A Comparative Study of Capital Market Failure and Institutional Innovation

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Abstract

Comprised of two separate projects, this study examines imperfections in early capital markets. The first concerns the insurance benefits associated with the scattered landholdings of medieval peasant farmers while the second traces the evolution of securities markets in the United States. In particular, the second focuses on both the development of the New York Stock Exchange and the role of the London Stock Exchange in channeling capital to U.S. firms.

Previous research suggests that scattered holdings may have reduced variation in annual agricultural yields. The argument hinges on the notion that yields were not too highly correlated on separate plots of land within the same village. To this point, however, researchers have lacked the sort of data necessary to adequately test this hypothesis.

Tithe records from two villages in northern France – Onnaing and Quarouble - provide the basis for constructing a time series of financial returns on individual plots of land. Using these returns, a portfolio analysis is undertaken to measure the reduction in yield variances associated with scattering. The results suggest that it was crop diversification, not scattering, that pro-

vided insurance benefits to peasant farmers.

In the second project, data from the London Stock Exchange indicate that, in the nineteenth and early twentieth centuries, British capital funded many ventures in the emerging American West. Many of these ventures, moreover, were not able to attract finance through the aegis of the premier domestic capital market – the New York Stock Exchange.

Financial data from a number of stock exchanges – most notably the New York, the London, and the Boston – and institutional descriptions drawn from various published sources, suggest that, in an effort to relieve uncertainty and establish wider markets for their securities, the Governors of the New York exchange developed a set of trading rules and vetting procedures which excluded securities from small new companies. Not surprisingly, these firms were often located in the West.

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Chapter 1

Introduction

Markets take time to develop, and capital markets are certainly no exception. In other markets buyers may simply evaluate tangible assets; in the case of capital markets, however, they are compelled to evaluate uncertain investment opportunities. Trading hard-earned savings for paper claims on unseen assets may seem commonplace to the modern reader; but, if that market is to operate efficiently, a high degree of institutional complexity is necessary. It is necessary, first, to coordinate suppliers and demanders of capital, and, second, to inspire the requisite trust between parties to these trades.

Suppliers of capital bring their savings to the market for a variety of reasons. At the simplest level, interest on savings provides earnings on balances that might otherwise remain idle. For some, investment may appear to be a road to wealth. In other instances, inter-country capital transfers may be designed to achieve political goals not directly connected to profitability. For example, capital flows from Great Britain to her colonies provided reason-

able rates of return to investors; but they were fostered by politicians whose desires included the development of a British Empire.[1] Beginning at the turn of the century, the capital transfers from the United States to Latin America can perhaps be viewed in a similar light. Certainly there have been many charges of dollar diplomacy.[2] Modern financial analysis has added other motives to the list: as a means of diversifying one's portfolio of assets to minimize risk or to smooth consumption across time periods to name just two.[3]

Although clearly a diverse group, those who demand capital face one common problem, for whatever reason, they are unable or unwilling to commit a sufficient portion of their individual reserves to fund a given project and must borrow from others. Some may need funds for just a short time – for

[1]Based on an analysis of 377 bills before the House of Commons from 1859 to 1910, Davis and Huttenback conclude that, "Broadly speaking, the Conservatives as opposed to the Liberals were the pro-imperial party, and from 1868 to 1906 (the years 1886 and 1895 aside) their assumption of this position was a strong one." Of those bills that dealt directly with imperial matters, forty-four percent of the imperial divisions dealt with military matters, eighteen percent with administrative and tax matters, and thirty-eight percent with actual capital transfers in the form of loans and other non-military subsidies. Lance Davis and Robert Huttenback, *Mammon and the Pursuit of Empire: The Political Economy of British Imperialism, 1860-1912*, (Cambridge: Cambridge University Press, 1986). pp. 268-272.

[2]That these flows were not large and yet warranted U.S. military intervention underscores the point that capital markets and politics are often inextricably linked. See Lance E. Davis and Robert Cull, "International Capital Movements and American Economic Growth," forthcoming in the *Cambridge Economic History of the United States*, Stanley Engerman and Robert Gallman, (eds.).

[3]See Harry M. Markowitz, *Mean-Variance Analysis in Portfolio Choice and Capital Markets*, (Oxford: Basil Blackwell, 1987.) on diversification and William A. Brock, "Asset Prices in a Production Economy," in John J. McCall (ed.), *The Economics of Information and Uncertainty*, (Chicago: Univ. of Chicago Press, 1982) or Robert E. Lucas, Jr., "Asset Prices in an Exchange Economy," *Econometrica* 46: 1429-45, for examples of consumption based intertemporal pricing applications.

example, modern investment companies turn to the money market to finance their day to day trade positions. Others require capital for longer periods– a firm that floats a bond issue to expand its operations, for example. Demanders need not operate on such a grand scale either. Consider the student investing in her own human capital who requires a series of bank loans to complete her education.

In light of the diverse incentives of both suppliers and demanders of capital, the task of matching the right saver with the right borrower is, of course, quite complicated. At their inceptions and in their early developments these markets were confronted by this fundamental problem, the problem addressed in this thesis; that is, how to match savers and borrowers – the suppliers and the demanders of capital – given an environment characterized by severe informational asymmetry. In the absence of institutions designed to solve this problem, those who demanded capital were likely to have much better information about the prospects of success for their ventures than did potential suppliers. The management of a railroad that issued bonds in the late nineteenth century, for example, probably knew more about the probability that it would repay the debt in a timely fashion than those investors who initially bought the bonds. Correctly perceiving that they were at an informational disadvantage, suppliers of capital were right to be skeptical:

> "In the exercise of your profession there is probably not one of you who will not be asked at some time or other to become agent, either for the sale of the bonds of a mortgage company in the United States or those of a railway company. If for a mortgage

> company, you will be told that the district in which it does business is the only in which mortgages are of value in the United States, and certainly the most thriving and prosperous, though in need of money. You will not be told that the virgin soil has been worked out, and that the land produces only one-half of what it did twenty years ago, yet this may be the case... If on the other hand, it be a railway company, you will be told that it possesses advantages superior to any other railway in the United States, and though possibly not yet built, it has a magnificent future before it.[4]

The evolution of capital markets, therefore, has hinged crucially on questions of information – that is, on the ability of individuals and society to devise institutions that elicit truthful revelation of information.

The evolution of such institutions has been long and arduous; and, claims by modern financial analysts about the completeness of asset markets aside, it is still anything but finished. In contrast, one notable theorist, Kenneth Arrow, has proven that the co-ordination necessary to achieve a general equilibrium in markets can be attained in well-behaved economies free of such impediments as externalities, indivisibilities, and increasing returns to scale, but only with an array of prices corresponding to a comprehensive set of futures markets, a set spanning every contingency. Of course, Arrow himself notes the wide gulf between theoretical paradigm and empirical investigation:

[4]William John Menzies, "America As a Field for Investment," Lecture delivered to the Chartered Accountants Students' Society, 18th February, 1892. (Edinburgh: William Blackwood and Sons). p. 3.

> "In my own thinking, the model of general equilibrium under uncertainty is as much a normative ideal as an empirical description. It is the way the actual world differs from the criteria of the model which suggests social policy to improve the efficiency with which risk bearing is allocated."[5]

While the world does not at present, and, for that matter, almost certainly will never satisfy the criteria of Arrow's model, in the case of capital markets, it comes closer than it once did. Futures markets do exist (although there are not terribly many) and increased capital flows suggest that risk bearing is better allocated, at least better than the time each individual was forced to bear his own risk and to rely solely on his individual resources.

These institutional developments, however, grew out of far more humble beginnings. Some recent research has focused on the evolution of capital markets and early attempts to circumvent informational asymmetry. Naomi Lamoreaux's work on the importance of kinship networks in capital formation in New England suggests one way individuals could draw on collective funds, pool risk, and resolve informational asymmetries.[6] Paul Milgrom, Doug North and Barry Weingast's treatment of the pivotal role of medieval law merchants in reputation building in credit markets highlights another early institutional solution to informational asymmetries.[7] Among the virtues of

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[5]Kenneth Arrow, "General Economic Equilibrium: Purpose Analytic Techniques, Collective Choice," *American Economic Review*, 64 (June, 1974) pp. 253-72.

[6]Naomi Lamoreaux, "Banks, Kinship, and Economic Development: The New England Case," *Journal of Economic History*, September, 1986, pp. 647-667.

[7]Paul R. Milgrom, Douglass C. North and Barry R. Weingast, "The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs,"

these studies is their focus on information, the critical element in establishing capital markets. Often these studies focus on one institution, describe its workings, and discuss both its pervasiveness and effectiveness. As a result, however, the dynamic flavor of institutional response in capital markets, a focus of this study, is somewhat de-emphasized.

Less institutional approaches to the study of capital markets doubtless have provided insight, but they also have their shortcomings. For example, a theoretical approach to the study of financial markets often involves assumptions about efficiency, completeness of markets, and uniformity of agents. Such assumptions are practical – they provide mathematical tractability and allow researchers to derive interesting results. Moreover, some of this theoretical literature has been quite attuned to the role of informational asymmetry and to the role of institutions in the way private information is revealed in financial markets. That the results of many of these theoretical studies hinge critically on institutional assumptions suggests the importance of examining institutional structure in capital markets in detail.[8]

Of course, researchers have not confined themselves solely to theoretical treatments of financial markets – the treasure trove of data generated by the world's financial markets provides a ready laboratory. Reliance on this data

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Economics & Politics, Volume 2, No. 1, March, 1990, pp. 1-24. For a similar example see Avner Greif, "Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders," *The Journal of Economic History*, Vol. XLIX, No. 4 (Dec. 1989).

[8]For an example of how tax shields affect firms' optimal capital structures see, F. Modigliani and M.H. Miller, "Corporate Income Taxes and the Cost of Capital: A Correction," *American Economic Review*, 52: 433-443. (June, 1963). For a recent example of how institutional structure within the capital market itself affects equilibrium, see Daniel Bernhardt and Eric N. Hughson, "Discrete Pricing and Institutional Design of Dealership Markets," mss. 1992.

has often meant that investigators focus on measures of risk and return to explain behavior and they have ignored uncertainty – here risk preferences refer to attitudes toward investment opportunities when the distribution of returns is commonly known while uncertainty results from a lack of knowledge by one or both parties to an exchange about the distribution of returns to a venture. Because the operation of even a primitive capital market required some resolution of informational asymmetries, a research approach concerned solely with risk and return is often insufficient. Of course, risk and return are far more reliably measured than uncertainty and informational asymmetry; one can hardly blame empirical researchers for the route they've chosen.

The point here is not to dismiss other approaches to the study of capital markets, but to suggest that there is a substantial benefit to an institutional analysis that distinguishes between the role of uncertainty and that of risk and return. The distinction was espoused long ago by Frank Knight, who noted that some risks cannot be quantified, at least not by all parties to a transaction. These risks, he argued, should be thought of differently from others, and thus he termed this sort of risk "uncertainty."[9] In early capital markets, however, these "uncertainties" were often better known to the entrepreneur than to prospective investors in a venture. Examining how individuals resolved these asymmetries is a major focus of this study.

The focus on uncertainty does not imply that traditional measures of risk and return are neglected here; techniques and measures from the field of finance are employed to help describe the evolution of institutions designed to

[9]Frank H. Knight, *Risk, Uncertainty, and Profit*, (New York: Harper & Row: New York, 1965), reprinted version of 1921 edition. pp. 43-44.

curb informational asymmetry and, thus, permit growth in capital transfers. This marriage of simple finance and empirical institutional research is useful in studying of capital markets. The thesis is composed of two separate studies, each drawn from different points in history, and therefore, from different points in the evolution of capital markets – the questions each attempts to answer and the methods employed differ.

1.1 An Outline

Chapter Two analyzes an institution endemic to peasant farming in much of the world: scattered landholdings. In particular, a portfolio analysis is undertaken to determine whether scattered holdings contributed to reductions in the variance of agricultural return. Scattering was never common in the United States. Consequently, when most of us think of farming, we think of individual farmers operating large, contiguous pieces of land. It is interesting to note, however, that contiguous holdings are a relatively recent development – scattered holdings persisted in some areas of England into the eighteenth century and in France until the nineteenth century. Moreover, there are reports of scattered holdings in Ireland as late as the 1960's. Nor should it be thought that scattering was solely a European development; instances of scattered holdings occur throughout Asia and Africa. In parts of Formosa, Pakistan, Bangladesh, Thailand, and Korea they are still in evidence.[10] Although, on the surface, scattering may seem an archaic

[10]Donald N. McCloskey, "English Open Fields as Behavior Towards Risk," in *Research in Economic History: An Annual Compilation of Research*, Vol 1. (Greenwich, Conn.:

institution, its pervasiveness and persistence make it a subject worthy of investigation by modern commentators.

Among economists, the theory of risk reduction via scattered holdings was first suggested by Donald McCloskey. McCloskey argued that medieval farmers held scattered strips of land to reduce the variance of their overall yields. While scattering may have reduced variance, it also induced inefficiency since it carried with it at least four types of negative externalities. First, drainage was needed for each of a peasant's strips of land; yet, draining one owner's strips increased flooding on adjacent strips. Consolidation of holdings would have helped alleviate this problem, since less land would have been needed for drainage ditches as the systems became less complex. Second, and somewhat less important, farmers lost time walking around from plot to plot in the course of their duties. Third, to move between fields required pathways, and these pathways took land out of cultivation. Fourth, since under the open field system peasants could not harvest their crop at their own discretion, communal harvesting meant that some peasants were forced to harvest their crop prematurely, while others were forced to wait until after their crop was overripe before harvesting.

McCloskey suggests that these inefficiencies were not great, at least not so great that peasants were unwilling to forgo the loss in average yield in return for the insurance provided by scattering. In characterizing the motivation for farmers to reduce variance in yields he states,

"The simplest way of bringing the gain in lower variability of

JAI Press, 1976). pp. 126-8. Cited hereafter as McCloskey, "English Open Fields."

> income and the loss in lower average income into the same unit of account is to measure their contributions to avoiding disaster. On this view the peasant's purpose was to reduce the probability of his income falling below the level that exposed him to debt, hunger, disease, or in the limit, death by starvation. He sought, in short, safety first."[11]

The modern reader may wonder why such an elaborate, inefficient system persisted. Why didn't peasants rely instead on credit and insurance markets in bad times? The short answer may be that these markets were not as yet sufficiently developed. Scattered holdings, therefore, may have been an institutional response to perceived failures in the capital market. Although this argument has intuitive appeal, output data from individual plots of land within villages has proved scarce; and, as a result, empirical tests of the "scattering as risk aversion" hypothesis have been less than satisfying.

The data set used in Chapter Two, however, permits reliable estimates of grain output on plots of land in two villages in northeast France (Onnaing and Quarouble) over the ninety year period 1701-1790. When combined with data on prices and wages, the output figures can be converted into financial returns for each plot of land; and financial theory enables construction of land portfolios that minimize portfolio variance for a given mean return. The use of estimated returns, as opposed to simple output correlations, has the virtue of also capturing the price fluctuations that farmers encountered. Further, the returns make it possible to distinguish the benefits of scattering from

[11]McCloskey, "English Open Fields", p. 131.

those produced by crop diversification; and they do so with greater accuracy than the output figures.

The portfolio analysis demonstrates that scattered holdings provided relatively little insurance. Contrary to McCloskey's claims, on these plots, returns were highly correlated; so highly correlated, in fact, that holding a diversified land portfolio typically contributed to variance reductions of only five to ten percent relative to consolidated holdings. On the basis of this evidence, it is clear that, at least in these two villages, scattering was not an institution that contributed greatly to risk reduction; and thus the institution was almost certainly not a response to capital market failure.

Chapters Three and Four attack a different problem – the evolution of the domestic American capital market – but each from a slightly different perspective. Chapter Three emphasizes the role of British portfolio finance in American economic development. Drawing on Lance Davis and Robert Huttenback's series on capital calls on the London Stock Exchange from 1865-1914, yearly estimates of the level of British portfolio finance directed towards the United States are derived. The Capital Called series differs from the standard capital export series in two major ways: it deals only with portfolio finance; and it relies on more direct measures, namely the records of the London Stock Exchange, of British capital exports. The principal advantage of the new Capital Called series is that, unlike the standard series, it can be disaggregated to display the industrial and spatial breakdown of the flows to the U.S. Among other findings, the disaggregated series clearly reveals, for example, the extent to which Britain aided the development of America's rail network and the nation's westward expansion.

Chapter Three goes on to compare the range of American firms drawing finance in London with that of companies listed on the premiere domestic American capital market – the New York Stock Exchange. The most striking result of these comparisons is that smaller American firms (in terms of capitalization) located in the emerging West and primarily engaged in economic activities linked to the land (agricultural firms, investment companies dealing in land and mortgages, and mining firms, to cite but a few examples) were able to attract finance across the Atlantic in London but not across the country in New York. Attempts to resolve this puzzle and, at the same time, explain the American need for British capital are the twin foci of the remainder of the thesis.

Chapter Three closes with a comparison of the return characteristics of the firms neglected by the New York Stock Exchange with those of American railroad issues – an industry whose firms were able to attract finance in both London and New York. The study indicates that the puzzle of apparent capital market failure cannot be explained by risk alone. Although some of the land-based firms (the mines) exhibited higher variability on their returns than the railroads, others (the investment companies and agricultural firms) exhibited less.

The analysis in Chapter Four suggests that the American need for British finance was due, at least in part, to imperfections in the domestic capital market. While capital accumulation was not a major problem in the U.S. from 1865-1914 (the savings rate among Americans was *greater* than that of the British), directing those accumulations towards prospective ventures proved

far more difficult.[12] Matching prospective borrowers and lenders – demanders and suppliers of capital – required a complex institutional framework designed to resolve informational asymmetries; and that structure evolved only slowly. When viewed in this light, the actions of the New York Stock Exchange – in particular the decision by its Governing Committee to exclude many land-based firms – become much less puzzling. In short, the Exchange developed stringent admission guidelines because a NYSE listing was a signal to prospective investors of the quality of a security.

Although a number of scholars have studied the history of the New York Stock Exchange during the late nineteenth century and they have provided a rich description of that institution, they have only hinted at possible economic explanations of the evolution of the structure of the Exchange.[13] Ranald Michie, for example, notes, "a strong prejudice against volatile securities or those of unproven companies," but fails to emphasize the economic significance of their exclusion: in order to develop large, depersonalized, national securities markets, the directors of the Exchange had to create institutions capable of signaling, at least to some extent, the "quality" of a particular investment opportunity. Otherwise, skeptical American investors would have

[12]Lance Davis and Robert Gallman, "Savings, Investment, and Economic Growth: The United States in the Nineteenth Century," forthcoming in John James and Mark Thomas (eds.), *Capitalism and Social Progress, Essays in Honor of Max Hartwell*, (Chicago: University of Chicago Press, 1992).

[13]See Ranald C. Michie, *The London and New York Stock Exchanges, 1850-1914*, (London: Allen & Unwin, 1987). Paul Wyckoff, *Wall Street and the Stock Markets: A Chronology 1644-1971*, (Philadelphia, 1982). Edmund C. Stedman (ed.) *The New York Stock Exchange: Its History, its Contribution to National Prosperity, and its Relation to American Finance at the Outset of the Twentieth Century*, (New York, 1969). Sereno S. Pratt, *The Work of Wall Street*, (New York, 1903).

chosen to hold onto to their savings.[14]

In sum, institutional description combined with an emphasis on the economics of information provide plausible explanations for the puzzles arising in Chapter Three.[15] Chapter Four also includes data and descriptions drawn from a number of sources – some published, others original – that further portray the position of the New York Stock Exchange in the domestic capital market. These data indicate that, although there were some American investors with tastes similar to the British, they tended to be geographically clustered; and as a result did not find it economically burdensome to use local stock exchanges – i.e., the Boston, the Philadelphia, or the San Francisco – when dealing in land-based securities. Their numbers were, however, small relative to the number of investors holding securities listed on the New York market. Chapter Four demonstrates that the smaller exchanges and the London Exchange clearly played a role very distinct from that of New York in the evolution of the domestic capital market. Finally, Chapter Five provides an attempted synthesis of the results from Chapters Two, Three, and Four and offers some concluding remarks.

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[14]Michie, *London and New York*, p. 198.

[15]A similar approach, although one with less reliance on financial data, is taken in Jonathan Barron Baskin, "The Development of Corporate Financial Markets in Britain and the United States, 1600-1914: Overcoming Asymmetric Information," *Business History Review*, Vol. 62 (2), Summer, 1988.

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Chapter 2

New Evidence for an Old Controversy: Scattered Landholdings and Open Fields

2.1 Introduction

This chapter investigates whether peasant farmers gained insurance benefits by holding plots of land scattered throughout a village. Using data drawn from the tithe records of two French villages, series of returns are constructed for individual plots of land. A portfolio analysis is then undertaken to quantify potential variance reductions in yearly agricultural return achievable by holding "optimal" portfolios. The results demonstrate that, once crop rotations within the villages are accounted for, little additional variance reduction could be obtained through scattering. The data only permit a test of

the insurance hypothesis, and thus no competing explanation for scattering is tested in this chapter. Speculation as to why scattered holdings persisted is offered in Chapter Five.

2.2 The Problem

In a celebrated series of articles, Donald McCloskey has sought to elucidate the most puzzling mystery of medieval and early modern agriculture – the scattered holdings that prevailed across the open fields of northern Europe. While historians had long invoked population growth, inheritance laws, the difficulties of plowing, or a primeval spirit of egalitarianism to explain why peasants dispersed their holdings throughout the open fields, McCloskey argued that the practice served as insurance against agricultural risk. In the jargon of finance, the scattered plots of land were a diversified portfolio that protected a peasant against weather, pests, and natural disasters. A strip of land in a damp hollow might bear fruit in searing drought, while one on a sunny hillside might do so in frost or flood. Still others might let crops survive locusts or hail. For a cautious peasant, dispersing plots of land must have seemed a better strategy than risking hunger when the harvest dipped perilously low.[1]

The virtue of McCloskey's argument is that it accounts for a major obstacle to technological change. To be sure, the open fields were far from universal in Europe, particularly before the later Middle Ages, and the rigid-

[1] McCloskey 1972, 1975, 1976, 1989, 1991.

ity of open field farming should not be exaggerated. Grain yields did improve on the open fields; farming practices on them – contrary to what is often assumed – were not always hemmed in by unyielding regulation.[2] Even so, there is no denying that the scattered plots exacted a heavy toll, particularly in the eighteenth and nineteenth centuries. They exacerbated strife between neighbors and forced farmers to adopt defense practices that left everyone worse off. They bred strategic behavior that blocked improvements such as drainage, and they so complicated the tasks of planting, grazing, or harvesting that new crops and innovative practices were discouraged.[3]

In a discipline as contentious as economic history, it is perhaps not surprising that McCloskey's argument, despite its merits, has never convinced all the practitioners. Scholars trained as traditional historians have long remained skeptical, and among those schooled as economists, several (most

[2]Recent work by both historians and archeologists suggests that although the scattered fields and open field farming date quite far back in some places (as in parts of England) they were by and large an invention of the later Middle Ages; even then they were unknown in much of Europe (Rösener [1986] pp. 57-61, 130; Chapelot and Fossier [1985] pp. 50, 170-174; Abel [1978] pp. 19-20, 73-83). Grain yields apparently rose on English open fields (Allen and O Grada [1988]; Yelling [1977] pp. 146-173). The yield figures here, though, are somewhat controversial; for the controversy, see Allen [1988], Overton [1979, 1984], Turner [1982, 1984]. As for the regulation of open field farming, it is often assumed that the grazing rights and the communal crop rotations associated with the open fields restricted innovation, but such was not the case, for example, in much of France; see the masterful discussion in Meuvret [1977-88] (2 (*Texte*): 11-46). Moreover, it was quite possible to have open fields and scattered holdings without either grazing rights or communal crop rotations: Thirsk [1964].

[3]See Ault [1972]; Meuvret [1977-88], vol. 2 (*Texte*): 38, 107-108; and Hoffman [1988]. There is abundant evidence of the disputes brought on by scattering in nineteenth-century France, where, because the loser paid the winner's legal fees, the costs of litigation could exceed the value of the land fought over: Hottenger [nd], [France] Ministère des finances [1891], and Boulay [1902].

notably Stefano Fenoaltea) have devised intriguing alternative explanations.[4] The resulting controversy has never died down, in large part because both McCloskey and his critics lacked the sort of evidence that would settle the debate. They lacked it for an obvious reason: it seemed impossible to find. Yet the necessary evidence does exist, or at least something close to it. With this new data, and with tools more powerful than those McCloskey himself employed, his reasoning can therefore be to the test.

2.3 The Evidence from Onnaing and Quarouble

McCloskey's story revolves about the variance of grain yields, grain being the major crop on the open fields. Bad weather, pests, and natural disasters caused yields to swing wildly, but a peasant could reduce the variation by scattering his holdings to take advantage of microclimates and local differences in the incidence of plant disease and other calamities. Conceivably, he might even be able to the reduce the variance of his grain output to that of the village as a whole.

For this story to work, though, requires that the yields on separate strips of land in the village not be too closely correlated, for if the yields on separate strips do rise and fall together, then scattering provided no insurance and no compensation for the burden of farming dispersed holdings. Nearly

[4]For one historian's skepticism, see Wilson [1977], p. 37. For Fenoaltea's views, see his most recent contribution to the debate (Fenoaltea [1988]), which contains an excellent summary of the literature on the open fields.

the whole argument, at least in McCloskey's formulation, therefore depends on the correlation between yields on different plots within the typical open field village. McCloskey maintains that this correlation –call it R–was, for typical plots, probably about 0.60, but he admits that the evidence is far from perfect.[5] Since medieval and early modern farmers did not record the grain produced on each individual strip of land, McCloskey is forced to rely on evidence from nineteenth-century agronomy experiments and from the records of manorial farms in order to estimate R. Neither source is entirely reliable.

The agronomy experiments correlate yields on individual plots of land, but since they involve late nineteenth-century methods of cultivation, they make for a rather strained comparison with medieval and early modern farming, as McCloskey himself acknowledges. If one were to overlook such difficulties and simply extend the experimental correlations back into the past, then R would be perhaps 0.80 or so, a dauntingly high correlation. McCloskey argues, not unpersuasively, that this is merely an upper bound for R, because the experimenters carefully controlled the methods of cultivation and thereby eliminated sources of variation among plots. But the variation among the plots may also have been reduced by the very different agricultural techniques utilized in open field farming.[6] If so, then R may have indeed been

[5]McCloskey [1989], pp. 39–43; [1976], pp. 145–53.

[6]McCloskey [1989] (pp. 39-40). The common practice of sowing maslin (mixed rye and wheat) was but one technique of traditional open field farming that reduced the variation in yields among plots. One reason farmers planted maslin was that the sturdier stalks of rye prevented the wind and rain from beating down the fragile wheat. The maslin would therefore diminish yield variations due to differences in exposure among plots. See Meuvret [1977-88], vol. 1(*Texte*): 148, and *passim*, for this and other techniques of plowing, sowing,

as high as .80.

The evidence from the manorial records is also imperfect. It concerns, not the individual strips of land within a single village, but entire farms located in separate villages. The problem here is the distance between the farms: because they lay in separate communities, the distance between them was far greater than that between typical strips in a single village's open fields. Unfortunately, the distance and the output correlation are related. As the distance between manorial farms increases, the output correlation falls; presumably, the correlation R between typical strips does the same. McCloskey is therefore forced to extrapolate from the distance-correlation relationship for manorial farms in order to estimate R for strips, but even though he restricts himself to nearby farms, he is still dealing with properties that are much further apart than the strips in an open field village. His extrapolation is thus quite risky; as he himself admits, the 0.60 estimate for R that he derives from the extrapolation "may be too low to represent the correlation facing a peasant in one open field in a village."[7]

What are needed, obviously, are yields from plots of land that are much closer together–precisely the evidence that seems impossible to find. Yet such evidence does exist and has been located, surprisingly, in published documents. It comes from the unusual tithe records unearthed by Morineau for his study of the evolution of French grain yields.[8] The records in question

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and harvesting that might have also lessened the variation among plots.

[7]McCloskey [1989] pp. 40-41.

[8]Morineau [1971], pp. 32–35, 97–162. His evidence comes from the Archives départementales du Nord in Lille [henceforth AD Nord], 4 G 3456-3457, 5379-5731, which we have also examined. Though rare, similar sources can occasionally be found in tithe

concern the tithe levied by the Cathedral of Cambrai in two northern French villages, Onnaing and Quarouble. Located only 4 kilometers outside the city of Valenciennes, the two villages were adjacent, their centers a mere 2 kilometers apart. The villages and their environs (part of the area known as the Hainault) had come to the classic three-field crop rotation rather late in the Middle Ages, but the three-field regime was certainly established by the sixteenth century, as were the hallmarks of open-field farming, including grazing on the stubble. The region was also one of scattered holdings, with typical plots measuring between roughly 0.1 and 1.0 hectares.[9]

The Cathedral possessed the right to an 8-percent tithe on certain parcels of land known as *taques* in Onnaing and Quarouble. There were 27 of the taques, covering 49 percent of the surface of Onnaing and 39 percent of Quarouble. Unlike most tithe owners, who leased their tithe rights out for a fixed cash rent over a number of years, the Cathedral of Cambrai insisted

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records and in the documents concerning seigneurial dues such as the champart, but they always seem to lack the virtues of Morineau's documents. Whereas his sources track grain yields on separate parcels of land for centuries, most other records stop after a short time or make it exceedingly difficult to follow the yield on the same parcel of land. That was the case, for example, with the champart records in the Archives départementales du Calvados (Caen), H 2873- 2874, and with those in the Archives départementales des Yvelines (Versailles), 55 J 348-351. Other sorts of documents that would shed light on scattering are also rare–in particular, evidence that operating farms (as opposed to owned farm land) were actually scattered. Landownership was certainly scattered, but whether the operating farms were is not clear, because the rental market could have rearranged holdings considerably.

[9]Sivery [1977] (pp. 88-89, 98-106, 112, 132); Morineau [1971] (pp. 34, 98); Lefebvre [1959] (pp. 47, 90-91, 210-217); Demangeon [1905] (pp. 345-57). The local agriculture was not, however, rigid and backwards. By the end of the eighteenth century, for example, local farmers had adopted a number of progressive techniques, such as the planting of clover, the preparation of seed with arsenic, the use of a wide variety of fertilizers, and intensive hand cultivation of small plots.

on collecting its tithe in kind one year at a time, and it did so separately for each taque. By the eighteenth century, the process of collection had settled down to a routine. On the eve of the harvest, the cathedral would auction off the right to collect the tithe on each taque to the highest bidder, with bids made not in money, but in grain–wheat if the standing crop on the taque was wheat, oats if it was oats. The highest bidder had the right to 8 percent of the crop on the taque after the grain farmers had harvested it; he owed the Cathedral either the amount of grain he had bid or a cash payment equal to the bid times the post harvest price of grain in nearby Valenciennes, where his payment was due.[10]

In the eighteenth century it was the cash that changed hands, although the Cathedral continued to insist on bids in kind.[11] The bidders were by and large residents of Onnaing and Quarouble, presumably farm owners whose

[10]Archives Départementales du Nord, 4 G 3456; Morineau [1971], pp. 32-35, 97-162. The cash payments were based on the November 30 price for wheat and the Christmas price for oats–the dates when the wheat and oats payments were due in Valenciennes. In addition to the tithe rights on the 27 taques, the Cathedral possessed similar rights on parcels known as the *espiliers*. Areas are not available for the espiliers, in contrast to the taques, but the espiliers appear to have been smaller bits of dispersed land, sometimes outside the usual crop rotation. In the eighteenth century the espiliers produced 25 to 30 percent of the total tithe income from both taques and espiliers: Morineau [1971], p. 98. We will use the espiliers for some but not all of our calculations below.

[11]The Cathedral considered switching to long-term cash leases at the end of the Old Regime, but the Revolution cut short the project: Morineau [1971], p. 100-102. It probably adhered to the in–kind bids, even though the tithe was actually paid in cash, because it wished to protect its tithe rights against legal attack. When in–kind seigneurial dues were let out on long term cash leases in the region of Onnaing and Quarouble, the lease sometimes paved the way for a legal argument that the rights to the dues themselves had lapsed; the Cathedral might have feared the same fate for its tithe rights if they were leased for cash. See Lefebvre [1959], p. 148-50. The eighteenth-century auctions stipulated that the tithe be levied in kind and that bids be made in kind, but final payment had to be in cash: AD Nord, 4 G 3456.

workers were already out in the fields bringing their own harvested grain into local barns. For them the marginal cost of hauling in a little additional grain from the taques was low, all the more so since they probably bid on the taques where their own crop stood. With the marginal cost of bringing the tithe in near zero, it is reasonable to assume that the highest bidder would offer an amount equal to 8 percent of the quantity of grain standing on the taque. Such an argument assumes, of course, that competition among the bidders would drive their profits down to zero, but the bidders were numerous and no one seemed to monopolize the tithe collection. On July 26, 1707, for example, the cathedral auctioned off the right to the tithe on 7 taques planted in wheat and 11 planted in oats to a total of 21 high bidders – usually, a separate high bidder for each taque.[12]

The winning bids thus furnish an estimate of 8 percent of the grain output on each taque. But what precisely were the taques? Averaging 41 hectares in size, they were too large to be individual strips of land. Rather, each

[12]AD Nord, 4 G 3456, July 26, 1707, and passim; because a few of the tithe rights were won by joint bidders, there were more high bidders than taques. Conceivably, one individual could have monopolized collection of the tithe on each taque, but a perusal of the eighteenth-century auction records suggests that was not the case. Unfortunately, the auction records do not list the number of individuals who bid for each taque, but Morineau argues that it was probably large because numerous individuals usually had holdings on each taque: Morineau [1971], p. 34, 102. For evidence that the high bidders were local farmers, see ibid, p. 102, and AD Nord, 4 G 3456, July 9, 1784, where all 11 of the high bidders for taques in Onnaing were from Onnaing, and all 9 in Quarouble were from Quarouble. Presumably bidders would have adjusted their bids slightly to reflect the difference between the farm gate price and the Valenciennes price for grain, but this adjustment can be safely ignored because Valenciennes was a mere 4 kilometers away. It also seems reasonable to ignore the risks involved in the collection process. They were minimal–the grain was ready for harvest and the bidders did not have to guess the future price of grain–and with a handful of risk neutral bidders the auction should have soon pushed very close to eight percent of the grain on the taque.

taque was a group of adjacent strips, all sown with the same crops and in all likelihood ploughed in parallel–what was termed a furlong in England, or a *quartier* or *delle*, to cite but two of the common names in other parts of France. Indeed, on occasion the Cathedral even called the taques "quartiers." Each taque therefore included the holdings of a number of individuals and each was planted with a single crop or left fallow in any given year. The crop would of course change with the three-field rotation, shifting from wheat to oats and then to fallow before beginning the cycle anew. In turn, each taque belonged to one of the three larger land units in each village that made up the three field system – units called great fields in England and known in Hainault as *royages*. Each *royage* included all the taques and other parcels that were sown with the same crop and moved through the crop rotation together.[13]

Without a map, it is impossible to tell how close the taques were, nor whether the ones in a given royage happened to be nearer than the others. Unfortunately, no suitable map depicts the taques, but whatever their location in Onnaing and Quarouble, they had to be closer than McCloskey's manorial farms. The distance between two taques located within one of the villages would be comparable to that between individual strips, and even

[13]For the size of the taques, see the corrected areas in Morineau [1982] 2:625-643. For the use of the word "quartiers" to describe the taques, see AD Nord, 4 G 3442, and for the peculiar meaning of the word royage in Hainault, see Godefroy, *Dictionnaire du français médiéval*, s.v. "royage". One taque, known as Dessous-la-Crête, seemed to have two parts: 35 hectares in the first royage in Onnaing and 20 hectares in the second royage in Onnaing. Each part was counted for our purposes as a separate taque. All areas here concern only the taques and not the additional parcels known as espiliers, for which no areas are available.

if we took one taque in Onnaing and a second in Quarouble, the distance would be relatively small. The two villages, after all, were only 2 kilometers apart, whereas few of McCloskey's farms stood within 3 kilometers of one another. Indeed, the closest of his farms were 2.4 kilometers apart–further than Onnaing and Quarouble.[14]

Correlating the grain output of all the taques over a number of years provides us with an estimate for R. To be sure, such a calculation raises certain questions. In the first place, for some taques, the winning bidder had to pay a small, fixed amount of grain to the local priest; for such taques, the winning bid and hence the assumed grain output would be artificially reduced each year by the same small constant. Yet although the grain output would be a bit lower, the correlations between the grain output of different taques would not be affected, for subtracting a constant would leave the correlations unchanged.

A second problem is that the winning bids involve the bidder's estimate of the grain output, an estimate that was undoubtedly made with error. Unlike the subtraction of a constant, the error would affect the calculation of R. If

[14]McCloskey, [1989] pp. 40-43. So as to be consistent with McCloskey, the distance between Onnaing and Quarouble is measured here as the distance between their centers. Old-Regime maps of Onnaing and Quarouble, which one would expect to show the taques, concern only meadows, woods, and adjoining land, not the whole villages: AD Nord, 4 G 3454, 3510, 3520. The Cathedral's eighteenth-century *terrier* did list the taques, but unlike some *terriers* of the period, it lacked maps: AD Nord, 4 G 3442. Tax records are of no help either: right through the Revolution they too lacked maps. One could consult the nineteenth-century cadastre–it was unfortunately not available to researchers during our stay at the AD Nord–but that would be of little help, for even if holdings had not been consolidated, the taques would have disappeared and all one could do would be to reason by analogy with *quartier* names. Cf. Lefebvre [1959], pp. xvii-xxi, for what one can expect of the documents in the region.

the actual time series of grain outputs for taque i is y_i and the time series derived from the winning bids is x_i, then:

$$x_i = y_i + e_i \tag{2.1}$$

where e_i is the error resulting from the use of the winning bids. If the e_i are independent of the y_i and one another – a reasonable assumption – then:

$$\frac{cov(x_i, x_j)}{\sigma_{x_i}\sigma_{x_j}} = \frac{cov(y_i, y_j)}{((\sigma^2_{y_i} + \sigma^2_{e_i})(\sigma^2_{y_j} + \sigma^2_{e_j}))^{\frac{1}{2}}} \leq \frac{cov(y_i, y_j)}{\sigma_{y_i}\sigma_{y_j}} \tag{2.2}$$

The value of R derived from the winning bids is the expression on the left of (2.2) averaged over all pairs of taques, while the true R is the average of the expression on the right of (2.2).

The bids therefore lead to an underestimate of R, though by only a small margin because the errors e_i are likely to be tiny. After all, the farmers who bid on the tithe knew well how to estimate the amount of grain standing in a field. They made such estimates frequently, not only when they bid on the tithe but when they evaluated relatives' estates or testified in court. The errors they made –the e_i– would be minor. The magnitude of the errors is reduced even further if we restrict ourselves –as we shall– to the tithe records of the eighteenth century, when the delay between the tithe auction and the actual harvest was at most a matter of days. In earlier centuries, the tithe rights were sold off in May or June, but in the eighteenth century the auctions took place in July, the month when harvesting began. In 1707, for instance, the tithe was auctioned off on July 26, perhaps moments before the onset of

the harvest.[15]

Under such conditions the errors e_i were in all likelihood minuscule. Suppose, for example, that they were normally distributed with mean zero and standard deviation equal to 10 percent of the average yield on a taque. Under these assumptions, the winning bidders would be within 20 percent of the true yield roughly 95 percent of the time–hardly unreasonable accuracy for experienced bidders competing against one another only a day or two, or perhaps even hours, before the harvest. Equation (2.2) then implies that we underestimate R by only 15 percent.[16]

McCloskey's R concerns a single crop, and we shall limit ourselves to calculating it for wheat.[17] The calculation entails correlating wheat yields from the eighteenth century for each pair of taques that grew wheat simultaneously and then averaging the correlations over all the pairs. The correlations also permit a test of another of McCloskey's ideas, for if he is correct, then

[15]Morineau [1971], pp. 100-104; AD Nord, 4 G 3456. A second reason for restricting the analysis to the years 1701-1790 is that before the eighteenth century the tithe rights were sometimes sold for several years at a time and the payments subsequently reduced in case of disaster. One additional cause for worry–as it turns out, a groundless one–is the accuracy of Morineau's publication of the original figures from Onnaing and Quarouble. Morineau's calculations with the data have been attacked as inaccurate, and one might therefore worry about the accuracy of his publication, which we relied upon for our calculations. While his arithmetic may have contained errors, a comparison with the original manuscript sources suggests that the raw published data itself was transcribed with reasonable accuracy. The decimal tenths in his tables have, however, been converted to the eighths they actually are.

[16]This calculation uses the coefficient of variation of the winning bids –in other words, the standard deviation of x_i in equation (2.1) divided by its mean. When estimated by averaging over all the taques and espiliers, the coefficient of variation turns out to be 0.275. The calculation here concerns eighteenth-century wheat yields only.

[17]McCloskey does consider correlations between different crops, but it is the single crop R that is "critical.": [1976], 132–36, 145.

the correlations should decline with the distance between taques. The precise distance between each pair of taques remains unknown, but we can at least distinguish those pairs with both taques in the same village, which would have been closer on average than the pairs spanning both Onnaing and Quarouble. Presumably, their correlations would be higher too.

What then do the correlations reveal? When both taques lay in the same village, R was a low 0.473 (Table 2.1). For the pairs spanning the two villages, it was lower still–0.386–just as McCloskey's relationship between yield correlations and distance would suggest. Nor does the smaller R for taques in different villages appear to be a statistical fluke–or at least that is what is suggested by a regression of the correlations on a constant and a dummy variable for taques lying in the same village.[18] Since Onnaing and Quarouble are only 2 kilometers apart, the lower R for taques spanning the two villages is probably the figure relevant to open field agriculture. The pairs of taques that lay within the same village and grew wheat at the same time were necessarily in the same royage and thus perhaps closer than individual strips needed to be, particularly if the royage was compact. The pairs that spanned the two villages, by contrast, were probably no further apart than typical peasant holdings.

With such a low R, even large errors in the bidders' estimates of the

[18]If r is the yield correlation calculated from the winning bids for a pair of taques and z is a dummy variable that is 1 when both taques lie in the same village, then $r = .386 + .087z$ (n = 224, $R^2 = .03$) and the t-statistic of z's coefficient is 2.69. The t-statistic assumes, of course, that the pairs of taques within a single village and the pairs spanning two villages have observed yield correlations that are normally distributed with the same variance but different means. All yield correlations here use data both from the taques and from the parcels known as espiliers.

yields would be unlikely to raise R to unsettling levels. If the bidders' errors had a standard deviation of 15 percent of the crop – incredible sloppiness, given the circumstances – then the true R would be 0.548, or 0.672 if we were to utilize the higher, though somewhat less reasonable, estimate based on taques in the same village. If they erred with a standard deviation of 10 percent – and they probably achieved greater accuracy than that – then the true R would be 0.444 or 0.544, depending on which estimate of R we used.[19] All of the figures are obviously low, most even lying below McCloskey's own estimates. His argument, apparently, is vindicated on all counts, but before judging the debate closed, the evidence should be analyzed in a different way, for as we shall see, the simple output correlations for a single crop conceal far more than they reveal.

2.4 A Portfolio Analysis

Several questions remain unanswered. First, how do we judge whether R is low enough? Equivalently, how do we gauge the effectiveness of the insurance that scattering provides? McCloskey did so in a relatively simple way, by measuring how much scattering reduced the likelihood of disaster, which he defined as a crop equal to half the normal.[20] But the likelihood of disaster is not the only yardstick for evaluating insurance. It might suit a world of self sufficient farmers, but such a world, if it ever existed, was long gone

[19]Because yields rose in the eighteenth century, the output series were non stationary. As a result, the correlations here may actually overstate the relationship between output on different taques. For further discussion, see below.

[20]McCloskey [1976], pp. 131-32, 143.

from Western European agriculture by the early modern period. By the eighteenth century, for example, most peasants in the Hainault – the region of Onnaing and Quarouble – worked as agricultural laborers. Perhaps only 1 or 2 percent of them were independent.[21] The independent ones were by and large engaged in commercial agriculture, and they might well prosper when the harvest fell to half the normal, because of the inelastic demand for grain. Only the farm laborers would suffer, but they had little or no land to scatter anyway.

The evidence from other parts of Europe is similar. Self sufficiency, even in the late Middle Ages, was surprisingly rare; many peasants hired labor and marketed their crops. Furthermore, even self sufficient peasants might have defined disaster differently or reacted to it in different ways.[22]

What we need, therefore, is a more supple yardstick, one that takes into account the costs and profits of farming and allows for differences in wealth and in aversion to risk. One obvious technique is to rely upon portfolio analysis from the field of finance. The early modern landholder's problem could be rephrased as that of choosing an optimal portfolio of land holdings based on the expected financial returns from farming and their variances. Of course such a portfolio analysis entails certain theoretical assumptions – none more drastic though than McCloskey's focus on averting disaster – and to a historian it may seem anachronistic when applied to the world of early modern landholders.[23] But it is, after all, merely a model, a way of

[21]Lefebvre [1959], pp. 37, 289.

[22]For a discussion, see Newberry and Stiglitz [1981].

[23]If McCloskey's way of thinking seems preferable, one could instead construct a frontier

thinking about the problem – our way of thinking, rather than his – which can nevertheless shed light on the difficulties they faced. While it might not be reality as perceived by the landholders, it could well reveal the advantages that they discerned in scattering their holdings. And as we shall see, it has the great advantage of permitting comparison with other available forms of insurance.

The portfolio analysis requires time series of financial returns for each parcel or field where the landholder might own land – for example, each taque. The output of each parcel is not enough, for we need to know what the financial return to farming each parcel is, returns after the crops are sold and the labor paid. If we only examine output fluctuations, as McCloskey does, then we merely take into account the risks affecting physical output, but we ignore the changes in wages and prices, which, given inelastic demand, might have compensated the landholder for a drop in output. If we calculate returns, the price changes are obviously taken into account.[24]

The portfolio analysis also resolves a more vexing problem with the output series. The problem is that average grain yields changed over time in Onnaing and Quarouble; in particular, they rose in the eighteenth century. It

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that marks the tradeoff between the expected return and the probability of disaster; the results would be the same. For the theoretical assumptions involved in mean variance analysis and other ways of analyzing risk, particularly in primitive economies, see Newberry and Stiglitz [1981]. Despite their warnings about the dangers of mean-variance analysis, they end up using it because it provides a good approximation. Using the approximation is certainly justified for our returns sample, because the single period returns are drawn from nearly normal distributions.

[24]McCloskey is certainly aware of the dangers of ignoring price fluctuations. In his sample, price fluctuations can be safely neglected, since they are small relative to the output fluctuations.

is therefore difficult to derive reliable estimates of R from the output series, because the output correlations confound the short term fluctuations of output that interest us with the long term change in yields. In technical terms, the output series are not stationary and they give inconsistent estimates of R. McCloskey avoids such difficulties by restricting his attention to short output series that run for only a few years, but such short output series, though they may be close to stationary, rob his estimates of precision.[25] Fortunately, our series of financial returns involve no such complications. They are stationary, even though the output series and the price series themselves are not. We can therefore employ the full 90 years of financial returns from the eighteenth century in order to sharpen the accuracy of our calculations.

The returns circumvent another serious obstacle as well. If we restrict the calculation of R to a single crop such as wheat, then we overlook the effects of the crop rotation. But once the other crops are included, R is much higher. Suppose, for example, that we correlate the output for entire royages rather than for taques. For wheat alone (on the royages growing wheat simultaneously), the correlations average 0.714; for oats, they average 0.757. But if we correlate not just wheat or oats but the entire output for the royages on the same crop rotation, then the average correlation jumps to over 0.95.

[25]McCloskey argues that correlating short output series fits the peasants' own expectations, but the peasants of course were not correlating any series, short or long. They evaluated scattering not by calculating correlations but by looking to their experience, experience that may have passed from father to son and stretched over generations. Our task is quite different: to determine whether scattering had any benefits by measuring parameters such as R as accurately as possible. The accuracy is easier to achieve with long output series.

It is the alternation of crops and fallow that is responsible for the increase. Because each crop has a different average yield, the output correlation is pushed upward by the regular variation in average yields. It is boosted even higher by the fallow every third year. One could limit one's attention to a single crop and thereby ignore the crop rotation's effect on output, but that would be tantamount to underestimating R and overestimating the value of scattering.[26] With the financial return series, by contrast, no such difficulties arise. Unlike the output series, the returns take into account wheat, oats, and fallow as well, for they measure each year's financial contribution, whatever the crop. That is a powerful argument in their favor.

To use the returns, we recast the landholder's dilemma as a portfolio problem, imagining that the landlord cares only about high mean returns and low return variances. He will then arrange his holdings so that, at any given level of return for his entire land portfolio, his return variance will be minimized. In mathematical terms, the landowner faces the following minimization problem:

$$\min \ \omega'\Sigma\omega \tag{2.3}$$

subject to

$$1'\omega \ = \ 1 \tag{2.4}$$

$$z'\omega \ = \ \mu \tag{2.5}$$

[26]McCloskey's solution to the problem is to use correlations of different crops such as wheat and oats, but in doing so, he overlooks the alternation of fallow.

and

$$\omega_i \geq 0 \; \forall \, i \tag{2.6}$$

for each component ω_i of ω. Here ω is a vector of portfolio weights telling what fraction of his property lies in each parcel where he can own land, Σ is the variance-covariance matrix of financial returns for all the parcels, z is the vector of expected returns for the parcels, and μ is the expected return of his entire portfolio. Constraint (2.4) simply means that the weights sum to 1, while (2.6) says that the weights must be non-negative–in the language of finance, the landowner cannot sell short his assets. Given a return μ on his portfolio, equation (2.5) implies that the landowner chooses weights ω to minimize the return variance (2.3). He does so, it is worth stressing, whatever his own tastes and attitude toward risk. There are, of course, a number of solutions to the minimization problem. The solutions trace out a surface known as the mean-variance efficient frontier, and given the landlord's own level of risk aversion, he simply chooses the μ and the ω on the mean-variance efficient frontier that maximize his own expected utility.[27] Our formulation of the landowner's problem thus allows for great differences in tastes and in attitudes toward risk.

Ideally, one would like to solve problem (2.3) for each taque and allow the landowner to spread his land out over all 27 taques. Working with all 27 taques, though, obscures the results without changing any of the conclu-

[27]For a discussion of portfolio analysis, see Markowitz [1987]. In our case, the portfolio weights are non-negative, and riskless borrowing and lending are not possible. Under these conditions, the mean-variance frontier is a set of parabolic sections with kinks at the joints. The number of kinks equals the number of portfolio weights that equal zero. See Dybvig [1984] for details.

sions. The analysis is, therefore, restricted to a choice among smaller groups of taques and among the six royages in Onnaing and Quarouble. Despite the restriction, we can still determine whether the optimal portfolios–those along the mean-variance efficient frontier–are scattered and whether scattering really does contribute to reducing the portfolio variance.[28]

The first step in the portfolio analysis is to convert the grain yield figures into series of returns for each taque, or for each royage if we are solving the portfolio problem for the royages. Ideally, the returns should incorporate the total revenue and the total costs incurred on a given taque or royage, with revenues and costs based on the market prices of grain, land, labor, and capital. Unfortunately, despite efforts to find better data, some of the price series are far from perfect. The series of returns are thus only approximations– albeit reasonable ones – to the actual returns.

To calculate total revenue, the wheat and oats output of each taque or royage was multiplied by the price of wheat and oats in the city of Montdidier. Montdidier lay 100 kilometers from Onnaing and Quarouble, but it proved impossible to find usable price series for closer markets. Prices proved unreliable in Valenciennes, which was only 4 kilometers from Onnaing and Quarouble, and the same was true in other nearby markets, such as Douai and Lille. In the end, Montdidier was the closest market whose prices could be trusted; although the distance from Montdidier to Onnaing and Quarouble was not small, the Montdidier price and that in Onnaing and Quarouble

[28]Calculations for all 27 taques are available from the author; they do not change the results.

appear to have been closely correlated.[29]

To calculate total costs, we begin with estimated labor inputs derived by George Grantham. The numbers used were those Grantham gives for the region that included Onnaing and Quarouble –the French department of the Nord (Table 2.2).[30] The next step was to combine Grantham's labor

[29]The Valenciennes prices would seem the obvious ones to use for the two villages, because Valenciennes was practically next door. Some seventeenth-century prices from Valenciennes are published in Morineau [1971], p. 103, but the published series stops before our own period, the eighteenth century. While additional prices for the eighteenth-century may well exist in the manuscript Morineau used, the prices from Valenciennes leave much to be desired. In the first place, the units for oats are not entirely clear (on this, see Sivery [1977], pp. 64-65), and, worse yet, the prices seem suspiciously repetitive, particularly after 1650. Prices series from other nearby markets suffered from even more serious problems. In Douai and Lille–the two other obvious markets–intractable problems with units and monetary conversions rendered available price series useless. That left Montdidier as the closest market with reliable prices–slightly closer than Charleville and much closer than Abbeville. The Montdidier prices did correlate highly with the available Valenciennes prices ($r = 0.70$ for wheat, 0.50 for oats, 0.69 for wheat when differenced, 0.36 for oats when differenced), and their movement seemed particularly close before 1650, when the Valenciennes prices seemed more reliable. The Montdidier prices are taken from de Beauville [1875] 2:501.

[30]Grantham [1991], pp. 8-10. The estimates used are Grantham's for stiff soils circa 1750. Grantham's figure for threshing combines an estimate of the time required for threshing a hectoliter of grain and a figure for average yields. He reports that threshing operations consumed one man day per hectoliter of output and that average yields in the Nord were seventeen hectoliters per hectare. Since we already have yield estimates in hectoliters, we multiply these yields by Grantham's man days per hectoliter estimate in calculating the costs for threshing.

Labor inputs for oats were not exactly the same as for wheat, which benefited from more manure and more plowing. Grantham attributed fallow plowing and manuring operations (both of which came after the oats but before the wheat) to wheat production. In constructing the returns here, oats were treated in two different ways. The first assumes the same amount of plowing for oats as for wheat and the second places plowing used in oat production at half of Grantham's wheat plowing input figure. In both cases, all manuring operations were attributed to wheat and none to oats. The results presented here will be for the returns figures computed assuming the same plowing for oat production, although the conclusions hold up regardless of which oat return measure is employed. Harvesting costs were assumed to be the same for both crops, for in contrast to most parts of France, the scythe was used for both wheat and oats in the Nord in the eighteenth

inputs with an appropriate local wage series in order to compute total labor costs, but finding such a series proved difficult. The regional archives (the departmental archives of the Nord) did not seem to have a suitable source for eighteenth-century unskilled wages – wages paid in cash with tasks specified – and no appropriate published series exists for the region. We were therefore forced to rely on the wages of unskilled laborers in Paris. As could be expected, Parisian wages were higher than those in the countryside near Onnaing and Quarouble: eighteenth-century evidence suggested that Onnaing and Quarouble wages ran only 65 percent of what they did in Paris. We therefore set the wage series equal to 65 percent of the Parisian series; variations in this figure led to similar results.[31]

Capital costs posed similar problems because there was no local price series for the major component of agricultural capital – livestock. The only

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century. Threshing oats took slightly less time but the differences were small enough to ignore. For details, see Meuvret [1977-88], 1 (*Texte*): 166-69, 1 (*Notes*): 175, note 11; Tessier [1787-1821] s.v. "Battage".

[31]Guignet [1977] (p. 566) contains wages for female lace makers in Valenciennes, but we need the wages of unskilled males. Furthermore, his series only covers the years 1748-1774. The evidence that local wages were 65 percent of those in Paris comes from a variety of sources. Young [1931] reported that wages were 0.6 livre/day in Picardie, which lay between Paris and the Hainault. Paris wages at the time were near 1.25 livre/day, suggesting that countryside wages were only fifty percent of Paris wages. Deyon [1967] noted that workers in the city of Amiens, also between Paris and the Hainault, received 0.6 livre/day in 1700-20. Paris wages during this period were hovering just below 1 livre/day. In the 1720s Deyon estimated wages in Amiens to be 0.8 livre/day while Paris wages were somewhat over 1 livre/day. Deyon suggests that wages in the countryside around Amiens were lower than these estimates. Lefebvre [1959] estimated wages for unskilled laborers in the Nord during the 1780s at about 0.625 livre/day if one takes into account board usually granted to agricultural laborers in this area. Given these estimates, 65 percent of Paris wages seemed a not inappropriate estimate for Onnaing and Quarouble. In any event, the conclusions here are not sensitive to the 65 percent scale factor. We tried scale factors ranging from 55 to 75 percent; the results were not greatly changed.

recourse was to use accounting information from the Paris Basin, where agricultural technology was similar. There the rental cost of capital did not vary greatly in the eighteenth century, and the accounting information suggests that it absorbed about 22 percent of total costs. Here capital costs are assumed to be the same.[32]

To figure the cost of land required a local land rental series, but such a series proved impossible to find. The local ecclesiastical archives–typically the best source for rental data–contained only isolated leases for Onnaing and Quarouble and lacked anything like a rental series for the two villages. Tax records shed no light on the rental rate of land either; worse yet, much of the regional lease information was contaminated by the custom known as *mauvais gré*, which restricted rent increases and kept the rental rates stated in leases below the market price of land. The only alternative was to rely upon a decennial rent series from 34 villages in the vicinity of the city of Amiens. On average, these villages lay slightly over 100 kilometers from Onnaing and Quarouble, and their rent levels were lower than in Onnaing and Quarouble. In fact, the few usable leases found from Onnaing and Quarouble implied that rent in the 34 villages was lower by a factor of approximately 2.5. The time series from the 34 villages was, therefore, multiplied by 2.5 to derive an overall rental trend; it was then corrected for differences in land quality among taques in Onnaing and Quarouble via differences in average yields. Changing the 2.5 scale factor did not disturb the results.[33]

[32]The capital share here is net of seed; it did not vary greatly in the eighteenth century. See Hoffman [1991b] and Hoffman [1991a] (pp. 27-32).

[33]For mauvais gré and the rental market, see Lefebvre [1959] and Hoffman [1991]. The

Given total revenues and total costs, it is easy to calculate a rate of return. For a farmer renting a portion of a given taque or royage, it is:

$$return = \frac{total\ revenue - total\ costs}{land\ rent + total\ costs} \tag{2.7}$$

The return is the same, it should be noted, whether the farmer rents the whole taque or merely a portion of it. More important for our purposes, though, is the rate of return for a landowner who farms his own property. To calculate it, we assumed that land rented for 4 percent of its sale price, as was common in the eighteenth century, and simply multiplied our rental figures by 25 to get a sales price series. The owner's rate of return is then:

$$return = \frac{total\ revenue - total\ costs}{land\ price + total\ costs} \tag{2.8}$$

The resulting average financial returns are listed by royage in Table 2.3. The returns, of course, are approximations, and one might rightly worry about their accuracy. A simple way to check them is to calculate the ratio of profits to land rents:

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correlation matrix of returns (the key to this analysis) is largely unaffected by the choice of the 2.5 rental scale factor. Indeed, multiplying the Amien rent series by anywhere from one to three changes none of the conclusions. To adjust for land quality differences within the villages, we computed the average output on each taque or royage over the ninety years covered by the tithe data. We then divided each of these average output figures by Grantham's estimate of average output for the department of the Nord in 1750 (17 hectoliters per hectare). For each taque or royage, this provided an individual scale factor which was multiplied by the rental time series constructed for Onnaing and Quarouble.

$$\frac{total\ revenue - total\ costs}{land\ rent} \tag{2.9}$$

If the revenues and costs are accurate, then the returns will be accurate too. But the difference between revenues and costs will be profits. With a competitive rental market for land, the profits will be siphoned off by landlords, leaving the ratio (2.9) close to one. If the ratio is indeed close to one, it will lend credence to the returns. Ratios for each royage appear in Table 2.4.

Although the ratio exceeds one on each royage, it does so by only a small margin. The excess might reflect slight errors in the prices or land values or – more likely still – entrepreneurial profits, which would prevent all the earnings from flowing to the landlord. In addition, the land market might not have been perfectly competitive because of *mauvais gré*; if so, the ratio would remain well above one.[34] In any event, the ratio is close enough to one to support confidence in the financial returns. Also supportive of the returns is their level. For owners they in fact hover close to the rate prevailing on long term loans – further evidence in their favor.

Once calculated for each taque and royage, the returns make clear the benefits of holding separate plots of land. A landowner, for example, could cut his risks drastically merely by spreading his holdings among the six roy-

[34]Returns are computed not only for royages, but also for the individual taques that comprise royage 3 (in Onnaing) and royage 6 (in Quarouble). The average of the ratio test is 1.19 for the taques in royage 3 and 1.28 for those in royage 6.

ages. To see why it suffices to solve the portfolio problem (2.3) for the royages.

For various portfolio returns μ, we can calculate the portfolio weights that minimize the landlord's portfolio variance and thereby trace out points along the mean–variance efficient frontier; a number of such points are listed in Table 2.5 and depicted in Figure 2.1. From the frontier, it is obvious that farming different royages greatly reduced the portfolio variance. To achieve an expected return of 0.055, for example, a landowner could consolidate all his holdings in royage one in Onnaing; his portfolio would then have a variance of .004297. Were he instead to adopt a mean–variance efficient portfolio, he would spread his holdings according to the weights shown in Table 2.6, opposite the expected return of 0.055. He would then own land in royages one, three, four, five, and six, and his portfolio variance would fall to .000753. Compared to the portfolio consolidated in royage one, the variance would have dropped 82.5 percent.

At first glance, the dramatically lower variance might appear to support McCloskey's argument about scattering, but a closer look at the evidence suggests otherwise. What we have to examine are the correlations between the financial returns of the various royages. When the correlations are low or negative, the landowner can indeed cut his portfolio variance by scattering his holdings. But when they are highly correlated, scattering does little to spread his risk.

For the royages, the returns correlations are either over 0.97 –and hence far too high – or else negative (Table 2.6). If scattering really did reduce risks, then why would some of the correlations be nearly one? Such high

correlations might be understandable for royages within the same village, where the effects of scattering would be muted, but the pairs of royages with high correlations (royages one and four, royages two and five, and royages three and six) all lay in different villages. In separate villages, where the effects of scattering would presumably be most pronounced, the correlations should be low or negative, but certainly not above 0.97.

To be sure, there are other royages with negative correlations. But what distinguished them was not scattering but the crops they grew. In every case, if a pair of royages had a negative correlation, then the royages grew different crops. In Onnaing, for example, royages one and two were never sown with the same crops: they marched through the crop rotation one year apart. Their return correlation was -0.242. Like royages one and two, many of the royages with negative correlation lay in the same village. The same was true of royages four, five, and six in Quarouble. If McCloskey's argument about scattering were correct, the correlations would not dip so low for royages within a single village.

Apparently, what did reduce risk was not scattering but the crop diversification inherent in the three-field system. The royages with low correlations never grew the same crops. Those with high correlations (royages one and four, two and five, and three and six) always did (Table 2.6). Whether the royages were in different villages mattered little – contrary to what McCloskey's argument would lead us to expect. After all, if he were correct, the correlations should have been consistently high for royages in the same

village and consistently low for royages in different villages.[35] It is clear that a landowner did not have to scatter his fields wildly to reduce his risk; rather, he simply had to farm land in each of the three parts of the crop rotation. The crop rotation gave him the necessary crop diversification, and he did not have to sow dozens of additional crops.

Here McCloskey might counter that scattering across royages is not a fair test. The royages, he might say, were too large and heterogeneous. Encompassing a wide variety of soils, they would already have exhausted the benefits of scattering. If so, then little would be gained by holding land in different royages, beyond the benefits of crop diversification. The results here, he might conclude, would come as no surprise.

Yet it is not so easy to dismiss the evidence from the royages. If they seem too large – keep in mind that they are hardly larger than the manorial farms McCloskey himself uses – then the analysis can be repeated for the taques, which are certainly small enough to reveal the benefits of scattering. And if scattering mattered, independently of crop diversification, then its benefits should stand out even on taques sown with the same crops. In other words, a landowner should be able to reduce his portfolio's variance by spreading his holdings across different taques, and he should be able to do so even if

[35]McCloskey does not deny the importance of growing different crops, and he might rightly argue that both scattering and crop diversification reduced risk. The issue then is whether scattering provided much additional insurance. If it did, then we could detect the effect of scattering by looking at the returns correlations between royages growing different crops. These correlations should be much lower when the royages are in different villages and the effect of scattering is more pronounced. For the royages, though, they are hardly lower at all: they average -0.230 for royages in the same village and -0.233 for different villages, which suggests that scattering's contribution was minimal. Output correlations for taques lead to the same conclusion.

the taques grew identical crops.

Was this possible on the taques? Consider, for example, the taques in royage three in Onnaing. They all grew the same crops, year in and year out. If the royages were indeed large and heterogeneous, then the six taques in royage three must have offered considerable opportunity for diversification by scattering alone. The returns correlations suggest, however, that these taques provided little in the way of insurance. Although their returns correlations are not as close to one as some from the royages, they are still quite high: they range from 0.743 to 0.960 (Table 2.7). None are negative. And the correlations are just as large for the other taques that grow the same crops – for instance, those in royage six in Quarouble.

There is another way to appreciate how meager were the benefits to scattering across the taques in royage three: solving the portfolio problem. If we solve it for a landowner who can divide his holdings among these taques, we quickly see how little insurance scattering brings in the absence of crop diversification (Table 2.8). The solution with the lowest possible variance –one that might appeal to an ultra cautious landowner –had an expected return of 0.412 and a variance of .002467. It was scattered, but one could do almost as well without any scattering at all, simply by holding land in a single taque, taque five, which returned .0404 and had a variance of .00253. Similarly a landowner could concentrate his land in taque three and achieve a return of .0507 and a variance of .004194. To get a similar return (.0505) along the mean variance frontier, he would have to scatter his holdings over three taques, yet his portfolio variance would diminish only slightly to .003943. Gone were the gigantic reductions in variance that a landowner could enjoy

by holding different royages and diversifying his crops!

One might argue that limiting the landowner to the taques in royage three is too restrictive. Why not let him range over the eleven taques in royages three and six? Although they all grew the same crops, they spread over two villages and so offered ample opportunity for scattering to work its supposed magic. Yet adding the five extra taques from royage six did little to reduce the portfolio variance (Figure 2.2). Usually it declined by less than 5 or 6 percent with the addition of the extra taques, even though they allowed the landowner to hold land in Quarouble instead of just Onnaing.[36]

Not that scattering was completely ineffective. If we consider the portfolios made up of land from the taques in royage three, we see that many along the mean–variance efficient frontier involved some scattering (Table 2.8). Furthermore, holding a scattered portfolio was clearly superior to concentrating one's land in a plot such as taque four.[37] But by and large, scattering did little to reduce the portfolio's variance, and as insurance it paled to insignificance besides crop diversification. After all, a landowner could protect himself simply by rotating his crops; he did not have to scatter his fields.

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[36]The royage six taques did contribute somewhat more at higher rates of return. With only taques from royage three, for example, the highest achievable expected return was .0534 with a .006073 variance. With the addition of taques from royage six, the optimal portfolio of assets with nearly the same return (.0535) included land in taques three, six, seven, and nine; its variance was .04738, some 22 percent below that of the portfolio restricted to the taques from royage three.

[37]In equilibrium, the price of taque four would presumably decline enough so that it too would be held. The imputed rent on taque four is probably too high and the return too low – a sign that we undoubtedly erred slightly in correcting for rent differences among the taques. Such errors, though, should not disturb our results, because the returns correlations matrix would remain nearly the same.

2.5 Conclusions

On the basis of the results for taques, it is impossible to conclude that scattering provided much in the way of insurance. This is somewhat unfortunate. McCloskey's description of scattering as a response to market failure to provide insurance opportunites is quite compelling. Yet, it seems that returns on parcels of land within theses villages were too highly correlated to substantiate his claims. Certainly, scattering provided something in the way of portfolio variance reduction since returns were not perfectly correlated across taques. Yet, the magnitude of this reduction does not appear to have been large enough to have counterbalanced the inefficiencies associated with scattering. This analysis suggests that scattering cannot be explained solely by risk aversion on the part of peasants.

If scattering provided so little insurance, why did it persist? The answer may lie with Fenoaltea's ideas, revised to take into account the imperfections of the pre–industrial labor market. Or it may lie with the workings of the land market, as Bruce Campbell has proposed.[38] But for the moment scattering remains what it has long been, a matter of mystery.

[38]Campbell [1980]. He attributes scattering at least in part to the workings of the land market, but he fails to explain why buyers did not prefer consolidated holdings. If they did, then the land market should have led to concentration, unless it was obstructed by some intriguing imperfection.

2.6 Figures

Figure 2.1

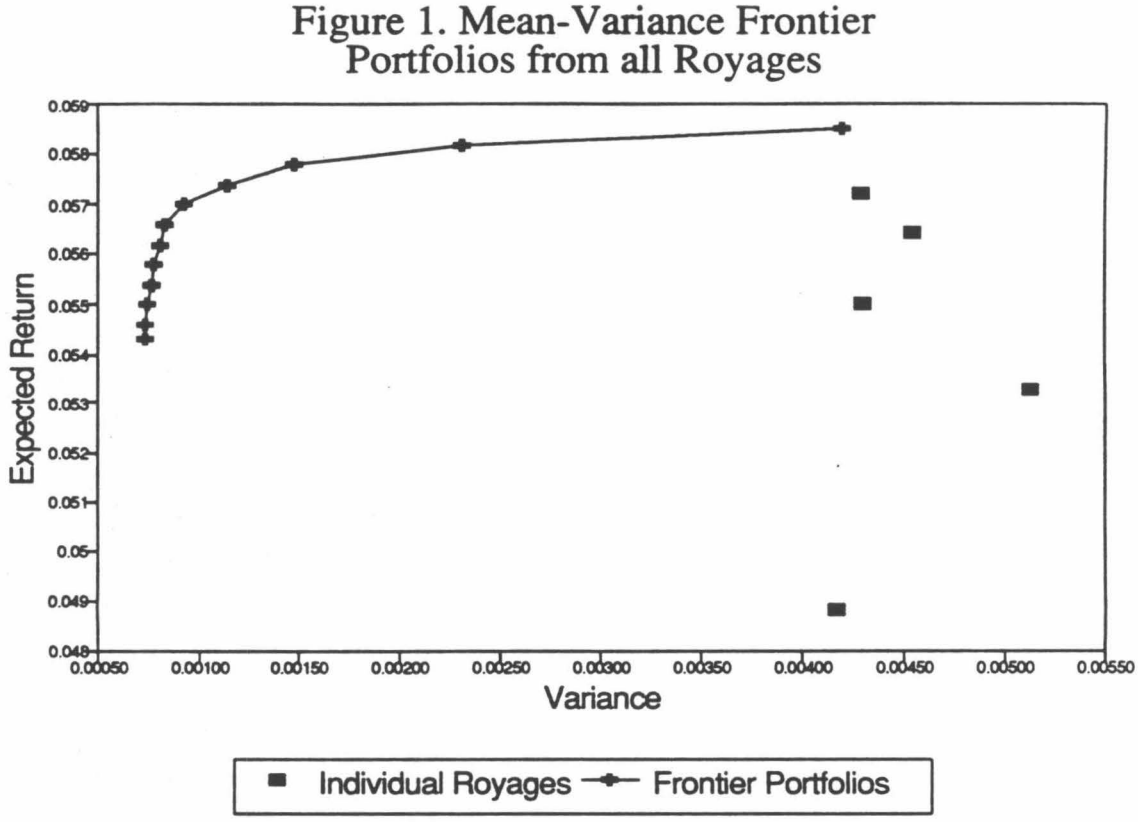
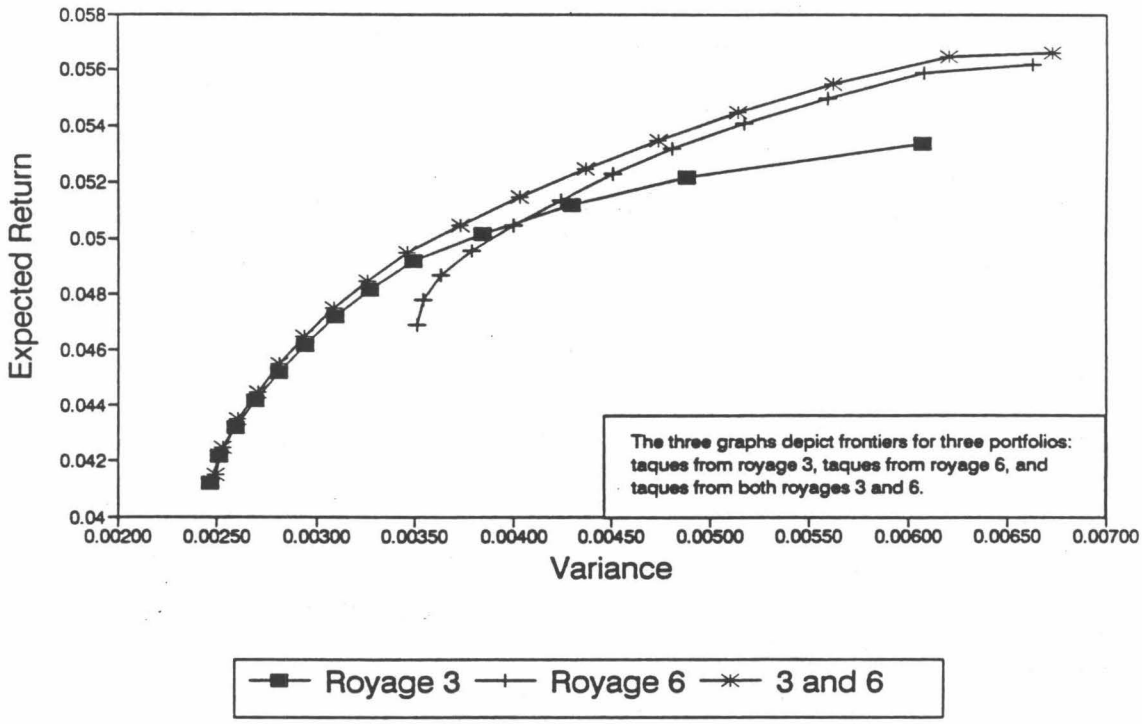


Figure 2.2

Figure 2. Mean-Variance Frontiers
Portfolios from Taques in Royages 3 & 6



2.7 Tables

Table 2.1. Wheat Yield Correlations 1701-1790

	Pairs of taques within one village	Pairs with one taque in Onnaing and one in Quarouble
Average correlation	0.473	0.386
Number of pairs	106	118
Standard deviation	0.249	0.234

Source: Morineau [1971]

Note: The wheat yield correlations are averaged over all pairs of taques growing wheat simultaneously including the espiliers. Both here and in all subsequent calculations, data from 1740 were eliminated because the 1740 tithe was commuted to a monetary payment.

Table 2.2 Labor Inputs

	man days per hectare
pre–harvest	14.65
manuring	8.1
harvest	9.3
threshing	17.0

Source: George Grantham [1991].

Note: In Grantham's calculations, wheat farming requires labor for four tasks: pre–harvest operations, manuring, harvesting, and threshing. Pre–harvest operations cover plowing, harrowing, sowing, and weeding. Manuring includes loading manure, transporting it to fields and then spreading it. Harvesting comprises cutting, binding, stooking, and transporting output from fields.

The figure for threshing is actually a combination of two of Grantham's other estimates. He argues that threshing required 1 man day of labor per hectolitre. He gives the average yield on fields in the department of the Nord as 17 hectolitres per hectare. Multiplying these two numbers yields an estimate of the average labor input per hectare associated with threshing in the Nord. For our returns, we computed the labor inputs associated with threshing by multiplying the output on each of our fields (measured in hectolitres per hectare) by Grantham's estimate of 1 man day of labor per hectolitre threshed.

Table 2.3. Average Return on each Royage 1701-1790

Owner's Return			
	Return	St. Dev.	Variance
royage1	.0550	.06555	.004297
royage2	.0564	.06741	.004544
royage3	.0488	.06455	.004167
royage4	.0572	.06551	.004292
royage5	.0585	.06478	.004197
royage6	.0533	.07160	.005126
Renter's Return			
	Return	St. Dev.	Variance
royage1	.1893	.559460	.312995
royage2	.1998	.549291	.301720
royage3	.1439	.507234	.257286
royage4	.2351	.590245	.348389
royage5	.2531	.566378	.320784
royage6	.2049	.609967	.372059

Source: See Text

Note: Royages one, two, and three were in the village of Onnaing; four, five, and six were in Quarouble.

Table 2.4. Ratio of profits to rental value of land	
royage1	1.329
royage2	1.360
royage3	1.212
royage4	1.391
royage5	1.413
royage6	1.322
weighted avg	1.328
Source: See text	

Note: For locations of the royages see note in Table 2.3.

Table 2.5: Mean-Variance Efficient Portfolios, Royages

		Portfolio Weights by Royage					
Exp. mean	variance	1	2	3	4	5	6
.0543	.000738	.233	.078	.326	.110	.254	.000
.0546	.000740	.185	.000	.314	.163	.338	.000
.0550	.000753	.103	.000	.274	.249	.347	.027
.0554	.000769	.092	.000	.201	.262	.352	.093
.0558	.000788	.080	.000	.125	.275	.358	.161
.0562	.000810	.069	.000	.049	.288	.363	.230
.0564	.000820	.064	.000	.019	.294	.365	.258
.0566	.000836	.002	.000	.000	.357	.369	.272
.0570	.000927	.000	.000	.000	.378	.430	.192
.0572	.000994	.000	.000	.000	.386	.453	.161
.0574	.001141	.000	.000	.000	.398	.492	.110
.0578	.001477	.000	.000	.000	.418	.553	.028
.0582	.002301	.000	.000	.000	.234	.766	.000
.0585	.004196	.000	.000	.000	.000	1.00	.000

Source: See text

Note: For the locations of the royages see note in table 2.3. Exp mean is the expected portfolio return μ; the variance is the total portfolio variance $\omega'\Sigma\omega$; and the weights give the portion of land ω_i held in each royage.

Table 2.6: Returns Correlation Matrix

Royages	1	2	3	4	5	6
royage1	1.00					
royage2	-.242	1.00				
royage3	-.231	-.243	1.00			
royage4	.970	-.211	-.254	1.00		
royage5	-.295	.973	-.180	-.260	1.00	
royage6	-.202	-.255	.978	-.215	-.191	1.00

Source: See text

Note: Royages 1,2, and 3 were in Onnaing; 4,5, and 6 in Quarouble. Royages 1 and 4 grew the same crop. So did 2 and 5, and 3 and 6.

Table 2.7: Returns Correlation Matrix

Taques in Royage 3, Onnaing

	1	2	3	4	5	6
taque 1	1.00					
taque 2	.925	1.00				
taque 3	.877	.960	1.00			
taque 4	.920	.797	.743	1.00		
taque 5	.816	.799	.811	.746	1.00	
taque 6	.868	.890	.873	.749	.866	1.00

Source: See text

Note: All taques in royage 3 grew the same crops.

Table 2.8: Mean-Variance Efficient Portfolios
Taques in Royage 3.

Royage 3		Portfolio Weights by Taque					
Exp. mean	variance	1	2	3	4	5	6
.0412	.002467	.000	.232	.000	.000	.768	.000
.0415	.002472	.000	.297	.000	.000	.703	.000
.0425	.002530	.000	.255	.000	.000	.588	.157
.0435	.002614	.000	.211	.000	.000	.475	.315
.0445	.002724	.000	.131	.056	.000	.403	.411
.0455	.002845	.000	.026	.151	.000	.358	.464
.0465	.002980	.000	.000	.216	.000	.262	.522
.0475	.003138	.000	.000	.272	.000	.149	.580
.0485	.003312	.000	.000	.327	.000	.035	.637
.0495	.003565	.023	.000	.530	.000	.000	.446
.0505	.003943	.171	.000	.584	.000	.000	.245
.0515	.004415	.318	.000	.638	.000	.000	.044
.0525	.005072	.640	.000	.360	.000	.000	.000
.0534	.006073	1.00	.000	.000	.000	.000	.000

Source: See text

Note: The mean returns, and the portfolio variances have the same meaning as in table 2.5, but the portfolio now consists of land in the taques of royage 3. The portfolio weights ω_i therefore give the portion of land held in each taque.

2.8 References

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Chapter 3

One Market, Two Markets, Three Markets, Four? The Network of Finance: Capital Market Integration - the U.S. and the U.K, 1865-1913

3.1 Introduction

This chapter sets out to accomplish four main objectives. The first is to argue that one recent attempt to measure nineteenth century capital market integration is inadequate because of its focus on correlations in price movements between similar securities offered by different countries. Such an approach

addresses neither the range of securities offerings in respective countries nor the extent of inter-country capital flows. The present study, however, focuses on both of these questions for two countries – the United States and Great Britain – from 1865-1914. The second aim in the chapter is to quantify the British contribution to American economic expansion by measuring the capital flows through the London Stock Exchange to U.S. companies. These flows are then disaggregated by region and by industry. When compared with securities listings from the New York Stock Exchange, the disaggregated flows are used to demonstrate that London serviced a wider array of economic sectors and regions in the U.S. than did the New York market. Cataloguing the listings discrepancies between the two exchanges becomes the third objective of the chapter. Finally, a simple explanation for the discrepancies is put forth which suggests that U.S. securities listed in London were riskier than those listed in New York. Using price and dividend data from the London Exchange, returns are calculated for two groups of stocks – those solely listed in London and those jointly listed in London and New York. Price volatility and returns measures from the two groups demonstrate that many "London" issues were less risky than typical jointly listed issues. The data indicate that the simple risk/return explanation is simply inadequate, and must revised.

3.2 The Problem:

This is the story of two cities and two nations. In 1870 greater London was a city with a population of more than three million, the political capital of what was arguably the world's richest country and of what was unarguably

the world's greatest empire. [1]

More importantly for this story, it was also the location of "The City"–the world's unchallenged financial center. In the same year, New York was a city of less than one million, the business, but not the political, capital of a rapidly developing, but certainly not yet fully developed, country and home of Wall Street–a maturing, but yet far from mature, *domestic* capital market. In 1914, greater London was a city of more than seven million people, the capital of a country that, although still rich, could no longer argue that it had the highest per capita income; but a city that exercised at least nominal political control over almost twenty-five percent of the earth's land mass and that contained a financial center that, while still unquestionably the single most important capital market, no longer commanded the unchallenged monopoly position that it had held forty years before.[2] New York was a city of more than five million people, the business center of the world's leading industrial power, and the seat of a highly developed domestic financial

[1]The question of relative incomes is a difficult one. If the measure is GNP per capita (unadjusted for price differences), Britain had the highest per capita income in the world. If an attempt is made to adjust for differences in purchasing power, the answer–as between the U.K. and the U.S.–lies with the choice of weights and prices. Kuznets speculated that the U.S. may have passed the U.K. sometime between 1840 and 1869.

In 1870 per capita gross national product was about $250 in the UK and $165 in the US. By 1914, the figure for the US was $408 and that for the UK $365. It has, however, been estimated that in 1913 one-tenth of British national income was earnings on investment abroad. Making a similar adjustment for the 1914 figures, indicates that income in the UK and the US were very similar ($408 vs. $402), if price differences are ignored.

In 1870, for example, Britain and the empire encompassed an area of 9,540,000 square miles populated, in 1872, by an estimated 205,000,000 persons.

[2]It is not clear what level of political control Britain exercised over the self governing colonies–Australia, Canada, New Zealand, and South Africa. It is also not clear just how much control was exercised over the very underdeveloped colonies in Africa and Asia.

market–a market that, while still not directly challenging its London counterpart, was beginning to take on international overtones. The old order had not yet been swept away, but it had been markedly altered. No longer did London bankers refer to their New York competitors as hicks, or country cousins. In fact, when, in 1911, Edward Holden, the managing director of the Midlands Bank and Britain's most distinguished commercial banker, was visited by an American colleague, he not only entertained the visitor in his home but also loaned him both his Rolls Royce and his chauffeur for a tour of the British Isles.

Recently, Robert Zevin has reintroduced the subject of the degree of integration of nineteenth century international financial markets.[3] In an important contribution to the literature on the development of financial markets, he argues that the evidence indicates no mid-twentieth-century technical or institutional revolution, but shows instead that the capital markets in Amsterdam, London, New York, and Paris were well integrated by *at least* the end of the last century and probably earlier.[4] Nor, suggests Zevin, has the recent past produced any significantly greater degree of integration. He concludes that those four markets were at least as well integrated in the decades before the First World War as the world's major financial markets are today. He argues that the institutional structure that provided the foundation for the

[3]Robert B. Zevin, "Are World Financial Markets More Open? If So Why and with What Effects?" Working Paper Number 79 of the World Institute for Development Economics Research of the United Nations, October 1989. The paper is to be published in *Financial Openness and National Autonomy.*

[4]Zevin argues "that financial markets were strongly integrated across northwest Europe by the early *eighteenth* century, if not sooner."

well integrated late nineteenth century transnational market was provided by the gold standard, and that, the telegraph aside, integration did not depend on modern innovations in communication or exchange technology.

In the case of the U.S.A. and the U.K., there is little doubt that there had been a substantial and long-standing international financial connection–a connection that, in some dimensions, antedates the adoption of the Federal Constitution. In the last analysis, the British had absorbed a large part of the American debts incurred during the Revolutionary War and, within less than a quarter century, those arising out of the Louisiana Purchase–debts that had initially been funded by the French and Dutch. Those same British financiers had made temporary loans to the Second Bank of the United States within three years of the Treaty of Ghent; British mercantile houses had carried much of the short term debt arising from trade between the two countries; and investors from Bristol to Edinburgh had rushed to purchase the American state and state guaranteed bonds issued to finance the transport expansion of the 1830s.[5]

Although the figures are subject to a significant level of error, it is estimated that total foreign investment in the U.S. exceeded $250 million in 1853, had risen to $2 billion by 1883, and may have been as much as $7 billion at the outbreak of the First World War.[6] Of this total, the British

[5]See Leland H. Jenks, *The Migration of British Capital to 1875*, (London: Thomas Nelson and Sons Ltd., 1963), Chapter III.

[6]The 1853 estimate of $222 million excludes commercial and bank debts and direct ownership of land and business enterprise. The estimates for 1914 range from $4.5 to $7.0 billion. The lower figure is from *Review of Economic Statistics*, Vol. I, p. 230 the larger from Harvey E. Fisk, *The Inter-Ally Debts*, p. 312. All estimates are reported in Cleona Lewis, *America's Stake in International Investments*, (Washington D.C.: The Brookings

fraction is thought to have been as high as 90 percent in 1861, 80 percent in 1881, 70 percent in 1901, and 60 percent in 1911.[7] Thus, British investment in the U.S. may have been as high as $1.6 billion in 1883 and $3.9 billion in 1914.[8]

Although the institutional arrangements that structured 19th century Anglo-American financial transactions makes precise demarcation difficult, of that total, about $3.4 billion was probably portfolio and the rest direct investment. For the purposes of this study, the direct-portfolio distinction is unimportant. The central focus is on the institutional network that linked American enterprise with British finance; and, to that end, it makes no difference whether an American company sold its securities in the U.K. or whether the American firm was opened or purchased by a group of British promoter/financiers who then marketed the new or reconstructed enterprise's stocks and bonds in their country.

Nor were the British investments in the United States limited to government and transport issues. The range and scope of those financial commitments is illustrated by Cleona Lewis' estimates of the distribution of direct investments. In addition to the finance directed toward railroads, insur-

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Institution, 1938), pp. 518-519.

[7]These proportions are derived from Matthew Simon, "The Pattern of British Portfolio Investment 1865-1914," in J. H. Adler, *Capital Movements and Economic Development*, (New York: Macmillan, 1967) and "The United States Balance of Payments 1862-1900" in *Trends in the American Economy in the Nineteenth Century*, National Bureau of Economic Research, Studies In Income Wealth, Vol. 24, (Princeton, N.J.: University Press, 1960) by John H. Dunning, *Studies in International Investment*, (London: Allen & Unwin, 1970), pp. 178-181.

[8]Buckley and Roberts put the 1914 figure at $4.0 billion. Peter J. Buckley and Brian R. Roberts, *European Direct Investment in the USA before World War I*, (New York: St. Martin's Press, 1982), p.12.

ance companies, and banks, she concludes that in 1914 British investment in land-holding companies probably totaled $40 million, cattle companies $6 million, mining companies $56 million, oil companies $35 million, breweries and liquor companies $58 million, other miscellaneous commercial and industrial companies $36 million, and mortgage companies between $200 and $250 million.[9]

The evidence of substantial investment by one country in the economy of another is not, however, evidence of financial market integration. Such financial flows may merely reflect a recognition by investors in one country of potential profit opportunities in another. Opportunities that, because of institutional failure (or, if one prefers, high transactions costs), cannot be successfully exploited domestically. Zevin recognizes the problem, and he does not include the magnitude of international capital movements in his measure of the degree of market integration. Instead, his definition of transnational integration combines two distinct, but not unrelated, concepts: (1) that the integrated system is efficient, i.e., that it represents "a single efficient system for disseminating and responding to information"; and (2) that the assets traded on the national markets (for example, Amsterdam and Paris or London and New York) are "close but [perhaps] imperfect substitutes" for each other.

For evidence of the first–the efficiency of nineteenth century markets – Zevin turns on Oskar Morgenstern's studies of the relationship between movements of interest rates, bond yields, and stock prices on six pairs of inter-

[9]Lewis, *America's Stake in International Investment*, chapter 5.

national financial markets (London-Paris, London-Amsterdam, London-New York, Paris-Amsterdam, Paris-New York, and Amsterdam-New York).[10] For example, using monthly data for the years January 1876 to July 1914, Morgenstern shows that the average correlation between "Nominal Short Rates" in the six pairs of markets was .54. In contrast, in the more recent past, the correlation (a correlation that employs annual, not monthly, data) between West Germany, Japan, the US, and the UK was .15 for the years 1960-1970, .59 for 1971-1980, and .78 for 1981-1987.[11] Zevin is interested in world capital market integration, and he is concerned with the London-New York pair only because it represents one-sixth of his nineteenth century story. In terms of this discussion, however, the London-New York connection is central; and, for that city pair, the evidence on British-American integration may be less compelling than the Morgenstern summary figure suggests. While the average for the six city pairs is, indeed, .54, the average for the three pairs that include New York is only .40.[12]

Zevin's evidence for the second characteristic of an integrated market, near perfect substitutability between assets, is more difficult to assess. Drawing on the recent work of Larry Neal, he concludes that "speculative money

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[10]Oskar Morgenstern, *International Financial Transactions and Business Cycles*, National Bureau of Economic Research, *Study in Business Cycles*, Vol. 8, (Princeton N.J.: Princeton University Press, 1959), pp. 98-123.

[11]It is quite possible that it is the use of annual data for the more recent past and monthly data for the earlier period that gives Zevin his results.

Also, the use of nominal rates as opposed to real rates may induce artificially high correlations. At the very least, nominal rates produce somewhat misleading results.

[12]The figure for New York-London is .45, New York-Berlin .40, and New York-Paris .36. In contrast, the average for the three pairs over the years January 1925 to December 1938 is .93, .77, and .34 respectively. See Morgenstern, *International Financial Transactions and Business Cycles*, p. 105.

moved swiftly from one country to another as early as 1870"; but speculative money hardly covers the entire range of paper securities that would be traded on a fully integrated capital market.[13] As for the rest, Zevin merely asserts that "a growing multinational class of portfolio investors perceived securities of different national origin but similar characteristics as close substitutes because of comparable transactions costs, low information costs and the absence of serious currency exchange impediments." It is with these latter classes of securities that questions about the degree of formal structure in the financial network that connected Britain and America in the late nineteenth century do not appear to have been adequately answered.

In short, the evidence here will indicate that, until the end of the nineteenth century, at the very least, the London capital market was institutionally more developed and served a far more sophisticated group of savers than its New York competitor.[14] Obviously the two markets did not exist in isolation, but it appears that a substantial fraction of the American securities traded in London were not even imperfect substitutes for many of the stocks and bonds traded in New York. That is to say, while the British contribution to American capital formation was never large, the financial flows were not trivial; and, more importantly, they were often targeted at economic activities that lay outside the scope of the still embryonic Ameri-

[13]Larry Neal, "The Integration and Efficiency of the London and Amsterdam Stock Markets in the Eighteenth Century," *The Journal of Economic History*, March 1987, pp. 97-115.

[14]For a more extensive development of this point see Lance Davis, "The Capital Markets and Industrial Concentration: The U.S. and U.K., A Comparative Study," *Economic History Review*, Second Series, Vol. XIX, No. 2, 1966.

can financial market. Moreover, they were particularly important during the last two decades of the nineteenth century when the American economy was undergoing a very rapid structural transformation.

The actual size of those transfers is still the subject of some dispute, but an examination of the American capital called up on the London market provides some clues as to the magnitude as well as the spatial and industrial distribution of those financial flows.

3.3 American Capital Called on the London Stock Exchange.

Although the actual size of aggregate capital flows to the U.S. is still the subject of some dispute, a significant portion of the flows from the largest supplier, Great Britain, was recorded in rich detail. An examination of the American capital called up on the London market provides clues as to the magnitude as well as more precise estimates of the spatial and industrial distribution of those financial flows.[15]

John Dunning has reworked and combined the estimates of Albert Imlah and Matthew Simon to produce a series on British Investment in the United States between 1861 and 1913.[16] Lance Davis and Robert Hutten-

[15]One word of caution. While it is sometimes possible to unambiguously classify a firm into the appropriate industry–a railroad is usually (but not always) a railroad–there are sometimes questions. In particular it is sometimes difficult to distinguish between an agricultural firm that owns several ranches (Agriculture & Extractive Sector), a Financial Land and Development Company (also Agriculture & Extractive Sector) that owns a portfolio of ranches, and a Trust (Finance Sector) that owns of portfolio of ranching securities. When there was any doubt the classification adopted by the *Stock Exchange Annual Year Book* has been employed.

[16]John H. Dunning, *Studies in International Investment.* (London: George Allen & Unwin, 1970). Chapter 4, "British Investment in the United States 1860/1913. pp. 143-89. Cited hereafter as Dunning, *Studies in International Investment.* By adjusting two other series of *net* capital flows derived using balance of payments estimates, Dunning arrives at estimates of gross capital exports from Britain to the United States. The two series that form the foundation for the Dunning estimates are Albert Imlah's estimates of British net foreign investment ("foreign investment by the U.K. minus investment by foreigners in the U.K."), and Matthew Simon's estimates of net capital movements into and out of the U.S. Imlah's estimates are found in *Economic Elements in the Pax Britannica*, (Cambridge: Harvard University Press, 1958) pp. 42-81.; Simon's are from Matthew Simon, "The United States Balance of payments 1861/1900," pp. 629-715, in *Trends in the American Economy in the Nineteenth Century*, (Princeton: NBER, 1960). It should be further be noted that the Simon estimates have been updated to 1913 by the U.S. Bureau

back, drawing on reports in *The Investors Monthly Manual* and *The Stock Exchange Annual Year Book*, have produced a series on "Capital Called Up" in the London market between 1865 and 1913.[17] Table 3.1 displays both the Dunning and the Davis and Huttenback series as well as the results of an attempt to merge the two sets of numbers.

The "Capital Called" series (Column 13) reflects the gross export of finance from the U.K. to the U.S.; it is, therefore, never negative. Dunning's estimates of U.K. Investment in the U.S. (Column 9) are net figures and show periods (1876-1880 and 1894-1901) when repatriations exceeded new security purchases. Similarly, the flow estimates based on the Dunning-Imlah totals and the U.S. proportions reported in Davis and Huttenback (Column 12), while showing no negative flows, are also net of repatriations. As one might expect, the estimates based on Capital Called (column 13) are generally much above the Imlah-Dunning based estimates of Total Financial Flows (column 12). For example, most of the $731 million difference between columns (12)

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of the Census. Refer to *Historical Statistics of the United States*, Washington, 1960, p. 564. Each series is, of course, manipulated differently to arrive at the final estimates of gross U.K. capital export to the U.S. That both methods produce strikingly similar final estimates is taken by Dunning as evidence of their accuracy.

[17]Lance Davis and Robert Huttenback, *Mammon and the Pursuit of Empire: The Political Economy of British Imperialism, 1860-1912*, (Cambridge: Cambridge University Press, 1986), pp.30-72. Today, it would be normal to estimate flotations. In 19th century Britain, initial flotations frequently did not require that the purchaser pay the full price "up front." Instead he was often only asked to make an initial payment and agree to make further payments (up to the amount of the face value of the security) when called upon in the future. Thus a "Capital Call" might represent the entire flotation or only some fraction of that total figure. In fact, there are many instances when the purchaser was never asked for the full amount. One caveat: since the penalty for refusing to pay a call was limited to forfeiture of the security, there is no guarantee that all calls were paid. Examination of the records of the stock exchange indicate that such potential distortions were, in fact, small.

and (13) for 1877, can be explained by a single $500 million U.S. government refunding loan.

A comparison of the Dunning-Imlah and the Davis-Huttenback estimates of the U.S. fraction of U.K. overseas finance provides some further insight into the relationship between the two series. One caveat, the Dunning-Imlah series has been extrapolated by Dunning from a series of cross section estimates of British financial capital in the U.S. and of total U.K. financial capital abroad.[18] In any year observations are, therefore, heavily weighted by past investment decisions. The Davis-Huttenback series (both U.S. and total U.K.) relate to new calls alone and carry no historical component.

Not surprisingly, the Davis-Huttenback estimates are much more volatile; however, the causes of the significant differences in level between the two series appear to lie elsewhere. While both capture the peaks in the flows in the early '70s and in the '90s, the Imlah series does not capture the minor peak in the early '80s nor the not-so-minor elevations in the first and second quinquennia of the present century. Overall, the Davis-Huttenback series indicate a somewhat lower fraction of U.K. overseas investment being directed toward the U.S. While a part of that difference can be traced to the role of British investments made before 1865, much of it is associated with the 1880s.

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[18]Dunning, *Studies in International Investment* Table 2, p. 151. The total U.K. capital abroad figures are from Imlah, the estimates of U.K. capital abroad are from Jenks (1854), Cairncross (1870 and 1885), Bacon (1899), and Paish (1911). See A.H. Imlah, *Economic Elements of the Pax Britannica*, (Cambridge, Mass.: 1958); Leland H. Jenks, *The Migration of British Capital to 1875*, (London and elsewhere: Thomas Nelson & Sons Ltd., 1963); A.K. Cairncross, *Home and Foreign Investment 1870-1910*, (Cambridge: Cambridge Univ. Press, 1953); Bacon, "America's International Indebtedness"; G. Paish, "Great Britain's Capital Investment in Individual, Colonial, and Foreign Countries." *Journal of the Royal Statistical Society*, Vol. LXIV, Part II. January, 1911.

Between 1865 and 1879 and between 1890 and 1913 the Davis-Huttenback figures are about 90 percent of Imlah's. Between 1880 and 1889, however, they are only about three quarters of the Imlah figure.[19]

Although not capturing the net financial flows, the "Capital Called" series make an important contribution to any attempt to understand the nature of the relationship between the British and American capital markets. First, the net figures are aggregates and provide no clue as to the industrial or spatial distribution within the U.S. of the international financial flows. The "Capital Called" series, on the other hand, can be disaggregated by industry and, to some extent, by location.[20] Second, since repatriations are not reflected in the data, the Capital Called series mirrors the composition of the demand for finance at any point in time. Thus, if in a given year the U.S. Government paid off $100 million in British held debt while American railroads were, for the first time, able to place $100 million in securities on the London market, the net series would, correctly, show no net flow; but the Capital Called series would, also correctly, indicate that the British had begun to fund American railways.

Obviously, not only British, but also continental investors utilized the London market. As a result, reliance on American capital called in London makes it impossible to cleanly separate British investor sentiments from those

[19]This difference remains a puzzle, and it is a subject of current research.

[20]It would, of course be very useful to examine the industrial and spatial composition of the net series, since that would make it possible to pinpoint industries and regions from which finance was withdrawn as well as those that were the new recipients; but any such analysis would involve disaggregating the series into its export and repatriation components; and, given the existing data, that goal cannot be attained.

of non-British investors; but external evidence indicates that the London market was principally used by British investors. Thus, the Capital Called data used here primarily reflects capital flows from Britain to the U.S.; and, as a result, it does not appear to overly distort reality to term the capital calls in London by American firms "British" flows.[21]

Table 3.3 provides a year-by-year industrial breakdown of the American flotations and calls; those results are summarized in Table 3.2. Not surprisingly, given the pattern of American development, railroads were by far the single most important recipient of British savings. It is easy to see why Alfred Chandler has dubbed America's railroads "The Nation's First

[21]Measuring British foreign portfolio investment has long been a subject rife with controversy. For example, D.C.M. Platt took exception to estimates from George Paish on the grounds that Paish did not sufficiently account for foreign holdings of securities traded on the London market. Platt offered similar criticisms of estimates derived by Leland Jenks; and he criticized estimates derived by J. Fred Rippy on the grounds that the use of nominal values of loans was improper because often the face value of loans had little relation to the capital actually invested. In general, Platt called for downward revision of all estimates. Charles Feinstein has countered Platt arguments. In particular he has offered evidence in support of Paish's estimates. Fortunately, this work is far more concerned with the industrial and spatial distribution of the flows to the U.S. than with their magnitudes so the question is largely irrelevant. D.C.M. Platt, "British Portfolio Investment Overseas before 1870: Some Doubts," *The Economic History Review*, February, 1980. pp. 7,11,12,15. Leland H. Jenks, *The Migration of British Capital to 1875*, (London, 1965); George Paish, "Great Britain's Capital investment in Other Lands," *Journal of the Royal Statistical Society*, 72 (1909); J. Fred Rippy, *British Investments in Latin America*, (Minneapolis, 1959); Charles Feinstein, "Britain's Overseas Investments in 1913," *Economic History Review*, March 1990.

With regard to the foreign ownership of securities listed on the London exchange, Davis and Huttenback constructed a sample of shareholders of foreign firms traded on the London market between 1883 and 1907 and calculated that only 17 % of the shareholders were foreign (that is, non-U.K. residents); while 83 % were residents of the United Kingdom. Although not all of these firms were American, the assumption that the Capital Called series represents flows from British investors appears plausible. Lance E. Davis and Robert A.Huttenback, *Mammon and the Pursuit of Empire*, pp. 195, 209.

Big Business."[22] Over the years 1865 through 1913, total railroad flotations exceeded $2.775 billion and averaged almost $57 million (Table 3.4, Figure 3.2). In no year did they total less than $3.2 million, and in 1902 they reached nearly one hundred times that amount. They accounted for about one-quarter of the total in the 1860's and 70's, about two-thirds of the total in the next two decades, and more than four-fifths of that figure in the present century.

Railroad construction in the United States proceeded in a series of waves with peaks in 1872, 1879, 1890, 1902, and 1906; the financial data track that pattern closely but lag it slightly.[23] The "calls" reached $80 million in 1873, $79 million in 1881, $89 million in 1890, $291 million in 1902, and $210 million in 1907. The timing of the waves was primarily dictated by economic conditions, but the composition of the issues reflects the history of the construction of the American railroad network.

Although some western and southern roads found their way onto the London market, the first wave of finance – the wave that peaked in 1873 – was primarily associated with the expansion and near completion of the networks in the East and Midwest. In the East, most of the major lines were represented among the twenty railroads that floated their issues on the British market. That group included the Chesapeake & Ohio, the Baltimore and

[22]Alfred D. Chandler, *The Railroads: The Nations First Big Business*, (New York: Harcourt, Brace & World, 1965).

[23]U.S. Department of Commerce, *Historical Statistics of the United States: Colonial Times to 1970*, (Washington, D.C.: GPO, 1975), Vol. II, p.732. The figures indicate peaks of 7,439 miles in 1872, 5,006 miles in 1879, 6,026 miles in 1902, and 5,523 miles in 1906.

Ohio, the Erie, the Pennsylvania, the Philadelphia and Reading, and the New York Central; but it was not only the majors that turned to "The City" for finance. The stock exchange provided the funding mechanism that permitted a number of very small lines to raise additional capital. The bonds of the Perkiomen railroad–a Pennsylvania line connecting Perkiomen and Emaus junctions, a distance of 38.5 miles–found their way onto that distant market as did the issues of the Geneva & Ithaca (45 miles) and the Northern Central of Maryland, a line that connected Baltimore and Sunbury, Pennsylvania.

In the Midwest, between 1865 and 1875 no fewer than twenty-five railroads drew British finance. As in the East, the major lines were well represented – the list included the Burlington, the Chicago and Alton, the Chicago and Northwestern, the Illinois Central, and the Louisville and Nashville – but it did not end there. Issues of roads like the Indiana and Southern, the West Wisconsin, the Paris and Danville, and the St. Louis Tunnel were also present.

In the South, the Alabama and Chattanooga, the East Tennessee, the Virginia and Georgia, and the Galveston, Harrisburg, and San Antonio all tapped the British market. The eight Western roads included the Central Pacific, the Denver Pacific, the Minneapolis, St. Paul and Pacific, the Northern Pacific, and the Union Pacific, as well as the Katy, the Oregon and California, and the Omaha Bridge.

While the East and Midwest continued to draw funds, the geographic focus of the second wave shifted South and particularly West. The Alabama and Great Southern drew substantial blocks of finance, but the Alabama, New Orleans and Texas received even more. To the west there were flota-

tions by the A.T.& S.F., the Chicago, Milwaukee, St. Paul, and Pacific, the Denver and Rio Grande, the Great Northern, the Northern Pacific, and the Southern Pacific not to mention those of railroads whose names, while never well known, have long since passed into history – roads like The Central City, Deadwood, and Eastern and the Texas Trunk.

By 1890 the national network was largely in place. From then until 1913, the majority of existing railroads were no longer constructing new lines, but they were in the process of double tracking and otherwise upgrading their facilities. At the same time, although the demand for finance remained high, integration and consolidation had dramatically reduced the number of roads competing for funds. Some small lines including the Colorado Midland, the Cleveland and Canton, the Knoxville and Cumberland Gap, and the Tonopah and Tidewater did enter the market; but it was the "majors" that dominated the list. Between 1905 and 1909 – a period that saw a total call of $572 million – only twenty-five individual lines were involved.

Thus far only railroads have been mentioned, but the Transport Sector also contained a few issues by canal and dock and tramway and omnibus companies (Table 3.4). At no time could these issues be viewed as large, if the standard of measurement is the funds directed to the railroads; but in the last decade, urban transport, particularly the subways of New York and Chicago, drew a small, but not insignificant, share of the total.

It is not surprising that United States government bodies were the second largest recipients of London finance. Over the forty-nine year period, public flotations totaled $1.604 billion; however, unlike railroads, the pattern is not uniform. Calls were made in only nineteen of the forty-nine years; and while

they amounted to more than $780 million in 1877 and between $200 and $300 million in 1871, 1873, and 1876, they totaled a mere $39,000 in 1885 (Table 3.3). Overall, they averaged $32 million a year, but the number and size of calls declined irregularly from seventy and $522.6 million in the first decade to four and $2.3 million in the last (Figure 3.3). While they accounted for more than seven-tenths of the total in the 1860's and 70's, their share had fallen to only six percent in the next two decades, and to a mere one-tenth of *one* percent in the opening years of the twentieth century. That decline, of course, is a reflection of the improved domestic market for *this* type of securities.

While the Federal government was the largest recipient, the London market also serviced the needs of eight states and nine cities. Massachusetts was by far the heaviest user of the London exchange, but the public issues of Alabama, Arkansas, Georgia, Louisiana, New York, Pennsylvania, and Virginia all found their way to the north shore of the Thames. Among American cities, St. Louis and Boston were the clear front runners, but the list also includes other major urban centers – Chicago, New York Providence, St. Paul, and the nation's capitol – and two relatively minor cities – Duluth, Minn. and Fall River, Mass.

If there is a surprise in the Capital Called data, it is in the extent of the penetration of finance directed by the London market into the other dimensions of American economic life at a time when the "Frenzied Financiers" of Wall Street were expressing little or no interest in any sector of the economy save railroads, and federal, state and local governments.

Although the figures pale in comparison to the commitments to the Trans-

port and Government sectors, overall, the British directed almost fifteen percent of their finance to Manufacturing and Commerce, the Agriculture and the Extractive industries, Finance, and Public Utilities. Moreover, although the figure for the 1860's and 70's was less than five percent; the total reached almost twenty percent in the 1800's and 90's – the two decades of most rapid structural transformation; and it was still almost twenty percent in the first years of the present century.

Over the five decade period, advances to Manufacturing and Commercial firms totaled almost $231 million – an average of more than $4.5 million a year. The time pattern of those transfers was, however, not smooth (Table 3.3, Figure 3.4). Not surprisingly, there were few transfers in the first years, but there was a peak in the early 70s with calls reaching $9.6 million in 1874. Firms that provided railroad equipment, particularly the United States Rolling Stock Company – a firm organized to provide equipment for the Atlantic and Great Western Railroad and whose directors had chosen General George B. McClelland as president – got a not insubstantial share of those funds.[24] A few miscellaneous firms, like the Anglo-American Leather Cloth Company, received small infusions; however, the most numerous recipients were associated with the infant American iron and steel industry. No fewer than eight such firms ranging alphabetically from the Alton Coal, Coke, & Iron Company, through the Lehigh & Wilkes Barre Coal Co., to the Southern States Coal, Iron, and Land Co. Ltd, received between $24,000 and $8.8

[24]For a more detailed description of the United States Rolling Stock Company see Mira Wilkins, *The History of Foreign Investment in the United States*, Harvard Studies in Business History, No. 41, (Cambridge, Mass.: Harvard Univ. Press, 1989), p. 837.

million.

The Manufacturing & Commercial sector drew relatively little additional finance between the first surge and the late 80's (there were, for example, no such calls in 1878, 1879, or 1880); but overall, between 1882 and 1898, the sector received almost twelve percent of all British finance. The end of the ninth and the beginning of the century's tenth decade saw a renewed British interest in the rapidly expanding manufacturing sector of the American economy. There were $84 million in calls over the three years 1889, 1890, and 1891–including almost $41 million in 1889 alone. That torrent was in large part a response to the British investor's sudden interest in American breweries. Between 1885 and 1894, of the one hundred eighty-seven calls issued by sixty-five manufacturing and commercial firms, ninety-seven were issued by the calls of twenty-five breweries. They included nine calls by the Frank Jones and by the Springfield breweries, seven by the Chicago, the Cincinnati, the City of Baltimore United, the Illinois United, and the New England, and six by the United States Brewing Company. Taken together, American breweries received more than $38.5 million in that one decade alone.

In the case of almost all of these American breweries drawing capital in London, the organizers were British. For example, between 1888 and 1891 twenty four British "syndicates" acquired about eighty American breweries. Although the largest were the St. Louis Breweries (capitalization £2.85 million) and the Milwaukee and Chicago Breweries Ltd. (capitalization £2.271 million), the movement toward merger was a national one; the twenty four were spread from coast to coast – in New England, New York, New Jersey, Baltimore, Philadelphia, Washington D.C., Cincinnati, Springfield Ohio, De-

troit, Indianapolis, Chicago, St. Louis, Denver, and San Francisco. Although investment declined somewhat from its peak in the early 1890's, Lewis put total investment in 1899 at $75 million and the figure for 1914 at $58 million.[25]

Breweries alone, however, did not account for the entire surge in industrial finance. The other recipients of "London" capital included several milling companies (Pillsbury-Washburn was probably the best known), General Electric, Eastman's, Pullman, and Edison Phonographic. Specifics about the ownership of at least one of these companies are known. In 1899, the British purchased Pillsbury mills, the nation's principal flour producer and launched Pillsbury-Washburn with a capital stock of £1 million and debentures of £635,000. Of that total the previous American owners received almost eighty percent.[26] About the same time the British purchased a chain of grain elevators in Minnesota, the Dakotas, and Montana and organized the Chicago and Northwest Graineries Company Ltd; and another British group acquired the City of Chicago Grain Elevator Line and reorganized its properties as the City of Chicago Grain Elevators Ltd.[27]

Given the market possibilities underscored by the obvious British interest, it is not surprising that, for the first time, the New York Stock Exchange began to take a more serious interest in its department of *Unlisted* Securities – a department not organized until 1885. Although lagging its British

[25]Wilkins, *Foreign Investment*, p. 325. Lewis, *America's Stake*, p. 99.

[26]Lewis, *America's Stake*, p. 101. Wilkins, *Foreign Investment*, p. 320.

[27]Wilkins, *Foreign Investment*, pp. 319-320 & 323. Neither milling nor the grain elevators proved a success. Pillsbury-Washburn went into receivership in 1908; the City of Chicago Grain Elevator Company shed its British connection in 1894; and the Chicago and Northwestern Graineries Company went into liquidation in 1910.

counterpart by a generation, the Americans did begin to respond to the potential profits offered by the financial demands of the growing manufacturing sector.[28] By the 1890s and triggered by the explosion of trusts and mergers – to say nothing of the desire of some owners to take advantage of access to the developing financial markets to diversify their investment portfolios – the Department of Unlisted Securities became one route by which the offerings of a number of American manufacturing companies finally found their way on to the until then, not so "Big Board".[29]

The American market's increased ability to handle industrial securities combined with the competition provided by new investment alternatives that had opened for British investors – particularly opportunities north of the 49th parallel – appear to have been sufficient to move the center of American industrial finance away from London. There was little American Manufactur-

[28]Although, as we shall see in Chapter 4, the NYSE was not the domestic financial institution initially most responsive to profit opportunities in this and other sectors of the U.S. economy.

[29]For an excellent discussion of the evolution of the market for industrial securities, see T. Navin and M. Sears, "The Rise of a Market for Industrial Securities," *Business History Review*, Vol. 29, 1955, pp. 105-138.

Navin and Sears report that between 1890 and 1893 thirteen firms formed by the organization of trusts or mergers and eight firms interested in recapitalization issued investment grade preferred stocks; and of these about one-half ultimately found their way on to the New York Stock Exchange. The trusts included the American Cotton Oil Company, the American Sugar Refining Company, and the National Lead Company. The newly merged firms included the American Tobacco Company, the American Soda Fountain Company, the American Type Founders' Company, the General Electric Company, the Hecker-Jones Jewell Company, the Herring-Hall-Marvin Company, the Michigan Peninsular Car Company, the National Cordage Company, the National Starch Manufacturing Company, the Trenton Potteries Company, the U.S. Leather Company, and the U.S. Rubber Company. The recapitalizations included the Barney and Smith Car Company, the H.B. Claflin Company, the Henry R. Worthington Company, the P. Lorillard Company, the Proctor and Gamble Company, the R.I. Perkins Horse-Shoe Company, the Thurber, Whyland Company, and the Westinghouse Electric and Manufacturing Company. p. 118.

ing & Commercial activity on the London exchange between 1902 and 1907. There were no such calls in 1902, 1904, and 1905, and in 1906 they totaled less than $146,000. Beginning the next year, however, the volume of American manufacturing calls began to rise again; the total reached $24.9 million in 1912 and $50.4 million for the five years 1910 through 1914. Unlike the earlier concentrations – first in railroad equipment and in iron, coal, and steel in the 1870's and, then, in brewing in the late 1880's and early 90's – there is little evidence in the pre-war decade of any industrial concentration. The Indianapolis and the St. Louis breweries are represented, as are the Oglivie Flour Mills; but the list includes an additional almost $7 million of General Electric securities as well as issues of $21.4 million of the British-American Tobacco Company, $8.2 million of Bethleham Steel's stocks and bonds, and even $50,000 of Quaker Oats securities.

The composition of the early manufacturing and commercial calls, with concentrations in support of iron making, brewing, and milling suggests something about the natural resource intensity of the nineteenth century American economy; and that conclusion is underscored by the almost five percent of finance channeled to industries that were directly linked to the natural resource base (mining, financial, land, and development, agricultural, and petroleum and chemical firms). Moreover, while the figure was only two percent in the 1860's and 70's, it reached almost eleven percent between 1882 and 1896, and it was still more than five percent in the last sixteen years of the period.

The almost five percent figure (2 percent to mines, almost 2 percent to financial, land and development companies, 0.6 percent to agriculture, and

0.4 percent to petroleum and chemicals) translates into a total transfer of $258 million, or an average of $5.2 million a year. The transfers to the Agricultural & Extractive sector mirror the cyclic patterns found in the Railroad and Manufacturing & Commercial groups (Figure 3.5). There was a peak of $12.5 million in 1872, and a massive transfer of $100.9 million in the years between 1881 and 1891 (calls amounted to $14.8 million in 1882 and 1883 and an almost unbelievable $48.9 million in the three years 1889 through 1891). Following a slow period in the early 90's, the level of transfers again increased. They rose to $8.5 million in 1897; and, in a final a run-up in the years after 1907, the level of Agricultural & Extractive transfers reached $23.9 million in 1910 (Table 3.5). Unlike firms in the Manufacturing & Commercial sector, however, these Agricultural & Extractive firms seldom found a home on Wall Street in the years before the outbreak of the First World War.[30]

No single story can explain the movements in the sector's totals. That figure is a composite of movements in four quite different industries. Mines were the largest of the four; they attracted a total of $102.7 million (an average of $2.1 million a year). The transfers to firms in the Financial Land

[30]Often, U.S. Agricultural and Extractive firms were listed on smaller, more regionally-oriented American exchanges rather than on the NYSE. For example, the December 31, 1910 listings of the Boston Stock Market include 57 mining operations but only fifteen railroads. Among those mines are the Adventure, the Hancock, the Old Dominion, the Wolverine, and the Wyandotte. The Consolidated Exchange, located in New York, had a special mining stocks section in their December 31, 1910 listings. That list included the El Paso, the Elkron, the Tramps, the Tonopah, and the Yellow Jacket. Although not as extensive as the listings on either the Boston nor the Consolidated, mining stocks listed on the Philadelphia Exchange included the Amalgamated Mining Company and Tonopah Mining.

& Development sector were, however, almost as large. They drew a total of $101.1 million – an annual average of $2.0 million. Agriculture accounted for an additional $30.9 million ($619 thousand annually), and the chemical-petroleum-and- miscellaneous group $22.8 million, or about $455 thousand a year.

The pattern of mining calls shows a transfer of $8.5 million in 1871 and $7.8 million in 1872, five years of substantial flows between 1882 to 1887 (reaching $5.1 million in 1887), another surge in the mid 90's ($5.5 million was called in 1897), and a final crest in the second quinquennium of the present century that culminated in a transfer of almost $12.0 million in 1910 (Table 3.5, Figure 3.6). In the transitional decades (the years 1882 to 1898) mining investment represented more than three in every one hundred dollars of British financial transfers.

In the first wave of investment in American mining, the focus was on gold and silver mines in the far West; and firms with mines in the states and territories of Arizona, California, Colorado, Montana, Nevada, Utah, and Wyoming all managed to attract British finance. Between 1865 and 1874, sixty-two American mining companies ranging alphabetically from the Austin Consolidated Silver Mines to the Yreka Creek Gold Mining Company of California issued ninety-five calls on the London market. The list included $2,435,000 for Emma Silver Mining (located in Utah), $1,370,418 for Sierra Buttes Gold Mining Limited, $974,000 for South Aurora Mining, and $584,400 for Phoenix Quicksilver Mining.

This initial outpouring of finance was not, in most cases, met with the expected reciprocal flow of profits. The list of offerings included the notorious

Emma, whose Scottish owners were finally forced to sue both its American and British promoters for fraud, and Cassels Gold Extracting Company, about which a London financial journal reported that the British investors had fallen victim to "gold extraction with a vengeance."[31] In the words of the editors of *The Economist*, "Looking back over the mining mania of 1871, it has been ascertained that out of more than one hundred ventures then brought forward only ten are now in existence, and but half that number have ever earned dividends."[32] The editors of the same magazine also reported that "there is a pretty general belief that the profits were never honestly made; that, as a matter of fact, the ore bodies which yielded the dividends were planted by human hands and not by nature."[33]

Burned, wary, but still hopeful, the British moved somewhat tentatively back into American mining finance in the mid 1880's. Although well below the peak level of transfers of the previous decade, the calls reached $3.0 million in 1886 and $5.1 million the next year; over the entire decade, forty-seven mining firms issued eighty-four calls for a total of almost $27.0 million. Although Gold and Silver continued to dominate the lists, the group included at least six copper and one quicksilver mine –for example, the Belt Copper Mines raised $414.000 and the Arizona Copper Company, while attracting

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[31]Clark C. Spense, *British Investments and the American Mining Frontier*, (Ithaca, N.Y.: Cornell University Press, 1958), p. 84.

[32]"The Most Risky of All Investments", *The Economist*, 18 July 1881, p. 756. The reference is not only to the American, but world-wide British mining investments.

[33]W. Turrentine Jackson, *The Enterprising Scot: Investors in the American West after 1873*, Edinburgh University Publications: History, Philosophy, Economics, No. 22, (Edinburgh: Edinburgh Univ. Press, 1968), p. 142. The quotation is from *The Economist*, "The Speculation in Mining Shares," 28 January 1888, pp. 105-106.

less than $2 million in the 80's, had, by 1914, drawn a total of $9.2 million. Moreover, even among the precious metals mines, while names like Old Lout, Sapphire Gold, and Slide and Spur still appeared on the list of calls, those whose contribution to the American economy was somewhat less transitory, Nevada Consolidated, for example, began to appear with greater frequency. It should, however, be noted that the "New" Emma ultimately tapped British and Scottish investors for almost another $1.4 million.

During the 1890's, mining calls totaled almost $11.7 million; and the industrial distribution – heavy in gold and silver, nine calls from five copper mines, and a smattering of mines producing other metals – looks much like the pattern of the previous decade. While Mountain Copper did raise over $4 million, the major difference was the evidence of the Alaskan gold rush found in the offerings of firms like Felix Klondyke and Golden Klondyke River.

While there were no American mining calls in 1913, the years between 1905 and 1912 saw more financial transfers ($33.9 million) than even the heady early 70's ($20.2 million between 1870 and 1875). The mix had, however, shifted. Of the eighty-six calls made by a total of twenty-seven firms, forty-six were made by copper mining companies. If the five calls by the Ducktown Sulfur, Copper, and Iron Company for a total of $309,000 are included, those demands summed to more than $18.8 million, or about three-fifths of the mining total for the years in question.

These later enterprises appear to have fared substantially better than the get rich quick mining schemes floated in the "roaring 70's". Firms like Arizona Copper, Ducktown, Mountain Copper, Camp Bird, De Lamar, and the Natomas Company of California all survived until the outbreak of the

Great War, and some lasted much longer. For example, in 1916, Arizona Copper, a firm that had been profitable from the time it was founded in 1882, paid a tax free dividend equal to 80 percent of the initial investments. The firm was sold to Phelps-Dodge Corporation in 1921.[34] The Camp Bird mine, with John Jay Hammond as consulting engineer and Herbert Hoover as chairman of the board, had, by 1911, paid dividends equal to 155 percent of the initial investment; and De Lamar's cumulative dividends were also a rosy 146 percent.[35]

The British-American Financial Land and Development connection was established early, and, overall accounted for a total transfer of $101 million, or about $2 million a year. While those figures represent less than two percent of all finance, the sector drew more than five percent of the total in the years between 1882 and 1898. In 1865 the British American Land Company turned to the London market for more than $1.3 million, and in 1869 the Nevada Freehold Properties Trust raised almost $1.6 million. The time pattern of the sector's financial flows followed the pattern observed in mining (Table 3.5, Figure 3.7). There was a peak in the early 70's. Between 1872 and 1874 the Californian Land Investment, the Scottish American Investment, the Scottish American Mortgage, the United States Land and Colonization, and the United States Mortgage Company, together, drew almost $6.2 million.

The 1880's were a decade of British investment in the American West. From the beginning of 1881 through the end of 1891 financial land and devel-

[34]Buckley and Roberts, *European Direct Investment*, p. 58. Lewis, *America's Stake*, p. 91.

[35]Lewis, *America's Stake*, p. 91.

opment calls totaled $50.3 million, and over $21.1 million was transferred in 1890 alone. The western flavor of those investments is captured in the names of the firms that turned to the London market. The list includes the Arizona Trust and Mortgage, Cedar Valley Land, Iowa Land, Missouri Land and Live Stock, Nevada Land and Cattle, Oregon Mortgage, Scottish Mortgage and Land Investment of New Mexico, London and North-West American Mortgage, San Antonio Land, San Jacinto Estate, South Minnesota Land Company, Texas Land and Cattle, Texas Land and Mortgage, Trust and Mortgage of Iowa, and Western Mortgage and Investment.[36]

Western mines and financial land and development companies came early to the attention of the British investor; however, the lure of agricultural profits were muted in the 60's and 70's and did not become important until the next decade (Table 3.5, Figure 3.8). Although firms like the Anglo American Oyster Company did receive small infusions in the 70's, the only important transfer was the result of an 1874 call for $250,000 by the South Carolina Rice Plantation and Trust. Over the entire period, however, despite the fact that Agricultural calls were zero in twenty-five of the forty nine years, financial

[36]A recent study of foreign investment in Nebraska indicates that in 1890 four Scottish, twelve English, and seven American firms had channeled at least $ 3,419,475 in foreign investment into Nebraska farm mortgages. That figure translates into about 3.8 percent of all farm loans in force in that state. Parallel studies suggest that the comparable figures were 3.7 percent in Minnesota, 9.6 percent in North Dakota and 14.5 percent in South Dakota, 1 percent in Iowa and 2 percent in Kansas. Larry A. McFarlane, "British Investment and the Land: Nebraska 1877-1946," *Business History Review*, Vol LVII (Summer 1983), pp. 258-292. The figures for Iowa, Kansas, Minnesota and the Dakotas are from Larry A. McFarlane, "British Investment in Minnesota Farm Mortgages and Land, 1875-1900," (unpublished mss); "British Agricultural Investment in the Dakotas, 1877-1953," and "British Investment in Midwestern Farm Mortgages and Land, Iowa and Kansas," both in Paul Uselding (ed), *Business and Economic History*, (Urbana, IL: Univ. of Illinois Press, 1976), pp. 112-126 and 196-198.

transfers to those enterprises totaled $30.9 million, or about $619,000 a year. While accounting for far less than one-percent of all transfers in the years 1865 through 1881 and 1899 through 1914, they amounted to more than two percent in the seventeen years 1882-1898.

Thus the $30.9 million figure turns, in large measure, on the industry's growth in the 1880's. A flotation of the Anglo-American Cattle Company in 1879 marks the beginning of the British investors' flirtation with western cattle ranching. It was 1880, however, before it was possible to speak of a significant shift in British finance toward that industry. Total calls exceeded $1.9 million in 1882, $4.7 million in 1883, and $2.2 million the following year. The first experiments were moderately successful, but falling cattle prices, severe weather, and outbreaks of disease spelled disaster in the middle years of the decade (calls averaged less than $400 thousand a year between 1885 and 1887).

Some firms survived. For example, the oldest of the "class of 1880," the Prairie Cattle Company, paid dividends of 20.5 percent in 1883 and, while barely struggling through the disastrous 80's, proved to be a very profitable investment in the years before World War I. The firm continued to operate until 1915 when it sold its assets at a substantial profit. During its thirty-five years of life, the Prairie Cattle Company drew on the London market for $4.7 million, but a shareholder who had participated in the initial offering and held on until the end could feel satisfied with his choice of investments. Overall, however, the most successful single cattle ranching enterprise was almost certainly the Matador Land and Cattle Company. That firm posted substantial profits early; and, although unprofitable during the depression of

the mid-80's, it survived and proved extremely profitable in the years after 1910. While its profits suffered again during the depression of the 1930's, the Matador became a virtual bonanza in the 1940's; and when, in 1951, it was sold to a group of New York investment bankers, it brought thirty times the value of the initial investment. The Swan Land and Cattle Company, on the other hand, despite the more than $9.0 million in British finance, barely struggled on until it was sold to American investors in the 1920's.[37]

The picture for the remaining cattle ranching firms is less rosy. It is estimated that the loss to British investors between 1884 and 1900 was more than $18 million.[38] As a result, agricultural calls after 1890 were fewer in total and in volume. The few surviving cattle companies aside, finance went to lumber companies (for example, the Arkansas Timber and Cotton, Columbia River Lumber, and the United States Lumber and Cotton) and firms developing agricultural properties in California and Florida (The Riverside Orange Company, Ltd., for example). The United States Lumber and Cotton Company, a firm with a pre-World War I balance sheet that reported £3,457,900 in capital stock, raised a total of $2.8 million on the London market in 1909 and 1910; and the firm survived through the 1920s.[39]

The chemical and petroleum group of the Agricultural and Extractive sector received a total of $22.7 million, or about $455,000 a year. Those transfers were, however, almost all concentrated in the twentieth century

[37]The history of British investment in the American range is drawn from Jackson, *The Enterprising Scot*, pp. 73-100, 114-138; Buckley and Roberts, *European Direct Investment*, pp. 59-63; and Lewis, *America's Stake*, pp. 87-88.

[38]Jackson, *The Enterprising Scot*, p. 137.

[39]Buckley and Roberts, *European Direct Investment*, p. 60.

(Table 3.5, Figure 3.9). Although there was a single call for $110,000 to a rock asphalt firm in 1871 and calls totaling almost $400,000 in 1886, 1887, and 1891 to firms like Colorado Nitrate, Natural Portland Cement, and Old Swan Borax, there were no other transfers in the nineteenth century. Between 1900 and 1914, however, the industry attracted more than one percent of all finance. There were peaks of more than $5.5 million in 1904, and again in 1910 ($5.5 million). Those twentieth century transfers were dominated by oil companies, particularly those located in California. Recipients included California Oilfields, Pacific Oilfields, the Anglo-California Oil Syndicate, the Kern River Oilfields of California, the Santa Maria Oilfields of California, California Amalgamated Oil, Santa Barbara (California) Oil, and the Consolidated Oil Fields of California. California firms, however, were not the only recipients; there were also flotations by the Kansas-Oklahoma Oil and Refinery Company, Oklahoma Oil, Texas Oilfields, and the Tulsa Oil Company. Outside of petroleum, there were issues of the Virginia-Carolina Chemical, and the American Cyanamid Company.

Some facts about the initial proponents of some of these ventures are known. The British investors Balfour, Williamson, and Company launched the California Oilfields Ltd. with initial capital of more than $1 million in 1901; and, with some aid from the Dutch, that enterprise was followed by Texas Oilfields Ltd. the same year, by Pacific Oilfields in 1907, by the Oklahoma Oil Company and Kern River Oilfields in 1910, the Santa Maria Oilfields (a $5.8 million enterprise) in 1911, and the Kansas, Oklahoma Oil

and Refining Company in 1912.[40]

Given the pattern of urban growth in the United States, American Public Utilities received less British financial support than one might have expected. Overall, firms producing gas and electricity, telephone and telegraph, urban public transport services, and purified water for public consumption received $207.4 million, or about $4.1 million a year. That figure amounts to about 1.5 percent of all finance, but eighty percent of the sector's receipts were concentrated in the years 1898-1914 when the industry accounted for more than eight percent of the total (Table 3.6, Figure 3.10).

There was an early surge of telegraph finance in the first quinquennium that culminated in transfers of almost $9.0 million in the four years 1865 through 1868. A second wave, divided in the ratio of about one to three between gas and light and telephone and telegraph companies, peaked at $8.8 million in 1875. The former industry underwrote a flow that crested at $8.7 million in 1889, but that year was an exception. Finally, however, the year 1907 and those from 1909 onward witnessed the highest volume of Public Utility calls observed at any time between 1865 and 1913. The figures for the years 1909 through 1913 were $11.4, $11.9, $5.6, $17.7, and $42.7 million respectively. The largest issues were made by telephone companies (particularly AT&T and New York Telephone) and by firms providing electricity to American cities. On the whole, however, while there were public utility shares traded on both the New York and on the London exchanges, they did not represent a significant fraction on either.

[40]Lewis, *America's Stake*, pp. 94-98. Wilkins, *Foreign Investment*, pp. 285-292.

Of all of the six sectors, Finance benefited the least from the British financial network. The one and a half percent of London calls that were directed toward the Financial sector were received by a handful of commercial banks, a few insurance companies, and an assortment of trust companies; however, it was the last named industry, that received the bulk of the sector's finance. Calls by Finance firms aggregated $79.2 million, or about $1.6 million a year. The movements were cyclical, mirroring closely the patterns displayed by the other sectors, although the peaks in the 70's and in the early twentieth century are less pronounced while those in the 1880's and 90's are more so (Table 3.7, Figure 3.11). In 1873 Financial calls reached $4.9 million. There were, however, no calls in five of the six years between 1874 and 1880, but 1882 saw more than $10.0 million channeled into the sector; and the flow averaged almost $3.2 million a year for that decade. Subsequently, either British demand had shifted or the American markets for these securities had improved. At its subsequent peak (in 1890) the total reached only $7.6 million, and the 1911 peak was a mere $2.3 million.

Of the three industries that constitute the Financial sector, neither the commercial banks nor the insurance companies were important. Over the entire period, only nine commercial banks drew funds from the London market, there were no calls in thirty-nine of the forty-nine years and none in the present century. Of the nine, five (the British and California, the Anglo-Californian, the London Bank of Oregon, the London Bank of Utah, and the London and San Francisco Bank) were located in the West. There were even fewer (three) calls by insurance companies; and they, like the 1881 call for $243,500 by the Scottish-American Accident Insurance, were relatively

small. On the other hand, the finance that went to trusts that specialized in American investments was not trivial. Altogether the trusts received $73 million (almost $1.5 million a year).

3.4 American Issues Traded on the London vs. New York Exchange

In light of the significant flows from London it is natural to examine the state of the domestic American capital market during this period. Although the domestic market was gradually maturing, the process was slow; and, certain sectors were unable to attract sufficient finance from domestic sources. American securities listings on the London Stock Exchange are compared with those listed on the premier domestic securities market – the New York Stock Exchange. Table 3.8 reports the number of American firms whose stocks were traded on the New York Stock Exchange and the number that were traded on the London exchange in 1870, 1880, 1890, 1900, and 1910.[41]

[41]The listings of American firms on the London exchange come from the end of year report of the *Investor's Monthly Manual*; the New York issues are those reported in the *New York Times*. Though the *Investor's Monthly Manual* listings are comprehensive for both stocks and bonds, the *New York Times* information on stock listings is far more comprehensive than its bond information. The heading for the 1870 non – railroad stock issues in the *New York Times* read, "Closing Quotations for the City Bank Stocks and Miscellaneous Shares." Railroad listings for 1870 were found under the heading, "Closing quotations – Dec. 31." Sampling additional days in the last week of December yielded no additional stock issues. The 1880 stock issues were found under the heading, "The following table shows the highest and lowest prices of stocks during the past year." As an indication of the level of market activity in stock issues, of the 105 issues identified in 1880, all but six were traded during the last week of December, 1880. We rely on this 1880 trade activity result in constructing the 1890 sample as the 1890 issues were under the heading, "The following table shows the range in prices of stocks during the past week and furnishes a comparison with the closing figures of the corresponding week a year ago."

There are no sampling problems associated with the 1900 stock issues as they were found under the heading, "New York Stock Exchange, Complete Transactions in Stocks for the Year 1900." The 1910 stock issues were found under two headings. The first was simply, "The New York Stock Exchange – Saturday," which listed issues which were traded on December 31, 1910, while the remainder were found under the heading, "Closing quotations for Government bonds and stocks in which there were no transactions."

Due to the thin trading in many NYSE bond issues, using daily bond price data from the *New York Times* to construct a similar sample may produce misleading comparisons. Although a complete listing of bond issues traded on the NYSE in 1900 has been found, and we have also constructed a sample for 1870 using daily price data from the full month of December, comparisons of LSE and NYSE American stock issues may be more likely to yield an accurate picture of London's contribution to portfolio investment in the United States than are bond comparisons, at least for the years 1880, 1890, and 1910. As a result, the bond issues will be used mainly as a means of corroborating conclusions drawn on the basis of the stock issues.[42]

Among the American stocks listed in London in 1870, there were six railroads, two mining firms (the Colorado Terrible Load and the Eberhardt & Aurora), and one telegraph. The twenty-seven stocks listed in New York included eleven rails, and included among the sixteen issues of thirteen other firms were the Delaware and Hudson Canal, two coal and one quicksilver mine (the American and Pennsylvania Coal Companies and Quicksilver Mining), four express companies (Adams, American, Wells-Fargo, and U.S.), Western Union, the Boston Water Power Company, and the Pacific Mail steamship

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In sum, though the *New York Times* information on stock issues is not consistent across years, evidence indicates that a relatively complete listing was arrived at for each of the years 1870, 1880, 1890, 1900, and 1910.

[42]The bond issue samples were drawn from two or three days during the last week in December for each of the years in question, although, in one case the first week of the subsequent year was employed. Whereas the overlap in stock issue listings was nearly perfect from day to day, or at least from week to week, the overlap in bond listings is far from perfect. For example, the 12/31/09 listings include 111 issues. Sampling an additional day, 12/30/09, yields 89 new bond issues. This variability in day to day listings inspires doubts about using the bond issues to draw conclusions about London's contribution to foreign investment in the U.S.

line.[43] Only a single stock issue, the $100 shares of the New York Central Railroad, was traded on both exchanges.

The increase in American stock listings from 1870 to 1880 suggests rapid American economic expansion – an expansion that involved major shifts in both the geographic and the industrial structures of the economy – and it is obvious that the financial demands engendered by that expansion were placing a severe strain on the nation's adolescent capital market. The total number of shares listed on the New York exchange nearly quadrupled while American issues on the London exchange more than quintupled. The forty-seven stocks listed on the London exchange included eighteen railroads, still a large percentage of the total U.S. stock listings, but, it was the non–railroad listings that increased most rapidly. In 1870 only three non–railroad firms were listed in London; the 1880 listings include one canal company, two telegraph companies (Anglo–American Telegraph and Direct U.S. Cable), two banks (the Anglo–Californian and the London and San Francisco), four investment trusts, one wagon and railway carriage company (United States Rolling Stock), and eight mines.

Although the 1880 listings on the New York exchange indicate some institutional response to the increased demand for finance in the non-railroad sectors, nearly three-fourths of the companies listed were railroads. The number of non-railroad listings nearly doubled between 1870 and 1880, but New York's appetite for railroad shares was even more voracious – the number of

[43]The other two firms were the Mariposa Company and the Canton Co. of Baltimore. Note that New York City Bank Stocks are not included in Table 3.8 because their listings were only available for 1870 and 1890. In the interest of consistency, and for the sake of comparison across years, the bank listings were eliminated.

listings increased from eleven to seventy-two. While the New York rail total had been twice that of London, it was now four times as large. Clearly, although much of the expansion of the New York exchange can be traced to an increasing focus on railroad securities (their share of a much increased total increased from forty to seventy percent), the number of non-railroad shares also increased. In 1880 the list included telephone and telegraph companies, mines, express companies, a water and power company, and a canal. In 1870 those New York listings outnumbered their London counterparts by more than five to one. A decade later, although the New York list had risen from sixteen to thirty-one, there were no fewer than twenty-nine such listings on the British exchange.

In 1890 the number of American stock issues listed in New York was greater than the number listed in London; however, if the focus of attention is turned to the non-railroad sector, the London market was servicing almost two and a half times the number of enterprises supported by the New York exchange. While railroads still accounted for one-third of the American issues on the London market, the listings included seventy-two American firms drawn from at least nine different industries. There were two gas and waterworks, two iron, coal, and steel firms, four telephone and telegraph companies, seven land and building enterprises, seventeen land, mortgage and financial firms, four trusts, one wagon and railway carriage company, three mines, and eleven breweries. In addition there were nine other enterprises including Borax Ltd., the Chicago and Northwestern Granaries, Eastman's, J.&P. Coats, and the Pillsbury–Washburn Flour Mills. Over the previous two decades, the number of American equity issues traded on the

New York exchange more than tripled; over the same period, however, the number traded on the London exchange increased twelve fold. The financial demands required to support the rapid pace of economic growth was clearly straining the newer nation's domestic financial network.

The degree of that strain is reflected in a comparison of the proportion of non-railroad American equity issues listed on the two exchanges (see Table 3.9). In 1870, the proportion tilted heavily toward non-rail issues on the New York exchange (.59) but not on the London market (.33). A decade later the results were very different. As the demand for finance for new industries – industries often located in the South and West – grew, the British reacted quickly, the New York Stock Exchange much more slowly. The proportion of non-rails had increased by half, while the fraction in New York had declined to one-half its former level. Nor was the trend reversed over the next decade. The British figure continued to increase (to two-thirds of the total), but the American total continued to decline (to one in four).

In fact, despite the overall expansion of the New York exchange, the number of non-railroad issues traded declined slightly between 1880 and 1890. The twenty-nine issues that were listed included those of six firms that had been listed two decades previously (the Delaware and Hudson Canal, Adams Express, the United States Express, Pacific Mail, Quicksilver Mining, and Western Union) and an additional seven issues by five companies *The Times* referred to as "unlisted but traded." That latter group included three issues of the American Cotton Oil Company, three of the Sugar Refineries Trust, and one of the Distillers and Cattle Feeders Trust. The list of express companies now included the Atlanta and that of the iron, coal and steel firms

contained the Colorado Coal, Iron, and Steel, the Colorado and Hocking Coal, and the Tennessee Coal and Iron Companies. The shares of four gas companies (the Chicago, Consol, Consolidated, and Laclede) were listed as were nine miscellaneous firms – a list that included Edison–General Electric, the National Lead Trust, the National Linseed Oil Company, and the Pullman Palace Car Company.

Of the thirty-six U.S. railway stocks listed on the London exchange in 1890, twenty-one were also listed in New York; however, the only shares of "non-railroad" firms traded on both exchanges were those of the Delaware and Hudson Canal. Even if railroads are included in the enumeration, such jointly traded issues were rare (see Table 3.10). There was almost no overlap between the two exchanges in 1870; and, while the fraction of jointly traded issues increased through the turn of the century, it never exceeded one in nine. A similar lack of overlap is found in a study of bond issues traded on the two exchanges. In 1900, for example, only ten percent of the total was traded on both markets. Though the data provide some evidence of increasing market integration, it remains clear that the London market supplied capital to firms still incapable of attracting finance on the New York exchange.

By 1900, however, the New York market had begun to respond to the"non-railroad" demands of American enterprise. Over the last decade of the nineteenth century, total American issues on the London exchange increased by about twenty-five percent, but the share of "non-rail" enterprises actually declined slightly. On the other side of the ocean, the number of listings on the New York Stock Exchange rose by more than 130 percent; and the proportion of "non-rail" issues almost doubled. The New York trend

away from rails continued – albeit more slowly – over the first decade of the present century; and, in that latter year, for the first time since 1870, rails made up less than one half of the total stock listings. The American market was maturing rapidly.

The 1900 "non-rail" enumeration for London had an eclectic flair. The list included ten breweries, nineteen land, mortgage, and investment companies, two telephone and telegraph companies, seven investment trusts, an equal number of mines, two banks, and ten firms listed under, "other companies," –including American Thread, Cassell & Co., Fraser & Chalmers, Kodak, Redfern, and Spratt's Patent, in addition to the previously listed Borax Ltd., J.&P. Coats, Eastman's, and the Pillsbury–Washburn Flour Mills.

The extent to which the New York Stock Exchange had emerged as a conduit for capital to the previously neglected sectors of the American economy is captured in an enumeration of the 1900 listings beginning with the word "American." The list includes American Beet Sugar, American Car and Foundry, American Coal, American Cotton Oil, American District Telegraph, American Express, American Ice, American Linseed, American Malting, American Smelting and Refining, American Spirits Manufacturing, American Steel Hoop, American Telegraph and Cable, American Tin Plate, American Tobacco, and, finally, American Woolen.

By 1910 the NYSE was certainly teen–aged, if not, adult. While London listed one hundred thirty-three American stock issues (ninety-one "non-rails"), three hundred and six were traded on Wall Street; and, of that number, one hundred sixty were from sectors other than rails. American commercial and industrial firms, breweries, iron, coal, and steel firms, investment

trusts, and land, mortgage, and financial firms, however, were still listed in London, but such firms also appeared on the New York exchange. Despite the obvious movement toward maturity, however, the same firms were seldom listed on both exchanges. What joint listings there were, were dominated by rails; the only "non-rail" equity issues listed on both exchanges were of the United States Steel Company, A.T.&T., Anaconda, and Amalgamated Copper.

One addition to the New York listings might have provided a glimpse of the future for those readers with foresight. The 1910 list included a British firm – the Underground Electric Railways of London. On the Big Board it joined the shares of the Canadian Pacific Railroad, the Cuban-American Sugar Company, and the Northern Railways of Mexico. In that year the Board also listed bonds issued by the governments of Argentina, Japan, and Panama. Wall Street had begun to dip its toes into the waters of international finance.

Moreover, as far as domestic finance was concerned, the New York list began to resemble the lists we know today. The one hundred sixty "non-rail" listings ranged alphabetically from Allis Chalmers to Western Union. It included some old friends – although Adams Express, the Delaware and Hudson Canal, and Quicksilver Mining had disappeared, both the Pacific Mail and Western Union remained from the 1870 close. From the 1890 roster, American Cotton Oil was now formally listed, and Colorado and Hocking Coal and Iron, Consolidated Gas, Distiller's and Cattle Feeder's Trust (now Distiller's Securities), General Electric, Laclede Gas, National Lead, North American, Chicago Gas (now People's Gas), and the Pullman Palace Car

Co. (now simply the Pullman Company) remained. In addition, since 1890 the exchange had expanded to include the offerings of a set of firms that are still household names today – Allis Chalmers, American Tobacco, Bethlehem Steel, International Harvester, National Biscuit, Republic Steel, Sears Roebuck, United States Rubber and United States Steel. The New York Stock Exchange was becoming a truly national domestic capital market.

Although the data on bond listings is probably less reliable, they too confirm the pre-war trends apparent in the equity market.[44] While both the London and New York exchanges responded to demands for finance originating in the rail and federal, state, and local U.S. governments the London exchange responded more quickly than its New York counterpart to the demands of the other sectors of the economy (See Tables 3.11 and 3.12). In contrast to the stock issues, however, the majority of bond issues were railroad issues regardless of the year or the exchange under consideration.[45] In

[44]For example, the decrease in total bonds listed on the NYSE from 267 in 1880 to only 170 in 1890, is an obvious error, and is likely the product of sampling bias. It is likely that there was a more active market for many bonds at year end 1880 as opposed to year end 1890.

[45]That bond listings so heavily favored railroads throughout the period on the NYSE may be the result of sampling bias. That is, it is possible that the markets in railroad bond issues were more active than those in non-railroad issues. Yet, the complete listings for 1900, indicate that, if anything, railroad bonds were slightly more thinly traded than other bond issues. Of the one hundred sixty-three bond issues identified through sampling, one hundred thirty or eighty percent of them were railroad issues, whereas, of the five hundred ninety total bond issues traded on the New York market in 1900, five hundred and five (86 percent) were railroad issues (see Table 3.12.)[46] Sampling financial data for the entire month of December, 1870 as opposed to sampling during only one week reverses this conclusion, but not dramatically. The average federal bond issue traded on sixty-three percent of the December trading days, while the same figure for state bonds was seventy percent and that for railroad bonds was seventy-four percent. Of the one hundred twenty-two bond issues identified through one week of sampling in 1870, fifty-eight percent of them were railroad issues; of the issues identified by sampling a whole month of financial

any event, as with the equity issues, it appears that it was the turn of the century before New York began to list substantial numbers of "non-rail" offerings.

data, fifty-seven percent were railroad issues. It seems safe to conclude that the sampling techniques employed did not overstate the importance of railroad issues in the NYSE bond markets.

3.5 Returns on American Shares Listed on the London Exchange

One simple explanation for the listings discrepancies in American issues between the London and New York exchanges could have been that western issues from small new firms in emerging industries were riskier than securities from more traditional sectors of the U.S. economy (i.e., government and rails), and thus were too risky for typical American investors. As discussed in Chapter One, Knight's distinction between risk versus uncertainty must be borne in mind: risky ventures are those whose expected are (1) commonly known to all potential investors, and (2) characterized by distributions with high variances. Uncertainty arises when these distributions of expected returns are unknown. In this section, data for American firms' shares traded on the London and New York exchanges provides the actual returns distributions; and, assuming investors had rational expectations, discrepancies in the distributions could help explain the listings on the two exchanges.

Price data from the *Investors Monthly Manual* was used to construct two ten-year samples of returns on the common stock of American railroads, land, mortgage, and financial firms (hereafter referred to as LMF firms), and mines traded on the London market for two periods, 1880-1889 and 1900-1909. Although the LMF and mine samples constitute the full list of American firms in London for 1880 and 1900 respectively, the railroads sample contains only those common stock issues traded on both the London and New York

exchanges.[47] Because the New York Stock Exchange carefully vetted its potential listings, consciously avoiding potentially volatile securities, jointly listed rails – shares that had successfully withstood this scrutiny – were likely to exhibit different returns characteristics than those from land-mortgage-finance firms or mines.[48]

Table 3.13 furnishes comparisons between the three industries. The least surprising finding indicates that railroad issues required more capital from London than did LMF or mine issues. Whether the measure is the capital subscribed to the common stock issue ("Subscribed"), or the total London capitalization of the firm ("Total Capital"), railroads drew far more capital than LMF firms and the latter, in turn, drew somewhat more than mines in

[47]The 1880-89 sample includes five railroads – the Illinois Central, New York, Lake Erie, & Western, Ohio & Mississippi, Philadelphia & Reading, and the Union Pacific. Also included are five LMF firms – British American Land, American Mortgage of Scotland, Colorado Mortgage and Investment of London, Scottish American Investment, Scottish American Mortgage – and seven mining operations including La Plata Mining Co. of New York, Colorado United, Limited, Eberhardt & Aurora, Limited, Flagstaff Silver, Ruby & Dunderberg Consol., Lim., Sierra Buttes Gold, Limited, Plumas Eureka, and Richmond Consolidated Mining. Both the Eberhardt & Aurora and Flagstaff Silver do not last the entire period in the London listings.

The 1900-09 sample include the following railroads: the Atchison, Topeka & Santa Fe, Baltimore & Ohio, Chesapeake & Ohio, Chicago Great Western, Cleveland & Pittsburgh, Denver & Rio Grande, Erie, Illinois Central, Kansas City Southern, Mexican Central, the Missouri, Kansas, & Texas, N.Y. Central & Hudson River, the New York, Ontario, & Western, Norfolk and Western, Northern Pacific, Pennsylvania, Reading, the Pittsburgh, Fort Wayne & Chicago, Southern Pacific, Union Pacific, Wabash, and, finally, the Wheeling & Lake Erie. Among the LMF firms were the British America Corporation, British & American Mortgage, Canadian and American Mortgage and Trust, Edinburgh American Land, Investors Mortgage Security, Matador Land and Cattle, Missouri Land and Livestock, Pacific Loan and Investment, Prarie Cattle, Scottish American Investment, Scottish American Mortgage, Swan Land and Cattle, Texas Land and Cattle, Texas Land and Mortgage, U.S. Debenture Corporation, U.S. Investment Corporation, and Western Ranches. The 1900's mines sample includes Arizona Copper, Alaska Goldfields, De Lamar, Montana, Ltd., Mountain Copper, and Utah Consolidated.

[48]See Chapter 4 for more details on the New York Stock Exchange vetting procedures

both the 1880's and 1900's.

The capital structures of the railroads as opposed to those of LMF firms and mines point to further differences between New York and London issues. For the most part, the LMF firms and the mines had trivial capital structures – structures consisting solely of their respective issues of ordinary stock. Individual railroads, on the other hand, listed a variety of both debt and equity issues on the London exchange. As an indication of the complexity of railroad capital structures relative to LMF/mining capital structures, consider the percentage of the total capital structure that is senior to (that is, paid off first in the event that the issuing firm defaults) the common stock issue for each of the three firm types ("Senior Oblig."in Table 3.13). For the 1880's sample only the railroads showed any sign of non-trivial capital structure – 31.5% of the capital of the average rail was senior to its common stock issue. The corresponding figure for LMF firms was only one percent while none of the mines had any senior obligations. By the 1900's all three industries had moved toward more complex capital structures, though rails at fifty-four percent senior obligations, still clearly outdistanced LMF firms at twenty-eight and mines at nineteen.

To compare the relative price volatility of the three types of issues, we created a simple volatility measure:

$$volatility = \frac{Year\ High\ Price - Year\ Low\ Price}{(Year\ High\ Price + Year\ Low\ Price)/2} \tag{3.1}$$

The results in Table 3.13 suggest that, at least according to this measure, for the 1880's mine prices were over twice as volatile as rail prices, and rails were

somewhat more volatile than LMF prices. In the 1900's, however, mines and rails were equally volatile, although both were less volatile (much less in the case of mines) than they had been in the 1880's. LMF firms remained the least volatile, but they too were much less volatile than they had been two decades before.

The most significant comparison almost certainly involves the level of returns. The data in Table 3.13 indicate clearly that in each of the sectors returns in the second period were much higher than they had been in the 1880's.[49] The average return on mine issues was actually slightly negative for the 1880's, while that for railroads was positive, but quite small. Conversely, the LMF firms had relatively high expected returns in both periods. The overall picture one gets from looking simply at average returns and volatilities suggests that LMF firms earned high returns with relatively less price volatility, and, in that sense, they were less risky than both rails and, especially, mines.

Further support for the notion that LMF securities were relatively safe, stable investments as compared with rails and mines, particularly in the 1880's, can be found in an examination of the variances of the returns in

[49]The *Investor's Monthly Manual* provides two separate data sources on dividends. The first simply gives the amount, either in nominal or percentage terms, of the last four dividends paid and their payment date. The second gives the average percentage of the year's close price represented by the last two dividend payments. In years when the number of dividend payments are unequal to two, the second method yields only approximate dividends. Unfortunately, not all issues report dividends in the first manner, and we therefore are forced to rely somewhat on the approximate dividends measure. Resulting returns computed using either method contain only slight discrepancies. Moreover, the conclusions reached in this section are unaltered regardless of which dividend measure is used.

each of the three sectors (Table 3.14 reports means and standard deviations). In the 1880's mines exhibited the lowest expected return coupled with the highest standard deviation – hardly a winning combination – however, rails exhibited only a slightly better mean–standard deviation profile than mines. LMF firms were characterized by the highest mean returns and the smallest standard deviation. By the first decade of the twentieth century the situation had changed somewhat: railroads and LMF firms exhibited similar mean-variance profiles; and mines continued to earn the least while sustaining the highest return variance. The jointly listed issues, that is, the railroads, which were expected to exhibit less return variance and price volatility than the pure London issues (LMF firms and mines), actually exhibited more than the LMF firms in the 1880's and comparable variability in the 1900's.

Of course, average returns and mean standard deviations may be statistical flukes, driven heavily by outliers. Figure 3.12, therefore, displays the mean return and standard deviation for individual issues in the 1880's sample. Fortunately, the results from the average industry returns are borne out here as well. Mines had higher return standard deviations than rails; rails, in turn, had higher standard deviations than LMF firms. Not only did LMF firms have the lowest return variances, they generally had higher expected returns. In fact, that most striking feature of Figure 3.12 is that, for a given expected return level, it appears, roughly, that mines had higher standard deviations than rails or LMF firms, causing one to wonder why investors would ever have held mine shares. The answer, presumably, is that, depending on the way mine returns covaried with returns on other issues, they may have contributed to minimizing overall portfolio variance.

Mean-standard deviation results for the 1900's sample largely confirm the results for the earlier sample (See Figure 3.13). Again, LMF firms and rails typically had lower standard deviations and higher expected returns than mines. Also, it still appears that, for a given expected return level, mines sustained higher return deviations than either LMF firms or railroads. The two samples do, however, differ in one respect – whereas in the 1880's sample rails generally had a somewhat higher standard deviation than LMF firms, this distinction is less pronounced in the later sample. Again, the firms with the lowest return deviations were LMF firms, although there were still a handful of rails that challenged them. On the whole, though, the mean-standard deviation profiles of individual rails and LMF firms were similar enough to prevent making any obvious distinctions between the two industries. Yet, for the LMF firms to have performed on a par with the rails still confounds original expectations. It was expected that the share prices of these small firms located in the West would fluctuate wildly relative to those for rails listed on the New York market. Instead, the returns evidence suggests LMF firms were far more stable than rails in the 1880's, and still slightly more stable twenty years later.

A portrait of volatile mine shares, stable LMF shares, and middling rail shares persists not only across the issues from each industry, but also throughout the time series spanned by each of the two samples. A breakdown of the yearly volatility rankings of the issues in the 1880's sample appears in Table 3.15. The firms were ranked by their average volatility from least volatile to most volatile over the ten year period. The originating industry of the stock issue is indicated in the second column – L for LMF firm, M for mine,

or R for rail – and quartile volatility rankings appear for each year, with 1 signifying least volatile quartile, and 4 the most.[50]

Of the five LMF issues in the 1880's sample, none was ranked lower than seventh in the average volatility rankings. Conversely, of the eight mines in the sample none was ranked higher than eleventh. With the exception of the Illinois Central (traditionally a stable issue, and long a favorite of British and continental investors), the rails tended toward the middle of the rankings.[51] These results further confirm the mean/standard deviation results.

Even within an industry it is difficult to determine whether western shares were volatile relative to other issues. Although Colorado Mortgage and Investment of London was the lowest ranked (most volatile) LMF firm, it is difficult to draw definitive conclusions about LMF firms because the names of the other issues reveal little as to their location and no listings of the assets of these firms has been found. Rails are just as confusing. The two western most – the Union Pacific and the Ohio and Mississippi – were the third and fourth ranked of the six issues from that industry. Surprisingly, eastern rails, namely the New York, Lake Erie, and Western and the Philadelphia and Reading, were the two bottom ranked shares in the industry. Regional comparisons for mines are more difficult because most operated in the West, or, at least, not in the East. Although the Eberhardt and the Eberhardt and Aurora, two mining operations located in Nevada, were ranked among the bottom three issues overall, the Ruby and Dunderberg – located in Min-

[50]Note that for the 1880's sample the Delaware and Hudson Canal was included with the rails because it was a transportation issue.

[51]See Lewis, *America's Stake*, pp. 36-45 on the history of foreign interest in the Illinois Central.

nesota – was ranked between them, and the issue ranked fourth from the bottom, La Plata Mining of New York, actually operated in Colorado.

The quartile rankings indicate that the overall rankings are no fluke, but were consistent across the decade. With only minor exceptions, the most volatile issues remained in quartiles three and four throughout the decade while the least volatile issues remained in the first two quartiles. Although La Plata Mining of New York moved up to the second quartile in its final year in the sample, its four previous years were spent in the fourth quartile. The Illinois Central, Scottish American Investment, Scottish American Mortgage, and the Delaware and Hudson Canal remained in the upper two quartiles throughout the period. With the exception of 1882, in which the Union Pacific edged its way into the first quartile, it spent the majority of its time bouncing between the second and third quartiles eventually ranking eigth in average volatility among the nineteen issues listed. The clear separation between the three industries in the average volatility rankings and the consistency of the rankings throughout the time period underscore differences between mines, rails, and LMF firms in the 1880's.

The 1900's sample produces similar results (Table 3.16). Although one LMF firm did rank in the bottom half of the forty-one issues listed (Edinburgh American Land at twenty-two), the remaining fifteen ranked within the top twenty. The least volatile firm, Pacific Land and Investment, was not only an LMF firm but also a western issue. Scottish American Investment and Scottish American Mortgage remained from the 1880's sample and had the second and third lowest average volatilities respectively. Joining them in the top ten were newcomers Investors Mortgage Security and Texas Land

and Mortgage, and two cattle companies – Matador Land and Cattle and Western Ranches.

On the other end of the volatility spectrum, each mine share finished in the bottom half of the overall rankings. The least volatile, Arizona Copper, ranked twenty-first, while the most volatile, Alaska Gold, was thirty-eighth. Yet, whereas in the 1880's sample mines occupied all but one of the bottom nine spots in the rankings, rails occupied nine of the last eleven spots in the 1900's. Again, the mines were located primarily in the West making regional comparisons within the industry impossible. Mines, which comprised a little less than half of the total issues in the 1880's sample, comprised less than twelve percent (five of forty-one) of the total issues in the 1900's sample. Conversely, LMF firms and rails proliferated from the 1880's to the 1900's – rails comprised six of nineteen issues in the earlier sample, twenty of forty-one in the latter; LMF firms numbered five in the earlier sample and sixteen in the latter. While railroads like the Union Pacific and the Illinois Central and LMF firms like Scottish American Investment and Scottish American Mortgage appear in both samples, the same cannot be said of any of the mining shares, indicating, perhaps, further lack of stability in the mining industry.

Rails were scattered throughout the 1900's volatility rankings. Three of them, the Illinois Central, the Pennsylvania, and the New York Central and Hudson River, were among the ten least volatile shares in terms of average volatility. Another handful including the Baltimore and Ohio, the Norfolk and Western, and the Southern Pacific finished in the middle of the rankings (from fifteen to twenty-five); the remaining rails fleshed out twelve of the

bottom sixteen spots. Of those rail shares in the top half of the average volatility rankings, all were located outside the West – four in the East, one in the Midwest. However, not all eastern rails shares enjoyed such stability. As in the 1880's rankings, Philadelphia and Reading shares ranked near the bottom; the Erie Railroad finished dead last.

Just as in the earlier sample, shares in the 1900's sample maintained their positions in the quartile volatility rankings year in and year out. Of course, some shares, like those of the Edinburgh American Land Company did bounce around from quartile to quartile, but such shares were rare. More typical was Matador Land and Cattle which ranked in the upper two quartiles in all but one year of the sample (six in the first quartile and three in the second). Highly volatile shares also maintained positions in the bottom of the rankings as evidenced by the Missouri, Kansas, and Texas Railroad, and De Lamar Mining; each ranked in the bottom quartile for over half the decade and finished in the top half but once.

In sum, the quartile rankings demonstrate that the industry volatility profiles hold throughout the time series in both the 1880's and 1900's. Stable LMF shares and volatile mining shares persist, and are consistent not only cross-sectionally but also through time. The LMF firms were not only more stable than mines, but also, all but the most traditional American rails. More importantly, the LMF results demonstrate that initial conjectures regarding the relative riskiness of western issues were incorrect – at least one western industry could offer shares more stable than some eastern American rail shares traded on the New York Stock Exchange.

Consistency in the quartile rankings is valuable because it permits indus-

tries with relatively volatile shares to be readily identified. Having identified volatility distinctions between the three industries, it is possible to glean some insight as to the way returns in each industry covaried with one another, albeit in a less direct fashion than typically employed in financial research.

A standard tool in finance for measuring covariance in returns between an individual share and the market as a whole is the Capital Asset Pricing Model, or CAPM. In the simplest application of the CAPM the following regression is run:

$$return_{it} = rf_t + \beta_i(rm_t - rf_t) \tag{3.2}$$

Here rf is the risk free rate of return in year t, rm is the market rate of return, and β , the coefficient estimated in the regression, roughly measures the responsiveness of firms i's returns to changes in the market rate of return (assuming, of course, little variation in the risk free rate). Although the British consols could provide a reasonable time series for the risk free rate, arriving at a market rate of return is considerably more problematic.[52] As a result, direct application of the CAPM model is impractical for the present data set. Instead, yearly sample mean returns and the yearly return/volatility correlations are used to, hopefully, make the same point that could be made if a market return were calculated.

[52]It would be possible to construct yearly returns for all issues traded in London, though the task would be quite formidable. More importantly, the benefits from such calculations are likely to be minimal, as it is possible to construct an approximate market return by taking average yearly returns from our present samples.

One would expect that, if the CAPM holds, in years when the market rate of return minus the risk free rate of return was positive $(rm_t - rf_t) \geq 0$, more volatile, "high Beta" firms performed better than more stable, "low Beta" issues. Because a market rate of return is impractical to compute for this time period, the average sample rate of return is used as a proxy. In years when the sample average return minus the rate of return on British consols was positive, therefore, volatile shares are expected to have outperformed stable issues. A crude way to check this intuition is to test whether return/volatility correlations were positive when the quantity rm - rf, as measured by our proxies, was positive. Conversely, in market downturns (as represented by years when this quantity is negative),a negative return/volatility correlation is expected as high Beta firms presumably sustained the most damage when the market return declined.

The results of such a calculation for each year in the two samples (Table 3.17) largely confirm expectations. It is striking that, in each year when the mean return was negative, or, alternatively, small enough that the quantity rm - rf was negative, the returns/volatility correlation was negative, throughout both the 1880's and 1900's. On the other hand, when the yearly mean return was positive, the return/volatility correlation was positive, except for 1880 (by far the smallest sample for any year), 1887 and 1889, years in which the mean sample return was quite close to the consol return rate, and 1902, when the return volatility correlation was only slightly negative. Given these results and the previous results on volatilities it seems safe to conclude that the mines probably had higher Betas than the jointly listed railroads. The LMF firms, however, make it impossible to conclude that all

American firms listed on the LSE were high Beta firms relative to American rails listed jointly on the LSE and NYSE.

3.6 Conclusions

While the British contribution to capital formation in the U.S. was never large – at least when compared to domestic capital accumulation – the sums were not trivial, and, more importantly, the flows were targeted for sectors of the economy neglected by the New Stock Exchange. With respect to Zevin's conclusions regarding capital market integration, the lack of listings overlap between the two exchanges suggests one way in which international markets were as yet not well integrated.

Why did America's premier domestic capital market reject securities from smaller ventures often located in the emerging West? The simple answer tested in this chapter – that these issues were too risky for investors using the New York Exchange – is rejected. Certain American securities listed only in London were far less risky than others listed jointly on both the New York and London exchanges. The explanation of this nation's need for British capital, therefore, requires a different approach.

3.7 Figures

Figure 3.1

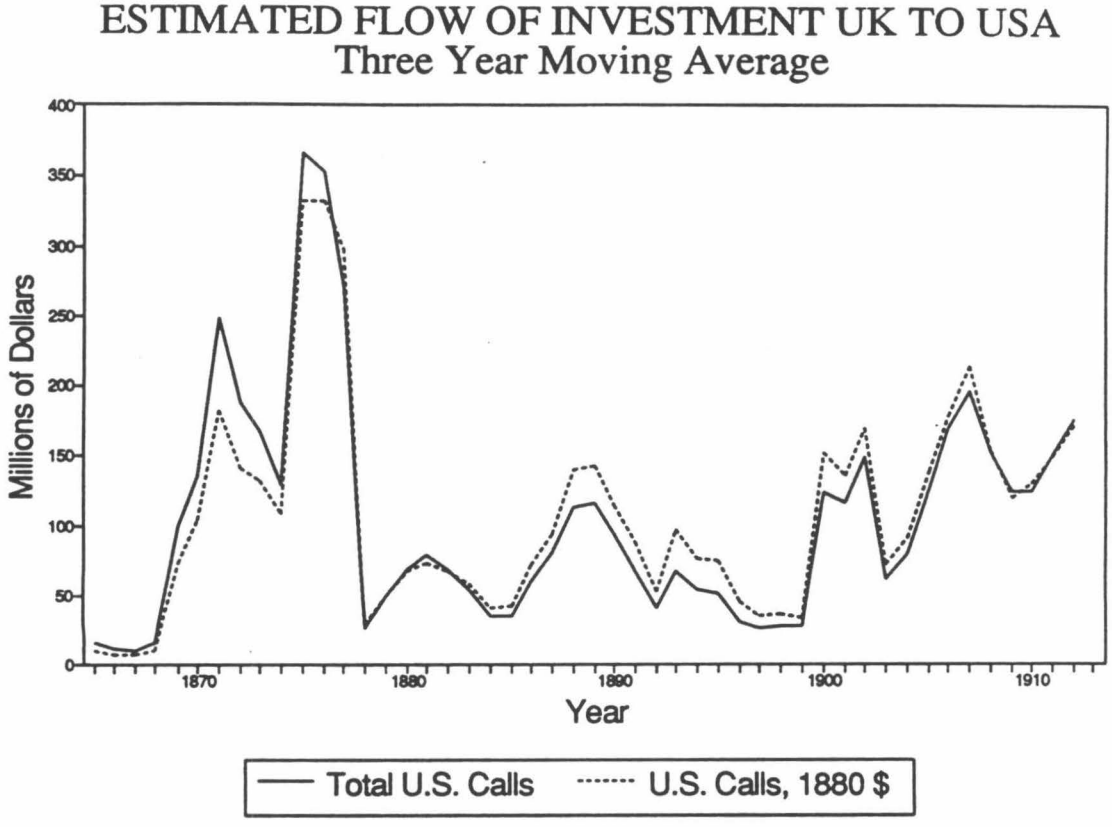


Figure 3.2

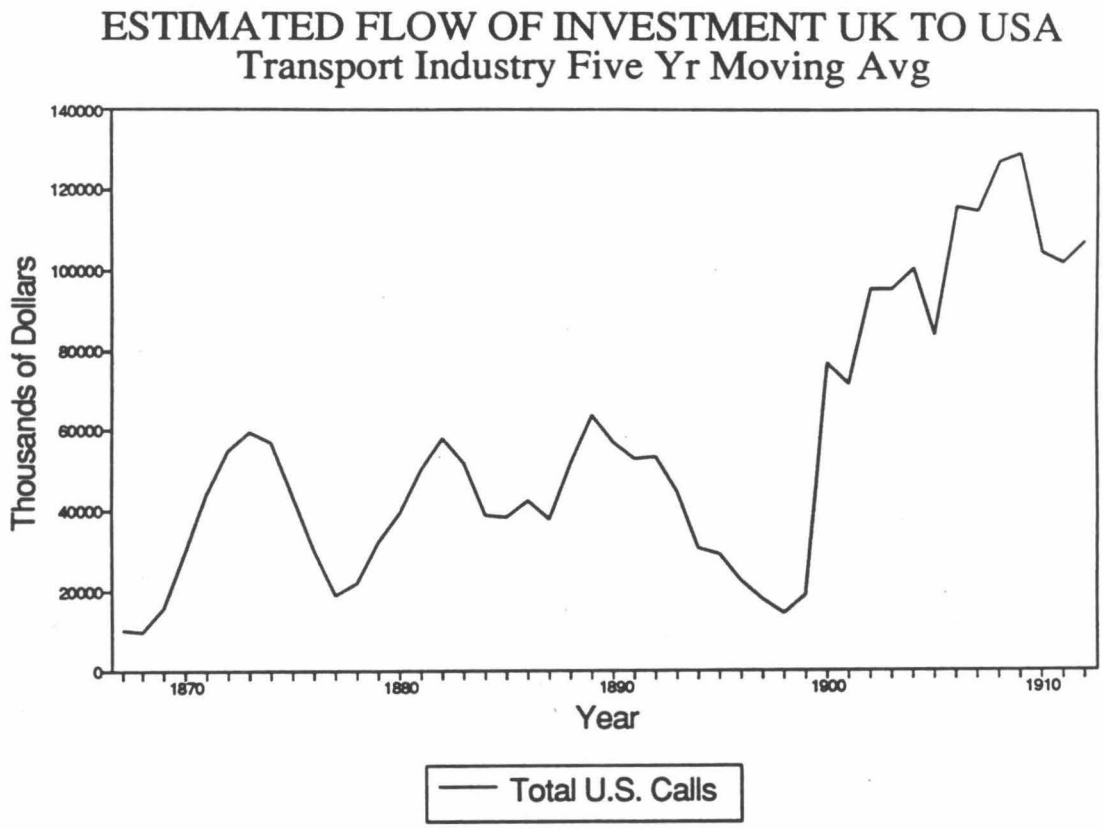

ESTIMATED FLOW OF INVESTMENT UK TO USA
Transport Industry Five Yr Moving Avg
Thousands of Dollars
140000
120000
100000
80000
60000
40000
20000
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.3

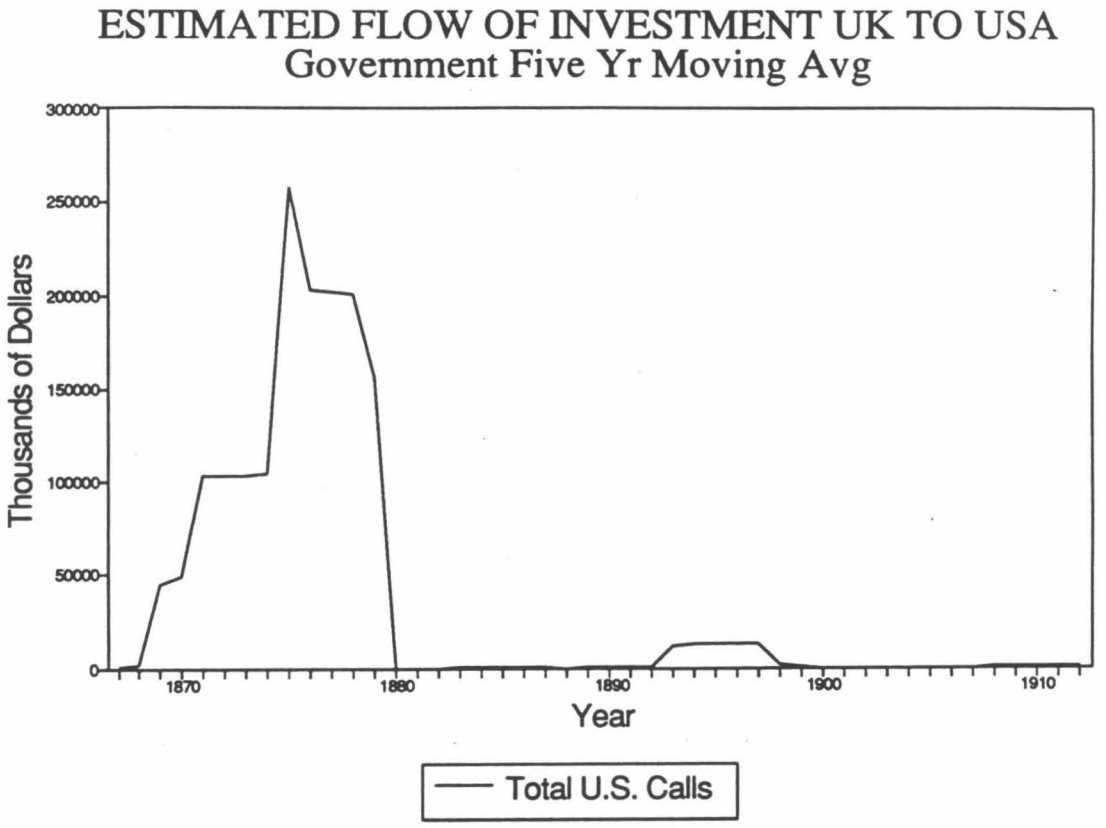

ESTIMATED FLOW OF INVESTMENT UK TO USA
Government Five Yr Moving Avg
Thousands of Dollars
300000
250000
200000
150000
100000
50000
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.4

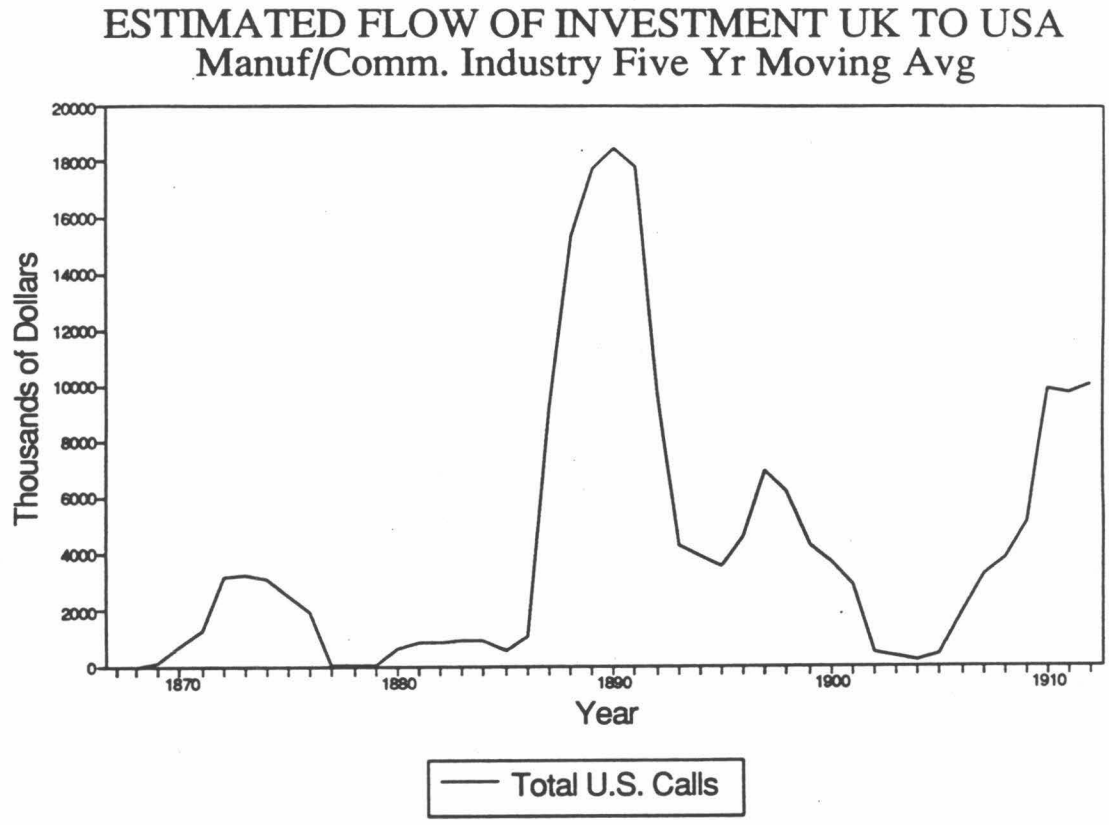

ESTIMATED FLOW OF INVESTMENT UK TO USA
Manuf/Comm. Industry Five Yr Moving Avg
Thousands of Dollars
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.5

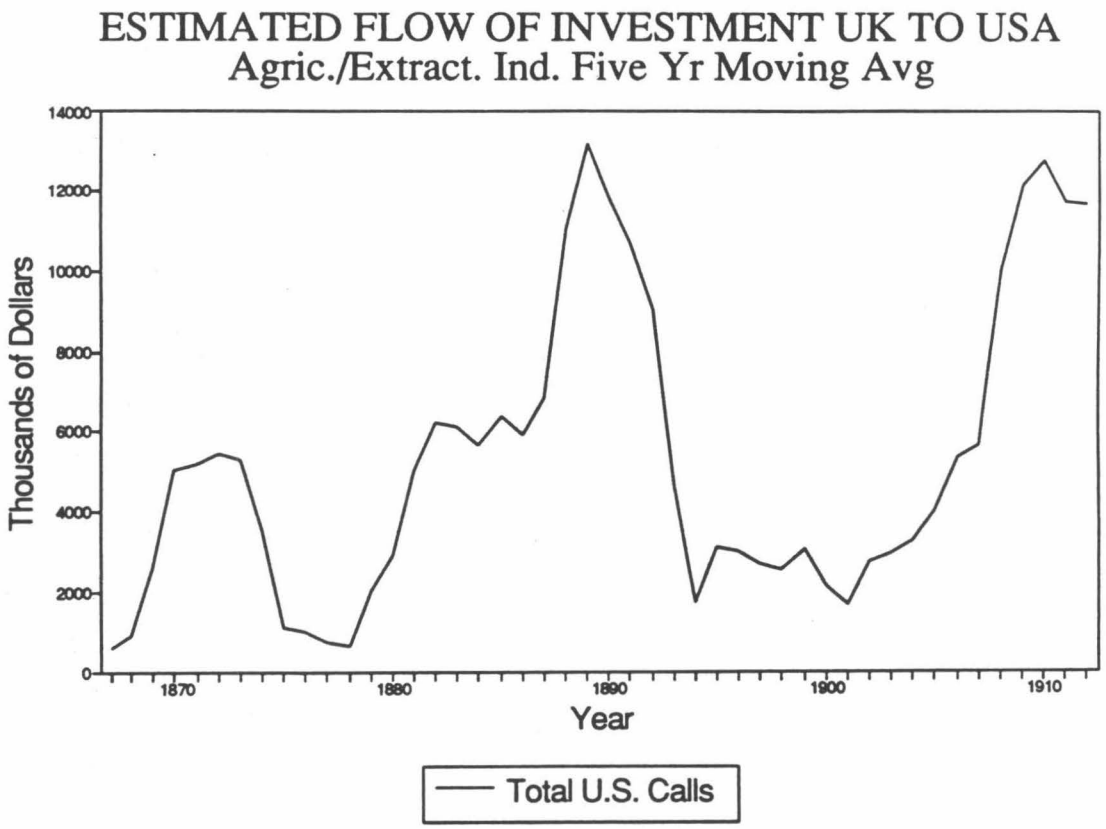

ESTIMATED FLOW OF INVESTMENT UK TO USA
Agric./Extract. Ind. Five Yr Moving Avg
Thousands of Dollars
14000
12000
10000
8000
6000
4000
2000
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.6

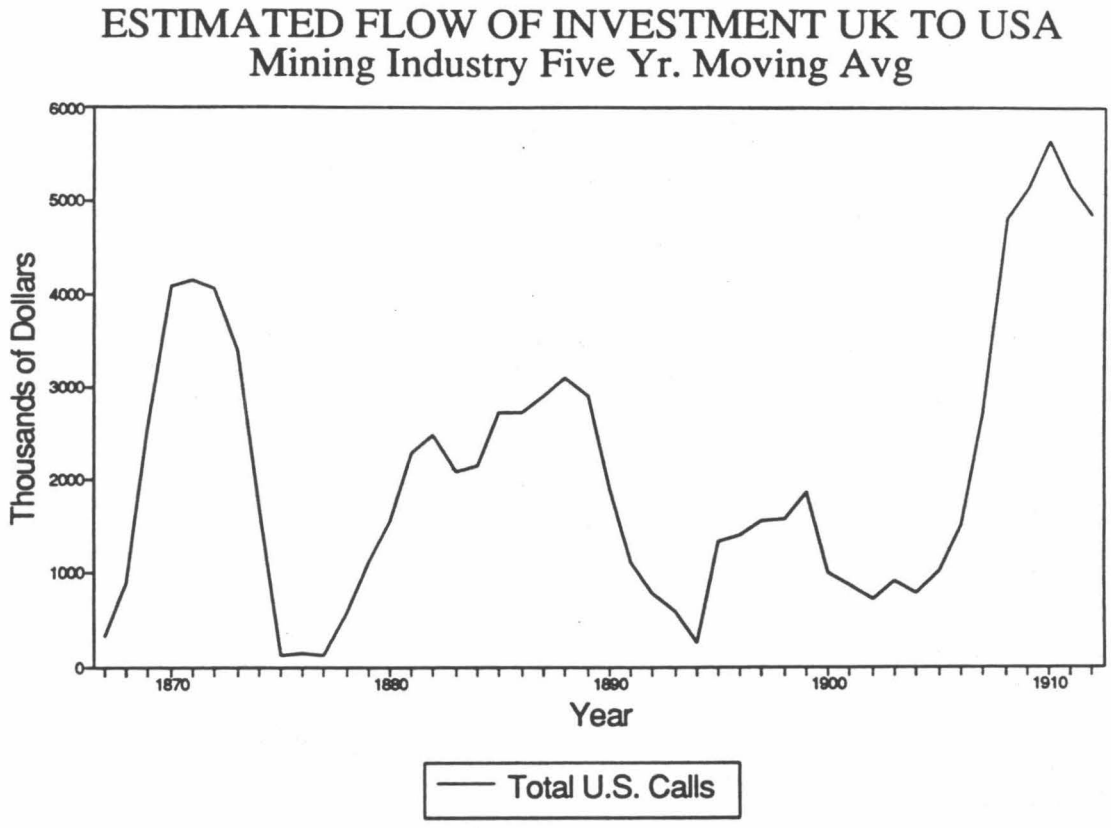

ESTIMATED FLOW OF INVESTMENT UK TO USA
Mining Industry Five Yr. Moving Avg
Thousands of Dollars
6000
5000
4000
3000
2000
1000
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.7

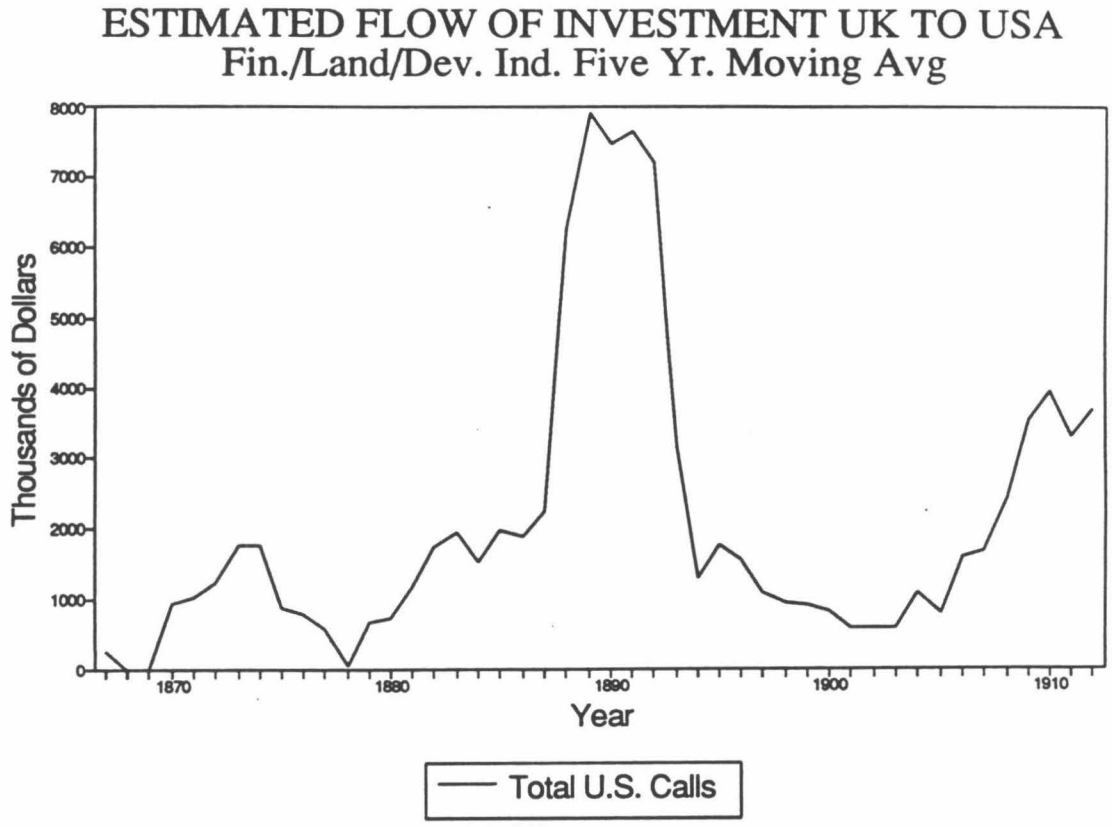

ESTIMATED FLOW OF INVESTMENT UK TO USA
Fin./Land/Dev. Ind. Five Yr. Moving Avg
Thousands of Dollars
8000
7000
6000
5000
4000
3000
2000
1000
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.8

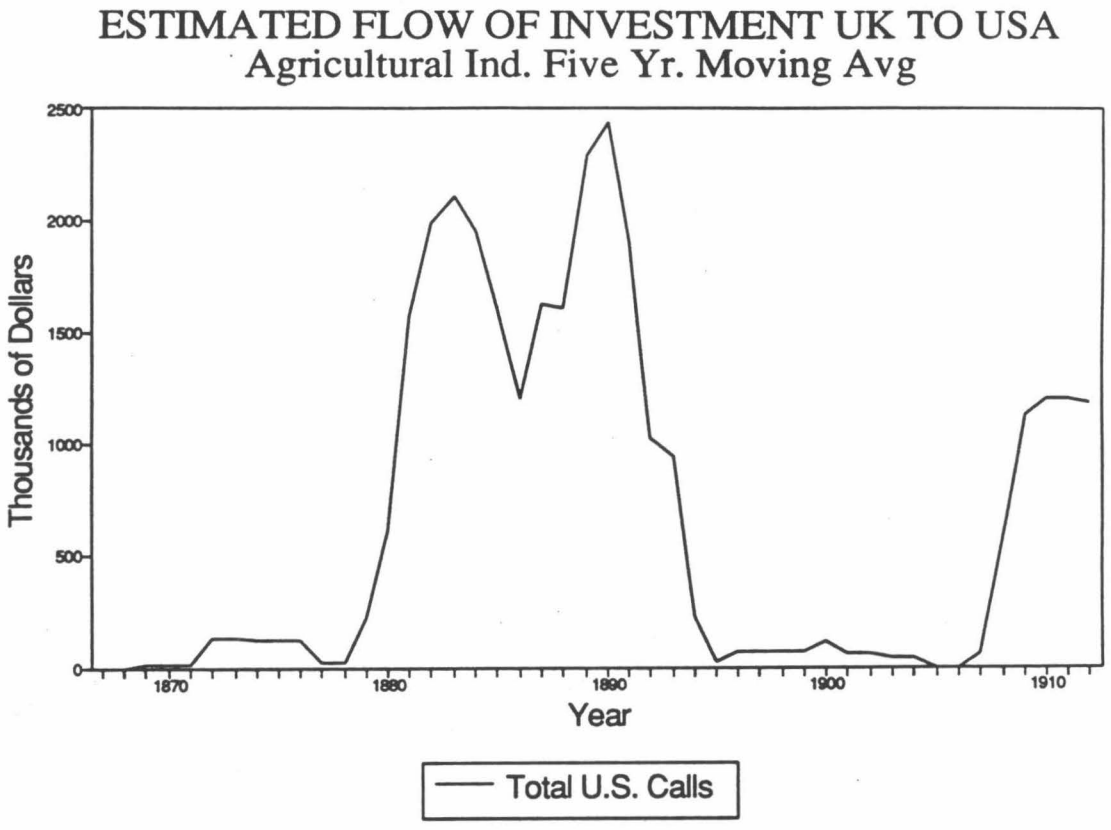

ESTIMATED FLOW OF INVESTMENT UK TO USA
Agricultural Ind. Five Yr. Moving Avg
Thousands of Dollars
2500
2000
1500
1000
500
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.9

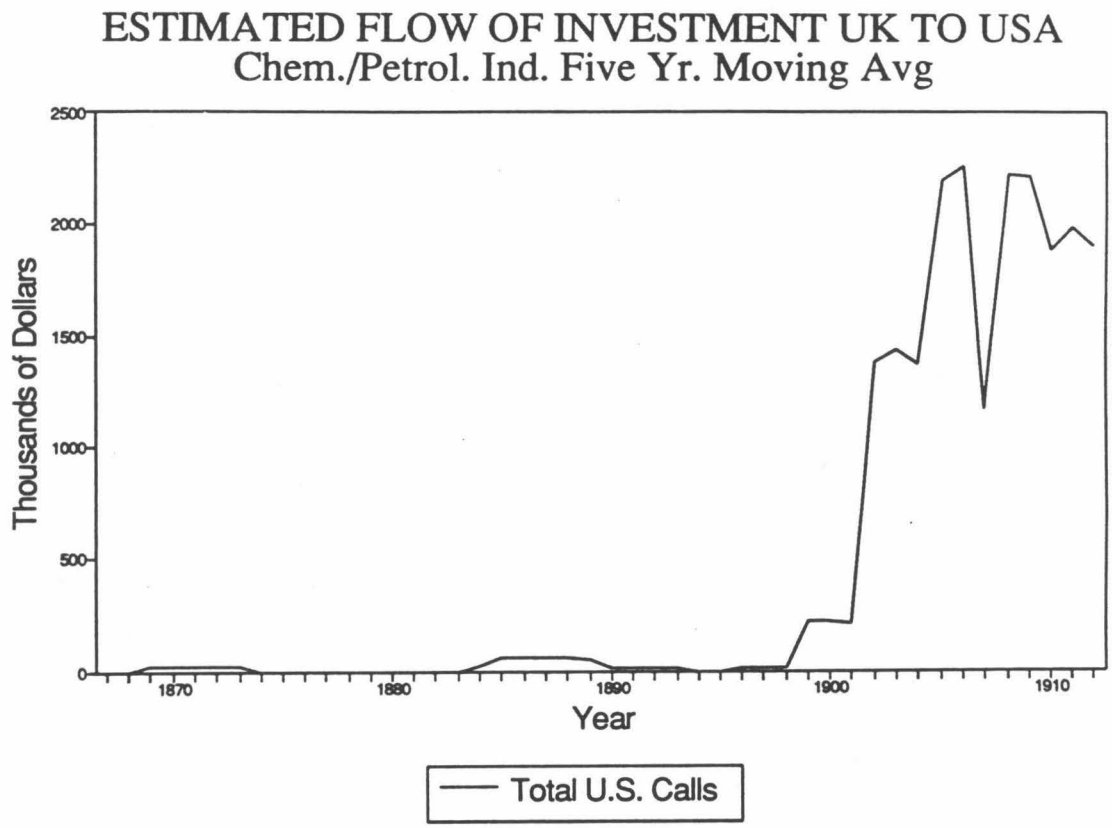

ESTIMATED FLOW OF INVESTMENT UK TO USA
Chem./Petrol. Ind. Five Yr. Moving Avg
Thousands of Dollars
2500
2000
1500
1000
500
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.10

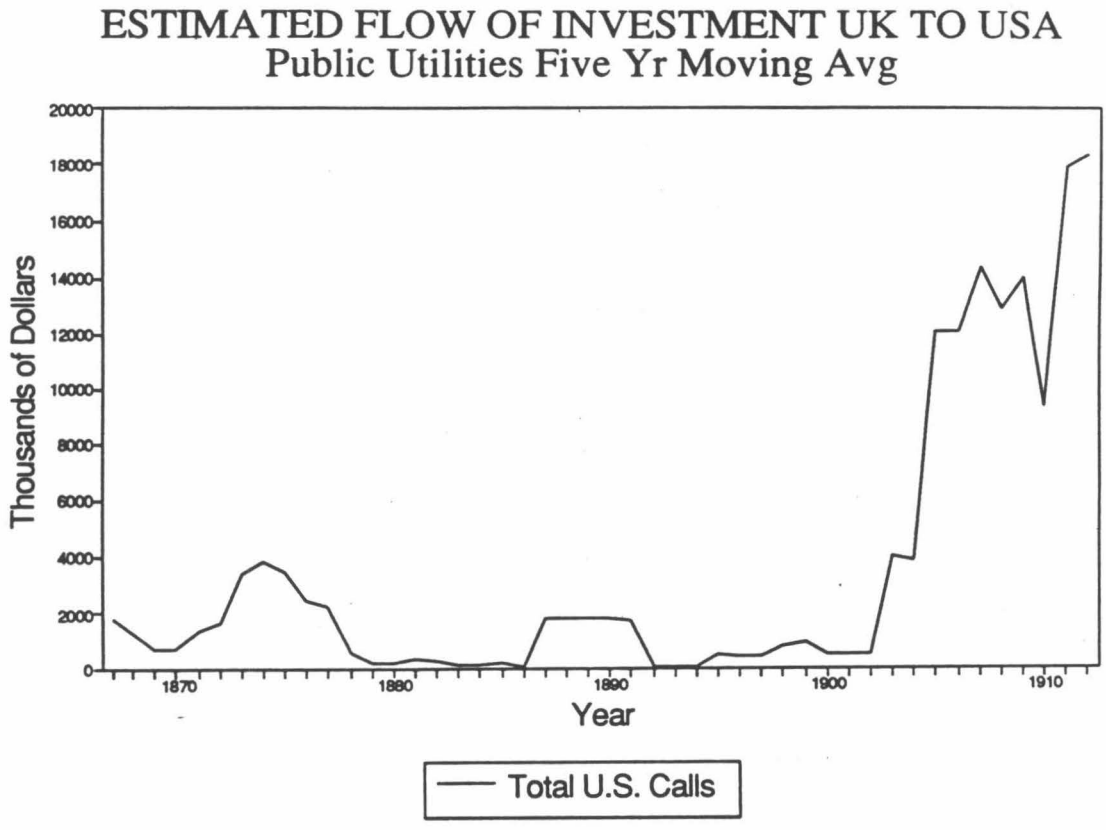

ESTIMATED FLOW OF INVESTMENT UK TO USA
Public Utilities Five Yr Moving Avg
Thousands of Dollars
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.11

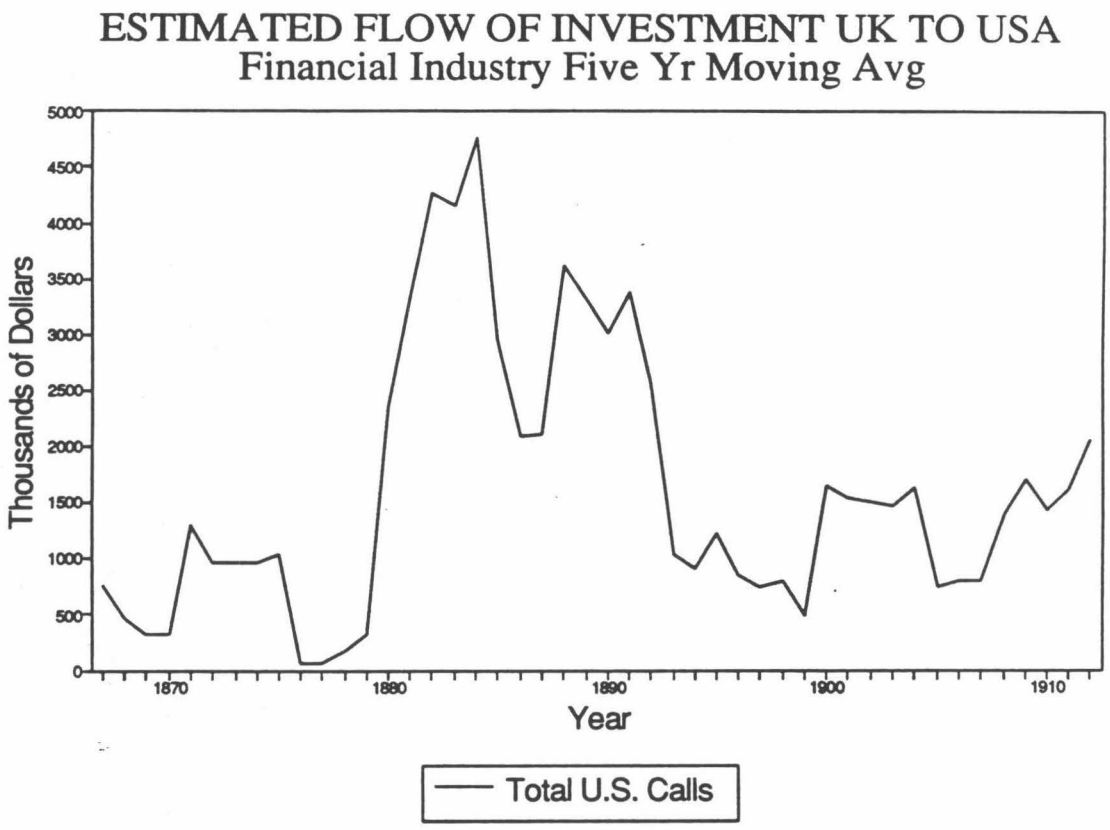

ESTIMATED FLOW OF INVESTMENT UK TO USA
Financial Industry Five Yr Moving Avg
Thousands of Dollars
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1870
1880
1890
1900
1910
Year
Total U.S. Calls

Figure 3.12

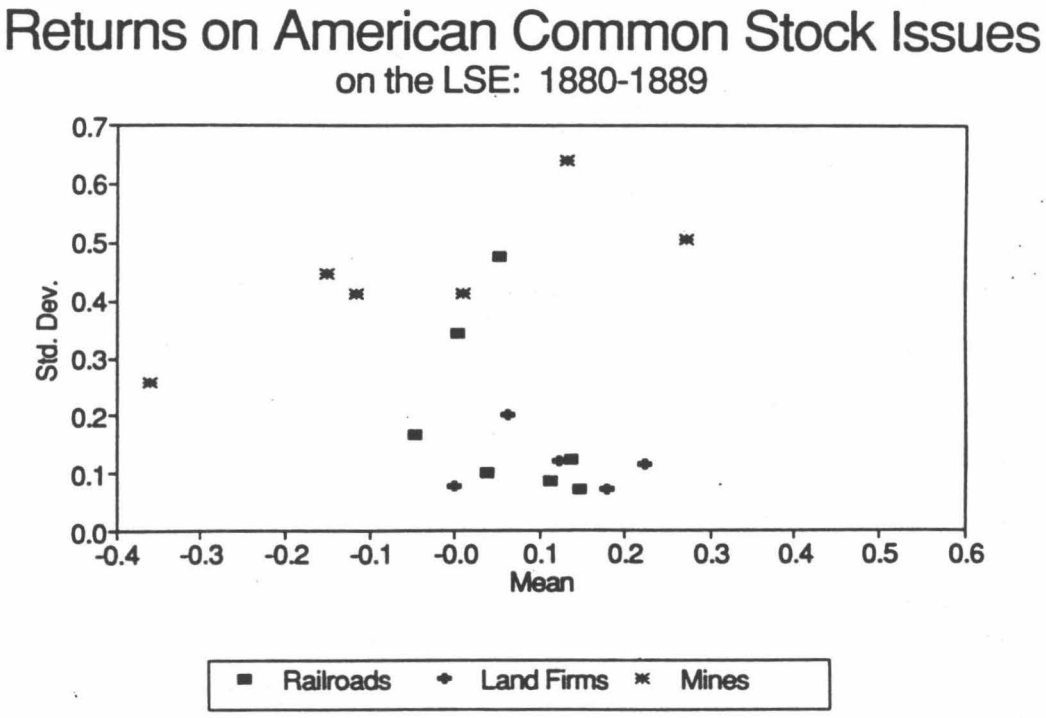
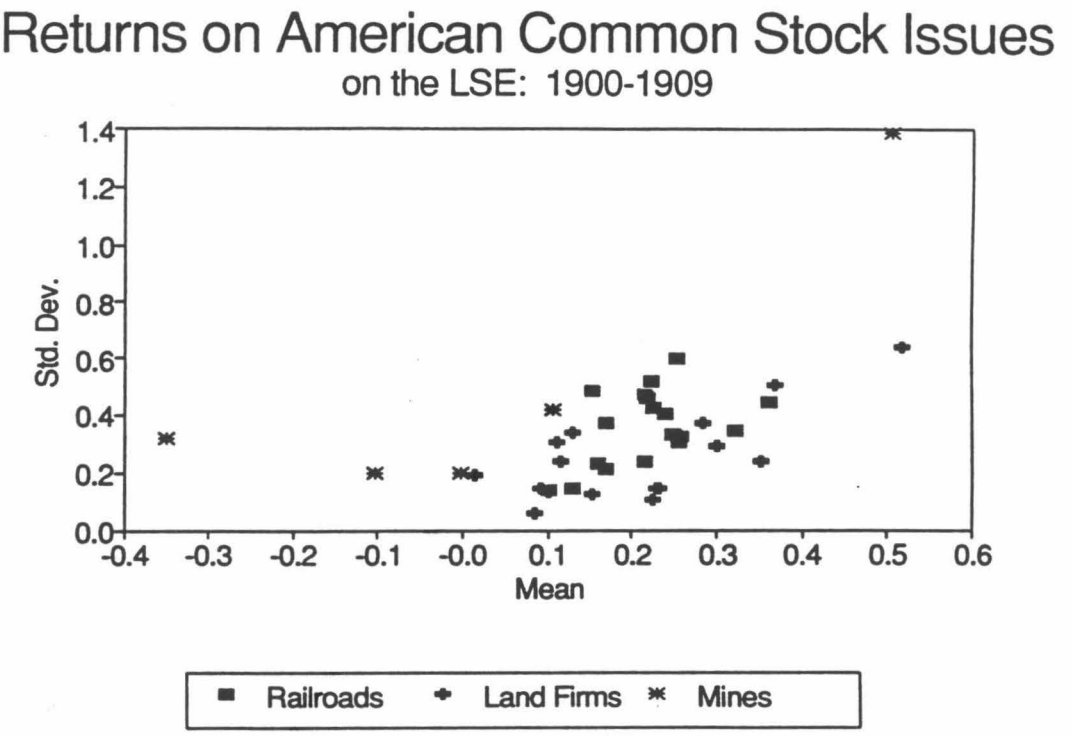

Returns on American Common Stock Issues
on the LSE: 1880-1889
Std. Dev.
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.4
-0.3
-0.2
-0.1
-0.0
0.1
0.2
0.3
0.4
0.5
0.6
Mean
Railroads
Land Firms
Mines

Figure 3.13


Returns on American Common Stock Issues
on the LSE: 1900-1909
Std. Dev.
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.4
-0.3
-0.2
-0.1
-0.0
0.1
0.2
0.3
0.4
0.5
0.6
Mean
Railroads
Land Firms
Mines

3.6 Tables

Table 3.1

Table 3.1 (a).

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	Total Foreign Investment in the US (Simon) (millions of dollars)	UK Share Foreign Investment in the US (Simon) (percent)	UK Investment in the US (Stock) (2)X(3) (Simon) (millions of dollars)	UK Total Foreign Investment (Stock) (Imlah) (millions of dollars)	Share of UK Investment Going to the US (Imlah) (percent)	UK Investment in the US (Stock) (5)X(6) (Imlah) (millions of dollars)
1865	710	88.0	666	2644	24.0	635
1866	809	87.5	773	2823	25.0	706
1867	963	87.0	868	3051	26.0	793
1868	1039	86.5	973	3247	27.0	877
1869	1217	86.0	1089	3500	28.0	980
1870	1322	85.5	1172	3735	29.0	1083
1871	1428	85.0	1318	4120	30.0	1236
1872	1683	84.5	1499	4652	30.0	1396
1873	1876	84.0	1607	5091	30.0	1527
1874	1963	83.5	1672	5474	30.0	1642
1875	2054	83.0	1701	5751	29.0	1668
1876	2056	82.5	1666	5876	28.0	1645
1877	1996	82.0	1562	5947	27.0	1606
1878	1825	81.5	1414	6033	25.0	1508
1879	1657	81.0	1350	6224	23.0	1432
1880	1688	80.5	1341	6422	22.0	1413
1881	1653	80.0	1373	6776	21.0	1423
1882	1779	80.0	1449	7094	20.0	1419
1883	1843	80.0	1524	7357	20.0	1471
1884	1966	80.0	1586	7748	20.0	1550
1885	2012	79.5	1657	8084	20.0	1617
1886	2171	79.0	1813	8510	20.0	1702
1887	2434	78.5	2032	8984	21.0	1887
1888	2761	78.0	2238	9480	22.0	2086
1889	2999	77.5	2405	9917	23.0	2281

Table 3.1 Cont.

Table 3.1 (a).

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	Total Foreign Investment in the US (Simon) (millions of dollars)	UK Share Foreign Investment in the US (Simon) (percent)	UK Investment in the US (Stock) (2)X(3) (Simon) (millions of dollars)	UK Total Foreign Investment (Stock) (Imlah) (millions of dollars)	Share of UK Investment Going to the US (Imlah) (percent)	UK Investment in the US (Stock) (5)X(6) (Imlah) (millions of dollars)
1890	3229	77.0	2550	10449	24.0	2508
1891	3416	76.5	2639	10824	25.0	2706
1892	3502	76.0	2731	11143	25.0	2786
1893	3709	75.5	2779	11429	25.0	2857
1894	3676	75.0	2824	11639	24.0	2793
1895	3880	74.5	2916	11853	23.0	2726
1896	3974	74.0	2938	12160	22.0	2675
1897	3865	73.5	2801	12384	21.0	2601
1898	3768	73.0	2751	12509	20.0	2502
1899	3701	72.0	2665	12738	19.8	2522
1900	3637	71.0	2582	12943	19.6	2537
1901	3614	70.0	2530	13127	19.4	2547
1902	3703	69.0	2555	13307	19.2	2555
1903	3854	68.0	2621	13548	19.0	2574
1904	3975	67.0	2663	13828	18.8	2600
1905	4134	66.0	2729	14268	18.6	2654
1906	4371	65.0	2841	14902	18.4	2742
1907	4550	64.0	2914	15733	18.2	2863
1908	4723	63.0	2975	16569	18.0	2982
1909	5078	62.0	3148	17301	17.8	3080
1910	5427	61.0	3311	18205	17.6	3204
1911	5661	60.0	3397	19268	17.4	3353
1912	5913	59.0	3489	20332	17.0	3456
1913	6166	59.0	3638	21543	17.0	3662

Table 3.1 Cont.

Table 3.1 (b).

Year	(8) UK Investment in the US (Stock) [(4)+(7)]/2 (Dunning) (Millions of Dollars)	(9) UK Investment in the US (Flow) [(8) Year 2 -(8) Year 1] (Dunning) (Millions of Dollars)	(10) UK TOTAL Foreign Investment (Flow) [(5) Year 2 -(5) Year 1] (Imlah) (Millions of Dollars)	(11) US Fraction of All British Overseas Finance (Davis, Huttenback) (Percent)	(12) UK Investment in the US (Flow) (10)X(11) (Imlah + Davis, Huttenback) (Millions of Dollars)	(13) UK Investment in the US (Flow) London Capital Calls (Davis, Huttenback) (Millions of Dollars)
1865	650	71	188	0.080	15	25
1866	739	89	179	0.066	12	14
1867	831	91	228	0.066	15	10
1868	925	94	196	0.035	7	9
1869	1035	110	253	0.046	12	12
1870	1128	93	235	0.073	17	25
1871	1277	149	385	0.431	166	262
1872	1447	170	532	0.195	104	117
1873	1567	120	439	0.537	236	365
1874	1657	90	383	0.186	71	81
1875	1684	27	277	0.189	52	53
1876	1656	-29	125	0.615	77	250
1877	1584	-72	71	0.893	63	794
1878	1461	-123	86	0.080	7	14
1879	1391	-70	191	0.045	9	8
1880	1377	-14	198	0.180	36	56
1881	1398	21	354	0.151	53	87
1882	1434	36	318	0.204	65	66
1883	1498	64	263	0.270	71	84
1884	1568	70	391	0.152	59	56
1885	1637	69	336	0.070	24	22
1886	1758	121	426	0.065	28	25
1887	1959	202	474	0.176	83	57
1888	2162	202	496	0.167	83	99
1889	2343	181	437	0.142	62	88

Table 3.1 Cont.

Table 3.1 (b).

Year	(8) UK Investment in the US (Stock) [(4)+(7)]/2 (Dunning) (Millions of Dollars)	(9) UK Investment in the US (Flow) [(8) Year 2 -(8) Year 1] (Dunning) (Millions of Dollars)	(10) UK TOTAL Foreign Investment (Flow) [(5) Year 2 -(5) Year 1] (Imlah) (Millions of Dollars)	(11) US Fraction of All British Overseas Finance (Davis, Huttenback) (Percent)	(12) UK Investment in the US (Flow) (10)X(11) (Imlah + Davis, Huttenback) (Millions of Dollars)	(13) UK Investment in the US (Flow) London Capital Calls (Davis, Huttenback) (Millions of Dollars)
1890	2529	186	532	0.235	125	154
1891	2673	144	375	0.287	108	108
1892	2758	86	319	0.102	33	20
1893	2818	60	286	0.338	97	73
1894	2809	-9	210	0.112	24	28
1895	2821	12	214	0.261	56	102
1896	2807	-14	307	0.096	29	31
1897	2701	-106	224	0.094	21	20
1898	2626	-74	125	0.119	15	40
1899	2594	-33	229	0.050	11	16
1900	2559	-34	205	0.144	30	28
1901	2538	-21	184	0.136	25	36
1902	2555	17	180	0.456	82	302
1903	2598	43	241	0.024	6	9
1904	2631	34	280	0.300	84	131
1905	2691	60	440	0.084	37	47
1906	2791	100	634	0.119	75	61
1907	2889	97	831	0.354	294	264
1908	2979	90	836	0.177	148	183
1909	3114	135	732	0.150	110	140
1910	3528	144	904	0.134	121	133
1911	3375	117	1063	0.139	148	96
1912	3473	98	1064	0.162	173	140
1913	3650	177	1211	0.221	267	211

Table 3.2

Table 3.2

	TOTAL CALLS (thousands of dollars)	AVERAGE CALLS PER YEAR (thousands of dollars)	PERCENT OF TOTAL
Transport	2841739	56835	54.4
Government	1603793	32076	30.7
Mfg./Commercial	230768	4615	4.4
Agric./Extractive	258073	5161	4.9
(Mining)	(102721)	(2054)	(2.0)
(Agriculture)	(30941)	(619)	(0.6)
(Petrol./Chem.)	(22751)	(455)	(0.4)
(Fin./Land/Devel.)	(101154)	(2023)	(1.9)
Finance	79217	1584	1.5
Public Utilities	207417	4148	4.0
Unidentified	2867	57	0.1
Total Call	5223874		

Table 3.3

Table 3.3.
Capital Called by U.S. Firms by Industry
(in thousands of dollars)

year	MF/COM	FIN	GOVT	UNKNWN	SERV/RET	AG/EXT	TRNS	Pub util
1865	0	1461	2065	0	156	1712	16440	2679
1866	0	731	302	0	0	244	9890	2922
1867	0	0	1248	0	0	195	6813	1461
1868	0	0	0	0	0	248	6818	1899
1869	0	1656	0	0	0	524	10034	0
1870	0	0	8087	0	0	3305	13315	0
1871	560	0	212234	0	0	8716	40908	0
1872	2922	0	24051	0	0	12472	76082	1512
1873	3127	4870	271349	0	0	990	79718	5381
1874	9599	0	3251	0	0	1751	65316	1476
1875	122	0	5565	0	0	2574	35787	8850
1876	0	0	220560	0	0	88	27792	1948
1877	24	331	783827	0	0	210	9380	0
1878	0	0	0	0	0	548	13812	0
1879	0	0	0	0	183	243	6816	487
1880	0	548	0	49	0	2249	52112	584
1881	365	731	0	0	0	6845	78857	0
1882	2804	10471	0	0	317	4732	47522	0
1883	1115	4870	0	0	0	11079	66202	685
1884	58	4703	0	0	219	6179	45214	0
1885	251	0	39	0	0	1804	19858	0
1886	390	3774	0	61	0	4421	16539	0
1887	1018	1461	0	0	0	8351	45526	209
1888	3529	487	0	0	0	8663	86437	206
1889	40633	4799	0	102	833	10854	22061	8729

Table 3.3 Cont.

Table 3.3.
Capital Called by U.S. Firms by Industry
(in thousands of dollars)

year	MF/COM	FIN	GOVT	UNKNWN	SERV/RET	AG/EXT	TRNS	Pub util
1890	31215	7583	0	0	2791	23027	89073	0
1891	12199	2178	2070	225	49	14959	75882	0
1892	4790	0	609	0	0	1650	13192	37
1893	163	2300	1252	0	0	2970	65919	122
1894	146	730	0	0	0	2599	24955	0
1895	4500	0	52989	0	0	1228	43169	122
1896	10258	1538	10485	0	0	377	8433	58
1897	2874	1534	1532	0	0	8494	3271	2016
1898	5236	560	0	0	0	2556	31178	0
1899	12003	122	0	0	0	880	3347	0
1900	878	244	0	0	122	573	24943	1670
1901	694	0	0	0	0	2836	31801	950
1902	0	7305	0	29	0	4001	290757	0
1903	1096	0	0	0	609	257	6943	0
1904	0	0	0	0	3090	6098	121823	0
1905	0	0	0	4	0	1705	25914	19383
1906	146	811	0	0	0	4343	55429	0
1907	822	2933	0	375	1169	7614	210150	41103
1908	8884	244	0	0	0	7115	166885	0
1909	6534	0	0	0	1213	7363	113882	11406
1910	2850	3027	2280	18	122	23853	88680	11871
1911	6518	2331	0	0	0	14625	66774	5584
1912	24865	1527	0	0	0	10853	85335	17718
1913	8094	1120	0	487	447	1909	155900	42692
1914	8023	2240	0	1517	146	7194	138857	13657

Table 3.4

Table 3.4
Capital Called by U.S. Transportation Industry
(in thousands of dollars)

year	TOTAL	Railroads	TRAM/BUS	Canals/Docks
1865	16440	16440	0	0
1866	9890	9890	0	0
1867	6813	6813	0	0
1868	6818	6818	0	0
1869	10034	10034	0	0
1870	13315	13315	0	0
1871	40908	40908	0	0
1872	76082	76082	0	0
1873	79718	79718	0	0
1874	65316	65316	0	0
1875	35787	33937	0	1851
1876	27792	27792	0	0
1877	9380	9380	0	0
1878	13812	13812	0	0
1879	6816	6816	0	0
1880	52112	52112	0	0
1881	78857	78857	0	0
1882	47522	47522	0	0
1883	66202	65959	244	0
1884	45214	44849	365	0
1885	19858	19858	0	0
1886	16539	16539	0	0
1887	45526	45526	0	0
1888	86437	86437	0	0
1889	22061	22061	0	0

Table 3.4 Cont.

Table 3.4
Capital Called by U.S. Transportation Industry
(in thousands of dollars)

year	TOTAL	Railroads	TRAM/BUS	Canals/Docks
1890	89073	89073	0	0
1891	75882	75785	0	98
1892	13192	13192	0	0
1893	65919	65919	0	0
1894	24955	24955	0	0
1895	43169	42273	896	0
1896	8433	4484	3949	0
1897	3271	3271	0	0
1898	31178	31145	33	0
1899	3347	3347	0	0
1900	24943	24943	0	0
1901	31801	31801	0	0
1902	290757	290757	0	0
1903	6943	6943	0	0
1904	121823	121823	0	0
1905	25914	25914	0	0
1906	55429	55429	0	0
1907	210150	210150	0	0
1908	166885	166885	0	0
1909	113882	112868	1014	0
1910	88680	88680	0	0
1911	66774	66670	104	0
1912	85335	85178	157	0
1913	155900	152857	3044	0
1914	138857	138857	0	0

Table 3.5

Table 3.5
Capital Called by U.S. Agricultural/ Extractive Industry
(in thousands of dollars)

year	TOTAL	MINING	AGRI.	CHEMICAL	FLD
1865	1712	426	0	0	1286
1866	244	244	0	0	0
1867	195	195	0	0	0
1868	248	248	0	0	0
1869	524	524	0	0	0
1870	3305	3305	0	0	0
1871	8716	8545	61	110	0
1872	12472	7833	0	0	4639
1873	990	503	0	0	487
1874	1751	73	609	0	1069
1875	2574	0	0	0	2574
1876	88	88	0	0	0
1877	210	15	0	0	195
1878	548	548	0	0	0
1879	243	0	146	0	97
1880	2249	2249	0	0	0
1881	6845	2847	974	0	3024
1882	4732	2200	1972	0	560
1883	11079	4193	4766	0	2120
1884	6179	966	2223	0	2990
1885	1804	335	597	0	872
1886	4421	3040	203	122	1057
1887	8351	5080	239	195	2837
1888	8663	4199	2759	0	1705
1889	10854	1894	4319	0	4641

Table 3.5 Cont.

Table 3.5
Capital Called by U.S. Agricultural/ Extractive Industry
(in thousands of dollars)

year	TOTAL	MINING	AGRI.	CHEMICAL	FLD
1890	23027	1346	526	0	21154
1891	14959	1996	3571	82	9310
1892	1650	137	1002	0	511
1893	2970	298	61	0	2612
1894	2599	145	0	0	2454
1895	1228	392	72	0	765
1896	377	292	0	0	85
1897	8494	5548	0	0	2946
1898	2556	712	282	73	1488
1899	880	822	0	0	58
1900	573	488	85	0	0
1901	2836	1803	0	1033	0
1902	4001	1222	206	0	2573
1903	257	15	0	0	242
1904	6098	109	0	5844	145
1905	1705	1413	0	292	0
1906	4343	1175	0	684	2484
1907	7614	2512	0	4128	974
1908	7115	2428	0	329	4359
1909	7363	6104	326	402	531
1910	23853	11961	2671	5518	3704
1911	14625	3214	2625	668	8118
1912	10853	5060	390	2475	2928
1913	1909	0	0	798	1111
1914	7194	4490	256	0	2449

Table 3.6

Table 3.6
Capital Called by U.S. Public Utilities Industry
(in thousands of dollars)

year	TOTAL	GAS/LIGHT	TPHN/TGPH	WATERWKS
1865	2679	0	2679	0
1866	2922	0	2922	0
1867	1461	0	1461	0
1868	1899	0	1899	0
1869	0	0	0	0
1870	0	0	0	0
1871	0	0	0	0
1872	1512	0	1512	0
1873	5381	0	5381	0
1874	1476	409	950	117
1875	8850	2454	6396	0
1876	1948	1948	0	0
1877	0	0	0	0
1878	0	0	0	0
1879	487	0	487	0
1880	584	584	0	0
1881	0	0	0	0
1882	0	0	0	0
1883	685	514	0	170
1884	0	0	0	0
1885	0	0	0	0
1886	0	0	0	0
1887	209	209	0	0
1888	206	50	0	156
1889	8729	7726	0	1003

Table 3.6 Cont.

Table 3.6
Capital Called by U.S. Public Utilities Industry
(in thousands of dollars)

year	TOTAL	GAS/LIGHT	TPHN/TGPH	WATERWKS
1890	0	0	0	0
1891	0	0	0	0
1892	37	0	37	0
1893	122	122	0	0
1894	0	0	0	0
1895	122	122	0	0
1896	58	58	0	0
1897	2016	0	2016	0
1898	0	0	0	0
1899	0	0	0	0
1900	1670	1670	0	0
1901	950	950	0	0
1902	0	0	0	0
1903	0	0	0	0
1904	0	0	0	0
1905	19383	0	19383	0
1906	0	0	0	0
1907	41103	0	41103	0
1908	0	0	0	0
1909	11406	2980	8425	0
1910	11871	0	11871	0
1911	5584	5584	0	0
1912	17718	9767	6392	1559
1913	42692	10064	32628	0
1914	13657	13657	0	0

Table 3.7

Table 3.7
Capital Called by U.S. Financial Industry
(in thousands of dollars)

year	TOTAL	BANKS	TRUSTS	INSURANCE
1865	1461	1461	0	0
1866	731	731	0	0
1867	0	0	0	0
1868	0	0	0	0
1869	1656	0	1656	0
1870	0	0	0	0
1871	0	0	0	0
1872	0	0	0	0
1873	4870	730	4140	0
1874	0	0	0	0
1875	0	0	0	0
1876	0	0	0	0
1877	331	331	0	0
1878	0	0	0	0
1879	0	0	0	0
1880	548	548	0	0
1881	731	487	0	244
1882	10471	731	9740	0
1883	4870	0	4870	0
1884	4703	0	4703	0
1885	0	0	0	0
1886	3774	244	3531	0
1887	1461	0	1461	0
1888	487	0	487	0
1889	4799	0	4799	0

Table 3.7 Cont.

Table 3.7
Capital Called by U.S. Financial Industry
(in thousands of dollars)

year	TOTAL	BANKS	TRUSTS	INSURANCE
1890	7584	341	7243	0
1891	2178	0	2178	0
1892	0	0	0	0
1893	2300	0	2300	0
1894	731	0	731	0
1895	0	0	0	0
1896	1538	92	1446	0
1897	1534	0	1534	0
1898	560	0	499	61
1899	122	0	122	0
1900	244	0	244	0
1901	0	0	0	0
1902	7305	0	7305	0
1903	0	0	0	0
1904	0	0	0	0
1905	0	0	0	0
1906	811	0	811	0
1907	2932	0	2932	0
1908	244	0	244	0
1909	0	0	0	0
1910	3027	0	3027	0
1911	2330	0	2257	73
1912	1527	0	1527	0
1913	1120	0	1120	0
1914	2240	0	2118	122

Table 3.8

Table 3.8

Number of U.S. Stock Issues Traded on the London and New York Stock Exchanges

	Total Stocks	RR Stocks	Misc. Stocks
1870			
LSE	9	6	3
NYSE	27	11	16
1880			
LSE	47	18	29
NYSE	103	72	31
1890			
LSE	108	36	72
NYSE	118	89	29
1900			
LSE	135	51	84
NYSE	273	143	130
1910			
LSE	133	42	91
NYSE	306	146	160

Note: New York City Bank Stocks are excluded from these totals for 1870 and 1890, the only two years for which such listings appear.

Table 3.9.

Percentage Breakdown of U.S. Stock Issues Traded on London and New York Exchanges

Year	London		New York	
	Railroad	Non-Rail	Railroad	Non-Rail
1870	.67	.33	.41	.59
1880	.39	.61	.70	.30
1890	.33	.67	.75	.25
1900	.38	.62	.52	.48
1910	.32	.68	.48	.52

Table 3.10

Percentage of Total American Stock Issues Traded on Both the New York and London Exchanges

Year	Percentage
1870	.028
1880	.053
1890	.102
1900	.110
1910	.091

Table 3.11

Table 3.11.

Number of U.S. Bond Issues Traded on the London and New York Stock Exchanges

	Total Bonds	RR Bonds	U.S. Fed. Bonds	U.S. State Bonds	U.S. City Bonds	Misc. Bonds
1870						
LSE	51	37	7	6	1	0
NYSE	122	71	11	40	0	0
1880						
LSE	128	97	4	11	7	9
NYSE	267	190	15	64	0	0
1890						
LSE	228	172	2	10	6	38
NYSE	170	154	11	0	0	5
1900						
LSE	216	171	2	1	4	38
NYSE	163	130	11	3	0	29
1910						
LSE	180	135	1	0	0	44
NYSE	200	143	6	0	4	47

Note: The NYSE numbers were derived by sampling *New York Times* price data for the last week in December for each of the respective years. The LSE numbers come from the *Investor's Monthly Manual.*

Table 3.12.

U.S. Bond Issues Traded on the London and New York Stock Exchanges: 1870, 1900

	Total Bonds	RR Bonds	U.S. Fed. Bonds	U.S. State Bonds	U.S. City Bonds	Misc. Bonds
1870						
LSE	51	37	7	6	1	0
NYSE	161	91	51	19	0	0
	Total Bonds	RR Bonds	U.S. Fed. Bonds	U.S. State Bonds	U.S. City Bonds	Misc. Bonds
1900						
LSE	216	171	2	1	4	38
NYSE	590	505	11	10	0	64

Note: The 1870 totals were derived by sampling *New York Times* financial data for the entire month of December. The 1900 totals come from a complete bond listing also found in *the Times*.

Table 3.13.

Descriptive Statistics: Means of Variables in Returns Sample by Subpopulation

1880-1889

	Rails	Land Firms	Mines
Subscribed (£)	9,902,860	729,759	254,482
Total Capital(£)	16,064,440	740,167	555,936
Senior Oblig.	.315	.010	0.0
Returns	.032	.116	-.025
Volatility	.426	.214	.796
Observations	63	48	56

1900-1909

	Rails	Land Firms	Mines
Subscribed (£)	20,074,000	500,264	265,105
Total Capital(£)	46,670,000	882,542	377,737
Senior Oblig.	.540	.281	.193
Returns	.214	.195	.110
Volatility	.460	.264	.512
Observations	188	144	38

Table 3.14.

Comparison of Standard Deviations in Returns

1880-1889		
	Mean Return	Stand. Dev.
Railroads	.032	.300
Land Firms	.116	.145
Mines	-.025	.479
1900-1909		
	Mean Return	Stand. Dev.
Railroads	.214	.371
Land Firms	.195	.311
Mines	.110	.781

Table 3.15

Table 3.15.
Volatility Rankings, 1880-1889
LSE Common Stock Issues, American Firms

	FIRM	TYPE	VOL.	Quartile Rankings									
				80	81	82	83	84	85	86	87	88	89
1.	Illinois Central	R	.158	1	1	1	2	1	1	1	2	1	2
2.	Scottish Amer. Inv.	L	.187	2	1	2	1	1	2	2	1	1	1
3.	Scottish Amer. Mort.	L	.200	2	1	1		2	1	1	1	1	2
4.	Del. Hudson Canal	*R**	.211	1	2	2	1	2					3
5.	British Amer. Land	L	.223	3	2	1	1	2	2	2	2	1	1
6.	Amer. Mort. Scotland	L	.225		3	3		1	1	1	1	2	1
7.	Col. Mort. Inv. London	L	.240		1	2	1	1	1	2	2	2	4
8.	Union Pacific	R	.360	2	2	1	2	3	2	2	2	2	3
9.	Ohio Mississippi	R	.437		4	3	3	2	4	3	3	3	2
10.	NY,Lake Erie,Western	R	.454	3	3	2	2	3	4	3	3	2	2
11.	Richmond Cons. Mining	M	.596	3	3	4	3	3	3	3	3	3	4
12.	Sierra Buttes	M	.605	4	4	3	3	2	4	3	4	3	4
13.	Plumas Eureka	M	.629		2	4	3	4	3	4	3	4	4
14.	Phil. Reading	R	.634	4	3	3	2	4	3	4	4	3	3
15.	Colorado United	M	.825	4	4	4	4	3	3	4	4	4	
16.	La Plata Mining NY	M	.863		4	4	4	4	2				
17.	Eberhardt	M	1.00									4	
18.	Ruby Dunderberg	M	1.19		4	4	4	4	4	4	4	4	
19.	Eberhardt Aurora	M	1.67				4	4					

Table 3.16

Table 3.16 (a)
Volatility Rankings, 1900-1909
LSE Common Stock Issues, American Firms

	FIRM	TYPE	AVG. VOL.	Quartile Rankings									
				00	01	02	03	04	05	06	07	08	09
1.	Pacific Land Inv.	L	.133	2	1	1	1	1	1	1	1	1	1
2.	Scottish Amer. Inv.	L	.158	1	1	1	1	1	1	1			
3.	Scottish Amer. Mort.	L	.181	1	1	2	1	2	2	1	1	1	2
4.	Investors Mort. Sec.	L	.181	2	2	2	1	1	1	1	1		
5.	Texas Land Mort.	L	.198	2	1	2	1						
6.	Illinois Central	R	.201	1	2	2	1	1	2	1	2	1	1
7.	Matador Land. Cattle	L	.209	1	1	1	2	1	1	4	2	1	2
8.	Pennsylvania	R	.211	1	1	1	3	1	1	2	1	2	1
9.	NY Central Hudson	R	.231	1	2	1	2	1	2	2	2	2	2
10.	Western Ranches	L	.232	2	1	1	2	2	1	1	1	2	
11.	US Investment Corp.	L	.267	2	4	1*	1*						
12.	Missouri Land. Livestock	L	.283	1	1	2	4	3	3	1*			
13.	Texas Land. Cattle	L	.286	1	2	3	1	2	2	4			
14.	Swan Land. Cattle	L	.305	2	1	1	3	3	3	3	2	2	3
15.	Can. Amer. Mort. Trust	L	.307	1	3	4	2	4	2	1	1	1	3
16.	Baltimore Ohio	R	.310	3	2	2	3	2	1	2	3	2	1
17.	British Amer. Mort.	L	.314	2	3	4	2	2	3	3	1	1	1
18.	Prarie Cattle	L	.341	2	1	3	2	3	4	4	2	1	4
19.	Norfolk Western	R	.342	4	2	3	3	2	1	1		3	1
20.	US Debenture Corp.	L	.359	3	2	3	2	2	4	2	3	2	2
21.	Arizona Copper	M	.387	4	3	2	2	2	3	2	4	3	2

Table 3.16 Cont.

Table 3.16 (b)
Volatility Rankings, 1900-1909
LSE Common Stock Issues, American Firms

	FIRM	TYPE	AVG. VOL.	Quartile Rankings									
				00	01	02	03	04	05	06	07	08	09
22.	Edinburgh Amer. Land	L	.389	2	2	4	1	4	1	4	1	2	2
23.	Southern Pacific	R	.406	3	3	3	3	3	2	4	2	3	2
24.	Union Pacific	R	.406	3	3	1	3	3	3	3	3	3	3
25.	Ach. Top. Santa Fe	R	.419	4	4	2	3	2	2	2	2	3	3
26.	Northern Pacific	R	.421	4	4				2	2	3	2	1
27.	Utah Consolidated	M	.446	3	3	3							
28.	NY Ontario Western	R	.456	3	2	3	3	4	4	2	3	3	2
29.	Chesapeake Ohio	R	.492	3	2	2	4	3	2	2	4	4	4
30.	Mountain Copper	M	.502	3	3								
31.	Philadelphia Reading	R	.538	3	4	2	3	4	4	3	3	3	4
32.	De Lamar	M	.550	4	4	4	2	4	4	4	3	4	4
33.	Denver Rio Grande	R	.591	4	3	3	4	3	4	3	4	4	3
34.	Mexican Central	R	.599	1	4	3	4	4	3	4	4		
35.	Miss. Kansas Texas	R	.605	4	4	4	4	2	4	4	3	4	3
36.	Wabash	R	.618	4	4	4	4	3	3	3	4	4	4
37.	Montana	R	.619	4	4	4	4	4	1*	4	4		
38.	Alaska Gold	M	.630	2	4	4							
39.	Southern Rail	R	.638	4	4	3	4	4	3	3	4	4	4
40.	Chic. Great West.	R	.639	3	3	4	4	3	4	3	4	4	
41.	Erie	R	.653	4	3	4	4	3	3	3	4	4	4

Note: Asterisked entries in the quartile rankings indicate that the share price remained unchanged throughout the year.

Table 3.17

Table 3.17.
Returns Statistics by Year

Year	Mean Return	Consol Return	Ret/Vol Correl.	Obs.
1880	.455	.031	-.43	6
1881	.026	.030	-.85	11
1882	-.078	.030	-.81	13
1883	-.044	.030	-.48	14
1884	-.169	.030	-.78	15
1885	.193	.030	.30	16
1886	.154	.030	.02	15
1887	.046	.030	-.12	15
1888	-.061	.030	-.69	13
1889	.047	.028	-.36	12
Year	Mean Return	Consol Return	Ret/Vol Correl.	Obs.
1900	.392	.028	.63	31
1901	.344	.029	.35	37
1902	.190	.029	-.05	36
1903	-.086	.028	-.83	35
1904	.322	.028	.60	33
1905	.235	.028	.20	34
1906	.090	.028	.29	35
1907	-.169	.030	-.82	31
1908	.471	.029	.83	29
1909	.238	.030	.28	28

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Chapter 4

London and New York – A Tale of Two Exchanges

4.1 Introduction

This chapter attempts to explain the listings discrepancies in American securities between the New York and London Stock Exchanges from an institutional perspective. In short, the New York exchange set up admittance and trading rules which prevented securities from small new ventures often located in the West from obtaining listings. The first part of the chapter outlines the organization of the New York market and briefly contrasts it with that in London. The differences between the two markets were clearly reflected in the objectives that each of the respective ownerships sought to accomplish. The chapter goes on to explore the ways in which the Board of Governors of the New York Stock Exchange constructed its trade rules to

accomplish particular objectives. Broadly speaking, each of these rules accomplished at least one of the following objectives: (1) they attracted wider markets for listed securities, (2) they protected existing markets from rival exchanges, or (3) they insured that trading profits would not be competed away within the membership of the exchange. The Board's desire to accomplish the first objective precipitated the exclusion of securities from small, new firms – strict vetting procedures quelled the doubts of typical American investors and thus broadened markets in NYSE securities.

The final part of the chapter demonstrates that these neglected securities found homes not only on the London Exchange but also on regional exchanges in the United States. In particular, price data for securities listed on the Boston Stock Exchange are shown to be similar to data for American securities listed in London. The investors in both Boston and London appear to have been able to resolve informational asymmetries for themselves and did not need to rely solely on NYSE vetting procedures. What is more, although investors using the Boston Exchange appear to have also invested in securities suitable for NYSE listing, non-Boston investors did not, for the most part, hold shares of Boston-listed securities. That is, some subset of listings remained held by this smaller group of geographically clustered investors through the turn of the century.

4.2 Institutional Differences

Given the size and composition of the flows from savers in Britain to capital using firms in the United States, the question remains – why did those

American firms look abroad for financial support when domestic help was so much closer at hand? The answer to that question is not simple – it has at least three different but not entirely unrelated components. First, while the American savings rate was high, it was probably not high enough to have underwritten the short-term surges in investment demand that marked this nation's development. Second, British savers were probably more sophisticated than their American counterparts. That is, while there may have been clusters of American savers who were willing to risk their accumulations in enterprises far removed from their everyday experience, most were not. Third, the institutional structure of the New York Exchange was different than that of its London counterpart. That is to say, the New York market was constrained by an institutional structure and a set of operating rules that, although designed to reassure investors, made it somewhat difficult to adjust to rapidly changing demand considerations.

Although there may be some question of "chicken or egg," the evidence for the first component is relatively straightforward. The surges of foreign finance were temporally correlated with the Civil War and with periods of most rapid American growth and structural transformation: 1814-1819, 1832-1839, 1870-1877, and 1882-1896. Most scholars agree that both the second and third components contributed to the problem; but, to some extent, they disagree about the relative weights to be assigned to each; and the evidence is indirect and somewhat ambiguous.

As early as the mid 1930's, M.M. Poston had become intrigued by questions about the evolution and integration of both national and international markets; and his concerns have led to a steady flow of work that focuses on

questions of institutional innovation and capital market evolution.[1] More recently, Robert Zevin and Larry Neal have examined the question of the degree of integration of international capital markets. As noted in Chapter Three, Zevin concludes that the international markets were well integrated by *at least* the end of the last century and probably before.[2] In a similar vein, Neal argues that, while international markets were reasonably well integrated in the eighteenth century, the international market disintegrated in the early nineteenth century and was only gradually reintegrated over the course of that century.[3]

Poston concluded that pre-modern capital transfers were usually not founded on market exchanges between unrelated savers and investors, but on direct transactions based on personal relations. Before a modern capital market could develop, it was necessary to educate savers – to prove to them that investment in depersonalized "symbolic capital" (mobile and divisible – that is, liquid paper claims on assets rather than the assets themselves) was as safe as direct ownership of an asset. In the case of Britain, Poston argued that this educational process began with the sleeping partnerships

[1]M.M. Poston, "Some Recent Problems in the Accumulation of Capital," *Economic History Review*, 1935. See also Poston, an unpublished series of lectures given at the Johns Hopkins University, 1954-55.

[2]Robert B. Zevin, "Are World Financial Markets more Open? If So Why and With What Effects," Working Paper Number 79 of the World Institute for Development Economics Research of the United Nations, October 1989, forthcoming in *Financial Openness and National Autonomy.*

[3]Larry Neal, "The Disintegration and Reintegration of International Capital Markets in the 19th Century," mss. February 29. 1982. Craig and Fisher, however, have recently suggested that the American market may have been less well integrated than the British, French, and German. Lee A. Craig and Douglas Fisher, "Integration of the European Business Cycle: 1871-1910," *Explorations in Economic History*, Vol. 29, No. 2, April 1992, pp. 144-168.

of the sixteenth century, but it was not completed until savers had, first, come to recognize the profitability of investments in government bonds issued during Napoleonic Wars and, then, had discovered the ultimate safety of investments in railroad securities during the "height of unsafety" – the early 1840's.[4] Poston then went on to draw parallels in the histories of Russia, Germany, and France.

In the case of the United States, it has been argued that, because of the greater geographical distances between savers in the East and investors in the South and West and because of the marked disparity between the new expanding industries that required finance and the older traditional activities that were the source of savings, the problem was even more complex. The educational process in the United States, was, however, similar to that experienced on the other side of the water – similar, at least, as far as the North and Midwest were concerned; but, in the U.S., the process was delayed by at least half a century. Thus, Yankee and Midwestern savers' experience with the 5-20s during the Civil War provided the same lessons as the British Napoleonic War debt; and, during the 1870's, 80's, and 90's, their experience with U.S. railroad bonds duplicated the lessons of the Hudson years in Britain.[5] In the South, however, investment in Confederate bonds had not

[4]Somewhat later Alexander Gershenkron made a similar case for Germany and Russia. See his *Economic Backwardness in Historical Perspective.*

[5]Lance E. Davis, "Capital Immobilities and finance Capitalism: a Study of Economic Evolution in the United States, 1820-1920," *Explorations in Entrepreneurial History*, Second Series, Vol. 1, No. 1, Fall 1963, pp.88-105. Recently Kerry Odell has found similar evidence for gradual integration *within* the Pacific Coast States even before that region was integrated into the national capital market. Kerry A. Odell, "The Integration of Regional and Interregional Capital Markets: Evidence from the Pacific Coast, 1883-1913," *The Journal of Economic History*, Vol. XLIX, No. 2, June 1989, pp. 297-310.

had the same effect on the Southern saver's education. Despite the Southern experience, to the North, the educational process had proceeded far enough by the early twentieth century to lead Frank A. Vanderlip, a prominent New York banker, to argue, that "the whole great Mississippi Valley gives promise that in some day distant perhaps it will be another New England for investments. There is developing a bond market there which is of constant astonishment to eastern dealers,"[6]

There are, of course, a set of institutional developments that aided the process of interregional integration. Davis has argued for the role of life insurance companies and the expansion of the commercial paper market, Sylla looks at changes in the national banking laws, and James at changes made by the states in the legal framework of banking. More recently, Clark and Turner have underscored the role played by the nation's real current account trade balance as an independent factor.[7]

Of course, regional integration – an obvious precondition for interregional integration – itself developed only slowly. For example, Naomi Lamoreaux, in a study of New England commercial banking, has shown just how personal-

[6]Frank A. Vanderlip was Vice President of the National City Bank. He made the statement in a speech in 1905. He is quoted in G. Edwards, *The Evolution of Finance Capitalism*, (New York: 1908), p. 185.

[7]Lance E. Davis, "The Investment Market, 1870-1914: The Evolution of a National Market," *The Journal of Economic History*, Vol. XXV, No. 3, September, 1965, pp. 355-393; Richard Sylla, "Federal Policy, Banking Market Structure, and Capital Mobilization in the United states, 1863-1913, *The Journal of Economic History*, Vol. XXIX, No. 4, December, 1969, pp. 657-686; John James, "The Development of the National Money Market," 1893-1911, *The Journal of Economic History*, Vol. XXXVI, No. 4, December, 1976, pp. 878-897; William Clark and Charlie Turner, "International Trade and the Evolution of the American Capital Market, 1888-1911," *The Journal of Economic History*, Vol. XLV, No. 2, June, 1985, pp. 405-410.

ized capital remained despite the existence of an apparently depersonalizing institutional structure.[8] From her examination of the records of a number of nineteenth century New England banks, she concludes that it was not market forces but kinship connections that structured the loans made by those institutions.

Drawing on a different body of evidence and making a distinct, but parallel, argument, Kenneth Snowden has demonstrated that as late as 1890, after the effects of risk have been netted out, there still remained significant interregional differences in mortgage interest charges. "Mortgage rates were substantially higher for borrowers in the South and West and represented a tangible financial burden. Effective rates of interest on both home and farm mortgages were 2 to 3 percent higher in many of the western regions than identical loans would have been in the Northeast. Borrowers in these regions do not, however, appear to have been the victims of eastern monopoly power. Instead, I conclude that home as well as farm borrowers paid high rates in the West and South because of the direct costs of moving funds between regions and uneven diffusion of financial innovation."[9]

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[8]Naomi Lamoreaux, "Banks, Kinship, and Economic Development: The New England Case," *Journal of Economic History*, September, 1986, pp. 647-667.

[9]Kenneth A. Snowden, "Mortgage Rates and American Capital Market Development in the Late Nineteenth Century," *Journal of Economic History*, September, 1987, pp. 671-692.

Recently Hugh Rockoff and Howard Bodenhorn have shown that there was little difference between short term rates in the North and the Old South in the ante bellum era. Despite the lack of correlation in movements, there is evidence of an integrated market between those two sectors; and, given the dependence of southern cotton factors on northern financial markets that result is not surprising. They make a similar argument for the Mid West; however, their evidence is much less compelling; and they find no evidence for any significant integration between the Pacific Coast and any other region. Hugh Rockoff and

Yet a third avenue of support for the immobility argument can be found in an examination of the monopoly profits earned by those few American capitalists who were able to exploit their personal ability to mobilize capital. The list includes, but is not limited to, Jay Cooke, John D. Rockefeller, and, of course, J.P. Morgan – who, as late as 1912, was able to control more than two billion dollars of the savings of Americans willing to put their funds into enterprises that he backed, even though they were still unwilling to trust the formal depersonalized financial markets.[10] Moreover, recent work by Bradford Delong indicates that, given the existing structure of the financial markets, those savers were almost certainly correct.[11]

It seems, therefore, safe to conclude that, until the end of the nineteenth century, at the very least, the London capital market served a far more sophisticated groups of savers than its New York competitor.[12] Obviously the two markets did not exist in isolation, but it appears that a substantial fraction of the American securities traded in London were not even imperfect substitutes for many of the stocks and bonds traded in New York. That is to say, while the British contribution to American capital formation was never large, the financial flows were not trivial; and, more importantly, they

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Howard Bodenhorn, "Regional Interest Rates in Ante Bellum America," paper prepared for NBER Conference on Strategic Factors in Nineteenth Century American Economic History, Cambridge, Mass., March 1 through 3, 1991.

[10]See Davis, "Finance Capitalism," pp. 588-590; G. Edwards, *The Evolution of Finance Capitalism.*

[11]Bradford DeLong, "Did Morgan's Men Create Value?" paper presented at the 1990 meeting of the National Bureau of Economic Research program in The Development of the American Economy, Boston, Mass., July, 1990.

[12]For a more extensive development of this point see Lance Davis, "The Capital Markets and Industrial Concentration: The U.S. and the U.K., A Comparative Study," *Economic History Review*, Second Series, Vol. XIX, No. 2, 1966.

were often targeted at economic activities that lay outside the scope of the still embryonic American financial market. Moreover, they were particularly important during the last two decades of the nineteenth century when the American economy was undergoing a very rapid structural transformation.

While a part of the relatively slow development of the New York market may merely reflect the preferences of the savers with which the market dealt, a part, at least, can be traced to the institutional differences between the New York and London exchanges. The New York Stock Exchange was organized (and owned) by a collective to engage in the creation and maintenance of securities markets. While the London Stock Exchange was organized for ostensibly the same purposes, it was not owned solely by traders:

> [When the LSE] decided to build its own exchange in 1801 it did so by issuing shares which could be purchased by anyone. Consequently, there was a divorce between those who used the building for the conduct of their business – the members – and those who controlled the building and saw it as a business – the owners. In 1878, for example, there were 2,009 members of the London Stock Exchange but only 508 shareholders, a number of whom were non-members.[13]

The New York Stock Exchange building, constructed in 1868, was fully financed by its membership. Thus the wedge between owners and members that marked the London market was absent in New York – there, the sets of

[13]Ranald C. Michie, *The London and New York Stock Exchanges, 1850-1914* (London: Allen & Unwin, 1987) , p. 250.

owners and of members were identical.

The owner/member cleavage in London was clearly reflected in the exchange's governing structure. Two committees – the Committee of Trustees and Managers and the Committee for General Purposes – were jointly vested with ultimate control over exchange matters. As their names suggest, however, the committees represented different interests: the Trustees and Managers Committee represented exchange owners and General Purposes Committee represented members. Inevitably, their interests collided.[14] The identity between owners and mangers of the NYSE meant that there would be no infighting between the two groups. One committee, the Governing Committee, was final arbiter on all issues affecting the exchange, although it delegated much of its authority to subcommittees. As a collectively owned firm, the NYSE adopted policies typical of collectives in general; and those policies were quite different from the policies of the shareholder-owned London exchange.[15]

On the one hand, the evidence suggests that the rewards associated with organizing as an efficient cartel were high relative to the costs. On the other hand, the cartel carefully screened potential issues and implemented rules that, while providing a valuable service to some, made trading on the NYSE

[14]See Michie, *London and New York*, pp. 250-3 on conflicts of interest. Generally, traders were eager to adopt any technological advance which could facilitate increased market activity. Owners resisted many innovations – for instance, ticker tape machines – fearing that their introduction made exchange price quotes readily available to outsiders thus creating a disincentive for non-members to pay fees to join the exchange.

[15]See Lee Benham and Phillip Keefer, "Voting in Firms: The Role of Agenda Control, Size, and Voter Homogeneity," *Economic Inquiry*, Vol. XXXIX, October, 1991 on actions taken by collectives.

more expensive than on other competing exchanges. Firms willing and able to sustain these costs were, in effect, buying a signal – a signal that assuaged the doubts of skeptical investors – and thus, those firms were able to attract a fairly wide range of relatively unsophisticated investors and, thus, build a national market for their securities. Of course, some investors felt no need to rely on NYSE certification to gauge the attractiveness of uncertain investment opportunities; and some firms were unable or unwilling to bear the additional costs.

The more sophisticated investors refused to bear the high NYSE transaction costs and took their business to rival exchanges. It is clear that this group was small relative to the number of unsophisticated investors – the NYSE handled the lion's share of transactions in domestic securities (Table 4.1). Because the numbers of sophisticated investors were small, the rival domestic exchanges were unable to mobilize sufficient capital to meet the demands of all the myriad of firms whose growth reflected the transformation of the industrial profile of the United States. Thus, British entrepreneurs were given an opportunity to purchase American enterprises, reorganize them as "free standing companies" and, through the aegis of the London exchange, raise capital from the relatively more sophisticated British investors. At the same time, some American firms began to utilize the services of the London market themselves. From the point of view of the Board of Governors of the New York market, however, given the relative numbers of the two groups, the decision to forgo the business of sophisticated investors in an attempt to attract the business of larger blocks of relatively unsophisticated investors appears to have been a sound one.

The minimum commission rule provides perhaps the clearest example of the exchange's desire to impose a single pattern of behavior on its membership – a pattern of behavior that would guarantee efficient cartel operation. NYSE members were permitted to charge no less than one-eighth percent on every transaction they handled for non-members. The minimum NYSE rate was high; and members of rival exchanges, in an attempt to divert business to themselves, frequently undercut NYSE commission; but, because of their relatively small size, they failed to provide effective competition. Traders on two rival New York exchanges – the Consolidated and the Curb market – and those on the Philadelphia Stock Exchange typically charged half the NYSE commission rate; but when, in 1875, twenty NYSE brokers petitioned the Governors to charge one-sixteenth percent commission on large volume trades for non-members, their request was flatly refused. The importance attached to the minimum commission rule was most clearly stated by the Governing Committee in 1894; "The Commission Law is the fundamental principle of the Exchange, and on its strict adherence hangs the financial welfare and the life of the Institution itself."[16] While such language may seem overly melodramatic, it is nevertheless apparent that NYSE rulemakers sought to eliminate any commission competition between its members – differences in commission rates would not be tolerated.

The Governing Committee also attempted to secure higher individual profits for members by strictly limiting membership. In the wake of its 1869

[16]NYSE: Governing Committee, April 13, 1894; Constitution of the New York Stock and Exchange Board, February 21, 1820, Article 10. Cited in Michie, *London and New York*, p. 258.

merger with what had been called the 'Open Board,' the committee placed a 1,060 cap on membership. Between then and 1914 that cap was increased just once (to 1,100). As business on the exchange grew – 1879 stock sales were $73 million as compared with a pre-World War I high of $262 million in 1906; and bond sales had grown from $571 million in 1879 to a $1,314 million pre-War peak in 1909 – the price of seats rose. Michie notes, "Reflecting the fact that membership was restricted, and did not meet demand, was the fact that the cost of purchasing a place rose [from] between $14,000 and $26,000 in 1880 to between $65,000 and $94,000 in 1910, or approximately fourfold."[17] Restricting membership, a tool employed by many collectives, kept numbers manageable; and, as seats became increasingly expensive, it guaranteed that only the relatively wealthy could gain membership.[18]

Because it was organized as a traders' cartel, the New York Stock Exchange was able to pursue a collective strategy designed not only to maximize short run profits but also to foster rapid growth in the volume of transactions. In the mid to late nineteenth century, the typical American saver was relatively unsophisticated and, therefore, plagued by high levels of uncertainty about alternative domestic investment opportunities.[19] The informational asymmetry faced by potential investors was great; and, in an effort to at-

[17]Michie, *London and New York*, pp. 194-6; P. Wyckoff, *Wall Street and the Stock Markets: A Chronology (1644-1971), 1st Edition*, (Philadelphia: Chilton Book Co., 1982) pp.150-1; Edmund C. Stedman, *The New York Stock Exchange: Its History, its Contribution to National Prosperity, and its Relation to American Finance at the Outset of the Twentieth Century*, (New York: Greenwood Press, 1969 (copyright 1905)) pp. 473-4.

[18]See Benham and Keefer, "The Role of Voting," pp.708-10 on restricting membership in collectives.

[19]Again, the term uncertainty is used in the "Knightian" sense. That is, there was a lack of knowledge about the distribution of expected returns.

tract large national markets for its listed securities, the NYSE devised a set of procedures and trading rules that were designed to reduce the level of uncertainty. In such an environment, potentially viable firms faced a standard problem in their attempts to attract capital:

> "Higher quality parties are usually adversely affected by the presence of lower quality parties; either the higher quality parties, are pooled with the lower quality parties, to their detriment, or they must invest in signals beyond the point that they would if there were no informational asymmetry to distinguish themselves from their low-quality peers."[20]

Market screening undertaken by the NYSE allowed certain firms to invest in costly signals to separate their securities from those of competing ventures.[21] A NYSE listing itself became a signal to American investors of the "quality" of an investment opportunity.

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[20]David M. Kreps, 1990, *A Course in Microeconomic Theory*, Chapter 17, "Adverse Selection and Market Signaling", (Princeton, NJ: Princeton University Press, 1990) p. 625-660. The term "quality" appears somewhat pejorative, but in this case it should be taken as a synonym for *either* unable or unwilling (i.e., could find alternative capital sources to signal.

[21]Kreps defines market screening as a situation in which the party to a contract without information proposes a menu of contracts from which the informed party selects. In this context, the NYSE, as representative of unsophisticated investors, was the party to the contract at an informational disadvantage because the firms attempting to list their securities were relatively better informed about the distribution of potential return. The institutional rules imposed costs on those firms. Those firms willing and able to absorb these costs separated themselves from other ventures.

For a treatment of how promoters of one notorious mining venture, the Emma, used their informational advantage to manipulate investors see Clark C. Spence, *British Investments and the American Mining Frontier, 1860-1901*, (Ithaca, N.Y.: Cornell University Press, 1958) pp. 84. Of course, this firm was listed on the London Stock Exchange; there screening activity was far more lax than on the NYSE.

The most obvious of the NYSE's screening policies was its stringent vetting procedure – a procedure that required potential listings to meet high minimum standards in terms of, "size of capital, number of shareholders, and proven track record."[22] The exchange made a deliberate effort to attract large, widely held and, price wise, relatively stable issues. The rules also imposed additional costs on securities whose prices dipped below par value, and they made it virtually impossible to trade a security that did not generate the required high level of trade volume in sufficiently large trade blocks. Moreover, an addendum to the commission rules mandated that commissions would be based not on the market price of the security but on a minimum $100 par value. Thus, the rule dictated that members demand at least 12.5 cents on every share traded on behalf of non-members, even if the share price was well below $100. The importance of par values as a signal to relatively unsophisticated investors is emphasized in one study of capital market development:

> "A prerequisite for anonymous public markets was the development of mechanisms to enable outside investors better to estimate the value of businesses; this has been a very slow and arduous process, which even today appears far from complete. A rudimentary step, when most available accounting data was entirely unreliable, was the use of par value as a benchmark."[23]

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[22]Michie, *London and New York*, p. 198.

[23]Jonathan Barron Baskin, "The Development of Corporate Financial Markets in Britain and the United States, 1600-1914: Overcoming Asymmetric Information," *Business History Review*, Vol. 62 (2), Summer, 1988. p. 225.

Similarly, the Exchange imposed a minimum size requirement for a single transaction. Although in the 1890's the rules were relaxed to permit members to deal in "odd lots," until then, members had been prohibited from dealing in quantities less than the "normal" lot of one hundred stocks or bonds.[24] In short, a firm that passed the admittance tests and continued to demonstrate that the market for its issues was active and stable had purchased an expensive signal about the probable quality of those issues.

The "par value rule" discriminated not only against $100 securities trading at less than that amount, but also against "low-denomination" securities issued at values well below $100. Low denomination securities were most often offered by companies with small capital bases; and there were many such firms in the industrial, in the land, mortgage, and financial, and in the mining industries. Even if investors were willing to trade in normal lots, and it is likely that the small investor preferred odd lots, the par value rule made purchases or sales very expensive. It is, therefore, not surprising that most of these securities were listed on exchanges with more liberal trading rules.

Institutional rules are, however, not set in stone; and changing conditions led to changes in institutional structure. The NYSE did not, for example, turn away business because of an irrational prejudice against certain types of securities – they were, in fact, interested in any security that passed their

[24]Since most stocks and bonds listed on the NYSE traded near a par value of $100, the value of the smallest allowable transactions was about $10,000. Michie reports that, of the 131 million shares sold on the exchange in 1912, less than nineteen percent were priced at under $50, while 43 percent were over $100. Michie, p. 199. NYSE: Special Committee on Commissions, 1924; Governing Committee, May 11, 1886, April 13, 1887, November, 1902, May 27, 1903, March 16, 1910, March 30, 1910; Special Joint Committee on Copper Stocks, May 18, 1903.

"signal" test and, equally importantly, could attract investors from all regions and all walks of life. As long as a security was of interest to only a small or to a geographically concentrated group of investors, there were few benefits to be gained from a listing on the "Big Board", and neither the issuing firms nor the investors themselves were willing to pay the price of admission. By the mid 1880's, however, the continued viability of certain industrial, land-mortgage-finance, and mining shares on rival exchanges led the Governing Committee to conclude that those issues were beginning to attract a broad range of investors. As a result, in order to permit its members to share in those potential profits while not diluting the Exchange "quality" signal, the Board of Governors created the "unlisted department" – a department designed to permit members to trade in certain securities without granting those issues an official quotation.

Despite this institutional innovation, by the turn of the century the majority of those issues had still not managed to attract a truly national clientele; and the trade rules (i.e., commission and trade block regulations) were not weakened. The attractiveness of the new market was obviously limited. Although the unlisted department struggled along until 1910, few of its issues generated any significant trading volume. In 1895, for example, of the surprisingly large number of industrial stocks (435) covered by the department, the securities of just three firms – American Sugar Refining, National Lead, and U.S. Leather – generated ninety-four percent of the department's $13.6 million sales total.[25] When, in 1910, the unlisted department was dissolved,

[25]Michie, *London and New York*, pp.198-9; Sereno S. Pratt, *The Work of Wall Street*, (New York: D. Appleton and Company, 1903) pp. 86, 153.

securities from these three firms were added to the quoted listings.

In part, at least, as a result of the Exchange's trading rules, many firms went unlisted on the NYSE, and they turned to other American exchanges (the Boston, the Philadelphia, or, perhaps, the Consolidated), or foreign (i.e., London) exchanges. Because potential investors in these enterprises often tended to be geographically concentrated, some mining and land, mortgage, and financial firms were adequately served by other – more local – American exchanges. The San Francisco and the Boston Exchanges and the Curb Market in New York listed a wide array of mine shares throughout the years 1880-1914. Before the turn of the century, land companies and investment trusts were also often listed on the Boston Exchange.[26] Other firms – those whose capital requirements could not be met by domestic savers – turned to the more broadly based British market. It was not that all mining and land ventures could not find homes for their securities in the United States; many could and did, but that home was not the New York Stock Exchange.

In general, as long as rival exchanges steered clear of transactions in NYSE issues, peaceful coexistence was possible. For example, the Curb Market appears to have served as a proving grounds for securities unable to measure up to the rigorous standards required for an NYSE listing. NYSE brokers, moreover, recognized that there were small pockets of investors willing to channel savings into securities that did not pass the exchange's screening procedures:

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[26]Michie, *London and New York*, pp. 211-12. Joseph G. Martin, *A Century of Finance, Martin's History of the Boston Stock and Money Markets.* (published by the author, Boston, 1898). pp.196-223.

> "The Curb existed in uneasy harmony with the New York Stock Exchange, never officially recognized but extensively utilized by its membership to fill orders for clients throughout the country...An estimated 85 percent of the Curb's total business was on behalf of members of the NYSE, with whom constant contact was maintained through the use of messenger boys, signalling from upper office windows, and conveniently sited telephones at ground-floor window level."[27]

Interestingly, this quote not only underscores the tacitly accepted division in function between the two exchanges, but it also suggests that Curb listings enjoyed something more than local or regional interest.

The continued existence and viability of regional exchanges indicates that there was also a fragmentation between investors in different regions of the country. If there were gains to be had from consolidation of trade activity in national issues, at some point in the period, one would have expected the smaller American exchanges to handle only regional listings as national issues gradually gravitated to New York. Through at least 1910, however, the Boston Stock Exchange, for example, listed land, mortgage and financial firms and mining concerns located throughout the country. At least one market observer, Charles Head, a member of both the New York and Boston Stock Exchanges, noted the regional fragmentation between investors:

> "We do a pretty large business in Boston which does not come to this city [New York] at all – where the customers are Boston

[27]Michie, *London and New York*, pp.206-7.

men, and the business is done there. We do a large business in these Boston stocks – in all the copper stocks."[28]

The persistence of trade activity unique to a single exchange – the Boston (and to a lesser extent the Philadelphia) – suggests that the exchange served a group of relatively sophisticated investors who did not solely rely on the New York Stock Exchange's "certification" to reduce their uncertainty. Arthur Johnson and Barry Supple argue that Boston investors' early experience in the China trade made them particularly suited to investment in the American West. In their words, those investors were "A close-knit group, accustomed to managing far-flung enterprises, they appeared on the domestic scene at a time when the West offered great opportunities to capital and entrepreneurial talent."[29] In sum, it is quite apparent that not all American savers were equal in their abilities to evaluate uncertain investment opportunities; and, even at the turn of the century, the majority, even of those willing to hold paper securities at all, still demanded "official certification."

The combination of rapid increases in the demand for capital, relatively unsophisticated investors, and restrictive trade rules meant that firms in certain sectors of the American economy, particularly corporations located in the South and West went unserviced by the New York market; they were, however, often able to attract capital on the London market.[30] Certainly, by

[28]NYSE: Special Investigation Committee, Continuous Quotations, January 27, 1903; Michie, *London and New York*, p. 210.

[29]Arthur M. Johnson and Barry E. Supple, *Boston Capitalists and Western Railroads*, (Cambridge, Mass.,Harvard University Press, 1967) p. 19.

[30]Although the London market was less likely to shy away from smaller, more volatile issues with low potential trade volumes than its American counterpart, it has been sug-

the end of the period, the New York market had begun to display evidence of approaching maturity – that is, its traders and specialists had begun to serve a wider array of enterprises; however, it lagged its London counterpart by at least two decades. Domestic land, finance and investment companies, as well as mining, agricultural, and other land based firms, were forced to retain their London connections until well into the present century.

In the final analysis, except perhaps in the short run, it was not lack of American savings that led American firms to the London capital market. While there may still remain questions of the level of American savings in the ante bellum decades, there is little doubt that the gross savings rate averaged almost twenty-five (and the net rate more than eighteen) percent from about 1870 to at least 1908; and these rates were far higher than those observed in Britain.[31] Instead, it was a combination of the organizational structure of the New York exchange and the perceptions of the majority of

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gested that the LSE was also unable to serve the full range of financial requirements of its domestic economy – particularly those of industries characterized by rapid technological innovation and potential economies of scale. "If British capital markets were poor places to buy and sell industrial securities, they, especially London, were very good places to sell government stocks, railroad securities, and municipal and public utility bonds. Substantial markets also existed in London for trading the securities of foreign land, finance, and investment companies – the later two types generally dedicated to financing international trade – and mining, agricultural, and other extractive activities. Foreign industrial assets, however, were traded in Britain with, if anything, even less success than their domestic counterparts." [William P. Kennedy, "Notes on Efficiency in Historical Perspective: The Case of Britain, 1870-1914," mss. May, 1981.] Regardless, the point here is not that the LSE serviced all American economic sectors sufficiently, but that it better serviced certain sectors than did the NYSE.

[31]Lance Davis and Robert Gallman, "Savings, Investment, and Economic Growth: The United States in the Nineteenth Century," forthcoming in John James and Mark Thomas (eds.), *Capitalism and Social Progress: Themes and Perspectives, Essays in Honor of Max Hartwell.* (Chicago, IL: University of Chicago Press, 1992), Table 2.

American savers – savers who were unwilling to risk their accumulations in enterprises far removed from their usual experience. As those savers became more sophisticated, the potential economies of scope from a more broadly based exchange increased; and, ultimately, it paid those who governed the New York exchange to increase their listings – at least somewhat.

Despite the very high rate of domestic savings, the New York exchange failed to mobilize sufficient savings to provide finance for the entire range of investment opportunities then available in the United States. That problem became particularly acute in the decades following the Civil War as the rapid transformation of the American economy generated a substantial demand for finance in sectors of the economy that were well outside the normal experience of American savers. At the same time, European, and particularly British, savers possessed sufficient resources to fill at least part of the gap; but they appear to have been more comfortable dealing with their local brokers and a known market than with strangers and strange institutions located thousands of miles away.

4.3 Institutional Differences: Additional Quantitative Evidence

The results from Chapter Three indicate that land-mortgage-finance (LMF) firms, mines, and rails each had distinctive return profiles. They differed in size of issue, average return, return variance, and price volatility. Mining and LMF issues were unsuitable for the NYSE, albeit for slightly different

reasons:

> "The New York Stock Exchange did not discriminate solely on size and potential turnover; for there was also a strong prejudice against volatile securities or those of unproven companies, because of the risks involved. Sudden price changes could cause large losses, resulting in the collapse of individual brokerage firms and undermining the stability of the market, while the failure or difficulties of quoted companies would reflect badly on the others lowering their status and discouraging investment. For these reasons the Stock Exchange was extremely careful to vet the stocks and bonds it admitted to quotation, seeking for reasons to refuse rather than to accept. The securities most affected by this policy were those of mining companies, which tended by the very nature of their business to have an erratic and often brief life. Oil was similarly regarded, as were industrial and commercial concerns until they had proved themselves both individually and as a sector. The [New York] Stock Exchange was not a market for either small, new, or risky ventures but one for large, established and secure corporations or the issues of government, at all levels but with unblemished records." [32]

Whereas mines failed on three counts – they were small, new, and risky – LMF firms failed on two; they were small and new. Although the returns data suggests LMF firms were far from volatile, the small size of the issues

[32]Michie, *London and New York*, pp. 198.

and the relatively low potential turnover made a New York Stock Exchange listing impossible.

Results from the 1900's returns sample indicate that LMF and mine shares were more thinly traded than rail shares. For each firm type, the percentage of issues having the same December high, low, open, and close prices was computed for each year. Of the LMF firms, on average, roughly fifty-one percent experienced no December change in a given year, as compared with thirty-seven percent for mine shares, and only one percent for rail shares.[33] Although it may have been possible to conduct transactions in these markets without affecting price, it seems highly unlikely. It was assumed therefore that no price change indicated no market activity for the month. That LMF and mine issues often generated no trades for an entire month further underscores their inappropriateness for the NYSE.

Another way to demonstrate that the pure LSE listings (LMF firms and mines) differed from the jointly listed railroads is to look at defaults. It is easy to pick out those firms whose common stock issues did not persist throughout the sample period (see Table 4.2). While one in five of the LMF firms and half of American mines identified on the LSE in 1880 did not persist through 1889, all of the 1880 American rails did last. While, for the 1900's sample twenty-one percent of rail issues disappear before 1909, the percentages for LMF firms and mines are forty-seven and sixty-seven respectively. Of course, disappearance from the returns sample does not necessarily imply that these firms defaulted. Fortunately, however, consulting *The Register of Defunct*

[33]Curiously, for the 1880's sample, all issues experienced December price changes in all years.

and Other Companies Removed from the Stock Exchange Official Year Book enabled identification of the majority of the disappearing firms as either having reorganized or defaulted.[34]

Of the five mines disappearing from the 1880's sample – La Plata Mining of New York, the Eberhardt, the Eberhardt & Aurora, Flagstaff Silver, and Last Chance Silver of Utah – three ceased operation outright while two reorganized. The two reorganized firms each went out of business before the turn of the century. Four of the six mining issues in the 1900's sample departed previous to 1909 – two were removed from the *Register* by 1904 (Mountain Copper and Utah Consolidated); the remainder appear to have discontinued operation by 1916 at the latest. The *Register* does not disclose the fate of two of the eight LMF firms departing from the 1900's sample (Texas Land & Mortgage and Investors Mortgage Security), but it does indicate that four others had their final meetings previous to 1910; another underwent reorganization and subsequently failed in 1919, while the U.S. Investment Corporation, the firm with the remaining issue, was not dissolved until 1968. In contrast to LMF firms and mines, of the five rail issues disappearing during from the 1900's listings, the Kansas City Southern and the Northern Pacific reappeared before 1910, two others were reorganized, and the Mexican Central had its properties transferred to National Railways of Mexico in 1909. That mines disappeared from the sample was, perhaps, to be expected in that ore deposits become exhausted over time. However, the LMF disappearances are less readily dismissed. LMF firms, therefore, exhib-

[34]Wilfred S. Wareham (ed);*The Register of Defunct and Other Companies Removed from the Stock Exchange Official Year Book*, Thomas Skinner & Co., Croydon. 1971.

ited a volatility not apparent in price fluctuations, and, most importantly, not seen in railroads.

In sum, the evidence uncovered here points to differences in issue size, trade volume, and probability of default between LMF and mining firms on the one hand, and rails on the other. Although LMF and mine shares clearly lacked the requisite qualities for a New York Stock Exchange listing, they could find homes on other smaller American exchanges – most notably, the Curb, and the Consolidated in New York City, and exchanges in Boston, Chicago, Philadelphia, and San Francisco. Again, the business transacted on these exchanges was trivial compared to that of the NYSE (Table 4.1). Clearly, no American exchange rivaled NYSE supremacy; however, these exchanges served their purpose in that they provided markets for shares from firms with small capital bases – firms often located in the West.

For example, evidence from Martin's *History of the Boston Stock and Money Markets* suggests that at least by the 1880's, the Boston exchange handled a variety of Land Company, Investment Trust, and Mining Shares.[35] Martin reported high and low share prices for a number of "miscellaneous" companies from 1886 to 1898. Among them were the American Loan and Trust, Boston Investment Co., Davidson Investment, Farmers Loan and Trust of Kansas, Massachusetts Loan & Trust, Iowa Railroad Land, Lombard Investment, and New England Mortgage Security. Of course, it is impossible to know from their names what kind of activities these firms engaged in; it does, however, seem safe to conclude that, despite their listing on the

[35]Joseph G. Martin, *A Century of Finance, Martin's History of the Boston Stock and Money Markets.* (Boston, published by the author, 1898). pp. 196-223.

Boston exchange, firms like Iowa Railroad Land and Farmers Loan & Trust of Kansas engaged in investment activity outside of New England. Martin's decision to categorize these firms as "miscellaneous" is unfortunate because it is unenlightening, but the names of at least some of them resemble those from trusts and investment companies in the 1880's LSE returns sample (Colorado Mortgage and Investment of London, for example).

Fortunately, Martin provided a separate category for land companies. As with the miscellaneous firms, he reported yearly high and low share prices for 1886 to 1898. Among the similarities between the Land Companies in the Martin sample and those from the Capital Called and Returns samples taken from the *Investor's Monthly Manual* are their share prices. Of the twenty-seven land companies listed by Martin for 1889, twenty-one had share prices under $10 - the vast majority of these hovered well below $5. With the exception of British American Land, the five LMF firms in the 1880's returns sample all had share prices below $5 throughout 1889. Though price level comparisons are suggestive of similarities between LMF firms listed in London and land companies traded in Boston, comparisons based on price movements would perhaps be preferable. In particular, it would be best if returns series could be computed for the Boston firms. Unfortunately, while Martin did report dividend information for many of these firms, he left out yearly opening and closing prices thus making returns impossible to construct based solely on his information. The yearly high and low share prices do, however, permit direct volatility comparisons with the London sample for

1886-1889 (Table 4.3.).[36]

One difficulty in comparing the Boston and London samples is that Martin and the *Investor's Monthly Manual* almost certainly used different definitions for land companies. For example, the Boston Water Power Co. would not have been categorized as a land firm had it been listed in London. Further, whereas London listed land firms tended to concentrate investment in the West, Boston land firms lacked a particular regional focus. Firms like Penobscot Bay and Anniston City probably didn't specialize in Western investments; others like Topeka Land and San Diego Land probably did. With still others – Maverick or Boston Land – it seems impossible to tell. The wide range of Boston land firms is reflected in yearly share price volatility rankings of Boston and London firms. While the London firms all ranked among the least volatile shares, that is, within the top ten, the Boston firms were more widely dispersed. Five Boston firms – firms such as the Essex Company and Boston Land – fleshed out the top ten; the remainder and vast majority of Boston firms ranked well below the London firms. In any event, the volatility results suggest that there were some shares that were considered "land" company shares in Boston that exhibited volatility and share price levels consistent with American land, mortgage, and financial companies listed in London.

American mine share comparisons between the Boston and London exchanges are somewhat less problematic than were land company comparisons. Whereas Martin apparently grouped a wide variety of firms under the general

[36]As in Chapter 3, issues are ranked from least volatile to most volatile.

heading "Land Companies," most mine firms were found under the relatively more specific heading, "Michigan Copper Mines." As with the land companies, returns for the Boston mine shares are impossible to compute from the Martin data. Comparisons based on yearly share price volatilities do, however, suggest similarity between American mines listed on the London exchange and copper mining shares traded in Boston (Table 4.4). Over the period 1880-1889 the mean yearly volatility for the Boston copper mining share sample and the London sample were strikingly similar: .785 for Boston and .796 for London. The standard deviation for the Boston sample (.514) was only somewhat greater than for the London sample (.361). Further, the range between high and low volatility observations in each sample was also quite similar – subtracting the lowest observation for the highest yielded a 1.15 volatility differential for Boston mines versus 1.07 for London mines – although the extreme observations for Boston are at a somewhat lower level than those for London. On the whole, the share volatility comparisons between the Boston and London exchanges suggest that American land and mining company shares were not unique to London; at least one U.S. exchange listed issues similar to the London offerings from these industries. The notion that American savers were risk averse and thus were unwilling to invest in risky western ventures cannot be entirely correct – some American investors found mines and land firms suitable investments; but, as noted in the previous chapter, these groups of investors tended to be small and geographically concentrated.

Of course, Boston's was not the only American exchange to list mining shares; in fact, Martin's heading "Lake Superior Mining Shares" suggests that

Boston mining listings catered not to American mining in general, but to a specific regional subset of mining operations.[37] On a number of American exchanges mining shares were traded throughout the late nineteenth and early twentieth centuries, and most of those mines were located in areas other than the Lake Superior region (Table 4.5).

Given both Michie's descriptions of listings on the New York Stock Exchange and the New York/London listings comparisons in Chapter 3, it may seem surprising that at year end 1880 ten mining shares were found among the NYSE daily price data printed in *The New York Times*. However, on the same day *The Times* reported share prices for twenty-eight mining firms traded on the San Francisco exchange; in addition, Martin's data indicates that thirty-three copper mine shares were traded in Boston during 1880. The bulk of American mine listings were on exchanges other than the New York and London markets; yet, no single one of these "other" exchanges had a stranglehold on mine listings as evidenced by the roughly equal number of listings on the Boston and San Francisco exchanges.[38]

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[37]Martin's data does however indicate that by at least 1886, trading in a handful of non-Michigan or "Miscellaneous Mine Shares" did occur on the Boston exchange.

[38]Though on the last day of 1880 *The Times* reported mine data from only New York and San Francisco, this does not imply that no other exchange listed mine shares. Michie notes that after the Civil War:

> "The sudden unearthing of minerals and oil created an explosion of interest in the ventures involved, which led in turn to the creation of numerous stock exchanges to cope with the vast turnover in the securities they issued, with which investors hoped to make their fortunes. The exchanges were usually sited either in convenient centres for the mineral fields – such as Virginia City for the Comstock lode and Pittsburgh for the Pennsylvania oil wells – or in populous cities with numerous investors, like San Francisco and Chicago. Most of these exchanges disappeared long before the minerals, but a few did progress to become established securities markets." Michie, p. 211.

Boston and San Francisco maintained extensive mine share listings throughout the 1880's; at year end 1890 *The Times* reported price quotes for twenty-four listings in San Francisco while Martin reported thirty copper listings and twelve listings under the heading "Miscellaneous Mining"on the Boston exchange.[39] Although twenty years later, at year end 1910, *The Times* reported no price data from San Francisco, price quotes on mine listings from four other American exchanges were reported – an exchange in Colorado Springs listed twelve mine shares, Boston thirty-four, the Consolidated Exchange nine, and the Curb market listed twenty-nine shares.[40] Relying on *New York Times* price data most assuredly understates the number of mine listings on non-NYSE exchanges. For example, Michie reports that in 1908 the Curb Market quoted prices for one hundred seventy-four different mining companies but that only seventy had what he considered an "active" market.[41] *The Times* data is clearly less comprehensive than Martin's Boston data, yet it is rich enough to demonstrate that the Boston experience was not particularly unique – at least with respect to mines. A number of exchanges serviced sectors of the economy whose firms typically had small capital bases and whose shares had small trade volume relative to

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[39]The miscellaneous mine listings include the following: Bonanza Development, Bonanza and Montana, Breece, Butte & Boston, Catalpa, Crescent, Don Enrique, Dunkin, Geyser, Lake Superior Iron, Napa, and Santa Fe.

[40]Although *The Times* neglected San Francisco listings at year end 1910, the exchange apparently still was doing some mine business: "The San Francisco Stock Exchange managed to find a succession of mining securities in which to trade, being able to tap an extensive and diverse mineral area, so that it remained a mining exchange throughout the period from its foundation in 1862 to the First World War." Michie, p. 211.

[41]Michie, p. 206-7.

NYSE shares.

The respective "regional" exchanges and the New York Stock Exchange did not, however, operate in isolation from one another. While small clusters of sophisticated investors in New England may have concentrated solely on Boston Stock Exchange listings, some New Englanders were concerned with shares listed on the "Big Board". The New York Stock Exchange estimated that its, "members ... were receiving from 850 to 2,300 domestic cables a day, especially from connections in other major cities such as Philadelphia, Boston, Baltimore, St. Louis, Chicago and San Francisco, as well as small neighboring centres like Hartford, Connecticut and Providence, Rhode Island."[42] It is, of course, difficult to know whether these 800 to 2,300 cables are impressive without knowing what percent of overall trade volume they generated. The point, however, is that some investors outside of the New York City area utilized the NYSE from at least the beginning of the period covered in this study. Whether these were unsophisticated investors who happened to be located in cities with small pockets of relatively sophisticated investors, or whether the sophisticated investors themselves made use not only of their local exchange but also the New York market, is difficult to know.

Some hints can, however, be found in a somewhat peculiar place – the advertisements chapter of Martin's *A History*. It seems that investment banking and brokerage houses – at least those houses catering to the readership of Martin's studies – felt the need to emphasize their widespread connections

[42]Michie, p. 204.

in financial markets throughout the United States and, to a lesser extent, Europe. Of the thirty firms under the heading "Bankers and Brokers" in Martin's advertisements, twenty of them advertised trading connections outside the Boston exchange (Table 4.6). Of the ten that didn't mention outside services, at least one, Kidder, Peabody & Co., had connections in other markets.[43] While one stock broker, James R. O'Hara, was relatively vague about the nature of his connections in other markets, noting simply that he bought and sold machinery stocks, mining stocks, and inactive or unlisted stocks and bonds "in all markets," most advertisements were somewhat more specific. For example, of the 17 advertisements in which membership on any exchange is mentioned, twelve made mention of membership on at least two exchanges. Of the five that advertised only Boston Stock Exchange membership, three had direct wires to firms with membership on other exchanges. One of the three, Bright, Sears & Co., had direct wires to members on the New York Stock Exchange, the Pacific Stock Exchange, the New York Cotton Exchange, and the Chicago Board of Trade. Richardson, Hill, & Co., a firm engaged in transactions in "the highest grade of commercial paper," advertised membership on no exchange, choosing rather to emphasize their, "direct private wires connecting with New York, Philadelphia, Baltimore, Washington, Chicago, and New Haven and Bridgeport (Conn.)."

Although the typical advertisement emphasized connections between the Boston and New York Stock Exchanges, five, including Brown Bros. & Co.(later to become Brown Bros. Harriman after a 1930 merger with Harri-

[43]See Vincent P. Carosso, *Investment Banking in America: A History*, (Cambridge, Mass.: Harvard University Press). 1970. pp. 1-40.

man Brothers), Brown Riley & Co., and A.L. Sweetser & Co., explicitly mentioned connections to other cities or exchanges along the eastern seaboard. Four firms – E.C. Hodges & Co. and Lee, Higginson & Co, in addition to the two previously mentioned – advertised connections in Chicago; the advertisement of Jacob C. Rogers, attorney to the seemingly omnipotent J.P. Morgan & Co. emphasized connections in London and Paris.

4.4 Conclusions

Securities from companies with relatively small capital bases – for example, land companies and mines – were purposefully avoided by the Board of Governors of the New York Stock Exchange. Market screening undertaken by the exchange allowed certain firms to invest in costly signals to separate their securities from those of competing ventures; an NYSE listing, therefore, became a signal to American investors of the "quality" of an investment opportunity. Of course, firms had to be both willing *and* able to absorb these costs. Securities from some small firms, although clearly relatively stable, high-quality investment opportunities, were unable to satisfy the NYSE criteria simply because of their size. Apparently, the small trade volumes these issues did generate were not sufficient to induce the Governors of the Exchange to change their vetting procedures.

Listings from U.S. exchanges other than the New York Stock Exchange suggest that these smaller firms did market securities domestically. London, therefore was not the only option for these firms. These exchanges probably catered primarily to a local clientele, although regional divisions between

investors were not so cut and dried. The New York exchange received orders from throughout the country from at least 1870 on, and Boston Banker and Broker advertisements from 1898 indicate that some subset of investors was keenly interested in financial services offered not only outside Boston, but also outside New York.

4.5 Tables

Table 4.1

Table 4.1.
U.S. Securities Markets, Sales in 1910

	Stocks		Bonds	
Market	Number	Proportion	Par Value	Proportion
New York Stock Exchange	164,150,061	68.5%	$ 635.0m	90.6%
Consolidated Stock Exchange	32,238,773	13.4%	-	-
New York Curb Market	18,671,438	7.8%	$10.8m	1.5%
New York: Total	215,060,272	89.7%	$ 645.8m	92.1%
Boston Stock Exchange	15,503,336	6.5%	$32.7m	4.7%
Philadelphia Stock Exchange	8,341,599	3.5%	$14.6m	2.1%
Chicago Stock Exchange	894,362	0.4%	$7.4m	1.1%
Total	239,799,569	100.1%	$700.5m	100.0%

Sources: Reprinted from Michie, p.170. NYSE: New York Stock Echange, Special Committee on Commissions, Memorandum, 1924; Consolidated: Consolidated Stock Echange, Annual Report, year ending 31 May 1910; Curb: Jones & Baker, *Profits and Dividends on America's Second Largest Stock Market*(New York, 1919); Boston: J.G. Martin, *Stock Fluctuations* (Boston, 1911); Philadelphia: A.W. Barnes (ed.), *History of the Philadelphia Stock Exchange, Banks and Banking Interests (Philadelphia, 1911); Chicago: F.M. Huston and A. Russell,* Financing an Empire - History of Banking in Illinois (Chicago, 1926), Vol. I.

Table 4.2.

Percent of Issues Disappearing From Returns Sample

	1880-1889	1900-1909
Railroads	0	20.8
Land Cos.	20	47.1
Mines	50	66.7

Source: *The Investor's Monthly Manual.*

Table 4.3

Table 4.3.
U.S. Land Firm Volatility, 1886–89
Boston and London Exchanges

	FIRM	EXCHANGE	AVG. VOL.
1.	Essex	B	.092
2.	Scottish Amer. Inv.	L	.144
3.	Scottish Amer. Mort.	L	.151
4.	British Amer. Land	L	.153
5.	Boston Wharf	B	.185
6.	Amer. Mort. of Scot.	L	.189
7.	Anniston City	B	.234
8.	Colorado Mort. Inv. London	L	.336
9.	Boston Land	B	.364
10.	New Hampshire	B	.376
11.	Aspinwall	B	.433
12.	Brookline	B	.434
13.	Winthrop Shore	B	.545
14.	East Boston	B	.559
15.	West End	B	.580
16.	Topeka	B	.634
17.	Maverick	B	.674
18.	Wollaston	B	.686
19.	Boston Water Power	B	.705
20.	Cutler	B	.766
21.	Payson Park	B	.769
22.	San Diego	B	.779

Sources: Joseph G. Martin, *A History of the Boston Stock and Money Markets*; *Investor's Monthly Manual.*

Table 4.4

Mine Volatility Comparison

Boston, London Exchanges 1880–89

EXCHANGE	LOW	HIGH	MEAN	ST. DEV.
Boston	.262	1.41	.785	.514
London	.596	1.67	.796	.361

Sources: Joseph G. Martin, *A History of the Boston Stock and Money Markets*; *Investor's Monthly Manual.*

Table 4.5.

American Mines, Common Stock Listings

EXCHANGE	DATE	MINE LISTINGS
London	12/31/80	8
NYSE	12/31/80	10
San Francisco	12/31/80	28
San Francisco	1/30/90	24
Colorado Springs	12/30/10	12
Boston	12/31/10	34
Consolidated (NY)	12/31/10	9
Curb (NY)	12/31/10	29

Source: *The New York Times.*

Table 4.6

Table 4.6.
Services advertised by bankers and brokers in
A Century of Finance, Martin's History of The Boston Stock and Money Markets

Firm	Orders Executed	Wires	Seats
Adams & Co.			BSE
Bangs, E.D. & Co.			BSE, NYSE
Basset, William	All		BSE, NYSE
Blake Bros. & Co.			BSE, NYSE
Blodgett, Merritt & Co.			BSE
Bright, Sears & Co.	All	NYSE,PSE,NYCE,CBOT	BSE
Brown Bros. & Co.		N.Y.,Phil.,Balt.	
Brown, Riley & Co..	All		BSE, NYSE, NYCE
Curtis & Motley			BSE, NYSE
Day, R.L. & Co.			BSE, NYSE
Hodges, E.C. & Co.		N.Y., Chic., All large	BSE, NYSE,CBOT
Lee, Higginson & Co.			BSE, NYSE, CSE
Norman & Co.		N.Y.	BSE, NYSE
O'Hara, James R.	All		
Parkinson & Burr		N.Y.	BSE, NYSE
Prince, F.H.			BSE, NYSE
Richardson, Hill & Co.		NY,Phil,Bal.,DC,Chic.,Conn.	
Rogers, Jacob C.	London, Paris		
Sweetser, A.L.	All	N.Y., Prov., Phil.	BSE
Tower, Giddings & Co.		N.Y.	
Tucker, Anthony & Co.		N.Y.	BSE
Vermilye & Co.			BSE, NYSE

Note: BSE–Boston Stock Exchange CBOT–Chicago Board of Trade CSE–Chicago Stock Exchange NYCE–New York Cotton Exchange NYSE–New York Stock Exchange PSE–Philadelphia Stock Exchange

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Chapter 5

Conclusions

At one point in the evolution of each of the projects that comprise this study, the analysis seemed straightforward. In the case of the scattering problem, it appeared that, given reliable financial returns on plots of land within a village, a portfolio analysis could clearly demonstrate that scattered holdings contributed to variance reductions in peasant farmers' overall agricultural yields. Similarly, in explaining the American need for London capital flows, it seemed sufficient to demonstrate that the British targeted these flows at industries and regions neglected by American investors because the ventures were too risky. Unfortunately, expectations often require serious updating; and difficult puzzles spur more subtle explanations. In short, the data simply did not support the simple conjectures; the conclusions that can be drawn are, however, more enticing.

A simple conclusion that can be drawn from each of the projects – one that was never in any serious doubt – is that capital markets take time to

develop. As mentioned in the introduction, these markets often fail because the institutional framework required to (1) match demanders and suppliers of capital and (2) inspire the requisite trust between parties to these exchanges, is lacking. Because of the potential informational asymmetries present in capital market transactions, individuals were right to be somewhat skeptical of one another. In early capital markets, complex institutional frameworks had not yet evolved, and individuals were compelled to rely on more personal connections such as kinship networks and simple reputation building techniques. Personal connections sufficed, particularly when the scale and scope of ventures was small, and where typical owners of capital accumulations tended not to be in search of investment opportunities, at least not far from home – a place like agrarian medieval France, for example.

Perhaps then, scattering – a relatively complex institutional framework – was not a response to capital market failure. The portfolio analysis in Chapter Two makes it impossible to conclude that scattering across the taques that comprised the villages of Onnaing and Quarouble did much to reduce the overall variance of typical landholders' portfolios after accounting for the effects of crop diversification and the attendant rotation. Of course, it might be argued that, scattering may have been useful, provided it contributed to *any* variance reduction. Such an argument, however, neglects the costs associated with scattered holdings. The following simple cost-benefit analysis, in which variance reduction is compared with loss in average yields, might help settle the debate. In Table 5.1 below, the expected return on each taque in royage three is compared with that of the mean-variance efficient portfolio with the same return variance. The efficient portfolios could be comprised

of land in any of the five taques in royage three or the six in royage six. These eleven taques represented all the available land on this particular crop rotation – save for the tiny espiliers – available in the two villages.

Table 5.1

Variance	Mean-Variance Efficient Return	Individual Taque Return	Percentage (3)/(2)
(1)	(2)	(3)	(4)
.0025	.043	.040	94
.0032	.048	.044	92
.0034	.049	.048	98
.0043	.052	.051	97
.0061	.056	.054	96
		Average	95

By McCloskey's estimates, on average, landowners lost ten percent of their crop yields due to scattering.[1] In other words, provided McCloskey's estimate can be applied to these villages, peasants who held scattered plots (taques), reduced their crop yield variance by five percent in return for ten percent of their expected annual yield. Although there are undoubtedly preference profiles that would be consistent with such a tradeoff, it seems unlikely that peasant farmers would give so much in return for so little.

[1]Donald N. McCloskey,"English Open Fields as Behavior Towards Risk." in *Research in Economic History: An Annual Compilation of Research*, Paul Uselding, ed., volume 1. Greenwich, Conn: JAI Press. 1976. p. 126.

Scattering, an institution supposedly arising out of perceived market failures, apparently provided little insurance at a relatively high cost.

How then did peasant farmers subsist in relatively lean years? Recent research suggests that credit markets in early modern France, although hardly depersonalized, did exist. In particular, Hoffman, Postel-Vinay, and Rosenthal emphasize the critical role that notaries assumed in monitoring creditworthiness and matching borrowers with lenders. Based on analysis of 8,000 loans in and around Paris from 1690 to 1840 the authors conclude, "Credit, it turns out was hardly confined to the rich and influential or even to the world of government finance. In Paris, artisans both lent and borrowed. Outside the city, farmers went into debt to purchase livestock, and day laborers did so in times of dearth."[2] Rosenthal, using data from 3600 credit contracts in Southeastern France, demonstrates that short-term contracts became increasingly available to larger segments of the population from 1630 to 1788, and that, "credit markets played an important role in the French countryside."[3] These markets, moreover, were not solely confined to major urban centers such as Paris; his sample, for example, comes from l' Isle-sur-Sorgues, in which about 11,000 people lived, and "ninety percent of all loans were made to and by people who resided within a ten mile radius of the cathedral."[4] To combine the returns data in Chapter One with data on

[2]Philip T. Hoffman, Gilles Postel-Vinay, and Jean-Laurent Rosenthal, "Private Credit Markets in Paris, 1690-1840," *Journal of Economic History*, Vol. 52, No. 2 (June 1992). pp. 293-306.

[3]Jean-Laurent Rosenthal, "Credit Markets and Economic Change in Southeastern France 1630-1788," mss. 1992.

[4]Rosenthal, "Credit Markets in Southeastern France," p. 19.

credit market activity in and around Onnaing and Quarouble would be ideal; that project, however, lies beyond the scope of this particular study.

One vexing problem still remains – if scattering provided no insurance benefits, why did it persist? Unfortunately, because no answer can be determined on the basis of the data in Chapter Two, the most that can be offered here is speculation. An alternative explanation for scattered holdings that focuses on labor rather than capital market imperfections may be appropriate. As noted in Chapter One, landowners may have had difficulties in contracting for labor that made it nearly impossible to harvest all their crops at once. As a result, it may have been more efficient to contract for a small number of laborers who would then harvest plots that ripened sequentially. Scattered holdings may have provided the necessary staggering of ripening times. One piece of evidence suggestive of labor contract problems in Northeastern France during this period has been found – both the landowner and the laborer had to post a bond which would be forfeited in the event that the terms of the contract went unfulfilled.[5] Presumably, these bonds protected laborers from unexpected termination, and assured landowners that their laborers would not be hired out from under their noses. Obviously, however, much more work must be done before this explanation is anything more than speculation.

While notaries may have sufficed as intermediaries in early modern French capital markets, the demands of industrialization would require a more elab-

[5]Alexandre-Henri Tessier; Thouin; Bosc, s.v. "Arrhes" *Encyclopédie méthodique ou par ordre de matières. Agriculture* 7 vols. (Paris, 1787-1821), 1:651. For similar contractual agreements between farmers and laborers in this period, see Jean Meuvret, *Le problème des subsistances à l'epoque Louis XIV*, 3 Vols., (1977-88). Paris.

orate depersonalized institutional framework to facilitate much larger transfers. To be certain, personal connections were still important, even crucial, in this more complex environment. For example, Brad DeLong indicates that, in the late nineteenth and early twentieth centuries, because of J.P. Morgan & Co.'s access to capital, having a member of that firm on the Board of Directors added roughly thirty percent to the value of a firm's common stock equity.[6] Ron Chernow also notes the vital role played by investment bankers during this period:

> "The merger of industry and finance had made some sense in the Baronial Age and had given some stability to the American economy. Companies were then weak and had difficulty tapping capital markets, especially abroad. Only the banker's reputation could reassure skittish creditors."[7]

These personal intermediaries clearly eliminated some informational asymmetries in the financial markets; and their contributions are increasingly well documented. However, parallel developments within the largest institutional intermediaries – the stock exchanges – also aided capital flows, but have perhaps received less attention from scholars. This study has focused on the role that the exchanges played – albeit not always very successfully – in rooting out informational asymmetry in financial markets.

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[6]J. Bradford DeLong. "Did J.P. Morgan's Men Add Value? An Economist's Perspective on Financial Capitalism." forthcoming in Peter Temin (ed.) *Inside the Business Enterprise: Historical Perspectives on the Use of Information.* (Chicago: Univ. of Chicago Press, National Bureau of Economic Research.)

[7]Ron Chernow, *The House of Morgan*, 1990, (Boston: Atlantic Monthly Press), p. 698.

Certain investors did not require the aid of the New York Stock Exchange's strict vetting procedures to evaluate investment opportunities. Perhaps they had a particular expertise – in mining, for example – or relied on personal financial intermediaries like J.P. Morgan's men, or perhaps they attempted to overcome informational asymmetries in some other way. To be sure, their attempts often failed; consider the notorious "Emma," for example. It is, however, in this context that much of the capital flowing through the London Stock Exchange to the United States should be viewed. While some of the capital was placed in railroad ventures and federal, state, and municipal government bonds that also traded on the New York exchange, the vast majority of the issues from U.S. firms traded in London were not jointly traded; and, although these flows were never large, at least in comparison with the amount of domestic capital accumulation in the U.S., they were far from trivial. What is more, these flows took on a greater significance in that they were targeted for sectors of the economy whose firms could not attract capital in New York. British investment often supported land-based ventures – land, mortgage, and development firms and mines, and later chemical and petroleum firms – located in the South, the Midwest, and the West. Similarly, certain commercial and industrial concerns – in particular breweries – had success in attracting finance in London but not along the shores of the Hudson.

Why then did the New York market refuse to help finance these activities? Was the Board of Governors merely responding to investor sentiment by permitting listings for only those firms able to attract capital? The answer, somewhat surprisingly, is a qualified yes. For the particular subset of in-

vestors the Governors hoped to attract, it appears that only very specialized listings would suffice. As noted previously, capital accumulation in the U.S. around the turn of the century was not nearly as substantial a problem as was mobilization. The typical American investor was somewhat squeamish at the prospect of trading hard-earned savings for paper claims on unseen assets. The Governors of the Exchange, therefore, set up rules designed to insure that offerings on the New York market were relatively safe, stable investments.[8]

The Governors of the New York exchange preferred listing securities from firms with proven track records – issues that generated high trade volume with relatively little price volatility. Due to their small capital bases and high share price volatility mines were particularly unsuited for listing. Land, mortgage, and financial firms, on the other hand, were among the most stable securities in terms of price movements, but were also excluded form the exchange. As with breweries, small capital bases precluded a high-volume market in these securities. On the whole, these rules ensured uniformity in the kind of securities traded on the exchange; a New York listing, therefore, reassured Chernow's "skittish creditors," and those firms that survived the scrutiny obtained a costly signal which enabled them to attract capital from a much wider segment of the population.

Of course, members of the exchange often found this environment a bit restrictive. Although these rules secured for the New York traders cartel a stranglehold on the largest domestically traded issues, individual traders had

[8]These policies were not always sufficient, however. Consider the market panics of 1895 and 1907.

incentives to compete with each other not only on commission, but also by offering trading in different types of securities. However, with the exception of the "unlisted department," the Board of Governors were loathe to expand their listings to include new types of securities, and, they steadfastly refused to alter the minimum commission rule thus prohibiting any price competition between members. Of course, this meant that traders on other exchanges could undercut those in New York on any jointly traded issues, perhaps explaining why joint listings were rare. On the whole, these trade rules ensured a uniformity of business and behavior on the exchange that, first, attracted typical American investors, and, second, made sure that the trading profits generated by these new investors would not be competed away by members of the exchange.

Some of the fears of typical American investors appear to have been misplaced regarding land-based ventures in the emerging West. Cattle ranches, mortgage companies, and investment trusts earned relatively sizable, steady returns in the late nineteenth and early twentieth centuries. In fact, as the data in Chapter Three demonstrate, in terms of return level and volatility, the London listed land firms outperformed rails listed on both the New York and London exchanges. Word of such investment opportunities did not, however, sneak across the Atlantic without leaking. Groups of American investors displayed the same interest in these securities as their European counterparts. As noted previously, these groups tended to be small in number and members tended to be geographically concentrated; and, in the case of Boston investors, at least, they were accustomed to working with one another to evaluate investment opportunities far from their New England homes.

Of course, these relatively sophisticated American investors needed markets in which to trade their securities – preferably markets on this side of the ocean. The regional exchanges – most notably Boston, Philadelphia, Chicago, and San Francisco – in addition to the Curb and the Consolidated markets in New York offered the ideal homes for these securities. While most of the "regionals" tended to do a strong business in local issues, many also found room for issues from firms in land-based sectors of the economy, as evidenced by the mining and land company listings on the Boston Exchange. Provided they did not compete directly over issues with the New York Stock Exchange, these exchanges were free to exploit their unique niches in the financial network of the U.S. More importantly, along with the London market, these exchanges were crucial conduits for the capital that initially developed the West.

In the end, the story of the exchanges, one about fostering capital flow by circumventing informational asymmetry, further underscores the main point of this study: often the major obstacle in the establishment of capital markets was uncertainty as distinct from risk. Although the details differ from place to place, reliance on personal contacts proved a common response. For example, it appears that in times of dearth, agricultural laborers in early modern France could turn to highly personalized credit markets. Similarly, small groups of sophisticated investors – investors who often knew and trusted each other well – banded together to exploit investment opportunities in the American West. Relatively more elaborate institutional responses to capital market uncertainty appear to have evolved more slowly. For example, the data in Chapter Two suggest that peasant farmers' scattered holdings

were not a response to insurance and credit market failures. By contrast, nineteenth century New York Stock Exchange trading rules appear to have been attempts to alleviate uncertainty in American capital markets and thus dramatically widen their scope.

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