

# Liquidity and efficient markets

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### Liquidity is control of money

Money is at the heart of the question of liquidity. Money resolves the central problem of barter exchange, the need to identify a double coincidence of wants. This is the need for, say, a farmer wishing to exchange his eggs for bacon to find a counterpart who wishes to exchange his bacon for eggs. It is then obvious that the necessary requirement for money to have justified existence is that there is uncertainty. Without uncertainty, money may have no economic purpose. The notes which we know as money are themselves merely symbols of trust. The uncertainty faced by the egg or bacon producer is modified and trade more likely to occur efficiently with monetary intermediation – trust serves to resolve the problem.

Any purchase of assets or settlement of obligations requires control of money; the execution process is transfer of control of money. Money could have been saved from previous economic activities or could be made available by others in the form of credit. In this sense, credit is nothing more than control of money. The credit process is one of transfer of money.

The possession, ownership or control of money requires the economic agent to have deferred consumption in time. As such, compensation, a rate of return for deferment of consumption, arises naturally. A creditor makes money available to a borrower to permit current consumption, which of course can include investment by the borrower, and expects the return of this sum plus accrued compensation. From the perspective of the creditor, credit is an expectation of future liquidity.

Credit requires trust in the good faith of the borrower; this is a compound concern involving both the borrower's willingness and ability to pay or deliver money at the future date. In the same sense that money is trust in the good faith of governments, liquidity for the banking system is also based upon trust. Trust of course grows with (good) experience. In this context the banking credit cycle of lending first against (projected) cash-flows and later against assets arises naturally. Assets can be seized and usually realised for cash liquidity when necessary, which mitigates the dependence upon the borrower's ability to pay.

### Banking and Credit Creation

Currency in circulation and central bank money are known as high powered money. This outside money is recycled by the banking system in the credit creation process. The art of sound

commercial banking is the ability to estimate accurately the extent to which this recycling may be securely achieved, the multiplier, given that many depositors may reclaim their money at call. In mitigation of these difficulties, banks have developed many forms of near money, inside money. Deposits with a bank, commercial paper issued and undrawn credit facilities are examples of inside near money. The purpose of banking regulation here is to ensure the security of both institutions and the system.

It is perhaps a little odd in this context that the central thrust of banking regulation internationally for the last twenty years has been on capital adequacy, or solvency. Banking regulation has developed to demand capital funds to secure the system rather than liquidity. It may have been assumed or believed assured that central banks would automatically supply liquidity to solvent banks, but this fails to take account of the difficulty of assessing solvency for a bank in liquidity distress.

The incentives within a risk-based capital adequacy regime encourage banks to optimize their own balance sheets and capital through the use of off-balance sheet vehicles such as SIVs. These possess the principle characteristics of banks, converting short term liquid liabilities into long term illiquid assets, but are not regulated as banks. These SIVs extensively issued a form of inside near money, short term commercial paper.

Of course, with difficulties apparent, trust in this near money dissipated rapidly and the SIVs experienced their equivalent of a bank run – run-off of commercial paper outstanding. The SIVs had to call upon their stand-by liquidity lines, which were often with their sponsor bank, or had to dispose of loans and assets hastily, with little regard to price, in response.

### **Markets, Liquidity and Information Asymmetries**

There is a common belief that markets create liquidity when they do not. In its more extreme forms the efficient market of financial theory is perfectly liquid; money is never a problem, it is magically available.

The trading frequency of an instrument and its aggregated or averaged trading volumes do not measure liquidity. These are intrinsically measures of flows of cash money, while liquidity is more a question of the total stock of money, which is the sum of inside and outside monies. Attempts to measure liquidity by turnover volumes or bid-offer spreads fail badly in this perspective<sup>1</sup>. These studies perhaps capture to some limited degree the willingness of the banking system to offer credit to market participants, which of course can be expected to enhance the efficiency of the market. There is some confusion between the stock of money and the velocity of its turnover in these studies.

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<sup>1</sup> There is vast amount of literature confusing tradability with liquidity:

Amihud, Yakov, and Haim Mendelson, 1986, Asset pricing and the bid-ask spread, *Journal of Financial Economics* 17, 223–249.

Brennan, Michael J., and Avanidhar Subrahmanyam, 1996, Market microstructure and asset pricing: On the compensation for illiquidity in stock returns, *Journal of Financial Economics* 41, 441–464.

Chordia, T., R. Roll and A. Subrahmanyam (2000), “Commonality in Liquidity,” *Journal of Financial Economics* 56, 3-28.

Amihud, Yakov, 2000, Illiquidity and stock returns: Cross-sectional and time series effects, Working paper, New York University.

These studies do reflect the capability of market participants to bridge information asymmetries. The difference between the offer price of a product and its bid price is the length of the gap to be bridged. In more efficient markets, the bridge is relatively short. Bid-offer spreads and trading volumes are measurements of market efficiency rather than liquidity.

The same holds for more advanced measures trying to quantify the impact of trading size on trading prices. A market is deemed liquid if the impact of trading size on trading price is judged relatively small and illiquid if the impact is seen as significant. But what is actually measured is the stability of the bridge commonly referred to as market depth. The capability to purchase or sell sizeable positions in a security without leaving foot-prints depends on the robustness of information asymmetries. Somewhat perversely, a market is deep if transactions in the securities do not deliver, in themselves, significant information as to the value of the security. This runs entirely contrary to the recent accounting convention where market transaction prices always embody the fair value of the asset.

In a perfectly efficient market no trade will occur as result of changes to the information content of the security<sup>2</sup>, though of course changes in the preferences or needs of investors may result in transactions. In a near perfectly efficient market, the only control variable available is transparency, or information disclosure.

There is one notable recent contribution to the research on market liquidity. Maureen O'Hara argues *"that symmetric information-based asset pricing models do not work because they assume that the underlying problems of liquidity and price discovery have been solved"*<sup>3</sup>. She introduces a pricing model in which information asymmetries continuously incorporate the transactions costs of liquidity and the risks of price discovery. From her reasoning of "risks in price discovery", it follows that *"Transparency reduces the information content of specific trades and so reduces dealers' incentive to compete for orders. As a result, bid-ask spreads in transparent markets tend to be wider than those in less transparent markets"*<sup>4</sup>. This is close to our view that liquidity is external to markets, rooted in uncertainty, and that disclosure costs are incurred to build trust and overcome its absence.

## **Markets, Banks and Arbitrageurs**

There are many things financial markets can do but they certainly cannot provide trust. Quite the opposite, financial markets are the product of trust generated by their institutional structure. A market cannot choose to hoard or supply liquidity, but its institutions can. A market cannot credibly promise to deliver future liquidity, but its participant institutions can. The fact that futures and options are traded on markets is not falsification of these assertions. The ability of markets to permit trade in such contracts rests crucially upon the institutional structure supporting the market. Financial markets cannot provide liquidity, but they do redistribute it.

It is market incompleteness and inefficiency rather than their efficiency and completeness that require consideration of liquidity. In a theoretical efficient market there are all-powerful arbitrageurs who stand ready to buy and sell any security if its price moves away from its true

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<sup>2</sup> Sanford J. Grossman and Joseph E. Stiglitz, "On the Impossibility of Informationally Efficient Markets" *The American Economic Review*, Vol. 70, No. 3 (Jun., 1980)

<sup>3</sup> O'Hara, M. , "Presidential Address: Liquidity and Price Discovery," *Journal of Finance* 58, 1335-1354. 2003

<sup>4</sup> O'Hara, M., "Overview: market structure issues in market liquidity", BIS Jan 2008

value rather than a Walrasian auctioneer coordinating activity. But this requires the arbitrageur to be able to discern true value and also have access to adequate liquidity to execute transactions.

The overarching business activity of banking is the transformation of liquid liabilities, principally deposits, into illiquid longer term assets, loans. Banks are also the principal suppliers of credit or liquidity to securities arbitrageurs operating in financial markets. In recent times the practice developed of relying upon the market as a source of liquidity. This is perhaps best illustrated by the “originate and distribute” business model of Northern Rock. Under this model the bank advanced long-term mortgage loans using its current liquidity to create these assets and then subsequently sold these assets in securities markets to recapture its liquidity.

This seems, at first sight, perfectly reasonable since the seller of the asset has acquired the liquidity, and this remains in the system. Ignoring, for simplicity, the possibility that some of the sale proceeds may have been used to discharge any seller indebtedness, this is deposited within the banking system. Liquidity in markets then depends upon the willingness of the banking system to offer credit to arbitrageurs. Many banks now have trading departments which are themselves arbitrageurs and are material consumers of liquidity as credit to finance their (long) inventories. Short sales offer the prospect of generating liquidity, but of course require the arbitrageur to borrow the security and that activity requires the provision of cash or securities as collateral to the securities lender.

In essence the situation is that banks relying on markets for financing or liquidity provision are ultimately relying upon the willingness of other banks to provide this through the maintenance of the level of credit they make available. This depends upon the level of trust in the securitisation of loans offered for sale or the credibility of the near money issued by the specific bank. Default by a borrower on a loan affects only the level of future liquidity, the service and repayment flows. To reduce current liquidity, we need either the central bank to withdraw money from circulation, or banks to refuse to extend further credit or fail to replace existing credit after it has been repaid.

### **Choice and Uncertainty**

When losses become evident the revelation of this information reduces the trust of other institutions in those banks considered exposed to these loans. This is apparently a paradox where information, which of course reduces uncertainty, seems to increase risk. It might be tempting to dismiss the effect as one in distribution of uncertainty rather than the absolute level of uncertainty but the problem is, we believe, more basic.

It is important to recognize that the “*boundedness of uncertainty is essential to the possibility of decision*”<sup>5</sup>. The boundaries chosen though are themselves uncertain. With the ability to assign probabilities to all possibilities accurately, there could be no business enterprise or money. These boundaries are nonetheless a necessary pretence of knowledge for decision, without which inaction dominates. In the case of the banking system, inaction results, as loans mature and are not replaced, in a lowering of credit and problems of liquidity in the economy and markets.

In an organizational context, in order to act it is necessary to conceal this pretence and further to conceal the concealment. The simplest manner in which uncertainty may be bounded is to rely upon the comfort and apparent sufficiency of wide ranging theories.

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<sup>5</sup> George Shackle, *Decision, Order and Time in Human Affairs* Cambridge University Press 1969

It is, of course, not necessary for the predicates to a theory to be empirically accurate as Friedman noted<sup>6</sup>: “A hypothesis is important if it ‘explains’ much by little.....if it abstracts the common and crucial elements from the mass of complex and detailed circumstances.....and permits valid predictions on the basis of them alone. To be important, therefore, a hypothesis must be descriptively false in its assumptions.”

However the caution offered by Samuelson<sup>7</sup> should be noted: “[It is]...*fundamentally wrong that unrealism in the sense of factual inaccuracy even to a tolerable degree of approximation is anything but a demerit for a theory or hypothesis. ...The fact that nothing is perfectly accurate should not be an excuse to relax our standards of scrutiny of the empirical validity that the propositions of economics do or do not possess.*”

There are questions with all financial theories as to whether they function as cameras, recording empirical regularities or as engines influencing performance. Most important for these latter theories are the prescriptive actions they generate to reinforce themselves. Or as German sociologist Max Weber expressed it: “*To seal the ideological bondage*”<sup>8</sup>.

The Black Scholes model of option pricing for example exhibited this property at least until the 1987 crash and also the rating based model for asset-backed securities which collapsed in 2007. It appears that theories or models that function as engines do ultimately fail rather visibly.

One problem with efficient market theories is the exclusion of liquidity as an element. The market here in essence offers an option on liquidity for free at all times. As the market cannot itself create liquidity, this is scarcely a credible property. The possibility that liquidity may be entirely unavailable is also incompatible with the equilibrium of optimizing agents, in which there can be no unexploited gains from trade, of this finance and price theory.

### **Strategic behaviour and Markets**

There is a distinct co-ordination feature to financial markets which was famously compared by Keynes to a newspaper competition in which “*the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick not those faces which he himself finds prettiest, but those he thinks likeliest to catch the fancy of other competitors, all of whom are looking at the problem from the same point of view.*”

Francis Galton’s study of the wagers placed on the weight of an ox at a fair in 1906 is relevant in the context of aggregation of individual beliefs – the average guess was 1,198 pounds and the actual weight was 1,197 pounds. The aggregation of the crowd proved remarkably accurate<sup>9</sup> in its guess – though this was a disappointment to Galton who was apparently hoping to demonstrate the opposite. However these wagers had one important property; they were independent – no-one knew anyone else’s wagers. But when a crowd is permitted to know the wagers of others, we admit the possibility of strategic behaviour.

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<sup>6</sup> Milton Friedman, ‘The Methodology of Positive Economics’ in *Essays on Positive Economics* University of Chicago Press 1953

<sup>7</sup> Paul Samuelson , *American Economic Review* 53: pp 231-236 1963

<sup>8</sup> Weber, Max: *Economy and Society. An outline of interpretive sociology*, 1978

<sup>9</sup> The apparent accuracy is higher than would be expected from sampling theory given that the sample size was 800 wagers.

Strategic behaviour and Keynesian co-ordination have the effect of making endogenous to the market new sources of risk and uncertainty; this lowers the role of true information in price formation. In Galton's example this might consist of placing wagers close to those of the experts, the slaughter-men and butchers, or equally of relying on rating opinions in a more recent context. The possibilities for hysteresis or feed-back in such situations are obvious – and can result in very strange equilibria indeed. Certainly there is no longer any reason to believe that the law of large numbers will apply to this market, or that its elementary statistics will be relevant, adequate descriptions.

It is evident that financial markets are mixed games – they are partly games against nature and partly games against others. Uncertainty and risk have both exogenous and endogenous sources. In such situations the all powerful arbitrageur is as likely to behave in a destabilising predatory manner as to arbitrage prices back to fair value.

A more realistic pricing model, with liquidity explicitly present, in which empirical regularities such as momentum and information in prices can arise is quite clearly needed.

## **Information and Price**

The use of market price valuation, “fair value” accounting, has proved contentious in the context of the recent financial turmoil, with calls for its suspension. Some have observed “*once in a while, they can lead to an equilibrium which is harmful to the social welfare*<sup>10</sup>”. This standard has also been criticised as inducing myopia in behaviour.

Today's price may, perhaps, reflect current information perfectly, but, even with the addition of rational expectations, that does not mean that it embodies perfect information with respect to future prices – that would require perfect foresight. A consumption good may be consumed immediately; the information content of its current market price is close to complete, though the option to defer consumption needs a little thought, as do alternate possible uses as a store of value. The value relevance of a market price is high for such assets

By contrast, the information content of a market price for a capital asset is at best limited to that known today, which is far from complete over the life of that capital asset. Of course, for very long lived capital assets the information content of today's price may actually be very small and the value relevance low. Obviously as the time dimension increases, so too does the potential information incompleteness of a market price today with respect to the future value.

An accounting concept such as “fair value” which reduces to the market price for everything traded is a very mixed measurement system indeed. Each and every price may have differing information content, though they all share a common set, today's available information. The value relevance of today's price may also differ for each and every owner of the capital asset. Increasing the size of today's information set, that which is available today, will not remedy this incompleteness as that is based predominantly in future information.

It might be argued that, however incomplete the information forming a price, this price constitutes in some sense a “best” estimate. The problem then, however, is that the more incomplete the information content of a price the greater is the potential for strategic behaviour, and far more substantial and sustained departures of the market price from true value.

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<sup>10</sup> De Grauwe, P., “Act now to stop the markets' vicious circle” FT, March 20 2008

It is difficult to determine the motivations behind the calls for revision or suspension of mark to market accounting standards as a number of these are possible. There are those who believe the standard is inappropriate and have been long term critics, and there are more recent converts who are now concerned by the “engine” characteristic where financial statements and valuations are driving market and institutional behaviour, but there is also unfortunately a small group whose ambition is simply to hide real losses incurred.

## **Trust and Transparency**

This question of the availability of information is the heart of the concept of transparency, but the concept in practical application is incompatible with markets in continuous equilibrium as it can itself operate to induce strategic behaviour among market participants.

*“Transparency and openness may not be the unconditional goods that they are fashionably supposed to be.”<sup>11</sup>* This problem has been mis-specified; the central issue is, in fact, one of trust. *“Transparency certainly destroys secrecy: but it may not limit the deception and deliberate misinformation that undermine relations of trust. If we want to restore trust we need to reduce deception and lies rather than secrecy. Some sorts of secrecy indeed support deception, others do not.... By the same token, secrecy and lack of transparency may not be the enemies of trust.”* *“There are deeper and more systematic reasons for thinking that transparency damages trust.”* Deception is a rather extreme form of strategic behaviour, of suspect morality.

These problems suggest strongly that an information theoretic approach to valuation may prove fruitful. In these approaches the role of a model is as a tool to parse data into information and noise. This use of models, of course, precludes any role for them as “engines”. Moreover, they permit the analysis of the packing of information within a distribution of data, returns or prices – and those extreme events which are so unlikely under the modern model of efficient markets and so troubling in consequence are precisely the events which are information rich.

Money or alternately liquidity is a symbol of trust enabling the funding of assets or the performance of obligations. Neither liquidity nor trust can be generated by markets<sup>12</sup>. Trust arises from experience and beliefs. The use of money as a store of value is also rooted in its trust-based acceptance as a medium of exchange.

The problem faced by central banks is that while they may supply large amounts of liquidity to banks, this is outside money and unless recycled by the banking system in the credit creation, inside money process, their actions may prove entirely unproductive. Colloquially this has been expressed as pushing on a string. In simple terms, it is simply not practical for a central bank to supply outside liquidity on the scale necessary to ensure no diminution of credit within an economy, which demands the co-operation of the commercial banks.

Trust is not easily promoted. An excessive belief in the capabilities of markets may hinder the development of individual judgement of trustworthiness. Time, effort and communication are required to generate belief in trustworthiness. *“[...] informed consent can provide a basis for trust*

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<sup>11</sup> O'Neill, O., “A Question of Trust” The BBC Reith Lectures 2002, C.U.P. 2002

<sup>12</sup> [T]rust is particularly relevant in conditions of ignorance or uncertainty with respect to unknown or unknowable actions of others. [...] In this respect, trust concerns not future actions in general, but all future actions which condition our present decisions.” Gambetta, Diego “Trust: Making and Breaking Cooperative Relations.” University of Oxford, 2000

*provided that those who are to consent are not offered a flood of uncheckable information, but rather information whose accuracy they can check and assess for themselves. This is demanding.*"<sup>13</sup> The signals we send to promote belief in our trustworthiness must be costly to be credible. And this is the true cost of liquidity.

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<sup>13</sup> Onora O'Neil: Trust and Transparency , BBC, Reith Lectures 2002