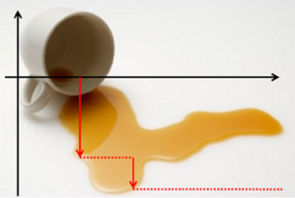
Projet de recherche DéCAF

Dépréciation comptable d'actifs financiers : problématique et résultats



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Projet de recherche DéCAF I

Problématique de la dépréciation comptable (ou de communication financière) des instruments financiers :

- analyse des principes normatifs,
- étude des pratiques,
- recommandations de mise en oeuvre ou de modélisation

Work supported by :

- Research Chair *Management de la modélisation* (ISFA - BNP Paribas Cardif) : `http://isfa.univ-lyon1.fr/m2a`
- DéCAF project with financial support of Institut Europlace de Finance Louis Bachelier (EIF) : `http://isfa.univ-lyon1.fr/decaf`

Projet de recherche DéCAF II

Projet réalisé par une équipe du laboratoire SAF composée de :

- Porteurs du projet :
  - Stéphane Loisel
  - Pierre Thérond
- Chercheurs associés :
  - Yahia Salhi
  - Alexis Bienvenüe
  - Nicolas Leboisne

Projet de recherche DéCAF III

Thèmes développés ou en cours de développement :

- impairment d'instruments de capitaux propres comptabilisés en AFS sous IAS 39
- expected credit losses d'investissements obligataires en IFRS 9
- modélisation et projection de PDD.

Contents

Sommaire

1.1. Motivation

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Joint work :

- Azzaz, Loisel & Thérond (2014) Some characteristics of an equity security next-year impairment, *Review of Quantitative Finance Accounting*
- Bienvenüe, Loisel & Thérond : working paper about multi-period developments

Framework :

- IFRS under use (at least til 2018) : IAS 39
- Top Management of Insurance groups has to incorporate financial reporting constraints and opportunities taking strategic decisions

1.1. Motivation

Table: Financial investments of some insurers in 2011

(Mds €)	Allianz	Axa	CNP Assurances	Generali
Balance Sheet Size	641.472	730.085	321.011	423.057
Total equity	47.253	50.932	13.217	18.120
AFS Assets	333.880	355.126	231.709	175.649
AFS (Funds and equity securities)	26.188	20.636	27.618	20.53

1.1. Motivation

Category	HTM	AFS		HFT
Eligible securities	Bonds	Bonds	Others (stock, funds, etc.)	Everything
Valuation	Amortized cost	Fair Value (through OCI)		Fair Value through P&L
Impairment principle	Event of proven loss	Event of proven loss	Significant or prolonged fall in the fair value	NA
Impairment trigger	Objective evidence resulting from an incurred event (cf. IAS 39 §59)		Two critera (non-cumulative : cf. IFRIC July 2009) : significant **or** prolonged loss in the FV	NA
Impairment Value	Difference between the amortized cost and the revised value of future flows discounted at the original interest rate	In **result** : difference between reported value (before impairment) and the FV		NA
Reversal of the impairment	Possible in specific cases	Possible in specific cases	**Impossible**	NA

1.1. Motivation

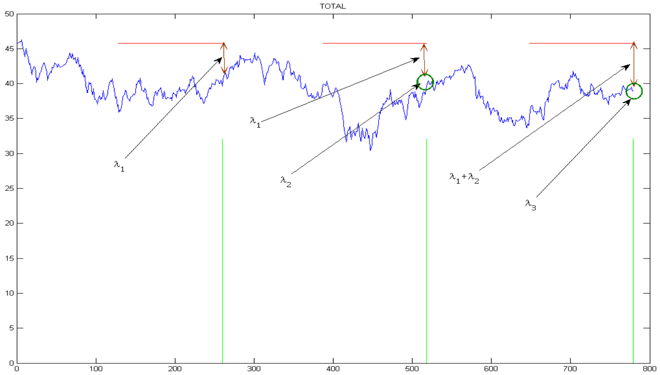

Figure: Illustration : Total Stock price, 2010-2012 ($\alpha = 0.3$, $s = 0.5y$)

1.1. Motivation

Table: Equity instruments impairment parameters used by some financial institutions (2011)

Group	Parameter *significant*	Paramètre *prolonged* (months)	Additional criterion
Allianz	0.2	9	
Axa	0.2	6	
BNP Paribas	0.5	24	0.3 | 12 months
CNP	0.5	36	0.3 | 6 months
Crédit Agricole	0.4	$\emptyset$	0.2 | 6 months
Generali	0.5	36	
Groupama	0.5	36	
ING	0.25	6	
Scor	0.5	24	0.3 | 12 months
Société Générale	0.5	24	

1.1. Motivation

Table: P&L and impairment losses resulting from equity securities classified as AFS 2011

(M€)	Allianz	Axa	CNP Assurances	Generali
Result	2804	4516	1141	1153
Impairment losses on AFS funds and equity securities	-2487	-860	-1600	-781

1.2.1. Notations

Main notations :

- $S = (S_t)_{t \geq 0}$ the stock price process
- t_a the acquisition date
- $\lambda = (\lambda_s)_{s \in \{[t_a]+1, [t_a]+2, \dots\}}$ the successive impairment losses (may be nil)
- $\Lambda(S, t_a, t) = \sum_{s=\lfloor t_a \rfloor + 1}^{t} \lambda(S, t_a, s)$ the sum of pas impairment losses
- $\Omega(S, t_a, t)$ the amount in OCI resulting from S at time t

At each reporting date t, the balance sheet equilibrium property leads to :

$$S_t - S_{t_a} = \Omega(S, t_a, t) + \Lambda_t.$$

1.2.2. Impairment triggers

A necessary condition for considering an impairment loss at time $t+1$ is :

$$\begin{cases} S_{t+1} \leq (1-\alpha) S_{t_a}, \text{or;} \\ \forall u \in \left]t+1-s, t+1\right], S_u \leq S_{t_a}, \end{cases}$$

where α and s are determined by the reporting entity. α represents the relative level of fall in fair value since the acquisition date corresponding to *significant* decline, s represents the minimum period before the financial reporting date that leads to consider that the decline is *prolonged*.

Moreover, there is an effective impairment loss if , in addition :

$$S_{t+1} \leq S_{t_a} - \Lambda_t.$$

Then, the impairment loss λ_{t+1} is given by :

$$\lambda_{t+1} = S_{t_a} - \Lambda_t - S_{t+1} = K_t - S_{t+1}.$$

1.2.3. Probability and amount of impairment losses

Let us denote J_{t+1} the probability of an effective impairment loss at reporting date $t+1$:

$$J_{t+1} = (S_{t+1} \leq (1-\alpha)S_{t_a}, S_{t+1} \leq K_t) \bigcup \left(\max_{t+1-s \leq u \leq t+1} S_u \leq S_{t_a}, S_{t+1} \leq K_t \right),$$

By introducing $m_t = \min((1-\alpha)S_{t_a}, K_t)$, we have :

$$\mathbb{P}_t\left[J_{t+1}\right] = \mathbb{P}_t\left[S_{t+1} \leq m_t\right] + \mathbb{P}_t\left[\max_{t+1-s \leq u \leq t+1} S_u \leq S_{t_a}, S_{t+1} \leq K_t\right] - \mathbb{P}_t\left[\max_{t+1-s \leq u \leq t+1} S_u \leq S_{t_a}, S_{t+1} \leq m_t\right].$$

1.2.3. Probability and amount of impairment losses

Similarly, the impairment loss at time $t+1$ is given by :

$$\lambda_{t+1} = (K_t - S_{t+1})^+ \mathbf{1}\left\{\max_{t+1-s\leq u\leq t+1} S_u \leq S_{t_a} \cup S_{t+1} \leq (1-\alpha)S_{t_a}\right\},$$

with $K_t = S_{t_a} - \Lambda_t$.
This expression can be expressed as a sum of three terms :

$$\lambda_{t+1} = X_{t+1} + Y_{t+1} - Z_{t+1},$$

avec

- $X_{t+1} = (K_t - S_{t+1})^+ \mathbf{1}\left\{\max_{t+1-s\leq u\leq t+1} S_u \leq S_{t_a}\right\}$,
- $Y_{t+1} = (K_t - S_{t+1})^+ \mathbf{1}\left\{S_{t+1} \leq (1-\alpha)S_{t_a}\right\}$, and
- $Z_{t+1} = (K_t - S_{t+1})^+ \mathbf{1}\left\{\max_{t+1-s\leq u\leq t+1} S_u \leq S_{t_a}\right\} \mathbf{1}\left\{S_{t+1} \leq (1-\alpha)S_{t_a}\right\}$.

1.2.3. Probability and amount of impairment losses

The three terms could be seen as payoffs of options of S :

- the first one : a *rear-end up-and-out* put option (cf. Hui (1997))
- the second one : a traditional European put option,
- the third one corresponding to the sum of a *rear-end up-and-out* put option and a compensation amount.

The main objective of our work is to exhibit some characteristics of future impairment losses (with a one-year horizon) for risk management purposes (prediction, risk measures and decisions), the following results are obtained :

- using option theory ;
- under the real-world probability measure.

1.3. Main results

Considering a Black & Scholes framework (i.e. a geometric brownian motion), we obtain closed formulas for (one-year horizon) :

- the probability that some impairment occurs,
- the expectation of impairment losses,
- the cumulative distribution function (c.d.f.) of impairment losses.

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1.3. Main results

Theorem (Impairment probability)

The probability to recognize an impairment at future time $t+1$, given the information $\mathcal{F}_t$ at time t, is given by

$$\mathbb{P}_t\left[J_{t+1}\right] = \left(\frac{S_{t_a}}{S_t}\right)^{k_1-1}\left[\Psi_\rho\left(C, D(K_t)\right) - \Psi_\rho\left(C, D(m_t)\right)\right] + \Phi\left(-A(K_t)\right) + \Psi_\rho\left(B, A(K_t)\right) - \Psi_\rho\left(B, A(m_t)\right),$$

where Φ denotes the c.d.f. of a standard normal distribution, and Ψ_ρ is the bivariate normal distribution function : for all x, y, $\Psi_\rho(x,y) = \mathbb{P}_t\left[X \leq x, Y \leq y\right]$ where (X, Y) is a Gaussian vector with standard marginals and correlation ρ.

1.3. Main results

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Other terms, for $x \in \{m_t, K_t\}$:

- $A(x) = \frac{\ln(S_t/x)+\mu}{\sigma} - \frac{\sigma}{2}$, $A'(x) = A(x) + \sigma$,
- $B = \frac{\ln(S_t/S_{t_a})+\mu(1-s)}{\sigma\sqrt{(1-s)}} - \frac{\sigma\sqrt{(1-s)}}{2}$, $B' = B + \sigma\sqrt{(1-s)}$,
- $C = \frac{\ln(S_{t_a}/S_t)+\mu(1-s)}{\sigma\sqrt{(1-s)}} - \frac{\sigma\sqrt{(1-s)}}{2}$, $C' = C + \sigma\sqrt{(1-s)}$,
- $D(x) = \frac{\ln(S_{t_a}^2/S_t x)+\mu}{\sigma} - \frac{\sigma}{2}$, $D'(x) = D(x) + \sigma$,
- $k_1 = \frac{2\mu}{\sigma^2}$,

1.3. Main results

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Theorem (Impairment loss expectation)

The expectation of next-year impairment, given the information $\mathcal{F}_t$ at time t, is given by

$$\begin{aligned}
\mathbb{E}_t\left[\lambda_{t+1}\right] = & \; S_t e^{\mu}\left(\frac{S_{t_a}}{S_t}\right)^{k_1-1}\left[\Psi_{-\rho}\left(C',-D'(K_t)\right)-\Psi_{-\rho}\left(C',-D'(m_t)\right)\right] \\
& + S_t e^{\mu}\left[\Psi_{\rho}\left(-B',-A'(m_t)\right)-\Phi\left(-A'(m_t)\right)-\Psi_{\rho}\left(-B',-A'(K_t)\right)\right] \\
& + K_t\left[\Psi_{\rho}\left(-B,-A(K_t)\right)+\Phi\left(-A(m_t)\right)-\Psi_{\rho}\left(-B,-A(m_t)\right)\right] \\
& + (K_t-m_t)\left(\frac{S_{t_a}}{S_t}\right)^{k_1-1}\left[\Phi\left(-D(m_t)\right)-\Psi_{\rho}\left(-C,-D(m_t)\right)\right] \\
& - K_t\left(\frac{S_{t_a}}{S_t}\right)^{k_1-1}\Psi_{-\rho}\left(C,-D(K_t)\right)+m_t\left(\frac{S_{t_a}}{S_t}\right)^{k_1-1}\Psi_{-\rho}\left(C,-D(m_t)\right),
\end{aligned}$$

where all constant numbers, variables and parameters are defined in Theorem 1.

1.3. Main results

Two sensitivity results :

Theorem (Probability sensitivity)

The probability is decreasing according to α, μ, Λ and s.
Moreover, the probability is convex according to α, μ, μ and s.

Theorem (Expectation sensitivity)

The expected impairment loss is decreasing according to α, μ, Λ and s, non-decreasing with σ. Moreover, it is convex according to α, μ, σ and Λ, and concave with s.

1.3. Main results

Theorem (Cumulative distribution function of impairment loss)

The cumulative distribution function of the next-year impairment loss, given the information $\mathcal{F}_t$ available at time t, is given by :

$$\mathbb{P}_t\left[\lambda_{t+1} \leq l\right] = \begin{cases} (1-\mathbb{P}_t\left[J_{t+1}\right]) + \Phi\left(A(K_t-l)\right) - \Phi\left(A(K_t)\right) & \\ + \left(\frac{S_{t_a}}{S_t}\right)^{k_1-1}\left[\Psi_\rho\left(C, D(K_t)\right) - \Psi_\rho\left(C, D(K_t-l)\right)\right] & \\ +\Psi_\rho\left(B, A(K_t)\right) - \Psi_\rho\left(B, A(K_t-l)\right) & , 0 \leq l \leq K_t - m_t, \\ \Phi\left(A(K_t-l)\right) & , K_t - m_t < l \leq K_t, \end{cases} \quad (1)$$

with the same notations and variables as in 1.

1.4. Illustrations

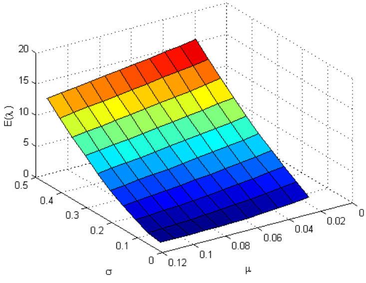


Figure: Average next-year impairment as a function of μ and σ (left), and of α and Λ (right).

1.4. Illustrations

Table: One-year expected loss for TOTAL according to past impairment losses

Total. $S_{t_a} = 45.795$

S_t	Λ	$\mathbb{P}_t[J_{t+1}]$	$\mathbb{E}_t[\lambda_{t+1}]$	$VaR(80\%)$	$VaR(95\%)$	$VaR(99.5\%)$
38.42	2.28975	0.5509	4.0699	10.7697	16.2236	21.402
	4.5795	0.5075	3.3007	8.4799	13.9338	19.1123
	22.8975	0.0078	0.0124	0	0	0.7943
	34.34625	0	0	0	0	0

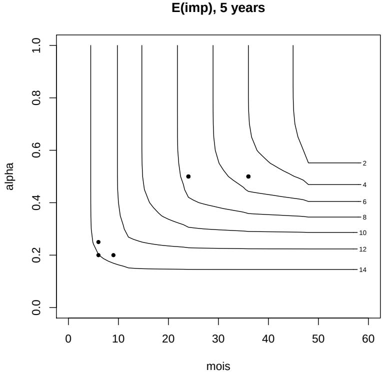
1.4. Illustrations

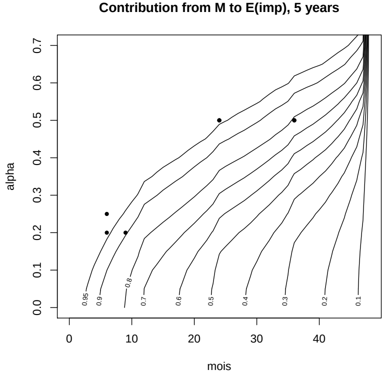
Table: Impact of impairment parameters (Axa et Generali) for five stocks

	Axa		Generali	
	$\mathbb{P}_t\left[J_{t+1}\right]$	$\mathbb{E}_t\left[\lambda_{t+1} \mid J_{t+1}\right]$	$\mathbb{P}_t\left[J_{t+1}\right]$	$\mathbb{E}_t\left[\lambda_{t+1} \mid J_{t+1}\right]$
BNP Paribas	0.3331	21.3545	0.0698	33.8002
Bouygues	0.2762	10.3336	0.011	20.3283
Carrefour	0.2851	8.7095	0.0162	16.4673
Pernod Ricard	0.2374	13.1027	0.00076	32.1938
Total	0.2365	9.7935	0.00069	24.2181

1.5. A glimpse inside the multi-period analysis

Work in progress with A. Bienvenüe.





Sommaire

2.1. Motivation

Presentation based on the joint work : Y. Salhi & P.-E. Thérond (2014) Alarm System for Credit Losses Impairment under IFRS 9, *Working paper ISFA*.

Framework

- Post Financial crisis IFRS standards
- *IFRS 9 : Financial Instruments* published by IASB on July 24, 2014
- Since equity securities have to be classified as Fair Value through PL, impairment losses stand for financial instruments which are eligible to amortized cost (or Fair Value through OCI)
- Moving from an *incurred* approach toward an *expected* one
- New rules inspired by loan pricing and risk management : what about non-banking financial institutions (e.g. insurers with bonds) ?

2.1. Motivation

Table: Figures from consolidated financial reports 2013. Debt instruments measured at fair value through other comprehensive incomes (FVOCI), at amortized cost and at fair value through profit or loss (FVPL) are reported. The bottom panel depicts the percentage of debt instruments over the total financial investments detained by the considered companies.

	Allianz	**Axa**	**CNP Assurances**	**Generali**
Total financial investments	**411.02**	**450.04**	**339.56**	**342.04**
Debt instruments				
FVOCI	359.73	319.62	209.52	212.679
Amortized Cost	4.65	6.52	0.60	59.003
FVPL	2.37	34.24	30.32	8.691
Total	**366.74**	**360.37**	**240.44**	**280.37**
	89%	80%	71%	82%

2.2. Credit Losses Impairment

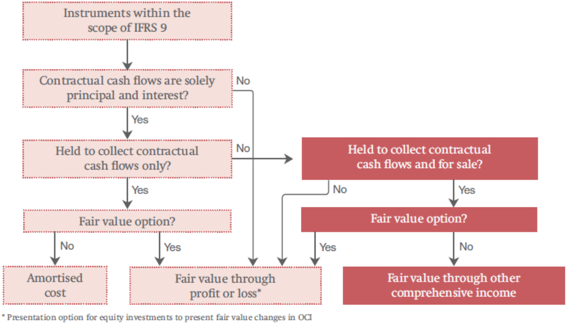


Figure: Classification & Measurement of financial assets

2.2. Credit Losses Impairment

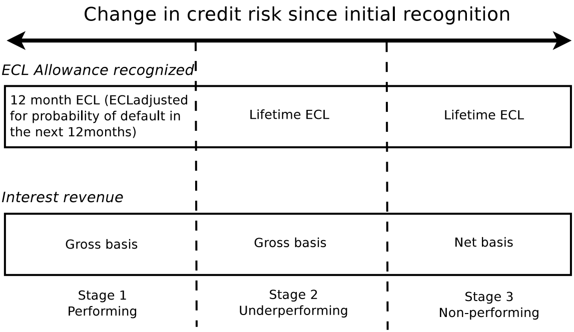


Figure: Overview of the general impairment model

2.2. Credit Losses Impairment I

To assess credit risk, the entity should consider *the likelihood of not collecting some or all of the contractual cash-flows over the remaining maturity of the financial instrument*, i.e. to assess the evolution of the probability of default (and not of the loss-given default for example).

The standard did not impose a particular method for this assessment but it included the two following operational simplifications :

- For financial instruments with 'low-credit risk' at the reporting date, the entity should continue to recognize 12-month ECL ;
- there is a rebuttable presumption of significant increase in credit risk when contractual payments are more than 30 days past due.

2.2. Credit Losses Impairment II

In practice, most credit risk watchers rely on ratings released by major agencies, e.g. Moody's, Standard & Poors and Fitch among others. There have been strong criticism about the accuracy of ratings, for example :

- lack of timeliness (cf. Cheng and Neamtiu (2009) and Bolton et al. (2012))
- too slowly downgrading (cf. Morgenson (2008))
- unability to predict some high-profile bankruptcies (cf. Buchanan (2009))

2.3. Credit Risk Monitoring

In order to assess a significant increase in credit risk, we propose a monitoring procedure based on implied default intensities of CDS prices.

It consists in modelling CDS prices and an alarm system based on quickest detection procedure (cf. Poor and Hadjiliadis (2009)).

2.3.1. Modelling I

Letting τ be the random time of the default event, the present value of the CDS fixed leg, denoted $\text{FIL}(T_0, [\mathbf{T}], T, S_0)$, is given by

$$\text{FIL}(T_0, [\mathbf{T}], T, S_0) = S_0 \sum_{j=0}^{n} B(T_0, T_i)\alpha_j \tau > T_j, \tag{2}$$

where $B(t, T)$ is the price at time t of a default-free zero-coupon bond maturing at T, i.e. $B(t, T) = \exp\left(-\int_t^T r_s ds\right)$ and r_s is the risk-free interest rate.

2.3.1. Modelling II

Similarly, the present value of the floating leg $\text{FLL}(T_0, [\mathbf{T}], T, L)$, that is the payment of the protection seller contingent upon default, equals

$$\text{FLL}(T_0, [\mathbf{T}], T, L) = L_{\text{GD}} \sum_{i=0}^{n} B(T_0, T_j)\tau \in [T_{j-1}, T_j], \qquad (3)$$

where L_{GD} is the loss given default being the fraction of loss over the all exposure upon the occurrence of a credit event of the reference company.

2.3.1. Modelling III

We denote by $\text{CDS}(T_0, [\mathbf{T}], T, S_t, L_{\text{GD}})$ the price at time T_0 of the above CDS. The pricing mechanism for this product relies on the risk-neutral probability measure $\mathbb{Q}$, the assumptions on interest-rate dynamics and the default time τ. Accordingly, the price is given as follows

$$[ll]\text{CDS}(T_0, [\mathbf{T}], T, S_t, L_{\text{GD}}) = \quad \mathbb{E}\left[S_0 \sum_{j=0}^{n} B(T_0, T_j)\alpha_j \tau > T_j\right] \\ -\mathbb{E}\left[L_{\text{GD}} \sum_{j=0}^{n} B(T_0, T_j)\tau \in [T_{j-1}, T_j]\right],$$

where $\mathbb{E}$ denotes the risk neutral expectation (under probability measure $\mathbb{Q}$). For a given maturity, the market quote convention consists in the

2.3.1. Modelling IV

rate S_0 being set so that the fixed and floating legs match at inception. Precisely, the price of the CDS is obtained as the fair rate S_t such that

$$\mathrm{CDS}(T_0, [\mathbf{T}], T, S_0, L_{\mathrm{GD}}) = 0,$$

which yields to the following formulation of the premium

$$S_0 = L_{\mathrm{GD}} \frac{\sum_{j=0}^{n} B(T_0, T_j)\mathbb{E}\left[\tau \in [T_{j-1}, T_j]\right]}{\sum_{j=0}^{n} B(T_0, T_j)\alpha_j \mathbb{E}\left[\tau > T_j\right]}. \tag{4}$$

Note that the two expectations in the above equation can be expressed using the risk-neutral probability $\mathbb{Q}$ as follows :

$$\mathbb{E}\left[\tau \in [T_{j-1}, T_j]\right] = \mathbb{Q}(T_{j-1} \leq \tau \leq T_j) \quad \text{and} \quad \mathbb{E}\left[\tau > T_j\right] = \mathbb{Q}(\tau \geq T_j).$$

2.3.2. Market-Implied Default Intensities

The real-world DI are estimated from statistics on average cumulative default rates published by Moody's between 1970 and 2003. The implied DI are estimated from market prices of the CDS in the US market.

Table: Average real world and market-implied default intensities based on 5-year CDS

Rating	Actual DI	Implied DI
Aaa	0.04%	0.67%
Aa	0.06%	0.78%
A	0.13%	1.28%
Baa	0.47%	2.38%
Ba	2.40%	5.07%
B	7.49%	9.02%
Below B	16.90%	21.30%

2.3.3. Quickest detection problem I

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We assume that the time varying intensity λ_t obeys to the following dynamics

$$\log \lambda_t = \underline{\mu} + \sigma \epsilon_t, \tag{5}$$

where, ϵ_t is a a zero-mean homoscedastic white noise and $\underline{\mu}$ and σ are some constant parameters. The trend $\underline{\mu}$ is assumed to be deterministic and known. With credit quality deterioration in mind, the intensity λ_t (in logarithmic scale) may change its drift $\underline{\mu}$ in the future at an unknown time θ referred to, henceforth, as a change-point. We assume that the change-point θ is fully inaccessible knowing the pattern of λ_t. It can be either ∞ (in case of absence of change) or any value in the positive integers.

2.3.3. Quickest detection problem II

After the occurrence time θ the λ_t's evolve as follows :

$$\log \lambda_t = \overline{\mu} + \sigma \epsilon_t, \tag{6}$$

where $\overline{\mu}$ is the new drift, which is assumed to be deterministic and known. The quickest detection objective imposes that t_d^c must be as close as possible to θ. Meanwhile, we balance the latter with a desire to minimize false alarms.
For this detection strategy, it is shown that the cumulative sums (cusum for short) is optimal.

2.3.3. Quickest detection problem III

More formally, if one fix a given false alarm to π, which stands for the time until a false alarm, the stopping time $t_d^c = \inf\{t \geq 0; V_t \geq m\}$ is optimal for triggering an alarm. Here, V_t is the process given by

$$V_t = \max_{1 \leq s \leq t} \left(\prod_{k=s}^{t} L(\log \lambda_k) \right), \quad S_0 = 0,$$

where $x \to L(x)$ is the likelihood ratio function. In view of our model the likelihood function $L(x)$ is given as follows

$$L(x) = \frac{\overline{\mu} - \underline{\mu}}{\sigma} \left(x - \frac{\overline{\mu} - \underline{\mu}}{2\sigma} \right).$$

2.3.3. Quickest detection problem IV

- The log-likelihood process L works as a measure of the adequacy of the observation with the underlying model in 5.
- The process V can be interpreted as a sequential cumulative log-likelihood. The latter is :
  - equal to 0 when the incoming information of the log-intensity does not suggest any deviation from the model in (5)
  - greater than 0, we can interpret this as a deviation from the model in (5). This means that the 'real' model stands in between (5) and (6).
- In order to declare that the intensity is evolving with respect to the model in (6) one needs a constraint in order to characterize the barrier m. This is typically achieved by imposing that the optimal time to raise a false alarm when no change occurs should be postponed as long as possible.

2.4.1. Educational example : AIG I

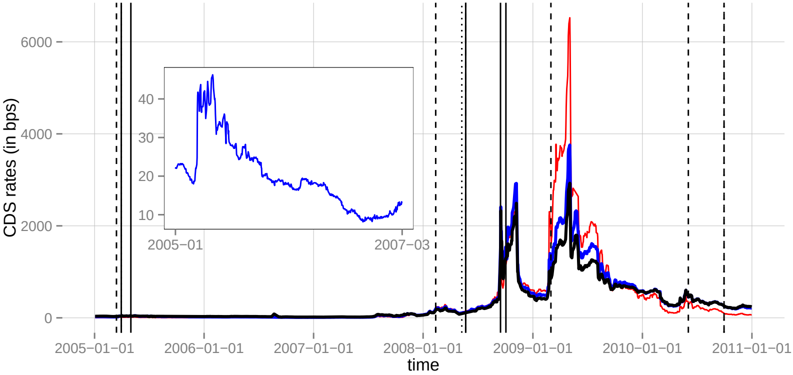


Figure: CDS spreads between January 1st, 2005 and December 31st, 2010 on AIG for different maturities : 1-year (red), 5-year (blue) and 10-year (black).

2.4.1. Educational example : AIG II

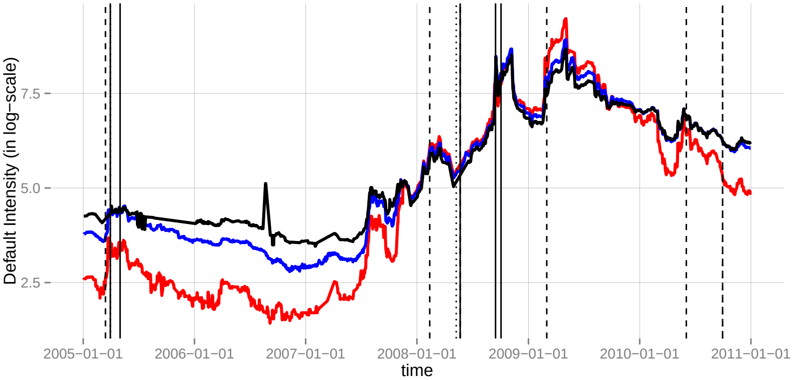


Figure: Time-series plot of AIG's market implied intensity process for different CDS maturities : 1-year (red), 5-year (blue) and 10-year (black)

2.4.1. Educational example : AIG III

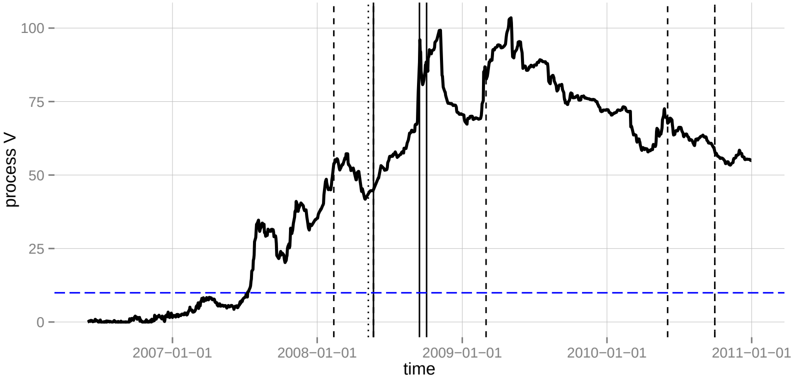


Figure: The evolution of the process V since the initial recognition in September 1, 2006.

2.4.2. Other illustrations

Table: The grade change column corresponds to the time the entity's grade witnessed the main downgrade during the period of interest.

	Main Change	Alarm
Industrials		
Boeing co.	3/15/06 (A2)	—
Siemens		—
Alstom	5/7/08 (Baa1)	—
Technology		
Google Inc.	7/5/10 (Aa2)	—
Cap Gemini	not rated	—
Alcatel-Lucent	11/7/07 (Ba3)	—
Consumer Services		
Pearson	12/2/98 (Baa1)	—
Carrefour	3/23/11 (Baa1)	8/9/11
Marks & Spencer	7/13/04 (Baa2)	—
Utilities		
Iberdrola	6/15/12 (Baa1)	9/30/11
SUEZ	8/18/08 (Aa3)	—
Healthcare		
Sanofi	2/18/11 (A2)	3/7/08
Pfizer inc.	3/11/09 (Aa2)	—

	Grade Change	Alarm
Financials		
HSBC	3/9/09 (C+)	1/21/08
Allianz	8/26/04 (Aa3)	3/17/08
UBS	7/4/08 (B-)	7/27/07
AXA	3/19/03 (A2)	—
Dexia	10/01/08 (C-)	7/20/07
Merill Lynch	not rated	9/17/08
Con. Goods		
Nestlé	8/15/07 (Aa1)	12/4/07
Coca Cola co.	8/21/92 (Aa3)	—
Procter & Gamble	10/19/01 (Aa3)	—
L'Oréal	not rated	—
Energy		
Total	2/2/11 (Aa1)	11/8/07
Schlumberger	9/22/03 (A1)	—
Repsol	5/16/05 (Baa1)	—
Basic Materials		
Arcelor	11/6/12 (Ba1)	—
Solvay	9/5/11 (Baa1)	—

2.4.3. Overview of the procedure

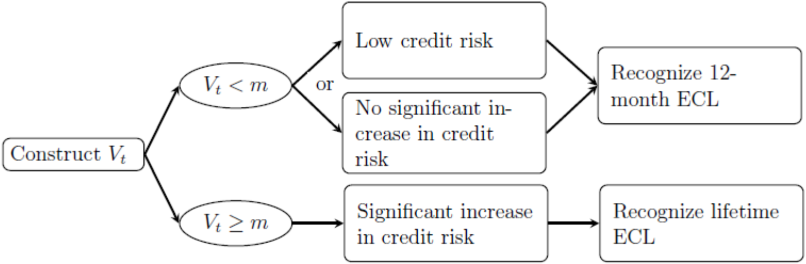
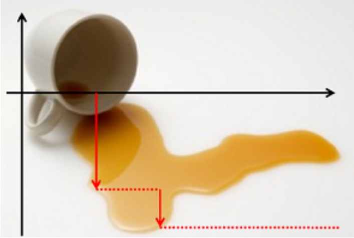


Figure: Summary of the main proposals. The time t refers to the current reporting date.

This approach should lead to further examination of bond issuers for which alarm sounded. The effective impairment should rely on closer investigation of their financial position, e.g. financial analyses and non-quantitative information.

Sommaire

DéCAF - What else ?



Work in progress :

- portfolio assessment of expected credit losses ;
- multi-period framework for equity securities at FVOCI (fol. of Azzaz et al. (2014))
- other stock price models : regime-switching, Levy, etc.
- projection de PDD

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