

Nominal Anchors for Monetary Policy: A Doctrinal Analysis *

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I. Introduction

Volatility of the general price level has been an object of concern and controversy at least since the early eighteenth century. Ever since, periods of price-level instability have provoked proposals for monetary reform aimed either at price-level stabilization or at mitigation of the undesirable consequences associated with changes in the price level. Specifically, monetary-reform movements have sought to avoid the cyclical periods of expansion and contraction of economic activity that derive from price-level instability, and to offset the distributional effects on various economic groups – including debtors and creditors, and savers and investors – of rising and falling prices.

The orientation of monetary policy toward the goal of providing a stable price level is typically referred to as the nominal anchor issue (e.g. Bruno 1986; Flood and Mussa 1994). In this connection, Patinkin (1993a) has called attention to the following simple truth of general-equilibrium monetary theory – namely, “that a necessary condition for determining equilibrium values of the nominal values of a system is that the values of one of these variables be exogenously fixed” (Patinkin 1993a, p. 112). Two main types of nominal-anchor proposals have endured over the last two centuries (Flood and Mussa

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* This paper was written while George S. Tavlas was Guest Scholar at the Brookings Institution. We have benefitted from helpful comments by James Dorn, Milton Friedman, and two anonymous referees. The views expressed are the authors' own and are not to be interpreted as those of the International Monetary Fund.

1994, p. 1). One type of anchor aims to fix the price of one or more commodities. This kind of anchor is typically referred to as a commodity standard. A second type of anchor targets the growth of a nominal magnitude. Because it is the growth rate of a variable that is targeted, this type of anchor has been called a "moving nominal anchor" (Flood and Mussa 1994). Although the inflation rate and the growth of nominal income have served as such anchors, the most common type of moving nominal anchor has been a monetary aggregate, and the growth of such an aggregate is monitored and/or targeted.¹

This paper provides a doctrinal analysis of the issue regarding the relative merits of commodity standards versus monetary targeting. As pointed out by Aschheim and Tavlas (1991) and by Sinclair (1992, p. 64), the doctrinal element has been neglected in recent work in monetary economics. The paper is divided into seven sections, including this introduction. Section II discusses the issue of the emergence of a money economy and the importance of providing stability in the value of money. As foreshadowed in the work of Léon Walras during the late nineteenth century, a sufficient condition for the regime switch from a barter system to a monetary economy is the provision of the unit of account; the section argues that the numeraire quality of money constitutes what Aschheim and Tavlas (1995a) have called "embryonic money" and provides the basis for various proposals that have sought to stabilize the general price level. Sections III and IV deal with the origins of the commodity standard and monetary targeting, respectively, as the linchpins of monetary policy. Each of these proposals has aimed to provide stability in the value of money, and in Section V we suggest reasons for the wider practical acceptance of monetary targeting. Recent academic work has attempted to revive and extend the commodity standard; this work is assessed in Section VI. Concluding comments are provided in Section VII.

¹ Flood and Mussa identify a third kind of nominal anchor that aims at fixing or managing the price of a country's currency in terms of another country's currency. They note, however, that this type of arrangement "is not really completely distinct from the previous two" (1994, p. 2). The nominal anchor issue in an international context is discussed in Tavlas (1993, pp. 670-73).

II. The emergence of a monetary economy: embryonic money

At least since Walras, a major strand of monetary economics imparts primacy to the capacity of money to serve as a numeraire. Specifically, in his classic work, *The Elements of Pure Political Economy* (1889), Walras's formulation of a general equilibrium model demonstrated the primacy of money's role as a unit of account. It is Walras's inclusion of the numeraire quality of money that imparts to his model the clear-cut character of a money-exchange as contrasted to a barter-exchange framework.

In particular, in his general equilibrium model, Walras incorporates the numeraire as an integral part of his system of equations. Each of his market clearing equations is denominated in the numeraire. The existence of a numeraire allows market clearing to occur, through a continuous groping for prices. Prices emerge at the point of equation of the quantity supplied with the quantity demanded in individual markets. Yet this process of tâtonnement takes place without money having changed hands (means of payment) and without money having been saved (store of value). Consequently, it is the existence of money solely as a numeraire that allows the distinction to be made between a money-exchange system and a barter-exchange system. The introduction of a numeraire involves a switch of regimes from a barter- to a money-exchange economy. The contraction in transaction costs (*e.g.*, calculation, information, search) imparts a non-neutrality character to money. It is Walras's grasp of the numeraire role of money as essential for the economic calculus at the core of a money-exchange economy that has permeated the subsequent development of general equilibrium and capital theory. It is for this reason that Aschheim and Tavlas (1995a) have advanced the primacy of the unit of account as the theory of the core of the nature of money – what we have named "embryonic money".²

To further clarify this line of argument, and to cast it in practical perspective, consider that there have been a number of historical episodes during which the unit-of-account function of money existed without money also serving as a medium of exchange. For example, in ancient Sparta, the government outlawed the use of money as a

² The importance of the numeraire function of money was articulated by Aschheim and Park (1976).

medium of exchange; trade was conducted by the direct exchange of goods. Yet to facilitate such transactions, the government created (and held) huge coins – too heavy to be carried about, and which served only as units of account. (Indeed, as Del Mar 1895, p. 39, pointed out, the ancient Greek words, *measure* and *money*, both derive from the same root, “*nomos*.”) In turn, during the thousand-year span from the reign of Charlemagne to the French Revolution, the unit of account and the medium of exchange were separate phenomena (see Guggenheim 1989, pp. 9-18, and Aschheim and Park 1976).

Consider, also, work on the determinants of international currency use. As Krugman (1984, p. 261) has stated, the choice of currencies to be used for international transactions is predominantly “the result of ‘invisible hand’ processes”. In this connection, empirical and theoretical work on the uses of international currencies has shown that the numeraire function determines to a significant extent the currency used as a means of payment. Once a contract is denominated in, say, the exporter’s currency, the medium-of-exchange function emerges as a by-product. Measures can be taken to hedge foreign exchange risk, but, at the time of settlement, payment is typically made and accepted in the same currency (Tavlas 1991).

Accordingly, the primacy of the numeraire function of money necessitates that the crucial factor underlying international currency use is confidence in the value of a currency. High and variable inflation rates in the country issuing an international currency increase the costs of ascertaining information and performing efficient calculations of the prices bid and asked for traded goods and capital assets. In other words, since the general price level by definition expresses the purchasing power of money, a change in the price level involves a change in the common denominator in which all prices are expressed. Such a change in the price level of a country issuing international currency results in a signal extraction problem. Traders have diminished capacity to decompose price variations into changes in demand and supply in world markets and changes owing to price level variations in the country issuing the international currency.

The importance of providing a stable numeraire has several crucial implications. On the international level, it has led to a movement away from single and dual commodity standards and toward the adoption of the currency of a low inflation country as the common denominator in which prices are expressed worldwide (*e.g.*, the pound sterling in the first part of the twentieth century and the

US dollar subsequently, with increasing roles being played by the Deutsche Mark and the Japanese yen). The reason for this outcome is that the prices of commodities such as gold and silver, which in the past served as common denominators for prices worldwide, are subject to the vagaries of world supply and demand conditions; thus, such prices are exposed to factors beyond the control of the monetary authorities. On the domestic side, the need to provide a constant yardstick of value has led to proposals for commodity, or tabular, standards and for targeting the rate of growth of money, as discussed below.

III. The origins of the tabular standard

The basic idea underlying a commodity, or tabular, standard for money involves the stabilization of money’s function as a unit of account by tying the value of money to a basket of goods and/or commodities. As Irving Fisher (1934, p. 11) observed, “a tabular standard of value consists of a chosen assortment of goods, in specified quantities, to be used as a test of the value of money, with a requirement that all money payments must be made according to the changes in the value of money in terms of this assortment of goods”. To show how the concept evolved, we turn to discussions of the tabular standard in the classical literature.

Classical monetary theory has often been interpreted in the long-term context of the quantity theory of money; changes in the money supply lead to proportionate changes in prices. Some classical economists also recognized, however, that in the short term changes in the money supply (*i.e.*, the precious metals) could affect the level of economic activity. In 1752, for example, David Hume argued that money is not neutral in the short run and that following a change in the money supply, there is a lag in the adjustment of prices and wages:

“[...] though the high price of commodities be a necessary consequence of the increase of gold and silver, yet it follows not immediately upon that increase; but some time is required before the money circulates through the whole state and makes its effects felt on all ranks of people [...] alterations in the quantity of money, either on the one side or the other, are not immediately attended with proportionable alterations in the prices of commodities. There is always an interval before matters be adjusted to their new situations; and this interval is as pernicious to industry, when gold and silver are diminishing, as it is advantageous, when these metals are increasing” (Hume 1752, pp. 30-40).

Yet Hume, in common with most classical quantity theorists, did not formulate a well-delineated theory of the reasons why changes in the money supply would produce short-term effects on industry.³ This factor would become an important consideration in the choice between a monetary standard and a monetary growth-rate rule.

Hume, writing in a period of falling prices, suggested that the metallic content of money should be slowly and steadily reduced. In contrast, Sir James Steuart, writing in 1767, called attention to the inadequacy of the precious metals to serve as a standard of value and proposed that gold should be replaced by a price index as a standard:

“[...] no material money, let it be contrived as it will, is exempted from vicissitudes in its value as a metal. This is proved by the universal risings and sinkings in the price of commodities, in consequence of circumstances peculiar to the coin. These risings and sinkings of the value of the coin, and this fluctuation again in the value of the coin, is a lengthening and contracting of the equal parts of the scale of value which is attached to it. Now there is no such thing as any vicissitudes in the prices of all commodities with respect to bank money, although nothing is more common than fluctuations in agio, with respect to current money; consequently, bank money has a property and a stability in it, which no material money is capable of acquiring, and for this reason it is preferable to it, and is properly considered the thing fixed” (reprinted in Steuart 1805, p. 74).

Steuart sought to improve understanding of the consequences of monetary instability by suggesting a system based on an abstract unit of account separated from the medium of exchange; the value of the unit of account would be tied to a bundle of commodities (Cowen and Kroszner 1987, p. 575).

David Ricardo (1923, p. 161) was skeptical as to whether such a commodity standard was practical: “This idea of a currency without a specific standard was, I believe, first advanced by Sir James Steuart, but no one has yet been able to offer any test by which we could ascertain the uniformity in the value of money so constituted”. Ricardo considered the notion that a commodity standard might be constructed whereby the value of money would be determined by its relation not merely to one commodity but to the mass of commodities. How-

³ Henry Thornton was an exception. Thornton argued that changes in the supply of money affect prices first, with wages lagging. Profit is, therefore, stimulated and production rises. On Thornton's analysis, see Humphrey (1985).

ever, he dismissed the idea: “[...] when we consider that commodities are continually varying in value, as compared with each other, and that when such variation takes place, it is impossible to ascertain which commodity has increased, which diminished in value, it must be allowed that such a test would be of no use whatever” (*ibidem*, p. 161).

In particular, Ricardo did not think that it was possible to determine whether, say, a general fall in prices was due to a fall in the supply of money or to changes in conditions of production. Assuming a given initial stock of money, he argued that harvest failures would, by reducing real output, act to raise the general price level. To keep prices constant, the money supply would have to be reduced. In the Appendix to the fourth edition of his *The High Price of Bullion: A Proof of the Depreciation of Bank Notes*, he wrote: “England, in consequence of a bad harvest, would come under the case [...] of a country having been deprived of a part of its commodities, and requiring a diminished amount of circulating medium” (1811, reprinted in 1953, p. 106). He also thought that, because of political considerations, periods of declining prices would typically be countered by an expansion of the money supply while no corresponding check to the money supply would exist in periods of inflation. Thus, for Ricardo, the notion of a commodity standard for money contained an inflationary bias, the basis of his skepticism being the difficulty of telling which commodities were rising in value and which were falling. A practical objection facing commodity money emerged from his analysis; *i.e.*, the requirement of quantifying a basket of commodities as a representative measure of value. The solution to this difficulty would have to await the development of index numbers for commodities in the second half of the nineteenth century.

Ricardo's criticism of the tabular standard reflected the proposal of the idea by his contemporary, John Wheatley. Writing in 1807 (pp. 328-29), Wheatley stated:

“[...] in compositions of a permanent nature, some criterion should be assumed for the purpose of providing a graduated scale of the value of money, and [...] an increase or diminution of income should be allowed in conformity to the result. The present impoverishment of the crown is a sufficient warning against permanent contracts for a definite sum; and no public composition will, I trust, be hereafter concluded, that does not contain within itself the power of revision as to the pecuniary compensation. In a late projected composition government very properly departed from the principle of a fixed income, and as a commutation for tithes, it was

proposed to grant a stipendiary salary, according to the price of corn. The basis upon which the compensation was to be negotiated was perfectly just; but I have already shown the inefficiency of corn as an exclusive standard; and whenever it may be necessary for any object of extended policy to ascertain the relative value of money for a period of long duration, the principles, upon which Sir George Shuckburgh constructed his table of proportions, will be found the least objectionable".

Several years after Ricardo had expressed his doubts about the commodity standard, the idea was refined in terms of the tabular standard of money by Joseph Lowe, a Scottish merchant. Writing in 1823 (p. 333), Lowe described the "injurious effect of fluctuation in the value of money" and proposed an index number of consumption to serve as a measure of value. The index of consumption would be a "table comprising articles of general consumption to each of which is affixed the probable amount of money expended on it by the public. [...] The object is to show that contracts for a series of years ought to be made with reference to the power of money in purchasing the necessaries and comforts of life" (*ibidem*, pp. 94-96). According to Lowe, the standard would thus be "in itself merely a table of reference, and all contracts, whether relative to loans, leases, or bequests, might, at the will of the parties, be made payable, either according to the proposed standard, or in money of undefined value" (*ibidem*, p. 345). Among the benefits of this proposal would be: "In ascertaining, on grounds that would admit of no doubt or dispute, the power in purchase of any given sum in one year, compared to its power of purchase in another" (*ibidem*, p. 335).

Some ten years later, G.P. Scrope, an English geologist who between 1833 and 1868 served as a Member of Parliament, where he actively participated in monetary reform, also recommended the tabular standard. Scrope also dealt with a number of difficulties that arose from variations in the purchasing power of money, including their effect upon labour. He held that the relative share of labour in 'gross produce' must be reduced as the share of creditors increases (at fixed interest). On the tabular standard Scrope (1833, p. 25) asked:

"But must a standard necessarily consist of a single commodity? [...] Why then cannot a standard be formed by taking an average of the mass of commodities, or, at least, of so considerable and varied a list of them as may with sufficient correctness represent that mass? Even though not employed as the legal standard, it may serve to determine and correct the variations of the legal standard [...]. The table need only be sufficiently extended to

afford, in the mean price of the whole number of articles contained in it [...], a standard of value (in its true sense of general purchasing power) as near to complete invariability as can be desirable for any practical purposes".

A major practical problem confronting the adoption of a standard in the early nineteenth century was the difficulty of measuring movements in commodity prices against one another, a problem pointed out by Ricardo. That difficulty would be surmounted in the second half of the nineteenth and early part of the twentieth centuries, as such scholars as William Stanley Jevons and Francis Edgeworth, in the United Kingdom, and Irving Fisher, in the United States, developed and refined the concept of index numbers.

Jevons helped pioneer the development of index numbers and applied the concept to economic investigation. In the early 1860s he investigated the effect of the Australian and Californian gold discoveries of 1849 upon the value of gold. In evaluating the impact of the gold discoveries on some 118 commodity prices, Jevons used the geometric mean as a numerical estimate of the overall rise in commodity prices. Equipped with his contribution to the construction of index numbers, Jevons moved the notion of a practicable tabular standard a major step forward. He joined Lowe, and Scrope before him, in proposing such a standard. Unlike Lowe and Scrope, however, both of whom had recommended the standard on a voluntary basis, Jevons, writing in 1875 (p. 330), thought that it could become compulsory:

"Such schemes for a tabular or average standard of value appear to be perfectly sound and highly valuable in a theoretical point of view, and the practical difficulties are not of a serious character. To put Lowe's and Scrope's plan into effect a permanent government commission would have to be created and endowed with a kind of judicial power. The officers of the department would collect the current prices of commodities in all the principal markets of the kingdom, and, by a well-defined system of calculations, would compute from these data the average variations in the purchasing power of gold. The decisions of this commission would be published monthly, and payments would be adjusted in accordance with them".

Jevons (*ibidem*, pp. 331-32) also stated: "At first, the use of this national tabular standard might be permissive, so that it could be enforced only where the parties to the contract had inserted a clause to that effect in their contract. After the practicability and utility of the

plan had become sufficiently demonstrated, it might be made compulsory, in the sense that every money debt of say more than three months' standing, would be varied according to the tabular standard, in the absence of an express provision to the contrary".

A little more than a decade later, Francis Edgeworth, editor of *The Economic Journal* from 1891 to 1926, and from 1887 to 1889 Secretary to the Committee of the British Association for the Advancement of Science on the Monetary Standard, contributed to the construction of index numbers for prices, and also advocated the tabular standard. In a memorandum prepared for the Committee he discussed several ways for calculating index numbers; and he also set forth the "consumption standard" which is a price index "of all the commodities consumed yearly in the community" (1925, p. 199). Edgeworth noted that Alfred Marshall was also a proponent of the "consumption standard"; in the case of Marshall, however, the tabular standard was viewed as a tool for policy intervention directed to smoothing the cycle, and not as a link between money and prices.⁴

Despite the backing of such leading economists as Jevons, Edgeworth and Marshall and with the problem of index numbers largely solved, the tabular standard was not implemented as a policy tool. Two main factors inhibited its adoption. First, the fact that the price index in the United Kingdom remained approximately unchanged from 1850 until the First World War (Flood and Mussa 1994) meant that the appeal of the standard remained low. Second, as a solution to the problem of economic 'injustice' caused by fluctuations in average prices, through the erosion of savings, confounding of expectations, and so on, the tabular standard was incomplete. As proposed, the commodity standard did not address the problem of fluctuations in the value of labour. This deficiency was pointed out clearly by the English economist J.C. Leaver in 1893 (pp. 17-18): "Appreciation and depreciation do not mean a comparison of the value of gold with other commodities; and to demonstrate that gold has or has not appreciated or depreciated we must not merely judge by the prices of articles produced, but by the cost of obtaining labour, hour by hour, which has produced them, and as wages have risen considerably during the last fifty years, gold has heavily depreciated". Similarly in the United States, J.T. McCleary, in a speech before the US House of Representatives in 1896 (p. 11), said: "There is one commodity which

stands out by itself preeminent [...], a commodity which is the truest and best measure of value ever discovered [...] and that is a given unit of human labor. [...] The wages of labor have been on the average largely increased".

Moreover, even if the price of labour were included in the standard, the problem of economic justice would still be unresolved. This defect endures because the tabular standard deals with the maladjustments caused by changes in average prices by varying the number of monetary units disbursed as remuneration. The significance of this insight is revealed in American developments in the quantity theory of money, where emphasis was on regulation of the money stock. The implications of this distinction for the purposes of economic justice are quite substantial.

IV. The origins of monetary targeting

1. *The London-Chicago connection*

The notion that the growth rate of the money supply should be regulated so as to grow in accordance with the rate of increase of economic activity was first advanced by the Italian economist Ferdinando Galiani in 1750. Galiani (1750, Book II, Chapter 4, pp. 165-66) argued that money "should be maintained within certain limits in proportion to the veins through which it circulates; exceeding or falling short of those limits is fatal to the body". Galiani explicitly noted that by veins he meant the "veins of commerce" (*ibidem*, pp. 165-68). Subsequently, several British writers – including Jeremy Bentham and Henry Thornton – developed monetary schemes based on proportionate increases in the money supply (see Tavlas 1977). It is the work, however, of the British economist John Gray that links up directly to contemporary versions of monetary targeting.

In his 1848 book, *Lectures on the Nature and Use of Money*, Gray argued that aggregate production tended to increase steadily over time. He (*ibidem*, p. 108) referred to this tendency as "proportional production" and considered that it was a "natural consequence of free and unrestrained competition". Gray, however, perceived no such tendency for the money supply to increase over time. According to the

⁴ We are grateful to an anonymous referee for bringing this point to our attention.

quantity theory of money, prices would therefore have to decline. The reduction in prices involves a decline in profits, for "as commodities must always be produced [...] before any fall can take place in their money price", they have embodied in them relatively higher costs which have already been paid out (*ibidem*, p. 272).

The problem of declining profits, according to Gray, is not one of an overproduction of goods, for if the money supply were sufficiently expanded, the necessity of reducing prices would not arise and the economic cycle could be avoided. Thus, Gray proposed one of the clearest and earliest statements of the money supply growth-rate rule: "There will be no such thing; there can be no such thing [as overproduction]. [It is only necessary to] regulate the increase of money by the increase of goods [...] *proportionate* increase being the *one and only* qualification required to the assertion" (*ibidem*, p. 77, original italics). Cowen and Kroszner (1987, p. 575) argue that Gray also proposed a monetary reform based on separation of the means of payment from the unit of account, whereby such separation would impart economic stability because it would enforce Say's law as in a barter economy.

Gray's analysis of money growth was extended by University of Chicago economist, Paul Douglas, during the 1920s and 1930s. Douglas who credited Gray as an important predecessor of his (*i.e.* Douglas's) monetary theory (see Douglas 1927, p. 37), argued that business cycles were caused by the failure of the supply of money and credit to keep pace with the long-term gain in production. Douglas's empirical work on production functions showed that over the long-term, the annual increase in the level of production was 3 to 4 percent. Accordingly, the price level could be kept stable, and the cycle eliminated, "if the quantity of purchasing power were to be increased at the rate of 3 to 4 percent a year, or the long-time rate of production" (1935, p. 185).

2. The Del Mar-Fisher-Friedman connection

Douglas was not the first economist to advocate a precise, numerical version of the monetary growth rate rule. He was preceded in this respect by the American economist Alexander Del Mar,⁵ whose views on monetary economics were formulated on the basis of numer-

⁵ For a discussion of Del Mar's contributions to monetary economics, see Aschheim and Tavlas (1985).

ous empirical studies, beginning with the American Civil War. "Knowledge", Del Mar wrote in 1864 (p. 3), "is the product of a long series of brilliant investigations into the laws of nature, and its groundwork is experiment and deduction". In Del Mar's day, the sovereignty of the gold standard was challenged only by another metal – silver. As John Stuart Mill put it (1897, p. 293): "Money is a commodity, and its value is determined like that of other commodities, temporarily by demand and supply, permanently and on the average by cost of production. There can not, in short, be intrinsically a more insignificant thing in the economy of society, than money". Del Mar (1903, p. 339), however, denied that money is, or should be, a commodity. "Money is not pieces of merchandise any more than acres are pieces of land, or minutes are pieces of clocks. Money is a measure or an institution of law".

Given that money is a measure, it must be a creature of law, and the object of management, for "all measures of precision are of artificial limits. Nature affords none" (Del Mar 1885a, p. 76). Furthermore, "the efficiency of a measure does not depend so much on the substance of which it is made as upon the exactness of its limits" (*ibidem*, p. 78). Hence, Del Mar thought that the important attribute of coins is not the number of grains they contain, nor their fineness, but the total number of coins in circulation.

Del Mar (1864, p. 3) maintained that monetary forces are "amendable to the dynamical laws which govern physics; and, as such, are to be studied not in their normal, but in their abnormal condition". Once money was studied in its abnormal condition, there could not be an intrinsically more *significant* thing in the economy of society than money: "When the principles which underlie it are thoroughly understood, money is perhaps the mightiest engine to which man can lend his guidance" (Del Mar 1886, p. 345). Del Mar thought that the classical quantity theory was valid as a long-term proposition: over time a doubling in the quantity of money would produce a doubling of prices. He also thought, however, that the quantity theory is not valid during shorter periods of time. In the short run, a doubling in the quantity of money would affect prices of goods and services, but not according to the same sequence. Some prices, he argued, react to changes in the supply of money faster than others, depending upon how marketable a good or service happens to be. In his empirical

studies during the American Civil War, Del Mar (1885a, p. 82) observed the following sequence of changes in prices, which he termed the "Precession of Prices":

"The order [is] somewhat as follows: 1. Bullion. 2. Stocks and bonds. 3. Shares of incorporated companies. 4. "Staples", or crude and imperishable commodities. 5. Merchandise, including perishable commodities, crude articles or subsistence, etc. 6. Fabrics, such as machinery, manufactured food, articles for wear, etc. 7. Landed property, or real estate. 8. Skilled labour, or artisan's wages. 9. Unskilled labour, or the wages of labourers, soldiers, seamen, etc. 10. Professional services, or the emolument of authors, inventors, lawyers, engineers, clergymen, accountants, and other professional and clerical classes".

Del Mar's 'Precession of Prices' is remarkably similar to the transmission process of monetary policy articulated by monetarists such as Milton Friedman, whereby changes in the supply of money sequentially affect the prices of a wide spectrum of assets, with their position in the spectrum dependent upon their marketability. Because the prices of labor lagged behind product prices in the sequence, changes in the money supply would affect profits leading to changes in production. Del Mar (1896, p. 187) estimated that the full effect on prices of, say, a doubling of the quantity of money (the classical version of the quantity theory) would take ten years to complete; if after "say the fifth year the money of the country had been suddenly diminished to its original sum [the result would be that] at the sixtieth month the prices of some commodities are falling and others are still rising, and that both movements arise from a single original impulse and its reversion". Once set in motion, an economic cycle would result in a dynamic process because of the impacts of price expectations and nominal interest rates on the velocity of money. Therefore, to avoid economic cycles, Del Mar advocated the stabilization of prices. His empirical investigations had shown that there are long-term trends in the growth of output in the economy. In particular, he estimated that the rate of increase in production was about 3 1/3 percent a year. Accordingly, in order to attain the desired goal of price stabilization, in 1885 Del Mar proposed that the rate of monetary growth should also expand at about 3 1/3 percent a year (1885a, pp. 115-16).

The next important monetary economist in the United States was Irving Fisher, whose approach to the study of monetary forces was also empirically based. Although Fisher's monetary analysis was in some

respects similar to Del Mar's analysis (Aschheim and Tavlas 1985), Fisher did not adopt the "Precession of Prices" and the view that price changes precede variations in wages. His view was that, during what he termed "transition periods", changes in the money supply lead to increases in prices with nominal interest rates lagging behind. As a result profits increase, setting off expectations of still further increases in profits, causing velocity to vary in a pro-cyclical direction. Fisher did not, however, incorporate the effect of lagging wages on profits into his business-cycle analysis. He argued that the important component of business costs in the analysis of the cycle is the effect of interest payments on debt; as noted, Del Mar considered both interest payments and wages in his business cycle mechanism.⁶

With regard to the essential criterion for stabilization, Fisher laid considerable emphasis upon justice. In line with his business-cycle theory, justice was viewed as offsetting the effects of lagging nominal interest rates on debtors and creditors: "The most ideal standard would seem to be one which should satisfy the reasonable anticipations of the contracting parties to a debt; and, fundamentally, justice is best served in a loan contract if the reasonable anticipations of the parties are met" (1937, p. 87). In this connection, he proposed the 'compensated dollar' scheme, which combined the then-existing gold-exchange standard with a device of varying the gold content of the monetary unit according to variations in an official price index so that the dollar would represent, instead of a constant quantity of gold, a constant quantity of purchasing power.⁷ Thus, the proposal for the compensated dollar was a combination of the gold-exchange standard and the tabular standard. Unlike the growth-rate proposal which aimed at preventing large-scale price changes from occurring, the compensated dollar scheme allowed changes in the price level to occur. It was a mechanism which – like the tabular standard – reacted to previous changes in prices. It attempted to maintain economic justice by compensating the relevant parties after the changes in price had occurred.

⁶ In so doing, Del Mar followed the approach taken by such classical writers as David Hume, Richard Cantillon, and John Cairnes. This approach was also utilized by Del Mar's contemporary, Alfred Marshall. This point was made by one of the referees.

⁷ A detailed discussion of Fisher's compensated dollar proposal is provided in Patinkin (1993b).

Fisher first proposed his plan for the compensated dollar in 1911 in his classic book, *The Purchasing Power of Money*, and he continued to advocate it, sometimes in association with other proposals, over the next three decades or so. But in his 1934 book (p. 82), *Stable Money*, he wrote: "I had never believed that the compensated dollar plan was the only possible plan, nor even ideally the best. [It was] a solution, not the solution. I had offered it as requiring the least radical change from the existing gold standard, and therefore perhaps politically the most feasible".

It should be noted that Fisher's notion of a compensated dollar, as a particular adaptation of a commodity standard that reflects the price of gold, differs from his important formulation of the concept of the general price level. In particular, Fisher's conception of the general price level derived from his aim of grasping the purchasing power of money (Fisher 1911). The role of money in economic activity that Fisher sought to encompass in his analysis embraces three broad sets of exchange transactions:

a) transactions in the production of current output of goods and services in terms of both final output plus all the double counting of intermediate steps in the production process;

b) transactions involving goods changing hands that had been produced in past periods (*e.g.* antiques, buildings);

c) transactions involving change of ownership of financial claims (debts as well as equities). Thus, the general price level that Fisher sought to conceptualize ranges over the entire gamut of transactions in which money is used. As such, Fisher's concept of the general price level – as distinct from his compensated dollar proposal – is a bold analytical attempt to capture the numeraire function of money.

V. Lessons from history

To briefly summarize, early proposals for the commodity standard were confronted with a major practical problem pointed out by Ricardo; such proposals initially could not deal with the problem of measuring the movements of different prices against each other. This

problem was solved in the second half of the nineteenth century as contributions to the construction of index numbers helped alleviate the measurement issue. Nevertheless, objections continued to be raised that the commodity standard does not account for the price of labour; thus, the standard did not fully address the issue of economic justice. Moreover, even if wages could be included in the standard, the task of preventing the economic cycle – the other major issue confronting monetary reform proposals through history – would still not be resolved.

A comparison of the monetary views of Milton Friedman with those of Del Mar and with those of Fisher will help clarify this argument. Friedman and Del Mar share: 1) an empirical orientation to the study of monetary forces; 2) a belief in the long-run validity of the quantity theory of money; 3) an empirically-based view that there are long-term trend increases in real output; and, 4) belief in the short-run non-neutrality of money. Friedman's view is that changes in the money supply initially affect product prices. With wages lagging (because wage-earners are temporarily fooled by the change in product prices), profits rise and employment increases. In general, this analysis is similar to Del Mar's paradigm. Friedman also includes the effects of price expectations upon interest rates in his monetary analysis and has formulated a mechanism of the transmission of monetary policy which includes the prices of a broad spectrum of assets and goods. Friedman and Del Mar both advocated rules for the rate of growth of the supply of money, with the money supply expanding at around 3 percent a year in order to attain stability in prices.

Put differently, the respective monetary paradigms formulated by Del Mar and by Friedman have been built upon two neutrality principles; both of these principles have been identified by Lucas (1994). The first of these is the hypothesis of the long-run neutrality of money. As pointed out by Lucas (1994), this hypothesis is implicit in Friedman and Schwartz's classic volume (1963), and explicit in Friedman's Presidential Address (1968) before the American Economic Association. Specifically, the hypothesis assumes that there is a trend path of real output that has the property that neither its level nor its growth rate is affected by monetary policies. This trend path is stable in that "the economy returns to its trend behavior after displacements" (Lucas 1994, p. 6). The second principle is the hypothesis that in the short-run money is not neutral; fluctuations in the

money supply induce spending fluctuations, which in the face of rigidities in prices and wages induce real output fluctuations (*ibidem*, pp. 6-7).

Turning to Fisher, he also accepted the long-run validity of the quantity theory, as well as the short-run non-neutrality of money. Moreover, Fisher contributed seminaly to the relation between price expectations and nominal interest rates. He did not, however, articulate the role of leading prices and lagging wages in the business-cycle process; nor did he formulate a broadly based mechanism of monetary transmission. His main policy proposal was the compensated dollar scheme, which, although it involves an adjustment of the monetary unit disbursed as remuneration, it attempts to deal with price changes after they have occurred. As its name makes explicit, it compensates for earlier variations in prices. These comparisons of Friedman's views with Del Mar's and with Fisher's hold a key to explaining a practical advantage of a money supply growth rate rule over the commodity standard. Specifically, the operation of a commodity standard during the period of transition would not address the issue of economic justice. In this connection, F.A. Hayek (1986, pp. 391-94) has argued that the weighted index number should be based on thirty or forty commodities "of different quotations of internationally traded raw materials and foodstuffs, weighted according to the approximate volume of their turnover at the commodity exchanges". This arrangement may ensure justice between the debtor and creditor. We suggest, however, that it would not ensure justice between the creditor and the wage-earner, or the employer and the wage-earner.

Recall that Del Mar had shown that commodity prices rise earlier than wages during the expansionary phase of the cycle. Supposing an index-adjusted contract is for one year, indexing according to the tabular standard will not serve the criterion of justice if, after that year has passed, a producer of commodities has seen the prices of his product(s) rise by more than the wages he pays out because of the sequential nature of the transmission mechanism. Thus, efforts to ensure justice and to mitigate the cycle do not require merely compensating for previous changes in prices, since prices of assets and goods change in an order of varying sequence. The challenge is to prevent the price level changes from occurring in the first place. Meeting this challenge will defuse the pressure for indexation of labor and other contracts that would otherwise mount as wage grumbles proliferate.

Hence, for a commodity standard to be just to all parties, according to our interpretation of Del Mar and Friedman, it would not only have to account for the turnover of commodities in a basket, but would have to deal with the difficulties of determining the sequence through which the various prices are affected. At the time when Del Mar formulated his analysis, he (1896, p. 187) added a qualification: "[...] this [sequence of changes in prices] is, in fact, what did occur, though not in the symmetrical order delineated". Moreover, although Friedman has been asked to spell out his transmission mechanism in more precise detail, he has not done so. His reason may be that it is simply not possible to articulate the transmission mechanism more specifically. Some prices react to changes in the supply of money faster than others, depending upon the marketability of the good, but the price sequence is subject to lags that are long and variable. A commodity standard, by reacting to previous price changes, does not address the issue of the sequence of price changes. It, therefore, does not directly deal with the mechanics of the Del Mar-Friedman cycle or with the issue of justice to wage-earners, the price of whose service lags during a cyclical expansion.

A further distinction underlies the debate between proponents of the commodity standard and the monetary growth rate rule. This distinction has to do with what can be viewed as the issue of the *quality* versus *quantity* of money. According to proponents of the commodity standard, the quality of money is determined by its intrinsic value as embodied in a collection of commodities. This view harks back to the classical period where the central function of money was considered to be its role as a medium of exchange. The gold standard is the pre-eminent case in point. In order to be acceptable as a means of payment money needed to have intrinsic value (see Aschheim and Tavlas 1995a).

In contrast, proponents of the monetary growth rate rule stressed the numeraire function of money. The central role of money in the economic system was to maintain a stable yardstick of value. In this connection, Del Mar (1885b, p. 498) argued: "Money is a measure or an institution of law designed to measure the numerical relation called value. The value of a piece of money does not at all depend upon the cost of its production, or else it would be impossible to alter the value of coins by the emission or retirement of payer notes". Consequently,

he argued that the essence of money is limitation in issue to achieve price-level stability. A fiat money system was viewed as more capable of limiting price-level fluctuations than were commodity-based systems because the control of the money supply could be brought under the direction of government, and not left to the vagaries of gold and/or silver production.

A key conclusion that emerges from the foregoing comparison is that the quality of money derives from the limitation of its quantity and not from money's physical content. A fiat money system is therefore the optimum regime for the provision of the fundamental role of money as a common denominator of economic value of all exchange transactions.

VI. Lessons applied

A major theme of the contemporary "new monetary economics" is a quest for a new monetary standard. In particular, a major revival is underway of the notion, set forth by Sir James Steuart in the late eighteenth century, of separating the numeraire from the medium of exchange. This revival reflects unease and even discontent with the methodology of giving determinacy to the prevailing unit of account. The "new monetary economics" views the choice of numeraire as haphazard and capricious in contrast to the clearcut delineation of units of weights and measures in every other manifestation of economic life. The focus of objection is the identification of the standard unit of account with the supply-and-demand determined value of the fiat medium of exchange (Cowen and Kroszner 1994; Yeager 1985, p. 104).

Two reform proposals have been put forward. They would both retain a role for government as the official definer of the unit of account. They aim, however, to split the unit of account from the medium of exchange. The government would remain responsible for establishing the unit of account but private entities alone would compete in the issuance of the medium of exchange. One proposal is known as the BFH (after Fisher Black, Eugene Fama and Robert Hall)

scheme.⁸ Under this scheme, the government retains its role as author of embryonic money. A second proposal would retain the feature whereby the unit of account is separated from the medium of exchange. Additionally, it would explicitly presume that private currency issuers would redeem in commodities the currency that they issued. This proposal has been advanced by Yeager and Greenfield (1989).

Under the BFH proposal, because the unit of account would be split off from the medium of exchange, a homogeneous medium of exchange would no longer exist. The government would define the new numeraire just as it defines standard units of weights and measures. The numeraire definition would be specified in terms of a bundle of commodities so inclusive as to embody a nearly stable value against goods and services in general; the national government would denominate its own transactions and accounts in terms of the new BFH unit. In abiding by the new unit, however, the government would practice *laissez-faire vis-à-vis* the financial system and would itself be forbidden to issue money. Financial deregulation would be radicalized by the complete privatization of the supply of money.

Innovative financial intermediation would be given free reign, and individual institutions would be in competition with one another in seeking to elicit the trust and confidence of customers in the media of exchange that they would respectively issue. Apparently, the general dictum for free banking under the BFH system is *caveat emptor* – buyer beware. Not only would deregulation extend to abolition of government deposit insurance but it would logically extend to abolition of the reputed lender of last resort – the central bank.

Yet we have evidence that even thorough-going commendation of the BHF system is not without the expression of misgivings among its advocates (Yeager 1985). We are cautioned that perhaps the greatest impediment to installing the BFH system is the difficulty of making the transition to it. Whereas it is posited that the appearance of attractive alternatives would collapse the demand for bank-account money, the replacement of base money (*i.e.*, Federal Reserve notes and deposits

⁸ See, for example, Black (1970), Fama (1980), and Hall (1982). The "new monetary economics" views the quantity theory as "nothing more than an artifact of government regulation" (Hall 1982, p. 1552). McCallum (1985) compares the "new monetary economics" with monetarism. White (1984) also assesses the "new monetary economics". He argues that a payments system not based on convertibility into an outside currency should not be expected to arise in the absence of government intervention.

and Treasury coins) is viewed as a residuary hard core. For either the base money stock would be totally debased, expropriating its holders, or else the government would have to replace it with interest-bearing government debt. Either way the transition problem is countenanced as not foreseeably susceptible to a practicable answer (Yeager 1985, p. 105).

Yeager and Greenfield, to their credit, acknowledge that their explicit assumption, that competition would force money-issuers to offer outright redemption in commodities, would be a cop out that they do not want to take. Accordingly, as Meltzer (1989, p. 425) has argued, "to avoid doubts about convergence to a common unit, Yeager and Greenfield should let the government impose a legal tender requirement". In other words, as we imply throughout, there is no escaping the government, for the sake of sound money, exercising the sovereign power of imposition of an official currency.

An even more fundamental problem is that of identifying the nature of money. Fischer Black (1970, p. 9) claims that in the *laissez-faire* economy completely devoid of governmental interference in the financial sector "money in the usual sense would not exist". According to Cowen and Kroszner (1987, p. 570), "the macroeconomic properties of a *laissez-faire* world would bear a striking likeness to those of a barter economy". Fama, they note, has even depicted it as a system of "sophisticated barter" and Jurg Niehans is being credited by Cowen and Kroszner (1987, p. 573) as having contributed an "advanced barter" system. Indeed, Niehans (1978, p. 122) characterizes an economy with a time dimension wherein the medium of account is divorced from the medium of exchange as "efficient". As the foregoing doctrinal perspective illustrates, James Steuart in the early 1800s had already identified the divorce proposal for money as enforcing Say's law in accordance with a barter economy.

What accounts for this time-honored and recently revived search for a sophisticated barter system? The search for an advanced barter system, *i.e.*, for a numeraire that is disembodied from the means of payment, is a quest for neutral money. As general equilibrium theorists from Walras to, most recently, Hahn (1982) have implied, the search for neutral money in moving from a barter economy to a monetary system is a will o' the wisp. Specifically, the introduction of money into an exchange system involves a non-neutral principle and may be named regime-switch non-neutrality. This terminology differentiates this par-

ticular principle from the two neutrality principles identified by Lucas (1994), which apply only after a money economy has been established. In turn, Hahn's own negation of the neutrality of money was clearly foreshadowed by such other prominent contributors as Joseph Schumpeter and Harry G. Johnson (see Aschheim 1973, pp. 3-11). Nevertheless, the fact is that affirmation of the long-term neutrality of money pervades mainstream monetary literature from Patinkin to Fama (see Hoover 1988, pp. 87-106). Suffice it to conclude that even at the hands of its exponents, neutral money is a *desideratum* rather than an implement.

VII. Conclusions

The emergence of money involves a regime switch from a barter system to a monetary economy. As demonstrated by such earlier economists as Walras and Del Mar, it is the existence of the numeraire that constitutes the fundamental distinctiveness of a monetary system. The numeraire quality of money imparts a non-neutral characteristic to a monetary economy compared with a barter system because of the reduction in information and calculation costs in exchange transactions. The reduction in transactions costs is reflected in the appearance and proliferation of markets for financial instruments which is a distinctive attribute of money-exchange economies that neither primitive barter nor advanced and sophisticated barter systems can generate (Aschheim and Tavlas 1995b). In other words, the financial-intermediary dimension is a linkage mechanism between investors and savers unparalleled among barter exchange economies.

The introduction of money, however, involves a further non-neutral attribute. Gray, Douglas, and other writers recognized that in a money economy Say's law of markets is no longer valid; the possibility of an overproduction or underproduction of goods is a basic feature of economic life. Monetary policy should therefore strive to preserve the numeraire function of money by avoiding fluctuations in the price of money, the common denominator in terms of which all other prices in an economy are measured. As documented above, optimization of the quantity of money is a time-honored idea in monetary economics. We suggest that optimization of the quality of money merits no less at-

tion as the focal point of scholarly work on monetary standards. The concept of monetary anchor embraces both quantity and quality optimization. Primacy, however, belongs to quality; before there can be quantification, qualification must be established. It was this idea that was foreshadowed in the writings of certain earlier monetary economists, who recognized that the value of money depends upon its stability and not upon its intrinsic composition. The embryo must exist before multiplication can ensue.

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