



## **LIQUIDITY: LESSONS FROM THE CURRENT TURBULENCE**

**John Eatwell**

*DISTINGUISHED LECTURE SERIES 28*

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*Distinguished Lecture Series 28*

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## FOREWORD

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In recent decades, the structure of financial markets has changed, shifting from a bank-based to a market-based financial system, with banking now following an *originate, rate and relocate* model. Financial intermediation has moved from banks into markets, and as a consequence of this disintermediation, financial crises now manifest themselves in markets rather than institutions. Accordingly, interest has moved from bank runs to “market gridlock” as a source of systemic risk.

In this edition of the *Distinguished Lecture Series*, John Eatwell, a leading scholar in the field of financial policy, sheds new light on the long-debated issue of liquidity in order to draw lessons from the current financial turbulence. In particular, he discusses market liquidity and the causes of financial bubbles; how liquidity relates to monetary and financial policy; and lessons that can be drawn from the current financial turmoil for emerging markets and how to reduce systemic risk in financial markets. The discussion that followed his rich lecture was highly relevant and the answers provided by Eatwell were insightful and constructive. Both the lecture and the discussion are included in this publication.

Hanaa Kheir-El-Din

Executive Director and Director of Research, ECES

December 2008



## تقديم

شهدت العقود الأخيرة تغييرا في هيكل الأسواق المالية، فبعد أن كان النظام المالي يستند أساسا إلى البنوك أصبح يعتمد على الأسواق، وتحولت البنوك إلى تطبيق نموذج ينطوي على إنشاء القروض وتوريقها، وتصنيفها انتمانيا من قبل وكالات التصنيف الائتماني ثم نقل ملكيتها فيما يُعرف بنموذج "إنشاء القروض وتوزيع المخاطر". ومع تحول عمليات الوساطة من البنوك إلى الأسواق، والذي اصطلح على تسميته باللاوساطة، أصبحت الأزمات المالية تظهر في الأسواق وليس المؤسسات. ومن ثم، تحول الاهتمام من ظاهرة التدافع للسحب من البنوك إلى ما يسمى الآن بالاختناق في الأسواق المالية (Market gridlock) كمصدر من مصادر المخاطر المنظومية.

وفي هذا الإصدار من سلسلة المحاضرات المتميزة، يعيد جون إيتويل إلقاء الضوء على قضية السيولة بهدف استخلاص الدروس المستفادة من الاضطرابات الحالية في أسواق المال العالمية. وتحديدا، يتناول قضية السيولة وأسباب الفقاعات المالية؛ ومدى ارتباط السيولة بالسياستين النقدية والمالية؛ وأخيرا، الدروس التي يمكن للأسواق الناشئة استخلاصها من الاضطرابات المالية الحالية، وكيفية الحد من المخاطر المنظومية في أسواق المال. وقد تطرقت المداخلات الثرية والمفيدة التي أعقبت هذه المحاضرة إلى العديد من الملاحظات والأسئلة المتعمقة، وجاءت إجابات إيتويل عن استفسارات الحضور بذات القدر من التعمق والوضوح. ويضم هذا الإصدار كل من المحاضرة وملخص المناقشات.

أ. د. هناء خير الدين

المدير التنفيذي ومدير البحوث

المركز المصري للدراسات الاقتصادية

ديسمبر ٢٠٠٨





## ABOUT THE SPEAKER

### **LORD JOHN EATWELL**

*Professor of Financial Policy*  
*Director of the Centre for Financial Analysis and Policy (CFAP)*  
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*BA (Univ. of Cambridge), AM, Ph.D. (Harvard University)*

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From 1985 to 1992, John Eatwell served as economic adviser to Neil Kinnock, the leader of the British Labour Party. In that post, he was responsible for much of the work that led to a substantial re-alignment of the Labour Party's economic policies. In 1992, he entered the House of Lords, and from 1993 to 1997 was Principal Opposition Spokesman on Treasury and Economic Affairs.

In 1988, together with others, he set up the Institute for Public Policy Research, which has now established itself as one of Britain's leading policy think tanks. He remains chairman of the Board of Trustees. In 1997, he joined the board of the Securities and Futures Authority, Britain's securities markets regulator. In this position, he has developed his interest in securities regulation, particularly with respect to risk management in financial institutions. In a report to the Ford Foundation, he proposed the establishment of a World Financial Authority to manage systemic risk in the international financial system.

John Eatwell is a member of the Board of Directors of the Royal Opera House, Covent Garden, with particular responsibility for the Royal Ballet. He is also chairman of the Commercial Radio Companies Association and the British Library. Lord Eatwell is an elected foreign member of the Italian Academy of Sciences.



## PART I

### LIQUIDITY: LESSONS FROM THE CURRENT TURBULENCE

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#### INTRODUCTION

Liquidity is an elusive concept. On the one hand an asset is liquid if it can be immediately exchanged for money without any significant change in price (a fire-sale is not a manifestation of liquidity). Financial assets command a liquidity premium determined by their market relationship to cash. In this usage liquidity is an adjective, not a noun.

On the other hand, aggregate liquidity is often characterised as if it were a measurable quantity. Adrian and Shin (2008, p.1) cite popular phrases such as “a flood of global liquidity” and “excess liquidity” as metaphors embodying this quantitative image. In this case liquidity is a noun.

This latter characterisation of liquidity is at the heart of the current financial turmoil. Adrian and Shin define aggregate liquidity today as “the growth rate of financial intermediaries’ balance sheet” and relate that growth to the development of the repo market. This amounts to defining liquidity as “the ability of agents to command purchasing power by acquiring liquid liabilities,” an ability dependent on the willingness of others to supply purchasing power against the issuance of liabilities. An economy “awash with liquidity” is then an economy in which the financial system becomes, as Shin argued in his Clarendon Lectures (2008), an “inflating balloon” looking for assets to match its fast growing liabilities. Conversely, that balloon may deflate when the ability to issue liabilities disappears and balance sheets shrink.

The history of financial bubbles (see Kindleberger and Aliber 2005) demonstrates that all bubbles require two components:

*First*, an asset or set of assets that becomes the focus of speculation, in the sense that it is purchased purely as a financial placement, not for its intrinsic characteristics whether they be tulip bulbs, railway shares, dotcom companies or securitised mortgages. In particular, the price

of the financial placement becomes divorced from any likely return from the underlying asset (Eatwell 2004).

*Second*, the rising value of the financial placement requires a continuous expansion of purchasing power. This is often a stimulus to financial innovation to provide the wherewithal. The Dutch tulip mania of 1637 is famously associated with the introduction of trading on the margin (Posthumus 1929). The railway bubbles of the early and mid nineteenth century saw the development of the joint stock company to something approximating its modern form.

The relationship between the innovation that enhances liquidity, and the rising value of placements that demand liquidity, is a complex one: does the growth of liquidity set off the spiralling value of placements, or does the growth of the value of placements stimulate the innovation necessary to the expansion of liquidity?

The assets that were the focus of the recent boom in the United States were provided by the development of securitisation enabling mortgages (and other assets) to be packaged into tradable bundles,<sup>1</sup> allied with the tranching of risks characteristic of credit derivative markets from the mid-1990s onward. The liquidity was provided by the expansion of the repo and reverse repo market.<sup>2</sup>

Shin (2008) has argued that the interaction of securitisation and the growth of the repo market stimulated and fuelled the growth of liquidity, and led to the development of a “shadow banking system” that became an “inflating balloon.”<sup>3</sup> The system comprised an interdependent chain: sub-prime borrower  $\Leftrightarrow$  mortgage broker  $\Leftrightarrow$  originating bank  $\Leftrightarrow$  mortgage pools  $\Leftrightarrow$

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<sup>1</sup> In the United States mortgage-backed securities began to be significant in the 1930’s with the creation of Fannie Mae.

<sup>2</sup> A repurchase agreement (or repo) is an agreement between two parties whereby one party sells the other a security at a specified price with a commitment to buy the security back at a later date for another specified price. While a repo is legally the sale and subsequent repurchase of a security, its economic effect is that of a secured loan—the party purchasing the security makes funds available to the seller and holds the security as collateral.

<sup>3</sup> Recent events have demonstrated that the growth of liquidity in the “shadow” banking system of investment banks and hedge funds was still closely integrated with counterparties in the core banking system. These links were enhanced by proprietary trading by the commercial banks, and by the “warehousing” of securitised mortgages.

commercial and investment banks  $\Leftrightarrow$  rating agency  $\Leftrightarrow$  SPV  $\Leftrightarrow$  final investors (see Alexander et al. 2007).

Historically, financial innovation has been fundamental to the ability of financial institutions to acquire purchasing power by growing their liabilities and hence growing liquidity. Changes to the structure of the financial markets, and the inter-relationships between changing financial institutions and monetary policy, have presented a challenge to the development of monetary theory, and have been a fertile source of controversy.

In this lecture I will attempt to clarify exactly what is liquidity, what constitutes a liquid market, how liquidity expands and contracts, and relationship between liquidity and monetary and financial policy. We shall find that liquid market is a market in which both “adjective” liquidity and “noun” liquidity are in evidence, and that financial innovation is the driving force behind the expansion of liquidity.

## **LIQUIDITY AND SYSTEMIC RISKS**

In the past three decades innovations in data analysis capability, in statistical theory and in the theory of finance have transformed risk management, pricing, the range of financial products, and so have transformed the liquidity of financial markets.

Efficient risk-management by firms is a fundamental component of competitive success in today’s financial markets. It also makes an important contribution to general market stability—in normal times. However, in the face of extreme events (even “moderately” extreme events) rational risk-management by individual firms may precipitate a macro-economic reaction that is destabilising, can place those firms in jeopardy, and result in a general welfare loss.<sup>4</sup>

The classic example is a bank run. A depositor at a particular bank would be willing to leave funds on deposit, but believes that other depositors are likely to react to an adverse event by withdrawing their funds, forcing the bank to call in loans or sell securities and suffer losses,

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<sup>4</sup> Note that an “extreme event” is not the same thing as a “rare event” and certainly not the same thing as a totally unexpected event or “black swan” (Taleb 2007). Financial crises are part of the DNA of the financial system, and, far from being rare or “totally unexpected,” they occur regularly.

perhaps even suspending payments. Consequently, a rational investor will seek to be the first to withdraw funds at the first sign of serious trouble. Hence all withdraw their funds as rapidly as possible when there are adverse developments resulting in a “run.” A run on one particular bank necessarily effects the perception of the liquidity of other banks and the run spreads to other, nominally solvent, banks.<sup>5</sup> More formally, whilst a depositor may be certain about the probability of suffering a liquidity shock, the depositor cannot be certain about the probability that his or her shock will occur early or late relative to others. In other words, the depositor cannot be sure where they will be in the queue to withdraw funds. The result is the rush to withdraw (Caballero and Krishnamurthy 2006, p.8).

However, in recent decades the structure of financial markets has changed, shifting from a bank-based to a market-based financial system (Hendricks, Kambhu and Mosser 2006) with banking now following an *Originate, Rate and Relocate* model. Financial intermediation has moved from banks into markets, and as a consequence of this disintermediation, financial crises are now manifest in markets rather than institutions. Accordingly analytical interest has moved from bank runs to “market gridlock” as a source of systemic risk.<sup>6</sup> A market oriented systemic crisis is a breakdown in the functioning of markets for traded assets. It may be triggered, for example, by a sharp decline in the price of one asset that sparks a widespread sell-off in the general rush for liquidity. Again, in more formal terms, the individual agent knows the probability of a shock, but does not know the probability of being able to trade with the market counterparties on whom his or her liquidity depends. Not knowing, and being averse to uncertainty, the agent, and all other agents, has a collective bias toward liquidity (Caballero and Krishnamurthy 2006, p.15). The collective rush for liquidity produces the market gridlock characteristic of market based systemic crises. It is important to note that a relatively small event

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<sup>5</sup> Before the introduction of deposit insurance in the twentieth century, bank runs were common in Europe, the UK and the US. In the late nineteenth century there were approximately one major bank run every decade. During the National Banking Era in the United States (1863-1914), there were five major bank runs: 1873, 1884, 1890, 1893, and 1907.

<sup>6</sup> The crises at IKB and at Northern Rock are examples of market gridlock, not of a bank run. In the case of Northern Rock the bank run was not a *cause* of Northern Rock’s difficulties, but a *result* of the crisis and of the preliminary response of the authorities.

can produce this gridlock in very large markets. The market for sub-prime mortgages was a relatively small part of the credit market. Yet failure in that sector has precipitated a total gridlock.

## **EXTERNALITIES AND THE MACROECONOMICS OF SYSTEMIC RISK**

Financial risk-taking is a concern of public policy because associated with the risk-taking actions of individuals there are externalities; i.e. costs and benefits accruing to the society that are *external* to the calculations of the individual investor, and not accounted for in the market place.<sup>7</sup> A major financial failure imposes costs on society going far beyond the losses suffered by the immediate investors. In an economy where there are important externalities, competitive markets will be socially inefficient. The task of public policy, in this case of financial regulation, is to attempt to mitigate these market failures (without creating new ones).

Financial externalities are particularly potent because they are transmitted *macroeconomically*. Financial markets are markets for stocks of current and future assets, the value of which today is dependent on the expectation of their future value. To the extent that expectations are shared any factor that leads to a general shift in expected future values will have an immediate impact on financial markets, and on the major macro-financial variables, such as the interest rate and the exchange rate. So the failure of a single firm can, by influencing expectations, have an influence not only on its immediate counterparties, or even just on firms dealing in similar products, but also, through its impact on expectations, on financial markets as a whole, and then via the interest rate or the exchange rate, the contagion may spread to the whole economy.

Yet despite the presence of externalities and potential contagion, a peculiarity of market expectations is that they can be remarkably stable (or tranquil) for substantial periods of time, even when underlying real circumstances might be decidedly unpropitious. Periods of

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<sup>7</sup> There are a number of other important market failures in the financial sector which attract the concerns of public policy, most notably the asymmetry of information between individual savers and market professionals that is the motivation of consumer protection legislation. This lecture deals solely with the market failure manifest in systemic risk, and the implications for risk management by the authorities.



tranquillity defined by stable expectations and stable market confidence may sustain the illusion that, despite evidence to the contrary, financial markets are truly reflecting a strong and balanced real economy. The shattering of that illusion can be catastrophic. In consequence, the financial markets can resemble the cartoon character who, having run off the edge of the cliff remains suspended for some time in mid-air, with no visible (or rational) means of support, before suddenly plunging into the abyss.

One of the tasks of financial regulation is to keep markets away from the cliff edge, and when they rush over, to ensure that the damage to the economy as a whole is minimised.

### **THE ANALYSIS OF LIQUIDITY (ADJECTIVE)**

If markets are to be liquid and reasonably stable then, as Avinash Persaud has emphasised (Persaud 2000, 2003) it is not enough that markets should be large, it is also a fundamental requirement that they should be characterised by a wide range of participants with heterogeneous objectives and methods *and* with confident expectations that markets will be relatively stable. A market is liquid when buyers are broadly balanced by sellers. Markets become illiquid when actions become homogeneous—especially when everyone wants to sell.

A number of factors contribute to the relative heterogeneity of actors in financial markets:

*First*, individual investors and traders must be highly heterogeneous with regards to their objectives, risk preferences, time horizons, market valuations, structures and infrastructures. In economics this was traditionally described as the difference between those seeking income certainty and those seeking wealth certainty, with the implied different patterns of risk aversion, time horizons and so on (Robinson 1951).

*Second*, investors may have differing access to information, so even if their goals might be the same they will behave differently.

*Third*, when the general opinion is that markets are stable, then stability becomes a convention. Convention (meaning belief in stability) is vital in financial markets, because convention *creates* and *sustains* heterogeneity. This power of stable expectations should not be

underestimated—by defining the *expected* range of movements in asset prices it fixes (at least for a while) the *actual* range of fluctuations in current asset prices. But of course once convention is breached, then the flood will follow.<sup>8</sup>

*Fourth*, investors may be forced, by government regulation, into segmented markets—where heterogeneity is effectively imposed by the authorities. For example, the UK mortgage, insurance and cash deposit markets used to be legally separated. Part of this separation was achieved through non-price mechanisms such as credit rationing and queuing as was common in the hire purchase and mortgage markets in Europe. Similarly the Glass-Steagall Act (1932) segmented US financial markets. Exchange and capital account controls segmented national financial markets.

Taking these four dimensions as a starting point it is clear that the liberalisation and hence internationalisation of financial markets that has taken place over the past three decades has inevitably reduced heterogeneity in financial markets.

By definition liberalisation and internationalisation have broken down market segmentation—allowing cross-market correlations to rise sharply at times, in a way that would not have been possible before.

And with liberalisation has come a growing professionalisation of financial management (BIS 1998, chpt.V), and extensive conglomeration of financial institutions (Group of Ten 2001; IMF 2004a, 2004b). Most investments are now managed by mutual funds, pension funds, insurance companies and so on; and these funds are themselves locked into sophisticated wholesale money markets, securitising and packaging and hence homogenising funds from previously segmented markets. Professionalisation has reduced the heterogeneity of investor preferences as expressed in the marketplace. The professional investor is subject to a continual

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<sup>8</sup> The most powerful convention of all is that imposed by governments. When the exchange rates of the future Eurozone currencies were declared prior to being irrevocably fixed on 1<sup>st</sup> January 1999, the markets rapidly converged on those rates.

competitive pressure to maximise (short-term)<sup>9</sup> returns, and is constrained by the well-known institutional dilemma that “it is better for reputation to fail conventionally than to succeed unconventionally” (Keynes 1936, p158). So whatever the preferences of the private investor might be, convergence on “professional” or “conventional” strategies by institutional investors are homogenising the market. And with professional investment go professional information services—both in sources and processing—again making for a more homogeneous environment.

Conglomeration is clearly a major homogenising force too. As conglomeration proceeds risk management procedures acquire common characteristics throughout the financial sector, whether in banking, securities, fund management or insurance. Where once management techniques were sector specific, they are now becoming firm specific, applied across all sectors of the firm’s activities.

In addition, increased Credit Risk Transfer (through credit derivatives and other forms of securitisation), may also be a homogenising force. In principle risk transfer can enhance the heterogeneity of risk bearing, transferring risks from those without an adequate capacity for it to those who do. But risk transfers do not necessarily do this and a number of questions arise: Has risk been better spread or has it been concentrated, either through a small number of intermediaries or through a large number of investors with homogeneous behaviour? Has risk been transferred to those institutions with a greater capacity for bearing the risk in question, or merely those with a greater appetite for risk premia? When a risk erupts has the transfer of risk made it easier or harder for central banks to mitigate the wider, systemic, impact? How does the CRT change the risk-taking, risk-absorption and risk monitoring capacity of both buyers and sellers of risk? These questions are as yet unresolved, with only tentative answers on offer (see also Bank of England 2001; FSA 2002; IAIS 2004; BIS 2004; BCBS 2004; Wagner and Marsh

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<sup>9</sup> “... there is a peculiar zest in making money quickly, and remoter gains are discounted by the average man at a very high rate.....It is the long-term investor ... who will in practice come in for most criticism, wherever investment funds are managed by committees or boards or banks” (Keynes 1936, p.157).

2004). However, what does seem clear is that risk transfers were a powerful homogenising force across financial institutions.<sup>10</sup>

### ***Regulation and Homogeneity***

Financial sector regulators are tending to reinforce the homogenising process. The most important reaction to the recurring crises that have followed the process of liberalisation since the 1970s has been the development of international regulatory standards and procedures. In this context the IMF-World Bank Financial Sector Assessment Program (FSAP) is of particular note since it locates regulation within a treaty framework under Article IV of the IMF Articles of Association. FSAP surveillance concentrates on the adherence of national regulation and practices to core principles developed by the Basel Committee, together with the International Organisation of Securities Commissions (IOSCO) and the International Association of Insurance Supervisors (see IMF 2004a, 2004b). But it is in the principles underlying Basel 2 that the most important intellectual foundations of the new international financial architecture are revealed.

These principles are expressed through the three pillars of Basel 2: Pillar One—the determination of regulatory capital now heavily weighted toward use of banks’ internal risk weighting models, as well as the views of rating agencies; Pillar Two—supervision; and Pillar Three—market discipline enforced by greater disclosure of banks’ financial status as well as their internal risk management procedures.

What is particularly noticeable is the emphasis on the role of firms’ own risk management procedures and on market discipline. A rather odd way to confront systemic risk, which is by definition an externality that internal procedures do not encompass and is not accounted for in the market place.

But perhaps of even greater importance is that Pillar One and Pillar Three will tend to increase the homogeneity of financial markets.

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<sup>10</sup> ‘With higher activity in risk transfer markets, financial market participants with traditional business lines could assume completely different roles as “virtual insurers” or “virtual bankers”’ (OECD 2002, p.2).

*First*, there is the emphasis on the use of firms' internal risk management systems, systems that are by definition, market sensitive. Whilst firms' models may differ in detail, they are constructed on similar analytical principles, estimated on similar historical data, and sensitive to the same market information.

Modern risk management practices will result in firms holding a portfolio of assets that exhibit in quiet times high expected returns, low price volatility and low price correlation with other instruments and assets. The composition of the set of assets that exhibit these characteristics will therefore be common to many investors. Suppose however that the volatility of a given asset rises sharply. The rise in volatility will cause the risk models to signal that a reduction in risk is required and best achieved by selling those assets where volatility has recently risen. As all those investors who share similar assets try to sell the same assets at the same time, volatility will rise further, spilling over to other instruments, leading to a rise in correlation, causing risk models to signal that further selling is required. Previously uncorrelated assets are now correlated in the general sell-off, enhanced by the model driven behaviour of other institutions caught up in the contagion.<sup>11</sup> The attempt to reduce risk augments its rise. Whilst in normal times such models may encompass a wide range of behaviour, in extreme circumstances the models will encourage firms to act as a herd, charging toward the cliff edge together (Persaud 2000).

*Second*, the emphasis on disclosure reduces the diversity of information that has in the past created diversity of views. Today information is ever more readily available, and disclosure of price sensitive information is legally required before it can be traded upon. Insider dealing on private information is, rightly, characterised as market abuse. But the attainment of equal information is bought at a cost—increased homogeneity and hence potentially reduced liquidity.

In the light of the enforcement of greater homogeneity by Pillars One and Three, considerable weight is placed on Pillar Two (enhanced supervision) to inhibit the behaviour that generates systemic risk. Unfortunately it is not at all clear that an essentially subjective, personal

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<sup>11</sup> The change in correlation is a market manifestation of what the individual agent cannot know prior to an "abnormal" event.

interaction between bureaucrat and risk taker can be either consistent or effective, particularly on an international scale (Ward 2002; IMF 2004a).

The drive toward homogeneity is not confined to the Basel 2 banking proposals. Regulators are responding to the creation of seamless financial markets, spanning banks, securities firms, insurance companies, pension funds, and so on, by requiring that they all follow the same regulatory regime. For example, in considering the relationship between banking and insurance, Sir Howard Davies, then Chairman of the UK Financial Services Authority argued “Our general view is that the capital treatment should in principle be the same, where the risks are the same” (Davies 2002). The homogenising pressure exerted by the regulators was evident in the UK Financial Services Authority’s Consultation Paper 142 on *Operational risk systems and controls* (which enunciates policies that apply to all regulated firms) and is a defining theme of the Capital Requirements Directive and the Market in Financial Instruments Directive.

More generally, the Financial Stability Forum report on “Enhancing Market and Institutional Resilience” (2008), whilst recommending a number of detailed specific measures, had at its core the familiar homogeneity-enhancing trio of greater transparency, more disclosure, and yet more rigorous risk management by firms.

### ***Strategic Behaviour***

To the increased homogenisation of financial markets must be added a further, potentially yet more destabilising phenomenon: strategic behaviour by market participants.

The essence of strategic behaviour in financial markets was captured by Keynes in his famous analogy of a “beauty contest.” In Keynes’s contest beauty is not in the eye of the beholder. Instead, the game is won by those who can accurately assess what others think is beautiful. In financial markets, it is knowing what others believe to be true that is the key to knowing how markets will behave. The market is driven by participants’ belief about what average opinion believes average opinion believes . . . . and so on (Keynes 1936, chpt.12; Eatwell and Taylor 2000, chpts.1 and 3; Morris and Shin 2002).

Such strategic behaviour is notable by its absence from the predominant models of asset pricing, whether Black-Scholes or later variations on the theme. In these models the individual agent is portrayed as an independent atom, unheeding of the actions of others. Once strategic behaviour is taken into account, then, even in quite simple models, prices can be shown to deviate systematically from what might be deemed to be competitive market prices (Persaud 2003). Bubbles are generated by the same behaviour (Allen, Morris, and Shin 2006).

It is not hard to see that homogenisation will interact with and encourage strategic behaviour. As markets become more homogeneous agents will become increasingly aware of the interdependence of their actions. The changing character of financial markets has resulted in greater homogenisation, and a greater tendency toward strategic behaviour, especially in the face of extreme events.

#### **FINANCIAL STRUCTURE AND THE EXPANSION OF LIQUIDITY (NOUN)**

A very simple monetary structure (perhaps representative of the early stages of the development of market economies, or of some developing countries today) is presented in Table 1.

In normal times (one historically significant sort of “abnormality” is considered below), the only private assets are the value of tangible capital  $p_k K$  with  $K$  as the existing stock at historical or replacement cost and  $p_k$  as its asset price. “Money” (broadly construed)  $Z$  is the sole liability of the banking system.<sup>12</sup> There is no significant market in bonds, so private holdings of government securities are negligible. On the liability side, private business may borrow  $L_p$  from the banks. Loans from abroad are negligible and both private housing and the value of equity outstanding are effectively non-traded.

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<sup>12</sup> As is often the case in macroeconomic modelling, bank equity held as an asset by the private sector is omitted from the table. It is introduced and discussed in connection with financial regulation below.

**Table 1. Stage One**

Sector Assets	Private	Banks	Government	RoW	- Real Assets	$\Sigma$
Tangible capital	+ $p_k \cdot K$				- $p_k \cdot K$	0
Govt. Bonds		+ $B_b$	- $B$		0	0
Loans	- $L_p$	+ $L$			0	0
Foreign reserves		+ $e \cdot F^*$		- $e \cdot F^*$	0	0
“Money”	+ $Z$	- $Z$			0	0
- Net worth	- $NW_p$	0	+ $\Gamma$	+ $e \cdot F^*$	+ $p_k \cdot K$	0
$\Sigma$	0	0	0	0	0	0

The system’s assets are loans (at this stage only  $L_p$  to the private sector), bonds  $B_b$  which the government has placed with the banks, and international reserves of the central bank  $eF^*$  with  $F^*$  as the value of reserves in foreign currency and  $e$  as the exchange rate (units of local currency per unit of foreign currency). The sum of bank assets determines the money supply  $Z$ . The government’s total borrowing, which at this stage is only from the banking system, is  $B = B_b$ . The corresponding asset is the “full faith and credit” of the State,  $\Gamma$ .

Table 1 is a matrix that describes the interlocking system of balance sheets within the economy. Symbols with a plus sign describe assets and negative signs indicate liabilities. The sum of each row must be zero since (a) every financial asset of a given sector is a liability of another one and (b) there is a column allowing every real asset to appear as a double entry. The last row presents the sum of each column—zero other than the final entry representing national net worth. The entries in this Table 1 represent values of *stocks* of assets. They change in two ways. One is through flow accumulation or decumulation over time. The other is the capital



gains and losses consequent upon changes in asset prices  $p_k$  or  $e$ . For the private sector, liquidity takes the form of one *asset*, namely money. Nothing else is at hand.<sup>13</sup>

The accounting framework just sketched puts strict limitations on policy options. Suppose that money demand is described by the equation of exchange  $Zv = PX$  with  $P$  the price level,  $X$  output, and  $v$  the velocity of circulation of money. If  $X$  is set by “full employment” as determined by the Walrasian equations of exchange,  $P$  comes from an inflation forecast or target, and  $v$  is determined “institutionally,” then money demand must follow. This is in accordance with the basic closed economy monetarist inflation model, set out by Wicksell (1935) and developed by Friedman (1968). A higher fiscal deficit,  $B$ , is “monetised” because the government cannot easily place debt obligations other than with the banks. The resulting increase in  $Z$  forces  $P$  up.

If loans  $L_p$  to the private sector are set by needs of production, the sum of bank loans to the government and international reserves is determined from the consolidated banking system’s balance sheet:  $B_b + eF^* = Z - L_p$ . If reserves are targeted to increase as the current account improves, then government debt  $B_b$  must fall via a larger fiscal surplus. This is the basis of the “twin” fiscal/foreign deficits that have been at the heart of IMF financial programming for more than half-a-century.

Because liquidity in many economies now comprises a spectrum of financial assets and liabilities far wider than just money, such monetarist inflation models are anachronistic. However, the inflation in Zimbabwe that took off in the mid-2000s can be interpreted along these monetarist lines (including the fact that money creation was mostly in the form of cash).

Even in this simple structure financial manias can appear. One familiar scenario is based on government assets that have been privatised and sold through a dealer to the public.<sup>14</sup> If the

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<sup>13</sup> To limit the number of symbols in the balance sheets, government liabilities to the private sector in the form of coin and currency are omitted from the present discussion. They were key components of the rich countries’ financial systems well into the 19<sup>th</sup> century and remain important in many developing economies today.

<sup>14</sup> The “assets” might be claims on hypothetical future revenue streams (the South Sea and Mississippi examples) or equity of former state enterprises.

dealer happens to have a captive bank at his disposal, he can lend money to himself to bid up the share price leading to a capital gain (or on-going inflation). Others may then start borrowing from the captive and other banks to try to buy shares, setting off a boom that ends inevitably in a crash. Famous examples are the Mississippi and South Sea crises early in the 18<sup>th</sup> century, in which John Law’s Banque Générale in Paris and the Swordblade Bank in London issued the loans. These examples illustrate what was to become a recurring theme in financial instability. Capital gains are financed by liquidity in the form of *liabilities* assumed by financial actors to buy the appreciating assets. Many possibilities along these lines exist in more complicated financial systems.

**Table 2. Stage Two**

<b>Assets \ Sector</b>	<b>Private</b>	<b>Banks</b>	<b>Government</b>	<b>RoW</b>	<b>- Real Assets</b>	<b>Σ</b>
Tangible capital	+ $p_k \cdot K$				- $p_k \cdot K$	0
Govt. Bonds	+ $B_p$	+ $B_b$	- $B$		0	0
Loans	- $L_p$	+ $L$			0	0
Foreign reserves		+ $e \cdot F^*$		- $e \cdot F^*$	0	0
“Money”	+ $Z$	- $Z$			0	0
- Net worth	- $NW_p$	0	+ $\Gamma$	+ $e \cdot F^*$	+ $p_k \cdot K$	0
Σ	0	0	0	0	0	0

In Table 2 the model is extended by incorporating a domestic market in government debt. The banks and the non-bank private sector now have substantial holdings of government bonds ( $B_b$  and  $B_p$  respectively). Keynes (1936) thought in terms of this sort of financial system, with the significant extension of having markets in corporate debt instruments as well. Primary liquidity is still money. Keynesian ideas about liquidity preference come into play, with the interest rate mediating portfolio choices between more liquid money and less liquid bonds (with government bonds being more liquid than corporates, which are subject to interest rate spreads associated with both liquidity and solvency risks). Financial instability takes the form of shifts in liquidity

preference, mixed with over-borrowing (high leverage), such shifts provide the foundation for Minsky’s “financial instability hypothesis” (Minsky 1975).

The potential for the use of liabilities as a source of liquidity is expanded in Table 3 (the foreign sector is dropped to simplify the exposition). A local market for equity issued by the private sector can provide the dynamic. In the Table the value of private sector shares outstanding is  $p_v V$  with  $p_v$  as a price index and  $V$  a measure of outstanding volume.<sup>15</sup> The use of liabilities (and derivatives built around them) as sources of liquidity is illustrated in the Table’s “Finance” sector that holds shares  $p_v V_f$  financed by borrowing from banks and abroad. The sector’s net worth is  $NW_f$ , held by the private sector as an asset. Within the Financial Sector, there are offsetting asset and liability entries  $R$ . Individual financial actors such as broker-dealers and hedge funds can borrow from one another but for their “leveraged” subsystem as a whole many of these transactions will be mutually offsetting.<sup>16</sup> By increasing transactions  $R$ , financial institutions can add to cash flow as they build up their leverage ratios  $(p_v V_f + R)/NW_f$ . The liabilities  $(L_f + R + eL^*_f)$  underlying total assets  $(p_v V_f + R)$  can support imposing structures of leverage and liquidity.<sup>17</sup> So long as  $p_v$  continues to rise, for example, then growing intra-financial sector claims make it possible to mobilise large sums of liquidity to buy stock. This is exactly how the repo and reverse repo markets have worked to the size of balance sheets in the finance sector.

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<sup>15</sup> For the private non-financial sector, Table 4 follows the accounting convention of the flow of funds by treating equity outstanding as a “liability” and allowing non-zero net worth. So, for example, in flow of funds terms Google has highly negative net worth because its stock market valuation vastly exceeds its tangible capital and financial assets. On a balance sheet set up to follow accountants’ conventions, Google like all other corporations would have zero net worth.

<sup>16</sup> In available US flow of funds data they do not offset completely—leveraged financial institutions typically have negative *net* positions in fed funds and security repurchase (repo) agreements (see Table 4). *Gross* repo asset and liability positions are not reported.

<sup>17</sup> In the US at the end of 2007, leverage for households was around 1.2, for commercial banks it was about 10, and for investment banks it was over 30.

**Table 3. Stage Three**

Assets \ Sector	Private	Banks	Finance	Government	- Real Assets	$\Sigma$
Tangible capital	+ $p_k \cdot K$				- $p_k \cdot K$	0
Govt. Bonds	+ $B_p$	+ $B_b$		- $B$	0	0
Loans	- $L_p$	+ $L$	- $L_f$		0	0
Repos			+/- $R$		0	0
Equities	- $p_v \cdot V$		+ $p_v \cdot V_f$		0	0
“Money”	+ $Z$	- $Z$			0	0
- Net Worth (financial sector)	+ $NW_f$		- $NW_f$		0	0
- Net worth (others)	- $NW_p$	0	0	+ $\Gamma$	+ $p_k \cdot K$	0
$\Sigma$	0	0	0	0	0	0

The use of repos and reverse repos by financial institutions as a source of liquidity was analysed by Minsky (1957), who demonstrated that the tight US monetary policy of the mid-50’s led government bond houses to develop repurchase agreements in order to finance the expansion of their balance sheets, despite the rise in short-term interest rates.<sup>18</sup> Repos can be depicted as a financial innovation which makes “idle” liquidity circulate: for instance repos can allow a financial institution to obtain funds from another financial institution whose lending capacity has not reached its regulatory maximum. In addition, repos can result in an increase in the velocity of

<sup>18</sup> “...if the institutional framework is stable, a tight monetary policy will be effective and the interest rate will rise to whatever extent is necessary in order to restrict the demand for financing to the essentially inelastic supply. However, the rise in interest rates feeds back upon the institutional framework. With rising interest rates the incentives to find new ways to finance operations and new substitutes for cash assets increase. ... Hence there is a favourable environment for financial innovations. Since the significant institutional innovations during a period of monetary policy will be those which tend to increase velocity, they can be represented as shifting the [supply of money]-interest rate relation to the right” (Minsky 1957, p.182).

circulation by shortening the time intervals between overlapping transactions and so increases the liquidity of the economy.<sup>19</sup>

Nowadays, apart from repos, the potential expansion of liquidity has been further enhanced by the development of asset securitisation (Table 4). Suppose that as well as capital the private sector holds a tangible asset, residential housing  $H$ , with price  $p_h$ . It borrows  $M$  (mortgages) from banks, using  $p_h H$  as collateral. The banks in turn bundle the mortgages into a security  $S$  with price  $p_s$  that is then sold on to other financial actors. This makes it possible to borrow large sums and increase leverage by increasing claims on the non-financial sector. It is also another potential collateral for repo or short-term commercial paper borrowing.

**Table 4. Securitisation**

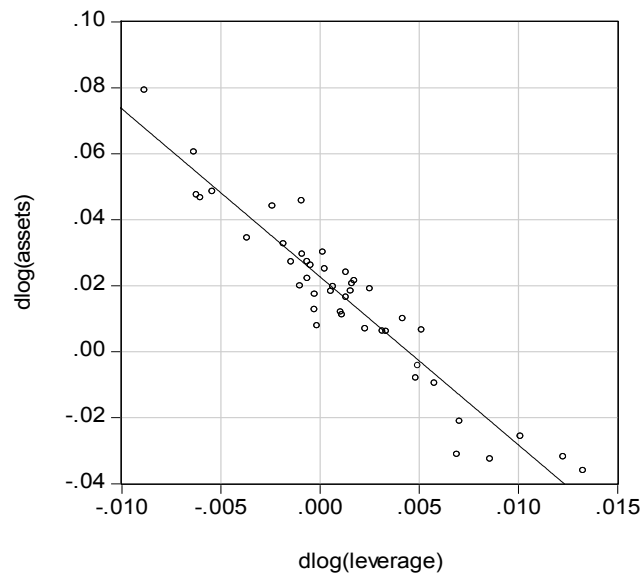
Assets \ Sector	Private	Banks	Finance	Government	- Real Assets	$\Sigma$
Tangible capital	+ $p_k \cdot K$				- $p_k \cdot K$	0
Real estate	+ $p_h \cdot H$				- $p_h \cdot H$	0
Govt. Bonds	+ $B_p$	+ $B_b$		- $B$	0	0
Loans	- $L_p$	+ $L$	- $L_f$		0	0
Mortgages	- $M$	+ $M_b$			0	0
MBS		- $p_s \cdot S$	+ $p_s \cdot S$		0	0
Repos			+/- $R$		0	0
Equities	- $p_v \cdot V$		+ $p_f \cdot V_f$		0	0
“Money”	+ $Z$	- $Z$			0	0
- Net Worth (financial sector)	+ $NW_f$		- $NW_f$		0	0
- Net worth (others)	- $NW_p$	0	0	+ $\Gamma$	+ $p_k \cdot K$ + $p_h \cdot H$	0
$\Sigma$	0	0	0	0	0	0

<sup>19</sup> Suppose initial repo contracts are for two weeks. Then after receiving liquid funds the issuer can buy a further asset, using that asset as collateral in a second repo to raise the funds to conclude (or roll over) the first contract. The original asset may then be used to raise funds to settle (or roll over) the second contract, and so on. The average length of a repo contract is now one week and the velocity of circulation has doubled, as has the liquidity generated by the repo contracts. As the average length of repo contracts shortens the velocity of circulation accelerates.

The combination of securitisation and the growth of the repo market have greatly expanded the potential for the growth of liquidity by the expansion of the balance sheets of financial intermediaries. Indeed, Adrian and Shin (2008, p.12) have argued that not only are repos and reverse repos important financing activities for investment banks, but that “the margin of adjustment in the expansion and contraction of balance sheets is through repos and reverse repos.”

Given that liquidity is defined as “the growth of the balance sheets of financial intermediaries” it is instructive to examine the composition of balance sheet growth in different sectors of the economy (see Adrian and Shin 2007). In the household sector the growth of assets is associated with a decline in leverage (Figure 1). Amongst commercial banks there is a very weak relationship between the growth of assets and the growth of leverage (hardly surprising since capital ratios in commercial banks are regulated).

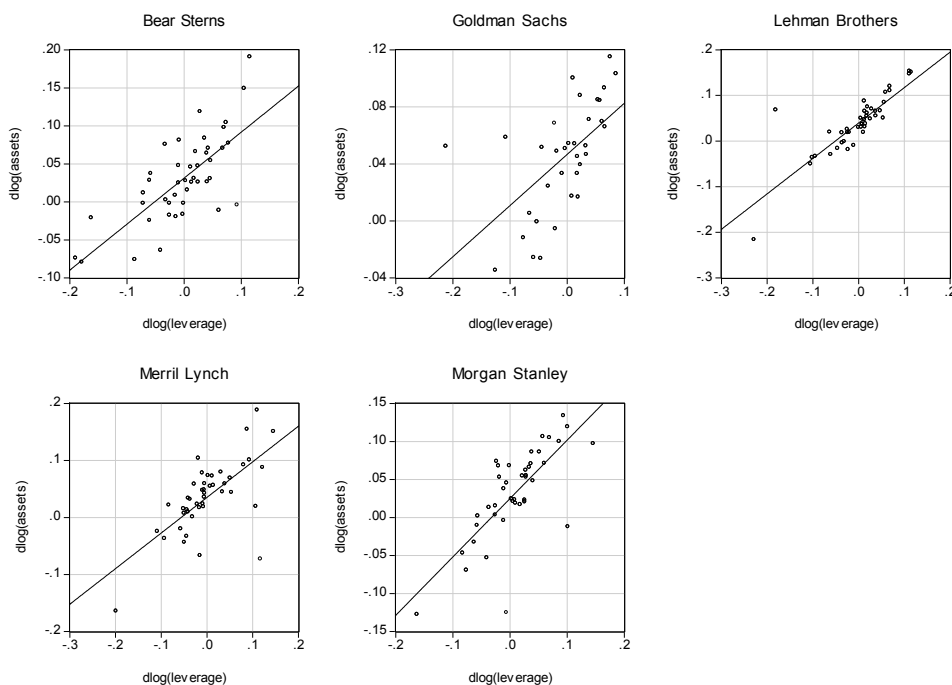
**Figure 1. Assets and Leverage Growth Rates of Households**



*Source:* Federal Reserve.

However, in the case of the investment banks there was a strong positive relationship between the growth of assets and the growth of leverage (Figure 2). In other words as asset values increased the investment banks increased their leverage, further bidding up asset values. The system also worked in reverse. When asset values fell sharply in 1998 following the LTCM crisis, the investment banks cut leverage sharply, precipitating further falls in asset prices and adding a further twist to the vicious downward spiral.

**Figure 2. Assets and Leverage Growth Rates of Five Investment Banks**

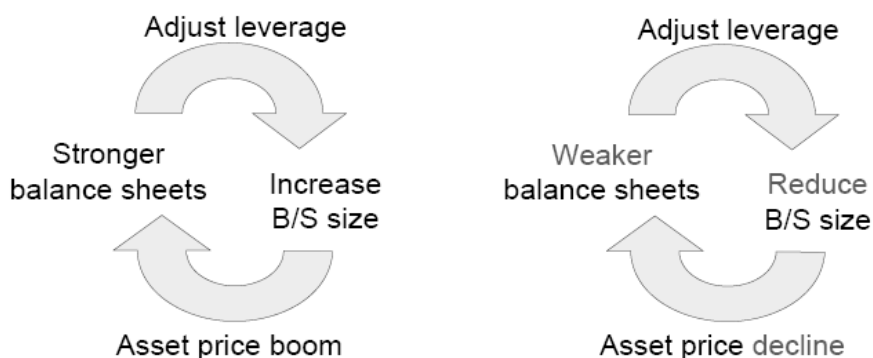


Source: Securities Exchange Commission, Adrian and Shin (2007).

The result of the growth of leverage was a powerful upward spiral. As asset prices rose leverage rose *increasing the demand for assets*. So rising prices stimulated further price rises – a classic bubble. But when the bubble burst, the powerful mechanism went into reverse, with falling prices leading to deleveraging resulting in further price falls. Moreover, the short-term

funding through the repo market and the commercial paper market dried up, forcing firms to deleverage further (Figure 3).

**Figure 3. Vicious Cycles**



*Source: Adrian and Shin (2007).*

The collapse of Lehman Brothers added a powerful twist to the downward spiral. The very large number of OTC contracts and repo contracts frozen in the failed firm, resulted not only in serious losses, but also a major collapse of market confidence.

### **“THE INNOVATION THAT FAILED”: THE ORIGINATE, RATE AND RELOCATE MODEL OF BANKING**

Regulatory incentives played an important role in the evolution of the credit crunch. In early 2007, according to the regulatory-prescribed models of their “riskiness,” banks had a safe buffer



above their capital requirements.<sup>20</sup> In some systemically important banks, this has since diminished dramatically.<sup>21</sup> One of the recent puzzles of banking was the contrast between the risky activities they were increasingly associated with, such as prime-brokerage and credit derivatives, and the increasingly healthy ratio of their regulatory capital to risk that they reported. Banking appeared riskier, but capital ratios declared them safe. In the run up to the credit crunch, this apparent safety encouraged banks to do more of the same: to originate more debt with the intention of relocating it. It also made regulators generally comfortable that they were doing so.

Many bank regulators portrayed the rapid growth of securitisation as a welcome way of bankers spreading risks more evenly.<sup>22</sup> Regulatory-prescribed risk models, such as those embedded in the EU Capital Requirements Directive (CRD), not only failed to provide an early warning signal, they signalled the all clear. Moreover, they contributed to the homogenising of financial participants behaviour that significantly worsened the crisis.

Moreover, recent experience casts doubt on the efficacy of markets as a means of “disciplining” financial institutions. Market discipline is a critical component of pillar three of Basel 2. But prior to the collapse of Northern Rock, the UK stock market “rewarded” its management and praised its risk management strategy.<sup>23</sup> Elsewhere any bank with a high degree of capital that was not showing a competitive growth in earnings would have been considered by stock markets to be wasting shareholders capital. They would have paid a stock market penalty that, through share-ownership incentives, would have hit the pockets of their management. This

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<sup>20</sup> At the end of 2006, the ratio of regulatory capital to risk-weighted assets at the end of 2006 was 13 percent in the US, 12.9 percent in the UK, 12.2 percent in Germany, 10.7 percent in Italy, significantly above the 8.0 percent minimum.

<sup>21</sup> In the third quarter of 2007, Citigroup reported that its Tier 1 capital fell below its 7.5 percent target, below the 8.0 percent standard of Basel 1 and close to its 6.0 percent regulatory minimum.

<sup>22</sup> For example, as late as November 23, 2007, Mr. Patrick Neary, Chief Executive of the Irish Financial Services Regulatory Authority said “All of us would probably agree that the spreading of risk via new and sophisticated financial techniques and instruments is, in principle, positive for the financial system, insofar as it reduces the likelihood that such risk would be concentrated in one or more financial institutions.”

<sup>23</sup> A little over 12 months before its collapse, on 31 March 2006, Northern Rock’s shares hit a price-earnings ratio high of 17.78, significantly ahead of its peer group that averaged a price-earnings ratio of around 11.5 in 2006.

was what Chuck Prince, then CEO of Citigroup was intimating when he commented, notoriously, on July 10, 2007, “When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you’ve got to get up and dance. We’re still dancing”. Just as Mr. Prince was taking time out from dancing to make his comments, the music stopped.<sup>24</sup>

While the music was playing, banks were incentivised by bank regulation to earn fees for originating debt and for relocating the debt elsewhere. As a result of capital adequacy requirements the cost of keeping a loan on the balance sheet made banks uncompetitive providers of capital to the most credit worthy borrowers, especially when liquidity was high, non-banks were providing cheap consumer debt (e.g., auto loans) and the bank’s best clients could go straight to the capital markets.

It is often said that investors were to blame for not knowing what they were buying, and more investor knowledge, transparency and disclosure —the perennial response to all crises— will solve the problem. To an extent, this reflects a misunderstanding of the nature of the market for securitised bank loans and other debt instruments. It is a market where investors, almost by definition, know less detail than normal of the instruments they own.

A stylistic characterisation of modern banking is that borrowers who can go directly to investors do so, as it is cheaper. Hence the bank loan books of today generally represent borrowers or instruments to which investors do not want direct exposure. The borrower may be small or an infrequent borrower, the borrower’s business may be hard for investors to understand or monitor or maybe the risks are just too great. Loans also carry interest rate and liquidity risks as well as credit risks. To attract investors, banks have to persuade them, with some reasonableness, that a portfolio of idiosyncratic credit risks will yield substantial diversification benefits: lower risk for a given yield (or equivalently, higher yields for a given risk). This is why the rating agencies are so important to structured finance.

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<sup>24</sup> It stopped for Mr. Prince on November 2, 2007 when he was released from his position of CEO of Citibank.

Investors using statistical models to optimise the risk and return of their credit portfolios find these credit instruments highly attractive. They provide an attractive yield, not just because of the diversification of credit risks, but because they offer a liquidity premium—a higher return because they are illiquid, a premium paid on assets that are not liquid and therefore should only attract those investors who do not need liquidity.

Up to two years ago they represented an ideal investment for German Landesbanks who enjoyed a State guarantee that virtually ensured that they would have fail-safe access to liquidity. Landesbanks were therefore incentivised through the guarantee to seek out investments that offered an extra liquidity premium in their choice of assets like private equity and CDOs. However, two years ago the European Commission, in the interests of fostering fairer competition, removed these credit guarantees. This was the right thing to do from a competition perspective and inevitably it introduced a risk to the existing asset holdings of the Landesbanks that had not been there originally—the risk that access to liquidity would be denied. This was a risk that was not in the living memory of the Landesbanks' managements and according to statistical models of the past five years, was a very low risk. At the same time these illiquid credit instruments assets were delivering good returns while the removal of the guarantee was hurting margins. These returns would have been largely lost if the funding for these assets was maturity matched to the asset (i.e., funding ten year assets by raising a ten year loan). Armed with their risk-sensitive models for assurance, the Landesbanks held on.

Other buyers who were incentivised to buy these assets were investors not required to observe capital adequacy or solvency requirements for owning illiquid loans: investors who were acting like banks and insurance companies but without the regulatory requirements. No one was more aware of this than banks themselves and they often organised investors into SIVs that owned the assets and leveraged the funding through short-term debt. Like any bank, SIVs had an inherent liquidity problem in that they were buying illiquid long-term assets using short-term borrowing and so to allay the fears of investors and rating agencies, the banks often provided a liquidity “backstop.” According to the bank's risk-sensitive models, measured over a period of calm in the credit markets, the probability of having to employ the backstop was small.

It is interesting to note that under the risk-sensitivity approach of Basel 2 and the CRD, these contingent liabilities would have required the banks to put aside more capital than they did. It is argued by some that this would have tempered their use and is an argument for the CRD. While this appears so from a static perspective it is worth considering the dynamic implications of risk-sensitive provisioning for contingent liabilities. When liquidity is high and it might be hoped that banks would apply discretion, risk sensitivity models would indicate that these liabilities were not risky and so they would have been acquired with relative ease. When the credit cycle turns, volatility and correlation rises, so risk-sensitive models would indicate that these liabilities had become extremely risky, requiring banks to set aside substantial amounts of capital at a time when such capital was in scarce supply. This pushes up money market rates and when capital is hard to find, will lead to a firesale of assets to generate liquidity. The static position looks prudent, but the dynamic is dangerous. The dynamic aspects of these risk-sensitive models are discussed further below.

### ***Risk Traders versus Risk Absorbers***

It is important to note that many of the investors who hold assets in SIVs or as an investment in CDOs/CDS, are set up as “traders.” Their risk management systems assume that if they cannot fund the assets for whatever reason they will be able to sell them. They trade and treat the assets as ratings with yields. They “outsource” the monitoring and understanding of the risks to the rating agencies so they have no independent view of the risks. They are not risk *absorbers*.

A risk absorber needs to have the capacity to take a different view about the risks than the market place. To do this they would not depend on market liquidity and they would have a credit monitoring capacity that was independent of market prices. The stylised characterisation of Warren Buffet’s insurance company, Berkshire Hathaway, is a risk absorber: prepared to buy assets that have been beaten down by the market place in calculated anticipation that while they may not appreciate shortly, they will do so over a time horizon shorter than his liabilities.

Investors with long-term liabilities like pension funds and insurance companies are natural risk absorbers. Their ability to be risk absorbers however has been curtailed by regulations that

require or encourage pension funds and insurance companies to mark-to-market their assets and respond to short-term changes in asset prices.

### ***Risk Sensitive Models and Liquidity***

Before considering risk models in greater detail, it is important to emphasise that the *originate, rate and re-locate* model is a direct by-product of the incentives facing financial institutions. It is arguable that greater individual and institutional responsibility should have tempered the impact of these incentives. But it is unlikely that there will be any lasting change unless incentives are changed. Regulatory requirements encourage the banks to originate, but relocate loans to investors that do not have those regulatory obligations. The direction of this flow of credit risks, from banks to investors, is not always wrong from a systemic risk perspective. But the size and concentration of the flow to risk traders has proved destabilising. This is due in part to risk-sensitive models that, in the dynamic of the crisis, turned out to be part of the problem rather than of the solution.

The statistical risk models used by banks, credit rating agencies and investors have differences, but at their core, lies the modern portfolio theory developed by Harry Markovitz and further extended by Robert Merton. That theory presumes that instruments have inherent risk and return characteristics. There is a frontier of portfolios of instruments that maximise returns for a given average level of risk and the one that the investor picks relates to their own investor risk aversion. Risk and return of instruments and portfolios of instruments are not fixed points but are distributions. Using a model that optimises this mean-variance relationship, an investor can estimate the probability of a loss of a specific cash level. Equivalently, an investor can infer the loss they would suffer at a given probability level. For example an investor may say of his portfolio, based on past distributions of risk and correlation, that there is a 2.0 percent probability that his loss tomorrow is greater than Euro1,000,000. This is referred to as a DEAR limit (daily

earnings at risk). Risk management using DEAR limits was developed by banks in the late 1980s.<sup>25</sup>

Risk is a subject that generates much concern, uncertainty and confusion. It is a subject where people seek confidence and convention. These risk-sensitive models have become the convention for three broad reasons. First, they had academic credibility. The models were based on the work of the “enNobeled” of finance like Markovitz (1952), Merton (1973) and William Sharpe (Sharpe 1963). Second, regulators had approved their specific use for the evaluation of market risks held by banks in the 1996 amendment to the Basel Accord (Basel 1). Today the approach to modelling risks based on distributions of past risk is the lynch pin of the risk-sensitive approach to risk in Basel 2 and the CRD. Third, “everybody” uses these models. Uncertainty leads to herding. The fact that many are using a similar risk model gives confidence to many more to follow suit. Paradoxically, their widespread use lies at the heart of why these models fail (see Persaud 2000).

The modern statistical versions of the Markovitz and Merton models were developed to help banks measure their private risks. Banks are commonly assumed to have short-term liabilities. Consequently, risk was defined as the probability of a loss occurring “tomorrow” based on past distribution of volatility and correlations. If volatility or correlation rises, increasing the probability of a loss above the bank’s DEAR limit, they reduce their exposure to return within their DEAR limit. Implicit in the drawing of inference from the past distribution of volatility and correlation to tomorrow is the assumption of statistical independence. Specifically, the process of selling risk return into the DEAR limit, or the period in which DEAR limits are hit, are assumed to be independent of the previously observed volatilities and correlations.

### ***Risk Models and Strategic Behaviour***

This made sense in the 1950s when Markovitz was developing modern portfolio theory, and even in the 1970s when Merton was developing the Merton model. In those days investors were

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<sup>25</sup> J. P. Morgan was one of the first banks to develop a bank-wide “daily-earnings-at-risk” model under Till Guilderman in 1987. J. P. Morgan’s approach was seen by many at the time as industry “best-practice” and later a division selling market risk-management know-how called Riskmetrics was spun out.

“segmented” behind country and regulatory borders. The supply of capital was relatively inelastic. Information was sparse. Investment management was less professionalised and computing power limited. Cross-border financial flows were a tiny fraction of the levels today. For example, the stock of international bank lending rose from \$265 bn in 1975, to \$42000 bn twenty years later (Eatwell 1997, pp.4-5). If a single, small, investor were to construct a portfolio that maximised the expected return for a given level of short-term risk based on past observations, they could reasonably assume statistical independence. They could reasonably expect that measures of volatility, correlation, and returns reflected inherent characteristics. Risk models today are essentially the same, but the world has changed in such a way to undermine the assumptions that make these models work. These models systematically underestimate risk in “quiet” times and overestimate risk in “stressed” times.

Today’s world is flat in terms of information and investment flows. When an asset or portfolio of assets offers a higher yield than its historic risk based on databases of five or more years, investors are aware of it globally and they begin to add these assets to their portfolios. The response of global capital changes the characteristic of the asset into an increasingly over-priced instrument that is vulnerable to the herd exiting.

This vulnerability is not picked up in the five-year average of short-term volatility until the herd has assembled and there is a bump in the night.<sup>26</sup> When the price volatility of an asset rises following some bump, and the DEAR limits of the herd of investors invested in the asset are in danger of being breached, the investors try to reduce their risk exposures. However, because they are all doing so at the same time, and the wider set of instruments that looked attractive on a risk-return basis to one investor looked so to all investors, investors are selling a similar set of instruments. Correlation as well as volatility rises further, which causes the DEAR limits to be hit again and forces the holders to sell more. This dangerous circularity has been described as a liquidity black hole (Persaud 2003, 2004).

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<sup>26</sup> The *Financial Times* (August 27<sup>th</sup> 2005) described this as the *Persaud Paradox*: “the observation of safety creates risk and the observation of risk creates safety.”

The essential problem with the traditional models is that in assuming statistical independence, they assume away the strategic behaviour that is the hallmark of investing today. They assume that when an individual investor uses a readily available database of market prices and a common risk model to identify markets with better risk return characteristics, they are the only ones to react to what they see. And when investors see risk-return characteristics changing and want to reduce risk back below some level, that they are the only ones doing so. In today's more fluid markets, where the supply curve of capital is almost horizontal, the observation of statistical characteristics triggers an investor response that is large enough—over time—to change these statistical characteristics. The implication is that, at a time of stress, the probability distribution of future price is unstable. This instability cannot be addressed by simply assuming fatter tails of the historic distribution. A good analogy is that Markovitz/Merton derived risk models are like seat belts in a car that lock when you are at standstill and unlock when you start moving. Adjusting the inertia settings will not help.

The essence of a liquidity black hole is that in normal times, price declines bring out buyers looking for bargains. In a liquidity black hole, falling prices, by triggering some risk limit, lead to more sellers, more price declines and more selling. There is growing evidence for this risk-model induced liquidity crises (see Cohen and Shin 2003).

Risk models attract a herd of investors, and then use adverse movements in price measures to signal to the herd that it is time to reduce risk by “hitting” the same prices. This is why when a bank or fund is enveloped by a liquidity black hole a harried risk manager is often seen explaining that according to the risk model it was a “once in a thousand year” event. Those who recall the 1987 problem of “portfolio insurance,” the 1994/95 Tequila crisis, the 1997 Asian Financial Crisis, the 1998 LTCM debacle and today's credit crunch, would observe that these “once in a thousand year events” occur every five to ten years.

The problem is not caused solely by an overly static measurement of risk, but the mechanistic reaction to these faulty measures of risk. In the case of banks and insurance companies, these mechanistic rules to “sell risk when it appears high” are often part of



regulation. Even where they are not part of formal regulation, mechanistic rules are used by a great many other investors, in part to reassure and signal to regulators and clients that they are applying commonly accepted risk management practices. While it would be impossible to put the genie back in the bottle and request that market participants do not look at mark-to-market measures or market-price measures of risk, the systemically dangerous degree of responsiveness of market participants to contemporaneous measures of risk could be lowered.

For example, many prudential regulations require investors to only hold assets of a minimum credit rating. This leads to the mechanistic selling of assets that have been downgraded below this level even though the price of these assets has already discounted the news that subsequently led to the downgrading. The herd selling leads to a disproportionate response to the rating change causing a valuation hit in portfolios that triggers further selling of risk. It has been suggested that it would be better to require that investors should not *purchase* assets below a certain credit rating and give the managers some freedom as to whether to hold on to the assets that have been downgraded or when to sell them.

Risk modelling in this form also amplifies the credit cycle with potentially systemic implications. In economic good times when credit defaults and market volatility is low, historic measures of risk are low, encouraging more risk-taking. Continuing along the economic up cycle, historic price measures suggest that this increased risk taking is “safe” and emboldens further risk taking. Risk taking grows ever more aggressive until the peak of the credit cycle when some bump causes the herd to rush for the exit at the same time, forcing up volatility and correlation measures. Risk models encourage more risk taking at the height of the boom when we would rather encourage greater circumspection and discourage lending as the boom collapses, just when the economy would benefit from some forbearance. Although the primary purpose of banking regulation should be to avoid the undesirable systemic implications just discussed, Basel 2 and the CRD places these pro-cyclical risk models at the heart of capital adequacy requirements. It is not surprising that despite substantial investment in risk management using these models, they have failed to protect the financial system. Financial market crises occur as a result of market failure to fully recognise risks. If the markets fully

anticipated risks they would not materialise. But if market pricing is the problem, using risk models that rely on market prices is very unlikely to prove a defence against market failure. Non-market price measures of risk, such as measures of concentration or measures of the economic cycle, are more likely to anticipate a market failure than are market prices.

What is surprising is that these models of private risk should have been adopted as the measure of choice by regulators. The models are measuring the sensitivity of *individual* bank profitability to risks. The issue regulators should be focused on is the sensitivity of *systemic* risks to banks pursuing their individual profitability. This is clearly not the same thing and where the use of these faulty models of individual risks generates systemic selling or buying as described above, it is almost the opposite of how regulators should be tempering private behaviour. The prescriptive reliance on these market-price, risk-sensitivity models at the heart of the CRD appears tangential to the objective of regulation at best, and dangerous at worse.

#### **SYSTEMIC LIQUIDITY AND SEARCH LIQUIDITY**

As noted above, and contrary to common belief, the liquidity of a market today rests not so much on its size (as measured by market capitalisation or turnover) but in the diversity of its participants. It is easier for observers to see this distinction in the midst of a crisis than during the quiet time before a crisis when liquidity appears high and capitalisation is galloping ahead. The global corporate credit market is hardly small.<sup>27</sup>

In many markets there are many different types of market participants like hedge funds or pension funds and within each type there are many different investment strategies. But diversity is often richer in appearance than in the reality of behaviour. A key measure of the critical degree of diversity required for liquid markets is how differently market participants respond at times of stress to short-term price declines. A market where, for whatever reason, falling prices trigger selling by most players and generate few buyers, is one that may be large and appear liquid in quiet times, but will be fragile and illiquid in stressful times. This is a stylised description of what has occurred in the global credit markets.

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<sup>27</sup> The non-Government bond market makes up almost 50 percent of daily turnover of fixed-income instruments.

Many investors have long-term liabilities that do not require sensitivity to daily market moves. Examples would be pension funds, insurance companies, sovereign wealth funds (SWFs) or any other investor where funding or liabilities are long-term. These investors can earn a liquidity premium versus other investors who require short-term liquidity. From a systemic point of view these investors act as a liquidity absorber during times of stress.

For example, if the Abu Dhabi Investment Authority (ADIA) were constrained by a tight DEAR limit, it would not have been able to purchase 4.9 percent of Citibank shares in November 2007, just as the market was anticipating the bank to be forced to raise fresh capital. But ADIA is a SWF, investing for when Abu Dhabi runs out of oil in several decades. On this long view it was buying Citi shares at a bargain basement price. ADIA's presence and behaviour countered the likelihood of a steep price fall in Citi shares that could have developed into a vicious cycle. European pension funds and insurance companies should have been vying with ADIA to buy Citi shares. These investors would be ideal candidates for holding illiquid but good credit quality packages of debt instruments, or for buying them from investors who are forced to sell them during a time of stress. But they cannot do so if they are required to behave in the same way as liquidity-hungry investors as a result of inappropriately applied mark-to-market accounting of assets, Solvency II,<sup>28</sup> or risk-management fashion.

Investors who have short-term funding, or are forced to follow short-term solvency or stop-loss rules, or who intended to trade an asset and so are not incentivised to understand it sufficiently to hold on to losing positions—will be forced to sell assets when they fall sharply in price. Indeed, they are incentivised to try to be the first to sell assets before other investors do. Liquidity disappears in this rush for the exit. These liquidity-hungry investors act not as risk absorbers, but risk amplifiers.

Many regulators used to argue that the transfer of risk from one bank's balance sheet to several investors was a desirable spreading of risk. But what matters is not the number or name

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<sup>28</sup> Solvency II is a fundamental review of the capital adequacy regime for the EU insurance industry. It mirrors Basel 2 and aims to establish a revised set of EU-wide capital requirements and risk management standards to replace Solvency I.

of those that risk is transferred to, but their behaviour. The transfer of risk from banks was a transfer from a risk *absorber* to entities that acted as risk *traders or amplifiers*. This did not spread risk, it concentrated it. Supervisors ignored or misunderstood the distinction between risk traders and risk absorbers, and the need for heterogeneity.

It may appear from this analysis that the most liquid markets are those where there are only risk absorbers. But an efficient market requires both risk absorbers and risk traders. This is because there are at least two types of liquidity and different players serve different types (see Lagana et al. 2006). Risk absorbers improve systemic liquidity—the liquidity available under times of market stress. A world full of Warren Buffets would suffer fewer liquidity crises.

But there is another kind of liquidity: search liquidity. The cost and time required to find securities that don't trade often during less stressful times. Search liquidity is important for the efficiency of markets in the quiet times, that is, most of the time. This type of liquidity is best served by risk traders, trading assets on a continuous basis, repeatedly turning them over and checking their prices. Markets require a balance between risk traders and risk absorbers and regulators must ensure that their regulation does not cut across this balance and does not artificially suppress one type of risk taker for the other. In the recent past, regulators focused on supporting risk traders at the expense of risk absorbers. This is a little odd, given that financial markets have demonstrated that, via innovation, they can support search liquidity themselves, while regulators are the key defence against a worsening of systemic liquidity.

## **SUMMING-UP**

This lecture began by identifying two different uses of the term “liquidity,” as adjective and as noun. The two uses come together in the characterisation of a liquid market, in which the expansion of liquidity is driven by financial innovation. Financial innovation both induces the expansion of liquidity, and, by its very novelty, creates entirely new risks that are often not well understood until they are manifest in a sudden loss of liquidity.

This poses a dilemma for financial policy. Innovation can be an important element in the enhanced efficiency of a financial system, and stifling innovation by excessive regulation may

reduce significantly the growth of real income. Dealing with externalities is never a precise science (as environmental legislation demonstrates) and achieving a balance between systemic risk and financial innovation poses difficult choices. However, the starting point must be the recognition that the task of regulation is to reduce systemic risk, and this cannot be achieved through reliance on market forces, or market driven processes such as risk management by firms.

For example, there is currently a head of steam building up behind that proposition that “greater transparency” should be a dominant theme of any regulatory reform package. Precisely what is meant by “greater transparency” is not made clear: does this refer to improved availability of market information or to enhanced understanding of the structure of complex instruments? Unfortunately in neither case will “greater transparency” reduce systemic risk in financial markets. Indeed, in some cases greater transparency could make things worse.

Current events in financial markets have demonstrated beyond all reasonable doubt that the sophisticated market-sensitive risk models deployed by banks and other financial firms, and espoused so enthusiastically by the regulators, have totally failed to ensure stability in financial markets. On the contrary, to the extent that anyone believes them any more, the models have been a major factor in the failure of credit markets since in the face of extreme events, they all tended to endorse the same actions at the same time—guaranteeing widespread illiquidity. One of the drivers of the consequent lemming-like behaviour has been the greater transparency that regulators have campaigned for over the past twenty years or so. Greater transparency meant that more firms shared the same information, had access to the same procedural knowledge and even the same modelling—so it is hardly surprising that they all behaved in the same way.

But the risk modellers should not be blamed. Their models are not capable of measuring market liquidity risk, nor are they intended for that task. A firm’s risk model seeks to price the risks that are the result of its actions in the market place. They are necessarily market sensitive, and greater transparency will tend to increase that sensitivity. But it’s not just that market sensitivity may increase the likelihood of stampedes. In the presence of the systemic externalities, such as liquidity risk, even the most transparent competitive market will be

inefficient, and therefore risk will be mis-priced. The current turmoil is clearly a systemic event. There is no way it could have been accurately priced by an individual firm. Greater transparency will only add to the illusion of accuracy, and, by reinforcing herd behaviour, may well make things worse. Indeed, a number of writers have suggested that the requirement to mark complex investments to market, hence increasing transparency, has been an important element in rapid de-leveraging and subsequent financial collapse.

The second interpretation of the case for “greater transparency” rests on frequent references to securitised market instruments that “no-one understands,” and “no one knows how to price.” Once again the call for greater transparency is mis-conceived. What is at issue is not the transparency of such instruments but their complexity and the controls employed by buyers and sellers. Firms have bought complex instruments without understanding the risk, often relying exclusively on rating agencies to assess the risk, and in most cases have relied on valuations provided by sellers. Banks have sold complex products to unsophisticated investors with little attention to whether the investment is appropriate or whether the risks are understood, and have provided valuations using models that cannot price liquidity risk accurately (see above). Where all parties involved believe in a particular asset class and in the rating of such assets, and where both sides of a transaction are financially motivated to see the transaction completed, then no amount of transparency will result in greater stability.

But transparency has nothing to do with the systemic risk that is the proper object of regulation. Indeed the persistent emphasis on transparency is a dangerous diversion from the massive task of regulatory reform that is now required. Unfortunately, for the past twenty years or so the regulators have swallowed the argument that superior market sensitive risk management by firms would result in greater overall stability. They must now abandon their belief in the tired trinity of greater transparency, more disclosure and better risk management by firms. Surely it must now be recognised that that regulatory model has failed? Instead they must turn to finding ways to develop a systemic approach to regulation, including pro-cyclical provisioning and system-wide stress testing, and confront the vicious market cycle of rising asset prices accompanied by rising leverage, and the even more vicious cycle running in reverse.

The need for systemic regulation is not confined to the financial systems of the UK and the US. It is a quite general requirement of all financial and monetary structures. All financial systems are risky, since all financial systems rely ultimately on confidence and trust. Maintaining that confidence and trust is the first task of the financial regulator, and the basis of the maintenance of liquidity—and of liquid markets.

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## PART II: DISCUSSION

### LIQUIDITY: LESSONS FROM THE CURRENT TURBULENCE

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Participants in the discussion that followed Lord Eatwell's lecture included Gouda Abdel Khaleq, Ahmed Fouda, Omar Mohanna, Faika El-Refaie, Karima Korayem, Mostafa El-Said, Ahmed El-Dersh, Amr Mohieldin, Mohamed Hassan and Adel Beshai. The following is a summary of the discussion.

**Moderator:** Thank you for a very enlightening presentation. We now open the floor for discussion.

**Participant:** To face the current financial crisis, some are advocating a new Bretton Woods agreement. One core element of this agreement is to bring the international monetary system back to stability. Others are proposing going back to some form of the gold standard. I would like to know your perspective regarding the ways of approaching the crisis at the national level vis-à-vis the international level.

**Speaker:** The call for a new Bretton Woods agreement somehow misses the point considering what the Bretton Woods institutions were created for. The World Bank is essentially concerned with development; whether it did that successfully or not is controversial. The International Monetary Fund (IMF) was concerned with currency stability and the relationship of currency stability to macroeconomic performance. Neither of these organisations was concerned with the development of private financial markets. It is only in the last couple of years that the IMF—with the development of its Monetary and Banking Committee—has become interested in private financial markets. The regulation of these markets has mainly rested with the Basel Committee. The issue of international finance is what concerns us in this particular crisis. Let us look at the Basel Committee. The Basel Committee on Banking Supervision, which is the key committee for setting rules for bank capitalisation around the world, is a voluntary committee of

the G-10. Its rules are decided by consensus. It is not a treaty organisation like the IMF, which has treaty rights and responsibilities. However, it has been quite successful, not in preventing crises, but rather in developing a framework where countries join to make collective decisions. I believe if we need a new international financial institution, it should be one that addresses private financial markets as this is what the current crisis is all about. Therefore, we need to look for an institution that builds on the Basel Committee, and gives it an international dimension, perhaps with a treaty structure to facilitate enforcement, rather than the IMF that comes with too much “baggage.”

**Participant:** With the disappearance of investment banks and firms as you said, do you expect other types of financial institutions, mainly hedge funds and private equity firms, to play the role of investment banks?

**Speaker:** It is interesting to look at these two institutions. Many hedge funds are very highly leveraged in the short term. Therefore, I expect the hedge funds to have a very tough time. In fact, we have already seen many hedge fund failures. The same goes for insurance companies as more and more insurance companies have moved into a traded structure rather than the old actuarial long-term structure. Private equity firms are a bit different, because the high levels of leveraging in an equity firm are not in the firm; they are in the firm in which the investment has been made. In other words, it is the company that is at risk and not the originating private equity firm. With respect to their own borrowings, they are not at risk. If you invest in a private equity firm you cannot get your money without a substantial penalty. But I believe hedge funds and insurance companies—like AIG which is the biggest insurance company in the world—will have leverage difficulties.

**Participant:** You talked about regulating leverage, especially the short-term type, then you mentioned rating agencies, but you were rather soft on the rating agencies. Don't you think that they also deserve their share of blame?

**Speaker:** They have been getting all the blame already. However, we must not be too hard on rating agencies. Firstly, they rated credit risk, not liquidity risk. In other words, they are criticised for not rating something that they did not rate. Secondly, the transparency requirement for them to reveal their models—which I think is not their fault, but dictated by US government regulations—was an important element in weakening the stability of financial markets. However, where they really are to blame was rating a securitised instrument in the same way as a single-name bond; that was a serious mistake.

**Participant:** You have said that fraud is not a reason for this international crisis. I disagree with you on this point. I consider misreporting and overestimating the rating of companies and instruments as fraud, and therefore we should highlight fraud as one reason behind the crisis. The second point is that you have mentioned the success of Russia and China in taking a common position. I agree that we need a common position among developing countries, but we cannot leave things to developing countries alone. We should institutionalise the role and responsibilities of developed countries, and give equal treatment to developing countries. Besides, there is the Financial Stability Committee, which is composed of Ministers of all members of the IMF. Where has this committee been? The crisis started in the mid-2007, and until the beginning of 2008 nothing was done to tackle the problem.

**Speaker:** The argument I want to oppose is that the system is fine, and all that has gone wrong was some bad people who committed semi-criminal acts. There has been some criminality, no doubt about that. An example is the subprime market. People were sold mortgages, which were called Ninja mortgages, i.e., no income, no jobs, no assets. This was a semi-criminal thing to do. But it is not that the system was fine and criminality or bad behaviour brought it down. The overall financial services structure that we have built over the last thirty years was not fine, and that was the problem. There will always be fraud, criminality and greed. Regarding the Financial Stability Committee of the IMF, there are reports written three years ago by the research division of that committee explaining what was wrong and predicting what would happen. However, they

were disregarded. If the institutions actually produce the correct analysis, then you cannot really blame the institution, but the political reality.

**Participant:** You have talked about credit risk and liquidity risk. Don't you think that there is a strong relationship between them? Secondly, I agree with you that the increasing homogeneity and conglomeration of the participants in the markets are reasons behind this financial crisis. Don't you agree that we have to accept the fact that this homogeneity and conglomeration will stay forever because of globalisation? This leads me to a third point, which I believe is one of the reasons of the financial crisis, namely, credit policy. When bankers assess the position of loan seekers, they do not have to look at their position only, but also at what is expected in the economy as a whole. My point is that the general position and outlook of the economy should be taken into account whether in credit assessment or in risk assessment. My last point concerns developing countries, which you said will have a role. I want to stress that developing countries are mostly on the receiving end. They are always content to see foreign investors come in to invest in their stocks and they rarely impose a ceiling on that, which enhances their exposure to risk.

**Speaker:** It is quite true that the risks in an economy are interrelated. However, what these firms can do is observe cycles in the economy; what they cannot do is test the risk to the system as a whole when things all happen at the same time. It is not possible to do that and to find the dynamics that can occur in such a system. As I said earlier, the Federal Reserve has started attempting that in the US. In other words, credit risk and liquidity risk are related, but that externality cannot be included simply because the data is not there in the pricing of risk in the individual firm. Regarding your point about greater homogeneity and conglomeration, I agree that they will always exist. Conglomeration carries with it some benefit though. For example, the measures the US government has taken recently could not have been taken twenty years ago. When you have highly conglomerated institutions they are easier to regulate because there are not too many of them. Regarding your point about developing countries, it is true that developing

countries need to think about the sort of financial structure and risks they are willing to take as a nation; that is what Manmohan Singh did in India and India is benefiting from it today.

**Participant:** You said that the IMF foresaw such a problem years ago, but no preventive action was taken. There are three reasons for that in my opinion. First, the economic ideology prevailing during the last 20 years did its part to prevent taking an action at the proper time. The second reason is greed, which led to the invention of complex tools in the financial market. Securitisation and high leverage were also among the reasons. Shouldn't these reasons be addressed to avoid future crises?

**Speaker:** You are quite right. The political ideology is enormously important and it selects the economics it wants. However, there is a big opportunity now to develop new ideas and to create a different view, which is one of the main messages I emphasised in my presentation.

**Participant:** Do you think that we are approaching the collapse of the capitalist system? Are there losers and winners from the recent crisis, and if there are winners, who are they?

**Speaker:** Paradoxically, the fact that the US government has nationalised its banks demonstrates that capitalism is not collapsing. In other words, if the US government has not taken such a radical action to bring security to the financial system, then the collapse would have been more dramatic, more severe, and the political repercussions could have been as nasty as they were in the 1930s. So, paradoxically, the nationalisation of the banks proves that capitalism will survive in the sense that the state is underpinning the system. On the losers and winners, of course the significant winners have been those people in the financial markets who bet on shares falling and on banks collapsing.

**Participant:** My question relates to moral hazard. During the Asian crisis, this issue was used as a tool to pressure these countries to accept very small packages. I believe that, with what is happening in the US and given this question of socialisation and nationalisation, what we are doing is actually socialising costs and privatising gains. Secondly, what is really new about the

financial crisis this time? Is it merely a question of securitisation carried out in an environment of deregulation and then what we should do is to rethink the securitisation model? Or is there something deeper and more systemic that needs to be looked at? My suggestion is that we should follow the ratio of financial wealth relative to the world GDP to see what this ratio has been throughout the last 30 years. Thirdly, concerning interest rate policy, would you agree that low interest rates for a long time had been problematic?

**Speaker:** It is not entirely true that all costs were socialised and all gains privatised, because there could be a cost of a real economy collapse. That cost was imposed on Korea where the real economy in 1998/99 fell by 30 percent. However, it is also true that the Korean economy recovered within two years. But the loss suffered in those two years was a loss forever. But if the US economy fell by 20 to 30 percent, with all due respect to Korea, that would have been catastrophic for people throughout the world not just in the US. So, moral hazard exists, but there are costs of doing nothing, which I think overwhelmed that argument. The way I would deal with moral hazard is that the people who run the banks would lose their licenses and never be allowed to work in financial services again. You asked if there is something new about the crisis this time. If we look at financial crises, they have these dual characteristics of an asset bought just for capital gain and the growth of purchasing power and the way these two feed on each other. But the particular form of course is new, and it is new every time. Every crisis is the same but with some new components. I think your point about the ratio of financial wealth to GDP is important, because the financial wealth should reflect the capitalisation of the economy and potential real returns. I agree with you on this point. You asked if lower interest rates created problems. In a way, they did, in the sense that the very low rates of return on US treasuries produced largely by the very large deposits by the Chinese into US treasuries did result in people looking for returns elsewhere and being willing to take greater risks. Certainly, the way the indebtedness of the US household sector grew due to low interest rates and capital gains in housing was a major element in this structure. So, I agree with that. However, I think two things are important at this time. Firstly, short-term interest rates must be cut. The purpose is to persuade people to get into longer-term lending. Also, there must not be cuts in government



expenditures or increases in taxes; this would be bad economics. What I would be doing now in the UK, for example, is spend more on housing because we have a housing shortage in the UK and I would be looking towards the poorer segments of society because poorer people have one tremendous macroeconomic advantage: they spend every pound they get.

**Participant:** Is there a tradeoff between economic crisis and economic growth? If yes, one will have to accept a combination of financial crises and economic growth. In other words, higher economic growth with more frequent financial crises, or lower economic growth with a more stable financial system. The second question actually relates to capital flows. If regulators cannot keep pace with the sophistication of the instruments, do you recommend imposing restrictions on capital inflows? The third question is about the “watch” example you cited. If you have a watch worth \$5 and then you securitise it and the chain goes on. My question is: what if the collateral becomes worth just \$1 rather than \$5 over the period from 1945 to 2002? If the collateral collapses then the chain will collapse.

**Speaker:** Those are very interesting points. Regarding the relation between crises and growth, if we look back over the period of liberalisation we have had reasonable growth on average over that period. But we must remember that a financial crisis in Japan in 1990 produced ten years of no growth in that country. The current crisis is many times greater than the Japanese problem and is much more linked internationally. So, we could have a long period of very low growth or no growth at all as a result of this. Regarding your point about collateral, this is a very interesting problem. For example, I borrowed this watch, I have sold it to you, the market for watches has collapsed, and I decide I don’t want to buy it back. But now I have a legal contract with you to buy it back. The only way I can avoid not buying your watch back legally is for me to go bankrupt, otherwise I have to buy your watch back at the price I agreed even though it is now worth one dollar only. What we are seeing in the US is some voluntary bankruptcies because of people trying to avoid the collateralised chain that they are locked into by legal contracts.

**Participant:** With the current preoccupation with the monetary aspect, isn’t it time at the international level to look at the real aspect and even at the national aspect? Isn’t it time to read

those few pages in Adam Smith's productive *versus* unproductive labour; and producing commodity *versus* producing services? Secondly, could you talk about interbank lending a little bit? To what extent can a government help in interbank lending, which is a major issue in the US now? Finally, to what extent will the dollar in ten years or twenty years from now continue to be a reserve currency where the dollar is shining on its own light, not that I am demanding the dollar because of the goods produced by the dollar?

**Speaker:** I would not go as far as the classical definition of productive versus non-productive labour; and producing material things versus producing services. Services are commodities; they are goods. When we talk about GDP, we talk about goods and services. In other words, I do not agree that you can take the old productive and non-productive labour definition. But there is the issue of relative economic strength of countries, and then to jump to your third question, there is the relative economic strength of the United States. The US has been running a balance of payment deficit of about 6 percent of GDP for the last seven or eight years. The counterpart surplus in the world was mostly in China, though not entirely; some of it was in the European Union. That is bound to place pressure on the reserve status of the dollar. Because why does a currency have a reserve status? Because other people accept it. Why do they accept it? Because in the end they would want to buy American goods and services; if they don't want to buy American goods and services, there is no point in having dollars. So, I suspect that we may see in twenty years, which is the time horizon you suggested, a more multinational currency system. This may be true in light of the growth of the euro, which now has the scale and financial markets, but this is not entirely stabilising. If you have switches between two currencies, that can cause problems. That is to say, you may be right that the reserve status of the dollar may decline, but we should not be sure that this is beneficial. Going back to interbank lending, the measures that the British and American governments have taken have been to guarantee interbank lending. So, if HSBC lends to Barclays and Barclays defaults, the UK government will pay. It is guaranteed.







## *Distinguished Lecture Series*

In recent decades, the structure of financial markets has changed, shifting from a bank-based to a market-based financial system, with banking now following an *originate, rate and relocate* model. Financial intermediation has moved from banks into markets, and as a consequence of this disintermediation, financial crises are now manifest in markets rather than institutions. Accordingly, interest has moved from bank runs to “market gridlock” as a source of systemic risk. In this distinguished lecture, John Eatwell, a leading scholar in the field of financial policy, sheds new light on the long-debated issue of liquidity in order to draw lessons from the current financial turbulence. In particular, he discusses market liquidity and the causes of financial bubbles; how liquidity relates to monetary and financial policy; and lessons that can be drawn from the current financial turmoil for emerging markets and how to reduce systemic risk in financial markets.