Towards a General Theory of Financial Regulation:
Predicting, Measuring and Preventing Financial Crises

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Towards a General Theory of Financial Regulation: predicting, measuring and preventing financial crises

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Regulatory failure causing financial crises has occurred with great frequency in the last ten years in both advanced and emerging nations. Theories of regulation have failed to define and describe the meanings of deregulation, the range of regulatory models and their goals, the significance of regulatory failure, how to measure it and how to prevent it. This paper is motivated by the perception that incorrect design and failure to conduct ongoing performance monitoring of regulatory models in emerging economies as well as in some advanced industrial states is precipitating financial crises. Deregulation is redefined in a framework that recognises the diversity between financial systems that exists due to differences in regulatory models, in the ability to comply with best international structure, in the ownership of the means of production and in the calibre of human and social capital, within the framework of the limiting features of government goals and economic resources and infrastructure. Case studies of regulatory failure in an advanced and an emerging nation illustrate the necessity for a staged approach to liberalisation of a financial system, which takes account of the capacity of the underlying economy and society to conduct effective prudential supervision before attempts are made to remove protective measures. The comparison of fin de millenium solutions in advanced nations of integrated supervisors also illustrates the correct embodiment of government goals in regulatory models and the importance of feedback mechanisms such as the establishment of early warning systems.

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Keywords: Regulatory failure; regulatory models, Deregulation.

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1. Introduction - Background

In the first two years of the new millennium, financial crises which can be attributed to regulatory failure have occurred in two major advanced and two major emerging nations – the USA, Australia, Argentina and Indonesia. In the case of the USA the failure has been one of regulation of agency relationships and corporate reporting. In Indonesia and Argentina the entire regulatory model governing the financial systems failed to deliver traditional goals of stability, safety and confidence, resulting in collapse in both countries of the entire banking system and an ongoing currency crisis. Regulatory failure occurred in the Australian insurance industry in 2001 replicating that in the banking industry in the 1990’s. These failures should be seen in the perspective of the frequency and outcomes of financial crises in the last twenty years where at least ten countries have experienced the simultaneous onset of banking and currency crises, with contractions in Gross Domestic Product of between 5% and 12 % in the first year of the crisis, and negative or only slightly positive growth for several years thereafter (Stiglitz, 1998a). Since the late 1970s, Caprio and Klingebiel (1996) identified banking crises, defined as episodes when the entire banking system had zero or negative net worth, in 69 countries, while Lindgren, Garcia and Saal (1996) using a less stringent definition, concluded that 75% of IMF countries had significant bank sector problem in the period 1980 – 1995, with 87 countries experiencing a currency crisis between 1975 and 1995. In 1998 the Asian Crisis spread to other countries resulting in banking problems in the European Union via the Deutsche Bank and in the USA via the effect of hedge funds, such as the Long Term Capital Fund.

These cases illustrate the enormous gap between theories of regulation and the reality of financial crises. Not only is there a lack of definition as to what constitutes a financial crisis, but there is a lack of understanding of causes, measurement, anticipation and prevention. In part this derives from failure of existing theories of regulation to put forward a cogent argument for the role of regulation, and failure of such theories to incorporate concepts of economic and social development, which emphasise the importance of appropriately designing and tailoring regulatory models to the specific stage of growth of the underlying society and economy. Assumptions as to the correct regulatory model are evident in ratings ascribed to nations. When categorising political risk as an input into country risk rating models, rating agencies put at the lowest end of the scale government controlled economies, while free enterprise economies were given the higher rating, without identifying the rationale for this assumption (Nagy, 1984). Even after the 1998 crisis the “Washington Consensus” as first described by Williamson (1990), practiced by the IMF and criticised by Stiglitz (1998b), promoted free market policies of privatisation, liberalisation of the financial system and removal of government controls as a panacea for
emerging nations and financial crises, not recognising these as means not ends and only capable of being effective if the economy has reached a certain stage of growth.

Defining regulatory change necessitates understanding the way financial systems can evolve. A taxonomy of regulatory models is a prerequisite as it outlines the diversity of permutations and combinations that can exist across financial systems, and hence how regulatory failure resulting in financial crises can occur by governments changing the regulatory model governing a financial system without a clear understanding of their own goals, the available economic resources and infrastructure, the legal system and quality of human capital necessary for compliance with regulatory standards, as well as limiting factors such as existing ownership structure and barriers to change all of the aforementioned factors.

This paper introduces such a taxonomy (Section 3) as it clarifies the existing debate regarding regulation and constitutes a basis for defining and understanding financial crises due to regulatory failure (Section 4), as well as permitting the development of a new theory of regulation and development (Section 5), which assumes a central role of financial institutions in an economy. Such a new taxonomy and theory allows the prediction and measurement of regulatory failure and its corollary, regulatory success, as it enhances our understanding of how, why and when failure can occur. Hypotheses regarding the effects of regulatory change can then be tested using first a case study methodology of failure in an emerging nation, then empirical tests of regulatory change in an advanced nation, permitting isolation of the necessary and sufficient conditions for regulatory success (Section 6). A comparative analysis of the application of new regulatory models in OECD nations is then conducted to further highlight why regulatory change has succeeded in some advanced nations and not in others (Section 7).

This paper makes a contribution in its development of a new general theory of regulation, in its taxonomy of regulatory models, its definition of regulatory failure and its measurement techniques that can be used to predict financial crises. It also provides a fertile ground for formulation of hypotheses for further research on how best to promote economic development, while suggesting that the major ingredient for successful regulatory outcomes is the development of a monitoring system which permits feedback, and allows early warning and crisis management similar to that practiced by the Office of the Supervisor of Financial Institutions in Canada since 1995.

2. The rationale for regulation of the financial system

Regulation has been defined in a tautological sense by Llewellyn (1996) as the supply of regulatory and supervisory services where the former is defined as prescriptive and the latter involves the exercise of allowable
discretion, even when both services may be supplied through the same agency involving a trade-off. A number of other definitions abound in the literature which imply that regulation of the financial system alters outcomes by controlling the actions of financial institutions and market mechanisms, where control means “power to decide resource allocation, production, and consumption in a manner that displaces the market as an institution” (Howard, 1978, p.1623). These definitions conceive of only two perspectives – the allocation of scarce resources by the state versus the free market mechanism and equate supervisory or prudential measures and regulatory or protective measures with a highly restrictive financial system. Hence the concept of deregulation or liberalisation has unfortunately become confused with the concept of unregulated markets, with no checks or controls, because of the failure to understand how that an enormous range of models exist between the poles of 100% state control and zero government intervention. Table 1 details the full spectrum of deregulation possibilities (Mitnick, 1980, Chapter 9). Deregulation can take place in a formally planned or informally planned manner, with various options or stages within each process.

**INSERT TABLE 1**

Each scenario has a different goal. A formally planned wind down can be managed, guided, or unguided, in response to external demand. An informal or evolutionary form of deregulation would be non or selective enforcement, where a cost benefit analysis indicated that it does not pay to do away with even a poorly performing regulatory agency. This avoids legislative backing for deregulation. The informal alternative is to allow regulatory failure to occur as a regulatory agency passes through all growth stages as its procedures become rigid and it no longer serves public interests, only those of the regulated industry.

Mitnick’s (1980) study of deregulatory possibilities referred to above does not equate financial liberalisation with the removal of all controls both direct and indirect, as these are often retained in part to act as systems checks on the performance of the financial system, and hence on that of its participants. In Asia in the nineties, and in Australia and other OECD countries such as Norway, Sweden and Denmark during the eighties, deregulation in relation to the financial system was largely directed at the banking sector, by stripping the principal regulatory agency, the central bank, of the necessity to impose certain protective measures. The taxonomy of regulatory models outlined in this paper is based on the assumption that in financial systems undergoing deregulation, at the same time that protective measures are removed, prudential supervisory measures to monitor the effects of deregulation should be increased (Currie, 1997). The validity of this assumption has now been recognised as a result of the Asian Crisis (Stiglitz, 1998a,b)
Just as there are no well-developed theories of regulation that provide guidance as to the optimum regulatory mix for an economy at a certain stage of political, economic and social development given limited economic resources and infrastructure, there is no one cohesive theory that prescribes, predicts and helps control regulatory change. In particular there is a need for a theory which counters what Stiglitz (1998b) calls the Washington consensus or neoliberal view, that is the trend to advocate deregulation of financial markets as a prescription to promote economic growth and development, without specifying the means, the method and the mode.

Instead there are six distinct arguments based on six distinct theories which can be reduced to two basic theorems. The six arguments are that,

1. “free markets outperform regulated markets” which is based on the fundamental theorem of welfare economics which advocates competitive equilibrium as an optimum Pareto efficient outcome, where marginal revenue equals marginal cost, preventing discriminatory pricing, and promoting service quality through economies of scale;

2. “regulation is inefficient” as it increases agency costs, distorting agency relationships (Watts and Zimmerman, 1978). Jensen and Meckling (1976) maintained that in an unregulated economy, management will voluntarily agree to supply shareholders with financial information to aid monitoring, because they can do so at a lower cost and because it provides evidence of contractual undertakings not to transfer wealth. Bonding of management is effected by a variety of mechanisms - reputation, as it will reflect in future remuneration; current compensation schemes; dividend covenants; and pricing of bonds, where debt holders are the principals.

3. “the stock market is a ‘fair game’” where information concerning companies is rapidly absorbed making quoted prices unbiased estimates of true market value (Fama, 1970). A stronger version of the Efficient Markets Hypothesis supporting this view claims that investors cannot earn above average benefits analysing financial statements. Therefore regulation is unnecessary.

4. “that regulation of innovations in financial products and services can result in social costs” which are the sum of administrative costs and the smaller of forfeited economies of scope and avoidance and joint costs (Kane, 1987, Sinkey, 1992). Moreover the regulation of innovations in financial services and products will not inhibit the growth of innovations and/or foster them if the benefits of joint production or economies of scope exceed avoidance and joint costs.

5. “regulatory capture occurs as public or private groups manipulate regulations for their own interests”. The origin of regulation, whether from public or private interests will determine whether and how
the regulator is captured. This theory first developed by Redford (1952), is similar to the life cycle theory of regulation, where regulatory failure is seen an inevitable part of growth (Bernstein, 1955, p.169).

6. “experts should regulate themselves as the free operation of ethics is more efficient and effective than regulation.”. Therefore regulation of self-regulatory professions is unnecessary. Such professions use cancellations of membership as the ultimate sanction. As it may destroy a career and livelihood, it should only be decided by the experts, the profession itself.

These six arguments can be summarised into two theorems,

1. Regulation is counterproductive in achieving its own economic goals of efficient resource allocation and its social goal of protection of public and private interests (arguments 2, 3 and 4).

2. The free market mechanism including self-regulation by experts and professional ethics will always produce an outcome closer to Pareto optimality and more likely to promote the enforcement of agency relationships (arguments 1, 5 and 6).

It should be noted that each of the above six arguments and two themes were couched only in terms of national financial markets and the domestic financial system, not of the international system. In part this arises because they were being developed largely during the 1970’s pre the deregulation era and applied only to a tightly controlled function in the economy, such as the provision of accounting information (Watts and Zimmerman, 1977; Jensen and Meckling, 1976). None of the authors ever considered regulation in terms of systems theory. They did not consider how unregulated or poorly regulated markets could raise systemic risk levels and precipitate a crisis in the core banking system of a major trading nation such as Germany with the 1974 Herstatt crisis. Nor did they consider how such unregulated markets could precipitate a major crisis in the international banks such as happened during the less developed country debt crisis in 1982, or how systemic crises could be precipitated by the lack of regulation across several securities markets, which allowed increases in the market risk levels of newly innovated products, such as floating rate notes in 1986 or share derivatives in 1987 and 1989. The world view of those arguing against regulation never envisaged a world of instant twenty four hour globalised trading which interlinked the banking systems of major trading nations. The potential for one crisis to spread from a national market or financial system to another and hence to the international finance system has been documented and analysed not only by the OECD (1991, 1992) but by several authors studying a crisis in one particular sovereign state - Norway (Kaen and Michalsen, 1993) and Brazil (Karafiath, Mynatt and Smith, 1991). Yet such arguments have formed the basis of many government policies in advanced nations and in IMF and World Bank prescriptions for emerging nations (Stiglitz, 1998b).
If either theoretically or empirically the assumption of the superiority of the free market mechanism can be shown to be based on invalid logic or incorrect premises, then deregulatory changes in a financial system may produce effects other than anticipated. The two theorems which flow from the six arguments are also supported by two theories - the Efficient Markets Hypothesis and Agency Theory. If either theory does not hold, a strong case can be made for regulation of the financial system to ensure that financial institutions can perform effectively as delegated monitors of information, screening loans in a situation of asymmetric information. In the ensuing discussion, arguments and theories of regulation are expanded to include all financial institutions as deregulation has led to the growth of financial conglomerates. Traditional segmented financial services markets and products, as well as distribution channels have been merged so that banks now can conduct activities previously carried out by separate autonomous bodies where no cross guarantees existed.

2.1 Role of banks in financial systems and Information Asymmetry

Arguments for regulation of financial institutions rest on assumptions regarding the role of such institutions in an economy and hence the resulting goals of government. These assumptions range from,

1. “financial institutions are safe depositories” providing a guaranteed store of wealth. This assumption is related to government goals of safety in terms of depositor and investor and consumer protection, which can be promoted by ensuring that banks are managed in a prudent manner possible in terms of risk, return and agency relationships (Sinkey, 1992).

2. “financial institutions allocate credit and hence their risk return behaviour requires control”. This can be effected through capital adequacy rules so that loans are directed to certain areas of the economy. This assumption is related to government goals of controlling the structure of the markets goal, so that banking services and products that affect the allocation of resources are provided in the most efficient manner possible (BIS, 1992). This can be further defined in terms of allocative efficiency which is the extent to which the system is successful in directing savings into the highest yielding forms of investment; operational efficiency or the extent to which resource costs are minimised for any given level of service provided and dynamic efficiency or the capacity of the system to adapt to changing needs, generate innovations in financial services and raise productivity (Campbell Committee, 1981, p.2).

3. “financial institutions through the dual functions of promotion of saving, and investment and consumption can ignite instability throughout the financial system and affect economic activity” (Benston and Kaufman, 1986). This is related to government goals of stability in terms of no major disruption being caused to the
financial system’s role in savings and investment flows which could resulted from financial distress of major institutions or financial or real asset price instability.

Agency theory can be used to justify government goals of safety, whereby regulatory intervention is required for the protection of public savings when it is threatened by the behaviour of financial institutions (Stiglitz, 1989). Similarly risk management theories (Davis and Harper, 1991) explain why regulators are concerned with monitoring and supervising the management of certain risks, such as liquidity and credit due to the effect of mismanagement by major banking institutions of the amount and timing of such risks on the other layers of the financial system. Finally theories which view banks as delegated monitors acting as intermediaries between savers and borrowers because of their superior loan screening ability (such as Leland and Pyle, 1977) combined with theories of information asymmetry (Stiglitz and Weiss, 1981) can explain how failure by financial institutions to monitor credit risk in resource allocation can threaten the stability of the financial system.

The Stiglitz and Weiss (1981) analysis highlights several important points. First the ability of banks to screen loan applicants in terms of initial quality, collateral and ongoing performance is central to the efficacy of the financial system. Second for intermediaries to be able to perform these tasks effectively an economy must have a strong legal system, which defines property rights and sets standards for truthful reporting and accounting standards. Third the structure of the banking system can play an important role in minimising the costs arising from asymmetric information. For instance Stiglitz and Weiss (1981) prefer a universal system where the providers of finance having an active role in the internal management of the firm, as enhancing the role of financial intermediaries as delegated monitors.

Given these arguments for regulation associated with perceived government goals and individual theories to explain the role of financial institutions in an economy, what general theories of regulation exist?

2.1 Existing theories of regulation

Sinkey (1992) is the only theoretician to attempt to develop a general theory of regulation. He combined agency theory focussing on problems of hidden actions (moral hazard) and hidden information (adverse selection) with a theory of production of regulatory and financial services where output is dependent on two variables of confidence, and convenience (see Table 2). Theories of innovation (Kane, 1981) and contestability ((Baumol, Panzar, and Willig, 1983) are used to explain regulatory change.

INSERT TABLE 2
The role and importance of government guarantees are most easily demonstrated in the case of distressed institutions. Given the confidence function, a distressed institution is simply one with low or negative net worth, unstable earnings, and unreliable and costly information (i.e., low-quality information). All this is evidence of a breakdown in agency relationships, resulting in increased financial risk and lower return, due to incorrect or poor risk management. It could also be due to imperfections in the information set, which results in banks being unable to perform their role as delegated monitors. That is their loan screening ability is so affected that the credit risk of the loan portfolio escalates, resulting in above normal bad and doubtful debts.

In the convenience function "Geog" stands for the firm's geographic reach in terms of owned and shared facilities (e.g., ATM networks), "Prod" stands for the vector of products and services supplied by the firm, "Cost" stands for the average cost of accessing the firm's facilities, and "Qual’ stands for the quality or speed and reliability of the services generated by the firm. Except for the cost factor, user convenience is positively related to all other inputs. Specifically, as a firm’s geographic reach increases, products, and quality of service expand, user convenience is enhanced. Conversely, as the average cost of using a firm's facilities increases, user convenience is reduced. Unlike the confidence factor, most of the inputs to the convenience factor are hard to quantify.

The implications of this theory is that regulatory changes can be measured by their effect on the quantitative and qualitative measures of these functions. However to complete the amalgam model of regulation we need to understand how regulatory changes occur and what unintended by-products they may produce that are not captured in the above quantifications of confidence and convenience. One of these major side effects is innovation, such as derivatives, and technological change, such as electronic banking. To measure this effect, we need to understand the reasons for its evolution. A further model called the regulatory dialectic or struggle model, adds an additional dimension to the development of the amalgam model of regulation by explaining how regulation develops.

This model is based on the works of Kane (1981 and 1984). Cast in a regulatory framework, the regulatory dialectic pits the regulators against the regulatees in an ongoing struggle. The regulators attempt to impose constraints on the financial system (such as interest rate, product, or geographic controls). The regulatees, who tend to be driven by profit or wealth-maximisation motives, attempt to circumvent the restrictions because these are implicit taxes on their profits through structural arbitrage. This is defined by Kane (1984) as adaptive changes in a firm's organisational form designed to lighten its tax and regulatory burdens. The process creates
costs and benefits for government officials that require reactive adjustments in operative tax codes and regulations.

An important component of the reregulation process is again the contestability theory of multimarket competition. Baumol, Panzar, and Willig (1983) and Kane (1984) which maintains that market structure adapts through entry and exit to permit customer demand to be served at minimum cost. Regulatory interference slows the rate of adaptation by imposing entry restrictions and corresponding avoidance costs on particular firms. In a free society in which multiple legislatures and regulatory agencies compete for regulatees, tax receipts, and/or budgeted funds, authorities cannot induce either great or long-lasting divergences between the actual and the cost-minimising market structure. However this divergence may be justified if it produces greater stability. If regulatory goals in controlling the banking sector restrict entry and exit then it is a non contestable market where the economic principles of perfect competition cannot be applied, economies of scale and scope may best be achieved by a smaller number of larger banks, than by the opposite (Baumol, Panzar, and Willig, 1983).

Sinkey (1992) now relates the regulatory dialectic model in relation to exclusionary rules imposed on financial institutions, particularly rules producing non contestable markets. In accordance with the struggle concept exclusionary rules promote attempts to circumvent such restrictions. The attempts are, of course, not costless. The avoidance costs are the incremental costs of creating an unregulated substitute product or institutional arrangement, such as derivatives provided by over the counter markets. As long as the reduced costs of joint production exceed the costs of avoidance, joint production is favoured. In other words, if the benefits of joint production (i.e., the economies of scope) exceed the avoidance costs, avoidance activities are encouraged. The social cost of a regulatory exclusion is the sum of (1) the administrative costs of promulgating and enforcing the restriction and (2) the smaller of the forfeited economies of scope and avoidance costs. Regulatory changes may be aimed at improving the confidence and convenience functions of banks but may be defeated through the regulatory dialectic process, structural arbitrage and the degree of contestability of the marketplace.

The flaws with this model are its failure to how regulatory change can be successful in promoting the economic and social development of an economy, given independent and exogenous factors of a government goals and economic resources and infrastructure. Sinkey’s theory in its combination of agency theory with a convenience and confidence production function explains the goals of government, but then predicts through its combination of the regulatory dialectic and contestability arguments why regulation will fail.
To develop a new general theory of regulation we need first to understand the vast range of states of nature that can exist in a financial system, so that we can define the components of a model that are necessary for regulatory success, as two of the major inputs to a development strategy are assessing existing regulatory models and those aimed for, to be called the M factor, as well as assessing the legal infrastructure in terms of compliance with best international practice, which will be explained in Section 5 below as the C factor.

3. A Taxonomy of Regulatory Models

Existing classification models are fairly simplistic, such as that of Frenkel and Montgomery (1991) who distinguish only two models according to their use of protective measures, bankruptcy procedures and contractual relationships between banks and customers, ignoring prudential supervisory systems. Another is that of Llewellyn (1996) and of Goodhart, Hartmann, Llewellyn, Rojas-Suarez and Weisbrod (1998) who distinguish between institutional and functional regulation. The former is regulation according to the type of institution or firm based regulation, and the latter is regulation according to activity or industry based regulation.

Very little has been written that refines such distinctions between regulatory models except for that first developed by Grabosky and Braithwaite (1986), and later refined by Ayres and Braithwaite (1992). These authors used an interdisciplinary approach derived from psychology, criminology and sociology to develop a typology to classify the various types of regulatory models of every type of activity, not just the provision of financial goods and services. Grabosky and Braithwaite’s approach concentrated only on the mode of enforcement and is expanded upon here in order to classify regulatory models governing or controlling financial systems according to the types of prudential supervisory and protective measures used, as well as exact modes of enforcement, as financial systems may differ greatly in how they enforce what may basically be the same set of rules.

A regulatory model can be defined as consisting of an agency or group of agencies and a set of measures embodied in legislation or in government policy, which primary goal is to constrain, mould or control the behaviour of financial institutions operating within a national economy. The central regulatory body is accountable to the government, or can have partial or full independence from the government. Its role with respect to financial systems is to evolve prudential and protective measures and check and enforce compliance thereto, by applying sanctions.

Since central bank independence in setting regulatory goals is reflected in the types of measures devised to control the financial system, differences in regulatory models governing financial systems can largely be due to differences in the prudential supervisory methods and protective rules. Prudential, or preventive methods and measures are those aimed at controlling the levels of risk assumed by banks in order to reduce the
probability of bank failures. Apart from differences in the rules specifying risk limits, the prudential side of a regulatory model can have different strengths of enforcement, different systems of sanctions and compliance audits. They are aimed to achieve goals of stability and structure. Protective measures, on the other hand, offer protection to customers of financial institutions or to the institutions themselves in the case of actual or impending bank failures and can be applied at a firm or industry base to achieve the goal of safety (as described in Figure 1).

**INSERT FIGURE 1**

Different models of regulation have developed in different countries over time, even if all have common goals. Some models may be more effective than others in terms of goal achievement. In order to assess any change in performance in the financial system or a sector thereof, which results from a change in the regulatory model, it is necessary to understand the exact components of that model, and hence specify which components have been altered. The most important factors distinguishing regulatory models governing financial systems are the strength of the enforcement mode or regulatory intervention and sanctions applied when checking compliance with measures, and how those compliance audits are carried out, as well as the restrictiveness of protective measures.

### 3.1 Prudential Supervisory Systems

Grabosky and Braithwaite (1986, 1993) view enforcement modes as consisting of pyramids of increasingly stringent enforcement actions and escalating forms of regulatory intervention necessary to ensure regulated firms respond to regulatory goals. They identified seven different types of regulatory intervention, which they called enforcement modes, ranging from weak to strong (non-enforcer to enforcer), based on multivariate clustering analysis, a technique which used thirty nine variables to isolate nine major factors - *resources devoted by the government, citizen participation in the regulatory process, the degree of federalism displayed in the political system, the degree of legalism and use of the adversarial approach, regulatory standards and investigative strategies, sentencing and the use of other sanctions*. These nine factors could then be used to identify seven different types of enforcement modes used to carry out any type of supervisory activity.

The weakest score on the thirty-nine variables which are used to rate agencies according to the nine major factors identified above would lead to the classification of the regulatory model used by an agency as having a conciliatory enforcement mode, while the strongest score on these variables would indicate a strong
enforcement mode. Those regulatory models receiving aggregate scores ranging from two to six would be classified then in direct ascending order between the strong and weak poles. Grabosky and Braithwaite (1986, p. 222) were not attempting a uniquely ‘correct’ classification of every agency’s enforcement mode, but to generate a typology of agencies which is broadly robust.

The seven categories of enforcement modes depicted in Table 3, range from cooperative regulation, self regulation, to detached command and then control regulation. They focus on either particularistic solutions or rulebook solutions. Enforcement modes can be characterised by the degree of aggressiveness, by the degree of publicity given, and by the balance between deterrence and punishment as opposed to positive incentives for exemplary corporate conduct. Aggressiveness can be directly related to the number of staff employed out of the total supervised population.

The first three enforcement modes - the Conciliatory, the Benign Big Gun Mode, and the Diagnostic Inspection Mode - tend to lead to co-operative fostering of self regulation with particularised solutions. Co-operative models are concerned to find the best solution to a particular problem irrespective of the law. The other four enforcement modes called Detached Token Enforcement, Detached Modest Enforcement, Token Enforcement Modes, and Strong Enforcement Modes use all forms of enforcement. They are rule book oriented, being legalistic, applying universal rules codified in law, and tend to use command, control or arms length regulatory relationships. What categorises these models into separate quadrants is their propensity to enforce, with the previous three at the left end of an horizontal axis, representing weak enforcement severity and the latter four at the right hand side of such an axis, representing the strongest end of the enforcement spectrum.

**INSERT TABLE 3**

Enforcement modes are one dimension distinguishing prudential supervisory systems. A further dimension is the range of sanctions which can be pitched at the firm or the industry. A third dimension is the type of compliance audit methods used. Hence the seven enforcement modes can be combined with a range of sanctions and compliance audit methods to produce a variety of enforcement pyramids representing prudential supervisory systems. Under a theory known as the “pyramid strategies of responsive regulation”, there are two possible pyramids representing sanctions - one to represent the sanction pitched at single regulated firms, the other

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1 All tables are a unique application and extension (by the author of this paper) of the taxonomy developed by Grabosky and Braithwaite (1986) and Ayres and Braithwaite (1992). The concept of sanctions and compliance audits in the context of a financial system, the distinction between prudential and protective measures, their ranking as strong or weak and their combination into a matrix of regulatory models is original.
pitched at the entire industry. As prudential supervisory systems are systems of preventive, rather than protective regulation, regulation occurs in a responsive mode, whereby the performance of a bank and/or the industry as a whole is examined. A response is then made, ranging from no response to a maximum penalty moving up a pyramid of sanctions, with a variety of compliance audit methods used to check on the response, such as on site or off site inspections.

The form of the pyramid - whether broad based and high or at the other extreme, narrow based and low in height - represents enforcement of compliance with prudential and protective measures using different kinds of sanctioning as appropriate to regulatory goals, where often secrecy of regulators’ efforts to enforce compliance is necessary due to the effect on confidence of the banking system. The key contention of this regulatory theory is that the most successful financial systems use a broad based but highly pitched sanction pyramid: “Lop the tops off the enforcement pyramids and there is less prospect of self regulation, less prospect of persuasion as an alternative to punishment” (Ayres and Braithwaite, 1992, p.39).

Hence the broader part of the first firm based pyramid of sanctions consists of the more frequently used regulatory sanctions - coaxing compliance by persuasion. The next phase of enforcement escalation is a warning letter followed by imposition of civil monetary penalties, then criminal prosecution, plant shutdown or temporary suspension of a license to operate. Each stage is only followed if there is failure to secure compliance. At the top of the first firm based enforcement pyramid of sanctions, there is permanent revocation of licenses.

Knowledge by a firm of the enforcement pyramid actually increases the effectiveness of the enforcement. If a banking regulator only has the power to withdraw or suspend licences as the one effective sanction, it is often politically impossible and morally unacceptable to use it, because the sanction is so drastic. Withdrawal of a licence involuntarily in banking would result in that bank losing the implicit or explicit guarantee of the central bank, with a likely bank run or cessation of activities, resulting in possible contagion effects in the rest of the financial system. This is one case of the paradox of extremely stringent regulatory laws at times resulting in a failure to regulate, so that the design of the regulatory sanction pyramid should ensure that the information costs to the regulated firm of calculating the probability of the application of any particular sanction acts as a barrier, and that there are sufficient politically acceptable sanctions to match escalations of non compliance with escalations in sanctions by the state (Ayres and Braithwaite, 1992, p. 36).

A second type of pyramid can be used to represent regulatory sanctions pitched at the entire industry which can incorporate forces beyond the agency of the single firm, such as industry associations, which can be more important regulatory players than single firms as they can order their individual firms to comply because of clever signally of regulatory pyramids by regulators. Self regulation constitutes the broadest base of the
pyramid, enforced self regulation, the next layer up, followed by command regulation with discretionary punishment. The top layer is command regulation with nondiscretionary punishment such as the imposition of codes of conduct, or interest ceilings on loans, or prudential ratios across the entire banking industry. Obviously self regulation is the least burdensome from taxpayers’ and the regulated industry’s viewpoint. But given the possibility of socially suboptimal compliance with regulatory goals, the willingness of the regulator to escalate its regulatory strategy up another pyramid of interventionism must be communicated.

The range of firm and industry based sanctions are summarised in Table 4 below. Intrinsic to the success of the use of sanctions combined with one of the seven types of enforcement modes is the use of compliance audits of sufficient strength to deter, if not detect, non compliance with prudential measures. The importance of this one factor of strong compliance audits to the effectiveness of regulatory models is highlighted in the new general theory of regulation outlined in Section 4, which highlights that the economic and social development depends on having the type of infrastructure and human capital which can comply with standards set.

**INSERT TABLE 4**

Table 5 depicts compliance audit types. These show a considerable variety, ranging from degrees of offsite and onsite examinations, and utilising a variety of surprise or spot inspections. They also differ in the use of company appointed auditors, who cannot be monitored by the central bank, or central bank appointed auditors. Compliance audits are thus distinguished by dimensions similar to sanction types, ranging from weak to strong whether regulators are checking firm or industry based prudential guidelines or rules.

**INSERT TABLE 5**

Regulatory agencies using weak enforcement modes, such as Conciliators, Benign Big Guns and Diagnostic Inspectorates, tend to use weak sanctions and compliance audits at both the firm or industry level, while agencies using strong enforcement modes, such as Token Enforcers, Detached Token Enforces, Detached Modest Enforcers and Strong Enforcers tend to use strong compliance audit methods at all levels.

This taxonomy of prudential supervisory systems which is unique to this paper thus includes three essential elements -

- the predominant enforcement mode (seven types),
- the type of sanctions (which can be summarised into two categories of strong and weak) and,
- the type of compliance audits (two types of strong and weak).

Different financial systems differ in the strength of each element.
3.2 Protective Measures

The goals of the protective measures described in Table 6 are safety in terms of depositor, investor and consumer protection as well as structural efficiency, to create confidence in the banking system, with subsequent beneficial effects on the probability of bank runs and system crises. At the same time, however, protective measures involve the danger of moral hazard and adverse effects on the riskiness of banks.

INSERT TABLE 6

The separation between protective and prudential measures of regulation is not entirely mutually exclusive. They interrelate in several ways. At times some disclosure rules such as reports to central banks are used in a discretionary sense, and hence become part of the compliance audit process, or at times a form of sanction. Prudential measures are designed to check on the state of risk management, performance and adherence to agency relationships. They are also to check on the success of protective measures, and whether additional protective measures are needed or existing should be removed. In reverse, protective measures often call for supplementary prudential measures. That is, there are particular bundles or packages of prudential and protective regulations which go together.

The main characteristic of a discretionary intervention under safety net or liquidity support schemes is that it is not granted without some element of uncertainty, since some amount of private risk remains. This uncertainty creates obvious incentives for lenders to monitor the riskiness of the financial institutions to which they are lending. Nevertheless, over time certain traditions and practices can evolve, and authorities can be more or less generous in determining the thresholds beyond which help is supplied. Important aspects here are the relation of these discretionary measures to formalised deposit insurance on the one hand, and to routine discount window operations of the central bank on the other hand. Another difficult question concerns coordination between different national authorities in terms of allocation of responsibilities between the parent and the host country in the case of foreign subsidiaries.

Institutionalised protective measures must be applied on an industry basis in order to ensure consistency, so as to promote regulatory goals of safety, stability and structure. Institutional interventions include contractual relationships referred to by Llewellyn (1996), such as deposit insurance systems used in the United States and recently introduced in numerous other countries. In the case of institutionalised deposit insurance, the specific form of the insurance schemes employed can vary in a number of ways. Important dimensions in this context are the fee structure (flat fee versus variable, risk-related fees), the degree of coverage (full versus particular
coverage maximum limits), funding provisions (funded versus unfunded systems), public versus private schemes and compulsory versus voluntary participation. These will be related to the enforcement mode, and graded according to where they stand in terms of the strength of the enforcement pyramid.

Considering protective measures only, and reviewing all likely and possible combinations of protective measures, one can derive a spectrum consisting of,

- weak discretionary measures combined with weak institutional,
- strong discretionary measures only,
- strong discretionary combined with weak institutional measures,
- weak discretionary combined with strong institutional measures, and
- strong discretionary combined with strong institutional measures.

The two halves of the regulatory model - the prudential measures and the protective set of measures can be combined in order to classify regulatory models. The seven enforcement modes together with the variety of strong and weak sanction and compliance audit types, which are an essential part of a prudential supervisory systems, can be combined with the above combination of five protective measure types to define an overall regulatory model governing the financial system. This gives a matrix of $2 \times 2 \times 7 \times 5$, or 140 possible regulatory models.

Under this taxonomy various financial systems having prudential supervisory systems characterised by weak enforcement modes, with weak sanction and compliance audit types, namely ‘Conciliators’ and ‘Benign Big Guns’, can incorporate weak discretionary and institutionalised protective measures. Examples were Asian economies prior to the Asian crisis. Or a model could exist with weak prudential supervision but strong protective measures, such as Australia prior to its banking crisis over the period 1990 - 2. At the other end of the spectrum of regulatory models are various financial systems which have prudential supervisory systems with strong enforcement modes combined with strong sanctions and compliance audit methods, such as ‘Detached Modest Enforcers’ and ‘Strong Enforcers’ displaying a range of strong discretionary and institutional measures, such as the USA. Or strong prudential but weak protective measures, such as the UK. Between the two ends of the spectrum are three enforcement modes which apply their prudential supervision in a weak or medium strength manner - the ‘Diagnostic Inspectorates’, the ‘Token Enforcers’, and the ‘Detached Token Enforcers’.

Use of this classification system provides a foundation to the development of a theory of the inputs which are essential to achieve the outputs of the goals of government and the promotion of economic and social development, as an economy can be characterised by a starting regulatory model. Changes to the model can be
analysed in terms of the components above, and causes of failure or success isolated and measured. However before proceeding to outline this theory we need to define a financial crisis and analyse its causes.

4. Definition of financial crises and its principal cause, regulatory failure

The evolution of the financial services sector in advanced and emerging nations has been marked by a change in regulatory models from one dependent on protective measures to one which has to be more reliant on prudential supervision. The removal of protective measures such as barriers to entry, restrictions on diversification, and ownership structure has led to the growth of financial conglomerates which not only necessitates coordination amongst different regulatory bodies but also means that regulation, whether prudential or protective, must now concentrate on financial institutions, rather than banks, as the latter now can conduct activities previously carried out by separate autonomous bodies where no cross guarantees existed. This also changes the way financial crises can occur and their speed and impact.

Evidence of an association between loss of confidence displayed in financial panics, bank failures, and recessions is provided by the US financial system and by international financial crises, during the 1930’s and 1980’s by Eichengreen and Portes (1986, 1987). They maintain that rather than bank failures causing recessions, multiple bank failures or problems occurred after a recession was already underway, and added to their depth and severity - an association that was repeated across many OECD countries in the late eighties and early nineties (BIS, 1992). US and British monetary history provides a record of intermittent financial failures that has been studied many times by academics and regulators such as Schwartz (1985), Bordo et al., (1993) and Meltzer (1986, p.79), who interpret this as evidence that bank failures do not necessarily precipitate financial panics.

However financial panics invariably involve a failure by the central bank to discharge its duty as lender of last resort to the financial system. Studies of financial crises in the eighties such as Diamond and Dybvig (1983) conclude that the net result of a poorly regulated financial system is the lack of control of the rate of economic growth and inflation, and this precipitates financial crises. Bordo et al. (2002) found that the institutional environment was a key factor in controlling financial crises.

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The literature fails in clearly defining a financial crisis, and analysing its causes. Attempts have been made to explain the Asian Crisis using traditional economic theories specifically blaming misallocation of resources, theories of bank management, political interference via a command or control economy. At times all three explanations are used, together with reasons of underregulation or excessive deregulation. Later studies do emphasise regulatory capture but there is a need to explain exactly what was wrong with the regulatory models applied in these countries and how to correct them. The view of the systemic crises in Asian economies as being a currency crises ignores the OECD's analysis of crises developed to explain the 1987 and 1989 stock market crashes (OECD, 1991).

The OECD (1991) applied a systems approach to explain financial or systemic crises during the eighties and nineties. They viewed a financial system as having four layers - the banking sector, the national financial markets, the international financial markets, and the world economy with market participants connected by trading and regulatory arrangements. Given this framework a systemic crisis is any disturbance, which severely impairs the workings of the system or causes a complete breakdown, while systemic risks have the potential to cause such a crisis. Systemic efficiency can be defined from an operational or capital markets viewpoint.

The OECD used this framework to assess the effects of changes to the financial system, such as innovation or shifts in the regulatory model. The criteria used are the potential of such changes to raise the systemic risk levels sufficiently to endanger the stability of the first layer of the system. Such a disturbance or crisis can then be spread to other systems layers by mechanisms such as derivative products. Such shocks on the real economy can have "real damage potential" if they disrupt the savings and investment processes, undermine the confidence of long term investors; and disrupt the normal course of economic transactions due to a breakdown in the banking and payments systems (OECD, 1991, p15). The extent of such damage would depend on the size and duration of the breakdown as well as on the readiness and ability of monetary and other appropriate authorities to take corrective action.

A systemic crisis can thus be seen as having four stages:

- Stage I begins with a sharp, sudden fall in the prices of securities and derivatives.

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3 Akyuz (1998) attributes it to macroeconomic instability due to poor economic policies.

4 As put forward by Stiglitz, (1997), and extended by Wade and Veneroso, (1998), in terms of lifting of exchange controls causing excessive short-term, unhedged dollar loans which when misallocated led to a liquidity crisis.

5 Radelat and Sachs (1998) claimed that political interference was accompanied by 'insider dealing, corruption, and weak corporate governance'.
Stage II is the spreading of price falls from one market to another.

Stage III is the effect of the preceding stages on international financial intermediaries, leading to the failure of one or more, which could endanger the system through the effects on the liquidity and solvency of interdependent participants.

Stage IV - the effect Stage III has in generating a crisis in the core banking and payments system of the national economies.

Eichengreen and Portes’ (1987) definition of financial crises is consistent with the four stages of the OECD’s systemic crises, having a series of linkages. They analysed the essential anatomy of financial crises as follows: debt defaults lead to bank failures; bank failures lead to further debt defaults, through a reduction in credit; debt defaults and exchange market disturbances interact and finally exchange market disturbances cause further bank failures, which in turn cause further exchange market disturbances.

This definition implies a distinction between generalised financial crisis on the one hand and bank failures, debt defaults and foreign-exchange market disturbances on the other. Eichengreen and Portes (1987) review international crises in the 1930s and 1980s concluding that the banking system and the linkages by which it is connected to the rest of the financial sector play a pivotal role in the propagation of crises. Two sets of factors are important in the process of propagation: asset-market linkages running from debt defaults and exchange-market disturbances to the stability of the banking system, and the role of economic policy in blocking these linkages, thereby insulating the banking system and the economy at large from threats to their stability.

Goodhart (1987, p.85) maintains that it is not the provision of payments services which requires the support of a central bank, but the fundamental raison d’etre of banking itself. That only a bank can purchase the non-marketable or non-marketed, diversified collection of assets that the bank does, due somewhat to advantages arising from economies of scale and the provision of safe-keeping services, but mainly due to the fact that the particular role of banks is to specialise in assessing the economic condition and prospects of borrowers, to act as a delegated monitor.

Non marketable assets are hard to liquefy if depositors seek to withdraw large amounts or refuse to refinance. If debt defaults precede bank and non bank financial institution failures, spreading contagion as envisaged by Eichengreen and Portes (1987) and the OECD (1992), and if price volatility precipitates debt defaults, questions arise as to what exposed the economy in the first place to such volatility, and why are financial institutions so vulnerable. The answer must lie in the lending practices of financial institutions and the role of loan screeners envisaged by Stiglitz and Weiss (1981). Therefore the motivation for bank regulation
arises from the asymmetry of information between banks and non-bank financial institutions and their customers, which necessitates expert loan screening ability in putting non marketable assets on the banks balance sheet, and the exposure of a major portion of bank liabilities to the possibility of withdrawal on demand (Eichengreen and Portes, 1987; Goodhart, 1987).

From this analysis and that of Flood and Garber (1982), we can understand the interdependence that exists between the banking sector and the financial system by distinguishing between bank runs that can cause serious systemic disturbance, and those that do not have the potential to cause major dislocations in the allocation of resources, savings and investment. The differences hinge on whether there is a flight to other currencies and hence offshore banks, a flight to gold, a flight to cash, a flight to alternative investments, a flight to non bank financial institutions, or whether there is a flight to other domestic banks.

Unlike Diamond and Dybvig (1983) who consider that only three scenarios of bank runs of flight to cash, gold or offshore are serious as they take funds out of the system, Goodhart (1987, p. 88) maintains that the other scenarios of flight to alternative investments, or to non bank or even to bank financial institutions, can severely impact on the economy. This is due to the fact that bank runs occur when conditions have turned adverse, so that many loan assets cannot be paid. Or if borrowers can repay loans, because conditions are adverse, they cannot refinance their ongoing needs. Thus bank failure can jeopardise not only depositors’ wealth, but also the economic well being of borrowers.

The interdependence of banks with the other layers of the financial system derives from the bottom up, from the ordinary cheque clearing systems, through the foreign exchange markets to the high powered derivative markets. Correspondence banking, or the determination of inter-bank limits, which involves the assessment by each bank of the amount of risk it will accept from another bank, results in the present global payments system in any one bank at any time being owed or owing large sums by or to other banks. The failure of one bank can have both knock on and contagion effects within a national system of inter-bank relationships, or an international inter-bank markets as well.

Saunders (1987) has examined the potential sources of contagion in the inter-bank market and the effects on interest-rate spreads, loan/deposit flows and bank equity. He argued that while a considerable potential for contagion results from asymmetric information among contracting parties, due to imperfect information collection and monitoring costs in markets for uncollaterised loans, the actual settlement process itself creates an ‘institutional’ contagion potential. This arises not just from the ability to spread credit risks of participating banks, but those relating to sovereign risk and liquidity risk. These arguments rely on claims regarding the
special relationship and links between banks themselves both within a national economy and within the international economy. In that other financial institutions are performing the role of banks as safe depositories such as superannuation/pension funds and insurance companies, also affecting confidence, the arguments above apply equally to such institutions particularly when they are part of a large banking conglomerate.

Applying the arguments regarding the role of regulation (outlined above and in Section 2.1) financial or systemic crises can be attributed to regulatory failure, which allows a shock, usually price volatility, to enter the financial system raising systemic risk levels and lowering systemic efficiency. For instance in 1987 failure to supervise banks credit risk led to uncontrolled lending to entrepreneurs, margin loans and property developments which resulted in several years of price instability and eventually bank failures in some OECD nations. In 1997 the net result of a similar failure to supervise loans to emerging nations and lending within those nations impacted on all layers of the financial system. In the USA in 2002 regulatory failure of the corporate reporting of some large high profile non financial institutions has resulted in international security price volatility. Hence we need a definition of the severity of regulatory failure resulting in financial crises. The scale used herein is an arithmetic scale from 1 to 10 where the series represents an escalation in severity as follows:

1. Volatile security and asset prices, resulting from failure by central banks to target inflation and prudentially supervise the risk behaviour of financial institutions,
2. Failure in major corporates, and/or a minor bank and/or a major non bank financial institutions,
3. Removal of funds from minor banks and/or non bank financial institutions to major banks or to alternative investments such as prime corporate securities,
4. Removal of funds from corporate securities to major banks, precipitating further volatility or at worst a stock market crash,
5. Removal of funds from major banks to government guaranteed securities, such as postal savings accounts in Japan,
6. Flight to cash and or gold,
7. Contraction in lending leading to lower economic growth, disruption to savings and investment,
8. Failure in major non financial institutions, and failure in major non bank financial institutions,
9. Failure in major banks,
10. All of the above together with a currency crisis leading to rapid depreciation, rescheduling of external country debt, higher inflation and negative economic growth.
Despite defining financial crises according to the OECD (1991) schema and using the above scaling of crises, a new theoretical framework is needed to aid in the prevention of such crises and isolating the optimum strategy for development of emerging nations, while avoiding the Stiglitz criticism (1998a,b) of one size fits all.

5. Towards a New General Theory of Regulation

The rationale for a new general theory of regulation is the need to recognise that,

1. regulation is required to promote a stable economic structure in order to prevent the price and output volatility that can lead to financial crises resulting in declining or negative economic growth. This can be achieved by central banks having an independent preeminent role to target inflation and induce the correct price signals regarding the cost of capital in order to mould market participants’ behaviour as to the allocation of scarce resources;

2. regulation is multi-faceted and also involves establishing a regulatory model the role of which is to contain and mould the risk taking and management behavior of both financial and non financial institutions as well as market participants through prudential supervisory systems appropriate to the strengths or weakness of the protective measures.

The theory assumes a central role of financial institutions as outlined in the Section 2.1 above and hence the design of the regulatory model, called the M factor, must be taken as a starting point to promotion of an economy and society up the development scale.

However it is postulated that there are three other factors which are necessary to the achievement of economic and social development in an emerging, transition or advanced nation, but that they are not sufficient without the interaction of these factors, which requires a feedback mechanism or adjustment process between the components of the envisaged system. This feedback mechanism promotes the advancement up a scale representing the degree of development of all four factors.

In this theory economic development is defined as sustainable growth which can be measured at the level of the individual by the increase in a maintainable and stable level of income per capita, at the corporate or institutional level by the increase in a maintainable and stable accumulated earnings per capita, and at the country level by improvements in the ratio of external debt and current account balance to Gross Domestic Product (GDP), as well as increases in the level of maintainable and stable GDP per capita. Social development is defined as growth in the equitable distribution of wealth, which can be measured by the dispersion and
distribution of per capita income, and participation in institutions, which could be measured by a scale ranking the democracy of the government of a country. The distinction between emerging, transition and advanced nations can be made using scores derived from these measurement scales.

The other three factors which are necessary to the effective operation of the M factor in order to promote economic and social development are:

1. establishing the legal infrastructure – competition, bankruptcy, commercial and criminal laws, which will promote compliance with best international practice, as set out in the Compendium of Standards developed by the Financial Stability Institute as a result of the Asian Crisis, but recognised before the Crisis in the World Bank’s Strategic Compact (Stiglitz, 1998b). Such legal infrastructure may contain legislative barriers to entry and exit to the finance sector to promote stability. This is the C factor.

2. Changing the structure and pattern of ownership of both financial and non financial institutions from state ownership and/or control by elite power groups to that which is broad based involving both direct and indirect ownership. The latter can be achieved through employee share ownership trusts, pension or superannuation funds, publicly listed funds, community and family groups. The necessity for the O factor lies not only in the improvements to efficiency and removal of political intervention (OECD, 2000), but also in the promotion of participation in adapting a development strategy to the needs and capacities of the underlying economic and societal systems (World Bank, 1998). Participation is required to build consensus and induce change from within (Stiglitz, 1998b, Section IV). The O factor requires a knowledge basis for understanding the rights and obligations of ownership, and leads to demand led investment in education.

3. Improving the quality of human capital, in terms of education, knowledge and skills. The importance of this factor lies in embodying ethics and values to reduce corruption, in the promotion of the understanding necessary to the acceptance of the goals of regulation. In this theory human capital or the H factor, involves not just increasing the capacity but learning, but enabling the individual to participate in a financial system so that social and organisational capital, or the interrelationships and systems for mediation and dispute resolution, can be adapted to increasing stages of development.

While these components, M, C, O and H are interdependent, economic development (or \(Y_1\)) tends to be more a function of M and C, while social development (\(Y_2\)) is promoted by improving the O and H

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6 See Financial Stability Forum - Compendium of Standards, initial page, key standards and home page - also refer direct to their website: http://www.fsforwn.org/.
factors. Although the case studies of Indonesia and Australia will illustrate the relationship between Y, M, and C, other studies have confirmed a systematic relationship between market liberalisation and economic crises (Demirguc-Kent and Detragiache, 1998) and why liberalisation may not yield higher growth (Furman and Stiglitz, 1998). The role of ownership in social development has also been documented in case studies (Isham, Narayan and Pritchett, 1995; World Bank, 1995), while the World Bank has recognised the role of H by assuming a role as a knowledge bank with one of its central tasks being to help countries close the knowledge gap (Wolfensohn, 1998). While the Asian crisis illustrates the need for M and C, the Russian case illustrates that given a high level of H, that increasing private ownership was not sufficient without increasing the distribution of that ownership (Stiglitz, 1998b, p.10).

Government goals (G) influence the development of M and O. That is, they are policy dependent factors. If these goals are consistent with the creation of a strong, competitive, stable and efficient private sector while preventing financial crises, they will be geared to macroeconomic stability, structural efficiency, depositor safety, user convenience and confidence of participants in the market system. These terms were defined in Sections 2.1 and 2.2 above and can be called S, S, S, C, C. If government goals are not consistent with this set of parameters which define and limit prudent behaviour of financial and non financial institutions, then economic and social development policies directed to the M and O factors will not be optimally designed to achieve the maximum welfare function. For instance a concentration on maximising output can lead to hyperinflation, or if spreading ownership and control is resisted due to power elites, then productive efficiency can fall. If state ownership exists, or control by power elites, then policies of privatization accompanied by encouragement to changes in lending and remuneration practices will be needed. The latter could involve capital adequacy requirements to promote housing and equity linked loans, as well as the compulsory provision of share bonus schemes, employee share trusts and/or superannuation packages. The government must identify its role with respect to the O factor – what goods, services and infrastructure in terms of transport, roads, hospitals, education, housing, defence, police – are to be deemed to be the responsibility of the public sector, how it can share responsibility with the private sector and encourage its development by providing initially vital communications and transport infrastructure.

However here the E factor, or the starting set of economic resources and infrastructure, both developed and undeveloped, influence the attainment of economic growth and social development by limiting, influencing and constraining C and H. An economy needs to devote economic resources to the development of a legal infrastructure and the improvement of human capital which is vital to the organisational and social
capacity and all types of expertise necessary to implement C, M and take advantage of O. H requires health and educational services, and although the development of other factors will create the demand, it is supply limited. An emerging nation, or for that matter an advanced nation which wishes to increase its wealth and production frontier outwards, may need to initially dedicate capital internally, and then seek external funds through public private partnerships, direct foreign investment and aid.

**Y\textsubscript{1} and Y\textsubscript{2} can interact positively**, which could be in an upward stepwise or exponential function in an economy where goals are set optimally to structure M and O in the correct direction, provided economic resources are dedicated to the promotion of C and H. Or **Y\textsubscript{1} and Y\textsubscript{2} could interact negatively** in a Cobb Douglas pattern, or even downward step or concave curve when the direction of G and E results in dysfunctional policies to M, O, C and H. To understand this interaction we need a measurement scale for the factors of development, in order to act as benchmarks for the monitoring of goal achievement. This enables a feedback mechanism to occur, so that through social learning demands for adjustment of strategies controlling G and E can occur, so that **Y\textsubscript{1} and Y\textsubscript{2} can be increased or redirected**.

**M can be measured using a scale representing the taxonomy of regulatory models outlined above.** An emerging economy with almost 100% state ownership or elite control may need to slowly weaken protective measures while increasing the strength of prudential measures. Hence the strength of the prudential supervisory system could be the dominant measurement factor with a 1 to 7 point gradation matching the seven main types of models described above, in Section 4.

**C could be measured according to compliance with the Compendium of Standards.** The objective of the Compendium of Standards is to provide a common reference for the various economic and financial standards that are internationally accepted as relevant to sound, stable and well-functioning financial systems. The Compendium highlights 12 standards which have been designated as key and deserving of priority implementation depending on country circumstances, and includes around 60 more standards considered relevant for sound financial systems. While the key standards vary in terms of their degree of international endorsement, they are broadly accepted as representing minimum requirements for good practice and cover macroeconomic policy and data transparency, institutional and market infrastructure (insolvency, corporate governance, accounting, auditing, payments and settlements, market integrity) as well as compliance with financial regulation and supervision, such as banking supervision, securities regulation, and insurance supervision. The latter financial regulation standards are included as a C factor as the performance of M needs constant checking through legal test cases and convictions, as the form of M may appear to be that of a strong
prudential supervisor but the substance may be different. The IMF now conducts ratings of countries according to compliance with the Compendium of Standards, and this could be used as a scale to measure whether the necessary legal infrastructure is present, together with World Bank assessments of judicial independence.

The dispersion of ownership and control, the O factor, should be evident in statistics of shareholdings provided the economy has an established stock exchange with data transparency. Obviously such a scale would start from 100% state and move to 100% private with standard deviations of dispersions around a mean distribution of private ownership scaled in to indicate concentrations of private ownership, which may be dysfunctional.

The level of the H factor could be measured by a combination of inputs, such as the percentage of population with basic literacy and numeracy skills, secondary, tertiary education, the number of books sold per capita, education level of women, internet use, standard of health services, longevity, and the number of cooperative and community groups including charities, and their relative size or contribution to GDP.

The theory envisages a key role for regulation in that if government goals are expressed in terms likely to maximise the efficiency of the financial system, then M, O, C and H will develop in a manner to raise the level of $Y_1$ and $Y_2$. In the theory changes to M must be assess in terms of the economy and society’s capacity to develop O, C and H. Changes must be incremental and continually monitored through assessment of the degree to which the factors are moved along their own scale against the measurement scales of $Y_1$ and $Y_2$. Hence M is a starting point of the development process and the effectiveness of its outcomes requires a unique monitoring process which assesses how well changes to the regulatory model achieve the goals of S, S, S, C and C. Such a monitoring process together with essential hypotheses is described in Sections 5.1 and 5.2 below.

The new general theory of regulation thus conceives of a national economy as set of interrelating systems and subsystems which can be described in terms of a matrix (see Figure 2) and a set of equations.

**INSERT FIGURE 2**

If Government Goals or $G = X_1 = f (S, S, S, C, C)$ where the terms

- safety (S), stability (S), structure (S), convenience (C) and confidence (C) are defined in the text.

If Economic Resources or $E = X_2 = f (D, FDI, K, A)$

- As explained in the text the availability of economic resources to devote to C and H will depend on government funding which may require deficit spending (D), direct foreign investment (FDI), private capital formation (K) and foreign aid (A).

Economic Development or $Y_1 = M (X1), C (X2)$

Social Development or $Y_2 = O (X1), H (X2)$
It is postulated in the above model that $Y_1$ or Economic Development decreases then decreases as $M$ advances. This is due the initial effects of deregulation of protective measures and the time lag before learning effects of a changed regulatory model and the requisite increase in the strength of prudential supervision and hence compliance, or the establishment of legal infrastructure to induce compliance, take effect. The resulting increase in $Y_1$ may be at a decreasing rate as decreasing returns to scale of compliance are experienced, as the legal infrastructure may become burdensome, clogged and lead to obstacles. This requires input from $Y_2$, Social Development, to ensure the feedback mechanism leads to changes in $M$ and $C$ in terms of less burdensome protective measures, and less resources devoted to $C$, as increases in the $O$ factor results in private sector regulation through the social and organisational capital embodied in agency relationships. Such self-regulatory market mechanisms induce compliance without the dedication of economic resources. Also the $H$ factor will contribute to more effective prudential supervision through enhanced skill levels both within the regulator itself and within financial institutions.

Social Development or $Y_2$ may increase at a decreasing rate as efficiencies are realised and/or agency relationships are distorted by a poor performance of $H$, or $M$ or $C$. Returns to scale on $H$ may display a similar pattern or even a Cobb Douglas function due to sectoral imbalances and failure to adjust rapidly to changing demands. The time lag to produce in country expertise and technology may be one explanation. These functional relationships require empirical investigation and verification.

There is one important assumption regarding this theory. It is a theory of financial regulation where trade policy is assumed to be neutral, although these two models interact as described by Stiglitz (1998b). Trade liberalisation confers benefits in not only causing an outward shift in the production frontier, but through direct foreign investment enhances $E$ and $H$ via the injection of “management expertise, technical human capital, product and process technologies, and overseas marketing channels” (Stiglitz, 1998b, p.37). If a country’s goals are inconsistent with trade liberalisation, and the economic resources and infrastructure required are not there to ensure even transmission of benefits, or if its trading partners are practising protectionist policies towards imports of goods and services and export of intellectual property, then this is another factor which can inhibit economic and social development and prevent financial regulation achieving goals. Although the theory as outlined herein applies to regulation of the financial system it could be applied equally with adaptations to regulation and liberalisation of trade.

The advantages of the new general theory of regulation outlined above are that it focuses on factors not traditionally regarded as drivers of economic growth and social development. For instance privatisations have
been advocated as a cure all without considering the necessity to combine privatisations with spreading ownership and control through employee share ownership trusts (ESOTs), or structured remuneration packages or discounted share issues to customers promotes economic growth and heighten consensus (Kelso and Kelso, 1991; Ashford and Shakespeare, 1999). A recent IMF survey\(^7\) highlighted the spread of ownership as a principal contributing factor behind the recent high comparative growth rates of the Australian and Chinese economies. In those countries privatisation was accompanied by a dramatic increase in direct investment by shareholders in the stockmarket. This was achieved by the issuing of employee options, but also through the mandatory superannuation in Australia, and ESOTs, as well as issuing shares at a discount to customers of a company being privatised.

It also is derived from the experience of past financial crises, and from theories regarding the importance of moulding and controlling the behaviour of financial institutions and market participants. Previous models of economic development have emphasised some of these factors as ends not means, and have not considered absorptive capacities (Rostow, 1960) or the necessity to assess the existing capacity and structure then tailor transition stages, taking account of the fact that government goals and economic resources can only be effectively transformed from within. Such models also fail to emphasise the need for ongoing monitoring which requires a measurement technique to assess behavioural changes.

### 5.1 Measurement of regulatory failure

In designing regulatory models appropriate to a government’s goals, given the starting level of economic resources and stage of economic and social development, we need to assess the performance of the starting, transition and ending regulatory model. This necessitates the use of measurement techniques to assess effectiveness of regulatory models and changes in it. One method is to use measures of stability such as:

1. exits and failures of banks, when the reference is to winding up, or sale due to insolvency;
2. a lack of community confidence in banks;
3. a weakened banking system beset by poor profitability and low capitalisation, and

\(^7\) IMF, 2001. Speakers argue that ownership, not the number of conditions, is key to success of an IMF program. IMF Survey, 30 (16) August 13, 2001.
The effect of any change in a regulatory model can be assessed by looking at the effect on the behaviour of financial institutions in terms of regulatory achievement of goals of financial stability, structure and safety. Crockett (1997) links the definition of financial instability to efficiency, to an economy where information flows are disrupted to such an extent that the financial system cannot channel funds to productive investment projects in an efficient manner. Other viewpoints lead to the measurement of regulatory failure in terms of macroeconomic losses, being a function of the number of financial institutions that fail, perceiving stability and efficiency as trade-offs in certain circumstance (Kent and Debelle, 1999). Whichever definition is accepted measuring the effects on behaviour of financial institutions of policy changes can be both a lead and a lag indicator of the effectiveness of that change.

According to some theories, bank behaviour can influence changes in macroeconomic variables such as credit, interest rates, money supply, savings and investment – for instance, Wignall and Gizycki (1992), (effect on credit supply and demand), Mills, Morling and Tease (1993), (the effect on corporate funding), Battelino and McMillen (1989), Fahrer and Rohling (1990), (monetary policy), Coombes (1995), (price stability), OECD (1991), (patterns of bank lending and effects on consumption and saving). Hence if those variables change this is taken as indicative of the effectiveness of policy change. This approach has been rejected by the authors themselves due to difficulties in establishing a causal relationship because of intervening variables and other exogenous factors. Moreover when attempting to measure macroeconomic gains they could not quantify such factors as the provision of more financial services, and greater opportunities for users to smooth shocks to income levels via the use of credit and capital markets.

Another alternative methodology to assess policy changes is frontier and data envelopment analysis (DEA) studying efficiency effects resulting from the effects of regulatory change on the structure of the industry, either by creating greater competition, such as more products at lower prices, or economics of scope and scale, which can have the same effect – for instance, Fecher and Pestieau (1993) and Bauer, Berger and Humphrey (1993). When aspects of distributional efficiency or inequality may be a trade off, the qualitative judgement in assessing industry and efficiency effects is difficult. Besides distributional efficiency is only one aspect of efficiency, and limits the total cost benefit analysis of regulatory change. Policy changes may not change factor productivity, but alter the risk profile of a financial institution while creating user benefits or costs. DEA studies are also constrained by choice of minimising input or maximising output (Avkiran, 2000).

A further way of assessing the effects of regulatory change on the financial system is through studies of user satisfaction and changes in consumer behaviour of those utilising banking services. This approach is subject to
limits of subjective assessment regarding trade-offs between outputs. Users focus on maximising their satisfaction, which may indicate greater efficiency but lower financial stability.

The final option advocated in this paper is to use measures that reflect changes in the risk minimisation and return maximisation behaviour of financial institutions, as well as changes in financing and investing patterns, as these can reflect changing agency relationships. The rationale is that the design of all regulatory models contains both prudential and protective measures that ultimately aim to delimit banks’ risk taking behaviour, as well as influence investing financing and agency behaviour. At the same time these regulatory models are seeking to ensure that banks maintain their viability through the earning of adequate returns. Hence measuring changes in the aggregated microeconomic variables of banks and testing for significant changes pre and post policy changes appears a viable option. This use of ratio analysis has often been rejected as being too costly and time consuming with ratios subject to the vagaries of accounting methods and possessing suspect statistical properties (serial correlation and auto correlation), despite this method being the basis of models used by regulators in the largest economies, and despite the ability to use statistical techniques so that only non redundant and relevant cues are used as input.

Regulators use this method in their own assessment of the achievement of regulatory goals using a surveillance system that relies on microeconomic variables. By selecting ratios used by regulators to assess the stability and efficiency of the financial system, this methodology is using an expert system, a model of the man as compared to an environmental model. Ratio analysis of bank’s financial statements constitutes an early warning system for any central bank of the immediate impact of a major change in the financial system. This is because in the literature on financial economics, the numerous studies that model the financial condition of banks show a relatively consistent set of microeconomic variables to be related to bank financial conditions and

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8 Terminology adapted from Human Information Processing literature


hence aggregating these measures across the financial system is indicative of its overall performance\textsuperscript{11}.

The approach used in the methodology advanced herein is based on the principal arguments for policy changes in the finance sector which were either phrased in terms of the advantages of a free market mechanism (based on the Efficient Markets Hypothesis) or in terms of the deficiencies of regulation. The question of defining efficiency is important to understanding what regulators were trying to achieve and how best to measure it. In this approach it is defined in terms of three dimensions which on a micro or firm based level, are easy to operationalize. Allocative efficiency can be measured by changes in the investing patterns of banks, as evidenced by the asset composition of banks. Operational efficiency by changes in return, risk and cost measures and dynamic efficiency can be measured both by changes in investing and finance patterns, as well as the interest margin charged. In fact the latter measure reflects both former types of efficiency, as price rationing can cause allocative inefficiencies while loan stickiness can reflect operational inefficiencies. These effects can then be tested for statistical significance in order to relate any such effects to major policy changes.

Measures of operational efficiency based on financial statements look at aspects indicative of total operating expenses to some measure such as total assets, the break even yield of earnings, the level of auditors’ remunerations to total non-interest expense, personnel expense to full time equivalent employees, full time equivalent employees to every $1 million of assets, and interest expense to interest paying liabilities. Ratios indicative of auditors fees and personnel expenses also have a bearing on agency relationships and can offer an explanation of movements in efficiency ratios, a too low a level of auditors’ fees indicating possible managerial abuse of disclosure methods.

In the discussion of qualitative assessment of the effects of policy changes the main focus of attention has been on interest margins, a lowered margin assumed to be indicative of increased allocative and operational efficiency. Measurement should be on a total firm basis of all interest revenue less interest expense adjusted for bad and doubtful debts, as the latter is a cost of the process of bank lending.

In assessing interest margins overall return ratios of profitability or return on equity (ROE) ratios may move in a different direction. ROE can be decomposed into three components, the net margin and asset utilisation and leverage. When multiplied together these three give the return on equity figure and hence indicate how much the profit result is due to an increase in all banking activities (asset utilisation), or due to a higher interest margin or

due to greater leverage, or due to some combination thereof. The efficiency benefit to consumers of lower interest margins may be offset if the bank grows too quickly (an increase in revenue could be achieved by making larger and riskier loans) and/or increases its overall borrowings.

Theories of bank behaviour that concentrate on the effect of asymmetric information on credit decisions imply savings will be allocated poorly and the return measures of banks suffer if banks cannot properly screen loans. The latter may be due to the legal system failing to ensure that adequate disclosure is made by borrowers in an appropriately relevant, timely and accurate manner, of such aspects as non-performing loans and provisions. To interpret performance measures, we need to analyse risk levels of banks.

Agency theory justifies measuring risks from balance sheet ratios. This allows assessment of how well the interests of depositors, investors, customers, creditors and regulators have been satisfied as to the appropriate bank behaviour in managing the four principal risks that can threaten the stability, safety and structure of the financial system - namely credit risk, liquidity risk, interest rate risk and leverage risk.

The use of investing and financing patterns, and dividend and executive compensation ratios to assess dynamic efficiency is justified by the application of agency theory. For instance performance based executive compensation may defeat the goal of greater dynamic efficiency of a policy change, a finding substantiated by several studies (Davies, 1997; Demsetz and Saidenberg, 1998; Hubbard and Palia, 1995; Instefjord, Jackson and Perraudin, 1998). Where also dividend payout ratios are increasing while return ratios are falling, and retained earnings are declining, this can indicate a breakdown in appropriate bonding and monitoring relationships. It can also be a response to reregulation through the imposition of capital adequacy requirements provoked by excessive innovation as in 1988.

Collins used agency theory to predict that as the environment became riskier due to policy changes, bank management would reduce financing from riskier sources such as external debt, as opposed to capital, in particular retained earnings. This would permit banks to expand into more risky areas apart from the traditional low risk mortgage loans in their lending and investing activities. Dividend policies should reflect the trend towards greater retention of retained earnings, while executive compensation schemes should direct management to behave in accordance with their bonding and monitoring contracts. That is better agency agreements should result from a liberalised environment. On the other hand if a policy change results in the banking sector being suddenly liberalised without reinforcing the legal infrastructure governing disclosure and audit arrangements, agency agreements may be distorted. An alternative viewpoint of policy changes is that
where it leads to innovation which in turn leads to ill-conceived reregulation, this can distort agency relationships (Kane, 1984). The net effect on ratios should be the same whichever explanation is used.

In conclusion, assessment changes in the ratios of financial institutions as measured from their balance sheets (and described in Table 7 below) will permit a more complete analysis of the effects of policy changes on the efficiency of financial institutions, as it directly assesses outcomes according to the criteria of original goals of the policy makers. By altering the regulatory model policy makers are primarily attempting to alter the behaviour of bank management so as to improve the efficiency of the system while maintaining stability, with the latter goal of prime importance. Hence testing for significant differences in ratios over time and between institutions pre and post a policy change allows direct assessment of the success of the regulatory outcome, provided both parametric and non parametric tests are used to adjust for non normal distributions of ratios. Such a methodology can be used as an early warning system as well as a means of testing the effect on a financial system of any change in the regulatory model, as well as being used to categorise the severity of regulatory failure.

**INSERT TABLE 7**

### 5.3 Hypotheses regarding the effect of regulatory change

A number of hypotheses regarding the interrelationships between the components of the model developed above in Section 5.1 require testing, which goes far beyond the ambit of this paper. However we can from the new general theory of regulation develop some scenarios that relate to the assessment of regulatory change. This allows us to test whether outcomes from changing a regulatory model are consistent with the goals of government and will promote economic and social development or are likely to precipitate a financial or systemic crisis. These hypotheses are couched in terms of the ratios that can be measured from the financial statements of financial institutions, but other indicators could be used.

- **H**: After changing components of a regulatory model, return, risk and efficiency measures remain the same;
- **H**: After changing components of a regulatory model return measures increase, but so do risk levels but not to a level to threaten systemic stability, while efficiency measures decline but not to a dysfunctional level;
- **H**: After changing components of a regulatory model return and risk decline, while efficiency measures improve;
$H^i$: After changing components of a regulatory model return measures decline, risk levels increase while efficiency deteriorates.

The judgement as to whether increase in risk levels is suboptimal and likely to threaten systemic stability can be made using the Currie scale to measure regulatory failure. The collection of data regarding the ten stage sequence of regulatory failure is a necessary input into assessing the severity of the movements of risk measures in relation to return and efficiency. It is obvious that of the four hypothesised scenarios, the fourth outcome is not only inconsistent with the optimum set of government goals of safety, structure and stability, while maximising convenience and confidence functions, but is likely to push an economy into a state at the higher end of regulatory failure scale. It could result from a number of causes such as efficiency savings being consumed by management in increased compensation packages, so that they are not passed on to the economy in cost savings. Hence measures of executive compensation and understanding ownership structures (\textit{O}) is a necessary part of the final interpretation as is assessment of the legal and market mechanisms to ensure adequate provision of information both to regulators and to the financial institutions in performing their delegated monitoring role (\textit{C}). The fourth scenario may be a result of poor credit judgements due to low scores on the \textit{O} and \textit{C} factors, which eventually erode risk and return levels. A further possible reason for a suboptimal outcome could be that liberalisation of bank entry rules in a previously strictly controlled environment was too rapid and permitted too many new entrants, creating a rush to increase market share, and resulting in what the BIS (1992) called poor crowd like judgements. This could be directly attributable to the \textit{H factor, the state of human and social capital}.

These hypotheses are a starting point to aid in the design and monitoring of the staged approach to the development of a regulatory model (\textit{M}) for a financial system which is derived from the Currie theory of regulation, given limits of government goals, (\textit{G}), the state economic resources and infrastructure (\textit{E}), and the interaction of the legal infrastructure which results in compliance with the Compendium of Standards, (\textit{C}), the ownership structure of both financial and non financial institutions which reflects the degree of state ownership or control by elites, (\textit{O}), and the state of human and social capital(\textit{H}).

These hypotheses can be tested using a case study methodology, or by applying the measurement techniques outlined above, to determine whether regulatory changes are successful. It also helps determine whether financial crises in emerging and advanced nations are a result of the same factors, or require an explanation that is unique to the history of that economy.
6. Regulatory failure in emerging and advanced nations – is there a difference?

Taking Indonesia as a case study illustrates in gross relief many common elements in regulatory failure. In Indonesia the 1997 Asian crisis rebounded within months bringing to an end 30 years of uninterrupted economic growth during which per capita income had grown in comparative terms from $\frac{1}{2}$ of India’s to 3½ times India’s level (Enoch, 1999). The resultant banking crisis was regarded by the IMF as one of the most serious in any country in the world in terms of effect on GDP and on external debt, with external debt expected to equal 835 of GDP by the end of 2002.

To understand the current situation, the history of deregulation of the Indonesian banking sector is a necessary input. The best description of this lies in the analyses by Enoch (1999) and by Agung (2001). The comprehensive package of deregulation measures introduced in October 1988 had clearly stated reasons, which included measures to promote the export of non-oil and gas products, reforms to mobilise funds, reforms to enhance efficiency, reforms to enhance the implementation of monetary policy, and reforms to develop the capital market. Some of these reforms appeared to increase the efficiency of the market by loosening protective measures, but were accompanied by a total weakening of prudential supervision and protective measures necessary to the containment of the risk behaviour of banks, such as the loosening of legal lending limits to permit 20% of a bank’s capital to be lent to any single borrow, 50% of capital to any group and 5% to any members of business connected with the Board who were not shareholders, with loans against equity participation in a financial institution allowed. Reforms also permitted a dramatic lowering of liquidity requirements for banks and non banks from 15% to 2% of liabilities to third parties, and freed from investigation the background and origin of funds placed in time and savings deposits. This reform now is in direct contradiction to the recommendations of the Financial Action Task Force\(^{12}\) to prevent money laundering issued in 1990.

The structure of the banking system was largely government owned before liberalisation with 70% of the market share controlled by five State Owned Banks\(^{13}\), the rest of the market being dominated by private national foreign exchange banks of which there were ten, branches of foreign banks permitted to work only outside Jakarta in joint ventures, investment finance companies (nine) and co-operative banks. After deregulation in

\(^{12}\) www1.oecd.org/fatf/

\(^{13}\) The Bank Bumi Daya, the Bank Dagand Negara, the Bank Ekspor Impor Indonesia, the Bank Negara Indonesia (1946) and Bank Rakyat Indonesia.
1988 the number of banks increased from 111 to a peak of 240 (Enoch, 1999), so that the market lost its special status as a non-contestable financial system with high barrier to entry and exit necessary to preserve stability. Both family owned banks, such as the Bank Summa, and state owned banks suffered from poor prudential supervision, and experienced falling return and heightened risk ratios, resulting in liquidity problems from within months of the deregulatory programme commencing in 1988.

Rapid deregulation exposed the Indonesian economy to price volatility such as occurred in 1997 through structural vulnerabilities of nontransparent ownership which created portfolio problems through crossholdings of equity and loans, loan concentration in the real estate sector, lack of regulation of non-bank financial institutions, poor enforcement of prudential supervision, poor loan classification and provisioning and no bank exit regulations. That is, the economy was characterised by both a high degree of state ownership and control of financial institutions by elites, giving a negative score on the $O$ factor. Given the spectrum of deregulation possibilities (see Table 1) what Indonesia did was to conduct a formal deregulation which could be regarded as a catastrophic ending to a previous regulatory model of strong protective measures which contained risk taking behaviour by banks and corporations. Their starting model in 1988 was moved back the spectrum to the weakest end of the prudential supervisory scale, to a Conciliatory enforcement mode, with weak sanctions and compliance audits while loosening all discretionary and institutional measures protective measures, taking no account of the lack of legal certainty for borrowers, lenders and investors due to failure to establish bankruptcy laws, accounting and reporting standards and governance codes. To the negative $O$ rating, the government added a negative $M$ and $C$ rating.

The IMF prescribed a three stage/ten step scheme for bank restructuring directed at Indonesia’s response to the Asian crisis (see Enoch, et al, 1999, pp. 10-12), which in retrospect, using the Currie theory, was not only incorrectly designed but had its staged recovery plan in the wrong sequence, a criticism levied by Stiglitz in 1998 and in 2002 (Stiglitz, 1998a,b; 2002). Stage I comprised four steps consisting of management of the acute crisis phase, where measures were utilised to stop the panic and stabilise the system, such as liquidity support to banks affected by runs, then a blanket guarantee for depositors and creditors. Stage II, (steps 5 – 8) consisted of the stabilisation phase, where measures were used to restructure the system. This involved designing the tools needed for a comprehensive restructuring, including the required legal, financial and institutional framework as well as tightening prudential supervision and regulations. Losses were to be recognised with a focus shifting

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14 According to Enoch (1999) Bank Indonesia allowed infringement of capital adequacy ratios by 15 banks, or legal lending limits (41 banks) for rules on foreign exchange exposure (12 banks).
from liquidity to solvency support. The authorities were to design a financial sector restructuring strategy, based on a vision for the post-crisis structure of the sector. Visible banks were to be recapitalised which the Bank of Indonesia did through the injection of fixed interest government bonds, in return for assuming control of bad bank assets.

By 1999 the first eight steps had been attempted to some extent. The net result of the IMF staged plan to recovery was that by 2\textsuperscript{nd} March, 2002 the Republic of Indonesia (RI) had lost more than US$14.3 billion due to manipulation of the Liquidity Support Fund (BLBI), first disclosed by the Supreme Audit Agency (BPK) in May 1999\textsuperscript{15}. From August 1997 to early 1999 Rp144.5 trillion was provided to assist 48 commercial banks to cope with bank runs. The audit agency subsequently revealed that 95\% of the troubled banks misappropriated the BLBI funds. Slow law enforcement meant that when a fire in the Bank of Indonesia in December 1999 destroyed some of the documents of those banks, that prosecution of 80 suspects was thwarted by lack of data. Only a dozen defendants have been indicted with only one conviction, a minor infringement of a banking law. In the case of one bank corruption charges were overturned and the fine imposed was equal to only 0.1\% of the total losses caused of Rp583.4 billion.

By 2002, Stage III consisting of two further steps, 9-10 comprised the recovery phase, or measures to normalize the system, such as nationalization of banks by reprivatization, privatization of government owned banks, restructuring of corporate debt and sale of bad assets, had not been completed. Hence the blanket guarantee issued by the Republic of Indonesia to support family owned or controlled banks could not be revoked.

Failure to complete Stage III may be considered to be one cause of the continuation of heightened systemic risks and lowered systemic inefficiency in Indonesia, with the possibility of a further systemic crisis. However in retrospect it appears that the design and timing of Stage I and II may have made Stage III impossible to achieve, and some of the content of the rescue package may have been unnecessary. The whole package of government guarantees, liquidity support and assumption of control over bad bank assets has suffered from inherent weaknesses of moral hazard. Failure to realise that laws and judicial standards were not in place to ensure the basic infrastructure to effect asset sales and recover debts was another cause. Stage II should have preceded Stage I, and alternatives to the Bank of Indonesia Liquidity Support Fund, bank closures and guarantees of private bank shareholders canvassed.

Continuing elite control of financial institutions has aborted the recovery program as has failure to prosecute and convict for fraud, which apart from limited or destroyed evidence, is attributable to the lack of knowledge of both judges and prosecutors of the banking system and regulations. Judicial independence and training should have been an essential element of the IMF package, which should have preceded all reform attempts. For instance a World Bank report in 2001, when comparing South East Asian judiciaries highlighted the lack of independence and transparency in recruitment and promotion (World Bank, 2001), which concerns were also noted in a Brookings Institutions Brief in September 2001. Despite countries such as Australia funding judicial training in Indonesia, the ability for the Indonesian President to directly appoint judges lacks the checks and balances of the Westminster system.

In addition Indonesia only reformed the legal system to prevent money laundering and minimise bank fraud in the first quarter of 2002, while setting up programs to ensure accountability and good corporate governance. At the same time the Indonesian Board for Reconstruction of Assets (IBRA) was placed under surveillance by a parliamentary committee during the sale of a key bank (BCA) with the independence of IBRA’s chair being questioned, leading to his replacement in 2002.

Regulatory failure on the Currie scale of severity detailed above would rate Indonesia’s systemic crisis at 10/10, with causes attributable to deregulation carried out in a manner of “catastrophic ending” of all protective measures, without improving prudential supervision or putting in place all the essential governance, disclosure, accountability and transparency infrastructure detailed in the Compendium of Standards of the Financial Stability Institute. Not only should the C factor have been improved, but also the M, H and O factors. Indonesia in 2001/2 is still rated as the highest on the corruption scale, with ownership still largely state or elite controlled, with poor overall development of human capital and with a regulatory model that is only starting to develop the prudential supervisory capacity.

Indonesia can be viewed as a control case of total liberalisation of all regulatory measures, together with failure to establish the legal infrastructure in which deregulated competitive financial and non-financial institutions can grow. An advanced nation such as Australia did have the latter infrastructure. So the issue that merits examination is whether theoretical conclusions can be drawn from examining what appears to be a less severe regulatory failure.

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16 http://www.brook.edu/comm/policybriefs/pb89.htm
6.1 Regulatory Failure in an Advanced Nation

Australia has experienced two periods of financial crises and regulatory failure in the last ten years – in the early 1990’s when all State Owned Banks collapsed, and credit losses were incurred by the four publicly listed banks; and in 2001 when the collapse of a major insurance company led to a Royal Commission of Inquiry as contagion was spread through the small business sector via denial of insurance or claims for certain activities or incidents, or through higher premiums. Meanwhile Australia’s biggest medical indemnity provider, United Medical Protection (UMP), was put into liquidation on 3rd May, 2002, with governments having to insure doctors until an alternative medical supplier is found.

The reason for choosing the Australian episodes is that Australia’s financial architecture prior to 1984 was characterised by a Benign Big Gun prudential model – weak enforcement, sanctions and compliance audits, but with strong discretionary and firm based protective measures. Due to strong activity measures and the limited number of banks, with a ban on new banks and foreign entrants, strong prudential supervision was unnecessary. Rapid changes in Australia’s regulatory model were effected during a relatively short time period, commencing in 1973 with foreign banks allowed to own one third of a non bank financial institution. By 1980/81 the deregulation of activity measures such as controls on deposit terms, interest rates, exchange rates and capital flows were commenced. A major turning point was reached in 1984 with the announcement of the granting of sixteen new bank licences. However within four years adverse trends in bank performance led to the introduction of capital adequacy requirements in 1989, but a financial crises, commencing with volatility in financial and asset prices, escalated, resulting in the collapse of sixteen major corporations, the winding up merchant banking and finance company arms of banks, and the collapse of all State Owned Banks over the period 1989-1991. By 1992 the number of corporate failures, had increased tenfold to 10,361 from 1975 to 1992 (Clarke, Dean, and Oliver, 1997) and the extent of bad and doubtful debts in the banking sector blew out to A$28 billion, representing 10% of broad money, with the major Australian bank at that time, Westpac, unable to fill a $1.5 billion rights issue (Verrender, 1997). Since 1992 all major State banks have disappeared into the control of another entity due to the size of their non performing loans (Currie, 2001). The only federally owned bank has been fully privatised.

The Australian regulatory model prior to the commencement of reforms from 1992/3 onwards, did not match best practice in OECD countries in terms of compliance audits and sanctions. The rapid improvements made
after 1993 are a possible explanation of why a crisis in its core-banking unit 1990-1991 did not produce a full-blown run on the Australian financial system. Just as the Bank of England has had pressures of near collapse or failure of banks such as Johnson Matthey in the eighties, and the Bank of Credit and Commerce International (BCCI) and Barings in the nineties, which forced it to move away from its old enforcement mode of regulation by persuasion (Norton, 1991), so too has the Australian financial system. Australia has strengthened its enforcement mode after a committee of inquiry in 1991 was set up to examine regulatory failure of the model governing the Australian financial system. Onsite examinations of banks’ credit risk were introduced, and by 1997 changes to other prudential measures were made ensuring banks attempted to provide for market risk, recording asset securitisation and netting to reflect the true substance, and supervising insurance and funds management activities where banks exert a controlling interest.

Prior to the introduction of onsite examinations in 1992 the Reserve Bank of Australia (RBA) only supervised at arms length. The reform of the prudential measures comprising the Australian regulatory model, culminating in the formation of the Australian Prudential Regulatory Authority (APRA) in 1998, was undertaken incrementally. It was a formal recognition of the fact that liberalisation of protective and prudential measures during the previous decade had failed to produce desired efficiency gains and in fact lowered systemic stability.

Despite strengthening the enforcement mode and compliance audit methods comprising the Australian prudential system, it was not until the Wallis Inquiry in 1997 (FSI, 1997) that proposals were put in place to liberalise all protective measures by removing safety net and liquidity support arrangements, liberalising industry structure by permitting non-banks direct access to the payments system, removing activity restrictions relating to shareholdings, mergers of banks, and bank and non-banks and the level of foreign investment in the

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19 The recognition in 1987 in the UK that prudential measures are such an essential part of the regulatory model that they merit a separate Prudential Supervisory Board governed by its own Act, which directly supervises the conduct of financial institutions, conducting on site examinations, was followed ten years later by the establishment of a supra regulator to monitor all types of financial institutions, the Financial Services Authority (FSA).

20 The recommendation to introduce onsite examinations was made as a result of an inquiry into the performance of the banking system (Martin, 1991, recommendation 26, p.xxxii) and was adopted in 1992.

21 As at July 1, 1998 a separate supervisory body, the Australian Prudential Regulatory Authority (APRA) operating in a similar manner to the UK’s FSA, and the German Federal Board Supervisory Office was established. APRA liaises with the Reserve Bank of Australia (the RBA) when problems of systemic stability are posed by an institution’s management. The RBA by virtue of its monitoring of all payments on a daily basis still has a supervisory role.
industry, allowing banks to take equity in borrowers so as to induce the provision of more symmetric information. Some of these proposals have been put into effect through the Treasurer’s delegated power. Others such as the question of mergers of the major banks still await market tests.

Whether the Australian regulatory model shows improved performance after major regulatory changes can be tested empirically using the measurement techniques outlined above. Such a study has been carried out testing the effects of regulatory changes in 1984 (deregulation of protective measures, such as removal of barriers to entry), 1988 (enhanced capital adequacy requirements), and 1992 (improvement in prudential supervision) by comparing data for the periods 1973-1983, 1983-1992, 1993-2000, 1984-1988, 1989-1993, and 1989-2000 using data from the financial statements of the four major banks (Currie, 2001).

The evidence from this study is that there are a majority of microeconomic measures of changes in return, risk, and efficiency, which when grouped into time periods to represent pre and post deregulation in 1984, display significant differences. These can be interpreted as a suboptimal outcome for all banks as a group, using both parametric and non-parametric tests. To a lesser extent similar outcomes arise for individual banks assessed over the entire time period, or for individual banks comparing pre and post deregulatory time periods. That is, regulatory changes had a significant adverse impact on bank behaviour, even when allowing for a longer time period during which attempts were made to correct the original design of the pattern of deregulation by removing inefficient or ineffective protective measures and adding prudential measures. The evidence supported the fourth hypothesis post 1984 using the time period up until 1992. Changes made in the period 1992-1997 stabilised and improved the situation but when comparing the performance 1973-1983 with 1984-2000, poor bank performance in the years 1989-1992 swamped the data.

The fact that major return ratios of profitability used in this study showed a significant decline post deregulatory was not due to greater competition for deposits and loan customers, as initially companies showed an increase in profits and net interest margin. The decline in return measures post deregulation comparing the periods 1973 -1983 to 1984 -1993 and 1984 - 2000 was due to a significant increase in the level of bad and doubtful debts. The increase in bad and doubtful debts22 can be related back to credit growth since deregulation. Banks in attempting to maintain and increase market share rewarded employees on volume of loans, without risk rating such loans. Given inadequate management and credit skills in the newly de-regulated environment, that is a poor standard of the $H$ factor, rapid credit growth was accompanied by quality loans. It could be argued

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22 For instance, write-offs to receivables increased five times post deregulation, from 0.132% in the period 1973-1993 to 0.565% in the period 1984-2000, a change that was highly significant for all tests at the 0% probability level.
that the general deterioration in economic conditions in the period 1989-1993 was a cause, but countering that is the argument that banks were responsible for that state due to their lending practices, and the inclusion of a period of rising profitability for Australian businesses up until 2000 should negate the poor bank performance prior to 1993. The four major banks suffered from a deterioration in their ability to act as delegated monitors in the immediate post deregulation period in the eighties, together with a deterioration in the provision of information by borrowers, and the monitoring and bonding connected with borrowers’ agency relationships.

The failure to perform as delegated monitors was a result of the interaction of C, O and H factors as well as an incorrectly designed transition model. First Australia had a poor infrastructure for corporate reporting and governance. Although the institutional structure was improved post 1987 by introducing legally enforceable accounting standards, and by the federal government taking over the policing of companies and securities legislation from the states in 1991, it was still found deficient due to continuing enforcement difficulties. This resulted in two further reorganisations in 1998 and 2001 and ongoing examination as a result of the insurance crisis. Second the financial system was deregulated when government ownership of most of the regional banks and one of the big four banks predicated against appropriate internal risk management. Even although these entities were privatised by 1994, changes in Australia’s protective measures have permitted an increasing concentration of private mostly institutional ownership and control in the financial sector with banks and insurance companies permitted to merge, and an increase in the takeover of smaller regional banks by the major banks (Currie, 2001). Third the human capital necessary for a deregulated financial system was not available. Salary levels increased dramatically as bankers were recruited from other disciplines and countries. The banking crisis of the early 1990’s has resulted in the introduction of formal university courses in financial services, with financial institutions demanding this type of certification as evidence of the standard of human capital. The final factor of failure to increase and improve prudential supervision as protective measures were removed has already been detailed above.

The fourth scenario hypothesised for Indonesia also occurred in Australia over the one and a half decades following major deregulatory changes. The conclusions are the same for both the emerging and advanced nation in this case study – that changes in the regulatory model did not strengthen the prudential measures nor remove inefficient protective measures. The Australian Financial System did not move its regulatory model far enough down the spectrum to a strong enforcement mode with strong compliance audits and sanctions, while eradicating dysfunctional measures, such as the ban on new banking entrants that could provided competition at the retail end of the market. In other words there is no empirical evidence to support the null hypothesis that
changes in Australia’s financial architecture have been beneficial. However this finding is subject to qualifications of the methodology used, the measurement problems, the need for a longer time period and more refined measures of efficiency.

Comparing regulatory failure in an emerging and an advanced nation, it is the comparative severity of failures in Indonesia and Australia which reflected in systemic instability that is the most notable difference, as both cases appear to be the result of the same factors – inappropriate design given M, C, O and H operating within the constraints of G and E. According to the Currie scale, Indonesia ranks 10/10 while Australia is ranked 3.5/10 as no formal insolvency of a major bank financial institution occurred in Australia, although several banks have exited by handing in their licence or selling out\(^{23}\), while others\(^{24}\) have been sold or propped up. Several bank owned merchant banks\(^{25}\) have been sold, liquidated or absorbed back into their parent. A similar comment applies to bank owned finance companies\(^{26}\).

However the insurance crisis of 2001-2002 did result in the collapse of a major non-bank financial institution, HIH Insurance, which impacted on smaller superannuation funds\(^{27}\). The resulting systemic crisis appears a 2/10 failure. It was preceded by an exogenous shock to the system – 11\(^{th}\) September, 2001- which caused all insurance companies to not only review their premiums but their entire book. Although some volatility in share prices was caused by 11\(^{th}\) September 2001, the direct cause of the insurance crisis in Australia was regulatory failure. For instance, the APRA was slow in formulating new rules (only introduced 30\(^{th}\) June, 2002) due to the consultation process being held up by the insurance self regulatory authority, which was headed by one of those charged in connection with the HIH collapse. Adverse reports to the regulator were ignored and not acted upon. The withdrawal of institutional shareholdings was not regarded as a warning signal by the regulator\(^{28}\).

Reasons for this need to be sought in the new regulatory model introduced in 1998. The Australian Prudential Regulatory Authority was established as an off-budget institution funded by charging fees to the entities it supervises. This can induce too compliant an attitude to regulatees with user perceptions and client satisfaction

\(^{23}\) For instance, the National Mutual Royal Bank, the Bank of America, the State Bank of South Australia, and the Tasmania Bank

\(^{24}\) The Bank of New Zealand and the State Bank of Victoria, the State Bank of NSW, the Rural and Industries Bank.

\(^{25}\) Security Pacific, Rothwells, Tricontinental, Partnership Pacific, NZI, AEFC.

\(^{26}\) Custom Credit Corporation, the finance arm of the National Australia Bank, and Australian Guarantee Corporation, a wholly owned subsidiary of Westpac Banking Corporation, both owned by two of Australia’s largest four banks.

\(^{27}\) Pension funds.
dominating the regulatory process. APRA does not have the same reporting lines and public scrutiny as the RBA (Reserve Bank of Australia, charged with supervision of monetary policy, payments, and the currency). Nor does it benefit from the multitude of boards or recruitment from outside as does the UK regulatory model, which also has an informal communication network and runs formal training programs to receive timely market intelligence.

Once again apart from the $M$ factor, the $C$, $H$ and $O$ factors as a function of $G$, appear to have contributed to the insurance crisis in Australia. Government goals were focussing on the banking sector as the prime target to be regulated and standards of prudential supervision and reporting of insurance companies were left to lag. Hence compliance with best practice was low. The calibre of human capital both within the regulator and insurance companies was poor. After the collapse of HIH new licensing requirements, educational standards and courses were introduced in universities in insurance. Although ownership of many insurance companies is no longer a mutual form of organisation and HIH was a public listed company, executive options and elite networks meant that control or effective ownership lay with the Board, and the takeover of a failing insurance company, FAI Ltd was made without due diligence tests. FAI itself was largely a family controlled company. Rules for distancing the audit and consulting functions have only been introduced in 2002 and were operative factors in the case of HIH where an ex auditor became a Board member.

From these case studies we can generalise that the differences between regulatory failure in advanced and emerging nations is not simply one of degree, but is also one of capacity to monitor, respond and prevent contagion and escalation in the crisis. Whereas an advanced nation has developed its capacity along the $M$, $O$, $C$ and $H$ scales further, and hence can take greater and more rapid preventive actions, an emerging nation is starting from a lower point on these scales. Another important factor was Indonesia’s protectionist policies to trade and those of its trading partners. Hence there were negative trade factors which were not as marked in the case of Australia as in Indonesia, as the former was well advanced in developing a model of trade regulation, compliance checks, ensuring appropriate ownership structure and education levels necessary to the removal of tariffs. As a result its economy was better structured to withstand any protectionist policies of its trading partners.

The Australian case study also has a bearing on those emerging and advanced nations, which have modelled their new financial architecture on the concept of integrated supervisors. To understand the components of the Australian regulatory model which have been changed with adverse outcomes in this millennium, a comparison

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28 Refer to website for the HIH Royal Commission
with other integrated supervisors such as Canada, may illustrate where Australia’s regulatory model is failing. Causes of the failure of Australia’s new integrated supervisor may be due to the limited powers and responsibilities it has compared to other similar bodies, that is the incorrect embodiment of government goals in the regulatory model via the distribution of powers to prevent failure, as well as design flaws mentioned above, which meant that it became a reactive rather than proactive regulator.

7. New Regulatory Models Compared

The Canadian and Australian regulatory models have evolved from a similar background of English law and practices. However the Canadian system adapted sooner to the challenges of deregulation adopting a more codified practice which could have been influenced by its divergent cultural background. It introduced a policy of staged early intervention and crisis management in 1995 and a uniform supervisory framework for all types of financial institutions from banks, to insurance companies and pension funds in 1999, ahead of the BIS recommendations in 2001 (BIS, 2001). The history of the development of the Canadian regulatory model displays very rapid adaptation to environmental change, compared to the slowness of the Australian response described above, which merits further investigations in terms of the C, O and H factors.

The primary regulator in Canada of all federally chartered financial institutions is OSFI, the Office of the Superintendent of Financial Institutions. By 1997 it was unique in English based regimes as an integrated supervisor of all types of financial institutions with ten years experience since 1987, as the UK and Australia only adopted a single supervisory regime for both deposit-taking and insurance institutions after July 1, 199829. This factor alone, which permitted it to advance earlier along the C and H scales may explain why it was able to cope with the increase in systemic risk and efficiency threats posed by globalisation, deregulation and conglomerations. Changes have been made quickly when problems were perceived. For instance in 1994 the regulation and supervision of various types of financial institutions were handled by separate OSFI divisions with off-site and on-site examinations handled by separate sub-divisions, creating coordination problems. In addition specialisation within OSFI was by industry, and beyond the actuarial and accounting functions, there

29 Although the Scandinavian countries had integrated supervisors from 1986 onwards (Norway, 1986, Denmark, 1990 and Sweden 1991) these countries did not adopt the same approach to continual monitoring of developments and subsequent changes to legislation as Canada. The consequence of failures in those countries affected 90% of bank assets by 1991 (BIS, 1992).
were few dedicated subject specialists\textsuperscript{30}. Following the failure and near failure of a number of financial institutions in the early 1990s, the Canadian federal government undertook a review resulting in changes to the organisational structure of OSFI reducing overlap and duplication, improving communication and coordination while enhancing expertise. Changes were also made in 1996 to the legislation governing supervisory systems for federally-regulated financial institutions, changes to the federal deposit insurance system, changes to the arrangements in place for protecting policy holders of life and health insurance companies, and federal oversight of clearing and settlement systems. These changes resulted from a clear mandate in its legislation, which were spelt out in a policy document in 1995\textsuperscript{31}. Of all the major elements of the policy package, it appears that in retrospect it was the early intervention policy plus measures to strengthen the regulation and supervision of insurers that has resulted in greater satisfaction with the performance of OSFI. An IMF conducted survey in 1999 rated OSFI highly as a regulatory agency, evidenced by its avoidance of problems encountered in the UK and Australia insurance industry\textsuperscript{32}.

\textbf{7.1 The Early Intervention Approach}

Apart from Canada’s strong economic performance and OSFI’s role in promoting good risk management practices, higher capital adequacy and loss reserves, OSFI’s early intervention approach towards financial institutions allowed it to demand a variety of actions when it perceived inappropriate risk taking, failure to limit or control risks adequately, or potential solvency problems. These action plans, when followed by the institutions in which OSFI intervened, usually resulted in those institutions being removed from OSFI’s watch list. The early intervention/crisis management approach has four different stages from Stage 1, Early Warning to Stage 2, where a risk to financial viability or solvency is perceived, to Stage 3 where future financial viability is in serious doubt to the final Stage 4, where insolvency is imminent. Actions taken are described in Figure 3.


\textsuperscript{31} Department of Finance, 1995. Enhancing the Safety and Soundness of the Canadian Financial System, Canada, February, 1995. This document was produced under the mandate of the then Secretary of State (International Financial Institutions), The Honourable Doug Peters.

\textsuperscript{32} OSFI, 2002, p.6.
Necessary conditions to this approach were a legislated mandate for OSFI to take prompt action within flexible guidelines as to when an institution is experiencing financial difficulties, with enhancement of the transparency concerning the steps authorities could be expected to take. A third element required amendment of the financial institutions legislation and the Winding-Up Act to allow institutions to be closed earlier than at present even if not technically insolvent, with more flexible processes to restructure insurance companies in financial difficulty.

7.2 Enhanced regulation and supervision of Insurance Institutions

In 1996 a PPB (Policy Protection Board) was established with a legislated requirement to collect assessments from all federal life and health insurance companies (required to be members) and from provincial companies that opt to be member institutions, in order to facilitate borrowings by the PPB and to enter into going concern solutions for institutions in financial difficulties, where cost effective. The PPB shares information with OSFI.

The assessments give greater protection to lenders to the PPB and an additional requirement that no directors of the PPB be active industry participants eradicates conflicts of interest that have been proven in Australia to lead to non-objective decision making. For instance a director of the failed Australian insurer HIH, was a director of another insurer, FAI that was sold to HIH, and was also Chair of the self-regulatory insurance body. Directors of the PPB have flexibility in setting the levels and method of assessments.

In addition to strengthening the prudential framework for insurance companies, OSFI was given the authority to obtain independent actuarial reviews of all federally regulated insurance companies, to require the company appointed actuary to answer a list of questions, to prohibit the appointed actuary not to hold the position of chief financial officer33, to designate certain directors as related parties and hence require that non related directors who serve on the board of a federal financial institution not be on the board of the unregulated parent. In 1995 OSFI was directed to work with the industry to develop standards of capital adequacy and sound business and financial practices for all federally regulated insurance companies.

These requirements suggested in 1995 and legislated for in 1996 put the Canadian regulatory model in the category of a Strong Enforcer, with strong sanctions and compliance audits not only for banks but for insurance

33 Note that in HIH’s case the auditor left Arthur Anderson to become the Chief Financial Officer.
companies, a factor which only in the new millennium has proven of such critical importance. Other measures included ‘fit and proper’ tests for directors with OSFI having power to veto directors and senior officers as well as allow for their removal.

A further review in 1997 of the Canadian regulatory model lasted two years and resulted in a new Supervisory Framework for all federal financial institutions. The key principles were assessment on a consolidated basis both in Canada and internationally, focusing on risk identification and management with the level and frequency of supervision directly related to the risk assessment of the institution. Supervision includes reviews of major risk management control functions such as financial analysis, compliance, internal audit, risk management, senior management and board oversight, using internal audit reports as well as the results of on-site reviews. Reports to be communicated to the institution with intervention commensurate with the risk profile of the institution after ratings have been assigned according to the Guide to Intervention for Federal Financial Institutions.

Although OSFI is to continue to rely on external auditors and appointed actuaries as to fairness of the financial statements and adequacy of policy liabilities, this is to minimise duplication and modify the scope of OSFI’s reviews. In addition OSFI will carry out benchmarking studies to compare institutions to peer groups to identify best industry practices for dealing with various levels of risk. The supervisory framework then spelt out methods of identifying, measuring and assessing the risk profile of financial institutions of all types.

The effectiveness of these ongoing changes to the regulatory model since 1994 is illustrated by the reducing number of entities appearing on OSFI’s stages of intervention list. As at March 31, 2001 OSFI was responsible for supervising some 500 financial institutions and 1,200 pension plans. Of these only 40 were on the intervention list, most in the “early warning” stage, which was the lowest number since introduction of the early intervention approach 1995/6. Enactment of further legislation in 2001 has further strengthened the regulatory model in terms of consumer protection by establishing a Financial Consumer Agency of Canada, but has blurred the distinction between different kinds of financial institutions, expanding access to the payments system and changing the ownership structure of financial institutions by allowing the creation of bank holding companies and by instituting a new size-based ownership regime for banks and converted life insurance companies.


35 www.osfi-bsif.gc.ca
7.3 Integrated Supervisors Compared

The structure of the Canadian and Australian regulatory models can be clarified by comparing the responsibilities and powers of nine integrated supervisors, chosen as having responsibility for the prudential supervision of both banks and insurance companies\(^{36}\) (see Table 8). Carmichael (2002) distinguishes between regulatory models according to responsibilities given to agencies to supervise and prevent four different types of market failure – anti-competitive behaviour, market misconduct, asymmetric information and systemic instability. In an institutional model, of which the USA is probably the closest example, although it has elements of the functional model, there would be a single regulator for each institutional group with regulation geared to prevent each type of failure. In a functional model, a single regulator would be assigned to correct each form of market failure. Carmichael (2002) considers only Australia’s APRA is close to the pure functional model, with APRA in charge of institutions likely to be subject to material asymmetric information failures, with the RBA monitoring those institutions participating in the payments system likely to affect systemic stability, a separate regulator (ASIC – the Australian Securities and Investments Commission) charged with disclosure and market conduct, while the Australian Competition and Consumer Commission is empowered to prevent anticompetitive behaviour.

The main differences between powers of the integrated supervisors of Australia, Canada and the UK, apart from the fact that the Canadian OSFI regulates only federally licensed institutions, is that Australia has no fit and proper rules, and no powers to remove directors, auditors, suspend operations. The UK FSA has a full battery of powers plus has responsibility for all forms of market failure which came into effect on 1\(^{st}\) December, 2001 when it assumed its full powers and responsibilities under the Financial Services and Markets Act, expanding its goals from the maintenance of confidence in the UK financial system, promotion of understanding of the financial system, protection for consumers, to include reduction of financial crime, defined as money laundering, fraud and dishonesty, and criminal market misconduct such as insider dealing.

\textbf{INSERT TABLE 8}

Other differences between these integrated supervisors devolve around organisation, operational structures, and regulation of conglomerates, regulatory neutrality and public expectations. Some integrated supervisors are

\(^{36}\) Australia (APRA), Canada (OSFI), Denmark (Finantilsynet), Japan (Japanese FSA); Korea (FSS); Norway (Kredititslynet); Singapore (MAS); Sweden (Finansinspektionen), and the UK (UK FSA).
technically government agencies while half are independent authorities. Most have boards of directors and liaise with other agencies and some seek to attract private sector staff. Most use asset based levies and fees for services, but although consultation may occur with industry regarding budgets, no agency is subject to anything other than ministerial veto. Apart from APRA, which has no institutional demarcation lines at any level, being built around regulatory purposes, most have an institutional structure reflecting difficulties in integration. APRA is endeavouring to cope with modern day demands of better regulation of conglomerates (in particular intra-group exposure limits), while achieving regulatory neutrality by viewing all financial institutions in terms of common core risk types - credit, risk, market, governance and insurance.

Carmichael (2002, p. 14) explains the slow approach to overhauling Australian insurance regulation as due to inheriting an enormously diverse regulatory framework. Although identifying the need for a sweeping rewrite of the Insurance Act 1973, it devoted its early policy energy to developing a common set of prudential standards for deposit-taking institutions, then extending the risk-based approach to insurance companies. He claims that should the reform process have been completed before the Australian insurer HIH failed, that it would have identified the nature and extent of the problems earlier. However the new General Insurance Reform Act did not come into effect until 1\textsuperscript{st} July 2002, too late to prevent other insurance failures such as UMP. This was despite ongoing work by the Joint Forum of Basel Committee on Banking Supervision, the International Association of Insurance Supervisors and the International Organisation of Securities commissions urging rapid adoption of core principles of supervision to both banks and insurance companies.\textsuperscript{37} In the UK insurance firms are considered candidates for early implementation in 2004 of new integrated prudential rules to correlate with the introduction of the new Basel Accord\textsuperscript{38}. This comparison reveals that it is perhaps in the specification of government goals with respect to the regulatory models and the separation of powers between the central bank and the supervisory agency that a major flaw in Australia’s regulatory model is revealed. In its design the Australian government is refusing to recognise the goals of safety and structure as well as stability are intertwined with their stated objective for their prudential supervisor of preventing failure in the provision of


information. These goals cannot be separated and are not in the UK and Canadian model appear to be more effective model.

8. A New Research Paradigm – the relationship between regulatory models and economic and social development

As the international Financial System enters the third millennium there is a need to resolve challenges such designing regulatory models that promote economic and social development for both emerging and advanced nations. The former are just coming to terms with bank supervision yet may be forced to cope with problems that advanced nations have still not successfully overcome such as supervision of conglomerates, insurance companies, e-commerce and financial crime.

Some consider that “correcting regulatory failure requires better regulation – which means setting more appropriate prudential and market conduct standards, improving surveillance and strengthening enforcement. Integrated regulation may help facilitate this process, but it does not, by itself, cause these changes to occur” (Carmichael, 2002, p. 6). What may help is more research on regulatory failure, its definition, measurement, and causes, and attempts to validate the inputs into the new general theory of regulation developed in this paper which is based on a taxonomy, a measurement method and scale. A more precise mathematical exposition of the Currie scale of regulatory failure and taxonomy of regulatory models, together with research as to the exact types of functional relationships that exist between the components of the new general theory of regulation would provide a guide to both national and international policy makers, such as the IMF, in attempting to mould economies in the right direction for growth and stability.

A basis for such initial research would be a classification of regulatory models in advanced and emerging nations, and then an ongoing monitoring of the performance of financial institutions, in order to verify the hypothesis that moving the regulatory model towards one with a Strong Enforcement Mode with strong sanctions and compliance audits, but with weak discretionary and strong institutionalised protective measures, will achieve the desired goals of greater efficiency while maintaining systemic stability. This combined with the rating of such nations on the G, E, M, C, O, and H scales and attempting to statistically derive functional relationships between these variables is likely to provide development strategies that are adjusted to the underlying fundamental differences between economies.

Acknowledgements
This paper has benefited enormously from the comments of Professor Maurice Altman, at the Business and Economic Society International Conference in Canada 2002, from the encouragement of participants at the 8th International Public and Private Sector Partnership Conference and from the opportunity to attend the APEC Finance and Development Conference in Beijing in 2002. Presenting this analysis of the Indonesia crisis at the Indonesian Chamber of Commerce in Jakarta on 14th February, 2002 at the invitation of Mr Suryo Sulisto was a great source of inspiration.
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### Table 1: Spectrum of Deregulation Possibilities

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Deregulation (Planned)</td>
<td>Guided or unguided</td>
<td>Wind down</td>
<td>Disintegration with transfer of programs</td>
<td>Stripping</td>
</tr>
<tr>
<td>Informal Deregulation (Evolutionary)</td>
<td>Non Enforcement or selective enforcement</td>
<td>Life cycle effects</td>
<td></td>
<td>Catastrophic ending</td>
</tr>
</tbody>
</table>

### Table 2. Types of Principal Agent/Problems

<table>
<thead>
<tr>
<th>Agent</th>
<th>Hidden Action/Hidden Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governments</td>
<td>Denying that problems exist, off-budget spending, secret campaign contributions, being unduly influenced by the lobbying of special-interest groups, etc.</td>
</tr>
<tr>
<td>Regulators/deposit insurers</td>
<td>Capital forbearance, solvency of insurance funds, conflicts of interest, denying that problems exist, etc.</td>
</tr>
<tr>
<td>Managers of banks</td>
<td>Risk-taking behaviour, bank solvency, dishonesty, denying that problems exist, etc.</td>
</tr>
<tr>
<td>Confidence = f(NW, SOE, IQ, G)</td>
<td>= f(Net Worth, Stability of Earnings, Information Quality, Government Guarantees)</td>
</tr>
<tr>
<td>Convenience = f(Geog, Prod, Cost, Qual)</td>
<td>=f(Geography, Product, Cost, Quality)</td>
</tr>
</tbody>
</table>

### Table 3 - A Taxonomy Of Prudential Systems Enforcement Modes On An Industry Wide Basis

1. **Conciliators**, where law enforcement is rejected and conciliation is used to resolve disputes.
2. **Benign Big Guns**, whereby enormous power is given in terms of confiscation, takeover of activities, seizure, increasing operational rules, banning of products. Powers are rarely used - the threat is sufficient. This model has been called "regulation by raised eyebrows" or "by vice-regal evasion" (Grabosky and Braithwaite, 1986).
3. **Diagnostic Inspectorates**, where supervision is carried out by encouraging self-regulation by well qualified inspectors detecting non-compliance. The goal is a co-operative relationship though prosecution will be used to prosecute individuals, rather than companies.
4. **Token Enforcers**, where co-operative and self-regulation is not important.
5. **Detached Token Enforcers**, where this model is more rule-book oriented, training staff, prosecuting more, seizing assets, targeting repeat offenders.
7. **Strong Enforcers**, uses all forms - licence suspensions, shut down of productions, injunctions and adverse publicity, as well as high penalties.
Table 4. A Taxonomy Of Prudential Systems — Sanction Types

<table>
<thead>
<tr>
<th>Either Firm Based or Industry Based Ranging from Strong to Weak in Strength Of Enforcement:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firm Based</strong></td>
</tr>
<tr>
<td>1. Coaxing by Persuasion (Armchair Chats)</td>
</tr>
<tr>
<td>2. Written and Oral Communication requesting further information (ratios and spreadsheets)</td>
</tr>
<tr>
<td>3. Written advice re escalation in prudential supervisory requirements</td>
</tr>
<tr>
<td>4. On Site Inspections</td>
</tr>
<tr>
<td>5. Seizure of Licenses Arranged Merger, Takeover, Sale</td>
</tr>
<tr>
<td>6. Seizure of bank assets and/or assumption of control of day to day running of the bank by the staff of appointees of the central bank</td>
</tr>
<tr>
<td>7. Revocation of licence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Industry Based</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consultation re appropriate preventative measures</td>
</tr>
<tr>
<td>2. Discussion papers with written and oral input sought from industry via the Exposure Draft process</td>
</tr>
<tr>
<td>3. Imposition of codes of conduct</td>
</tr>
<tr>
<td>4. Imposition of direct controls, such as new prudential ratios, new interest rate ceilings, new reserve ratio rules, new capital adequacy rules</td>
</tr>
<tr>
<td>5. Changes to Competition laws</td>
</tr>
<tr>
<td>6. Cooperation with sister agencies to initiate prosecution to establish a precedent</td>
</tr>
<tr>
<td>7. Changes to licensing rules, changes to banking laws</td>
</tr>
<tr>
<td>8. Enforced divestitures or acquisitions (for instance of non bank financial institutions) on an industry basis.</td>
</tr>
<tr>
<td>9. Nationalisation of the banking industry</td>
</tr>
</tbody>
</table>

Table 5: A Taxonomy Of Prudential Systems — Compliance Audits

<table>
<thead>
<tr>
<th>Strength of Enforcement ranges from Weak to Strong and can be applied at Firm or Industry Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIRM LEVEL</strong></td>
</tr>
<tr>
<td>1. Offsite examinations only using information supplied by the bank itself plus audited accounts, supplied by company appointed auditors</td>
</tr>
<tr>
<td>2. External (company appointed) auditors to supply additional data and reporting directly if concerned regarding a bank’s risk management. Note that this system includes no method of monitoring or controlling company appointed auditors in the event of deliberate or unintentional errors in their reports</td>
</tr>
<tr>
<td>3. Pre arranged onsite inspections of certain risk management aspects of a bank by regulators and/or by Banking Law auditors appointed by the central bank</td>
</tr>
<tr>
<td>4. Surprise or spot inspections to check a bank’s risk management by Banking Law auditors appointed by the subject bank. Banking Law auditors can liaise with Company Law auditors</td>
</tr>
<tr>
<td>5. Surprise onsite inspections of all aspects of banks’ risk management systems, when auditors are appointed by the central bank, not from the same firm as the banking law auditors, or the company appointed auditors.</td>
</tr>
<tr>
<td>6. Surprise onsite inspections but with reports only going to the bank and central bank</td>
</tr>
<tr>
<td>7. Reports published as a method of censure</td>
</tr>
</tbody>
</table>

**INDUSTRY**

1. Industry hearings to check on best practice and to bring banks into alignment. |
2. Special reports commissioned by government using outside consultants. |
3. Government initiated inquiries at which evidence is sought form the public |
4. Royal Commissions presided over by a Judge or appointed by the government |
5. Commission presided over by a specialist appointed by an outside agency eg. The BIS, or the OECD or the IMF, or presided over by another country (For instance the Niemeyer Commission in Australia post the Great Depression and the Royal Commission into the collapse of HIH Insurance Group in 2001).
Table 6. A Taxonomy Of Protective Regulatory Systems — Protective Measure Type (All Industry Based)

<table>
<thead>
<tr>
<th>DISCRETIONARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Safety net schemes, apart from deposit insurance schemes. Safety net schemes can include one or all of the following. If all are included the regulatory model or system is becoming increasingly stronger: implicit or explicit guarantees, special shareholder liability, regulatory intervention, both to ensure depositor protection and to prevent runs.</td>
</tr>
<tr>
<td>• Liquidity support arrangements comprising policies towards lender of last resort and towards the cheque clearing accounts that most banks hold at the central bank (known as Exchange Settlement Accounts).</td>
</tr>
<tr>
<td>• Activity restrictions, such as restrictions on permissible activities, restrictions on branching, restrictions on equity holdings, regulations creating market segmentation, interest rate caps and floors imposed on borrowing and lending, restrictions on interlocking directors, restrictions on banking conduct, through either a voluntary or legislated code of conduct which can escalate from no restrictions as in a Universal Banking model to a Restricted Banking model.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INSTITUTIONALISED</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Disclosure regulations, such as secrecy provisions regarding client details as well as rules relating to what information a bank must publicly disclose. There are two types of information demanded - reports to regulators, such as the central bank, a banking ombudsman, and reports to shareholders, which are lodged with a companies and securities regulators and also available to other stockholders, such as depositors and consumers.</td>
</tr>
<tr>
<td>• Institutionalised Deposit Insurance Schemes, which can range from weak versions using private insurance, flat fees, partial coverage, unfunded, voluntary to the strong version which is a public scheme, charging risk related fees, offering full coverage, being fully funded and compulsory.</td>
</tr>
</tbody>
</table>

Table 7. Measuring the effects on bank performance of regulatory changes

<p>| Financing Ratios: | ratios of various types of funds to total funds, such as deposits to total funds, issued capital to total funds, acceptances to total funds and so on. |
| Investing Ratios: | ratios describing the composition of total assets, such as liquids, securities, loans, fixed assets to total assets. |
| Off Balance Sheet Ratios: | measures of off balance sheet assets to total assets and measures of changes in lending patterns accompanying changes in capital adequacy requirements favouring investment in off balance sheet instruments such as derivatives. |
| Dividend Ratios: | dividend yield, ordinary dividends to shareholders’ equity, ordinary dividends to net profit after tax and extraordinary items, dividends to reserves, dividends per ordinary share, percentage change from a base year. |
| Executive Compensation Ratios: | salaries and other staff expenses to total non interest expense; salaries etc to profit measures, to net assets, to number of full time employees; directors remuneration of salaries and other staff expenses; executive and directors remuneration to salaries and other staff expenses; auditor’s remuneration to total non interest expense (included as all these ratios are relevant to effects of changes in regulation on agency relationships). |
| Profitability Ratios: | various profit measures to shareholders funds and assets, operating profit after tax and before minorities to total interest and non interest income (net margin); asset utilisation or total revenue to total assets; and two measures of interest margin - interest income less interest expense to earning assets - interest income plus non interest income less interest expense to earning assets. |
| Expense Control Ratios: | total operating expenses to total assets, break even yield of earnings (total expenses less non interest income to earning assets); full time equivalent employees per $1 million of assets; interest expense to interest bearing liabilities. |
| Asset Yield Enhancement Ratios: | yields on loans and leases before and after bad and doubtful debts; non interest income to total assets; return on investment and trading securities. |
| Credit Risk Ratios: | bad debts to total receivables; changes in provisions to total receivables; non performing assets to total assets; total provisions to assets, receivables and non performing assets; composition of non performing assets and total receivables. |
| Liquidity Risk Ratios: | liquid assets to total assets, to total deposits and interbank loans; measures of gapping under 1 year, and 1 year and over. |
| Interest Risk Ratios: | Interest sensitive assets to interest sensitive liabilities. |
| Leverage Risk Ratios: | leverage multiplier (total assets to shareholders funds and the converse); capital adequacy ratios; growth in assets. |</p>
<table>
<thead>
<tr>
<th>Responsibility (N=No; Y=Yes)</th>
<th>Australia</th>
<th>Canada</th>
<th>Denmark</th>
<th>Japan</th>
<th>Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymmetric information failure:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Prudential policy</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>*</td>
</tr>
<tr>
<td>• Prudential implementation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market misconduct failure</td>
<td></td>
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Figure 1

THE REGULATORY FRAMEWORK

- BANKING SYSTEM STRUCTURE
- GOVERNING LAW
- REGULATION

- CAPITAL ADEQUACY AND INTERNATIONAL CONVERGENCE
- PRUDENTIAL CONTROL
- SUPERVISORY ARRANGEMENTS AND COOPERATION
- EXCHANGE OF INFORMATION

- BANKING SUPERVISION
- EXAMINERS
- AUDITORS
- BANKING SUPERVISOR

- PROTECTIVE MEASURES
- RULES

- PRUDENTIAL MEASURES
- METHODS

- FIRM BASED
- INSTITUTIONAL
- PROTECTIVE
- PROTECTIVE

- ENFORCEMENT MODE
- WEAK TO STRONG

- SANCTIONS

- COMPLIANCE
- AUDITS

Figure 2: Factors in Method of Deregulation or Choice of Optimum Regulatory Structure

<table>
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<tr>
<th>Government Goals (G)</th>
<th>Stage of Economic Development</th>
<th>Stage of Social Development</th>
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<tbody>
<tr>
<td>Existing Regulatory Structure (M)</td>
<td>Mix of Prudential and Protective Measures</td>
<td>Ownership of Capital – proportion of direct and indirect ownership by individuals vs institutional/elite vs state (O)</td>
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<tr>
<td>Economic Resources and Infrastructure (E)</td>
<td>Compliance or stage of legal infrastructure development (C)</td>
<td>Stage of Human Capital (H)</td>
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Figure 3. Canada’s prudential supervisory system of a early intervention approach

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<th>Stage 1 – Early Warning</th>
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<td>- F1 notified by OSFU/CDIC.</td>
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<tr>
<td>- Remedial Action Plan requested by OSFI.</td>
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<tr>
<td>- Additional information may be requested by OSFI/CDIC.</td>
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<tr>
<td>- OSFI may request external auditor to expand work.</td>
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<tr>
<td>- CDIC may conduct special examination if circumstances warrant.</td>
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<tr>
<td>- Institution may pay higher CDIC premiums (risk-based premiums).</td>
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<tr>
<td>- CDIC may levy a premium surcharge. CDIC = deposit insurance arm</td>
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<table>
<thead>
<tr>
<th>Stage 2 – Risk to Financial Viability or Solvency</th>
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<td>- OSFI/CDIC place F1 on watch list and formally notify F1. Contingency planning begins.</td>
</tr>
<tr>
<td>- Business plan with remedial measures (eg, capital injections) and the time frame to implement them is required by OSFI/CDIC.</td>
</tr>
<tr>
<td>- Increased monitoring by OSFI/CDIC; scope of on-site exams and/or frequency of exams may be enlarged or increased by OSFI.</td>
</tr>
<tr>
<td>- OSFI may request external auditor to expand work further.</td>
</tr>
<tr>
<td>- OSFI may impose restrictions on F1’s business.</td>
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<tr>
<td>- CDIC may inform F1 of non-compliance with CDIC Act and by-laws and that, if situation not rectified, CDIC may seek. Minister’s permission to terminate policy of deposit insurance.</td>
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</table>

<table>
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<th>Stage 3 – Future Financial Viability in Serious Doubt</th>
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<td>- OSFI may require independent auditor to examine F1.</td>
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<tr>
<td>- Business plan specifying remedial measures needed to avoid moving to Stage 4 and time frame to implement them is required by OSFI.</td>
</tr>
<tr>
<td>- Increased monitoring/OSFI staff may be posted at F1.</td>
</tr>
<tr>
<td>- Enhanced exams with possible sampling of credit files, in-depth reviews of files, specialists hired to assess assets, etc.</td>
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<tr>
<td>- OSFI may issue an order to F1 to increase capital.</td>
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<tr>
<td>- Further restrictions on F1’s business may be imposed.</td>
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<tr>
<td>- F1 is pressured to find a purchaser.</td>
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<tr>
<td>- FIRP Order possible.</td>
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<td>- OSFI contingency plan developed to expedite taking control, if necessary.</td>
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<td>- CDIC may pursue various failure resolution processes including seeking the Minister’s approval to terminate deposit insurance.</td>
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<tr>
<th>Stage 4 – Insolvency imminent</th>
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<tbody>
<tr>
<td>- Winding-up order sought or other resolution found while F1 still has positive capital.</td>
</tr>
<tr>
<td>- CDIC may seek Minister’s approval to cancel the F1’s policy of deposit insurance.</td>
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