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# The Use of Accounting Models, Statistical Models, and Securities Marketing Prices to Predict Corporate Failure and the Case for Continuing Fiduciary Obligations to Corporate Creditors

## **Abstract**

[extract] This paper elaborates further why duties to creditors should be of a continuing nature alongside duties owed to shareholders. This viewpoint is advanced for two reasons: (1) Recognition of duties to creditors at the point of insolvency will often be too late as insufficient funds may be available to satisfy claims owed to creditors; and (2) the current state of research does not pinpoint with any degree of confidence an earlier time, prior to insolvency, at which duties to creditors may be said to commence. Such surrogates as have been used to predict the state of a company's financial health, for example, financial information, statistical prediction techniques, and securities market prices, have proved to be unsatisfactory because of the subjective nature of the evaluation process and the quality of the information on which such evaluation is made.

## **Keywords**

creditor interests, shareholder interests, insolvency, predicting insolvency

## **Cover Page Footnote**

Valuable research assistance by Nina Bognuda, a final year Law student at this University is gratefully acknowledged.

THE USE OF ACCOUNTING MODELS,  
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CORPORATE CREDITORS

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There is general recognition in both United Kingdom and Australian courts that creditor interests merit special attention when a company is insolvent. For example, Street CJ in the Australian case of *Kinsela v Russel Kinsela Pty Ltd (in liq)* said as follows:<sup>1</sup>

In a solvent company the proprietary interests of the shareholders entitle them as a general body to be regarded as the company when questions of the duty of directors arise. If, as a general body, they authorise or ratify a particular action of the directors, there can be no challenge to the validity of what the directors have done. But where a company is insolvent the interests of the creditors intrude. They become prospectively entitled, through the mechanism of liquidation, to displace the power of the shareholders and directors to deal with the company's assets. It is in a practical sense their assets and not the shareholders' assets that, through the medium of the company, are under the management of the directors pending either liquidation, return to solvency, or the imposition of some alternative administration.

This statement has been cited with approval by Dillon LJ in the United Kingdom case of *West Mercia Safetyware Ltd v Dodd*<sup>2</sup> and maybe taken to fairly represent the United Kingdom and Australian positions. More recently, courts in both of these jurisdictions have gone further and recognised creditor interests as requiring protection at a stage much earlier than the onset of insolvency. These decisions recognise that certain actions by corporate management can hurt creditor interests long before the company becomes insolvent, and in some cases can be the cause of the company becoming insolvent. A notable opinion in this regard in the United Kingdom is the decision of Templeman LJ in *Winkworth v Edward Baron Development Co Ltd*<sup>3</sup> where his Honour said as follows:<sup>4</sup>

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1 [1986] 4 NSWLR 722, 730.

2 [1988] BCLC 250, 252-53.

3 [1987] 1 All ER 114.

4 At 118.

But a company owes a duty to its creditors, present and future. The company is not bound to pay off every debt as soon as it is incurred and the company is not obliged to avoid all ventures which involve an element of risk, but the company owes a duty to its creditors to *keep its property inviolate and available for the repayment of its debts*. The conscience of the company as well as its management, is confided to its directors. A duty is owed by the directors to the company and to the creditors of the company to ensure that the affairs of the company are properly administered and that its property is not dissipated or exploited for the benefit of the directors themselves to the prejudice of creditors. (Emphasis added.)

This statement was approved of by the West Australian full Supreme Court in the recent decision of *Jeffree v National Companies and Securities Commission*<sup>5</sup>. Mason J had of course anticipated these events when, as early as 1976, his Honour observed in *Walker v Wimborne*<sup>6</sup> that as creditors could only look to the company for payment of their debts they would always be threatened by the possibility of future insolvency. For this reason, thought his Honour, there existed the need for a continuing obligation on directors to consider the interests of creditors irrespective of the financial health of the company. This paper elaborates further why duties to creditors should be of a continuing nature alongside duties owed to shareholders. This viewpoint is advanced for two reasons: (1) Recognition of duties to creditors at the point of insolvency will often be too late as insufficient funds may be available to satisfy claims owed to creditors; and (2) the current state of research does not pinpoint with any degree of confidence an earlier point of time, prior to insolvency, at which duties to creditors may be said to commence. Such surrogates as have been used to predict the state of a company's financial health, for example, financial information, statistical prediction techniques, and securities market prices, have proved to be unsatisfactory because of the subjective nature of the evaluation process and the quality of the information on which such evaluation is made. This paper is structured as follows: Part I examines accounting choices, off balance sheet finance techniques and debt defeasance schemes; Part II examines statistical models to predict bankruptcy/ financial distress; Part III examines the efficient market hypothesis and the use of market price as a predictor in this context; and Part IV provides an evaluation and conclusion, with the recommendation that it is more helpful and fulfilling to examine the cause of the problem rather than engage in speculation at any given point of time of what the financial circumstances of a particular corporation is likely to be at a later point in time. With this in mind, it is suggested that directors be required to owe a fiduciary obligation to both corporate creditors and shareholders throughout the life of the corporation.

## PART I - Accounting Choices

Statements of Australian Accounting Standards (AAS's) are given authority with respect to members of the accountancy profession by virtue of Professional Statements (APS), 'Conformity with Statements of Accounting Standards', and disciplinary procedures may follow for non-compliance.

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5 (1989) 7 ACLC 556.

6 (1976) 137 CLR 1.

AAS's are intended to apply to all reporting entities in the private and public sector; limitations of applicability are stated (if any) in the text of the specific statements. In the case of companies, standards proclaimed by the Accounting Standards Review Board (ASRB) are granted legislative backing by *Corporations Law*. The ASRB's do not mirror the AAS's.<sup>7</sup> Recently, the Australian Accounting Research Foundation (AARF) has indicated that where AAS's and AARF's are in conflict, the ASRB's will prevail. Despite this formal network of adherence and sanctions, the reality is that business requires, and is permitted, a fair degree of flexibility in valuing the various items that constitute its business activity. A corporation's financial viability is measured commonly by reference to certain standard financial ratios and more recently by reference to its cashflow. The use of such financial accounting ratios to characterise firms on a broad scale is, however, made difficult because of the wide range of accounting choices available (and perhaps necessary) to management under current accounting standards and general accounting principles. As every account is subject to a degree of choice, the accounting technique best suited to management's purposes will generally be selected. Different types of companies can be subject to different accounting requirements. Thus, true solvency/insolvency levels can be disguised. Freeman<sup>8</sup> gives an example of two firms equivalent in every respect that, because of different accounting treatment of similar transactions, received polarised signals of future viability based on Altman's<sup>9</sup> model. Generally, firms restricted by debt covenants are thought to be more likely to use income increasing/leverage reducing accounting techniques than those which are not. The accounting choices available to management are too numerous to be listed. The following examples are illustrative:

- (i) ASRB 1009 (AAS11), 'Accounting for Construction Contracts' allows two methods of revenue recognition for accounting contracts. The 'percentage of completion'<sup>10</sup> method is prescribed where revenue, costs and stage of completion can be reliably estimated, otherwise the

7 See paras. 6 and 9, Authority of Statements of Accounting Standards, in Foreword to *Statements of Accounting Concepts and Statements of Accounting Standards, Accounting and Auditing Handbook 1991*, Australian Society of Certified Practising Accountants and The Institute of Chartered Accountants.

**Authority of Statements of Accounting Standards**

Statements of Accounting Standards are given authority, with respect to members of the accountancy profession, by virtue of Professional Statement APS1 'Conformity with Statements of Accounting Standards'. This Statement '... requires members who assume responsibilities in respect of the preparation, presentation, or audit of financial statements to support the Statements of Accounting Standards approved by the profession'. This requirement is supported by disciplinary procedures for non-compliance.

Statements of Accounting Standards are also given legislative backing in respect of certain reporting entities in both the private and public sectors through requirements specified in Acts of Parliament or in Regulations pursuant to such Acts. In the case of companies, Statements of Accounting Standards are submitted by the Foundation, on behalf of the Accounting Bodies, to the Accounting Standards Review Board for approval under... (*Corporations Law*).

8 Freeman M & K, 'Accounting Choices and Going Concern Prediction Models' (Dec 1989) *Accounting and Finance*, 16 - 22.

9 Altman EI, 'Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy' (Sept 1968) *Journal of Finance*, 589-609.

10 Percentage of Completion - A portion of total contract price is recognised as revenue in each period. Contract costs are recognised when incurred.

'completed contract'<sup>11</sup> method is to be used. For the calculation of profit under the percentage of completion method, (a) engineering estimates are preferred, but (b) proportion of costs incurred is also allowed, and where neither is feasible, (c) amount billed is used. Income under the percentage of income method is recognised earlier and with lower variance as compared to the completed contract method. Current and total assets will be higher by the amount of income recognised on the uncompleted contract.

- (ii) ASRB1019 (AAS2) deals with the 'Measurement and Presentation of Inventories in the Context of the Historical Cost System'. The cost base to be used is essentially the lower of cost or net realisable value<sup>12</sup> but standard cost<sup>13</sup>, replacement price<sup>14</sup> and the retail inventory<sup>15</sup> method are provided for. In dealing with fixed costs, a choice is given between absorption<sup>16</sup> and direct costing<sup>17</sup>, although absorption cost is advocated. Again, costing is to be applied on an item-by-item basis unless it is impracticable to measure items separately, there being a large number of homogeneous items each having insignificant cost; allocation by groups is then allowed. Additionally, cost of inventories is to be assigned to particular items of inventory by one or more of specific identification<sup>18</sup> viz, average cost<sup>19</sup> (weighted), first in first out<sup>20</sup>, and standard cost methods<sup>21</sup>. The minimum number of choices for inventory valuation is consequently  $5 \times 2 \times 2 \times 4 = 80$ .
- (iii) Non-current assets are generally carried at either depreciated historical

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- 11 Completed Contract - Recognition of revenue and expenses upon completion of the project, provided a customer has been found and there are revenues to be received. Minor costs at the end may be ignored when determining if the contract is complete. AAS 11.
- 12 Net realisable value means the estimated proceeds of sale less, where applicable, all further costs to the stage of completion and less all costs to be incurred in marketing, selling and distribution to customers: AAS 2 [7(c)].
- 13 Standard Cost - Predetermined product costs established on the basis of, inter alia, planned products and/or operations, planned cost and efficiency levels, and expected capacity utilisation: AAS 2 [21].
- 14 Replacement Price - Is the cost at which an identical inventory item could be purchased or manufactured at the balance date, having regard to normal purchasing or production quantities and conditions: AAS 2 [7].
- 15 Retail Inventory Method - Involves discounting of the selling value of the total inventory in a merchandise department, or classification, by the current period average mark-up in that department, or classification, expressed as a percentage of the selling price, AAS 2 [22].
- 16 Absorption Costing - Cost of inventories is determined so as to include the appropriate share of both variable and fixed costs, the latter being allocated on the basis of normal operating capacity: AAS 2 [7].
- 17 Direct Costing - Cost of inventories is determined so as to include the appropriate share of variable costs only, all fixed costs being charged against revenue in the period in which they are incurred, AAS 2 [19].
- 18 Specific Identification - Specific costs are assigned to identified units of inventory, AAS 2 [31(a)].
- 19 Average Cost - This method assigns weighted average costs, arrived at by means of a continuous calculation, a periodic calculation or a moving periodic calculation, AAS 2 [31(b)].
- 20 FIFO - 'First in first out' - This method assigns costs on the assumption that the inventory quantities on hand represent those last purchased or produced, AAS 2 [31(c)].
- 21 Standard Cost - This method assigns predetermined costs, subject to adjustment for cost variances where appropriate, AAS 2 [31(d)].

cost or at revalued and depreciated cost. The question is what goes into the cost (capital) amount. No standard explicitly addresses the problems in this area. The only guidance is found in s 294(4)(a) of the *Corporations Law* which requires non-current assets to be recorded at a figure not more than the reasonable acquisition cost of the asset at year end. Again, a wide discretion remains.

- (iv) Revaluation of non-current assets upwards or downwards is allowed under ASRB 1010 (AAS10) 'Accounting for the Revaluation of Non-Current Assets'. This can affect leverage and liquidity ratios. It is not allowed in the USA.
- (v) ASRB 1021 (AAS4) 'Depreciation of Non-Current Assets' necessitates three basic choices, viz:
  - (I) The basis for assessing the useful life of the asset by reference to either time, output, or in special cases, revenue; (II) the method adopted for calculating depreciation charges in case of the time basis being selected, the choice is straight line or reducing balance; and (III) the present estimate of the net amount recoverable on the ultimate disposal of the asset. The paragraph also requires the historical cost of freehold property to be separately apportioned to land and building with buildings being depreciated and not the land. Firms have been found not to comply with this requirement, it being argued<sup>22</sup> that: since land and buildings are a 'composite' asset it is not 'practicable' to make a distinction between them; the current value of buildings was greater than book value; and the economic life of the buildings having expired, the value of the land alone was at least equal to the reported value of the freehold property.
- (vi) Extractive industries have special requirements which they must meet under ASRB 1022 (AAS7) 'Accounting for the Extractive Industries'. For extractive industries, proved reserves is the most valuable asset but it is not allowed to be recorded on the balance sheet. Some Australian companies have adopted Reserve Recognition Accounting, used in the USA, and recognise the reserves in a supplementary statement.

It may be pointed out here, that many of a company's most valuable assets are not recorded in the balance-sheet, for example: prime locations near wharves, airports, railheads, labour supplies<sup>23</sup>, loyalty of employees, and capabilities of employees.

## Off-Balance-Sheet Finance

Another problem, further limiting the use of financial statement ratios, is the presence of off-balance-sheet finance. (OBS) The amount of such finance is presently of concern to the financial world. Such finance has a significant impact on ratios, especially in relation to leverage (gearing). Leverage is

22 Harris G, 'Depreciation of Freehold Buildings - a Survey of Compliance with AAS4 by Australian Companies' (May 1981) *The Chartered Accountant in Australia*, 55-61.

23 Whittred G and Zimmer I, *Financial Accounting Incentive Effects and Economic Consequences*. Holt, Rinehart & Winston, Sydney: 1988, p 176.

extended against capital adequacy requirements, possibly increasing risk relative to assets, but improving their returns.

Off-balance-sheet financing is the condition which occurs when financing arrangements are structured so that underlying assets and associated liabilities do not appear on the balance sheets of the company which sponsors or participates in the arrangement.

Underlying much off-balance-sheet financing is the strict black letter law, legal interpretation approach. A transaction is structured so that its form enables it to be kept off-balance-sheet ... a trail of QCs opinions all stating that the letter of the law is being faithfully observed by having the transaction off-balance-sheet... The accountant's protestations that the accounts should give a true and fair view are met by questions as to what this actually means at law (it remains undefined) and by questioning what qualifications in law the accountant holds.<sup>24</sup> It is even claimed that it is in contravention of the law to reflect such transactions in the accounts.

There are a number of reasons for the use of off-balance-sheet financing. For example, debt finance is generally cheaper and more readily available than equity. At the same time, interest payments are generally tax deductible, while dividends must be paid out of income. Therefore, OBS financing may be used to at least partially avoid the financial risks of debt while offering its advantages. Avoidance of breaching restrictive covenant debt ratios is another motivating factor.

Pulbrook<sup>25</sup> identifies a variety of legal arrangements concerning ownership and use of assets conducive to OBS financing: corporations, partnerships, co-ownership, unit trusts, leases, joint ventures together with shareholder agreements, operating and management agreements, licences, put and call options, underwriting agreements, guarantees, assignments and selling arrangements.

OBS financing is currently of concern to the world's central banks, which are alarmed about the capital adequacy of banks under their jurisdiction. Significant OBS transactions are forward foreign exchange contracts, interest rate and currency swaps, standby letters of credit, options, guarantees, commitments, loan participation agreements, and fee driven advisory functions (which differs from the others in that it carries minimal risk)<sup>26</sup>. Estimates suggest that for major banks, OBS finance is approximately twice the size of current balance sheets leading to a distortion of several key financial ratios<sup>27</sup>. For example a study in 1986 of 43 of the 100 largest holding banks in the US by the American Bankers Association (with Ernst & Whinney), showed that although banks indicated they had extensive controls

24 Shanahan J, 'Accounting for Innovation - Understanding and Creating Off-Balance-Sheet Financing', paper presented to IIR Pty Ltd Seminar on accounting for Swaps, 1987.

25 Pulbrook B, 'Off-Balance Sheet Financing' (Mar 1988) *Accounting and Finance*, 27-33, at 30.

26 A detailed analysis of the OBS activities of US Banks during 1983-1986 is provided in Khambate D, 'OBS Activities of US Banks: An Empirical Evaluation' (Summer 1989) *Columbia Journal of World Business*, 3-13.

27 Hancock P, 'OBS Finance' (July 1988) *Australian Accountant*, 44-50.



over OBS activities and they are generally considered in determining overall risk to the customer, few disclosed OBS information in the financial statements. Following this, in 1987, bank supervisors from US, UK, Japan, Germany, Italy, Canada, Switzerland, Belgium and Luxembourg met and decided that by 1992, all banks under their supervision would be required to have true capital adequacy reserves of at least 8%. Under these regulations, OBS activities are to be included in establishing the necessary levels of capital to be set aside in fulfilment of the capital adequacy requirements. Regulations would assign differing risk levels and reserve adequacy standards to OBS activities.

The problem of OBS financing is a real issue not only for banks throughout the world, but companies in general. In Australia, professional and mandatory accounting pronouncements are attempting to eliminate or reduce the incidence of OBS financing. The theme underlying these pronouncements is that the economic substance underlying a transaction is to be reflected in the accounts in preference to its legal form. However, this has been recognised for a number of years now, as [4(e)] of AAS6 'Accounting Policies: Determination, Application and Disclosure' states:

Transactions and events should be accounted for and presented in accordance with their financial reality and not merely with their legal form.

Determining economic substance behind a transaction, however, is not always easy. There will always be an argument either way, with the party able to put forward the best argument succeeding. AAS24, AAS23 and AAS17 are all attempts to reduce the incidence of OBS financing where there is insubstance debt financing, despite the legal forms of the contracts underlying the reported phenomena.

(1) AAS24 'Consolidated Financial Statements'

An investor can require a financing vehicle (investee) to borrow and then through related party transactions, transfer funds to the investor. If there is consolidation of accounts, the liability is recognised; if there is no consolidation, the investment is reflected as a one-line asset. AAS24 attempts to remove the use of interposed unit trusts and non-majority shareholdings to avoid consolidation and hence the recognition of the financing arrangements of subsidiaries, increasing the reported leverage within group accounts<sup>28</sup>. At present, compliance with AAS24 would result in a breach of the *Corporations Law* because of its definition of 'subsidiary' in s 9 and Division 6. However, in early April, the Government declared the Act would be amended to enable the successful operation of AAS24.

(2) ASRB1014 (AAS23) 'Set-Off and Extinguishment of Debt'

The right to offset rights and obligations is generally opposed by the Accounting Principles Board, Opinion 10, para. 7 and the Securities and Exchange Commission (SAB Topic 11-1) except where there is a legal right

28 Godfrey FM, 'Standards to Deter Off-Balance Sheet Financing: *Theory v Practice*' (March 1990) *Accounting and Finance*, 5.

of set-off. This is also the basis of AAS23.

Extinguishment of debt is allowable by insubstance defeasance. This involves the creation of an irrevocable trust whereby riskless assets are assigned to the trust to be used solely for the satisfaction of *both* interest and principal payments due under a debt. The requirements are to be strictly met. The debt and the trust assets are removed from the borrowing company's balance sheet even though it is not legally released from the debt. The assets left are riskier and the other creditors are worse off. Disclosure by way of note in the financial statements is required.

(3) ASRB1008 (AAS17)'Accounting for Leases'

Finance leasing, traditionally a form of OBS finance must now be disclosed in the balance sheet, although operating leases remain OBS. Once the assets and liabilities are on the balance sheet, a much higher level of gearing is reflected. The definition of 'finance lease' in ASRB1008 [0.09(1)] which is equivalent to AAS17 [5(h)] states:

any lease not an operating lease which effectively transfers from lessor to lessee substantially all risks and benefits incidental to ownership of leased property without transferring legal ownership.

Guidelines are then given for determining when the definition is satisfied.

Whittred and Zimmer identify six methods frequently used to avoid the capitalisation requirements of AAS17.<sup>29</sup> These are:

- (i) AAS17 implies a financial lease arises if its term is greater or equal to 75% of the asset's useful life. Therefore, the arrangement is structured so as to lease the asset for a period less than 75% of the asset's useful life with an option to renew. This may also imply that the lease is cancellable at the option of the lessee.
- (ii) AAS17 implies that if the payments to be made under the lease are greater or equal to 90% of the fair market value of the asset, then the agreement is a finance lease. Such payments include the periodic payments during the lease term and the extent to which the residual value at the end of the lease is guaranteed by the lessee. The amount of the residual guarantee is therefore minimised.
- (iii) Contingent rental usage may be implemented to circumvent the 90% requirement, for example, a low base rent plus a proportion of sales volume as consideration for the right to use an asset.
- (iv) The use of an inbetween company, though this alternative is now threatened by AAS24.
- (v) Sustain the allocation of 75% or more of the total value of the land and buildings to land and capitalisation of both can be avoided. This is

<sup>29</sup> Whittred G and Zimmer I above n 23, 243-4.

because AAS17 provides that leases of land are operating leases because the infinite life of land prevents the transfer of all risks and benefits of ownership. That is, if the fair value of the building is less than 25% of the total property value, the property can be treated as a single unit for the purposes of classification. Otherwise, it is separated into an operating lease and a finance lease.

- (vi) Some other form of OBS financing is used.

A conceptual framework for accounting standards is currently being developed by the AARF. It is a set of interrelated objectives and fundamentals which define the nature, subject, purpose and broad context of financial reporting. It is intended that repeated reference to them will be necessary in establishing, interpreting, and applying accounting and reporting standards. This may be determinative in resolving issues such as the accounting treatment (if any) of OBS finance. The key concepts underlying the framework are comparability, materiality, relevance, reliability and understandability, dealt with in Statement of Accountancy concepts (SAC)<sup>3</sup> 'Qualitative Characteristics of Financial Information.'

'Assets' are defined in ED42C[7] as '... service potential or future economic benefits controlled by the reporting entity as a result of past transactions or other past events'. Absence of other common characteristics of an asset such as acquisition at cost, tangibility, exchangeability and legal enforceability is not sufficient to preclude an item from qualifying as an asset. An asset is to be recognised in the financial statements when (a) it is probable that the service potential or future economic benefits embodied in the asset will eventuate; and (b) it possesses a cost or other value that can be measured reliably. Where the definition of 'asset' is met but the recognition criteria are not, disclosure should be made in the notes to the statement.

'Liabilities' are defined in ED42D[7] as '... future dispositions of economic benefits that a reporting entity is presently obliged to make to other entities as a result of past transactions or other past events'. Similar recognition criteria as are relevant for assets, apply.

Hancock<sup>30</sup> points out that the arguments for not recording assets and liabilities in the balance sheet revolve around two main issues, these being (1) the right to offset rights and liabilities; and (2) that executory contracts should not result in the creation of assets and liabilities.

As stated above, the right to offset rights and obligations is opposed except where there is a legal right of offset. ED42C[44] discusses executory contracts, concluding that if such a contract cannot be avoided without a penalty then 'control' would appear to exist. Therefore, given the following: that forward exchange contracts, futures and options are normally characterised by an outlay (receipt) of funds at the outset; that the investment has certain rights and obligations attached to it; and that penalties exist in the event of default; an argument exists using the conceptual framework to support recognition of assets and liabilities on the balance sheet. AAS24

<sup>30</sup> Hancock P, above n 27, 47.

illustrates, in some degree, the application of the conceptual framework idea. 'Control' is the criterium selected for determining the requirement to prepare consolidated accounts for entities, corporate and otherwise. It is defined as the capacity to dominate financial and operating policies so that entities function as a single economic unit in achieving the objectives of the controlling entity.

Both Pulbrook<sup>31</sup> and Godfrey<sup>32</sup> detect problems with this substantive approach. There is a great deal of uncertainty and it is also very subjective. It is clear that standard setters do avoid (and have avoided) establishing strict rules to be applied at all times by all firms, implicitly recognising the difference between firms. The battle between substance and form of transactions will continue while the scope for professional judgment remains enormously wide.

Clearly OBS financing will continue. The 'prime economic reason for OBS financing, the quest for superior returns on equity and the opportunities for superior access to debt markets will ensure continuing demand'<sup>33</sup>. A clear example of attack and evasion is the response to AAS17. It is noted that ED42C[45] provides for the possibility of capitalisation of non-cancellable operating leases, although dependent upon additional considerations.

### Cash Flows v Accrual Accounting

The current financial reporting environment emphasizes accrual accounting whereas models of firm value in financial economics emphasize cash flows. Net cash inflows and accounting profit generated by a company in a year are not equivalent.

Accrual accounting is the basic concept behind accounting for financial information disclosure; it is a combination of recognising revenue when earned and recognising expenses when assets or benefits are used. Cash flow accounting in contrast, recognises revenue when received and expenses when paid.

Accounting literature maintains that accrual-based income is a better indication of an enterprise's present and continuing ability to generate favourable cash flow than information limited to the financial aspects of cash receipts and payments. However, the use of cash flow accounting avoids many of the difficulties associated with profit measurement which are always present with the accrual method. For example, which depreciation method to apply, or how to value inventory as discussed above, lead to different measures of profitability. The effects of OBS financing are also made irrelevant under cash basis accounting.

Bowen, Burgstahler and Daley (1987)<sup>34</sup> provide evidence of the role of accrual (earnings and working capital) and cash flow measures in an

31 Pulbrook B, above n 25, 32.

32 Godfrey FM, above n 28, 13.

33 Pulbrook B, above n 25, 33.

34 Bowen RM, Burgstahler D, Daley LA, 'The Incremental Information Content of Accrual Versus Cash Flows' (Oct 1987) *The Accounting Review*, Vol 62 (4) 723.

explanatory model of security measures. The study did not address the issue of which system is superior, merely their information content. The results were that:

- (i) cash flow information is consistent with information impounded in security prices and also has incremental explanatory power beyond that contained in accrual flows alone;
- (ii) accrual information is consistent with information impounded in security prices and also has incremental explanatory power beyond that contained in the cash flow variables considered in the study and, therefore, suggestively, cash flow data in general.

It was noted that similar earlier research had generally failed to detect incremental information content in cash flow data but several had used a surrogate measure for cash flow equalling net income + depreciation + amortisation, which is not the true cash flow measure. Since financial distress is a solvency issue, it might be expected that cash flow data is especially relevant in the prediction of insolvency.

Several studies have found the ratio cash flow/total debt to be useful in predicting insolvency,<sup>35</sup> for example, Beaver,<sup>36</sup> Blum,<sup>37</sup> Deakin,<sup>38</sup> Mensah,<sup>39</sup> and Elam.<sup>40</sup> However, all used the surrogate calculation for cash flow. Studies that give attention to cash flow specifically, define it much more carefully.

A thorough cash flow analysis in the failure prediction context was carried out by Casey and Bartzak<sup>41</sup> who found that the addition of cash flow data did not improve the model's ability to discriminate failed firms from non-failed firms. It was a univariate study of the predictive ability of cash flow from operations and related cash flow ratios compared to an MDA model based on accrual ratios (and similar results were obtained from a logit analysis of the same sample). The hypothesis formulated in the study was that cash flow variables are not useful in classifying solvent firms, since some growing, but successful companies may be cash poor as a result of efforts to take advantage of market opportunities. It concluded that the

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- 35 As identified by Gentry J, Newbold P and Whitford D, 'Classifying Bankrupt Firms with Fund Flow Components', (1985) *Journal of Accounting Research*, 146-160.
  - 36 Beaver WH, 'Market Prices, Financial Ratios and the Prediction of Failure' (1968, June) *Journal of Accounting Research*, 179-192.
  - 37 Blum M, 'Failing Company Discriminant Analysis', (Spring 1974) *Journal of Accounting Research*, 1.
  - 38 Deakin E, *Business Failure Prediction: An Empirical Analysis in Financial Crises: Institutions and Markets in a Fragile Environment* (Eds. Altman E and Sametz A, N.Y. Wiley 1977) and 'A Discriminant Analysis of Predictors of Business Failure' (Spring 1972) *Journal of Accounting Research*, 167.
  - 39 Mensah Y, 'The differential Bankruptcy Predictive Ability of Specific price level adjustments: Some Empirical Evidence' (1983) *Accounting Review*, 228.
  - 40 Elam R, 'The Effect of Lease Data on the Predictive Ability of Financial Ratios,' (Jan 1975) *The Accounting Review*.
  - 41 Casey C and Bartzak N 'Cash Flow - It's Not the Bottom Line' (1984) *Harvard Business Review*, 61-66; 'Using Operating Cash Flow Data to Predict Financial Distress: Some Extensions' (Spring 1985) *Journal of Accounting Research*, 384-401.

presumed value of cash flow data for forecasting a company's financial position should be questioned.

The lack of contribution by cash flow ratios was attributed to the high degree of *variability* in cash flows within the bankruptcy group and suggested further research into the variability of cash flow as a predictor variable. The results of Gentry, Newbold and Witford (1985)<sup>42</sup> provide support for this idea. The study found that one of the three significant variables was 'change in receivables' which receipted a net outflow for successful firms and a net inflow for failing firms. Jones<sup>43</sup> suggests that this variability would address Casey and Bartczak's<sup>44</sup> criticism that cash flows from operations do not distinguish well between firms because successful firms may be losing cash due to expansion. However, because no holdout sample was used in the Gentry, Newbold and Whitford<sup>45</sup> study, the results should be viewed with appropriate caution.

At present, the use of financial ratios in a universal financial distress predictive model faces insurmountable difficulties of multiple accounting method choice and OBS financing, manipulations, combinations and permutations of which lead to distorted ratios. Disclosures in notes to financial statements may aid in the standardization of accounting figures, but often disclosures are not made, and even if the fact is disclosed, an amount is often not. The use of cash flow data may overcome these problems but research in the area of cash flows as a predictor of distress is still in an experimental stage. There is no definite indication that its predictive powers are in any way superior to that of accrual information. However, research into the variability of cash flows may provide positive results.

## **PART II - Prediction by Statistical Bankruptcy/Financial Distress Models**

Numerous studies have been undertaken with the purpose of developing a statistically based model to predict corporate insolvency. These models seek to anticipate failure before it occurs and are different from pure classification models. The latter are capable of discriminating between failed and successful companies, but in hindsight only. Studies of prediction models take the following steps:<sup>46</sup>

- (i) data from failed firms is paired with contemporaneous data from non-failed firms;
- (ii) traditional and plausible ratios are calculated;
- (iii) a formula is derived which is based on a single or combination of ratios

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42 Gentry J, Newbold P and Whitford D above at n 35, 1.

43 Jones FL, 'Current Techniques in Bankruptcy Prediction' (1987) *Journal of Accounting Literature*, 6 131-164 at 137.

44 Above n 43.

45 Above n 42.

46 Jones FL 'Current Techniques in Bankruptcy Prediction' (1987) 6 *Journal of Accounting Literature*. 131-164.

that discriminates between failed firms and those remaining solvent;

- (iv) the formula is tested on the original data and on a holdout sample (which was not used to derive the formula).

The choice of method employed among studies varied greatly. Three techniques frequently used in the selection of the variables/ratios are: intuitive/theory technique, data reduction, and overfitting.<sup>47</sup> The actual model type is generally chosen from univariate analysis, discriminant analysis (linear or quadratic), and conditional probability models (logit or probit). Univariate analysis attempts to predict distress on the basis of individual financial ratios. This method is ineffective to develop a general model due to the multidimensional nature of the company and the conflicting signals which different ratios will give. However, where a particular variable is of interest to a researcher, such analysis may be useful. Multiple discriminant analysis (MDA) was first introduced by R.A. Fisher in the 1930's.<sup>48</sup> It maximises difference between groups (for example, failed and non-failed companies) while minimising difference within groups across a set of factors (such as the financial ratios). The procedure used is to classify an object into one of several *a priori* groupings dependent upon the individual characteristics of the object and for data then to be collected for these objects. From this, a linear or quadratic combination of the characteristics best discriminating between the groups is derived. Thereafter, the individual objects are classified into one of the original groups and the accuracy of the model considered. This method has the advantage of considering multiple characteristics common to the companies as well as their interaction. Conditional probability models (CPM) provide the conditional probability of a firm becoming insolvent given the values of weighted independent variables for the observations. It is based on a cumulative probability function<sup>49</sup> and unlike MDA does not require multivariate normality<sup>50</sup> of independent variables nor equal covariance matrices<sup>51</sup> for the groups. Most studies have implemented MDA with

47 Overfitted - The developed model (equation) is fitted to the sample data. If too many variables (ratios) are used, the developed model may be useless for general application, being too sample specific.

48 Fisher RA, 'The Use of Multiple Measurements in Taxonomic Problems' (Sept. 1936) 7 *Annals of Eugenics*, 179-188.

49 Cumulative Probability Function - Function which operates to specify all possible values of the variable, along with their respective probabilities.

50 Multivariate Normality - For the purpose of correlation analysis it is assumed that the joint distribution of variables is normal. A normal distribution is shaped - almost two-thirds of the readings will always be between plus/or minus one standard deviation from the mean.

51 Covariance Matrix - Covariance is a measure of the interrelation between two variables. The covariances can be collected into a matrix:

$$C = \begin{matrix} C_{11} & C_{12} & \dots & C_{1n} \\ C_{21} & C_{22} & \dots & C_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ C_{n1} & C_{n2} & \dots & C_{nn} \end{matrix}$$

The diagonal elements are the variances  $C_{ii} = \sigma^2(x_i)$ . Since  $C_{ij} = C_{ji}$ , the covariance matrix is symmetric.

variable information as a general rule coming directly from audited financial statements.

## Summaries of Selected Studies

Amongst the best known prediction models are those of Altman,<sup>52</sup> Altman, Haldeman and Narayana,<sup>53</sup> Ohlson,<sup>54</sup> and Gilbert, Menon and Schwartz<sup>55</sup> all with respect to the United States; Bathory with respect to the United Kingdom; Castagna and Matolcsy, and Pacey and Pham, with respect to Australia; and Ferner and Hamilton, with respect to New Zealand. Altman is considered by many to be the founder of modern bankruptcy analysis. The purpose of his 1968 study was to empirically investigate the characteristics of bankrupt companies and attempt to develop an accurate bankruptcy prediction model through a MDA technique using financial and economic ratios as predictive variables.

Altman's sample consisted of 33 bankrupt and 33 non-bankrupt manufacturing firms stratified by industry and size (all medium sized). Data was contemporaneous, from the period 1945-1965. Financial statements one and two years prior to bankruptcy were used. Bankruptcy was defined as those firms having filed a petition of bankruptcy with the courts or which have had such petition filed against them. A long list of 22 variables were chosen on the basis of popularity in literature; potential relevance to the study; and some new ratios. Five variables were eventually selected.

The statistical significance of various alternative functions were observed, the relative contributions of each independent variable determined, and the intercorrelation between the variables evaluated. The predictive accuracy of the model was thereafter observed and the judgment of Altman incorporated.

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- 52 Above n 9.
- 53 Altman EI, Haldeman R and Narayana P, 'Zeta Analysis: A New Model to Identify Bankruptcy Risk of Corporations' (June 1977) *Journal of Banking and Finance*, 29-54.
- 54 Ohlson J, 'Financial Ratios and the Probabilistic Prediction of Bankruptcy' (Spring 1980) *Journal of Accounting Research* 109-131.
- 55 Gilbert LR, Menon K and Schwartz KB, 'Predicting Bankruptcy for Firms in Financial Distress in New Zealand Listed Companies' (May 1987) *Accounting and Finance* 55-63.
- 56 Bathory A, 'Predicting Corporate Collapse: Credit Analysis in the Determination and Forecasting of Insolvent Companies' *Financial Time Business Information Ltd: London*, 1984.
- 57 Castagna AD and Matolcsy ZP, 'The Prediction of Corporate Failure: Testing the Australian Experience' (1981) 6, (1) *Australian Journal of Management*, 23-50.
- 58 Pacey JW and Pham TM, 'The Predictiveness of Bankruptcy Models: Methodological Problems and Evidence' (Dec. 1990) 51, (2) *Australian Journal of Management*, 315-337.
- 59 Ferner DG and Hamilton RT, 'A Note on the Predictability of Financial Distress' (Spring 1990) 17(1) *Journal of Business Finance and Accounting*, 161-173.
- 60 Above n 9.
- 61 Stratified - in stratified sampling, the population is divided into strata and a sample is selected independently from each stratum.
- 62 Intercorrelation - this calculation measures the strength of association between the quantitative variables (the ratios).



The results of Altman's study were as follows:

		Number Correct	Percent Correct	Percent Error	Number of Firms
First state- ment prior to bankruptcy	Bankrupt	31	94	6	33
	Non-Bankrupt	32	97	3	33
	Total	<u>63</u>	<u>95</u>	<u>5</u>	<u>66</u>
Second state- ment prior to bankruptcy	Bankrupt	23	72	28	32
	Non-Bankrupt	31	94	6	33
	Total	<u>54</u>	<u>83</u>	<u>17</u>	<u>65</u>
Holdout Sample	Bankrupt	24	96	4	25
	Non-Bankrupt	52	79	21	66
	Total	<u>76</u>	<u>83</u>	<u>17</u>	<u>91</u>

In the holdout sample, non-bankrupt firms were selected without asset amount restriction. Size was not used as a means of stratification.

Shortfalls identified by Altman of his study included:

- (i) a 'zone of ignorance', (range of Z-scores where misclassifications arise), could be observed.
- (ii) the model's effectiveness with firms of varying size was uncertain. Results showed that the MDA model is inaccurate in 2 areas:
  - (a) very small firms (lack of testable data) (less than \$1M in assets) and
  - (b) very large firms (infrequency of bankruptcies) (more than \$25M in assets)
- (iii) the model is not useful for long-run predictions (2 years prior to bankruptcy at the most).

The study by Altman, Haldeman and Narayanan (US)<sup>63</sup> involved a refinement of Altman's model by incorporating prior probabilities and costs of misclassification<sup>64</sup>. Fifty-three bankrupt companies were matched by industry and year of data (1969-1975) with 58 non-bankrupt firms. This study used the linear MDA technique.

The results of the hold-out sample were as follows:

	Percentage Correct 1 year prior	Percentage Correct 5 years prior
Bankrupt	93%	70%
Non-Bankrupt	90%	82%

A quadratic MDA did not improve these classification results.

63 Above n 53.

64 Costs of misclassification - the cost/detriment which a user may experience in applying a model and (1) misclassifying a non-bankrupt firm as bankrupt; and (2) misclassifying a bankrupt firm as non-bankrupt.

Ohlson<sup>65</sup> was the first to use the conditional logit method to predict distress. The sample consisted of 105 failed industrials and 2058 unmatched non-failed firms (that is, not matching for size). Data was from the period 1970-1976 and financial service companies, real estate investment companies, service companies and conglomerates were excluded. The model was successful in classifying 87.6% of bankrupt companies and 82.5% of non-bankrupt companies. There was no holdout sample.<sup>66</sup> For bankrupt firms, 17% of financial statements for the financial year ended before bankruptcy filing were not issued until after filing. In these cases, the figures for the previous financial year were substituted.

The Castagna and Matolcsy<sup>67</sup> study was the first with respect to Australia. The model used the quadratic MDA and was intended as an early warning device to corporate managers. The results of the study showed that companies are likely to move towards, and away from, the 'at risk' category over time. The relevant information was obtained from the 'yellow sheet reports' published by the Sydney Stock Exchange Statex Service over the period 1963-1977. The same data could be derived independently from the companies' annual accounts and reported share prices. The model applies only to companies listed on the Industrial Board of the AASE and is inapplicable to companies having a finance, banking or mining classification with the AASE, and private companies. The evidence suggested that on average, the model correctly classifies 85% of listed industrial companies up to three years prior to the appointment of an official receiver or liquidator.

Bathory<sup>68</sup> argues that his model, used in relation to the United Kingdom is suited to both public and private companies, of any size, in any sector (industry). It is, however, *not* intended to be a sole determinant of failure prediction. Failure was defined as liquidation, receivership, or auditor's qualifications on the going-concern basis to the effect that the company continues trading only with the continued support of its creditors.

The ratios eventually selected were given equal weightings. Bathory supported this departure from the MDA method on the basis that:

- (i) the computations in MDA models by statutory procedures have the effect of pulling characteristics of the insolvent set as far as possible from those of the insolvent set of companies, therefore ignoring the idiosyncrasy of financial movements;
- (ii) idiosyncrasies of firms entail varieties of financial movements that can lead to insolvency and collapse - consequently, weights could be discarded in this practical, as opposed to theoretical, model;
- (iii) the works of Myers and Forgy<sup>69</sup> indicate that superior discriminating

65 Above n 54.

66 Holdouts Sample - a validating data sample from companies not included in the original sample from which the model is created.

67 Above n 57.

68 Above n 56.

69 Myers H and Forgy EW, 'Development of Numerical Credit Evaluation Systems' (Sept. 1963) 50 Journal of the American Stastical Association, 797-806.

powers have been obtained purely on correlative criteria using equal weighting for all ratios;

- (iv) the necessary computational routines require weights limited by the matrix used - this is self-limiting and impracticable for all but mathematicians with adequate computer facilities<sup>70</sup>.

The original test sample contained twenty companies of various size and trading activities, public and private. Data was used from the accounting years in 1980 and 1981. The holdout sample<sup>71</sup> was similar. It consisted of ten solvent firms including one public and nine private companies of widely divergent asset size and trading activities and ten insolvents consisting of one public company subsidiary and nine private companies. No company showed a loss after taxation.

The results of the study were as follows:

	(insolv)	(insolv)	(solv)	(solv)
Correct (Orig + Holdout)	13	19	19	19
Incorrect (Orig + Holdout)	6	1	1	1
Total	<u>19</u>	<u>20</u>	<u>20</u>	<u>20</u>

The at-risk area was identified as  $Y=0-20$ . Although the predictive ability appears high, the sample profile was *very* small.

Ferner and Hamilton's<sup>72</sup> New Zealand study defined financial distress as companies delisted from the NZSE between 1964-1983 which failed to continue trading as independent entities. Sixteen listed financially distressed companies were paired with sixteen non-distressed listed companies selected, as far as possible from the same industry at that point in time (manufacturing and retailing companies only).

A 95% success rate on the original sample was achieved. However, gaps in the data set meant that sample composition was not constant from year-to-year. The analysts specifically opined that reasonable predictions for companies in other industries were not expected.

Gilbert, Menon & Schwartz<sup>73</sup> in their United States study of 1990 attempted to show that previous models did not distinguish firms that failed from other financially distressed firms, suggesting thereby that the resolution of distress was influenced by other, possibly non-financial, factors. A bankruptcy prediction model was developed using an estimation sample of bankrupt firms and randomly selected non-bankrupt firms in the ratio 1:4. Bankrupt firms were defined as those which had bankruptcy petitions filed against them during 1974-1983. The model was tested using two holdout samples: (i) bankrupt and random firms; and (ii) bankrupt and financially distressed firms, some of which filed for bankruptcy. A second model was then estimated from a sample of bankrupt and distressed firms. A distressed

70 Bathory A above n 56.

71 Above n 65.

72 Above n 59.

73 Above n 55.

firm was defined as one with negative cumulative earnings over a consecutive three year period between 1972 and 1983.

The results of the first model were as follows:

	Number	B as NB	NB as B	Overall
Estimation Sample	260	17 (32.7%)	13 (6.2%)	30 (11.5%)
Bankrupt/Random Holdout	120	9 (37.5%)	2 (2.1%)	11 (9.2%)
Bankrupt/Distressed H/out	120	9 (37.5%)	31 (32.3%)	40 (33.3%)

Although high, the results are less impressive than a normal bankruptcy study: This is probably due to: (a) the unequal proportions of bankrupt (B) and nonbankrupt (NB) firms, or (b) the inclusion of borderline but non-bankrupt firms.

The results of the second model were as follows:

	Number	B as NB	NB as B	Overall
Estimation Sample	260	36 (69.2%)	11 (53%)	47 (18.1%)
Bankrupt/Distressed holdout	120	17 (70.8%)	9 (9.4%)	26 (21.7%)

As would be noted, while results of the second model are poorer than those of the first model, the overall classification in the bankrupt/distressed holdout sample in the former is slightly higher.

Pacey and Pham's<sup>74</sup> Australian study of 1990 defined failure as the appointment of a receiver or liquidator to the firm. The sample was formed by industrial companies listed on an Australian Stock Exchange with at least five years of financial reports prior to failure. Weighted Exogenous Sampling MLE (WESML) was used to correct predictive bias introduced by non-random sampling in MDA models. The original sample consisted of 57 failed and 57 non-failed companies from 1958-1978, then validated with respect to hold out random samples of 20 failed and 149 non-failed companies from 1966-1978 and 17 failed and 228 non-failed companies from 1979-1985. The analysts identified the following limitations of their study:

- (i) no theoretical framework to determine the set of independent variables used;
- (ii) the sampling procedure involved pooling data. This implicitly assumes the probability of default is stationary over time;
- (iii) firms with missing or incomplete data were excluded; and
- (iv) only public companies were used.

### Criticisms of the Prediction Models

Although the studies on the whole appear to result in high predictive success based on the chosen samples, the models are subject to wide criticism.

74 Above n58.

- (1) Many models are based on outdated data. Shailer<sup>75</sup> argues that all significant changes in the capital and trade markets and the relevant industrial sectors must be seen as seriously affecting the contemporary usefulness of early models. The Altman, Haldeman and Narayanan 1977 study in improving on the 1968 Altman study discovered a different set of significant financial ratios. Only one ratio was the same and while this was most important in 1977, it was practically the least important variable in 1968. This raises the question of how long a list of key ratios will remain pertinent insolvency indicators.
- (2) Models not based on Australian data or which have not undergone substantial testing using Australian data, are of limited use: See Shailer<sup>76</sup>, Ling and Matthews<sup>77</sup>, Ferner and Hamilton<sup>78</sup> and Tabb and Wong<sup>79</sup>.
- (3) Australian (and other) studies have to draw data from extended periods of time in order to obtain sufficiently large sample sizes because of the scarcity of data that is sufficiently complete for insolvent firms. Firms with missing or incomplete data are generally excluded from studies unless pooling of data takes place. This implicitly assumes that the probability of default is stationary over time: see Pacey and Pham<sup>80</sup> and Nash, Anstis and Bradbury<sup>81</sup>.  
  
Crapp and Stevenson<sup>82</sup> consider that organisations with high failure probabilities have low probabilities of having complete data which results in general understatement of model failure. Similarly, because of the limited data available relating to insolvent firms, sample sizes are often very small: see Shailer<sup>83</sup> and Jones.<sup>84</sup>
- (4) The sample is generally selected from public listed companies for ease of information access. The application of the model to unlisted companies is therefore questionable: see Shailer.<sup>85</sup>

75 Shailer G, 'Going Concern Prediction Models' (Sept 1988) *The Australian Accountant*, 63-64.

76 Above n 75.

77 Ling UH and Matthews MR, 'Business Failure Models and their Application to New Zealand' Occasional Paper, Massey University (1982).

78 Ferner DG and Hamilton RT, 'A Note on the Predictability of Financial Distress in New Zealand Listed Companies' (May 1987) *Accounting and Finance*, 55 63.

79 Tabb B and Wong J, 'Predicting Company Failure' (1983) *The Accountants' Journal*, 62 (4), 176-178.

80 Pacey JW and Pham TM, 'The Predictiveness of Bankruptcy Models: Methodological Problems and Evidence' (1990) *Australian Journal of Management*, 15 (2), 315-337.

81 Nash M, Anstis M and Bradbury M, 'Testing Corporate Model Prediction Accuracy' (Dec 1989), *Australian Journal of Management*, 14 (2), 211-221.

82 Crapp HR and Stevenson M, 'Development of a Method to Assess the Relevant Variables and the Probability of Financial Distress' (Dec. 1987) *Australian Journal of Management*, 12 (2), 221-236.

83 Above n 75.

84 Jones FL above n 43.

85 Above n 75.

- (5) There is uncertainty as to whether there is a relationship between the size of a company and various financial ratios, thus limiting the applicability of a model to companies of the size used in the study. For example, Ohlson<sup>86</sup> did not control for size, and found it to be a significant predictor. However, it has been argued that ratios by their very nature have the effect of deflating size dissimilarities: see Bathory<sup>87</sup>. Generally, small and new firms are excluded because of the paucity of data.
- (6) The sampled companies are almost always from the same industry, for example, manufacturing, retail, finance, service. Because of the different financial structures and operating characteristics among various industries, industry specific models are probably more accurate in the prediction of corporate failure: see Ferner and Hamilton<sup>88</sup> and Castagna and Matolcsy<sup>89</sup>.
- (7) In most studies, equal numbers of bankrupt and nonbankrupt firms are used. This gives a much higher representation of bankrupt firms than exist in the real world. This inbuilt bias leads to overstatement of bankruptcy prediction success: See Gilbert, Menon & Schwartz<sup>90</sup> and Palepu<sup>91</sup>.
- (8) MDA assumes multivariate normality and equal covariances of the variables used and these assumptions are typically violated: see Freeman<sup>92</sup>. Since conditional probability analysis does not suffer from this problem, it is theoretically preferable. However, tests to date show it is little or no better than MDA: see Jones.<sup>93</sup>
- (9) Phacey and Pham<sup>94</sup> and Palepu<sup>95</sup> identify the problem of choice based, equally distributed samples and arbitrary cut-off points usage in MDA and conditional probability analysis leading to asymptotic bias<sup>96</sup> in parameter<sup>97</sup> and probability estimates of the

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86 Ohlson J above n 54.

87 Bathory A above n 56.

88 Above n 59.

89 Castagna AD and Matolcsy ZP, 'A Predictive Model of Corporate Failures in Australia' (Mar 1983) *The Chartered Accountant in Australia*, 22-24.

90 Above n 55.

91 Palepu KG, 'Predicting Takeover Targets: A Methodological and Empirical Analysis' (1986) *Journal of Accounting and Economics* 8, 3-35.

92 Freeman M & K above n 8.

93 Above n 43.

94 Above n 58.

95 Above n 91.

96 Asymptotic Bias - In reference to the normal distribution contravention of the assumption that two-thirds of the readings are within plus or minus one standard deviation of the mean.

97 Parameter - In any analysis and/or interpretation, a variety of descriptive measures representing the properties of central tendency (mean, median, mode, midrange), dispersion (range, variance, standard deviation, coefficient of variation), and shape (symmetrical or skewed) may be used to extract and summarize the major features of the data batch. If the descriptive summary measures are computed from a sample of data, they are called statistics, if they are computed from an entire population of data, they are called parameters.

models.<sup>98</sup>

- (10) The choice of model used brings with it inherent problems as seen from the above discussion. Univariate analysis can lead to different predictions for the same company. Individual ratios are highly susceptible to manipulation or the effects of unusual cases. When used in combinations, the best predictor(s) individually are not generally the most significant.

There is some confusion as to which is the better model, MDA or conditional probability. Hamer<sup>99</sup>, found that linear MDA and logit models gave analogous results and were at least as accurate in prediction as the quadratic MDA model. Jones<sup>100</sup>, cited MDA as having high classification accuracy but probit and logit analyses were slightly preferable. Pacey and Pham<sup>101</sup> thought quadratic MDA was more appropriate than linear because the linear model assumptions of homoscedasticity<sup>102</sup> of covariances and multivariate normality were not met.

- (11) While the introduced variables invariably come from financial reports, there is no theoretical foundation from which they are developed. There is no hypothesis linking specific variables to business failure: Ohlson;<sup>103</sup> Pacey and Pham;<sup>104</sup> Nash, Anstis and Bradbury.<sup>105</sup>

Crapp and Stevenson<sup>106</sup> however, conclude that their study shows that

98 In the estimation stage, most studies use non-random sampling procedures which select approximately equal numbers of failed and non-failed firms while assuming random sampling. The resultant bias leads to an understatement of the expected error rate in predicting insolvent firms (Type 1 error) and an overstatement of Type 2 error. Such error can be corrected by the use of a modified maximum likelihood technique in the parameter estimation stage. Manski/McFadden (1981) identify two possibilities with respect to use of this technique: (1) the weighted maximum likelihood estimate (WMLE), and (2) the conditional maximum likelihood estimate (CMLE).

The use of non-random holdout samples in testing the validity of the model introduces bias in favour of the model's predictive ability to identify insolvent firms. Again, this error may be minimised by choosing a random holdout sample from either the period in which the parameters are established or the subsequent period or if possible, use the entire population of firms at a given time. The second method is the real test of the model's prediction ability.

Finally the use of a cut-off probability of 0.5 commonly assumed in the model validation stage does not reflect the decision context in which the choice to reject or accept is made. The solution here is to derive cut-off probability in a well-defined decision context. Palepu above n 91 illustrates this well.

99 Hamer MM, 'Failure Prediction: Sensitivity of Classification Accuracy to Alternative Statistical Methods and Variable Sets' (1983) *Journal of Accounting and Public Policy*, 2, 289-307.

100 Above n 43.

101 Above n 58.

102 Homoscedasticity - refers to homogeneity of variances. Variance provides a measure of how the data tend to vary around the mean. If data are tightly clustered around the mean, variance will be small.

103 Ohlson J above n 54.

104 Above n 58.

105 Above n 81.

106 Above n 82.

the evidence does allow for the selection of predictor variables on the basis of rigorous theory. The study, however, was highly experimental.

There are three common techniques used in the selection of failure variables:

- (i) intuitive or theory technique whereby variables considered to be of importance are selected;
- (ii) data reduction technique which aims to cut down the correlation between variables, for example, the principal components method;
- (iii) overfitting technique which searches for the best-fitting models, eg. stepwise regression.

Hamer<sup>107</sup> finds evidence suggesting the prediction of business failure is insensitive to the selection method of accounting variables. Nash, Anstis and Bradbury<sup>108</sup> also found strong classification result correlations for all three technologies.

- (12) Jones<sup>109</sup> warns that too many ratios in a model means that the model will be overfitted<sup>110</sup> and so highly successful in classifying the data set, but less effective in application.
- (13) The assumption of equal costs of errors<sup>111</sup> in prediction tests generally does not hold. It will differ from firm to firm. It is possibly necessary, therefore, to identify the user of the model and specify the cost-of-error function: Pacey and Pham.<sup>112</sup>
- (14) A holdout sample should always be used for validation purposes. It should contain different samples to the original, over a different time span (for increased predictive validity). Ohlson<sup>113</sup> avoided the biases from using non-random samples by using the entire population for his model-based sample. This meant a loss of a holdout sample in the relevant period.
- (15) Although companies which liquidate are generally in financial distress, there are sometimes other reasons for this ultimate failure and, therefore, motive should be addressed in the models: Jones<sup>114</sup> and Gilbert.<sup>115</sup>

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107 Above n 99.

108 Above n 81.

109 Above n 43.

110 Above n 47.

111 Cost of Error Function - Refer to 'cost of misclassification' above n 64.

112 Above n 58.

113 Above n 54.

114 Above n 43.

115 Above n 55.



- (16) The models cannot determine when failure will occur. Only likely failures and non-failures can be identified. The models are devoid of any time framework: Shailer<sup>116</sup>.
- (17) Rosser and Copping<sup>117</sup> observe that despite low prediction errors, the use of such models is not believed to be widespread. Since computer-based models should permit cost savings at large volumes, the analysts suggest that existing decision processes are either superior or benefit from more up-to-date information, more than offsetting lower processing costs at higher volumes. The Rosser and Copping study distributed a questionnaire containing financial data of companies for five years prior to failure among thirteen chartered accountant firms in Adelaide. Subjects, consisting of senior status and above, were asked to make a blind assessment of the viability of ten companies. The success of the professional judgments in failure prediction led to the conclusion that the use of computer-based prediction models hinges on costs.
- Nash, Anstis and Bradbury<sup>118</sup> find through elimination of biases found in models that success rates are overstated and confirm the view that models should not be the sole criterion in decision-making. Again, the overall thrust of Pacy and Pham<sup>119</sup> points to the futility of using bankruptcy prediction models for forecasting purposes.
- (18) The audited financial data for a company is only available in full form at the beginning/end of a financial year. Evaluations made, for example, eight months through the year, would generally be based on incomplete data.

### Difficulties in setting up a Time-Framework from Prediction Models

The discussion above should have made clear that even though statistical failure prediction models are both relevant and informative, developments to date can in no way be said to provide a sufficient foundation for the formulation of a general statutory rule.

Clearly no one model is sufficiently superior to another so as to be introduced into legislation. A framework must then come from a comparison of the common findings of the most stringent and efficient models. What is significant, however, is the lack of common findings.

Pacey and Pham<sup>120</sup> are correct when they observe that '[t]he comparison of the results of different failure prediction studies is fraught with difficulties due to differences in experimental design which includes different definitions of failure, variable selection criteria, data sets and estimation

116 Above n 75.

117 Rosser B and Copping R, 'Professional Judgment Versus a Computer-Based Failure Prediction Model' QUT Accounting Research Journal, 4-6.

118 Above n 81.

119 Above n 80.

120 Above n 80.

methodologies' and, to which one may also add, purpose. No study chooses the same population sample group, nor the same ultimate variable set. There is no one ratio variable which appears in all the studies nor even in most studies. Many variables appear only once. There is no clear supremacy of a type of ratio in the studies although liquidity and profitability ratios are frequent.

Criticisms of the inherent biases of the prediction models outlined earlier are relevant. Even if the methodological errors are corrected for, the problems of changing economies, markets and industries over time, the distinct financial characteristics of companies, and the choice of accounting methods and OBS financing, present major difficulties. Bathory<sup>121</sup> specifically states that any financial profile of a distressed firm which can be obtained from the results of his (or any) study will be rough only, because of different companies' idiosyncracies. An analysis of ratio trends showed no absolute rule but indicated that, generally, financially distressed companies exhibit the following:

- (i) a developing inability to service current debt from main operating income;
- (ii) current profitability extremely low or almost non-existent;
- (iii) losses tend to increase;
- (iv) reserves, if any, show gross depletions and are inadequate when present to discharge current obligations in the event of break-up of the corporation;
- (v) marked deterioration in tangible net worth, if there was any; and
- (vi) illiquidity in respect of discharge of current obligations.

Crapp and Stevenson<sup>122</sup> conclude that mean failure probability is inversely related to total asset size. Altman<sup>123</sup> finds that as a rule of thumb, companies suffering negative profits in two out of three years are likely to fall insolvent, regardless of other characteristics. All ratios showed a deteriorating trend over five years as failure approached with the most serious ratio change occurring between two and three years prior to bankruptcy, the most significant drop occurring in the ratio market value of total equity/total debt. Liquidity ratios were the least significant. These observations, however, are dependent on the financial variables selected. They are not consistent. They are merely different, possible indicators of financial distress, tinged with the biases and shortfalls of the model itself.

In general, predictive accuracy of the models improves as failure approaches. But this can only be seen in an 'after-the-event' context. There is no ability to differentiate between firms which are temporarily weak and those with serious problems. Financial distress is not a sudden phenomenon but one which develops over time due to a multiplicity of causes. Clearly, the duty to creditors should arise before liquidation, but it would be imprecise and dangerous to specify a general rule based on statistical prediction to date.

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121 Above n 56.

122 Above n 82.

123 Above n 9.

AUP17 'Analytical Review' is a statement of auditing practice, operative from 1 August, 1983. The models of Beaver,<sup>124</sup> Altman<sup>125</sup> and Castagna and Matolcsy<sup>126</sup> are listed as examples of models to aid auditors in forming an opinion on the going concern basis of a company. Shailer,<sup>127</sup> and Freeman<sup>128</sup> criticise this as they allege that AUP17 suggests a use not intended by the various authors of the cited studies (nor of other studies) given their work was developmental. The critics advise auditors to take care in the use of these models or not use them at all. Most importantly, the studies in general make it clear that the models are *not* to be used as sole determinants in the prediction of distress.

### PART III - Market Price as a Predictor

Markets have access to information not reflected in financial statements. Market perception of the value of the company should therefore incorporate not only financial statement data but other information as well. It could be that the necessary information required to predict financial distress is at the market place.

A foundation stone for modern finance theory is the efficient market concept.<sup>129</sup> In an efficient market, price is an unbiased estimate of value given the existing information set at a point in time. This does not mean price is always an accurate estimate of value, so assets may be mispriced. Evidence shows fairly strongly that markets are semistrong form efficient; that is, price is an unbiased estimate of value given all publicly available information. Hence, abnormal profits can only be consistently made with the aid of 'insider' information (at least they would be if it was legal to do so).

Castagna and Matolcsy<sup>130</sup> identify four reasons why prediction of financial distress by use of market characteristics may be preferable to financial statement analysis:

- (i) market characteristics are based on continuous variables<sup>131</sup> (market prices) rather than discrete variables;<sup>132</sup>
- (ii) an examination of continuous price adjustments of failed companies provides insight into the timing of failure, which 'predictive' models based on financial characteristics cannot provide;
- (iii) market characteristics are homogeneous measures enabling cross-sectional comparisons of failed companies while financial

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124 Above n 36.

125 Above n 9.

126 Above n 89.

127 Above n 75.

128 Above n 8.

129 See generally, Sappideen, *Securities Markets Efficiency Reconsidered* (1988) UTas LR pp 1 - 58.

130 Above n 57.

131 Continuous Variables - phenomena whose outcomes can be expressed numerically, arising from a measuring process.

132 Discrete Variables - phenomena whose outcomes can be expressed numerically, arising from a counting process.

characteristics of failed companies from different industry groups may not permit such comparison - this assertion, however, is open to question in the light of a study discussed below; and

- (iv) market characteristics incorporate information beyond financial information released by companies and may indicate failure prior to models based on financial characteristics.

However, there has not been much exploitation of information available in financial markets with respect to financial distress. Altman,<sup>133</sup> Altman, Haldeman and Narayanan<sup>134</sup> and Castagna and Matolcsy<sup>135</sup> have used a ratio that includes market value of equity in the prediction model. Fisher<sup>136</sup> found the market value of equity/par value of debt to be a particularly good indicator of all-over firm solvency.

The Castagna and Matolcsy<sup>137</sup> study examines the failure phenomenon within the market context with the intention of identifying and analysing the characteristics of companies prior to failure. The study included all failed companies listed for a minimum of forty-eight months (to enable estimation of systematic risk) during 1962-1976 for which share price and capitalisation data were available at the Sydney Stock Exchange Research Library. The sample consisted of a total of 42 companies, (29 industrial and 13 mining.) The methodology of the study drew from the finance theory of the Capital Asset Pricing Model (CAPM) and the efficient market hypothesis. Failure was identified as the appointment of a receiver or the suspension of trading, whichever occurred the earlier. First, the systematic risk of the sample was estimated, and then the characteristics and timing of continuous price adjustments of the sample were analysed by estimating cumulative average residuals (CARS) using two forms of the Market Model, making different assumptions about the estimates of systematic risk. These models were used because of evidence that they provided as efficient estimates of cumulative average residuals as more 'sophisticated' specifications of CAPM.<sup>138</sup>

This process was adopted for both the sample and for the four subsets of the sample (companies that failed during an economic upswing, companies that failed during an economic downswing, failed mining companies, and failed industrial companies). The results of the study showed that mining companies had a greater systematic risk<sup>139</sup> than industrials; similarly, companies in a downswing had a greater systematic risk than failed companies during an upswing. An explanation put forward for this, was the mining boom in Australia during the late 1960s and early 1970s, when the volatility of mining shares significantly increased relative to the market in

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133 Above n 9.

134 Above n 53.

135 Above n 57.

136 Fisher L, 'Determinants of Risk Premiums on Corporate Bonds' (June 1959) *Journal of Political Economy*, LXVII, (3), 217-237.

137 Above n 57.

138 Brown SJ and Warner JB, 'Measuring Security Price Performance', (Sept. 1980) *Journal of Financial Economics*, 205-258.

139 Systematic/non-diversifiable risk measures the sensitivity of expected return to market-wide factors, that is, factors which affect the whole market.

general, and to the industrial sector. The downswing sample was dominated by mining companies.

Further the market was found, on average, to adjust prices of failed companies approximately 30 months prior to failure. Market characteristics of failed companies started to change prior to any signalling from earnings and dividend announcements. Therefore, observation of the price adjustment could be regarded as an early warning signal, triggered off by other information cues.

On a sub-sample basis, mining companies appeared to have a shorter price adjustment period than industrial companies, while no conclusions could be drawn about the timing of market price adjustments of failed companies during an economic downswing/upswing. Possible explanations for these results include the fact that because many failed companies were floated during the Australian mining boom as exploration companies, their paid-up capital came to be rapidly depleted because the companies were primarily engaged in exploring new mining leases, resulting in their rapid failure.

While these results are promising they should be viewed with caution as the study was experimental only. Furthermore, the data used was outdated, there was no control for 'market noise', and there were inherent problems in the methodology utilised.

Beaver<sup>140</sup> and Westerfield<sup>141</sup> both concluded, on US data, that investors appear to adjust to new solvency positions of failed companies on a continuous basis over a five year period prior to failure. Castagna and Matolcsy<sup>142</sup> treat the period as 30 months, and warn against the general application of results from other economies because of differences in institutional and regulatory environments. Industry differences/influences also seem to differentiate companies. Three factors are believed to affect price changes of stock attributed approximately as follows: 50% to market and general economic influences; 40% to industry influences; and 10% to stock specific movements (for example, a change in the composition of the board of directors or the arson of plant).

Burgstahler, Jiambalvo and Noreen<sup>143</sup> while not attempting to develop a model for failure prediction purposes found that unexpected changes in the probability of bankruptcy are negatively related to unexpected changes in the value of firm equity. This further confirms the proposition that market information is fertile ground for the basis of financial distress prediction. The study actually incorporated financial statement information which was used in accordance with Ohlson's<sup>144</sup> bankruptcy prediction model, to

140 Above n 36.

141 Westerfield R, 'Pre-Bankruptcy Stock Price Performance', (1970) Working Paper University of Pennsylvania, Philadelphia, reported in G. Foster, *Financial Statement Analysis*, Prentice Hall, 1978.

142 Above n 57.

143 Burgstahler D, Jiambalvo J, Noreen E, 'Changes in the Probability of Bankruptcy and Equity Value' (1989) *Journal of Accounting and Economics*, 11, 207-224.

144 Above n 54.

calculate unexpected changes in the probability of bankruptcy in connection with the market model. As it is generally established that unexpected changes in equity value are associated with unexpected changes in earnings, the effect of unexpected earnings was controlled for. It was hypothesized that because of significant indirect costs associated with bankruptcy, there are substantial grounds for expecting changes in the probability of bankruptcy to have cash flow implications and have incremental information content. This was found to be so.

Despite these encouraging features, there remain many uncertainties as to the true effectiveness of stock market security valuations because of the market's reaction to various economic events or company actions. Financial statements may represent the true economic picture. For example, a stock distribution is a proportionate distribution of additional corporate shares to existing shareholders. Such distributions do not increase company assets, change a company's economic value, change the percentage ownership of shareholders, nor entitle a shareholder to different future cash flow streams.<sup>145</sup> Although in the financial statements equity value does not change, the market value of equity has been shown to rise after the announcement. As both the company and shareholders incur costs when a distribution takes place, the validity of the market's reaction is questionable.

Fekrat<sup>146</sup> identifies the 1980s period of deepening international debt crisis. The financial markets acted promptly while the accounting response was virtually a non-response - which in the circumstances was appropriate in the analyst's opinion. Fekrat noted that accounting operates on the positive theory assumption: that in practice, only efficient accounting procedures tend to survive, suggesting that accounting treatment should reflect considerations independent of market signals and identify the information content of financial data. On the other hand, market imperfections may exist where information is available to certain sectors of the market and not others, such as reserve data for extractive industries.<sup>147</sup>

To date, the use of market information in preference to that of financial statement data in company failure prediction has been slight. There are a number of assumptions behind the CAPM model which do not hold true in the real world, most significantly the assumption of perfect capital markets<sup>148</sup>. In the real world, friction, transaction costs and taxes all exist; anomalies to the CAPM model have also been found to exist in that positive abnormal returns accrue to small firms and firms with high BP ratios (where

145 Klein LS, 'Stock Distributions: A Review and Synthesis of the Literature', (1989) *Journal of Accounting Literature*, 8, 165-180.

146 Fekrat A, 'Accounting Non-Response to International Debt Crisis: A Positive Theory Perspective', (1989) *International Journal of Accounting*, 24, 131-141.

147 Gibson RW, 'Is More Disclosure of Benefit - the Case of Oil and Gas Companies: A Note' (1987 Mar) *Accounting and Finance*, 51-54.

148 Perfect Capital Markets - a phenomena in finance theory based on the assumptions that: (1) there are no transaction costs in trading securities; (2) all available information is costlessly available to all market participants; and (3) all agree on the implications of current information for the current price and distributions of future prices of each security. See Pierson G et al, *Business Finance* (4th ed) McGraw-Hill Book Company (1985) Sydney, p 20.

B = book value and P = market share) over time. At present, financial research is attempting to improve the CAPM model. Finance theory does, however, provide fertile grounds for in-depth studies into this area, possibly utilising Option Pricing and Arbitrage Model in preference to CAPM. One drawback is that, naturally, only listed companies will be able to be samples.

#### PART IV - Conclusion

As the evidence in this paper should have made clear, were a time framework for the commencement of directors' duties to corporate creditors established by reference to what are known to be general characteristics of financially distressed companies, it would be an imprecise exercise. Many companies, in no danger of defaulting on debts payable, may be caught.

Companies are individual creatures, their characteristics being shaped by market, industry, and company-own events. General characteristics are general only and may be seen in quite healthy firms and not at all in distressed firms. Furthermore, it has been shown that firms tend to wane to and from exhibiting distress characteristics. Confusion would reign if duties were owed when certain characteristics showed and ceased when such characteristics disappeared. Economists refer to these phenomena as asset specificity, that is, the assets of each enterprise are different and peculiar to itself by reason not only of each individual enterprise's different production/service function, but also in their ability to exploit each of these characteristics being sunk costs.

Even more troublesome are the qualitative assumptions underlying accounting and statistical models, and securities prices. Each of these rests on impressionistic judgments of individuals. Prediction based on the outward manifestation of such actions is necessarily flawed. As so very well stated by Emmanuel '[t]he difficulty lies in trying to utilize a one-dimensional figure to reflect a multi-dimensional reality. Facts arise only in a set of circumstances, but to be reported they must be abstracted and interpreted.'<sup>149</sup> And again, '[t]he core of the problem is that the auditor is only expressing an opinion on managerial representations as to how management has performed during the year. The auditor is only an umpire and [arguing is permitted with the umpire].'<sup>150</sup> Also, the qualitative assumptions of the kind referred to above ignore the all important impact of insider information. Insider information, when made known, acts to alter the creditworthiness of the particular corporation. The danger then is that prediction based on a scheme of guesswork is not one that rests on firm foundations. And where prices respond to available information, judgments as to the financial stability of the corporation will be necessarily momentary. No firm decision as to creditworthiness can be usefully made then. Given the above, it will be both preferable and desirable to focus on the cause of the problem than the cure; on pre-event decision making rather than post event prediction.

Decision making which affects the creditworthiness of the corporation falls

149 Emanuel D, *Protecting the Debentureholder*, 1976 BLR13, 33.

150 Above 34.

within the province of corporate management alone. Management determines the corporation's debt to equity relationship and the nature of long term (capital investment) and short term (cash flow) rewards to each of these groups. What is more, management can by its actions harm the legitimate expectations of its creditors by expropriating corporate opportunities, appropriating corporate property, shirking, under-investing in effort, asset substitution, diluting creditors' claims, and by paying out excessive dividends. The first and second forms of management misbehaviour are a problem commonly encountered in all agency relationships;<sup>151</sup> the last four are peculiar to those entrusted to administer the

151 Agency theory views investors as principals and those entrusted with their welfare or on whom their welfare may depend, as agents. In the corporate context, management would thus be regarded as agents of both shareholders and creditors, and management and shareholders as agents of creditors during the solvent life of the corporation. An indication of the agency problem is provided in the following paragraph in Adam Smith's *An Inquiry into the Nature and Causes of The Wealth of Nations* Cannan E (ed) 1937, 700 though the reference therein is to the problem in relation to the management-shareholder relationship:

The directors of such [joint-stock] companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honour, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company.

Common examples of the above are the taking of excessive perquisites, conflicts of interest, shirking, and inaction (unauthorised leisure). The problem is more acute where the principal is a creditor and springs from the essential shareholder-creditor relationship: creditors have prior but fixed claims against the assets of the corporation while shareholders have limited liability for the firm's debts and unlimited claims on its remaining assets. The greater the debt-equity ratio, the greater the potential exists for such conflict. Variations of the agency problem may be further illustrated by the following:

Assume principals A and B and respective agents A1 and B1. Transactions entered into by A and B (independent of A1 and B1) supposedly benefit both parties. Absent extraneous considerations, such a transaction would not have been entered into by the principals unless both parties indeed do benefit. However, where the transaction is entered into by A1 and B1 on behalf of A and B respectively, one of several consequences can result:

- (1) A and B both benefit;
- (2) only A or B benefits;
- (3) A or B benefits at the expense of the other;
- (4) neither A nor B benefits;
- (5) A1 and B1 may choose to ignore transactions beneficial to the two principals;
- (6) A1 and B1 may act to directly further their own interests; and
- (7) numerous other outcomes.

The difficulty is that each of the above could be the product of (1) the natural bargaining process, (2) calculated misconduct, or (3) indifference. It is argued that since the welfare of agents depends on the welfare of their principals, agents would therefore act as their principals would. Such an argument, however, presumes that every time the principal benefits, the agent also benefits. While concern for the principal's welfare is necessary in an aggregate sense, there is no need for the agent to have that concern in every transaction. Often, the interest of the agents may well differ from those of the principals they are presumed to serve.

See Sappideen, *Motivations of Offeror Company Directors in Corporation Acquisitions*, 9 U Pens JIBL 67, 68 (1987).



welfare of creditor interests alongside the interests of other corporate beneficiaries. Expropriating and appropriating take the form of using corporate assets to management's own benefit by either re-directing a corporate opportunity or by physical stealth of the asset itself. Shirking (or inadequate effort) is common where a fixed percentage of profits is required to be paid out to the lender. Management may here be tempted to invest less effort in the development of this form of opportunity (beyond what is necessary to make an appropriate minimum payout) and to concentrate on opportunities that do not require the rewards to be shared with the creditor. The end result is a failure to exploit to its fullness the opportunity for which the loan was advanced. The overall danger is that such actions may lead to the decline in value of the security to which the credit is tied. Under investment is a variant of shirking. It recognises that a substantial part of the value of the firm is composed of intangible assets in the form of future investment opportunities. Thus a corporation with long term debentures, for example, may be tempted to reject projects which have a positive net expropriation of present value if the benefit from accepting such projects would accrue to debentureholders.<sup>152</sup>

Asset substitution takes the form of embarking creditor funds on a different and riskier venture for the sake of higher returns, than that which the creditor may have contemplated, or by making the venture for which the loan was advanced (same venture) riskier, again, for higher returns. Where the additional risk added project succeeds, the market value of the firm will increase but it will be the stockholders who will pick up most (if not all) of the gains. Conversely, where the project fails, the market value of the firms will decrease but it will be on the creditors that most of the loss (if not all) will fall.<sup>153</sup> The effect of such action is to effectively reduce the interest costs of the loan, or stated differently, a higher risk loan is obtained at a lower rate of interest. This type of misbehaviour occurs where loans are obtained at fixed rates of interest. Interest rates, for their part, partially reflect the risk of default (other factors influencing interest rates being the rate of inflation, the opportunity cost-factor, and the availability of security for credit), such risk itself being a function of the riskiness of the debtor's business. Diluting creditors' claims, in its simplest form, involves taking further credit on terms where the new debt competes with the original debt for the security. The problem is exacerbated where the later loan is obtained at a higher rate of interest and is used for higher risk ventures. Excessive dividend payments also have the effect of reducing a creditor's claims to available security, and is in a sense, a more blatant form of creditor claim dilution.

Creditors advance funds on the assumption that the borrower company would adhere to an established pattern of dividend payments. Thus where the company decides not to retain any part of its projects as working capital or as development capital but to distribute all of it as dividends to its shareholders, the interests of creditors are affected adversely. This is because the company's working and development capital will now have to be

152 Smith CW and Warner JB, on Financial Contracting - An Analysis of Bond Covenants, 7 *Journal of Financial Economics* 117, 119, (1979).

153 McDaniel MW, 41 *Bus L*, pp.413, 419 (1986). See also R.A. Brealey and S.C. Myers *Principles of Corporate Finance* (McGraw Hill Book Co., 3rd edn. 1988).

financed out of additional borrowings. The borrowing corporation can go even further. It can pay dividends to its shareholders out of the excess of book value based on the sale or revaluation of its assets. As the pricing of debentures and related securities, more than shares, depends on the borrowing company's asset backing, the impact of such payouts on the value of such securities would be harmful.<sup>154</sup>

More recent cases seem to suggest the existence of a *general* duty of care and good faith by the directors of a corporation to its shareholders and creditors in both Australia and the United Kingdom. As stated by Mason J in *Walker v Wimborne*:<sup>155</sup>

The directors of a company in discharging their duty to the company must take account of the interests of its shareholders and its creditors. Any failure by the directors to take into account the interests of creditors will have adverse consequences for the company as well as for them. The creditor of a company ... must look to that company for payment. His interests may be prejudiced by the movement of funds between companies in the event that the companies become insolvent.

Similarly, in the United Kingdom, Diplock LJ has said that 'the best interests of the company are not necessarily those of the shareholders but may include those of the creditors.' Even more wide ranging remarks have been made by Templeman LJ in the House of Lords in *Winkworth v Edward Barron Development Co Ltd*.<sup>156</sup> These statements have been cited with approval by the Full Court of the Supreme Court of Western Australia in *Jeffree v NCSC*.<sup>157</sup> It appears that the courts have come around to recognizing difficulties endemic and inherent in the shareholder-creditor relationship. The legislature, however, has failed to come to grips with the problem. While it has made it easier for affected shareholders to bring an action against Corporate management by overcoming some of the absurdities of the *Foss v. Harbottle*<sup>158</sup> rule, creditors have to be content with an application for winding up.<sup>159</sup> Such a remedy is very much after the event. There has been a failure to appreciate conflicts of interest outside

154 McDaniel MW, *Bondholders and Stockholders*, J of Corp Law 205 (1988), illustrates stockholder gains at the expense of bondholders as follows (at 229):

'For any firm, let A = assets, B = bonds, and C = common stock, where all values are at market. In that case, A = B + C. If A remains constant, any decrease in B produces a corresponding increase in C. This is called a zero sum game. If A increases and B decreases, C will increase, but part of the increase in C comes from the decrease in B. This is called a positive sum game. If A decreases while C increases, B will decrease. This is called a negative sum game. Since stockholders control the firm, they can play these games at bondholder expense. All the games have the same object - to make the bonds more risky, which will reduce their value.'

155 (1976) 50 ALJR 446. See also the decision of Jacobs J in *Grove v Flavel* (1986) 4 ACLC 654, 660.

156 [1987] 1 All ER. 114. Above n 4 for a quote from Templeman LJ's judgement.

157 (1989) 7 ACLC 556. See also *Nicholson v Permakraft (NZ) Ltd* [1981] 1 NZLR 242; and *Kinsela v Russell Kinsela Pty Ltd* (1986) 4 A.C.L.C. 215.

158 Such as the question of standing, and when this is to be determined. See s 260 *Corporation's Law* 1989. See also *Wallersteiner v Moir* [1975] 1 AllER 849; *Prudential Assurance Co Ltd v Newman Industries Ltd* [1982] 1 AllER, 354.

159 Section 462(2) (b) *Corporations Law*.

management appropriation and expropriation. This is a conflict where shareholder gain is at the expense of creditors and where the issue may not be the size of the pie, but the division of an already existing pie.<sup>160</sup>

What has to be appreciated is that even where interest rates are fixed, the market value of creditor securities such as debentures would itself fluctuate (being deeply discounted or at a premium) depending on conditions general and firm specific. Management actions are to a large extent responsible for firm specific conditions. To overcome this imbalance of potential (and likely) management partiality towards shareholders, a general statutory provision requiring directors to be even-handed to both shareholder and creditor interests with respect to the corporation's financing, investment and dividend decisions should be enacted. However, recognition of such an entitlement without a corresponding right of enforcement is of no use. It is necessary, therefore, to also recognize a right of enforcement through an appropriate application to court. Unless such an even-handed approach is recognised creditors would see their interests as subject to the risk of being downgraded by management action. Consequently creditors would opt for higher interest rates, security over the assets of the borrower and/or more restrictive debenture trust deed covenants. Whatever way the latter restrictions are viewed, they end up increasing the cost of credit either in terms of direct interest payments or lost opportunities. Directors' duties to creditors should then not be made to depend on the occurrence of an event(s), but one that should be required to exist alongside duties to shareholders.

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160 The point may be illustrated as follows. Assume that a corporation with \$100,000 of cash following a share issue, issues \$100,000 worth of debentures. The corporation has \$200,000 worth of cash with which it acquires \$200,000 worth of assets. In other words, the corporation's asset backing reflects an investment into the corporation of shares and debentures worth \$100,000 each. The proportionate relationship between the firm's value to its shares and debentures could thereafter take one of several forms. First, the total value of the firm could increase in excess of \$200,000; secondly, the firm's value could remain at \$200,000; or thirdly, the firm's value could fall below \$200,000. The point to note is that in the two latter situations, the firm's debentures may drop in value in line with any decline in the overall value of the firm bearing in mind the costs of recovery of the asset in the event of default and the opportunity cost of having the funds frozen, or less than optimum use being made of them when the firm is in difficult circumstances. More importantly, managerial action could transfer all the losses to creditors alone. Where the corporation prospers and creditor investments are left untampered with, creditor investments increase in value because of the financial strength of the corporation and the remoteness of bankruptcy (the corporation's ability to service and meet its debt obligations). On the other hand, where the corporation's fortunes decline, the proximity of bankruptcy would cause the market to adjust its outlook for both shareholders and creditors alike.