

Un'analisi condotta negli ultimi tre secoli evidenzia che mercati finanziari integrati sono stati più la regola che non l'eccezione anche su un periodo di tempo così lungo. Questo processo di integrazione finanziaria, tuttavia, è stato discontinuo: si è interrotto durante le principali guerre e a causa degli shock nel periodo tra le due guerre mondiali. Ogni volta, però, il processo è ripreso abbastanza spontaneamente. Nel campo della finanza, così come in altri, la prospettiva dei vantaggi generati dagli scambi internazionali ha esercitato una spinta poderosa, tale da mantenere sistematicamente attivo il processo di integrazione superando i molti ostacoli incorsi negli ultimi trecento anni.

**James R. Lothian**  
Fordham University

The current period of increased financial integration is not a first. Economic historians who have studied the subject point to two earlier periods during which international integration apparently also ran high. One was under the classical gold standard – the forty-year or so period running from the mid-1870s to 1914 (see, e.g., Jackson and Lothian, 1993; Lothian, 2000). Another appears to have occurred even earlier, during the approximate century beginning in the 1690s and ending at the start of the French Revolution (Neal, 1990).

In research that is still in progress and which I summarize in this paper I examine the degree of international financial market integration over the past three centuries. The measure that I use to judge the degree of integration is the cross-country standard deviation of real interest rates. I compute this measure for both short-term and long-term interest rates for groups of countries that vary over time according to data availability. A major focus of this exercise is on the differences and the similarities in behavior across various subperiods.

I reach two conclusions on the basis of this work. The first, which I discuss here is that financial integration has in fact been the rule over this long historical period. Major wars and the Great Depression of the 1930s temporarily arrested the process, but in each instance such interruptions proved to be transitory. The second which I merely

mention and which is the subject of continuing research has to do with the types of changes that have occurred in the integration process over time. In the main these appear to have involved a broadening of the markets involved, in terms both of geographics and the number of assets involved.

### 1 Historical Overview

In this section I discuss various features of the three key episodes of financial integration identified above, the periods 1690 to 1789, 1875 to 1914 and 1975 to 1998. Since the earliest of the three is the least well researched I deal with it in somewhat greater detail than the later two.

**The Eighteenth Century.** From the thirteenth through the sixteenth centuries the Italian city states reigned supreme in both trade and finance. During the course of the next hundred years, however, the situation changed dramatically (Kindleberger, 1984). As the seventeenth century drew to a close, the Dutch Republic was the world's foremost commercial empire and Amsterdam its most important financial center. Banking, foreign exchange trading, stock trading and bullion trading were located in Amsterdam. Amsterdam, moreover, was the conduit for the funds that Dutch investors directed abroad, principally though not exclusively in the direction of England.

The Dutch of this era were financial in-

Graduate School of Business, Fordham University, 113 West 60th Street, New York, NY 10023; emails lothian@fordham.edu, jrmlothian@aol.com. I would like to thank Matthew Morey, Jeffrey G. Williamson and participants in the European Workshop on Historical Market Integration, held at Venice International University in December 1999 and in the Ninth International Tor Vergata Conference held at the University of Rome, Tor Vergata in November 2000 for their comments on the longer study from which this paper has been excerpted.

novators and active international arbitrageurs. Perpetual bonds were a Dutch invention. Futures contracts, margins, short sales and many other financial-market instruments and techniques that we look upon as modern were commonplace (Homer and Sylla, 1976).

The Amsterdam Exchange, the center of Dutch financial trading activities, underwent a substantial change in the course of this period, greatly broadening both the types of assets traded and its geographical focus. In the early decades of the seventeenth century Dutch East India Company shares, a small number of commodities and bills of exchange were the sole trading vehicles. A century later, the Amsterdam Exchange had become a world market in which a wide range of securities and commodities were traded.

During these years, London and Amsterdam became closely linked financially (Eagly and Smith, 1976; Neal, 1990). Amsterdam, however, was the senior partner, providing the stabilizing force for London during times of English financial crisis. England, in contrast, only started to develop into a financial power at the end of the seventeenth century. The initial event in this process was the chartering of the Bank of England in 1694 as part of the Tonnage Act, a broad package of measures to enhance the government's fiscal position. In the years that followed commercial banking in England developed rapidly. The number of London banks increased from between 25 and 30 in the years 1750-65, to 50 in 1770, to 70 in 1800. Country banks – banks outside London – grew even faster, from a dozen or so in 1750, to 334 in 1797, to double that number in 1810 (Ashton, 1955, pp. 179-183). During this period, too, the London Stock Exchange was set up and an active market in foreign exchange got underway.

Then, as now, information and finance were closely linked. In 1681, the first publication regularly reporting financial market price quotes was established. Several competitor publications others quickly followed. The best known and longest in operation was the twice-weekly *Course of the Exchange* founded in 1697 by John Castaing, a London broker and Huguenot immigrant, and published by him until his death in the 1730s and by a variety of subsequent publishers over the course of the next eighty years. This eighteenth-cen-

tury version of Reuters, and its competitors were the sine qua non for the development of London into the major world financial center that it later became. For subsequent scholarly research, Castaing's publication also has proven highly valuable.<sup>1</sup> If one event can be said to mark the completion of England's transformation, however, it is the development of London to the point where it eclipsed Amsterdam as an international financial center. This took place in the decade or so following the Napoleonic War.

**The Classical Gold Standard Era.** The period from the mid-1870s until the start of World War I was the heyday of the gold standard. It was also an era of considerable economic and financial stability, and by all indication, a time of substantial economic and financial integration. Studies of the period and qualitative evidence drawn from a variety of contemporary sources suggest that the securities and foreign exchange markets during those years were among the most integrated that the world has seen. Stock and bond markets had a strong international dimension. International arbitrage activities moreover became commonplace. Commercial and investment banking systems in all of the major countries developed closer links. Rondo Cameron (1991, p. 3) in writing about the period described it as one in which «international investment reached dimensions previously unknown and the banking systems of the world achieved a degree of internationalization also without precedent».

Recent quantitative studies of the period tell a similar story. These include the studies of financial market integration by Jackson and Lothian (1993), Obstfeld and Taylor (1997), Bordo, Eichengreen and Kim (1998), and Lothian (2000), as well as the study of savings and investment by Taylor (1996), the study of cross-country real wage behavior by Williamson (1995), of capital flows by Grassman (1980), and the book still in manuscript form of Obstfeld and Taylor. All show substantial similarities between the degree of integration during the gold standard era and during the past several decades. The only debate in this literature has been with regard to which period has seen greater integration.<sup>2</sup>

**The 1980s and 1990s.** The last two decades have been a time of substantial institutional change in financial markets

<sup>1</sup> In their studies of the London and Amsterdam markets during this period, Eagly and Smith (1976) and Neal (1990) used these data extensively, as had Ashton (1955) some decades earlier.

<sup>2</sup> This internationalization was manifest in both trading and corporate finance. In this regard, see see (Michie, 1987; Wilkins, 1991; and Lothian, 1997).

and, it seems, substantially increased and still increasing, financial integration. A question that has been raised with regard to this period is why real exchange rate volatility, which increased so dramatically in the early 1970s, has apparently mattered so little. Intuitively, one might have expected it to have hindered the process of integration rather severely – something that does not appear to have happened.<sup>3</sup>

The reason, I have argued elsewhere (Lothian, 2000), is that the institutions surrounding international finance underwent a major evolution, an evolution that was itself largely a response to the increased volatility of these years and the increased risk that it occasioned.<sup>4</sup> Regulatory impediments to international capital mobility – capital controls, interest-rate ceilings and the like – were eroded and then removed because they became much more costly in this new environment. New financial instruments and new markets developed that enabled investors to mitigate the effects of exchange-rate volatility. Combined, these changes in institutions appear to have more than offset the effects of the increased volatility.

In this regard, consider the following quote from an article written in the early 1980s by Walter Wriston (1986, p.133), the former chairman of Citibank and one of the principal architects of the financial changes of that era:

«Today except in a very few instances, national borders are no longer defensible against the invasion of knowledge, ideas, or financial data. The Eurocurrency markets are a perfect example. No one designed them, no one authorized them, and no one controlled them. They were fathered by controls, raised by technology, and today are refugees, if you will, from national attempts to allocate credit and capital, for reasons that have little to do with finance or economics».

## 2 Theoretical considerations

The measure that I use to judge international financial integration is the degree of dispersion of real interest rates internationally. As Frankel (1992) and von Furstenberg (1998) have pointed out, real interest rate equalization is a quite stringent criterion. It involves behavior not only in financial

markets but in the economy as a whole. A standard way to illustrate this is in terms of the following decomposition of the real interest differential:

$$\rho_t - \rho_t^F = [(R_t - R_t^F) - s_t^*] + [s_t^* - (\pi_t^* - \pi_t^{F*})] \quad (1)$$

where  $\rho_t - \rho_t^F$  is the ex ante real interest rate differential ( $R_t - R_t^F$ ) is the nominal interest rate differential,  $s_t^*$  is the anticipated percentage change in the nominal exchange rate and  $(\pi_t^* - \pi_t^{F*})$  is the differential in anticipated inflation rates.

The first term on the right of (1) is the deviation from uncovered interest parity (Uip). The second is the deviation from relative ex ante purchasing power parity (PPP). For real interest rates to be equal, either Uip and PPP, or their analogues under fixed exchange rates, equality of nominal interest rates and equality of inflation rates, have to hold perfectly or their deviations have to totally offset one another. In either case, the right-hand side of (1) will be zero and  $\rho_t - \rho_t^F$  will be equal. The only difference between fixed and floating exchange rates in this regard is that  $s_t^*$  is zero under fixed rates, and non-zero under floating. Real interest equality is therefore a useful criterion for gauging the degree of integration over long periods of time, periods in which exchange rate regimes have changed with some frequency. As such, it is ideally suited the types of comparisons made in this paper.

In the absence of perfect foresight, distinctions between actual and anticipated rates of inflation and actual and anticipated rates of exchange-rate change, and hence between ex ante and ex post real yields, all become relevant. In this case we can write an analogue to (1) as

$$r_t - r_t^F = (\rho_t - \rho_t^F) + \varepsilon_t^\pi \quad (2)$$

where  $r_t - r_t^F$  is the difference in ex post real yields, which in parallel fashion to (1) is equal to the sum of the deviations from ex ante UIP and PPP, and where  $\varepsilon_t^\pi$  is the difference in the inflation-prediction errors in the two countries,  $(\pi_t^* - \pi_t) - (\pi_t^{F*} - \pi_t^F)$ , which in turn is equal to the difference between the foreign and domestic deviations of the actual and anticipated rates of inflation.

In the empirical work that follows, I use ex post measures of real interest rates throughout, but focus exclusively on the

<sup>3</sup> See McKinnon (1990) and the survey of Mussa and Goldstein (1993) for discussions of this issue.

<sup>4</sup> For theoretical treatments of this issue see Telser (1981).

relationships in quinquennially averaged data. Under the usual assumptions of rational expectations, prediction errors will be mean zero in large samples, and therefore are likely to be reduced by this averaging.

### 3 Data and empirical results

The underlying interest-rate data are annual observations for long-term bond yields (generally government bonds) and a variety of short-term, money market interest rates for samples of ten countries and seven countries respectively. The price-level data used to construct these estimates are for the most part for Gdp (or Gnp) deflators beginning in 1870 and linked to either Cpis or WPIs before that date.<sup>5</sup> The ten-country sample is made up of Belgium, France, Germany, the Netherlands, Sweden, the United Kingdom, the United States, Canada, Italy, and Norway; the seven-country sample excludes the last three. The sample period varies according to data availability, but at its longest – short-term real rates for both the United Kingdom, and the Netherlands – runs from 1700 through 1998.

As a proxy for the ex ante real interest rate I use the spreads between the nominal rates and the contemporaneous rates of inflation. For the money market rates, the errors introduced by this procedure probably are somewhat less of a problem than for the long-term bond yields. For the short-term interest rates the actual rate of inflation is likely to provide a better estimate of the anticipated rate of inflation than it is for the long-term interest rates. Also, as mentioned earlier, I use five-year averages of these basic data as units of observation. Arguably this provides more accurate estimates of anticipated rates of inflation than the annual data.

There are both differences among countries in the dates at which the series start and occasional missing observations for most of the countries thereafter. Such lacunae provide additional reasons for focusing on the cross-country dimension of the data.

**Overview of Real Interest Rate Behavior.** Figure 1 and Table 1 provide overviews of the data. The underlying data in both instances are cross-country standard deviations of quin-

quennial average ex post real short-term interest rates and ex post real long-term interest rates for the maximum number of countries for which data are available in any particular quinquennium. I refer to these measures throughout as the «composite» standard deviations.<sup>6</sup> Table 1 lists averages of these figures for various subperiods; Figure 1 plots those averages.

Additional information on cross-country real interest rate

Figure 1

#### Cross-country real interest dispersion by subperiods

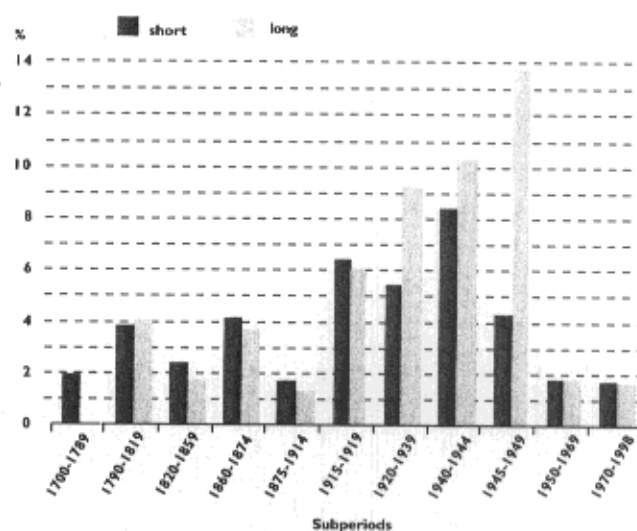


Table 1

#### Subperiod averages of quinquennial cross-country standard deviations<sup>1</sup>

Periodo	Short-term rates	Long-term rates
1700-1789	1.76	
1700-1729	1.82	
1730-1789	1.73	7.10
1790-1819	3.65	3.87
1820-1859	2.22	1.50
1860-1874	3.94	3.51
1875-1914	1.50	1.17
1915-1919	6.22	5.87
1920-1939	5.23	9.10
1940-1944	8.22	10.16
1945-1949	2.08	4.01
1945-1949	4.08	13.62
1950-1969	1.58	1.60
1970-1998	1.55	1.43

<sup>1</sup> Figures are averages of the composite standard deviations.

<sup>5</sup> A detailed description of series and sources is presented in a data appendix available from the author on request. Note that for Belgium, the WPI is used for the full sample period and for the Netherlands the CPI is used.

<sup>6</sup> This number varies over time and across assets. For short-term interest rates, for example, data are available for only two countries in the early part of the eighteenth and as opposed to the ten countries for which there are long-term bond data in the twentieth century. In additional work not reported here, these variations in sample size make little difference.

behavior over this long sample period is provided by the regression results reported in Table 2. The independent variables in these regressions were a set of zero-one dummy variables for the various subperiods. I ran these regressions for the two composite standard deviations. The dummy variables and the periods for which they took the value of one were as follows: Dww2, a World War II dummy, 1940-49; Dww1, a World War I dummy, 1915-1919; Dcw, a U.S. Civil War dummy, 1860-1874; Dfn, a French Revolution and Napoleonic War dummy, 1790-1819; D18 an eighteenth century dummy, 1700-1789; D19, an early nineteenth century dummy, 1820-1859; DGS, a gold standard dummy, 1875-1914; and Dbw, a Bretton Woods dummy, 1950-1969.<sup>7</sup> I omitted a dummy for the most recent period of floating exchange rates (defined here as 1970-1998). The constant, therefore, serves as an estimator of cross-country real interest rate dispersion during this subperiod. The corresponding estimator for any other subperiod is the algebraic sum of the coefficient for that subperiod's dummy and the constant. The standard *t* test for the significance of such a coefficient is therefore a test for significantly higher or lower real-interest-rate dispersion during the subperiod in question than under the current float.

Table 2

**Regression results<sup>1</sup>**

Variable	Short rates		Long rates	
	Coeff.	t value	Coeff.	t value
Constant	1.552	2.571	1.434	1.080
D18	0.253	0.371		
D19	0.673	0.988	0.069	0.040
DGS	-0.050	-0.061	-0.264	-0.150
DBW	0.026	0.036	0.169	0.081
DNW	1.721	1.930	2.436	1.236
DCW	2.386	1.752	2.079	0.904
DWW1	4.671	9.075	4.434	1.262
DWW2	4.599	5.651	10.460	3.938
DIW	3.682	3.577	7.669	3.652
SEE	1.261		3.253	
RSQ	0.580		0.532	

<sup>1</sup> The dummy variables and the periods for which they took the value of one were as follows: DWW2, a World War II dummy, 1940-49; DWW1, a World War I dummy, 1915-1919; DCW, a U.S. Civil War dummy, 1860-1874; DFN, a French Revolution and Napoleonic War dummy, 1790-1819; D18 an 18th century dummy, 1700-1789; D19, an early 19th century dummy, 1820-1859; DGS, a gold standard dummy, 1875-1914; and DBW, a Bretton Woods dummy, 1950-1969. The sample for the long-term real interest rate regressions only begins in 1795. Hence D18 is omitted from that regression.

<sup>7</sup> The sample for the long-term real interest rate regressions only begins in 1795. Hence D18 is omitted from this regression.

The principal findings that emerge from this exercise have to do with differences in behavior across the various subperiods. One thing that is quite clear, and this ought not be surprising, is that wars matter a lot. World Wars I and II, the Napoleonic War and the American Civil War were all characterized by markedly greater real interest rate dispersion than during most of the peacetime periods, World War II particularly. We see this quite clearly in Figure 1 and in Table 1. Table 2 provides more formal evidence in this regard. In the regression results presented there, the war dummies all have sizable and generally statistically significant coefficients. The dummies for other periods in contrast generally have small and insignificant coefficients. The one exception is the interwar period. It has a much larger coefficient and hence much greater cross-country real-interest-rate dispersion than any of the other peacetime periods, and in fact is only exceeded in this respect by World War II. The difference between the interwar period and the gold-standard years and the post-World War II subperiods is well known. I have documented it in several papers dealing with the issue of international financial integration (Lothian, 1997; Lothian, 2000); Obstfeld and Taylor (1997) discuss it in detail. The difference vis-à-vis the two earlier peacetime periods (1820-59 and 1730-89), however, has gone largely unnoticed.

#### 4 Conclusions

In this paper, I have investigated international financial market behavior over the past three centuries and compared the degree of integration across various important subperiods. This is the first time that so temporally extensive a comparison has been attempted.

What the paper shows is that integrated markets of one sort or another have been the rule rather than exception over this exceedingly long span of years. This should not be surprising to an economist, but to many of us who came of age in the immediate post-WWII decades – economist or not – I suspect that it is. The status quo, or so it seemed only three decades ago, was a world of rather well insulated, if not entirely isolated, economies.

Against this backdrop, the developments of the past several decades have at times seemed almost totally revolutionary. While that is perhaps true on the purely technological level, it is not the case more generally. Financial integration to varying degrees has been characteristic of long periods in both the eighteenth and nineteenth centuries as also in the early part of the century now ending. The process, however, has been a discontinuous one. It has been interrupted by major wars and their after effects, and in the case of the interwar years by the severe economic shocks of that era and governments' reactions to them. In each instance, however, it began anew.

It did so, moreover, quite spontaneously. Financial integration was not something that was either planned, or otherwise orchestrated from on high. In finance as elsewhere, the prospect of gains from trade exerts a powerful force. That has evidently been enough to keep the integration process going through thick and thin. Indeed the movement back to greater integration that is now very much still in progress, got underway and, at least initially proceeded in spite of, rather than because of, the actions of governments.

#### REFERENCES

- Ashton, T.S.** *An Economic History of England: The 18th Century*. New York: Barnes and Noble, 1955.
- Bordo, Michael D., Barry Eichengreen, Jongwoo Kim**, «Was There Really an Earlier Period of International Financial Integration Comparable to Today?» NBER Working Paper No. W6738, September 1998.
- Cameron, Rondo**, «Introduction», in Rondo Cameron and V.I. Boykin, eds. *International Banking, 1870-1914*. Oxford and New York: Oxford University Press, 1991.
- Eagly, Robert and V. Kerry Smith**, «Domestic and International Integration of the

London Money Market, 1731-1789» *Journal of Economic History*, March 1976, 36: pp. 198-212.

**Frankel, Jeffrey A.**, «Measuring International Capital Mobility: A Review», *American Economic Review*, May 1992, 82: pp. 197-202.

**Grassman, Sven**, «Long-Term Trends in Openness of National Economies», *Oxford Economic Papers*, March 1980, 32: pp. 123-133.

**International Monetary Fund**, *International Financial Statistics*, various issues.

**Homer, Sydney and Richard Sylla**, *A History of Interest Rates*, 3rd ed. revised, New Brunswick NJ: Rutgers University Press, 1996.

**Jackson, Paul S. and James R. Lothian**, «The Behavior of Bond Yields Across Exchange-Rate Regimes and the Integration of Capital Markets», *Greek Economic Review*, December 1993.

**Kindleberger, Charles P.** *A Financial History of Western Europe*. London: Allen & Unwin, 1984.

**Lothian, James R.** «The Reinternationalization of Banking and the Financial System», *Managerial Finance*, Number 2, 1997.

**Lothian, James R.** «Capital Market Integration and Exchange Rate Regimes in Historical Perspectives», in Iftekhar Hasan and William C. Hunter, eds. *Research in Finance and Banking, I*. New York: Elsevier Science, Inc., 2000.

**McKinnon, Ronald I.** «Interest Rate Volatility and Exchange Risk: New Rules for a Common Monetary Standard», *Contemporary Policy Issues*, April, 1990, 7: pp. 1-17.

**Michie, R.C.**, *The London and New York Stock Exchanges, 1850-1914*. London: Allen and Unwin, 1987.

**Mussa, Michael and Morris Goldstein**, in «The Integration of World Capital Markets», *Changing Capital Markets: Implications for Monetary Policy*. Kansas City, MO: Federal Reserve Bank of Kansas City, 1993.

**Neal, Larry**, *The Rise of Financial Capitalism*. Cambridge: Cambridge University Press, 1990.

**Obstfeld, Maurice and Alan M. Taylor**, «The Great Depression as a Watershed: International Capital Mobility over the Long Run», NBER Working Paper No. W5960, March 1997.

**Taylor, Alan**, «International Capital Mobility in History: Savings and Investments», NBER Working Paper 5743, April 1996.

**Telser, Lester G.**, «Why There Are Organized Futures Markets», *Journal of Law and Economics*, April, 1981, 24: 1-22.

**Von Furstenberg, George M.**, «From Worldwide Capital Mobility to International Financial Integration», *Open Economies Review*, January 1998, 9: 53-84.

**Williamson, Jeffrey**, «The Evolution of Global Labor Markets since 1830», *Explorations in Economic History*, April 1995, 32: pp. 141-96.

**Wriston, Walter**, *Risk and Other Four-Letter Words*. New York: Harper and Row, 1986.