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Financial diversification before modern portfolio theory: UK financial advice documents in the late 19th and the beginning of the 20th century

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Abstract: The paper offers textual evidence from a series of financial advice documents in the late 19th century and the early 20th century of how UK investors perceived of and managed risk. In the world's largest financial centre of the time, UK investors were familiar with the concept of correlation and financial advisers' suggestions were consistent with the recommendations of modern portfolio theory in relation to portfolio selection strategies. From the 1870s there was an increased awareness of the benefits of financial diversification – primarily putting equal amounts into a number of different securities – with much of the emphasis being on geographical rather than sectoral diversification and some discussion of avoiding highly correlated investments. Investors in the past were not so naïve as mainstream financial discussions suggest today.

JEL Classifications: B10, B30, G11.

Keywords: Diversification, Markowitz, portfolio theory, portfolio risk, capital flows.

1. Introduction

Today investors are generally assumed to be risk averse wanting to maximize their expected investment return, generally agreed to be the total of income and capital gain over a particular period, for a given level of risk. Alternatively, they are satisfied only with the least possible risk relative to the return they seek. The measure most commonly used to quantify risk is the standard deviation of returns. In his PhD dissertation in the early 1950s, Markowitz developed a formalized model of portfolio selection, combining the statistical definition of risk with the risk averse assumption of investor behaviour. This application of a mean-variance model to the portfolio selection problem laid the ground for modern portfolio theory (hereafter MPT) (Markowitz 1952), triggering, inspiring and influencing a vast amount of research in mainstream finance. The main insight is simple and in line with the widely established financial strategy of diversification: if individual security risk is captured by expected variance of returns, portfolio risk requires a set of variances and covariances in order to be described. In other words, when it comes to the analysis of portfolio risk, one needs to take into account not only individual components' risk but also their interactions. Markowitz's mean-variance model was designed for a single period: an investor is assumed to estimate the mean and the variance of return for each asset being considered for the portfolio over the single period. Subsequent mainstream research has tried to generalize the single period model to a multi-period one under various assumptions about investor utility functions and dependency of returns between periods (see Elton and Gruber 1997). Markowitz was awarded the Nobel Prize in 1990 for his contribution to financial economics.¹

¹ The famous Capital Asset Pricing Model (CAPM), mostly associated with the names of Sharpe (1964) and Lintner (1965), was the 'logical' next step. It approached the risk of an individual asset through the lens of diversification theory. In the 1960s, given limitations in computing power, financial practitioners were more interested in a simple methodology by means of which they could value the risk of an individual security. Drawing upon Markowitz's formalization, CAPM (itself based on some very limited assumptions) offered investors this simple tool. According to the latter, the risk of every financial security comprises two components: the systematic risk and the unsystematic risk. The unsystematic part is idiosyncratic and can be reduced through diversification. The systematic risk is related to the market variation as a whole and cannot be diversified away. Thus, it is only the systematic risk which is relevant in determining the return. There is no premium for bearing risks that can be eliminated through diversification. In the following sections of this study, we see that a similar division of security risk into specific and systematic can be found in the financial discussions, both in the UK and France before World War I.

Everybody acknowledges, including Markowitz himself (Markowitz 1999), that general ideas of portfolio diversification existed long before the rise of MPT. In the case of the UK, there is also a consensus in the business history literature that “the practice of spreading capital among numerous investments was being adopted much earlier” than the 1950s, at least from the last quarter of the nineteenth century,² with studies even investigating diversification as early as in the aftermath of the Glorious Revolution in the 17th century (Carlos *et al.* 2015). At the same time, some of the analytical insights of MPT had also been addressed before Markowitz’s paper in 1952. For instance, Marschak, Markowitz’s supervisor, had used statistical variance as measure of return uncertainty, assuming that investor utility does not solely depend on expected return but also on expected volatility (Marschak and Makower 1938, see also Roy 1952). Other authors in the 1930s, such as Williams (1938) and Hicks (1935), also acknowledged by Markowitz (1999), had stressed the possible benefits of diversification but without delivering a proper optimization model. In 1952, independently from Markowitz, Roy also published an alternative approach to portfolio selection recognizing that “the principle of maximizing expected return does not explain the well-known phenomenon of the diversification of resources among a wide range of assets” (Roy 1952: 431). Nevertheless, Roy’s insights differed from Markowitz’s model and were later developed in an alternative approach to portfolio theory by the proponents of behavioural economics (see Edlinger and Parent 2014: 24).

For Markowitz (1999: 5) and the majority of mainstream research in financial economics, discussions prior to 1952 provided “an inadequate *theory* of investment that covered the effects of diversification when risks are correlated, distinguished between efficient and inefficient portfolios, and analysed risk-return trade-offs on a portfolio as a whole” (emphasis in the original). In other words, after the establishment of the discipline of financial economics in the 1960s (Jovanovic 2008), the rise of MPT was mostly seen as a genuine break with the past, signifying a lack of financial sophistication in investment strategies before the 1950s. It is usually argued that not until Markowitz’ paper on diversification in 1952, and in practice not until the advent of fast computers in the 1970s, were these modern approaches to portfolio

² Cheffins (2010: 127). See also Foreman-Peck and Hannah (2011: 1222) and Rutterford (2009).

management fully implemented (Faulhaber and Baumol 1988: 589, Read 2012). Prior to this, investors are thought to have had an erroneous and unsophisticated approach to risk and return (Bernstein 1996: 247), despite the fact that some might have been diversifying their portfolios in practice.

An indication that runs contrary to the above viewpoint was offered in 1945 by Leavens, a former member of the Cowles Commission. Leavens mentioned that he had examined “some fifty books and articles on investment that have appeared during the last quarter of a century” with all of them referring to a desirability of diversification (cited in Markowitz 1999: 14). Leavens does not offer any account of these studies and also mentions that the majority of them discusses diversification “in general terms and do not clearly indicate why it is desirable” (ibid.). Markowitz, who was aware of this paper at the time of his PhD (Markowitz 1999: 14), dismisses this indication of the existence of “some fifty books and articles” as he is not interested in approaches that do not put forward a formalized mean-variance modelling of investor behaviour. Markowitz reflects here the eclectic way in which the discipline of modern financial economics perceives of its history, being reluctant to recognize or even discuss interventions that did not invoke the language of mathematical formalization.

Approaching the financial history and the history of financial ideas through the lens of mathematical formalization might lead to serious misinterpretations. Financial history and the history of related economic and financial ideas before the 1950s or 1960s are more complex, heterogeneous and rich than suggested by mainstream approaches. Recent studies have attempted to revise and enrich the “canonical” history of financial economics (see Jovanovic 2008) in many different ways, pointing out, for instance, that in France of the 1860s and 1870s Jules Regnault laid the basis of modern stochastic models of price behaviour (Jovanovic and Le Gall 2001) and Henri Lefèvre came up with consistent graphs representing financial payoffs (Jovanovic 2006a). In the topic of diversification, the two books by Lowenfeld in 1907 and 1909 (see Lowenfeld 1907 and 1911) in the UK have been mentioned as genuine and influential studies of portfolio diversification with practical applications of how to internationally spread portfolio risks (Goetzmann and Ukhov 2006). Lowenfeld does not identify an efficient set of portfolios, nonetheless he offers a sophisticated analytical context of the main principles and building blocks of financial diversification. A recent study by Edlinger and Parent (2014) has established

that similar insights can also be found in France around the same time. In the books of two famous French financial analysts, Leroy-Beaulieu in 1906 and Neymarck in 1913 (see Leroy-Beaulieu 1924 and Neymarck in 1913), one can equally see that: “notions such as risk aversion and risk premium, international diversification and correlation, specific and systematic risks and arbitrage were common sense” (Edlinger and Parent 2014: 23). It is evident that the basic principles of MPT had already been outlined in the UK and France before World War I.

This paper goes one step further. Offering textual evidence from a series of financial advice documents, it shows that these basic principles of diversification along with related empirical portfolio selection techniques were widely discussed and debated among the UK financial community at least from the 1870s. After the turn of the century, diversification recommendations by UK financial analysts took a more sophisticated approach to advising investors of how to achieve a targeted return while reducing overall portfolio risk. This top-down approach appeared in a consistent way not only in Lowenfeld’s writings but also in texts by other authors and was openly debated in press and financial reviews. UK investors were made familiar with the concept of correlation and its practical workings to reduce portfolio risk. Financial advice given at the time was consistent with the recommendations of modern portfolio theory in relation to portfolio selection strategies. The same can also be said for the relevant discussions in France. As we see below in our analysis, Leroy-Beaulieu and Neymarck were not alone in their effort to systematically explain the benefits of diversification.

In a performative fashion, one would expect a mutual presupposition between financial practices, such as diversification, and related financial knowledge, practical or not. Financial knowledge can indeed be ‘practical’ in the sense that it contains, in an undocumented manner, everything that sets the visible and articulable domain of investors: experiences, perceptions, prevailing ideas, commonly held belief, ethics, aesthetics and know-how techniques and rules that guide everyday practice.³ At some point, this practical knowledge crosses a certain threshold and appears in a more systematic way in financial documents such as books, pamphlets, articles, reviews and prospectuses, being further developed and systematized. What the rest of the paper

³ For this performativity approach see Deleuze (2012) and Derrida (1988).

does is to trace and describe these visible moments in which the practical knowledge of the well-established practice of diversification is transmitted into documents and archives, thereby becoming observable to historians of thought. The paper discovers historical traces of ideas related to modern financial theory and sketches an alternative understanding of individual investment practices before Markowitz's mathematical formulation in the 1950s. It highlights an aspect of investor behaviour which, while dominant among financial communities in the past, has been unnoticed by the canonical history of financial economics.

2. Early conceptions of risk premium in the 1870s

From the second half of the nineteenth century, after the introduction of limited liability in 1856 (and its extension in 1862), the UK experienced a widening of participation in financial investment. A series of stylized facts have been highlighted in relevant discussions and debates, such as the developed character of UK stock exchanges, the rise of listed companies, the wide dispersion of shareholdings and the so-called gradual divorce of ownership from control (Cheffins 2010, Rutterford *et al.* 2011). So, at least from 1870s, ordinary investors and minority holders were gradually confronted with the question of how to manage their investments in the face of uncertainty in the gradually globalized financial markets. Early UK investors were aware of the practical implications of the risk-return trade off. This approach informed their investment decisions as how to deal with risk. In fact, all authors who attempted to put forward a systematic analysis of financial diversification at the time (see below) argued (implicitly or explicitly) on the basis of risk averse investors.

In the period under consideration, the late nineteenth and early twentieth century, UK government bonds, known as Consols, were generally considered as the risk-free benchmark, against which all other securities could be compared. Trustee securities, those which could be bought for trusts which did not allow trustees free rein for investments, were also considered relatively safe.⁴ For example, government

⁴ A trust is an arrangement whereby a person (trustee) holds property as its nominal owner for the good of one or more beneficiaries. In this instance trusts were often set up for widows and children, on the

bonds, such as those issued by the Indian government, were considered to be as low risk as home government bonds but offered a higher return: “The security of the Indian Government is scarcely, if at all, inferior to that of the British Government itself; for where would be the prestige of the British name were we to allow our Indian empire to be wrested from us by any power whatever?”⁵ Other overseas government and municipal bonds were clearly riskier than British or Colonial bonds, but offered highly attractive rates. For example, *Chadwicks* reported amongst new foreign issuers in London in 1870, the City of Boston, Massachusetts offering 5% coupon at a price of 87% of par, Russia offering 5% at 80, the Mississippi Bridge financing paying 7% and offered at 90, with Alabama paying 8% and offered at 94 ½. Japan came to the market for the first time in that year, with a 9% offering at 98.⁶ Such offers were very attractive in yield terms compared to 3% Consols.

The risk hierarchy moved up the scale from such government-guaranteed bonds, through priority corporate securities, to dividend-paying shares. Risk was reflected in the desired level of yield on each security – the riskier it was, the higher the required yield: “The higher the rate of interest, the worse the security” (Beeton 1870: 26). Once this had been determined, the investor could minimise risk in a number of ways.⁷ The first was to avoid investing in categories of security that were considered too high up the risk scale, the higher yield being deemed not worth the risk of interrupted income and/or capital loss (that is looking at risk-adjusted returns). The second was to spend time investigating each security in depth, by studying the accounts and reading newspapers, or by consulting advisers.⁸ The third method of reducing risk was to spread risk across different securities. Initially done as an ad hoc ‘extension’ to a limited portfolio, by the early twentieth century a global

death of the husband. Prior to 1893, trustees who were restricted to investing only in so-called ‘trustee investments’ could only purchase Consols. The Trustee Act of 1893 allowed trustees to purchase safe British and colonial government stocks, in particular those of India, UK and Indian Railway debentures and some ‘safe’ railway preference shares, as well as Bank of England and Bank of Ireland stock.

⁵ *Chadwicks’ Investment Circular* (1870: 52).

⁶ *Chadwicks’ Investment Circular* (1871: 38).

⁷ This categorization is not explicit in the texts of the period, but it is implied by them. For further discussion see Rutterford (2004) on how yields were used as a valuation tool to take account of risk.

⁸ Another way for investors to improve information flow was to live close to the company’s headquarters, area of operations and/or location of annual general meetings. For more discussion on local investment bias at the time, see Rutterford *et al.* (2015).

diversification strategy had been developed. The following sections focus on the diversification issue.

3 Naïve diversification in the UK as early as 1870s

Spreading risk across a number of securities was widely promoted by the 1870s. Financial advisers and analysts offered recommendations as how to combine a number of investments in a portfolio. For example, after acknowledging the British investor's preference for none but British securities, *Chadwicks' Investment Circular* in 1870 argued:

We are now too much alive to our own interests to place our trust in Consols alone; for indeed the British Government Funds cannot accommodate a tithe of the money that is always pressing forward for investment. Moreover, Railways, and even Foreign Stocks, have been found to pay better in the long run. We hold that, by a careful selection from the various media of investment, very remunerative returns in the shape of interest may be obtained; while, by a proper division of risks, not only may the *security* for the principal be rendered perfectly satisfactory, but there may be a good prospect that the invested capital will steadily increase in value (*Chadwicks' Investment Circular* 1870: 30-1).

Chadwicks, Adamson, Collier & Co. (Chadwicks) was a firm of accountants based in Manchester, but also with offices in London. In the 1870s they specialized in issuing prospectuses on a series of firms from different industries. The company was run by David Chadwick, a well-respected analysts and also a member of the Select Committee on company law amendment in 1877. *Chadwicks' Investment Circular* was issued monthly, from 1870 to 1875. They started the journal using their existing client base (of 5,000 investors). There is no doubt that the abovementioned ideas of diversification reached a wide audience of financial investors and with possible significant impact.⁹ The very first issue of the magazine was welcomed by the press

⁹ See Thomas (1973: 66, 123).

as a review of “sound and profitable investment.”¹⁰ Chadwicks used the magazine, also sold to the public, as a means of both suggesting investments and as an educational tool, including, as the above quotation shows, discussion of diversification as a risk reduction tool.

The authors of *Chadwicks’ Investment Circular* provided an empirical example, see Table 1 below, of how such “proper division” of risks might work in practice. Choosing four securities then dealt on the Stock Exchange of very different types, they showed that, had one invested £1,000 each in Three per cent Consols, Spanish Three per cents, Turkish Six per cents, and London and Western railway shares ten years before, the annual income yield would have ranged from 3¼% for Consols to 10¾% for Turkish bonds. They also took the change in principal value over the ten years into account, and showed how the total annual (simple interest) return on investment would have been 3 per cent for Consols, the same for Spanish Three per cents, 8¼% per cent for Home Railway Stocks, and a sizeable 11¾% on Turkish Six per Cents. They concluded that: “the best mode of employing money would thus appear to consist in making a judicious selection amongst Home Railways and Foreign Stocks” (*Chadwicks’ Investment Circular* 1870: 32).

[TABLE 1 NEAR HERE]

Similar advice was also offered in *Beeton’s Guide to Investing Money with Safety and Profit*, published in the same year:

If an investor wishes to secure a high rate of interest, he should divide his capital among a number of stocks that can be bought to pay a high rate of interest – the more the better. Supposing he has £500 to invest, let him invest £100 in each of the following – Turkish, Italian, Spanish, Egyptian, Guatemalan, or Argentine. By dividing his capital in this way, the investor reduces risk to a minimum, as it is unlikely that all these countries could stop paying their interest, although it is not unlikely that any one might do so (Beeton 1870: 26).

¹⁰ Liverpool Daily Post, 5 September 1870.

Samuel Orchard Beeton was a prolific publisher who aimed at the mass market; for instance, he started *Boy's Own* magazine in 1855 and published *Beeton's Guide to Household Management*, authored by his wife, in 1861. A major investor in Overend & Gurney, which suspended trading in 1866, he was forced to sell his brand, *The Beeton's Guide to...*, to another publisher, Ward, Lock and Tyler, for whom he subsequently worked as an employee. It was while working for Ward, Lock and Tyler that the *Beetons Guide to Investing* was published. Given the wide range of topics published under his brand, it is likely that *Beeton's Guide to Investing Money with Safety and Profit* probably captured public attention and disseminated the concept of diversification to a wider audience.¹¹

Although the example given above appears to limit investor choice to government bonds, *Beeton's Guide* to investing allowed choice from a wide range of countries and types of security. For example, the author showed how a 5% yield could be achieved in a number of different ways, by investing in two, three or more securities and a similar approach could be used to lock in any desired rate of interest. Five per cent could be achieved, for example, by buying half Russian bonds yielding 6% and half English railway debentures, yielding 4%. Alternatively, the same overall yield could be obtained from one third Turkish bonds yielding 6 ½ %, one third London and North Western Stock paying 5 ¼ %, and one third in new Three per cent Consols yielding 3 ¼%. A third method of gaining the magic 5% was one half in new Three per cent Consols, one quarter in 7 ¾% Argentine bonds and one quarter in Brazilian 5 ¾ % bonds. The key point was that “it is only necessary to invest a small portion of the whole in a high dividend-paying stock to bring the rate up to 5% and that the greater part is invested in perfectly safe securities. The more the capital is divided the better, so that there may be a smaller amount in each security” (Beeton 1870: 26, 54).

For those who had some savings but not enough to be able to diversify, investment trusts were a possible alternative; these funds diversified on behalf of their security holders adopting quickly a corporate status. Investment trusts issued securities mostly targeting small, ‘unsophisticated’ or passive investors. They promised diversification strategies, in the same way as wealthy people could do, and

¹¹ See Hughes (2005) and Elliot (2006).

“a return greatly superior to that obtainable on Consols without the introduction of any really abnormal risk” (Powell 1916: 472).¹² For example, in the prospectus of the Foreign and Colonial Government Trust in 1868 we read:

The object of this trust is to give the investor of moderate means the same advantages as the large capitalist in diminishing the risk of investing in Foreign and Colonial Government stocks, by spreading the investment over a number of different stocks and reserving a portion of the extra interest as a sinking fund to pay off the original capital. A Capitalist who at any time within the last twenty or thirty years had invested, say, £1,000,000 in 10 or 12 such stocks with ordinary prudence, would, on the above plan, not only have received a high rate of interest, but by this time have received back his original capital by the action of the drawing and sinking fund, and held the greater part of his stocks for nothing.¹³

The Foreign and Colonial Government Trust was the first British investment trust. It was promoted by Philip Rose, a partner in a law firm, familiar with the legal structure of trusts.¹⁴ *The Times* commented on the trust’s principle of risk management through diversification:

The scheme in its principle supplies a want that has long been felt, since it not only gives to that large number of persons who are always disposed to encounter the risk of foreign investments the means of restricting that risk to the smallest amount, but will also to a great extent provide an insurance against it by limiting the yearly dividends to a sum which, with the gains from sinking funds, will admit of an accumulation to meet any untoward contingencies.¹⁵

The success of the Foreign and Colonial Government Trust led to a rush of imitations of what became known as “average investment trust.”¹⁶ For instance, the Share Investment Trust, floated in 1872, drew directly on the success of the Foreign and Colonial:

¹² For an overview of the UK investment trusts see Rutterford (2009).

¹³ Guldhall Library, MS 18000, File 1223.

¹⁴ McKendrick and Newlands (1999: 26).

¹⁵ *The Times*, 20 March 1868, p. 10.

¹⁶ Scratchley (1875: 16), see also Rutterford (2009: 161).

The principle of distribution of risk by embodying in a Trust a number of undertakings, yielding high rates of interest, introduced by the F&C Trust, has been fully recognised to be of great advantage to investors... The present scheme proposes to embrace a number of well-selected industrial undertakings yielding high rates of interest.¹⁷

Following the same line of reasoning, the chairman of the Government Stock Investment Co stated in 1873 that: “our safety is having a wide area in which we trade instead of depending upon one municipal capital or one country. We have forty or forty-two different investments, that is, investments secured by different Governments” (cited in Powell 1916: 470). In those days, prospectuses and chairmen’s statements were published in newspapers, thus promoting the basic principles of diversification to a wide audience. At the same time, the directors of these trusts were typically professionals, lawyers and accountants, that is, knowledgeable and respected by the investor community, offering professional competence and prestige to the practice of diversification.

As these examples have shown, the general principles of diversification were by no means foreign to investors by the 1870s. From the early 1870s, these principles appeared in (investment trust) prospectuses, magazines, pamphlets, books and newspaper articles, and made investors systematically aware of the benefits of spreading risks worldwide. Moreover, investment trusts were able to undertake the distribution of risks on behalf of investors of “moderate means.” The examples also show that the primary advice to investors was to add as many risky securities, in equal weights, as required to generate a targeted yield. According to contemporary financial definitions, this amounts to *naïve diversification*. Surprisingly, recent empirical research offers evidence that naïve diversification, or alternatively the so-called $1/N$ rule of portfolio weights (N is the number of different securities), over-performs optimal portfolio strategies. Due to the complexity of financial markets, it seems that the gain from optimal diversification is more than offset by investor estimation errors (DeMiguel *et al.* 2009). Thus it would appear that the recommending of naïve diversification was a sophisticated approach to improving the return risk trade-off.

¹⁷ Prospectus, Guildhall Library, MS 14235.

4. More sophisticated approaches to diversification

A key development to the understanding of the benefits of diversification took place at the beginning of the twentieth century, offering a more sophisticated approach to global portfolio diversification. Instead of adding as many risky securities as required to generate the targeted yield, some investors began to realise that a more *top-down approach* to portfolio construction was desirable, targeting a particular level of yield *and* reducing capital risk through the choice of relatively uncorrelated securities. Historical analysis of returns, price volatility and correlation were all taken into account in the portfolio selection. The need for rebalancing was also allowed for by ensuring that only marketable securities were considered for inclusion. By 1914, only the mathematical optimisation of Markowitz' model was lacking in terms of portfolio best practice. In contemporary discussions relating to diversification, Lowenfeld's approach has been recognized in recent studies.¹⁸ The contribution of Lowenfeld was significant and quite influential (both within and outside the UK) but was not the only one that drew upon the earlier diversification recommendations in order to elaborate a more sophisticated top-down approach. Lowenfeld can be thus seen as part of a wider shift towards a more advanced, systematized and investor-friendly diversification approach that explained techniques and methods of how to reduce portfolio risk for a targeted return.

An early twentieth century example of the top-down approach is from a 1908 Pamphlet by "W.B" (anonymous) entitled *Women as Investors*. In a list of important principles and rules, the author recommends that women readers should "spread the capital over a number of concerns, and do not keep to one class of investment, so that if one or more are failures, there may remain others which are not" (W.B. 1908: 29). At the same time, women were also advised contrary to investing "more than about one tenth of the capital in any one concern, unless personally occupied in its management and control" (ibid.). More complex diversification strategies were

¹⁸ We are referring here to Lowenfeld (1907). This intervention was initially discussed by Goetzmann and Ukhov (2006) and later by Mitchell et al. (2011) and Edlinger and Parent (2014).

actively promoted by a number of contributors to the *Financial Review of Reviews*, a monthly magazine first published in 1905, and in textbooks such as *Investment an Exact Science*, authored by Lowenfeld. Lowenfeld, for example, recommended the following simple rules:

(1) The capital must be divided evenly over a number of sound securities. (2) All the stocks must be identical in quality. (3) Each stock must differ, in respect of the risk to which capital invested in it is exposed, from every other stock in the same list (Lowenfeld 1911: 79-87).¹⁹

May (1912), an actuary at the Prudential Assurance Company recommended that life assurance companies should diversify by choosing countries, then types of securities and deciding an amount authorized for each type/country according to preference. May divided the world into seven regions; Lowenfeld (1907), advising individual investors, recommended that they split the world into nine regions by dividing Europe into North and South, as well as adding an 'international' grouping, made up of companies operating on a global scale: international trusts, shipping, telegraph, marine insurance, etc. Figure 1 presents Lowenfeld's global investment geography. Such proposals recommended investing in each region of the world, and in a variety of types of security in each region, should funds permit. Crozier, in a 1910 investment text influenced by Lowenfeld and the *Financial Review of Reviews*, suggested spreading the securities of any one country across a number of different sectors such as government, railways, shipping, banks and industrials. Different types of financial instrument were also allowed, although preference shares and debentures were preferred to equities, the latter deemed more exposed to market volatility (Crozier 1910: 113).

[FIGURE 1 NEAR HERE]

¹⁹ The very same principles were also thorough developed in Lowenfeld (1907).

In terms of how much to invest in each security, the preferred number recommended for the private investors was ten securities, with equal nominal²⁰ amounts to be initially invested in each. This number tallied nicely with Lowenfeld's nine regions of the globe plus one 'international' sector. Withers (1930: 41) argued that, with ten securities, individual investments were large enough for the investor to have the power to realise a substantial portion of his invested capital whilst being few enough to allow the investor to monitor his portfolio and watch for any investments which required replacing. However, some allowance was made for the amount of money to be invested: for example, Lowenfeld (1907: 85) recommended holding 5 to 6 stocks for an investment of £500 to £1,000 and 8 to 10 stocks for £5,000 to £20,000.

The *Financial Review of Reviews* in their 1909 issue and Lowenfeld in his 1907 pamphlet, from which Figure 2 is extracted, produced a number of portfolios of ten securities, from different regions, each portfolio with a different income target, and each aiming to protect the capital value of the portfolio over about a ten year period, using a ten year historical period as an example. For each required yield level, securities with similar initial yields were chosen from each geographical area.

[FIGURE 2 NEAR HERE]

The historical data shown in Figure 2 are for the period 1897 to 1906, the longest and strongest period when overseas investments outperformed British investments pre-World War I. This historical analysis tallies with the approach of *Chadwicks' Investment Circular*, forty years earlier. Both use historical data as the basis of their recommendation for full global approach to diversification. Indeed, as Lowenfeld (1911: 15) argued, these sound principles of investment were based on "centuries of statistics and decades of practical experience." Today, ten years, or more

²⁰ The emphasis on nominal rather than market value reflected the relative disregard for capital gain or loss compared with yield as a source of return. Some publications were unsophisticated as to the number of securities to choose and the difference between nominal and market values as far as diversification was concerned. For example, the weekly *Investors' Review*, in 1905, recommended a model trust with four securities of nominal value £100 each, with market prices varying from £102 ½ for Buenos Ayres Railway Debentures paying 5% nominal to £280 for Nobel Dynamite shares paying 10% nominal yield (*Investors' Review*, November 11, 1905: 594).

commonly five years, of historical data is still the most commonly-used method of modelling optimal portfolios for the future.

On the basis of these charts, the portfolio analysis of the *Financial Review of Reviews* went further than an analysis of historical returns. It attempted to show graphically the impact of correlation on investment performance. These charts helped investors to portfolio selection picking up securities with negative correlations and thus making financial decisions that would have required very difficult matrix calculations and algorithms. Charts were a valuable guidance to complex financial decision making in other aspects of financial transaction as well in the 19th and early 20th century (see Weber 2009 and Jovanovic 2006a).

An article by Professor Chapman in the *Financial Review of Reviews* explained positive correlation or lack of it by saying that some industries were complements, such as the pen and pencil industries, whereas others were independent, such as the pen and boot industries (Chapman 1908: 27; see also Crozier 1910 and Lowenfeld 1907). Although the term correlation is never mentioned as such by any of the above texts, these writers were clear that efficient global diversification required more than a simple geographical spread as is implied by the calculations in Figure 2. In order to justify their point, they distinguished security risks into two different broad risk categories, which were similar to the post-CAPM split between specific (or idiosyncratic) security risk and systematic (or market) risk (see footnote 1):

Like the horses in a race, the number of stocks in an investment list are few in number; while the quality of the horses, their past records and present form, the jockeys that ride them, the length of the course, the nature of the ground, etc., correspond to the past history and present quotations of the stocks, and to the Money Markets, Stock Exchanges and Trade Currents which ride and dominate them (Crozier 1910: 120).

The fundamental assumption in all these discussions was that security prices and returns were “dominantly influenced by the trading conditions of the particular country in which they are principally held and dealt in” thus following the country specific business cycle (Lowenfeld 1907: 61; Crozier 1910: 120). Figure 3, based on Lowenfeld’s calculations, illustrates the point: securities from the same (domestic)

market were very likely to be positively correlated. Domestic diversification was not ruled out but the selection of securities would be more difficult and demanding for the ordinary investor while the portfolio itself would be heavily reliant on domestic market movements (see Lowenfled 1907: 106-7). The estimates of Figure 2 emphasize precisely this point. While diversification was perceived as a “systematic method of averaging risks” (Lowenfeld 1907: 61) or, alternatively as a method to neutralize and balance risks against each other (Crozier 1910), in practice it became a method of “geographical distribution of capital.” Naïve international diversification could offer more beneficial covariances than domestic diversification as it allowed investors to “obtain as great a contrast as is possible in the trade influences which govern each one of his holdings” (ibid.: 90). Given that investors were lacking both the mathematical background and the computational power to proceed with complex calculations, they were advised to divide their savings into equal amounts and choose securities in stock exchanges “subject to entirely different market and trade influences” (ibid.). In this regard, the investor would be more likely to achieve low or even negative correlations, thereby substantially reducing overall portfolio risk for their targeted return. They should pick shares properly selected in order to minimize default risks and achieve “diametrical contrast” in their behaviour. This explains the emphasis on the breakdown of the world map into several financial areas shown in Figure 1 above. Of course, the basic assumption behind the above practical investment scheme is that global financial markets are by and large fragmented. This would easily allow the geographical distribution of capital to become the optimum way of portfolio diversification and it was this assumption that was challenged by the critics.

[FIGURE 3 NEAR HERE]

It is clear that from 1870 to World War I UK investors were familiar with the practical workings of diversification. They were also familiar with the related concept of financial correlation and were able to apply it in practice. A number of texts and financial advising documents discussed the benefits of diversification with the aim of ascertaining “some sound and practical scheme of investment, with a definite code of guiding rules and principles” for the ordinary investor (Crozier 1910: 117). There is

also evidence from the academic and financial press of the period that these investment insights and related recommendations did reach the financial community and triggered interesting discussions and debates. For instance, a comprehensive book review of Lowenfeld's pamphlets, by W. T. Layton, appeared in 1909 in *The Economic Journal*. The reviewer is critical of Lowenfeld's argument without discarding the idea of diversification. He is also eloquent on the success and the wide impact in academic and financial community of *The Financial Review of Reviews* and Lowenfeld's writings:

This idea, which *The Financial Review of Reviews* has made peculiarly its own, has attracted so much attention, and has been supported by so many well-known writers on economics and finance, that its authentic exposition by Mr. Lowenfeld is well worth careful study. It is a theory that has much to recommend it, based as it is upon the sound insurance principle of the averaging of risks. But as applied by Mr. Lowenfeld, risks of another kind are introduced which tend to counteract the advantage of distribution and make it unsuitable to those who have not a large capital to manage (Layton 1909: 256).

Layton's reservations are based on the fact that relying solely on overall country-specific market risk (systematic risk) "in order to find securities with independent fluctuation" is not enough for ordinary investors and small portfolios (ibid. 159). Therefore, the ordinary investor should "place himself in the hands of the experts" (ibid.). Another review in *The Times* five years later by an anonymous correspondent makes a similar point, being rather more critical of the "geographical distribution of investment." According to the anonymous author, experts, financial trusts and insurance companies "may within limits have found the adoption of the principle a satisfactory and remunerative one," but "it is unfortunately evident that the ordinary private investor has not the means of investigating the merits of a security in a remote part of the world."²¹ One week later, J. Gardner replied in the same newspaper defending Lowenfeld's investment principles against these criticisms.²²

All these debates indicate that the main principles of diversification were well established in the UK financial community. What was rather disputed was the

²¹ *The Times*, Friday 9 January 1914, p. 13.

²² *The Times*, Thursday 15 January 1914, p. 13.

assumption of fragmented financial markets and the ability of small investors to efficiently apply the global diversification recommendations and diversify away unsystematic risk. As Layton (1909: 259) put it, finding “securities with independent fluctuations” (thus, with low or negative correlation) might be a quite demanding task for the ordinary investor and could only insufficiently be tackled by naïve global diversification. Despite criticisms, Lowenfeld’s intervention became so popular that it was presented as such in 1914 to the French financial public by Francois Maury in a pamphlet entitled *Le Placement Stable*, which replicated and reproduced the main arguments of Lowenfeld (Maury 1914).

5. Conclusions and open questions

The paper offers textual evidence from a series of financial advice documents in the late 19th century and early 20th century showing that there was increased awareness among UK investors of the benefits of financial diversification – primarily putting equal amounts into a number of different securities – with much of the emphasis being on geographical rather than sectoral diversification and some limited discussion on the avoidance of highly correlated investments. UK investors were not unfamiliar with the workings of correlation and investment advisers made recommendations consistent with the tenets of modern portfolio theory in relation to portfolio selection strategies. By translating the concept of financial diversification into an empirical exercise of global distribution of risks, investors could take advantage in practice of the benefits of diversification without the need to go through complex and resource-consuming mathematical calculations. Given that the assumption of risk aversion was standard in the financial discussions of the time, all fundamental insights and principles of modern portfolio theory were present and outlined before World War I in the UK financial community.

From the above-mentioned documents and debates only the intervention of Lowenfeld (1907) has survived in recent literature. Our analysis does not undermine the importance of Lowenfeld; it revisits his intervention and places it into the general picture as part of a new rising ‘paradigm’ of dealing with risk among UK investors and financial analysts. To be sure, the strategy of the global distribution of capital was

by no means a unanimously shared strategy among financial analysts and probably not the most influential among ordinary investors. Nevertheless, it was a risk management ‘paradigm’ based on the fundamental principles of diversification with systematic proponents and opponents among the UK financial community. A recent study by Edlinger and Parent (2014) reveals that similar approaches by two influential French analysts, Leroy-Beaulieu (1924) in 1906 and Neymarck (1913) in 1913, also put forward a comprehensive analysis of the fundamental notions of modern portfolio theory: risk aversion, international diversification and correlation, specific and systematic risks.

The list of French financial analysts who adopted and developed a similar diversification approach is not limited to the above two names. The ex-Credit Lyonnais analyst, Francois Maury, prepared an adaptation of Lowenfeld’s book in French in 1914 (Maury 1914). Maury was also editor of the *Revue Financière Universelle*, which also appeared as *Finance Univers* in some years, a review with financial articles as well as economic and financial data presented by global region. In this review we also find articles supporting the “scientific” (as it was usually called by proponents to gain more prestige among investors) method of the geographical distribution of capital. For instance, René Lozé published an article in the same review in February 1911 with title: *The Scientific Method of Investments: Introduction to the distribution of capital* (La Méthode Scientifique des Placements: Introduction à la distribution du capital). Amongst other issues, the author explains in detail how the risk related to the erratic and unpredictable path of financial prices (due to idiosyncratic firm factors but also external influences, which include economic, social and political factors) could be reduced by a “scientific method,” which combines risks in a single portfolio so that they fight each other and cancel each other out (Lozé 1911a: 51). In another article two months later, the same author offers charts of price movements and a financial planisphere, surprisingly similar to those which appeared in Lowenfeld (1907) and *The Financial Review of Reviews* (see Lozé 1911b). Similar price charts were also prepared by Maury in his 1914 pamphlet (see Figure 4).

[FIGURE 4 NEAR HERE]

In 1914, the *Finance Univers* published in French an article by Lowenfeld explaining the basic insights of the method of the “Geographic Distribution of Capital.” In this article, Lowenfeld summarizes the gradual success of this method both in the UK and France as follows:

This method was formulated in 1903 and perfected from thence to 1906. It has been called the Geographic Distribution of Capital. As for all new doctrines, it has been opposed; but, little by little, almost all the important economists who have investigated this topic have declared themselves in favour; and not only the theoreticians, but also a large number of financiers who have considerable sums to invest on behalf of financial institutions. Private capitalists have also adhered to it and have applied it on a mass scale with much success. [...] One single company, in England, which is exclusively devoted to geographically diversified investment, administers and monitors, at this point in time, the fortunes of several thousand capitalists, totalling more than one billion francs [...] [this method] has been introduced much more recently in France; it is primarily, we know, Finance Univers which is responsible, in this country, for the propagation of this method through books and through this particular periodical. Thus, the geographical division of risks is also known in the French nation; and has immediately had significant success (Lowenfeld 1914: 7; our translation).

In the above passage, Lowenfeld mentions a UK financial firm which manages the “fortunes of several thousand capitalists.” In 1914, the *Finance Univers* also set up exactly the same system of advice, for which charged a fee of 1500 francs.

Quite contrary to the perspective of modern financial theory and its canonical history of financial economics, investors before the 1950s were not unsophisticated in their everyday investment decision making. A series of documents from the 1870s reveal that investors were familiar with the workings of diversification and introduced concepts and practical rules which were consistent with the findings of MPT. These financial documents in the UK and France are indeed an important, yet unnoticed, part of the history of financial economics (Edlinger and Parent 2014: 41). By 1914, only the mathematical optimization of Markowitz’ model was lacking in terms of portfolio best practice. The core principles of MPT, namely, the risk averse investor, the distinction between specific and systematic risk, the concept of correlation and the strategy of international diversification (on the basis that markets are segmented),

appeared and discussed both among UK and French financial experts, reviews, newspapers, books and pamphlets. A detailed comparative examination of these financial documents between France and the UK exceeds the scope of this study. We could briefly mention that, despite similarities in the main conceptions, there were also some differences probably reflecting the different financial cultures between UK and French financial sectors and institutions. For instance, French authors were keener on liquidity, talked more about different risk levels of securities and different types of investors, and put more emphasis on the distinction between specific and systematic risks. On the other hand, French analysts lacked the top-down approach to diversification. They explained why diversification is practically a mechanism to diversify away risks and favoured the global distribution of capital, but they did not describe nor illustrate how to mix uncorrelated securities to achieve lower portfolio risk for a targeted return (at least not before Lowenfeld's influence) as the UK authors did. Lowenfeld and *The Financial Review of Reviews* put forward detailed chart calculations in order to assist the implementation of this top-down approach. This might be the reason why Lowenfeld's pamphlet was presented to the French public by Maury and became so popular among the contributors of the *Revue Financière Universelle* and the *Finance Univers*. Despite these differences, our reading reveals that there was a deep and thorough understanding of the basic workings of diversification both by UK and French financial analysts using very similar concepts, insights, arguments and practical suggestions. A single paper cannot exhaust the wealth of insights contained in all these texts and this might be an interesting theme for future research.

Was this UK-French 'connection' part of a more general movement favouring diversification? Were the same financial insights discussed and debated in the other financial centres of the time, for instance in Berlin or New York? These questions also remain open to further research. Our working hypothesis is that there might have been a more general movement of similar financial approaches. We take here a performative standpoint, in the fashion of Foucault (2003), Derrida (1988) and Deleuze (2012). This viewpoint argues for a mutual immanence and presupposition between knowledge and established social practices. However, the term knowledge must be seen as something plural comprising combinations and different forms of systematization of the *visible* (perceptions) and the *articulable* (statements) of agents'

experience. Put simply, the domain of knowledge captures not only scientific (academic) production in the form of theories and models among properly structured academic communities,²³ but also any possible form of practical knowledge and everyday experience along with all the different levels of systematization lying in between.²⁴ Knowledge in its plurality is inseparable from the diagram of social relations which makes it possible, and social practices (diversification in our case) are not independent from the *forms* of knowledge which actualize these relations. The fact that diversification principles were discussed and debated in a series of financial documents, articles, reviews and pamphlets, under different forms of systematization, depth and analytical clarity, is the anticipated coupling of a widely established investment practice (diversification) in the different financial centers of the time. Or, alternatively, the practical knowledge developed within the investor community to support diversification would sooner or later cross certain thresholds of systematization and become properly ‘archived’ in the above-mentioned historical documents. To the extent that financial markets were interconnected, we would expect related financial ideas to develop in different parts and financial communities of the world. These all are open questions for further research.

The above argument has also a series of implications in the study not only of the history of financial economics but also on business history. One of the most important and widely discussed events in British and French economic history was the massive net outflow of investment funds in the late 19th and early 20th centuries. In particular, the UK placed on the average 5.2% of its GNP every year into foreign lending, a figure higher than other capital exporting countries of the time such as France and Germany (Edelstein 1982: 3). “Much of overseas investment passed through the Stock Exchange of London which floated issues of foreign sovereign debt, foreign corporate debt and equity securities, and securities of UK incorporated business which primarily engaged in business overseas” (Goetzman and Ukhov 2006: 261-2). Political economy discussions and related debates in the classical theories of imperialism offered alternative versions of underconsumption to explain this capital outflow (for a summary of these discussions see Milios and Sotiropoulos 2009). Other

²³ A discussion on the creation of the discipline of financial economics see Jovanovic (2008).

²⁴ This definition of knowledge goes beyond the distinction between academic and vernacular science. For related discussions and debates see Preda (2004), Jovanovic (2006b) and Preda (2006).

authors have argued that British investors and capital market institutions were biased towards overseas assets thereby harming the UK economy (see for instance: Saville 1961 and Kennedy 1982). However, the explanation might be quite different: capital outflow might have been the outcome neither of underconsumption nor of foreign biases and institutional malfunctioning but the genuine product of a financial technology of dealing with risk in an internationalised economic environment. Recent research in business history offers some evidence favouring this explanation.²⁵

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²⁵ See Goetzman and Ukhov (2006) and Chabot and Kurz (2010). On the contrary, Edlinger et al. (2013) argue that, while diversifying, British investors at the LSE showed a foreign bias.

References

- Beeton, S. (1870). *Beeton's Guide to the Stock Exchange and Money Market*. London.
- Bernstein, P. L. (1996). *Against the Gods: The Remarkable Story of Risk*. New York: John Wiley & Sons, Inc.
- Carlos, A. M., Fletcher, E., and Neal, L. (2015). Share portfolios in the early years of financial capitalism: London, 1690-1730. *Economic History Review*, 68(2): 574-599.
- Chabot, B. R., and Kurz, C. (2010). That's where the money was: Foreign bias and English investment abroad, 1866-1907. *The Economic Journal*, 120(September): 1056-1079.
- Chadwicks' Investment Circular* (1870), 1, 3 December: 30-2.
- Chadwicks' Investment Circular* (1871), 2, 8 October: 38.
- Chapman, S. J. (1908). Investment risks and the geographical distribution of capital. *Financial Review of Reviews*, 37: 28-41.
- Cheffins, B. R. (2001). Does law matter? The separation of ownership and control in the United Kingdom. *Journal of Legal Studies*, XXX: 459-484.
- Cheffins, B. R. (2010). *Corporate ownership and control: British business transformed*. Oxford: Oxford University Press.
- Crozier, J. B. (1910). *Notes on the First Principles of Investment*. London: *The Financial Review of Reviews*.
- DeMiguel, V., Garlappi, L. and Uppal, R. (2009). Optimal Versus Naive Diversification: How Inefficient is the 1/N Portfolio Strategy?. *The Review of Financial Studies*, 22(5): 1915-1953.
- Derrida, J. (1988). *Limited Inc*. Evanston: Northwestern University Press.
- Deleuze, G. (2012). *Foucault*. London and New York: Continuum International Publishing Group.
- Edelstein, M. (1982). *Overseas Investment in the Age of High Imperialism: The United Kingdom, 1850-1914*. New York: Columbia University Press.
- Edlinger, C., Merli, M., and Parent, A. (2013). An optimal world portfolio on the eve of World War I: Was there a bias to investing in the new world rather than in Europe? *The Journal of Economic History*, 73(2): 498-530.
- Edlinger, C. and Parent, A. (2014). The beginnings of a 'common-sense' approach to portfolio theory by nineteenth-century French financial analysts Paul Leroy-Beaulieu and Alfred Neymarck. *Journal of the History of Economic Thought*, 36(1): 23-44.
- Elliot, G. (2006). *The mystery of Overend and Gurney*. London: Methuen.
- Elton, E. J., and Gruber, M. J. (1997). Modern portfolio theory, 1950 to date. *Journal of Banking & Finance*, 21: 1743-1759.
- Faulhaber, G. R. and Baumol, W.J. (1988), Economists as innovators: practical products of theoretical research. *Journal of Economic Literature*, XXVI: 577-600.
- Foreman-Peck, J., and Hannah, L. (2011). Extreme divorce: the managerial revolution in UK companies before 1914. *Economic History Review*, 65 (2011): 1-22.

- Foucault, M. (2003). *Society Must be Defended. Lectures at the College De France 1975-7*. New York: Picador.
- Goetzmann, W. N. and Ukhov, A. D. (2006). British Investment Overseas 1870-1913: A Modern Portfolio Theory Approach. *Review of Finance*, 10: 261-300.
- Hicks, J. R. (1935). A suggestion for simplifying the theory of money. *Economica* (February): 1-19.
- Hudges, K. (2005). *The short life and long times of Mrs Beeton*. London: Fourth Estate.
- Jovanovic, F. (2006a). Economic instruments and theory in the construction of Henri Lefèvre's "science of the stock market." G. Poitras (Ed.), *Pioneers of Financial Economics*, vol. 1. Cheltenham: Edward Elgar.
- Jovanovic, F. (2006b). Was There a "Vernacular Science of Financial Markets" in France during the Nineteenth Century? A comment on Preda's "Informative prices, rational investors." *History of Political Economy*, 38(3): 531-545.
- Jovanovic, F. (2008). The construction of the canonical history of financial economics. *History of Political Economy*, 40(2): 213-242.
- Jovanovic, F., and Le Gall, P. (2001). Does God practice a random walk? The 'financial physics' of a nineteenth-century forerunner, Jules Regnault. *European Journal of the History of Economic Thought*, 8(3): 332-362.
- Kennedy, W. (1982). Economic growth and structural change in the United Kingdom, 1870-1914. *Journal of Economic History*, 42: 87-118.
- Layton, W. T. (1909). Book Review: "All about Investment" and "Investment an Exact Science." *The Economic Journal*, 19(74): 255-259.
- Leroy-Beaulieu, P. (1924) [1906]. *L'art de placer et gérer sa fortune*. Paris: Librairie Delagrave.
- Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The Review of Economics and Statistics*, XLVII(1): 13-37.
- Lowenfeld, H. (1907). *Investment an Exact Science*. London: *The Financial Review of Reviews*.
- Lowenfeld, H. (1911). *The Rudiments of Sound Investment*. London: *The Financial Review of Reviews*.
- Lowenfeld, H. (1914). La Stabilité des Placements. *Finance-Univers*, 15 Janvier 1914.
- Lozé, R. (1911a). La Méthode Scientifique des Placements: Introduction à la Distribution du Capital. *Revue Financière Universelle*, 15 Février 1911, pp. 47-57.
- Lozé, R. (1911b). La Méthode Scientifique des Placements: Les Marchés Étrangers. *Revue Financière Universelle*, 15 Avril 1911, pp. 40-48.
- Markowitz, H. (1952). Portfolio selection. *Journal of Finance*, 7(1): 77-91.
- Markowitz, H. (1999). The early history of portfolio theory: 1600-1960. *Financial Analysts Journal*, 55(4): 5-16.
- Marschak, J. and Makower, H (1938). Money and the Theory of Assets. *Econometrica*, 6: 311-25.

- May, G. (1912). The investment of life assurance funds. *Journal of the Institute of Actuaries*, 46: 134-168.
- Maurry, F. (1914). *Le Placement Stable: Ses Bases, Ses Règles, Ses Résultats*. Paris: Finance-Univers and Librairie Félix Alcan.
- McKendrick, N. and Newlands, J. (1999) *F&C: A History of Foreign & Colonial*. London: Chappin Kavanagh.
- Milios, J. and Sotiropoulos, D. P. (2009). *Rethinking Imperialism: A Study of Capitalist Rule*. London and New York: Palgrave Macmillan.
- Mitchell, B., Chambers, D. and Crafts, N. (2011). How good was the profitability of British railways, 1870-1912? *Economic History Review*, 64(3): 798-831.
- Neymarck, A. (1913) *Que doit-on faire de son argent?* Paris: Marchatet Godde.
- Powell, E. T. (1916). *The Evolution of the Money Market (1835-1915): An Historical and Analytical Study of the Rise and Development of Finance as a Centralised, Co-ordinated Force*. London: The Financial News.
- Preda, A. (2004). Informative Prices, Rational Investors: The Emergence of the Random Walk Hypothesis and the 19th Century “Science of Financial Investments.” *History of Political Economy*, 36(2): 351-386.
- Preda, A. (2006). Tracing the Boundaries between Vernacular Science and Academic Theories: A Reply to Franck Jovanovic. *History of Political Economy*, 38(3): 547-554.
- Read, C. (2012). *The Rise of the Quants*. New York: Palgrave Macmillan.
- Roy, A. D. (1952). Safety First and the Holding of Assets. *Econometrica*, 20(3): 431-449.
- Rutterford, J. (2004). From dividend yield to discounted cash flow: a history of UK and US equity valuation techniques. *Accounting, Business & Financial History*, 14(2), 115-149.
- Rutterford, J. (2009). Learning from one another's mistakes: investment trusts in the UK and the US, 1868s mis. *Financial History Review*, 16(2), 157-181.
- Rutterford, J., Green, D.R., Maltby, J., and Owens, A. (2011). Who comprised the nation of shareholders? Gender and investment in Great Britain, c. 1870-1935. *Economic History Review*, 64: 157-187.
- Rutterford, J., Sotiropoulos, D. and van Lieshout, C. (2015). Individual investors and local bias in the UK: 1870-1935. Paper presented at the annual conference of the *Economic History Society*, 27-29 March, University of Wolverhampton. Available: <http://www.ehs.org.uk/dotAsset/5cd1103c-695a-4152-8947-b22359ef5b66.pdf>
- Saville, J. (1961). Some retarding factors in the British economy before 1914. *Yorkshire Bulletin of Economic and Social Research*, 13: 51-59.
- Scratchley, A. (1875) *On Average Investment Trusts*. London: Shaw and Sons.
- Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The Journal of Finance*, XIX(3): 425-442.
- Thomas, W. A. (1973). *The provincial stock exchanges*. London: Frank Cass and Company Limited.

- W. B. (anonymous) (1908). *Women as Investors, Pamphlet for Women*. London.
- Williams, J. B. (1938). *The Theory of Investment Value*. Cambridge MA: Harvard University Press.
- Weber, E. J. (2009). A short history of derivative security markets. In W. Hafner and H. Zimmermann (Eds.), *Vinzenz Bronzin's option pricing models*. Berlin: Springer.
- Withers, H. (1930). *The Quicksands of the City, and a Way through for Investors*. London: Jonathan Cape.

Table 1
Chadwicks' Investment Circular's diversified portfolio, 1870

		Consols, at 93	Spanish 3 per Cts., at 47 1/2	Turkish, 6 per Cts., at 56	Lon. & N.W. Rail., at 100
Stock purchased ten years ago:		£1,075	£2,100	£1,800	£1,000
The ten years' dividends would have amounted to:-					
1861	First half	£16.10	£31.50	£54.00	£26.30
	Second half	£16.10	£31.50	£54.00	£18.70
1862	First half	£16.10	£31.50	£54.00	£23.80
	Second half	£16.10	£31.50	£54.00	£18.70
1863	First half	£16.10	£31.50	£54.00	£22.50
	Second half	£16.10	£31.50	£54.00	£21.20
1864	First half	£16.10	£31.50	£54.00	£30.00
	Second half	£16.10	£31.50	£54.00	£28.80
1865	First half	£16.10	£31.50	£54.00	£35.00
	Second half	£16.10	£31.50	£54.00	£30.00
1866	First half	£16.10	£31.50	£54.00	£36.20
	Second half	£16.10	£31.50	£54.00	£30.00
1867	First half	£16.10	£31.50	£54.00	£33.80
	Second half	£16.10	£31.50	£54.00	£26.20
1868	First half	£16.10	£31.50	£54.00	£33.70
	Second half	£16.10	£31.50	£54.00	£26.20
1869	First half	£16.10	£31.50	£54.00	£33.80
	Second half	£16.10	£31.50	£54.00	£22.50
1870	First half	£16.10	£31.50	£54.00	£35.00
	Second half	£16.10	£31.50	£54.00	£30.00
Total dividends		£322.00	£630.00	£1,080.00	£562.8*
Present value of the principal:-		£99,437.50			
		Consols, at 92 1/2	Spanish 3 per Cts., at 31	Turkish, 6 per Cts., at 61	Lon. & N.W. Rail., at 126 1/2
Final capital value		£994.00	£651.00	£1,098.00	£1,265.00
Total value		£1,316.00	£1,281.00	£2,178.00	£1,827.40

* Typographical error as total value of these dividends is £562.40

Source: Chadwicks Investment Circular (1870, 3 December: 32).

Figure 1. The global financial geography according to Lowenfeld's analysis.

Source: Lowenfeld (1907: 88).

Figure 2. Price movements of a portfolio of 10 stocks from different geographical world areas. The choice of the stocks indicates a practical working of correlation as understood and implemented by UK investors.

Source: Lowenfeld (1907:86).

Figure 3. Typical price movement of securities in different national markets.

Source: *Lowenfeld (1907: 80).*

Figure 4. Price chart offered by Maury (1914: 24).