in the form of higher interest rates. The net result is that, once again, the market rate of interest is below the rate of marginal time preference, and the propensity to hoard increases.

This will trigger a second round of purchases of marketable goods for hoarding purposes financed through further liquidation of bond holdings. The inflationary spiral repeats itself at a higher level of prices and interest rates. Thus a ratchet is engaged whereby subsequent rounds of increases in marginal savings pushes commodity prices as well as the rate of interest to ever higher levels. It may take decades for the inflationary spiral run its course. It is not possible to predict when the spiral will turn around. At any rate, high and increasing prices coupled with high and increasing interest rates will eventually lead to panic. People realize that further increases in the rate of interest would threaten the value of their marginal savings. Liquidation of marginal hoards of marketable goods begins. This spells a deflationary spiral, to which the inflationary spiral gives way, featuring ever lower propensity to hoard, or inventory deflation. There is a drawn-out process of dissipating excessive stockpiles.. The collapse in demand for newly produced goods causes business lethargy, as reflected by falling interest rates along with falling prices. It may take decades before business confidence can be rebuilt and economic expansion resumed, signaling the end of the deflationary spiral. It goes without saying

that credit expansion will spark a new round of the cycle before long, and the process will go on and on. This, then, is the long-wave inflation/deflation cycle, also known as the Kondratyeff cycle.

Note that the ratchet-effect is also responsible for the linkage between the movement of the rate of interest and that of the price level. With due allowance for leads and lags, the price level and the interest-rate structure are linked, and must move in the same direction. Linkage has been noted by several economists, but reasoning in terms of linear models (such as that of the quantity theory of money) has failed to provide an explanation of the phenomenon. Only partial explanations have been given, so that linkage is still something of a mystery. My explanation is in terms of a non-linear model. An increase in the propensity to hoard induces a long-term money-flow from the bond market to the commodity market, ultimately leading to panic, turning the money-flow back. Thus we have an oscillating money-flow between the bond market and the commodity market which was caused in the first place by the government in sabotaging and finally destroying the gold standard.

The linkage represents economic resonance between the price level and the rate of interest. The danger is that this resonance may cause amplitudes to increase without limit. Just as in physics, resonance could cause runaway vibration culminating in the self-destruction of the system. In economics, self-destruction is realized by hyperinflation (that may be described as the blackhole of infinite interest), or deflation (the blackhole of zero interest).

Note how the natural stability of the economic edifice has been perverted by the removal of gold. Hoarding makes for stability under the gold standard, as it is self-limiting through the interest-rate mechanism. But when gold is removed from the system, or when its free flow is inhibited by the governments, hoarding becomes cumulative, as a ratchet sends both the price level and the rate of interest ever higher which continues until panic puts an end to it. At that time a slow and painful process of dishoarding starts that will send the price level as well as the interest rate structure spiraling downwards. Each repetition of the cycle brings higher amplitudes in its wake for both the price level and the rate of interest, higher than those of the previous one. As the interest-rate cycle resonates with the price-level cycle, a runaway vibrator is activated.

Between Scylla and Charybdis

The long-wave inflation/deflation cycle is aggravated rather than alleviated by central bank intervention. Directly or indirectly, contra-cyclical monetary policy amplifies the oscillating money-flow back-and-forth between the bond market and the commodity market. An accurate reading of the present situation is that after the inflationary spiral lasting for forty years, culminating in the 1980 price explosion, the world economy saw a

panic ushering in the deflationary spiral that still continues. Prices and interest rates peaked in 1980 when dishoarding started. It is true that the downward ratchet of the interest-rate structure is more obvious than that of the price level, but you would be well-advised to watch for a very painful erosion of prices and profits as firms keep losing their pricing-power. Central bank intervention is counter-productive. As it tries to 'reflate' by injecting new cash into the economy, the central bank will only pour oil on the fire. Whenever it wants to inject new cash, the central bank goes to the bond market to buy bonds. But in doing so it will only join the crowd of frenzied bond speculators already busy in bidding up bond prices and pushing down interest rates as part of the deflationary process. As a matter of fact, speculators have taken it for granted that the central bank will act that way thereby taking the risk out of bond speculation. The new money injected in the economy, which the government has hoped that it would flow to the commodity market and bid up prices there, does instead flow to the bond market where the fun is. It stokes the fires of the boom there pushing interest rates further down and, due to the linkage, it makes prices fall as well. Far from putting an end to the deflationary spiral, central bank action depresses the economy even more. Unless, of course, the deluge of new money injected in the economy scared bond speculators in causing them to cut and run. As they dumped their bonds, they would make bond prices, and the value of irredeemable currency, collapse.

There is not enough room between the Scylla of inflation and the Charybdis of deflation to squeeze through. Before the central bank can navigate the economy to safety, further slimming appears necessary.

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Antal E. Fekete

Professor

Memorial University of Newfoundland

GOLD STANDARD UNIVERSITY
SUMMER SEMESTER, 2002

Monetary Economics 101: The Real Bills Doctrine of Adam Smith

- Lecture 1: Ayn Rand's Hymn to Money
- Lecture 2: Don't Fix the Price of Gold!
- Lecture 3: Credit Unions
- Lecture 4: The Two Sources of Credit
- Lecture 5: The Second Greatest Story Ever Told; (Chapters 1 - 3)
- Lecture 6: The Invention of Discounting; (Chapters 4 - 6)
- Lecture 7: The Mystery of the Discount Rate; (Chapters 7 - 8)
- Lecture 8: Bills of the Goldsmith; (Chapter 9)
- Lecture 9: Legal Tender. Small Bank Notes.
- Lecture 10: The Revolt of Quality
- Lecture 11: The Acceptance House; (Chapter 10-11)
- Lecture 12: Borrowing Short to Lend Long; (Chapter 12)
- Lecture 13: The Unadulterated Gold Standard

WINTER SEMESTER, 2003

Monetary Economics 102: Gold and Interest

- Lecture 1: The Nature and Sources of Interest
- Lecture 2: The Dichotomy of Income *versus* Wealth
- Lecture 3: The Janus-Face of Marketability
- Lecture 4: The Principle of Capitalizing Incomes
- Lecture 5: The Structure of Capital Markets
- Lecture 6: The Rate of Interest

Lecture 7: The Gold Bond
Lecture 8: The Bond Equation
Lecture 9: The Investment Banker
Lecture 10: Lessons of Bimetallism
Lecture 11: Aristotle on Check-Kiting
Lecture 12: Bond Speculation
Lecture 13: The Blackhole of Zero Interest

IN PREPARATION:

Monetary Economics 201: The Bill Market and the Formation of the Discount Rate

Monetary Economics 202: The Bond Market and the Formation of the Rate of Interest