Deloitte.

ACTUS: Cases for Demonstration

Definition and Test Results

May 28, 2013

Introduction: Demonstration Cases

- Step 1: Select contract calculator and set <u>Market Model</u> to 'ycUSGOV_AD31122012 (2nd bullet point)
- Step 2: you may follow the steps & use buttons on the GUI labeled as below to demonstrate the selected cases:
    - <u>Demo Cases 1 – 3</u>: Contract Type PAM
        - Proto-PAM (Certificate of Deposit) ➜ PAM \ Test Case 1
        - PAM as Zero Coupon Bond ➜ PAM \ Test Case 2
        - PAM as Coupon Bond ➜ PAM \ Test Case 3

    - <u>Demo Case 4</u>: Contract Type ANN
        - Proto-ANN demonstrating Capitalization Effect with Rate Resetting ➜ ANN \ Test Case **3**

    - <u>Demo Cases 5 & 6</u>: Contract Type SWAP
        - Plain Vanilla SWAP ➜ SWAP \ Child 1: PAM and Child 2: PAM \ Test Case 1
        - Basis SWAP ➜ SWAP \ Child 1: PAM and Child 2: PAM \ Test Case 2

    - <u>Demo Cases 7 & 8</u>: Contract Type OPTION
        - PAM as underlying ➜ OPTION \ PAM as child \ Test Case 1
        - STK as underlying ➜ OPTION \ STK as child \ Test Case 1

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# Demo Case 1: Proto-PAM (Certificate of Deposit)

- *Six month PAM contract starts on January 1, 2013 and runs to June 30, 2013.*

- *Principal/Notional is set to $1,000*

- *Interest Rate of 5% over six months on A/365 basis leads to a discount event value $24.79*
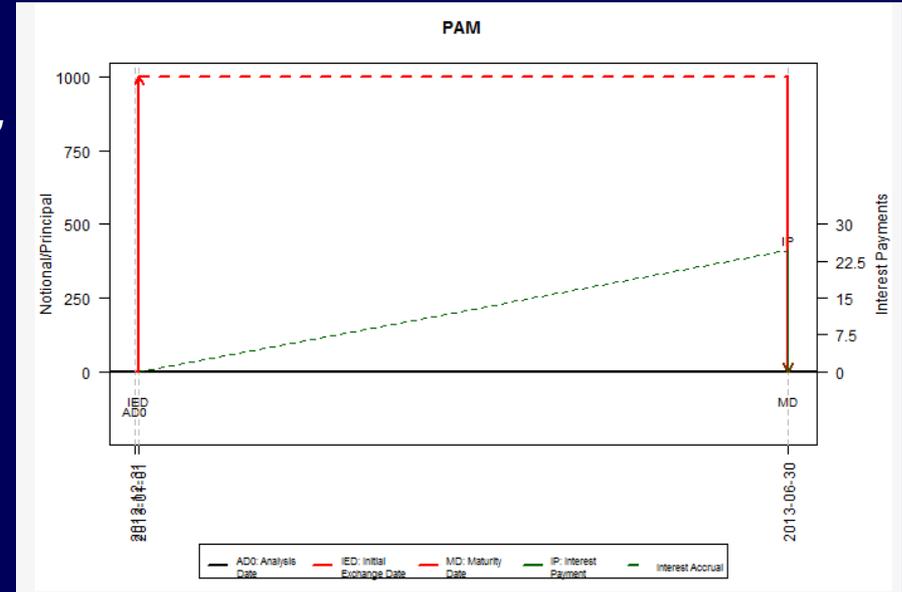
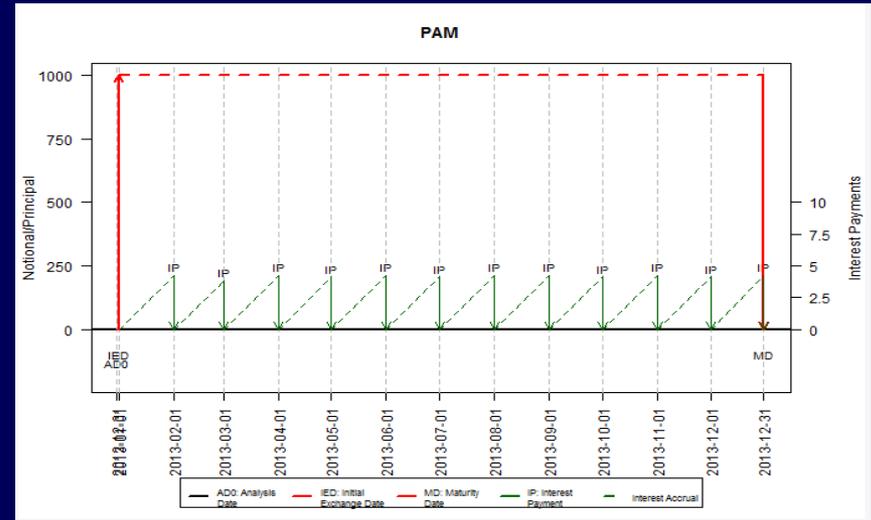| Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	NPV
2012-12-31T00	AD0	0.00	0.00	0.0000	0.00	24.23	24.23
2013-01-01T00	IED	-1000.00	1000.00	0.0500	0.00	1024.24	1024.24
2013-06-30T24	IP	24.79	1000.00	0.0500	0.00	0.00	0.00
2013-06-30T24	MD	1000.00	0.00	0.0500	0.00	0.00	0.00

Demo Case 2: PAM - Zero-Coupon Bond

- *Six month PAM contract with discount of $100*

- *All the other attributes remain same as in Demo Case 1*
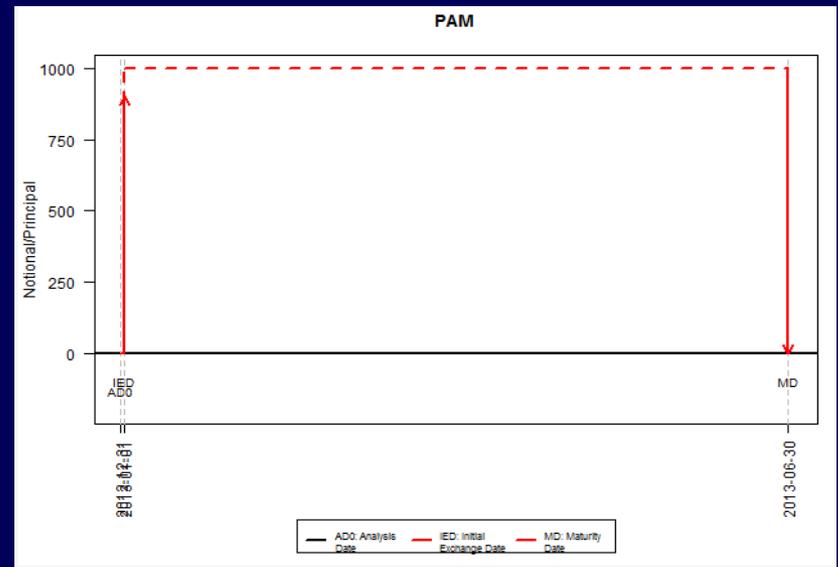
Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	NPV
2012-12-31T00	AD0	0.00	0.00	0.0000	0.00	99.45	99.45
2013-01-01T00	IED	-900.00	1000.00	0.0000	0.00	999.46	999.46
2013-06-30T24	MD	1000.00	0.00	0.0000	0.00	0.00	0.00

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Demo Case 3: PAM - Coupon Bond

- *An annual fixed bond with a monthly periodic interest payment*

- *Interest payment in each month is different due to different number of days in each month (A/365 day count convention)*

Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	NPV
2012-12-31T00	AD0	0.00	0.00	0.0000	0.00	48.37	48.37
2013-01-01T00	IED	-1000.00	1000.00	0.0500	0.00	1048.37	1048.37
2013-02-01T00	IP	4.25	1000.00	0.0500	0.00	1044.34	1044.34
2013-03-01T00	IP	3.84	1000.00	0.0500	0.00	1040.70	1040.70
2013-11-01T00	IP	4.25	1000.00	0.0500	0.00	1008.30	1008.30
2013-12-01T00	IP	4.11	1000.00	0.0500	0.00	1004.23	1004.23
2013-12-31T24	IP	4.25	1000.00	0.0500	0.00	0.00	0.00
2013-12-31T24	MD	1000.00	0.00	0.0500	0.00	0.00	0.00

# Demo Case 4: ANN - Capitalization & Rate Reset Effect

- *A 3-year annuity contract, with capitalization for first six months.*

- *The interest rate is fixed in the contract for one year before it resets to market rate every six months*

- *Relevant attributes can be found under the group name 'Notional' and 'Rate Reset'*
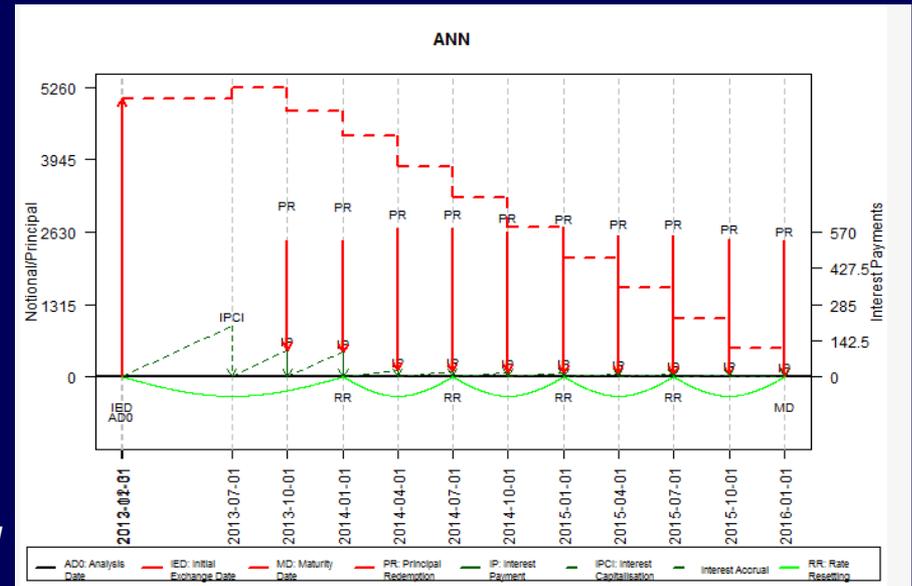
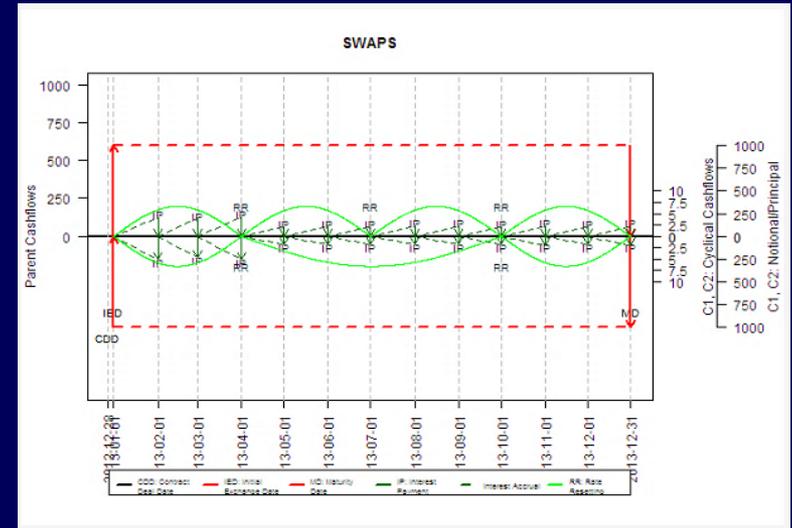| Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	NPV
2012-12-31T00	AD0	0.00	0.00	0.0000	50.00	734.04	684.04
2013-01-01T00	IED	-5050.00	5050.00	0.0800	0.00	5734.11	5734.11
2013-07-01T00	IPCI	200.34	5250.34	0.0800	0.00	5544.46	5544.46
2013-10-01T00	IP	105.87	5250.34	0.0800	0.00	4991.92	4991.92
2013-10-01T00	PR	450.85	4799.49	0.0800	0.00	4991.92	4991.92
2014-01-01T00	IP	96.78	4799.49	0.0800	0.00	4438.63	4438.63
2014-01-01T00	PR	459.94	4339.55	0.0800	0.00	4438.63	4438.63
2014-01-01T00	RR	0.02	4339.55	0.0221	0.00	4438.63	4438.63
2014-04-01T00	IP	23.60	4339.55	0.0221	0.00	3864.03	3864.03
2014-04-01T00	PR	553.74	3785.81	0.0221	0.00	3864.03	3864.03

Demo Case 5: Plain-Vanilla SWAP

- *SWAP with fixed and variable underlying one year PAM contracts*

- *Fixed PAM (first leg) is an asset and variable PAM (second leg) is a liability*

- *The rate is reset every quarter for variable PAM*
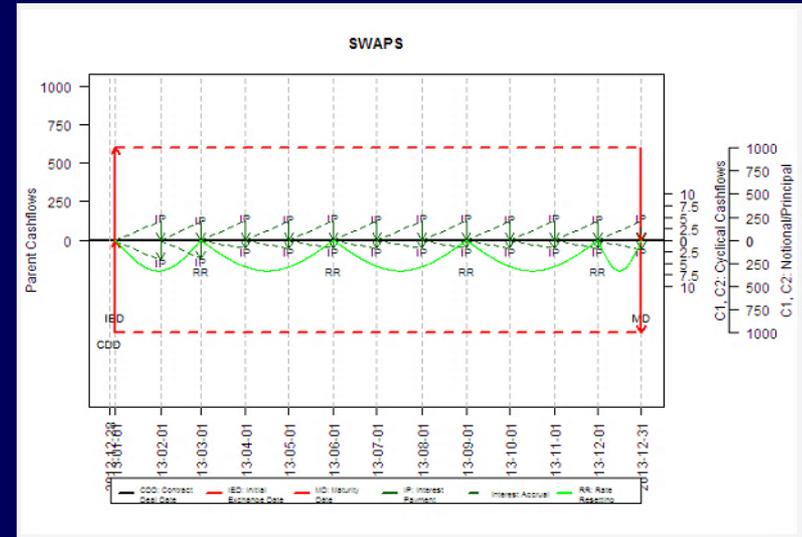
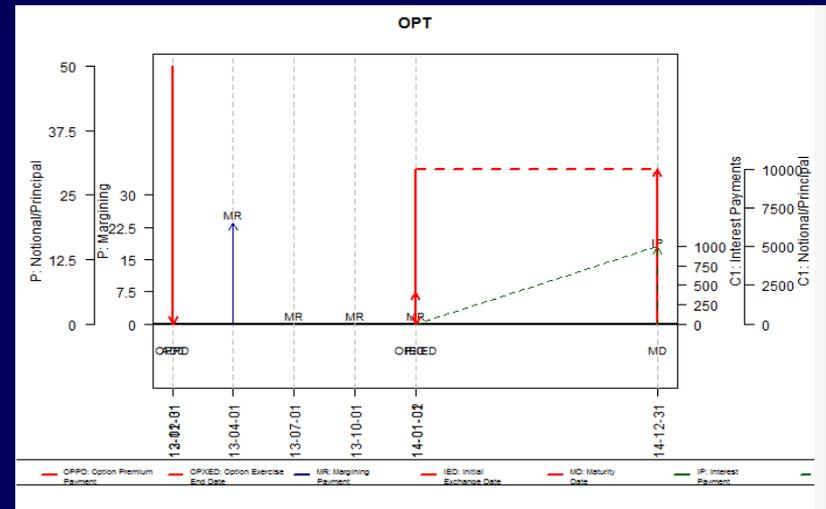| Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	NPV	Level
2012-12-31T00	AD0	0.00	0.00	0.0000	0.00	72.68	72.68	P
2013-01-01T00	IED	-1000.00	1000.00	0.0500	0.00	1048.37	1048.37	C1
2013-01-01T00	IED	1000.00	-1000.00	0.0500	0.00	-1024.31	-1024.31	C2
2013-02-01T00	IP	4.25	1000.00	0.0500	0.00	1044.34	1044.34	C1
2013-02-01T00	IP	-4.25	-1000.00	0.0500	0.00	-1020.28	-1020.28	C2
2013-03-01T00	IP	3.84	1000.00	0.0500	0.00	1040.70	1040.70	C1
2013-03-01T00	IP	-3.84	-1000.00	0.0500	0.00	-1016.64	-1016.64	C2
2013-03-01T00	RR	0.02	-1000.00	0.0209	0.00	-1016.64	-1016.64	C2
2013-04-01T00	IP	4.25	1000.00	0.0500	0.00	1036.64	1036.64	C1
2013-04-01T00	IP	-1.78	-1000.00	0.0209	0.00	-1015.05	-1015.05	C2
2013-12-31T24	MD	1000.00	0.00	0.0500	0.00	0.00	0.00	C1
2013-12-31T24	IP	-1.85	-1000.00	0.0218	0.00	0.00	0.00	C2
2013-12-31T24	MD	-1000.00	0.00	0.0218	0.00	0.00	0.00	C2

Demo Case 6: BASIS SWAP

- *SWAP with underlying one year variable PAM contracts*

- *The rate is reset every quarter for the first leg and has an initial interest rate of 5% p.a.*

- *whereas rate is reset every six months for the second leg and it has an initial interest rate of 6% p.a.*

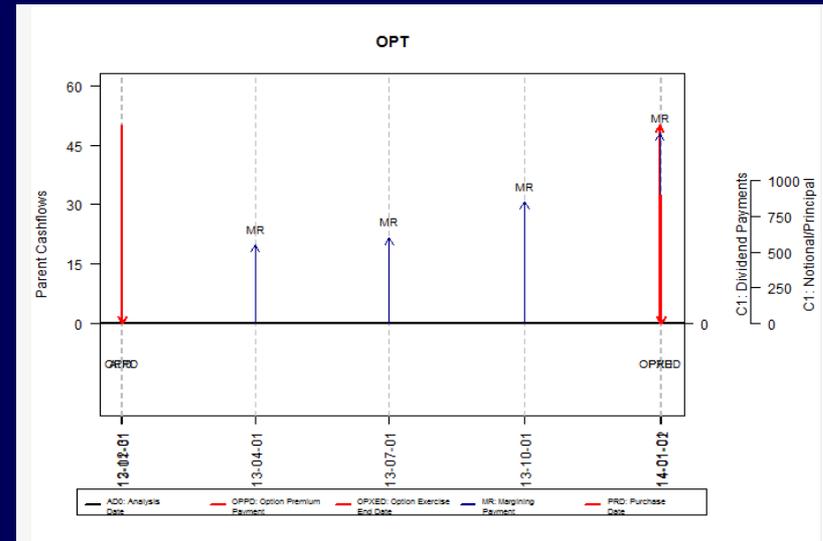| Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	NPV	Level
2012-12-31T00	AD0	0.00	0.00	0.0000	0.00	59.96	59.96	P
2013-01-01T00	IED	-1000.00	1000.00	0.0500	0.00	1030.57	1030.57	C1
2013-01-01T00	IED	1000.00	-1000.00	0.0600	0.00	-1029.39	-1029.39	C2
2013-02-01T00	IP	4.25	1000.00	0.0500	0.00	1026.53	1026.53	C1
2013-02-01T00	IP	-5.10	-1000.00	0.0600	0.00	-1024.50	-1024.50	C2
2013-03-01T00	IP	3.84	1000.00	0.0500	0.00	1022.90	1022.90	C1
2013-03-01T00	IP	-4.60	-1000.00	0.0600	0.00	-1020.10	-1020.10	C2
2013-04-01T00	IP	4.25	1000.00	0.0500	0.00	1018.83	1018.83	C1
2013-04-01T00	RR	0.03	1000.00	0.0261	0.00	1018.83	1018.83	C1
2013-04-01T00	IP	-5.10	-1000.00	0.0600	0.00	-1015.19	-1015.19	C2
2013-12-31T24	IP	2.26	1000.00	0.0266	0.00	0.00	0.00	C1
2013-12-31T24	MD	1000.00	0.00	0.0266	0.00	0.00	0.00	C1
2013-12-31T24	IP	-1.85	-1000.00	0.0218	0.00	0.00	0.00	C2
2013-12-31T24	MD	-1000.00	0.00	0.0218	0.00	0.00	0.00	C2

Demo Case 7: OPTION with underlying PAM

- *Call Option on an underlying PAM*
- *Seller of the option*
- *Underlying PAM starts after the Option exercise date*
- *Margin payments are made by the seller of the option*

Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	MVRM	Delta	NPV	Level
2012-12-31T00	AD0	0.00	0.00	0.0000	0.00	-81.03	0.00	-0.56	0.00	P
2013-01-01T00	OPPD	50.00	0.00	0.0000	0.00	-80.88	0.00	-0.56	0.00	P
2013-04-01T00	MR	-23.51	0.00	0.0000	0.00	-73.51	0.00	-0.57	0.00	P
2013-07-01T00	MR	0.00	0.00	0.0000	0.00	-64.30	9.21	-0.58	0.00	P
2013-10-01T00	MR	0.00	0.00	0.0000	0.00	-51.26	22.25	-0.62	0.00	P
2014-01-01T00	MR	0.00	0.00	0.0000	0.00	-29.64	43.87	-1.00	0.00	P
2014-01-01T00	OPXED	-6.13	0.00	0.0000	0.00	-6.13	0.00	0.00	0.00	P
2014-01-02T00	IED	10000.00	-10000.00	0.1000	0.00	-10979.72	0.00	0.00	-10979.72	C1
2014-12-31T00	IP	-997.22	-10000.00	0.1000	0.00	0.00	0.00	0.00	0.00	C1
2014-12-31T00	MD	-10000.00	0.00	0.1000	0.00	0.00	0.00	0.00	0.00	C1

Demo Case 8: OPTION with underlying STK

- *Call Option on an underlying STK*
- *Seller of the option*
- *Underlying STK only increases in value*
- *Margin payments are made by the seller of the option*

Event Date	Event Type	Event Value	Notional	Rate	IPAC	MVF	MVRM	Delta	NPV	Level
2012-12-31T00	AD0	0.00	0.00	0.0000	0.00	-52.65	0.00	-0.44	0.00	P
2013-01-01T00	OPPD	50.00	0.00	0.0000	0.00	-52.82	0.00	-0.44	0.00	P
2013-04-01T00	MR	-19.94	0.00	0.0000	0.00	-69.94	0.00	-0.55	0.00	P
2013-07-01T00	MR	-21.74	0.00	0.0000	0.00	-91.69	0.00	-0.69	0.00	P
2013-10-01T00	MR	-30.71	0.00	0.0000	0.00	-122.39	0.00	-0.88	0.00	P
2014-01-01T00	MR	-48.03	0.00	0.0000	0.00	-170.42	0.00	-1.00	0.00	P
2014-01-01T00	OPXED	-50.00	0.00	0.0000	0.00	-50.00	0.00	0.00	0.00	P
2014-01-02T00	PRD	900.00	-1000.00	0.0000	0.00	-1121.03	0.00	0.00	0.00	C1

General Assumptions: Test Cases

▪ *The analysis event for all the test cases December 31, 2012*

▪ *All the attributes of the record were updated as of December 30, 2012*

▪ *The agreement between the two parties is originated on December 28, 2012 i.e. from this date on, the institution will have a risk position for financial contract*

▪ *Initial cash flows for the basic contracts, generally, starts on January 1, 2013*

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