

Commodity Futures Markets: Analysis of a Capitalist Institution from Heterodox Perspectives

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Abstract:

“Wall Street is searching for a bottom in the oil price – and getting ready to pile in.”

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The 2008 commodity price bubble sparked food riots around the globe. It also set off a debate over the impact of speculators on commodity prices. Between the financialization of the US economy and the role of exotic financial products in the global financial crisis, there has been increased interest in derivative markets and financialization among heterodox economists.

There are two important historical contributions to our understanding of futures markets in the heterodox tradition: Hilferding on the influence of finance capital; and Keynes on the theory of the forward/futures markets. The purpose of this paper is to survey the views on futures markets by Hilferding and Keynes, and connect their ideas to the recent speculation debate.

Beginning around 1999, commodity prices experienced a lengthy bullish cycle that peaked with a dramatic spike in 2008, and the concomitant increase in food prices ignited riots in nearly thirty countries around the globe. At the time, most economists were pointing to global demand generated from China and other emerging market economies. However, market analyst Michael Masters (2008) blamed a new form of speculation in commodity futures markets, the Commodity Index Fund (CIF), while others (Krugman, 2008) argued that evidence of speculation--an accumulation of inventory--was non-existent at the time. US Senate investigations (US Senate 2006, 2009) into commodity speculation during the decade prompted academics to respond to this so-called “speculation debate” (see, for example, Singleton, 2013 and Irwin & Sanders 2010). Underpinning the speculation debate, and acknowledged by participants from both sides, was the “financialization” of commodity futures markets. As Schmidt (2015) describes, financialization of commodity markets allowed financial interests, previously constrained by regulation, to now dominate the price discovery process. While both sides acknowledge the dramatic change in the composition of futures trading, the speculation debate—whether or not speculators did influence spot prices--is still unresolved.

The relatively recent interest in the concept of financialization along with the role exotic financial instruments played in the global financial crisis has stirred increased interest in derivative markets by heterodox economists. Despite this relatively recent interest, there are two important historical contributions to the understanding of commodity markets from the heterodox tradition: Hilferding (Hilferding and Bottomore, 1990) analyzed the influence of finance on commodity futures markets from a Marxist perspective; and, Keynes (1930) provided a theory of forward markets which is still relevant today.

In this paper we survey the analyses of commodity markets by Hilferding and Keynes, then connect these historical views to the modern speculation debate. The paper is organized as follows: the first section provides an introduction to the futures markets, with an emphasis on the relationship between spot and futures prices; the second section discusses the contributions of Hilferding; the third section discusses the views of Keynes; and the fourth section connects their views to the modern speculation debate.

1. Modern Futures Markets: Functions and Price Relationships

The two most important functions of commodity futures markets are risk transference and price formation. The nature of agriculture production creates significant price risk for farmer-producers as the vagaries of *Mother Nature* can dramatically influence prices. The futures market allows producers to lock in a guaranteed price at harvest, and more important, a spectrum of future prices provides the incentive to store and sell over designated months throughout the year, consistent with the consumption of commodities. Futures markets presuppose the existence of an agent—the speculator—who is willing to take on that price risk—futures markets cannot function without speculators.

Commodity futures provide an active market for a specific quantity and quality of a commodity to be delivered or to take delivery in the future.¹ When it functions properly, the futures market is an important institution which provides a mechanism for discovering the price of commodities based on the fundamental market forces of supply and demand, and it is this price

¹ In the real world, there may be hundreds of variants of a commodity, so prices are adjusted for quality differences. For example, global futures exchanges trade various types of “sweet” crude oil with names like West Texas Intermediate (WTI) and Dubai Sour which are associated with their geographical areas of production. The petroleum services firm Intertek provides a partial list of over 180 grades of oil which are graded on levels of viscosity and acidity (www.intertek.com/petroleum/crude-oil-types/).

discovery function which has been used to justify restrictions on speculators, as prices should reflect the “true” underlying fundamentals generated by producers and consumers in markets.

Historically, futures markets were not as broad (number of participants) and deep (liquid) as stock and bond markets, so price discovery could easily be overwhelmed if speculators were allowed to dominate markets. For this reason, and for the majority of their history, futures markets regulated the number of contracts (position limits) that speculators could purchase on individual commodities. The goal in futures markets, then, is to ensure the right balance of commercial and speculative trading: commercial traders should dominate trading for the price discovery function, and speculators should be prevalent enough to ensure market liquidity. In this way the active, liquid futures markets establish prices for the illiquid, disparate real world of spot commodity markets.

The difference between the forward (F) and spot (S) prices is known as the basis. As forward contracts approach maturity, it essentially becomes a spot transaction, so the basis is supposed to approach zero ($F=S$). If it does not, then “delivery arbitrage” opportunities arise creating price changes that ensures the outcome.²

Since the forward price can be above or below the spot price, an interesting question is what determines the relation between F and S? When F is less than S, the markets are said to exhibit *backwardation*; and when F is greater than S, the markets are said to be in *contango*. Standard futures pricing theory shows the formal relationship between futures and spot prices is given as:

² For example, if F is higher than S when the contract approaches maturity, then producers of the commodity will sell a futures contract (earning a price F which is greater than S) and deliver the wheat to warehouses designated by the exchange. As more producers undertake this strategy, F is driven down to S.

$$F = S \times (1 + c) \quad \text{[Equation 1]}$$

$$\text{And, } c = sc + i - cy - rp \quad \text{[Equation 2]}$$

Where,

c = the full cost of carry expressed as a percent of the spot rate.

cy = the convenience yield, the benefit derived from holding inventory.

sc = explicit cost of storing a commodity, including warehousing, insurance, security, and spoilage.

i = the interest rate on an instrument with a maturity equivalent to the futures contract.

rp = a risk premium paid to speculators, from the perspective of hedgers selling forward.

To simplify the discussion, we begin by assuming $rp = 0$. In the case where storage costs exceed the benefits from holding inventories, $(sc + i) > cy$, then $F > S$, and markets exhibit contango. This would tend to occur when there is a surplus of goods on the market, so the benefit to additional inventories is marginal, and $F > S$ is sufficient enough to cover the cost of carrying the inventory forward. When $cy > (sc + i)$, then $S > F$, and markets exhibit backwardation. The difficulty with this “theory of the basis” is that cy is not observable. Backwardation tends to occur in “tight” markets, where goods are in short supply which makes inventory more valuable.

The determination of rp is debatable and is an important issue underlying the speculation debate. At this point, we will provide the standard explanation from investment theory. If F is an unbiased estimator of $E(S)$, the expected future spot price, then rp should equal zero; however, evidence suggests that F is not an unbiased estimator, so $rp > 0$.³ As an investment, if commodities do not reduce systematic risk for investors, and they are positively correlated with other assets, then investors require a risk premium to hold the asset. In this case, producers must compensate investors for taking on the risk. Again, to simplify by assuming $(sc+i) = cy$, then $c = -rp$, and $F <$

³ The most well-known evidence can be found in the foreign exchange market through what is known as the carry trade, and related to the “forward premium puzzle,” which states that the currency with the higher interest rate is expected to depreciate over the period; however, more often than not, that currency appreciates.

S (backwardation).⁴ On the other hand, if commodities are negatively correlated with other assets, then investors willingly hold commodities for diversification gains. In this case, no compensation is necessary to entice investors to hold commodities, and they may even be willing to compensate hedgers for the diversification gain, which is expressed as a negative value for r_p in Equation 2, so $c = +r_p$, and $F > S$ (contango). Under the assumption that investors are willing to pay hedgers a risk premium, and under conditions where $(sc+i) > cy$, then those with the ability to store commodities can generate significant risk-free storage arbitrage profits.⁵

Before we turn to the discussion on Hilferding, it is necessary to understand one more important concept. The majority of contracts created are never fulfilled, rather they are closed by taking an offsetting position. There would not be many speculators in the market if they had to deliver or take delivery of goods. For example, when a trader initiates a new buy (long) order, there must be someone on the other side who is willing to take the sell side of that trade. As more new buys enter the market, prices will have to rise to provide other traders with the incentive to take the sell side. Unlike the stock market, where at any given moment there are a fixed number of securities available for trade, in commodity markets the number of contracts created is limited only by the willingness of traders to take the other side of new positions offered. This means for every long position there must be an equal number of sell positions, and the number of open positions is known as “open interest” (measured by either the total of open longs or the total of open shorts).⁶ As we discuss, one indication of financialized commodity markets is the dramatic

⁴ Keynes called this situation “normal backwardation,” and we discuss it in greater detail in section three.

⁵ For example, if $cy=0$, storage and interest costs = 10%, and $F - S = 20\%$, then traders will simultaneously buy the commodity in spot markets at S and sell it forward at F . The 20% basis gain pays the storage cost and earns the risk premium of 10%, and locking into the futures contract makes this a risk-free trade.

⁶ In the delivery month the futures trade can be dangerous for speculators who do not deliver or take delivery, so they need to close their position with an opposite order. For example, a speculator with a long position must sell a contract before it expires. As long as there are speculators who have short positions who must also close with offsetting buys, the long speculator who must sell to close a long position has no problem finding a willing buyer

growth in open interest, an indication that contracts are not made to meet the underlying commercial needs of the market.

2. Hilferding on Commodity Markets

Financialization is a hot topic in the heterodox literature, yet significant interest in the concept really only emerges around 2000.⁷ The most commonly cited definition is Epstein (2005), “Financialization refers to the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, both at the national and international level” (p. 3). However, a similar concept of finance--as an institutional force and mechanism of control in capitalis--was introduced by Hilferding (Hilferding & Bottomore, 1990) over one hundred years ago:

Finance capital signifies the unification of capital. The previously separate spheres of industrial, commercial and bank capital are now brought under the common direction of high finance, in which the masters of industry and of the banks are united in a close personal association. The basis of this association is the elimination of free competition among individual capitalists by the large monopolistic combines. This naturally involves at the same time a change in the relation of the capitalist class to state power. (p.301)

Capitalism was being destroyed by its own regulating mechanism of competition, as increased capital intensity and the competitive struggle caused prices to decline over time which led to severe

from the speculators who sell and must close their positions with a buy. However, if the sell side is dominated by producers who can deliver the commodity, they do not necessarily need to close their positions with offsetting buys, they hold the contract to maturity and fulfill it by delivering the commodity. If producers dominate the sell positions, they have the ability to “squeeze” the speculative long positions by not offering offsetting buys to the speculators’ offsetting sells, which forces the contract price (F) to fall, and the longs take losses while the shorts take profits.

⁷ For example, a 2001 issue of the journal *Economy and Society* was devoted to the topic.

contractions in the form of debt deflations. If capitalism was to survive, large corporations required stable markets and prices. According to Hilferding, finance capital created stability by establishing control over markets through directing credit toward large oligopolistic corporations and away from nascent competitors. Stabilization was of course beneficial to the banks through reducing the probability of loan defaults and extending bank capital into increasingly more economic activity, increasing extraction of economic rent in the form of interest payments.

In his analysis of financial, Hilferding included chapters on the stock and commodity markets. While the focus of this paper is his analysis of commodity markets, there are several important concepts developed in the stock market chapter which carry over to commodity markets. In the pre-regulatory environment of the time, investors could buy stocks directly from banks; therefore, Hilferding concluded “the specific activity of the stock market is really *speculation*” (p. 134). Hilferding makes an important distinction here between investors and speculators: investors are those who buy and hold stocks for their yield, and typically did so from banks; on the other hand, speculators seek short-term gains from price changes in either direction. Hence his conclusion--most of the trading activity on the stock exchange was due to speculators. However, Hilferding says speculators serve an important purpose because they allow capitalists to easily convert fictitious capital into real capital or money capital—speculators and the stock market make that which is physical, liquid.

A key question for Hilferding was to explain the source of speculators’ profits. He argues that speculators seek to make (what he called) a “marginal profit” on price changes, regardless of direction, so their total profits must be a zero-sum game--one speculator’s marginal profit is another’s loss. Therefore, he argues that a class of large (inside) speculators--banks especially--profit at the expense of small (outside) speculators, the public. Banks and professional speculators

“set the mood” of the market to entice the general public in before selling; hence, the large speculators generate marginal profits from these small investors. As we will see, this view of speculators’ profits as a zero-sum game in the stock market is important to Hilferding’s erroneous explanation of speculator’s profits in commodity markets.

In markets that encourage speculation for liquidity, Hilferding states that “credit transactions always go hand in hand with speculative operations” (p. 147). Since speculators are only concerned about marginal price changes, they do not wish to use their capital to purchase the entire value of an asset. Banks, then, provide credit to speculators up to a certain proportion of the price based on expected price changes; for example, banks might fund 80% of the purchase of a security, holding it as collateral, so the speculator need only contribute the remaining 20%--the concept of margin.

Hilferding introduces his discussion of commodity markets by stating there is an explicit difference between futures trading on stocks versus commodities, “the futures business, while it facilitates the trade in securities, is not essential to it, and has no decisive influence upon prices. The situation is different in the case of commodity trading which follows stock exchange procedures” (p. 151). As he acknowledges, one of the main functions of commodity futures trading is price formation.⁸

⁸ In his discussion of the futures market for stocks, Hilferding provides an interesting example of how banks could control corporations without long-term ownership in shares, through what was known as the contango trade. In a market characterized by contango, the spot price (S) is lower than the futures price (F), and the contango trade consists of banks simultaneously buying shares (from large speculative traders) and selling those shares on the futures market, with the “interest” earned equal to $F - S$. Essentially, this is a repurchase agreement of the stock, and “through contango business the bank is enabled to acquire temporary ownership of the shares and thus to obtain control of the corporation...[thus giving the bank] a decisive voice in the decisions taken by a general shareholders’ meeting” (p. 147).

Hilferding acknowledges commodity futures markets were created to smoothen out annual consumption for goods produced on a seasonal basis; however, he argues they can only function—and therefore exist—if speculators can make marginal profits on price changes; therefore, only those commodities that experience sharp fluctuations in price over relatively short periods will be traded. Price stability would be the death of futures markets.

For Hilferding, “the distinctive feature of commodity exchange trading is that by standardizing the use value of a commodity it makes the commodity, for everyone, a pure embodiment of exchange value, a mere bearer of price” (p. 153). Commodity markets essentially transform commodities into an asset, “commodities are equivalent to money” (p. 153); hence, this makes them suitable objects of speculation. And, as he described about the stock market, credit transactions always accompany speculative trading to support the market.

Hilferding states “the incursion of bank capital thus has three consequences: (1) it increases industrial profit; (2) it reduces commercial profit; and (3) it converts a part of the commercial profit into interest” (p. 155). Bank capital allows merchants and speculators to “purchase” futures contracts for commodities on margin, freeing up their own capital; and the ability to “sell” commodities today for delivery in the future reduces circulation time of capital, and the price guarantee provides collateral for loan capital. Hilferding argues that futures markets, and margin trading in futures, reduces the need for merchant/commercial capital, and the “gains” from reduced profits to merchants is shared between industrial profits and the interest earned by banks.

Similar to his discussion on stock markets, one of the key question he attempts to address is the source of profits for speculators in commodity markets, and his analysis of speculative profits in the stock market leads him to a similar conclusion: profits from speculation are marginal--one speculator’s gain is another’s loss. However, recognizing the important role speculators play in

the transfer of price risk, it forces him to address another issue, “the only problem which remains is whether speculators also get a risk premium...which is frequently alluded to but very little studied” (p. 157). Futures trading allows manufactures and merchants to purchase insurance against price changes by transferring price risk to speculators, “capitalist profit originates in production and is realized in circulation. It is natural that both producers and merchants should try to insure their profits against fortuitous price fluctuations occurring in circulation” (p. 156). If speculators assume the burden of price fluctuations, Hilferding rhetorically asks, how do they profit? Unfortunately, he cannot escape his analysis of speculators’ profit in the stock market as a zero-sum game, stating similarly that large speculators can only profit at the expense of small ones. This creates a conundrum for Hilferding. If the source of profit is production, and profit is realized in circulation, then a risk premium cannot be a source of profit, “varying degrees of risk, or to put it another way, varying degrees of certainty that the profit which originates in production will actually be realized in circulation, can only bring about variations in the distribution of profit” (p. 157). Hilferding states the futures market can only insure against price changes in the course of circulation; it cannot insure against risks that alter the costs of production. For example, he states there can be no adjustment for risks that arise from global markets:

In so far as large, unforeseen fluctuations occur in circulation, the capitalists in such a branch of production must maintain reserves which will enable them to cover losses arising from price fluctuations, and to continue their production without interruption. This reserve fund is a part of the necessary circulation capital, and an average rate of profit is calculated for it. The profit imputed to it may therefore be regarded as the risk premium. Productive capitalists may still need such a reserve fund even when the futures trade has developed, for the latter cannot eliminate in any way those price fluctuations which result from a

change in the conditions of production. The impact of the world market upon domestic prices must be borne by the producer. (p. 158)

Hilferding describes a source of profit for the risk premium, but is wedded to his analysis of marginal profits gained by speculators in stock markets, and therefore believes the same must hold in commodity markets; however, it is a simple step to state the risk premium represents a transfer of profits from industrial capital through a reduction in reserves that were necessary to protect against risk. In commodity markets dominated by producers selling futures contracts, speculators need an incentive to take on that price risk, and the incentive is a transfer of profits in the form of the risk premium, just as modern futures price theory (and Keynes) argue. Once risk has been transferred, the source of the price change is irrelevant; therefore, even if global markets are the source of price changes, the speculator absorbs the risk once it is transferred, not the producer. Certainly, if speculators foresee price changes due to global conditions, then the price risk will fall upon the producer. Hilferding does not make this clear.

Another important question Hilferding addresses is speculators' influence on commodity prices. Hilferding argues that speculators can influence prices over short periods, but their actions must eventually cancel, and reverse the price change. Since speculators do not deliver or take delivery of goods, if they buy contracts betting on rising prices, they must cancel those bets by selling contracts prior to expiration; however, "this does not prevent one speculative trend—for example, a 'bullish' trend—from becoming dominant for a time, and so long as this trend persists the price will be higher than the actual trading in goods would dictate" (p. 159). Assuming no influx of new funds into the market in support of this trend, the price rise will diminish when speculators close their positions through offsetting sell transactions near maturity.

Lastly, Hilferding notes once banks, through their extension of credit in the commodity trade, become familiar with corporations that deal in commodities they begin to speculate on their own account:

The bank can also use its great capital resources and its general overview of the market to engage in speculation on its own account with comparative safety. Its numerous connections, extending over a wide range of futures markets, and its knowledge of the market, give it the opportunity to engage in safe arbitrage dealings, which bring considerable profits because of the large scale on which they are conducted. The bank can carry on such speculative dealings all the more safely the larger the quantity of the commodity that it controls and the greater its influence over the supply...It either buys the commodity outright, or operates on a commission basis; and in the latter case it can afford to accept a much smaller profit, in competition with other dealers, because it is also able to gain speculative profits, and to employ a far larger volume of credit. (p. 162)

Despite their participation directly in commodity speculation, the overarching goal of banks is to bring about cartels in order to stabilize prices, especially for those industries in which banks have extended significant credit. In fact, as banks facilitate the development of monopolies and cartels, Hilferding states the reduced price volatility “culminates in the elimination of the futures trade itself” (p. 163). Price stability is the death of speculative futures trading.

Hilferding’s conclusion to this chapter essentially characterizes modern notions of financialization, “futures trading allows money capital...to be converted into commercial capital while retaining its character as money capital, which opens the way for bank capital to extend its domination over trade and industry, and to impose upon an ever larger part of productive capital the character of money capital which is under control of the bank” (p. 169).

Financialization is the encroachment of financial capital into ever greater facets of economic activity, with the aim of extracting greater sums of rent in the form of interest. Hilferding's analysis of finance capital went (mainly) unnoticed in the post-war period because of the heavy regulatory structure placed upon finance as a result of its speculative excesses leading up to the *Great Depression*. In this modern era of finance capital, or what we now call financialization, the power of finance reemerges when banks break down regulatory barriers starting in 1980. We return to this in section four of the paper.

3. Keynes and Commodity Futures Markets

Discussions about Keynes and futures markets typically focus on a brief section (The Theory of the 'Forward Market') from volume II of the *Treatise on Money* (ToM); however, as we discuss, Keynes also provides important insights in the *General Theory* (GT). In ToM, futures markets are discussed in the context of business cycles, and the main purpose of the chapter is to explain how surplus stocks of commodities, or what he calls liquid capital, influence recovery from a slump, as the recovery cannot begin until the excess is eliminated.

Before proceeding, it is important to understand Keynes' definitions of liquid and working capital because it underlies the difference between his theory of forward prices and modern price theory. Keynes states, "for those stocks, which are in course of transport or are being carried between the seasons, or are required to average out the fluctuations of harvest or are a necessary safeguard against interruptions to the continuity of production, must be regarded as a part of working capital, and not of liquid capital" (Ch. 29, p. 134). As we saw, modern futures market price relations incorporate this benefit to inventories in the form of a convenience yield; however, Keynes views these inventories as necessary to support production and includes them as part of working capital. Liquid capital, on the other hand, are stocks of goods or commodities in excess

of these needs and arise from unexpected differences in supply and demand or accumulate during a slump,

Keynes constructs an equation to describe the process for liquidating excess stocks based on the assumptions, one, the price will rise back to normal (P_n) at a steady rate, and two, the increase in consumption stimulated by a decline in prices is equal to the decline in production:

$$pq = xy \quad \text{[Equation 3]}$$

where,

y is a measure of excess liquid stocks as a proportion of annual consumption,
 x is the annual return required for those holding excess stocks, which includes carrying costs and a risk premium and expressed a proportion of the normal price,
 q is the proportionate fall in new production below normal
 p is the initial price decline relative to the “normal price” (P_n)

Two factors determine x : first, carrying costs (c) which include deterioration in quality, warehouse and insurance costs, and interest charges; and, second, a risk premium (rp) for “remuneration against the risk of changes in the money-value of the commodity during the time through which it has to be carried by means of borrowed money” (Ch. 29, p. 135). Since the length of time it takes for the price to return to normal and for stocks to be liquidated is uncertain, a significant risk premium is necessary for speculators to take on that risk. Based on observations from market data, Keynes estimated traditional carrying cost charges were about 10% per year and the risk premium was (at least) another 10%, so $x = 20\%$.⁹

Assume $x = 20\%$, $y = 100\%$, and $q = 50\%$; then the required price decline p is 40%. At a production level 50% below normal, it would take two years to liquidate a year’s worth of stocks,

⁹ Keynes states it would take an enormous sum of capital to carry unwanted stocks over the projected time to liquidate them.

so a 40% initial price drop provides the 20% annual return required by speculators to hold the stocks, with the annual return $x = c + rp$. The important point is speculators only take on excess stocks if they expect to cover the cost of carrying those stocks over the period **and** they are compensated for the risk of carrying the stocks over time.

Based on this price relationship in the cash market, Keynes then turns to the “forward market” as a way to restate the argument. He begins with a discussion of the relation between spot prices (S) and forward prices (F) under a balanced market, defined as supply and demand equal under normal conditions of production. Keynes argues S should be greater than F equivalent to the risk premium producers are willing to pay to hedge or discard price risk over the period of production:

The normal supply price on the spot includes remuneration for the risk of price fluctuations during the period of production, whilst the forward price excludes this. The statistics of organized markets show that 10 per cent per annum is a modest estimate of the amount of this backwardation in the case of seasonal crops which have a production period approaching a year in length and are exposed to all the chances of the weather. (ch. 29, p. 143)

Since Keynes assumes inventories held to support production or meet seasonal production are part of working capital, he is implicitly assuming that storage costs equal the convenience yield; therefore, the forward price relation simplifies to $c = -rp$, and $F < S$. In this case, the shape of the futures price curve exhibits *normal backwardation* because producers who desire to hedge against price risk are willing to pay speculators a risk premium for taking on the risk (10% in his example). Where Hilferding argued speculators’ profits are zero-sum, Keynes (and traditional theory) argue

speculators are compensated by a transfer of the risk premium which is a component of the current supply price of output, therefore it represents a transfer of profit.

Most discussions regarding Keynes and futures markets tend to focus on his explanation for normal backwardation, but the purpose of the section on forward markets is to restate the argument related to the absorption of redundant liquid stocks. According to Keynes, when there is a surfeit of liquid stocks F must be greater than S (contango) to cover the cost of storage, allowing firms to carry the excess inventory until it is eliminated. In addition, he argues, producers must still pay the price of insurance, and, given the uncertainty during a slump, “he must pay more than usual” (p. 144). In this case, however, the risk premium is not expressed in the difference between S and F , rather it is expressed in the difference between the expected spot price $[E(S)]$ at maturity, “the quoted forward price, though above the present spot price, must fall below the anticipated future spot price by at least the amount of the normal backwardation; and the present spot price, since it is lower than the quoted forward price, must be much lower than the anticipated future spot price” (p. 144). In the case of a surplus of commodities in excess of those held for working capital, $c = sc + i = 10\%$, and $F > S$ (contango). Using estimates from his cash market discussion, and assuming stocks are absorbed in one year, Keynes states the risk premium is at least equal to that under normal backwardation (10%), which is expressed by $E(S) - F = 10\%$. Combining the storage return and risk premium, $E(S) - S = 20\%$, which equals the annual change in p from Equation 3.

To clarify, let us compare the two investment possibilities, a non-hedged cash market position versus a hedged position in the futures market. In the cash market, assuming stocks will be absorbed within a year, a speculator buys goods at S and sells at an expected price $E(S)$; where $E(S) - S = p = 20\%$, which covers the risk premium and storage costs, as above. In the futures

market, a producer who hedges sells (to a speculator who buys) at F , which is 10% higher than S , sufficient to cover storage costs; however, F is 10% less than $E(S)$, the value of the risk premium under normal backwardation. When a hedger simultaneously buys at S and sells at F , she guarantees the storage return of 10%. The speculator's return is $E(S) - F$, the value of the risk premium. In both cases, $E(S) - S = 20\%$, but in the futures market F is the value which compensates hedgers for the cost of storage. Keynes implicitly assumes there are no limits to arbitrage capital which ensures the risk-free storage trade is driven down to the cost of storage.

Keynes has been criticized for assuming futures markets are characterized solely by normal backwardation.¹⁰ Kaldor (1939) incorporates two other influences (included in the discussion of modern futures pricing theory), the convenience yield (cy) and the possibility that markets are dominated by long hedgers. As noted, the reason Keynes excludes cy is because he assumed an optimal quantity of inventory held for this purpose was included in his definition of working capital. For markets dominated by hedgers buying forward, Kaldor suggests speculative sellers would need to be compensated for the price risk (rp is negative, making $-rp$ positive, so $c = +rp$). In this case, the risk premium would be reflected in $F > S$, and markets would exhibit what could be called *normal contango*. This last point is significant for today's financialized futures markets, as we discuss in section four.

The most important contribution from Keynes for the speculation debate is the concept of user costs. Keynes (1936) states, "user cost constitutes one of the links between the present and the future. For in deciding his scale of production an entrepreneur has to exercise a choice between using up his equipment now and preserving it to be used later on" (pp. 69-70). While Keynes

¹⁰ Working (1949) receives much of the credit for modern futures pricing theory due to his emphasis on storage costs as the primary influence in the relationship.

focuses the discussion on fixed capital, it is also an important factor influencing commodity production. When using a commodity today, entrepreneurs must weigh the value of revenues generated from today's sales versus the value generated from selling at higher prices in the future:

It must be remembered that future prices, in so far as they are anticipated, are already reflected in current prices, after allowing for the various considerations of carrying costs and of opportunities of production in the meantime which relate the spot and forward prices of a given commodity...For the entrepreneur is guided, not by the amount of the produce he will gain, but by the alternative opportunities for using money having regard to the spot and forward price structure taken as a whole. (Keynes 1979, pp. 82-83, quoted in Wray 1999)

Keynes believed that “user cost has, I think, an importance for the classical theory of value which has been overlooked” (Keynes, 1936, p. 66).¹¹ He was referring to marginal price theory which assumes price is equal to marginal factor costs in competitive markets; however, in the GT Keynes stated that price is the sum of marginal factor costs plus marginal user costs. For Keynes, then, user costs can have an important influence on today's spot price of a commodity.

Keynes states the case of redundant liquid stocks provides a straight-forward view of how user costs could be estimated because factor costs are zero for goods having already been produced:

In the case of raw materials the necessity of allowing for user cost is obvious;--if a ton of copper is used up to-day it cannot be used to-morrow, and the value which the copper

¹¹ Wray (1999) argues the concept of user cost provides a critique of the Labor Theory of Value.

would have for the purposes of to-morrow must clearly be reckoned as a part of the marginal cost [today]. (p. 73)

The important point, user costs can be significant when prices are expected to be significantly higher in the future, and user costs for commodities can be estimated by observing the spot and forward price structure from futures markets. When a futures market is characterized by strong contango, marginal user costs can be significant, creating an incentive for producers to restrict production today, or store commodities for future sale. In the next section we connect the views of Hilferding and Keynes to the speculation debate, including the important concept of user costs.

Finally, it is interesting to note that Keynes comes closer to the modern expression of futures price theory in chapter 17 of the GT, “The Essential Properties of Interest and Money,” in which the purpose of the discussion is to explain why the money rate of interest “rules the roost.” Keynes argues that the return (r) on any asset carried through time in terms of money can be expressed as:

$$r = a + q - c + l \quad \text{[Equation 4]}$$

Where a is the expected price appreciation/depreciation over the period, q is its prospective yield, c is its carrying costs, and l is a liquidity premium. For commodities, Keynes states q and l are essentially zero, so the $r = a - c$, where a depends upon the expected price over the holding period, $E(S) - S$.¹² This is essentially the same argument he makes in ToM for surplus

¹² If one “invests” in commodities through the futures market, there is another important factor influencing returns, the *roll yield*, which is the difference in the price of the expiring contract and next dated contract. Investors who hold commodities over time would need to sell expiring contracts and buy new ones. If markets are in backwardation ($S > F$), then the roll yield is positive—one is selling high and buying low. The roll yield is negative in contango markets ($F > S$).

commodities. In comparison with other assets, one would only hold commodities as an investment if a was sufficient to cover the carrying cost (c) and investors received a risk premium (rp), hence $a = x$ from Equation 3.

3. Financialization of Commodity Futures Markets: Lessons from the Past?

The historical analyses of commodity markets by Hilferding and Keynes inform the speculation debate in several ways: 1) through financialization of commodity markets; 2) through the speculative impact on prices; and 3) by providing an explanation for the missing evidence in the debate, the lack of inventory buildup.

When Hilferding wrote *Finance Capital* there was no separation between banks, security trading, and commodity trading. After the speculative excesses that led to the Great Depression, banks were heavily regulated and speculative driven financial crises all but disappeared, as did analysis of financialization. After the turbulent 1970s, the power and influence of finance capital reemerges. Schmidt (2015) describes the *financialization process* in commodity markets, which begins with banks circumventing regulatory barriers through a financial innovation, then pushing to codify the innovations through a formal deregulatory act.

In commodity markets, the inhibiting regulation was position limits on financial traders, and the innovation that allowed banks to circumvent them was the Commodity Index Fund (CIF).¹³ One of the first CIFs (currently traded as the SP-GSCI) was created by Goldman Sachs (GS). The index was valued using nearest dated futures contract prices for over twenty commodities, and weighted by global production. GS sold swaps to investors which generated payments as the index

¹³ In addition, commodity exchange traded funds (ETFs) were created in the early 2000s that allowed retail investors to directly invest in commodities.

increased in value. GS would hedge the swap positions through buying futures contracts on the exchange, and the gains from their futures contracts would cover payouts on the swaps. As the commodity swap business expanded, the hedging needs of GS caused it to exceed position limits for financial traders. GS petitioned for exemptions, claiming they were hedgers, and the Commodity Futures Trading Commission agreed. With more banks entering the commodity swap business, they pushed for formal deregulation, which occurred in 2000 with the Commodity Futures Modernization Act (CFMA).

Commodity investments grew slowly until research by Gorton and Rouenhorst (2004) showed that the return from holding a bundle of commodities was negatively correlated to stock and bond returns, so portfolio managers could reduce the variability in portfolio returns by including commodities in the portfolio. As Masters (2008) estimated that, “assets allocated to commodity index trading strategies have risen from \$13 billion at the end of 2003 to \$260 billion as of March 2008, and the prices of the 25 commodities that compose these indices have risen by an average of 183% in those five years!” (Masters 2008, p. 2). Financialization literally flipped the commodity markets. According to *Better Markets* (2011), prior to the CFMA commercial traders in wheat and oil comprised 70% to 80% of the market as measured by open interest; however, from 2008 to 2010, commercial traders’ positions were reduced to 20% to 30%.

While financial traders now dominate the price discovery process, how did these changes influence prices? First, as Hilferding suggested, it is important to highlight the difference between speculators and investors. Prior to the development of CIFs and the 2000 CFMA, there were essentially two categories of traders in commodity futures, commercial hedgers and speculators. The innovation of CIFs created a tremendous flow of funds into a passive, long-only commodity investment. CIF investors hold commodities over time for their diversification gains, and are

therefore willing to hold commodities without the incentive of a risk premium, and they may even pay sellers a premium for those perceived benefits. Speculators, on the other hand, bet on price movements in either direction.

The dramatic influx of investment funds had two effects on prices. First, according to Hilferding, speculators can influence prices over the short term (a bullish trend), but their influence will be reversed once their long positions are closed through offsetting sells prior to expiration of contracts. However, as Petzel (2008) states, this is true if the amount of funds flowing into futures is relatively static, but when there is a continuous influx of funds into the long side, as the Masters data indicates, bullish trends can persist. The 2008 price spike lasted about 18 months, beginning in February 2007 and ending in August 2008.

The second impact was on the risk premium. Historically, as Keynes suggested, markets were dominated by hedgers on the sell side who had to pay a risk premium to entice speculators to take the long side of the transaction, and markets (mainly) exhibited backwardation. With the influx of CIF positions, the passive longs often covered the short positions of hedgers, so the risk premium disappeared, or quite possibly investors paid a premium to hedgers who sold futures.¹⁴ The impact from these changes showed up in the F-S price relationship for many commodities that were included in the index. For example, from 1983 to 2004, the futures price curve for WTI oil alternated between backwardation and contango, with no explicit trend. However, beginning in 2004, the dominant price trend changed to contango. In the wheat market, the average front-month basis was 25 cents from 2000 to 20005, increased to \$1.10 from 2006-07, and reached a peak of \$2.25 in 2008. This level of contango in the wheat market meant that the most profitable trade for

¹⁴ For example, Hamilton and Wu (2014) found that the average risk premium for long positions in the oil market declined and became more volatile.

commercial interests was the storage arbitrage trade, which generated risk-free profits. While Keynes believed the return from this risk-free trade would be driven to the cost of storage, long-only CIF investors increased the spread so that $F - S > \text{cost of storage}$. As Petzel (2008) stated, it is the “owners of the physical commodity who are willing to sell into futures market and either deliver at expiration or roll their hedge forward if the spread allows them to profit from continued storage” (pp. 8-9). For example, in the wheat market, even though US wheat production was stagnant from 2001 to 2008, the number of short contracts held by commercial traders increased dramatically beginning in 2003. From 1997 to 2002, weekly short contracts held by commercial interests averaged about 61,000, and from 2003 to 2008 it increased to 151,000, a 147% increase.

The risk-free contango trade was profitable and Wall Street banks were not going to be left out. As Hilferding described, once banks have their pulse on the market, combined with their cheap cost of credit, they will take advantage of speculative trades on their own accounts. Banks started investing in oil and mineral storage capacity in the midst of the commodity boom:

These days, the Wall Street banks are more like those grain traders than you might think. They have equipped themselves to take delivery of raw materials when they choose to...Goldman owns a global network of aluminum warehouses. Morgan Stanley (MS) chartered more tankers than Chevron (CVX) last year...And JPMorgan Chase (JPM) hired a supertanker to store heating oil off Malta last year, likely earning returns of better than 50 percent in six months. (Bjerga, 2010)

As the housing bubble popped in late 2007, profits from commodity trading helped cushion the blow.

Despite the obvious changes in commodity markets, critics of speculation during the 2008 bubble maintained there was no evidence, the lack of inventory accumulations. The focus of this debate was the oil market.¹⁵ As critics like Krugman (2008) and Irwin and Sanders (2010) pointed out that, if prices were being driven by speculation, then there would be a buildup of inventories as evidence.¹⁶ As they noted, there was no noticeable buildup in oil inventories in 2008.¹⁷

Davidson (2008) argues these commentators did not understand the concept of user costs articulated by Keynes. If oil producers were paying attention to the higher price signals from futures market, then the profit maximizing decision would be to reduce oil production today and sell when prices are higher in the future. Higher futures prices, which CIF investors and speculators helped cause, increased marginal user costs, and OPEC producers reacted by restricting output, or hoarding inventories underground for future sale at the higher prices.

Juvenal and Petrella (2011) formally tested for speculation using the user cost argument. Their formal Factor-Augmented VAR model tested for different types of shocks over the period from 1973 to 2009. Previously, most studies relied on VAR models which found global demand shocks explained most of the oil price rise (China did it!). When they added additional factors to the model, they found VAR models over-stated the demand shock impact.

Juvenal and Petrella incorporated a speculative supply-side shock into their FAVAR model based on the user cost concept, which suggests that producers react to higher futures prices by

¹⁵ Unlike oil and minerals, wheat cannot be continuously produced, and, while the USDA attempts to measure US stocks, the large grain merchants are very secretive regarding their holdings of inventory.

¹⁶ It is a simple argument based on supply and demand. If the market price is driven artificially higher, then there it will create a surplus of goods in the market.

¹⁷ There was evidence of inventory builds during two other price episodes, once in 2006, and another during the price run-up in 2009. In fact, Krugman (2009) acknowledged the role of speculation in the 2009 episode because inventories were rising.

restricting supply, and hoarding inventories, both above and under-ground, and they find that the speculative shock from the futures markets explained about 15% of the oil price increases over the 2004-2008 period. They also argue that user costs explains observations of “stagnant supply”:

The historical decomposition also helps to explain the developments in the physical side of the oil market in the last decade. For example, Hamilton (2009b) observes that the growing demand of the past ten years was linked to a stagnant supply. Our model suggests that the reason for more stable oil production can be found in rising expectations of future spot prices, which undermined the incentives of producers to accommodate demand. (p. 24)

Keynes’ concept of user costs explains, first, why producers would respond to higher expected future prices by restricting supply, and second, the lack of inventory build-up from spot prices driven higher by speculation—it was more profitable to keep oil in the ground at the present, then sell in the future at higher prices.

Juvenal and Petrella’s estimate from speculation was based on the full sample period. In an appendix, they tested a sub-period beginning in 1986:

Some results are of interest. The comparison of the impulse responses for the two periods reveals that the transmission of shocks remains very stable. The historical decomposition is very robust to the subsample analysis, with the speculative shock playing a slightly more important role from 2004 to 2008 while the impact of the other shocks is almost identical. The fact that the speculative shock exerts a larger influence in the 1986 subsample suggests that, if anything, **we might be understating the importance of speculation over the last decade** (p. 25—italics mine)

Conclusion

Over one hundred years ago Hilferding explained how finance was becoming a controlling force in capitalism, and more and more economic activity was being influenced by bank credit. Today, this concept of financialization is used to describe similar changes in the economy. In commodity futures markets, financialization has dramatically altered the price discovery process, with financial traders now dominating the markets. During the commodity bull cycle from the late 1999 to 2011, there were several price episodes where speculation was an important contributor to price rises. While some of these episodes exhibited evidence of inventory accumulation, the 2008 price bubble did not. Keynes' concept of user costs provides an explanation for this lack of evidence.

Historically, in futures markets dominated by producer-sellers, a risk premium was necessary to entice speculators to take on the price risk through long positions. With the incursion of CIFs into the markets, many are now balanced—the long CIF positions cover the short producer positions. This suggests that true speculators are more influential in determining price movements. In fact, evidence from the third commodity price bubble from 2009 to 2011, suggests speculators, in the form of hedge funds, have become the driving force in price movements. According to a study by UNCTAD (Flassbeck, Bicchetti, Mayer, & Rietzler, 2011), from July 2009 to February 2011, speculative money-manager traders (MMT) had the highest correlations with commodity price movements. Over this period, the correlation between CIF positions and oil price was 0.18,

while MMT positions had a correlation of 0.81.¹⁸ To paraphrase Keynes, while the bubble from speculators is fine when riding the stream of enterprise, the job of the futures markets is ill done when price formation is driven by a whirlpool of speculation. In today's financialized futures markets, the decisions of speculators drives the course of prices in the short run.

The impact from financialization of futures markets raises an interesting point related to this historical survey: given that CIF positions have reduced, if not eliminated, the risk premium, Hilferding's analysis may now be correct--speculator's profits are a zero-sum game.

¹⁸ The correlations for CIF and MMT positions for other commodities were similar: 0.09/0.56 for wheat; -0.08/0.52 for corn; and -0.12/0.54 for sugar.

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