

# JRC Scientific and Technical Reports

## Cost of Capital Indicator for EU Member States

David Guilleme Moreno  
Alexander Loschky



Contracts are listed on volumes traded in 2004

Eurodollar 3m	Jun	94.24	94.10	-0.23	97.35
Eurodollar 3m	Sep	94.28	94.22	-0.03	97.15
Sterling 3m	Dec	94.42	97.37	-0.08	96.97
Sterling 3m	Mar	97.39	97.25	-0.11	96.97
Sterling 3m	Jun	97.32	96.99	-0.15	96.030
Eurodollar 3m1	Sep	97.09	96.79	-0.005	96.015
Eurodollar 3m1	Dec	96.94	96.025	-0.005	96.025
Eurodollar 3m1	Mar	96.030	96.010	-0.010	96.155
Fed Fnds 30d1	May	98.015	98.020	+0.005	99.120
Fed Fnds 30d1	Jun	98.025	99.155	+0.010	99.120
Fed Fnds 30d1	Jul	99.145	99.120	-0.010	99.09
Euroyen 3m11	Jun	99.115	99.045	-0.010	99.09
Euroyen 3m11	Sep	99.055	99.045	-0.010	99.09
Euroyen 3m11	Dec				

INTEREST RATE SWAPS				
	Euro-€		USD	
	Bid	Ask	Bid	Ask
May 22	4.99	4.99	5.98	6.01
1 year	4.99	4.99	5.98	6.01
2 year	4.98	4.97	5.97	6.00
3 year	4.98	4.97	5.97	6.00
4 year	4.97	4.96	5.96	5.99
5 year	4.96	4.95	5.95	5.98
6 year	4.95	4.94	5.94	5.97
7 year	4.94	4.93	5.93	5.96
8 year	4.93	4.92	5.92	5.95
9 year	4.92	4.91	5.91	5.94
10 year	4.91	4.90	5.90	5.93

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# **COST OF CAPITAL INDICATOR FOR EU MEMBER STATES**

David Guilleme Moreno  
Alexander Loschky

Joint Research Centre  
IPSC – Econometrics and Applied Statistics Unit

This report neither commits the Commission nor limits the Commission's discretion with regard to any current or future action or policy.

## **Table of Contents**

<b>INTRODUCTION</b> .....	<b>4</b>
<b>SECTION 1 – Background and scope of the project</b> .....	<b>5</b>
<b>SECTION 2 – Concept of Cost of Capital</b> .....	<b>6</b>
<b>SECTION 3 – Methodology Overview</b> .....	<b>7</b>
<b>SECTION 4 – Indicator on Cost of Loans (<math>K_{LO}</math>)</b> .....	<b>9</b>
4.1 – Data Sources .....	9
4.2 – Methodology .....	10
4.3 – Temporary solution.....	11
4.4 – Results .....	12
<b>SECTION 5 – Indicator on Cost of Debt Securities (<math>K_{DS}</math>)</b> .....	<b>15</b>
5.1 – Methodology .....	15
5.2 – Sources of data.....	17
5.3 – Results .....	17
5.4 – Observations .....	23
<b>SECTION 6 – Indicator on Cost of Equities Listed (<math>K_{EL}</math>)</b> .....	<b>24</b>
6.1 – Methodological choices .....	24
6.2 – Recommendations .....	25
6.3 – Results .....	27
<b>SECTION 7 – Composite indicator and weighting of financing sources (<math>W_{Source - i}</math>)</b> .....	<b>30</b>
7.1 – Recommended data sources .....	30
7.2 – Calculation method .....	30
7.3 – Data limitations / Comments.....	30
7.4 – Results for the composite Cost of Capital Indicator .....	31
<b>SECTION 8 – Further developments</b> .....	<b>35</b>
8.1 –Composite Indicator on Cost of Capital.....	35
8.2 – Indicator on Cost of Loans .....	35
8.3 – Indicator on Cost of Debt Securities.....	35
8.4 – Indicator on Cost of Equities Listed .....	36
8.5 – Indicator on Cost of Equities Unlisted .....	36
8.6 – Weighting of financing sources .....	37
8.7 –The development of indicators at the economic sector level within each MS .....	37
<b>REFERENCES</b> .....	<b>38</b>

<i>APPENDIX 1 – Detailed description of the data used for each MS and the adjustments that had to be made to make rates comparable.....</i>	<i>39</i>
<i>APPENDIX 2 – Cost of Loans – Temporary solution.....</i>	<i>41</i>
<i>APPENDIX 3 – Liability composition .....</i>	<i>44</i>
<i>APPENDIX 4 – “Historical Approach” models .....</i>	<i>46</i>
<i>APPENDIX 5 – “Implied Approach” models.....</i>	<i>47</i>
<i>APPENDIX 6 – Proportion of each source of financing as a % of the total liabilities – Calculation method .....</i>	<i>49</i>
<i>APPENDIX 7 – Comparison between DG ECFIN’s Composite Financing Cost Indictors (CFCI) and the indicator presented in this report.....</i>	<i>50</i>

## **INTRODUCTION**

The purpose of this document is to outline the methodology recommended to develop a cost of capital indicator for EU non-financial corporations, across all the EU Member States (MS). This document is the final report of a joint project made by Directorate General Internal Market and Services (DG Markt) and Directorate General Joint Research Center (DG JRC).

Section 1 provides some background to the project and a brief description of its scope.

Section 2 defines the concepts of a corporation's capital, its components and cost of capital.

Section 3 briefly describes the methodology used for the construction of the cost of capital indicator, as a weighted average of its cost components.

Sections 4 to 6 describe for each individual capital components the methodology to build the indicator and the results of the calculations.

Section 4: for loans

Section 5: for corporate bonds

Section 6: for listed equity

Section 7 describes how to estimate the weights that should be given to the individual cost components and presents the results obtained for the composite indicator.

Section 8 lists some of the refinements and further developments that could be included in a follow-up to the first phase of the project.

The authors would like to thank Fabio Fiorello and DG Markt for the provision of the data and the valuable comments during the course of this project. In addition, the authors would like to thank the colleagues from various DGs for their helpful comments and suggestions.

## **SECTION 1 – Background and scope of the project**

The actions taken in the framework of the Lisbon Strategy and in the forthcoming EU2020 strategy are intended to improve the competitiveness of the EU's economy. To properly monitor the progress resulting from those actions, some indicators have been identified. One of those indicators is on the "cost of capital". The "cost of capital" is a key concept as it reflects the corporation's cost of investment funding. Thus, there is a need to develop an indicator to monitor how that cost changes over time.

The purpose of this project is to come up with an overall cost of capital composite indicator that would be updated on a quarterly basis and covering:

- each of the 27 EU Member States (MS)
- EU-27
- Euro area

In the first phase of the project, the cost of capital indicator<sup>1</sup> will cover the first three out of the four major sources of capital:

- Loans,
- Corporate bonds,
- Listed equity,
- Unlisted equity.

Following the first phase, further refinements and developments (see Section 8) can be considered such as:

- Include in the analysis the remaining major source of capital financing: Unlisted equity.
- The development of indicators that take into account factors such as the impact of taxation, and inflation (i.e. move from a "nominal rate" to a "real rate").
- The development of indicators at the economic sector level within each Member State.

In 2008 the Directorate General for Economic and Financial Affairs (DG ECFIN) has published a similar indicator to measure the cost of capital. The difference between the cost of capital indicator presented in this report and DG ECFIN's cost of capital indicator are presented in Appendix 7.

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<sup>1</sup> See Note on Terminology in Section 2.

## **SECTION 2 – Concept of Cost of Capital**

The total capital of a firm equals the value of its equity plus the value of its debt. If a firm was to increase its total assets (e.g. for a new investment), this would have to be financed by an increase of its equity, its debt or a combination of the two.

Financing through debt can be performed using two main sources: loans and debt securities (e.g. corporate bonds).

When financing through equity, a difference should be established between listed and unlisted equity.

Lenders, debt and equity holders expect to get a return on the funds they provide to a firm. The cost of capital represents the rate of return required by the fund provider.

For a firm using multiple sources of financing, the cost of capital can be calculated as the weighted average cost of the different sources, as follows:

$$\text{WACC} = \sum W_{\text{Source-i}} K_{\text{Source-i}}$$

Where:

WACC: Weighted average cost of capital

$W_{\text{Source-i}}$  : Proportion of source i (e.g. loans, debt securities, equity) in the total capital of the firm.

$$\sum W_{\text{Source-i}} = 1$$

$K_{\text{Source-i}}$ : Cost of capital for the i source of financing

**Note on terminology:** In financial terms, the concept of cost of capital includes the impact of taxation on the cost of financing. As stated in Section 1, the first phase of this project does not take this into account.



### **SECTION 3 – Methodology Overview**

To come up with a cost of capital composite indicator at the MS level, the same concept of Weighted Average Cost of Capital – WACC (i.e. weighted average cost of the different sources) will be used, as explained in Section 2. This requires the estimation at the MS level of:

- a cost of capital indicator for each source of financing ( $K_{\text{Source-i}}$ ), and
- their individual weight ( $W_{\text{Source-i}}$ )

As explained above, the cost of capital represents the required rate of return of the fund provider. Depending on the source of capital used, information on the required rate of return from fund providers can be either directly observed, inferred from observable data, or in some cases it is very difficult to measure.

In the case of loans, corporate debt and listed equity, we recommend building the cost of capital indicator from the rates / yields applied by financial institutions / inferred from financial markets data.

Examples of how the required rate of return can be measured:

- Loans: Interest rate charged by a bank on a loan.
- Corporate debt: Yield on a corporate bond with similar characteristics / risk.
- Listed equity: The earnings yield (equal to the ratio: expected earnings / stock price) can be viewed as the expected rate of return required by investors.

In the case of unlisted equities, the lack of market price information at the corporation level makes it very difficult to build an aggregated indicator at the MS level that reflects a required rate of return.

As a result, the WACC will only be calculated using loans, corporate debt and listed equity as sources of financing. The methodology to build the indicators for these 3 sources is described in Sections 4, 5, and 6.

For unlisted equity, given the lack of information, the recommendation is to rely on qualitative information to at least get a sense of the MS where it is more difficult or less difficult to raise funds through the issuance of unlisted equity (for example by looking at the fiscal and legislative framework). Some additional details on this approach are given in Section 8.4. As stated above in Section 1, the analysis of this source of financing will not be covered in the first phase of the project.

The following table summarizes for each source of capital, the type of data recommended to be used to build the indicators.

**Table 1 Data recommendation**

<b>SOURCE</b>	<b>TYPE OF DATA USED</b>
<b>Loans</b>	Interest rates applied by Monetary Financial Institutions (MFI) on loans to non-financial corporations. Source of data: European Central Bank, Eurostat, and national central banks.
<b>Debt securities</b>	Yield on a corporate bond indices. Source of data: financial markets data providers (e.g. Thomson Reuters' Datastream).
<b>Equities listed</b>	Prices of stock market indices as well as earnings forecast provided by financial analysts are used to infer the implied cost of equity capital. Source of data: financial markets data providers (e.g. Thomson Reuters' Datastream).
<b>Equities unlisted</b>	Rating of factors impacting the development of the private equity environment and facilitating the use of private equity as a source of funds. Source of data: European Private Equity and Venture Capital Association (EVCA). Statistics from the same source, related for instance to amounts raised will also be considered.

To assess the importance or weight of each financing source, we will rely on the Financial Accounts statistics published by Eurostat. This will be described in Section 7.

## **SECTION 4 – Indicator on Cost of Loans (K<sub>LO</sub>)**

Raising capital through loans is one of the main sources of financing. In 2008, at the EU27 aggregated level loans represented around 35% of the total liabilities.<sup>2</sup>

An obvious measure to assess the cost of loans is to build an indicator that measures the rate lenders (such as banks or other monetary institutions) charge on loans to corporations.

### **4.1 – Data Sources**

#### **4.1.1 – On interest rates**

##### **From the ECB:**

The ECB provides statistics<sup>3</sup> on interest rates applied by Monetary Financial Institutions on loans to non-financial corporations (“MFI Interest Rate Data” statistics). These statistics cover information both on “New Business” (i.e. new contracts or existing contracts that have been re-negotiated) or “Outstanding contracts” (i.e. all outstanding contracts that have been agreed in all periods prior to the reporting date).

Description of the data available from ECB on “New Business”:

- Data is available at the Member State level (for all EU 27 MS except the UK<sup>4</sup>) and at the Euro area aggregated level
- Layers of breakdown available:
  - Bank overdraft
  - Loans other than Bank overdrafts
    - Initial period of fixation of the interest rate<sup>5</sup>:
      - floating rate and up to one year initial rate fixation,
      - over one and up to five years initial rate fixation,
      - over five years initial rate fixation.
    - Size of the loan: Up to EUR 1 Million and over EUR 1 Million
- It should be noted that the rates correspond to loans denominated in local currency (i.e. EUR for euro area MS, and local currency for MS outside the euro area).

Description of the data available from ECB on “Outstanding Amounts”:

- Data on Interest rate. Data is available at the Member State level (for all EU 27 MS except the UK) with the following layers of breakdown:
  - Bank overdraft
  - Loans other than Bank overdrafts with an original maturity of:
    - up to 1 year,
    - over 1 and up to 5 years,
    - over 5 years.

---

<sup>2</sup> Own calculations from Annual Financial Accounts (Source of raw data: Eurostat), see Appendix 3.

<sup>3</sup> Regulation (EC) No 63/2002 of the European Central Bank of 20 December 2001 concerning statistics on interest rates applied by monetary financial institutions to deposits and loans vis-à-vis households and non-financial corporations.

<sup>4</sup> For the United Kingdom data from the Bank of England is used.

<sup>5</sup> The initial period of fixation is defined as the period of time at the start of a contract during which the value of the interest rate can not change (Example 1: Rate = 7% for the entire contract; Example 2: Rate = 3% above LIBOR as of 30 June 2008).

#### From Eurostat:

A significant proportion of the loans taken by non-financial corporations in non-euro area MS are denominated in EUR. Statistics on rates applied by MFI on those loans on “New Business” are available (for internal purposes only) from Eurostat<sup>6</sup>.

#### 4.1.2 - On volumes

#### From the ECB:

- Data on Business Volumes is only available at the euro area aggregate level.
- Layers of breakdown available:
  - Bank overdraft
  - Loans other than Bank overdrafts
    - Initial period of fixation of the interest rate<sup>7</sup>:
      - floating rate and up to one year initial rate fixation,
      - over one and up to five years initial rate fixation,
      - over five years initial rate fixation.
    - Size of the loan: Up to EUR 1 Million and over EUR 1 Million

#### From Eurostat (Data available for internal purposes only):

- Data on Business Volumes (New Business) is available at the MS Level (all EU 27 MS except Denmark, the UK, and Sweden) both for loans denominated in EUR and in local currency
- Layers of breakdown available:
  - Bank overdraft
  - Loans other than Bank overdrafts
    - Initial period of fixation of the interest rate<sup>7</sup>:
    - floating rate and up to one year initial rate fixation,
      - over one and up to five years initial rate fixation,
      - over five years initial rate fixation.
    - Size of the loan: Up to EUR 1 Million and over EUR 1 Million

## **4.2 – Methodology**

In order to have an indicator that covers the full spectrum of maturities available, and to be able to compare rates contracted over the same period of time, the recommended indicator would be the result of a weighted average of the MFI Interest rates on New Business across the various rates fixation periods and for the different amount sizes.

This would include the following rate series on New Business for each Member State:

- Bank Overdrafts
- Other loans with floating rate and up to 1 year initial rate fixation period
  - Size of the loan: Up to EUR 1 Million
  - Size of the loan: Over EUR 1 Million

---

<sup>6</sup> Except for Sweden, the UK, and Denmark

<sup>7</sup> The initial period of fixation is defined as the period of time at the start of a contract during which the value of the interest rate can not change (Example 1: Rate = 7% for the entire contract; Example 2: Rate = 3% above LIBOR as of 30 June 2008).

- Other loans over 1 and up to 5 years' initial rate fixation period
  - Size of the loan: Up to EUR 1 Million
  - Size of the loan: Over EUR 1 Million
- Other loans over 5 years' initial rate fixation period
  - Size of the loan: Up to EUR 1 Million
  - Size of the loan: Over EUR 1 Million

Using the rate series on “Outstanding contracts” would not be adequate as they would mix rates from old and new contracts.

The data available on volume of loans on New Business would be used to calculate the weightings to be given to each of the 7 loan categories listed above. These series are however not very stable due to sudden increases / decreases in the volume of new business. To provide a more stable weighting scheme over time, a 12-month moving average of the volume data would be used.<sup>8</sup>

### **4.3 – Temporary solution**

Although the method described in Section 4.2 seems the most appropriate to calculate a cost of loans indicator that covers the full spectrum of maturities and sizes of loans possible, its practical implementation at the MS level is not feasible given the data currently available.

- The key issue faced with the data currently available is that for 15 MS, rates are not available for one or more of the 7 rate categories.

Given the uncertainties around the timing required to close these data gaps, a temporary solution should be envisaged.

The key feature of the temporary solution is that the indicator on loans would be built using only the rates on loans with short term rate fixation periods and on overdrafts:

- Other loans with floating rate and up to 1 year initial rate fixation period
  - Size of the loan: Up to EUR 1 Million
  - Size of the loan: Over EUR 1 Million
- Bank Overdrafts

A more detailed description of the issues faced with the data and a justification for the temporary solution are provided in Appendix 2 to this document.

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<sup>8</sup> As an alternative to this weighting scheme that only uses volume data on “New Business”, the following method (combining volume data on “New Business” and “Outstanding contracts”) could be considered:

- For the weighting across different rates fixation periods, the volume data on “Outstanding contracts” would be used, but giving an extra weight to “loans with floating rates and up to 1 year rate fixation period” to take into account the fact that a significant proportion of the long term loans (over 1 year maturity) are granted at variable rates. For example, at the euro area level, it has been suggested to allocate 50% of the volume of long terms loans (i.e. over 1 year maturity) to the rates on “loans with floating rates and up to 1 year rate fixation period”.
- For the weighting across different sizes (up to / over 1 Million), the only statistics available are on “New Business”. These series are not very stable due to sudden increases / decreases in the volume of new business. To provide a more stable weighting scheme over time, a 12-month moving average of the volume data on “New Business” would be used.

#### 4.4 – Results

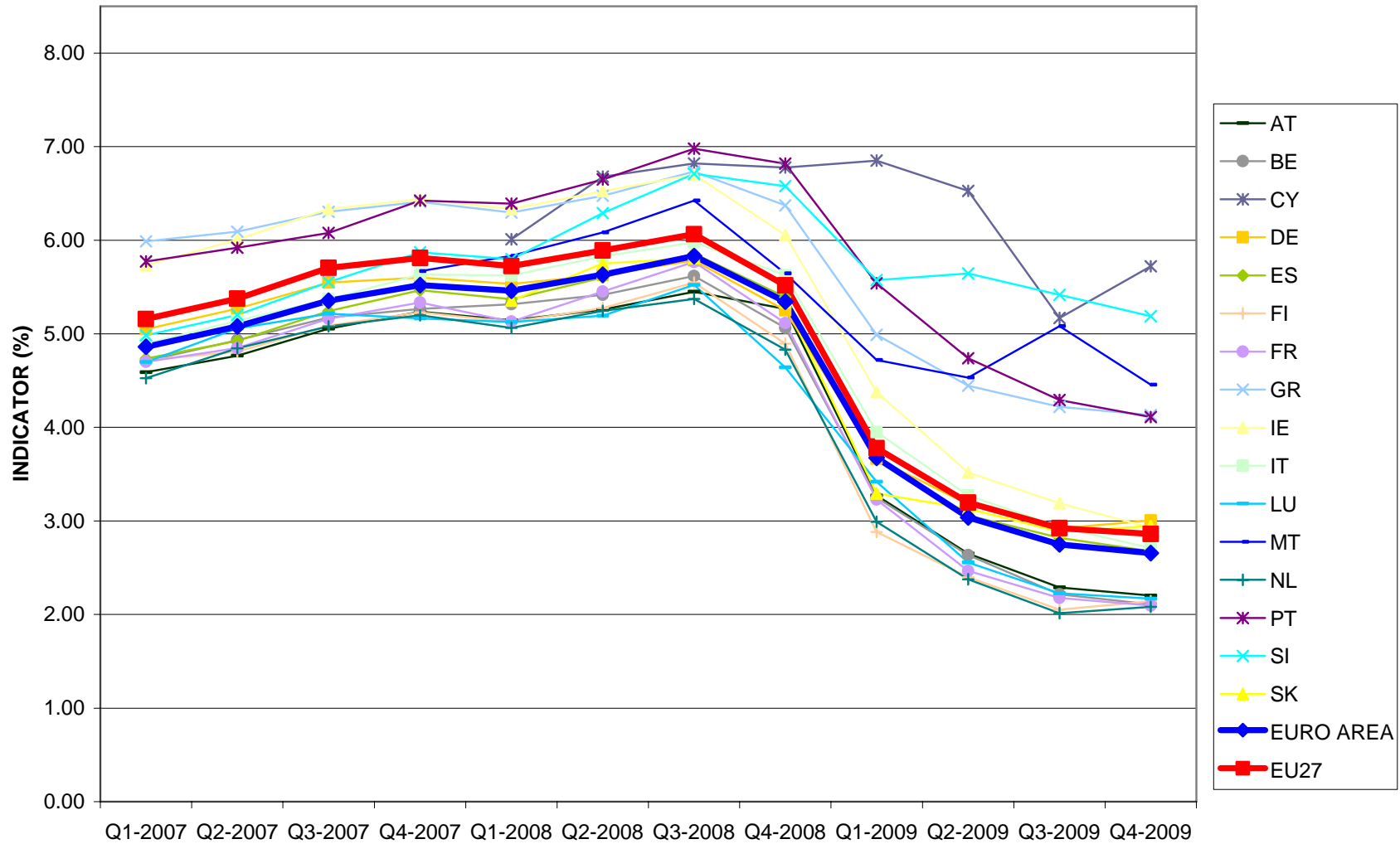
Please refer to Appendix 1 for a detailed description of the data used at the MS level as well as the adjustments performed to make the data comparable.

**Table 2 Cost of Loans Indicators (from Q1-2007 to Q4-2009) – Sorted by increasing order of values for Q4-2009**

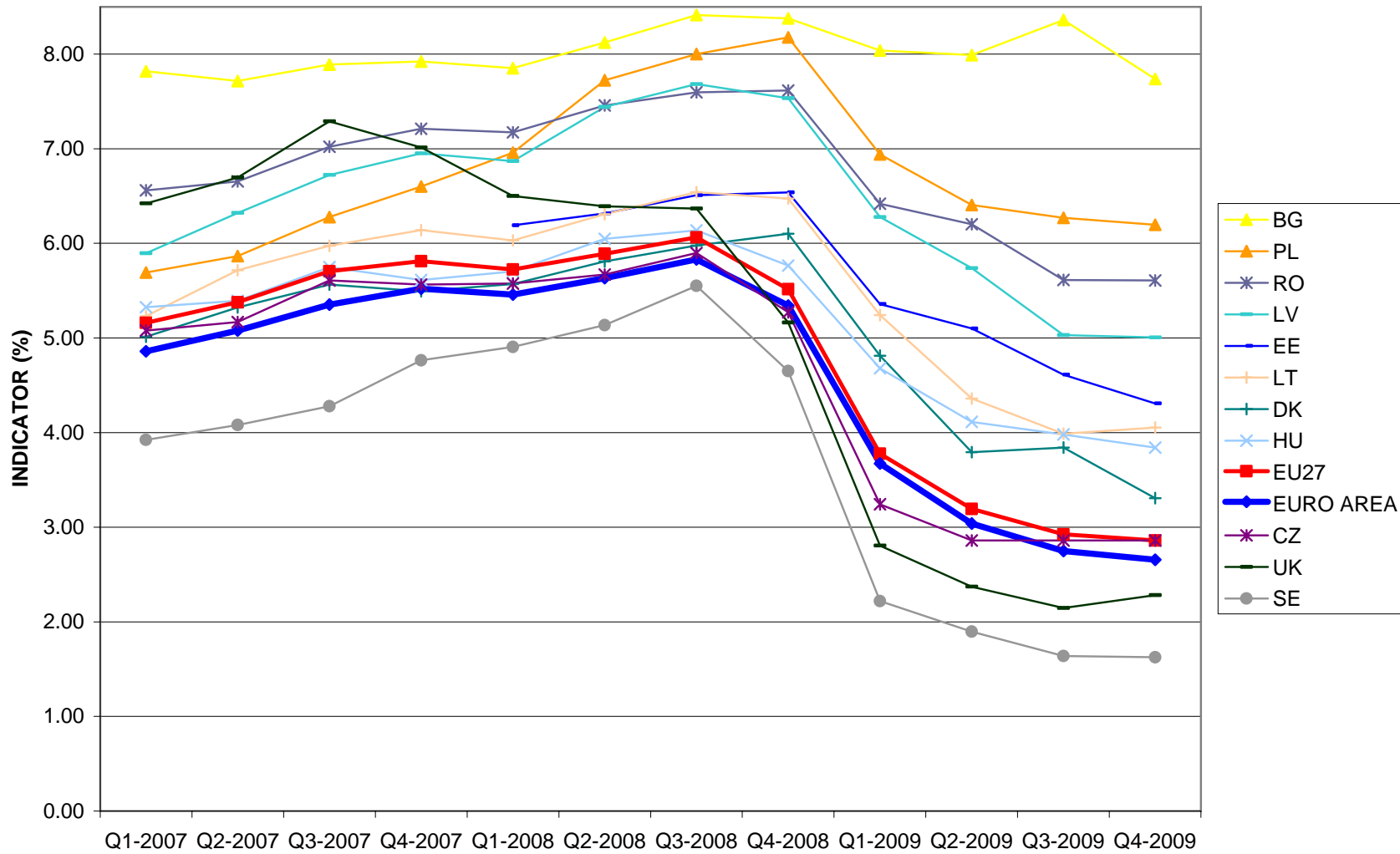
	Q1-2007	Q2-2007	Q3-2007	Q4-2007	Q1-2008	Q2-2008	Q3-2008	Q4-2008	Q1-2009	Q2-2009	Q3-2009	Q4-2009
SE	3.92	4.08	4.28	4.76	4.90	5.13	5.55	4.65	2.22	1.90	1.64	1.63
NL	4.53	4.85	5.08	5.20	5.06	5.25	5.37	4.83	2.99	2.38	2.02	2.08
FR	4.70	4.85	5.16	5.34	5.13	5.45	5.77	5.11	3.23	2.47	2.18	2.10
BE	4.71	4.93	5.18	5.27	5.32	5.42	5.62	5.06	3.25	2.63	2.21	2.11
FI	4.72	4.81	5.09	5.23	5.13	5.27	5.55	4.89	2.88	2.40	2.05	2.14
LU	4.70	5.06	5.22	5.16	5.13	5.19	5.52	4.64	3.42	2.56	2.23	2.17
AT	4.59	4.77	5.05	5.24	5.14	5.26	5.45	5.27	3.27	2.65	2.29	2.20
UK	6.42	6.70	7.29	7.01	6.50	6.39	6.37	5.16	2.81	2.37	2.15	2.28
EURO AREA	4.86	5.08	5.35	5.52	5.46	5.63	5.83	5.34	3.67	3.04	2.75	2.66
ES	4.74	4.92	5.24	5.47	5.37	5.60	5.86	5.39	3.67	3.06	2.82	2.68
IT	4.89	5.14	5.37	5.63	5.62	5.83	5.98	5.63	3.95	3.27	2.94	2.71
CZ	5.08	5.17	5.61	5.56	5.58	5.67	5.90	5.27	3.24	2.86	2.86	2.86
EU27	5.16	5.38	5.71	5.81	5.72	5.89	6.06	5.52	3.78	3.19	2.92	2.86
IE	5.73	6.01	6.33	6.44	6.33	6.52	6.70	6.06	4.38	3.52	3.19	2.93
SK					5.35	5.75	5.81	5.34	3.29	3.13	2.88	2.95
DE	5.05	5.27	5.55	5.60	5.53	5.63	5.78	5.25	3.66	3.18	2.92	3.01
DK	5.01	5.32	5.57	5.50	5.57	5.81	5.98	6.10	4.81	3.79	3.84	3.31
HU	5.33	5.39	5.75	5.61	5.70	6.05	6.14	5.77	4.68	4.11	3.98	3.84
LT	5.23	5.72	5.97	6.14	6.03	6.31	6.54	6.47	5.24	4.36	3.99	4.05
PT	5.77	5.92	6.08	6.42	6.39	6.65	6.98	6.82	5.54	4.74	4.29	4.11
GR	5.99	6.09	6.30	6.41	6.30	6.48	6.73	6.37	4.99	4.44	4.22	4.13
EE					6.19	6.32	6.51	6.54	5.36	5.10	4.61	4.31
MT				5.67	5.83	6.08	6.42	5.64	4.72	4.53	5.08	4.46
LV	5.90	6.32	6.72	6.95	6.87	7.44	7.68	7.53	6.28	5.74	5.03	5.01
SI	4.98	5.20	5.55	5.87	5.80	6.29	6.71	6.58	5.57	5.64	5.42	5.19
RO	6.56	6.65	7.02	7.21	7.17	7.46	7.60	7.61	6.42	6.20	5.61	5.61
CY					6.01	6.68	6.82	6.78	6.85	6.53	5.17	5.72
PL	5.69	5.87	6.28	6.60	6.96	7.73	8.00	8.18	6.94	6.41	6.27	6.20
BG	7.82	7.72	7.89	7.92	7.85	8.12	8.41	8.38	8.04	7.99	8.36	7.74

\*: CY, EE, and SK: data not available for the loans component for Q1 to Q4-2007; MT: data not available for the loans component for Q1 to Q3-2007.

**Figure 1 Evolution of the Cost of Loans Indicator for the euro area MS (Q1-2007 to Q4-2009)**



**Figure 2 Evolution of the Cost of Loans Indicator for MS outside the euro area (Q1-2007 to Q4-2009)**





## **SECTION 5 – Indicator on Cost of Debt Securities (K<sub>DS</sub>)**

Although issuance of corporate bonds has significantly increased since the introduction of the Euro, its importance is still marginal compared to other sources of financing. Greece, Romania, and the UK are the only MS where this source of financing accounts for more than 7 %<sup>9</sup> of the total liabilities (18.6% for Romania, 10.9% for Greece, and 10.3% for the UK in 2008). In Austria, Portugal, France, and Slovakia it accounted for 5 to 7%. Please refer to Appendix 3 for details by MS.

The cost of raising capital for a firm that issues bonds is based on the rate of return that investors will require on those bonds. The rate of return measuring the performance of a bond (including the payment of coupons as well as any capital gain or loss) is also known as the “yield”. The riskier the bond, the higher the yield will be.

From a risk/credit rating perspective, corporate bonds can be classified into two main categories:

- “Investment Grade”. These are bonds with a low risk of default (Under S&P credit rating classification: Rating of BBB or higher. Under Moody’s: Rating of Bbb or higher).
- “High Yield” or “Junk” bonds. These are bonds rated below investment grade by the rating agencies. They pay a higher interest than investment grade, but they have a substantial risk of default.

### **5.1 – Methodology**

One possible approach to come up with a corporate bond yield indicator at the MS level would be to use average yields on national corporate bond indices (e.g. a weighted average of the yields on an “investment grade” bond index and on a “high yield” bond index). However implementing this approach at the MS level would raise the following issues:

- Given the small size of the corporate bond market for most of the EU MS, a corporate bond index at the MS level does not always exist. Or when it exists, the average yield would be driven by a small number of companies, which might not be representative of the entire market.
- Comparison over time and across MS of average yields of bond indices only makes sense if the average maturity (a.k.a. average duration) of the indices does not change over time / across MS.

As a result of the above, if we want to build an indicator at the MS level we need to use some assumptions. The basic model recommended to build the indicator is based on the assumption that the yield on a corporate bond is the result of the addition of two components:

- A “Risk Free Rate”, representing the yield on an asset with no/small risk (e.g. yield on government bonds)
- A corporate spread, representing the additional spread required by investor to invest in corporate bonds and take on additional risk (in comparison with the risk free rate).

**Model:** *Yield on Corporate Bonds = Risk Free Rate + Corporate Spread*

As a measure of the Risk Free rate, the yield on 10 year government bonds will be used.

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<sup>9</sup> Own calculations from Annual Financial Accounts (Source of raw data: Eurostat), see Appendix 3 – Liability composition.

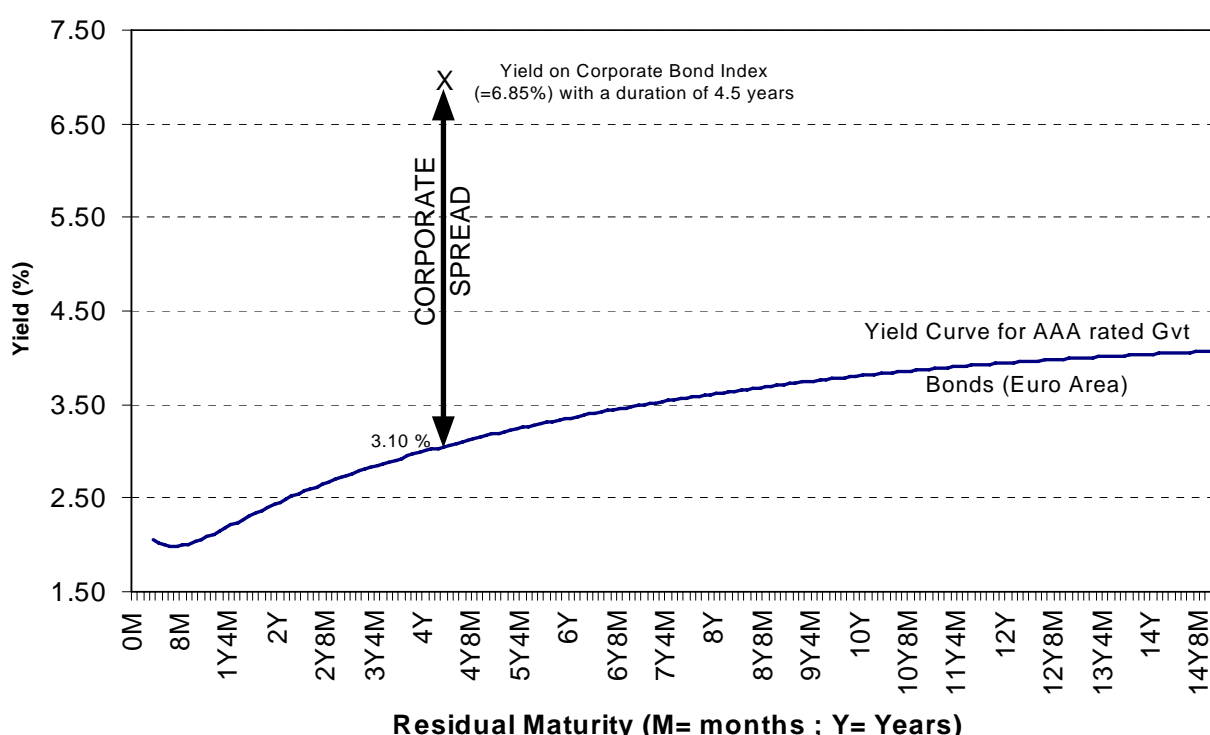
The corporate spread is measured as the difference between the corporate bonds yield and the yield on euro area AAA rated government bonds with a corresponding duration.

As an indicator of the corporate bond yield we will use the weighted average yield of the following two corporate bond indices:

- Markit iBoxx Euro Non-Financial Index (covers Investment Grade bonds)
- Markit iBoxx Euro High Yield main Non-Financials cum crossover LC (covers High Yield bonds)

**Illustration:** Let's assume that on a given day the weighted average yield of the two iBoxx indices is 6.85%, the weighted average duration is 4.5 years, and that the euro – area yield curve for AAA rate government bonds has the shape represented in Figure 3.

**Figure 3 Calculation of corporate spread**



The corporate spread would be calculated as the difference between 6.85% and the euro area yield for AAA rated government bonds for a duration of 4.5 years (3.10% in the example)

$$\text{Corporate Bond spread} = 6.85\% - 3.10\% = 3.75\%$$

The weights given to the “Investment Grade” and “High Yield” sections of the market are based on the market value figures of outstanding amounts for each section. Based on information available from the Securities Industry and Financial Markets Association (SIFMA), the Investment grade section represents more than 90% of the entire corporate bond market<sup>10</sup>. As a result we will use a weight of 90% for the yield and duration of the Markit iBoxx Euro Non-Financial Index, and 10% for the Markit iBoxx Euro High Yield main Non-Financials.

<sup>10</sup> Source: Securities Industry and Financial Markets Association. See page 2 of the Primary Distribution Survey report: <http://www.sifma.org/research/pdf/Primary-Distribution-Survey-Report-Spring-2007.pdf>

## 5.2 – Sources of data

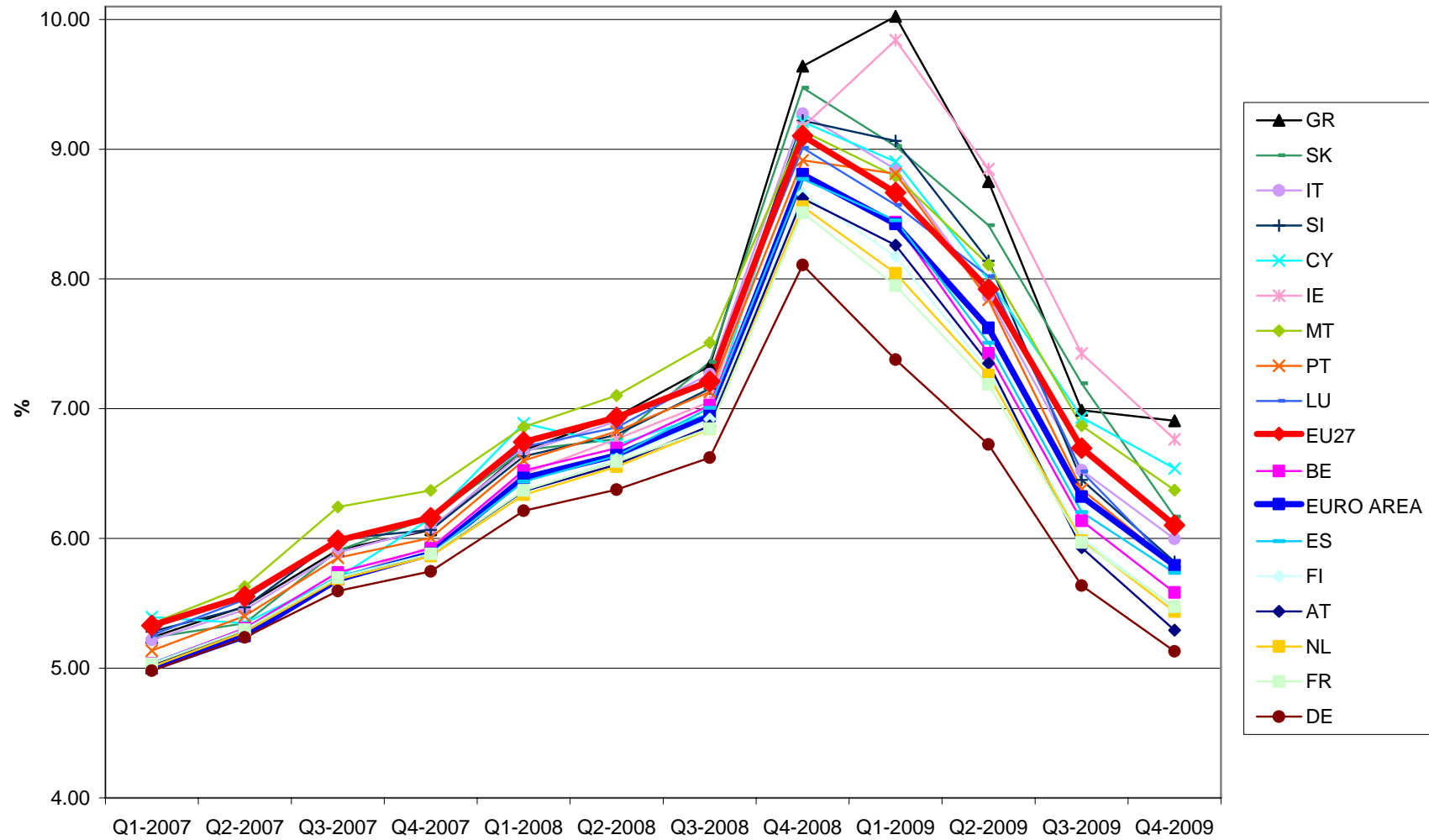
DATA	SOURCE
Euro area yield curve (AAA rated government bonds)	ECB
Yield on 10 years government bonds for each MS	ECB
Average yield and average duration for iBoxx indices	Datastream (Thomson Reuters)
Weighting of investment grade vs. high yield	Securities Industry and Financial Markets Association

## 5.3 – Results

**Table 3 Cost of Dept Securities Indicator (From Q1-2007 to Q4-2009) – sorted by increasing order of values for Q4-2009**

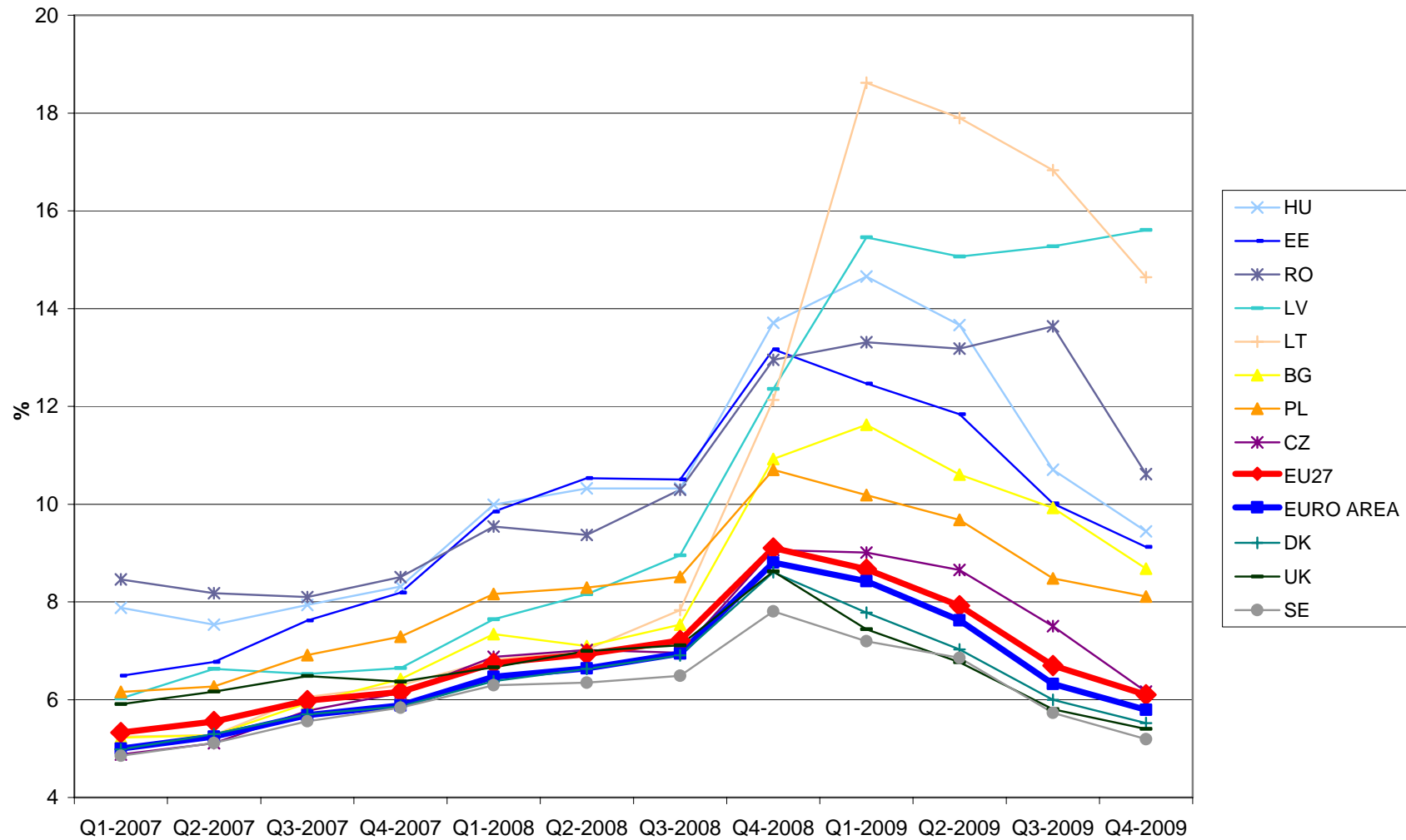
	Q1-2007	Q2-2007	Q3-2007	Q4-2007	Q1-2008	Q2-2008	Q3-2008	Q4-2008	Q1-2009	Q2-2009	Q3-2009	Q4-2009
DE	4.98	5.24	5.59	5.75	6.21	6.38	6.62	8.11	7.38	6.72	5.64	5.13
SE	4.85	5.12	5.56	5.83	6.30	6.35	6.49	7.80	7.19	6.86	5.73	5.19
AT	5.02	5.29	5.69	5.88	6.36	6.57	6.87	8.62	8.26	7.35	5.93	5.29
UK	5.91	6.16	6.48	6.37	6.66	7.00	7.11	8.62	7.44	6.77	5.81	5.40
NL	5.01	5.28	5.68	5.86	6.34	6.55	6.84	8.56	8.04	7.26	5.98	5.44
FI	5.01	5.29	5.69	5.87	6.35	6.61	6.92	8.66	8.17	7.29	6.01	5.46
FR	5.03	5.30	5.70	5.88	6.37	6.59	6.85	8.51	7.95	7.19	5.97	5.47
DK	4.98	5.30	5.70	5.86	6.38	6.63	6.91	8.61	7.78	7.03	6.00	5.52
BE	5.04	5.31	5.74	5.92	6.52	6.70	7.03	8.81	8.44	7.43	6.14	5.58
ES	5.04	5.30	5.71	5.88	6.44	6.64	7.01	8.77	8.45	7.51	6.20	5.73
LU	5.25	5.53	5.97	6.17	6.71	6.86	7.24	9.01	8.57	8.02	6.52	5.78
EURO AREA	5.00	5.25	5.68	5.88	6.47	6.64	6.94	8.81	8.42	7.62	6.32	5.79
PT	5.13	5.40	5.85	6.00	6.60	6.83	7.13	8.91	8.81	7.84	6.38	5.79
SI	5.28	5.47	6.00	6.07	6.63	6.80	7.16	9.22	9.06	8.14	6.45	5.82
IT	5.22	5.45	5.89	6.08	6.66	6.90	7.27	9.27	8.84	7.86	6.53	6.00
EU27	5.33	5.55	5.98	6.16	6.74	6.93	7.21	9.10	8.67	7.92	6.70	6.10
CZ	4.88	5.11	5.77	6.14	6.88	7.02	6.96	9.06	9.01	8.65	7.50	6.16
SK	5.23	5.35	5.91	6.16	6.68	6.77	7.36	9.47	9.02	8.41	7.20	6.17
MT	5.34	5.63	6.24	6.37	6.86	7.10	7.51	9.14	8.79	8.11	6.87	6.37
CY	5.39	5.35	5.70	6.15	6.89	6.72	6.96	9.21	8.90	8.00	6.93	6.54
IE	5.00	5.28	5.69	5.94	6.50	6.77	7.05	9.17	9.84	8.85	7.43	6.76
GR	5.24	5.48	5.91	6.07	6.68	6.94	7.33	9.64	10.02	8.75	6.99	6.91
PL	6.16	6.27	6.91	7.29	8.16	8.29	8.51	10.70	10.19	9.68	8.48	8.11
BG	5.22	5.28	5.93	6.42	7.34	7.10	7.53	10.92	11.62	10.61	9.93	8.68
EE	6.49	6.77	7.62	8.19	9.84	10.53	10.50	13.16	12.46	11.02	10.01	9.12
HU	7.88	7.54	7.94	8.31	9.99	10.32	10.32	13.71	14.66	13.66	10.71	9.44
RO	8.46	8.18	8.10	8.51	9.54	9.37	10.30	12.95	13.31	13.18	13.64	10.62
LT	5.24	5.28	6.06	6.30	6.82	7.03	7.83	12.13	18.62	17.90	16.83	14.64
LV	6.02	6.63	6.52	6.65	7.64	8.16	8.95	12.35	15.46	15.06	15.28	15.61

**Figure 4 Cost of Debt Securities Indicator for euro area MS**



Source: ECB, Datastream and own calculations

**Figure 5 Cost of Debt Securities Indicator for non-euro area MS**



Source: ECB, Datastream and own calculations

The two graphs above illustrate both the increase in the funding cost in the corporate bond market for all MS and the widening of cost gap between MS.

The increase in the cost of raising capital in the corporate debt market, from the beginning of 2007 till the end of 2008 is due to the global financial crisis (i.e. investors reallocating their money to safer types of assets such as government bonds, increased perception of corporate risk, lack of liquidity, ...). The average Cost of Debt Securities in the EU27 and the euro area reached its peak in the fourth quarter of 2008. Since then the average is falling again. However, in some MS the Cost of Debt Securities Indicator is still on the rise during 2009.

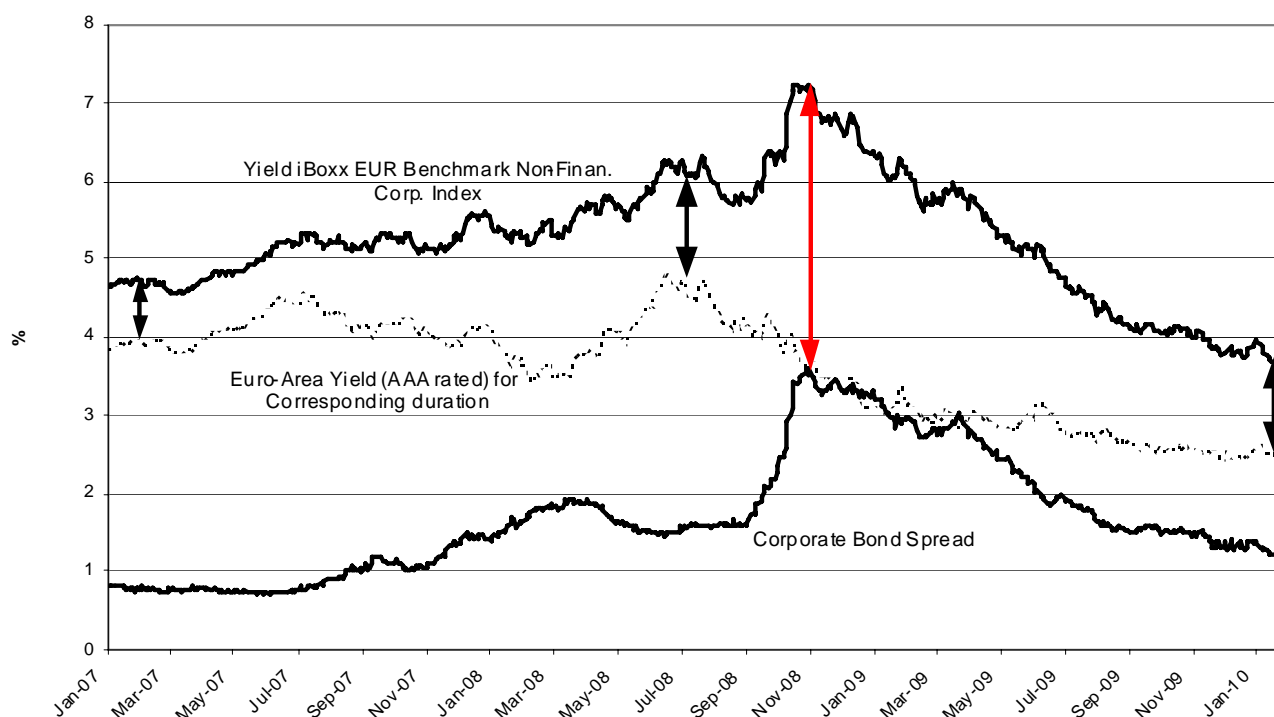
Breaking down the indicator into its two components (corporate spread and yield on 10 year government bonds) gives us additional insight.

### Corporate Spread

The main reason for the increase in cost of corporate debt indicator from Q1-2007 to Q4-2008 has been the widening of the corporate bond spreads.

For investment grade bonds, the corporate spread increased from an average of 0.74 percentage points in Q2-2007 to 3.25 percentage points in Q4-2008. Figure 6 illustrates this. Since then the corporate spread has decreased again slowly and reached roughly 1.4 percentage points in Q4-2009.

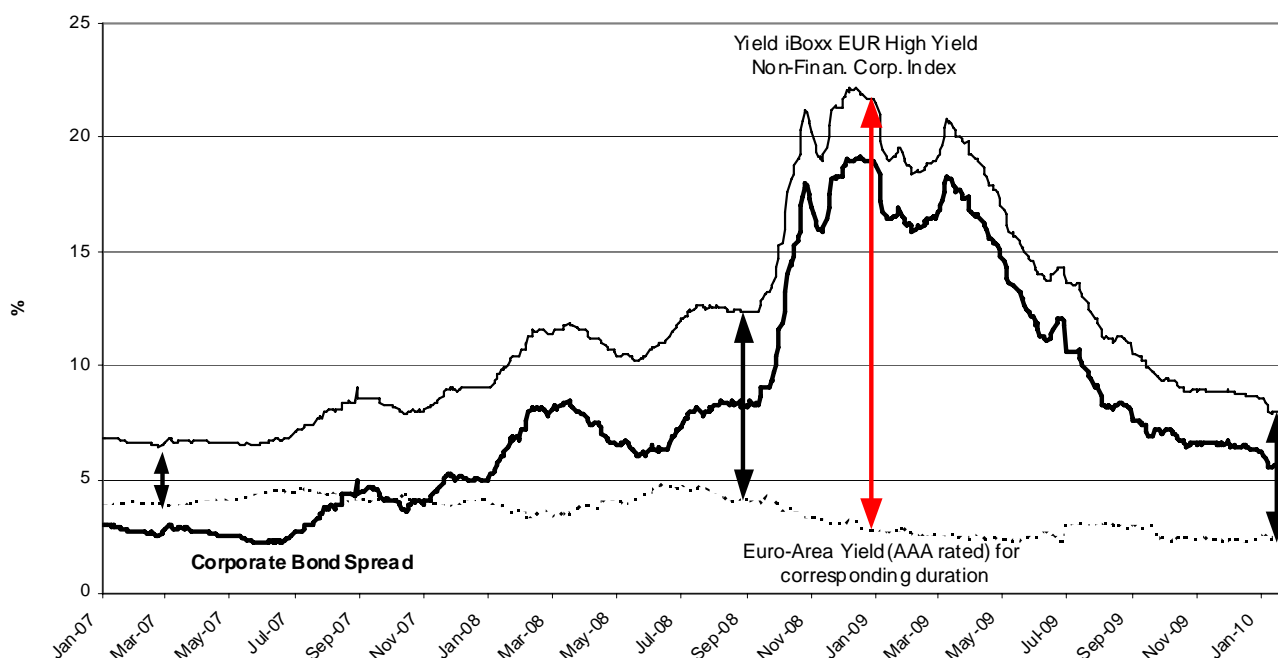
**Figure 6 Evolution of corporate spreads for Investment Grade Corporate Bonds (Jan 07 to Jan 10)**



Source: ECB, iBoxx

For High Yield bonds, the widening of the spreads was much more accentuated, moving from 2.41 percentage points in Q2-2007 to 16.91 percentage points in Q1-2009 and then to 6.58 in Q4-2009 (Figure 7).

**Figure 7 Evolution of Corporate spreads for High Yield Corporate Bonds (Jan 07 to Jan 10)**



Source: ECB, iBoxx

### Yield on 10 year government bond

To better understand the widening of the gap in the cost indicator between MS we should look at the evolution at the second component, the yield on 10 year government bonds.

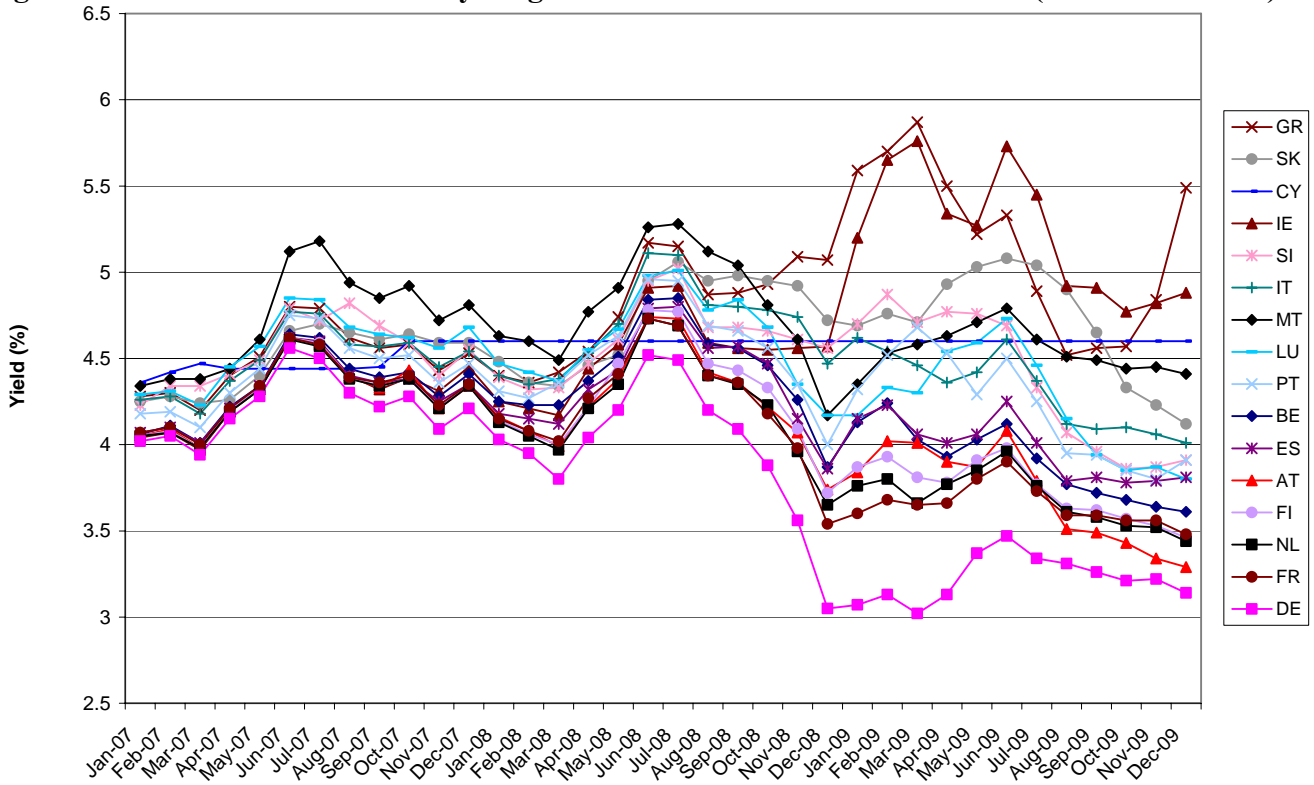
For euro area MS: Although government bond yields have fallen for most MS since its peak in June 2008 as a result of a flight to government bonds (considered as safe instruments), the 10 year bond spread between euro area MS and Germany (considered as the safest) have dramatically widened (see Figure 8). As an illustration:

- In January 2008 the 10 year bond spread between the euro area MS with the highest yield (Malta) and Germany was just 60 basis points (bp).
- In December 2008, the 10 year bond spread between the euro area MS with the highest yield (Greece) and Germany more than tripled to 202 bp.
- In March 2009, the 10 year bond spread between the euro area MS with the highest yield (Greece) and Germany reached its current peak with 285 bp.

From January 2009 the yields of government bonds started to increase again. Some MS with extreme difficulties due to the financial crisis, like Ireland, Greece, and Slovakia have to pay relatively large risk premiums on their bonds and were downgraded by the rating agencies.

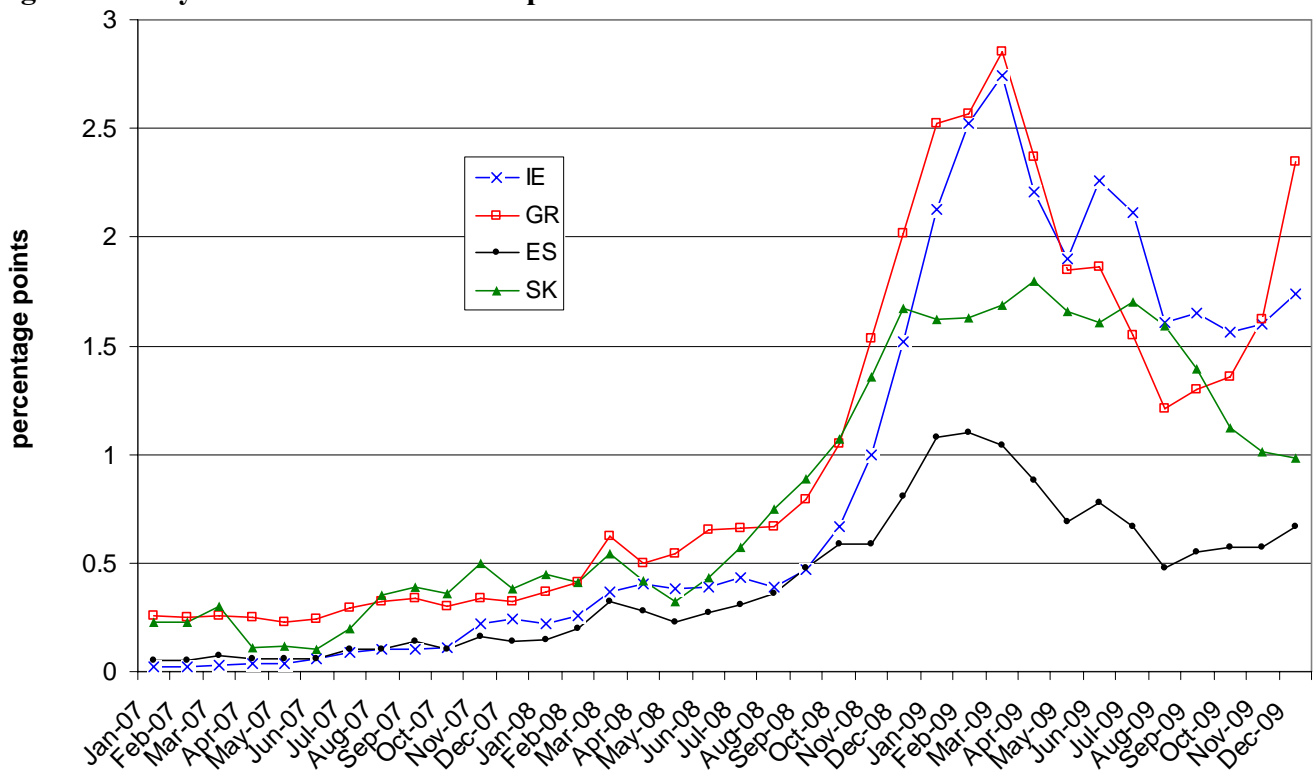
Figure 9 illustrates this for some euro area MS that are currently facing credit rating downgrades or have been placed on credit watch with negative implications by the rating agencies.

**Figure 8 Evolution of Yields on 10 year government bonds for euro area MS (Jan 07 to Dec 09)**



Source: ECB

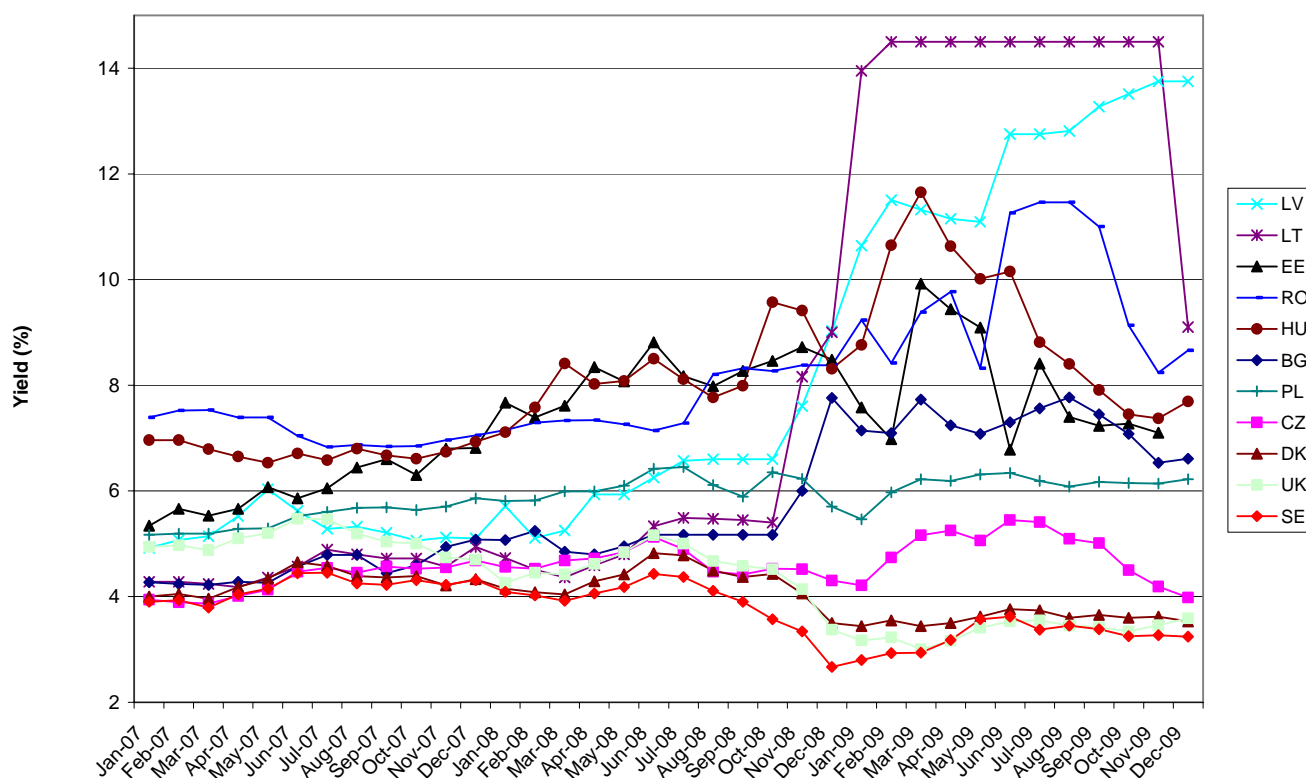
**Figure 9 – 10 year Government Bond Spread over Bunds**



For non-euro area MS: The borrowing cost for Eastern European MS (specially Baltic MS and Hungary) has also dramatically increased over the last year as a result of investors flying to safer instruments and increased perception of risk (see Figure 10).



**Figure 10 Evolution of yields on 10 year government bonds for non-euro area MS (Jan 07 to Dec 09)**



#### **5.4 – Observations**

- Available evidence suggests that the corporate bond market in the euro area has achieved a high degree of integration, with “country effects only explaining a very small proportion of the cross-sectional variance of corporate bond yield spreads”<sup>11</sup>. The above model assumes that the corporate bond yield spreads are the same across all EU MS which might be a strong assumption for MS outside of the euro zone. The only country specific component in the corporate bond yield indicator is included in the risk free rate. As a future development we could consider developing an indicator with a country specific corporate bond spread. However, given the small size of the corporate debt market for most of the EU MS, this might only be possible for a limited number of MS (e.g. UK, DE, FR, ...). Another possible problem for the calculation of country specific spreads could be that multinational firms can not be easily assigned to a specific country.
- Corporate bonds are mainly used by large companies. As a result the indicator for corporate bonds would not be representative for small/medium size firms.
- iBoxx indices used to calculate the corporate spread cover EUR denominated bonds, which means that bonds from corporations outside of the EU might be included in the indices. As a future development we could explore whether other families of corporate bond indices, such as the one produced by Merrill Lynch are more adequate.

<sup>11</sup> Source: Indicators of Financial Integration in the Euro area – European Central Bank – September 2006

## **SECTION 6 – Indicator on Cost of Equities Listed ( $K_{EL}$ )**

The listed equity cost of capital represents the return equity holders expect to get on their listed shares. It needs to compensate for the additional risk the investor is taking (compared to a risk free asset). This includes for example the corporation's specific risk profile, country risk, liquidity risk, foreign exchange risk, etc..

### **6.1 – Methodological choices**

To come up with an estimator at the MS level for cost of capital on equities listed, two methodological choices have to be made:

1. Estimation approach: Should we use historical or forward looking information? (Section 6.1.1)
2. Type of data to be used: Should we use data at the corporation level? Or would it be possible to use consolidated data at the market/MS level (e.g. use of stock indices) (Section 6.1.2)

#### **6.1.1 – Estimation approach: “Historical” vs. “Forward looking” (or “Implied”)**

In the financial literature, two main approaches are used when estimating the equity cost of capital:

- **“Historical” Approach** – The cost of capital is derived using historical data. These models (best example of this model is the CAPM) implicitly assume that future stock performances can be estimated using historical data. Appendix 4 provides some details on a couple of popular models used to estimate the cost of equity capital under the Historical Approach.
- **“Implied” Cost of Capital Approach** – The cost of equity capital is derived from current stock prices and forward-looking information. This approach starts from the assumption that the price of a stock should equal the present value of the future cash flows to the investors (i.e. the dividends). The implied cost of equity is then calculated as the discount rate ( $k$ ) that sets the current stock price ( $P_0$ ) equal to the present value of expected future dividends ( $D_1, D_2, \dots, D_t, \dots$ )

$$P_0 = D_1/(1+k) + D_2/(1+k)^2 + \dots + D_t/(1+k)^t + \dots +$$

The different models that can be used to estimate the cost of equity capital under the Implied Approach just differ by the assumptions used to estimate the dividends/earnings behavior. Please refer to Appendix 5 for some details on some of the models that could be used to estimate the cost of equity capital under the “Implied Approach”.

#### **6.1.2 – Type of data to be used: “Company level” vs. “MS’s overall stock market level”**

When applying any of the approaches above we may want to use either data at individual corporation level or at the Member State (MS) overall stock market level.

- **Use of data at the individual corporation level** – Estimate the implied  $K_{EL}$  at the individual corporation level using data at that level (e.g. accounting data, price of the stock, dividend/earnings estimates, ...) and then aggregate to come up with a MS estimate.
- **Use of data at the MS’s overall stock market level** – Estimate the implied cost of equity capital using information available at the MS level, such as stock indices. The main advantage of using an index is that it consolidates a lot of the market

information/expectations at the MS level with a very broad coverage. The recommendation here would be to use stock market equity indices such as the “Datastream Global Equity Indices”.

Benefits of using Stock Market indices, such as the Datastream Global Equity Indices:

- Each corporation defined as eligible can only be classified in one country (i.e. no risk of double counting for corporations listed in more than one market)
- Weight of each company in the index = Free-float adjusted market capitalization weighting. This could also be seen as a disadvantage, as the weight of large capitalization firms might be too high.
- Broad coverage – A minimum of 75% of the total market capitalization could be represented in the index.
- They allow to just focus on Non-Financial corporations
- The Datastream Equity Indices for non-financial corporations is available for 23 out of the 27 Member states. For Estonia, Latvia, Lithuania and Slovakia, we will use as an alternative the S&P BMI Index.
- Also index for euro area and EU27
- Amount of data to be processed is much lighter than when using data at the individual company level.
- Regularly updated (on a quarterly basis).

## **6.2 – Recommendations**

1. **Estimation approach:** Use of “Implied” Cost of Capital Approach as the current price of a financial instrument tells you more about the market’s expectations than past/historical information. This means that we will rely primarily on current stock prices to derive the implied cost of capital.
2. **Type Of Data To Be Used:** Use of Stock Market Indices. In addition the amount of data required is significantly reduced. In the first phase of the project the indices from Datastream will be used.
3. **Estimation Model:** In the financial literature there is no consensus on what is the best model to estimate the cost of equity capital. As the underlying assumptions are different, the results are different. In the first phase of the project, two basic models will be considered:
  - **“Earnings Yield” model:** Assumes earnings will remain constant (i.e. growth rate =0%).
  - **“Dividend Discount” model (a.k.a. “Dividend Yield” model):** Assumes that dividends remain constant.<sup>12</sup> This model was used for the calculation of the indicator.

As part of future developments, other models with different assumptions on the evolution of dividend/earnings could be considered, such as:

- **“Gordon Dividend Growth Model”:** Assumes dividends will grow at a constant rate.
- **“Three Stage Dividend Discount Model”:** This model makes the difference between three periods: 1 - A period of high growth of earnings with a low payout ratio. 2 - A period of declining growth of earnings with an increasing payout ratio. 3 – A period of long term stable growth of earning with a high payout ratio.

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<sup>12</sup> Earnings tend to be more volatile than dividends. As a result, the Dividend Yield model might give a more stable picture.

- “Ohlson-Juettner” (OJ) model: Assumes earnings will grow, but makes a difference between short and long term growth rates.

### **Data requirements**

- Daily Prices and Actual Earnings on MSCI Indices, going back 5/10 years if possible. Source of data: Data vendors (e.g. Bloomberg, Reuters).
- Earnings estimates provided by financial analysts. Source of data: Thomson Financial (I/B/E/S data – Institutional Brokers’ Estimate System) going back 5/10 years if possible.
- Dividend estimates for next period. We can assume that the payout ratio in period 1 will be the same as in the current period. As a result we can assume that  $D1 = E1 (D0/E0)$
- Long term economic growth rate (required for OJ Model). Source of data: Eurostat – Data on Real GDP Growth rate. This data set contains at the MS and at the aggregated level (EU27/Euro area) the GDP growth rate forecast for the current and next year. The long term rate would be estimated as the average of these two rates. Other possibilities were to take the potential GDP growth (estimated by DG ECFIN as part of its forecast) or the medium term projections (estimated but not published by DG ECFIN).
- Dividend growth rate (required for Gordon Model). We can assume that this rate equals the long term economic growth rate.

### **Important Remark**

Although conceptually the “implied Approach” is the preferred option to infer the cost of capital, its use would require the use of external data that might not be easily accessible for budgetary reasons (mainly the Thomson Reuters’ I/B/E/S data from the earnings estimates provided by financial analysts). To overcome this potential obstacle two options can be considered:

- Use the “Historical” approach, such as the CAPM Model. (Please refer to Appendix 4 for a short description).
- Use a variation of the “forward looking” Earnings Yield Model described in Appendix 5. Instead of using “future earnings estimates”, we could use a “trailing version” of the Earnings yield model by using “actual earnings” figures instead of future estimates.

The choice of the appropriate method will be dependent on the data available.

## 6.3 – Results

**Table 4 Cost of Equity Listed (From Q1-2007 to Q4-2009) – sorted by increasing order of values for Q4-2009**

	Q1-2007	Q2-2007	Q3-2007	Q4-2007	Q1-2008	Q2-2008	Q3-2008	Q4-2008	Q1-2009	Q2-2009	Q3-2009	Q4-2009
LV	0.71	0.73	0.40	0.19	0.04	0.03	0.27	0.39	0.39	0.39	0.39	0.39
LT	2.26	2.34	2.18	2.22	2.39	0.86	0.47	0.69	0.69	0.69	0.69	0.69
RO	1.32	1.94	2.14	2.39	3.02	3.03	3.79	7.26	9.49	3.90	1.41	1.33
DK	1.05	0.94	0.86	0.88	1.13	1.32	1.39	2.06	2.27	1.77	1.53	1.45
SI	0.62	0.63	0.54	0.56	0.71	0.84	0.74	1.19	1.88	1.89	1.74	1.65
IE	0.95	0.98	1.13	1.27	1.54	1.77	2.32	2.98	3.08	2.47	2.02	1.81
BE	2.07	1.94	2.20	2.51	2.74	2.86	4.26	6.76	7.70	6.97	3.07	2.50
HU	2.86	2.97	2.90	3.02	3.38	3.60	4.26	7.39	8.03	6.33	3.29	2.95
SE	2.42	2.45	2.52	2.74	3.52	3.77	4.42	5.80	4.89	3.80	3.32	3.02
SK	2.42	2.45	2.52	2.74	3.52	3.77	4.42	5.80	4.89	3.80	3.32	3.02
NL	1.93	1.94	1.97	2.25	2.62	2.61	3.15	4.70	5.02	4.37	3.60	3.12
DE	2.09	2.10	2.04	1.95	2.29	2.67	2.97	3.81	4.26	3.83	3.51	3.33
AT	1.71	1.76	2.23	2.23	2.39	2.46	3.31	5.40	5.80	5.05	3.91	3.48
LU	1.61	1.69	1.96	2.06	1.96	2.20	2.60	3.41	3.89	4.07	3.98	3.52
UK	2.75	2.66	2.77	2.73	3.04	3.05	3.53	4.53	4.67	4.50	4.01	3.58
PT	2.50	2.34	2.40	2.48	2.82	3.18	3.95	5.07	5.00	4.71	4.32	3.67
EU27	2.50	2.45	2.52	2.51	2.92	3.06	3.57	4.71	5.09	4.69	4.09	3.72
EE	1.67	1.60	1.91	2.33	2.09	2.19	3.54	3.79	3.79	3.79	3.79	3.79
EURO AREA	2.40	2.37	2.43	2.43	2.87	3.05	3.59	4.76	5.34	4.89	4.22	3.87
FR	2.40	2.44	2.61	2.63	3.09	3.13	3.61	4.59	5.05	4.86	4.20	3.87
MT	3.79	1.69	1.66	1.70	1.68	2.04	2.44	2.84	3.46	4.28	4.08	3.94
GR	2.16	2.17	2.55	2.32	2.52	2.72	3.67	5.34	5.60	4.78	4.52	4.25
CY	2.88	2.50	2.08	2.39	2.93	3.12	3.60	5.11	5.46	5.00	4.52	4.29
FI	3.07	2.82	2.66	2.53	3.32	4.04	4.80	6.93	6.95	5.07	4.47	4.31
PL	3.75	3.35	3.63	3.63	4.16	4.35	4.55	6.03	6.07	5.12	4.76	4.44
ES	2.55	2.43	2.34	2.22	2.73	2.97	3.63	4.65	5.86	5.60	4.92	4.49
IT	3.48	3.37	3.56	3.59	4.33	4.35	5.09	6.87	7.71	6.84	6.41	5.82
CZ	3.04	2.77	2.92	2.59	2.82	3.23	4.20	5.93	6.31	6.21	6.04	6.25
BG	0.87	0.91	0.92	0.82	0.96	1.00	1.19	1.25	0.88	2.84	6.70	7.01

To calculate the euro area indicator and the EU 27, we use Thomson Reuters' Datastream indices covering the respective areas.

**Figure 11 Cost of Equity Listed Indicator for euro area MS**

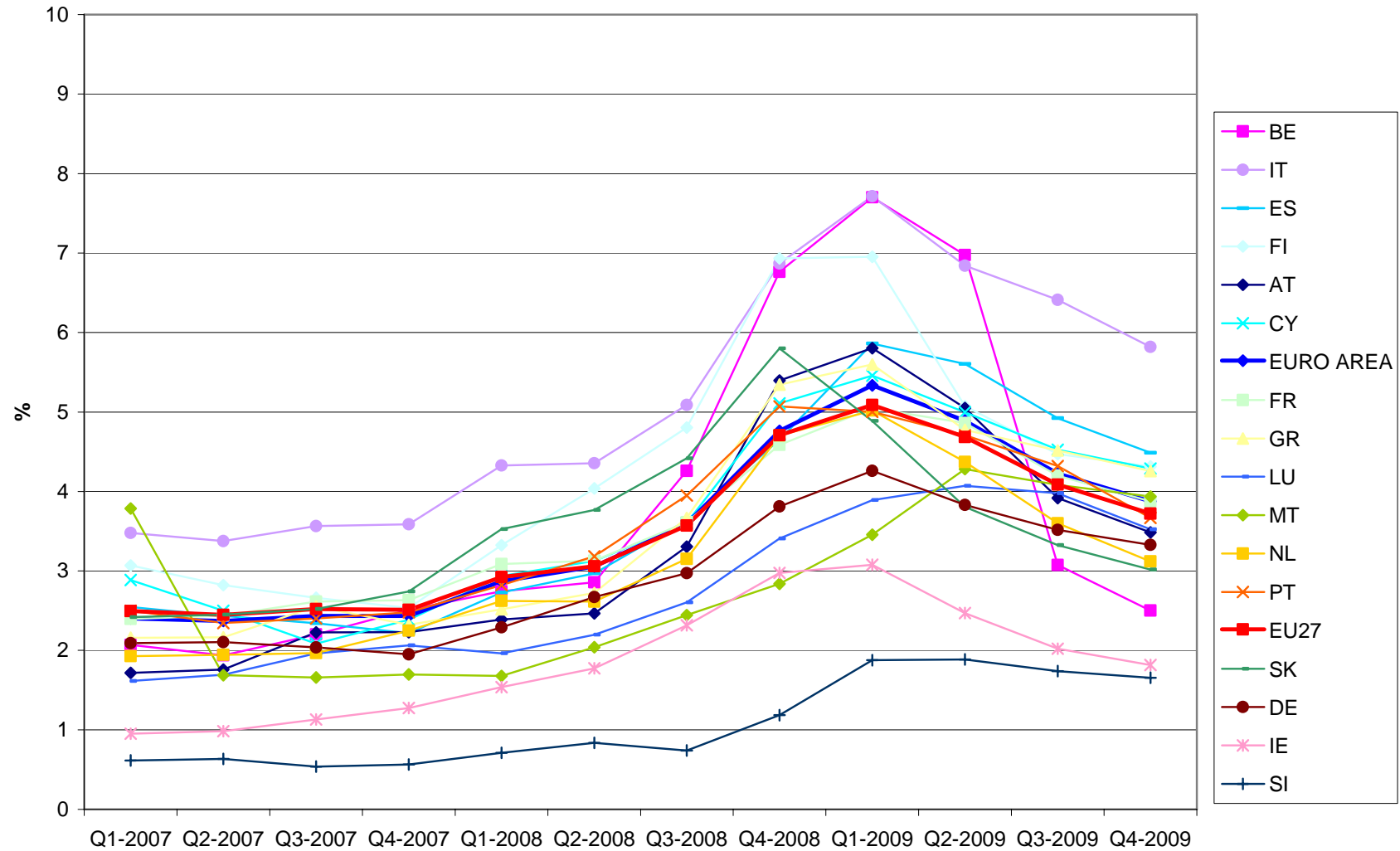
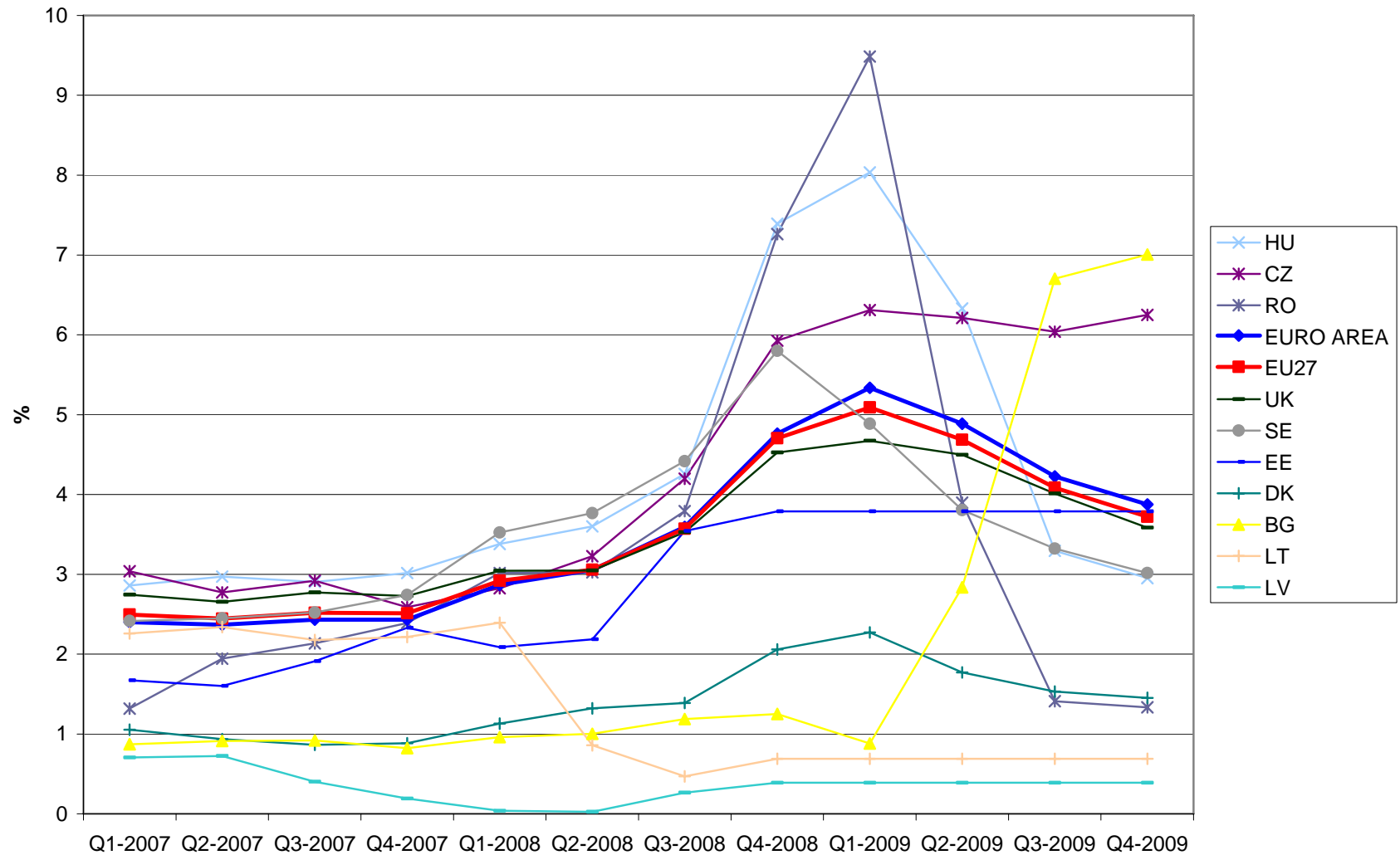


Figure 12 Cost of Equity Listed Indicator for non-euro area MS



## **SECTION 7 – Composite indicator and weighting of financing sources ( $W_{Source - i}$ )**

Corporate financing structures differ significantly from one MS to another. For example, in Latvia loans are the privileged source of financing for non-financial corporations (representing almost 49% of the total liabilities in 2008). In Belgium, on the other hand, equity represents the largest source of financing (representing almost 62% of the total liabilities).<sup>13</sup>

Evaluating the importance of each source of financing in each MS is key to determine the weights that should be allocated to each source-indicator.

### **7.1 – Recommended data sources**

The Financial Accounts statistics published by Eurostat provide at the EU Member state level data on the value of stocks of assets and liabilities. The data can be broken down by institutional sector (e.g. financial corporations, non-financial corporations, etc...) and by balance sheet item. This allows the estimation at the MS level of the proportion of each source of financing as a % of the total liabilities.

### **7.2 – Calculation method**

Details on the specific balance sheet items used and the calculation methods are provided in Appendix 6.

### **7.3 – Data limitations / Comments**

- Timeliness: In the ideal case the corresponding financial composition for each reference period should be used, this would allow to get closer to the real cost of capital at a certain point in time. However, the data on Financial Accounts used to calculate the weighting of financing sources is transmitted relatively late by the MS (T+9 months). So, e.g. the first data for 2009 is not available before October 2010. This makes it difficult to have changing weights over time. Currently, the financial composition of the newest available data (2008) is used as weights for the entire time series.
- No data on Financial Accounts available for some MS:
  - Malta and Luxembourg (as a result of a derogation until 2010)
  - Cyprus (as a result of a derogation until 2009)
  - In some case the data is incomplete data. For example in the case of Denmark, Germany, Italy, Austria, Slovakia and the UK there is no data available to breakdown the equity data between quoted and unquoted shares.

Alternative: For the weights that can not be calculated due to missing data we will apply the EU average.

- In some MS, the category “Other Accounts payable” represents a significant proportion of non financial corporation’s balance sheets. In the first phase of the project we will assume that its importance as a financing source is negligible when this category is netted against the equivalent category on the assets side (“Other accounts receivable”). This assumption should be verified at a later stage of the project.
- Only the shares of Loans, Corporate Debt, and Shares And Other Equity (C) of Table 6 in annex are taken into account. Therefore, the shares of Table 6 have to be rebased to the sum of A+B+C. Other categories (like “Other accounts payable”) are not taken into account. See Table 7 for the details on weights used.

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<sup>13</sup> See Appendix 2 - Own calculations from Annual Financial Accounts (Source of raw data: Eurostat)



## 7.4 – Results for the composite Cost of Capital Indicator

When applying the same weights for all countries (EU27 weights) the following results are received:

**Table 5 Cost of Capital Indicator (From Q1-2007 to Q4-2009) - Sorted by increasing order of values for Q4-2009**

	Q1-2007	Q2-2007	Q3-2007	Q4-2007	Q1-2008	Q2-2008	Q3-2008	Q4-2008	Q1-2009	Q2-2009	Q3-2009	Q4-2009
DK	2.87	2.95	3.03	3.02	3.21	3.42	3.54	4.04	3.58	2.86	2.70	2.41
BE	3.30	3.33	3.59	3.81	3.98	4.09	4.95	6.17	5.92	5.22	2.87	2.49
IE	3.11	3.25	3.49	3.62	3.74	3.97	4.34	4.54	3.94	3.21	2.77	2.52
SE	3.15	3.25	3.39	3.72	4.23	4.45	4.98	5.43	3.91	3.18	2.75	2.56
LT	3.62	3.87	3.92	4.02	4.10	3.39	3.32	3.62	3.44	3.05	2.84	2.76
NL	3.14	3.30	3.42	3.63	3.80	3.88	4.24	4.95	4.34	3.70	3.07	2.81
LV	3.09	3.31	3.29	3.28	3.21	3.46	3.73	3.91	3.55	3.31	3.03	3.03
AT	3.05	3.16	3.56	3.64	3.71	3.81	4.36	5.50	4.89	4.18	3.35	3.05
LU	3.06	3.26	3.49	3.53	3.49	3.66	4.03	4.19	3.93	3.65	3.39	3.08
UK	4.41	4.48	4.80	4.66	4.64	4.61	4.87	4.99	4.05	3.74	3.34	3.14
SK					4.43	4.73	5.13	5.79	4.44	3.76	3.34	3.14
FR	3.47	3.57	3.81	3.90	4.09	4.25	4.65	5.00	4.45	3.99	3.46	3.23
DE	3.44	3.55	3.65	3.63	3.81	4.06	4.30	4.61	4.17	3.71	3.38	3.29
SI	2.63	2.74	2.86	3.01	3.09	3.36	3.50	3.79	3.75	3.73	3.48	3.31
EURO AREA	3.54	3.62	3.79	3.87	4.11	4.29	4.68	5.20	4.81	4.27	3.72	3.47
FI	3.84	3.76	3.80	3.80	4.21	4.67	5.21	6.18	5.35	4.09	3.56	3.48
EU27	3.73	3.80	3.99	4.04	4.26	4.41	4.77	5.26	4.73	4.24	3.74	3.49
RO	3.82	4.18	4.43	4.67	5.04	5.15	5.67	7.69	8.42	5.30	3.74	3.54
HU	4.12	4.19	4.32	4.34	4.66	4.94	5.33	7.04	6.99	5.79	3.94	3.64
ES	3.57	3.59	3.69	3.73	3.99	4.23	4.71	5.16	5.09	4.66	4.13	3.81
PT	3.97	3.96	4.08	4.27	4.47	4.78	5.35	5.98	5.41	4.87	4.41	3.95
EE					4.15	4.29	5.10	5.38	4.86	4.72	4.44	4.27
MT				3.55	3.64	3.95	4.32	4.30	4.24	4.57	4.63	4.27
GR	3.88	3.94	4.25	4.18	4.27	4.47	5.10	5.98	5.57	4.84	4.52	4.34
IT	4.14	4.20	4.42	4.55	4.97	5.08	5.56	6.48	6.23	5.43	4.99	4.56
CZ	3.96	3.87	4.16	3.98	4.15	4.41	5.03	5.81	5.19	4.96	4.81	4.86
CY					4.39	4.76	5.09	5.99	6.20	5.77	4.91	4.99
PL	4.66	4.52	4.88	5.03	5.50	5.93	6.16	7.14	6.63	5.87	5.56	5.34
BG	3.93	3.91	4.02	4.01	4.10	4.22	4.46	4.65	4.34	5.33	7.54	7.39

\*: CY, EE, and SK: data not available for the loans component of the composite indicator for Q1 to Q4-2007; MT: data not available for the loans component for Q1 to Q3-2007. Therefore, data for the composite indicator is not represented here.

The very low cost of listed equity in some Eastern European MS (e.g. in Latvia and Lithuania) leads to also to a very low overall Cost of Capital indicator value. This is probably due to corporations not paying dividends. In a concrete case (Romania) this was confirmed by the data provider. Therefore, an analysis of the driving components of each indicator should be conducted in a follow-up project.

**Figure 13 Cost of Capital Indicator for euro area MS**

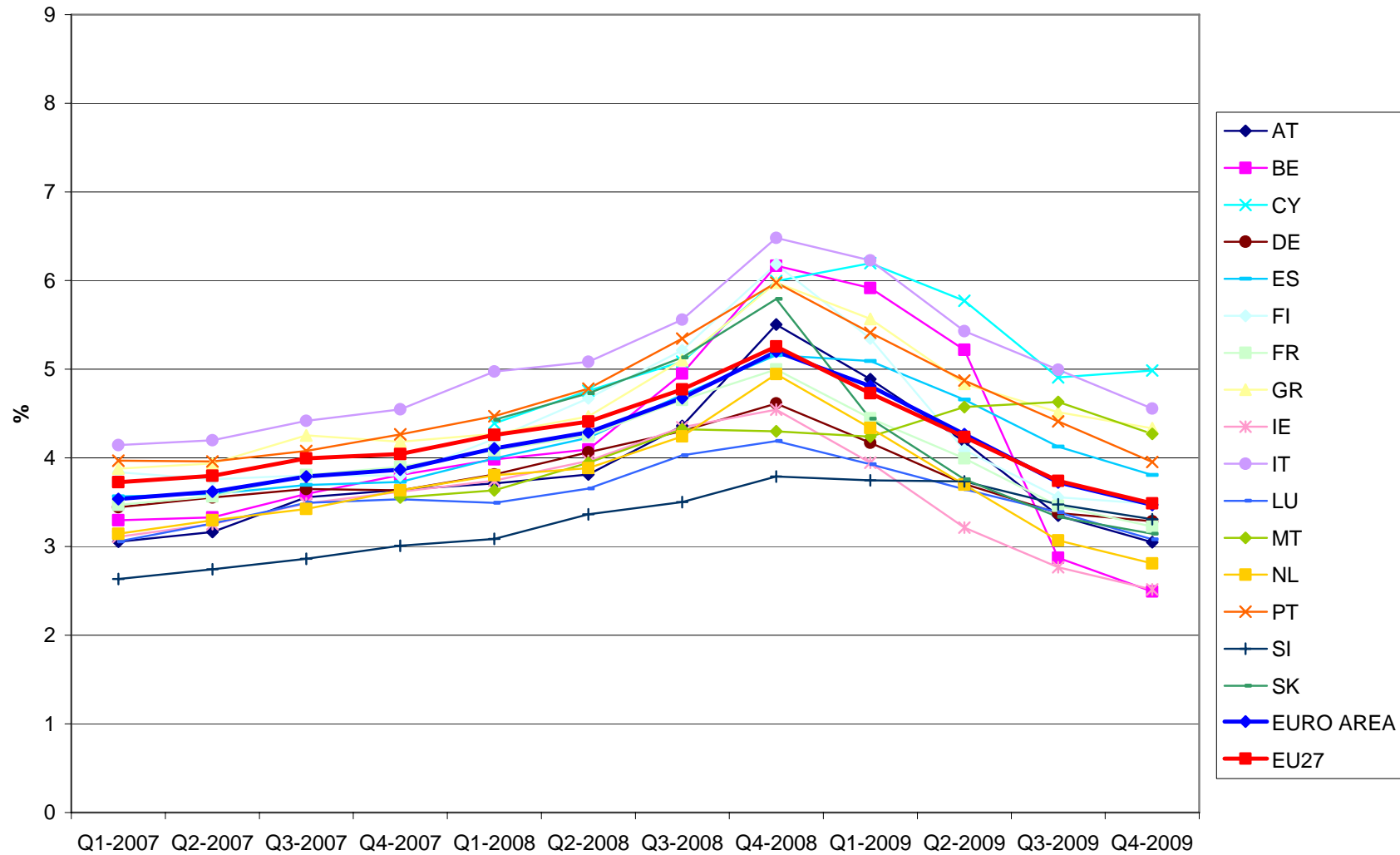


Figure 14 Cost of Capital Indicator for non-euro area MS

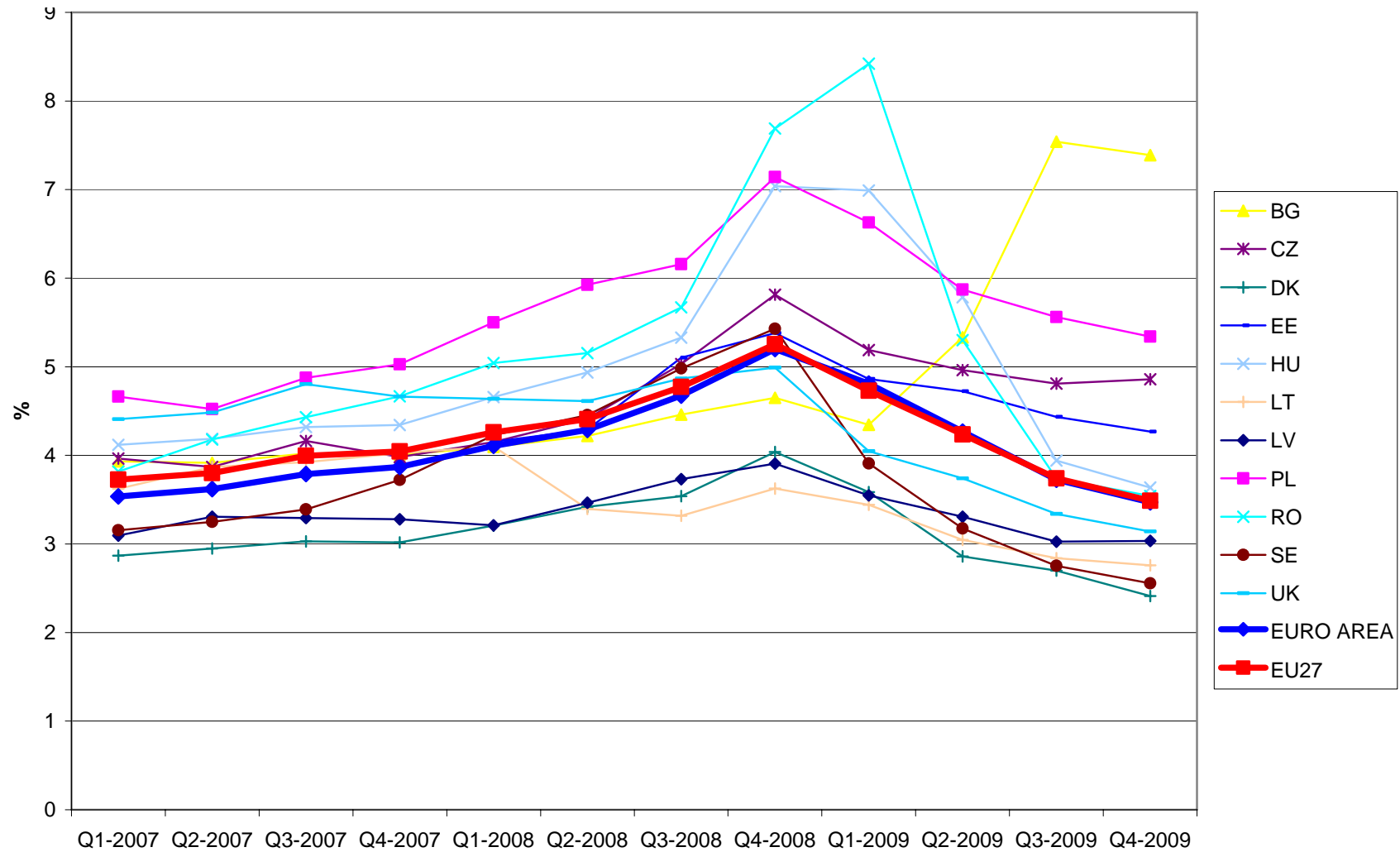
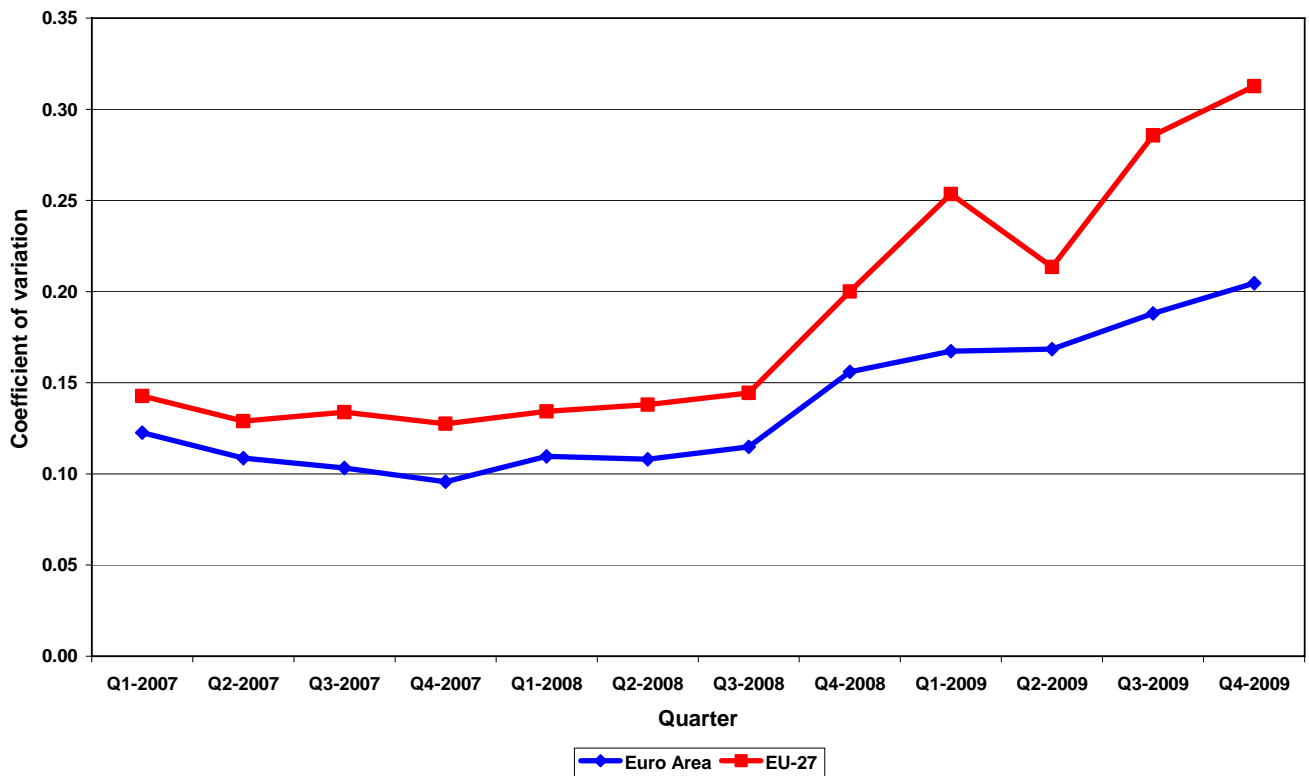


Figure 15: Dispersion of the cost of capital indicator – coefficient of variation<sup>14</sup>



<sup>14</sup> The coefficient of variation of the cost of capital indicator is calculated starting from the simple average of the squared absolute deviation from the Euro Area reference value (EU-27 reference value). The result is then taken in square root and divided by Euro Area reference value (EU-27 reference value) itself.

## **SECTION 8 – Further developments**

This section lists the areas that could be further refined and developed following the completion of the first phase of the project.

### **8.1 – Composite Indicator on Cost of Capital**

- The driving components of each sub indicator of the Cost of Capital Indicator should be better identified and analysed.
- In order to approach the credibility problem<sup>15</sup> that is inherent to all composite indicators, it should be further investigated which capital cost indicators have been used as empirical determinants of investment in the academic literature and to envisage a test whether the cost of capital indicator presented here performs as satisfyingly as these indicators in empirical estimates.
- The ranking of costs of capital components in our analysis is opposite to theoretical priors. In perfect markets, the cost of capital would be identical across financial instruments. The economic literature has identified a number of factors that explain differences in capital costs. The most important ones relate to asymmetric information (agency costs), taxation and legal treatment in case of default. These are used to define a pecking order of financial instruments running from internal funds to equity. The empirical results of the capital cost project are clearly opposite to the predictions of this theory as the cost of equity emerged as the cheapest capital component. Recent analysis of the cost of equity give much higher numbers, i.e. the equity premium (i.e. spread to risk-free rate) is averaging 5% in the *ECB: Monthly Bulletin, November 2008*<sup>16</sup>, the real costs of capital for banks were estimated at about 10% as historical average. Therefore, the calculation of the cost of equity should be revisited (see also below).

### **8.2 – Indicator on Cost of Loans**

- Take into account the potential impact of taxation (i.e. move from a “nominal rate” to a “real rate”).
- Modalities to reduce data gaps should be identified.
- The justification for the choice of X1, X2 and X7 (see page 45) could be strengthened by the use of Principal Component Analysis or a similar multivariate method.

### **8.3 – Indicator on Cost of Debt Securities**

- The recommendation in section 5.1 is to build the indicator using yields on iBoxx indices. As an alternative, the Merrill Lynch corporate bond indices could also be considered.
- To have country specific corporate bond spreads.
- Also a different methodology for the cost of corporate bonds should be considered. Section 5 describes the problems with the calculation of country-specific costs of corporate bonds and proposes a method on how to solve them. The result of this method is that sovereign yields determine cross-country differences and changes over time are determined by both changes in

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<sup>15</sup> For an enumeration of the pros and cons of composite indicators refer to: OECD, European Commission, Joint Research Centre (2008); Handbook on Constructing Composite Indicators – Methodology and User Guide, p. 13-14: <http://composite-indicators.jrc.ec.europa.eu/Handbook.htm>

<sup>16</sup> ECB: Monthly Bulletin, November 2008: <http://www.ecb.int/pub/pdf/mobu/mb200811en.pdf>

sovereign yields and changes to aggregate corporate bond yields. However, changes to sovereign spreads reflect changes in the solvency of the public sector and are not directly linked to the solvency of corporate issuers. Changes in risk-aversion may even lead to an adverse relationship between yields on government and corporate bonds, which would not show up in the chosen methodology. Therefore, it should be investigated whether the country-specific component for this financial instrument should be dropped and whether to apply the aggregate market indicators. This method seems to be justifiable because the corporate bond market is tapped predominantly by large firms, which rely on an international rather than national investor basis. Empirical support can be found in *ECB: Financial Integration in Europe, April 2008*<sup>17</sup>, which concludes "Country effects explain only a very small constant proportion of the cross-sectional variance of corporate bond yield spreads" (p.14 and S9). However, it needs also to be investigated whether this is still true in the light of the financial crisis.

#### **8.4 – Indicator on Cost of Equities Listed**

- Consider other valuation models such as (non-exhaustive list): the “Gordon Dividend Growth model”, the “Three Stage Dividend Discount Model”, or the “Ohlson-Juettner” model.
- Analysing the consistency of the results (according to which the listed equity is the cheapest component) with recent analysis providing measures of the 'equity premium'.

#### **8.5 – Indicator on Cost of Equities Unlisted**

Information on firms that are not listed does not exist or is very difficult to obtain. So estimating the cost of capital using or inferring from “observed values” in the financial markets does not seem to be possible.

An approach that could be explored is to leverage on the statistics collected and the research on factors impacting the development of the private equity environment performed by the EVCA (European Private Equity & Venture Capital Association).

- Statistics: The EVCA runs on a yearly basis a survey of private equity and venture capital activity<sup>18</sup>. This includes figures, such as the amount of money raised for most of the EU MS.

The EVCA also rates as a series of factors (27 in total)<sup>19</sup> that have an impact on the development of the private equity<sup>20</sup> environment.

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<sup>17</sup> ECB: Financial Integration in Europe, April 2008: <http://www.ecb.int/pub/pdf/other/financialintegrationineurope200804en.pdf>. The same conclusion is provided in the 2007 and 2009 editions. See also, European Commission, EFIR, 2007-2009.

<sup>18</sup> “EVCA Yearbook 2009 – Annual Survey of Pan-European Private Equity & Venture Capital Activity” (June 2009). A description of the data provided is available on: [http://www.evca.eu/uploadedFiles/Home/Knowledge\\_Center/Books\\_And\\_Publications/AggrYB09.pdf](http://www.evca.eu/uploadedFiles/Home/Knowledge_Center/Books_And_Publications/AggrYB09.pdf)

<sup>19</sup> The EVCA ‘Benchmarking European Tax and Legal Environments’ Paper – October 2008, published by the European Private Equity and Venture Capital Association (EVCA) and KPMG: <http://www.evca.eu/uploadedFiles/Benchmark.pdf>

<sup>20</sup> Definition of private equity: Private equity provides equity capital to enterprises not quoted on the stock market. Private equity can be used to develop new product and technologies, to expand working capital, to make acquisitions, or to strengthen a company’s balance sheet. (Source: EVCA)

These factors might give us useful information to rank or group MS. For example, the cost of raising unlisted equity will most likely be lower in MS having a legal environment that encourages the development of private equity and with significant inflow of money into private equity.

The results of this grouping/ranking could also be compared with the results obtained from the three other financing sources.

#### **8.6 – Weighting of financing sources**

- Validate whether the assumption that the negligible importance of the category “Other Accounts payable” as a financing source in the Financial Account statistics is correct (when this category is netted against the category “Other accounts receivable”).
- It should be investigated whether fixed or time-varying weights should be used. With constant weights, changes to the capital costs would be entirely driven by changes in capital costs and not by changes in the financial structure. This would come closer to the idea of monitoring capital costs. However, the financial crisis highlighted the issue of possible rationing behaviour. For instance, costs for loan declined considerably, but quantities came also drastically down. Issuance activity on equity and corporate bond markets was also severely affected. Yields for corporate bonds and equity are derived from secondary markets and we can only assume that they are good proxies for the costs on issuance markets, if there is issuance activity. Therefore, the use of time-varying weights could be suitable in some instances.

#### **8.7 –The development of indicators at the economic sector level within each MS**

The possibility to develop indicators at the level of the economic sectors within each MS should be investigated. This could lead to sector specific Cost of Capital Indicators.

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**APPENDIX 1 – Detailed description of the data used for each MS and the adjustments that had to be made to make rates comparable**

MEMBER STATE	RAW DATASET USED	DATA ADJUSTMENTS
AT / BE / CY / DE / ES / FI / FR / GR/ IE / IT / MT/ NL / PT / SI / SK	<p><u>Source:</u> ECB Statistics  <u>Dataset name:</u> MFI Interest rate statistics (at the MS level) – BS Counterpart sector: Non-Financial Corporations  <u>Series selected:</u></p> <ul style="list-style-type: none"> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, up to and including EUR 1 million</li> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, over EUR 1 million</li> <li>- Bank overdrafts</li> </ul>	N/A
LU	<p><u>Source:</u> ECB Statistics  <u>Dataset name:</u> MFI Interest rate statistics (Luxembourg) – BS Counterpart sector: Non Financial Corporations  <u>Series selected:</u></p> <ul style="list-style-type: none"> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, up to and including EUR 1 million</li> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, over EUR 1 million</li> </ul>	<p>For bank overdrafts, given that the data is not available for Luxembourg, the euro area average rate has been used.</p> <p><u>Source:</u> ECB Statistics  <u>Dataset name:</u> MFI Interest rate statistics (euro area) – Non-Financial Corporations  <u>Series selected:</u></p> <ul style="list-style-type: none"> <li>- Bank overdraft</li> </ul>
BG / CZ / EE / HU / LT / LV / PL / RO	<p><u>Source:</u> Eurostat (data for internal purposes only)  <u>Dataset name:</u> Retail Bank interest rates / MFI Interest rates – Loans to non-financial corporations / MFI interest rates – <b>Euro loans</b> to non-financial corporations.  <u>Series selected:</u></p> <ul style="list-style-type: none"> <li>- Other Loans – Maturity less than 1 year – Amount less or equal to 1 Million.</li> <li>- Other Loans – Maturity less than 1 year – Amount greater than 1 Million.</li> <li>- Overdraft</li> </ul>	N/A
DK / SE	<p><u>Source:</u> ECB Statistics  <u>Dataset name:</u> MFI Interest rate statistics (at the MS level) – BS Counterpart sector: Non-Financial Corporations  <u>Series selected:</u></p> <ul style="list-style-type: none"> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, up to and including EUR 1 million</li> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, over EUR 1 million</li> <li>- Bank overdrafts</li> </ul>	<p>Given that the rates provided are for loans denominated in local currency, we have transformed them in EUR-equivalent by using the Interest Rate Parity Theory.</p> <p><u>Source of FX spot and forward rates:</u> Financial Times – Markets Data: Euro Spot Forward report</p>

MEMBER STATE	RAW DATASET USED	DATA ADJUSTMENTS
UK	<p><u>Source:</u> Bank of England (BoE)</p> <p><u>Dataset name:</u> New business rates for sterling lending to private non-financial corporations.</p> <p><u>Series selected:</u></p> <ul style="list-style-type: none"> <li>- Loans with floating rate.</li> <li>- Loans with fixed rate up to 1 year.</li> <li>- Overdrafts to Non-financial corporations</li> </ul>	<p>The data on rates available from the Bank of England (BoE) do not combine rate fixation periods and size of loans. The average of the BoE's rates on loans with floating rate, and with fixed rate up to 1 year will be used as a proxy for:</p> <ul style="list-style-type: none"> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, up to and including EUR 1 million.</li> <li>- Loans other than bank overdrafts, with floating rate and up to 1 year initial rate fixation period, over EUR 1 million.</li> </ul> <p>Given that the rates provided by the Bank of England are for loans denominated in GBP, we have transformed them in EUR-equivalent by using the Interest Rate Parity Theory.</p> <p><u>Source of FX spot and forward rates:</u> Financial Times – Markets Data: Euro Spot Forward report</p>

## APPENDIX 2 – Cost of Loans – Temporary solution

The purpose of this appendix is twofold:

1. Highlight the limitations of the cost of loans indicator, as described in Section 4.2. Although the method described seems the most appropriate to calculate a cost of loans indicator that covers the full spectrum of maturities and sizes of loans possible, its practical implementation at the MS level is not feasible given the data currently available. (Section A of this appendix)
2. Propose an alternative, to be implemented on a temporarily basis, while the data gaps are closed. (Section B)

### A – Limitations with the data currently available

The cost of loans indicator, as described in Section 4.2., is the result of a weighed average calculation of MFI interest rates on the following seven types of loans (New Business):

- Other loans<sup>21</sup> with floating rate and up to 1 year initial rate fixation period
  - Size of the loan: Up to EUR 1 Million **(X1)**
  - Size of the loan: Over EUR 1 Million **(X2)**
- Other loans over 1 and up to 5 years initial rate fixation period
  - Size of the loan: Up to EUR 1 Million **(X3)**
  - Size of the loan: Over EUR 1 Million **(X4)**
- Other loans over 5 years initial rate fixation period
  - Size of the loan: Up to EUR 1 Million **(X5)**
  - Size of the loan: Over EUR 1 Million **(X6)**
- Bank Overdrafts **(X7)**

Given the data constraints for a significant proportion of MS, it is not feasible to calculate a cost of loans indicator at the MS level using the above rates.

The main issues preventing us from having a full data set comparable across all MS, are the following:

- For euro area MS:
  - Rates are not available for one or more of the seven rate categories (BE/CY/GR/LU/MT/PT)
- For Non-euro area MS:
  - Rates are not available for one or more of the seven rate categories (CZ/HU/LT/LV/RO/SE\*/UK\*) (\*: see following item)
  - Rates are only available for loans denominated in local currency (DK/SE/UK), not for loans denominated in EUR.
  - Comparability of rates across MS: Data has not been collected/has not been reported according to ECB regulation ECB/2001/18 (e.g. breakdown provided is different) (UK)
  - Loans with floating rates and up to 1 year initial rate fixation period account for a significant proportion of all new loans to non-financial corporations<sup>22</sup>. As a result, in

<sup>21</sup> “Other loans” are all loans that are not bank overdrafts.

<sup>22</sup> This is based on data available from those MS providing volume statistics (e.g. BG, CZ, DK, LT, HU,...)

some MS, the rates on loans with rate fixation periods over 1 year are based on business volumes that are very small<sup>23</sup>, raising the question of the representativeness of the data. (e.g. BG, DK)

Only for 13 out of the 27 MS the entire set of seven rates is available and can be considered as fully comparable from one MS to another. (AT, BG, DE, EE, ES, FI, FR, IE, IT, NL, PL, SI, SK)

### **B – Alternative proposal (method currently used)**

As an alternative, it is suggested to:

Use only the rates on loans with short terms fixation periods and on overdrafts instead of the 7 rates listed above:

- Other loans with floating rate and up to 1 year initial rate fixation period
  - Size of the loan: Up to EUR 1 Million (**X1**)
  - Size of the loan: Over EUR 1 Million (**X2**)
- Bank Overdrafts (**X7**)

The number of MS where the above 3 rates are available and can be considered as fully comparable across MS is 25 (all except the UK and LU)

For the remaining two MS, were X1, X2 or X7 are not available and/or have not been collected under ECB standards, we will proceed as follows:

MS	Rates missing / Not directly comparable	Proposed alternative
LU	X7	The euro area average.
UK	X1 / X2	For X1 and X2: Use the average between the following two rates as a proxy of the weighted average of X1 and X2: <ul style="list-style-type: none"> <li>- Rate on loans to NFC with floating rate.</li> <li>- Rate on loans to NFC with rate fixation period under 1 year.</li> </ul> Apply Interest Rate Parity (IRP) <sup>24</sup> theory to transform rates into EUR equivalent.

Weighting scheme:

For the weighting of the two interest rates on loans, data on volumes from Eurostat (only available for internal purposes, period: 01/2007 up to the latest available data) or from national central banks is used, depending on the better data availability. For bank overdrafts either information from national central banks or from a 2006 ECB publication are used.

<sup>23</sup> In other words, those rates could be influenced by a very small number of loans

<sup>24</sup> See footnote 23.

### Justification for the choice of X1, X2 and X7

- When we look at the pairwise correlations between the 7 variables, we can see that the first 6 (X1, X2,...,X6) are highly correlated between themselves, and that X7 is not correlated to any of the other 6 variables. Please refer to the table below with the pairwise correlations.
- The correlation analysis reveals two dimensions in the data<sup>25</sup>: one covering the rates on regular loans (X1, X2,...,X6) and the other one covering the rate on overdrafts (X7)
- Why do we choose X1 and X2 for the first dimension?
  - X1 and X2 are available for a much bigger number of MS than X3, X4, X5 and X6.
  - By using both X1 and X2 we cover both smaller and bigger size companies.
  - From a volume perspective, a significant proportion of the loans (across all maturities) are granted with floating rates or with initial rate fixation periods below 1 year.

It is clear that by removing X3, X4, X5 and X6 from the calculation, the resulting indicator can no longer be interpreted as weighted cost across all maturities and sizes, but has the merit of:

- 1 - Covering with reliable and almost complete set of data, most of the MS.
- 2 – Covering a significant proportion of the volume of loans.
- 3 – Including rates that are relevant for small size (X2) and bigger size companies (X1)

Table – Pairwise correlations between rates (for the rates we use a 3 month average: Mar/Apr/May-2008). *(In brackets: The number of observations)*

	X1	X2	X3	X4	X5	X6	X7
X1	1						
X2	0.9224 (21)	1					
X3	0.9632 (16)	0.9672 (16)	1				
X4	0.9078 (11)	0.9214 (11)	0.8937 (11)	1			
X5	0.9300 (13)	0.9058 (13)	0.9504 (13)	0.7970 (10)	1		
X6	0.9819 (10)	0.9696 (10)	0.9814 (10)	0.9130 (10)	0.9408 (10)	1	
X7	-0.0332 (20)	-0.0841 (20)	-0.0253 (16)	-0.0025 (11)	0.0646 (13)	0.0813 (10)	1

<sup>25</sup> Similar conclusions can be drawn when calculating the Cronbach reliability coefficient.

**APPENDIX 3 – Liability composition**

**Table 6 Liability Composition of Non-Financial Corporations' Balance Sheets (as a % of Total Liabilities) – year 2008**

	LOANS (A)	CORP. DEBT (B)	SHARES AND OTHER EQUITY				OTHER CATEGORIES				TOTAL (A+B+C+D)
			Subtotal (C)	Quoted shares	Unquoted Shares	Other	Subtotal (D)	Financial Derivatives	Insurance Tech- nical Reserves	Other Accounts Payable	
<b>EU27</b>	<b>35.21%</b>	<b>4.27%</b>	<b>46.57%</b>				<b>13.95%</b>				
<b>EURO AREA</b>	<b>35.61%</b>	<b>3.35%</b>	<b>45.90%</b>				<b>15.14%</b>				
<i>Belgium</i>	34.61%	2.93%	61.67%	6.92%	37.75%	16.99%	0.79%	0.00%	0.02%	0.78%	100.00%
<i>Bulgaria (2)</i>	23.71%	0.60%	57.54%	9.10%	36.76%	11.68%	18.15%	0.01%	0.00%	18.15%	100.00%
<i>Czech Rep. (1)</i>	19.80%	0.99%	47.81%	13.37%	22.11%	12.33%	31.40%	0.10%	0.00%	31.30%	100.00%
<i>Denmark</i>	42.52%	2.54%	47.78%	15.01%	28.40%	4.38%	7.15%	0.01%	0.00%	7.14%	100.00%
<i>Germany</i>	39.16%	3.38%	40.51%	10.01%	22.41%	8.08%	16.95%	0.00%	5.35%	11.60%	100.00%
<i>Estonia (2)</i>	31.03%	1.68%	53.26%	7.44%	45.82%	0.00%	14.03%	0.02%	0.00%	14.02%	100.00%
<i>Ireland</i>	47.42%	0.75%	35.73%	4.70%	31.03%	0.00%	16.11%	0.00%	0.00%	16.11%	100.00%
<i>Greece</i>	51.19%	10.86%	31.17%	18.57%	12.60%	0.00%	6.78%	0.00%	0.00%	6.78%	100.00%
<i>Spain</i>	39.81%	0.42%	42.47%	9.68%	19.65%	13.14%	17.30%	0.27%	0.00%	17.03%	100.00%
<i>France</i>	28.34%	5.43%	52.56%	14.84%	34.22%	3.50%	13.66%	0.70%	0.00%	12.96%	100.00%
<i>Italy</i>	36.09%	1.90%	39.98%	9.88%	22.12%	7.98%	22.04%	0.17%	3.30%	18.56%	100.00%
<i>Cyprus (3)</i>	35.21%	4.27%	46.57%	11.51%	25.76%	9.29%	13.95%				100.00%
<i>Latvia</i>	48.57%	0.08%	28.27%	6.99%	15.64%	5.64%	23.08%	0.00%	N/A	23.08%	100.00%
<i>Lithuania</i>	31.78%	0.10%	47.40%	4.27%	39.78%	3.36%	20.72%	0.04%	N/A	20.68%	100.00%
<i>Luxemb. (3)</i>	35.21%	4.27%	46.57%	11.51%	25.76%	9.29%	13.95%				100.00%
<i>Hungary</i>	29.42%	0.34%	58.89%	2.37%	11.45%	45.07%	11.35%	0.22%	0.00%	11.13%	100.00%
<i>Malta (3)</i>	35.21%	4.27%	46.57%	11.51%	25.76%	9.29%	13.95%				100.00%
<i>Netherlands</i>	37.67%	3.22%	45.45%	20.60%	24.48%	0.37%	13.65%	0.92%	0.00%	12.74%	100.00%
<i>Austria</i>	36.80%	6.16%	54.06%	7.80%	7.34%	38.92%	2.98%	0.00%	0.00%	2.98%	100.00%
<i>Poland</i>	24.51%	1.90%	46.38%	7.70%	13.54%	25.15%	27.21%	0.72%	0.00%	26.49%	100.00%
<i>Portugal</i>	32.96%	5.77%	45.14%	5.72%	22.99%	16.43%	16.13%	0.10%	0.35%	15.68%	100.00%
<i>Romania</i>	23.50%	18.59%	31.97%	6.75%	11.72%	13.49%	25.94%	0.00%	0.00%	25.94%	100.00%
<i>Slovenia</i>	38.24%	0.55%	41.20%	7.75%	11.25%	22.20%	20.01%	0.26%	0.00%	19.76%	100.00%
<i>Slovakia</i>	21.90%	5.17%	33.37%	8.25%	18.46%	6.66%	39.56%	0.30%	0.00%	39.26%	100.00%
<i>Finland</i>	38.55%	4.32%	45.80%	19.96%	22.58%	3.26%	11.33%	1.01%	0.00%	10.32%	100.00%
<i>Sweden</i>	33.22%	4.02%	51.34%	13.27%	30.80%	7.26%	11.41%	1.57%	0.82%	9.02%	100.00%
<b>UK</b>	<b>36.55%</b>	<b>10.34%</b>	<b>48.48%</b>	<b>11.98%</b>	<b>26.82%</b>	<b>9.67%</b>	<b>4.64%</b>	<b>N/A</b>	<b>N/A</b>	<b>4.64%</b>	<b>100.00%</b>

(1): data from 2006; (2): data from 2007; (3): Data non available. EU weighted average used

Due to rounding errors the subtotals (C) and (D) and the overall total can differ slightly from the sum of the addends.

Source: Own calculations from Annual Financial Accounts – Source of the Raw Data: Eurostat

**Table 7 Weights used for the calculation of the composite cost of capital indicator – year 2008**

	<b>LOANS (A)</b>	<b>CORP. DEBT (B)</b>	<b>SHARES AND OTHER EQUITY (C)</b>
<b>EU27</b>	40.9%	5.0%	54.1%
<b>EURO AREA</b>	42.0%	3.9%	54.1%
<i>be Belgium</i>	34.9%	2.9%	62.2%
<i>bg Bulgaria (3)</i>	29.0%	0.7%	70.3%
<i>cz Czech Republic (1)</i>	28.9%	1.4%	69.7%
<i>dk Denmark</i>	45.8%	2.7%	51.5%
<i>de Germany (including ex-GDR from 1991)</i>	47.2%	4.1%	48.8%
<i>ee Estonia (3)</i>	36.1%	2.0%	61.9%
<i>ie Ireland</i>	56.5%	0.9%	42.6%
<i>gr Greece</i>	54.9%	11.7%	33.4%
<i>es Spain</i>	48.1%	0.5%	51.4%
<i>fr France</i>	32.8%	6.3%	60.9%
<i>it Italy</i>	46.3%	2.4%	51.3%
<i>cy Cyprus (2)</i>	40.9%	5.0%	54.1%
<i>lv Latvia</i>	63.1%	0.1%	36.8%
<i>lt Lithuania</i>	40.1%	0.1%	59.8%
<i>lu Luxembourg (Grand-Duché) (2)</i>	40.9%	5.0%	54.1%
<i>hu Hungary</i>	33.2%	0.4%	66.4%
<i>mt Malta (2)</i>	40.9%	5.0%	54.1%
<i>nl Netherlands</i>	43.6%	3.7%	52.6%
<i>at Austria</i>	37.9%	6.3%	55.7%
<i>pl Poland</i>	33.7%	2.6%	63.7%
<i>pt Portugal</i>	39.3%	6.9%	53.8%
<i>ro Romania</i>	31.7%	25.1%	43.2%
<i>si Slovenia</i>	47.8%	0.7%	51.5%
<i>sk Slovakia</i>	36.2%	8.6%	55.2%
<i>fi Finland</i>	43.5%	4.9%	51.7%
<i>se Sweden</i>	37.5%	4.5%	58.0%
<i>uk United Kingdom</i>	38.3%	10.8%	50.8%

Only the shares of Loans (A), Corporate Debt (B), and Shares And Other Equity (C) of Table 6 above are taken into account. Therefore, the shares of Table 6 have to be rebased to the sum of A+B+C. Other Categories (D) are not taken into account.

**APPENDIX 4 – “Historical Approach” models**

<b>Model</b>	<b>Comments</b>
<b>1) Capital Asset Pricing Model (CAPM)</b>	<p>Under this model, the required rate of return is calculated as follows:  <math>K_{EL} = RFR + \text{Risk Premium}</math></p> <p>RFR: Risk Free Rate            Risk Premium = <math>(R_M - RFR)\beta_f</math>  <math>R_M - RFR</math> = is the “Market Premium” = Difference between the return of the entire market (<math>R_M</math>) and the RFR.</p> <p><math>\beta_f</math>=Beta for the firm. It measures how sensitive the return of a firm’s stock is compared to the market’s return (using historical data)  <math>\beta_f = 1</math> if the shares are as risky as the market  <math>\beta_f &gt; 1</math> if the shares are riskier than the market  <math>\beta_f &lt; 1</math> if the shares are less risky than the market</p> <p><u>Advantage:</u> Conceptually simple.</p> <p><u>Inconvenient:</u> The main issue is that the calculation of the Beta relies only on historical data. It does not use any forward looking information, such as earnings estimates.</p>
<b>2) Fama-French Three Factor Model</b>	<p>This models starts with the idea that small caps and value stocks (i.e. stocks with a high book value-to-price ratio) tend to outperform the market. So this model expands on the CAPM model (single factor model) by adding two additional factors to estimate the require rate of return: size and book value-to-price ratio.</p>



**APPENDIX 5 – “Implied Approach” models**

Model	Type of information required	Comments
<p><b>1) “Earnings Yield”</b> (Formula: <math>E_1/P_0</math>)</p>	<ul style="list-style-type: none"> <li>- Current Price of Stock (<math>P_0</math>)</li> <li>- Estimated Earnings for Next Period (<math>E_1</math>)</li> </ul>	<p>The Earnings Yield is the inverse of the widely used Price Earnings Ratio (PER). PER is used as a measure of how cheap/expensive a stock is. It is calculated as the ratio between Price and Earnings. It gives how much the market is ready to pay for each unit of earnings.</p> <p>The inverse of the PER (i.e. ratio Earnings / Price) would represents the implied return. If we consider that the Price today (<math>P_0</math>) reflects future estimated earnings, and <math>E_1</math> the estimated earnings for the next period, the ratio <math>E_1 / P_0</math> would estimate the return required by investors.</p> <p><u>Advantage:</u> Very simple approach.</p> <p><u>Inconvenient:</u> Earnings are not “hard numbers” (i.e. depending on how accounting standards are applied the earnings could be different). Using “consensus estimates” (average of individual estimates) from financial analysts could solve this issue. This model also assumes that the earnings will not change, and that they are not negative.</p>
<p><b>2) “Ohlson-Juettner” Model</b></p>	<ul style="list-style-type: none"> <li>- Current Price of Stock (<math>P_0</math>)</li> <li>- Estimated Earnings for forthcoming two periods (<math>E_1, E_2</math>)</li> <li>- Dividend per share estimates for the forthcoming period (<math>D_1</math>)</li> <li>- Estimated long terms economic growth rate (<math>\gamma</math>)</li> </ul>	<p>Under this model the cost of equity capital can be estimated using: Price of the shares (<math>P_0</math>), earnings per shares estimates for the forthcoming two periods (<math>E_1, E_2</math>), dividend per share estimates for the forthcoming period (<math>D_1</math>), and an estimation of the long terms economic growth rate (<math>\gamma</math>)</p> <p><u>Advantage:</u> Although the underlying assumptions need to be further analyzed, it looks more realistic than the “Inverse of the PER” model as it does not rely on the assumption that the earnings will not change. It relies mostly on information that can either be easily found (e.g. Price) or available in the market (earning estimates produced by financial analysts – IBES data).</p> <p><u>Inconvenient:</u> Earnings are not “hard numbers”. Depending on how accounting standards are applied the earnings could be different. Using “consensus’ estimates from financial analysts could solve this issue. Underlying assumptions of this model need to be further analyzed.</p>

Model	Type of information required	Comments
<b>3) Dividend Discount Model / Gordon Dividend Growth Model</b>	<ul style="list-style-type: none"> <li>- Current Price of Stock (P0)</li> <li>- Dividend per share estimates for the forthcoming period (D1)</li> <li>- Estimated dividend growth rate (g)</li> </ul>	<p>Under this model the current market price of a share should equal the present value of all future dividends discounted at the rate of return required by the investors (<math>K_{EL}</math>).</p> $P_0 = D_1 / (1 + K_{EL}) + D_2 / (1 + K_{EL})^2 + \dots$ <p><math>P_0</math> = current market price; <math>D_t</math> = dividend expected at the end of year t.</p> <p>If the investors expect a constant dividend annually, the value of <math>K_{EL} = D/P</math>.</p> <p>If the dividends are expected to grow at a rate of g %, then <math>K_{EL} = (D_1 / P_0) + g</math>    <math>D_1 = D_0 (1 + g)</math></p> <p><u>Advantage:</u> Very simple approach.</p> <p><u>Inconvenient:</u> Strong assumptions on dividend behavior (dividends are either constant or grow at a constant rate). It assumes that companies pay a dividend, which very often it is not the case (e.g. growth companies reinvesting all their earnings).</p>
<b>4) Three Stage Gordon Dividend Discount Model</b>	<ul style="list-style-type: none"> <li>- Current Price of Stock (P0)</li> <li>- Dividend per share estimates for the forthcoming period (D1)</li> <li>- Estimated dividend growth rates (g1, g2, g3)</li> </ul>	<p>This is the model used by ECB. It is a variation of the Gordon Dividend Growth Model. Instead of having a constant growth, it assumes three stages.</p> <p style="padding-left: 40px;">Stage 1: High Stable growth Stage 2: Declining growth Stage 3: Infinite Stable growth</p> <p><u>Advantage:</u> More realistic than “constant growth model”.</p> <p><u>Inconvenient:</u> Strong assumptions on dividend behavior (dividends are either constant or grow at a constant rate). It assumes that companies pay a dividend, which very often it is not the case (e.g. growth companies reinvesting all their earnings).</p>

## APPENDIX 6 – Proportion of each source of financing as a % of the total liabilities – Calculation method

- **DATA**
  - Source of Information: Eurostat
  - Data Category: Annual Financial Accounts – Balance Sheet
  - Selection Criteria:
    - Geographical breakdown: 27 individual MS
    - Sector: Non Financial Corporations (S11)
    - Balance sheet side: Liabilities (LIAB)
    - Frequency of data: Yearly
    - Indicators used (in brackets: ESA95 Codes):
      - Total liabilities (f\_lib)
      - Securities other than shares (f3)
      - Securities other than shares excluding financial derivatives (f33)
      - Financial derivatives (f34)
      - Loans (f4)
      - Shares other than equity (f5)
      - Shares and other equity, excluding mutual fund shares (f51)
      - Quoted shares (f511)
      - Unquoted shares (f512)
      - Other equity (f513)
      - Mutual Fund shares (f52)
      - Insurance Technical Reserves (f6)
      - Other accounts receivable (f7)
  
- **Calculation method to estimated the proportion of each source of financing for each Member State (using the ESA 95 codes)**
  - Proportion of LOANS :  $f4 / f\_lib$
  - Proportion of CORPORATE DEBT:  $f33 / f\_lib$
  - Proportion of SHARES AND OTHER EQUITY:  $f5 / f\_lib$ 
    - Proportion of QUOTED SHARES:  $f511 / f\_lib$
    - Proportion of UNQUOTED SHARES:  $f512 / f\_lib$
  - (Proportion of OTHER CATEGORIES:  $(f34 + f6 + f7) / f\_lib$ )<sup>26</sup>

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<sup>26</sup> Currently „other categories“ are not taken into account in the calculation of the cost of capital indicator.

## **APPENDIX 7 – Comparison between DG ECFIN’s Composite Financing Cost Indicators (CFCI) and the indicator presented in this report**

In 2008 the Directorate General for Economic and Financial Affairs (ECFIN) of the European Commission has published a composite indicator to measure the cost of capital.<sup>27</sup> The aim of ECFIN’s indicator is two-fold: First, ECFIN wanted an indicator representing the cost of external capital for the euro area. Second, it should be relatively quick and easy to update on a frequent basis, possibly every month. The differences between the cost of capital indicator presented in this report (CCI) and DG ECFIN’s cost of capital indicator (Composite Financing Cost Indicators, CFCI) are the following.

### General differences:

- DG ECFIN constructed two indicators: one for households and one for non-financial corporations. The CCI only covers non-financial corporations.
- The two CFCIs are based on monthly data and not on quarterly data as the CCI.
- The CFCI indicators are limited to the euro area. The CCI covers all EU Member States.

### Differences concerning loans:

For corporation bank loans the CFCI uses like the CCI 3 maturities. But the CFCI does not distinguish between the size of the loans as the CCI does (above or below 1 million). The CFCI excludes bank overdrafts and it uses the category “existing contracts (outstanding amounts)” as weights of loan categories whereas CCI only uses the category “new business”. This implies the exclusion of loans granted in years different from that considered.

### Differences concerning debt securities:

The CFCI uses the Economist corporate bond yield index (not country specific). The CCI calculates country specific indicators of debt securities costs (yield of corporate bonds) using a basis of AAA bonds and high yield bonds.

### Differences concerning equity:

The CFCI uses directly the dividend yield from the Eurostoxx50. This is easy to update and the overall development is analogous to the more complicated method applied by the ECB based on the three stage dividend discount model. As the CFCI indicator is based on the Eurostoxx50, it is not country specific and it only covers the euro area. The CCI however, is based on the stock market indices of all EU27 Member States and is therefore country specific.

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<sup>27</sup> Quarterly report on the euro area. 04/2008 published on 04 December, 2008. Brussels. ISSN: 1830-6403, p. 24.

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**Abstract**

The actions taken in the framework of the Lisbon Strategy and in the forthcoming EU2020 strategy are intended to improve the competitiveness of the EU's economy. To properly monitor the progress resulting from those actions, some indicators have been identified. One of those indicators is on the "cost of capital". The cost of capital is a key concept as it reflects the corporation's cost of investment funding. Thus, there is a need to develop an indicator to monitor how that cost changes over time.

This report outlines the methodology to develop a cost of capital indicator for EU non-financial corporations and presents the results for the 27 EU Member States. This composite indicator is based on quarterly data for three major sources of capital: loans, corporate bonds, listed equity, and unlisted equity.

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