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# THE EVOLUTIONARY CHAIN OF INTERNATIONAL FINANCIAL CENTERS

by

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Abstract

Financial products are unstandardized and subject to a great deal of uncertainty. They tend to concentrate geographically because of the reduction in information costs resulting from close contacts. Concentration leads to economies of scale and encourages external economies. Great financial centers enjoy a high degree of persistence but are not immune from decline and eventual demise. Yet, their achievements are passed along in a an evolutionary manner. In revisiting the historical record of seven international financial centers –Florence, Venice, Genoa, Antwerp, Amsterdam, London and New York— the paper finds evidence of a long evolutionary chain of banking and finance. As to the present and the future, the forces of integration are likely to give an additional boost to the persistence of international financial centers.

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## I. INTRODUCTION

The most important insights on financial centers remain those of Charles P. Kindleberger (1974) who wrote his classic study more than thirty years ago. In that essay, he advanced the thesis that financial centers perform a medium-of-exchange and store-of-value functions similar to money. The community gains in dealing with a single center instead of dealing with many locations; and these gains are proportional to the shift from N(N-1)/2 to (N-1), where N is the number of locations. The reasons why a center emerges are the same reasons why a currency emerges. People use money rather than barter because they economize on information and transaction costs. Money would not exist in a frictionless world, one devoid of transaction and information costs. Similarly, people execute financial transactions in a financial center in preference to executing financial transactions over a wide geographical domain because they save on transaction and information costs.

Financial products are unstandardized: they differ in terms of promised yield, expected yield, market risk, credit risk, maturity, liquidity, currency of denomination, and country of issue. Furthermore, the variations in the price of these products are largely explained by news. Unstandardized output facing a great deal of uncertainty tends to concentrate geographically because of the reduction in information costs resulting from face-to-face contacts. Concentration, in turn, leads to economies of scale. Concentration tends to occur in places, usually cities with large ports, that are hubs of commerce, both domestic and international. Commerce pulls banking and finance, which in turn attract the customers, corporate headquarters. External economies come along as hubs create a host of services that are supportive of banking and finance: accountants, computer programmers, information technology specialists, and lawyers, to mention a few. On the other hand, the lower cost of information in local markets for local products, differences in time zone, and congestion lead in the opposite direction. A tug of war ensues between centralization and decentralization.

Kindleberger identifies three attributes of great financial centers: a banking tradition, a central bank, and a strong currency. Financial centers and currencies tend to organize themselves in hierarchical order and Kindleberger (1983) predicted that the creation of a European currency and a European central bank would boost the development of a European money and capital market, which is right on the mark.

The purpose of this essay is to revisit the historical record of international financial centers, but with a much longer time horizon than used by Kindleberger and, more recently, by Youssef Cassis (2006), who focuses on the 19th and 20th century. A long time horizon has several advantages. First, given the degree of persistence of centers, examination of long periods of time gives us a deeper understanding of the forces that lead great financial centers, not only to rise, but also to decline. Second, a mixture of evolution and 'revolutions' has characterized the history of banking and finance (Fratianni and Spinelli 2006). Evolutions evoke a smooth rate of change, revolutions drastic changes. A long sweep of history is best suited to sort out exceptional sharp changes from smooth evolutionary ones. Finally, while banking concentration tends to coincide with finance concentration, the mix of the two products is not constant over time. Banking, in the extended sense of encompassing central banking, plays a critical role in the formation of financial centers, but the importance of finance rises over time.

The adopted strategy of this paper is to revisit the record of seven great international financial centers --Florence, Venice, Genoa, Antwerp, Amsterdam, London, and New York – so as to identify attributes of success, possible reasons for declines, and extent to which their achievements have been passed along in the evolutionary chain of finance. The sample is small but fits the purpose of looking at best practices rather than their distribution. The structure of the paper is as follows. I begin with the link between financial deepening and financial centers (Section II). I then examine the record of the seven centers (Section III), followed by an evaluation and implications for the future(Section IV). I conclude with a brief discussion on the

relevance of the paper for the mix of centralized and decentralized markets in a global financial environment (Section V).

## II. FINANCIAL DEEPENING AND FINANCIAL CENTERS

Financial deepening, or what some historians call financial revolution, is the natural antecedent of a financial center. Important cases of financial deepening in history have occurred in Florence in the 14th century, Genoa and Venice in the 15th century, Antwerp in the 16th century, Amsterdam in the 17th century, England in the 18th century, and the United States in the 19th century. These "financial revolutions" were far from being random events; they were supported by three basic pillars: (i) innovations in financial institutions, instruments and markets, (ii) an institutional mechanism through which the debtor commits not to renege on debt, and the presence of a public bank (Fratianni and Spinelli 2006).

The best known "financial revolution" is the English, which was sparked by the Glorious Revolution of 1688. With the ascendancy of Parliament, property rights in England became more secure and government gained credibility in its commitment not to renege on debt (North and Weingast 1989). In 1694, Parliament created a public bank, the Bank of England. The Bank was authorized to engineer a debt-for-equity swap, that is to transform government debt bearing a fixed rate of interest into equity. The shares issued by the Bank of England, but also those by the East India Company and the South Sea Company, were well received by the public and became increasingly marketable and liquid. Markets for these securities thickened and their underlying transaction costs declined (Neal 1990). All of this led to the ascendancy of London as a financial center. London was a great location: a harbor and a hub of commerce with an Empire.

London eventually overshadowed Amsterdam, which had benefited from the Dutch financial revolution This was sparked, in part, by Emperor Charles V, who, in search of an alternative to borrow from bankers like the Fuggers, spurred the provincial governments of the United Provinces to pledge taxes to service the debt issued to finance the Habsburg state. As

James Tracy (1985, p. 217) puts it, "In the of making this shift, however, control of tax revenue had to be relinquished into the hands of the very same urban oligarchs …who themselves had heavy investments in state debt…" In 1609, the *Wisselbank* of Amsterdam received the monopoly on money changing, on bills of exchange valued in excess of 600 guilders, and on bullion transactions. The *Wisselbank* became the center of the Dutch payment mechanism. Amsterdam, like London, had a great location: a harbor and the hub of commerce with an Empire.

These two brief references to Amsterdam and London serve to motivate the thesis of this paper, which is that great international financial centers originate in cities with superior location and benefit from a deep financial transformation of economies that are leaders in the world economy. This transformation, in turn, results from institutional changes that are driven by expanding markets and opportunities. Clearly, not all expanding markets and opportunities generate financial revolutions and international financial centers. These are more likely to occur under representative governments than under absolute monarchies and dictatorships. Once a center is created, the gains from centralization noted above work in its favor. This explains a high degree of persistence. But persistence eventually peters out in the face of contracting markets and opportunities, or of restrictive rules that make other centers more attractive. Many great centers of the past have declined or disappeared altogether. Yet, their achievements have been passed along to newer centers in a sort of evolutionary chain of progress.

## III. SEVEN GREAT FINANCIAL CENTERS

Medieval Florence, Venice and Genoa were at the frontier of economic development and capitalism from the mid 1200s to the early part of the 1600s. The key to their success were commerce, international trade, and finance. Despite the lack of a harbor, Florence was very successful in trading and banking with Northern European countries. Genoa and Venice were maritime economies and fought for dominance of overseas routes. Geographic specialization occurred after Genoa and Venice fought their last war in 1378-8: the Venetians specialized in the

East and the Genoese in the West, while both shared, with Florence, the North of Europe. Genoa and Venice shared republican political institutions and the rule of law, which gave them legitimacy and credibility to issue large amounts of long-term and marketable debt. Venice had a strong and stable government, willing and able to interfere with the economy. The state in Genoa was less interventionist because it was more "factious and unstable," as Machiavelli noted in his *Istorie fiorentine* (1965, 494-95). Republican Florence was closer to Genoa than to Venice, but after 1434 the rules of the political game were set by the Medici family.[1]

All three city states had great financial centers by the standard of the times, but Florence first and Genoa later had true international character. Venice was more inward than outward in banking and finance. There was a heavy presence of outside bankers in Venice, especially from Florence, and their business was geared predominantly to the domestic market.

Florence

Florence was a great banking centre by the mid 1200s (Sapori 1950). Florentine 'compagnie' –as the merchant-bankers of the time were called—like Bardi, Cerchi, Frescobaldi, Pazzi, and Peruzzi, among others- were active at home and abroad.[2] They set operations in England to purchase wool for the big wool and cloth industry in Florence, to collect papal contributions, to lend funds to belligerent sovereigns, and to collect customs fees which were given to them as a guarantee for their loans (Sapori, pp. 396-8). The merchant-bankers had a complex business plan (Hunt 1990, pp. 151-2). They collected papal contributions in England, in particular from monasteries. The contributions were then used to advance funds to English growers, monasteries being prominent among them, to secure a steady delivery of wool. The Pope, in Avignon, would receive his dues from the home office in Florence. This arrangement minimized the export and

[1] The Medici family exerted 'informal' hegemony from 1434 to 1494 and then more formally from 1512 to 1526; after 1530, their power became absolute.

[2] To Florentine bankers one must add those from Lucca (e.g., Riccardi), Pistoia (Ammannati) and Siena (Bonsignori).

import of specie, which was subject to large transportation and security costs. The sovereign, the other party in these transactions, provided protection to the merchant-bankers who repaid it by lending to the cash-strapped sovereign. The return on the loan came in part as disguised interest (to bypass canon law against usury) and in part as monopoly rights. As Edward Hunt (p. 152) puts it, "Merchant-bankers were primarily merchants who counted on trade for most of their profits. Banking for princes was thus mainly a means to this end."

The environment was risky and failure rates were high. A well-known story is the collapse of the Bardi and the Peruzzi in the mid 1340s after Edward III of England did not repay his debts in time. Giovanni Villani, the reputable chronicler of the time, gives an impassioned account of the event and treates it as a general banking crisis in Florence, spreading not only to other merchant-bankers but also to their creditors (Giovanni, Matteo and Filippo Villani 1857, Book 12, chapter 55). Hunt believes that the losses suffered by the Bardi, Peruzzi and their creditors were much smaller than traditionally attributed by historians and that the two merchant-bankers eventually failed because of shocks taking place in Florence and not in England. What it is not disputed is that the English king restructured his debts –one of the first restructurings in history—and settled them much later.[3]

Banking in Florence declined after that, undoubtedly feeling the aftermath of the Black Death of 1348. It returned to the frontier in the 1400s with the ascendancy of the Medici bank. For Raymond de Roover (1966), the greatness of the Florentine banking center derived from the superior organizational structure of the Medici bank. This structure resembled that of the modern holding company and facilitated the internationalization of banking business. With the structure, the vast international span of the Medici branches gave them a competitive advantage

[3] Hunt (p. 160) reports creditors' recovery rates ranging from 36 per cent for the Peruzzi and 46 per cent for the Bardi.

in the payment mechanism through which papal remittances were transferred from the periphery to Rome. The strong connections of the family with the Papacy did not hurt either.[4]

The decline of the Medici bank came in the latter part of the 1400s and had as proximate cause the same type of transactions that ruined the great Florentine merchant-bankers more than a century earlier: sovereign lending. "Although …well aware of this danger, [the Medici] were unable to steer clear of it and foundered on the same reef "(de Roover 1966, p. 372). But sour sovereign lending came at a time of depressed economic conditions and trade deficits of the Low Countries with Florence that made it more difficult to transfer funds from the North to the South. Quite possibly, and unfortunately we do not have the data to test it, lousy sovereign lending may well be endogenous relative to shocks to the economy. Whatever the ultimate causes, the Medici bank came to an end when King Charles VIII of France invaded Florence in 1494 and confiscated all Medici property. Other banks went under; some bankers had enough foresight to get out of the business before the crisis.[5]

Finance in Florence was, as in other city-states, connected with lending to government. This dates back to the 13th century, and it was compulsory and, as in Venice, based on a wealth census, the *estimo* (Molho 1971, ch. 4; Conti 1984, pp. 10-16). In 1343, debt was consolidated in the *Monte Comune*, along the Venetian model, at a 5 percent interest rate (Conti, pp. 30-1). *Monte Comune* units, issued with a par value of 100 florins, traded at a sharp discount because of the low coupon relative to market interest rates and the risk that government may tax, reduce, delay, or skip interest payments altogether. In fact, all these possibilities occurred. Interest

[4] De Roover (p. 202) calculates that up to 1435 more than half of total earnings generated by the vast Medici network came from the Rome branch.

[5] The heyday of banking in Florence, despite a resurgence of sorts in the following century, was over. The decline of the banking industry, it should be noted, preceded the decline of the great Florentine industry, wool, by approximately a century. After 1600, wool output in Florence fell drastically following a competitive shift in favor of the Low Countries and England (Goldthwaite 1980, p. 52).

payments were first taxed at 25% at the start of the 15th century and then reduced repeatedly through the century.[6]

A unique feature of Florentine finance was a specialized social insurance system called *Monte delle Doti* (Dowry Fund), created in 1425 as part of long-term voluntary lending to government. This Fund had the twin purpose of providing finance capital to starting families and reducing the large stock of the *Monte Comune* (Molho 1994). After a few false starts, it became very popular: the investment was much better than *Monte Comune* shares in terms of yields and market risk. Initially, a father could deposit into the Fund 100 florins for each of his daughters for a term of either seven and half years or fifteen years, yielding an annual compound interest rate of 12.99% and 11.33%, respectively. If the daughter died before the deposit maturity, the yield would be zero and the initial amount of the deposit was returned to the father (Molho 1994, pp. 34-8). With the probability of payment before the age of 20 estimated at approximately 0.75, the expected annual yield of a 15-year deposit was 8.5 per cent. This was the current yield on *Monte Comune* shares in 1425 (Conti, p. 34), but these shares carried a very substantial market risk. Hence, it is not surprising that the Dowry Fund grew in relation to the *Monte Comune*: it combined aspects of a social insurance system with promised yields that were competitive with the current yields of the risky *Monte Comune* shares. The Dowry Fund failed to meet the second objective, the reduction of government debt. It ceased at the end of Republican Florence in 1530 (Conti, p. 69).

In sum, foreign trade and financial innovations launched the great financial center of Florence. The decline of the center coincided with negative shocks to the economy and to trade patterns (exclude wars because these were a universal features of city-states). Ultimately, the end

[6] Interest payments were delayed in 1444, 1449, 1450, 1454 through 1459, and after 1467; back payments were cancelled in 1483 and 1489; and interest were paid only in part from 1488 to 1492 (Conti, pp. 31-5, 57, 362-63). For the taxpayer-investor, *Monte Comune* turned out be a financial disaster (Conti, Figure 2).

of Florence was the consequence of the rise of Genoa, the new powerhouse in banking and finance of much of the 1500s and the early part of the 1600s.

Venice

The biggest, although not the first by all means, Venetian contribution to banking was in the field of so-called public banks. There were two of then: the first, *Banco della Piazza di Rialto* (*Banco di Rialto* for short) was established in 1587, and the second, *Banco Giro*, which gradually displaced the first, in 1619. Technically, the *Banco di Rialto* was no different than the older script banks (*banchi di scritta*) in the Rialto bridge that accepted *giro* accounts, an innovation prompted by currency scarcity and high costs of information regarding the vast range and often poor quality of coins. The critical difference was that the *Banco di Rialto* had a solvency guarantee from the state and the older *banchi* did not.[7] The *Banco di Rialto* became the model for the much more famous *Wisselbank* of Amsterdam; see below. The *Banco di Rialto*, like the *Wisselbank*, was a monopolist and centralized the clearing mechanism. Since payments through the giro system were less costly than with specie settlements, a premium emerged for payments *in banco* relative to those in specie.

The *Banco Giro* was launched to manage Venice's floating debt. The bank lent to government at short maturities and obtained, in exchange, that its deposit liabilities be treated as legal tender (Day 1987, p. 153). In other words, the *Banco Giro* was in fact an issue bank, just like the later Bank of England, but with one difference: the *Giro* issued bookkeeping entries, whereas the Bank of England issued bank notes. The *Giro* deposits, like the *Rialto* deposits, enjoyed a premium with respect to currency, the economics being the same. Over time, the *Banco Giro* out-muscled and out-competed the *Banco di Rialto* because of the close connection it had with government.

[7] For early banking in Venice, see Mueller (1997, ch. 1). It should be pointed out that the first public bank was the *Taula de Canvi*, established in Barcelona in 1401. However, the *Taula* was not as purely a payments bank as the *Banco di Rialto* inasmuch as it lent heavily to the city.

In sum, the contributions of Venice to banking was to have created two institutions that served as model for the *Wisselbank* of Amsterdam and the Bank of England.

Genoa

Genoa became an important financial center in the early *Quattrocento* with the establishment of the *Casa di San Giorgio*, but acquired international status in the middle of the 1500s when Genoese merchants displaced the Fuggers as the principal bankers at the Spanish court. Ferdinand Braudel (1992, p. 157) identifies the period 1557-1627 as the age of Genoese finance, when "…the merchant-bankers of Genoa, through their handling of capital and credit, [called] the tune of European payments and transactions."

The genius of 16th century Genoese finance was to use the silver inflows from the New World to make profits, through their deep expertise of the international monetary and credit flows, in interest rate spreads and trading bills of exchange. The system was quite complex and worked as follows. The Spanish Crown sold silver spot in Spain to the Genoese in exchange for future delivery of gold in Antwerp, where the gold was used to pay Spanish troops fighting in the Low Countries. The Genoese cost to deliver gold up north, through bills, was a fraction of the cost of shipping specie, including the high risk of piracy, from Spain to Antwerp. The Genoese acquired this advantage through "increasing returns to scale in international financial services" (Conklin 1998, p. 499). The silver was shipped to Venice and from there to the Far East to settle a trade deficit. In exchange, the Genoese received bills drawn on Antwerp where they were used to buy gold. To these transactions, which brought into equilibrium a web of long and short positions through the use of credit (Braudel, p. 168; Conklin, p. 499), one must add credit, which centered around exchange fairs.

Exchange fairs were periodic financial centers; they took place typically four times a year and lasted several days. The Genoese started their own fairs in Besançon in France in1535 and then moved them to Piacenza in Northern Italy in 1579. Their objective was to centralize money and

exchange transactions in Europe (Da Silva 1969, p. 36). But also a credit market operated at the fairs. The demand for credit came not only from merchants who wanted their bills renewed but also from new borrowers like kings facing budget deficits; the supply from individuals and business who had placed their savings with merchant-bankers.[8] The Genoese merchant-bankers channeled vast amounts of entrusted deposits into short-term loans (*asientos*) to the Spanish Crown. Against the *asientos* the Genoese received from the Crown collateral in the form of long-term securities (*juros de resguardo*).[9] Since the interest rate on the *juros* flowed back to the Crown, the transaction worked out to be an interest rate swap, with the fixed flow going to the Crown and the floating flow to the Genoese. The Genoese earned the difference between the higher short-term interest rate and the lower long-term rate.[10] Furthermore, *asientos* loan contracts specified that the *juros* received as collateral would be sold if the Crown did not repay the loans. The Genoese received permission to sell the *juros* with the stipulation that they would be restored if the Crown paid the *asientos* (Lovett 1980, p. 905). Thus, the Genoese recovered immediately the initial capital lent to the Crown. If the Crown defaulted, the bankers gained the interest rate differential on the swap. If the Crown did not default, the bankers would make a capital gain by repurchasing the *juros* in the secondary market at a price below the price at which they sold.

It may be insightful to quote what a modern merchant banker like Sir David Scholey, at the time Chairman of S.G. Warburg Group in London, thinks of the Genoese system just described:

> "This Genoese system of international finance stands alone in history up until the present day as an example of an IFC [international financial center] built not so much on locally based trade or primarily on a local surplus (although both elements were present), but rather on an efficient and sophisticated system for gathering the monetary surpluses of other parties, in part through a process of –to use a familiar phrase- securitization, or the extension of paper credit. Although Amsterdam in the 18th century and London in the 19th century also based many of their financial activities on the issuance and discounting of securities, these were

[8] At the Piacenza fairs, according to Braudel (1992, 168), "…the capital of the Italian cities was all drained towards Genoa. And a multitude of small investors, Genoese and others, entrusted their savings to the bankers for modest returns."
[9] These arrangements start in 1566.
[10] It should be noted that short-term interest rates were higher than long-term interest rate

backed primarily by increasing volumes of trade and of surplus capital which were centred locally." (Scholey 1994, pp. 31-2).

In addition to international finance, the Genoese made two other significant financial innovations.[11] The first was the *Casa di San Giorgio*, a financial institution created in 1407 as a result of the consolidation of Genoa's public debt. San Giorgio's shareholders acquired all previous debt issues of the Republic of Genoa and performed what today would be called a debt-for-equity swap (Fratianni 2006). The swap would be done again in England in 1697, when the Bank of England began "engrafting" government debt onto the bank's capital (Neal 1990, p. 51). Economic historians have considered the conversion of debt into equity as a successful element of the English financial revolution because it helped to transform high transaction cost and difficult-to trade debt instruments into transferable and liquid shares (Neal 1990, pp. 96-7).

The other innovation was the *Banco di San Giorgio*, a unit of the *Casa*. The *Banco* was a public bank with the primary mission of facilitating the management of the San Giorgio's shares, called *luoghi* (Sieveking 1906, p. 46). It closed to external business in 1445 but continued to serve the state, *San Giorgio*'s shareholders, tax collectors and suppliers. It re-opened for business to the general public in 1530 and was permanently closed in 1805. The *Banco* handled deposits, specie transactions, loans, and interest payments on *luoghi*. Deposit accounts were used by customers to settle payments. The giro system reduced the use of scarce specie and raised the velocity of narrowly defined money. The bankers from the *Banco*, with other Genoese bankers, performed exactly the same function at the Besançon and Piacenza fairs but at an international level.

As a public bank, the *Banco di San Giorgio* had to guarantee that the depositor could receive specie on demand. Despite this constraint, the *Banco* extended loans to the Republic, tax farmers, and its own clients by allowing deposit accounts to run overdrafts (Assini, 270). These were exchanged among clients as part of an extended credit network. Interest in the form of

[11] What follows draws from Fratianni and Spinelli (2006).

dividends on San Giorgio *luoghi* were credited in the accounts of the owners four times a year but before they could be cashed (Assini 1995, p. 277). Payment delay on dividends fluctuated from nine months to a few years. The books registered the date of maturity of the dividends and owners, who had claims on future cash flow, would use the declared but unpaid dividends to extinguish a debt, settling the difference between the maturity of the dividend and the maturity of the debt through discounting. Dividends were actively exchanged at their own money of account, called *lire di paghe*. Jacques Heers (1961, pp. 159-72) gives an extensive discussion of the dividend market and the use of *lire di paghe* as bank money. In 1610, the *Banco* issued bank notes. In sum, the *Banco di San Giorgio*, just like *Banco Giro* in Venice, was the ancestor of the Bank of England.

From Antwerp to Amsterdam

Antwerp emerges as the financial "metropolis of Western Europe" between 1493 and 1520 (Van der Wee 1963, p. 113) and its star shines for much of the 16th century. The rise of Antwerp coincides with the decline of the money market in Bruges occurring between 1477 and 1482 (Van der Wee, pp.109-110). For Raymond de Roover (1948), this decline was sparked by a shift in regulatory regime in Bruges. The authorities there became hostile to banks because of the large number of failures and recurrent accusations that money-changers picked and culled coins. Money-changers "favored debasement whenever their cash reserves were running low because of a crisis in the money market" (de Roover 1948, p. 341), whereas the authorities preferred monetary stability. The climate was particularly hostile for foreign merchants who, between 1484 and 1488, were asked to either move out of town or resettle in Antwerp (Van Houtte 1966, p. 44). In addition to the unfavorable regulatory climate, Bruges suffered from deteriorating business conditions. Van der Wee mentions the profligate policy of Emperor Maximilian and large losses incurred by Italian merchant-bankers who had lent large sums to the Burgundian princes. The decline of Bruges was slow (Van de Wee, p. 140; Ehrenberg 1928, p. 233).

Antwerp made several important innovations. The first was the exchange or *bourse*, housed in a building created for that purpose in 1531, which transformed seasonal fairs into a permanent fair (Ehrenberg, p. 238). The institution of a *bourse* was not new; it had originated in Bruges earlier but there it was more a meeting place for merchants dealing in money and bills of exchange than a real exchange. The second was a legal framework supporting trading and contract enforcement. Rules were issued to legalize the transferability of bills of exchange through endorsement and bearer clause (Gelderbloom and Jonker 2005, p. 192; van der Vee, pp. 367-8)). These rules, in turn, gave impetus to an expansion of financial instruments, in particular forward contracts. Commodities, like pepper, were traded at the *bourse* not only for spot delivery but also for future delivery. Forward contracts were particularly suitable to bills, especially the round-trip or *ricorsa* bills, which imbedded differences in interest rates. Well-informed merchant-bankers engaged in arbitrage transactions. These would work as follows. A merchant-banker in Antwerp would draw a bill in Venice and buy Venetian ducats in Venice at the exchange rate of 50 groats per ducat. The delivery of the ducat would occur at usance (i.e., by custom), say 60 days. The merchant-banker, by writing a second bill drawn on Antwerp, would earn a profit if the ducat, 60 days hence, could fetch (ignoring transaction costs) more than 50 groats. If the first exchange rate is defined as the spot exchange rate and the second the future exchange rate, one can apply interest rate parity and readily see that when the future rate exceeds the spot rate the home currency (in this case the groat) is at a discount in relation to the foreign currency (in this case the ducat) and consequently interest rates in Antwerp must be higher than interest rates in Venice. Thus, profit from the two-way bill arises from borrowing in the low-interest rate location and lending in the high-interest rate location.[12] Forward premia and discounts on exchange rates were quoted in the Antwerp *bourse*.

[12] The account of Ehrenberg on pages 244-5, although incomplete is consistent with this reasoning. A much better explanation of the *ricorsa* bills is given by de Roover (1948, pp. 61-2).

Forward transactions were considered no more than waging bets and met with public disapproval and official sanctions. Ehrenberg (pp. 230-46) dedicates several pages to speculation and excesses taking place at the Antwerp *bourse*. This is not surprising given the imperfect knowledge of the time on the purposes of derivatives. There was a consensus that forward contracts were tantamount to taking chances or manipulating prices rather than managing risk. Authorities, fearing popular reactions to price increases of basic foodstuff, made repeated attempts to ban forward contracts, but to no avail (Gelderbloom and Jonker 2005, p. 193).

The last innovation of Antwerp was the development of a short-term loan market. The demand for loans came from governments, like the Netherlands government and Dutch municipalities, and sovereigns, like the Habsburg emperors, the English Crown, and the King of Portugal (Ehrenberg, pp. 247-280); the supply from South German merchant-bankers like the Fuggers and the Welsers, as well as Genoese, Spanish and Portuguese merchant-bankers. To some extent, the history of the Antwerp Exchange is closely tied to the fortunes of these bankers, in particular the Fuggers. The latter borrowed regularly on the Antwerp *bourse* on 'deposits' to finance their lending to the Spanish Court (Ehrenberg, p. 112). The relationship between the Fugger and the Habsburg emperors resonates with the relationship that the Florentine bankers had with the English kings in the 1300s and the Papacy in the 1400s. In both instances, business transactions were profitable at first but ended up disastrously. The mistakes made by the Bardis, Peruzzis and Medicis were uncunningly repeated by the Fuggers.[13] For Ehrenberg, the decline of Antwerp is associated with the Habsburg bankruptcies and the implosion of the Fuggers. More likely, Antwerp declined because of the rise of Amsterdam, the center of the commercial power of Holland and Zeeland. Regardless of the reason, by the late 1580s Amsterdam became the center of the financial world.[14]

[13] The Fuggers who, having barely survived the royal bankruptcies of 1575 and 1607, were dealt a final blow with the bankruptcy of 1626 (Ehrenberg, pp. 130-32).
[14] Van der Wee (p. 245) dates the final phase of Antwerp between 1572 and 1587; Gelderblom and Jonker (2004, p. 644) indicate that the shift from Antwerp to Amsterdam occurs after 1585,

In the evolutionary chain of financial centers, the Amsterdam Exchange of the 17th century stands out as the launching pad of corporate finance. In Amsterdam, shareholders of the Dutch East India Company (VOC) and the Dutch West India Company could realize their returns on investment by selling their equity positions in an organized exchange instead of waiting for the liquidation of the companies. Amsterdam developed an extensive secondary market in spot transactions, options, forward contracts and even the beginning of futures. Eventually, a secondary market for debt and public debt also flourished.

The rise of the Amsterdam Exchange coincided with Dutch long-distance trade to the East (Far Eastern Asia) and West (Western Africa and Latin America) Indies. These voyages required much higher levels of capital than earlier maritime trade because the voyages took more time and the cost of protecting the envoys was higher. Gelderblom and Jonker (2004, pp. 648-9) report that fitting a ship for the Asian trade would cost 100,000 guilders and that 20 per cent of this investment, on average, would be lost due to a variety of misfortunes, including piracy; furthermore, capital would be tied for approximately 24 months. The sums involved were such to spur the organizational innovation of the joint-stock company. In 1602, the States-General of the Netherlands gave the VOC a monopoly on Asian trade. VOC consolidated all previous Dutch trade companies and became, in the words of Braudel (1992, p. 213), "an independent power, a state within a state…" This is the same phrase Machiavelli (1965, pp. 494-5) used to characterize San Giorgio in Genoa. VOC's capital was 6.4 million guilders divided in fixed proportions among six Dutch cities; it was to be returned to shareholders after ten years, but in 1609 VOC directors –who were not elected by shareholders-- made it nonrefundable.[15] With no say on the

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the year the Spanish occupy Antwerp and the Dutch imposed a naval blockade of the Flemissh coast.

[15] Amsterdam had the largest share of the capital (50 per cent) and the highest representation in the board (eight directors); Rotterdam followed with 25 per cent of the capital and four directors; Delft, Enkhuizen, Hoorn and Middelburg had 6.25 per cent of the capital and one director each. A seventeeth director was added, on a rotating basis, from one of the five smaller cities to prevent Amsterdam from having veto power on decisions; read Neal (2005, p. 167).

management of the company and with capital being non-refundable, only a secondary market could provide liquidity in VOC shares and a timely return on investment.

VOC did not pay dividends until 1610, much to the disappointment of shareholders. In that year a large shareholder by the name of Isaac Le Maire carried out, through forward sales of VOC shares, the first bear squeeze on record. He failed but in the process got his message across to the directors who, after that incident, declared dividends fairly regularly and with high payouts.[16] Gelderblom and Jonker (2004, Table 1) document that there was an active secondary market in VOC shares from the very beginning. By the end of 1607, approximately one-third of the Amsterdam chamber's capital had changed hands. The liquidity of VOC shares made them very suitable (by far superior to annuities) as collateral for loans in the money market. Credit risk for these loans dropped and money market interest rates declined (Gelderblom and Jonker 2004, Appendix Table 1).

A full panoply of instruments enriched the Amsterdam Bourse; these instruments came to life partly as a result of delays in transferring shares on the company's books and partly because of the high price of VOC shares.[17] Forward transactions, with settlements every three months, were the preferred vehicle for buying and selling shares. Some forward transactions were standardized and sold to third parties in the fashion of modern futures. VOC shareholders could also use call and put options.[18] These derivatives, as we have already mentioned earlier, met with public disapproval and official sanctions, but, in practice, were tolerated. All of this has come to us courtesy of José Pensa de la Vega (1688), an erudite Amsterdam broker and a Sephardic Portuguese Jew, who wrote the first treatise on a stock market by titling it satirically *Confusión de confusiones*. de la Vega, who was addressing the Spanish-speaking Sephardic community so influential in the Bourse (Israel 1990), provides, not only a primer of various transactions, but

[16] Dividends averaged 16.5 per cent of stock par value for the first half of the 17th century (Neal 2005, p. 171).
[17] Initial price of shares was 3,000 guilders.
[18] The archival material on options and futures is rather thin; see Gelderblom and Jonker (2005, pp. 199-200).

also a first on behavioral finance, including profiles and underlying psychology of different types of investors. More importantly, de la Vega's account is evidence that the success of the illegal (but tolerated) derivative contracts depended, not on government regulations and the enforcement of the courts, but on the reputation of brokers and market participants (Stringham 2003).

The Amsterdam Exchange was much more than the trading building; it included also the grain exchange, the Chamber of Insurance, the adjacent coffee and tea houses where brokers congregated, and the *Wisselbank* (Israel 1990, p. 412). As I have already mentioned, the latter was patterned after the Venetian *Banco di Rialto*. The *Wisselbank* had a monopoly on money changing, bills of exchange valued in excess of 600 guilders, and bullion transactions. Merchants were to bring all foreign coins to the bank and received credit in deposit accounts denominated in bank guilders. The *Wisselbank* was at the center of the Dutch payment mechanism. In the absence of bank fees, money settlements through the *giro* system–that is, by debiting and crediting deposit accounts with the bank—were cheaper and faster than settlements using coins. Bank fees on coins deposited in a bank account raised the premium on deposits and lowered the incentive to settle payments with deposits. A rise in uncertainty, caused for example by wars, raised the premium on specie and raised the incentive to settle payments with deposit transfers. The movements of the agio were self correcting and

> "… the Dutch were able to reap the advantages of a fixed exchange rate for their international trade and finance, encouraging their own merchants as well as foreign merchants to use their financing facilities for long-distance trade and long-term finance. At the same time, they were able to maintain the shock absorber benefits of a flexible exchange rate for their domestic economic activity" (Neal 2000, 122).

In sum, Amsterdam became a leading financial center through its secondary market in equities. In the words of Gelderblom and Jonker (2004, p. 666), "…the course of events in Holland after 1600 runs counter to common opinion about the importance of a publicly traded government debt as the origin of secondary markets." Yet, for a careful scholar like Larry Neal the Dutch, despite the remarkable innovations and efficiency of their payment mechanism, failed

to achieve the success of the English financial revolution. The reason is that the provincial structure of the United Provinces was an obstacle to the creation of "a truly national debt backed by a national taxing authority" (Neal 2000, p. 123). This conclusion is even more remarkable if one recalls that the Dutch exported their financial techniques, human and non-human capital to London when William of Orange, the Stadholder of the United Provinces, became king of England in 1688.

The Anglo-American centers

While there are several important financial centers today, two stand out, London and New York, and both share a common culture and language. Government finance, we recall, was the engine of the English financial revolution and the ascendancy of London as a financial center. The problem was how could government raise large amounts of funds to pay for an increasingly activist commercial and foreign policy in direct competition with France first and the Dutch later. The solution was found in a strong commitment mechanism to honor debt and reduce credit risk; financial instruments that were appealing to investors in terms of yields, maturity, transferability and liquidity; and either financial institutions or financial markets which would make these characteristics happen. Economic historians are in agreement that the English implemented what the Dutch had done. This is true, except that the evolutionary chain of finance is longer than that: the Genoese of the 15$^{th}$ century had faced a similar problem and came up with a solution somewhat similar to the English solution. The Genoese entrusted their commitment mechanism to San Giorgio. San Giorgio was structured and governed to ensure that the Republic would honor its debts (Fratianni 2006). The latter were funded by alienated taxes, collected and administered by San Giorgio itself. San Giorgio was created with a debt-for-equity swap, or what the English called much later engraftment; its shares had low credit risk and were transferable. In England, the commitment mechanism resided with the Parliament that had superseded the divine rights of the monarch (North and Weingast 1989, p. 824). Government debt was placed with joint-stock

companies such as the Bank of England, the Million Bank, the East India Company and most of all with the South Sea Company (Neal 1990, p. 51).

The Bank of England was created in 1694 with a capital subscription of 1.2 million pounds to finance a loan to government of an equal amount at an 8 per cent rate of interest. The Bank was restrained from lending to the Crown unless explicitly authorized by Parliament (North and Weingast, 821). This authorization acted as an effective constraint imposed by creditors on debtor and thus lowered default risk. Just like San Giorgio, the Bank of England was in a position to represent and coordinate with ease all creditors. The lower coordination costs, in turn, implied a larger punishment on the defaulting debtor, and hence a lower credit risk of government (Wells and Wills 2000, 422).

The South Sea Company came into existence in 1711 with a very large (over 9 million pounds) purchase of short-term government debt and the assignment of monopoly rights to trade in South America (Dickson 1967, Table 5). Then, in 1720, a law was passed whereby all of the national debt –except that held by the Bank of England and the East India Company—would be sold to the South Sea Company; in other words, a complete takeover of English public borrowing. This takeover had been inspired by John Law's takeover of French debt in 1719 through his Mississippi Company (Murphy 1997, ch. 14). The sound economic principle underlying debt conversion was the gain associated in transforming high transaction cost and difficult-to-trade debt instruments into transferable and liquid shares (Neal 1990, pp. 96-7). But the management of the South Sea Company were keen in driving up share prices through margin sales, exaggerated reporting of future profits, promises to pay unrealistic dividends, and political influence that led to the curtailment of corporations competing with the South Sea Company for investment funds.[19]

[19] The restrictions were defined by the Bubble Act of June 1720 (Dickson, p. 148). On management running up share prices of the South Sea Company, see Dickson (pp. 141-45) and Neal (1990, p. 109).

South Sea Company share prices collapsed in August of 1720 as investors rushed for liquidity. It was a severe crisis and its effects reverberated throughout Europe. In October of the same year, John Law's system collapsed. Banque Royale, the bank that Law had set up to convert paper money into bank notes and to give 'elasticity' to French money supply, engineered an unsustainable inflation and a bubble in Mississippi Company share prices.[20]

The eclipse of the South Sea Company in England and the failure of John Law's system in France had momentous repercussions on the respective financial systems. In England, it worked as "the 'big bang' for financial capitalism," to use Neal's (2000, p. 128) description. It strengthened the role of the Bank of England which absorbed, through engraftment, the South Sea Company and launched, in 1726, its first irredeemable perpetual Three Per Cents Annuities in 1726.[21] England came out of the crisis with a well-delineated financial system. For Larry Neal (2000, p. 128):

> "The basic outlines of the Anglo-American structure of finance were set by 1723 --complementary sets of private and commercial and merchants banks, with all enjoying continuous access to an active, liquid secondary market for financial assets, especially for government debt."

In France, instead, the crisis did not elicit any policy response. It was left to fester mistrust in the monetary and financial system. The result was a rejection of markets and a delayed financial deepening (Baskin and Miranti 1997, pp. 113-115).

London's ascendancy matured for much of the 1700s and was fully completed by the end of the century, after the English defeated the Dutch in the Baltic naval war (Cassis 2006, p. 19). London stood out for the depth and breath of its financial services. Its preeminence in the international acceptance market was such to have earned the attribution of "the clearing house of

[20] See Neal (1990, Table 4.1 and Figure 4.4) for the data on the explosion of bank notes issued by Banque Royale and on the Mississippi bubble.

[21] Further boost to the power of the Bank had come in 1707, when the Parliament gave the Bank the monopoly on joint-stock banking in England and made its notes legal tender; and in1715, when the Bank began managing the national debt, thus re-enforcing its role as the fiscal agent of the state.

the world;" and bills of exchange denominated in pound sterlings were considered an "international currency" (Baster 1937, p. 294).[22] Merchant-banks made the acceptance a marketable security. Exporters, not only would be guaranteed payment, but could obtain its present value immediately. Importers, on the other hand, could disburse funds after having received delivery of the goods. London merchant banks were also preeminent in sovereign lending, a service that had begun in Amsterdam (Riley 1980, chs. 5-7) and had moved to London with the assistance of Dutch merchant-banks.[23] The House of Rothschild epitomized the importance and the power of merchant banks in financing foreign governments. They were the modern Bardis, Peruzzis, Medicis, and Fuggers, but without the excesses that come by being too close to debtors. The major innovation of the Rothcschilds was to create a true international bond market for sovereign loans. It started in 1818 with a loan to Prussia denominated in sterling, with interest payable in London, and other British features (Ferguson 1998, pp. 124-5); in other words, what today we would call a Eurobond. As a result, British investors did not bear a currency risk and could evaluate the difference between the Prussian loan and British government bonds in terms of differences in credit risk. The loan was also placed in Amsterdam, Berlin, Frankfurt, Hamburg and Vienna, making it a global loan.

The merchant bankers were one among the pillars of the London financial center. A large army of deposit bankers, discount bankers, central bankers, insurers, jobbers, stockbrokers, investment trust specialists, chartered accountants, and lawyers provided a dense concentration of highly specialized human capital that fed the growing and innovative markets for securities, gold, commodities, ship chartering, and insurance. The result was a distinctive and well-oiled machinery, with each piece fitting into a complex puzzle:

[22] With an acceptance a party, typically a merchant banker, guarantees the payment of the bill should the drawer defualt. Bills of exchange, we recall, were early medieval instruments used to finance international trade.

[23] Baring Brothers of London learned the business of foreign lending through its association with Hope & Co. of Amsterdam; see Cassis (2006, p. 20).

> "…[M]erchant banks…accepted…the bills of exchange, generally for three months, that constituted the main instrument for financing international trade…Well before they reached their maturity dates, they were discounted, also by specialised banking houses – the discount houses—which then resold them to various British or foreign banks…[T]he clearing banks provided cash, in the form of day-to-day loans, to discount houses that discounted the bills of exchange accepted by the merchant banks…[T]he beneficiaries of these bills of exchange—wholesale dealers, merchants and industrialists—replaced the liquid assets that they had obtained through discounting them in the deposit banks. It was the deposit banks that made the whole wheel of international trade financing turn. The Bank of England had pride of place at the top of the edifice, guaranteeing the country's gold reserves, essential to the smooth running of the system… [M]erchant banks also specialised in issuing loans on behalf of foreign companies and governments…These securities were then traded on the London Stock Exchange…This huge market too was sustained by money at call supplied to stockbrokers by the deposit banks…" (Cassis 2006, pp. 84-85).

The London Stock Exchange had no challengers at home. According to Lance Davis and Larry Neal (1998), this resulted from the separation of ownership of the Exchange from its operation. Owners wanted to maximize fees from membership and minimize the risk of inducing the emergence of competing exchanges, whereas Member of the Exchange wanted to maximize volume of transactions upon which commissions were charged. The outcome was a very competitive environment with a rapidly increasing number of traders that made it difficult to make collusive agreements. In contrast, the owners of the New York Stock Exchange (NYSE) limited the number of traders and colluded to have minimum commissions. Consequently, the NYSE faced national competition, even within the perimeter of the city.

London was at the center of global finance during the heyday of the gold standard (1880-1914). Foreign issues exceeded domestic issues; in fact, as much as one-third of world negotiable securities were trade there at the start of World War I (Davis and Neal, p. 40). The strong foreign orientation has remained a London characteristic to these days.

The United States went through a financial revolution a century after the British. Unlike the British Parliament, the U.S. Congress did not share power with a king and could legitimately raise taxes for servicing the Federal debt. This was done in 1789-90 by pledging customs duties and excise taxes to pay interest on debt in hard money, the U.S. dollar linked to gold and silver

(Sylla 1998, p. 86). Alexander Hamilton and the Federalists saw in the national debt an instrument of consolidating the Union. With funded debt came a public bank, the First Bank of the United States, established in 1791. The Fist Bank was patterned after the Bank of England, except that its notes, unlike those of the Bank of England, were subject to a 100 per cent specie requirement (Cowen 2000, p. 12). Like the Bank of England, the First Bank was more a national bank than a central bank. It lent to the Federal government, paid interests on government securities held in Europe (mainly in Amsterdam and London), held government deposits, and transferred these deposits and its own notes throughout the country (Cowen, pp. 139-40).

There was strong opposition to the First Bank. Thomas Jefferson, Hamilton's nemesis, had a vision of a decentralized agrarian republic. He disliked paper money because prone to losses of purchasing power and the banks that issued it. If banks were "dangerous," a monopoly bank he thought was outright "evil."[24] The conflict between the Hamiltonian vision and the Jeffersonian vision of money and banking was rooted in different visions of the role of government. This conflict was ultimately responsible for the short life of the First Bank of the United States (1791-1815) and of the Second Bank of the United States (1816-1836), the fragmented nature of the U.S. banking system, and the tension between decentralization and centralization built into the Federal Reserve Act of 1913.

In the first round of the struggle, Hamilton won the day and his plan of a funded national debt and of the First Bank launched the financial transformation of the United States. Active secondary markets quickly developed in New York, not only on government debt, but on bank and insurance stocks.[25] In Spring of 1792, Wall Street suffered its first crush. According to Ned Downing (2005, pp. 283-40), "[t]he roots of the panic of 1792 lay in the lack of an enforceable mechanism to settle the financial obligations undertaken by the auctioneers." Hamilton proposed

[24] For Jefferson's quotations on money and banking , see http://etext.virginia.edu/jefferson/quotations/jeff1325.htm

[25] Sylla (2005, p. 306) shows the price histories from 1790 to 1820 of three Federal government securities, the Bank of the United States, the Bank of New York, the Manhattan Company, and the New York Insurance Company.

a solution based on the credit transfer model of the Amsterdam *Wisselbank*, a solution that gave rise to the beginning of the NYSE.[26] The *Wisselbank* is also the ancestor of the Depositary Trust and Clearing Corporation set up in 1960s to provide custody and daily securities settlement (Downing, pp. 283-84).

The importance of the New York financial center grew despite competition from rival cities and a hostile legislation that reflected the Jeffersonian tradition against big business, big banks and concentration in general. As it has been already mentioned, the demise of the First and Second Bank of the United States was part of this tradition. The revised National Bank Act of 1964 assigned to New York central reserve city status, meaning that national banks in reserve cities could satisfy part of their reserve requirement by holding deposits with New York banks, a recognition of the fact that New York was the money market center of the country. However, Chicago and St. Louis, in 1887, managed to be added to the list of central reserve cities, thus re-establishing a multi-polar system. The Federal Reserve Act of 1913 was another example of the conflict between the forces of centralization and decentralization. The Act was a compromise between the advocates of a single central bank, patterned after the Bank of England, and their opponents (Meltzer 2003, pp. 68-73). The outcome was a regionalization of central banking that created a tension between the center (the Board of Governors) and the periphery (the twelve reserve districts). The special role of New York, the money and financial center of the country, was not officially recognized until 1942 when the president of the Federal Reserve Bank of New York became a permanent member of the Federal Open Market Committee (Meltzer, p. 559).

In the first approximation, the New York capital market was not that different from London's, except in foreign trade financing where it was far behind at the start of the 20th century; part of the reason was due to the legal impediment, until 1914, for national banks to accept bills

[26] There is some controversy about the effective start of the NYSE. For some, including Downing (p. 284), the Exchange began with the Buttonwood Agrement of 1792 signed by 24 New York merchants, securities dealers, brokers and auctioneers. For others, NYSE starts with the formal charter of 1817; on this, see Sylla (2005, pp. 307-309).

of exchange (Cassis, p. 122). Then, matters evolved and New York began to rival London. The Bretton Woods system and the key-currency status of the dollar propelled New York to the top of the pyramid of the international money and financial centers. Virtually all foreign central banks kept dollar deposits and their stock of gold (in custody) with the Federal Reserve Bank of New York. New York also became a center of foreign exchange dealings.

The NYSE benefited from the big wave of "managerial capitalism" that characterized 20th century America (Baskin and Miranti, ch. 5). It specialized in large-capitalization stocks and set restrictive listing admission standards aimed at winning the public's general trust in equity investment.[27] This specialization has remained to these days. The NYSE has the largest capitalization of all exchanges in the world. At the end of June of 2007, its equity capitalization was $16.6 trillion. Tokyo, Euronext, NASDAQ and London –following in the ranking—had capitalization ranging from $4 trillion for London to $4.7 trillion for Tokyo.[28] The difference is mostly due to the average listing capitalization. For example, whereas the NYSE and the London Stock Exchange have approximately the same number of listed companies (3,104 for NYSE and 3,273 for London, again as of the end of June 2007), average capitalization favors NYSE by a ratio of about four.

There is a consensus that London and New York are the top international financial centers. They have been throughout the 20th century.[29] London has continued to prosper despite the end of Empire, the collapse of the international gold standard, the decline of sterling as a key-currency, the rise of the political and economic power of the United States after World War II, the creation of the euro and the placement of the European Central Bank in Frankfurt. It has been

[27] Cassis (p. 120) mentions that the restrctive standards, coupled with fixed commissions, generated rents to the Exchange's owners. They also encouraged the rise of rival exchanges.
[28] The data are from the World Federation of Exchanges, *Focus*, July 2007; see http://www.world-exchanges.org.
[29] Howard Curtis Reed (1981) ranks international financial centers for much of the 20th century using hierarchical cluster analysis and setpwise multiple discriminant analysys. London and New York are always at the top. In banking, London prevails over New York; see Table 2.2. In finance, New York was higher than London in 1955, but falls behind London in 1965, 1975 and 1980; see Table 2.4 in Reed.

a durable center and has renewed itself repeatedly through innovation. New York has benefited from the effects of those shocks that should have impacted London negatively, but has suffered from legislation and rules designed to limit the comparative advantages of New York as a money market center and to maintain a regionalized banking system.

## IV. EVALUATION AND IMPLICATIONS FOR CONCENTRATION

Our long historical excursion confirms the basic proposition of Kindleberger's 1974 essay: namely, that the N-1 argument applies to money as well as to financial centers. Strong economies of scale are realized by financial centers; in the case of New York, these economies were so compelling to overcome a hostile political culture and a legislation against geographic concentration. Economies of scale also explain the relative persistence of these centers; when decline occurs, it tends to be slow. Kindleberger appears to be also correct about the positive correlation between great centers and great monies. At least five of the seven centers surveyed had internationally accepted monies: the florin in Florence, the ducat in Venice, the guilder in Amsterdam and, in more recent times, the pound in London and the dollar in New York. Fourth, great financial centers develop on the foundation of great banking centers.

One aspect Kindleberger did not emphasize was the nexus between financial centers and accountable institutions. Florence, Venice, Genoa, the Dutch, the English and the Americans shared, to various degrees, democratic institutions and developed commitment mechanisms to honor their public debts. There were differences in the mechanism. In Genoa, current government spending had to match current borrowing, primarily from San Giorgio. In Venice and to a lesser extent in Florence, elected government set tax rates and forced borrowing to match government spending, including interest payment on debt. The model of representative government was the protagonist of the commitment mechanism for Dutch, English and American finance. With the exception of Amsterdam, trading in government bonds preceded trading in

equities. What would have happened to the development of financial centers in the absence of this commitment mechanism poses an interesting counterfactual speculation.

Four of the seven centers (Florence, Venice, Genoa, and Antwerp) no longer exist and one (Amsterdam) has lost much of its former importance. Yet, their institutional and financial innovations have survived through the long evolutionary chain of banking and finance. About institutions, we recall that the Florentines of the 14th century were the most innovative in commercial banking, including international banking, although they underestimated the extent of sovereign risk. The Medicis of the 1400s put together an organizational structure, spanning over much of Europe, that is a precursor of the modern bank-holding company. Beyond banking, the Florentines were so worried about young ladies not marrying that they set up a Dowry Fund, the forerunner of a social security system. The Genoese and the Venetians created public banks that lowered transaction costs for settling debits and credits. The *Wisselbank* of Amsterdam was patterned after the *Banco di Rialto* in Venice. The *Wisselbank*, in turn, inspired reforms after the American bubble of 1792 and became the model of the Depositary Trust and Clearing Corporation, among others. The English, in the late 1600s, reproduced the core of *Banco Giro* and *San Giorgio* in the Bank of England. The latter, in turn, was the model, among others, of the First and Second Bank of the United States and the inspiration of the Federal Reserve Act of 1913. The latter, in turn, was the inspiration of the European System of Central Banks created in 1999.

As to financial instruments, Genoa was the most innovative of the three Italian city-states. San Giorgio effected the earliest recorded case of a debt-for-equity swap. The same type of swap was repeated approximately three hundred years later by the Bank of England, the Million Bank, the South Sea Company, and John Law's Mississippi Company. In Genoa, the swap, coupled with a sound governance structure that compressed credit risk for San Giorgio's shareholders, permitted the Republic of Genoa to borrow large amounts of debt at a low cost. The transformation of high transaction cost and difficult-to-trade debt instruments into transferable

and liquid shares also reduced interest rates in England. Ultimately, however, in England and France the swap was mishandled by poor governance structures and political corruption and ineptitude that facilitated big bubbles. The Genoese were the first financiers to fully exploit the international payment mechanism, using credit instruments instead of costly specie transfers. In international trade finance, the lineage goes from Genoa of the 16th century to Amsterdam of the 18th century to London of the 19th century, and so on. Genoese bankers at the Spanish court of Phillip II used *juros*, obtained as collateral for short-term loans, to earn an interest rate spread between short and long-term interest rates, thus being on record for the possibly first interest rate swap in history.

In Antwerp of the 15th century starts the history of exchanges and secondary markets and derivatives, which were greatly expanded in Amsterdam a century later. The Amsterdam Exchange brought us the modern age of funding and trading shares, including derivatives, of large enterprises. London copied Amsterdam and set a new frontier. New York followed London and both centers have been at the top of the pyramid for over a century. In fact, their business has grown relative to other centers. The United States went through a consolidation of exchanges in the 20th century, with the total number of them falling from approximately 100 to five over this period; and the NYSE gained market share from it (Arnold et al. 1999, Figure 1). Regulatory reform and technological innovations were responsible for this consolidation. The introduction of country-wide telephone service in 1915 and of open-ended teletype in the 1930s favored the expansion of NYSE (Arnold et al, p. 1086), just like the laying of the first transatlantic cable in 1866 enhanced the financial integration between New York and London (Garbade and Silber 1978). The creation of a monetary union and the consequent replacement of national currencies with the euro in Europe has ushered a consolidation of exchanges (McAndrews and Stefanadis 2002). In 2000, the Amsterdam, Brussels and Paris exchanges merged to form the pan-European Euronext. In June of 2007, the London Stock Exchange and Borsa Italiana announced plans for a merger. Consolidation of exchanges has now moved up to the global level. In April of 2007,

NYSE and Euronext combined to form the first global stock market. NASDAQ, after having failed to purchase the London Stock Exchange, has announced an agreement to acquire the Nordic exchange OMX. More of this is expected in the future.

Consolidation is consistent with a deepening of economies of scale. Improvements in communication and information technology and the breakdown in financial borders favor the further expansion of leading international financial centers. By stretching their global reach, these centers can lower costs by sharing common trading platform, while providing the benefit of deeper liquidity (Pagano 1989). The evolution of financial centers suggests that organized exchanges are best suited for low transaction cost and deep secondary markets.

## V. CONCLUDING COMMENTS

Financial products are unstandardized and subject to a great deal of uncertainty. Geographical concentration reduces information and transaction costs in trading these products. The strong advantages of concentration show up in the persistence of financial centers. When centers finally lose their importance or disappear altogether, much of their legacy is carried by newer ones. Naturally, old institutions and products are re-engineered to suit the circumstances of the time; their roots remain however. This is the essence of what I have called the long evolutionary chain of finance.

The evidence of this paper is not consistent with the thesis that financial globalization brings an end to geographical concentration of financial services, also called the 'end of geography' (O'Brien 1992). International financial integration is not a new phenomenon. It was a key feature of the classical gold standard from 1880 to 1914; it then receded in the inter-war years and started again after World War II, but especially after the end of Bretton Woods in 1973. Over this period, international financial centers have not only persisted but prospered. A mixture of centralization and decentralization is a better description of what happens as a result of financial globalization. Retail banking is widely dispersed, stock markets and bank headquarters are

concentrated (Martin 1999). The trend towards increasing concentration of capital markets is not inconsistent with the existence of local capital markets. Small and medium-size firms have not the characteristics to accede to large centralized markets; hence, the reason why local capital markets can survive along side concentrated markets.

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