Company Failure in the Construction Industry
A Critical Review and a Future Research Agenda

Dr. James M.W. Wong and Dr. S. Thomas Ng
Department of Civil Engineering
The University of Hong Kong

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Background of the Study

Construction companies are particularly vulnerable because:

- Fragmented nature of the industry
- Excessive competition
- Low entry barrier
- High risk
- Unpredictable fluctuating construction volume

→ Companies must therefore evaluate performance regularly

Background of the Study (cont'd)

Failure of a construction company may cause

- Project delay
- Rippling effect to other companies

Selecting contracting firm is not heavily towards discriminating between solvent and potentially bankrupt firms.

→ Developers / Government to recognise any potential failing company at the earliest opportunities.
Background of the Study (cont'd)

Bankruptcy prediction is under-explored, although it's a critical research topic and has been studied extensively in accounting and financial sectors.

Research Objectives

- To assess the recent trend of business failure in the Hong Kong construction industry and the common causes of failures;
- To identify the key variables determining the solvency of a company;
- To develop a prediction model to detect the impending insolvent company and estimate the chance of business failure in the construction industry;
- To verify the predictability and robustness of the developed prediction model.
Company Failure in the Construction Industry

- Common Causes of Failure in Construction
- Techniques for Predicting Company Failure
Predicting Techniques (1) – Ratio Analysis

Assess various financial ratios to unveil financial weakness of a company by benchmarking with a cut-off point:

- Liquidity ratios (e.g. current ratio): ability to meet its short-term commitments;
- Profitability ratios (e.g. ROA): overall performance / returns;
- Leverage ratios (e.g. gearing ratio): the extent to which a company is financed by debt and shareholders funds;
- Activity ratios (e.g. asset turnover): how well a company uses its resources

→ Relatively simple but rather an “early warning mechanism” of failure
Predicting Techniques (2) – Multiple Discriminant Analysis

A classification method that maximizes the distance between the means of the two classes while minimizing the variance within each class.

The discriminant function:
\[ Z_i = d_0 + d_1X_{i1} + d_2X_{i2} + \ldots + d_nX_{in} \]

Predicting Techniques (2) – Multiple Discriminant Analysis

A six-variable Z-score model was built based on a sample of 20 failed and 20 non-failed companies in the civil engineering sector of the UK.

\[ Z = 25.4 - 51.2X_1 + 87.8X_2 - 4.8X_3 - 14.5X_4 - 9.1X_5 - 4.5X_6 \]

where \( X_1 \) is the profit before interest and tax to net assets, \( X_2 \) is the profit before interest and tax to capital employed, \( X_3 \) is debtors / creditors, \( X_4 \) is current liabilities / current assets, \( X_5 \) is log10 days debtors, and \( X_6 \) is the creditors trend measurement.

A positive Z-score indicates a long-term solvency, while a company with a negative value was classified as a potentially failure.

→ Allow scoring of firms; but model has little intuitive interpretation.
Predicting Techniques (3)  
– Conditional Probability Models

Estimate the probability of failure conditional on a range of firm characteristics assuming certain probability distribution.

Logit regression:
\[ P_1(X_i) = \frac{1}{1 + \exp\left(-\left(b_0 + b_1X_{i1} + b_2X_{i2} + \ldots + b_nX_{in}\right)\right)} \]

The logit regression model combines several company characteristics into a multivariate probability score, which indicates the company’s vulnerability to failure.

→ Requires less assumptions than MDA, but sensitive to multicollinearity, outliers and missing values

Preliminary Findings

Company Failure in the Construction Industry

• Failure Rate in the HK Construction Industry  
• Comparison of Financial Performance between Failing and Non-Failing Companies
Data Collected

The construction companies are categorized by the Standard Industrial Classification Code (SIC) which include:

15: Building Construction General Contractors & Operative Builders
16: Heavy Construction Other Than Building Construction Contractors
17: Construction Special Trade Contractors

<table>
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<tr>
<th>SIC</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<td>15</td>
<td>1,829</td>
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<td>16</td>
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<td>17</td>
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<td>13,761</td>
<td>13,912</td>
<td>13,999</td>
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<tr>
<td>Total</td>
<td>15,970</td>
<td>16,217</td>
<td>16,385</td>
<td>15,464</td>
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Hong Kong Construction Industry Failure Rate (2005-2009)
Comparison of Financial Performance

<table>
<thead>
<tr>
<th>Key Financial Ratios</th>
<th>5 Failed Companies</th>
<th>5 Solvent Companies</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Average</td>
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<tr>
<td>Retained Earnings / Total Assets</td>
<td>0.001-0.06</td>
<td>0.04</td>
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<tr>
<td>Turnover / Net Assets</td>
<td>0.32-2.0</td>
<td>0.92</td>
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<tr>
<td>Working Capital / Total Assets</td>
<td>0.2-0.66</td>
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<tr>
<td>Current Liabilities / Net Assets</td>
<td>0.16-2.53</td>
<td>1.06</td>
</tr>
</tbody>
</table>

Research Significance

The models to be developed are anticipated to assess the solvency and predict the chance of business failure.
- Continuous monitor of a company’s financial performance.
- Able to carry out “what-if” studies by adjusting specific variables.
- Support decision-makers to assess and identify the risk of business failure.
- Enrich the knowledge in the area of business failure by using intelligent techniques.
END OF PRESENTATION

Thank you for your attention!

James M.W. Wong
Postdoctoral Fellow
Civil Engineering Department
The University of Hong Kong
Email: jmwwong@hkucc.hku.hk