

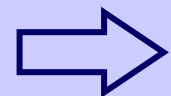
Credit Scoring and Credit Control IX - Edinburgh 2005

Modelling Personal Bankruptcy in the UK

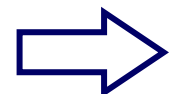
Chris Curtis

- **Bankruptcy traditionally not a problem in UK – 0.5% of individuals declared bankrupt annually compared to 4% that default**
- **Enterprise Act (2002) covers a range of measures designed to enhance enterprise**
- **Enterprise Act transforms the approach to bankruptcy, making voluntary bankruptcy easier and allowing for standard discharge in 12 months (reduced from 36 months)**
- **As a result it was envisaged that bankruptcy would become a much more significant issue for the credit industry**

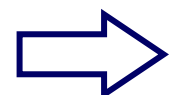
-  **Bankruptcy Process in the UK**
-  **Objectives of the Bankruptcy Analysis**
-  **Preliminary Analysis – Profile of Bankrupts**
-  **Bankruptcy modelling**
-  **Implementing the Bankruptcy score**



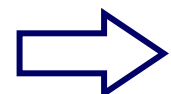
Bankruptcy Process in the UK



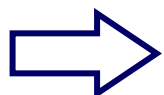
Objectives of the Bankruptcy Analysis



Preliminary Analysis – Profile of Bankrupts



Bankruptcy modelling

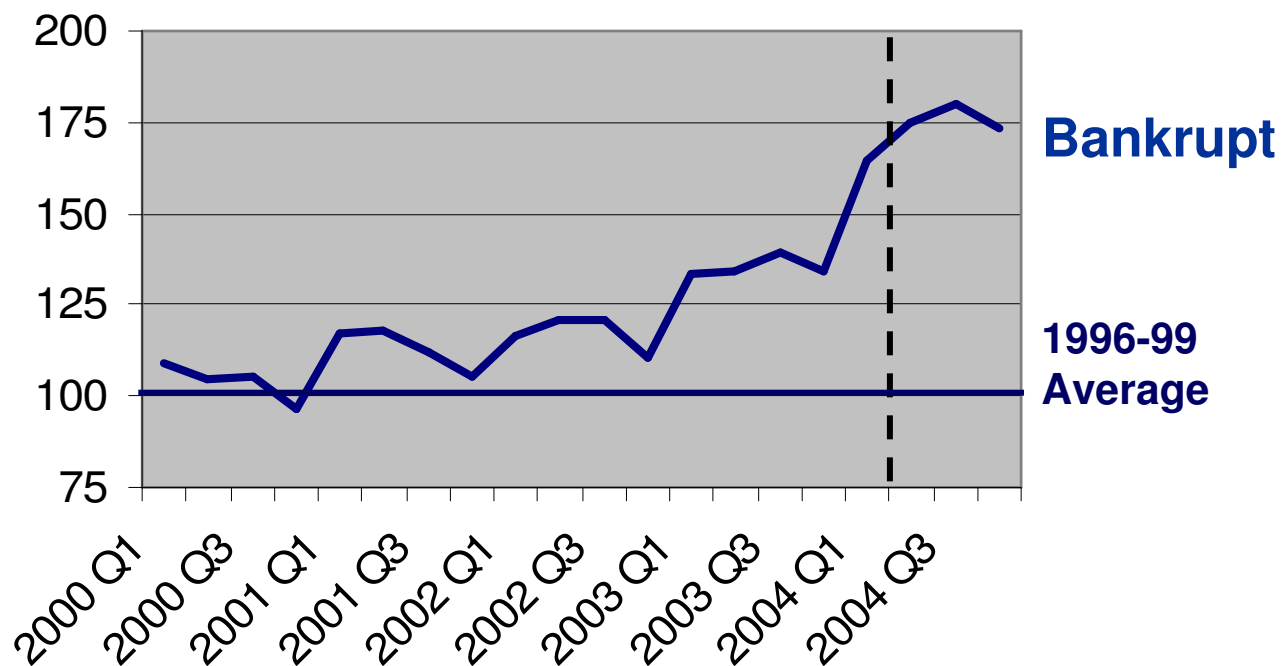


Implementing the Bankruptcy score

- **An individual may be officially declared bankrupt if a court is satisfied that there is no prospect of the debt being repaid - regarded as last resort because it means losing control over assets and limiting future access to credit market.**
 - **A trustee (usually an accountant) is put in charge of your estate and pays debts in a strict priority order. Creditors are given the lowest priority by the trustee and are therefore paid last – after costs relating to bankruptcy and sale of property**
 - **Standard discharge period is one year (can be extended through BRO or BRU) – during this period a bankrupt cannot open bank accounts, take out credit cards or resume normal financial life**
 - **Most debts are then written-off and creditors cannot be chased for any outstanding amounts – exceptions include court fees and student loans**
- **Suited to someone with considerable debts , no income and no assets**
 - **Should be avoided by those with equity in property,disposable income and those with professional qualifications**

Individual Bankruptcies in England and Wales

- Between 1996 and 1999 there were on average 5184 bankruptcies per quarter – the graph measures the percentage change on this figure

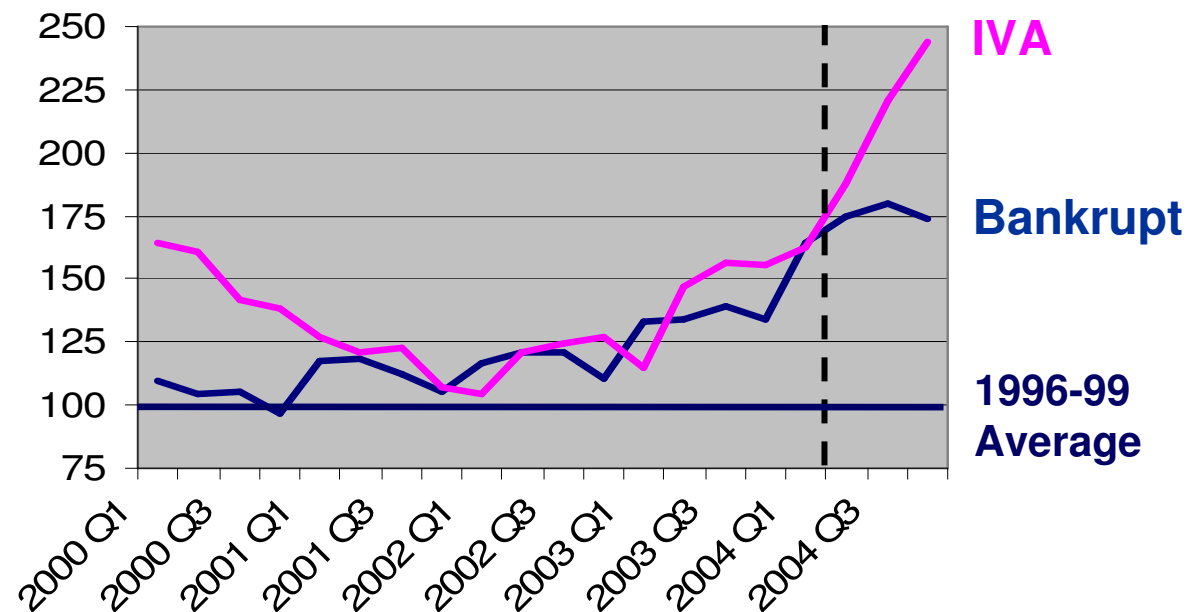


- It can be seen that the number of bankruptcies started to increase before the Enterprise Act came into force
- This suggests that increasing levels of indebtedness also contribute to the increase in bankruptcies

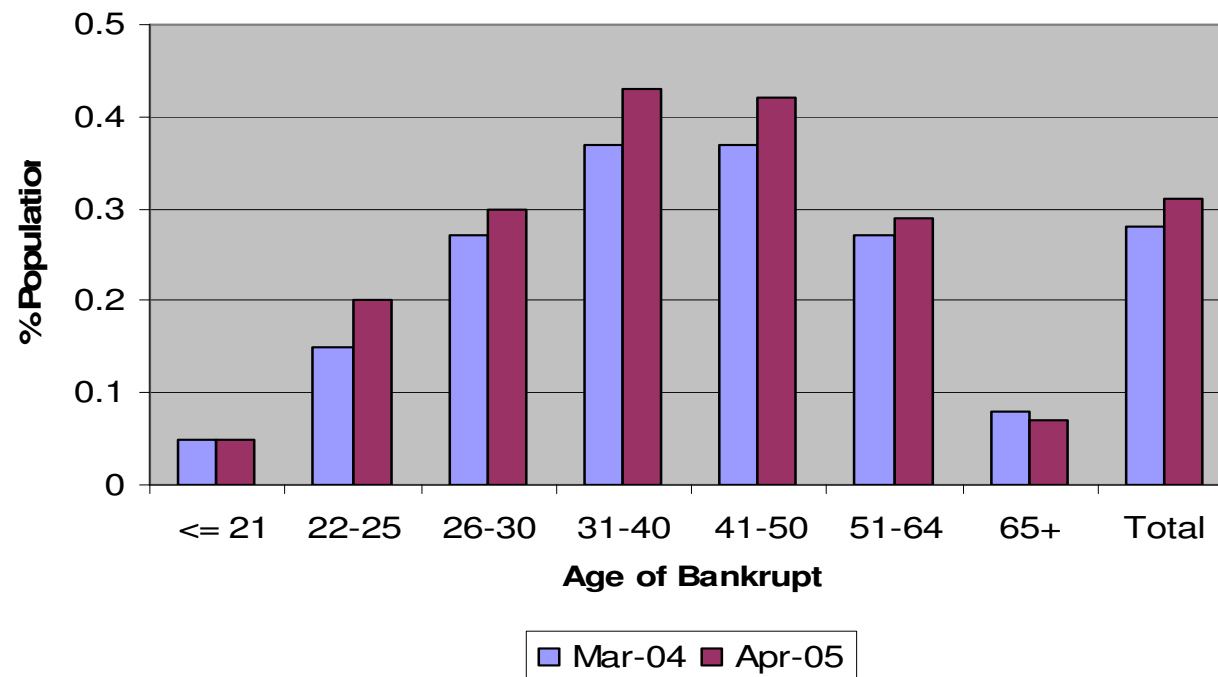
- The number of bankruptcies per quarter has risen to 11,195 (2nd quarter 2005) representing an increase of over 200% of the 1996-99 level.

Individual Insolvencies in England and Wales

- For individuals with a regular household income an IVA is an alternative to bankruptcy that gives greater control over assets and reduces the overall level of debt
- Creditors prefer IVA to bankruptcy because recovery rates are higher, however set-up and management costs are high
- Between 1996 and 1999 there were on average 1319 IVAs per quarter – the graph measures the percentage change in this figure
- This has now risen to 4,199 in the second quarter of 2005 (an increase to over 300% of the 1996-99 level)



- While the Enterprise Act has probably resulted in an acceleration in the increase in bankruptcy there was already an upward trend resulting from the level of indebtedness in the UK
- Based on the analysis undertaken the profile of people declaring themselves bankrupt has not changed following the implementation of the Enterprise Act



This graph compares the age profiles of bankrupts prior to the Enterprise Act with all bankrupts as at April 2005

 **Bankruptcy Process in the UK**

 **Objectives of the Bankruptcy Analysis**

 **Preliminary Analysis – Profile of Bankrupts**

 **Bankruptcy modelling**

 **Implementing the Bankruptcy score**

The following information was provided by a major UK Retail Bank:

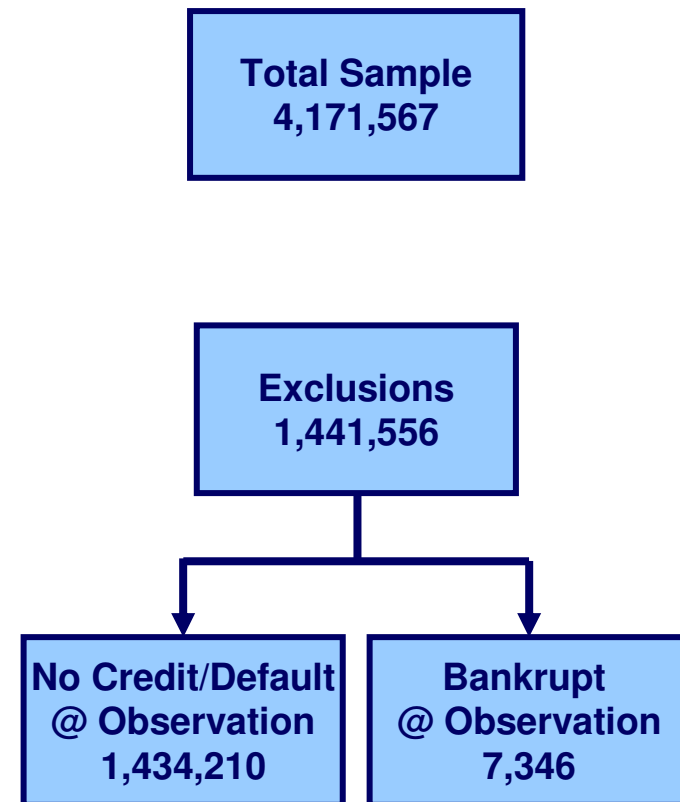
- **Average loss from Bankrupts/IVA £4,400**
- **Average loss from non-Bankrupt/IVA £2,800**
- **Expected recovery from Bankrupt/IVA is 4%**



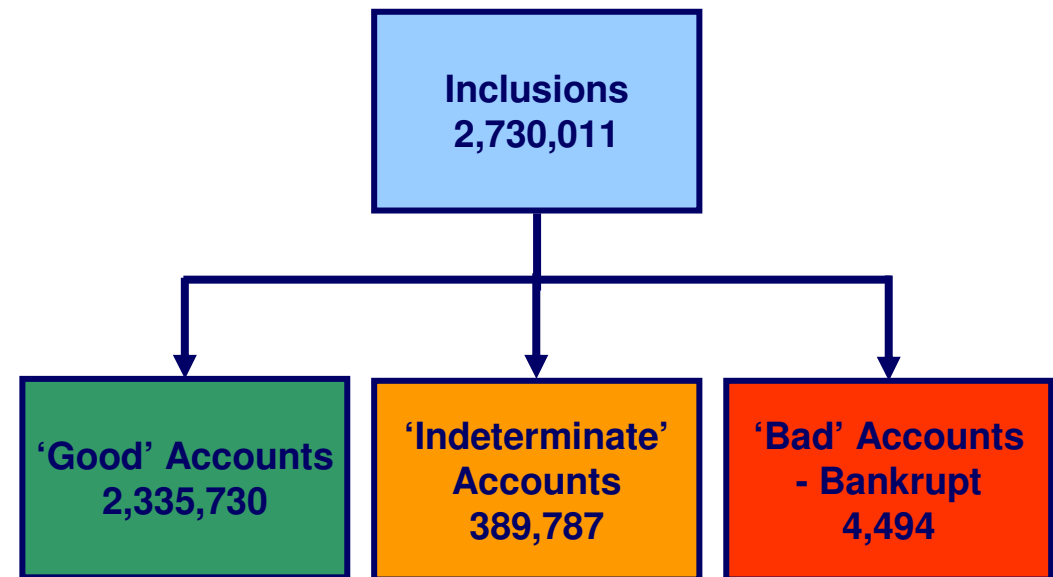
- **Investigate the key differences between bankrupts and standard 'risk bads'**
- **Develop a Bankruptcy scorecard to identify existing customers that are likely to become bankrupt in the next 12 months**
- **Identify how the bankruptcy model can be most effectively integrated within risk strategy**



- A random sample of the UK population was used within the bankruptcy analysis
- The following individuals were excluded from the analysis:
 - No active credit accounts or default information as at April 2004
 - Already bankrupt before April 2004



- Good/Bankrupt flag was defined as at March 2005* on the remaining individuals as follows:
 - **Bad**: Bankrupt
 - **Indeterminate**: Credit Default
 - **Good**: other accounts
- This gave Good/Bankrupt odds of 519.7:1
- A risk good/bad flag was also defined for comparison purposes

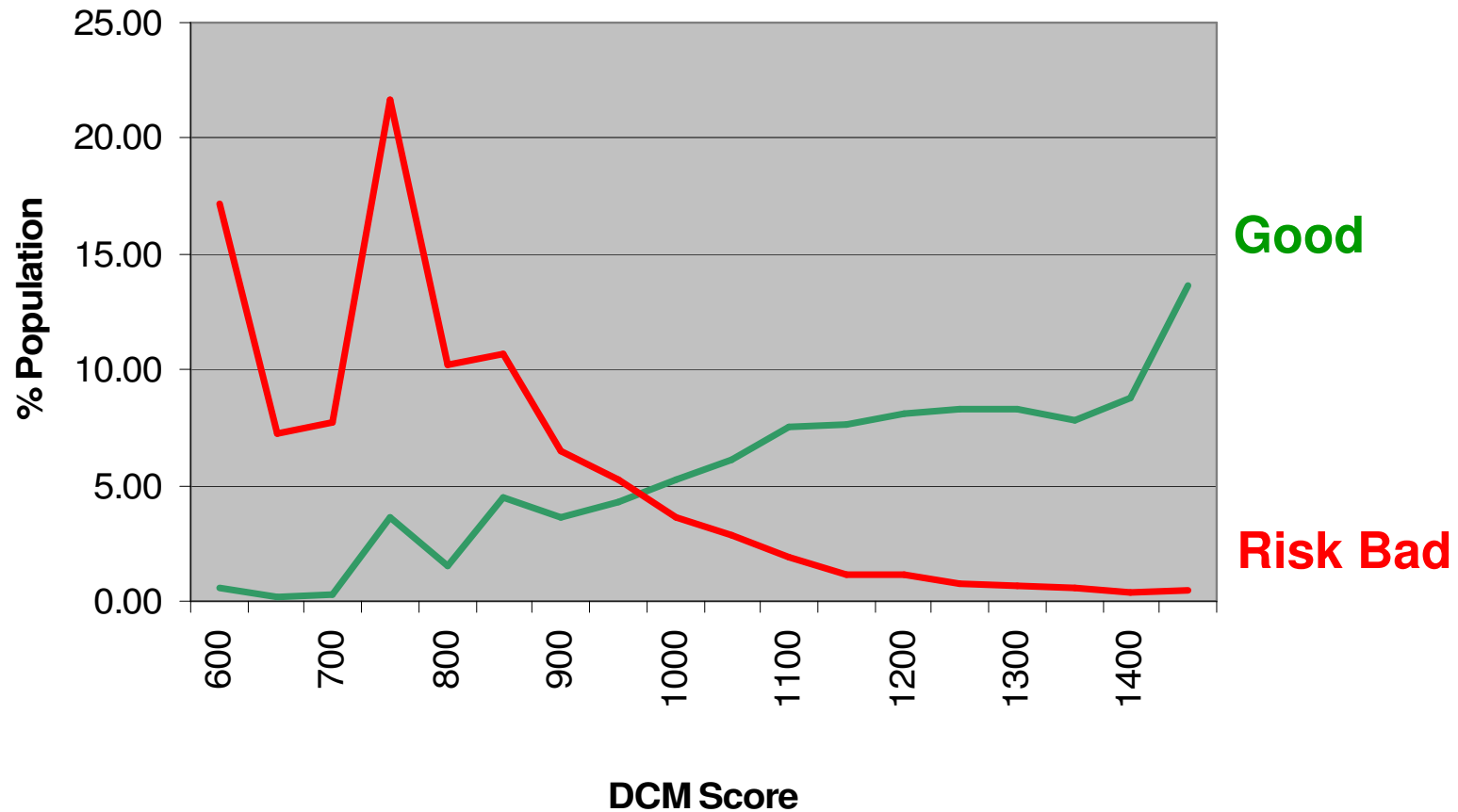


* All bankruptcies considered therefore occurred after the Enterprise Act came into force

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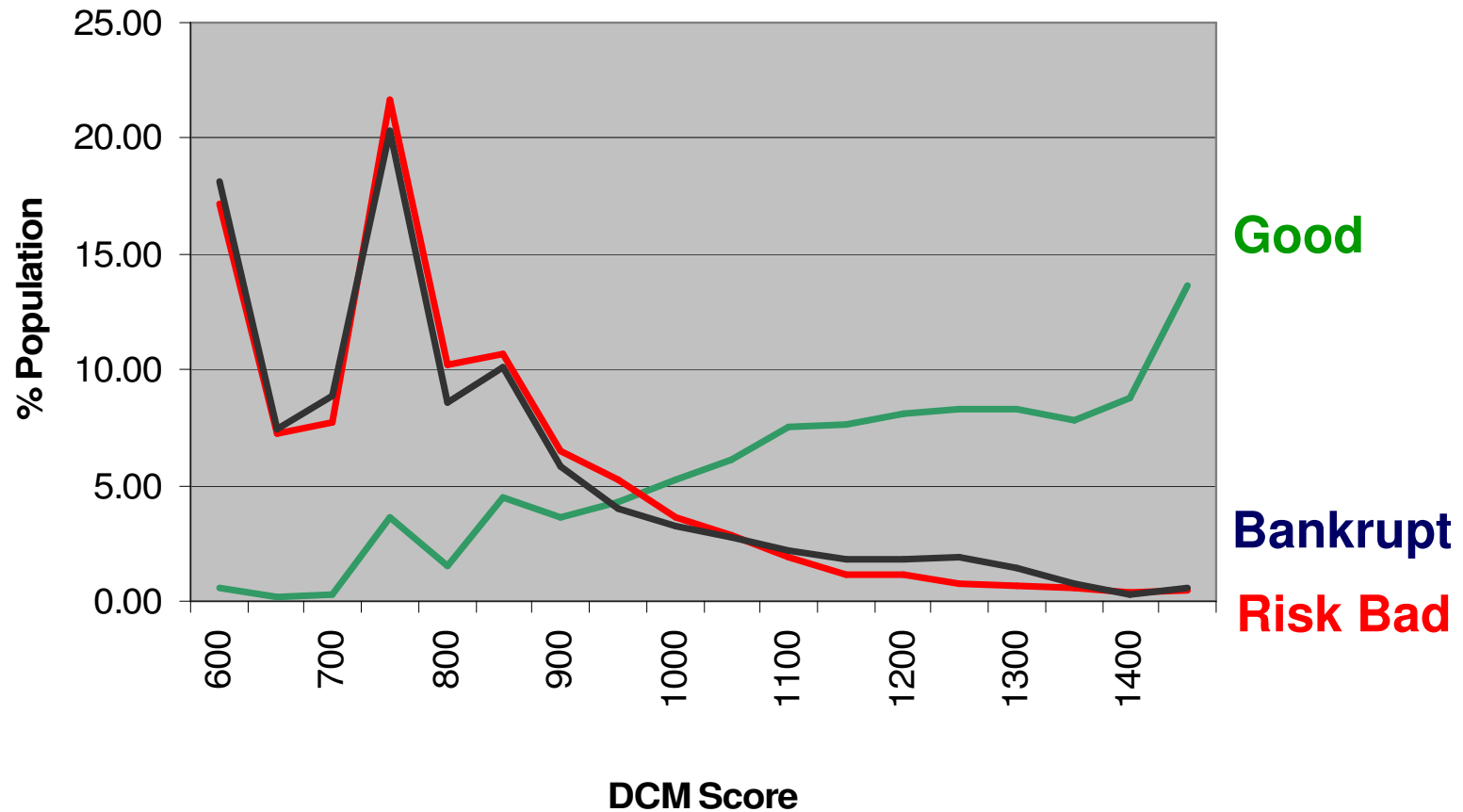
Discrimination of Credit Bureau Risk Score

- Delphi for Customer Management is a behavioural credit bureau risk scorecard developed by Experian-Scorex



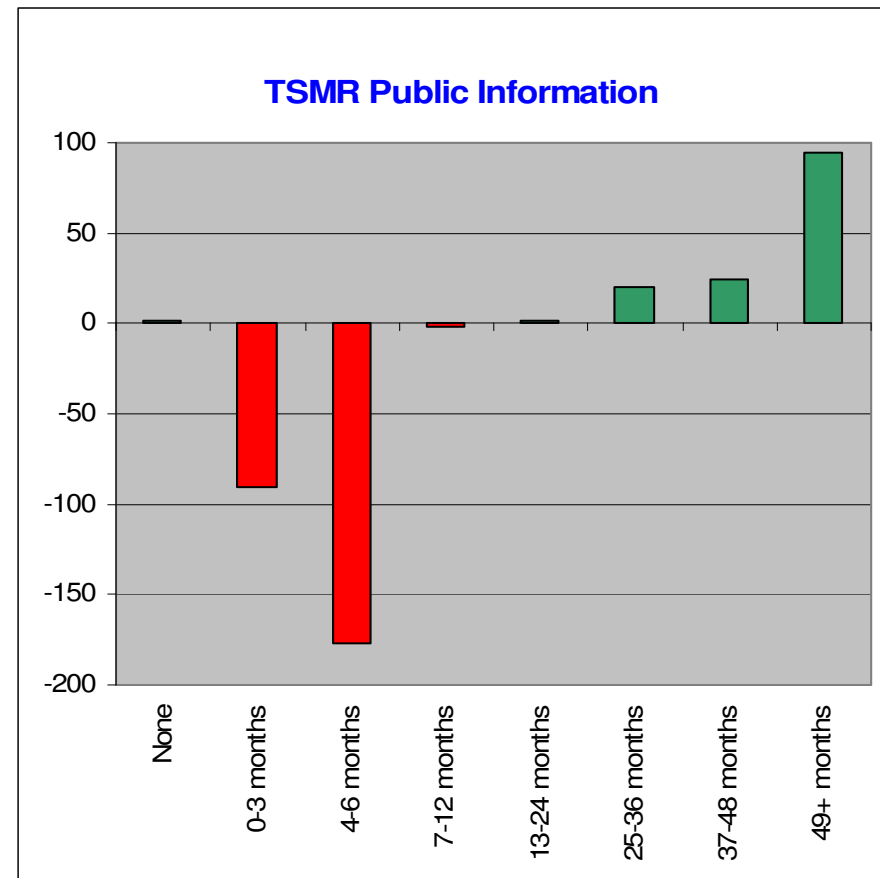
Discrimination of Credit Bureau Risk Score

- The distribution of bankrupts by score is very similar to risk bads



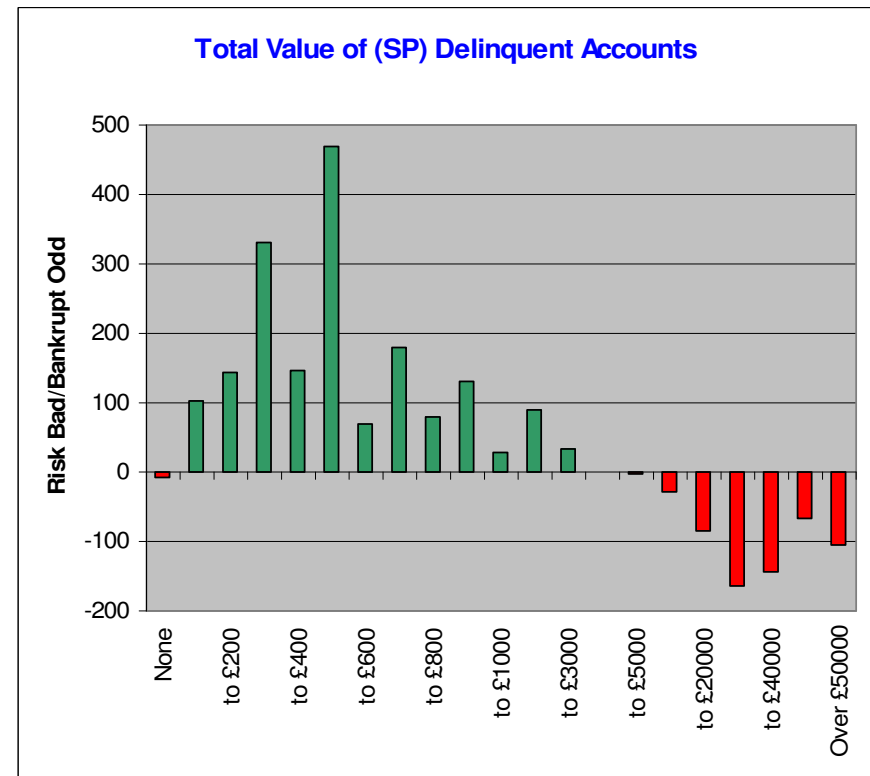
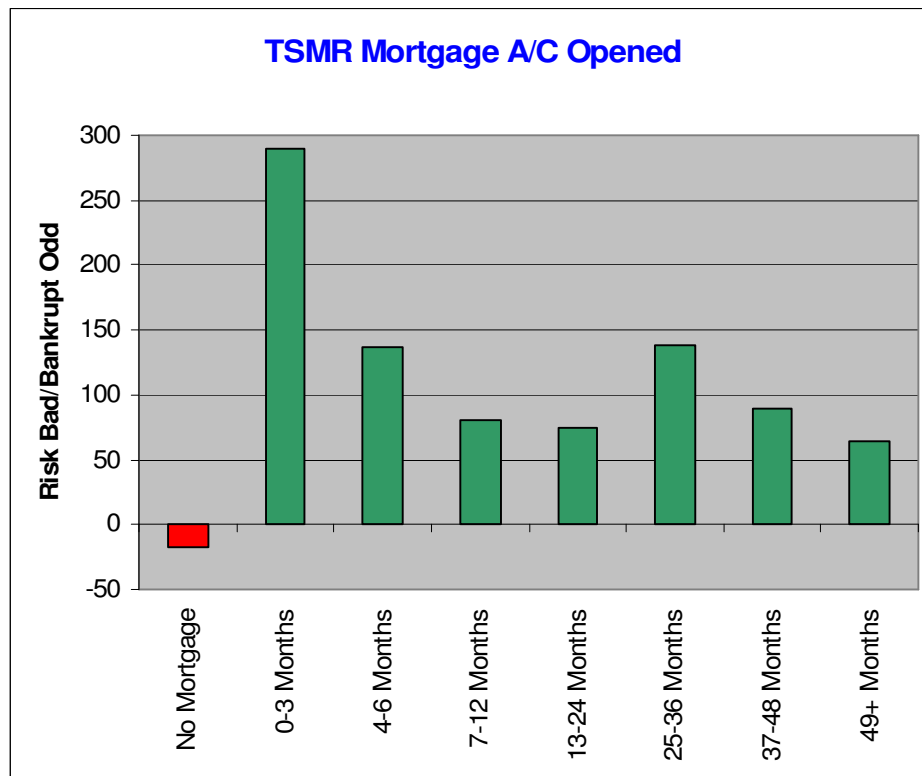
Differences between Bankrupts and Defaults

- Identifying difference in the profile of Bankrupts with risk bads is made clearer by calculating Default/Bankrupt Odds (default is risk bad excluding bankrupt)
- If the distribution of default bads by 'TSMR Public Information' were the same as the bankrupts then the index shown in the graph would be consistently around '0'
- The pattern shows that there are a significantly higher proportion of bankrupts with Public Information in the last 6 months and a significantly higher proportion of default bads with Public Information over 4 years ago

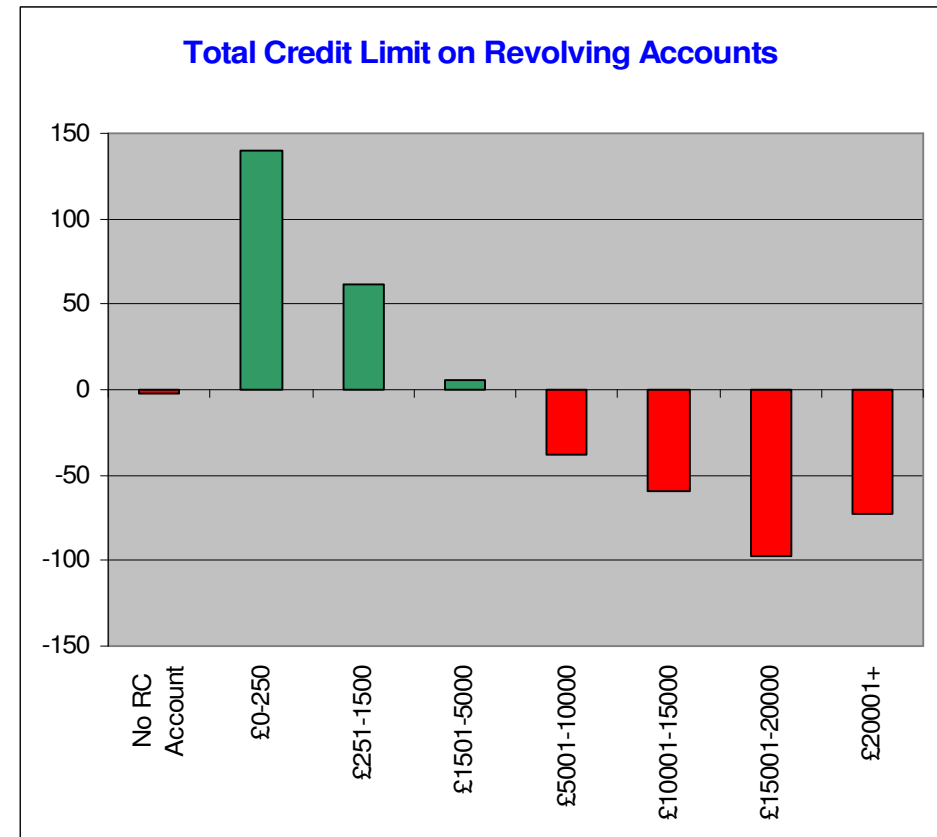
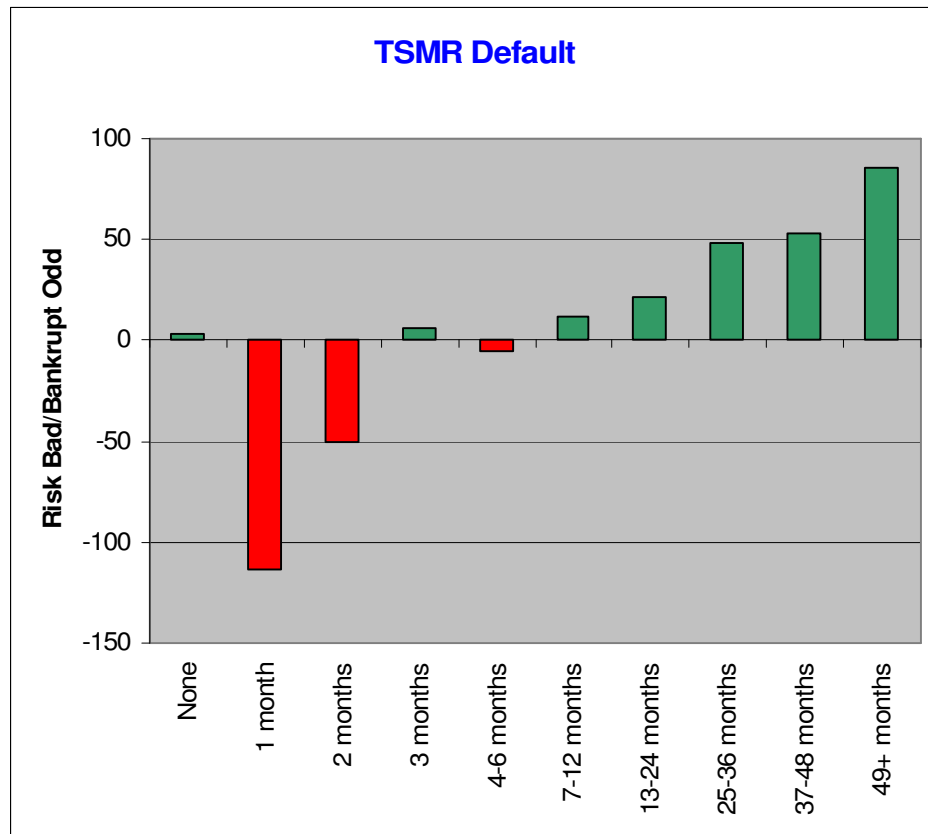


Differences between Bankrupts and Defaults

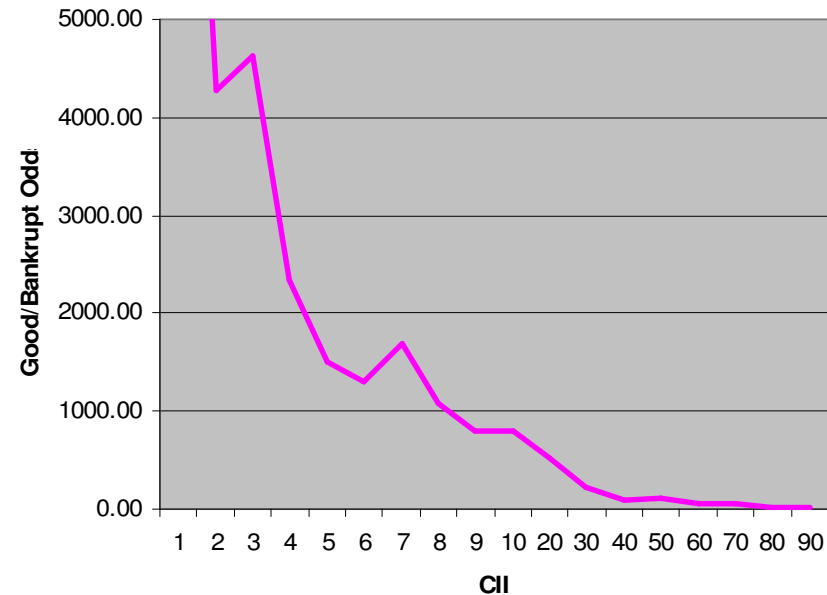
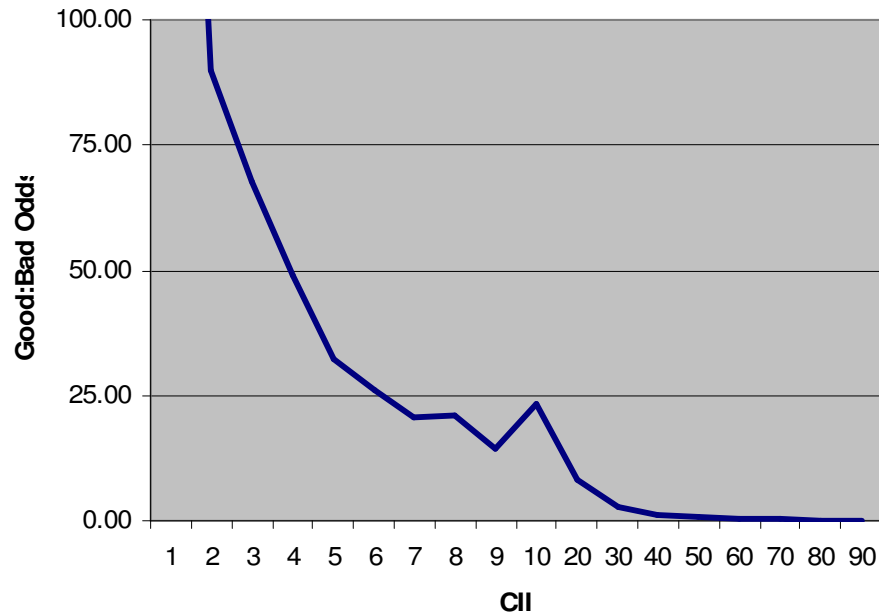
- Significant differences were also seen in other characteristics
- The differences observed were logical and suggested that a bankruptcy model could be developed



Differences between Bankrupts and Defaults

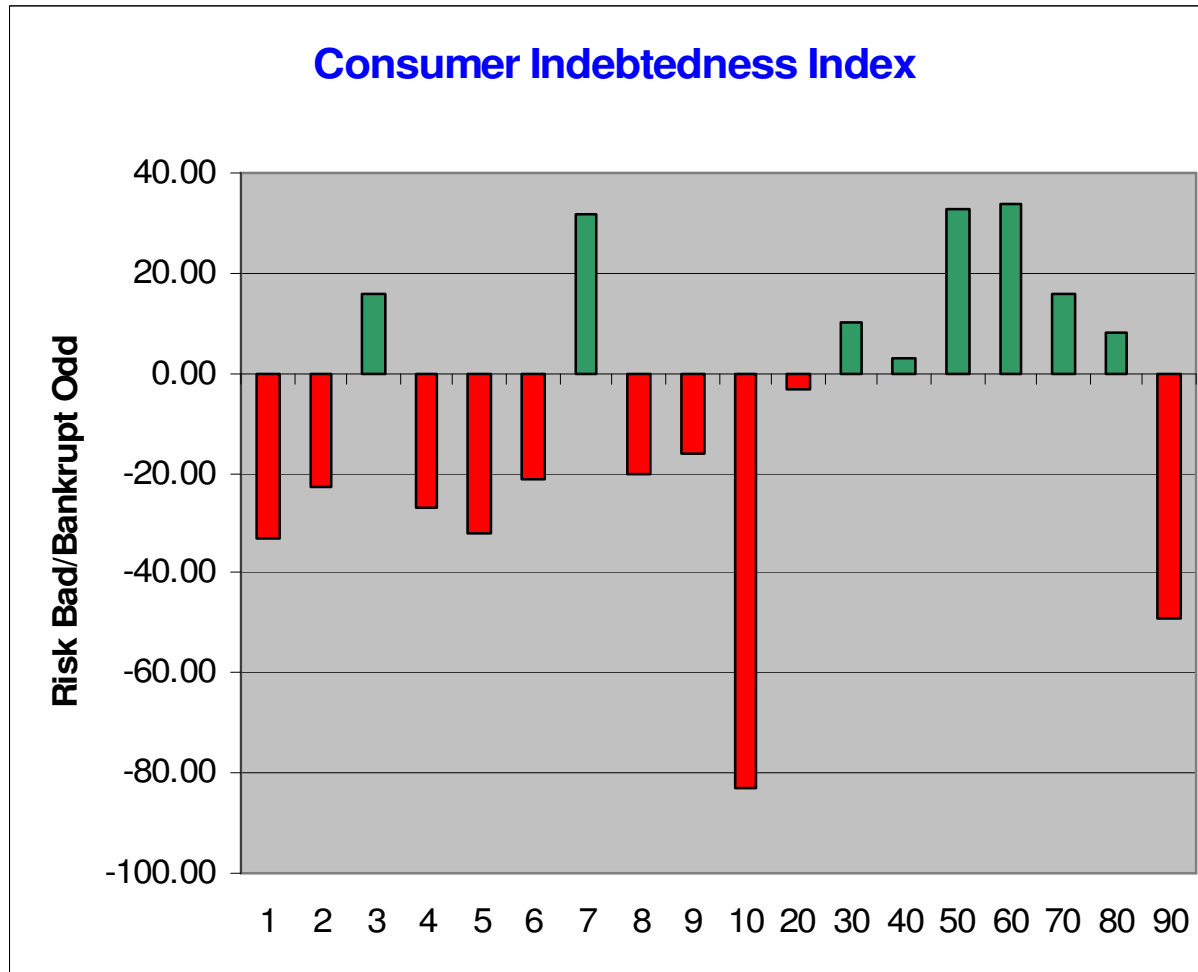




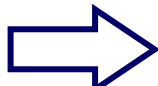


- **CII identifies individuals who are over indebted and likely to have payment difficulties in the future**



- **Discrimination for CII is very similar for both Bankrupts and risk bads**

- There is not a clear pattern in CII when comparing risk bads against bankrupts



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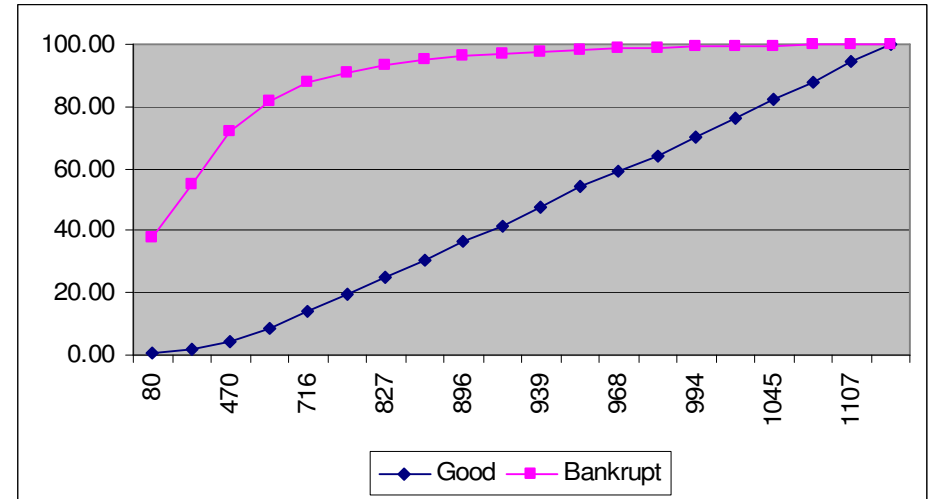
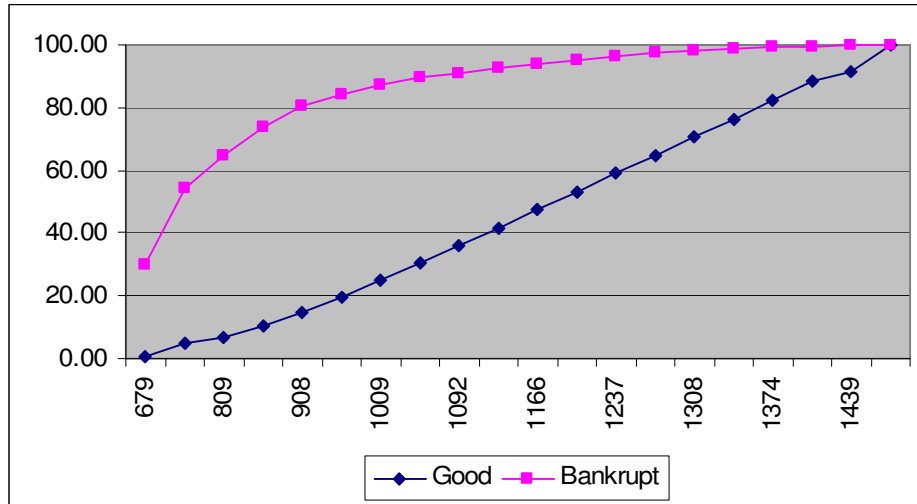
- **Most predictive characteristics identified within the initial model are also very strong risk predictors:**
 - Time Since Most Recent Default
 - Total Balance on Active Credit Accounts (excluding mortgages)
 - Worst Status on any Credit Account L6M
 - Time Since Most Recent Public Information (CCJ etc.)
 - Number of Accounts Currently 1 Payment in Arrears
- **Credit card information is also predictive of bankruptcy, for example:**
 - Worst Current Status on Revolving Credit Accounts
 - Highest Credit Limit Utilisation on any Credit Account

Comparison of Bureau Risk and Bankruptcy Scores



Delphi for Customer Management

Bankruptcy Score



Gini Co-efficient: 79.1%

Gini Co-efficient: 87.9%

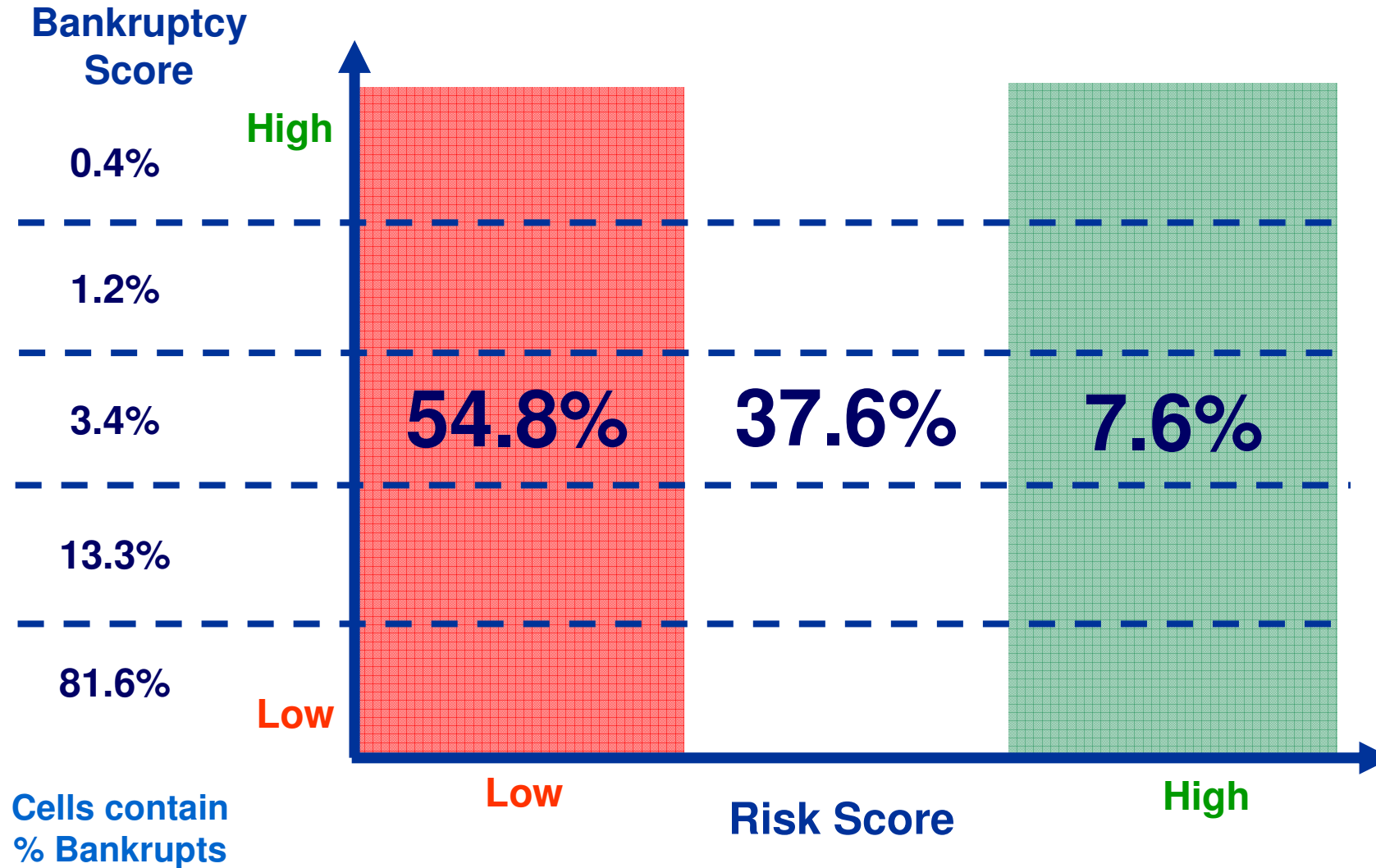
K-S Maximum Difference: 65.8

K-S Maximum Difference: 74.4

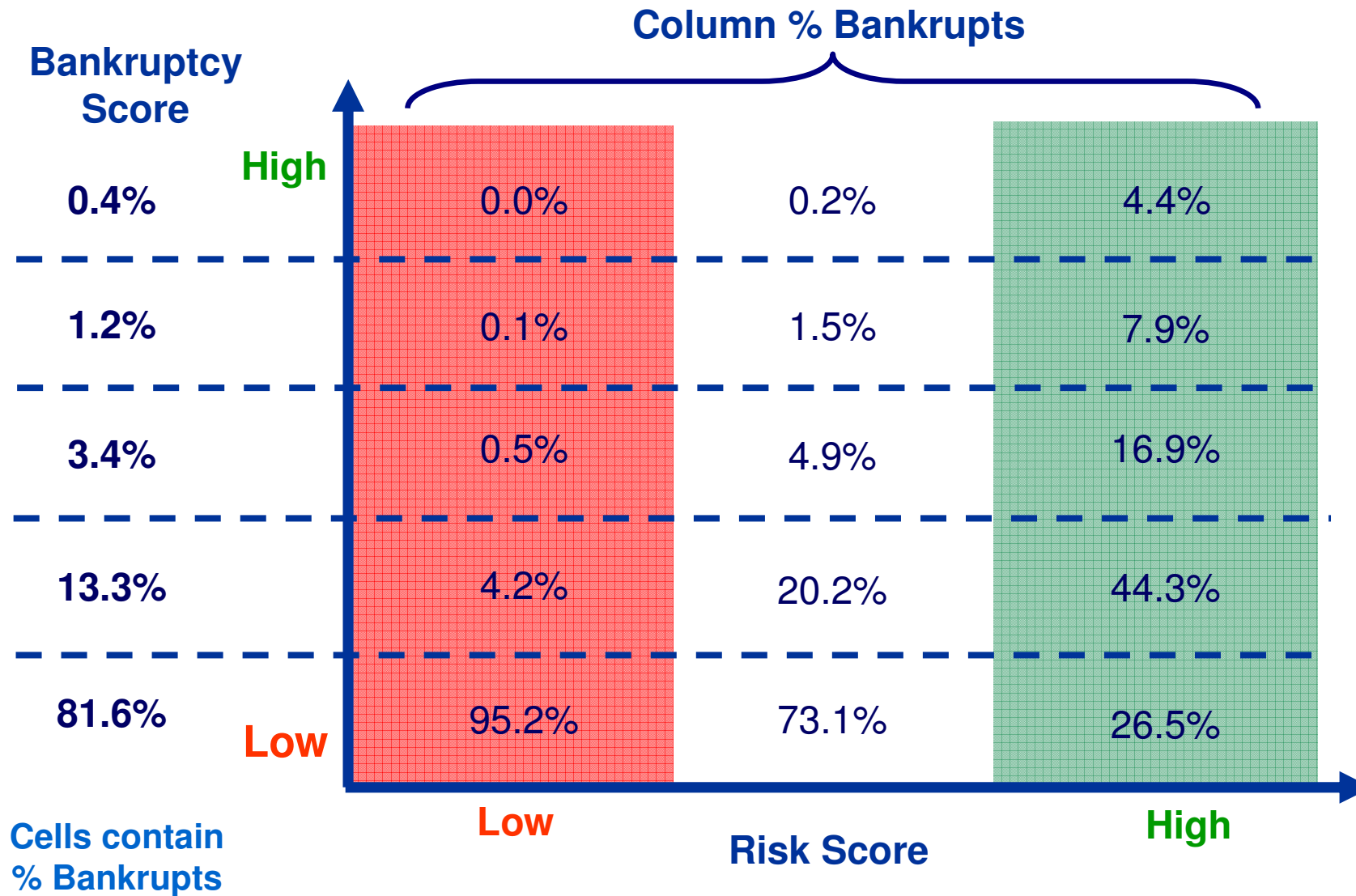
29.6% of Bankrupts for 0.9% of Goods

37.7% of Bankrupts for 0.6% of Goods

Comparison of Bureau Risk and Bankruptcy Scores

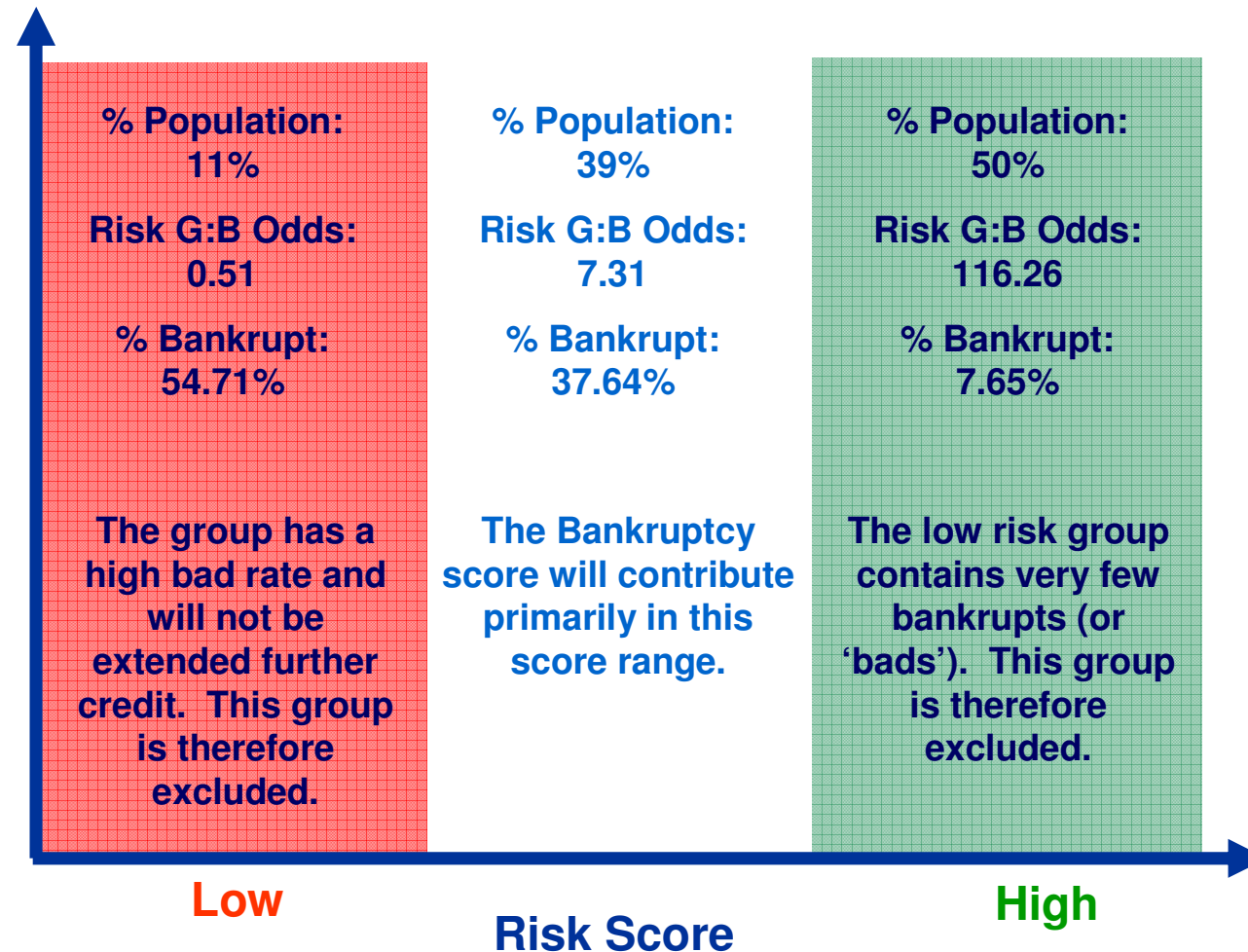


Comparison of Bureau Risk and Bankruptcy Scores



Comparison of Bureau Risk and Bankruptcy Scores

- There is strong correlation between risk and bankruptcy scores which reduces the impact of the scorecard

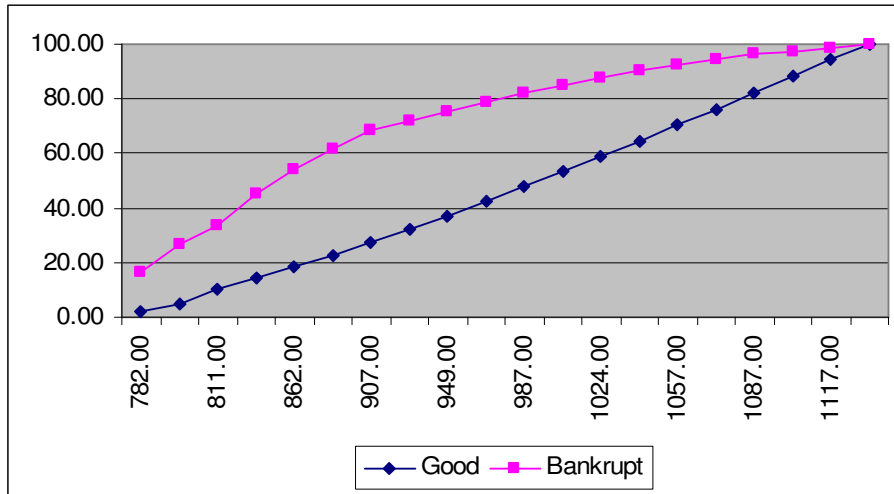


- **Generally the same characteristics as the original model were predictive in the 'mid-range' model**
 - **Time Since Most Recent Default**
 - **Total Balance on Active Credit Accounts (excluding mortgages)**
 - **Worst Status on any Credit Account L6M**
 - **Time Since Most Recent Public Information (CCJ etc.)**
 - **Number of Current Accounts Currently 1 Payment in Arrears**
 - **Worst Current Status on Revolving Credit Accounts**
- **However value of Defaults was much more predictive in this model**

Comparison of Bureau Risk and Bankruptcy Scores



Delphi for Customer Management

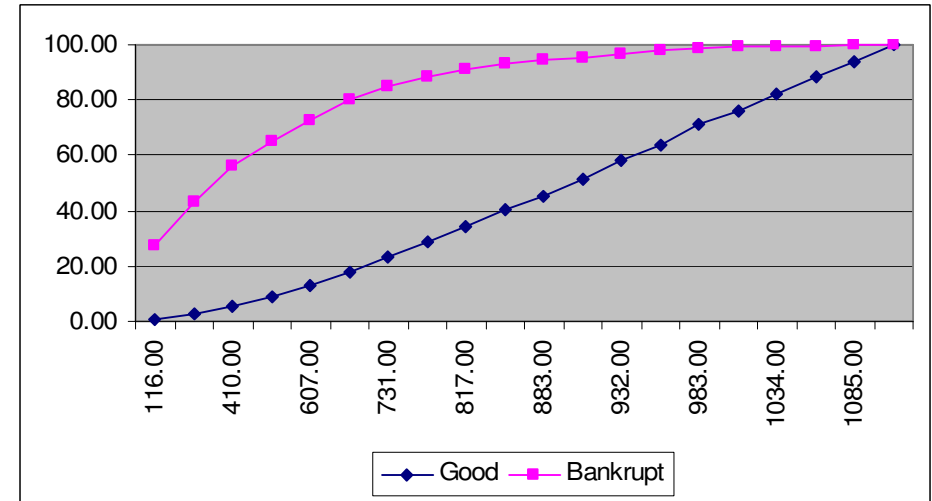


Gini Co-efficient: 50.8%

K-S Maximum Difference: 41.2

16.2% of Bankrupts for 2.4% of Goods

Bankruptcy Score

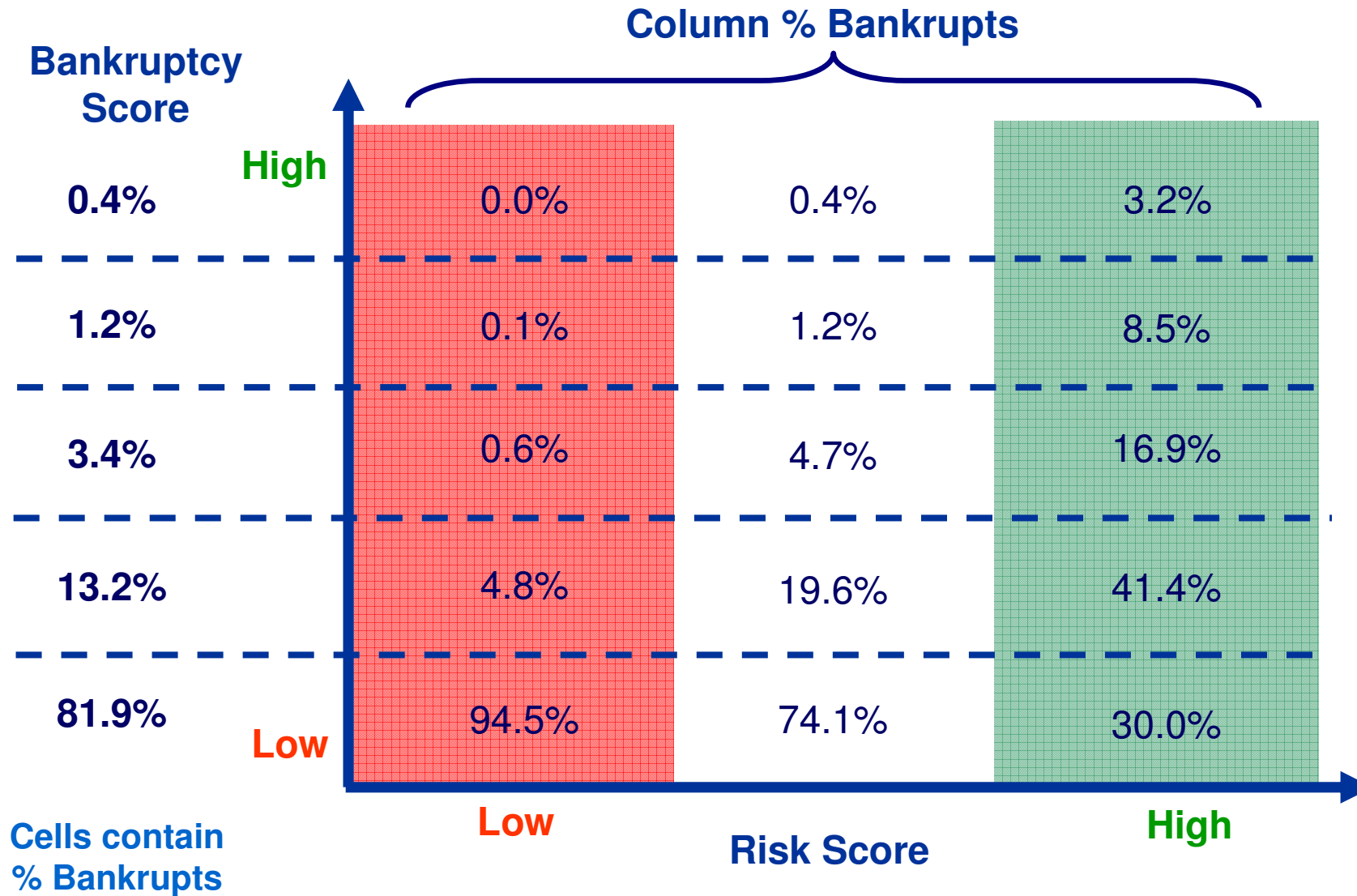




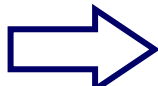

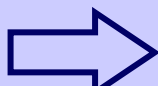
Gini Co-efficient: 78.2%

K-S Maximum Difference: 62.5

27.2% of Bankrupts for 0.8% of Goods

Comparison of Bureau Risk and Bankruptcy Scores



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Defining the Bureau Risk Index

- Bankruptcy score needs to be combined with both the existing behavioural score and credit bureau risk score i.e. Delphi for Customer Management
- The first stage in this is to create a Bureau Risk Index from the DCM and Bankruptcy scores

DCM Risk

Bankruptcy

5008	18505	0.27	3419	5857	0.58	5611	6613	0.85	3328	3733	0.89	3238	2653	1.22	1871	1434	1.30	1568
5517	6179	0.89	6437	3832	1.68	6736	4435	1.52	5463	3577	1.53	5903	1910	3.09	5594	1351	4.14	2917
7781	2918	2.67	5800	3569	1.62	7198	2763	2.60	7114	2018	3.52	6559	1558	4.21	7702	1190	6.47	5183
4005	777	5.15	7438	2369	3.14	6356	1251	5.08	9315	848	10.97	7995	987	8.10	10007	1282	7.81	9588
3467	790	4.38	9483	1637	5.79	6011	1048	5.73	7231	721	10.03	9977	576	17.30	7131	446	15.96	9591
2458	272	9.02	8504	698	12.18	7624	501	15.21	8524	399	21.35	12086	352	34.27	10861	398	27.27	12390
2536	382	6.63	4752	244	19.44	6303	265	23.74	9498	244	38.92	13934	175	79.25	10423	439	23.73	14648
2333	301	7.74	6773	663	10.21	6803	127	53.20	10011	301	33.26	6773	76	88.46	9758	234	41.65	10077
2363	101	23.23	9298	234	39.7	6700	129	51.7	8879	101	87.17	8107	112	71.79	10077	199	50.46	11247
676	0	Inf	1907	39	48.48	3069	338	9.07	5347	115	46.21	7928	27	291.97	11437	67	169.45	12246

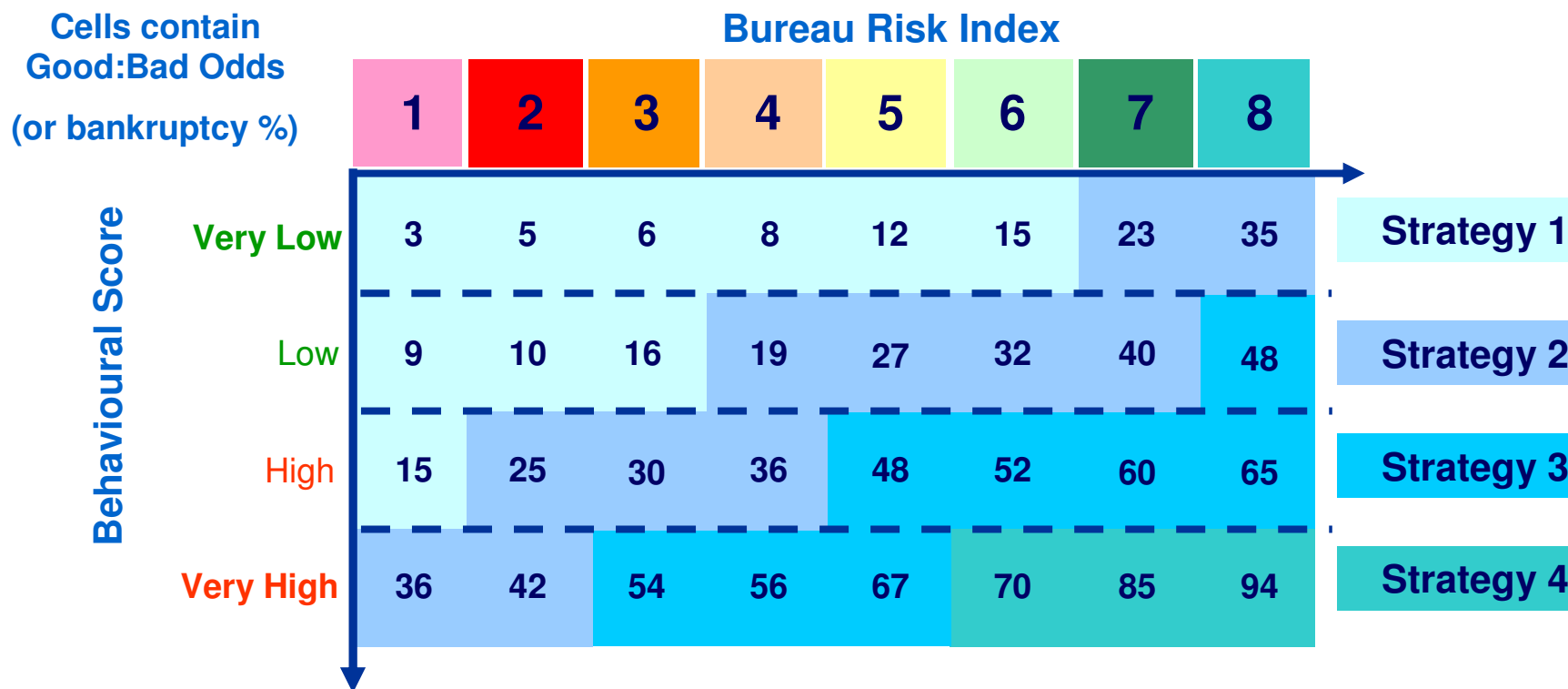
- When delivering the Bankruptcy Score Experian will define the BRI as standard, it can however be customised if required, based on the returned DCM and Bankruptcy scores

Combining the DCM and Bankruptcy Scores

BRI	% PopIn	DCM		Bureau Risk Index	
		Risk G:B Odds	% Bankrupt	Risk G:B Odds	% Bankrupt
1	5%	0.9	0.51%	0.4	0.86%
2	10%	2.7	0.30%	1.2	0.45%
3	10%	2.9	0.31%	2.8	0.27%
4	10%	4.7	0.21%	4.7	0.20%
5	10%	6.6	0.14%	11.8	0.11%
6	15%	12.6	0.10%	21.6	0.05%
7	20%	21.0	0.8%	43.9	0.02%
8	20%	44.0	0.5%	90.0	0.01%

Strategy Definition based on the BRI

- The Bureau Risk Index is then combined with the behavioural score based on account/customer data
- This is done through a matrix combining the behavioural score and BRI – similar to the way that the BRI is created
- Strategy definition would be done individually for each client



- **Bankrupts are included as a category of bad within risk scorecards**
- **Risk scorecards therefore identify individuals that are likely to become bankrupt**
- **However the profile of bankrupts is different to 'risk bads' and therefore bankruptcy can be more accurately predicted through a customised scorecard**
- **A key issue in implementation of a Bankruptcy score is the way in which it is combined with existing behavioural and credit bureau scores**
- **Originally it was envisaged that the Bankruptcy score would be used to restrict additional credit facilities – but the improvements in risk discrimination means that this approach can be used more widely across customer management**
- **Bankruptcy scores can also be used for new business**

- **Experian-Scorex are currently working on bankruptcy projects with a major UK bank and two credit card issuers**
 - **Validate the scorecard and definition of Bureau Risk Index**
 - **Prove the business case for Bankruptcy Scoring**
 - **Establish strategy for combining the BRI and Behavioural scorecard**
 - **Fully evaluate the use of the Bankruptcy score within new business**

- **Experian plan to incorporate the Bankruptcy score into their Delphi product set**
 - **It is currently available for retrospective analysis**
 - **Available 'live' early in 2006**

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