Investing in commodities: Keynes’s practice in speculation

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Abstract

Keynes’s attitude towards speculation cannot easily be assessed, appearing somewhat ambivalent. On the one hand, in well-known passages of the *General Theory*, he complained about the destabilizing role of speculation and, more in particular, about the short-term perspective which lies behind it, that seems to lead speculators, in search of quickly earned profits, towards ‘anti-social’ investment behaviors (Keynes 1936). On the other hand, when he elaborated his theory of speculation – with particular reference to the functioning of the commodity futures markets – he seemed to consider the role of professional investors not only as perfectly legitimate but also as beneficial to the efficiency of the economic environment, in so far as they provide the fundamental function of *risk-bearers* towards their counterpart on the market, the hedgers/producers (Keynes 1923, 1930, 1936). It seems, therefore, useful to better investigate Keynes’s approach to speculation and the aim of this paper is to provide a contribution in this direction. The analysis here offered – differently from other treatments of the same subject in the literature – is not undertaken on the basis of Keynes’s theoretical writings or statements contained in newspapers articles and official documents on speculation, but instead by looking at his practice as an investor in commodity markets. Only recently some studies have been focused on the reconstruction of Keynes’s investments in specific commodities (cotton, wheat, metals) in the interwar period (Cristiano-Naldi 2014, Foresti-Sanfilippo 2012, Cavalli-Cristiano 2012, Marcuzzo-Sanfilippo 2014) or in currencies (Chambers-Accominotti 2014). These studies, all grounded on unpublished archival material, represent an original perspective, that can provide new evidence to assess and clarify Keynes’s view of speculation. This paper, focusing on Keynes’s future and option trading in metal markets, specifically in the 1920s, detect and analyze the main speculative strategies he adopted in his investment activity. Keynes certainly must be considered as a ‘non-commercial’ investor, to use a current definition, and it appears therefore revealing (and relevant) to look at how he himself interpreted the role of speculator in these markets.

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1. Introduction

A full picture of Keynes’s investments in commodities, securities, shares and exchange rates is far from being achieved. A complete analysis of his portfolio and performance is still lacking. Nevertheless, some progresses have been done in recent years to provide some pieces of knowledge about his activity in some specific markets. Accominotti and Chambers (2014) have analyzed his performance in the exchange markets; Cristiano-Naldi (2014) have investigated his investment

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2 For an analysis of Keynes’s theory of ‘normal backwardation’ in the commodity futures market see Fantacci-Marcuzzo-Sanfilippo (2010).
activity in the cotton market; Foresti-Sanfilippo (2012) have provided a preliminary assessment of his trading in the wheat markets; Cavalli-Cristiano (2012) have focused on the tin market and Marcuzzo-Sanfilippo (2014) have analyzed his investment behavior in metal options.

In this paper it is provided an assessment of his main strategies in future and option metal markets, with the aim of clarifying the way in which Keynes himself played the role of ‘speculator’ and its evolution over time. This certainly represents only a partial and narrow perspective, not sufficient to reach general conclusions on his approach to speculation, but hopefully significant for the following reasons. Keynes invested in metals for a sufficiently long period of time, going from 1921 to 1939 and to a large extent. The total number of contracts (futures and options) traded by Keynes in the four non-ferrous metals (tin, copper, lead and spelter) amounted to 497, while the total volume – in terms of quantities indicated in the contracts traded – amounted to the striking value of 42,455 tons.

Furthermore, and differently from other commodity markets, in which he also invested for large periods of time (like cotton and wheat), in metals he traded not only in futures but also, in particular during the 1920s, in options, which represented then – as well as nowadays – a highly speculative type of investment. These circumstances, together with the high fluctuations shown by spot and futures metal prices within the interwar period, make Keynes’s trading in these markets a particularly telling case in point, that can provide useful elements to the understanding of Keynes’s behavior as a speculator and, through it, his attitude towards speculation.

2. Non-ferrous metals spot and futures markets in the interwar period

In Keynes’s times the leading market for futures and options trading on metals was the London Metal Exchange (LME) which, established in 1877, had by the 1880s grown and developed as the most important organized world market, in particular for exchanges on non-ferrous metals, namely tin, copper, lead and spelter (Forrester 1931). The contracts usually traded had three-month maturity but longer or shorter maturities were also admitted. Just after the end of the First World War, when dealings had just been restored, it started a period of disturbed trade to which many factors, common to all kinds of business, all contributed (see A History of the London Metal Exchange, 1958). First of all, there was the problem of readjustment of capacity, stock and prices, aggravated by labour unrest, political uncertainties and fluctuating exchange rates. A further source of trouble and instability, which was specific to metals trading, came from the drastic reduction in world demand that – unlike other commodity markets – took place just after the armistice, when armament requirements suddenly ceased. As a consequence, prices immediately began to fall from wartime levels, but this decline was brief and immediately succeeded by a remarkable inflationary boom. Prices reached a peak in February 1920 but collapsed again shortly after, in March and April, and remained low for the remaining part of the year, and indeed during 1921, basically because of an excess of supply and accumulation of stocks (ibid.). Another source of trouble lay in the increasing integration of international metal markets, which made the London Metal Exchange in particular much more sensitive to events in the United States, like metal deliveries there or the selling policies adopted by the American producers, as a consequence of the accrued importance of the US as world producer (and consumer) and the corresponding decline of Great Britain’s role. So, when Keynes started to deal in metals, in 1921, the general conditions of these markets were on the up-swing but highly volatile, thus providing ample scope for speculation. Let’s look now more closely (see Fig. 1
below) to spot price movements\textsuperscript{3} of the main non-ferrous metals along the interwar period, that is when Keynes operated in these markets.

Fig. 1

As the figure shows, the tin market in the interwar period was characterized by a very high volatility in prices. The spot price, starting from a level of £210 in January 1921, reached a maximum of £331 in mid-October 1926 and a minimum of £100 in May 1931 – just before the sterling abandoned the gold standard. It can be observed a substantial positive trend (even though with high fluctuations) from 1921 up to 1926, followed by a steadily negative trend from 1926 up to the beginning of the 1930s. After 1932 the trend decidedly reversed and the price reached a peak of £296 in March 1937, after which it dropped again in 1938, rising again in 1939, on the eve of the Second World War.

An observation of the spot prices of copper and lead reveals that these two metals showed a much lower instability than tin, their oscillations being substantially smaller. In particular, the copper spot price, starting from a level of £73 in January 1921, showed a slightly decreasing trend in the 1920s (with some ups and downs) and finally reached a peak of £97 in March 1929, only few months before the big crash. In the following years the prices decreased (with some oscillations), reaching a level of about £27 in September 1931 (just when the sterling has abandoned the gold standard). In Summer 1935 the trend started to reverse and prices went up reaching a peak of £76 in March 1937, after which prices decreased again.

\textsuperscript{3} The weekly time series for spot prices are taken from the Times on line Archives.
The lead spot price showed even a higher stability than the copper price. Starting from a level of £23 in January 1921, it can be observed an upward movement in the first half of the 1920s followed by a downward movement in the second half of the decade. The price remained stable at a low (and quite stable) level during the first half of 1930s, rising only from 1935 onward, and reaching a peak of £36 in March 1937, after which the price came back to its previous level.

3. Future and option trading in metals at Keynes’s times

Before analyzing Keynes’s investment behaviour and strategies, it is useful to consider the different financial instruments available in the London Metal Exchange at the time and the various costs involved. A part from standard futures contracts for different maturities (mainly three-month, but not exclusively) there were also different types of options. First of all standard call and put options, which gave the right to the buyer, at the expiration date, of buying (call) or selling (put) the quantity indicated in the underlying future contract at the strike price. Besides ordinary call and put options a financial investor at that time could also buy a double option, that was a combination of a put and a call, giving the right to exercise only one of the two at the expiration date. This type of option was quite expensive since it could be exercised as a put or as a call, according to the direction of price movements. It was therefore used when prices were particularly volatile and the direction of movements particularly uncertain: by buying it the holder could gain in fact not by anticipating the ups and downs of prices but by the size of changes. A special type of options also traded were the BOD (buyer’s option to double), which was an ordinary purchase of a future with the purchase of a call option attached, and the SOD (seller’s option to double), which was an ordinary sale of a future with the purchase of a put option attached. If the amount was not doubled at the expiration date (i.e. the option part was not exercised) these contracts worked in all respects as standard future contracts, although they had been negotiated at a price which was higher (in the case of BOD) or lower (in the case of SOD) than the standard future price in order to include the option premium.

All these types of options, like the standard call and put, were of the European type, namely they could be exercised only at maturity.

Finally, Keynes’s ledgers also provides evidence (at least starting from 1924) of the possibility for an investor to be a writer of an option, i.e. to sell options, as we shall see.

The price of the option (premium) changed according to the type of option and the metal traded. At this stage of the analysis we were unable to detect any option pricing formula consistently followed and we had to rely on the information scattered in the ledgers and correspondence, which seem to indicate the rule of thumb of a fixed amount (ranging from £1 to £3) added to the three-month future price of the metal.

The cover necessary to carry a position with a broker varied according to the instrument and the underlying commodity. For instance, in July 1922, Buckmaster & Moore (Keynes’s broker) gave

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4 This type of option at that times was also called ‘straddle’ in the US (see Smith 1922: 46) or ‘put-and-call’ in England (see Higgings 1896[1906]: 7).
5 For example, on 28 February 1923, Trouton explained to Keynes: ‘Options are becoming much more expensive. The Call option on Copper is 32/6 bid; the double option on Copper is 60/-; the BOD on Copper is at least £1 over three months, probably more like 25/- . The double option in Tin is £11.10/-; the BOD in Tin is £4.10. over three months and the three-month Call in Tin might be got at £6’ (SE/2/2/181).
Keynes the following quotes: ‘We expect the following proportions to cover to be maintained intact at all times on open positions at their current valuation: in exchange 20%, in Commodities 30%, on Call options Payment in full. We are content that not only cash balances standing to your credit and securities deposited with us (reckoned at their current market value), but also book profits on your open position, should count towards the proportions of cover required’ (SE/2/2/25).

4. Keynes as a speculator: main strategies

In this section we offer a presentation of the main strategies followed by Keynes in his investment in non-ferrous metal markets, more specifically in tin, copper and lead, in relation to both spot and futures price movements. Some references are also made to his activity in the spelter market. This section aims to let emerge the main characteristics of Keynes’s behavior as speculator in these markets. The analysis covers the period 1921-1928, except for copper where the interval is shorter (1921-1924), because these are the years in which the speculative activity undertaken by Keynes is not only greater in size and frequency of exchanges but also seems more interesting, since during this period he traded extensively both in futures and options. After 1928 and up to 1938, he reduced drastically his investment activity in metals. He traded in options only through few operations in the 1930s in tin and copper, while it continued to invest, even to a lesser extent, through futures. Before analyzing in detail the different strategies adopted by Keynes it is useful to provide an overview of Keynes’s investments in futures and options in these three metals markets.⁶

Copper

Keynes entered the copper market in September 1921. He would be active in that market until January 1925 (see Fig. 2 below), when he basically suspended his dealings both in futures and options;⁷ he resumed his activity with a small-scale operation in futures in the Spring of 1929 (SE/11/2/54) and again later in 1937 (February/April and August/September, TC/4/3/156-163 and TC/4/3/180-186). Options were the contracts most traded in copper by Keynes, as measured by the number of positions opened (53)⁸. Most of these options were call (39), followed by double (7), BOD (5) and Put (2).⁹

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⁶ We do not consider here Keynes’s investments in the spelter market since his activity in this metal was limited in size and time-span. He traded only from 1922 to 1924, through few, although highly profitable, operations in call options and futures (for a reconstruction of his activity in the spelter option market, see Marcuzzo and Sanfilippo 2014).
⁷ We have evidence only of one put traded by Keynes on March 15th 1929 (SE/11/2/54).
⁸ The number of futures contracts was 14.
⁹ Since one of these two puts – the one bought on October 16th 1924 – was not exercised (SE/11/2/29) and the other one was traded only in 1929 (see fn. 7 above), we can conclude that in the period considered here Keynes practically did not trade in copper put options. Furthermore, in neither case were put options associated with long positions in futures contracts for the purpose of hedging.
Lead

Keynes entered the lead market in February 1922, with some long positions in futures. Then in July 1922 he started to deal also in options, mainly through calls and doubles up to the end of 1923. In 1924 and 1925 he bought calls and futures, and in 1926 he completely stopped his activity for resuming it in January 1927 (see Fig. 3 below). In October of the same year he gave up dealing in options and carried on with long positions in futures, which he closed in August 1928 (SE/11/2/50). Options were the contracts most traded by Keynes in terms of the number of contracts (64) but, contrary to his practice with copper and tin, in the lead market he traded only two types of options: for almost all the cases he bought calls, and only in four cases (all in Spring 1923) did he take up doubles.

10 The number of futures contracts traded in lead was 38.
**Tin**

Tin was the commodity most traded by Keynes (see Fig. 4 below). He entered the market in September 1921 and carried on trading in it almost uninterruptedly until 1939, when all his commodity dealings were forcefully suspended due to the outbreak of the war. Between January 1922 and December 1928 he was very active in options, alongside large exposures in futures. Then he suspended all trading in this market for a year and a half and resumed it in April 1930, continuing until August 1931; he traded options occasionally again between April and June 1932 and between January and April 1933, after which he stopped again his activity on the tin market. He went back twice a few years later, between June 1936 and January 1937 and between April 1938 and April 1939, taking up mainly – but not exclusively – long positions in futures (TC/4/3/124, 138, 216, 257)\(^{11}\). In the tin market Keynes experimented with all the derivatives available to him at the time and held the highest number of contracts: futures (166), call (72), put (21) BOD (15), double (14), SOD (7). After 1925 he also took delivery of some of his futures and stocked tin in the London Metal Exchange warehouses, thus moving part of his operations onto the spot market. His strategies with tin options – not unsurprisingly, given the high volatility of prices – were more complex than with the other metals. In this market he experienced the largest combinations of investment strategies. He behaved not only as a buyer of futures, call and double options, but also as buyer of BOD and seller of SOD options. As we shall see, he was also a writer of double options and put options (these positions are accordingly represented in the negative quadrants in Fig. 4 below).

\(^{11}\) We have evidence of only two double options sold by Keynes in July 1936 (TC/4/3/128) and in July 1938 (TC/4/3/226).
Let’s now turn to the analysis of the strategies followed by Keynes in the different periods of investment in these three metal markets.

**From September 1921 to July 1922**

On the 19th of September 1921 Keynes entered in the metal markets through future trading in copper and tin. He went long and then, from December 1921 onward, he bought mostly call options in copper and call and BOD options in tin. This behavior confirms that Keynes had at that time bullish expectations and also a propensity to increase his exposure (through BODs) on the latter market. Along this period he bought also two future contracts in lead (respectively in February and in June). All these contracts were of three-month maturity. Ten months later his first operation, i.e. on the 19th July 1922, as a result of these first experiences of investment in metal markets, he registered in his ledger a loss of £2191.8s (SE/11/2/7).

What can we observe about the evolution of prices? As far as the tin market, when Keynes in mid-September 1921 bought his first future contract at a 3-month future price of £156.10s, the spot price was around £154, implying that Keynes’s bullish view were shared by the market itself. Around the beginning of December, when Keynes closed his long positions in tin, he was able to sell at a market price of about £165. Having therefore became more confident, Keynes in the same period ventured in the option trading, by buying, up to July 1922, a series of call options and in two cases also BOD options, betting on a further increase in prices. Once again his bullish expectations...
were shared by the market, as testified by the fact that along the whole period going from December 1921 to April 1922 the 3-month future price remained steadily higher than the spot price by 2-3 pounds. Then this differential started to reduce up to July 1922, when the market registered a substantial equality between the spot and the 3-month future price.

As far as the copper market, when Keynes bought his first future contract at a 3-month future price of £69.5s, the spot price was slightly lower (about one pound less) than the 3-month future. This implies that, also in the case of copper, Keynes’s and market’s bullish expectations coincided, but since price differentials between spot and future prices in this market were generally smaller (the market showed a greater stability than for example the tin market, as we have seen in section 2 above) it appeared more difficult to get the timing right. In fact when Keynes went to close his long positions in copper, in December 1921 and January 1922, the spot price had dropped around £66 and he bore some losses. The 3-month future price remained above the spot price until May 1922 but only by a small amount (often considerably less than one pound) and finally, from May to July 1922, this differential practically disappeared and spot and future prices tended to equalize.

As far as the option trading both in tin and copper, Keynes started, as we have seen, with buying call options in December 1921-January 1922 and after a first period in which he was obliged to let expire them (including a BOD on tin) because the market prices at maturities revealed to be lower than the strike prices, then, from February to July 1922, he could exercise all the options he bought at profit. But on the whole, as we have seen, his performance in this first cycle of investment was not successful. It is worth to be noted that good price forecasting does not necessarily implies high net profits, just because of the great weight of all the transaction costs, particularly high in the case of options (on this point see Marcuzzo and Sanfilippo 2014).

A look to the fundamentals of non-ferrous metals – as reported by Keynes himself in his first Special Memorandum on Stocks of Staple Commodities of April 1923 (CWK XII: 270) – can help in explaining the bullish expectations of both Keynes and the market. In fact in 1922 the level of consumption exceeded the level of production, both in 1921 and 1922, and the level of existing stocks were unable to cover the difference. So it was reasonable to expect, across the 1921-1922, a rise in prices of these raw materials.

Keynes’s first approach to investment in these commodities was characterized by two elements: (i) the trading on futures and options, while going in the same direction (i.e. betting on an increase in prices), appeared to be completely independent one from the other; (ii) his bullish behavior can be considered ‘in the swim’, i.e. in accordance with the prevalent view of financial investors in those markets, and so, we can infer, in line with the information directly deriving from the analysis of fundamentals.

**From July 1922 to February 1923**

This period was characterized by Keynes’s massive investment in options, in particular on the three markets of copper, lead and spelter, while tin was abandoned for a while. We have evidence of only one (though very profitable) operation in tin throughout the whole period, a 3-month call option bought on the 4th of December 1922 for 50 tons, with a strike price of £175.10s and exercised at a market price of £206, that brought to him gross profits amounting to £1525. The size of the price differential (about £30) and the timing of this single operation seems to reflect a very precise information. The options bought by Keynes in the other three markets were all 3-month calls and testify bullish expectations concerning the prices of all these metals. We have evidence of
only three future contracts bought in lead along this period, but again, as in the first investment cycle, these operations do not seem linked to his trading in options.

Keynes registered in his ledgers (SE/11/2/7) an increase in his losses for the period going from the 19th of July 1922 to the 13th November 1922 amounting to about £3560, partially recovered at the end of the year. In fact, on the 1st of January 1923 Keynes’s position (SE/11/2/16) was the following: the total realized losses from the beginning of his investment activity in metals (in September 1921) amounted only to £2113.8s.11p; the book profits amounted to £9320, £2175 of which was the estimated value of unexpired options.

**From March 1923 to September 1923**

His unsuccessful performance in these first periods of investment had not discouraged Keynes, who did not reduce his activity nor refrain from his trading in options, but probably had induced him to adopt some kind of hedging strategy. In fact, along the 1923 Keynes seemed to have acquired an advanced knowledge of the working of these markets. He started to follow a more sophisticated behavior, based on a combination of futures and double options bought for the same maturities, and quantities, with future prices very close, if not identical, to strike prices. In practice, he hedged his long positions in futures with doubles, which were exercised as put. He adopted this strategy in April-July 1923 in copper and lead (SE/11/2/19) and in May-August 1923 also in tin (SE/11/2/21). This behavior allowed him to reduce his losses in a period in which prices, contrary to his bullish expectations, went down.

In this period Keynes’s investment behaviour testifies: a) of an increased ability to employ the different financial instruments in a more complex way; b) of the persistence of a bullish attitude in these markets (both by Keynes and the market); c) of the difficulty in getting the time right (and making profits) even when at the end the expectations were revealing to be correct, as it was the case in the operations reconstructed above in lead and tin; d) of a desire (and also a capacity) to face risk of adverse changes in prices through the recurring of the purchase of double options. The latter type of option, in fact, can be exercised both as a put (to hedge long positions in futures in the event of a future decrease in prices) – as Keynes did in the examples seen above – or as a call, if prices increase, confirming the bullish expectations ruling at the time when the futures contracts have been bought. When the time comes, according to the direction of actual movements in prices, the investor can alternatively: (i) increase his exposure (and gains) by exercising the double as a call, if his bullish expectations will reveal correct and prices have increased; (ii) or offsetting his future contracts by exercising the double as a put, totally compensating (or at least reducing) the losses, if prices have dropped.

Another type of strategy that characterized this period was an outright long position in lead call options. In February 1923 Keynes bought 12 call options, 8 of which (those for maturities going from July to September 1923) he was obliged to let expire because prices went in the wrong direction.

As far as Keynes’s performance in metals in the whole 1923, we have evidence of the following results. Keynes registered in his ledgers (SE/11/2/16) realized profits of £14,470 up to the 8th of May. Then from the end of June to mid-August realized losses of about £8548 (when his bullish expectations on lead prices revealed to be wrong, as we have seen before). And finally a partial
recovery from October to the end of the year, with realized profits of £3177, giving a net value (for the whole year), of about £9100 realized profits.\textsuperscript{12}

**From September 1923 to December 1924**

In the last quarter of 1923 Keynes invested in futures on tin, lead and spelter. In particular in December, notwithstanding the negative results of the previous months, he tried again the same highly speculative activity in lead options. On the 7\textsuperscript{th} of December 1923 he bought 8 call options, each for 200 tons, at a strike price of £29, for maturities going from May to December 1924, revealing therefore his bullish expectations for the second half of 1924. The great exposure in terms of quantities (the total volume of the underlying futures contracts was of 1600 tons) and the total cost borne by Keynes in a single day for buying these options, £1000, testifies of the existence of a high ‘weight of the arguments’ for his bullish expectations, perhaps based on some precise information about the future evolution of lead prices. Whatever was the ground of his convictions, this time he was right and these operations revealed all to be highly successful. In fact Keynes was able to exercise all these options in the second half of 1924 at market prices going from £29.12s (in May 1924) to £39 (at the end of November 1924). It is worth to be noted that in this particular case Keynes’s and market’s expectations were at odds. On the 7\textsuperscript{th} of December 1923 (the same day in which Keynes bought his lead options), the spot price was higher than the 3-month future price,\textsuperscript{13} and this implies that the market had a bearish view about lead prices for the beginning of 1924. On the other hand, starting from January 1924, both spot and futures prices started to increase steadily, reaching on the 7\textsuperscript{th} of March 1924 a peak of about £39, after which the trend reversed. Then prices in mid-May came back to their levels of December 1923 (i.e. around £29), but from the end of May to the beginning of December 1924 they reached again the peak of £39. It was exactly this second phase of increasing prices that Keynes was able to anticipate at the end of the previous year, and for that reason he was able to gain huge profits.

From February-March 1924 to May-June 1924 there was another type of strategy adopted by Keynes which consisted in the selling of double options in tin and copper, associated to the buying (or selling) of futures. \textit{To sell} a double option means to be a \textit{writer} of this option. It seemed possible at that time for an individual investor to be the writer of an option, but only through the broker. In fact we have evidence of this kind of orders in the letters exchanged between Keynes and Buckmaster and Moore. When the option is sold the writer gains the premium, that in fact in this type of operations was registered in Keynes’s ledgers in the column of revenues (e.g. SE/11/2/24) and not in the column of costs (as it was usually the case when Keynes bought a double option). Once the option is sold by the writer, two are the possible scenarios at maturity: a) the double option is exercised by the buyer as a put and therefore Keynes must be ready or to ‘receive’ the physical commodity – as it was the case for example in two circumstances for tin and copper, as testified by the correspondence with the broker (SE/2/4/68; SE/2/4/74) – or alternatively to sell short the commodity, before the delivery date, through a future contract; b) the double is exercised by the buyer as a call and Keynes must already have (or must acquire on the market at the market price) the commodity that he had promised to sell to his counterpart at maturity. This explains why Keynes together with the selling of the double option bought a future for the same maturity and quantity of the underlying contract of the double option that he could have used in the event that the

\textsuperscript{12} It is not clear if Keynes registered here his net or gross realized profits.

\textsuperscript{13} The spot price was around £30 and the future price was something less than £28.
buyer exercised the double as a call. On the other hand, this future bought became in a certain sense ‘redundant’ (and Keynes could close it separately) once he was sure that the double was not exercised as a call (e.g. SE/2/4/76). Obviously, the choice of the buyer of the double option at maturity (whether to exercise it as a call or as a put) depends on the market price of the metal (relatively to the strike price). This type of operations represents the highest speculative form of behaviour adopted by Keynes since the writer of the double option offers to the buyer a cover against all the possible states of the world (either an increase or a decrease in prices). And for this reason it could therefore be interesting to clarify in details his operations, undertaken by Keynes only in copper and tin.

On the 25th of February 1924 Keynes sold a double option for 25 tons of tin with a strike price of £271.10s and 25th May maturity, gaining £687, given by the price of the option (premium) per ton, 27s, times the quantity indicated in the contract. At the beginning of May when maturity approached, it became clear to Keynes that the double would be exercised by the buyer as a put, since the basis was £271.10s while the spot price on the 9th of May has dropped to £225. This implied that Keynes had to be ready to receive tin at maturity (SE/2/4/68). Alternatively, Keynes on the 8th of May sold short a future contract with 26th May maturity for 25 tons at a price of £230, so he engaged himself to sell on the 26th of May exactly the quantity of tin that he should receive on the 25th of May by the closing of the double option by his counterpart.\textsuperscript{14} The net result of this complex operation was a loss of £350, to which commissions should be added.\textsuperscript{15}

The operation that Keynes did on the copper market in the same period is slightly different because Keynes on the 11th of March 1924 sold a double option for 250 tons with a strike price of £69.12s.6p for 11th June maturity, gaining £1125 given by the price of the option (premium) per ton, 90s, times the quantity, and on the same day he bought a future for the same quantity, delivery and future price equal to the strike price. This second operation can be interpreted simply as a covering by Keynes against the event that the double option was exercised as a call by the buyer, or as an evidence of Keynes’s bullish expectations for the future months. What actually did happen in the following months? Prices dropped drastically reaching in May a value around £61; so it became clear to Keynes that his counterpart would have exercised the option as a put and not as a call. Therefore, on the 15th of May, he decided to close his future contract at a market price of £61.11.10p, bearing total gross losses for £2008 (SE/11/2/24 and SE/2/4/64)). What happened to the double option sold in March? At maturity, on the 11th of June, since price had dropped the buyer of the option exercised it as a put and Keynes should have been ready to accept delivery of the commodity. But just the day before, when the intention of the buyer was already notified, through the broker, to Keynes, he sold short a future contract with maturity on the following day, at a future price of £61.15s and he used it as the closing of the double option (see the letter to B&M,\textsuperscript{14} In fact, this short selling of the future represents nothing else that the closing of the double option and just for this reason Keynes registered it on the same line as the double option, as he usually did for the closing of any operation (SE/11/2/24).

\textsuperscript{15} In February 1925, from the selling of the double, Keynes gained £687.10s. In May the buyer of the option exercised it as a put and Keynes had to buy 25 tons of tin at the strike price of £271.10s per ton, bearing a total cost of £6787.10s; at the same time he had sold short 25 tons at a price of £230, from which he totally gained £5750. So the net losses of £350 came up from £687+£5750-£6787.
SE/2/4/76). What were the results of this set of operations that should actually be considered as unique complex operation? A total loss of £844.\textsuperscript{16}

These examples show that when Keynes ventured to be the writer of double options in the 1920s he was highly unsuccessful. He could therefore reveal useful to examine deeper the specific circumstances that, in general, give rise to profits when this complex strategy is adopted. Generally speaking, a buyer of a double is an investor who bets on a high volatility in prices in the following months, while a seller (writer) of a double bets on a substantial stability (or low volatility) in prices. In fact the buyer will gain if, whatever the direction of price movements, the differential between the strike price and the market price is high, in particular higher than the premium paid for buying the option (+ the transaction costs). On the other hand, a writer of a double will gain if, whatever the direction of price movements, the differential between the strike price and the market price is low, in particular lower than the premium he has collected when he sold the option.

In the case of double options in commodities this reasoning is complicated by the circumstance that a seller of a double needs to associate to this operation the buying or selling of future contracts, because he needs to have the physical commodity to sell if the buyer will exercise the double as a call, and, at the opposite case, he needs to sell short the commodity (if he does not want to take delivery), in the case in which the buyer of the option will exercise it as a put. This implies that to assess whether the writer will gain requires a more complex analysis, which includes not only the consideration of the premium in comparison with the price differential between the strike price and the market price, but also the consideration of the differential between the future price and the strike price. Let’s examine separately the two possible scenarios of price movements.

When prices are decreasing, the buyer will exercise the double as a put; when the writer has associated to the selling of the double option also a short selling of a future contract for the same quantity and maturity, the writer will gain on the whole if it is satisfied the following inequality, where \( p_o \) represents the premium (the price of the option), \( p_f \) is the future price and \( p_m \) is the market price:

\[
[p_o+(p_f-p_m)]>(p_s-p_m)
\]

So the writer will gain when the sum of the premium (which represents his revenue from the selling of the double) plus the difference \( p_f-p_m \) (which represents his revenues from the short selling of the future contract) is higher than the difference \( p_s-p_m \) (which represents the cost that he must pay in compliance of the double option contract he sold). This implies that the more \( p_f \) is above \( p_s \) and the higher will be the chance of gain for the writer.\textsuperscript{17}

When, on the other hand, prices are increasing, the buyer will exercise the double as a call; when the writer has associated the buying of a future contract for the same quantity and maturity, he will gain if it is satisfied the following inequality:

\[\text{From the selling of the double he gained, as we have seen, £1125. As a result of the exercise of the option as a put by the buyer Keynes had to bear a cost of £17,406, but this cost was in fact partially compensated by the short selling of the future contract, which brought to him a revenue of £15,437. So the net result was a gross loss of £844 (given by £1125+£15,437-£17,406). To this it must be added also the losses due to the closing of the future contract that Keynes had bought as a covering against the event that the double was exercised as a call, which amounted, as we have seen, to £2008. If we consider also the commissions, the value of losses will be even higher.}\]

\[\text{In principle, the writer could gain also in the case in which } p_s>p_f \text{ provided that this differential remains lower than the premium.}\]
$$[p_b + (p_m - p_f)] > (p_m - p_s)$$

This implies that the more $p_f$ is below $p_s$ and the higher will be the chance of gain for the writer. In conclusion, a careful analysis of this type of complex strategy followed by Keynes (writer of double options+buyer/seller of futures) shows that this speculative behaviour, in the case of a downward price trend, turned more likely to be successful on the whole when the strike price indicated in the double option (i.e. the price at which the writer promised to buy forward the metal) was lower than the future price indicated in the future contract sold (i.e. the price at which he sold forward the metal). Conversely, in the case of an upward price trend, it resulted more likely to be successful on the whole when the strike price indicated in the double option (i.e. the price at which the writer promised to sell forward the metal) was higher than the future price indicated in the future contract bought (i.e. the price at which he purchased forward the metal).

These experiments, undertaken by Keynes in the first half of 1924, should have revealed to him how difficult was to gain from price differentials and to get the timing right. After these negative experiences, he abandoned this type of strategy in the 1920s. He tried again, probably with more expertise, in the 1930s, in the tin market, in two occasions, both characterized by an upward price trend, in 1936 and 1938, and this time he gained.\(^{19}\)

The second half of the year, from May to December, was also characterized by a great exposure of Keynes on the tin market; he invested through a series of BOD options bought in the expectations of an increase in prices, that actually occurred and Keynes could exercise them, by doubling all the quantities indicated in the underlying future contracts.

**From January 1925 to December 1928**

At the beginning of 1925 Keynes practically abandoned his investment in copper, both in futures and options.\(^{20}\) He stopped also his investment in lead in 1925 and 1926 and he came back in 1927-28 to invest in this metal, even tough to a much lower extent, through futures and options.\(^{21}\)

The only metal in which he continued to invest extensively throughout all this period was tin, alternatively using all the strategies that he have already adopted in the previous years. It is perhaps worth to focus only on a specific strategy adopted by Keynes from September to December 1925 (when he was in the Tin pool\(^{22}\)), and from December 1925 to March 1926, which consisted in the selling of 3-month put options.\(^{23}\) Looking at the tin spot prices we can observe that the trend was upward from September 1925, when the price was around £253, to December 1925, when it reached the value of £270. In this case, the buyer of the put options was obliged to let them expire and

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18 In principle, the writer could gain also in the case in which $p_f > p_s$, provided that this differential remains lower than the premium.

19 Applying the same complex strategy in the tin market in July-October 1936 (TC/4/3/128 and 132) and in July-October 1938 (TC/4/3/226 and 237) he got profits respectively of about £1400 and £230.

20 We have evidence only of few operations in futures in 1929 and he came back to invest more actively in this market only in 1930s.

21 It should be remarked that in 1925 Keynes started to invest extensively in wheat and corn, and he continued to pursue his investment activity in other commodity markets, such as cotton and rubber.

22 In fact, in the 1920s several “tin pools” were formed to control production and prices, and in May 1925 Keynes himself took a share (SE/2/5/95) in a private pool. From the correspondence we learn that Oswald Falk, Rupert Trouton and Jack Budd (son of Cecil) belonged to it and from the ledgers we can infer that Keynes’s participations lasted until October 1925, while the pool was presumably dissolved at the end of that year.

23 In the period September 1925-March 1926 Keynes was a writer of 17 put options, 15 of which were let expire by his counterpart.
Keynes gained the full amount of the premium. This trend continued also from December 1925 to March 1926, when it touched the peak of £290. In these circumstances one again Keynes gained the full amount of the premium for the put options sold and not exercised by the buyer.24 A careful analysis of these operations shows an impressive ability to guess the direction of price movements and to get the timing right. It is tempting to infer that his hunches seems to have been sparked by some ‘insider information’ to which he was privy as a member of the Tin Pool. Notwithstanding these fortunate investments, on the whole his performance was not successful in this period.

For the whole 1925 Keynes registered in his ledgers (SE/11/2/37) total realized losses on the tin market amounting to £628, due to a very unsuccessful performance in the first half of the year up to July (total realized losses of £9869), almost fully compensated by a very successful performance in the second half of the year (total realized profits of £9241) from September to December, due also to the fortunate speculation in selling put options, that we have analyzed above. He registered also heavy realized losses in lead (amounting to £5616).25

The years 1927-1928 were characterized by an investment activity focused on the tin market, where Keynes went long by buying futures, call options and BODs and only in few occasions he covered his position by buying double options. His performance was particularly unsuccessful in 1928, when the prices substantially dropped.

5. Conclusions

This paper focuses on the analysis of Keynes’s practice as speculator in the future and option non-ferrous metal markets of copper, lead and tin in the period 1921-1928 and considers his trading as a case-study, worth to be analyzed, of his practical attitude towards speculation. Without having any presumption to reach some general conclusions (that would require a full analysis of Keynes’s portfolio along the whole period of his investments), the examination of his trading activity and his main strategies in these markets could allow us to give some partial and provisional answers to the following questions: a) what was his attitude towards risk? How frequently he hedged his positions, how frequently he did leverage and how frequently he did not cover at all his positions?; b) did he more frequently follow a long-term perspective in his investment choices, characterized by the rollover of long positions in futures (and call options), or did he more frequently adopt a short-term perspective aiming at ‘beating the market’; and in this latter case how often was he able to anticipate the reversal in the price trend?; c) what was the role of fundamentals in determining his investment behaviour?; d) and what was the role of privileged information in his choices?

The analysis of Keynes’s investment in practice in metal markets can provide some elements of additional knowledge. First of all, his investment behavior seemed to assume a highly speculative profile especially in the years 1922-1926, when he associated to his investment in futures also his trading in options. Secondly, throughout the whole period here examined he showed a marked tendency to assume long positions through futures and call options but also a high propensity to risk, since he did not cover his positions, except in few occasions, with the short selling of futures or the buying of put options. More frequently he increased his exposure by associating to long positions

24 Only in one case, for the option sold on the 3rd of March 1926 and exercised by his counterpart on the 1st of June, Keynes took delivery (SE/11/2/41).
25 This negative performance was only partially compensated by a gain of £1007 in the spelter market. The situation did not change in 1926, when Keynes registered total realized losses in tin of £828, and a very modest gain in lead of £164, while investment in spelter ceased completely (SE/11/2/37).
also the selling of put options. In this respect, he appeared to be a risk-lover. Thirdly, in some cases, especially in 1923-1925, after having acquired a greater experience and knowledge of how these markets worked, he ventured in more complex strategies, made of different combinations of futures and double options, sold and bought, but his performance in particular in these operations was unsuccessful and he learned through them how difficult was to gain from price differentials. Finally, we have seen that the accurate knowledge of the market fundamentals was certainly an important element in determining his investment choices but a role seems also to have been played, at least in some specific circumstances, by the possess of some privileged information.

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