Il termometro dei mercati finanziari (26 Luglio 2019)

a cura di Emilio Barucci e Daniele Marazzina

28/07/2019 11:09

L'iniziativa di Finriskalert.it "Il termometro dei mercati finanziari" vuole presentare un indicatore settimanale sul grado di turbolenza/tensione dei mercati finanziari, con particolare attenzione all'Italia.

Il termometro dei mercati finanziari						
26-Jul-19	Legenda					
Valutazione complessiva		Calma	↑	miglioramento		
			↔	stabile		
		Tensione	↓	peggioramento		
Mercati italiani	26-Jul		19-Jul	12-Jul	5-Jul	28-Jun
Rendimento borsa italiana	0.906963	↑	-2.44	0.90	3.54	-0.72
Volatilità implicita borsa italiana	16.32	↑	16.67	15.14	14.88	16.29
Future borsa italiana	21820	↑	21580	22115	21945	21155
CDS principali banche 10Ysub	422.26	↑	438.13	449.05	455.91	473.95
Tasso di interesse ITA 2Y	-0.01	↑	0.04	0.07	0.10	0.22
Spread ITA 10Y/2Y	1.58	↔	1.57	1.67	1.65	1.87
Mercati europei	26-Jul		19-Jul	12-Jul	5-Jul	28-Jun
Rendimento borsa europea	1.27	↑	-0.50	-0.86	1.56	0.20
Volatilità implicita borsa europea	12.60	↔	12.70	12.13	11.93	12.83
Rendimento borsa ITA/Europa	-0.37	↑	-1.94	1.76	1.97	-0.91
Spread ITA/GER	1.95	↔	1.93	1.98	2.11	2.42
Spread EU/GER	0.68	↔	0.67	0.73	0.71	0.80
Politica monetaria, cambi e altro	26-Jul		19-Jul	12-Jul	5-Jul	28-Jun
Euro/Dollaro	1.113	↔	1.122	1.125	1.122	1.139
Spread US/GER 10Y	2.458	↑	2.372	2.35	2.40	2.33
Euribor 6M	-0.368	↑	-0.353	-0.342	-0.338	-0.313
Prezzo Oro	1419	↔	1429	1408	1395	1412
Spread 10Y/2Y Euro Swap Curve	0.50	↑	0.56	0.63	0.52	0.57

Significato degli indicatori

- Rendimento borsa italiana: rendimento settimanale dell'indice della borsa italiana FTSEMIB;
- Volatilità implicita borsa italiana: volatilità implicita calcolata considerando le opzioni at-the-money sul FTSEMIB a 3 mesi;
- Future borsa italiana: valore del future sul FTSEMIB;
- CDS principali banche 10Ysub: CDS medio delle obbligazioni subordinate a 10 anni delle principali banche italiane (Unicredit, Intesa San Paolo, MPS, Banco BPM);
- Tasso di interesse ITA 2Y: tasso di interesse costruito sulla curva dei BTP con scadenza a due anni;
- Spread ITA 10Y/2Y : differenza del tasso di interesse dei BTP a 10 anni e a 2 anni;
- Rendimento borsa europea: rendimento settimanale dell'indice delle borse europee Eurostoxx;
- Volatilità implicita borsa europea: volatilità implicita calcolata sulle opzioni at-the-money sull'indice Eurostoxx a scadenza 3 mesi;
- Rendimento borsa ITA/Europa: differenza tra il rendimento settimanale della borsa italiana e quello delle borse europee, calcolato sugli indici FTSEMIB e Eurostoxx;
- Spread ITA/GER: differenza tra i tassi di interesse italiani e tedeschi a 10 anni;
- Spread EU/GER: differenza media tra i tassi di interesse dei principali paesi europei (Francia, Belgio, Spagna, Italia, Olanda) e quelli tedeschi a 10 anni;
- Euro/dollaro: tasso di cambio euro/dollaro;
- Spread US/GER 10Y: spread tra i tassi di interesse degli Stati Uniti e quelli tedeschi con scadenza 10 anni;
- Prezzo Oro: quotazione dell'oro (in USD)
- Spread 10Y/2Y Euro Swap Curve: differenza del tasso della curva EURO ZONE IRS 3M a 10Y e 2Y;
- Euribor 6M: tasso euribor a 6 mesi.

I colori sono assegnati in un'ottica VaR: se il valore riportato è superiore (inferiore) al quantile al 15%, il colore utilizzato è l'arancione. Se il valore riportato è superiore (inferiore) al quantile al 5% il colore utilizzato è il rosso. La banda (verso l'alto o verso il basso) viene selezionata, a seconda dell'indicatore, nella direzione dell'instabilità del mercato. I quantili vengono ricostruiti prendendo la serie storica di un anno di osservazioni: ad esempio, un valore in una casella rossa significa che appartiene al 5% dei valori meno positivi riscontrati nell'ultimo anno. Per le prime tre voci della sezione "Politica Monetaria", le bande per definire il colore sono simmetriche (valori in positivo e in negativo). I dati riportati provengono dal database Thomson Reuters. Infine, la tendenza mostra la dinamica in atto e viene rappresentata dalle frecce: ↑, ↓, ↔ indicano rispettivamente miglioramento, peggioramento, stabilità rispetto alla rilevazione precedente.

Il termometro dei mercati finanziari (19 Luglio 2019)

a cura di Emilio Barucci e Daniele Marazzina

20/07/2019 09:24

L'iniziativa di Finriskalert.it "Il termometro dei mercati finanziari" vuole presentare un indicatore settimanale sul grado di turbolenza/tensione dei mercati finanziari, con particolare attenzione all'Italia.

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Il termometro dei mercati finanziari							
19-lug-19	Legenda						
Valutazione complessiva		Calma		↑	miglioramento		
				↔	stabile		
		Tensione		↓	peggioramento		
Mercati italiani	19-lug		12-lug	05-lug	28-giu	21-giu	
Rendimento borsa italiana	-2.44	↓	0.90	3.54	-0.72	3.77	
Volatilità implicita borsa italiana	16.67	↓	15.14	14.88	16.29	16.13	
Future borsa italiana	21580	↓	22115	21945	21155	21230	
CDS principali banche 10Ysub	443.39	↑	449.05	455.91	473.95	490.41	
Tasso di interesse ITA 2Y	0.04	↑	0.07	0.10	0.22	0.28	
Spread ITA 10Y/2Y	1.57	↑	1.67	1.65	1.87	1.88	
Mercati europei	19-lug		12-lug	05-lug	28-giu	21-giu	
Rendimento borsa europea	-0.50	↑	-0.86	1.56	0.20	2.60	
Volatilità implicita borsa europea	12.82	↓	12.13	11.93	12.83	12.78	
Rendimento borsa ITA/Europa	-1.94	↓	1.76	1.97	-0.91	1.17	
Spread ITA/GER	1.93	↔	1.98	2.11	2.42	2.44	
Spread EU/GER	0.67	↑	0.73	0.71	0.80	0.82	
Politica monetaria, cambi e altro	19-lug		12-lug	05-lug	28-giu	21-giu	
Euro/Dollaro	1.122	↔	1.125	1.122	1.139	1.132	
Spread US/GER 10Y	2.372	↔	2.35	2.40	2.33	2.35	
Euribor 6M	-0.353	↑	-0.342	-0.338	-0.313	-0.303	
Prezzo Oro	1429	↓	1408	1395	1412	1393	
Spread 10Y/2Y Euro Swap Curve	0.56	↑	0.63	0.52	0.57	0.60	

Significato degli indicatori

- Rendimento borsa italiana: rendimento settimanale dell'indice della borsa italiana FTSEMIB;
- Volatilità implicita borsa italiana: volatilità implicita calcolata considerando le opzioni at-the-money sul FTSEMIB a 3 mesi;
- Future borsa italiana: valore del future sul FTSEMIB;
- CDS principali banche 10Ysub: CDS medio delle obbligazioni subordinate a 10 anni delle principali banche italiane (Unicredit, Intesa San Paolo, MPS, Banco BPM);
- Tasso di interesse ITA 2Y: tasso di interesse costruito sulla curva dei BTP con scadenza a due anni;
- Spread ITA 10Y/2Y : differenza del tasso di interesse dei BTP a 10 anni e a 2 anni;
- Rendimento borsa europea: rendimento settimanale dell'indice delle borse europee Eurostoxx;
- Volatilità implicita borsa europea: volatilità implicita calcolata sulle opzioni at-the-money sull'indice Eurostoxx a scadenza 3 mesi;
- Rendimento borsa ITA/Europa: differenza tra il rendimento settimanale della borsa italiana e quello delle borse europee, calcolato sugli indici FTSEMIB e Eurostoxx;
- Spread ITA/GER: differenza tra i tassi di interesse italiani e tedeschi a 10 anni;
- Spread EU/GER: differenza media tra i tassi di interesse dei principali paesi europei (Francia, Belgio, Spagna, Italia, Olanda) e quelli tedeschi a 10 anni;
- Euro/dollaro: tasso di cambio euro/dollaro;
- Spread US/GER 10Y: spread tra i tassi di interesse degli Stati Uniti e quelli tedeschi con scadenza 10 anni;
- Prezzo Oro: quotazione dell'oro (in USD)
- Spread 10Y/2Y Euro Swap Curve: differenza del tasso della curva EURO ZONE IRS 3M a 10Y e 2Y;
- Euribor 6M: tasso euribor a 6 mesi.

I colori sono assegnati in un'ottica VaR: se il valore riportato è superiore (inferiore) al quantile al 15%, il colore utilizzato è l'arancione. Se il valore riportato è superiore (inferiore) al quantile al 5% il colore utilizzato è il rosso. La banda (verso l'alto o verso il basso) viene selezionata, a seconda dell'indicatore, nella direzione dell'instabilità del mercato. I quantili vengono ricostruiti prendendo la serie storica di un anno di osservazioni: ad esempio, un valore in una casella rossa significa che appartiene al 5% dei valori meno positivi riscontrati nell'ultimo anno. Per le prime tre voci della sezione "Politica Monetaria", le bande per definire il colore sono simmetriche (valori in positivo e in negativo). I dati riportati provengono dal database Thomson Reuters. Infine, la tendenza mostra la dinamica in atto e viene rappresentata dalle frecce: ↑, ↓, ↔ indicano rispettivamente miglioramento, peggioramento, stabilità rispetto alla rilevazione precedente.

Il termometro dei mercati finanziari (12 Luglio 2019)

a cura di Emilio Barucci e Daniele Marazzina

13/07/2019 10:01

L'iniziativa di Finriskalert.it "Il termometro dei mercati finanziari" vuole presentare un indicatore settimanale sul grado di turbolenza/tensione dei mercati finanziari, con particolare attenzione all'Italia.

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Il termometro dei mercati finanziari

12-lug-19	Legenda					
Valutazione complessiva		Calma	↑	miglioramento		
			↔	stabile		
		Tensione	↓	peggioramento		
Mercati italiani	12-lug		05-lug	28-giu	21-giu	14-giu
Rendimento borsa italiana	0.90	↓	3.54	-0.72	3.77	1.24
Volatilità implicita borsa italiana	15.14	↓	14.88	16.29	16.13	17.22
Future borsa italiana	22115	↔	21945	21155	21230	20460
CDS principali banche 10Ysub	451.30	↑	455.91	473.95	490.41	516.30
Tasso di interesse ITA 2Y	0.07	↑	0.10	0.22	0.28	0.37
Spread ITA 10Y/2Y	1.67	↔	1.65	1.87	1.88	1.95
Mercati europei	12-lug		05-lug	28-giu	21-giu	14-giu
Rendimento borsa europea	-0.86	↓	1.56	0.20	2.60	0.02
Volatilità implicita borsa europea	12.15	↓	11.93	12.83	12.78	13.47
Rendimento borsa ITA/Europa	1.76	↓	1.97	-0.91	1.17	1.21
Spread ITA/GER	1.98	↑	2.11	2.42	2.44	2.58
Spread EU/GER	0.73	↔	0.71	0.80	0.82	0.86
Politica monetaria, cambi e altro	12-lug		05-lug	28-giu	21-giu	14-giu
Euro/Dollaro	1.125	↔	1.122	1.139	1.132	1.123
Spread US/GER 10Y	2.351	↓	2.40	2.33	2.35	2.35
Euribor 6M	-0.342	↑	-0.338	-0.313	-0.303	-0.259
Prezzo Oro	1408	↔	1395	1412	1393	1350
Spread 10Y/2Y Euro Swap Curve	0.63	↓	0.52	0.57	0.60	0.58

Significato degli indicatori

- Rendimento borsa italiana: rendimento settimanale dell'indice della borsa italiana FTSEMIB;
- Volatilità implicita borsa italiana: volatilità implicita calcolata considerando le opzioni at-the-money sul FTSEMIB a 3 mesi;
- Future borsa italiana: valore del future sul FTSEMIB;
- CDS principali banche 10Ysub: CDS medio delle obbligazioni subordinate a 10 anni delle principali banche italiane (Unicredit, Intesa San Paolo, MPS, Banco BPM);
- Tasso di interesse ITA 2Y: tasso di interesse costruito sulla curva dei BTP con scadenza a due anni;
- Spread ITA 10Y/2Y : differenza del tasso di interesse dei BTP a 10 anni e a 2 anni;
- Rendimento borsa europea: rendimento settimanale dell'indice delle borse europee Eurostoxx;
- Volatilità implicita borsa europea: volatilità implicita calcolata sulle opzioni at-the-money sull'indice Eurostoxx a scadenza 3 mesi;
- Rendimento borsa ITA/Europa: differenza tra il rendimento settimanale della borsa italiana e quello delle borse europee, calcolato sugli indici FTSEMIB e Eurostoxx;
- Spread ITA/GER: differenza tra i tassi di interesse italiani e tedeschi a 10 anni;
- Spread EU/GER: differenza media tra i tassi di interesse dei principali paesi europei (Francia, Belgio, Spagna, Italia, Olanda) e quelli tedeschi a 10 anni;
- Euro/dollaro: tasso di cambio euro/dollaro;
- Spread US/GER 10Y: spread tra i tassi di interesse degli Stati Uniti e quelli tedeschi con scadenza 10 anni;
- Prezzo Oro: quotazione dell'oro (in USD)
- Spread 10Y/2Y Euro Swap Curve: differenza del tasso della curva EURO ZONE IRS 3M a 10Y e 2Y;
- Euribor 6M: tasso euribor a 6 mesi.

I colori sono assegnati in un'ottica VaR: se il valore riportato è superiore (inferiore) al quantile al 15%, il colore utilizzato è l'arancione. Se il valore riportato è superiore (inferiore) al quantile al 5% il colore utilizzato è il rosso. La banda (verso l'alto o verso il basso) viene selezionata, a seconda dell'indicatore, nella direzione dell'instabilità del mercato. I quantili vengono ricostruiti prendendo la serie storica di un anno di osservazioni: ad esempio, un valore in una casella rossa significa che appartiene al 5% dei valori meno positivi riscontrati nell'ultimo anno. Per le prime tre voci della sezione "Politica Monetaria", le bande per definire il colore sono simmetriche (valori in positivo e in negativo). I dati riportati provengono dal database Thomson Reuters. Infine, la tendenza mostra la dinamica in atto e viene rappresentata dalle frecce: ↑, ↓, ↔ indicano rispettivamente miglioramento, peggioramento, stabilità rispetto alla rilevazione precedente.

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Il termometro dei mercati finanziari (5 Luglio 2019)

a cura di Emilio Barucci e Daniele Marazzina

06/07/2019 08:34

L'iniziativa di Finriskalert.it "Il termometro dei mercati finanziari" vuole presentare un indicatore settimanale sul grado di turbolenza/tensione dei mercati finanziari, con particolare attenzione all'Italia.

Il termometro dei mercati finanziari

5-Jul-19	Legenda					
Valutazione complessiva		Calma	↑	miglioramento		
			↔	stabile		
		Tensione	↓	peggioramento		
Mercati italiani	5-Jul		28-Jun	21-Jun	14-Jun	7-Jun
Rendimento borsa italiana	3.54	↑	-0.72	3.77	1.24	2.82
Volatilità implicita borsa italiana	14.88	↑	16.29	16.13	17.22	17.81
Future borsa italiana	21945	↑	21155	21230	20460	20205
CDS principali banche 10Ysub	455.57	↑	473.95	490.41	516.30	517.04
Tasso di interesse ITA 2Y	0.10	↑	0.22	0.28	0.37	0.37
Spread ITA 10Y/2Y	1.65	↑	1.87	1.88	1.95	1.99
Mercati europei	5-Jul		28-Jun	21-Jun	14-Jun	7-Jun
Rendimento borsa europea	1.56	↑	0.20	2.60	0.02	2.99
Volatilità implicita borsa europea	11.64	↑	12.83	12.78	13.47	13.89
Rendimento borsa ITA/Europa	1.97	↑	-0.91	1.17	1.21	-0.17
Spread ITA/GER	2.11	↑	2.42	2.44	2.58	2.62
Spread EU/GER	0.71	↑	0.80	0.82	0.86	0.87
Politica monetaria, cambi e altro	5-Jul		28-Jun	21-Jun	14-Jun	7-Jun
Euro/Dollaro	1.122	↓	1.139	1.132	1.123	1.134
Spread US/GER 10Y	2.403	↑	2.33	2.35	2.35	2.34
Euribor 6M	-0.338	↑	-0.313	-0.303	-0.259	-0.259
Prezzo Oro	1395	↑	1412	1393	1350	1346
Spread 10Y/2Y Euro Swap Curve	0.52	↑	0.57	0.60	0.58	0.56

Significato degli indicatori

- Rendimento borsa italiana: rendimento settimanale dell'indice della borsa italiana FTSEMIB;
- Volatilità implicita borsa italiana: volatilità implicita calcolata considerando le opzioni at-the-money sul FTSEMIB a 3 mesi;
- Future borsa italiana: valore del future sul FTSEMIB;
- CDS principali banche 10Ysub: CDS medio delle obbligazioni subordinate a 10 anni delle principali banche italiane (Unicredit, Intesa San Paolo, MPS, Banco BPM);
- Tasso di interesse ITA 2Y: tasso di interesse costruito sulla curva dei BTP con scadenza a due anni;
- Spread ITA 10Y/2Y : differenza del tasso di interesse dei BTP a 10 anni e a 2 anni;
- Rendimento borsa europea: rendimento settimanale dell'indice delle borse europee Eurostoxx;
- Volatilità implicita borsa europea: volatilità implicita calcolata sulle opzioni at-the-money sull'indice Eurostoxx a scadenza 3 mesi;
- Rendimento borsa ITA/Europa: differenza tra il rendimento settimanale della borsa italiana e quello delle borse europee, calcolato sugli indici FTSEMIB e Eurostoxx;
- Spread ITA/GER: differenza tra i tassi di interesse italiani e tedeschi a 10 anni;
- Spread EU/GER: differenza media tra i tassi di interesse dei principali paesi europei (Francia, Belgio, Spagna, Italia, Olanda) e quelli tedeschi a 10 anni;
- Euro/dollaro: tasso di cambio euro/dollaro;
- Spread US/GER 10Y: spread tra i tassi di interesse degli Stati Uniti e quelli tedeschi con scadenza 10 anni;
- Prezzo Oro: quotazione dell'oro (in USD)
- Spread 10Y/2Y Euro Swap Curve: differenza del tasso della curva EURO ZONE IRS 3M a 10Y e 2Y;
- Euribor 6M: tasso euribor a 6 mesi.

Il termometro dei mercati finanziari (28 Giugno 2019)

a cura di Emilio Barucci e Daniele Marazzina

30/06/2019 17:21

L'iniziativa di Finriskalert.it "Il termometro dei mercati finanziari" vuole presentare un indicatore settimanale sul grado di turbolenza/tensione dei mercati finanziari, con particolare attenzione all'Italia.

Il termometro dei mercati finanziari						
28-Jun-19	Legenda					
Valutazione complessiva		Calma		↑	miglioramento	
				↔	stabile	
		Tensione		↓	peggioramento	
Mercati italiani	28-Jun		21-Jun	14-Jun	7-Jun	31-May
Rendimento borsa italiana	-0.72	↓	3.77	1.24	2.82	-2.82
Volatilità implicita borsa italiana	16.29	↔	16.13	17.22	17.81	19.82
Future borsa italiana	21155	↔	21230	20460	20205	19765
CDS principali banche 10Ysub	479.15	↑	490.41	516.30	517.04	542.40
Tasso di interesse ITA 2Y	0.22	↑	0.28	0.37	0.37	0.70
Spread ITA 10Y/2Y	1.87	↔	1.88	1.95	1.99	1.96
Mercati europei	28-Jun		21-Jun	14-Jun	7-Jun	31-May
Rendimento borsa europea	0.20	↓	2.60	0.02	2.99	-2.10
Volatilità implicita borsa europea	12.83	↔	12.78	13.47	13.89	15.63
Rendimento borsa ITA/Europa	-0.91	↓	1.17	1.21	-0.17	-0.72
Spread ITA/GER	2.42	↔	2.44	2.58	2.62	2.86
Spread EU/GER	0.80	↔	0.82	0.86	0.87	0.97
Politica monetaria, cambi e altro	28-Jun		21-Jun	14-Jun	7-Jun	31-May
Euro/Dollaro	1.139	↔	1.132	1.123	1.134	1.114
Spread US/GER 10Y	2.33	↔	2.35	2.35	2.34	2.34
Euribor 6M	-0.313	↑	-0.303	-0.259	-0.259	-0.247
Prezzo Oro	1412	↓	1393	1350	1346	1300
Spread 10Y/2Y Euro Swap Curve	0.57	↔	0.60	0.58	0.56	0.62

Significato degli indicatori

- Rendimento borsa italiana: rendimento settimanale dell'indice della borsa italiana FTSEMIB;
- Volatilità implicita borsa italiana: volatilità implicita calcolata considerando le opzioni at-the-money sul FTSEMIB a 3 mesi;
- Future borsa italiana: valore del future sul FTSEMIB;
- CDS principali banche 10Ysub: CDS medio delle obbligazioni subordinate a 10 anni delle principali banche italiane (Unicredit, Intesa San Paolo, MPS, Banco BPM);
- Tasso di interesse ITA 2Y: tasso di interesse costruito sulla curva dei BTP con scadenza a due anni;
- Spread ITA 10Y/2Y : differenza del tasso di interesse dei BTP a 10 anni e a 2 anni;
- Rendimento borsa europea: rendimento settimanale dell'indice delle borse europee Eurostoxx;
- Volatilità implicita borsa europea: volatilità implicita calcolata sulle opzioni at-the-money sull'indice Eurostoxx a scadenza 3 mesi;
- Rendimento borsa ITA/Europa: differenza tra il rendimento settimanale della borsa italiana e quello delle borse europee, calcolato sugli indici FTSEMIB e Eurostoxx;
- Spread ITA/GER: differenza tra i tassi di interesse italiani e tedeschi a 10 anni;
- Spread EU/GER: differenza media tra i tassi di interesse dei principali paesi europei (Francia, Belgio, Spagna, Italia, Olanda) e quelli tedeschi a 10 anni;
- Euro/dollaro: tasso di cambio euro/dollaro;
- Spread US/GER 10Y: spread tra i tassi di interesse degli Stati Uniti e quelli tedeschi con scadenza 10 anni;
- Prezzo Oro: quotazione dell'oro (in USD)
- Spread 10Y/2Y Euro Swap Curve: differenza del tasso della curva EURO ZONE IRS 3M a 10Y e 2Y;
- Euribor 6M: tasso euribor a 6 mesi.

I colori sono assegnati in un'ottica VaR: se il valore riportato è superiore (inferiore) al quantile al 15%, il colore utilizzato è l'arancione. Se il valore riportato è superiore (inferiore) al quantile al 5% il colore utilizzato è il rosso. La banda (verso l'alto o verso il basso) viene selezionata, a seconda dell'indicatore, nella direzione dell'instabilità del mercato. I quantili vengono ricostruiti prendendo la serie storica di un anno di osservazioni: ad esempio, un valore in una casella rossa significa che appartiene al 5% dei valori meno positivi riscontrati nell'ultimo anno. Per le prime tre voci della sezione "Politica Monetaria", le bande per definire il colore sono simmetriche (valori in positivo e in negativo). I dati riportati provengono dal database Thomson Reuters. Infine, la tendenza mostra la dinamica in atto e viene rappresentata dalle frecce: ↑, ↓, ↔ indicano rispettivamente miglioramento, peggioramento, stabilità rispetto alla rilevazione precedente.

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Il termometro dei mercati finanziari (21 Giugno 2019)

a cura di Emilio Barucci e Daniele Marazzina

22/06/2019 10:49

L'iniziativa di Finriskalert.it "Il termometro dei mercati finanziari" vuole presentare un indicatore settimanale sul grado di turbolenza/tensione dei mercati finanziari, con particolare attenzione all'Italia.

Il termometro dei mercati finanziari						
21-giu-19	Legenda					
Valutazione complessiva		Calma	↑	miglioramento		
			↔	stabile		
		Tensione	↓	peggioramento		
Mercati italiani	21-giu		14-giu	07-giu	31-mag	24-mag
Rendimento borsa italiana	3.77	↑	1.24	2.82	-2.82	-3.46
Volatilità implicita borsa italiana	16.13	↑	17.22	17.81	19.82	18.25
Future borsa italiana	21230	↑	20460	20205	19765	20355
CDS principali banche 10Ysub	489.77	↑	516.30	517.04	542.40	532.43
Tasso di interesse ITA 2Y	0.28	↑	0.37	0.37	0.70	0.48
Spread ITA 10Y/2Y	1.88	↔	1.95	1.99	1.96	2.07
Mercati europei	21-giu		14-giu	07-giu	31-mag	24-mag
Rendimento borsa europea	2.60	↑	0.02	2.99	-2.10	-2.19
Volatilità implicita borsa europea	12.49	↑	13.47	13.89	15.63	14.50
Rendimento borsa ITA/Europa	1.17	↓	1.21	-0.17	-0.72	-1.27
Spread ITA/GER	2.44	↑	2.58	2.62	2.86	2.67
Spread EU/GER	0.82	↔	0.86	0.87	0.97	0.94
Politica monetaria, cambi e altro	21-giu		14-giu	07-giu	31-mag	24-mag
Euro/Dollaro	1.132	↔	1.123	1.134	1.114	1.120
Spread US/GER 10Y	2.35	↔	2.35	2.34	2.34	2.45
Euribor 6M	-0.303	↑	-0.259	-0.259	-0.247	-0.242
Prezzo Oro	1393	↓	1350	1346	1300	1284
Spread 10Y/2Y Euro Swap Curve	0.60	↔	0.58	0.56	0.62	0.66

Significato degli indicatori

- Rendimento borsa italiana: rendimento settimanale dell'indice della borsa italiana FTSEMIB;
- Volatilità implicita borsa italiana: volatilità implicita calcolata considerando le opzioni at-the-money sul FTSEMIB a 3 mesi;
- Future borsa italiana: valore del future sul FTSEMIB;
- CDS principali banche 10Ysub: CDS medio delle obbligazioni subordinate a 10 anni delle principali banche italiane (Unicredit, Intesa San Paolo, MPS, Banco BPM);
- Tasso di interesse ITA 2Y: tasso di interesse costruito sulla curva dei BTP con scadenza a due anni;
- Spread ITA 10Y/2Y : differenza del tasso di interesse dei BTP a 10 anni e a 2 anni;
- Rendimento borsa europea: rendimento settimanale dell'indice delle borse europee Eurostoxx;
- Volatilità implicita borsa europea: volatilità implicita calcolata sulle opzioni at-the-money sull'indice Eurostoxx a scadenza 3 mesi;
- Rendimento borsa ITA/Europa: differenza tra il rendimento settimanale della borsa italiana e quello delle borse europee, calcolato sugli indici FTSEMIB e Eurostoxx;
- Spread ITA/GER: differenza tra i tassi di interesse italiani e tedeschi a 10 anni;
- Spread EU/GER: differenza media tra i tassi di interesse dei principali paesi europei (Francia, Belgio, Spagna, Italia, Olanda) e quelli tedeschi a 10 anni;
- Euro/dollaro: tasso di cambio euro/dollaro;
- Spread US/GER 10Y: spread tra i tassi di interesse degli Stati Uniti e quelli tedeschi con scadenza 10 anni;
- Prezzo Oro: quotazione dell'oro (in USD)
- Spread 10Y/2Y Euro Swap Curve: differenza del tasso della curva EURO ZONE IRS 3M a 10Y e 2Y;
- Euribor 6M: tasso euribor a 6 mesi.

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2020 UFRs – 3.75% is the value for the EUR currency

a cura di Silvia Dell'Acqua

26/07/2019 15:40

Last 21.05.2019 EIOPA (European Insurance and Occupational Pensions Authority) published the calculation of the Ultimate Forward Rate (UFR) applicable as of 2020.

The value to apply for the EUR currency is 3.75%.

Actually, the EUR calculated value would be 3.55%, but because of both the current value (3.90%) and the limit on the maximum annual change (15 bps), the applicable UFR for the EUR currency is floored to 3.75%. The EUR UFR has been previously equal to 4.20% (2017), 4.05% (2018) and 3.90% (2019).

The methodology to derive the UFR was decided by EIOPA at the end of March 2017. EIOPA calculates the UFRs on an annual basis, by the end of March, and, if they are sufficiently different from those in place, requires an update 9 months after the announcement, at the beginning of the following year.

The change in the UFR is limited in such a way that either it can increase/decrease by 15bps, or it remains unchanged:

$$UFR_{t+1}^{Limited} = \begin{cases} UFR_t^{Limited} + 15bps & if\ UFR_{t+1}^{Limited} \geq UFR_t^{Limited} + 15bps \\ UFR_t^{Limited} - 15bps & if\ UFR_{t+1}^{Limited} \leq UFR_t^{Limited} - 15bps \\ UFR_t^{Limited} & otherwise \end{cases}$$

As the UFR is a target for the long-term Nominal rates, it is defined as the sum of two components:

- **Expected Real rate**

This is the same for all currencies.

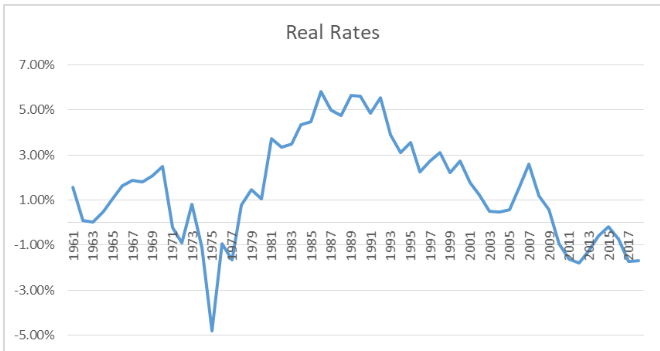
It is updated yearly, being the simple average of the past real rates since 1961 to the year before the calculation of the UFR.

Each annual real rate is derived as the simple arithmetic mean of the annual real rates of Belgium, Germany, France, Italy, the Netherlands, the United Kingdom and the United States. For each of those years and each country the annual real rate is calculated as follows:

Real rate = (short-term Nominal rate – Inflation rate) /(1+Inflation rate).

- The short-term Nominal rates are taken from the annual macro-economic database of the European Commission (AMECO database)
    - The inflation rates are taken from the Main Economic Indicators database of the OECD

The following chart shows the Real rates time series updated at 2019 (till 2018)



The time series is currently composed by 58 items, with the last observation, related to 2018, that enters the vector with a value of –1.68%.

The simple average gives a value of 1.51312%, rounded up to 1.55%.

Indeed, the expected real rate is rounded to full five basis points as follows:

- when the unrounded rate is lower than the rounded rate of the previous year, the rate is rounded upwards
- when the unrounded rate is higher than the rounded rate of the previous year, the rate is rounded downwards.

- **Expected Inflation rate**

This is currency specific.

It remains unchanged over time and it is based on the inflation targets of the central banks, assuming the values of 1%, 2%, 3% or 4% (e.g. 2% when the target is higher than 1%, but lower than 3%).

Where a central bank is not targeting a specific inflation figure but tries to keep the inflation in a specified corridor, the midpoint of that corridor is relevant for the allocation to the four inflation rate buckets.

For currencies where the central bank has not announced an inflation target, the expected inflation rate is 2% by default. However, where past inflation experience and projection of inflations both clearly indicate that the inflation of a currency is expected in the long-term to be at least 1 percentage point higher or lower than 2%, the expected inflation rate will be chosen in accordance with those indications. The expected inflation rate will be rounded downwards to full percentage points. The past experience is assessed against the average of a 10 years time series and the projection is derived by the means of an ARMA model. The table below summarized the UFRs values for the major currencies.

Acronym	Currency	UFR for 2020	Expected Real rate	Expected Inflation rate
EUR	Euro	3.75% (3.55%)	1.55%	2.00%
CZK	Czech koruna	3.75% (3.55%)	1.55%	2.00%
GBP	Pound sterling	3.75% (3.55%)	1.55%	2.00%
CHF	Swiss franc	2.75% (2.55%)	1.55%	1.00%
CAD	Canadian dollar	3.75% (3.55%)	1.55%	2.00%
CNY	Renminbi-yuan	4.50% (4.55%)	1.55%	3.00%
JPY	Yen	3.50% (3.55%)	1.55%	2.00%
USD	US dollar	3.75% (3.55%)	1.55%	2.00%

Advances in Incremental Valuation of Financial Contracts and Definition of the Economic Meaning of the Capital Value Adjustment KVA — Part II

a cura di Antonio Castagna

18/07/2019 18:57

1 Introduction

In the first part of this article, we sketched a general framework to calculate the bank's value. In this second part of the article, we will show how to apply the framework to the evaluation of a contract that is inserted in the existing bank's balance sheet and how to properly compute the xVAs quantities. Finally, we will see how to conciliate the apparently theoretical unsound market practices to evaluate derivative contracts, and the nowadays standard results of the modern financial theory, namely the Modigliani-Miller (MM) theorem (see Modigliani and Miller, [3]).

An extended version of this work, with the details of the analytical results, is available at www.iasonltd.com in the research section.

2 A Non-Trivial Set-Up to Evaluate Contracts

We can specify the general framework sketched in the first part to evaluate the incremental contribution of a contingent claim in the balance sheet of the bank. First, we outline how to calculate the value of the bank; then, we will assess how the insertion of a new contract in the bank's balance sheet impacts the value.

2.1 The Bank Value at the Reference Date

Let us set the evaluation reference date in $t=0$ and the terminal date in T, which is equal to, or greater than, the expiry of the longest maturing contract in the bank's balance sheet. The bank trades with $j=1,\dots,J$ counterparties: so there are J netting sets. Each netting set n contains $i_n=1,\dots,I_n$ contracts, V_{i_n}.

The "pure" value [1] of the netting set is $V_n=\sum_{i=1}^{I}=V_{i_n}$. Netting sets can be collateralised with collateral C_n.

Assets' and liabilities' cash-flows $CF\,(t_m)$ are deposited in, or withdrawn from, the bank account B that instantaneously earns the risk-free rate r and that has supposed to be counterparty risk-free. Assuming that the initial amount $B(0)\geq 0$, the present value $B(0,t)$ in 0 of the bank account considered up to time s is:

$$B(0,t)=B(0)+\sum_{m=1}^{M} CF\,(t_m)\int_0^s D(0,t_m)\delta(t_m-v)dv+\int_0^s D(0,v)B(v)r_v dv \quad (1)$$

Equation (1) states that the present value of the bank account is simply the sum of the starting value of the account ($B(0)$), the present value of all the cash-flows originated by the assets and the liabilities ($\delta(x)$ is the Dirac function centered in x). Since all cash-flows are evaluated also within the contracts in the balance sheet, to avoid any double counting, for the evaluation of the bank at the reference date we consider a modified version of the present value of the bank account, which exclude all cash-flows generated by the assets and the liabilities from a given time t to the terminal date T:

$$B^*(t,T)=B(0,t)+\int_t^T D(0,v)B(v)r_v dv \quad (2)$$

The bank account can never be below 0, so when cumulative cash-flows of existing contracts imply a negative balance on the bank account, short-term debt (liabilities) are issued by the bank:

$$SL(t)=|\min[B(t),0]|$$

The present value of the short-term debt in 0 up to T is:

$$S(0,T)=SL(T)D(0,T)+\int_0^t D(0,s)SL(s)[r_s+s_s^B]ds \quad (3)$$

where $SL(t)$ is the notional of the short-term debt outstanding in t and s^B is the funding spread paid by the bank over the risk free rate. The short-term can be repaid, in full or partially, whenever at some time t, the bank account $B(t)>0$.

At time 0 the bank has also some long-term debt outstanding LL, expiring in $T_L\leq T$. We assume the long term debt is rolled over for a period equal to T_L, or up to T if the renewed debt outlives the evaluation horizon. The present value of the long-term debt in 0 up to the evaluation horizon T is:

$$L(0,t)=\sum_{n=1}^{N}\kappa(t_n)LL\int_0^T D(0,t_n)\text{Î´}(t_n\text{âˆ'}s)ds+D(0,T)LL \quad (4)$$

where $\kappa(t_n)$ is the coupon paid on the notional LL, and N is the number of coupons to pay between 0 and $t_N=T$.

We allow also for the possibility that contracts withe counterparty j are collateralised, according to some rules, in cash, thus generating a collateral account equal to $C(t)$ in t. A positive balance ($C(t)>0$) means that the bank must pay the collateral rate c to the counterparty j, but at the same time can invest the amount at the market risk-free rate r. The net cost (or gain, if the balance in negative ($C(t)>0$) is then:

$$C_j(0,t)=\int_0^T D(0,s)C_j(s)(r_s-c_s)ds \quad (5)$$

We are simplifying the notation by assuming that the collateral rate is the same for all counterparties. It should be noted that the account balance $C(t)$ is deposited in (or withdrawn from) the bank cash account $B(t)$.

To make things more tractable, we assume that the joint default of two counterparties k and h is zero, so that:

$$P(\tau_k=\tau_h)=0$$

where τ_j is the default time of the counterparty j. When the counterparty j defaults, the value of the bank that includes also the loss given default is defined as $VB\,(\tau_j)$.

Considering the defaults of all the counterparties, and setting $VB^*(t)=VB\,(t)-KVA\,(t,T)$, the value of the bank in 0 can be written as:

$$VB\,(0)=E^P[\ [\textstyle\sum_j D(0,T)\ VB^*(T)(1-1_{\{\tau_j<T\}})+ \sum_j \max[D(0,\tau_j)\ VB^*(\tau_j),0]1_{\{\tau_j<T\}}]1_{\{\tau_B>T\}}] \quad (6)$$

We stress the fact that the measure, under which the expectation is calculated, is the real-world measure. Equation (6) states that the bank value is equal to the expected discounted terminal value, provided that no default of the counterparties occurs (first line), or the remaining value left after the default of the counterpaarties floored at 0 (second line), provided that the bank does not go bust itself (the indicator function of the bank's default multiplying the entire value within the expectation operator). Equation (6) can be equivalently written as:

$$VB\,(0)=E^P[[\ D(0,T)\ VB^*(T)- [\textstyle\sum_j D(0,T)\ VB^*(T)-\max[D(0,\tau_j)\ VB^*(\tau_j),0]1_{\{\tau_j<T\}}]]1_{\{\tau_B>T\}}] \quad (7)$$

which is simply the expected present value of the bank at expiry T, deducted the expected loss generated by the default of counterparty j (second line), provided that the bank survives until time T.

Equation (7) can be written more explicitly by considering the contract the sum of the contracts with the counterparty j, whose net value in T is $V_j(0,T)$, the bank account, the collateral account net cost, and the short-term and long-term liabilities defined above:

$$\begin{aligned}VB\,(0)=\ &E^P[[\textstyle\sum_j D(0,T)V_j(0,T)+C_j(0,T)+B^*(0,T)-[S(0,T)+L(0,T)]-KVA\,(0,T)\\&-\textstyle\sum_j [D(0,T)V_j(\tau_j,T)+C_j(0,\tau_j)+B^*(\tau_j,T)-[S(0,\tau_j)+L(\tau_j,T)-KVA\,(\tau_j,T)]\\&-\max[\textstyle\sum_{k\neq j} D(0,\tau_j)(V_k(\tau_j,T)+Rec_jV_j^+(\tau_j,T)+V_j^-(\tau_j,T))\\&+C_k(0,\tau_j)+B^*(\tau_j,T)-[S(0,\tau_j)+L(\tau_j,T)-KVA\,(\tau_j,T)],0]]1_{\{\tau_j<T\}}]1_{\{\tau_B>T\}}]\end{aligned} \quad (8)$$

where V_j^+ is the net value of the contracts with counterparty j, if positive, and Rec_j is the percentage recovered after the default of the latter; V_j^- is the net value of the contracts if negative. Basically, Equation (8) restates, in more specific terms, that the bank value is the expected discounted terminal value, deducted the expected losses given the default of the counterparty j, provided that the bank survives until T.

Equation (8) can be made more readable if we define the aggregated xVAs of the bank's balance sheet. Let us start with the Credit Value Adjustment (CVA) for the netting set of contracts referring to counterparty j, which takes into account the limited liability of the bank's shareholders, defined as:

$$\begin{aligned}CVA_j^{LL}(0,T)=\ &E^P[[[D(0,T)V_j(\tau_j,T)+C_j(0,\tau_j)+B^*(\tau_j,T)-[S(0,\tau_j)+L(\tau_j,T)-KVA\,(\tau_j,T)]\\&-\max[\textstyle\sum_{k\neq j} D(0,\tau_j)(V_k(\tau_j,T)+Rec_jV_j^+(\tau_j,T)+V_j^-(\tau_j,T))\\&+C_k(0,\tau_j)+B^*(\tau_j,T)-[S(0,\tau_j)+L(\tau_j,T)-KVA\,(\tau_j,T)],0]]1_{\{\tau_j<T\}}]1_{\{\tau_B>T\}}]\end{aligned} \quad (9)$$

The liquidity value adjustment LVA_j^{LL}, referring to the collateral agreement with counterparty j, accounting for the bank's default, is:

$$LVA_j^{LL}(0,T) = E^P[[\int_0^T D(0,s)C_j(s)(r_s - c_s)ds]1_{\{\tau_B>T\}}] \quad (10)$$

For the Funding Value Adjustment FVA^{LL}, first we need to define the risk-free equivalent of the short-term $S^*(0,T)$ and $L^*(0,T)$ and long-term debts, which means that they earn an interest equal to the short-term and the long-term risk-free, respectively, without any funding spread. Formally, we have:

$$S(0,T) = SL(T)D(0,T) + \int_0^t D(0,s)SL(s)r_s ds \quad (11)$$

and

$$L^*(0,T) = \sum_{n=1}^{N} \kappa^*(t_n)LL \int_0^T D(0,t_n)\delta(t_n - s)ds + D(0,T)LL \quad (12)$$

where $\kappa^*(t_n)$ is the coupon paid on the notional LL of a debt expiring in T, based on the market risk-free interest rate curve. The FVA accounting for the bank's default, is:[2]

$$FVA^{LL}(0,T) = E^P[[\int_0^T D(0,s)SL(s)s_s^B ds + [L^*(0,T) - L(0,T)]]1_{\{\tau_B>T\}}] \quad (13)$$

Finally, the Capital Value Adjustment $KVA^{LL} = KVA$ is defined in Equation (9) in Part I.

Inserting the xVAs in the valuation formula (8), the value of the bank can be written as follows:

$$\begin{aligned} VB(0) = E^P[[& \textstyle\sum_j D(0,T)V_j(0,T) + C_j(0,T) + B^*(0,T) - [S^*(0,T) + L^*(0,T)]]1_{\{\tau_B>T\}}] \\ & - KVA^{LL}(0,T) - FVA^{LL}(0,T) + \textstyle\sum_j [LVA_j^{LL}(0,T) - CVA_j^{LL}(0,T)] \end{aligned} \quad (14)$$

or alternatively:

$$\begin{aligned} VB(0) = E^Q[[& \textstyle\sum_j D(0,T)V_j(0,T) + C_j(0,T) + B^*(0,T) - [S^*(0,T) + L^*(0,T)]]1_{\{\tau_B>T\}}] \\ & - FVA^{LL}(0,T) + \textstyle\sum_j [LVA_j^{LL}(0,T) - CVA_j^{LL}(0,T)] \end{aligned} \quad (15)$$

where no difference is assumed to exist between market and bank's risk-premia.

It is worth noting that all the xVA include the limited liability of the shareholders, since the indicator function of the bank's default is present. This means that there is no need to include in the value of the bank in (14) the Limited Liability Value adjustment that was introduced in Castagna [2]. In that case the adjustment was justified by the fact that the other xVA did not account for the shareholders' limited liability and the bank's default.

3 Incremental Valuation of a New Contract

Assume at time $t > 0$ a new contract $I+1$ of the $J-$th netting set, V_{I+1_J}, is included in the bank's balance sheet; let us assume that the expiry of the contract matches the terminal evaluation date T (even if it will not be the case in most of cases). Let $VB^+(t)$ be the value of the bank that includes the new contract. From Equation (14), or (15), the variation of the bank's value $\Delta\ VB(t) = VB^+(t) - VB(t)$ can be decomposed in the following parts:

$$\begin{aligned} \Delta\ VB(t) = \ & E^P[V_{I+1_J}(T)1_{\{\tau_B>T\}} + \Delta B(t)] - \Delta\ KVA^{LL}(t,T) - \Delta\ FVA^{LL}(t,T) \\ & +\Delta\ LVA_J^{LL}(t,T) - \Delta\ CVA_J^{LL}(t,T) \end{aligned} \quad (16)$$

or

$$\begin{aligned} \Delta\ VB(t) = \ & E^Q[V_{I+1_J}(T)1_{\{\tau_B>T\}} + \Delta B(t)] - \Delta\ FVA^{LL}(t,T) \\ & +\Delta\ LVA_J^{LL}(t,T) - \Delta\ CVA_J^{LL}(t,T) \end{aligned} \quad (17)$$

The variation of the bank account $\Delta B(t)$ is due to the fact that the bank could finance the possible payment of a cash premium by reducing a positive cash balance; alternatively, the bank can finance the payment of the premium by issuing new short-term or long-term debt, which will affect the FVA.

The indifference value to the bank of the new contract is that one that makes the variation of the bank's value nil ($\Delta\ VB(t) = 0$): not always the bank is able to trade at the indifference price level, and hence the inclusion of a contract in the balance sheet may have a positive or a negative effect on the bank's value.

One may wonder if Formulae (16) and (17) are equivalent and they can be used indifferently when operating the incremental valuation of a contract. The answer is that, theoretically speaking, the two Formulae are equivalent, but in practice they will be used depending on the cases, the two most common occurrences of which we analyse below:

- The new contract is the purchase of a traded security or a listed derivative: the risk-premium is implicit in the market price, and the bank is a price taker. The incremental valuation can be operated with Formula (17) if the market risk-premium is equal to the bank's risk-premium for that security. Alternatively, Formula (16) can be used, where the real world measure implies an expected return of the security given by the risk-free rate plus the market risk-premium; the positive or negative effect on the value of the bank is produced by the difference between the risk-premium required by the market and by the bank (see the first part of this article).

- The new contract is an OTC derivative dealt with a weaker counterparty: the bank can exert its bargain power and it can set the value (or traded price, in this case) at the indifference level ($VB(0) = 0$). To this end, the bank includes all the adjustments and it uses Formula (16): if the contract provides for an initial cash-flow, such as a premium for an option, then since $VB(0) = 0$, the variation of the bank account will be equal, with the opposite sign, to the variation of the "pure" fair-value of the contract V_j plus the other adjustments:

$$\begin{aligned} \Delta B(t) = - \ & E^P[V_{I+1_J}(T)1_{\{\tau_B>T\}}] + \Delta\ KVA^{LL}(t,T) + \Delta\ FVA^{LL}(t,T) \\ & -\Delta\ LVA_J^{LL}(t,T) + \Delta\ CVA_J^{LL}(t,T) \end{aligned} \quad (18)$$

Since $\Delta B(t) = -V_{I+1_J}(t)$, we have that:

$$\begin{aligned} V_{I+1_J}(t) = \ & E^P[V_{I+1_J}(T)1_{\{\tau_B>T\}}] - \Delta\ KVA^{LL}(t,T) - \Delta\ FVA^{LL}(t,T) \\ & +\Delta\ LVA_J^{LL}(t,T) - \Delta\ CVA_J^{LL}(t,T) \end{aligned} \quad (19)$$

so that the initial value of the contract to the bank can be consistently derived.

As we have already stressed in the first part of this article, the KVA is consistently included in the incremental valuation only if this is operated in the real world measure, so that Formula (17) cannot be used in this case. In case the bank wants to evaluate the contract under the risk neutral measure, it should be either assumed that the market risk-premia are equal to risk-premia required by the bank for the relevant risk factors, or that the KVA adjustment should be calculated by considering only the differentials between the market and bank's risk-premia, as in Equation (11) of Part I of the article (*i.e.*: by replacing KVA with $\overline{KVA}$).

If the contract does not provide for any initial payment, such as in the case of a swap or a forward, then the "pure" fair value of the contract should be made equal to the negative of the xVAs. Formally, keeping in mind that the bank aims at an indifference value level ($VB(0) = 0$) and that no cash is paid or received ($\Delta B(t) = 0$), we have that:

$$\begin{aligned} E^P[V_{I+1_J}(T)1_{\{\tau_B>T\}}] = \ & \Delta\ KVA^{LL}(t,T) + \Delta\ FVA^{LL}(t,T) \\ & -\Delta\ LVA_J^{LL}(t,T) + \Delta\ CVA_J^{LL}(t,T) \end{aligned} \quad (20)$$

A starting value different from zero is achieved by modifying the relevant contract terms, *e.g.*: the forward price level, the swap fixed rate or the spread over the swap floating rate. If the bank manages to close the contract on these terms, then the initial incremental value will be $V_{I+1_J}(t) = 0$

To recapitulate, basically one should always perform the evaluation under the real world measure if he/she wants to include in a consistent way the KVA in the incremental value of the contract. When the evaluator wishes to work under the risk neutral measure, he/she can include the KVA under the provision that the bank's risk-premia are taken only differentially with respect to the market risk-premia. Clearly, this means that the current market practice, in most of cases and as it appears from the working papers by practitioners of the financial industry, is over-estimating the impact of the KVA.

4 Reconciliation with the Modigliani&Miller Theorem

Elsewhere,[1] we had to opportunity to stress that the incremental valuation framework that we introduced above is not in contrast with the main tenet of the Modigliani&Miller (MM) theorem, expounded by the two authors in their article of 1958 (see [3]).[2] On the contrary, when evaluating an investment that is included within the balance sheet of a company (bank) that has already started its operations, then the only way to keep the total value of the assets of the company equal to the total value of the liabilities, is to apply the principles of the incremental valuation stated in Castagna [2] to the non trivial framework sketched above.

In the recent work by Andersen *et al.* [1], the Modigliani&Miller theorem is proved to be correct when calculating the incremental value of a contract with respect to the total firm value, which is equal to the total value of the assets. In this case, the authors prove that the correct incremental value is given by the "pure" value, deducted of the CVA and incremented by the DVA, and it is independent from the way it is financed.

In our framework, we calculate the value of a contract only with respect to the value of the bank to the shareholders, because we think this is the only meaningful way the indifference to inclusion of the contract in the balance sheet to all stakeholders. When considering the total value of the firm, the evaluator allows for wealth transfers from shareholders to claimants of higher order, such as bondholders (see Andersen *et al.* [1], pag. 159). On the contrary, when considering the incremental value with respect to the shareholders' bank value, no wealth transfer is allowed and the contract value is such that all claimants are indifferent to it. Sure, such a value entails additional costs that have to be paid by the counterparty, but here we enter in the market action, where the price of the contract is determined. The price can be set at a level that matches the internal incremental valuation of the bank, thus generating a nil net contribution to the bank value; or it can be different, with a net positive or negative contribution. In any case, the price setting is the result of the bargaining process where the strengths of the bank and of the counterparty clashes and, possibly, they eventually agree to close the deal.

We think that the approach that we have detailed above and that relies on the simpler, but in any case complete, setting in Castagna [2], is in line with Proposition III of Modigliani and Miller [3], where the the optimal investment rule is derived: basically, when the firm (*i.e.*: the manager) is acting in the shareholders' best interest, it will undertake an investment only if its rate of return is at least equal, or above the rate of return required by the market for a class of risk corresponding to the riskiness of the firm. In our approach, we are internally setting the rate of return of a new contract by adding all the adjustments that make its rate of return equal to the appropriate rate of return. The latter is determined by the current composition of the assets and their related risks, and by the debt and equity capital financing it, whose costs mirror the leverage and the risk premium above the risk-free rate requested by the debt-holders and shareholders.

In our opinion, in Modigliani and Miller [3] it is Proposition III that has a normative value and that should be considered when designing a framework to evaluate new contracts. Proposition I and II, in the same article, have a positive value describing the equilibrium that can be retrieved *ex post*, equating the return of the assets to the average cost of capital, whichever mix the firm chooses to finance them. But both propositions are not including investments that produce a loss of wealth of one of the stakeholders in favour of another stakeholder: these investments are clearly excluded by Proposition III. Following the latter, we were able to derive the rules that determine the hurdle rate at which the actual contribution of contract to the (shareholders' bank value) is nil. It is clear that accepting only the investments that comply with Proposition III, also Proposition I and II will be proved to be true, provided we are working in a frictionless, perfect financial market.

5 Conclusion

In this work we have extended the approach of Castagna [2] to a non-trivial setting to calculate the incremental value of a contract that is included in the bank's balance sheet. A similar approach has been recently developed by see Andersen *et al.* [1]. To our knowledge, our framework is richer than those appeared since now in literature, in that we include a firm structural framework within a classical general equilibrium framework.

The framework considers different financing policies and consistently derives all the adjustment to the "pure" value of a contract, including the CVA , the FVA and, implicitly, the LLVA . We are also able to derive, in a natural fashion, an adjustment that relates to the KVA. In our structural, general-equilibrium enhanced framework setting, we do not only flesh out the origin of the KVA, but we can also identify the cases in which its inclusion is admissible in the evaluation, which is the correct premium to consider and, moreover, we can spot potential double counting of the adjustment.

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[1] See Castagna [2].

[2] We would like to recall here the MM theorem proves that the value of a project is independent from the way it is financed, or from the capital structure of the company undertaking it.

Does the identikit of European banks tend to underestimate the model risk?

a cura di Fabiano Salvio

12/07/2019 11:22

European banks are still experiencing a difficult situation, also dictated by the political-economic tone we are experiencing recently, the CER has focused on the problem in its Banking Report N.1 2018, based on 2014–2016 data, however in this article the analysis compared to the report it was also extended to 2017.

Analyzing a sample proposed by Mediobanca, consisting of about 20 larger European banks, we can see which are the business models that characterize the banks of the old continent and the composition of their assets in the portfolio. The analysis was carried out over the 2014–2017 four-year period. The total average assets of the sample amounted to 1,070 billion euros in 2017. The largest banking group is HSBC, with total assets of 2,192 billion euros. Overall, the 21 banking institutions hold assets of 1,900 trillion euros. The average ROE in the four-year period considered was 4.2%.

The German banks (25%), Nordea (24%) and Barclays (22%) are the ones that show the highest values(chart 1). The heaviest incidences are observed for Unicredit, Groupe BPCE and ING Group. The two Italian groups considered in the number, namely Unicredit and Intesa-San Paolo, have taken an incidence of 6% and 7%.

Even more interesting and third level. These financial instruments are illiquid and opaque, having complex structures and prices that are difficult to recognize. These parameters are not compatible with the standards. To take account of these valuation uncertainties, the accounting rules impose greater provisions and deductions from capital (additional valuation adjustments, AVA) for these instruments. However, adjustments are not calculated at the individual instrument level. Furthermore, the L3 instruments are more disadvantaged than the L2 ones, it is an incentive to hold this second form of activity.

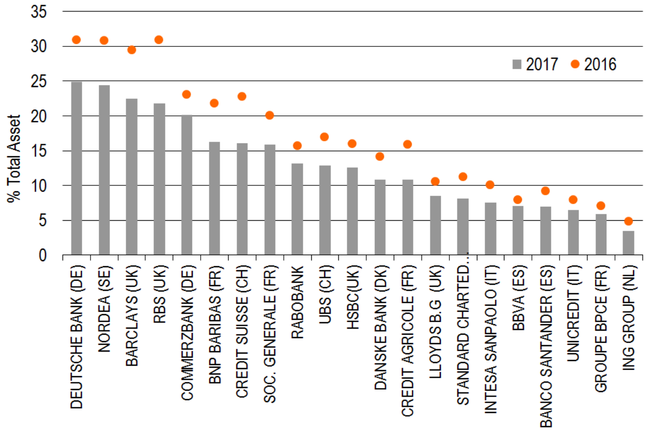

Chart 1. Incidence of active derivatives
Source: CER calculations on Mediobanca Data

Deutsche Bank is the bank with the greatest presence of L2 and L3 in its portfolio: in 2014, around 51% of total assets, to then decrease in 2017 to 44%, a level that is still on the increase compared to the previous year (chart2). Barclays and RBS follow. Italian banks are not particularly inclined to invest in L2 and L3 instruments. Both Unicredit and Intesa-San Paolo hold a percentage of the total assets among the lowest in the sample.

From the Mediobanca data relating to 2016 it appears that the L3 instruments consist almost 30% of derivative securities, 24.5% of equity securities and mutual funds, 20% of debt securities, 13.7% of loans and 12 .1% from other assets.

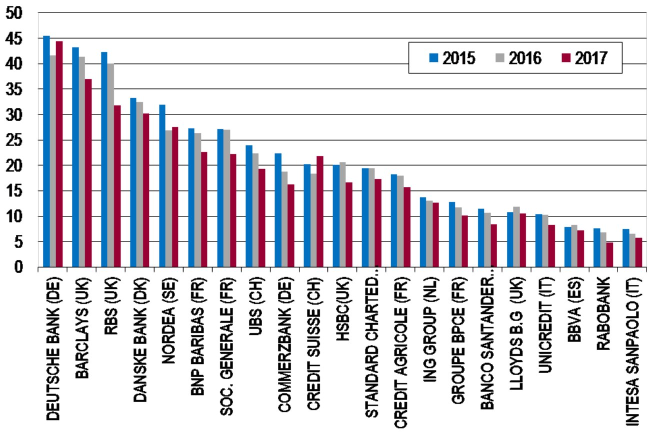

Chart 2. Incidence of 2nd and 3rd level assets
Source: CER calculations on Mediobanca Data

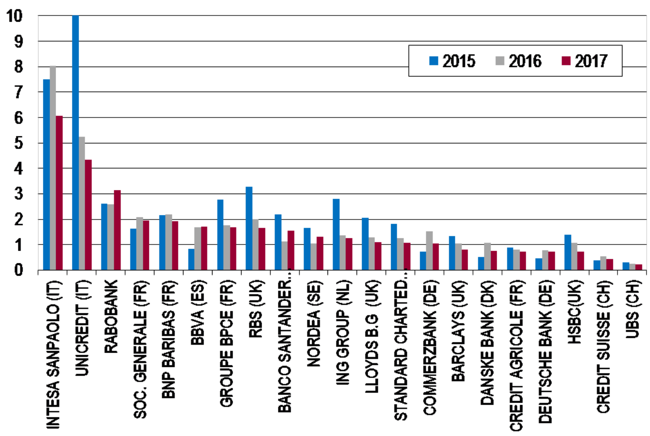

Chart 3. Incidence of Loans
Source: CER calculations on Mediobanca Data

Ultimately, analyzing the incidence of riskier assets shows a particularly heterogeneous situation. German and French banks have invested heavily in L2 and L3 instruments. Another group of banks, including the Italian ones, seems to suffer due to non-performing loans. Anglo-Saxon banks, on the other hand, operate in a framework in which both impaired loans and more complex financial assets are present in their financial statements. Finally, the remaining part of the institutions appears to have particularly prudent asset management, as evidenced by the low incidence of riskier assets.

Possible impacts of business choices on systemic risk

The economic and financial debate today is very focused on the possible systemic impacts, in this regard the Mediobanca database has been integrated with the information provided by the New York University Ster Volatility Lab. Specifically, the SRISK has been considered, indicator expresses the quantity of systemic risk connected with each listed company. The percentage share of SRISK with respect to the total of the sample was therefore calculated for each bank.

From the data of the NYU Stern Volatility Lab emerges as the banks with the greatest systemic impact, in 2017, are Bnp Paribas, with a share of systemic risk of 14%, and Deutsche Bank (13% chart.4).

This is followed by Barclays, Crédit Agricole and Société Generale. Unicredit and Intesa San Paolo account for 3.9% and 3% of the largest banks respectively.

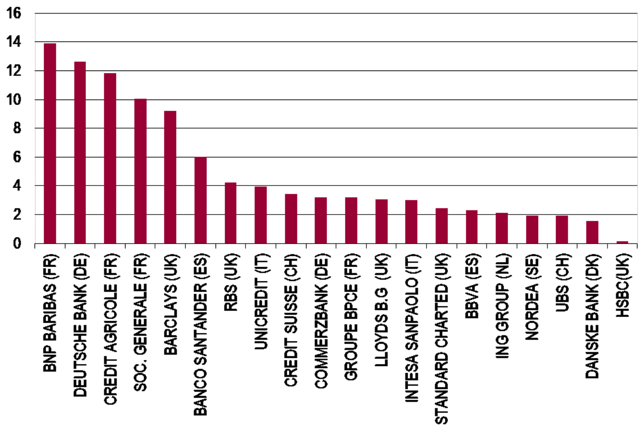

Chart 4. Incidence of systemic risk in systemically important European banks
Source: CER calculations on Mediobanca Data

Overall, the systemic risk of European banks attributable to French banks is 39%, 19% for the British, 16% for the German, 8% for the Spanish 7% for the Italian, 5% for the Swiss.

The same percentage share of the total of the sample was calculated for the most risk activities that characterize the business model based on credit and finance, or NPL, on the one hand, and L2 and L3 instruments, on the other. By relating this information to that relating to systemic risk, for the period 2014–2017, there are important indications (chart 5).

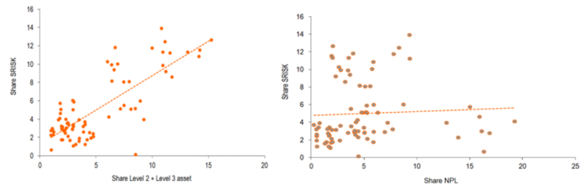

Chart.5 Systemic risk, complex financial assets and NPL (data for the 2014–2017 period)
Notes: sample of the top 20 significant banks in Europe. RISK expressed in% of the total sample.
Source: CER calculations on Mediobanca Data

The relationship between the share of the L2 and L3 instruments and that of systemic risk is strictly positive, which confirms that the impact of an eventual collapse of an institution, caused by problems deriving from excessive financial risks assumed, can have a serious impact on the whole market, jeopardizing its stability.

On the other hand, the relationship between the share of NPLs and that of systemic risk is slightly negative, highlighting that credit risk has no significant impact on global financial stability.

The undervaluation of market risk could have significant effects on the financial system. In fact, there does not appear to be a relationship between the SRISK share and the CET 1 ratio, a sign that the greater systemic risk does not push bank managers to hold more capital for the purposes of complying with the Basel requirements (chart 6). The fact that systemic risk is not adequately computed among the risks managed by European banks can be observed by looking at the relationship with the ratio between CET1 and total assets (an improper leverage ratio). In this case the relationship is even negative: those with more systemic risk have a lower proportion of good quality capital than the total assets. This implies that if the financial markets slow down significantly, the banks most exposed to the L2 and L3 instruments would quickly exhaust their capital endowment.

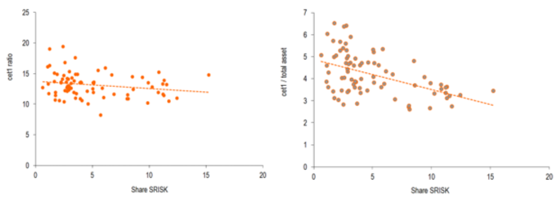

Chart.6 Systemic risk and capital endowment (data for the period 2014–2017)
Notes: sample of the top 20 significant banks in Europe. RISK expressed in% of the total sample.
Source: CER calculations on Mediobanca Data

This theme is strongly in line with the modern economic debate and recently the hypothesis of a possible merger between Unicredit and Commerzbank was born (the first hypothesis that the merger between Deutsche Bank and Commerzbank was avoided), but the merger between high banks impact (in Italy for Unicredit and on a large scale for Commerzbank) and with different business models (Commerzbank has a strong presence on its balance sheet levels 2 and fully concentrates its business model on finance, Unicredit instead on credit) is a solution to be adopted?

However, the regulatory authorities do not seem to worry about this, taking advantage of the concept “too big to fail”

At 2017, for Commerzbank the percentage of derivatives on total assets stood at 20%, while for Unicredit the share was much lower (6%). For second and third level activities (highly opaque and with a very high degree of risk), the percentage of total assets at 2017 was 16% for Commerzbank and 8% for Unicredit. The dynamics is completely reversed, while if we consider the NPLs, on the total loans the Unicredit share at 2017 was 4% (down compared to 2014 8%), for the German group instead, the value barely touched the 1%.

Can be seen from the previous analysis, the 2 and 3 level activities have a very different systemic impact, compared to the NPL

Concluding:

The regulatory authorities should have a very strong role in the hypothetical merger between these two groups, and in particular to understand if the merger will have positive returns or if instead we only risk creating a “systemic giant”.

The following analysis shows how the potential stresses facing the banks should not be underestimated, in fact in this regard the EBA introduced the benchmark models for the 2018 stress test to verify the consistency of the results obtained by the institutes from their assessments internal. The EBA has not gone as the Federal Reserve to establish homogeneous parameters for all banks, but uses these models only to highlight anomalies. However, the benchmark models will be used to estimate credit risk, thus leaving open the possibility of manipulating market risk.

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RegTech: Get Onboarding The challenges of compliance

a cura di Deloitte

06/07/2019 08:29

The regulatory context is constantly changing: since 2012, over 50,000 regulations have been published throughout the G20.

In this regulatory landscape, compliance functions are facing some key challenges:

- **Managing Regulators:** Respond to regulatory requirements with timeliness, protecting both the brand and reputation;
- **Compliance Strategy:** Lead the strategic decision-making process from a regulatory compliance standpoint;
- **Compliance Operations:** Reduce compliance costs by promoting transparency and managing inefficiencies in paper-driven processes;
- **Consumer Protection:** Implement new solutions to enhance customers' protection.

Current compliance tools used by financial institutions are gradually reducing the capability to meet regulatory demands. Therefore, in order to gather, analyze and compute all the required data, financial institutions are using a variety of IT systems and are increasing manual processes and the related operational risks.

A key issue is clearly arising: "*how can a financial institution address compliance in a more efficient and less resource-consuming manner while improving the quality of data reported to regulatory supervisory authorities*?" Within FinTech ecosystem there are a group of companies focused on meeting regulatory demands through innovative technologies: the RegTech Universe.

RegTech Universe

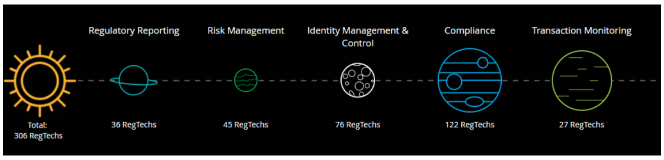
"RegTech (Regulatory Technology) is a subset of FinTech that focuses on technologies that may facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities".

FINANCIAL CONDUCT AUTHORITY

Deloitte is constantly mapping the FinTech ecosystem and has created the RegTech Universe where we are compiling a list of RegTech companies along with the technologies and solutions they are offering: https://www2.deloitte.com/lu/en/pages/technology/articles/regtech-companies-compliance.html

Deloitte research on the RegTech Universe is an ongoing exercise where we classify the regTech solutions in 5 key areas:

1. **Regulatory Reporting**: Enable automated data distribution and regulatory reporting through big data analysis, real time and cloud reports.
2. **Risk Management:** Detect regulatory and compliance risks, assess exposure to risk and anticipate future threats.
3. **Identity Management & Control:** Facilitate counterparty due diligence and Know Your Customer (KYC) procedures. AML and anti-fraud screening and detection. .
4. **Compliance:** Real time monitoring and tracking of current state of compliance and upcoming regulations
5. **Transaction Monitoring:** Solutions for real time transaction monitoring and auditing.



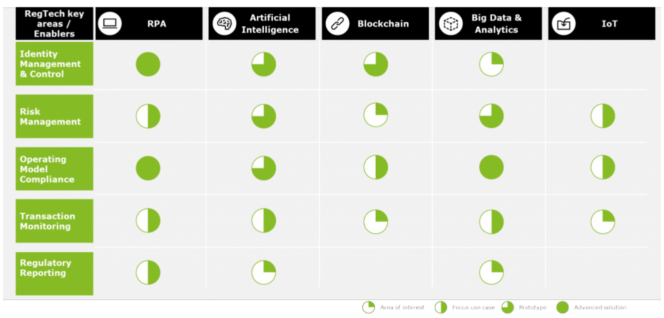
Considering the 5 key areas of RegTech Universe, Deloitte has developed a RegTech platform, exploiting the knowledge and expertise on technological enablers, gained through the EMEA Deloitte's Centers of Excellence:

1. **RPA**: Application of programmed software to perform repetitive and rule-based tasks;
2. **Artificial Intelligence**: Technology that reproduces logical thinking normally requiring human intelligence;
3. **Blockchain**: Technologies used to track and speed up the transaction lifecycle;
4. **Big data & analytics**: Tools and real time techniques that improve decision-making processes, starting from heterogeneous data;
5. **IoT**: Technologies that allow the internet connection of different types of devices in order to monitor, control and transfer information, and then perform subsequent actions.

Through the abovementioned enablers, RegTech introduces for the first time the following elements:

- **Agility**: Cluttered and intertwined data sets can be de-coupled and organized through ETL (Extract, Transfer, Load) technologies;
- **Speed**: Reports can be configured and generated quickly;
- **Integration**: Short timeframes to get solution up and running;
- **Analytics**: RegTech uses analytic tools to intelligently mine existing "big data" data sets and unlock their true potential e.g. using the same data for multiple purposes.

Deloitte's focus on the opportunity to developed a proprietary RegTech platform



Regtech: Niche solution

Regtech companies are therefore trying to exploit technological innovation to meet regulatory demands whilst complexity Financial Institutions have to manage is increasing:

Digitalization

- Complex IT Architecture

- High integration costs
- Long and uncertain maintenance times

Regulatory Pressures

- Increasingly frequent inspections by Supervisory Authority
- More sophisticated control techniques
- Analytical tools capable of identifying compliance risks (including RegTech tools)

Confusing Vendor Landscape

- Too many vendors cause confusion
- Financial institutions struggle to identify suitable partners

Data and Analytics

- Inappropriate data management
- Interpretation of increasingly complex data

Reporting

- Localized reports, unsuccessful handling of centrally-managed reports

Manual Processes

- Complicated manual procedures increase the possibility of error
- People are encouraged to ignore controls

The ability to cope with these issues is mandatory and RegTech companies may help Financial Institutions: the key success factor of RegTech versus "traditional solutions" is agility. The activities and processes covered by RegTech solutions go beyond regulatory reporting and is constantly increasing (e.g. see 5 RegTech Universe areas) and they all have one feature in common: the targeting of a *very specific niche.*

Digital onboarding for financial services

"Identity Management and control" is one of the categories in the "RegTech Universe" which horizontally contains all the issues considered.

Digital onboarding enables a new and personalized customer experience by simplifying the access to financial services while reducing processing time and cost for financial institutions due to optimized procedures:

- **Improved Customer Experience**
    - Create faster and more flexible access to banking services
    - Be perceived as innovative and reinforce brand image
    - Reduce document loss
    - Reduce paper usage
- **Reduced Cost/Income Ratio**
    - Reduce cost-to-serve
    - Improve sales effectiveness
    - Reduce failed client acquisitions
    - Automate and accelerate processes to enhance operational efficiency and to reduce operational costs

Three key reasons for Financial Institutions to invest on digital customer onboarding:

1. **Customer expectations in a mobile-first era**. Consumers are increasingly mobile-first and have already set the bar high in terms of their expectations as regards speed, convenience, and security. To win in this competitive landscape Financial Institutions must offer top class UX combined with robust evidence that security and privacy are paramount.
2. **Meeting regulatory requirements**. As fraud becomes more and more sophisticated Financial Institutions may leverage RegTech solutions such as Digital ID to meet D verification regulation.
3. **Benefits in ROI and Operational Cost Savings**. Digitisation of KYC capabilities may generate tangible cost savings for financial institutions, due to a significant reduction in manual verification processes.

Curently there are several "niche solutions" in RegTech ecosystem that offer both complete solutions (covering the customer's entire onboarding process) and partial solutions (specific to a part of the process, i.e. Mifid).

Key findings

RegTech providers/solutions may help Financial Institution in meeting compliance adherence in an "agile way". These tech — enabled solutions will deliver transformation of Regulatory Operations but in order to reach the full potential Financial Institutions must have the capabilities:

- to scan the ecosystem and choose the solution that best fits with their specific needs;
- to fully integrate the solution into the their organization (processes and IT systems).

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Common minimum standards on DQ agreed by EIOPA, ECB, NSAs and NCBs

a cura di Silvia Dell'Acqua

30/06/2019 17:11

Last 13.06.2019 EIOPA (European Insurance and Occupational Pensions Authority) and ECB (European Central Bank) published the Common Minimum Standards for Data Revisions agreed between themselves, the NSAs (National Supervisory

Authorities) and the NCBs (National Central Banks).

Because of the integrated reported approach, Data Quality (DQ) is crucial in any data management process: data reported by the insurance undertakings are used by both NSAs in the review process, whose outcome is then submitted to EIOPA, and by most NCBs to fill in the insurance corporation statistics, delivered to the ECB. This leads to a need of a common understanding of the minimum level of DQ required.

By agreeing on common minimum standards, all authorities have aligned their expectations for the minimum acceptable level of DQ for the purposes of the different uses of data. The common minimum standards specify:

- The request of revision
- The synchronization
- The timeliness
- The explanatory notes and notices
- The need for historical revision

[1] The common minimum standards should not prevent stricter practices from being applied at national level: the NSAs/NCBs still have the responsibility and the power to request that financial institutions revise data when necessary. As the XBRL validations cannot cover all DQ issues, it may happen that, after deeper controls carried out by the insurance undertakings themselves, data may be occasionally submitted a second time. Resubmissions are divided into (a) "revisions" (if data points have changed) and (b) "duplications" (if there are no changes in the data points, but duplications have been fixed).

[2] The synchronisation states that the same data have to be available at all levels (i.e. financial institutions, NSAs/NCBs, EIOPA, ECB) at all times: it is important to keep consistency between EIOPA's Central Repository, the ECB's statistical databases and NSA/NCB databases. Any revision of data should be carried out at all levels of the transmission chain so that all parties involved have the same data. Data should not be unilaterally modified at the NCB or NCA level, unless in exceptional cases (identification of wrong data and impossibility to fix them by the financial institution due to time restrictions).

[3] NSAs and NCBs shall send the revisions respectively to EIOPA and the ECB in a timely manner, reducing time pressure for business users who need high-quality and stable data on specific dates. Specifically:

- NSAs shall send the data to EIOPA within 1 week from the receiving or according to established schedules, but at least once per month.
- NCBs shall send the data to ECB as quickly as possible and at maximum before the closing of the next production period

[4] NSAs and NCBs shall send a note explaining what trigger the revision of aggregated data in case of all non-routine revisions and significant routine revisions. In case of DQ issues reported by individual entities, the NSAs shall either use the erroneous flag available in the XML metadata file of the EIOPA Central Repository Specification or email EIOPA to informing of the need for revision.

[5] Back data should be revised at least as far back as technically possible, given the operational limitations of the data collection infrastructure, where an issue is identified and supposed to lead to significant revisions, which could also affect the past.

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Advances in Incremental Valuation of Financial Contracts and Definition of the Economic Meaning of the Capital Value Adjustment (KVA) — Part I

a cura di Antonio Castagna

22/06/2019 14:30

We extend the analysis we sketched in Castagna [4] and we provide an application of the framework we introduced to incrementally evaluate financial contracts within a financial institution's balance sheet.

1 Introduction

In Castagna [4] we sketched a framework to evaluate a contract inserted within the balance sheet of a financial institution. The main result of that work is the importance to assess the impact that the contract's insertion in the bank's books causes in terms of changes of the value of the bank. This is tantamount to saying that a contract has a value to the bank that equals its incremental (or marginal) contribution to the total net value of the bank.

The first consequence of this approach is that the (incremental) value to the bank is a subjective quantity that does not need to be that same as the price quoted and dealt in the market. The difference between price and value of a contract is a concept that we stressed in Castagna [3] and [2]: For an evaluator that is a hedger/replicator, the price of a (derivative) contract is just the payment terms that both parties agree upon when closing the deal; the value of the same (derivative) contract is the present value of the costs paid to replicate the intermediate and final pay-off until the expiry, which in turn is the incremental change in the total hedger/replicator's net value.

The second consequence is that the valuation should be correctly operated by considering the existing balance sheet structure. The main result from the analysis in Castagna [3] is that, if the contract is sufficiently small so that it does not alter (for practical purposes) the probability of default of the evaluator (bank), then the approximated value can be fairly considered as the equivalent to the algebraic sum of the value of i) an otherwise identical risk-free contract (the "pure" value"), ii) the Credit Value Adjustment CVA and iii) the Funding Value Adjustment FVA referring to the same contract. If the contract has a large notional so that it changes the evaluator's default probability, then the value has to be determined in a more precise fashion by algebraically adding to the sum above the term iv) Limited

Liability Value Adjustment (LLVA). The latter quantity is somehow similar to the more common Debit Value Adjustment (DVA), in that it affects the value of the contract in the opposite direction than the CVA; nonetheless it cannot be considered as equivalent to the DVA for many reasons that we thoroughly discuss in Castagna [3].

Only the value of a contract can be *incremental*. The concept of *incremental* price is meaningless, because the price cannot include all the incremental valuations referring to the parties involved in the transaction, or two generic parties that would trade in that contract if the price is only a quote not yet dealt. Clearly we are not saying here that the two parties do not consider their own incremental value when bargaining before closing the deal at the agreed price: on the contrary, they will try to push the price as near as possible to the (likely diverging) values they assign to the contract. The effectiveness of this effort depends on the relative bargaining strength existing between the two parties.

The reference system, with respect to which the bank evaluates the incremental impact of the new contract it trades, should be the economic value of the bank to its shareholders. In fact, shareholders are the last claimants on the residual value of the assets, so that the value to them clashes with the ultimate value of the bank, after having considered the payment of all the other stakeholders that have a higher grade in the claimants' order. The only way to compute this value is to jointly evaluate all the assets and liabilities (investments, securities, contracts, etc.), taking into account the limited liability that is granted to the shareholders, to come up with the net wealth of the bank. We would like to stress the fact that if the shareholders directly, or (as it is usually the case) the bank's management indirectly, miximise the bank's value, they are also acting in the best interest of all other senior claimants to the assets' value (*e.g.*: bond holders, depositors, etc.). The present work is a two-part article. In the current first part, we will lay out a general framework to calculate the bank's value. The framework allows to shed some light also on the economic meaning of the Capital Value Adjustment (KVA) of a contract.

In the second part of the article, we will show how to apply the framework to the evaluation of a contract that is inserted in the existing bank's balance sheet and how to properly compute the xVAs quantities. Finally, we will see how to conciliate the apparently theoretical unsound market practices to evaluate derivative contracts, and the nowadays standard results of the modern financial theory, namely the Modigliani-Miller (MM) theorem (see Modigliani and Miller, [9]).

The analytical details of the results presented below can be found in an extended version of this work, available at www.iasonltd.com in the research section.

2 A Continuous-Time Setting for Incremental Valuation of Financial Contracts

In order to generalise the discrete-time setting sketched in Castagna [3], we needto work in a general equilibrium framework, since it is not generally possible to determine a single equivalent probability measure based on a no-arbitrage argument that relies on a dynamic replication. We will refer to that one outlined in Cox, Ingersoll and Ross (CIR, [5]), although we relax some of its assumptions. Namely, we will work in an economy where a single good is produced by means of N production technologies whose transformation process is governed by a system of stochastic processes.

Each technology is affected by K state variables Yk (with k= {1.....K}), whose evolution too is governed by a system of stochastic variables.

There is a single interest rate r at which a fixed number of economic agents may borrow or lend but, differently from CIR [5], we allow for the default of the borrower, which means that the terminal pay-off of a loan includes the expected losses due to the borrowers' default. Finally, another assumption of CIR [5] we relax is that all economic agents have an identical utility function *à la* Neumann-Morgenstern: we consider a specific utility function for each economic agent and a general utility function that can be seen as a sort of average of the single agents' utility functions.

The possibility to have different utility functions allows the presence of different risk-premia over the risk free rate r within the expected yield of the contingent claims possibly traded in the economy, whose pay-offs may depend on the K state variable and the wealth of a single agent, or of the entire economy aggregate wealth. The relaxing of the assumptions of the CIR [5] setting are necessary to distinguish between the fair (objective) price of a contract (contingent claim) and its (subjective) value.

Let us consider the value of the bank to shareholders at time t, VB(t): assuming that in the banks' balance sheet there are I assets Ai(t), cash B(t) and J liabilities (debt) Lj(t), the evolution of the value of the bank can be written as:

$$d \quad VB\ (t) = \sum_{i=1}^{I} dA_i(t) + dB(t) - \sum_{j=1}^{J} dL_j(t)$$

The dynamics of all three components is stochastic. As such, the dynamics of the bank value can be described by a general SDE:

$$d \quad VB\ (t) = \mu_t{}^{VB} \quad VB\ (t)dt + \sigma_t{}^{VB} \quad VB\ (t)dW_t{}^{VB}$$

Assuming that any financial contract depend on the K risk factors and that the cash is invested at the risk-free rate r, which is a variable that depends on the stochastic factors as well, it can be shown[1] that

$$\sum_{i=1}^{I} \mu_t^{A_i} + \mu_t^B - \sum_{j=1}^{J} \mu_t^{L_j} = r_t\left[\sum_{i=1}^{I} A_i(t) + B(t) - \sum_{j=1}^{J} L_j(t)\right] + \sum_{i=1}^{I} \lambda_t^{A_i} A_i(t) + \lambda_t^B B(t) - \sum_{j=1}^{J} \lambda_t^{L_j} L_j(t)$$

where λ_t^O, for $O = \{A, B, L\}$, is the risk premium for an asset, a liability or the bank account in the bank's balance sheet. To be a risk-premium (*i.e.*: an increase of the yield earned from the ownership of the bank and requested by shareholders), $\lambda_t^{A_i} \geq 0$, $\lambda_t^B \geq 0$, and $\lambda_t^{L_j} \leq 0$. The solution to Equation (3) can be written in terms of expectation (see Friedman [6], Theorem 5.2):

$$VB\ (t) = E^P\left[\left[D(t,T)\ VB\ (T) - \int_t^T D(t,s)\left(\sum_{i=1}^{I} \lambda_s^{A_i} A_i(s) + \lambda_s^B B(s) - \sum_{j=1}^{J} \lambda_t^{L_j} L_j(s)\right)ds\right] 1_{\{\tau_B > T\}}\right]$$

where $D(t,T) = \exp[-\int_t^T r_s ds]$ is the discount factor from time t to time T, $VB\ (T) = \sum_{i=1}^{I} A_i(T) + B(T) - \sum_{j=1}^{J} L_j(T)$ is the terminal value of the bank's equity,and $1_{\{\tau_B > T\}}$ is the indicator function equal to 1 until when the banks default occurs. Bank's default is defined ad the first time between the reference time t and the final time T when the assets and cash are smaller than the liabilities:

$$\tau_B = \inf\{t \leq s \leq T: \sum_{i=1}^{I} A_i(s) + B(s) < \sum_{j=1}^{J} L_j(s)\}$$

Some comments are in order: the expectation in Equation (4) is taken under the real world measure P , which means that all the drifts of the risk factors Yk are those of the real world dynamics. It should be noted that the discounting is operated with the risk free rate r as it is typically the case when the expectation is taken under the risk neutral measure Q.

i.e.: when the dynamics of the risk factors are risk neutral. To account for the error made in discounting with the risk free rate pay-offs that depend on real world dynamics of the risk factors, we add an adjustment equal to the risk-premia for all risk factors, referring to each contingent claim in the assets and in the liabilities of the bank's balance sheet.

We have now to examine two possible cases when the banks buys an assets, or issue debt.

The Bank is Price Taker

Let us assume that the bank buys all assets in the market and it has no greater bargaining power than any other agent. In this case, the bank must accept the prices set by the market for all the assets it buys. The bank funds the purchase of the assets by issuing debt claims whose price is also set by the creditors, and it passively has to accept it since it has no bargaining power. This assumption implies that the drift of each asset is determined by the market with no possibility for the bank to affect it. The same reasoning can be applied also to debt claims in the liabilities.

The risk-premium requested by the market for any bank's asset or a liability is ϑ_t^O for $O = \{A, B, L\}$. So the drift of any asset, or bank's debt claim, is: $\mu_t^O = r_t O(t) + \vartheta_t^O O_t$, by replacing which in Equation (3) we have:

$$\sum_{i=1}^{I} [r_t + (\vartheta_t^{A_i} - \lambda_t^{A_i})]A_i(t) + [r_t + (\vartheta_t^B - \lambda_t^B)]B(t) - \sum_{j=1}^{J} [r_t + (\vartheta_t^{A_i} - \lambda_t^{L_j})]L_j(t) = r_t[\sum_{i=1}^{I} A_i(t) + B(t) - \sum_{j=1}^{J} L_j(t)]$$

Equation (5) shows that, under the assumption the bank is price taker, when the market risk-premia $\vartheta_t^{A_i} > \lambda_t^{A_i}$ the expected return on the assets, adjusted for the risk-premium requested by the bank, is above the risk free rate, its inclusion in the balance sheet is positively contributing to the (present) value of the bank (and the reverse is true when $\vartheta_t^{A_i} < \lambda_t^{A_i}$).

For the bank's liabilities, from Equation (3) it is clear that the quantities $\lambda_t^{L_j}$ must have a negative value if they have to contribute as premia and not as penalties over the risk-free rate. This means that $\vartheta_t^{L_j} \geq \lambda_t^{L_j}$ always, since the debt issued by the bank is an asset when purchased by a creditor and he/she will require a positive premium over the risk-free rate ($\vartheta_t^{L_j} \geq 0$). In the end, the risk-premia of the creditor and of the bank are not netting out as for assets, but they are adding up.

In conclusion, when the bank has to issue debt claims whose price is set by the market, it will pay twice the risk-premium: the risk-premium embedded in the price required by the buyers (creditors of the bank), and the risk-premium that the bank has not been able to include in the price. While for the assets the market's and bank's risk-premia are affecting the total bank value only for the net difference, for the liabilities the difference is actually a sum of two risk-premia (since they must have opposite signs) and as such acting on an aggregated basis on the bank value.

Finally, by assuming that $\vartheta_t^{A_i} = \lambda_t^{A_i}$ and that $\lambda_t^{L_j} = 0$, for any i and j, the expectation in (4) can be calculated by setting the risk neutral drift for all assets, and by considering just the drift implied in market prices for all liabilities.[2]

The Bank is Price Maker

Let us assume that the bank is able to set the price when buying assets and when issuing new debt. In this circumstances, the price should be such that it embed a risk-premium such that the bank value at least does not decline after the inclusion of the new asset, or new liability, in the bank's balance sheet.

From Equation (3) it is clear that the bank must set the premium over the risk free rate for the assets it buys, or the liabilities it issues, equal to its own premium parameters $\lambda_t^{A_i}$ and $\lambda_t^{L_j}$.

It is also clear now that the bank should set a price so that its expected return (*i.e.*: the drift) is lower than risk free rate when issuing liabilities $\lambda_t^{L_j}$. This is what actually happens in reality when the bank has a strong bargaining power, as it is the case for example with retail depositors, when the competition with other banks is not fierce.

If the bank is able to set the premia on all assets and liabilities equal to its own levels, than the evaluation of the bank's value reduces to the standard risk-neutral one. More specifically, the drifts in Equation (3) will be equal to risk fee rate, as well as the return on the net value of the bank (*i.e.*: the equity, the right-hand side of Equation (3)). Equation (4) can be rewritten as:

$$VB\,(t) = E^Q[D(t,T)\;\; VB\,(T)1_{\{\tau_B > T\}}]$$

2.1 An Interpretation of the KVA

The Capital Value Adjustment (KVA) is the most recent item of the list of adjustments to the "pure" value of a contract, and it has been analysed by several authors: for an excellent review of the matter, and the regulatory and managerial concerns that originate the need for such adjustment, we refer to Prampolini and Morini [10] and the bibliography therein, which contains all the relevant literature at the time of writing.

The term in the integral in the second part of Equation (4) (*i.e.*: $\sum_{i=1}^{I} \lambda_s^{A_i} A_i(s) + \lambda_s^B B(s) - \sum_{j=1}^{J} \lambda_t^{L_j} L_j(s)$) can be seen as the risk-premium that is earned by the equity capital. Actually, from the balance sheet equivalence, at any time t the equity capital $E(t) = \sum_i A_i(t) + B(t) - \sum_j L_j(t)$: or, the equity capital is the liquidation value of the bank if all assets are sold and all liabilities bought back in t, without considering the value originated by seeing the bank as an on-going business activity with a limited liability of the shareholders in case of default. So, we can write the risk-premium of the equity capital π as a weighted average of the risk-premia earned by assets, cash and liabilities:

$$\pi(t) = \left(\sum_{i=1}^{I} \lambda_s^{A_i} \frac{A_i(s)}{E} + \lambda_s^B \frac{B(s)}{E} - \sum_{j=1}^{J} \lambda_t^{L_j} \frac{L_j(s)}{E}\right)$$

By replacing this definition of the π and using the balance sheet equivalence, Equation (4) can be written as:

$$VB\,(t) = E^P[[D(t,T)\;\; VB\,(T) - \int_t^T D(t,s)\pi(s)E(s)ds]1_{\{\tau_B > T\}}]$$

Let us assume that the bank determines the structure of the investments, and of the liabilities used to finance them, so that at any time t it has enough equity capital $E(t)$ to bear potential losses L occurring according to a given (real-world) distribution. The level of equity capital that is needed to that end is usually termed Economic Capital (EC) and it can be seen as the level that avoids the default of the bank with a given level of confidence $1 - q$, so that the (real-world) default probability is q. We can formally define EC as:

$$EC\,(t) = \inf\{E(t):\; P^P(\tau_b \leq t) = 1 - q\}$$
$$\inf\{E(t):\; P^P(\sum_{i=1}^{I} \lambda_s^{A_i} A_i(s) + \lambda_s^B B(s) - \sum_{j=1}^{J} \lambda_t^{L_j} L_j(s) \leq 0) = q\}$$

It should be noted that the losses of the bank that can be borne by the bank with a probability $1 - q$ are clashing with the definition of Value-at-Risk of a portfolio of contracts equal to the bank's balance sheet, as we will see in a while.

Typically, the bank calculates $EC\,(t)$ at the reference time 0, in terms of losses $L = E(t) - E(0)$, where $E(s)$ is the equity capital at time s. Let the expected losses be $EL = E\,[E(t) - E(0)]$: the Economic Capital $K_q(0)$, allocated at time 0, is $K_q(0) = [\; VaR_q(L) - EL\,]$. Assuming that the Economic Capital is always allocated one period before the date it refers too (*e.g.*: 1 year), the KVA can be easily defined as:

$$KVA\,(t,T) = E^P[(\int_t^T D(t,s)\pi(s)K_q(s)ds)1_{\{\tau_B > T\}}]$$

It is the adjustment in the evaluation formula (4) when the equity capital is set in such a way that it matches the Economic Capital as defined above. Some considerations are in order:

• the definition of Economic Capital given above can be applied both to risk-based measure (*e.g.*: simulation models applied to the bank's balance sheet) and non-risk-based measures (*e.g.:* regulatory formulae): for a discussion of both types of measures, see Prampolini and Morini [10];

• the KVA is consistently computed only under the real-world measure P and it is discounted with the risk-free rate: these are not assumptions or choices arbitrarily made, but both are naturally derived from the framework sketched above (different discount factors can be found in Prampolini and Morini [10], Kjaer [8], Brigo *et al.*[1], Green *et al.* [7]: in some cases the discount factors include the intensity of default of the counterparty and of the bank, in any case they are not consistently derived within an equilibrium framework such as the one above). When one wants to compute the bank's value under the risk-neutral measure, the inclusion of the KVA is not consistent, unless the adjustment includes only the difference between the bank's and the market's risk-premia, in which case Equation (4) becomes:

$$
\begin{aligned}
VB(t) = \; & E^{Q}[[D(t,T)\; VB(T) \\
& - \int_t^T D(t,s)(\textstyle\sum_{i=1}^{I} (\lambda_s^{A_i} - \vartheta_s^{A_i})A_i(s) + (\lambda_s^{B} - \vartheta_s^{B})B(s) \\
& - \textstyle\sum_{j=1}^{J} (\lambda_s^{L_j} - \vartheta_s^{L_j})L_j(s))ds]1_{\{\tau_B>T\}}] \\
= \; & E^{Q}[D(t,T)\; VB(T)1_{\{\tau_B>T\}}] - \overline{KVA}(t,T)
\end{aligned}
$$

where $\overline{KVA}(t,T) = E^{Q}[(\sum_{i=1}^{I} (\lambda_s^{A_i} - \vartheta_s^{A_i})A_i(s) + (\lambda_s^{B} - \vartheta_s^{B})B(s) - \sum_{j=1}^{J} (\lambda_s^{L_j} - \vartheta_s^{L_j})L_j(s))ds)1_{\{\tau_B>T\}}] = E^{P}[(\int_t^T D(t,s)\pi^*(s)K_q(s)ds)1_{\{\tau_B>T\}}]$ and $\pi^*(t)$ is accordingly defined as $\pi(t)$.

• the remuneration of the Economic Capital is given by only the risk-premia embedded in the assets, cash (bank account) and liabilities, either set by the market or by the bank depending on the bank's bargaining power in each case. This result in in striking contrast with all the literature publicly available at the time of writing (see the point above), where the remuneration encompasses the entire return on the contracts in the balance sheet. This will produce a double counting of the risk-free rate within the calculation of the bank's value, which will also imply a wrong adjustment if the bank is able to set a contract's price. Our result descends from the general equilibrium framework and is valid in the case the value is computed under the real-world measure, otherwise the inclusion of the KVA adjustment is quite untenabale;

• the risk-premium of the equity capital is a weighted average of the risk-premia of the different items of the balance-sheet: when the bank has pricing power, it can require a premium proportional to the risk of the contract and the incremental Economic Capital needed to preserve the same probability of default of the bank. Pricing based on RAROC criteria are common choices, lately suggested also in Prampolini and Morini [10] and Brigo *et al.*[1];

The framework that we have sketched above can be used in practice to evaluate the impact of a new contract inserted in the bank's balance sheet, or: the incremental value of the contract to the bank. We will show how to do that in the second part of the article.

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[1] See the extended version of the paper for the complete proof.

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26/07/2019 15:44

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Basel Committee discusses policy and supervisory initiatives and approves implementation reports

22/06/2019 10:38

he Basel Committee on Banking Supervision met in Basel on 19–20 June to discuss a range of policy and supervisory issues, and to take stock of its members' implementation of post-crisis reforms...

https://www.bis.org/press/p190620.htm

ESMA announces hearing on SFTR reporting

22/06/2019 10:37

The European Securities and Markets Authority (ESMA) will hold an open hearing on its consultation paper published on 27 May 2019...

https://www.esma.europa.eu/press-news/esma-news/esma-announces-hearing-sftr-reporting

Non-Bank Finance and Financial Intermediation

22/06/2019 10:35

La Banca d'Italia, la Banque de France e il Gruppo della Banca mondiale hanno organizzato congiuntamente l'edizione 2019 del workshop Euromed sul tema "Non-Bank Finance and Financial Intermediation" ...

https://www.bancaditalia.it/media/comunicati/documenti/2019–01/cs-Euromed-20.06.19.pdf

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