



**PIRAEUS
BANK**

Credit Risk Scoring & Credit Control XI conference

***ESTIMATING STRESSED PD TO BANK LOSSES WITH A
MODEL OF BEHAVIOURAL AND SOCIOECONOMIC
VARIABLES - THE CASE OF GREECE***

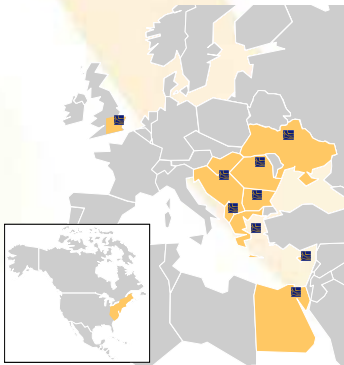
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Piraeus Bank Corporate Profile

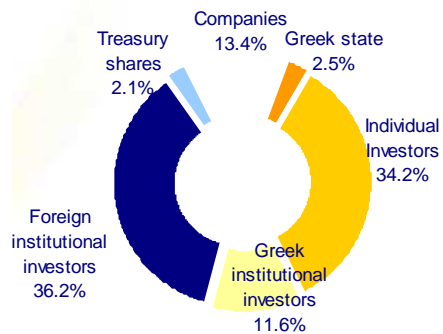


Geographical presence



Source: Company data

Shareholder Structure



Source: Company data

Profile

- Universal Bank operating in 10 countries
- The 4th largest bank in Greece with assets of over €52.9bn and 12.7%¹ market share
- A recognizable name with 902 branches and 13,935 employees
- 16 years of solid growth both organically, as well as through a series of successful M&A
- Growth orientation: opportunities in Greece and the neighbouring geographic region

Figures & Rating

- Loan portfolio of €38.5bn and deposits and retail bonds of €31bn (Mar '09)
- Capital base of €3.4bn, Basle II CAD ratio of 9.9% with Tier I ratio at 8.0%
- Credit ratings
 - Moody's: A2 (negative outlook)
 - S&P: BBB+ (negative outlook)
 - Fitch: A- (stable outlook)

Sound Asset Quality

- One of the lowest NPL ratios in the market 4.1% vs. 5.5% Greek market average, BoG data_Mar '09)
- Coverage ratio at 68%, while taking into account collaterals, the ratio exceeds 100%

1) Based on Sept. 2008 data in terms of loans; data provided by Bank of Greece

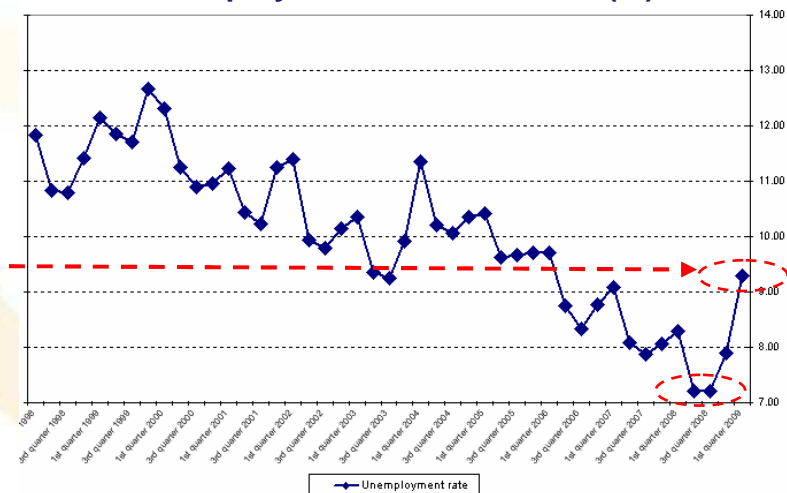
Greek Economic Overview

- Greece, has been one of the fastest-growing economies in the EU over the past five years. The last time that the country went through an economic recession was in the early 1990s. The Greek economy grew by about 4.4% per annum on average for the period between 2003 and 2007, largely because of an investment boom and infrastructure upgrades for the 2004 Athens Olympic Games. Traditionally, GDP growth has been based on tourism, shipping & construction activities. **However, since Q2-2009 Greece has been officially in recession with a slight negative GDP growth circa -0.2%.**
- Greece currently has an estimated 11 million inhabitants and after a steady decrease in unemployment rate over the past 5 years (unemployment fell to 7.4% in 2008) **unemployment jumped again to 9,4% in Q1-2009 and it is forecasted to reach 10.5% by year-end**, driven mainly by the slump in the building activity (-40%) as well as a drop in tourist reservations (-15%)
- Despite the progress made during the last years, **the fiscal deficit remains in relatively high levels**, reaching 3.4% of GDP in 2008 and expected to jump to ~5% in 2009.

Latest Statistical Data

Element	Period	Value
Consumer Price Index (CPI)	July 09/July 08	0,6
Harmonized Index of Consumer Prices (HICP)	July 09/July 08	0,7
Gross Domestic Product (Flash Estimates)	Q2 2009	-0,2
Unemployment rate	Q1 2009	9,3
Industrial Production index (excluding construction)	June 09/June 08	-11,4
Producer Price Index in Industry	June 09/June 08	-9,2
Building Activity (volume)	May 09/May 08	-39,5

Unemployment Rate evolution (%)



Source: National Statistical Service

Greek Economic Overview (Cont'd)

■ In summary:

The general consensus is that a mild recession will hit Greece over the next couple of years with certain regions (e.g. *Islands, Macedonia...*) and certain professions (e.g. *building industry, seasonal jobs...*) hit more severely

Figure 1: Country classifications according to credit market outlook

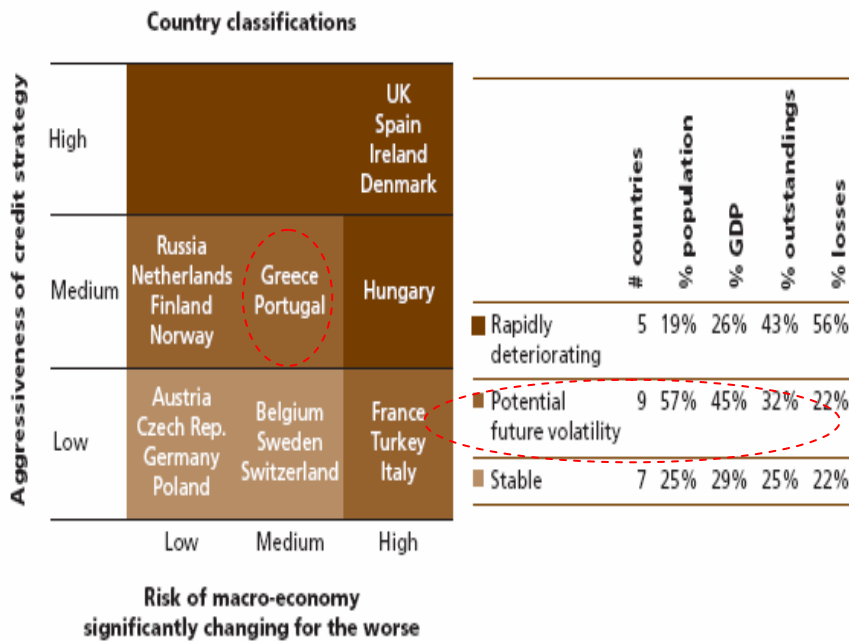


Figure 24: Mortgage loss rates for potentially volatile credit markets

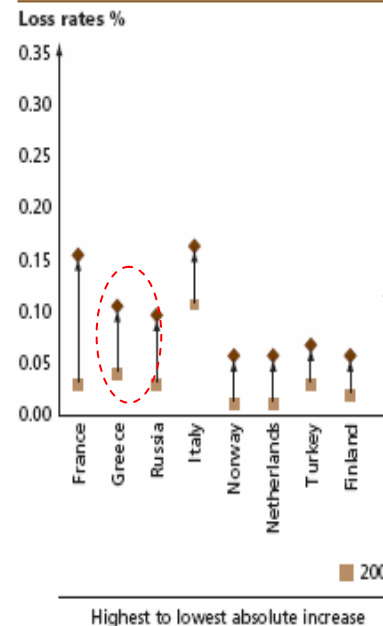
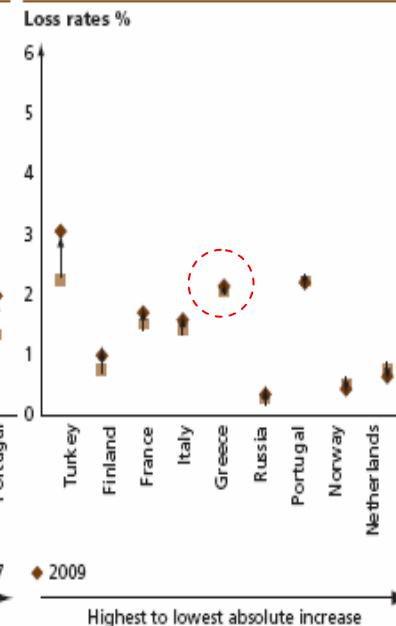


Figure 25: Consumer credit loss rates for potentially volatile credit markets



Source: Oliver Wyman

“...A good Captain in the sea storm proves himself...”

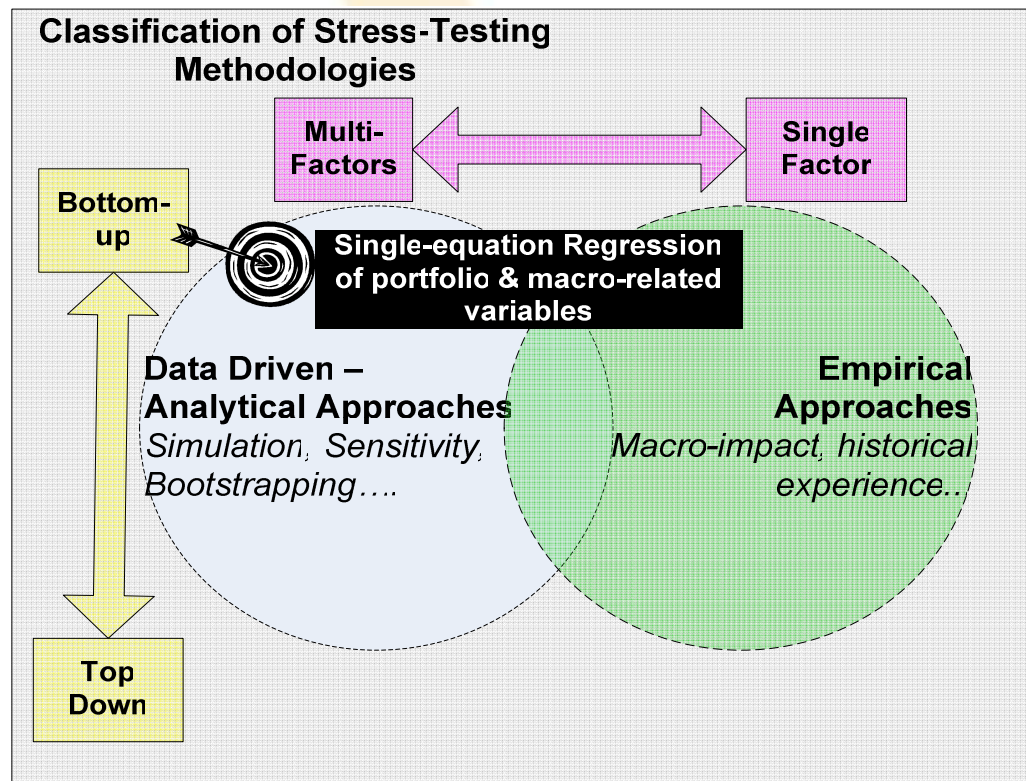
Old Greek saying



In search for a fit-for-Purpose stress-testing approach to take into account the following....

- Anticipated 2yrs mild recession caused by the economic crisis
- This recession will affect disproportionately certain regions and professions
- Relationship should be maintained with good customers in order to emerge stronger the day after -> *hence insights for specific portfolio segments and cause-effect relationships should be explored*
- No historical relationship between GDP & Unemployment rates with portfolio delinquencies

Regression Model: The adopted stress-test approach



Single-equation Regression of portfolio & macro-related variables

- Single-equation regression model** to estimate stressed probability of default (PD) to Bank default losses that incorporates both **Portfolio variables** (e.g. *customer behavioural score, days past due, etc*) and **Socioeconomic-related** variables (e.g. *geographic region, type of employment etc*).
- By incorporating all stress factors into an aggregated stress-model, various scenarios can be applied** simply by adjusting the weights of the coefficients of the model in order to reflect portfolio-wide stress factors (e.g. *transition from higher behavioral scores to lower behavioral score, etc*), as well as, the macroeconomic impact – which is reflected through the socioeconomic stress factors (e.g. *northern Greece PD, agricultural profession PD, etc*) that comprise the portfolio.

Regression Model: Development Steps

Single-Regression Base Model

	Char / Bin	Weight
INTERNAL FACTORS	Bucket	
	1. 0	144
	2. 1	96
	3. 2	33
	4. 3	41
	5. 4+	19
	Behavior Score	
	Below 522.0	18
	522.0-<586.0	32
	586.0-<609.0	52
	609.0-<647.0	51
647.0-<High	58	
EXTERNAL FACTORS	Region	
	1. ATTICA	40
	2. THESSALONIKI	43
	3. PELOPONNHSOS	51
	4. MAIN_GREECE	45
	5. NORTHWESTERN_GREECE	53
	6. NORTH_ESTERN_GREECE	37
	7. AIGAI0_ISLANDS	50
	8. KRHTH	38
	Profession	
	A. PUBLIC SECTOR	29
	B. DOCTOR	28
	C. PRIVATE SECTOR	24
	D. LAWYER	28
	E. FARMER	19
F. OTHER	46	

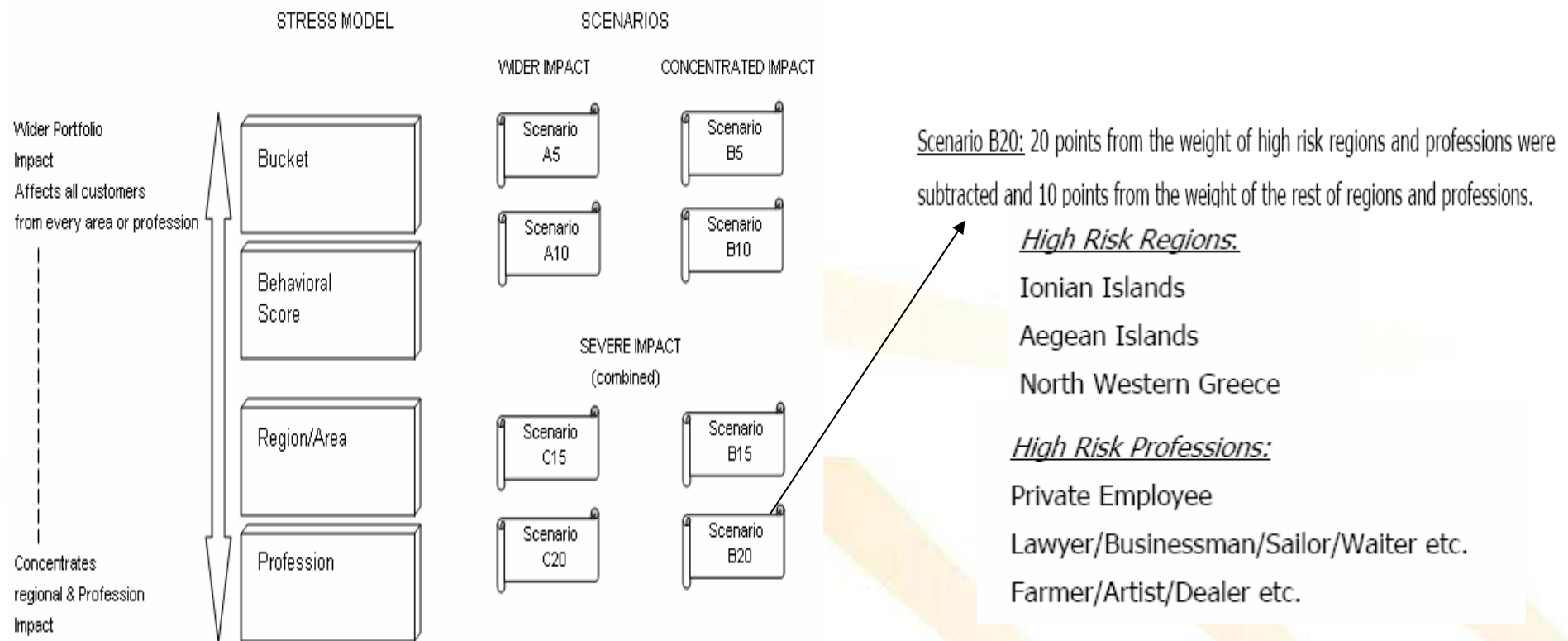
Note: score weights are fictional

- For each Retail credit product (*high level segmentation*), a different model was developed containing the following variables (*): **Bucket, Customer Behavioural Score, Region & Profession**
- In the process of **classing** model variables, by grouping different attributes, attention was paid to pairing high-risk regions and professions in terms of anticipated impact to economic crisis and not just by observing historical WoE. *For example public sectors employees grouped together, Aegean Islands grouped together....* These groupings were further validated and optimised by using “as at” risk indicators *e.g. 60+dpd as at Jun09* to reflect recent, actual trends as crisis evolves
- Each model was **scaled** to the same meaningful basis *e.g. 100 points 1:1 odds and 20 points-to-double the odds*
- Each model was **calibrated** so that score (*and hence expected PD*) reflects actual PD (*as crisis emerges*) across the score range
- Each model has been **applied** to a recent month *e.g. June 2009* and the calculated PD forms the **base scenario**

(*) additional variables could be tested for inclusion in the Base model as “internal-factors” *e.g. Marital Status, Age, time-in-employment, LTV for Mortgages....* but it was decided to keep a minimum, common set of variables across all products

Regression Model: Stress-test of Base model under a range of Scenarios

- The “**Base**” model is simple to stress under numerous scenarios by adjusting attribute-weights accordingly *e.g. by subtracting 20points from one attribute the PD doubles*
- “**Sense-check**” scenarios so that points subtracted reflect recent portfolio trends as crisis develops *e.g. flowrates, regional unemployment trends... avoid applying “end-of-world” scenarios*
- Each scenario below gets its name from the “**breadth**” of impact (*‘A’-type scenarios imply wide portfolio impact, while ‘C’-type scenarios imply **concentrated impact***), as well as, the “**severity**” of impact: *the number of points deducted reflects severity e.g. ‘5’-points deduction, ‘20’-points deduction.....*



Lessons Learned



Note: values are fictional, yet trend follows real pattern

Scenarios impact on PD

- A5 : 54% increase of PD
- B5: 25% increase of PD
- B10: 54% increase of PD
- A10: 55% increase of PD
- B15: 60% increase of PD
- B20: 68% increase of PD
- C15: 86% increase of PD
- C20: 104% increase of PD

- The process of blending external-factors with portfolio specific characteristics offers great insights to the portfolio’s risk drivers under crisis
- **Concentrated** impact could be reduced through applying risk mitigating actions on high-risk segments *e.g. tight limit management, inhouse collections, lending quotas....*
- **Portfolio-wide** impact could be reduced by
 - Credit policy review (*pricing, cut-off setting..*) based on anticipated stress-effects
 - Collection Strategies geared towards limiting increase in flow rates and drift of behavioural scores
- **Prepare for the next day** by:
 - Support customers likely to be affected by the crisis through restructuring programmes
 - Keep on lending within well-performing and positive-outlook segments
- The same “suite” of scenarios was applied at different observation points to **get through-the-cycle impact**

Thank You!

Q&As