Paul Einzig and the covered interest rate parity principle anomalies

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Abstract

Paul Einzig was an Hungarian columnist and economist who wrote an impressive number of books and articles between the early twenties and his death in 1973. Einzig is a specialist in international monetary relations and devoted a major part of his effort to discuss the comparative interest of various international monetary arrangements. His only technical concern is with the principles governing the forward exchange market. In the line of Keynes *Tract on Monetary Reform* chapter 3, he presents the covered interest rate parity principle, then exhibits its anomalies during the thirties, as Keynes did it on early twenties data series. The resulting Keynes-Einzig conjecture remains one of the more interesting expression of the international exchange rate market imperfections: contemporaneous debates suggest that these anomalies are still imperfectly understood.

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1 Introduction

"What may be termed the Keynes-Einzig conjecture has two components: first, that covered arbitrage between the major financial centers in the interwar period was only triggered once the deviation from CIP exceeded about 1/2 percent (that is, fifty basis points) on an annualized basis, and, second, that even when arbitrage was triggered, deviations were arbitraged away only slowly because of the less than perfect elasticity of supply of arbitrage funds." (J. David Peel and Mark Taylor, 2002, p. 52)

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Paul Einzig was born in 1897 in Brasov, Transylvania, at a time when this Romanian region was still a part of Hungary. He is educated at the Oriental Academy of Budapest where he begins to work as journalist during the WW1. He comes to London in 1919 where he is rapidly employed by *The Financial News* and finds an early editorial success with the publication of two articles in *The Economic Journal*, he is nominated as the Paris correspondent of *The Financial News* where he stays to prepare a *Doctorat* thesis at *La Sorbonne* under the supervision of Louis Germain-Martin University. He defends his thesis in 1923 on the movements of prices in France from 1914 with Bertand Nogaro in his committee (Einzig, 1960, p. 40). He becomes the foreign editor of *The Financial News* in 1923, then continues a carrier devoted to financial journalism, enhanced by frequent interventions as author of articles of *The Economic Journal* or other academic reviews. He meets and corresponds with the best British economists - including Keynes -, and begins to write this unreal number of books, ranging from *The Theory of Forward Exchange* in 1937 that he makes dynamic in 1961 (*A dynamic Theory of Forward Exchange*) to numerous less ambitious books devoted to a specific question or event related to the successive monetary and financial systems he will observe until his death in 1973. From 1939, he is correspondent of *The Financial Times* and maintains a continuous link with this review until he retires in 1956. During this period and after, he continues to write books and articles, overall on financial and monetary subjects but even on more unexpected topics like this strange (see *The economic consequences of automation* in 1956).

The name of Paul Einzig is still present in the contemporary academic debates but only in a very specialized subject: Einzig contributes in the twenties to the analysis of forward exchange rates and formulates the so-called "Keynes-Einzig conjecture". During many years, Einzig is indeed fascinated by the mechanisms of foreign exchange market. After a decade of observation of this market, he considers from the mid-thirties that his main purely analytical contribution to economic analysis will be located in this field. Einzig writes many book and articles before and after his developments on covered interest rate parity. But, while he considered the analysis of international monetary regulations as an imprecise science, hardly able to predict which of our current decisions will benefit to the future of our international relationships, he regarded exchange rates mechanisms as purely technical relations which could not be contradicted without serious reasons. This is the reason why we have chosen to devote this paper to the Keynes-Einzig conjecture.

The rest of this paper is then an attempt to present Einzig observations on exchange rates anomalies in a context where the covered interest rate parity should have hold. Section 2 presents the contribution of P. Einzig to the first observations of the covered interest rate parity anomalies during the inter-war. Section 3 addresses the modern explanations of the anomaly and the place of Einzig arguments in them. Section 4 concludes.

2 The inter-war exchange rate market and covered interest rate parity anomalies

2.1 The post-war evolution of gold points

During the twenties, after the return of the Sterling to Gold, Einzig publishes an article and many smaller notes in the *Economic Journal* devoted to comment the evolution the Gold points (Einzig 1927a, 1927b, 1928, 1929, 1931), then to elucidate the deviation of those points from their theoretical levels. These meticulous observations are devoted to observe any changes in the coordination rules of the external exchange market from the return to convertibility of the Pound. Einzig indeed observes significant changes in the Gold points between London and New-York. "It is a common but superficial conception to regard gold points as something essentially stable, bearing a fixed relation to mint parities. In reality, even before the war, when the factors determining the gold points were more settled than at present, gold points were subject to changes" (Einzig, 1927a, p. 133). Einzig begins to attribute these changes to the increase of the freight, of the insurance and the interest (Einzig, 1927a). In 1928, then in 1929, he comments the new and important movements of Gold among Central Banks, more or less associated with the difficulties of The Bank of England to maintain its too high parity. But for the moment, only gold points seem to interest Einzig. During this period, Einzig deplores the extent and the rapidity of the changes of the gold points, due to the tendency of Central banks to move large amounts of gold under conditions they determine "independently" from market forces: "in certain cases the exceptional measures of interference are explained by the necessity for some central banks to increase immediately their gold stocks, so as to be able to maintain the gold standard [...] In other instances the policy is inspired by a desire of saving transport costs. This was the case of the triangular gold transactions arranged in May and June 1929, between the *Reichsbank*, the Federal Reserve Bank of New York, and the *Bank of France*, and, to a small extent, between the two former and the National Bank of Belgium" (Einzig, 1929, p. 380).

2.2 Keynes and the covered interest rate parity

The chapter 3 of *The Tract on Monetary Reform* (Keynes, 1923) is devoted to "The theory of Money and of the Foreign Exchange". The chapter exposes and comment in its first part the Purchasing Power Parity principle. Then, Keynes presents the Forward exchange market, its utility for professional and its capacity to hedge usefully commercial transactions. Keynes has collected interesting data on the London market of exchange, concerning spot and forward transactions between the British Pound from one hand, US dollars, French franc, Italian Lira from the other hand. He observes the relations between sport and forward and notes for instance than "during 1920-1021 forward dollars were generally cheaper than spot dollars to a London buyer to the extent of from 1 to 1.5 per cent per annum" (*Ibid*, p. 117). He then presents complete tables to compare spot and forward rates of exchange and

proceeds to comment them, referring to several events able to explain specific variations of the spread between the two rates for a given couple of currencies. His first generalization follows these observations: "if dollars one month forward are quoted cheaper than spot dollars to a London buyer in term of sterling, this indicates a preference by the market on balance, in favour of holdings funds in New York during the month in question rather than in London, - a preference the degree of which is measured by the discount on forward dollars." (*Ibid.*, p. 123).

The gain made when an operator holds one currency instead of the other during one year and uses spot and forward transactions to hedge his position expresses "a preference by the market, on balance, in favour of holding funds [in a place] rather than in [another]" (*Ibid.*). "This difference between the spot and the forward rates is, therefore, precisely and exactly the measure of the preference of the money and exchange market for holding funds in one international centre rather than in another [...]. That is to say, forward quotations for the purchase of the currency of the dearer money market tend to be cheaper than spot quotations by a percentage per month equal to the excess of the interest which can be earned in a month equal to the excess of the interest which can be earned in a month in the dearer market over what can be earned in the cheaper." (Ibid., p. 125). This is probably one the first definition of the covered interest rates parity principle. The principles are illustrated by examples, still concerning the comparison of the spot and forward rates of exchange of British pound in another international currency: Keynes analyzes for instance the effect of cheap money rates in London from the middle of 1022 to the middle 1923: "In the case of the dollar the forward quotation had risen by the beginning of 1923 to a rate 3 per cent per annum above the spot quotation (*i.e.* forward dollars were 3 per cent per annum *cheaper* than spot dollars in term of sterling), which meant (subject to modifications by the other influences to be mentioned below) that the effective rate for short loans approached 3 per cent higher in New York than in London" (*Ibid.*, p. 125)

As soon as Keynes has formulated the principles governing the arbitrage rule determining the covered interest rates parity that he begins to identify cases where the principles does not apply perfectly of even approximatively. Keynes refers to uncertainty in general as a cause of non-respect of the general principle. Uncertainty can have political origin: "The various uncertainties of financial and political risk, which the war has left behind, introduce a further element which sometimes quite transcends the factor of relative interest. The possibility of financial trouble or political disturbance, and the quite appreciable probability of a moratorium in the event of any difficulties arriving, or of the sudden introduction of exchange regulations which would interfere with the movement of balances out of the country, and even sometimes the contingency of a drastic demonetisation, - all these factors deter bankers, even when the exchange risk proper is eliminayed, from maintaining large floating balances at certain foreign centres. Such risks prevent the business from being based, as it should be, on a mathematical calculation of interest rates; the obliterate by their possible magnitude the small "turns" which ca be earned out of differences between interest rates plus a normal bankers's commission" (*Ibid.*, pp.

126-127). Then, Keynes mentions other motives which could generate anomalies in the principles: the excess of sellers or purchasers of forward external currency and overall the cases "where our assumption of a large and free market breaks down." (*Ibid.*, p. 128). At last, Keynes refers to speculation as a last cause of anomaly in the application of the principle: in this case, the "abnormal discount can only disappear when the high profit of arbitrage between spot and forward has drawn fresh capital into the arbitrage business" (*Ibid.*, p. 130).

Keynes is not satisfied with his discussion on the motives of the anomalies of the covered interest rate parity. His development is then devoted to discuss the interest of a Central Bank control of the exchange rate market. In this passage, it is interesting that the main argument of Keynes is not to require the intervention of Central Banks to limit speculation but to substitute speculators when they are not sufficiently numerous on the market: "Where risk is unavoidably present, it is much better that it should be carried by those who are qualified or are desirous to bear it, than by traders, which have neither the qualification nor the desire to do so, and whose minds it distracts from their own business." (Ibid., p. 137).

2.3 Einzig *Theory of Forward Exchange*

With the first effect of the Great Depression and the progressive withdrawal of the major countries from the Gold Exchange Standard during the early thirties, gold points stop to play a stabilizing role at the international level and Einzig is now interested in the relevant external exchange stabilizing mechanisms, in a word of floating exchange rates. With his initial interest in gold points, Einzig has understood the role of arbitrage mechanisms in the foreign exchange markets. He finds rapidly that, with inconvertible currencies, the domestic and external short term interest rates provide a new possibility of international arbitrage when there is a possibility to conclude forward currency exchanges. He naturally refers to Keynes as the first to formulate in a newspaper article in 1922, then in his 1923 *Tract on Monetary Reform* a principle that in many practitioners already put in use in the prewar period.

In 1937, Paul Einzig then publishes his first theoretical book, on the only technical topic that he will choose to develop during his long life as economist and columnist: the forward exchange market. The book begins by a preface in which Einzig acknowledges his friends bankers for having read and controlled the manuscripts: Einzig is still not converted (he will never be) into an academic economist and he feels that the management practices of gold standard must be found in practitioners experiences more that in reading contemporaneous specialists of monetary analysis. He adds only the names of three academic economists to his list of acknowledgments: John-Maynard Keynes, Giovanni Demaria the young future editor of the *Giornale degli Economisti*, and Henry Parker Willis, the old professor of Washington and Lee university, adviser of the first real-billist Governors of the Fed of New-York and Washington.

While the topic of *The Theory of Forward Exchange* is rather technical, the style of the book is not. Einzig presents to the reader the arbitrage mechanisms and its imperfect application during the interwar in a very literary form, like he will do all his life to address other questions of finance or monetary policy. But he also proposes a long appendix presenting weekly quotations of the spot and forward exchange rates for one month and three months of the US dollar, French franc, German mark, Italian lira, Dutch gulder, Swiss franc and Belgian franc in sterling. These data are extracted from the weekly circular published by the Anglo-Portuguese Colonial an Overseas Bank, Ltd. which provides at this time the only continuous published record from the beginning of 1921. Einzig also collects and presents the London Bank rate and the Bank rates in New York, Paris, Berlin, Italy, Holland, Switzerland, Belgium from 1920 to 1936. With these data, he can calculates the discount rate parities between London and these other places. Einzig also publishes monthly averages of market rates of discount for three months' prime bills in the various centers, compiled from the Statistical Yearbook of the League of Nations and other sources and call money rate parities between London on one hand and New York, Paris, Berlin, Italy, Holland, Switzerland, Belgium on the other hand (Einzig, 1937). This impressive amount of data and evaluations is devoted to point out the deviations of the foreign exchange market during the thirties from an arbitrage equilibrium determined by the covered interest rate parity principle.

2.4 The imperfections of the external exchange market

In the thirties, arbitrage mechanisms are indeed currently used by practitioners and the interest rate parity has been presented by academic economics. Frenkel and Lewich (1975) provide a long quotation of David Ricardo's 1811 *Reply to Mr. Bosanquet* where arbitrage is presented as the adapted form of competition on the foreign exchange market. With the development of forward exchange markets in the nineteen century, arbitrage on interest rates becomes a well known strategy and allows even Central banks to manage in an adapted way Gold Exchange in the prewar period (Boyer-Xambeu, 1997). In normal time, "there exists a neutral band around the traditional line [between the absolute differential of interest and the relative differential of exchange rates - forward and spot] within which no covered arbitrage is profitable. Such a band is implied if there are transaction costs and/or if some (or all) of the elasticities of the demand and the supply (of securities and foreign exchange) are less than infinite" (Frenkel and Levich, p. 337).

Einzig comments the observations of Keynes and has a new explanation to propose for the observed anomalies: these abnormal margins around the forward exchange rate resulting from its arbitraged level could be associated to the "widespread feeling of optimism that set in after the war regarding the future of the depreciated currencies. It was generally taken for granted that not only sterling, but the franc and the lira, even the German mark, would eventually return to their Purchasing Power Parities, and even to their prewar Mint parities. Speculative anticipation of the rise of these currencies resulted in a persistent premium on forward sterling

against dollars, and in a premium on the forward lira, mark,..., against both sterling and the dollar. Ample opportunities were thus afforded for highly profitable interest arbitrage with the exchange risk covered (Einzig 1937, pp. 67-68).

But Paul Einzig provides also his own stylized facts and particularly concentrates his observations on the important anomalies on the French market in 1935-1936. "As the devaluation of the franc had been widely expected, forward francs were at a persistently heavy discount from May 1935 until the devaluation in September 1936... The result is that it had become highly profitable for French banks to use their liquid resources in interest arbitrage" (Einzig, 1937, p. 193). In a 2002 paper, David Pell and Mark Taylor use non-linear econometric methods to verify the conjecture of Keynes and Einzig. Their results support their observations: there exists a large margin of 0.5% around the "parity line" in which no arbitrage is made. Peel and Taylor do not select among the possible interpretations (inefficiency of the market, transaction costs, relative illiquidity of banks) but conclude that each one could be supported in the interwar context. The debate has a new episode with the conjecture of Lyons (2001): the "forward bias" will not be arbitraged until it only integrates an excess return over the other comparable trading strategies. This conjecture seems now supported by the econometric tests realized by Paya, Peel and Spiru (2010) on 1922-1924 data.

3 Modern explanations of the anomaly

3.1 At the twilight of the Bretton-Woods system

In 1961, twenty-four years after *The Theory of Forward Exchange*, Paul Einzig opens a second and definitive chapter to his analyzes of interest rate parity in a new and voluminous book entitled *A Dynamic Theory of Forward Exchange* (Einzig, 1961). The book is presented to the reader as a didactic and exhaustive work: it offers a general synthesis of all the developments that the prewar and postwar literature devotes to interest rate parity. The chapter 13 then identifies 10 different motives to an imperfect (covered) interest rate parity. The following chapters try to present elements for a dynamics of interest rate parity. "Dynamic theory in a methodological sense explains the process by which forward margins tend to remain in given circumstances in the close vicinity to their Interest Parities" (Einzig, 1961, p. 276). In these developments, Einzig encompasses a large range of causes of moves of the interest rates, forward or spot exchange rates, and the influence each variable has on the other ones.

In realty, the distinction made by Einzig between the static approach of interest rate parity and the dynamic one refers mainly to the sense of the causality between forward exchange rates and the other variables in move at each change of interest rate parity: "under a dynamic theory of forward exchange forward rates are liable to affect spot rates, and in doing so they tend to produce international transfers of funds, gold movements, changes in the levels of interest rates, in the trade bal-

ance and in the price levels" (*Ibid*, p. 270). For instance, this "dynamic theory" integrates all the causes of moves of forward rates with non-perfectly flexible spot rates: "under the Bretton Woods system of exchange stability the role played by the Foreign Exchange system is admittedly less dynamic than under a system of fluctuating exchanges, but more dynamic than under the pre-1914 gold standard, or even under the partly inter-war gold standard" (*Ibid*, p. 267).

Although the contemporaneous reader is frequently disappointed by the style of Einzig (few effort to synthesize the arguments, repetitions, lack of rigorous proofs, few illustrations...), Einzig progressively escape from the initial discussion of the sense of the causality between the four variables in relation in the covered interest rate parity and to evaluate the real effects of forward exchange market, in the case of the Bretton Wood system. The report is particularly negative for an early specialist of this kind of market: "forward exchange is liable to affect interest rates or relative level of interest rates in a disturbing senses. It may tend to raise interest rates where they are already too high, and to lower them when they are inconveniently low. It is liable to affect the volume of credit in a sense that reduces employment and output. Resistance to pressure on the gold reserve caused by covered arbitrage necessitates credit squeeze and this means a setback in the expansion of the output and in the rise of the standard of living" (*Ibid*, p. 281). In the following lines, after a discussion of specific effects of forward exchange market specifically linked to the residual role of gold in the Bretton Woods system, Einzig points out the origin of these destabilizing effects: they are "psychologically and technically self aggravating. The more funds are lost though interest rates arbitrage the more speculation is likely to increase against the currency concerned. This tends to widen the forward discount which again means more loss of gold through interest arbitrage" (*Ibid*, p. 282).

The book ends up with an analysis of the way each national monetary authorities have managed their forward exchange market during the inter-war period. The method of the book but also its style are evidently of another age, and it probably appeared as such even in 1961[1].

3.2 Why the covered interest rates parity does not yet apply?

The second book that Einzig devotes to the covered interest rates parity anomalies is followed by many academic articles, observing on diverse periods and markets the relation between exchange rate and interest rates. Half a century after the book they conclude that, in many circumstances, the covered parity of interest rates principle

[1]Remind that 1961 was also in macroeconomics the year of publication of the John Muth paper announcing the rational expectations revolution and in microeconomics the moment chosen by the *Journal of Political Economy* to publish the first Stigler proposals on "the Economics of information", announcing the next reformulation of a new paradigm in Economics. Compared with these texts, the old fashioned book of Einzig comes from another age.

still does not apply [2]. Some works limit to observe - with more or less sophisticated econometrics - the departure of forward exchange rate from their covered interest rate parity level (see for instance Crowder 1995). Other try to explain the reason of the departure. Their results can now be distributed in the following classification:

3.2.1 The transaction costs assumption

While the rational expectation generations glovally found that the influence of transaction costs on the Keynes-Einzig conjecture has been exaggerated (see Clinton, 1988), the next generation of macro-economists has been more attentive to the cause of the forward exchange rates anomalies. The transaction cost explanation is especially supported by Juhl, Miles and Weidenmier (2006). The authors find indeed that a comparison of spot and forward US-UK exchange rates during the classical Gold Standard period, with the interest rates of the two countries as an explanation of the spread, exhibits the importance of transaction costs as a cause of the anomalies in the covered interest rate parity principle. During the 1990 decade, another set of articles have pointed out the effect of transaction costs on these imperfections (Abeysekera and Turtle, 1995, Blake, 1998).

3.2.2 The asymmetric risk of counterpart

The 2007-2008 financial meltdown has renewed the observations on the way the "observed" covered interest rates arbitrage integrates uncertainty and finally departs from its deterministic expression (Coffey, Hrung, and Sarkar, 2009, Mancini and Ranaldo, 2011, Bhargava, Dania, and Malhorta, 2011). When the risk of counterpart is integrated, an apparent advantage of a position involving a loan in an insecure currency can correspond to the expression of a normal risk premium. As pointed out by Fong, Valente and Fung, "covered interest rate arbitrage is generally realized using interbank deposit rates which are not risk-free since they are subject to different levels of credit risk. Arbitrage activities can eliminate the market risk associated with the movements of exchange rates and interest rates, but they cannot eliminate the credit risk associated with the interbank deposits and the counterpart risk in the forward contracts." (Fong, Valente and Fung, 2010, p. 1099). Some of the arbitrage profits observed in the exchange rates then reflect such risks of credit and counterpart. Baba end Parker (2009) have found that "sharp and persistent deviations from the covered interest rate parity condition observed during the turmoil [can be] associated with differences in the counterpart risk between European and US financial institutions." (Baba and Partker, 2009, p. 1953).

[2]Note however that the post-keynesian position is not in line with the Keynes-Einzig conjevture as it develops the idea that the covered interest rate parity is verified. For this approach, the respect of the principle is a way to exclude any tendency of the forward rates of interest to predict the evolution of the spot ones. See on this subject I. Moosa (2004).

3.2.3 Liquidity

Financial market liquidity play a key role in moving prices to eliminate arbitrage opportunities and to restore the covered interest rate parity principle (Kumar and Seppi, 1994). More recently, Roll *et al.* (2007), then Fong, Valente and Fung (2010) study the arbitrage profits associated to the violations of covered interest parity and their relationship with market liquidity and credit risk using a dataset of tick-by-tick firm quotes for all financial instruments involved in the arbitrage strategy. They show that positive arbitrage deviations include a compensation for liquidity and credit risk.

3.2.4 The temporary impossibly for an efficient arbitrage

This is an explanation applying to singular period, corresponding mainly to sudden shocks on the exchange rate market, or in the domestic / international money-market. During the 2007-2008 events, the financial crisis then resulted temporarily in a "breakdown of arbitrage transactions in the international capital markets [...] that stems partly from lack of funding and partly from heightened counterpart credit risk, in this case the risk of counterpart affecting some of the parties involved in the transactions of loans" (Coffey, Hrung, and Sarkar, 2009).

3.2.5 Political risks

Political risks have been identified as the risk generated by the possibility that a country change the condition of access of its market of capital. It is "the probability that the authority of the state will be interposed between investors in one country and investment opportunities in other countries" (Aliber, 1973). Dooley and Isard present a theoretical model showing that the political risk "depends essentially on the gross supplies of debt outstanding against different governments and the distribution of world wealth among residents of different political jurisdictions" (Dooley and Isard, 1980, p. 71).

4 Conclusion

The external exchange market is frequently taken as a reference of a free market, with large flows of supplies and demands that make impossible that a transaction could fail. Forward markets have developed new ways to make efficient arbitrage transactions in this market, in order make indifferent the use of one currency if the other at a given moment of time, once exchange rate and interest rates have been freely determined. Keynes, then Einzig have found that markets exhibit strong and persistent anomalies which cannot be explained without renouncing to some usual assumptions depicting the ideal conditions of activation of international exchange markets.

While the exchange rate market is organized, it is also the place for the expression of country risks, risks of counterpart, default risk, which affect some countries more than others, one market instead of the other. Flexible exchange rates make

necessary the prediction of these risks: we have crossed a period where sovereign risks were the major counterpart market risk. The interconnections of terms and market components, but also the role of the banks which dominate the money market but also intervene in all these terms and components make arbitrage positions more complex than explained by textbooks. The Keynes-Einzig conjecture seems a way to express that exchange rate markets are more imperfect than efficient, but also that their apparent anomalies are only frequently rational answers to their complexity and informational imperfection.

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