Crisis improvement – Identification of categories and selection of the optimal improvement strategy

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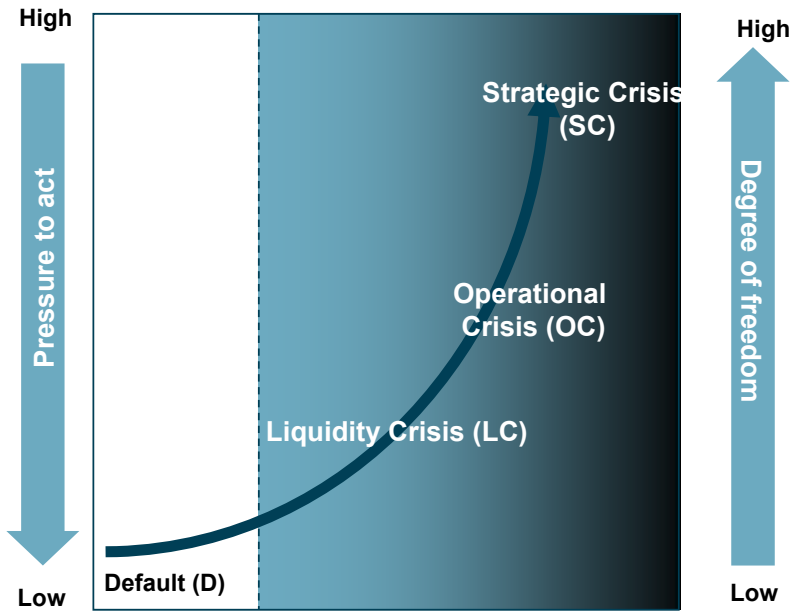
Agenda

- The idea
- Challenges in formulating a scientific problem and finding an approach
- The shift to US literature
- Campbell, Hilscher and Silagyi 2010 – Journal of Finance
- Hypotheses and model approach
- Overview data set
- First Results

Crisis improvement – a balance between short term needs and long term impact , degree of freedom and pressure to act



- **Pressure to act** shifts focus towards **short term needs** (liquidity improvement, debt reduction,...) away from long term impact (business and operational model improvement or extending market power)
- **3 operative questions**

  Which targets? operative performance, market performance or crisis intensity?

  Which portfolio of measures? asset structure, financing structure, operational setup

  Which impact in different phases of the crisis?

It was a long way to come here – Some challenges on the path from the idea to a structured scientific approach

- Restructuring work is very focused on numbers and immediate decisions/actions - not methods
- No case is the same – different context, different operational setup and different people
- European turnaround and restructuring literature is qualitative and oriented on definitions with focus on crisis resolution
- Mid of 2005 maturity of empirical research was in an early stage which changed after 2008
- US literature with more theoretical fundament (Altman, Merton,...) but focused on financial distress identification and less on resolution
- A vast variety of distress prediciton approaches and scientific papers with high complexity (mathematical statisitistical background)
- Finding the right links between European restructuring literature describing the phases of crisis, US literature with theoretical fundament but focusing on identification of financial distress and the upcoming distress resolution literature

Finance theory quantitatve based US approaches extended the qualitative management research based European view

European literature

- **Definition of restructuring and turnaround** – Witte (1981)
- **Phases of corporate crisis based on accounting indicators** – Mueller (1986), Krystek (1987), Kraus/Glenn (1998)
- **Turnaround Management** – Practical handbook – Clasen (1992)
- **Early crisis detection** – Bennewitz/Kasterich (2004)
- **Diagnosis based on balance sheet analysis**- Hausschildt (2000)

- **Qualitative orientation**
- **Comprehensive crisis definition**
- **Management science orientation**

US literature

- **Definition of crisis based on intensities** – Altman (1983), Merton (1973), Shumway (2001), Campbell et al (2010)
- **Market value of equity and volatility as performance indicators** – Bowman and Singh (1999)
- **Process oriented definition of financial distress** – Purnandam (2005)
- **Distress prediction models** – Market based, Reduced form and Hazard models
- **Restructuring approaches** - Asset, fiancial, operativ – Lai Sudarnam (1997)

- **Quantitative orientation**
- **Focus on financial distress**
- **Finance theory**

The key paper - Campbell, J., Hilscher, J., and Szilagyi, J. (2010) – In search of distress risk – Journal of Finance

The idea of the paper

- Campbell et al. extend the distress view from bancruptcy to failure to show that companies with lower distress intenisty provide higher coefficients in market capitalization and equity volatility then more distressed companies which provide higher coefficents on leverage and losses
- He uses a Hazard model that he extends with market information to get better results instead of using only account based informaion
- They used market data from the NYSE from 1963 to 2003 with 1.700.000 total observations of which 797 bankruptcy and 1617 failures

Model approach

Logit Model $P_{t-1}(Y_{it}+1)=1/(1+\exp(-\alpha-\beta x_{i,t-1}))$

NIMTAA	Net Income/Market Value of Total Assets
TLMTA	Total Liabilities/Market Value of Total Assets
EXRET	Excess Return (Market Value of Equity in relation to Value of Equity of S&P 500
SIGMA	Standard deviation of equity
RSIZE	Log ratio of market capitalization compared to S&P 500
CASHMTA	Cash and Short term liabilities / Market Value of Total Assets
MB	Market to book ratio

Three problems and their related hypothesis

Problem 1 - Is crisis classes migration directly related with lower crisis intensity and improved company performance?

H1: Corporate crises develop in a continous way

H2: Crisis intensity is increasing continously from strategic crisis to operative crisis,...

H3: With increasing crisis intensity equity value is decreasing and volatility of equity value is increasing

Problem 2 - Is the degree of freedom increasing by migrating to crisis classes with lower risk intensities

H4: Degree of freedom increases with decreasing crisis intensity

H5: Decreased crisis intensity is directly correlated with increased equity value and lower equity volatility

Problem 3 - Do successful restructurings follow compareable strategies in terms of performance improvement

H6: Most successful restructurings apply a higher number of restructuring approaches and show significant higher focus on combination strategies

H7: Within each crisis class a dominant restructuring pattern for successful reduction of crisis intenisty and performance improvenent exists

Three problems and their modelling approach

Problem 1	Crisis movement behaviour is explained by: - Crisis Intensity - Equity Value - Equity Volatility	Focus on downward path and check how many downward movements are continous and if equity value, sigma and failure probability move as expected with significant correlation
Problem 2	Degree of freedom explained by Campbell plus three indicators : -Revenue growth -Cost Structure -EBITDA/Revenue	Extending the Campbell et al model by adding operative indicators and calibrating it with the Default, Liquidity Crisis,... data set.
Problem 3	Successfull restructuring explained by 4 restructuring strategies: -Asset restructuring -Capital restructuring -Operational restructuring -Working Capital restructureing	The most successfull upward paths will be selected and based on 4 indicators restructuring strategies will be identified – A correlation test between restructuring indicator, crisis intensity and change of equity value will be tested

Contribution of the dissertation

Extending Campbell et al. by implementing the **crisis classes of Mueller**	**Extending Campbell** with an **operational perspective**	Combining **distress research** with **Corporate turnaround literature**
Extending the Campbell aprroach with the crisis definitions - Liquidity Crisis, Operational Crisic and Strategic Crisis	Extension of the hazard model with operative explaining variables	Increase understanding of which restructuring strategies are applied best based on crisis intensity change under different time horizons
Strategic Crisis Operative Crisis Liquidity crisis Default	Revenue growth Total cost ratio Working capital	Applying four restructuring strategies: - Asset - Financial -Operational -Working Capital

The crisis contingent performance improvement model (CCPIM)

CCPIM

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RG	Revenue Growth
VCR	Variable Cost Ratio
WC	Working Capital

Definition restructuring strategies

- **Asset restructuring** – Change of fixed assets
- **Operational restructuring** – EBITDA/Revenue, Variable cost ratio
- **Financial restructuring** – Change of equity ratio
- **Working Capital Restructuring** – Change of receivables, payables and stock
- **Combination strategies** – EBITA plus Change of assets minus depreciation

NYSE data from 1993 to 2013 with in total appr. 185.000 observations

- NYSE data from 1993 until 2013
- Appr. 2900 companies (listed and delisted)
- Quarterly accounting data
- Daily stock price data
- Identified upwards and downwards paths
- SC – Strategic crisis – 2 years negative Revenue growth
- OC – Operational crisis – 2 years EBITDA decline
- LC – Liquidity crisis – Operational cash flow below 10% Revenue
- D – Default – Equity ratio below 8%

4Q	NC	SC	OC	LC	D
NC	111800	577	2204	6350	1138
SC	483	735	427	276	29
OC	1521	569	3739	906	156
LC	4758	354	1266	39314	561
D	812	90	163	536	6022

8Q	NC	SC	OC	LC	D
NC	103483	789	2947	8184	1685
SC	545	425	374	294	37
OC	1645	528	2458	1074	198
LC	5450	479	1795	35105	776
D	1052	104	225	747	4935

Example – Overview accounting and market information for entire data set, Default sample and Liquidity Crisis sample

Variable	Revenue	COGS	EBITDA	Net Income	Total Assets	Total Liabilities	Cash and Short term liabilities	Market Value
				Entire Data Set				
Mean	24.529.672,18	18.914.705,30	4.799.215,36	2.388.658,67	156.661.531,20	147.354.069,65	5.915.090,27	23.996.391,78
Std. Dev.	7.979.042,85	4.912.018,17	1.564.504,03	574.869,16	30.215.312,07	25.454.052,48	1.051.363,86	7.869.983,01
Min	-18.912.019,00	-101.352,00	-88.231.000,00	-99.289.000,00	0,00	-278.506,00	0,00	50,00
Max	476.294.000,00	398.996.351,00	118.339.000,00	104.821.000,00	3.765.035.485,00	3.583.634.415,00	295.029.000,00	571.197.100,00
Observations	184.786							
				Default				
Mean	24.986.430,58	13.671.157,08	7.151.717,86	4.375.347,52	460.572.775,06	438.518.955,27	18.184.600,89	31.361.178,19
Std. Dev.	14.245.888,33	3.925.410,60	3.011.474,37	907.825,17	205.853.717,61	195.733.483,84	4.039.738,26	16.995.704,08
Min	-18.912.019,00	0,00	-88.231.000,00	-99.289.000,00	1,00	19,00	0,00	1.040,00
Max	177.089.000,00	137.645.000,00	61.218.000,00	99.157.300,00	3.765.035.485,00	3.583.634.415,00	295.029.000,00	273.691.200,00
Observations	561							
				Liquidity Crisis				
Mean	29.731.979,18	23.085.942,32	4.737.333,37	2.135.312,83	25.401.263,99	14.388.061,99	1.350.010,69	24.044.758,47
Std. Dev.	8.622.840,64	6.091.587,74	1.393.459,61	508.923,97	9.100.022,08	5.421.670,31	346.460,11	8.010.062,35
Min	23,00	-101.352,00	-12.126.200,00	-17.462.200,00	1.001,00	-61.207,00	0,00	0,05
Max	476.294.000,00	398.996.351,00	85.368.000,00	45.220.000,00	385.015.419,00	198.602.903,00	34.500.000,00	519.044,20
Observations	1623							

TEUR, NYSE 1993-2013, quarterly accounting data, daily stock price date

Example – Extending the model framework of Campbell with operative variables and implementing the Liquidity Crisis

	Campbell et al		Campbell et al		Campbell et al		CCPIM		CCPIM	
Dep. Var.	Bankruptcy		Failure		Default		Default		Liquiditycrisis	
	Coefficient	sign. at 5%	Coefficient	sign. at 5%	Coefficient	sign. at 5%	Coefficient	sign. at 5%	Coefficient	sign. at 5%
NIMTAA	-32,52	*	-32,46	*	-3,307	*	-3,607	*	-3,4501	*
TLMTA	4,32	*	3,87	*	2,579	*	2,592	*	1,4807	*
EXRET	-9,51	*	-8,82	*	0,021		0,073		0,072	
SIGMA	0,92	*	1,15	*	3,02	*	2,72	*	3,58	*
RSIZE	0,246	*	0,169	*	1,471	*	1,832	*	1,53	*
CASHMTA	-4,89	*	-3,22	*	-13,583	*	-12,973	*	-3,7924	*
MB	0,099	*	0,095	*	-0,04		-0,023		-0,088	*
RG							0,393	*	0,103	*
VCR							0,08		0,0134	*
WC							0,203	*	0,0497	*