Towards an Understanding of the Changing Structure of Financial Intermediation: An Evolutionary Theory of Institutional Survival

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Contents

I Introduction[1]

This paper is an attempt to look at the changing structure of financial intermediation in industrial countries from a different angle and with a different set of lenses than has previously been employed. The exercise is essentially exploratory. The study is concerned less with what we think is happening to the structure of financial intermediation than how we might try to understand its evolution. The idea is to borrow from some of the work of modern economic historians and industrial organisation theorists who have tried to understand the role of institutional structure and technological change in determining the evolution of economic systems. The attempt is presumptuous, firstly because the author is not an economic historian, and secondly because the topic presumes an understanding of a number of complex areas in theoretical and applied industrial organisation and finance. To excuse the presumption and the several pilfering of ideas which follow, I refer to T.S. Eliot's response to the accusation that in his poem 'Ash-Wednesday' he liberally lifted a line from a Shakespeare sonnet and from the work of the 13th century Florentine poet Guido Cavalcanti[2]. Eliot's retort was that immature artists imitate, while mature artists steal. My 'maturity' is revealed in my considerable references to the work of other researchers.

The paper attempts to weave together several related threads of financial evolution, the theory of risk, innovation, organisation and technology, financial regulation and adaptive economic behaviour, using some ideas initially developed by Armen Alchian, later furthered by Douglass North, on change and evolution in economic systems, and the theory of competing technologies and self-reinforcing mechanisms in economics developed by W. Brian Arthur. The weave is not always tight; at times the nitted fabric may tear. Several historical illustrations are given to make some of the conjectures appear less strained than they may at first appear. Much of the discussion of modern financial institution transformation has a decidedly US bent, given the rapid growth of institutional investment and bank asset securitisation in that country.

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1 The views expressed in this paper are those of the author and do not represent an official view of the Bank for International Settlements. I wish to thank the BIS library staff, in particular Chris Bennett, for their considerable assistance, Henri Bernard for statistical support and Sylviane Obert for typing assistance. My thanks also to Robert Einzig, Martin Fase, Gabriele Galati, Charles Kindleberger, Nicholas Krul, David Mann, Kostas Tsataronis, Al Wognilower and Marcel Wormser for helpful comments and encouragement.

2 It is interesting to note that the line Eliot lifted from Shakespeare was 'Desiring this man's art and that man's scope', Sonnet XXIX. Eliot replaced 'art' with 'gift'.

II The Recent Past: How Did We Get Here?

A number of years ago Douglass C. North stated that 'economic historians have failed to come to grips with the central issues in economic history: explaining the institutional structure which underlies and accounts for performance of an economic system, and explaining changes in that structure'.[3] Financial economists can similarly be accused of having failed to anticipate the enormous upheavals in financial systems and the structure of intermediation which have occurred since the mid-1980s, which in a surprising number of cases have brought major financial institutions to their knees and in a few instances entire financial system and governments as well. Our ignorance has been our undoing.

Arguably the two greatest changes that have occurred in the past decade in the structure of the financial industry are the relative decline in the proportion of total financial assets held by depository institutions, particularly in the United States , and the near or actual failure of major financial institutions around the globe following financial deregulation and the collapse of several asset price bubbles.[4] (See Table 1 and Charts 1 and 2). Much of the academic work in finance which might help us to understand this upheaval has been of a micro-economic nature, centring on the question of why financial intermediaries exist, how 'banks' differ from non-bank financial institutions and on the information, monitoring and contract enforcement aspects of principal-agent problems is financial intermediation. For example, the weakness of banks in some countries had been attributed to generous deposit insurance schemes inducing moral hazard problems, but little attention has been given to the corporate governance of banks. Relatively modest work has been done which stands back from the more narrow theoretical issues in financial development and asks the broader question of how financial systems have evolved the way they have or asks whether this evolution is indeed desirable.[5] Rather, many writers have implicitly assumed that there is some sort of historical inevitability, driven by 'free market forces', which will determine how financial systems develop once released of the constraints placed on the organisation of financial intermediaries, their activities and their geographical scope of operation. There has also been the implicit assumption that the existing and evolving structure of regulation and supervision of financial institutions by central banks and other financial authorities will be sufficient to contain any wide-spread systemic problems which might undermine the fundamental stability of an entire financial system. This assumption is largely based on the liquidity creating powers of the central bank. Experiences such as the limited impact of the 1987 world-wide equity market crash and the successful if costly resolution of the US saving and loan industry crisis may have reinforced an underlying confidence in the authorities' ability to contain financial crises. There also has remained the opinion that deposit-taking intermediaries, 'banks', are still 'special', and are not yet threatened by the growth of non-bank financial intermediaries, and should remain the primary concern of central banks.[6] It is also assumed that the

3 North (1981), p. ix.

4 For example, Barth (1993) reports that between 1990 and 1992 US depository institutions' share of total assets of all financial service firms declined from 85% to 39%.

5 See Annual Report, Bank for International Settlements (1992).

6 See George (1997). Corrigan (1982) attributes banks' 'specialness' to essentially their par value immediately callable deposit liabilities.

Table 1

Basic banking sector statistics[1]

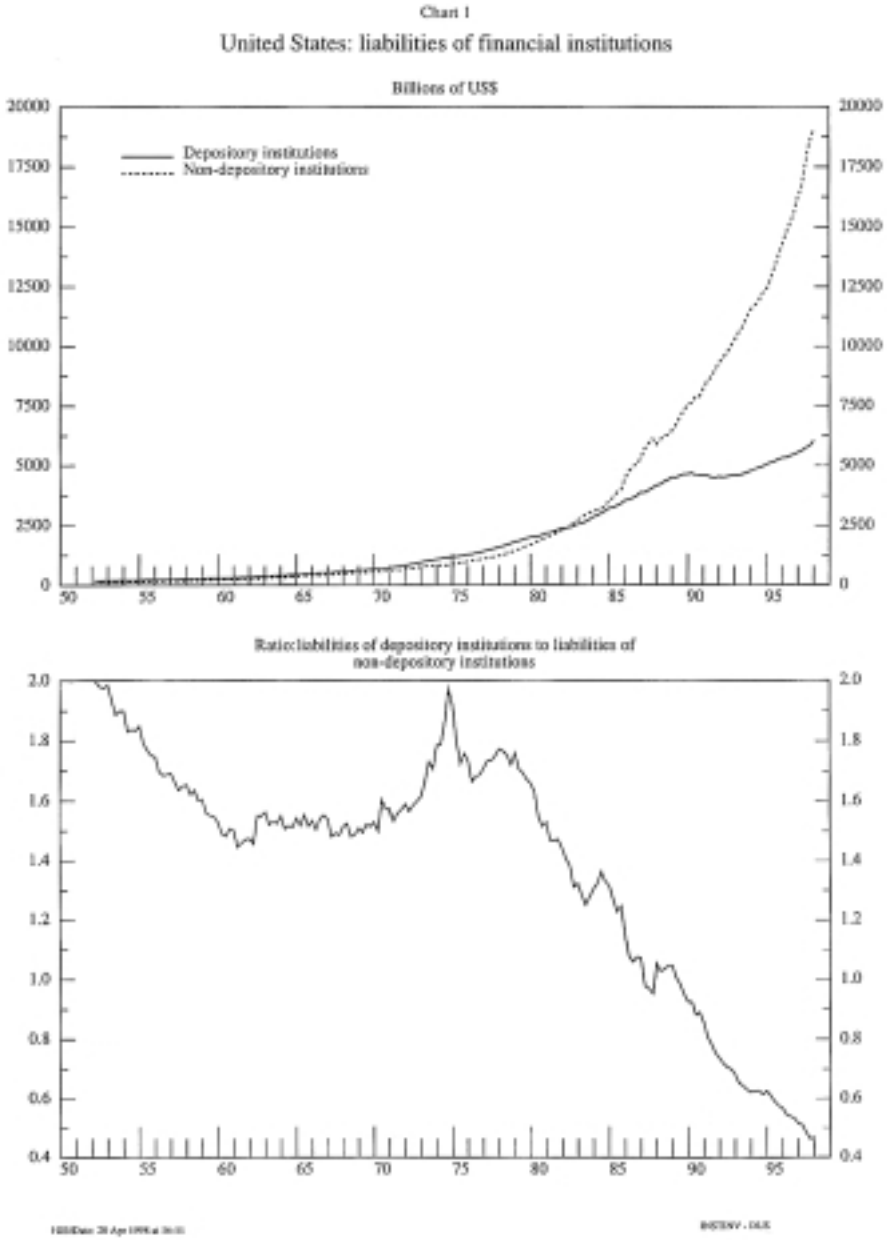
	Return-on-assets[2] (per cent)		Net provisions (as per cent of gross income)		Non-performing loans (as per cent of total loans)
	1990	1995	Average 1985-90	1995	1995
United States	0.70	1.81	17.96	5.28	2.50[3]
Japan	0.36	-0.17	2.48	44.87	5.6[4]
Germany	0.48	0.56[5]	13.18	22.10[5]	n.a.
France	0.36	0.15	10.47[6]	27.23	8.1[7]
Italy	1.00	0.41	14.51	21.67	9.7[9]
United Kingdom	0.70	1.17	18.32	7.41	1.50[10]
Canada	1.22	1.95	17.21	7.02	n.a.
Australia	0.67	1.25	10.10	4.26	1.9[11]
Austria	0.40	0.39	17.92[8]	15.64	3.5[12]
Belgium	0.29	0.33	16.93	13.55	n.a.
Netherlands	0.55	0.74	8.42	5.85	n.a.
Spain	1.31	0.82[5]	14.04	13.85[5]	n.a.
Sweden	0.22	1.33	23.54	-3.40	n.a.
Switzerland	0.52	0.56	19.22	25.29	n.a.

[1] Commercial banks: United States, Japan, Germany, France, United Kingdom, Canada, Spain and Sweden. All banks: Italy, Australia, Austria, Belgium, Netherlands and Switzerland: n.a. means not available. [2] Profit before tax as per cent of average balance sheet total. [3] Delinquency rates from Federal Reserve Bulletin, June 1996. [4] End of March 1996, Federation of Bankers' Association of Japan. [5] Break in series in 1992 (1993 and 1994 for Spain) due to change in methodology. [6] Average 1988-90. [7] Commission Bancaire, rapport 1995. [8] Average 1989-90. [9] September 1996, Banca d'Italia, Bolletino Statistico 24, December 1996. [10] Bank of England. [11] September 1996. Total imported loans as per cent of total loans, advances and bills held. Reserve Bank of Australia Bulletin, March 1997. [12] OECD Economic Surveys (1997), Austria. [13] 1986-90.
Source: OECD (1997), *Bank Profitability.*

ability of central banks to influence economic activity will remain, even in the face of technical change in financial markets and institutions. All of these assumptions should be questioned.

One possible reason for the failure to anticipate the major financial upheavals observed since the mid-1980s was the widespread believe that institutions and governments could adapt to regulatory and technical change and that they would adjust to the new environment of free capital movements, greater competition, fewer restrictions on place and scope of activities and rapid innovation without widespread weakness or failure or the need for massive government intervention. Obviously this confidence in institutional adaptation was exaggerated.

If the recent past is any guide, it is probable that economists and public officials will underestimate the future evolution and adjustment problems of financial institutions. One reason the financial turmoil of the past fifteen years was unanticipated was arguably that financial policy-makers, politicians and economists alike simply had the wrong 'model(s)' in mind. The wrong 'model(s)' may have resulted from optimistic reliance on the neo-classical behavioural assumptions economists use to understand economic activity, which, as North has argued, 'are the fundamental stumbling block preventing an

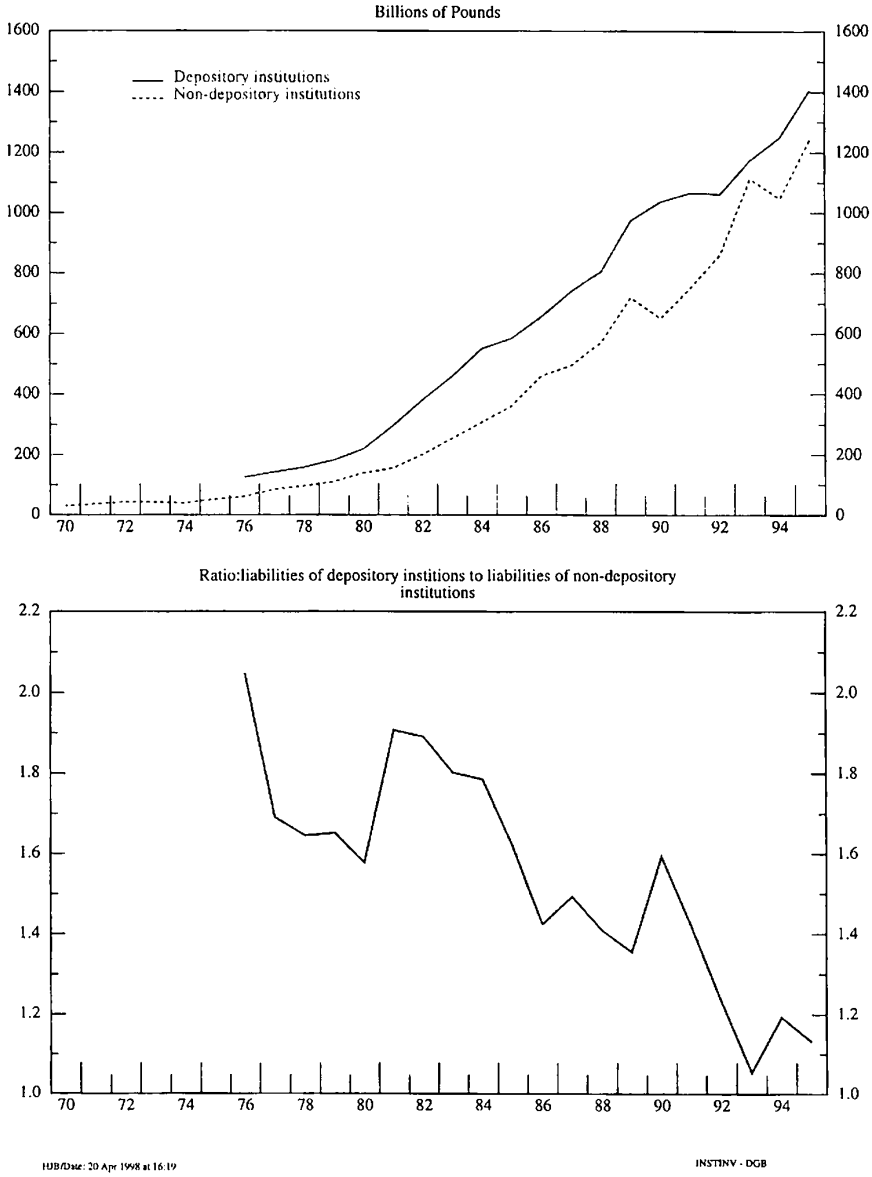


understanding of the existence, formation, and evolution of institutions'[7]. The considerable advances that have been made in finance since Akerlof (1970) and Leland and Pyle (1977), emphasising the relevance of informational differences between buyers and sellers, lenders and borrowers, did not prepare us for the unexpected turbulence which would hit some financial systems. The saving and loan industry crisis in the United

[7] North (1990), op. cit., p. 24.

Chart 2

United Kingdom: liabilities of financial institutions



States was hardly anticipated in 1980 when the industry was deregulated and given wider investment powers. ‘The overly optimistic view of the nature of the transmission process from a constrained to a less constrained or deregulated environment’, noted by Cargill and Garcia (1985, p. 64), which accompanied the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) of May 1980 in the United States, seems to have occurred in a number of countries and with similar consequences.

Another reason for the failure to anticipate the enormity of the problems suffered by many financial institutions since the early 1980s was our general lack of understanding of institutional adjustment in an environment of rapid deregulation and technological change. Scholars who have studied changes in the structure of financial intermediation may not have paid enough attention to the developments which have taken place in modern economic history and sociology, and the theory of technical change and innovation. They have possibly overemphasised the potential efficiency gains from rapid financial deregulation and financial innovation, assuming that the appeal to potential 'allocative efficiency' would be enough to deflect criticism that in the short-term the cure might be worse than the disease. Many now appear to be assuming that the disruptions caused by deregulation and asset price bubbles were merely 'adjustment costs' to a new intermediation environment. However, institutional change, promoted by financial deregulation, innovation and technological change, can increase, in the language of social psychologists, our 'uncertainty about uncertainties', or 'ambiguity', the uncertainty about the process generating possible alternative outcomes.[8] Our ignorance of how financial markets and institutions function and adapt to a new competitive and technical environment may have grown as a result of these changes. James Tobin (1984) has been one of the few well-known economists to caution us against too easily assuming that efficiency gains would quickly or necessarily result from financial deregulation and innovation.

> 'Any appraisal of the efficiency of our financial system must reach an equivocal and uncertain verdict. ... Nor are its shortcomings entirely attributable to government regulations and likely to disappear as deregulation proceeds apace. Here as elsewhere many regulations have been counterproductive. But the process of deregulation should be viewed neither as a routine application of free market philosophy nor as a treaty among conflicting sectoral interests. Rather it should be guided by sober pragmatic consideration of what we can reasonably expect the financial system to achieve and at what social cost.'[9]

Similarly, while some economists have emphasised the role of financial innovation as the primary force altering the shape of financial systems, to my knowledge there has been little work relating financial innovation and structural changes in intermediation to the considerable work on evolutional economic history and the theory of technical change and innovation. Robert Merton has been one of the few economists to emphasise that technological changes in finance may ultimately lead to increased difficulties for government regulation and might even increase international macro credit risk.[10] However, it is not clear what are the appropriate models we can use to discover what the future structure of financial intermediation might look like as a result of an essentially technically driven revolution in finance. One objective of this paper is to search for paradigms from other economic disciplines in order to understand the evolution of the structure of financial intermediation resulting from financial deregulation and technological innovations in finance. This search will be wide and the topics not always clearly interrelated. It will cover decision making under ambiguity, the evolutionary

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[8] The notion of uncertainty about uncertainty, to be used later, is discussed in Einhorn and Hogarth (1986).

[9] Tobin (1984), p. 14.

[10] See Merton (1990).

theory of institutional change, the theory of technical innovation adoption in the presence of increasing returns, network externalities, ‘path dependence’ in technical change, the notion of adaptive efficiency and the role of information systems and financial transparency in financial institution transformation. A second objective will be to use the resulting paradigms, admittedly rather loosely, to consider several recent structural changes in financial intermediation, including asset-backed securitisation, mutual funds, pension funds and electronic money. The paper concludes, by asking whether we can ‘predict’ the direction of change in the structure of financial intermediation.

III Theory and a Bit of History

To approach an understanding of the evolution in the structure of financial intermediation I suggest we begin with some building blocks. The issues to be addressed are too many and complex to pretend that a comprehensive review of the theoretical issues is possible in one paper. The exercise might be compared to turning over stones to see what lies beneath them. A brief appeal to some existing theory will hopefully help to understand the logic of the analysis and equally make more apparent the holes in any arguments.

A. Decision-Making Under Ambiguity

A fundamental component in the evolution of financial intermediation in industrial countries is the 'ambiguity' in financial asset-pricing and in the characteristics of modern financial instruments, markets and institutions. The frequent reference to the 'blurring of distinctions' among financial institutions is an example of this ambiguity. Another is that between financial instruments, debt and equity. An important ambiguity in financial decision-making is the persistent problem of understanding the determination of financial asset prices, of detecting when a particular level of an asset price represents a 'bubble' or whether asset prices are 'excessively volatile'.

There is a possible inconsistency in the way economists approach the analysis of financial intermediaries compared with their treatment of financial asset prices. Intermediaries are commonly approached through the lens of imperfect/asymmetric information (moral hazard, adverse selection and signalling). Asset prices, on the other hand, are often looked upon, as a maintained hypothesis, as fully reflecting available information and the 'rational' behaviour of market participants. It is often assumed that most relevant information is common to all agents. Financial asset prices are assumed to return to 'equilibrium' once disturbed. These equilibriums are also assumed to be unique. For example, there is only one equilibrium dollar-yen exchange at any given moment. Financial institutions, however, are frequently thought of as acting to reduce informational asymmetries and costs of information acquisitions. Asymmetric information is the fundamental characterisation of financial intermediation. There is relatively modest attention given to the possibility of systematic financial asset mispricing. Arbitrage is assumed to quickly remove profit opportunities in open financial markets. However, the presumption of 'rationality' leads to the difficulty of understanding why risk-averse individuals trade assets if they all share the same information.[11] If individuals share identical information then they must trade on the basis of differences in risk preferences. It would appear that to develop a theory of the evolution of financial intermediaries and to understand the policy implications of this evolution we should make clear how we think financial asset holders formally make decisions.

The notions of risk preferences commonly used in the finance literature are typically grounded in utility theory. In thinking about financial innovations and institutional change it may be worthwhile to consider a criticism of this approach to uncertainty; that

[11] Arrow (1986) asks how we can make consistent the assumption of rationality and full information with the observance of large security trading volumes. He notes that the incorporation of the perceptions of others and of their rationality becomes important if all of the assumptions of neo-classical theory fail to hold.

'uncertainty in the real world' cannot be best captured by thinking of sampling probabilities defined on a known sample space. As a heuristic device, the notion of decision-making under 'ambiguity' may provide some useful insights both about the evolution of financial institutions and the behaviour of financial prices. Financial decisions may be 'rational' in the sense of using all available information but still be 'ambiguous'. And asset price equilibriums may not be unique.

The notion of ambiguity in decision-making originates with a well-known paper by Daniel Ellsberg.[12] Ellsberg's concept of ambiguity is an element used in decision-making in addition to subjective probability and subjective utility. Ambiguity is 'a quality depending on the amount, type, reliability, and 'unanimity' of information, giving rise to one's degree of 'confidence' in an estimate of relative likelihoods'. Ambiguity exists when the decision-maker 'does not know enough about the problem to rule out a number of possible outcomes'. Ambiguity has also been defined as 'uncertainty about uncertainties', or in statistical terms, uncertainty about the probability generating function.

Ambiguity is particularly in evidence in financial asset markets. The US equity market in the spring of 1998 had reached record levels, causing some to make comparisons with the behaviour of the Japanese equity market during the late 1980s, later referred to as a 'bubble period'. Yet since the generating mechanism driving equity prices is unknown, or very uncertain, we are unable to say with much confidence that US equities are currently overvalued, even though on the basis of past history the likelihood of observing such a level of equity prices is low. Thus observers of the US equity market cannot rule out the possibility of an equity price crash or the possibility that US equity prices will move still higher. To quote a former Federal Reserve Governor on the recent state of US equity prices: 'Stock prices can continue upward if we continue this "new era" brought on by a favourable economic environment which surely begets a yearning for freedom and democracy'.[13] Contrast this statement with that of a seasoned observer of US financial markets, James Grant: 'The money that poured into equity mutual funds in 1996 was put to work at once, ... There was, indeed, little need for prudence, as prudence had been defined in a dangerous and accident-prone world. ... However, the growing faith in stability has become a powerful force for instability'. ... 'The outpouring of public money into mutual funds and pension funds may not, after all, be unrelated to the outpouring of public money into lotteries, casino gambling, and the other aleatory pastimes'.[14]

Becker and Brownson (1964) help clarify Ellsberg's concept of ambiguity, as follows. In L.J. Savage's concept of subjective probability, if a distribution on the probability of future events is known there is no ambiguity. In Ellsberg's view, ambiguity relates to the degree of confidence assigned to the estimated distribution. Ambiguity arises as a result of differences in the quantity or quality of information used to estimate probability distributions. Ambiguity, in a practical sense, concerns the 'uneasiness' that the decision-maker has with regard to the quality and quantity of his information. 'Ambiguity will

[12] See Ellsberg (1961). The concept of ambiguity is used by Kunreuther (1993) to understand the cost and provision of insurance for low probability events. Ambiguity is argued to lead to the failure of efficient risk allocation by the private market. The inability to estimate the probability of a rare event may cause private insurance not to be provided or to make it available only at extraordinary rates.

[13] Wayne Angell, 'Understanding 1929', The Wall Street Journal, 10 March 1997.

[14] Grant (1996), pp. 311-312 and p. 223.

generally be high when evidence is unreliable and conflicting or when the causal process generating outcomes is poorly understood'.[15] Note that Ellsberg and others using the concept of ambiguity in decision-making assume that 'the decision-maker utilises all available information to assess a distribution for each event in order to obtain a "best estimate" of the probability of the occurrence of the event'.[16]

Consider an example of ambiguity in asset markets. In June 1990 the New York Stock Exchange published a detailed report on US. equity market volatility. This report included a survey of market participants and studies by several academic economists. Two comments regarding the interaction of modern technology with investor attitudes show how it is possible to have both more liquid security markets and more volatile security market prices, particularly in a world of larger institutional investment trading.

> G. William Schwert stated:
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> 'The remarkable technological changes that have occurred in the computer and communication industries have made it much easier for large numbers of people to learn and react to information very quickly. They have also made it possible for financial markets to provide liquidity for investors around the world. ... The liquidity of organised securities markets means that prices can change quickly. From this perspective, volatility is a symptom of a highly liquid securities market'.[17]
>
> Robert A. Schwartz argued:
>
> 'The crux of the problem is that market impact is greater and price discovery more difficult in today's institutionally dominated market. ... Intraday price changes are not due to news only. They are also attributable to market impact effects and to price discovery. ... Unfortunately, the conventional thinking is that prices set in competitive markets reflect equilibrium values. ... Moreover, asset managers are reluctant to maintain large positions in securities that have suddenly dropped in value even though, in their opinion, long-run prospects remain bright. ... The growth of institutional investment has contributed to the problem of price instability.[18]

The portfolio investment behaviour of institutional investors should thus be of some importance in understanding financial asset price behaviour in light of their rapid and substantial growth.[19]

The reference to decision-making under ambiguity is made in order to suggest that there are useful alternative models of decision-making which appear more realistic and consistent with observed asset price behaviour than the rational expectations based present-value models of asset valuation. The appeal to decision-making under ambiguity

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[15] Einhorn and Hogarth (1986), p. 229.

[16] Becker and Brownson (1964), p. 64.

[17] New York Stock Exchange (1996), p. C5.

[18] ibid., p. G4.3-G4.5

[19] For a quick review of the growth of US institutional investment, see Blume, Siegel and Rottenberg (1993), Chapter 6.

is not meant simply to take a swipe at rational expectations assumptions. It is the combination of rationality with neo-classical theory, the assumptions of equilibrium, competition and the completeness of markets, which are at issue, with which North and Tobin, referenced above, are critical of.[20] Modern financial markets, simply because they are larger, more liquid and with rapid and widespread access to information, are not necessarily more 'efficient'. The nature of the major participants in these markets, increasingly large institutional investors, the likelihood that they engage in some form of decision-making under ambiguity, in an environment of rapid technical change and deregulation, suggests that we approach the issue of changes in the structure of financial intermediation without the bias that these changes are necessarily leading to more 'complete and efficient markets'. The direction of change in financial intermediation may raise problems which we have yet to anticipate.

Ambiguity in financial markets can also be looked upon as resulting from the 'self-referential nature of expectations.' By this is meant that financial asset prices are generated endogenously by market participants' expectations, which themselves are influenced by guesses and anticipations of the expectations of other market participants. Hence, as argued by Arthur, et.al. (1997), asset price expectations are not determined deductively, but rather inductively. 'The market becomes driven by expectations that adapt endogenously to the ecology these expectations cocreate.'

Ambiguity in financial decision-making is also not restricted to the difficulty of uncovering equilibrium asset prices in modern financial markets. It similarly exists with non-marketable loans provided by intermediaries. Financial intermediaries are supposed to exist because of their superior ability to screen potential borrowers and monitor their behaviour. Because 'information parity' rarely exists in financial contracting, much of the decision making is partially made 'in the dark', resulting in so-called 'lemons problems'. Moreover, as argued by Gale (1993), intermediaries have a limited capacity to screen borrowers in a given amount of time. The capacity constraint on information processing in intermediation can lead to problems similar to those faced by portfolio managers in selecting marketable assets, 'herd' or mimetic behaviour. For example, banks often take part in large syndicated loans because the larger institution which originates the loan is assumed to have superior information, or the smaller institution simply does not have the time to undertake detailed analysis of the borrower and must rely on the credit screening of the larger participants to the syndication. Pressure to participate in syndications at short notice with limited screening capacity means that considerable decision-making under ambiguity takes place in intermediated finance. This problem recently has been of concern in the US syndicated loan market.[21] Decision making under ambiguity may occur both as a result of lack of knowledge of the underlying asset return distribution (knowledge of 'equilibrium asset prices') and of the capacity constraints on information processing ('information congestion'). It exists in both intermediated and non-intermediated financial markets.

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[20] Arrow (1986) provides a crystal-clear analysis of the difficulties related to the assumption of rationality with incomplete markets.

[21] The problem of syndicated loan participation subject to serious time constraints and information screening capacity in the United States is discussed in American Banker (1997).

B. Evolution, Survival and Institutional Change

The notion of decision-making under ambiguity in a non-neo-classical world can be linked with an idea of how firms adapt to a changing environment where they have limited foresight and where their motivation may not be profit maximisation, but, in some general sense, survival. That is, they may have many objectives, not necessarily all consistent, but survival is the strongest among them. This is the environment Alchian (1950) asks us to consider and one which has influenced the direction of later research by economic historians, most notably Nelson and Winter and North.[22] The 'evolutionary theorists' in economic history use the analogy of market competition with biological competition, asking how individuals and firms respond and adapt to changing market and environmental conditions. The analogy in finance might be to rapid technical change, deregulation and intense competition.

The idea of Alchian which is worth pursuing in a study of financial intermediation is that as a result of the pursuit of survival in a world of 'incomplete information and uncertain foresight', 'modes of behaviour replace optimum equilibrium conditions as guiding rules for action'.[23] What results is considerable imitative patterns of behaviour, particularly patterns of behaviour which appear to copy behaviour which led to previous successes. Among the factors which give rise to this type of behaviour are '(1) the absence of an identifiable criterion for decision-making (which I would equate with ambiguity); (2) the variability of the environment; (3) the multiplicity of factors that call for attention and choice; (4) the uncertainty attaching to all of these factors and outcomes; (5) the awareness that superiority relative to one's competitors is crucial; and (6) the non-availability of a trial-and-error process converging to an optimum position.'[24]

Several economic historians have since the early 1980s dropped the neo-classical model in attempting to explain economic growth by concentrating on the role of institutions and institutional structure, clearly influenced by Alchian's 1950 paper. They have moved in the direction of considering the role and development of property rights, principal-agent problems and transactions costs in the economic growth of nations. Indeed, much of the later work on transactions costs, contract theory and principal-agent problems appears to have been motivated by some of Alchian's early insights, together with his work with Demsetz (1972, 1973). Historians such as North (1990, p. 4) also draw the analogy between institutions and competitive team sports, consisting of formal rules and un-written codes of conduct, the need to uncover rule violations and determine appropriate punishments; in other words, constraints and transactions costs.[25]

The 'destruction' of financial institutions we have observed since the mid-1980's is consistent with the insightful argument Alchian formulated in 1950. It is an *evolutionary theory of institutional survival*. It suggests that the 'fit' will survive, as inefficient institutions die out or are overrun by more efficient ones. But survival does not depend on neo-classical

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[22] See Nelson and Winter (1982), Chapter 6 and North (1981 and 1990).

[23] Alchian (1950), p. 218.

[24] ibid. Knight (1935a) had similar concerns with the strict application of utility theory to economic questions.

[25] The idea of looking at economic activity as a competitive contest or game, rather than as mechanical utility maximisation, was much earlier considered in Knight (1935b), p. 301.

maximising behaviour. Nor should we assume that the direction of institutional change will always be welfare improving. As will be discussed later, the direction of change, the 'path' down which the financial system evolves, will be determined by a variety of factors, one of which is that once a particular direction is taken it may be impossible or extremely costly to jump to a new path or reverse direction, even if in the long-run a new path is more efficient.

The weakening and destruction of many financial institutions and alteration of intermediary structures are the result of two factors related to Alchian's argument and later developed by economic historians: *the evolution of constraints on behaviour and changes in the capital stock brought about by the growth of knowledge*.[26] A third factor emphasised by Alchian is *chance*. The constraints on behaviour in North's (1990) terminology include, *constitutional rules, operating rules and normative rules*. Each of these have changed considerably for financial institutions. The constitutional rules which have changed are those which define the control and responsibilities of the state with regard to financial intermediaries and the general public. An obvious one is privatisation of financial intermediaries. Another is the guarantee the state provides intermediaries. The deregulatory process in many countries, the change in the manner in which the state intervenes to support or close financial institutions are examples of changes in constitutional rules which have altered the behaviour of financial intermediaries. Operating rules relate to changes in law or contract specification which would alter the terms of exchange of financial contracts. Here the examples are many, including relaxation or elimination of constraints on capital flows, changes in rules permitting the types and location of financial services, and deregulation of securities trading commissions. (The elimination of fixed commissions on equity trading in the United States is said to have tripled share values on the US national exchanges and led to the elimination of more than 100 US investment houses.[27]) Normative behavioural rules can also be expected to change as the institutional environment changes. The variety and number of violations of established codes of conduct in the finance industry in recent years have made financial newspaper headlines. The increased competition and fight for survival has encouraged some institutions breaking established codes of conduct with their regulators and with their clients, in one case causing a major foreign institution to be literally evicted by a host country. The client-bank relationship has been said to change significantly when some intermediaries became heavily involved in proprietary securities and derivatives trading. Employees of some institutions have violated established codes of conduct as the changing employer-employee contracts of financial institutions changed employee incentives. The changes in the three types of constraints on financial intermediaries may in combination have increased 'opportunism', requiring on the part of regulators, institutions and clients improved means of measuring compliance with operating and normative rules.

An important aspect of institutional behaviour and operating and normative rules which can at times secure and later undermine survival is information disclosure. Limited disclosure can be used to protect a firm's managers against competition, against takeover, against shareholders and creditors and even regulators. Limited disclosure of firms to shareholders and creditors and of financial institutions to regulators and shareholders is said to be a contributing factor to the recent weakness of some Japanese banks.[28] The issue of disclosure is discussed later.

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[26] See North (1990) pp. 205-209 and North (1981) pp. 92 ff.

[27] Blume, Siegel and Rottenberg (1993), p. 141-142.

[28] See The Economist, (1996).

An expression of concern regarding the current evolution of financial intermediation, encompassing all of Alchian's six points influencing institutional survival is that of Rotberg (1992). The combination of enormous competition, declines in returns to traditional financial intermediation, intellectual and technological advances in financial theory, information, computation and communication have resulted in many intermediaries increasing their proprietary risk 'well beyond that dictated by their client's needs' (pp. 17-18). The argument that financial assets and their related risks could be broken down into their component parts (stripped), repacked and redistributed led, in his opinion, to a reduction in the attention to credit quality. Technical advances and changes in the incentives of institutions and individuals in the finance industry have resulted in greater complexity and less transparency, increasing the importance and difficulty of the measurement and management of risk, both by financial institutions and their regulators. Survival of individual institutions and institutional structures depends on the ability to surmount the problems resulting from Alchian's six difficulties in decision-making.

This brief overview of behavioural constraints, applicable to recent developments in the finance industry, is the broad argument made by North (1981) to understand institutional change. The evolution of constraints on behaviour is related to elements missing in neo-classical theory, incentives, contracts and transactions costs. By removing constraints on behaviour in the financial industry via deregulation, 'transactions costs' have declined. Since it is transactions costs which help determine differences in institutional structure, competition between different forms of institutional structure are essentially transactions cost based. These costs are both costs within the firm, between firms, and between firms and their clients and regulators. As the relaxation of behavioural constraints has reduced transactions costs in the finance industry, it has considerably altered incentive (principal-agent) problems in the industry.

In addition to changes in constraints, changes in the capital stock brought about by technical advancements have influenced the structure of financial intermediation. North (1981) suggests that historically the more rapid is the change in the capital stock, the more unstable has been the structure of existing institutions. Merton (1990) makes a similar point when he states that financial innovation is the driving force behind disruption and change in the financial system. But in what direction or path of institutional change are financial systems heading? What I wish to emphasise here is the general direction of change brought on by low transactions and information costs, created by reductions is behavioural constraints and improved communication and computation technology. Not only are financial institutions threatened by technical change which yield economies of scale and by the relaxation of behavioural constraints which eliminate economic rents, but governments are increasingly less willing to provide services or guarantees which perpetuate economic rents and survival. The relaxation of constraints pushes the burden of survival on to the private sector. Some central banks, for example, desire to reduce and price the 'financial safety net'. The survival of intermediaries depends on their ability to adapt to this new environment. This adaptive ability will depend not only on their being able to lower transactions costs but also on their ability to exploit any remaining formal or informal contracts with the state which continue their protected position vis-à-vis predator institutions.[29] Past examples include the US saving and loan industry. Current examples include several weakened European state-owned banks and large postal saving systems and long-term credit banks in several countries.

The insight Alchian, North, and Nelson and Winter provides us with is that we may profitably look at current changes in the structure of financial intermediation as a test of evolutionary survival, where the survival of institutions is threatened by changes in behavioural constraints and the growth in the human and non-human capital stock. These constraints are in modern economic terminology often expressed as transactions costs, both explicit costs of exchange and prohibitions and restrictions on exchange.[30] The Alchian concept of evolutionary institutional survival related to constraints on behaviour has been used by economic historians to understand the economic growth of nations. The failure of France to maintain sustained economic growth during the 16th century has been related to the failure of the state to develop private property rights and the refusal to reduce the constraints on the mobility of capital and labour.[31] This was in good part due to the state's support of guild monopolies, on which the state was dependent for revenue. Similarly, Spain's inability to implement an effective system of property rights during the 16th and 17th centuries weakened the domestic economy, making the Spanish Empire severely dependent on external borrowing. The current weakness of the Japanese financial system and of several European banking systems can be seen as the result of difficulties of adapting to a world of greater competition and technical complexity with fewer constraints on behaviour.

C. A Historic Digression: the Netherlands Financial Markets: 16th-18th Century

An interesting historical example of how the relaxation of constraints on economic behaviour caused a nation without a significant natural resource advantage to blossom is the Netherlands during the 16th century, in particular the cities of Amsterdam and Antwerp. Their extraordinary growth and development derived in good part from a change in institutional structure, specifically the development and protection of property rights and the Burgundian state encouragement of factor mobility. Together with freer trade in goods than in France or Spain during the early 16th century, the Netherlands developed an efficient capital market in Antwerp and later in Amsterdam, largely based on a more efficient system of property rights. Deferred means of payment, the legal right of endorsement, the assignment principle (transfer of notes to discharge a debt) were all adopted into law in the early 16th century.[32] One of the most significant financial revolutions of the 16th century was the expanded use of the bill of exchange.[33] During the 17th century a long-term capital market developed on a

[29] Blume, Siegel and Rottenberg (1993), pp. 130-131 provide the example of how political pressure may have been exercised in the US to prevent the multiple listing of equities. More recently, we observe that the proposed reform of the Japanese financial system will leave the privileged postal saving system untouched. We also see that in France savings banks, the post office and Crédit Mutuel continue to offer tax-exempt savings account.

[30] Economists typically look at institutions are essentially regulative structures. Modern organisational theorists, such as Hart, approach the issue of transactions costs by considering the costs of writing contracts, emphasising the 'property rights' (ownership) which emerge from 'complete' and 'incomplete' contracts. See Hart (1995), Chapter 2. Modern sociologists look at institutions as cognitive, normative and regulative structures and activities which have different bases of compliance, mechanisms, logics, indicators and bases of legitimacy. See Scott (1995) for a review of modern institutional theory.

[31] See North and Thomas (1973), Chapter 10.

[32] On the origin of assignable debt instruments and English common law resistance to assignability, see Holden (1995), Chapter 1.

national scale. The consequence of these contractual developments, the formation of a centralised money market in western Europe in Amsterdam and the growth of intermediaries, was a dramatic decline in interest rates during the 16th century.[34] The establishment of property rights reduced ambiguity in economic contracting, improved the clarity of decision-making criteria and reduced the variability of the environment (e.g., state confiscation).

The legal enforcement of contractual rights in the Netherlands was one of the reasons for the surprising sophistication of the financial industry in Amsterdam in the 17th century. A forward market in shares existed as early as 1607. Spanish and Portuguese bankers in Amsterdam had already developed a sophisticated option's market by the mid-17th century, in which 'purchasers or potential purchasers of goods or securities had the option of either honouring the contract concluded or being released from it upon payment of a *premium or sanction*'.[35] Joseph Penso de la Vega's treatise 'Confusion de Confusiones' (1688) describes in detail the Amsterdam techniques of securities trading. Regarding forward transactions, de la Vega describes the 'carry-over' ('resconter') technique, 'which enabled the parties to speculative deals merely to settle the surplus every month', apparently similar to the modern user of futures margin accounts. By the late 17th century the Amsterdam exchange was doing a thriving business in the forward trading of foreign shares. Standardised options contracts were in use and by the mid-18th century options trading took place around four quarterly settlement days.[36] Multilateral clearing was also undertaken by the Amsterdam Exchange Bank.

It is worthwhile to pause to consider some of the details of the development of credit instruments in the Netherlands, particularly in Antwerp, during the 16th century. This history provides a vivid illustration of the importance of institutional constraints, transactions costs and the development of markets and institutions. Bills of exchange and promissory notes at the start of the 16th century were not transferable by endorsement; hence discounting of a note or bill was not possible. Although banks could issue credits and sell foreign exchange, there was no way to convert notes or bills into cash before maturity. Thus no money market in short-term paper could develop. This could not take place without the development of the legal concept of negotiability.[37] It was in Antwerp in the 16th century that 'for the first time concrete and successful attempts were made to simplify and safeguard the transfer of commercial and credit instruments'.[38] In 1507 a legal verdict was reached granting the holder of a bearer certificate (a bearer of 'writings obligatory') essentially the same legal rights as the rights of the original creditor in a

[33] Van der Wee (1963), Vol. II, Chapter III describes the technical evolution of commercial bills during the 16th century in three stages: the ordinary assignment, the application of the assignment to the circulating commercial bills with the clause 'payable to bearer', and the endorsement.

[34] North and Thomas (1973), Chapter 11. On the growth and development of merchant banking in Amsterdam during the 17th century, see Van der Wee (1977).

[35] Van der Wee (1977), p. 345.

[36] Van der Wee (1977), p. 346.

[37] Parker, pp. 540-545.

[38] Van der Wee (1977), p. 325. Van der Wee's (1963) dissertation provides a fascinating account of the development of credit contracts in Europe during the 16th century and of the contributions of Antwerp to innovations in banking and money market techniques as well as the speculative atmosphere of the Antwerp Exchange.

claim against a defaulting debtor. In 1537 an Imperial Edict made the Antwerp bearer's clause enforceable in all of the counties of the Netherlands. With the legal protection behind bearer instruments, the Antwerp Exchange became a major international clearing house of credits, providing impetus for the development of transferable promissory notes. As described in detail by Van der Wee (1977), the legal protection provided bearers of 'writings obligatory' (essentially an early form of the promissory note) encouraged *transferability* and with technical progress led to *negotiability*. Earlier once a party transferred an instrument he was legally retrieved of any further liability. As the instrument was transferred from party to party, the degree of imperfect knowledge of the debtor increased, as did the security of the instrument. To encourage negotiability Antwerp applied the principle of assignment to writings obligatory with a bearer clause: all of the transferring creditors had joint responsibility for final payment. An Imperial Edict in 1541 extended the assignment principle to the transfer of commercial instruments. Assignment was applied to commercial bills of exchange and gradually evolved into the modern legal practice of endorsement, yielding both transferability and negotiability. Thus we observe that the growth of modern financial markets and institutions originated in part with the development of the 'negotiable instrument', and the legal protection which provided financial guarantees for the creditor, encouraging the instrument's transferability and negotiability. Indeed, Van der Wee (1963) describes legal negotiability via the endorsement of commercial bills as a major 'technical improvement' in the Netherlands during the 16th century. In comparison, there were major restrictions on the negotiability of notes in both England and Italy. Not until the Promissory Note Act of 1704 did the English Common Law Courts recognise the negotiability of credit notes. Assignment of credit instruments was prohibited in Venice except for the public bank. In contrast, the 'recipissen', notes of the Amsterdam bank, circulated as easily as money.[39]

The sophistication of finance in Amsterdam during the 17th and 18th centuries also met with concern over its encouragement of speculation, similar to the criticism of today's derivative markets. Futures had for some time been used in the grain and herring trade. They were quickly adapted to shares when the new Dutch East Indian Company was created in 1602. Puts ('*prime à recevoir*') and calls ('*prime à délivrer')* on shares were in wide use in Amsterdam during the 17th century, by individuals buying and selling shares 'du vent' (speculatively).[40] Joseph Penso de la Vega's book 'Confusion de Confusiones' (1688) described what Wilson (1941) suggests was a 'mature speculative market'. De la Vega characterised the participants in the share market as long-term investors, moderate speculators and gamblers, similar to today's discussions of informed and uninformed 'noise traders'. Much of the speculation in Amsterdam during the 18th century is said to have been in English shares, which was driven there by Sir John Barnard's Act of 1734. The Act attempted to forbid 'time bargains', to restrain the activities of stock-jobbers in England. Some argued that the Act in fact had little effect. Nonetheless, at times there was considerable opposition and hostility to the developments of securities markets in the 17th-18th century. In 1701 in England Daniel Defoe wrote an essay entitled 'The Villainy of Stock-Jobbers Detected.'[41]

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[39] Usher (1943), p. 8.

[40] Wilson (1941), Chapter III, provides some interesting details on speculative activity and the use of options and futures in Amsterdam during the 16th and 17th century.

[41] Dickson (1967), p. 33. Legislation was passed in 1733 and 1734 'against the infamous Practice of Stockjobbing'.

This short digression into the financial history of the Netherlands illustrates how 'modern' techniques and institutional changes in finance are indeed less modern than we might think. What economic historians of 16-18th century Europe emphasise with regard to many changes in financial techniques and institutional structure is that much of it arose out of the ingenuity of the private market and not from the initiative of the state. 'That the Amsterdam money market remained unusually active until near the end of the eighteenth century was largely due to the creativity of the modernity of the *private* banking system, which from the second half of the seventeenth century played a leading role within the Amsterdam money market'.[42] Later we will see how the financial requirements of the state in 18th century England led to a revolution in financial structure which helped England replace the Netherlands as Europe's major financial center.

D. Legal Restrictions on Financial Intermediation: Courting the Ultimate Restriction

The creation and destruction of financial intermediaries depends on the legal restrictions placed on the writing of financial contracts, essentially the restrictions placed on financial intermediation. Looking back at financial history, we repeatedly see that once restrictions on intermediation are removed the new financial activity and institutional structure flourishes, until another restriction is removed creating competing new instruments and institutions, or governments act to restrain particular activities. One reason for such rapid growth, some argue, is that there are frequently increasing returns to new financial technologies and institutional frameworks, an issue which will be addressed later.[43]

As we precede with the discussion of factors influencing changes in the structure of financial intermediation, we should keep in mind that restrictions on certain types of intermediation are what provides governments with the power to influence economic activity, its incidence, timing and total impact. Under a complete laissez-faire intermediation regime it is conceivable that central banks could loose much of their ability to influence economic activity by altering the quantity and composition of their liabilities. The issue that continually hangs over the discussion of structural change in intermediation is the 'uniqueness' of money, banks and central banks and whether new instruments and institutions could undermine their uniqueness.[44]

The challenge to the power of the central bank, the ultimate financial intermediary, is argued to arise once all restrictions on intermediation are removed, particularly the restriction on the free market creation of legal means of payment, bank notes. More central to this debate is not bearer notes but the financial system's means and the institution for the clearing and settlement of spot transactions, the settlement medium of the payment system. The question is why the financial system settles transactions payments with government liabilities rather than with the liabilities of one of the private participants. Essentially, why is the payment systems centralised and operated by the state? Final payments settlement in most countries is required to take place on the 'books' of the central bank. This could, nonetheless, also be the 'market solution', since

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[42] Van der Wee (1977), p. 347.

[43] North (1990), p. 96.

[44] This is an old question in economics. A modern restatement of the legal restrictions theory of banking is Black (1970), Fama (1980), Hall (1982) and Wallace (1983). A good review of this issue is Hoover (1988).

the government's means of settlement has the highest 'credit standing', given the state's superior ability to tax and allocate resources by fiat.[45]

Frequently the introduction of new financial instruments and institutions raises concern over their impact on monetary policy and their impact on the ability of the state to raise revenue via the financial system. This was true with the introduction of many financial asset which potentially reduced the demand for bank deposits or competed with government securities. The former accounts for the earlier restrictions on the creation of money market mutual funds in Germany, for example. In the past economists repeatedly questioned whether the creation of non-bank financial intermediaries might weaken the power of central banks. Currently we see the concern with the creation of electronic money, which threatens to reduce central bank seigniorage, an issue to be considered shortly later.

Changes in the structure of financial intermediation may, as mentioned, also affect the efficacy of monetary policy. The fundamental question regarding the relevance of alternative intermediation structures is under what conditions the Modigliani-Miller proposition would hold; that is, under what conditions would a change in the composition of bank portfolios not alter real economic activity.[46]

Ultimately the financial system needs a settlement medium that is acceptable to all parties; typically it is central bank reserves. In theory, however, the private market could provide this settlement medium. The government settlement medium would be preferred if it has some comparative advantage over a competitor's private settlement medium. It is ultimately the settlement medium created by the central bank which gives it its power to influence economic activity and prices. Private market provision of the final settlement medium would be a direct challenge to the power of the central bank. The 'ultimate restriction' on private financial intermediation is that placed on the creation of private clearing systems and the settlement medium.

Looking at financial history as the evolutionary relaxation of constraints on financial intermediation will ultimately end up by our questioning the durability and appropriateness of the government's role in providing medium of exchange and settlement medium clearing services. The government's special attention to the banking system rests in good part on this function. But as Merton Miller and others have suggested, many firms could issue some variety of 'close-to riskless demand obligation'.[47] The fact that government notes and demand deposits are preferable results from the 'guarantees' the government gives their redemption and any explicit or implicit guarantee the government gives the institution providing payments services. Government guarantees on payments media is essentially a means of mutualising (spreading) the risk associated with a particular form of debt obligation which could, in theory, be provided by the private market.

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[45] The legal restrictions theory of banking debate sometimes takes place on the stage of restrictions on the creation of private currency, when the appropriate platform is that of the financial system's payments settlement institution and instrument.

[46] See Hoover (1988) for a lucid review of the new monetary economies. Miller (1995) argues that the Modigliani-Miller proposition is directly applicable to banks.

[47] Miller (1995) reports that IBM Credit Corporation issues what is essentially a demand deposit, a security called a Variable Rate Book Entry Demand Note.

The relaxation of constraints on intermediation and advances in technology, today as in the Netherlands during the 16th century, has potentially increased the ability of private markets to weaken the ability of governments and their financial intermediary, the central bank, to directly influence the quantity of credit and its price. The evolution of intermediation can in part be thought of as the evolution away from constraints on the institutions which create means of payment obligations, as an evolution in contracting and transactions costs associated with 'banks'.

E. Innovation, Contracts and Institutional Change

Returning again to the theme of viewing financial intermediaries in the context of the evolution of constraints and institutional survival, we observe that historically the creation of many financial instruments and institutions arose out of the threat to the survival of the state. Some historians consider that innovations in public finance, giving birth to sophisticated private credit markets, were a major determinant of European economic growth and development.[48] Van der Wee (1977) describes how the periodic European state bankruptcies during the 16th century caused short-term loans to governments to be turned into state annuities. In turn this gave rise to the creation of a consolidated, funded national debt. Innovations in finance in England in the 17th century, for example, were an important ingredient to the success of British mercantilism. The move from a floating to a consolidated long-term national debt was instrumental in financing England's commercial and industrial infrastructure in the 18th century. Specifically, in January 1693 royal approval was given to the English parliament's proposal to launch a tontine loan of £ 1 million sterling. The innovation was firstly that the debt was funded: interest was to be paid out of excise taxes on beer and liquor with a parliamentary guarantee. Secondly the debt was composed of *perpetual* annuities. The new principles of English public finance gave rise to other innovations, one being the creation of a national bank, the Bank of England.[49] The growth of English public debt also encouraged the development of financial markets elsewhere. Between 1720 and 1750 the Amsterdam bourse and the London securities market developed close ties. Dutch holdings of English securities were used as collateral in Amsterdam for short-term loans.[50] This illustrates how the survival motives of the English state during the 17th century gave rise to innovations which fostered the growth of European financial markets. In contrast, improved financial techniques in France during the 18th century only led to greater unproductive public expenditures, eventually leading to financial crisis. In 1765 France was near bankruptcy. England, on the other hand, was entering an industrial revolution. In the Netherlands new financial techniques and a large domestic capital base were not put to domestic use but to finance the rest of Europe. In consequence the Netherlands's economy declined dramatically through the 18th century.

The economic supremacy of England during the 18th century was not founded simply on innovations in public finance. It was grounded in fundamental changes in political and in institutional structure which improved the security of long-term contracting. The roots of these institutional changes were the Glorious Revolution of 1688 and the establishment of an English parliament and judiciary system.[51] Before the Glorious Revolution the

[48] See Van der Wee (1977), p. 391-392.

[49] See Van der Wee (1977), p. 384 ff. for details.

[50] Dickson (1967), p. 335.

English Crown was not 'credible', frequently resorting to private wealth confiscation by redefining the rights of the Crown. After the revolution commitments by the Crown could only be changed with the agreement of parliament. This change had an enormous impact on the ability of the state to raise capital and the development of capital markets in England. As described by North and Weingart (1989), in 1694 subscribers to a large new government loan incorporated as the Bank of England, which was then responsible for handling government borrowing. Importantly to the success of crown loan floatations, the Bank of England was not permitted to lead to the Crown without the approval of parliament. The reversal in the credibility of government commitments in the late 17th century, with constraints imposed by parliament, was instrumental in the establishment of private capital markets in England during the early 18th century.

The example of innovation in British public finance during the 17th century is made as an introduction to the subject of how *innovation* can alter the structure of financial intermediation. We earlier began our discussion by considering decision making under ambiguity and institutional evolutionary survival, threatened or encouraged by changes in behavioural constraints. We now consider how institutional survival and evolution are influenced by changes in the capital stock, specifically through innovation. We also introduce the role of 'chance', a factor emphasised in 1950 by Alchian, and in recent years underlined by economic historians' study of the path of innovation and economic growth. As argued by Merton (1990) and others, much of the direction and evolution of recent change in financial intermediation is being driven by technical change. Here we draw on some literature on competing technologies and its relation to economic history, and consider whether the paradigms examined are applicable to financial intermediation.

One factor is central to both the evolution of technology and to the evolution of institutions: increasing returns. The modern theory of competing technologies argues that in a laissez-faire world with constant or diminishing returns the technology which finally dominates will be 'inevitable'; there can be only one dominant technology.[52] Under increasing returns, however, a number of possible outcomes, or dominant technologies, can result, depending on the 'path' of the acceptance of a new technology. A technology or innovation which gains initial acceptance may be difficult or impossible to overcome by a later technology which is proven to be more efficient. Thus, under increasing returns laissez-faire will not necessarily result in the superior technology ultimately 'winning out' in the evolutionary race for survival. This argument implies that with constant or diminishing returns initial conditions and the path of technical change do not matter. However, with increasing returns 'the small events of history become important'.[53] An often cited example is the QWERTY typewriter keyboard; another is the dominance of alternating current.[54] The competition between personal and mainframe computer and between alternatives video cassette technologies are also examples. In these cases the increasing returns derive from coordination externalities. Here is where the role of 'chance' in the evolutionary process is relevant. With increasing returns there can be multiple allocation equilibria: a chance historical accident may lead the economy

[51] The importance of the Glorious Revolution on securing private property rights and stimulating the development of British capital markets is described in North and Weingart (1989).

[52] See Arthur (1989) for a development of these ideas.

[53] Arthur (1989), p. 127.

[54] David (1985).

in one direction from which it may never turn, even if a superior technology emerges. This evolution is sometimes described as the 'lock-in by historical events'.[55] Once a particular increasing returns technology takes over it becomes cemented by a specific infrastructure, complementary technologies and standards. The innovation then takes on the characteristics of dynamic increasing returns.[56] The technical innovation results in the economic system developing a 'path-dependence'. In this world of increasing returns 'institutions matter' in influencing the direction of the economy. Furthermore, borrowing a line of argument from North (1990, p. 95), in the case of *financial institutions*, where decision-making regarding equilibrium asset prices is subject to considerable ambiguity, *ideology* also may play a substantial role in determining the development of financial institutions. This can be seen in the still large difference, for example, between American/British and Japanese and German financial institutional structures, in accounting standards and in financial transparency and disclosure.

A few economic historians have taken Arthur's (1989) argument linking innovation, increasing returns and 'lock-in' and applied it to the evolution of organisations and institutions. Indeed, it is not so much the *technologies* per se which are competing but the nature and structure of *contracts* and *institutions*.[57] 'Competition occurs in *forms of organisation and contracts*'.[58] What we are currently observing in finance is a battle between alternative contracts and institutional intermediary structures.

Consider contracts. A major difference among countries exists with regard to the *maturity* of financial contracts, the formal relationship between the two parties, and their *negotiability*.[59] The maturity of a contract, and its adjustability, influence the relationship between the two parties: short-term (spot) contracts do not constrain the longer-term actions of parties. It is no accident that shorter-term financial contracts are typically more prevalent in economies where there is greater labour and capital mobility. Longer-term contracts in general restrain the flexibility of parties in the event of changes in the economic environment. As emphasised by legal contract scholars, differences over time and between countries in the nature of contracts reflects 'the constant clash in modern economic structures between the need for stability and the need to respond to change.'[60] Hence 'factor mobility', a necessary ingredient for efficient resource allocation, can be encouraged by and indeed require contract adaptability and 'competition in contracts'. There are increasing returns to the use of various kinds of contracts, depending on the variability of the environment, which impact on the structure and stability of financial intermediaries. *The competition in intermediary structure is first a competition in financial contracts*.

The notion of 'returns to contracts' can be understood in the way increasing returns to particular forms of organisational/industrial structure are understood. In some cases, for example, a long-term contract is an appropriate way to eliminate the opportunistic

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[55] In the past this 'lock in' of financial structure has often occurred after a financial crisis, such as the Great Depression, or after a war.

[56] See Dosi (1988), p. 1146-1147.

[57] See David (1994) and North (1990), Chapter II.

[58] Alchian (1984), p. 47.

[59] See Borio (1995) for a cross-country comparison of the structure of credit to the private sector.

[60] Macneil (1978), p. 854.

behaviour of both borrowers and lenders, the 'commitment' in long-term contract helping to reduce the informational differences between the two parties. As some have argued, a long-term contract can be thought of as a substitute for vertical integration.[61] In other cases, short-term contracts may be more efficient, not requiring detailed contract specification and performance appraisal. Short-term contracts permit both parties greater freedom to re-contract on the basis of new information. Short-term contracts may provide greater *contract mobility*, the ability of a purchaser/borrower to switch suppliers, with less chance of being held hostage by a longer-term relationship. Shorter-term contracts may also reduce the risk of contract disputes in the event of an unforeseen change in the environment.

Examples of changes in financial contracts and constraints on their formation are easy to come by: the development of certificates of deposit, junk bonds, asset-backed securities in the United States; the earlier administrative constraints on the issuance of corporate debt in Japan, causing Japanese corporations to issue in the Euro-bond market; the development of modern pricing techniques for options giving rise to the boom in options writing and trading; the earlier prohibition on the sale of money market mutual funds in Germany. Currently under threat in several countries are bank deposit contracts, as new liabilities of non-bank institutions offer greater return and flexibility. The 'innovation' is initially in the contract, then in the intermediary. To apply Arthur's analysis of innovation we must understand the source of the increasing returns to various competing financial contracts.

An important element in the competition between competing financial assets, for example, between a bank loan and commercial paper, is the degree of *asset specificity*. In transactions cost economic terms, asset specificity is the major element responsible for differences in the transactions costs associated with different types of contractual relations. The specificity of an asset refers to its redeployability. As the asset becomes less redeployable (more specific) the greater is the incentive for both parties to enter into a relationship which limits the flexibility of each party.[62] The contract, however, may be 'incomplete' because its terms cannot feasibly anticipate all future contingencies. In the case of financial assets the specificity may refer to the commitment of each party to the relationship, the contract's renegotiability and the potential for adaptability of each party in the case of an unexpected event. As an example, the rise of securitisation in the US first occurred in home mortgages and credit card receivables, contracts which are easily redeployable because of their homogeneity, not in commercial and industrial bank loans.[63] It is also possible to relate asset specificity with *risk specificity*, as well as to the relation (commitment) between the two parties to the credit contract. The increasing returns aspect of securitisation results from the ability to segment the various risks associated with an asset, and allocate them to those able to best take on the particular risk exposure. This decomposition of the component risks then makes the asset less 'specific' in transactions cost terminology and reduces the need for a continuing relationship between lender and borrower. Transactions costs are reduced because of the ability to

[61] Klein, Crawford and Alchian (1978) discuss the relationship between long-term contracts and vertical integration. Van der Wee (1963) describes the use of long-term credit contracts in the Netherlands associated with 'immovable property' during the 15th century.

[62] See Riordan and Williamson (1985).

[63] Even with corporate loans the transactions cost of securitisation are declining. See 'NatWest launches loan securitisation', Financial Times, 1 November 1996.

disaggregate the various risks associated with a financial asset, to price and then redistribute them to specialists in different types of risk absorption. In this manner the risk attributes of a financial asset gain *separability* and *mobility*.

The innovations in and competition among financial contracts have direct relevance to the structure of financial institutions; specifically they have had the effect of turning some financial intermediaries, particularly banks in some countries, increasingly into financial brokers and enhancers of marketable credits. As many intermediaries have discovered, greater competition and financial contract innovation have reduced the returns to strict financial intermediation, moving the funding activity into the market and away from depository intermediaries.

The above analysis looks at the financial innovation in the form of new financial instruments (e.g., swaps, options, asset-backed securities). Scholars of innovation theory stress the fact that the sequence of innovations frequently follow irreversible paths.[64] This 'path dependence', the essentially irreversible character of technical change, becomes even greater as a result of positive externalities, infrastructure and institutions built up around the innovation. Arthur (1988) argues that there are several 'reinforcing mechanisms' which permit one technology to gain and maintain dominance, from which it is difficult to reverse course. These reinforcing mechanisms are: (1) large fixed costs; (2) strong learning effects; (3) coordination effects; and (4) adaptive expectations, the believe that the new technology will continue to dominate. The result of these reinforcing mechanisms is that the innovation takes on a life of its own, directing the industry on a path which is difficult to reverse and in which most believe is the correct and efficient path. In a sense, the industry or economy becomes 'locked-in' to a particular technology (e.g., hydro-electric power, the gasoline driven combustion engine, razor blades). So too can the financial industry become locked-in to a particular technological and institutional structure.

A modern restatement of this argument applied to the finance industry, without actually using Arthur's paradigm, can be seen in the work of Robert Merton and Zvi Bodie on 'the financial innovation spiral'.[65] While not unique in their argument, Merton and Bodie are lucid and forceful in suggesting that the *evolution* of the financial system is a *competition* between organised markets and financial intermediaries, consistent with the classic question of Coase (1977) of why a 'firm' exists at all in a market exchange economy. Modern financial markets are developing so as to reduce the importance of traditional intermediation and the role of banks as providers of intermediation services. With many standardised financial products, markets are beating out intermediaries for business, the latter increasingly providing 'customised products'. The dynamics of change in the financial industry are leading to new instruments and new markets creating ever more 'new custom-designed financial products that improve *market completeness*'.[66]

The driving forces behind the development of new financial techniques, products, processes and institutions are a search for greater efficiency and market completeness and the desire to minimise regulatory and tax burdens. The 'branch' of the 'financial tree' which the financial system follows also depends on the existing domestic regulatory and

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[64] A comprehensive review of this literature is Dosi (1988) .

[65] See Merton and Bodie (1995).

[66] ibid., p. 21.

tax structure and the competition emerging from providers of financial services and products where tax and regulatory burdens are declining. The 'no turning back' nature of financial innovation results from the identifiable micro-economic benefits, such as lower transactions and agency costs, greater liquidity, improved risk reallocation and tax arbitrage possibilities.[67] The potential gains from innovations in finance are typically quantifiable and immediate but the potential social costs ambiguous and distant. The less identifiable, less quantifiable costs of such innovations, the potential negative externalities, are usually assumed to be modest in comparison to the perceived benefits.

The modern theory of innovation would appear to caution us in believing that the current 'path' that some financial systems are on, this path implying a long-term decline in (bank) intermediation, will necessarily deliver the optimal, most efficient allocation of financial resources. For some writers favourable to the current trend in modern financial markets, there is a sort of built-in inevitability about the direction pointing towards more and more new financial products and trading strategies, 'spiralling toward the theoretical limiting case of zero marginal transactions costs and dynamically complete markets'.[68] We should ask what factors should cause us to question the desirability of this trend.

A common presumption is that the near completeness of markets, lower agency-transactions costs and an improved allocation of capital will result where claims on assets are frequently traded. This implies that financial asset prices are more efficiently determined in open markets than when they are less frequently traded or not traded at all. For this greater efficiency to result participants in trading markets must in some sense have more information and act more 'rationally' than those in a more intermediated financial structure. We open for question the effect of partial rationality (non-optimising behaviour) on traded security prices in less intermediated markets. As shown by Akerlof and Yellen (1985), non-rational or less than complete maximising behaviour by market participants can lead to small losses for individual participants but may have serious first-order effects on market equilibrium.

F. Network Externalities and Increasing Returns in Finance

A factor which may cause a financial innovation to gain momentum and become 'locked-in' is the complementarities in the innovation's use and/or in its production. The innovator or dominant firm (intermediary) may build an infrastructure and establishes standards which increase the potential use complementarities of the new product. Credit cards are an example. (A recent example is the decision by Fidelity Investments, the largest US fund manager, to directly sell life insurance over the phone or through its website.[69]) Increasing returns may set in as the innovation becomes more valuable the greater the number of users. Competition may come in the form of competing products (e.g., asset-backed securitisation vs. bank held loans) and competing standards (e.g., Basle risk-weighted capital standards for banks vs. the 'pre-commitment' approach to bank capital requirements; 'self-regulation' vs. externally imposed regulation). The result is ultimately competition in organisational structure.

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[67] An excellent detailed list of modern innovations in consumer financial instruments, securities, financial processes and financial techniques is Finnerty (1988).

[68] Merton and Bodie (1995).

Changes in financial institutional structure, in part driven by competing financial technologies, can also give rise to potential inefficiencies. In the technology literature these inefficiencies are the result of coordination problems, resulting from the need to decide on which new technology to adopt.[70] These inefficiencies are sometimes referred to as 'excess inertia' and 'excess momentum' in technology adoption. The notion of a momentum in technological adoption can be similarly applied to the adoption of new financial institutional structure, regulatory structure and the range of new contracts offered by intermediaries. An example of the excess momentum, the rush to adopt a new 'technology', might be the urge to quickly deregulate the financial industry, 'big bang' financial deregulation, or the rapid optimistic adoption of a new financial technique, for example, portfolio insurance. Excess inertia in finance often occurs because of the power of vested interests to block reform regulation even in the face of clear potential macro efficiency gains, a common occurrence when potential change, such as induced by technology, would mean a redistribution of benefits away from existing economic coalitions (cartels).[71]

The network externalities from new technology are often strongly positive. In finance one of the greatest network externalities derives from the combination of individual investor wealth into large pools of funds which can then be spread over a wide variety of financial assets, eliminating so-called idiosyncratic or non-systematic risk. Financial diversification is one of the primary reasons for the existence of traditional financial intermediaries and competition from new intermediaries. Mutual funds are a recent example of the significant network externalities derived from asset 'pooling technologies' which exist in the financial industry. In the United States, the mutual funds industry's managed asset grew from just $50 billion in 1970 to $1.1 trillion in 1990.[72] Money market mutual funds have grown at the expense of bank deposits and equity mutual funds at the expense of individual portfolios of equity shares. So-called 'pooling vehicles', such as mutual funds, also provide network externalities in the form of improved liquidity and asset monitoring services. The complementarity between traditional bank products and mutual funds has also led to the rapid growth of the mutual fund services offered by banks in the United States and SICAVs managed by French banks. At mid-year 1992 banks were responsible for 14% of all stock and bond mutual fund sales in the United States and 30% of sales when money market funds are included.[73]

Network externalities in finance derive from the complementarity in services offered by an intermediary and also from the information networks intermediaries establish around the globe to originate, monitor and redistribute credits. The scale and scope economies in the industry will determine the number and size of viable intermediaries in a given market segment. Network externalities may, for example, be a reason for the existence of only a few large banks in some countries and for the rapid consolidation seen recently in the US banking market.

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[69] 'Fidelity to offer direct sale life cover', Financial Times, 22 May 1997.

[70] See Tirole (1989). Chapter 10 for a review of this literature.

[71] See Olson (1982), p. 63.

[72] Sirri and Tufano (1993), p. 181.

[73] See 'Masters of mutual funds', supplement, American Banker, 1 October 1993 and 'Banks outpace investment industry as proprietary fund assets rise 36%', American Banker, 11 August 1993.

Network externalities are also of considerable importance in understanding the dynamics of the evolution of the financial industry.[74] Typically the positive network externalities arise from greater consumer use of a durable good (personal computers, video recorders), the benefits increasing the greater the number of users. Financial services also can be viewed in the context of network externalities. However, in the case of durable goods the competing technologies are typically providing essentially the same service, whereas with financial products the services are not identical but highly substitutable, for example, a money market mutual fund versus a bank time deposit.

Network externalities with respect to financial products may arise in a variety of ways. The simplest may be that of 'liquidity', the notion that the greater the number of participants in a particular market for a financial asset, the greater the benefit to all participants; the less likely any one participant may influence the price of the asset. The network externality may also arise from the complementary goods or services associated with the financial asset/service. The demand for a particular financial asset increases if there are complementary services to hedge the risk of holding that asset. Financial institutional form and survival could well depend on those financial innovations/technologies on offer which benefit from network externalities.

A recent example of the excess momentum and potential *negative* network externalities in financial technology adoption is that of 'portfolio insurance'.[75] This technique was designed to protect investors, primarily corporate pension funds, from sharp equity price declines. The idea behind portfolio insurance was based on the insights derived from the Black-Scholes options pricing theory. Just before the 1987 equity market crash $100 billion in institutional investments are said to have been covered by portfolio insurance. To reduce equity exposure after the initial October 1987 equity price decline, portfolio insurance programs required large sales of equity index futures. But with large simultaneous sales of index futures the prices of index futures dropped sharply, so that sufficient sales could not be exercised to provide the so-called 'insurance' which had been promised. A potential negative network externality could also result from the growth of institutional investment and the mimetic behaviour of portfolio managers. During periods of financial market turbulence this could cause the benefits of international portfolio diversification to disappear.[76]

New financial technologies in the presence of positive network externalities can also give rise to 'first-mover advantage', causing that technology to become, similar to Arthur's argument earlier, 'locked in'. The dynamics of institutional change in the finance industry are also likely to be influenced by the fact that there are seldom property rights associated with a new financial technology.[77] There do not exist patent rights on many financial innovations. An open question is what the effect of free entry and marginal cost pricing will be on the competitive equilibrium in a financial market with network externalities.

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[74] Katz and Shapiro (1985) analyse the adoption of new technologies with network externalities.

[75] Blume, Siegel and Rottenberg (1993), p. 159.

[76] Iben and Litterman (1994) investigate the issue of whether return correlations across government bond markets are systematically related to the level of volatility.

[77] See Katz and Shapiro (1985, 1986) on this issue. They argue that without property rights, free entry and marginal cost pricing will cause the competitive equilibrium to be inefficient.

Theoretically, one result may be that certain financial products evolve towards nonstandardisation (e.g., OTC derivatives vs. exchange traded derivatives). Moreover, the 'wrong' technology may be adopted but may be difficult to reverse.

The argument surrounding how and why particular durable goods technologies are adopted and dominate in the presence of network externalities may appear somewhat removed from the question of how particular types of financial intermediary structures tend over time to dominate other forms of intermediary structure. However, financial institutional structure can also be viewed through the lens of competing technologies. Although not making explicit reference to the literature on technology adoption and its relation to institutional structure, Merton (1990) appears to be quite aware of the propelling force of financial innovation ('financial innovation spiral') in determining 'a real-world dynamic path evolving toward an idealised target of an efficient financial market and intermediation system'.[78] At the same time, it might be questioned as to whether he is being too uncritical of the financial innovation spiral: in what direction the 'dynamic path' is evolving and towards what 'idealised intermediation system'. The literature on network externalities and technology adoption points to potential problems of coordination on the demand side, as mentioned earlier: excess momentum (quick adoption of an inferior technology because of others are adopting it) and excess inertia (coalition resistance to change, delay in adoption). Excess momentum may lead to the adoption of a technology which promises more than it can deliver (e.g., portfolio insurance; diversification gains which disappear at times of market stress). Excess inertia may result from the standardisation of a product or institutional structure which traps an entire industry into using that standard even when it later proves inefficient.[79] Some regulatory authorities may resist technological change in finance because of the potential for considerable institutional upheaval, for example, weakening the banking industry. Standards can result in significant network externalities and therefore may be later difficult to change. On the supply side the problem is that of constructing compatible networks; in finance this could be credit distribution and information channels. Extensive positive network externalities could also lead to the existence of few but very competitive intermediaries in which intermediation spreads approach zero as prices approach marginal costs, something which has been observed recently in international lending. Substantial network externalities in highly diversified financial conglomerates could also result in there being natural oligopolies in the finance industry.[80]

The economics of technology adaptation and path dependence should, I believe, caution one in accepting uncritically the argument that the path of technical change in finance is necessarily leading us to an idealised financial system. Network externalities in finance could lead at different times and in different countries to problems of excess momentum, excess inertia, and excess concentration. The reinforcing mechanisms, mentioned by Arthur above, which can cause technical change to develop into an irreversible path of institutional change appear to be present in several areas of financial intermediation, particularly coordination effects related to informational network externalities and adaptive expectations related to the importance of reputation in intermediation. The path

[78] Merton (1990), p. 268.

[79] On the public and private goods aspects of standardisation see Kindleberger (1983). Farrell and Saloner (1985) consider the difficulty in changing to a new standard because of the significant coordination problems switching standards would imply.

[80] Gehrig (1992) considers this point. The issue of network externalities is briefly considered in Allen and Gale (1994) in their study of financial innovation.

which appears to be emerging in certain countries is one which has threatened the existence of certain intermediaries, both smaller ones with limited information/distribution network externalities and large institutions with coordination problems. Witness the rapid merger and acquisition activity in the US banking sector. It has also threatened the survival of those intermediaries which cannot provide improved diversification, lower transactions costs and greater financial information services. It is not surprising that much of the adjustment problem to the new path of intermediation have fallen on the banking industry in many countries, given that they are more highly regulated, particularly those with limited network externalities. Network externalities of non-bank intermediaries are reducing the returns from certain intermediation services, increasingly causing some banks to offer brokerage and contingent commitment services, transforming themselves into a different type of intermediary.

The notion developed by Alchian of evolutionary institutional survival, here related to the constraints placed on the institutions' activities in the face of rapid technical change, has relevance for banking, particularly in those countries where regulation has expressly attempted to segment the banking and securities industry. The lock-in and path dependence in the structure of the banking industry in the United States, for example, is a direct result of the desire to segment the risks in the financial system related to banking and securities activities. The result has been to limit the diversification of investments of banks and to reduce the economics of scope and network externalities. The risk segmentation in the US financial industry via the institutional separation of commercial and investment banking was designed to limit the extension of the official safety net to the securities industry. But as the technological developments in finance were clearly more related to securities activities, rather than to traditional bank deposit-taking and lending, banks have been encouraged to exploit their informational network externalities by expanding securities and derivatives trading activities and, in order to minimise capital requirements, to sell to other intermediaries or repackage for sale as marketable instruments many traditional banking credits.[81]

The evolutionary institutional survival of some banking intermediaries may be threatened by regulations which attempt to segment different types of risk, in affect, segmenting different intermediation technologies, for fear that risks derived from securities and securities-related activities will undermine the stability of banking intermediation. It is open to debate whether, as in the United States, their continued separation enhances the stability of the payments system related wing of intermediation.[82] What is clear is that there continues to be major differences between countries with regard to the desire to segment different types of risks and technologies within a financial system, limiting network externalities, in an attempt to restrict official safety-net support in the event of liquidity crisis or potential failure. The evolutionary survival of particular intermediary structures will strongly depend on the path-dependence and exploitable network externalities encouraged or constrained by regulatory structure. The near irreversible path created by a 'lock-in by regulation' and government control and excess inertia in adopting

[81] The dramatic change in US banking activity is reviewed in Kaufman and Mote (1994). What is being described in this evolution is clearly a US and to some degree UK phenomenon.

[82] Dale (1992) provides a nice account of how regulation of banks' securities activities through so-called firewalls may be redundant or even counterproductive in achieving financial stability.

institutional change can currently be seen in the difficulties some European and Japanese authorities are having in restructuring their financial systems.

G. Adaptive Efficiency in Finance and the Role of the State

It is argued by some historians that the international supremacy of England during the 18th century was largely based on an innovation in finance, the use of long-term debt by the state to finance its war efforts.

> 'It is a fair generalisation, therefore, that the wealth of the nation in this embryonic stage of its development could only be tapped with maximum effort for war purposes by a well organised system of long-term government borrowing, whose existence would compensate for the inadequacies of taxation, and enable taxes to be kept lower than they would otherwise have been. A badly organised system of borrowing, on the other hand, would deliver the state into the hands of financial cliques, discredit it in the eyes of its citizens, and necessitate further tightening of the screws of taxation. This was what happened in eighteenth-century France, and there is no reason to doubt that the fiscal incompetence of the French monarchy was the main reason for its ultimate collapse.[83]

During the 17th and early 18th century several European governments issued more short-term securities than they were capable of regularly rolling over. This problem led to a financial crisis in France in the 18th century. However, the system of public borrowing developed in England in the early 18th century permitted it to develop an army and naval force all out of proportion to its available tax revenue, its population or its natural wealth. Innovations in English public finance were completed just before the Seven Years War and were argued by Isaac de Pinto in 1771 to have been the reasons for Great Britain's military triumph over Spain and France. Innovations in public finance also permitted England to develop its North American and West Indian export markets. At the same time public borrowing in England during the first half of the eighteenth century provided a variety of securities for safe investment, given the absence of bonds issued by the industrial sector. The financial revolution in 18th century England was essentially the development of an efficient system of public debt issuance, primarily long-term, the development of a market in securities and of working relations between the British Treasury and the City. Britain then began to compete with the Netherlands as Europe's major financial centre. It is argued by economic historians that the financial revolution in England during this period was also an important ingredient in the establishment of an efficient government.

There are a number of parallels to modern financial innovation and structural change to be found in the English financial revolution of the first half of the 18th century. The development of actuarial science in Europe in the late 17th and early 18th centuries was based on the work of Pascal, Fermat, and Huyghens during the 1650s, furthered by Van der Burch, de Moivre, and Simpson.[84] These advances were as important to finance then as the Black-Scholes options price theory is to today's financial revolution. For example, so-called 'tontine loans' were developed in 1653 by Lorenzo Tonti, the Italian financial consultant to Cardinal Mazarin; they were an innovative form of speculative annuity

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[83] Dickson (1967), p. 11.

[84] See Dickson (1967), p. 41 ff.

designed for state borrowing. Such intellectual innovations spurred advancements in private marine and life insurance, municipal finance and long-term government borrowing. At the same time that finance theory was rapidly progressing there was an enormous interest in gambling and a growth industry in public lotteries.[85] Dickson (1967) notes that in the six decades after 1688 there was considerable 'alarm and disapproval' of the major innovations and developments in public and private finance 'based on fear of dislocation of the social order by the rise of new economic interests'[86] The public was hostile to the English financial revolution of the first half of the 18th century much like the hostility sometimes seen to today's financial revolution, and often for similar reasons.

This historical prelude is meant as an introduction to a discussion of the role of the state in promoting financial innovation and advances in the structure of financial intermediation. Like 18th century Britain, some innovations in finance since 1970 which were the seeds for the evolution of the financial system originated with government's need to finance itself. Governments frequently promoted innovations in public debt finance and changes in financial structure when it facilitated the sale of public sector debt and restrained changes when government financing costs might be adversely impacted. An example is Japan. Constraints earlier existed both on the type of government bonds that could be issued, the ability for purchasers to resell them and the interest rates payable, ending in a reluctance of intermediaries to absorb them without limit. For example, Clause 4 of the Japanese Fiscal Law previously forbid the government issuance of long-term bonds except for construction projects and prohibited their being used to finance current account deficits.[87] Government bonds also could only be directly placed and new issues could not be purchased by the central bank. To solve the problem, the Ministry of Finance, reluctant to pay interest rates required by direct placement, created a bond underwriting syndicate whose members were Japan's large private financial intermediaries. Bonds were required to be held for a minimum of one year after which they could be sold, for which the Bank of Japan provided a ready buyer. The problems created by this form of financing led to further innovations and changes in financial structure. First, similar to early 18th century Britain, many bonds matured before the public deficit was eliminated; so the maturities were extended from seven to ten years. During the early 1970s legal changes led to the issuance of general revenue bonds. Secondly, the bond syndicate came under pressure since the central bank was unwilling to purchase excessive amounts of bonds. This left the intermediaries holding government bonds with below market rates and only a small secondary market in which to sell them. The bond syndicate then lost its appetite for underwriting bonds at posted rates. From this followed several regulatory reforms which permitted the sale of bonds one year after purchase in the secondary market and the issuance of five-year discount bonds. In turn, a well-developed secondary bond market emerged, bringing with it further seeds for the future flowering of Japanese financial markets. A similar story, more based on the desire to stimulate competition within the banking system and create effective interest rate tools for monetary control, can be told for France beginning in the late 1970s-early 1980s, the end result being the creation of an efficient government securities market and the MATIF options exchange.

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[85] In a recently published book James Grant (1996) alludes to the new interest in gambling, arguing that the United States has become less risk averse.

[86] Dickson (1967), p. 35.

[87] On the process of financial innovation and deregulation in Japan, see Feldman (1986) and Suzuki (1986).

Today a number of changes in financial structure are occurring with government encouragement, and in some cases support, related to both private and government financing. One concerns the fact that many governments find themselves heavily in debt and now desire to withdraw, if they can, from previous public commitments, a notable one being the provision of pension retirement income. Hence the government encouragement in some countries for the growth of privately funded pension funds, the relaxation of portfolio constraints on pension fund investments and the related inducement to the further development of domestic capital markets. Another spur to innovation in the structure of intermediation is the failure or serious weakness in existing intermediaries, in particular banks, resulting in part from excessive inertia in revamping the financial system, excessive government ownership and control, and the unanticipated inability for some institutions to survive in a deregulated financial environment. (See Table 1 on banking sector performance.)

In addition to a paradigm for understanding the adoption of innovation and associated path dependence, an understanding of the evolution of financial intermediation structure would thus appear to require a financial theory of the state, in particular regarding government's desired and appropriate role in financial intermediation.[88] No doubt this complication makes the problem of understanding the evolution of intermediation structure even greater than it first appeared, but it is exactly where modern researchers of financial structure have found themselves. Kane (1985), for example, in examining the role of deposit insurance in undermining the health of the US deposit institutions, focuses on the reluctance, even refusal, of politicians to admit that serious problems existed in the US financial system during the early 1980s and the incentives for the private sector to exploit government guarantees. To admit that problems existed and to take action would have entailed a wealth redistribution which would have potentially weakened their political support. Excessive inertia thus became the norm.[89] This should not be a surprise. The nature of many of the risks faced by the state in its role of supporting the financial system is that the social risks are typically large but their appearance infrequent. This means that there is often a long-time lag between the occurrence of risk and the observance of actual damages.[90] As noted by Ringleb and Wiggins (1993), this problem is particularly relevant when considering the evolution and changing interrelationships of financial institutions and markets, since the past is often a poor roadmap for the future. The risks are potentially large, difficult to measure and hard to anticipate. The result is that government sponsored institutional change often occurs only when the potential risk finally turns into a real social loss.

In the terminology of innovation adoption, at times we observe 'excess momentum' on the part of the private sector in financial innovation creation and adoption, often to avoid the cost of regulation, but 'excess inertia' on the part of government in encouraging

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[88] North (1981), Chapter 3, emphasises the need to have a theory of the state (public choice theory) in order to understand economic growth, especially the specification and enforcement of property rights.

[89] Olson's (1982) analysis of narrow and encompassing interests helps to understand why governments are often slow, until collapse is near, to significantly alter financial structures. Widespread financial weakness and failure has the analogous effect of war in changing institutional structure.

[90] Such events can be classified as involving 'ambiguous risks', such as those involved in natural disasters.

institutional structural change.[91] In addition, similar to the present problem of understanding the potential risks related to the growth of financial derivatives, lack of data and reliable paradigms for understanding the probability of damage to the financial system from new products and techniques may increase government's inertia. In the past most governments have tried to handle low probability, high cost (e.g. 'systemic risk') financial disasters by a combination of government regulation and insurance. Aware of the inefficiencies and/or ineffectiveness of some regulations, the prevailing trend has been to reduce balance sheet restrictions on financial intermediaries. And aware of the adverse incentives caused by government insurance, in some countries the current wave is to reduce government-sponsored insurance of intermediaries, and to limit the scope of and increase the price of the 'financial safety net'. The 'financial spirit of the times' is to encourage and promote competitive incentives so that 'market discipline' becomes a partial substitute for government regulation and insurance.

Because of the excess momentum of the private sector in promoting financial innovation, the excess inertia on the part of government in recognising low probability, high cost financial risks, and the difficulty of altering existing financial legislation (political inertia), it is likely that both the private and the public sector will misperceive the risks related to major changes in the financial environment. Just as we earlier argued that considerable decision-making in finance involves 'ambiguity', so it can be argued that the government has a difficult time in defining its proper role with respect to 'ambiguous financial structural risks', those financial events which have a low probability of occurrence but potentially a high cost to society.[92] The the Japanese asset price bubble, the US saving and loan crisis, the Nordic country banking crises, and the French real estate bubble may all be classified as problems which involved 'ambiguous risks', resulting from excess momentum on the part of the financial sector, excess inertia by the government sector and a misperception of risk by both.

As in early 18th century Britain, the promotion of new financial activities is sometimes encouraged by the private sector because of the recognisable early gains which such activities promise. At the same time these activities are often difficult to value in terms of the long-term risk they might entail for society. The low probability of disaster shields the activity and institution from criticism. We are dealing here with what is sometimes called 'latent hazard problems'. How governments promote financial evolution and protect against latent hazard problems determines the lock-in, path-dependence which the financial system takes. Once the path is determined there is little likelihood that the financial system will 'jump' to another path unless the system again comes under intolerable strain. Only after the collapse of the Japanese asset price bubble did we observe a major blueprint for change of the Japanese financial system.

A classic example of financial path-dependence induced by risk misperception is the South Sea Act of 1720 which converted long-term government securities into new shares

[91] This can also be understood in terms of decision-making process in governments vs. that by firms. Olson (1982), Chapter 3, argues that 'distributional coalitions' typically make decisions much more slowly than individuals and firms which are members of the coalition because of the need for coalitions to use constitutional procedures or consensual bargaining to reach an agreement. Such arguments may help to explain why some countries have had more difficulties than others in adapting to new financial technology, a more competitive financial environment and adopting institutional reform of their financial systems.

[92] See Kunreuther (1993).

of the South Sea Company.[93] The conversion was much greater than anticipated, fuelled by speculation in share prices. When share prices fell dramatically the crisis led to the intervention of the government and the Bank of England. The South Sea Company was forced to drop its commercial ambitions and remained simply a financial intermediary in government debt. However, two path-dependent events resulted. The Bubble Act of 1720 prevented the future formation of unincorporated joint-stock companies, a prohibition on enterprise formation which lasted a century. Secondly, the Bank of England gained further prominence, both by its help in defusing the stock price bubble and by refusing to come to the assistance of the Sword Blade Bank. Its charter was renewed in 1742 and it was granted a near monopoly on note issuance in England. Crisis set the path for company formation and the establishment of the central bank.

These brief arguments and examples suggest that the direction of change in the financial system, its path-dependence, will be dependent on the financial requirements of government and on how the government attempts to secure the stability of the financial system. In the past regulation and insurance have been used to correct for potential market failure, particularly in the banking industry. These 'solutions' were thought to result in costly inefficiencies and to encourage undesirable risk-augmenting incentives. A number of countries have been recently or are currently in the process of adjustment to failed models of government intervention in the financial system. The track that several countries are on now is one directed squarely at the assumptions needed for Pareto-efficient allocation: perfect competition and free information. Increasingly governments are reducing barriers to competition in finance and promoting the greater disclosure of information, both by legislation and by encouraging the growth of private credit rating agencies. Some even argue that government intervention in the form of subsidies to private information activities in the securities, banking, and payment systems industries are better advised than more traditional forms of intervention.[94]

Such arguments emphasise the potential gains in allocative efficiency to be derived from fewer regulatory constraints on intermediaries and a less perverse incentive structure created by government guarantees and insurance. While welcome, it is worthwhile to question any unbridled optimism regarding the assumed allocative efficiency gains and the assumption that liberalised financial systems in industrial countries are approaching a new and stable regulatory equilibrium, encouraged by greater information disclosure and a more incentive-compatible regulatory structure. A more profitable line of argument is to think of government involvement (regulation/insurance/tax-subsidies) in the financial system in evolutionary and adaptive terms. An example is Kane's 'regulatory dialectic', in which no stable regulatory equilibrium is assumed to exist, but regulation is always thought to lead to adaptive change on the part of market participants, in the form of 'regulation avoidance behaviour'.[95] This in turn leads to 'reregulation', which in turn leads to a further move by financial intermediaries to avoid the costs of the new regulatory structure, and so on. The advantage of this paradigm is that it recognises the need for an efficient regulatory structure to be almost as adaptive and innovative as the participants it is trying to regulate; that is, to reduce the excess inertia in government adaptation to technical and institutional change. Viewed as a dialectic, regulation becomes

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[93] See Van der Wee (1977), p. 388 and Kindleberger (1984), p. 76-77.

[94] Flannery (1993), p. 90.

[95] Kane (1986) implicitly recognises the path-dependence created by regulatory problems and their solutions.

game-theoretic; governments are required to anticipate the possible next moves of financial participants and, importantly, the evolving institutional structure of the financial system.[96] This way of thinking about regulation is likely to require a refocusing of regulatory incidence from financial institutions to financial functions.[97] This vantage point moves us away from the assumption that market-driven technical and institutional change in finance is necessarily allocative efficiency enhancing, and places more emphasis on the 'latent hazard problems' associated with structural change in the finance industry. An adaptive-dialectic view of regulation may also encourage regulators to anticipate the possible future transformation or demise of certain financial intermediary structures. This is arguably preferable to excessive regulatory inertia making the demise slower, more painful for the ailing institutions and ultimately more costly to society. It is also politically more difficult.

H. Information, Transparency and Financial Transformation

In the conclusion to his book 'Structure and Change in Economic History', North argues that economic history conceived as a theory of the evolution of constraints should be able not only to explain the past performance of economic systems but should also provide an 'evolving contextual framework' with which to understand the current and presumably future behaviour of economies.[98] Similarly, as has been emphasised, we can try to understand the evolution of financial institutions through the lens of the evolution of constraints on their behaviour: how, why and when these constraints were relaxed.[99]

Constraints on financial institutions are not restricted to those exogenously determined by government. A sizeable endogenous constraint on the structure and activities of intermediaries is the quantity, quality and frequency of financial information: the ability of financial intermediaries to accumulate, verify and digest information on potential borrowers; similarly on intermediaries themselves. Because it influences the incentives of financial contracting parties, information, in combination with technology, will determine the structure of contracts and the form of intermediary organisational structure. For example, a financial institution may vertically integrate certain activities in order to minimise informational problems in production and distribution and align incentives to minimise attempts of parties to profit from an unequal distribution of information. Alternatively, information which can be credibly distributed in an open market may provide the information supplier with more offers for the credit it desires to sell or acquire than if the information was held within a small group of players. Information disclosure policy can be both offensive and defensive. For example, it can be used to promote survival by limiting the range of recipients.

One of the fundamental arguments for the existence of financial intermediaries is that some information is 'impacted'; not only is information unequally distributed but the cost of achieving it may be high and, even given equality of information, the future

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[96] Matthews (1986) argues that the economics of institutions and transactions cost economics is closely related to the theory of repeated games.

[97] Merton and Bodie (1995) argue for a functional perspective in regulation.

[98] North (1981), p. 209.

[99] Bisignano (1991) describes a 'deregulation pressure matrix' (domestic vs. foreign, market vs. institutional) to understand the sources and pattern of financial deregulation in Europe.

actions of the other contracting party can not always be reliably anticipated. Intermediaries have traditionally been thought of as solving information and contract performance problems existing in financial markets. Banks, in particular, are supposed to be superior at screening good borrowers, both with the use of superior information and collateral requirements.[100] At the same time, banks may themselves help to limit information, in attempts to protect themselves and/or their clients in a symbiotic survival relationship.

The endogenous informational constraint which influences the organisational structure of intermediaries also influences the financial and corporate control structure of borrowers. The two informational/incentive problems are, in a sense, jointly determined and resolved. For example, one reason for the growth of 'highly leveraged transactions' related to merger and acquisitions activity in the United States and the United Kingdom is the greater availability of information to 'outsiders' and the wider dispersion of equity ownerships.[101] One of the exogenous 'constraints' which prohibited US banks from behaving like Japanese banks in a closely-held information-financing arrangement with non-financial enterprises has been the general prohibition of bank ownership of shares in non-financial enterprises and the limitations on creditors to seriously influence the managerial decision-making of those to whom they lend (the principal of equitable subordination). Thus more 'open' enterprise information systems, as in some Anglo-Saxon countries, have arguably made these financial systems more adaptable to a change in environment, and, indeed, more required to adapt.[102] Enterprise information systems (mandatory and voluntary disclosure) have been closely related with change in the structure of financial intermediation. The structure of enterprise information of the 'closed' variety has caused the domestic long-term capital market in some countries to remain underdeveloped and an 'internal capital market' to reside within financial intermediaries, for example, in so-called long-term credit banks. The structure of intermediation is clearly related to both the market for information and, as seen earlier, the pace of innovation adoption. More open 'markets for information' have to some degree already undermined the assumed comparative information advantage of traditional intermediaries.

It is appropriate to question the so-called superior information, screening and monitoring abilities of banks. Other intermediaries may be equally good credit evaluators and monitors. In addition, with the assistance of credit rating agencies, the recognition that similar assets but with different idiosyncratic information and risk characteristics can be pooled to form an asset pool which can be turned into a marketable securities has reduced the assumed informational advantage of some intermediaries, in particular banks. We have, for example, recently seen the securitisation by a large British bank of a sizeable portion of its high quality corporate loans.

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[100] A good, quick review of this literature is Gertler (1988).

[101] See Borio (1990).

[102] Financial transparency, including accounting and disclosure standards and requirements, differ dramatically among the industrial countries. Some American lawyers argue that with many European and Japanese financial reporting standards 'conservative becomes a code word for concealment, as if disclosure were somehow the enemy of prudence'. Lowenstein (1996) provides a history of the US financial reporting and disclosure system and an international comparison.

There is slowly emerging in some countries a convergence in information disclosure objectives among financial intermediaries and among financial regulatory-supervisory bodies. The latter, in the process of reducing costly and often ineffective government regulation or insurance, are moving in the direction of encouraging or requiring financial intermediaries to disclose more of their activities, in order to improve the role of market discipline. Non-financial institutions also are being encouraged by investment houses to disclose more in order for them to tap less costly capital markets. And financial technology and rating agencies are helping to aggregate idiosyncratic risk, non-marketable assets to form marketable pools of securities.

The transformation of financial systems, from highly intermediated to more capital market oriented, and from bank intermediated to intermediation by non-bank financial institutions, is closely linked to the generation and distribution of information on potential borrowers. Much of the literature on changes in the structure of financial intermediation have focused on the role of transactions costs. But the search for a Pareto-efficient structure of financial intermediation will also critically depend on the removal of artificial barriers to information acquisition. Direct intervention in the financial system by government can also be significantly reduced if this constraint – impacted information – is removed. Efficient private financial market allocations can only occur when information is, in theory, freely available. An implicit assumptions of those who favour capital market-driven, rather than bank-driven, financial systems is that the financial price system is most efficient the more informed are market participants. The competition in alternative financial intermediation structures is also a competition in financial information structures.

The relationship between information disclosure and the structure of financial intermediation is a complex issue, partly because information is to some extent a public good. It is not clear how a competitive market in information might function, since publicly available information reduces its value to the producer. There are also problems of verifiability of information, creating potential moral hazard problems.[103] The absence of significant external financial disclosure, implying significant 'inside information', has been a major reason for the dominance of intermediated finance in some countries, at the expense of capital markets. This dominance is coming to an end.

Information disclosure will also influence the financial structure of an enterprise, its mix of debt and equity, and the firm's choice of finance supplier. The financial structure of a firm in the absence of the idealised world of perfect information can itself provide information to the market. Because of the bankruptcy risk associated with greater debt use, increased leverage alone may signal to the market greater potential profit opportunities, increasing the value of the firm.[104]

Notwithstanding the problems of creating a competitive market in information, it can be argued that the greater the ability of enterprises to signal their value to a number of potential credit suppliers, the greater will be their incentive to engage in 'non-relational'

[103] Ross (1979) argues that incentive-signalling theory would suggest that competition should force managers to disclose inside information and the private sector will develop monitoring and penalties to reduce the moral hazard problem. Lack of disclosure is evidence of a non-competitive market in managerial services.

[104] See Ross (1977). Yosha (1993) considers the choice between bilateral and multilateral financing and the role of information disclosure.

financial contracting, that is, less with banks and more with capital markets. Credit rating agencies and reputable private outside auditors reduce the value of 'information cartels' and 'inside informational rents'.[105] The recent rapid growth of commercial paper markets in a number of countries, France, Spain and Japan, attest to the speed with which open capital markets have partly displaced traditional bank lending.[106] Similarly, mutual funds, major purchasers of commercial paper, have seen spectacular growth in the United States, Spain and elsewhere, resulting in a significant loss of deposits for banks, and causing, in turn, banks, particularly in the United States, to respond by offering mutual fund services, both proprietary and non-proprietary, and stand-by credit facilities.[107] Banks in several major countries are evolving away from relational-proprietary information bound financing towards greater brokerage and contingent lending commitment services.[108]

What role information revelation and verification procedures and institutions (voluntary and mandated disclosure, credit rating agencies, the external auditing industry) have on the current and potential transformation of the financial industry is difficult to judge, since the transformations in the intermediation and information industries are jointly determined. Clearly there is a technological revolution proceeding in the financial information industry which is altering the structure of financial institutions and of capital markets. It is raising the question of how market participants obtain and use information, whether asset prices incorporate all available information and whether some financial intermediaries are being required to change their activities because of the loss of a comparative advantage in the accumulation and verification of private information. These transformations reflect the exogenously and endogenously engendered relaxation of the constraints on information. The competition between different financial institutional structures, bank-based (asset transformation) vs. capital markets (brokerage), is also a competition between different structures of information (inside vs. outside) accumulation, verification, distribution and use.

Using the paradigm developed by Arthur (1988) of dynamic systems are 'self-reinforcing', we can ask whether the innovation, deregulation spiral in the financial and information industry possess the characteristics of a dynamic system which can lead to 'deviation-amplifying causal processes' (e.g., asset price bubbles) and 'virtuous and vicious cycles' in financial structures. Many of Arthur's generic sources of self-reinforcing behaviour appear to be present in the financial and information industries: large fixed costs, learning effects, coordination effects and adaptive expectations. If this is the case we should be aware that the resulting 'equilibrium' we see gradually emerging in some financial structures may potentially contain serious inefficiencies. The information systems in finance now emerging and helping to displace traditional intermediaries with institutional investors could lead, for example, to unexpected behaviour in real and financial asset prices. Much of this asset price behaviour is difficult to explain with traditional paradigms. An open question is the degree to which evolving financial structures with less

[105] Watts and Zimmerman (1983) review the history of auditing in connection with agency problems of the firm.

[106] See Alworth and Borio (1993) on the growth and structure of commercial paper markets.

[107] An analysis of the viability of bank proprietary mutual funds is presented in Collins and Mack (1995). A history and description of the mutual fund industry is available in Baumol, et. al. (1990).

[108] Boot and Thakor (1997) analyse the changing role of banks in providing 'relationship loans' and 'transaction loans'.

intermediated finance will change asset price behaviour. Asset prices are known for their uncertain volatility and irregular cycles ('bull and 'bear' markets). Financial asset prices, some argue, often appear to behave more like non-linear stochastic systems, rather than linear systems with predictable returns to equilibrium.[109] The emergence of a new financial structures and players, particularly short-horizoned institutional investors, can be expected to change the behaviour of financial asset prices.[110] Arthur's (1989) argument regarding the pattern of technological adoption in markets with increasing returns (non-ergotic systems) appears consistent with the recent behaviour of financial asset prices, moving by large amounts often in reaction to small events.

> 'Under increasing returns, by contrast many outcomes are possible. Insignificant circumstances become magnified by positive feedbacks to 'tip' the system into the actual outcome 'selected'. The small events of history become important'[111].

The equity crash of October 1987 immediately comes to mind. A small event caused an enormous upheaval in equity prices. 'Equilibrium' in asset prices is often uncertain and ambiguous. In Arthur's terminology, self-reinforcing mechanisms, such as 'herd behaviour', caused by learning effects (mimetic behaviour), can lead to multiple equilibria. In such an environment, 'the selection problem – the question of *how* a particular equilibrium comes to be selected from the multiplicity of candidates – is left unresolved'.[112]

This uncertainty over how an equilibrium in asset prices is determined and the ability of a small event to dislodge one equilibrium and move to another appears to be related to Black's conjecture regarding the role of 'noise' in financial markets.[113] Many continue to believe that asset prices should display understandable return to equilibrium (mean-reverting) behaviour, without bouts of unexpected volatility followed by unexplained periods of calm and tranquillity. Black pours refreshing cold water on this argument, suggesting that financial asset prices may move far from 'equilibrium' values and for long periods of time, in markets where considerable trading may take place in the absence of any new information.

We are obviously far from an understanding of how financial information systems impact on the structure of intermediation and the behaviour of financial asset prices. Yet it is apparent that financial transparency differs widely among countries, and that transparency is closely related to systems of corporate governance, financing patterns, and asset price behaviour. It is difficult to prove that those economic systems which display the greatest financial transparency are also the most stable. Nonetheless, if financial markets are most efficient when asset prices reflect all available information, the same should be true for financial institutions. Financial institution stability is greatly dependent on financial disclosure. Changes in financial information systems and technology should thus over time dramatically alter the structure of intermediation.

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[109] The subject of how equilibrium is reached in a world with decentralised knowledge is quite beyond my grasp. I refer the reader to Arrow (1986) for an informal discussion of how nonlinear dynamic models may help to understand the unstable volatility and amplitude in financial asset prices.

[110] See Group of Ten (1993).

[111] Arthur (1989), p. 127.

[112] Arthur (1989), p. 12.

IV Illustrations

The section will attempt to illustrate some of the arguments presented in the previous sections. I will try to show how the direction of institutional change in financial intermediation, its evolution, has depended on the adaptation to constraints on intermediation, innovations in finance, the pattern of innovation adoption, and the ambiguity which surrounds the evaluation of financial assets. These factors have shaped the 'path' financial systems have taken. I will also attempt to illustrate how 'survival', both of particular firms and institutional structures, has depended on these factors.

A. The Early Rise of Financial Centres: the 'Geography of Finance' in Medieval Europe

The evolution and survival of specific financial institutions and institutional structures is part of the evolution and survival of financial centres. We see this today in the problems currently facing some large Japanese financial institutions and the considerable pressure on long-standing Japanese financial structures and relations, for example, the 'Keiratsu system' cementing relationships between industry, commerce, banking and insurance. The current weakness of the Japanese financial system is said to threaten to reduce its earlier status as a major international financial centre. We are also observing considerable competition in the form of banking structure, between banks which attempt to separate traditional lending and deposit taking from securities underwriting activities and those which combine all forms of financial services, including insurance, in one institution, so-called universal banks. At present we see significant competition in Europe between London, Paris and Frankfurt and in the Far East between Tokyo, Hong Kong and Singapore. In Europe national financial centres are facing increasing competition promoted by European Union financial legislation and the near prospects for a common European currency, at a time when some financial centres are experiencing considerable weakness in major institutions and continued consolidation in the banking sector.

The dominance of a financial centre depends on more than the particular skills of its inhabitants, its accumulated capital and forms of financial structure. It depends as well on the legal system, language, ethnic and religious tolerance and the behaviour of the state. Kindleberger (1978) has been one of the few economists to consider the 'geography of finance', the reasons for the rise of London, Paris, Berlin, Zurich and several Italian cities as major financial centres. As noted by Kindleberger (1978), financial centres facilitate the transfer of capital between savers and investors, spatially and over time, provide payments services, as well as medium of exchange and a store-of-value function. Early European financial history illustrates that the centres of financial transactions moved around Europe, depending on the economic and religious liberalism of the state, the burden of government taxation, and the efficacy of financial contracting.[114] We briefly illustrate here the factors contributing to financial sector growth.

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[113] Black (1986).

[114] Regarding the role of liberalism, London's famous Lombard Street got its name from the street on which Italian merchants and bankers were required to live during the 13th century. Spalding (1930), p. 13.

European commercial fairs gradually developed into financial fairs during the 15th and 16th centuries, specifically for the purpose of international clearing.[115] Earlier medieval trade in goods at the commercial fairs involving a variety of moneys generated a big demand for money-changing. By the early 14th century the fairs served to regulate the infant European capital market, involving considerable speculative activity in currency and bill of exchange. Recall that during the 15th century only those currencies officially authorised by royal ordinance were permitted to circulate in France, and presumably, in other European countries.[116] In 1419 Charles VII permitted the free circulation of foreign currencies used for transactions at commercial fairs. But it soon became evident that what medieval Europe required was an efficient payments system to settle various letters of credit and commercial bills, thus reducing the need to exchange moneys. Geneva was the centre of this activity during the middle of the 15th century, supplanting the Champagne fairs of the 14th century. The clearing was facilitated by the use of the stable and widely accepted gold mark. The municipal authorities of Lyon saw the attractiveness of commercial fairs and for many years competed with Geneva.[117] These fairs saw a heavy trade in bills of exchange, involving arbitrage on exchange rates, with considerable activity by Italian bankers.[118] It is important to note that this trade in bills of exchange did not include discounting, an activity which did not take place during the Middle Ages. (Discounting in the modern sense did not occur until the mid-17th century, in England.[119]) In 1484 Louis XI of France transferred the fairs to Lyon, where, as reported by Van der Wee (1977), regulations of the payment system were quite strict. The decline of the Geneva fairs caused the Florentine Medici bank to transfer its Geneva branch to Lyon.[120] During this period there developed various systems of payments clearing and settlement, strongly directed by merchant bankers from Genoa, Florence and Milan. But because of the intrusion of the French kings, in the form of constant demands for credit, in addition to the French religions wars, the ‘foires de change’ moved to the free city of Besanon in Franche-Comté.[121] The fairs at Besanon, unlike earlier fairs, were entirely financial, where ‘cambistes’ came from all over Europe for the purpose of the settlement and clearing of debts. It was here that the Genoese bankers increased their influence on

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[115] Verlinden (1971) provides a good overview of the development of medieval markets and fairs.

[116] Boyer-Xambeu, Deleplace and Gillard (1986), p. 148.

[117] Usher (1943), p. 121.

[118] A medieval bill of exchange was a contract in which funds were advanced in one place and repaid in another place, typically in another currency. The exchange of currencies was used to hide the payment of interest. See de Roover (1963), p. 11 and 109-110 for a discussion of medieval bills of exchange and also de Roover (1953), pp. 31-35. Note that while the religious doctrine of usury prohibited the explicit charge of interest, speculation on foreign exchange was quite legal. The bill of exchange, invented by Italian merchants in the 14th century, was thus a contract whose purpose was in part to get around the prohibition against usury.

[119] de Roover (1948), p. 31.

[120] de Roover (1963), p. 74.

[121] The fairs were transferred to Lyon so that the French government could more easily demand gifts and require the subscription to state debt issues in compensation for fair privileges. After 1525 the French state imposed large and constant demands for loans which disrupted the freedom of commercial and financial exchange at the Lyon fairs. A description of the commercial and financial fairs of Champagne, Geneva, Lyon, Anvers and Castille is also contained in Boyer-Xambeu, Deleplace and Gillard (1986), chapter 4.

European banking and avoided the grasping hands of the French kings. After 1579 the dominant position of Genoese bankers permitted them to move the financial fairs to Piacenza. At both Besanon and Piacenza financial transactions were conducted in a fictitious money of account, 'the écu de marc'. The value of this unit of account was equivalent to the average of seven gold coins, the gold écus minted in Antwerp, Spain, Florence, Genoa, Naples and Venice, and the French 'écu de soleil'.[122] During this period different forms of disguised loan contracts were developed and traded, each with special characteristics to improve their trading and to hide the payment of interest.

The successive moves of centres of financial activity around Europe, increasingly involving currency arbitrage, speculation and settlement, represented the search for a stable political environment. These moves were strongly influenced by the desires and demands of Genoese bankers (currency traders), whose importance should not be underestimated. After Lyon, where both currencies and merchandise were traded, the Genoese made the fairs exclusively for payments and currency arbitrage.[123] These fairs came to be called 'Bisenzone' fairs, the Italian term for Besanon. The Genoese bankers attempted to centralise currency trading and payments settlement, in effect establishing a money market, aimed at stabilising the rate of interest. [124]

The fairs of exchange gradually developed into efficient settlement institutions, with ultimately only modest amounts being exchanged in specie. The fairs not only settled debts but created new ones and extended the maturity of old ones.[125] As argued by Van der Wee and others, the financial fairs laid the foundation for the development of a money market in Europe. What quickly came to be appreciated was the need for a safe mechanism for the clearing of debts and a stable medium of exchange (the 'écu de marc'). Thanks to the skills of Genoese merchant bankers at the 'foires de change' in Besanon and Piacenza during the 16th century, the ground was set for the development of major financial centres in Europe.

The Spanish also developed financial fairs, in Castille during the 15th and 16th centuries.[126] They were quite sophisticated, including insurance and major credit extension. However, Castille declined as a financial centre in the late 16th century as a result of excessive speculation in precious metals, the bankruptcy of two major firms and the dominance of the Spanish state in the mobilisation and exportation of gold and silver, to the detriment of private traders. After that the Spanish financial market moved to Madrid. Moreover, after 1550 there occurred a dramatic change in intellectual life in Castilian Spain, a turning inward, as Spain cut off its links with intellectual centres in

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[122] Van der Wee (1977) p. 320 and Einzig (1962), chapter 7.

[123] Da Silva's (1969) doctoral thesis provides a fascinating scholarly investigation of the medieval history of financial fairs and the important role played by Italians, particularly the Genoese.

[124] Da Silva (1969), p. 23. Da Silva describe how the different financial fairs in Italy between 1535 and 1695 advanced financial technology, such as the regulation of financial transfers and the fixing of a unique rate of interest.

[125] A quick view of these developments is provided in Parker (1974). Usher (1943) provides some details of early international clearance at medieval fairs and on the practice of negotiability. Usher (p. 105) recognised the important role of Holland in the development of endorsement and negotiability.

[126] See Boyer-Xambeu, Deleplace and Gillard, p. 156-157.

Europe. Fearing close contact with a 'heretical Europe', Spain lost any chance of becoming a major financial centre.[127] Indeed, according to Elliott (1970), foreign bankers were managing the Spanish state's finances. The gainers were the Genoese, the Portuguese and the Dutch. The disastrous taxation policies of Philip IV used to finance military campaigns eventually led to the collapse of Seville's trading and credit system.

The centre of financial activity in Europe during the middle ages up until the 17th century was, as today, the result of the fiscal needs and financial liberalism of the state and, importantly, the legal structure governing the treatment of financial contracts. As argued earlier, competition in intermediary structure is first a competition in financial contracts. This can be clearly seen in the strategic role and transformation of the bill of exchange, the embryonic growth of money markets and clearing houses in medieval Europe and the use of bank checks.

Because of the church's prohibition against usury ways had to be found which permitted, in disguise, the payment of interest.[128] The bill of exchange was the vehicle by which this masking of interest payments was made to occur, for it involved both an exchange of currency and the extension of credit. This involved an extension of credit in one place, used for the export of goods, and the payment of the loan in another place, but in a different currency. The rates of exchange were different from the going market rates to allow for the payment of interest. Contrary to the assumption that the medieval bill of exchange was simply a means of payment tied to a commercial transaction, scholars such as de Roover (1953) have found that their use was often simply for speculative purposes. Exchange rate arbitrage and speculation, particularly by Italians, produced a crude form of exchange parity across Europe. The trade fairs in Champagne, Lyon and Besanon were in part embryonic money markets and clearing houses.[129]

The ever watchful eye of the church attempted to ensure that the bill of exchange contract involved both two different locations and different currencies. The adroit talents of Genoese bankers, prominent in every financial centre of Europe, were such that when the trade/financial fairs were moved from Besanon in 1579, the church appears to have insisted that they take place in Piacenza and not Genoa, so as to ensure the imposition of church law regarding the payment of interest.[130] 'Banking', recall, was officially not so much lending as currency exchange. The large Medici banks, for example, insisted that they were not engaged in lending, per se, but in currency exchange. Hence the guild to which they belonged was that of the 'Arte del Cambio', the exchange guild. While medieval Italian bankers did their best to get around the church's usury laws, many did so with a bad conscious. It was not uncommon for bankers to

[127] Elliott (1970) suggests that the religiously motivated insularity of Spain during the second half of the 16th century resulted in Spanish students being forbidden to attend foreign universities and a general cut off from the major intellectual centers in Europe.

[128] Studies of medieval accounting practices reveal that before 1300 the receipt or payment of interest was sometimes recorded in a firm's or bank's account. Borrowers who signed a letter obligatory received less than the total amount lent. The 1312 decree of Pope Clement V meant that accounting books could be used to indict lenders for usury. Bankers then used various methods of concealing the payment or receipt of interest. See de Roover (1956), pp. 120-121.

[129] De Roover (1953) provides an interesting and detailed account of the use of the early bill of exchange and the development of early money markets.

[130] De Roover (1953), p. 45.

include in their testament a distribution to the church or the poor in restitution for 'illicit' gains.[131]

The gradual decline of the Lyon fairs, the French religious wars, the excessive revenue demands of the French kings and the mobility of Italian merchant bankers towards a more liberal environments eliminated France from contention. What is surprising in historical perspective is that the birth of a major financial centre did not take place in Italy during the 16th century but in the Netherlands. Beginning as far back as the 12th century, Italians were prominent in deposit banking and payments clearing. By the 15th century they dominated foreign exchange trading in Europe.[132] An interesting question is why Antwerp, then Amsterdam, developed into a major financial centre and not an Italian city, such as Venice. Venice was a forerunner in the development of modern banks. The 'Banco della Piazza di Rialto', established in 1587, accepted deposits, provided payments services and credited bills of exchange.[133] Following its creation other deposit banks were established under state authority in Milan, Rome, Genoa and Naples.

It appears that the 'change of the centre of gravity and exchange' during the 16th century from Venice to Antwerp was partly due to the ability to move the inflow of metals from the New World to the east, permitting Antwerp, according to Shaw (1896), to act as 'the safety-valve of the 16th century system'. The extensive commercial links of the Netherlands with the 'Indian East', at the same time as the development of new production methods of precious metals in America, permitted Antwerp to reexport the metal surplus, something Venice was unable to do.[134] A significant factor which also restrained the development of a major financial centre in Italy during the 16th century, was the absence of negotiable commercial and financial instruments. Although modern endorsement is said to possibly have originated in Tuscany during the late 16th century, its use was quite limited and endorsement was legally prohibited in Italy during the 17th century.[135] At the same time, it was as common in Antwerp to transfer commercial instruments hand to hand as it was money. And with the right of endorsement came the technique of discounting commercial bills, aided by the growth of the Antwerp money market. Another reason that Venice did not develop as a financial centre capable of competing with Antwerp and Amsterdam was its extreme conservative attitude in financial matters. Quite simply, there was considerable mistrust of the use of checks.[136] In 1663 the Venetian Senate approved the rules of the Banco del Giro which prohibited the transfer of funds by check. Transfer orders had to be effected verbally at the bank in the presence of both issuing and receiving parties. Astonishingly, this rule continued up

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131 De Roover (1963).

132 On the early role of Italians in the development of modern banking, see de Roover (1952).

133 See Parker (1974), p. 549.

134 Regarding the triumph of Antwerp over Venice as a financial center, see Shaw (1896), pp. 62-68.

135 See Van der Wee (1997), pp. 329-330.

136 Note that a check is a special form of a bill of exchange. Both checks and bills are unconditional orders to pay, whereas a promissory rate is a promise to pay. The classic legal treatment on bills of exchange is 'Byles on Bills of Exchange'. There are significant differences between UK and US laws regarding bills of exchange, on the one hand, and those of continental Europe and Japan.

until the beginning of the 19th century.[137] In sharp contrast, the Bank of Amsterdam and other Dutch banks not only permitted but required the transfer of bank funds by check in the early 17th century.[138]

The negotiability of financial instruments did not occur in England until the 17th century. It was only then that the English Common Law Courts recognised the assignability of the bill of exchange.[139] During the second half of the 17th century the bill of exchange was freely transferable by endorsement, with multiple endorsement common, greatly contributing to the development of private banking. This was followed by the assignability by endorsements of all types of the promissory notes, established by an Act of Parliament in 1693.

The growth of deposit banking owes considerably to the expanded use of the negotiable instrument. In continental Europe bills of exchange could be used only by merchants or individuals with special authorisation under the commercial codes.[140] English common laws, on the other hand, permitted bills of exchange to be used by everyone. As checks were classified as bills of exchange there were thus negotiable. However, in continental Europe the check was defined as an order of payment and was therefore not negotiable. This difference in the legal treatment of the check made an enormous difference between England and continental Europe in the development of banking and the system of payments clearance. Bank deposits became a flexible and general means of payment during 17th century, England. Although Italy had enormous influence in finance at least from the time of the early medieval fairs, it later lost out in competition with both the Netherlands and England because of restraints on the form and use of financial instruments.

B. The Pecora Hearings, Ambiguity and Path Dependence in American Banking

Fifty-five years after its enactment, the chairman of Chase Manhattan Corporation would argue that the Glass-Steagall Act, barring banks from the securities industry, had caused American commercial banks to ‘come up short of the mark’, the biggest change in American banking being ‘the diminished importance of commercial lending’.[141] In 1986 Chase Manhattan undertook a study of the value of its banking charter and discovered that its business which depended on a banking charter had lost money, while its most profitable half dozen businesses could be conducted without one. Moreover, the major competition in these areas came from institutions which were not banks.

The Glass-Steagall Act was in part directly targeted at the intermediary which had successfully combined deposit banking and securities activities, the Morgan Bank.[142] Some argue that the Act was meant not only to reform the US banking industry but to

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[137] Germany was also very slow in developing new financial techniques. During the late 16th century almost all payments on the fairs in Frankfurt were made in cash. Van der Wee (1963), p. 367.

[138] De Roover (1952), p. 645.

[139] Richards (1979), pp. 43-47

[140] Usher (1943), p. 108.

[141] Labecque (1988), pp. 22-23. The Glass-Steagall Act did not prohibit banks engaging in securities brokerage activities.

punish it for using its image of stability to sell risky securities to an unaware public. The Pecora hearings of 1933, Ferdinand Pecora being the legal council to the US Senate Banking Committee, exposed a number of dealings by large US banks which brought to light a variety of transactions, some legal and many questionable, which turned public sentiment against the banking industry. One heavily criticised activity was the sale of risky Latin American bonds, bonds of Brazil, Peru, Chile and Cuba, to a poorly informed public.[143] At the same time, some bankers were found profiting personally from the short setting of shares, financed by the banks for which they were employed.

With the Pecora hearings successfully turning public sentiment against Wall Street, the Glass-Steagall Act was strongly supported by Congressional populists, who desired both federal deposit insurance and restrictions on interstate banking, both opposed by President Roosevelt. The flurry of letters to Congress in favor of federal deposit insurance sealed the fate of the US banking industry for virtually the rest of the century. Fearful that deposit insurance could be used to support the securities activities of banks, a choice had to be made between bank deposit and securities activities. As a result, Chase Bank withdrew from the securities business, while dissatisfied members of the First National Bank of Boston created the first American investment bank, First Boston. Until almost the end of the century the American banking system had to learn to live with a fundamental segmentation in finance, that between deposit banking and securities activities and with an enormous fragmentation of the banking industry, which the recent flurry of banking mergers and acquisitions is only now correcting. Since 1933 the US banking industry has been split both geographically and functionally – without a truly national banking market and with a split between commercial and investment banking.

The constraint on US bank activities in securities underwriting and dealing in 'bank ineligible securities', Section 20 of the Glass-Steagall Act, was loosened by the Federal Reserve beginning in 1987. It also approved bank underwriting of asset-backed securities. The '1987 powers' of Section 20 permitted limited underwriting and dealing in municipal revenue bonds, mortgage-related securities, and commercial paper, by so-called Section 20 subsidiaries, subject to the constraint that no more than 10 percent of the subsidiaries gross revenues are obtained from such activities.[144] Further securities powers were granted in 1989 to banks' Section 20 subsidiaries permitting the underwriting and dealing in corporate debt and equity securities.[145] Thus more than fifty years after the passage of the Glass-Steagall Act US banks were granted expanded security powers through their affiliates. The Act has been interpreted by some as an overly harsh response to a

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[142] Chernow (1991), Chapter 18.

[143] See Chernow (1991) for a fascinating account of this period.

[144] In December 1996 the Federal Reserve used its powers under Glass-Steagall to increase the ceiling on the proportion of total revenue a commercial bank can earn from brokering from 10 percent to 25 percent. This had the effect of inducing Bankers Trust to merge with Alex Brown, a broker.

[145] See US General Accounting Office (1995). On 31 December 1996 the US Controller of the Currency changed its rules to permit national banks to provide financial services through an operating subsidiary which the parent bank is prohibited from offering. Previously these activities were provided by bank holding company affiliates (Section 20 holding company affiliates). One bank intends to underwrite municipal revenue bonds under the new 'op-sub rule'.

misperceived problem: of the 9,000 banks failures in the United States between 1930 and 1933 relatively few were the result of investment banking activities.[146]

Viewing financial evolution as the gradual relaxation of constraints, we see the greatest constraints on US commercial banking having been the separation of traditional banking and securities activities and restrictions on interstate banking. But if banks are now able to convert their illiquid assets, loans previously held to maturity, into liquid diversified asset pools, by essentially selling shares backed by these diversified asset pools, the banks have essentially become securities firms, with immediately callable par value liabilities. The argument that banks need some sort of protection because of their mismatched balance sheet, liquid liabilities but illiquid assets, then loses some force.

Recent attempts by the US Controller of the Currency to grant banks greater powers rests on the argument that the Glass-Steagall Act resulted from 'a serious misdiagnosis of the causes of the banking collapse in the 1930s'.[147] The 'ambiguity' over the causes of bank failures between 1930 and 1933 led to path dependence by legislation which was to last to the end of the century. However, this historic path dependence is now being undermined by innovations which require us to question the very nature of banking activity. Does the loss of considerable commercial lending to the securities markets mean that the US banking industry has fundamentally changed? Does the transformation of credits which the bank originates into marketable securities later purchased by non-bank intermediaries mean that commercial banking is 'in decline'. Do US banks need greater security powers to make them more competitive with less regulated intermediaries? Does the substitution of 'contingent commitment banking' (issuing of stand-by letters of credit, options, bank loan sales with recourse) for loan origination and loan warehousing (holding loans to maturity) mean that banking functions have dramatically changed? Is contract innovation and technology changing banks from being true intermediaries to increasingly becoming dealers in loans?[148]

Both academics and central bankers appear to be split over the issue of whether banking in the United States has fundamentally changed and whether Glass-Steagall is still a major constraint on the activities of the modern bank. Boyd and Gertler (1994) attempt to answer this question by converting off-balance sheet activity into on-balance sheet equivalents using Basle capital accord procedures. These plus other balance sheet adjustments suggest that the share of total value added by US financial intermediaries attributable to banks has not changed significantly since World War II, and that as a share of GDP the value added of banks has in fact increased. This argument has led the Chairman of the Federal Reserve to conclude that 'the basic functions of banks remain unchanged'.[149] The broad function of 'risk information processing' he defines as the measurement, management and taking of risk. But this definition can also be applied to a variety of financial intermediaries. His argument would seem to bring into question what is the desired role of banks in financial intermediation, why they should receive special government protection, and why they should be excluded from the (non-government) securities industry. As assets are removed from the banks' balance sheets,

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[146] Ludwig (1997).

[147] Ludwig (1997), p. 4.

[148] See Kareken (1987) on the rise of contingent commitment banking.

[149] Greenspan (1994).

repackaged and sold as shares on an asset pool, for which the bank may retain some credit risk, the bank has entered the securities underwriting business. What then constitutes a bank?

We can conjecture that the limit to this transformation is defined by the need of banks to hold the assets they originate. That is, since transactions deposits, which provide banks with their 'uniqueness', are a small percentage of total financial assets in many countries, banks need not have a large 'on-balance sheet' to perform this function. Other intermediaries, mutual funds, pension funds, and other asset-pooling intermediaries, can warehouse both directly issued securities and securities formed from transformed credits provided by banks, credit card receivables, mortgages, car loans, and the like. Such an evolution would increasingly see banks turn into financial asset dealers and transformers.

C. Intermediary Survival, Banking Concentration and Too Big to Fail

Alchian's (1950) article on evolution and environmental adaption in economies stressed the search for survival rather than profit maximisation as the motivation in economic behaviour. This search for survival involves considerable 'adaptive, initiative, and trial-and-error behaviour'. The current search for survival in banking markets is resulting in considerable mergers and acquisitions of banks. It is worthwhile to ask what justifies this behaviour.

As argued above, there may be natural oligopolies and/or network externalities in certain types of financial intermediation. In addition, there may be substantial 'reputational externalities' resulting from size which lead to large financial intermediaries. Considerable reference is often made to the necessity for intermediaries, particularly banks, to offer a wide range of financial services to remain competitive in a deregulated financial environment.

An understanding of the evolution of financial intermediation would require some knowledge of the forces leading to large financial conglomerates. With reference to banks a puzzle exists, since there is little empirical analysis which confirms the existence of significant economies of scale in banking, yet in some countries, particularly the United States, we have recently seen a wave of large bank mergers and acquisitions. In certain cases this activity is designed to rescue weakened institutions, for example, as a result of the bursting of a real estate or equity price bubble. However, we also have observed the merger of large healthy institutions. Even granted the potential economics to be gained in combining information, computation, distribution, and related technologies, the merger-acquisition wave in banking is difficult to understand. If this activity among healthy institutions is due to potential economies of scale, why are researchers unable to show that significant gains exist for banks above a relatively modest size?

The United States provides a good illustration of this puzzle. A recent study by Amel (1996) of the Federal Reserve found that among the one hundred largest depository institutions in 1984, only 57 were around as independent institutions in 1994. During this period there were 4,509 acquisitions of healthy banks by other banks. Although a variety of possible reasons for this acquisition activity have been given, including economics of scale in back-office operations, greater interest of shareholders in increasing the market value of banks, and the impact of technology, research has not uncovered the reason for such a major change in bank acquisition behaviour. Amel suggests that the acquisition behaviour might reflect more the preferences of bank managers than shareholders, reflecting a survival motive. Another

puzzle is the fact that the 1974-1984 period saw a steady creation of new banks, hardly a sign of a moribund industry. Indeed, the entry rate (newly chartered banks) during the period 1985-1990 was greater than that during the 1960s and 1970s.

A possible answer to the acquisition puzzle in American banking may be consistent with the Alchian evolutionary survival hypothesis, that proposed by Boyd and Graham (1991). Contrary to the hypothesis that larger banks are 'safer' than smaller banks because of their greater diversification opportunities, they found that during the period 1971-1988 the percentage of bank failures was larger, for all banks in the respective size category, for banks with $ 1 billion or more in assets than for banks with less than $ 1 billion in assets. Large US banks did not appear to have been safer than small banks. The reason for the flurry of bank acquisitions in the United States, they argue, may have more to do with non-market factors, such as attempting to come under the umbrella of the unstated but well-know 'too big to fail doctrine'. More plausible may be the implicit if unintentional regulatory protection larger banks obtain from threats of hostile take-overs. Furthermore, Boyd and Graham discovered that among the 50 largest US bank holding companies salaries and bonuses of bank managers were significantly related to size and unrelated to profitability or asset growth. The largest banks as a group, over the period 1972 to 1990, have not exhibited the highest return on assets or on equity.[150] Bank mergers may arguably reflect the incentives of managers to enhance personal wealth more than the wealth or shareholders. The survival motive offered by Alchian as a criterion for economic decision-making appears to have some applicability to the merger-acquisition behaviour in American banking. If we are to understand the evolution of financial intermediation, we should have some knowledge of the determinants of institutional size. At least for the American banking industry, profitability and returns to scale do not seem to provide an answer. Bank corporate governance may hold the clue to both the current bank mergers and acquisitions wave in the US and to the widespread bank weakness during the 1980s.[151]

D. Competition in Contracts and Institutions: the Rise of Mutual Funds

Mutual funds have grown rapidly since the mid-1980s in Spain, France, the United Kingdom and the United States. In the brief period 1991 to the end of 1996 Spanish mutual funds' shares as a percent of GDP rose from roughly 2.5 percent of GDP to 25 percent. Net total assets of the mutual fund industry in the United States have grown from $ 135 billion in 1980 to over $ 2.7 trillion in 1995, with roughly 46% in equity mutual funds at end 1995. In many countries their growth has been largely at the expense of depository institutions, which in the United States have responded by offering both proprietary and non-proprietary mutual fund services.

To obtain some perspective on the role of growth of mutual funds it may help to refer to Merton and Bodie's (1995) characterisation of the primary functions of a financial system.

1. clearing and settling payments;
2. providing a mechanism for the pooling of capital to finance large investments and for the subdividing of financial assets to facilitate diversification;

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150 Boyd and Graham (1991), Tables 2 and 3.

151 See Prowse (1995) on the variety of corporate control methods in banking.

3. transferring financial resources across time and space;
4. to facilitate the management and control of risk;
5. to provide financial price information to help coordinate decentralised decision-making, i.e., the ability to trade financial assets;
6. to help resolve incentive and asymmetric information (principal-agent) problems.

Mutual funds are essentially vehicles for pooling marketable financial resources, providing diversification, investment asset monitoring and liquidity services to investors and a capital source for borrowers. They are but one form of pooling which provide such services.[152] Mutual funds, like other pooling intermediaries, provide valuable asset selection, disposal and monitoring services which could be difficult for an individual investor to perform on a diversified portfolio. Where permitted by law, they may also play a valuable corporate governance role, helping to reduce asymmetric information problems through information acquisition and analysis. It is worth noting the distinction between pooling intermediaries which perform a significant monitoring role and other pooling methods which do not. Asset-backed securitisation provides marketable financial assets in the form of claims on the cash flows of a specific pool of non-marketable, relatively homogenous assets not requiring significant monitoring or servicing. Securitisation is thus a sort of financial contract transformation, converting individual illiquid assets with high transaction and monitoring costs, into relatively liquid assets with low transaction costs and improved risk-return characteristics. Mutual funds have been major purchases of securitised assets in the United States, where the transformations of financial contracts has been greatest. One thing which differentiates them from other pooling vehicles, for example a commercial bank, is their relative transparency. The recent rapid growth of mutual funds in a few countries attests to the competitive potential of these institutions and the demand for pooling services.

One reason why institutions like the modern mutual fund failed to arise in some countries has been the constraints governments placed on the creation of capital markets, thereby restricting the liquidity, tradability and capital mobility of the private sectors' financial assets. Even up until the early 1980s several industrial countries had only modestly developed corporate bond and equity markets. With the relaxation of exchange controls many firms went abroad to fund themselves in liberalised capital markets. Domestic depository institutions remained, and in some cases still remain, a highly protected financial enclave. Only fifteen years ago there were few means of asset diversification and risk management for investors in many countries. Until quite recently many investors had relatively limited ability to diversify their investments through the use of pooling vehicles, outside of depository institutions holding largely nontradable assets.

Not surprisingly, the one notable historical exception to this characterisation has been the Netherlands. As far back as 1700 the Netherlands had major investments in Russia, England, France and several other European countries. These investments were often the accumulation of small savings pooled into widely diversified investments, managed by large Dutch banks. As recently as 1938 the Netherlands was the world's third largest creditor country, behind the United States and the United Kingdom.[153]

[152] See Sirri and Tufano (1995) on the economics of pooling. Moon, et.al. (1998) provide a good review of the factors influencing the asset management industry. Borio, Chincarini and Tsatsaronia (1997) provide an overview of institutional investment practices and their potential impact on markets.

Traditionally investments in depository institutions have been at fixed rate and, for the modest sized investor, in nontraded assets. While the investments can be thought of as being pooled, the pool being the collection of consumer, commercial and industrial loans, they provided the investor with little transparency, liquidity and capital mobility. Modern pooling institutions provided an alternative, a pool of tradable assets. However, in the United States, for example, investment management was constrained by the 'prudent man rule', requiring, the primary objective of the investment manager to be the preservation of capital.[154] Similar constraints exist in other countries. Modern finance theory and risk management techniques have helped to reduce the force of this investment constraint.

Another constraint on the growth of financial pooling vehicles has been investor preferences, in particular against equities. Recall that the American Telephone and Telegraph pension fund first ventured into common stock in 1958. It was only in 1958 that the first American equity mutual fund was created, the $ 221 million equity 'One William Street Fund' founded by Lehman Brothers.[155] The fund was initially formed as an investment partnership of 28 Ford Motor executives wishing to invest in equity. Lehman reportedly expected to sell 3 million shares in the fund; they ended up selling 16 million.

Mutual funds have dramatically transformed the financial landscape in the United States. This may also occur in Europe but with a difference. Firstly, neither the relative size of the equity markets nor the appetite for equities is as large in Europe as it is in the United States.[156] Secondly, the mutual fund industry in the United States grew up out of the securities industry, reviving interest in equity investment first and into a variety of money market and bond funds later. Commercial banks responded by offering mutual fund products, some of which are proprietary funds.[157] As of mid-1996, US bank-sponsored funds accounted for 21.5 percent of all money market fund assets.[158] In recent years US banks have moved aggressively into the offering of equity mutual funds. As of March 1997, the total of bank-managed equity mutual funds amounted to $ 149 billion.[159] In Europe, on the other hand, much of the mutual fund industry grew out of

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153 Lewis (1945), p. 9. During the first half of the eighteenth century the sizable investments in England flowing out of the Netherlands came from a broad class of the population, including 'sprinters, widows, retired naval and army officers, magistrates, retired merchants, parsons and orphanages'. Wilson (1941), p.118-119.

154 In the United States this rule goes back to 1830, established by Justice Samuel Putnam of the Massachusetts Supreme Court. See Blume, Siegel and Rottenberg (1993), Chapter 5.

155 Actually the first US mutual fund was created in 1924 in Boston. See Grant (1996), pp. 38-39.

156 See The Economist (1997).

157 See Mack (1993). A proprietary fund is one which is advised by the bank, whose shares are brokered by the bank to its customers. Although money market funds account for the bulk of US bank mutual fund assets, long-term funds have been gaining in popularity. Collins and Mack (1995) find significant economies of scale for the average bank proprietary mutual funds, will full economies of scale obtained with assets under management between $ 15 billion and $ 30 billion.

158 Golter (1996) reviews banks' involvement in mutual funds. A number of US banks have converted 'collective investment funds' of their trust departments into proprietary mutual funds.

159 See Ratner (1997).

the banking and insurance industries. SICAVs, the French equivalent of mutual funds, are frequently managed by banks although not formally part of the banking enterprise.

Table 2

Growth of investment companies[1]

	Total net assets							
	1987	1990	1993	1997[2]	1997[2] of which in %			
	in billions of US dollars				Money market	Bond	Equity	Balanced
United States	770	1067	2075	4031	24	20	53	3
Japan	–	336	455	409	26	46	23	3
Germany	42	71	79	144	12	50	35	3
France	204	379	484	507	42	28	13	17
Italy	51	42	65	157	33	39	19	6
United Kingdom	68	89	131	225	0.4	5	88	6
Canada	–	22	73	187	13	9	55	15
Spain	4	12	72	159	42	41	8	6
Netherlands	16	24	46	67	10	30	54	6
Luxembourg	74[3]	85	248	364	21	49	24	6

[1] Open-end funds in investable and transferable securities and money market instruments. [2] June. [3] 1989.
Sources: Fédération Européenne des Fonds et Sociétés d'Investissement and ICI Mutual Funds Fact Book.

The rapid growth of the institutional investment in industry can be seen in Charts 1 and 2 for the United States and the United Kingdom. Since the mid-1970s there has been a steady decline in the on-balance sheet liabilities of depository institutions relative to those of non-depository financial intermediaries. Since the late 1980s the liabilities of US insurance companies and pension and mutual funds have exceeded those of US depository institutions. In 1985 mutual funds and insurance savings of households were roughly equal to 41% the size of bank deposits. In 1995 they were 103% the size of bank deposits.

Several characteristics of mutual funds, the most available data being that on US funds, reveal their ability to compete effectively with many traditional depository institutions. Firstly, there is considerably more transparency regarding the investment objectives and management styles of mutual funds than there are for depository institutions. Mutual funds can be classified into different groups which can be useful in predicting the cross-sectional variation in returns on different types of funds.[160] The dominant proprietary information-intensive lending of depository institutions in non-traded assets provides a considerable disadvantage in the competition of deposits with mutual funds. The obvious disadvantages are limited diversification and liquidity of traditional bank loans. The difficulty of depository institutions to reveal the risk-return characteristics of its investments to depositors would appear to be a disadvantage which may have contributed to the relative long-run decline in bank deposits compared to the growth of mutual funds.

[160] Brown and Goetzmann (1997).

Another reason for the possible long-run advantage of mutual fund intermediaries over depository institutions is the general governance structure of many banks compared with more transparent mutual funds. The creditors of depository institutions have a more difficult time uncovering the performance of bank intermediaries, one reason being the non-marketability of many assets and the lack of transparency in many bank securities and derivative related activities. This may be a reason for the appearance of only a few large banks in some countries, for example, and the considerable concentration in some segments of the interbank market.[161] In contrast, the mutual fund industry, in the United States at least, is composed of many institutions whose performance is readily available and activity tracked by the investment industry.[162]

Because of the characteristics of mutual fund shares in terms of diversification, liquidity, transparency, risk-return characteristics and corporate governance, the 'competition in financial contracts' as investment instruments against traditional bank deposits appears easily won by mutual funds. These contract advantages help explain the rapid growth in US mutual fund assets under management from $ 120 billion in 1980 to $ 1.5 trillion by the end of 1992. The rich variety of mutual funds (load funds, no-load funds, 401 (k) plans, etc.) offering various financial services (retirement plans, accumulation and withdrawal plans, check writing, insurance and tax planning, etc.) with different fee structures make them extremely adaptable to investor needs.[163] It is difficult to believe that mutual funds will not compete aggressively with depository institutions in other countries and with similar effect.

Another advantage performance-transparent mutual funds may have over depository institutions is the ability of investors to signal their preference to managers in light of return performance. This 'feet to the fire' governance characteristic is much less in evidence in depository institutions, where, for example in the United States, merger and acquisition activity in the banking industry may be more manager than shareholder driven, and where compensation in the banking industry appears more dependant on size than performance. The compensation contracts for managers in the mutual fund industry arguably may promote greater efficiency compared with manager contracts in depository institutions. Some evidence suggests, however, that while mutual fund managers earning relatively higher returns observe large proportional inflows of funds, poorer performing funds do not see proportionally smaller inflows. Furthermore, poorer performing fund managers (for US growth funds) have been seen to increase their portfolio risk after a weak performance period more than do 'winners', the higher return funds.[164] Hence some mutual fund managers may respond, not unlike aggressive depository institutions during the 1980s, in a manner inconsistent with the interest of investors. Nonetheless, a factor that helps to explain the long-run growth and 'survival' of mutual funds is their greater return transparency and the ability of shareholders, through the threat of share redemption, to encourage more efficient behaviour. Such behaviour would be consistent with Alchian's (1950) argument that persistent realised profits, and not 'maximum prof-

[161] See pp. 29-32 of the 'Promisel Report', Bank for International Settlements (1992).

[162] Mack (1993) reports Herfindahl measures of concentration in the US mutual fund industry which suggest quite low concentration.

[163] See Chordia (1996) on the structure of mutual fund fees. Davanzo and Nesbitt (1987) have conducted simulations to determine the appropriate asset-based fee structure for investment managers, in order to minimise opportunistic portfolio management behaviour.

[164] See Brown, Harlow and Starks (1996).

its', is the relevant decision criterion in firm behaviour. At the same time, his argument that 'the awareness that superiority relative to one's competitors is crucial', when there is considerable 'variability of the environment', and an 'absence of an identifiable criterion for decision-making' may help explain the imitative behaviour that some argue is found in the mutual fund industry.[165]

It is clear that mutual funds provide significant advantages over bank deposits as investment vehicles. Banks' uniqueness continues to be their provision of bank deposit contracts, specifically transactions deposits. Bank's non-transactions deposit contracts, such as large negotiable certificates of deposits (CDs), are arguably a curiosity as a 'deposit' contract, since in the United States they typically yield a return similar to that on commercial paper. Whether banks are still 'special' because of their loan contracts, requiring 'inside information' on borrowers, is also open to question. This obviously depends on the particular country in question and the availability of competing information-intensive loan contracts. In some country their 'specialness' during the 1990s has been their weakness.

What may also be a survival advantage of mutual funds over banks is the incentive structure and the transparency of their objectives. US regulations, for example, require that mutual fund managers state explicitly in their prospectuses the investment objectives of their fund. Currently the Investment Company Institute lists nineteen categories of investment objectives for long-term funds.[166] This clarity of objectives is likely to influence the incentives of managers of mutual funds, who are unprotected by any specific financial safety net. No such objectives are required of banks, although recent experience in several countries shows some to have had aggressive investment strategies. As argued by Guttentag and Herring (1986), the compensation of bank loan officers is often related to current revenues from loan expansion. What they term 'disaster myopia', referred to here as latent long-term hazard problems, may reduce incentives to closely evaluate credit risks and monitor creditor status, as has occurred with some banks' real estate lending in recent years. Because the value of mutual fund assets are known to investors, mutual fund managers are arguably less subject to 'cognitive dissonance', essentially the ability to rationalise a previous decision made questionable with the arrival of new information. The point to emphasise here is that survival of a given institution, and in the long-run of a particular institutional structure, will depend on the incentive structure of managers, some part of which is formed endogenously.[167] And the incentive structure will be strongly influenced by mandated and voluntary accounting and financial information reporting systems. It should not be a surprise that banks in some countries have responded to the rapid growth of mutual funds by countering with mutual fund services of their own. However, the two institutions are enormously different in the variety and complexity of their services, risk management capacities, official

[165] Alchian (1950), p. 218. Remolona, Kleiman and Gruenstein (1996) consider the relationship between returns on mutual funds and flows into and out of them, to determine whether there is any positive feedback which might lead to a cascade of redemptions in the event of a major decline in bond or equity prices. They uncover only modest positive feedback effects.

[166] See Saunders (1994).

[167] Regarding endogenously vs. exogenously incentive structures, see Pelikan (1987). Rotberg (1992) looks at the change in behavioural incentives of security firms and banks as a result of the loss of returns to previously 'non-replicable value-added services in traditional securities activities'.

protection, transparency and structure of manager incentives, all of which will influence their future survival.[168]

In terms of Merton and Bodie's (1995) list of the primary functions of a financial system, generic mutual funds appear to provide at least four of the six functions. Arguably, one of the latent strengths of mutual funds may be their inability to act as a 'flight to quality institution', not being under any official financial safety net, even though many are potentially subject to 'runs' (redemptions) by investors. This may act to reduce rent seeking behaviour and opportunistic activities on the part of mutual fund managers, contributing to the strength of the industry.

E. Optimal Information Disclosure and the Structure of Intermediation

As 'competition in finance', broadly speaking, is composed of competition in financial contracts, technologies and institutional structures, it is equally concerned with competition in financial information disclosure, specifically in financial reporting systems and external disclosure. This competition is recognisable in the pressure recently placed by a number of groups to allow foreign firms to list their shares on American equity exchanges without having to fully satisfy the requirements of US GAPP accounting.[169] Competition in financial information disclosure is continuing to have a profound impact on the structure of financial intermediation.

The considerable differences in corporate financial disclosure systems among the major economies partly rests on the historical American preference for the promotion of equity markets. The desire to restore the health of the US equity market after the Great Depression saw dramatic expression in the Securities Exchange Act of 1934. This Act created the Securities Exchange Commission, giving it the power to define and enforce corporate financial reporting standards. The SEC statutes have a well articulated bias: 'The recurrent theme throughout is disclosure, again disclosure, and still more disclosure'.[170] A major difference among financial accounting standards is the American practice of not requiring financial accounting to be identical to tax accounting. This can be seen most recently in FASB statement # 115 which requires US banks to mark to market on their financial statements the decline in the market value of securities, whether or not the losses have actually been realised. It is suggested that two common European criticisms of American compulsory financial reporting standards are first that it requires firms to disclose proprietary information and secondly that such reporting is costly.

Differences of opinion between countries regarding the value of public information disclosure are reflected both in the prevalence for particular contracts (complete vs. incomplete (relationship) contracting) and in the structure of their financial markets and institutions.[171] The American preference for equity financing by medium and large size

[168] With respect to the issue of corporate control in the US banking industry, see Gorton and Rosen (1994) and Prowse (1997). Prowse argues that US bank holding companies 'may be weakened because hostile takeovers are precluded by regulation and bank boards of directors are not as aggressive (as in manufacturing firms) in removing poorly performing managers'.

[169] See Lowenstein (1996).

[170] Lowenstein (1996), p. 1340.

[171] Hart (1995) provides an excellent review of contracting theory and firm financial structure. Macneil (1978) reviews the different forms of legal contracts.

enterprises and considerable financial disclosure casts it as an outlier with regard to financial transparency among the major industrial economies. Restraints on the ability of US creditors to actively participate in the management of firms to which they lend further encourages many enterprises to promote information disclosure which permits them to tap commercial paper and bond markets.

Information disclosure is also intimately related to the firms' desired source of finance.[172] Costly verifiable information disclosure, which may be used to the advantage of competitors, may cause firms to seek bilateral financing sources. Bilateral financing sources may also be sought to protect against potential takeover. Countries where partnerships are a prominent means of enterprise formation, as in Germany, find many firms with strong bilateral financing arrangements with banks.

There are obviously a large number of factors influencing information disclosure by firms, related to resolving asymmetric information problems with creditors, ensuring control by incumbent management, protecting proprietary information which may be used for competitive advantage by others and the like. All of these will influence the choice of financing source, the structure of borrowing contracts and the sharing of risk and information between creditors and debtors. These in turn will help determine the competition between intermediated and non-intermediated finance and the development of particular intermediaries.[173] Economic systems with strong mandatory disclosure rules in theory emphasise the efficiency gains to be had with greater information availability. One 'information technology' emphasises full and prompt disclosure competing with another information technology promoting narrowly held information systems and long-term relational contracting. Investor activism, corporate control, and the market value of enterprises are all dependent on the given financial information technology. Institutional investors are more likely to arise in a world where marketable financial assets and financial information are in an abundant supply. Efficiency in financial allocation is typically assumed by Anglo-Saxon financial systems to be best achieved where assets are marketable under the first technology. The size and attractiveness of US financial markets, particularly equity markets, to foreign investors is in good part dependent on the ready availability of financial information on medium and large size enterprises. In comparison, many continental European equity markets are still underdeveloped, publicly available financial information limited and less than transparent and considerable corporate control in the hands of banks. Not unrelated, mutual funds and private pension funds are in several of these countries an infant financial industry.

The 'standard' for public disclosure by enterprises based on US mandatory disclosure requirements has also helped promote endogenous disclosure pressures from private credit rating agencies. The 'competition in technologies' in information and the

[172] Yosha (1995) argues that since profitability is positively related to the value of private information, firms which seek bilateral financing sources are typically more profitable than those seeking multilateral financing. He gives the example of medium size US enterprises (with less than 1000 employees) accounting for about fifty percent of product innovation over certain periods.

[173] Pagano and Jappelli (1991) consider the related issue of information sharing in credit markets, in which lenders exchange information with each other through information brokers. Information sharing is argued to be greatest when borrowers are numerous, mobile and where little previous information on potential borrowers is available.

'information standard' has largely been encouraged by mandatory disclosure requirements in the United States and the United Kingdom, and the growth of private credit rating agencies. Such efforts are now catching hold in Europe and elsewhere, fostering the growth of capital markets at the expense of long-term relationshops lending and narrow financial information systems. However, the continued differences among countries in accounting standards, financial disclosure systems, and the role of banks in corporate control should not be underestimated.

F. Securitisation, Institutional Investors and Advances in Credit Technologies: What Remains of the Bank?

'Banks' have traditionally been viewed as the potentially weak sister of financial systems given the endemic liquidity mismatch of their balance sheet: their need to fund a considerable portion of relatively illiquid, information-specific loans with par value demandable debt contracts. The evolutionary institutional survival of banks with this characterisation would appear to be under threat by the relaxation of constraints (deregulation) and changes in the capital stock (technical financial innovation adoption) emphasised by North.[174] Five fundamental questions need to be addressed in viewing the transformation and/or decline of 'traditional banking'. Firstly, given their strategic role in the payments system, is it optimal for banks to both originate loans, particularly longer term loans, and hold largely non-diversified loan portfolios to maturity? Specifically would banks be less vulnerable if the liquidity and maturity (duration) of their assets more closely approximated that of their liabilities? Secondly, what are the informational advantages banks are said to have in the screening and monitoring of borrowers and have these advantages eroded with advances in information and communications technology? Thirdly, does the rise of the institutional investment industry pose a threat to the banking industry's health and survival or does it actually reduce potential instability and systemic risks in banking? Fourthly, how can banks best diversify and liquify their asset portfolios so as to make them less vulnerable to liquidity shocks? And fifthly, should 'banks' specialise in the provision of liquidity in order to limit the expansion of the safety net to the securities industry? This last question concerns the desirability and feasibility of defining the ring around that part of the financial system which deserves explicit government and central bank protection. These questions are obviously complex, interrelated and worthy of lengthy study. Here I will attempt to treat them in a summary fashion, looking at them in an evolutionary light, drawing on the paradigms of path dependence, technological adaptation and legal restrictions on intermediation.

Because of the characteristic mismatch in the balance sheets of deposit-taking banks, they universally have been heavy regulated, the most common being the suppression of competition in the banking industry. The removal of constraints on competition in their loan-deposit creating role and innovations in technology and finance has been in a couple of countries driving banks in a direction which might be considered 'natural' for an institution with very liquid liabilities. This direction is to reduce the balance sheet mismatch by converting previously illiquid assets into liquid ones and to transfer (sell) these assets to intermediaries with longer-term liabilities, institutional investors. This suggest that natural competitive and technological forces are, to a degree, pushing 'traditional banking intermediation' into a 'narrow bank'. Banks can screen loan appli-

[174] This is admittedly a very restricted view of banking and abstracts from their many other activities related to 'contingent commitment banking', trust activities and securities services.

cants, originate loans, and then securitise loan pools, providing contingent credit insurance. Securitisation can be looked upon as a market solution to a traditional imperfection in intermediation, previously requiring significant regulation to avoid potential instability. A market solution is now made possible by advances in information and credit technology which permits the formation, servicing and trading of securitised assets.[175] Part of this advance in intermediation technology has had, like many nonfinancial technical advances, a 'sponsor' which has given it a strong push over rival financial technologies.[176] In the United States mortgage securitisation was promoted by subsidised credit risk guarantees provided by the three major government mortgage corporations.

Securitisation can take a variety of forms all having the same effect, that of separating the origination and servicing of bank loans from their financing.[177] One form is the straight-forward loan participations, the sale of loans through loan syndications to non-bank financial institutions as well as to other banks. Another is the establishment of an institution to which the loans are transferred (the loan pool) and on which securities are issued. Secondary markets are then established for these special securities. In this manner the bank is in fact only a temporary provider of credit before the securities are sold. Indeed, the bank is acting as an underwriter of securities. The bank could be removed from the intermediation business to the extent it no longer plays a role in monitoring the borrower. Banks may also provide some sort of credit guarantee (credit enhancements) to the loan pool entity. In the United States banks provide credit enhancements to loans securitised by other institutions, such as finance companies. Clearly the securitisation of loans satisfies one of the traditional bank's major concerns, liquidity. It receives quick payment for loans sold to the securitisation entity as well as any fees for servicing the loans. Secondly, the bank also experiences smaller credit risk, since some of this risk is taken on by the institutions which purchase the shares in the loan pool. And, importantly, the removal of loans from the banks' balance sheets will result in a decline in their regulatory capital requirements. In this light, one can think of the bank as having created the equivalent of a closed-end mutual fund (with a fixed quantity of shares outstanding), enhanced with bank credit risk guarantees.[178]

There are several ways one can view the transformation of banks involved in loan securitisation; one, as mentioned, is that banks are essentially underwriting collateralised securities. Since the securitised assets are credit rated, they are less risky than the individual loans, amounting to a net risk reduction to investors. To the extent that the bank provides any credit enhancement to the securitisation entity (the 'conduit') it is engaging in contingent commitment banking. For example, the bank may provide

[175] See Greenbaum and Thakor (1987). Asset backed securities have been used by troubled banks to reduce capital requirements. For example Crédit Lyonnais was considering the issuance of FF 40 billion, backed by a loan to Etablissement Public de Financement et de Restructuration. See 'Troubled Crédit Lyonnais Plans Record ABS Launch', Financial Times, 15 August 1997.

[176] Katz and Shapiro (1986) discuss the importance of a sponsor (with property rights to the technology) in giving an innovation a competitive advantage.

[177] See Frankel (1993) on the impact of loan securitisation on bank structure.

[178] Some non-bank institutions have created closed-end bank loan mutual funds, which either purchase bank loans or themselves engage in primary loan syndications.

'recourse', in which it agrees to take on any credit losses of loans securitised up to an agreed upon limit (so-called 'first-dollar loss protection'). The bank may alternatively provide credit risk insurance through an 'excess spread account', an escrow account used to absorb pool losses and funded with the spread between the return on the pooled assets and the funding costs of the conduit.[179]

Securitisation can also be viewed as solving a major problem of many commercial banks, even very large ones, that of underdiversification.[180] Many of the major bank problems to arise in the US banking industry during the 1980s were largely attributable to poorly diversified loan portfolios. Modern credit grading technology permits the securitising of commercial and industrial bank loans which are of less than high quality. In theory, loan assets assembled nation-wide could be pooled and securitised, improving diversification possibilities; banks themselves could then buy portions of the securitised assets.

The potential impact of securitisation on the functions performed by banks can be viewed as a result both of the regulatory pressure on banks (regulatory capital requirements and reserve requirements, the 'push' to get assets off the balance sheet) and the attraction of improving diversification and liquidity through the use of modern information technology (the 'pull'). There are thus both regulatory and information cost arguments for banks' desires to securitise loans.[181]

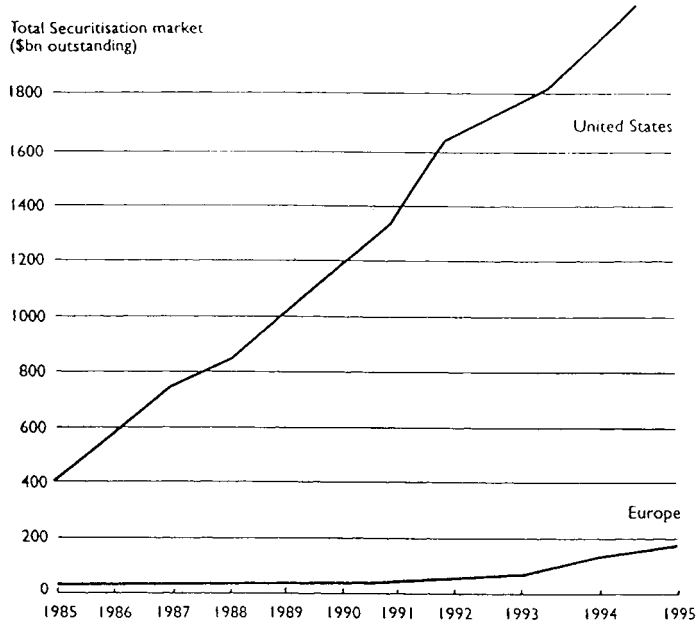
In the context of the earlier discussed literature on competing technologies, innovation adaptation and path-dependence in economics, we clearly see that securitisation of bank assets is a new technology competing with the traditional bank technology of originating loans and retaining then until maturity. Although securitisation could entail adverse selection and moral hazard problems, obtained when the bank securitises lower quality loans than the purchaser of the securities is aware of, this is partially overcome by the bank selling assets subject to recourse. The loan securitisation process contains some of the characteristics of dynamic systems in which given initial conditions (e.g., regulatory structure) and random events (e.g., cyclical conditions) could push a financial system in a particular direction such that it eventually becomes 'locked in', the Arthur (1988) paradigm of path-dependence. This dynamic evolution appears under way with regard to particular bank assets in the United States, such as mortgages.

[179] I owe this information to some unpublished work of David Jones and John Mingo of the staff of the Federal Reserve Board. Benveniste and Berger (1987) make the interesting argument that bank securitisation with resource can be viewed as the issuance of segmented claims on banks' loan assets, which is formally prohibited in the US, i.e., banks cannot issue deposits with senior claims on bank assets. However, a loan-backed security with a bank guarantee attached permits the security holder, in the event of bank failure, to hold the security as a claim on the pooled assets rather than make a general claim on the failed bank's assets. The bank asset-backed security with a bank guarantee is then equivalent to a large CD with senior claim privileges.

[180] See Rose (1993).

[181] Assets could be pooled with the aid of new information technology and thus liquefied but still be held by banks. The decision to warehouse assets will be influenced by the regulatory costs of holding assets or selling them and providing credit insurance. See Greenbaum and Thakor (1987). The implications of asset securitisation for the importance of banks in financial intermediation and on the risks to bank organisations is discussed in Basle Committee on Banking Supervision (1997). Wall (1991) considers the issue of recourse risk in asset sales. For example, the liquefaction transformation could result in greater asset price volatility. In addition, it is possible that non-bank financial intermediaries not subject to capital requirements could gain a competitive advantage over banks in securitising assets.

Chart 3



Total securitisation market in Europe ($ billion outstanding). Source: Citibank.
Source: Global Banking. Roy C. Smith and Ingo Walters. Oxford University Press (1977).

In fact, the story told with regard to securitisation is largely a US story, but a path other countries may in the long-run go down. (See Chart 3 comparing US and European securitisation.) Reserve requirements, capital requirements, geographical restrictions on loan origination, and weak intermediaries may all contribute to the securitisation process and push some banks more in the direction of being dealers than true financial intermediaries. An information constraint on securitisation in some countries is the underdevelopment of rating agencies and limited financial disclosure. Successful securitisation requires that potential investors be able to judge the quality of the securitised assets and not simply the credit standing of the organisator. The process also illustrates how the cost of constraints on a financial system may gradually give rise to their relaxation and to the creation of innovations which further reduce these costs, until the institution is transformed or seriously weakened, and other institutions arise which replace it in the financial structure. Such is the dynamic process in some countries gradually transforming banks into institutions creating 'contingent commitment', 'contingent liquidity' services.[182]

While securitisation can be viewed as partially solving the liquidity and diversification difficulties of deposit-taking intermediaries, it still leaves them with the traditional risk of deposit 'runs'. Securitisation would continue to leave banks with some illiquid, information idiosyncratic loans. This residual liquidity problem is sufficient to require

[182] Banks are not alone in providing credit risk insurance. Surety and insurance companies have provided these services for some years. Banks compete for such business with standby letters of credit. See Bennett (1986).

some form of deposit protection, or some other means of guaranteeing liquidity. One method would be to simply restrict the permissible investments of a separate depository institution, a retail bank, such as in short-term government securities. This 'narrow depository bank' alternative can be thought of as a natural evolutionary outcome to the 'unbundling' of financial services. Transactions deposits of the retail bank would be made safe by the liquidity, credit quality and short-term duration of the banks' assets. In this manner, the security of the payments system is attempted to be secured by restrictions on the payment institutions' assets. This could help to define the purview of the government's financial safety net. This is not a recommendation, simply an extension of the unbundling of financial services argument.

The idea to segment credit and interest-rate risk-related finance into non-depository institutions is not new and received considerable attention in the United States during the late 1980s.[183] The rapid growth of securitisation in the US now makes the issue even more pressing, as large banks increasingly move into contingent commitment banking business and as securitisation and the further development of capital markets occurs in other countries. The increasing difficulty of separating 'banking' from so-called 'securities activities' means that, like it or not, it will be increasingly difficult for policy-makers to restrict in any real sense 'the de facto financial safety net' to depository institutions. Indeed, while securitisation may help to solve the liquidity and diversification problem of banks, it could increase the magnitude of a different concern. By creating even greater quantities of tradable assets, securitisation raises the volumes of securities trading, testing the capacities of securities clearing and settlement systems, and the volumes of large-value payments related to securities trading.

The above characterisation of one aspect of the evolution of financial systems is obviously biased towards events which are currently taking place in the United States. However, convergence in financial structures is gradually occurring from two directions, as the US loosens constraints on the separation of commercial and investment banking and as other countries further develop deeper and broader equity, commercial paper, and corporate bond markets, integrate their securities trading exchanges, and advance financial disclosure. A further impetus to convergence in financial structure of long-run significance will be the development of private pension systems outside the US, where many governments face up to their enormous unfunded pension liabilities.

At the same time, there are good reasons to question whether the US-style of off-balance sheet securitisation will spread to other large countries. The typical balance sheet imbalances characteristic of US banks does not, for example, exist with German mortgage banks, where long-term mortgages are offset by the issuance of mortgage bonds and communal bonds.[184] (Mortgage banks in Germany are often subsidiaries of commercial banks.) These institutions typically fund themselves with long-term bonds; hence investors in these bonds have no claim on specific collateral. Here we observe a form of on-balance sheet securitisation, in which the mortgage bank separates the credit risk from

[183] Bryan (1988) provides an interesting discussion of securitisation and the narrow bank proposal.

[184] See Thompson (1995) for an international comparison of securitisation and Jeanneau (1996) and Twinn (1994) on the market for international asset-backed securities and asset-backed securitisation in the UK, respectively. Stone, et. al. (1991) provides a broad overview of European practices.

the interest rate risk. The mortgage assets are held by the bank assuming the mortgage credit risk, while the market risks are absorbed by the investors in long-term mortgage bank bonds. The bond investor's credit risk is then a general claim on the assets of the bank. One reason US-style off-balance sheet securitisation has not caught on in Germany is the difference in financial information technology. As a recent OECD study on securitisation makes clear: 'Strict rules regarding banking confidentiality in Germany pose formidable obstacles to disclosure in a securitised transaction'.[185] Other forms of German securitisation other than mortgages are, nonetheless, more likely to grow, such as for auto loans. As earlier mentioned, the growth of off-balance sheet securitisation in Germany and elsewhere is likely to be influenced by the future growth of institutional investors, particularly, pension funds with large appetites for marketable securities.

Elsewhere the prospects for asset-backed securitisation are mixed. In Japan it is argued that the unavailability of plentiful quality bank asset and relatively modest differentiation of investments on the basis of credit risk make securitisation on a large scale at present unlikely. Investors are said to associate the credit of the originator with that of the assets securitised, exactly what securitisation is meant to separate. In France progress has been much more significant, encouraged by changes in the legal framework in 1993 permitting securitisation of a wider variety of assets. However, assets of industrial companies are yet not allowed to be securitised.[186] Advances in British legal technology have spurred the securitisation of credit card receivables.

The transformation of the banking system via asset-backed securitisation also can be stimulated by the loss of bank deposits to competing non-bank institutions, such as mutual funds, and the need to economise on scarce capital. Both factors have contributed to the growth of securitisation in France. The balance sheet mismatch at some French credit institutions in the mid-to-late-1980s saw demands for mortgage renegotiations at lower interest rates result in serious liquidity and return difficulties. Securitisation helped solve these mortgage pre-payment induced problems, pushing the interest rate risk onto investors with fewer balance sheet liquidity constraints and greater market risk absorption capacity.[187] The growth of French securitisation and transformation of French depository institutions is likely to be further stimulated by legislation adopted in November 1996 allowing enterprises to establish voluntary pension funds to complement existing unfunded pension plans.

The contribution of asset-backed securitisation to the growth of institutional investment brings us to the question of their portfolio behaviour. The issue of the role of institutional investors in influencing developments in securities and exchange markets was raised in the context of the 1987 world-wide equity market crash and again with regard to the 1992 European exchange rate crisis.[188] Their asset growth, often at the expense of traditional depository institutions, and trading volumes have raised three issues; (a) the determinants of their investment behaviour; (b) their influence in

[185] Thompson (1995), p. 84.

[186] Regarding securitisation in France see Landrieu and Zanelli (1995); regarding Japan see Noe (1995).

[187] ibid., p. 75-76.

[188] The important role of institutional investors in cross-border securities trading was given special attention in Group of Ten report (1993).

financial asset prices and exchange rates; and (c) the pressure they can potentially place on securities and foreign exchange clearing and settlements systems and on large value payments systems.

The portfolio behaviour of institutional investors relates to some of the earlier discussed questions raised by Alchian (1950) on 'adaptive, imitative and trial-and-error behaviour' in an environment characterised by pervasive uncertainty and incomplete information. The transformation of financial systems is increasingly being influenced by the investment behaviour of non-depository intermediaries. Some understanding of their portfolio behaviour would appear warranted. Recent research suggests that non-neoclassical models of behaviour, as suggested by Alchian, are worth pursuing. Shiller and Pound (1989), for example, have attempted to understand the equity investment behaviour of individual and institutional investors using a so-called contagion or epidemic model, similar to those used to explain the spread of infectious diseases. A 'contagion of interest model' is employed to determine the amount of interest by investors in particular equities. Their survey evidence found that a third of a random sample of institutional investors and roughly sixty percent of a random sample of individual investors characterised their equity solution behaviour as 'unsystematic'. Although such evidence was not used to argue that financial markets are inefficient, it points to the possible role of short-run imitative and herd behaviour in securities markets, resulting in periodic strong momentum buying and selling pressures. Other studies have found that institutional investors behave in a manner as might be explained by traditional utility maximisation.[189]

The evolution from bank intermediated credit to greater market financing and asset trading by institutional investors has also influenced the behaviour of financial asset prices. It is doubtful, however, whether it is possible to make many generalisations which are empirically supportable. Periods of financial and exchange market turbulence are frequently attributed to the behaviour of large institutional investors and the use of modern techniques to both leverage and hedge portfolio positions. There is evidence that the prominence of institutional investors and advances in communication and information technology have reduced the former information advantages of market makers, contributing to less intra-day volatility of some asset prices.[190] It is also difficult to argue that the asset price volatility periodically observed in financial markets is quantitatively different from that which was observed during earlier periods. Financial market behaviour often remains a 'puzzle', but without reliable models of equilibrium asset prices behaviour it is difficult to confidently argue that recent puzzles are any greater than in previous periods with liberalised capital movements. Nonetheless, the volumes, complexity of transactions, speed of asset price volatility contagion between markets and the low degree of financial transparency of balance sheets in some countries have all contributed to the impression of greater credit risk among financial market participants. This has had the effect of reducing the number of market makers in some

[189] An attempt to characterise institutional investment as 'systematic' is the study by Dinenis and Scott (1993) of UK pension funds, using ordinal utility maximisation. They find that fund managers are characterised by short-term investment horizons but can also be described as behaving in a manner consistent with rational utility maximisation.

[190] Lower intra-day exchange rate volatility and greater continuity in trading activity is said to have resulted from the growth of large and better informed market participants. See Group of Ten (1993), p. 8.

areas, increasing concentration, and to the questioning of the ability of some markets to remain liquid in periods of increased asset price volatility.[191]

The evolutionary rise in technological advancements in information, communication and credit analysis, institutional investment and the progressive transformation of some large banks into securities brokering, risk management and proprietary trading institutions has had the further impact of requiring major advancements in the technologies used to clear and settle securities, derivatives and foreign exchange transactions and in risk management techniques and complementary advancements in interbank payment and settlement mechanisms, primarily the move to real time gross settlement systems.[192] These issues are reasonably well known, having received considerable public attention since 1987. Many of the changes in finance touched on so far might be thought to have reduced the uniqueness and importance of banks. Yet in one sense banks may have become more unique and important. The enormous increase in securities trading volumes and growth in interbank payments and securities settlement volumes have sharpened the focus on the one function banks alone can provide, the ultimate liquidity of the financial system, payment settlement balances. The equity market crash of 1987 highlighted the impact of institutional investment selling on equity prices and the strategic role of the central bank via the conduit of the banking system to provide needed liquidity in support of dealers having to finance securities inventories. What Grossman and Miller (1988) describe as a major imbalance in the 'demand for immediacy' by securities sellers (the demand to sell an asset rather than wait) required a major injection of bank liquidity.[193] The crisis, they argue, was one of liquidity, not of fundamentals, causing simultaneous liquidity pressures on equity spot and futures markets. The event saw the withdrawal of market making on the organised exchanges. In the event, the crisis was averted by the liquidity provided by the central bank through its 'liquidity correspondents' in the banking system. Banks essentially acted as the conduits of central bank liquidity based on the superior information of the central bank justifying the liquidity injection.

The equity crash of 1987 illustrates not only the strategic role of banks as specialists in liquidity provision but also, again illustrative of Alchian's model of imitative market behaviour, an example of how assumed differences in information among market makers and investors can result in markets rapidly losing liquidity. The disappearance of liquidity in one market and the related price decline are at times interpreted by other markets as the first having superior information.[194] Decision-making under ambiguity, where price change in one market is the major news in others, can set in train the kind of imitative behaviour seen in the 1987 international equity market crash. The potential for future

[191] See Bank for International Settlements (1992) for a discussion of changes in interbank and wholesale financial markets as a result of the deregulation, increased competition and the growth in the use of derivative instruments and cross-border securities trading.

[192] See Bank for International Settlements (1992, 1996, 1997).

[193] Grossman and Miller (1988) argue that the demand for immediacy, essentially selling pressure, depends on the volatility of the underlying price and the diversifiability of the risk related to a change in price. It might also be described as an increase in 'ambiguity' regarding the appropriate generating mechanism of security price changes.

[194] A model illustrating how informational differences among market participants and initially small amounts of securities selling can lead to a wave of selling and large price changes is developed in Gennotte and Leland (1990). Regarding the relationship of price volatility to dynamic hedging strategies, see Grossman (1988).

such events, heightened by securitisation, the greater institutionalisation of saving and increased concentration of market making, makes banks as providers of ultimate liquidity unique and essential to modern securities markets. At the same time, it places central banks in the increasingly delicate position of surveyors of capital market performance and stand-by providers of liquidity in times of crisis.

G. Electronic Money, Path Dependence and Central Bank Intermediation

As earlier mentioned, an historic constraint on private intermediation during this century has been the prohibition on the private issue of bank notes. A new technology, replete with implications of network externalities and path dependence, is now threatening to relax to an uncertain degree this constraint. It goes by the name of electronic money (E-money). This new technology is essentially a 'stored-value' or 'prepaid vehicle' permitting the consumer to store value for payments purposes on an electronic device, typically a plastic card with a microprocessor chip. The introduction of E-money thus creates a direct competitor with the principle means of making small value transfers, government notes and coins.

A number of aspects of the introduction of E-money are interesting, not least of which is the relatively open and laissez-faire attitude of many public officials, particularly central bankers, with regard to a competing payments technology which could undermine a sizable revenue source for some of them.[195] Central bank seigniorage is on average fairly large compared to central bank operating costs, and could fall significantly as a result the substitution of E-money for government notes and coin. Nonetheless, even though E-money is at present envisioned as being used only for relatively small payments, the demand for the new technology is still quite uncertain. E-money clearly represents a direct technological challenge to the monopoly given central banks to issue notes and coin.

Since it is a liability of the issuing institution E-money represents privately created money, similar to notes issued as liabilities of banks during the 19th century 'free-banking' period in the United States. For consumers the competition of E-money with notes and coin would revolve around cost, convenience, credit risk and security (of theft, loss, etc.). The private issuance of a near perfect substitute for government currency entails a credit risk for the consumer. In theory such payments media could be backed by near risk-free assets, such as short-term government securities. As noted earlier, Wallace (1983) has argued that if the return on a portfolio of government securities is greater than the cost of provision of private currency, the demand for government currency could decline dramatically or even disappear. One can easily imagine E-money yielding a return, which would be less than the return on a diversified portfolio of government securities, the difference being the cost of providing the transactions technology service. If the technology caught on and was subject to network externalities similar to those observed with credit cards, E-money could over time expand to encompass larger payments, in the limit supplanting currency.[196]

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[195] Governor Blinder (1995) of the Federal Reserve has stated to the US Congress that 'the Federal Reserve has not the slightest desire to inhibit the evolution of this emerging industry by regulation, or to constrain its growth'. See also Greenspan (1996).

[196] Lacker (1996) argues that stored-value cards could entail a social cost, since they could replace an almost costless transaction's media, currency, with a substitute which is much more costly.

There are a number of interesting policy issues related to the use of E-money. An important one is whether such cards are considered 'deposits'; if not they could be issued by nondepository institutions. Depository institutions in many countries are required to hold reserves against transactions accounts and are subject to considerable regulation and supervision. If granted permission to issue E-money, nondepository institutions would appear to have a sizable competitive advantage over banks and other depository institutions.

Electronic money provides an interesting illustration of a technological innovation which can *potentially* impact the future structure of intermediation and in which network externalities and possible path dependence are present. The attitude of some authorities is to 'suggest patience and study rather than regulatory restrictions' given that the 'uncertainties regarding the future of electronic money are so overwhelming.'[197] There is now little in the way of regulation to prevent the emergence of a good substitute for currency. It is argued that for E-money to significantly replace currency, the 'electronic financial networks' will have to be extremely efficient.[198] Also, to be broadly acceptable the new technology would need to guarantee the security of the new payments technology. Network externalities would appear to be present in the advancement and acceptance of E-money. Similar to the spread of credit cards, these externalities occur as more consumers adopt the same good or ones similar to it (e.g., Visa vs. Mastercharge). The uncertainty is the future general acceptance of electronic money. Similar to many technologies which depend on the assumption of wide use to encourage individual utilisation, initially we could observe considerable 'excess inertia' in the adoption of E-money. However, if the E-money industry quickly adopts standards which permit compatibility of competing E-money plastic cards, there could be increasing competition with notes and coins. The E-money technology could potentially save considerable time for consumers. Instead of standing in front of an automatic teller machine, E-money cards could be 'filled-up' with more potential purchaser power than consumers might prefer to carry around in bulk cash.

Over time there could be substantial demand for the E-money technology not only as a substitute for currency by as a substitute for checks, assuming that the technology assures the security of E-money cards. For example, the time and trouble of writing checks is avoided, as is the risk of accepting a bad check. E-money also reduces float, permitting an instantaneous transfer of funds from purchaser to seller. Hence E-money helps correct a serious market failure represented by cash float, a transfer payment to the government, and check float, a transfer payment to check writers.[199] The assumption at present is that E-money would be used primarily for small purchases. Therefore the official attitude appears to be one of not wishing to stifle a promising innovation in payments technology. However, as credit cards reduced the use of checks, E-money plastic cards could decrease the demand for currency and checks.

Allowing the private issuance of bearer liabilities with E-money without initial restrictions, for example, on the maximum amount that can be transferred to an electronic card or on the permissible issuers of E-money, could make it difficult for regulators later to back-track, particularly if an E-money infrastructure is built up.

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[197] Blinder (1995), p. 1093.

[198] See Congressional Budget Office (1996), pp. 7-8.

[199] For an analysis of the gap between the private cost and social cost of payment instruments, see Humphrey and Berger (1990).

Unless there are obvious reasons why governments have a comparative advantage in providing retail payments media or the private sector is unable to provide a secure and efficient one, once in place the new payments technology may be difficult to remove. The widespread use of E-money could indeed potentially impact on central bank intermediation in its provision of currency. As a recent report by the BIS suggests, the need for a policy response will depend on the degree to which E-money replaces currency.[200] Should it do so central banks could find their balance sheets shrinking. Technology and the relaxation of a long-standing constraint would thus potentially reduce the returns to central bank intermediation.

In the United States, cash transactions have declined significantly since the mid-1980s.[201] Nonetheless, it is estimated that approximately 20 percent of net consumer expenditures involve currency, or roughly $ 1 trillion.[202] Hence the potential market for E-money appears to be substantial. E-money as a new technology competing for adoption might be compared with the use of automatic teller machines (ATMs). First introduced in the United States in 1971, ATMs grew from less than 2,000 in 1973 to 90,000 in 1992. They exhibited network externalities and economies of scale. The regional ATM networks gradually consolidated and national networks were formed, as consumers desired to access various ATM delivery systems with the same card. The US evidence suggests that given the convenience of ATMs individuals made more small cash withdrawals, using ATMs more intensively than they had bank tellers.[203] However, a very small percentage of ATM transactions were used for bill payments; they simply increased the use of cash at the expense of checks and debit cards. Moreover, the study by Humphrey (1994) shows that while deposit delivery systems have changed in the United States, from bank tellers to ATMs, actual deposit delivery costs are higher, although net income is also slightly higher because of ATM charges. Even though considerable economics of scale are available with ATMs, (an ATM transaction costs around one half a typical teller transaction) consumers appear to use them twice as much. The gains from the ATM technology have hence gone to consumers in terms of greater convenience rather than to banks in terms of lower costs. The stored value cards could potentially reduce the frequency of ATM use and the demand for cash. This would depend on the costs of the two competing technologies and the comparative network economies. At present it might appear that ATMs have a ‘first move advantage’ which E-money may have difficulty in overcoming.

Conjectures regarding the potential impact of E-money on central banks should be placed in the framework which has been emphasised in this paper: technology combined with the relaxation of constraints on intermediation. While at present stored-value cards are certainly not expected to present a serious threat to the conduct of monetary policy or to the stability of the financial system, they are nonetheless a further incremental extension on the path of intermediation unencumbered by constraints.[204] However this new technology is likely to experience significant network externalities, and once established the course of future retail payments systems may be difficult to reverse.

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[200] See Bank for International Settlements (1996), p. 10.

[201] See Avery, et al. (1986). The 1984 Federal Reserve survey of currency usage by households found that the gross cash outflow from depository institutions was about $ 65 billion per month, representing a 3º times vault cash turnover per month.

[202] Congressional Budget Office (1996), p. 18.

[203] See Congressional Budget Office (1996), p. 21.

H. Financial Institutional Structure as Reflecting Alternative Economic Systems of Ownership and Control

As we view the evolution of financial structure among the industrial countries and the possibility of greater convergence, we should not forget that the structure of a financial system is a major reflection of the economic system of the ownership and control of enterprises by the private and the public sectors. The evolution of the institutional structure of finance in several countries may be biased away from that observed in the United States and the United Kingdom because of private and public desires to retain the existing systems of enterprise ownership and control. The future structure of financial intermediation in some countries may depend on the desire not to disrupt the existing network of corporate governance.[205]

Where this issue may be most relevant over the next decade is in the area of the development of the private pension fund industry. The need to move from government to private and from pay-as-you-go to fully funded pension systems is well-known.[206] Given the historic dominance of returns on equity over returns on government bonds, observed in particular in the US but true in other countries as well, and the need to provide sizable returns to pension investments in order to satisfy retirement needs, it would appear that the future demand for equities by pension funds could be substantial. The percentage of pension fund assets held in equities in 1995 in the United States, the United Kingdom, Canada, Australia, and the Netherlands was, respectively 53%, 66%, 29%, 52% and 26%. In many other countries pension fund equity holdings are trivial. Furthermore, there exists as well a need to maximise diversification gains, implying a relaxation of constraints on pension fund portfolio investment. (See Table 2 and Charts 4 and 5.) Yet constraints exist both on the future growth of equities and on pension fund diversification. To see the contrast in the portfolio investment constraints of pension funds in Europe, simply consider the UK and Germany. Domestic equities in 1995 were more than one-half of UK pension fund assets, and international equities accounted for a quarter of their assets. In contrast, German pension fund law require that no more than 5% of assets be invested in foreign equities. In 1991 German pension funds were composed of 70% in domestic bonds and less than 1% in foreign assets.[207] A common feature of German company pension funds is that companies note the pension liability on their balance sheets without specific fund allocations, suggesting that a sizable portion of German company pension liabilities are unfunded. There are said to be major tax obstacles to a move to funded pensions in Germany. It is not surprising that negotiations over the European pension fund directive broke down in 1994.

The potential growth of private pension funds in many industrial countries appears enormous, while a constraint on the growth of equity markets is the desire to retain existing systems of corporate control. (Three quarters of the assets of pension funds

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[204] Federal Reserve officials have recently expressed doubt that E-money would significantly replace government currency. See Kutler (1997).

[205] Mayer (1997) emphasises the still profound differences in corporate governance among countries.

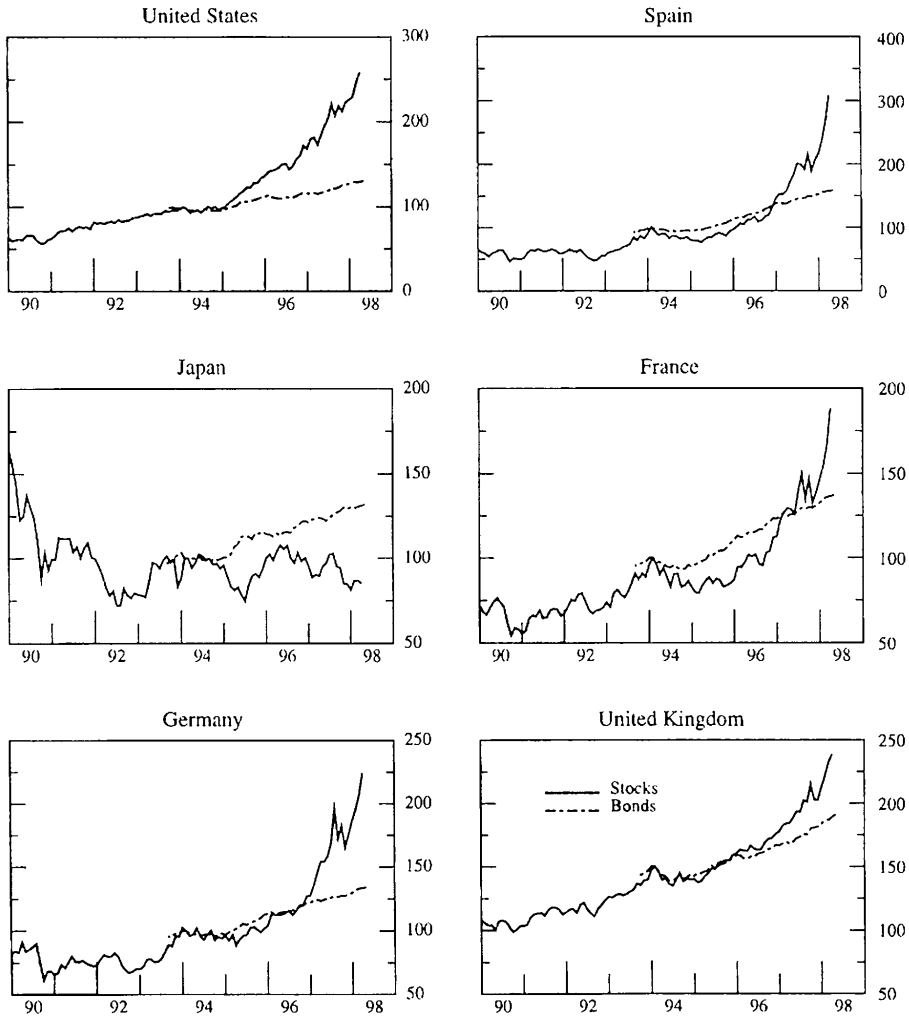
[206] See Davis (1995) for an excellent review of these issues, as well as Roseveare, et. al. (1996) and Davis (1997).

[207] See Tett (1994) and Dickson (1993).

Chart 4

Total return on stock and bond markets

Local currency, January 1994=100



Sources: JP Morgan & Morgan Stanley Capital International

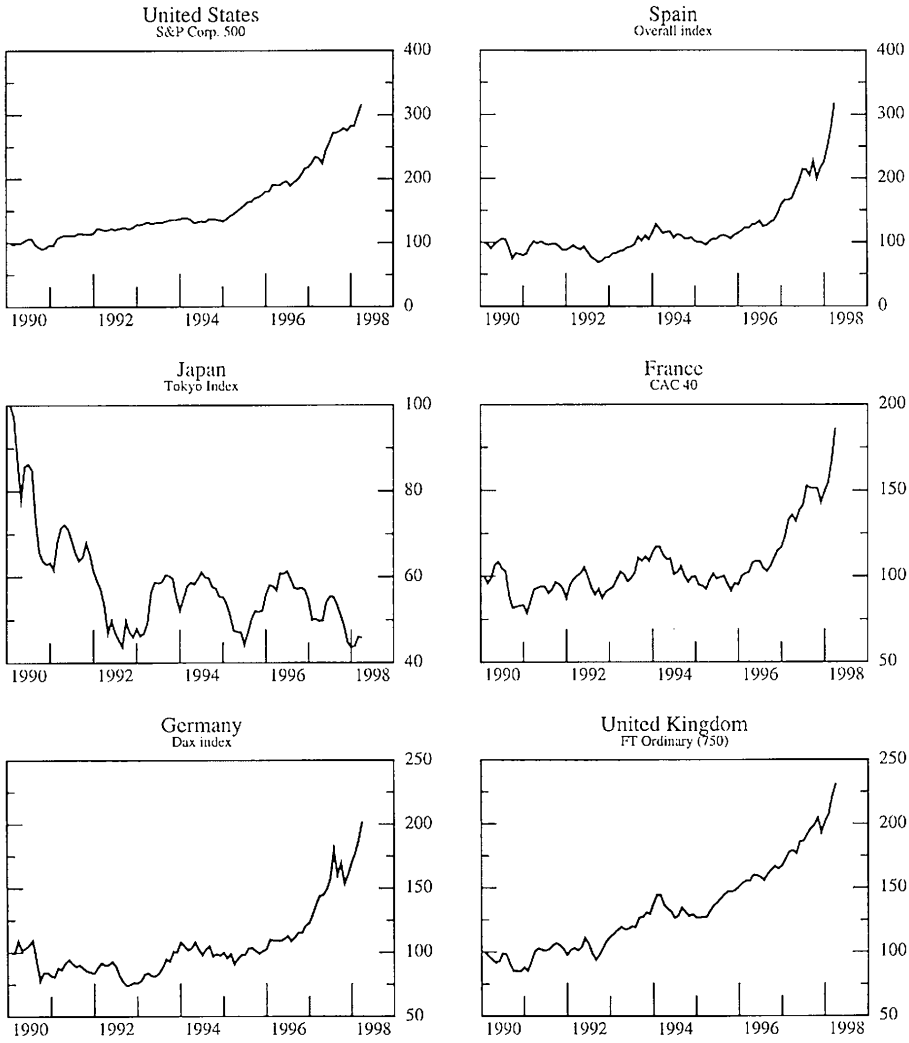
around the world were concentrated in North America in 1995.[208]) For example, private pension funds are almost non-existent in France and Italy and governments are straining under the burden of large unfunded pension liabilities. The future growth of private pension funds will likely require a substantial increase in equity financing in many countries. As an example of the need for equity securities growth, contrast the United Kingdom with Germany, France and Italy. The UK's fully funded pension system had

[208] Not including Japanese pension funds, which are held with insurance companies and trust banks. Based on OECD estimates.

Chart 5

Stock market indices

January 1990=100



approximately £ 500 billion in financial assets in 1995. Germany, France and Italy are said to have pension fund needs similar to those of the UK. However, the market capitalisation of the German stock market at end 1996 was around $ 665 billion and $ 259 billion for the Italian market.[209] (See Table 3.) In a number of countries the likely future pension fund appetite for equities appears to considerably exceed currently supply. The equity market capitalisation in several continental European countries would appear

[209] Smith and Walter (1997), p. 384.

Table 3

Market Capitalisation

Domestic and foreign equities (listed and parallel markets)

Market/country	Billions of US$, end-1996
Amsterdam	378
Brussels	120
Germany	665
London	1729
Madrid	243
Italian	259
Paris	591
Switzerland	403
Hong Kong	303.8[1]
Tokyo	2163
Nasdaq	1835
NYSE	7300
American SE	135

[1] end-1995.

modest in comparison with the future needs of private pension systems. As a result, the prospective long-term growth of private pension funds could imply a considerable upheaval in the corporate control structure in a number of countries.

At the same time as we consider the future potential equity appetite of pension funds we need to recall the major differences among industrial countries in systems of corporate control. While equity ownership by pension funds is large in the United States and the United Kingdom, these equity holders exercise only limited influence on the management of firms in which they invest. Corporate control takes place increasingly through takeover activity. In contrast, in countries such as Japan, Germany and France equity ownership is much more stable and shareholders, particularly banks, have considerable influence on enterprise management decision-making.[210] In these countries the exercise of corporate control by the threat of takeover is limited and in some cases strongly discouraged by government policy. Hence a major distinction in 'financial structure' is the relative shareholder passivity in the United States and the United Kingdom, although this is currently changing, and the much more active shareholder participation in some other large countries, particularly by government and the banking sector.[211]

The enormity of the potential change in financial structure in some countries as a result of the shift from public to private pension systems and the need to produce sizable returns on pension assets should not be underestimated. Davis (1997) reports that the average ratio of old-age pension expenditures to GDP in countries of the European Economic

[210] See Fukao (1995) for a cross-country comparison of corporate governance structures.

[211] Regarding shareholder passivity in the United States, see Black (1990).

Union increased from less than 5% in 1960 to 10% in 1993. Including survivors' and disability benefits the figures for 1993 is 14.7%. In Italy, for example, total pension spending as a percent of GDP in 1993 was 19%. It is clear that many of these obligations will have to be shifted to the private sector. The question is how and in what assets private pensions will invest.

Current private pension funding compared with projections of pension costs for many European countries show a wide discrepancy, i.e., a need to dramatically increase private pension funding programs. For example, in France the stock of private pension assets (end-1993) as a percent of GDP was 3%, while pension costs as a percent of GDP in 1995 were 10.6% and are expected to rise to 14.3% by the year 2040. In contrast, in the United Kingdom pension costs as a percent of GDP were 4.5% in 1995, while the stock of private pension assets was 82% of GDP at end 1993. In both Spain and Italy we also see wide gaps between present and projected pension costs and the existing stocks of private pension fund assets.

An example of a dramatic shift in financial structure related to changes in pension schemes is the case of Australia.[212] Unlike many European government pension programs, which are public unfunded with defined benefits, Australia earlier had a flat-rate funded non-contributory system for non-government employees. To gradually reduce the private sector's dependence on government pensions Australia moved to a compulsory contributory pension system (superannuation) in 1986. The system was significantly expanded in 1991. The Superannuation Guarantee Charge legislation established a timetable for employer contributions to rise to 9% by the turn of the century. In addition, efforts were made to encourage employee contributions of 3%, matched by an equal government contribution, ultimately to result in a total contribution of 15%. The proportion of private sector employees covered by the new pension program rose from around one-third in the early 1980s to roughly 90% in 1996. Superannuation assets have as a result more than doubled as a percent of GDP from the early 1980s to 1995. Importantly, the variation in the growth of the assets of superannuation funds in Australia has come from earnings and capital gains and not contributions.[213] That is, the trend rise in net contributions to superannuation funds has not yet occurred but is expected to be apparent as the mandatory contribution rates increase.

The Australian compulsory superannuation example is an interesting one to watch, first for its impact on private saving and second for its effect on the structure of financial intermediation. The sector has traditionally invested in debt securities, equities and property. But in recent years the growth has been particularly strong in equities and foreign assets. At end 1995 roughly 35% of Australian superannuation assets were in equities. Because the banking system in Australia, unlike several European countries, has not traditionally been an avenue for long-term saving for the most part, fund managers and banks have not been competing in the same market. However, this neat distinction is gradually becoming diffuse, as some fund management institutions, unit trusts for one, provide short-term investment outlets, some of which have deposit-like characteristics. Furthermore, the fund management sector is now an important source of finance for traditional financial intermediaries. Edey and Gray (1996) report that roughly 15% of superannuation assets were invested in bank securities and deposits.

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[212] This material is drawn from Edey and Simon (1996) and Edey and Gray (1996).

[213] Pre-existing voluntary pension programs partly absorbed the new compulsory system so that by 1995 the aggregate effect of the compulsory scheme was still modest.

Consider the current and projected pension costs in industrial countries. In Germany, Spain and Italy, pension expenditures as a percent of GDP are projected by the OECD to increase by roughly 7% between 1995 and 2040. Clearly existing public pension promises are going to place enormous pressures on government resources. If one assumes that during this period attempts will be made by governments to spur the growth of private pension funds, as they have in Australia and recently in France, the potential future demand for equities will be substantial, particularly if pension fund managers attempt to achieve the kinds of returns experienced in recent years by US and British fund management firms.[214] Even given the rather timid attraction of many European investors towards equities, in the long-run equity supply will have to increase and will likely move into the hands of pension fund managers. With this may come a significant change in corporate ownership and control.[215]

We argued earlier that the role of the state needs to be considered in understanding financial innovation and advances in the structure of financial innovation. At times these advances may contain elements of 'excess momentum' and push the economy on a particular financial evolutionary path. While this technological adaptation analogy should not be pushed too far, it seems reasonable to argue that 'financial survival' is at stake for some governments as they face mounting unfunded pension liabilities. A number of governments are having to face a reality check, having to back out of earlier retirement pension and health care commitments and having to promote voluntary or mandatory private pension funding. While this transformation will take many years to complete, it will greatly alter the shape of financial systems, and will be a prime factor in the future international integration of financial markets.

[214] See Riley (1993) on the return performance of pension fund management houses.

[215] On European demand for equities, see The Economist (1997).

[216] As argued by Kindleberger (1992), middlemen prosper on the basis of superior information and reputation, both in finance and commerce. Technological advances have reduced their role in both industries.

V Conclusion: Can We predict the Direction of Change in the Structure of Financial Intermediation?

The evolution of financial institutions as viewed in this paper has emphasised the competition between different types of financial technologies: contracts, financial information and disclosure systems, incentive structures, systems of corporate control and alternative providers of payment media and finance. All of these elements of intermediation have been influenced by the adoption of theoretical and technical innovations and the relaxation of formal and informal constraints on intermediation. The integral of these competitive forces is sometimes summarised in the notion of competition between financial 'markets' and 'institutions', or, alternatively, competition between intermediated and non-intermediated finance. This competition has increasingly led to the 'death of the middleman' in finance.[216] However, at its broadest level there is also a major competition taking place in institutional structure which both influences and has been influenced by changes in intermediation structure, that being the competition between the government and the private sector in the provision of a variety of financial services. The increasing liberalisation and integration of financial markets and the need for governments to appeal to these markets for funding has been an element for fundamental change in the public sector. The relaxation of capital controls, for example, has placed enormous pressures on governments to behave in a more economically consistent and efficient manner. Having grown to considerable size and bloated by indebtedness, many governments are now faced with the problem of not being able to deliver some financial services efficiently and are having difficulty fulfilling earlier promises to the private sector. As a result they are having to retrench and rethink their proper role, one of which is their place in the financial system. Thus governments themselves are involved in a fight for institutional survival. They are continuing to find that they have underestimated the costs of moving to a deregulated financial environment and overestimated their skill in facilitating this transition. The saving and loan crisis in the United States, the banking crises in the Nordic countries and Japan, and the recent Asian financial crises, are all examples of failed government intervention in the financial system. Large public debts and unfunded pension systems are examples of current pressures on governments.[217] These pressures are due to changes in the demographic, macroeconomic and financial environment, and to a variety of past policy errors. How the private financial system adapts to these pressures on government by further innovation, consolidation and pushing on remaining constraints will influence the shape of the institutional structure of finance.

Financial institutional structure over the next several years is likely to receive major pressures for change from three sources, two related to problems currently facing the public sector. The first is the need for many governments to push the burden of providing retirement income back on to the private sector. The second is the need for some governments to restore the health of their financial systems, ravaged by bursting asset price bubbles, excessive government ownership or control of large financial inter-

[217] In a number of countries the elderly have emerged as a particularly aggressive group of rent seekers, with disastrous consequences for state pension systems. This issue is analysed by Orr (1980). See also 'State pensions will be Prodi's biggest test', Financial Times, 22 May 1997.

[218] See again Arthur (1989).

mediaries, and still constraining regulations. Thirdly, continuing private market advances in information, computation and communication technology and in financial theory are likely to increase the supply and demand for marketable instruments, further promoting the growth of institutional investors. As a result, while the banking industry may not be in decline, in many countries it will experience considerable transformation in terms of services provided and size, as consolidation continues.

But do these ingredients to change in the structure of intermediation shed any light on its likely direction? One is tempted to say that it does, that it points to less intermediation through the banking system, more, via the securities markets, by non-bank intermediaries, especially mutual funds and pension funds. Yet the literature on technology adoption that has been leaned on in this paper requires us to be cautious with any predictions. Technologies subject to increasing returns, which also includes financial technologies, have the property that the resulting market configuration is unpredictable.[218] Banking structures in a few countries have broadly moved from being deposit funded, with non-traded loans, closed-information corporate governance, and government protected intermediation technologies to ones with increasingly securitised funding and traded assets, open disclosure corporate control and more modest government intervention. The second now may appear to be the ‘superior technology’. Hence all the confidence expressed by some in financial systems moving to ‘seamless complete markets’. But the future structure of financial intermediation in the industrial countries will depend on the return regimes, uncertain events and the decision-making under ambiguity of market participants. Just as personal computers have considerably replaced mainframe computers in a relatively short period of time, increasing returns from network externalities will help determine the future shape of financial systems. But as with technology adoption in the real sector, increasing returns in the financial industry will cause path dependence and unpredictability of intermediation structure. We should not be too certain we known where we are going.

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