

MANAGING THE RISKS OF GROWTH: HARD MONEY AND RESILIENT FINANCIAL SYSTEMS*

This paper examines a national risk management approach to strengthening the domestic financial system. Risks to the financial system are inter-related to risks in the real sectors and their methods of financing growth. Shocks to financial systems are seen as emanating from distortions to incentives and structural weaknesses in fundamentals, which create portfolio shifts by investors. The importance of credible policies, sound fundamentals, good supervision, robust infrastructure and non-distortive incentives is emphasised.

The “hardness” of money is defined as the degree of credit, liquidity and market risks to the value of market participants’ holdings of monetary assets. High exposure to risks implies that the financial system and the real sectors must have “resilience” in the form of higher capital cushions. Strengthening the financial system involves improving market information, removing incentive distortions, and deepening markets and instruments to allow market participants to manage their risks better.

Introduction

In condemning the dangers of derivatives, policy makers are apt to forget that the financial system is itself a derivative of the real economy. In the aftermath of the debt crises of the 1970s (when governments went bust), the banking crises of the 1980s (when banks went bust) and the derivatives scare of the 1990s (when markets threatened to melt down), we are only beginning to understand the behaviour of financial systems and markets. Financial markets facilitate the exchange of property rights, which involves considerable risks. If the financial system does not function properly, we are likely to encounter the bubbles, manias, crashes and crises that have plagued the world in recent years. In other words, the market participants, including the policy maker, are not managing their risks properly.

The theme of this Seminar: “Strengthening the Domestic Financial System” suggests that policy makers should do more. The basic proposition of this paper is that the policy maker’s real job is to enable the market participants to manage their risks better. As I shall try to develop in this paper, market problems occur because market participants: banks, non-banks, depositors and investors, domestic or foreign, have difficulties managing their risks.

These risks include the well known credit, liquidity, market, sovereign, settlement, systemic and regulatory risks. Each of these risks prevents the well-functioning of the market. As my colleague Joseph Yam puts it: the market has a way of flowing around obstacles placed in front of it. And, in this world of global capital flows, the market tends to punish policy mistakes rather severely.

For some time now, I have advocated that the real task of the economic policy maker should be **national risk management**¹. If we accept the financial sector as a derivative of the real sector, we need to understand better the behaviour of ~~the~~ the inter-relationship between the derivative and the underlying assets. As we now know, derivatives are dangerous if they are not properly understood, the legal framework is unclear, and they are highly leveraged. Derivatives were created because they were more flexible and tradable, incurring lower transaction costs than the underlying assets. Financial innovation and institutional deepening, including access to global markets, are all part and parcel of the creation of new derivatives to make the real sector operate more efficiently. In other words, there may be severe distortions in the real sector which drive the market to create derivatives (or financial innovation)

* This is the text of a speech by Andrew Sheng, Deputy Chief Executive (Monetary) of the HKMA to the Bank for International Settlements Seminar on Strengthening the Domestic Financial System in Basle on 14-15 February 1996.

1 Andrew Sheng & Yoon Je Cho, (March 1993) “Risk Management and Stable Financial Structures”, Policy Research Working Papers WPS 1109, World Bank, Washington DC.

to deal with these risks. This suggests that financial fragility or crises have deep real sector causes that may be created by regulatory or policy distortions in the incentive structure. In my cross-country study on bank failure and restructuring, I have tried to pull together the inter-relationship between the banking system and other sectors of the economy².

The next section presents a framework to analyse the inter-relationship between the financial sector and the other sectors of the economy. The following section uses modern finance theory to examine the importance of “hard money and a resilient financial system”. The final section looks at the restructuring of the financial system, with emphasis on the banking system.

National Risk Management Framework

The conventional wisdom in reviewing financial sector development in developing countries always begins with a closed economy model, with economies graduating towards an open economy. The policy framework in this model assumes that with relatively closed markets, the central bank is able to influence the level of domestic interest rates and allocate resources through credit directives. Deregulation, privatisation, liberalisation of capital accounts and globalisation have changed that policy framework. Today, central banks have to deal with both internal disturbances and external shocks at the same time. This requires an analytical framework to consider simultaneously such inter-relationships, not only from flows, but also stocks. In other words, traditional national income flow analysis is insufficient: an examination of balance sheet (stock) adjustments is also necessary. As we have all learnt, the exchange rate is no longer driven by the current account, but by changes in the capital account of the balance of payments.

Table I presents a pro-forma National Risk Management matrix, with the economic sectors in the columns and the CAMELOT rating³ in the rows. We are using the bank supervisor’s analytical framework to look at weaknesses in different economic sectors and the economy as a whole. ‘Filling in the blanks’ of the matrix would enable the policy-maker to assess the risk exposures in each

sector and potential areas for reform. For example, a close examination of the enterprise sector would reveal the level of corporate debt, and quality of earnings. Over-exposures in real estate, for example, or concentration of earnings (e.g. single commodity exports) would expose the banking system and the economy to high volatility risks. Over-exposure of the household sector to residential mortgages, with excessive loan-valuation ratios, or consumer debt would subject the public to high interest rate risks, thus weakening the will of the central bank to use interest rates to defend exchange rates. This was the lesson obtained from the ERM crisis of 1992.

Similarly, an examination across rows would reveal the quality of asset-liability management in each sector. For example, liquidity management is important for all sectors, not least the central bank and the banking system. How exposed is the financial sector to market (interest rate and exchange rate) risks would depend on the degree of leverage in both domestic and foreign currency, as well as the duration of debt. If the banking system relied excessively on short term deposits to finance long term mortgages, a growing maturity mismatch occurs.

An examination of quality of operations would reveal weaknesses in systems and infrastructure, including the possibility of contagion. If payment systems are not robust, or public utilities are not efficient, high risks are imposed on the operations of the financial system and the private sector. Failure of a stock market clearing and settlement system would have a massive shock on the inter-bank payment system and vice versa.

Thus, a review of the risks of the economy as a whole requires an understanding of the way growth has been financed in each sector, and the inter-relationships between the sectors. If domestic financial systems are inefficient, the private sector or even the public sector may resort to external financing, thus exposing the economy to the volatility of capital flows and exchange rate risks. Such flows are not in themselves the causes of economic or financial problems, but are the effects of distortive incentives in the market, possibly a

2 Andrew Sheng, “Bank Restructuring: Techniques and Experience”, (1996), Financial Sector Development Department, World Bank, Washington DC.

3 The US CAMEL rating as amended by the Canadian Office of Superintendent of Financial Institutions, who include quality of Operations and Treasury as two additional items in the rating of institutions.

Table I:
National Risk Management Matrix

	Financial Sector							
	Central Bank	Banking System	NBFI	Enterprises	Households	Government	External	National
Capital Adequacy	Central bank losses are quasi-fiscal deficits	Need to maintain BIS CAR using GAAP	Capital standards still being formulated -adequacy of provisions	Monitor enterprise gearing	Monitor levels of consumer debt	Maastricht limits – budget deficit less than 3% and debt less than 60% of GDP	Monitor debt service capacity and external debt levels	Monitor national savings levels
Asset Quality	Are accounts at GAAP and regularly reported?	Examine levels of loan provisioning	Standardize accounting of NBFI and and mark to market	Monitor concentration risks	Monitor residential mortgage loan/value ratios	Quality of public investment	FDI vs FPI Debt levels	Capital output ratio as indicator of quality of investment
Management Quality	Central bank independence and monetary stability	Integrity, competence	Integrity, competence	Return on capital, entrepreneur-ship	Education levels	Quality of policy formulation and public administration	Quality of information on domestic economy	
Earnings	Return on foreign exchange reserves	Return on capital	Return on capital	Return on capital	Earnings per capita	Return on capital	Return on foreign investment	Real growth rate
Liquidity	Liquidity management - asset duration	Maturity mismatch Exposure to market risks	Liquidity of financial markets - impact of asset prices	Monitor corporate liquidity ratios		Public sector cash management		National debt management
Operations	Robustness of wholesale payment system	Efficiency and robustness of operating systems	Efficiency of securities markets & clearing systems			Efficiency of public utilities	Linkages with international payments and securities systems	Robustness of overall national payments and transactions networks
Treasury	Management of central bank asset-liabilities	Asset-liability management and treasury risk management	Portfolio allocation	Corporate leverage and equity funding	Exposure to consumer and residential debt	Public debt management	Ability to hedge FDI & FPI	National interest rate and exchange rate risk management

CAR – Capital Adequacy Ratio
 GAAP – Generally Accepted Accounting Principles
 NBFI – Non-Bank Financial Institutions
 FDI – Foreign Direct Investments
 FPI – Foreign Portfolio Investments

combination of policy mistakes and weaknesses in economic fundamentals. To withstand greater shocks, an economy requires a combination of **credible policies, sound fundamentals, good supervision, robust infrastructure and a non-distortive incentive structure**⁴.

The following pre-conditions appear to be necessary for a stable financial system:–

- **Credible policies** demand monetary and fiscal policies that are consistent with each other, and are applied consistently.

4 see Joseph Yam, (June 1995) "International Capital Flows: Opportunity or Threat? View from Hong Kong", Bank for International Settlements, Basle. see also Glaessner, Thomas and Mas, Ignacio, (October 1991), "Incentive Structure and Resolution of Financial Institution Crises: Latin American Experience." Latin American Technical Department Technical Paper, World Bank, Washington, DC

- **Sound fundamentals** include a high domestic savings rate, sustainable fiscal and balance of payments positions, high foreign exchange reserves and prudent debt management.
- **Good supervision** involves the maintenance of solid capital adequacy and liquidity requirements for the financial sector, as well as regular examination and monitoring of financial institutions and markets. The banking system must have the capacity to avoid excessive credit concentrations and risks, and to manage market risks well.
- **A robust financial infrastructure** would encompass an efficient payments and settlements system for domestic and international transactions.
- **A non-distortive incentive structure**, such as taxation or regulatory restrictions that would not encourage risk concentrations or excessive leverage in any economic sectors. Examples are property development tax incentives that led to excessive commercial real estate lending in the US in the 1980s, or land restrictions that fueled the Japanese property bubble. Moral hazard distorts risk management.

Hard Money and Resilient Financial Structures

It has been suggested recently that a currency board is an important anchor of monetary stability for economies in transition. Since Hong Kong has operated a currency board system since 1935, with a totally open capital account and well developed financial system, our experience may be useful to demonstrate that “hard money” is a necessary but insufficient condition for resilient financial systems.

What is hard money? Would anchoring the domestic currency to a reserve currency constitute hard money? Maxwell Fry⁵ suggests that for a currency to be “hard”, “it must maintain its value and so eliminate inflation.” In fact, to maintain hard

money, the monetary authorities must be concerned not only with the level of prices, but also interest rates and exchange rates. The fact that in an open capital market, the domestic investor has a wide choice of financial instruments, both domestic and foreign, must mean that money has acquired a greater liquidity and global dimension than the textbook definition of money as a unit of account, medium of exchange and store of value. In fact, central banks must pay attention to all asset prices, including consumer prices, stock prices and real estate prices, as well as the exchange rate, which is also an asset price.

A currency may be hard because the currency board backs narrow money (M_0) fully with foreign exchange reserves. But, bank-created money (M_3) can be very “soft” if there are extensive bad loans in the banking system, with inadequate bank capital. Similarly, fiduciary money is only as strong as the level of sustainable fiscal deficits.

However, as pension and mutual funds now have assets larger than banking systems, with their liabilities almost as liquid, the concept of money as a store of value is changing. In the past pension rights were illiquid. With financial innovation, a Central Provident Fund holder in Singapore may be able to utilise part of his provident savings on a down-payment for his apartment purchase and buy shares, even though he cannot withdraw his claims on the Fund until retirement. Sudden portfolio shifts by both domestic and external fund managers in an open economy can move exchange rates much faster than the central bank’s ability to stabilise them.

Consequently, we need to understand financial fragility in terms of the impact of such portfolio shifts. These portfolio “re-balancings” do not occur for no reason. We can use the basic monetary equation to demonstrate the impact of credit, liquidity and market risks on the value of money.

$$M_3 = NFA + NC_g + NC_p + NOA \quad (1)$$

where NFA is Net Foreign Assets, NC_g is Net Credit to the Government, NC_p is Net Credit to the Private Sector, and NOA is Net Other Assets

Equation (1) states that the value of broad money (M_3), is a function of changes in foreign exchange reserves (net claims on the external sector), net credit to government, net credit to the private sector and net other assets. We can define the “hardness” of broad money as a function of the level of credit, liquidity, market and other risks to which the determinants of money are exposed. Obviously, the higher the level of NC_g , the greater the exposure to sovereign and public sector risk. Similarly, the higher the level of NFA , the higher the level of foreign exchange backing for the currency, but the greater the exposure to exchange rate risk.

To understand the inter-relationship between bank capital and reserves and money supply, we shall separate NOA into two components: NBC (Net Bank Capital) and NOA' . Since NBC is a liability rather than an asset, the sign changes in equation (2).

$$M_3 = NFA + NC_g + NC_p + NOA' - NBC \quad (2)$$

Equation (2) suggests that when NBC is negative, ie, banks have large loan losses, the risks on the value of broad money actually increases⁶.

By taking changes, equation (3) shows the contributions to monetary growth from the various components. The figures in brackets show the empirical evidence on monetary creation (1984-1994) in Hong Kong. The primary impetus to broad money in Hong Kong remains bank lending to the private sector (which grew by 107% of the increase in M_3) and the increase in net foreign exchange reserves (36%). On the other hand, the fiscal surplus, averaging 2.1% of GDP in the last 10 years, and substantial increases in bank capital and reserves were contractionary on monetary growth.

$$\begin{aligned} \Delta M_3 &= \Delta NFA + \Delta NC_g + \Delta NC_p + \Delta NOA' + \Delta NBC \quad (3) \\ (1.00) &= (0.36) \quad (-0.15) \quad (1.07) \quad (-0.13) \quad (-0.15) \end{aligned}$$

Hong Kong has a currency board regime, with a fixed exchange rate at HK\$7.80 = US\$1, and a strongly capitalised banking system. The full

convertibility of the HK dollar is backed by the seventh largest foreign exchange reserves in the world, amounting to 492% of the currency issue and 34% of HK\$ M_3 at the end of 1995. The average BIS capital adequacy ratio of banks in Hong Kong is 17%. The “hardness” of the HK dollar is built not only on the ability to deliver solid foreign exchange to the currency, but on the fact that loan quality and banking reserves are sound. The fiscal surplus strengthens the “hardness” of the currency by eliminating the credit risks to the government. In many countries, large fiscal deficits add to domestic monetary creation and inflation, thus depreciating the value of currency holdings in real terms.

Looking purely at the credit risk issues, we see that even though there is extremely high foreign exchange backing HK\$ M_3 , the primary determinant is still bank credit, i.e., the quality of bank loans. In the Hong Kong case, that credit quality is very high, because domestic saving ratios have averaged more than 35% in recent years, with very low corporate leverage levels. In the last decade, bank loan losses have averaged less than 0.05%, and the average loan-valuation ratio of residential mortgages is in fact 53.3%, giving banks considerable cushion even if property prices fall substantially. To put it simply, the “hardness” of money is as good as the ability of the banking system to manage its risks, especially credit risks relative to its capital. Whenever that is called into question, there may be a flight to quality (within domestic financial institutions), capital flight to foreign assets, or both.

Let us now generalise equation (2), by taking M as all broad monetary claims against the financial system as a whole (including liquid liabilities of the non-bank financial sector), and adding the element of market risk and liquidity risk into the equation. For simplicity's sake, we shall only consider the interest rate (i) risk and the duration (d) to represent liquidity risk⁷. The exchange rate (r) risk is a major component of market risk, but will not be considered here in order not to complicate the example.

6 Money is being created against bad assets. As experience from a number of weak banking system suggests, banks with negative capital have a perverse incentive to expand credit, and would disguise losses by hiding non-performing loans.

7 The term 'duration' is the weighted average maturity of the cash flow (including coupon and principal repayments) on a bond. It is often less than the original maturity of the bond. The “effective duration” refers to the percentage change in price of a bond due to a change in the reference interest rate. When loans can be prepaid or called, the duration can be shortened considerably. See D. Babbel, C. Merrill, and W. Panning, (September 1995), “Default Risk and the Effective Duration of Bonds”, Financial Sector Development Department, PR Working Paper 1511, World Bank, Washington, DC

$$Mf\{i, d\} = NFAf\{i, d\} + NCgf\{i, d\} + NCpf\{i, d\} + NOA' - NBC \quad (4)$$

Each sector of course has its own structure of interest rates and duration for its liabilities. For example, the duration of government bonds are usually longer than the duration on loans to the corporate sector, while interest rates are lower because of lower credit risks on government debt. We know that the value of an asset is highly correlated to its duration and the level of interest rates. The longer the duration, the larger the decline in asset value due to an increase in interest rates. Let me now introduce an empirical observation that has relevance to financial fragility, which I shall call the law of changing duration:—

Under conditions of uncertainty, the duration of a financial institution's liabilities shortens and the duration of its assets lengthens⁸.

This is the converse of Gresham's law on bad money driving out good money. When the holder suspects that a coin is bad, he keeps his good coins and passes out bad coins in order to reduce his risks to loss. Similarly, when risks of capital loss increase, investors shorten the duration of their monetary claims to improve liquidity and reduce losses due to both credit and market risk, while increasing the duration of their liabilities, which would pass on market risks to their lenders⁹.

This behavioural phenomenon also explains why bank capital can deteriorate almost geometrically when interest rates are increased. Firstly, interest rate increases relative to expected earnings would deflate asset prices, especially share prices and land prices, which form the most common form of loan collateral. As interest rates increase and corporate earnings are adversely affected, borrowers have an incentive to delay repayment, thus lengthening their liability duration. When loan collateral values fall below loans outstanding, the lender's exposure to credit risks accelerates while net capital declines. At a certain level of interest rate, even the best borrowers would default as the market value of their liabilities outweigh the market value of their assets.

Secondly, even though banks may lend to the public sector to reduce credit risk during a period of uncertainty, they cannot wholly reduce their market risks. Even the government cannot lay off its risks without large foreign exchange reserves that are negatively correlated to domestic assets. If forced to absorb domestic losses through public guarantees, the larger fiscal deficits would have to be financed either through inflation or taxation or both. The resultant higher interest rates would reduce the market value of public sector debt, especially fixed rate debt, and pass the losses to holders. Thus, marking bank balance sheets to market prices due to higher interest rates would reduce the value of bank capital. Under conditions of high real interest rates, banks can quickly become insolvent even if they are holding exclusively government paper. As is now well known, perverse incentives arise when both state-owned banks and state-owned enterprises operate with negative capital.

The lesson from the above is that just as excessive financial repression using negative real interest rates is bad, so is the use of excessive real interest rate policy to stabilise an economy undergoing high inflation during an economic transition. In fact, such policies worsen financial distress for highly leveraged banks and their enterprise borrowers. As Caprio suggests, premature financial liberalisation with initial conditions of weak banks and under-capitalised firms may lead to conditions of financial fragility¹⁰. For the financial sector to remain strong, not only must it have adequate capital, but the capital adequacy of the sectors on which it has claims must also be sufficiently high to absorb different levels of risks or shocks.

Restructuring the Financial Sector

We can now consider the need for restructuring the financial sector within the framework of derivatives and financial markets. The innovation of different financial instruments (or derivatives) stems from the need to create different types of contractual arrangements to

8 Babbel, Merrill and Panning (op cit) puts this as: credit risks shorten the effective duration of corporate bonds.

9 For example, a corporate borrower expecting a rise in interest rate would have an incentive to borrow fixed rate loans with the longest maturity possible. Any rise in interest rates would cause a capital loss to the lender and a capital gain to the borrower, if both assets and liabilities are marked to market. Another example is the tendency of banks to reschedule residential mortgages when loan-collateral values become negative in order to prevent massive defaults, as observed in the UK in the 1980s.

10 Gerard Caprio, Jr., Izak Atiyas and James Hanson, (1994) "Financial Reform: Theory and Experience", Cambridge University Press, Cambridge, Massachusetts

share or distribute risks. Thus, equity markets are derivatives of real assets of firms, whereby the ownership risks are distributed amongst the shareholders. From this analysis, we can conclude that single instruments, such as bank deposits, are inadequate instruments for asset holders to diversify or distribute their risks, especially in times of financial stress. We need different types of instruments, equities, bonds, convertibles, futures and options, in order to hedge different types of risks more efficiently in the economy.

Derivatives can break down asset specificity (lumpiness of assets) and add liquidity. For derivatives to work, they need good information, a clear and equitable legal framework that is fairly enforced, and a robust infrastructure that processes the transaction between the ultimate buyer and seller from clearing to final settlement. Market participants also need time to learn the rules of the game. In a relatively simple financial system, the banking sector provides the superior information, low risks for the depositor and a good payments mechanism. In a more sophisticated or changing environment, when risks are higher, the banking system may not be able to intermediate these risks well, so that other types of financial instruments and institutions must evolve to deal with such risks.

In hindsight, we can now appreciate why centrally planned resource allocation is less efficient than market forces. Government controls over financial sectors create information restrictions, and obstacles to innovation of different derivatives for the private sector to hedge their risks. Instead of distributing risks throughout the economy and even abroad, risks are centralised or concentrated in the state sector, leading to moral hazard and wastage. In a centrally planned economy, the poor quality of information, including lack of generally accepted accounting standards, did not allow both planners and participants to manage their resources efficiently. Without equity and bond markets, state-owned entities had no instruments to manage risks, nor the payment processes to transact efficiently. Worse, the incentive structures were highly distorted towards production according to plan, rather than market needs. With highly leveraged entities, the “big bang” liberalization led

to rapid institutional failure without a legal framework in place to distribute the losses equitably.

Financial fragility is a *condition*. Financial crisis is an *event*. Financial sector restructuring is a *process*. The sequencing of financial sector restructuring requires the insight that the overall objective of restructuring is to allow the market to work, so that resources can be allocated efficiently and risks can be managed well. There are four essential steps in the restructuring process¹¹:-

- A **diagnostic** process, whereby the application of generally accepted accounting and auditing principles and required disclosure by market participants, would reveal the major risks and losses in the system. The use of the national risk management matrix in Table I would assist the diagnostic process;
- A **damage control** process, whereby immediate institutional or supervisory measures are taken to reduce the losses caused by institutional failure ([such as bank failure or borrower bankruptcy]);
- A **loss allocation** process, where the losses are distributed within the economy. In the absence of clear “exit” rules, this has proved to be the most politically difficult. Consider for example how long the Japanese financial system is taking to recognise the extent of losses and to agree on the appropriate allocation of losses between the taxpayer, the depositor and the major lenders to the Jusen mortgage cooperatives; and
- A **re-building of the incentive structure**, so that there are no tax or regulatory measures that distort market behaviour in one direction or the other. In other words, the market must make its own judgment, using transparent information, on its own merits.

Parallel to the restructuring process is the need to get the different financial markets going. For example, one obvious weakness of financial

11 For a full description, see Sheng (1996), *op cit*.

systems in transitional socialist economies is the excessive leverage (low capital base) of state-owned banks and state-owned enterprises. Unless an efficient equity market is built, so that both banks and enterprises can de-leverage themselves, they will not have the capital cushions to absorb the considerable shocks of transition.

Even though Hong Kong has a deep financial system, a review of the risk matrix for Hong Kong showed two areas that required reform. The first related to the high degree of bank asset concentration in property related loans. Even though the bulk of the property loans were floating rate residential mortgages that had a low level of bad loans, it was felt that in the long run, there were high maturity and concentration risks involved by funding long-term mortgages with short-term bank deposits. An Informal Working Group on the Secondary Mortgage Market has already made a report recommending further development of the

secondary mortgage market to diversify such maturity and concentration risks.

Secondly, a review of the existing paper-based payment system revealed that next day settlement of cheques with unwinding provisions was not consistent with modern high value electronic financial markets. The decision was quickly taken to upgrade to a modern, robust and fully electronic Real Time Gross Settlement system that would settle across the books of the Hong Kong Monetary Authority. The system will be operational by the end of this year.

In this world of rapidly changing financial technology and innovation, the policy maker cannot be complacent. The derivatives debacle has shaken our understanding of how the financial system really works, but it has also improved our appreciation of the real role of the authorities in making the markets work better. ☉