WORKING PAPERS

An optimal world portfolio on the eve of World War One: Was there a bias to investing in the New World rather than in Europe?

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July 2011

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Abstract

Conventional literature considers that Victorian foreign investments were economically driven whereas the objective of French foreign investments was to establish a political influence over European countries. In this paper, we wish to take the refutation of PARENT and RAULT (2004) to this conventional wisdom one step further by focusing on the opposition between British geographical distribution of capital and that of France.

We address the following issues: why was the geographical distribution of French and British foreign portfolios so different prior to World War One; European oriented for the former, "new world" oriented for the latter? Should economic rationality have encouraged investors to invest largely in the "New world" and to a much lesser degree in Europe at the beginning of the 20th century?

We have applied Modern Portfolio Theory to a unified and original time-series of indices representing the assets listed on the Paris and London Stock Exchanges. We have found that investing in European assets would have been profitable for French as well as for Victorian and international investors. We give empirical evidence that European assets are always included in optimal portfolios. We have found that investing in the "New world" did not necessarily yield more than investing in emerging European countries. The efficiency of Victorian portfolios could have been enhanced by investing a larger proportion in European assets. However, the "European preference" of French investors did not prove to be inefficient.

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Introduction

The last quarter of the 19th century saw the emergence of the first truly global economy which was to end with the outbreak of the First World War. This was a period of huge capital flows. According to FISHLOW (1985), Great-Britain invested around 5% of its GDP overseas annually, reaching a peak of 10 percent just before the outbreak of World War One, while France invested approximately half as much. Germany's foreign investments accounted for less than 2% of its GDP over the same period[1].

Competition between Great-Britain, France and Germany was high, particularly between France and Great-Britain, these two markets being "the places to be" in order to obtain capital[2]. Investors could access a wide range of not only domestic but also of European and international investments. In 1913, the nominal value of the foreign stocks listed on the London stock exchange accounted for 60% of the total nominal value of all the stocks listed on this exchange[3]. One third of these foreign stocks were issued by foreign governments and municipalities while 40% was devoted to railways. The rest financed mines and plantations, banks and financial institutions or public utilities[4]. In France, the archives of the Credit Lyonnais reported that from 1892 to 1913, foreign issues accounted for almost 50 percent of the total issues on the Paris stock exchange[5]. If European stocks were initially very present on this Stock Exchange, the geographical distribution became progressively more international up until the outbreak of the First World War.

Many scholars have wondered what prompted these investments. Regarding Great-Britain, one particular approach was to explain these huge investments abroad in the light of the gaps in returns between domestic and foreign assets or in the light of a possible push/pull effect[6]. GOETZMANN and UKHOV (2006) showed that British foreign investments allowed Victorian investors to hold diversified portfolios which enhanced their portfolio performances. However, little emphasis was put on the geographical distribution of these foreign investments. Moreover,

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[1] GREEN and URQUHART (1976), cited by EDELSTEIN (1982). These figures are consistent with the estimates of FENSTEIN (1972) for Great-Britain.
[2] ARBULU and VASLIN, 2000.
[3] MORGAN and THOMAS, 1962.
[4] MORGAN and THOMAS (1962), RIPLEY (1934), cited by GOETZMANN and UKHOV (2006).
[5] Crédit Lyonnais (1963), see PARENT and RAULT, 2004.
[6] EDELSTEIN, 1982.

GOETZMANN, UKHOV and ZHU (2001) considered that geographical distribution was a methodology that European investors were aware of at the end of the 19th century.

As for France, conventional wisdom was to consider that these foreign investments were "overcommitted to European countries" (WHITE 1933, FEIS 1930, CAMERON 1961, LÉVY-LEBOYER 1977) and obeyed political and diplomatic considerations. For WHITE (1933), "*The French were very cautious investors. The bulk of capital was invested by small savers who above all wished security.*" [7] But, using an econometric approach (Var-ECM model), PARENT and RAULT (2004) have highlighted that French investments abroad were economically and financially driven, not politically or diplomatically. PARENT and RAULT (2004) also considered that due to their restrictive investment opportunity set as compared with the London Stock Exchange, French investors were likely to invest on the London stock exchange. The views of two famous French financial analysts, NEYMARCK (1913) and LEROY-BEAULIEU (1906), leave no doubt that French investors considered the potential benefits of diversification[8]. We can assume that investors invested directly on foreign stock exchanges and not only in foreign stocks on their domestic financial markets. Indeed concerning France, LEROY-BEAULIEU (1906) considered that interest rate differences between France and other countries had encouraged French investors to invest directly on foreign stock exchanges and championed French investors to proceed to investments directly on other financial markets. This strategy was not limited to British and French investors. For instance, TAÜBER (1911) explained how German investors could turn to international financial markets. Hence, the existing literature provides historical evidence that investors of the time were well aware of foreign investment opportunities.

Assuming that all investors were well aware of such opportunities, we have addressed the following issue: why was the geographical distribution of French and British foreign portfolios so different prior to World War One; European oriented for the former and "new world" oriented for the latter? Should economic rationality have encouraged investors to invest largely in the "New world" and only to a

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[7] WHITE,1933, page 110.
[8] EDLINGER, MERLI and PARENT, Working Paper AFC 2011-2.

lesser extent in Europe at the beginning of the 20th century? Should we necessarily conclude that there was a European bias in French foreign investments in contrast to an efficient British portfolio distribution?

We will answer these controversial and still unsolved questions by means of a portfolio and risk/return analysis.

Our objective is to take PARENT and RAULT's (2004) refutation to the economic inconsistency of French foreign investments one step further by determining the efficiency of the set of investment opportunities available to French investors on the Paris Stock Exchange (section 1). We will also do this for an English and an international investor (section 2).

Section 1 is devoted to the Paris Stock Exchange and the portfolios of French investors. Section 2 is devoted to the structure of a world optimal portfolio, defined here as the aggregate of London and Paris Stock Exchanges which represented two thirds of global foreign investments before World War One. We develop a risk/return analysis and compare optimal portfolios for a French investor (investing in Paris only) in section 1, a British investor (investing in London only) and an international investor (investing both in London and Paris) in section 2. We apply this Modern Portfolio Theory approach (MARKOWITZ 1952, 1959) to a new database gathering all existing sectorial and debt published indices for France and Great-Britain financial markets. In the case of the Paris Stock Exchange, this new database consists in the aggregate of the databases of ARBULU (1998), PARENT and RAULT (2004) and VASLIN (2007) that we have homogenized and reworked in order to obtain 15 indices representing the annual returns of domestic and foreign assets listed on the Paris Stock Exchange. In section 2, when considering the case for an international investor we have added EDELSTEIN's (1982) data revisited by GOETZMANN and UKHOV (2006) to this database. This refers to the London Stock Exchange over the same period. As previously, the London Stock Exchange database has been reworked in order to obtain a total of 39 homogenized indices for the "world portfolio". In each step of our analysis, we determine mean variance frontiers and optimal portfolio structures. These optimal portfolios are then compared with the estimates of actual British

and French portfolios. We also carried out these optimizations using various assumptions: with and without short sale constraints and in the presence or not of a risk-free asset.

Under the most likely historical hypothesis over the period – the existence of a risk-free asset but no short sale[9] - we discover in section 1, not surprisingly, that French investments abroad improve portfolio efficiency but more amazingly that French investors could have endured a bias against domestic investments which is in contrast with the image of the "*French rentier*" who is supposedly very conservative. Moreover, the structure of French optimal portfolios corroborates the rationality of the preference of French investors for European investments.

In section 2, we test this outcome further, by asking ourselves whether an international investor would have devoted such an important percentage of his portfolio to European assets. We first identify that actual British portfolios, considered independently, differ notably from optimal allocation: we highlight that economic rationality should have encouraged Victorian investors to invest more widely in foreign assets. This suggests the existence of a domestic bias for investment in British assets. Moreover, the structure of the world optimal portfolio indicates that on the eve of World War One, two thirds of it should have been composed of foreign assets half of which should have been European assets. After crossing all existing estimates of actual British portfolio distribution in 1914, it clearly appears that Victorian investors disregarded European investments and that this strategy was not the most efficient in terms of risk/return analysis.

Finally, we give evidence that the optimal strategy for an international investor would have consisted in holding a large proportion of European assets; hence the French preference for Europe did not prove to be economically inconsistent.

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[9] We justify this hypothesis in section 1; other results are available upon request.

Were French investors right to favour European investments?

The Paris Stock Exchange at the end of the 19ᵗʰ century: French investors' preference for Europe.

The 19ᵗʰ century was the century of growth and expansion for Parisian financial markets, favored by the improvement in the "terms and conditions" of securities[10]. During the last quarter of the century, the ordinary share became the most common type of share[11]. The Decree of 1893 which reduced the value of nominal shares also helped the Paris Stock Exchange to attract a new category of savings, that of the "middle class". This led NEYMARCK (1911) to hail the arrival of "financial democracy": "The number of large capitalists gave way to a larger number of small stockholders"[12]. Referring to COURTOIS (1910), PARENT and RAULT (2004) described the Paris Stock Exchange as a fully developed and international financial market on which both French and foreign securities were traded with identical administrative rules.

Before the First World War, French foreign investments seemed largely committed to European stocks. This European-oriented distribution of French foreign assets has been the pillar of the literature considering that France was excluded from a world of higher growth and the cornerstone of the conventional wisdom regarding the economic inconsistency of French foreign investment: investments were politically and not economically driven[13]. Using econometric modeling, PARENT and RAULT (2004) refuted this conventional view.

Indeed the estimated geographical distribution of French investments abroad by the end of the 19ᵗʰ century and the beginning of the 20ᵗʰ century (Table 1) shows the prevalence of Southern and Eastern Europe in French portfolios. Few investments were made in "young nations", contrary to British investors who devoted roughly 40% of their foreign investments to these nations between 1900

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[10] ARBULU, 2007, page 410.
[11] As opposed to registered share, popular in France during most of the 19ᵗʰ century.
[12] NEYMARCK, 1911, cited by ARBULU (1998) ; The nominal value of ordinary shares felt from 100 to 25 francs for public companies with a capital smaller than 200,000 Francs and from 500 to 100 Francs for public companies with higher capital.
[13] LEVY-LEBOYER, 1977.

and 1913. Notwithstanding, it seems that over the period under study, the percentage of investments allocated to Mediterranean countries and Europe's periphery decreased. These destinations alone represented 61.5% of French investments abroad in 1892 while the "rest of the world", i.e. the world outside Europe, 'its periphery" and Russia, received only 5% of French investments abroad. Yet in 1913, the "rest of the world" collected 25% of French investments abroad while Mediterranean countries and the periphery of Europe collected respectively 12.5% and 16% of French overseas investments. On the contrary, the proportion of French investments in Russia considerably increased between 1892 and 1900: from 10% to 27%. FISHLOW (1985) explained that this increase was notably induced by the growth of Russia's industrialization after the 1890s. Its economic characteristics improved and its growth perspectives received positive rankings by financial analysts.

These observations lessen the conventional view but have already influenced the approach developed by contemporary financial analysts. For instance, LEROY-BEAULIEU (1906) summarized the changes in the distribution of French foreign investments over the period as follows : "*Formerly, the horizon of rentiers and capitalists was limited to Western and Central Europe, then it expanded to the whole of Europe. Today it embraces the entire world, notably the two Americas and Asia, including the two modernized countries advancing towards new destinies : Japan and China.*"[14]

Table 1. Geographical distribution of French investments abroad.

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[14] LEROY-BEAULIEU, 1906, page 141: « Autrefois, l'horizon des rentiers et des capitalistes se bornait à l'Europe occidentale et centrale, puis il s'est étendu à toute l'Europe ; aujourd'hui il embrasse le monde entier, notamment les deux Amériques et toute l'Asie, y compris les deux nations rajeunies en marche vers des destinées nouvelles : le Japon et la Chine.

	1892	1900	1913
Spain and Portugal		17.0	9.5
Italy		5.0	3.0
(1) Mediterranean Area Total	37.5	22.0	12.5
Austria-Hungary		10.0	5.5
Balkan countries		2.5	6.0
(2) Central Europe Total	19.5	12.5	11.5
(3)Western Europe (Switzerland, Germany, Belgium, Lux-Holland, Scandinavian countries)	4.0	6.5	7.5
(4) Russia	10.0	27.0	27.5
Turkey		7.5	8.0
Egypt		11.0	8.0
(5) Periphery Total	24.0	18.5	16.0
EUROPE AND PERIPHERY (1) + (2) + (3) + (4) + (5)	95.0	86.5	75.0
(6) United States and Canada	2.0	3,0	5,0
(7) Latin America (Argentina, Brazil)	2.0	7.5	14.5
(8) Asia	1.0	3,0	5.5
REST OF THE WORLD (6) + (7) + (8)	5.0	13.5	25.0
TOTAL	100.0	100.0	100.0

Sources: PARENT and RAULT, 2004, according Cameron, France and Feis, Europe

Despite this late move toward a more diversified foreign portfolio, one question remains: why was the geographical distribution of French and British foreign portfolios so different prior to World War One, European oriented for the former, "new world" oriented for the latter?

In the next section, we deal with the first part of this question: using Modern Portfolio Theory, we ask ourselves whether holding a high proportion of European assets made French foreign portfolios more efficient.

Were French investments inefficient?

In this section, we test the efficiency of French portfolios using Modern Portfolio Theory (MARKOWITZ 1952, 1959)[15]. Consequently, investors are considered as being risk averse. The decisions they make are based upon a choice of portfolio providing minimum variance for a given, expected return or a choice of portfolio providing maximum expected return for a given variance.

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[15] The same approach is adopted by GOETZMANN and UKHOV, 2006.

With no short sale restrictions and no risk-free asset, the mean-variance frontier is defined as the set of efficient portfolios. For each given expected return, these portfolios minimize investment variance. In a mean-standard deviation space, this frontier is a hyperbola. When a risk-free asset is available, the efficient portfolio with the higher Sharpe ratio (known as the market portfolio in the Capital Asset Pricing Model) is the optimal one. A rational investor should combine this risky portfolio with risk-free asset to construct an optimal investment (according to his preference). The Sharpe ratio measures the excess of return compared to the risk-free rate by risk unit and is defined as:

$$SR[\tilde{r}_x] = \frac{E[\tilde{r}_x] - r_f}{\sigma[\tilde{r}_x]}$$

Adding an imperfectly correlated asset to the portfolio enables its overall variance to be reduced. Thus the diversification principle postulates that in building a portfolio with imperfectly correlated stocks, an investor can diversify and eliminate the specific risk of the asset (only systematic risk cannot be eliminated).

Before implementing the Modern Portfolio Theory, we asked ourselves whether there was a risk-free asset before the First World War and whether short sales could be a plausible hypothesis.

In an initial sub-case, we consider that no French Rente could really have constituted a risk-free asset for French investors. Indeed from 1874 to 1913, French Rentes were converted five times and only a few of these conversions could have been predicted by investors. So these investors were uncertain about their future incomes. This is why they may have considered French Rentes as being risky assets. When there is no risk-free asset, the optimal portfolio is considered as being the portfolio which maximises the return on standard deviation ratio. In a second sub-case, however, we consider the 3% French rente as a risk-free asset. Indeed this is the only Rente that was never converted. Moreover, the nominal rates of the other French Rentes converged to 3% over the course of the various conversions. Finally, as from 1902, 3% was the only French Rente[16]. There is historical evidence for both sub-cases and we therefore consider both of them.

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[16] See VASLIN, 2007.

We also questioned the existence of short sales at the beginning of the 20th century. For an investor, short sales consists in selling a security that he doesn't own. It enables him to speculate on the fall in the security price or to protect his portfolio. In this case, the weight of this security within the portfolio is negative. Nowadays the term "short sales" is strictly used for spot short sales operations. But before the First World War, the definition was not that narrow: spot and forward sales were recognised as "short" provided the securities traded were not held by the seller when the contract was set[17]. Jean HAYAUX DU TILLY (1901), in his PhD thesis specified: "People speculate not only thanks to forward operations. Short sales speculation is practised daily on a small scale and only among professionals. These Stock Exchange regulars sell stocks they don't have or buy some they do not intend to hold, hoping to perform the opposite operation before the delivery or the payment date in order to make profit." It seems that "spot" short sales were practised in small quantities by only a few professionals and on a limited number of stocks. Moreover, our analysis targets indices (which did not exist at that time) and not individual stocks. Thus it was difficult to accept the assumption that short sales on indices were common pratice at that time.

It is for these reasons that we have chosen to present the results when short sales are not allowed. In this sub-case, the weight of every index is necessarily positive (i.e. optimization under constraint)[18]. It remains possible to trace the security market line when there is a risk-free asset and to determine the optimal portfolios in the same way as when short sales are authorized.

In this section, the data base consists in the aggregate of published data bases from ARBULU (1998), PARENT and RAULT (2004) and VASLIN (2007)[19]. We have homogenized these data in

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[17] See HAUTCOEUR and RIVA (2007), HAUTCOEUR, REZAEE and RIVA (2010) as well as LAGNEAU-YMONET and RIVA (2011).

[18] With restrictions on short sale the frontier is generally not a hyperbola (DYBVIG, 1984).

[19] We have also taken into account new data provided by David Le Bris (2010) and Amir Rezaee (2010), respectively new Historical CAC40 and new historical French bond index. Since these indices are weighted by market capitalization, on a methodological point of view they differ from Arbulu, Parent and Rault, and Vaslin sources which are unweighted. Thus they are not strictly comparable. That is the reason why we considered them to test the robustness of our results. We have tested three scenarios: the first one consisted in replacing Arbulu's data by HCAC40; the second one consisted in replacing Arbulu's data by HCAC 40 and adding Rezaee's data; then the last scenario consisted in keeping Arbulu's data and adding Rezaee's data. Our outcomes on the structure of the French optimal portfolio are not modified by the inclusion of these indices. These results are available upon request.

order to obtain fifteen indices of real annual returns representing the Paris Stock Exchange from 1875 to 1913. There are twelve domestic indices: eleven indices represent ordinary, domestic shares and one index represents French Rentes listed on the Paris Stock Exchange. There are also three indices representing foreign securities listed on the Paris Stock Exchange: one index represents European Railways ordinary shares, one represents European Governments Bonds and one represents the "Rest of the World" Government Bonds, i.e. Government bonds other than European.

Table 2 reports these various indices and their main characteristics.

Table 2. The detail of Paris Stock Exchange indices

Paris Stock Exchange Indices (1875-1913, in Francs)				
	Ordinary Shares	R (%)	Variance	Description
D o m e s t i c	French and colonial			
	FR RAIL	5.907	0.00801	Railways
	FR FIN	7.495	0.0129	Finance and insurance
	FR TXTL	5.4	0.01979	Textil
	FR FD	12.33	0.02106	Food and Drink
	FR IRN	9.828	0.0196	Metal
	FR IND	8.006	0.0119	Industry
	FR UTIL	8.607	0.01062	Utilities
	FR CD	9.308	0.01558	Canals and Docks
	FR SHIP	4.508	0.0135	Shipping
	FR TO	6.907	0.02705	Tramways and Omnibus
	FR PRINT	12.825	0.06427	Printing
	Debentures			
	French FR RC	4.707	0.00357	Rentes
F o r e i g n	Ordinary Shares			
	European WP EUR RAIL	9.322	0.0209	Railways (Mediterranean and Eastern Europe)
	Debentures			
	European WP EUR FOGVDB	6.244	0.0063	Governments (Mediterranean, Western and Eastern Europe)
	Rest of the World WP W FOGVDB	9.432	0.03911	Governments (Europe's periphery, Latin America, China,

We chose to work on unweighted indices in order to conform to existing historical portfolio analysis and make our outcomes comparable with Edelstein (1982) and Goetzmann and Ukhov (2006) studies of British foreign investments over the same period (see section 2).This choice was also motivated by the loss of information when taking into account such aggregate indices.

Here, we observed optimal portfolio structures and compared them to the effective structure of French portfolios as given by contemporary financial analysts and by FEIS (1930), CAMERON (1961) and WOODRUFF (1966).

When there is no risk-free asset, mean variance frontiers (Figure 1) show that the introduction of foreign assets improves the set of mean variance portfolios: the mean variance frontier considering Foreign and Domestic Securities listed on Paris Stock Exchange is higher and to the left as compared to the mean variance frontiers when considering the set of domestic securities. Thus, an investor seeking a standard deviation of 5.5% could have improved the return of his portfolio from 6% (when only composed of French assets), to 6.35% when composed of both French and Foreign assets.

Figure 1: Minimum Variance Frontiers of risky assets on the Paris Stock Exchange[20]
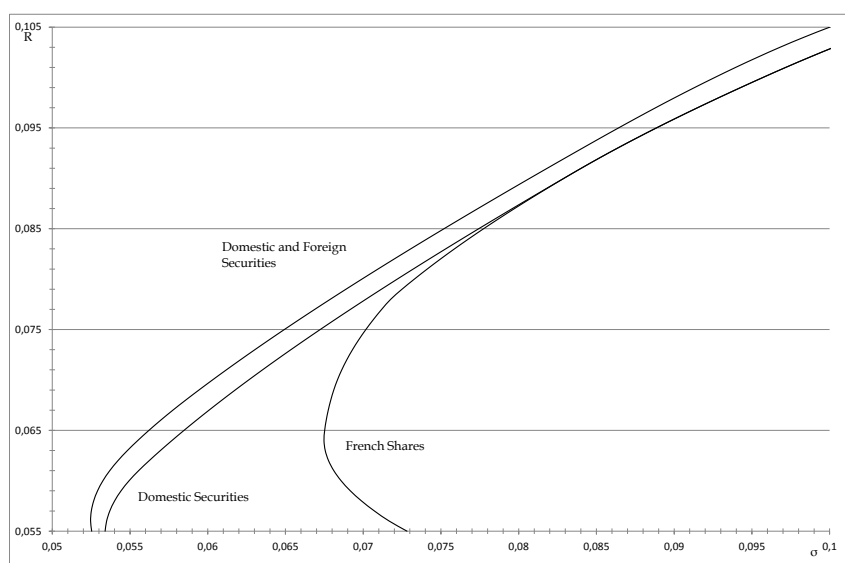
« French Shares » consist in the mean variance frontier determined from domestic indices, French Rentes excluded, i.e. the indices of French industrial Shares annual returns.

« Domestic Securities » consist in the mean variance frontier determined from domestic indices, i.e. the indices of French industrial Shares' annual returns and the index of French Rentes' annual returns.

« Domestic and Foreign Securities » consist in the mean variance frontier determined from all domestic and foreign indices, i.e. the indices of French industrial Shares annual returns, the index of French Rentes annual returns, the indices of Foreign Governments Loans annual returns and the index of European Railways Shares annual returns.

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[20] When there is no risk-free asset.

Table 3. French Optimal portfolio structure[21]

OPTIMAL PORTFOLIOS	Domestic securities only	Domestic and Foreign securities
Variance	0.004026	0.003525
Standard Deviation (s)	6.345%	5.937%
Average Yield (R)	7.092%	6.892%
R / s	1.118	1.161
INDICES		
FR RAIL	-	-
FR FIN	12.8%	5.0%
FR TXTL	10.3%	8.6%
FR FD	7.8%	0.9%
FR IRN	6.0%	6.3%
FR IND	24.5%	18.4%
FR UTIL	1.4%	7.3%
FR CD	4.1%	-
FR SHIP	-	-
FR TO	-	-
FR PRINT	-	-
WP EUR RAIL	//	13.3%
FR RC	33.1%	38.3%
WP EUR FOGVDB	//	-
WP W FOGVDB	//	2.0%
TOTAL	100.0%	100.0%

//: Not included in the investment opportunity set

Here we compare the efficiency of the optimal portfolio when the investment opportunity set is composed of domestic shares and rentes with the efficiency of the optimal portfolio when the investment opportunity set is composed of domestic and foreign securities. Table 3 details the structure of these optimal portfolios, defined as the portfolios with the highest ratio return on standard deviation. The ratio return on risk of the optimal portfolio determined when all the securities listed on Paris Stock Exchange are considered is higher than that of the optimal portfolio determined considering only domestic securities. This shows the efficiency gain potentially offered by the introduction of foreign assets listed on Paris Stock Exchange (around 4%).

When there is no risk-free asset, a French optimal portfolio includes around 15% of foreign securities, 13% being European railway shares and 2 % being government bonds from the rest of the world. There are also large proportions of four French indices: textiles (TXTL), iron (IRN), industry

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[21] When there is no risk-free asset; whatever the combination of 14 indices out of 15 indices, the geographical structure of the optimal portfolio is stable.

(IND) and utilities (UTIL). Amongst them are sectors in which there had been significant growth. For instance, the number of listed companies in the electricity sector (one of the branches in the utilities sector along with gas and water), grew from 2 to 40 between 1880 and 1920, representing 5% of the Paris Stock Market Capitalization in 1920.

The French industrial sector also grew significantly, its market capitalization having been multiplied by 2 between 1871 and 1918. This sector represented about 13% of Paris market capitalization in 1920. Similarly, the sector of iron grew considerably, representing 21% of the Paris stock market capitalization in 1920, its market capitalization having increased tenfold between 1880 and 1920[22]. On the contrary, among the indices which are not represented in the optimal portfolio, there is the French Railways sector (RAIL) which decreased significantly between 1880 and 1920[23]. The Shipping (SHIP) and Tramways and Omnibus (TO) sectors are also absent from this optimal portfolio, their development remaining low on the Paris Market. The match between actual French investments (that we can assume if we examine the evolution of market capitalisations) and the structure of the optimal portoflio tends to confirm the rationality of French investments at that time. Finally, the index of French Rentes (FR RC) is also very important in a French optimal portfolio, its proportion being around 38%. This supports the rationality of huge investments in French rentes.

When there is a risk-free asset, the improvement of the mean variance frontier, enabled by the introduction of the foreign assets listed on the Paris Stock Exchange, is once again obvious (Figure 2). An investor seeking a standard deviation of about 6.9% could improve the return of his portfolio from 7.15% when composed only of domestic shares, to 7.7%, when composed of domestic shares and foreign assets.

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[22] These data are from or calculated from ARBULU, 2007, table 12 p.415 and table 14 p.418.
[23] ARBULU (2007), p.415, table 12: the market capitalization of the Domestic Railway sector decreased so that its proportion on the Paris Stock Exchange market capitalization decreased from 48% in 1870 to 9% in 1920. The number of ordinary shares decreased from 42 to 34 between 1880 and 1920.

Figure 2. Minimum Variance Frontiers of risky assets on the Paris Stock Exchange[24]
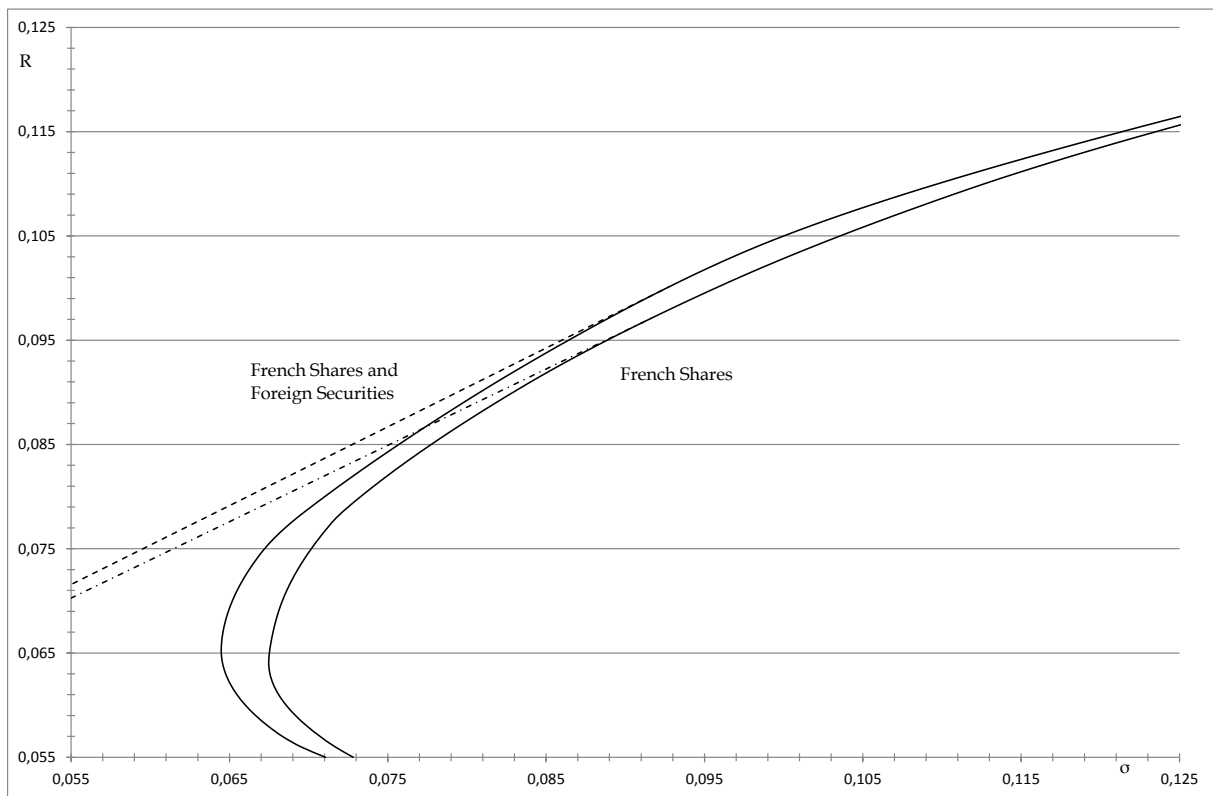
« French Shares » consist in the mean variance frontier determined from domestic indices, French Rentes excluded, i.e. the indices of French industrial Shares' annual returns.
« Domestic Shares and Foreign Securities » consist in the mean variance frontier determined from all domestic and foreign indices, French Rentes excluded, i.e. the indices of French industrial Shares annual returns, the indices of Foreign Governments Loans annual returns and the index of European Railways Shares annual returns.

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[24] When there is a risk-free asset.

<h2 style="text-align:center">Table 4. French Optimal portfolio structure[25]</h2>

OPTIMAL PORTFOLIO	Domestic Shares Only	Domestic Shares and Foreign Assets
Variance	0.008458	0.008601
Standard Deviation (s)	9.197%	9,274%
Average Yield (R)	9.734%	10.010%
SHARPE's ratio	0.732	0.756
INDICES		
FR RAIL	-	-
FR FIN	12.9%	4.6%
FR TXTL	2.8%	0.3%
FR FD	40.4%	37.9%
FR IRN	3.2%	5.2%
FR IND	35.9%	29.5%
FR UTIL	-	-
FR CD	4.8%	-
FR SHIP	-	-
FR TO	-	-
FR PRINT	-	-
WP EUR RAIL	//	17.1%
FR RC	//	//
WP EUR FOGVDB	//	-
WP W FOGVDB	//	5.5%
TOTAL	100.0%	100.0%

//: Not included in the investment opportunity set

Table 4 details the structure of French market portfolios when there is a risk-free asset. Here we quantify the increased efficiency of the market portfolio when foreign assets are added to French shares. Even if the difference is less marked than previously, we discover that the introduction of foreign assets improves French market portfolio efficiency by at least 3%.

Even more interesting is the fact that foreign assets, once introduced into the investment opportunity set, accounted for around 22% of the market portfolio, three quarters being European stocks (17%).

Considering the 3% French Rente as a risk free asset and hence removing the French Rentes index from the investment opportunity set, leads to an increase in the proportion devoted to the dynamic Food and Drink industry (from 1% previously to 38%) as well as the equally dynamic industrial sector (from 18% previously to 29%). The French industrial sector went through tremendous development between 1880 and 1920[26]. As previously, the financial sector (FIN) is included in the optimal portfolio at around 5%, as well as the iron sector (IRN). As in the previous sub-case, the French Railway,

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[25] When there is a risk free asset; whatever the combination of 13 indices among 14 indices, the geographical structure of the optimal portfolio is stable.

[26] ARBULU, 2007, pages 415 et 416.

Shipping and Tramways and Omnibus sectors are not included in the optimal portfolio. Again, this tends to show the adequacy between actual French investments and optimal investments.

Thus, the introduction of foreign assets improves the performance of the efficient portfolios. Based on the data available, it would appear that the Paris Stock Exchange was offering real diversification opportunities to French investors.

Similarly, the sectors introduced into French optimal portfolios in high quantities are sectors with obvious market and economic development over that period. Three sectors are systematically introduced in significant proportions: the finance and iron sectors, and in an even higher proportion, the industrial sector. Depending on whether there is a risk-free asset or not, the optimal portfolio is also significantly composed of assets respectively of the food and drink sector and the utilities sector. These similarities between French optimal portfolio structure and Paris Stock exchange evolution corroborates that French investments were economically and rationally driven.

Moreover, it seems that French investors were not as cautious as the conventional literature suggests. Indeed, the market portfolio, without risk-free asset, includes a high proportion of the French Rentes index: more than one third. According to ARBULU (2007) in 1913, 31% of French holdings in French portfolios were French rentes[27]. Considering the estimates of NEYMARCK (1913) and MOREAU-NERET (1939), of the share held by French investors in foreign assets[28], between 18.6% and 23% of a French portfolio was composed of French Rentes. These proportions are somewhat lower than those predicted by the Modern Portfolio Theory. The optimal portfolio, depending on assumptions on the risk free asset, is composed of 15% or 22% of foreign assets, whereas contemporay financial analysts estimated it to be between 40% and 54% of French holdings before the First World War[29]. It seems that, regarding Modern Portfolio Theory and Financial Analysts Statistics, French investors widely inclined to foreign investments which is quite the opposite of the traditional view of French investors i.e. conservative and cautious.

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[27] ARBULU, 2007, table 13 page 417.
[28] Respectively about 40% and 54%.
[29] NEYMARCK (1897) and MOREAU-NERET (1939)

Finally, it is noteworthy that, of the foreign stock included in French optimal portfolios, more than 75% were European stocks. This also suggests that it was rational for French investors to devote a larger part of their foreign portfolio to European assets.

In order to further test the rationality and efficiency of large investments in Europe, we adopt a different perspective in the next section, considering the case of an international investor distributing his wealth between the Paris and London Stock Exchanges. We adopt the view of an international investor and determine a World optimal portfolio enabling us to know whether European investments would have represented such a high proportion in a more widely distributed portfolio.

Would an Optimal World Portfolio have devoted such an important proportion to European investments?

The assertion of an international investor spreading capital over the London and Paris stock exchanges.

The study of WOODRUFF (1966) is the cornerstone of our analysis of international portfolio diversification (Table 5). To our knowledge, WOODRUFF (1966) is the only author who calculated the total amount of world overseas investments as well as their geographic distribution on the eve of the First World War.

In his view, world overseas investments amounted to more than USD 45 billion. Basically, four great nations were involved which accounted for 85% of all foreign investments. Among them, Great-Britain (44%) and France (20%) were the source of about two thirds of these. Half of the investments went to Europe (26.4%) and North America (24.4%).

Victorian investors held a very diversified portfolio but exhibited a distinct preference for North America which accounted for 35.3% of their overseas investments. Their capital flow to European nations remained marginal, representing only 5% of British foreign investments. Asia and

Latin America accounted both for roughly 18% of overseas British investments. Capital invested in Oceania and Africa accounted respectively for 11% and 12% of the total.

In 1914, French foreign investments represented approximately half those of Britain in total and 20% of World foreign investments. France showed a real preference for Europe. While half of these investments were made in European countries (including Russia), French capital was also exported across the rest of the world in significant proportions. Thus, the proportion of French foreign portfolios devoted to Latin America (18%) was almost equivalent to that of Great-Britain. The rest of French foreign investments were distributed over Asia (14%) and Africa (10%). North America accounted for only 5% of French investments.

In fact, the differences between the British and French geographical distribution of capital can be summarized as follows: a first difference is the absence of French investments in Oceania to which Victorian investors devoted 11% of their foreign investments. A second crucial difference is that French investors chose to invest massively in Europe (51.9%), investments in North America remaining marginal (5.5%), whereas Victorian investors chose to invest much more (35%) in North America, Europe remaining marginal in their portfolio (5.3%).

Table 5. Geographical distribution of foreign investments in 1914, in millions of USD to the nearest $ million.

From	UK	France	Germany	USA	World
To					
Europe	1 050	4 700	2 550	700	12 000
Total Europe	*1 050*	*4 700*	*2 550*	*700*	*12 000*
%	*5.25%*	*53.11%*	*43.97%*	*20.00%*	*26.40%*
North America					
USA	4 250	400	950		7 100
Canada	2 800	-100	200	900	3 850
Total North America	*7 050*	*500*	*1 150*	*900*	*11 100*
%	*35.25%*	*5.65%*	*19.83%*	*25.71%*	*24.42%*
Latin America					
Mexico	500	400		850	2 200
Cuba	150			350	-500
Argentina	1 550	400	-200		2 950
Brazil	700	700	-500		2 200
Chile	300	50			
Peru	150		-100		
Uruguay	200	50		450	1 000
Rest	100				100
Total Latin America	*3 700*	*1 600*	*900*	*1 650*	*8 900*
%	*18.5%*	*18.08%*	*15.52%*	*47.14%*	*19.58%*
Oceania					
Australia	1 700	-100			1 600
New Zealand	300				300
Rest	-200				-200
Total Oceania	*2 200*	*-100*	*0*	*0*	*2 300*
%	*11.00%*	*-1.13%*	*0.00%*	*0.00%*	*5.06%*
Asia					
Turkey	100	650	450		1 200
India & Ceylon	1 850				1 850
Indo-China		-200			-200
Straits Settlements	150				200
Dutch East Indies	200				750
China	600	150	250	50	1 600
Japan	500	200		50	1 000
Rest	150			150	300
Total Asia	*3 550*	*1 250*	*700*	*250*	*7 100*
%	*17.75%*	*14.12%*	*12.07%*	*7.14%*	*15.62%*
Africa					
British Africa					0
British West Africa	200				200
British East and Central Africa	150				150
Rodhesia	250				250
Egypt	-200	-500			-700
French North Africa		-200			-200
French Africa (South of Sahara)		100			100
South Africa	1 550	-100			1 650
German colonies			400		400
Belgian Congo			-100		300
Rest	100				100
Total Africa	*2 450*	*900*	*500*	*0*	*4 050*
%	*12.25%*	*10.17%*	*8.62%*	*0.00%*	*8.91%*
World total	**20 000**	**8 850**	**5 800**	**3 500**	**45 450**
%	*100.00%*	*100.00%*	*100.00%*	*100.00%*	*100.00%*

Sources : WOODRUFF (1966) page 154.

Although geographical distribution of capital differs, EDELSTEIN (1982) noted that in terms of industrial distribution, "the other major 19th century capital exporters, France and Germany, followed the same pattern [as Great-Britain]: of heaviest involvement in social overhead capital projects, with minor investments in agriculture, mining, finance, etc."[30]

Figure 3 highlights the weight of the main creditors within each geographical area. The investments of Great-Britain and France accounted for about two thirds of all investments received in each area, except Europe.

France was clearly the European financial center in 1914. Indeed, half of French foreign investments were devoted to European countries and the proportion of French capital in Europe accounted for 39% of the capital received by Europe and its periphery. France was undoubtedly the main creditor of Europe, followed by Germany (21%), whereas British investments in Europe accounted for less than 9% of its foreign investments.

By 1914, Great-Britain was the real international financial center and was the main creditor of almost all geographical areas except Europe (8.75%).

Thus we consider that an international investor could have decided to turn to these two main financial centers, Paris and London, to form an internationally diversified portfolio.

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[30] EDELSTEIN, 1982, page 38.

Figure 3

Proportion of the main capital exporters within each geographical area.
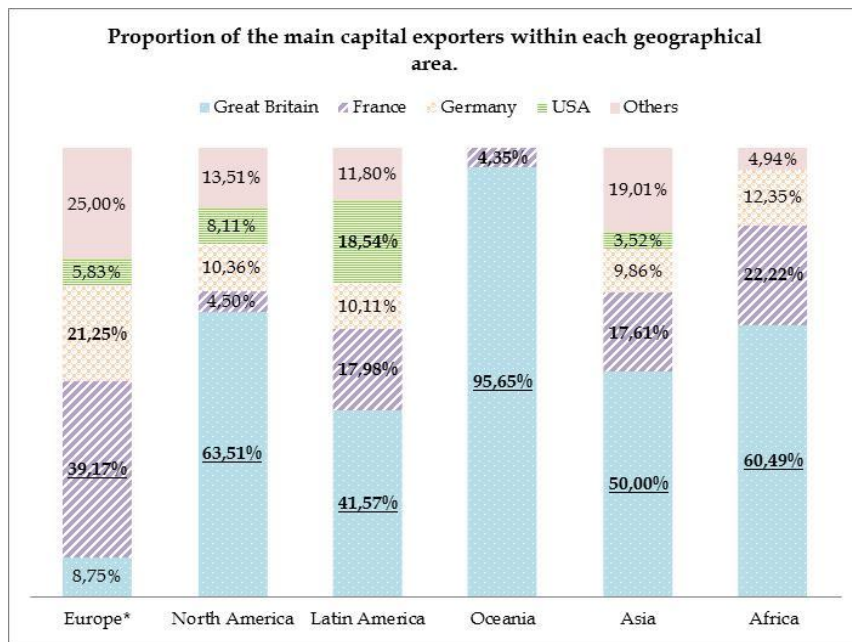
From table 1, WOODRUFF (1967)

Optimality of Victorian portfolio choices on the London Stock Exchange.

Optimization is now applied to EDELSTEIN's (1982) database, organized into 24 industrial indices (Table 6). There are fifteen British domestic indices : eleven represent British and colonial ordinary shares while four represent British and colonial debentures. There are nine foreign indices, three of which represent European ordinary shares while four represent "Rest of the World" ordinary shares; one index represents European Railway debentures and one represents "Rest of the World" Railway debentures; "Rest of the World" meaning the world except Europe.

Table 6 details the characteristics of these indices and clarifies the terminology used in the following pages.

Table 6. Details of the London Stock Exchange indices

		R (%)	Variance	Description
London Stock Exchange Indices (1877-1913)				
	Ordinary Shares	R (%)	Variance	Description
Domestic — British and colonial	UK RAIL	3.262	0.00375	Railways
	UK FIN	6.538	0.00288	Finance and insurance
	UK TXTL	7.978	0.01397	Textil
	UK FD	12.562	0.02052	Food and Drink
	UK IRN	9.138	0.03012	Metal
	UK IND	9.101	0.00719	Industry
	UK UTIL	5.815	0.00784	Utilities
	UK CD	1.626	0.00578	Canals and Docks
	UK SHIP	5.542	0.01493	Shipping
	UK TT	7.632	0.00818	Telephon and Telegraph
	UK TO	11.232	0.08573	Tramways and Omnibus
Debentures				
British and colonial	UK MUNIDB	3.524	0.00059	Municipalities
	UK RAILDB	3.371	0.0011	Railways
	WL CLGVDB	3.77	0.00042	Colonial governments
	WL CLMUNIDB	4.998	0.00101	Colonial municipalities
Ordinary Shares				
Foreign — Rest of the world	WL W RAIL	8.445	0.01077	Railways (India, US, Latin America)
	WL W BANK	8.443	0.00495	Banks (Asia, Australia, South Africa, Canada, Latin America)
	WL W INFRA	8.227	0.00611	Infrastructures (India, North America, Latin America)
	WL TEA	8.481	0.03018	Tea and Coffee
European	WL EUR RAIL	5.235	0.00557	Railways (Western and Eastern Europe)
	WL EUR BANK	8.818	0.01832	Banks (Eastern Mediterranean Countries)
	WL EUR INFRA	8.63	0.01104	Infrastructures (Western Europe)
Debentures				
Rest of the world	WL W RAILDB	5.16	0.00095	Railways (India, Canada, US and Latin America)
European	WL EUR RAILDB	5.125	0.00097	Railways (Western and Eastern Europe)

Here the British Consols are considered as a risk free asset[31]. Table 7a details the structure of the British market portfolio and table 7b presents this structure in major categories of assets.

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[31] As GOETZMANN and UKHOV (2006) did.

Table 7a. Structure of London Market Portfolio[32]

LONDON OPTIMAL PORTFOLIO	
Variance	0.001244
Standard Deviation (s)	3.528%
Average Yield (R)	7.206%
SHARPE's ratio	1.348
INDICES	
UK RAIL	-
UK FIN	-
UK TXTL	11.5%
UK FD	9.6%
UK IRN	-
UK IND	5.3%
UK UTIL	-
UK CD	-
UK SHIP	-
UK TT	-
UK TO	1.2%
WL W RAIL	-
WL EUR RAIL	-
WL W BANK	18.4%
WL EUR BANK	-
WL W INFRA	-
WL EUR INFRA	-
WL TEA	4.2%
UK MUNIDB	-
UK RAILDB	-
WL CLGVDB	//
WL CLMUNIDB	-
WL W RAILDB	-
WL EUR RAILDB	49.7%
TOTAL	100.0%

Table 7b. Structure of the London optimal portfolio in main categories.

LONDON OPTIMAL PORTFOLIO	
British Domestic and Colonial Assets	27.6%
Total Foreign Assets	72.4%
European Foreign Assets	*49.7%*
Non-European Foreign Assets	*22.6%*

Our results with regard to the London Stock Exchange can be compared to those of GOETZMANN & UKHOV (2006). They are consistent in terms of the industrial sectors included in the optimal portfolios. Indeed the best combinations of GOETZMANN and UKHOV (2006) are composed of almost the same indices as our optimal portfolios when the differences in account indices

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[32] Whatever the combination of 23 among 24 indices, the geographical structure of the optimal portfolio is stable.

construction are taken into account. Yet some methodological differences can explain certain different outcomes. The main difference is that our study introduces a geographical dimension which is absent from GOETZMANN and UKHOV's analysis. Indeed, we "split" every foreign index according to its geographical origin. For instance, GOETZMANN and UKHOV (2006) consider one index of foreign railways debt whereas we consider one index of European railways debt and one index of "rest of the world" railway debt. The other methodological differences seem to have little impact despite our indices not being perfectly identical[33].

In the same way as GOETZMANN and UKHOV (2006), we discover that almost 50% of this portfolio ought to be devoted to foreign railway bonds. Having divided this index between European and "Rest of the world" stocks (i.e. the world except Europe), we can distinguish the geographical origins of this stock. Thus, our results cast a new light on the study of British portfolio diversification. *Contrary to the idea that before the First World War, rationality should have encouraged Victorian investors to invest outside Europe in new nations with higher growth prospects, our portfolio optimization leads to an optimal portfolio composed of about 50% of European railway bonds. A London optimal portfolio is composed of about 75% of foreign stocks of which two thirds are European stocks. This optimal structure seems to be a long way from the true nature of British portfolios.*

Investing in "Young countries" rather than in European assets.

This previous outcome highlights the importance of European investments within British optimal portfolios. It is also obvious that British overseas investments were very different from those predicted by the Modern Portfolio Theory. We therefore proceed to an additional optimization. We now compare two strategies: "London optimal strategy" consists in determining the efficient portfolio obtained with no constraints other than short sale constraints; "London constraint strategy" consists in determining the efficient portfolios when investments in European assets are necessarily below 2.5%

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[33] We work on 24 British indices whereas GOETZMANN and UKHOV (2006) worked on 19 indices. The indices' composition is somewhat different, as is the period considered: 1877-1913 for us and 1870-1913 for GOETZMANN & UKHOV (2006).

of the overall British portfolio. This seems to have been the highest proportion Victorian investors had ever devoted to these assets.

We compare the corresponding optimal portfolios, the aim being to quantify the potential efficiency gap between "London optimal strategy" and "London constraint strategy". Table 8 details the structure and characteristics of these two optimal portfolios.

Table 8. The structure and characteristics of Optimal portfolios.

OPTIMAL PORTFOLIO	London Optimal Strategy	London Constraint Strategy
Variance	0.001248	0.001777
Standard Deviation (s)	3.533%	4.216%
Average Yield (R)	7.213%	7.782%
SHARPE's ratio	1.348	1.265
INDICES		
UK RAIL	-	-
UK FIN	-	-
UK TXTL	11.5%	12.1%
UK FD	9.6%	12.2%
UK IRN	-	-
UK IND	5.3%	9.7%
UK UTIL	-	-
UK CD	-	-
UK SHIP	-	-
UK TT	-	-
UK TO	1.2%	2.0%
WL W RAIL	-	-
WL EUR RAIL	-	-
WL W BANK	18.6%	22.6%
WL EUR BANK	-	-
WL W INFRA	-	-
WL EUR INFRA	-	-
WL TEA	4.2%	4.1%
UK MUNIDB	-	-
UK RAILDB	-	-
WL CLGVDB	-	-
WL CLMUNIDB	-	1.2%
WL W RAILDB	-	33.7%
WL EUR RAILDB	49.5%	2.5%
TOTAL	100.0%	100.0%

The Sharpe ratio corresponding to "London optimal strategy" is around 6.5% higher than the one corresponding to "London constraint strategy". This means that even ideally "London constraint strategy" does not dominate the "London optimal strategy". By neglecting European investments, "London constraint strategy", leads Victorian investors to miss out on diversification opportunities.

Both portfolios are mainly composed of foreign assets, around 73% for London "optimal" strategy and around 65% for "constraint" strategy. The same domestic indices are included in these portfolios. Only the porportion invested in each indice differs slightly.

Thus it appears that "constraint" London strategy with regard to foreign investments was not optimal and could have been biased toward "young nations" to the detriment of European assets.

A World Optimal Portfolio on the eve of the First World War.

To confirm previous results, we now embark on an original extension. Here, optimization is applied to an extended database gathering data from the Paris and London Stock Exchanges: these two Stock Exchanges represented two thirds of World overseas investments at the outbreak of the First World War. We use the previous French database between 1877 and 1913 corrected by the Franc/£ exchange rates (Table 8) and EDELSTEIN's (1982) database (table 6)[34].

Optimization under constraint is now applied to a data set composed of 39 indices. Tables 6 and 9 detail the characteristics of the indices.

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[34] As in the previous section, we tested the robustness of our results in taking into consideration the HCAC 40 index (Le Bris, 2010) and the historical French bond index (Rezaee, 2010). See footnote 19. Our outcomes on the structure of the World optimal portfolio are not modified by the inclusion of these indices. These results are available upon request.

**Table 9. The detail of the Paris Stock Exchange indices**

		R (%)	Variance	Description
Paris Stock Exchange Indices (1877-1913, in £)				
	Ordinary Shares			
	FR RAIL	5.358	0.00773	Railways
	FR FIN	7.765	0.01327	Finance and insurance
	FR TXTL	5.981	0.01972	Textil
	FR FD	11.39	0.01982	Food and Drink
Domestic — French and colonial	FR IRN	9.384	0.0202	Metal
	FR IND	8.392	0.01196	Industry
	FR UTIL	7.625	0.0093	Utilities
	FR CD	8.624	0.01288	Canals and Docks
	FR SHIP	3.782	0.01282	Shipping
	FR TO	5.781	0.0248	Tramways and Omnibus
	FR PRINT	9.903	0.04089	Printing
	Debentures			
French	FR RC	4.292	0.00337	Rentes
	Ordinary Shares			
Foreign — European	WP EUR RAIL	9.757	0.02022	Railways (Mediterranean and Eastern Europe)
	Debentures			
European	WP EUR FOGVDB	11.909	0.02991	Governments (Mediterranean, Western and Eastern Europe)
Rest of the World	WP W FOGVDB	6.432	0.00629	Governments (Europe's periphery, Latin America, China,

Figure 4 shows the mean variance frontiers and capital market lines for French and British markets and for a "world" market composed of the two previous markets. It is obvious that an "international" investor was interested in holding assets from both London and Paris Stock Exchanges. Indeed portfolios from the "world" market frontier are more efficient than those from domestic markets. Thus, it was in the interest of French and British investors to turn to the market on the other side of the Channel, even if the potential gain in efficiency was higher for French investors than for Victorian ones.

It seems that London's risk/return tradeoff was higher than that offered by the Paris Stock Exchange. This is not surprising in as far as London was the most important and the largest Stock Exchange in the world[35].

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[35] GOETZMANN and UKHOV, 2006.

Figure 4. Mean Variance Frontiers of risky assets.
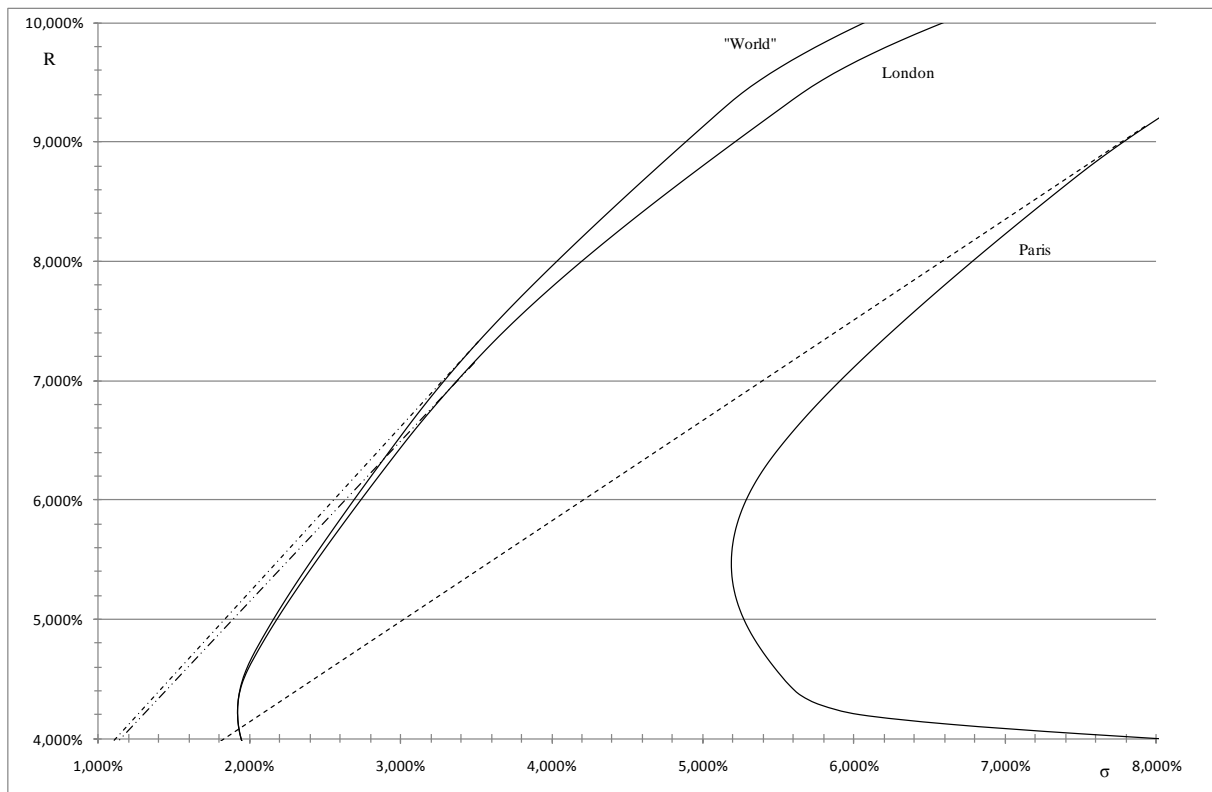
"Paris" corresponds to the mean-variance frontier when the investment opportunity set is considered to be composed of all the assets listed on the Paris Stock Exchange.
"London" corresponds to the mean-variance frontier when the investment opportunity set is considered to be composed of all the assets listed on the London Stock Exchange.
"World" corresponds to the mean-variance frontier when the investment opportunity set is considered to be composed of all the assets listed on both Paris and London Stock Exchanges.

Table 10a details the structure and the characteristics of the World optimal portfolio. On the eve of the First World War, an international investor would have benefited from simultaneous investment on both London and Paris Stocks exchanges. Indeed the World optimal portfolio is more efficient than the British Market Portfolio.

Table 10a. Structure of the World Market Portfolio[36].

OPTIMAL PORTFOLIO	
Variance	0.001173
Standard Deviation (σ)	3.425%
Average Yield (R)	7.233%
SHARPE's ratio	1.3965
INDICES	
UK RAIL	-
UK FIN	-
UK TXTL	10.1%
UKFD	9.2%
UK IRN	-
UK IND	4.2%
UK UTIL	-
UK CD	-
UK SHIP	-
UK TT	-
UK TO	0.8%
WL W RAIL	-
WL EUR RAIL	-
WL W BANK	15.1%
WL EUR BANK	-
WL W INFRA	-
WL EUR INFRA	-
WL TEA	3.0%
UK MUNIDB	-
UK RAILDB	-
WL CLGVDB	-
WL CLMUNIDB	-
WL W RAILDB	10.4%
WL EUR RAILDB	36.7%
Total London Stock Exchange	89.4%
FR RAIL	-
FR FIN	1.1%
FR TXTL	-
FR FD	-
FR IRN	-
FR IND	9.4%
FR UTIL	-
FR CD	-
FR SHIP	-
FR TO	-
FR PRINT	-
WP EUR RAIL	-
FR RC	-
WP EUR FOGVDB	-
WP W FOGVDB	-
Total Paris Stock Exchange	10.6%
Grand Total	100%

Table 10b combines the structure of the optimal World portfolio into main geographical categories. This portfolio is composed on average of 65% of Foreign assets and more particularly of around 37% of European assets. This is the most important category of the optimal World portfolio. This proves once again the rationality of investing heavily abroad and particularly in Europe.

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[36] Whatever the combination of 38 out of 39 indices, the geographical structure of the optimal portfolio is stable.

Table 10b. Structure of the "world" Market portfolio into main categories.

WORLD OPTIMAL PORTFOLIO	
Total Domestic and Colonial Assets	34.8%
British Domestic and Colonial Assets	*24.2%*
French Domestic and Colonial Assets	*10.6%*
Total Foreign Assets	65.2%
European Foreign Assets	*36.7%*
Non-European Foreign Assets	*28.4%*

Let us compare the structure of the optimal world portfolio with the actual structures of French and British Portfolios in 1914.

HOBSON (1914) and FEIS (1930) estimated that 28% of the Victorian portfolio was devoted to foreign assets while EDELSTEIN (1982) estimated this proportion at 47.7%. Regarding French portfolios, NEYMARCK (1913) considers that 40% of French holdings were foreign while for MOREAU-NERET (1939) this proportion amounted to 54% in 1902. When set against our calculations, these estimates show that the vast scale of British and French investments abroad were economically rational and should have been even greater.

In addition, according to WOODRUFF (1967), half of French foreign investments were devoted to Europe, which represents between 20.8% and 28% of the overall portfolio. Similarly he estimated that 5.3% of British Foreign investments were devoted to Europe, which represents between 1.5% and 2.5% of the British Portfolio. Our optimization suggests that an international investor should have devoted around 37%? of his portfolio to European foreign assets. This result suggests that the higher concentration of French foreign investments on European assets was economically rational and corroborates the findings of PARENT and RAULT (2004) according to which large French investments in European assets were economically driven. In the light of those results, it appears that the efficiency of Victorian portfolios could have been enhanced by investing a higher proportion in European assets. The importance of European assets within the "world" portfolio tends to invalidate the thesis that investments in young nations were more profitable than those in Europe. This suggests that British investorscould have had a "new world" bias.

Conclusion

In this paper, we have addressed the issue of the economic consistency of French and British geographical distribution of capital. Thanks to the Modern Portfolio Theory and considering various standpoints, we highlighted that on the eve of the First World War, any investor should have devoted a large part of his portfolio to European assets.

In the first section, we gave empirical evidence that this was the case for French investors. We also highlighted that French investors were less conservative and cautious than the conventional literature suggests.

In the second section, the notable differences of structure between British optimal portfolio and British effective portfolio were pinpointed. Using the Modern Portfolio Theory, contrary to conventional wisdom, we found that rationality should have encouraged Victorian investors to invest more heavily in European assets.

Following this we went one step further, considering an international investor and determining an optimal world portfolio. Once again, the outcome is that an optimal portfolio should have been mainly composed of foreign assets and notably of European ones.

Ultimately, our conclusion falls in line with the results of KENNEDY (1974) and the questions of MCCLOSKEY (1970): "Did Victorian Britain Fail"?

Indeed, these authors emphasized that the British allocation of capital was characterized over the period 1870 – 1914 by a massive allocation to "conservative foreign investments", suggesting a pronounced implicit risk aversion. According to KENNEDY (1974), this supposes a strong preference for risk avoidance, reflected by "the infrequency of defaults on foreign investment; the preponderance of fixed-interest securities in the aggregate portfolio of British foreign assets and the relatively low rate of return"[37]. The Victorian aggregate portfolio over this period is described as "bond-laden, conservative and chosen to suit the tastes of discriminating *rentiers*"[38].

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[37] KENNEDY, 1974, pages 427-428.
[38] KENNEDY, 1974, page 432.

Our results, using the rigorous framework of Modern Portfolio Theory tend to corroborate and support

Kennedy's intuition that Victorian investors did not exploit all the investment opportunities available,

notably in European assets. In this way, the disturbing lesson from portfolio analysis revives the ties

with a forgotten view that has probably not hitherto attracted enough attention.

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Appendix

Appendix 1
The Time Composition of the securities listed on Paris Stock Exchange

A. French Shares		1875	1880	1890	1900	1910	1913
Railways	FR RAIL	6	6	6	6	6	6
Finance and insurance	FR FIN	15	17	18	23	23	23
Textil	FR TXTL	3	3	4	3	3	3
Food and Drink	FR FD	2	3	8	11	12	14
Metal	FR IRN	6	7	11	14	20	20
Industry	FR IND	7	8	17	31	34	34
Utilities	FR UTIL	5	10	17	27	38	40
Canals and Docks	FR CD	3	3	4	4	4	4
Shipping	FR SHIP	2	2	6	6	6	6
Tramways and Omnibus	FR TO	2	2	2	11	11	11
Printing	FR PRINT	1	2	6	7	8	8
B. French Rentes							
French Government Rentes	FR RC	5	5	5	5	5	5
C. Foreign Shares							
Railways (Mediterranean and Eastern Europe)	WP EUR RAIL	4	5	7	7	7	7
D. Foreign Rentes							
Governments (Mediterranean, Western and Eastern Europe)	WP EUR FOGVDB	6	8	14	21	19	18
Governments (Europe's periphery, Latin America, China, Madagascar)	WP W FOGVDB	1	3	5	7	7	7
Subtotal		68	84	130	183	203	206

Appendix 2
The Time Composition of the securities listed on London Stock Exchange

A. British Shares		1870	1880	1890	1900	1910	1913
Railways	UK RAIL	16	16	16	15	15	15
Finance and insurance	UK FIN	28	32	31	30	28	26
Textil	UK TXTL	3	16	14	22	24	25
Food and Drink	UK FD	1	1	7	12	14	14
Metal	UK IRN	8	13	15	21	25	25
Industry	UK IND	9	13	18	20	22	23
Utilities	UK UTIL	9	12	13	14	8	8
Canals and Docks	UK CD	5	7	7	6	4	4
Shipping	UK SHIP	8	8	10	10	8	7
Telephon and Telegraph	UK TT	1	2	2	3	2	1
Tramways and Omnibus	UK TO	1	3	3	2	2	1
B. British Rentes and Bonds							
Municipalities	UK MUNIDB	4	10	25	37	38	36
Railways	UK RAILDB	15	21	20	15	15	15
Colonial governments	WL CLGVDB	12	21	31	42	35	34
Colonial municipalities	WL CLMUNIDB		7	13	19	17	16
C. Foreign Shares							
Rest of the World Railways (India, US, Latin America)	WL W RAIL	15	18	21	26	26	26
Rest of the World Banks (Asia, Australia, South Africa, Canada, Latin America)	WL W BANK	16	17	16	12	12	12
Rest of the World Infrastructures (India, North America, Latin America)	WL W INFRA	6	17	20	18	25	23
Tea and Coffee	WL TEA	2	5	7	15	14	14
European Railways (Western and Eastern Europe)	WL EUR RAIL	11	14	13	8	6	4
European Banks (Eastern Mediterranean Countries)	WL EUR BANK	4	4	4	4	4	4
European Infrastructures (Western Europe)	WL EUR INFRA	2	6	8	8	8	7
D. Foreign Bonds							
Rest of the World Railways (India, Canada, US and Latin America)	WL W RAILDB	3	24	44	62	54	50
European Railways (Western and Eastern Europe)	WL EUR RAILDB	14	20	16	11	10	7
Subtotal		193	307	374	432	416	397

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