

# Spreadsheets and Long Term Corporate Survival

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# Question

**Does Spreadsheet Use Confer a Long-Term Economic Advantage to the Individuals and Companies that use them?**

# Related Previous Work

- Mc Millan PhD, University of Aberdeen, 2000
- Reviewed use of Decision Analysis Techniques in 27 UKCS companies in March 1998
  - Payback Rate of Return, Risk, Uncertainty, Monte Carlo Simulation, Real Options, Preference & Portfolio Theories
- Ranked the use of these techniques:
  - 0 no use, 1 some use, 2 full use
- Found +ve correlation between use of these techniques and various measures of corporate performance

# MacMillan (2000)

| CRITERIA                         | COMPANY  |          |          |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|----------------------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                                  | A        | B        | C        | D         | E         | F         | G         | H         | I         | J         | K         | L         | M         | N         | O         | P         | Q         | R         | S         | T         |
| Quantitative analysis            | Green    | Red      | Red      | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       |
| Holistic view                    | Green    | Green    | Red      | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       |
| Discounted cash flow             | Green    | Red      | Red      | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       |
| Risk and uncertainty definitions | Blue     | Blue     | Blue     | Blue      | Green     | Blue      | Blue      | Green     | Blue      | Red       | Green     | Blue      | Red       | Blue      | Red       | Green     | Red       | Green     | Green     | Green     |
| Use Monte Carlo (MC)             | Blue     | Blue     | Green    | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Green     | Red       | Red       | Red       | Red       | Green     | Red       | Red       | Red       |
| P10,p50,p90 reserve cases        | Blue     | Blue     | Green    | Blue      | Blue      | Blue      | Green     | Blue      | Green     | Blue      | Blue      | Green     | Green     | Red       | Red       | Green     | Green     | Red       | Red       | Red       |
| EMV decision tree analysis       | Blue     | Blue     | Green    | Red       | Green     | Red       | Blue      | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Red       | Green     | Red       | Red       | Red       |
| Use MC for prospect economics    | Blue     | Blue     | Blue     | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Green     | Blue      | Green     | Blue      | Blue      | Green     |
| Use MC for prod. reserves        | Blue     | Blue     | Blue     | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Green     | Blue      | Blue      |
| Use MC for prod. economics       | Blue     | Blue     | Blue     | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      |
| Portfolio theory                 | Blue     | Blue     | Blue     | Blue      | Blue      | Blue      | Green     | Blue      | Green     | Blue      | Green     | Red       | Green     | Blue      | Green     | Green     | Green     | Red       | Green     | Green     |
| Option theory                    | Blue     | Blue     | Blue     | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Green     | Blue      | Green     | Blue      | Green     | Green     | Blue      | Green     | Green     |
| Preference theory                | Blue     | Blue     | Blue     | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Green     | Green     | Blue      | Blue      | Green     | Blue      | Blue      | Green     |
| Qualitative and quantitative     | Blue     | Blue     | Blue     | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Blue      | Green     |
| <b>TOTAL</b>                     | <b>3</b> | <b>5</b> | <b>9</b> | <b>10</b> | <b>10</b> | <b>10</b> | <b>10</b> | <b>11</b> | <b>12</b> | <b>12</b> | <b>12</b> | <b>13</b> | <b>15</b> | <b>15</b> | <b>15</b> | <b>15</b> | <b>15</b> | <b>16</b> | <b>17</b> | <b>17</b> |

# Test Data

- Ex Eastern Software Publishing Ltd (ESP)
- Customers & Enquirers
- Extant 1993-1999
- Specialised in sale of spreadsheet related decision analysis software & related management training
  - Monte Carlo (@Risk), Forecasting, Optimisation etc
- 60,000 Name, Job Title, Company & Address records
- 350,000 telephone conversation outcomes
- All spreadsheet users

# Control Data

- Ex well known information provider
- Named Directors in 50,000 largest UK companies
- Obtained in 1996 on CD-ROM
- De-duplicated against ESP Data
- Added 20,000 companies ESP did not know about
- Intensive marketing commenced late 1996
  - very few sales (<0.1%)
  - marketing suspended after six months or so
  - data “remained available” ie included in 60,000

# Database Scoring System

- With so many companies, who do you target with limited resources?
- Statistically profiled 60,000 ESP & Control records
- Scored each record using historical sales data
  - Score = 0 = non customer
  - Score = 1 = customer
- All ESP & Control data given a score between 0 & 1
  - extremely successful at predicting sales outcomes
  - from a sales point of view, ranked data in order

# UK Companies House

- Statutory Company Registration Authority
- Offers Free Web Check Service
  - Company Name
  - Company Number
  - Company Status
    - Active
    - Inactive
    - Dissolved
    - Liquidated
- LTD companies & PLC's only



# Preliminary Study

- Looked at two cohorts of ESP Ltd & PLC data
  - 20 “Risk Analysis” Seminar Attendees
  - 20 Other purchasers
- Looked at CH data to find who survived
  - Determined Match, Near Match No match on Co. name
  - Counted up Actives versus Liquidated/Dissolved etc
- Did it Twice – 80 records total
- 72.5% & 84.2% survival rate
- No statistical difference
- Important result was the match rate of 97.5%

# Main Study – Data Segments

| ESP DATA    | RANK |
|-------------|------|
| ■ CONTROL   | 1    |
| ■ ENQUIRERS | 2    |
| ■ OTHER     | 3    |
| ■ RISK      | 4    |
| ■ SEM       | 5    |
| ■ RISK&SEM  | 6    |

- Approx 70 records in each segment
- Performed experiment twice – 851 records total
- Further experiment on City of London Data

# Main Study – Data Types

|                              |     |
|------------------------------|-----|
| ■ Individuals                | 851 |
| ■ Companies (Both Ltd & PLC) | 766 |
| ■ Ltd Companies              | 638 |
| ■ PLC's                      | 128 |
| ■ City of London Individuals | 240 |
| ■ City of London Companies   | 201 |

# Sample Sizes

| <b>SEGMENT<br/>NAME</b> | <b>TOTAL<br/>DATA</b> | <b>%<br/>TOTAL</b> | <b>LTD &amp; PLCS<br/>1993-1999</b> |               | <b>SAMPLE<br/>SIZE</b> |             |
|-------------------------|-----------------------|--------------------|-------------------------------------|---------------|------------------------|-------------|
|                         |                       |                    |                                     | <b>%</b>      |                        | <b>%</b>    |
| CONTROL                 | 19,271                | 31.8%              | 18,134                              | 54.0%         | 147                    | 0.8%        |
| ENQ                     | 33,723                | 55.6%              | 12,583                              | 37.5%         | 146                    | 1.2%        |
| OTHER                   | 6,159                 | 10.2%              | 2,320                               | 6.9%          | 140                    | 6.0%        |
| RISK                    | 809                   | 1.3%               | 264                                 | 0.8%          | 140                    | 53.0%       |
| SEM                     | 372                   | 0.6%               | 138                                 | 0.4%          | 138                    | 100.0%      |
| RISK&SEM                | 321                   | 0.5%               | 140                                 | 0.4%          | 140                    | 100.0%      |
| ALLRISK                 | 1,502                 | 2.5%               | 542                                 | 1.6%          | 418                    | 77.1%       |
| <b>TOTAL</b>            | <b>60,655</b>         | <b>100.0%</b>      | <b>33,579</b>                       | <b>100.0%</b> | <b>851</b>             | <b>2.5%</b> |

# Sample Sizes – City of London

| <b>SEGMENT<br/>NAME</b> | <b>TOTAL<br/>DATA</b> | <b>%<br/>TOTAL</b> | <b>LTD &amp; PLCS<br/>1993-1999</b> |        | <b>%</b> | <b>SAMPLE<br/>SIZE</b> | <b>%</b> |
|-------------------------|-----------------------|--------------------|-------------------------------------|--------|----------|------------------------|----------|
| CONTROL                 | 1,144                 | 35.3%              | 1,056                               | 62.4%  |          | 67                     | 6.3%     |
| ENQ                     | 1,598                 | 49.3%              | 469                                 | 27.7%  |          | 66                     | 14.1%    |
| OTHER                   | 356                   | 11.0%              | 125                                 | 7.4%   |          | 65                     | 52.0%    |
| RISK                    | 80                    | 2.5%               | 15                                  | 0.9%   |          | 15                     | 100.0%   |
| SEM                     | 39                    | 1.2%               | 12                                  | 0.7%   |          | 12                     | 100.0%   |
| RISK&SEM                | 22                    | 0.7%               | 15                                  | 0.9%   |          | 15                     | 100.0%   |
| ALLRISK                 | 141                   | 4.4%               | 42                                  | 2.5%   |          | 42                     | 100.0%   |
| TOTAL                   | 3,239                 | 100.0%             | 1,692                               | 100.0% |          | 240                    | 14.2%    |



# Summary Results – Survival Rate Comparisons

## SUMMARY RESULTS

ESP ACTIVE% VS CONTROL ACTIVE%

TEST OF TWO PROPORTIONS

| SEGNAME  | INDIVIDUALS | COMPANIES | LIMITED   | PUBLIC    | CITY OF     | CITY OF   |
|----------|-------------|-----------|-----------|-----------|-------------|-----------|
|          |             |           | COMPANIES | LIMITED   | LONDON      | LONDON    |
|          |             |           | COMPANIES | COMPANIES | INDIVIDUALS | COMPANIES |
| CONTROL  | 54.4%       | 54.4%     | 54.5%     | 53.3%     | 55.2%       | 54.5%     |
| ENQ      | 60.6%       | 61.5%     | 60.0%     | 68.0%     | 59.7%       | 55.8%     |
| OTHER    | 61.7%       | 62.1%     | 58.6%     | 92.3%     | 60.7%       | 61.2%     |
| RISK     | 68.6%       | 69.1%     | 62.5%     | 92.6%     | 80.0%       | 66.7%     |
| SEM      | 71.2%       | 73.0%     | 70.5%     | 82.6%     | 100.0%      | 100.0%    |
| RISK&SEM | 69.9%       | 71.3%     | 66.2%     | 87.0%     | 80.0%       | 85.7%     |
| ALLRISK  | 69.9%       | 71.0%     | 66.3%     | 87.7%     | 85.7%       | 80.8%     |

# Summary Results – Correlations with Segment Rank & Database Score

## SUMMARY CORRELATIONS (R<sup>2</sup>)

DEP VAR IS ACTIVE%

| INDEP VAR | METHOD   | LIMITED     |          | PUBLIC   | CITY OF  | CITY OF     |          |
|-----------|----------|-------------|----------|----------|----------|-------------|----------|
|           |          | INDIVIDUALS | COMPANES | LIMITED  | LONDON   | LONDON      |          |
|           |          | INDIVIDUALS | COMPANES | COMPANES | COMPANES | INDIVIDUALS | COMPANES |
| DSCORE    | SPEARMAN | 94%         | 83%      | 77%      | 71%      | 64%         | 60%      |
| DSCORE    | LINEAR   | 78%         | 75%      | 60%      | 62%      |             |          |
| RANK      | SPEARMAN | 94%         | 94%      | 89%      | 54%      | 90%         | 94%      |
| RANK      | LINEAR   | 83%         | 82%      | 63%      | 53%      | 57%         | 60%      |



# Main Findings I

- 68-73% of @Risk user companies survived against 55% in the control segment
- @Risk User PLC's had highest survival rate of 87%
- @Risk User Companies in City of London has similarly high survival rate of 86%
- Control survival rate consistently low across all segments
- Intensity of use of ESP products/services +vely correlated with survival rate

# Main Findings II

- Less than 2% of companies of the 30,000 largest in the UK (in period of study) benefited from @Risk survival advantage
- City of London is not a special case
- For the vast majority of companies where spreadsheet use is certain, there is only a small survival rate advantage over companies where spreadsheet use is unknown

**Thank You!**

*Any Questions?*