INCORPORATING NBFIs RISK ASSESSMENT INTO BANK CENTRIC FINANCIAL STABILITY REPORTS:
Bank of Jamaica's experience

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SECOND WORKSHOP
IADB FUNDED PROJECT
FINANCIAL RISK ASSESSMENT IN AN INTEGRATING REGION: THE CARIBBEAN

Agenda

1. Aim of macro-prudential analysis
2. Balance sheet structure of DTIs vs NBFIs
3. Common risk exposures of DTIs and NBFIs
4. Monitoring (macro-financial) systemic risk factors
5. Monitoring other systemic shocks for NBFIs
6. Monitoring common exposures across DTIs and NBFIs
7. Monitoring connections between DTIs and NBFIs
8. Data requirements for macro-prudential surveillance
9. Risk assessment and reporting

1. Aim of macro-prudential analysis

- Increase the resilience of the financial system to shared macro-financial (credit, asset price or liquidity) shocks
  - safeguard the interdependencies of major components of the financial system among each other as well as other indirect participants in the system – such as households, nonfinancial corporations, public sector and external sector
  - identify, assess and monitor distribution of risks within the financial sector and contagion channels among DTIs and NBFIs (*especially shadow banks*)
  - mitigate unsustainable levels of *leverage*, debt or credit growth
  - inform use of macro-prudential tools to minimize impact of macro-financial shocks on real economic activity
- Main NBFI coverage in macro-prudential surveillance: credit unions, broker-dealers, insurance companies, pension funds

2. Balance sheet structure of DTIs vs NBFIs

- Common asset holdings:
  - loans
  - bonds
  - equities
  - (property)
- Different funding models:
  - insurance and pensions reserves versus bank retail deposits and wholesale funding
- NBFIs generally contribute a lower level of systemic risk compared to DTIs (fixed contracts)

3. Common risk exposures of DTIs and NBFIs

- Shocks are transmitted to the financial system and *amplified* through common risk exposure to:
  - market, liquidity and credit risks for mainly DTIs
  - But NBFIs contribute to *herding* behaviour
  - common exposures vary across the *macro cycle*
- Response of the financial system to the systemic risks (e.g. asset fire sales) prompts feedback effects to the real economy
- Emergence of NBFI products with non-traditional features affect risk profile (eg, CDS, repos)

4. Monitoring and forecasting (macro-financial) systemic risk factors

- High frequency risk factors:
  - interest rates (short- and long-term)
  - exchange rates
  - credit spreads
  - equity prices
- Lower frequency risk factors:
  - property prices
  - private sector credit growth
  - capital flows
  - real GDP growth rate
  - unemployment rate

5. Monitoring other systemic shocks for NBFIs

- Major NBFIs risks are generally independent of the economic conditions, especially for insurers:
  - demographic shocks like pandemic, changes in mortality rates
  - natural catastrophes like earthquakes, hurricanes and floods
  - increases in reinsurance rates, low interest rates
- MP surveillance and toolkit requires close collaboration between central bank and NBFI regulators due to large difference in products

6. Monitoring common exposures across DTIs and NBFIs

- Track risk exposures to assets and capital:
  - household loans
  - corporate sector securities and loans
  - public sector securities and loans
  - equities and real estate
  - external sector
- Track sectoral exposures against financial system assets (SISs)

7. Monitoring connections between DTIs and NBFIs

- No direct connection between the NBFIs and the payments system (eg., no netting or collateral or counterparty risks)
- Shocks are also transmitted to the financial sector through the interconnectedness within the system
- Financial conglomerates have expanded in scale and scope with nontraditional activities
- Need to assess systemic importance of NBFIs

8. Data requirements for macro-prudential surveillance

- Institution-specific informational inputs by currency (US$, €, £, Can.):
  - detailed balance sheets and income statements
  - repricing profile of interest rate sensitive A&L (AFS vs HTM)
  - maturity profile of A&L
  - details of security inventories
  - details of network inter-linkages

Repricing profile of interest rate sensitive assets and liabilities by currency

LEVEL CODE	DESCRIPTION	On Call	1 - 30 days	31 - 90 days	91 - 180 days	181 - 365 days	1 - 2 yrs	2 - 5 yrs	5-10 yrs	10 yrs - 15 yrs	15 - 20 yrs	Over 20 yrs	Total Rate Sensitive Items	Non-rate Sensitive Items	Total Assets / Liabilities
1	**Total Financial Assets**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.1	**Notes and Coins**												0		0
1.2	**Due From Bank of Jamaica**												0		0
1.3	**Due From Banks & Other Deposit-Taking Financial Institutions**												0		0
1.4	**Investments**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4.1	**Jamaican Government Securities**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4.1.2	Available-for-Sale												0		0
1.4.1.4	Held-to-Maturity												0		0
1.4.2	**Foreign Government Securities**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4.2.2	Available-for-Sale												0		0
1.4.2.4	Held-to-Maturity												0		0
1.4.3	**Securities Acquired under Repurchase Agreements**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4.3.2	Available-for-Sale												0		0
1.4.3.4	Held-to-Maturity												0		0
1.4.4	**Securities Acquired under Margin Agreements**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4.4.2	Available-for-Sale												0		0
1.4.4.4	Held-to-Maturity												0		0
1.4.5	**Other Investments**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.4.5.2	Available-for-Sale												0		0
1.4.5.4	Held-to-Maturity												0		0
1.6	**Accounts Receivables**												0		0
1.7	**Other Financial Assets**												0		0
2	**Total Financial Liabilities**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1	**Repo Liabilities**	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1.1	Retailed Clients												0		0
2.1.2	Corporate Clients												0		0
2.1.3	Banks & Other Deposit-Taking Financial Institutions												0		0
2.1.4	Other Securities Dealers /FSC Licensees												0		0
2.2	**Due to Bank of Jamaica**												0		0
2.3	**Borrowings from Banks & Other Financial Institutions**												0		0
2.4	**Borrowings under Margin Agreements**												0		0
2.5	**Other Borrowings**												0		0
2.6	**Interest Payable on Repos and Borrowings**												0		0
2.7	**Other Financial Liabilities**												0		0
3	**Net Financial Assets/(Liabilities) maturing in each range**	0	0	0	0	0	0	0	0	0	0	0			
4	Cumulative Total RSA	0	0	0	0	0	0	0	0	0	0	0			
5	Cumulative Total RSL	0	0	0	0	0	0	0	0	0	0	0			
6	Cumulative Gap	0	0	0	0	0	0	0	0	0	0	0			

Maturity profile of financial assets and liabilities by currency

LEVEL CODE	DESCRIPTION	On Call	1 - 30 days	31 - 90 days	91 - 180 days	181 - 365 days	1 - 5 yrs	5-10 yrs	over 10 yrs	Total Assets / Liabilities
1	**Total Financial Assets**	0	0	0	0	0	0	0	0	0
1.1	**Notes and Coins**									0
1.2	**Due From Bank of Jamaica**									0
1.3	**Due From Banks & Other Deposit-Taking Financial Institutions**									0
1.4	**Investments**	0	0	0	0	0	0	0	0	0
1.4.1	Jamaica Government Securities									0
1.4.2	Foreign Government Securities									0
1.4.3	Securities Acquired under Repurchase Agreements									0
1.4.4	Securities Acquired under Margin Agreements									0
1.4.5	Other Investments									0
1.5	**Loans & Advances**									0
1.6	**Accounts Receivables**									0
1.7	**Other Financial Assets**									0
2	**Total Financial Liabilities**	0	0	0	0	0	0	0	0	0
2.1	**Repo Liabilities**	0	0	0	0	0	0	0	0	0
2.1.1	Retail Clients (Individuals)									0
2.1.2	Non-Financial Corporate Clients									0
2.1.3	Banks & Other Deposit-Taking Financial Institutions									0
2.1.4	Other Securities Dealers /FSC Licensees									0
2.2	**Due to Bank of Jamaica**									0
2.3	**Borrowings from Banks & Other Financial Institutions**									0
2.4	**Borrowings under Margin Agreements**									0
2.5	**Other Borrowings**									0
2.6	**Interest Payable on Repos and Borrowings**									0
2.7	**Other Financial Liabilities**									0
3	**Net Financial Assets/(Liabilities) maturing in each range**	0	0	0	0	0	0	0	0	
4	Cumulative Total Assets	0	0	0	0	0	0	0	0	
5	Cumulative Total Liabilities	0	0	0	0	0	0	0	0	
6	Cumulative Gap	0	0	0	0	0	0	0	0	

Foreign currency exposure

Item	US$	£	Can$	€	All other Currencies converted to US$	
Assets	16,318					
Liabilities	0	0	0	0		
Net Long Position[1]	16,318	0	0	0	0	
Net Short Position[2]	0.00				0	
Rate	0.00	0.00	0.00	0.00		**Total**
J$ Equivalent Long Position	1,662,315	0	0	0	0	1,662,315
J$ Equivalent Short Position	0	0	0	0	0	0
Foreign Currency Exposure (higher absolute figure of items 6 and 7 totals)						**1,662,315**

Note:

[1]Net Long Position will exist if Assets > Liabilities

[2]Net Short Position will exist if Assets <Liabilities

Details on inventory of securities by currency

NAME OF SECURITIY	TYPE OF INSTRUMENT (VR/FR)	INITIAL COUPON (%)	ISSUE DATE	MATURITY DATE	FREQUENCY OF COUPON PAYMENT	PREVIOUS RESET COUPON DATE	NEXT RESET COUPON DATE	RESET MARGIN (%)	CURRENT COUPON (%)	ACCOUNTING CLASSIFICATION (HTM/AFS)	CURRENT MARKET VALUE	MARKET YIELDS	ACQUISITON COST

Details on bilateral financial exposures

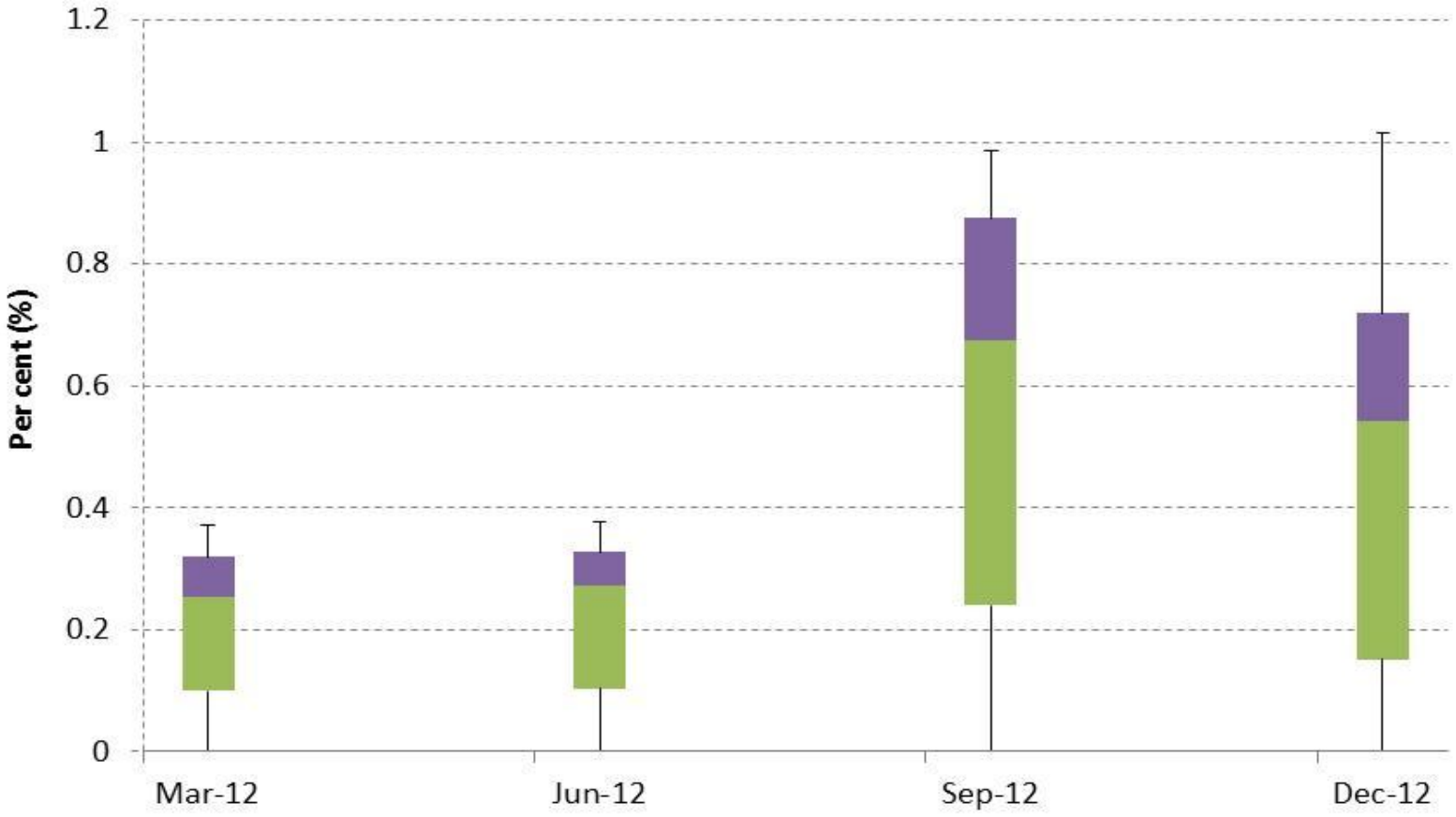
		FUNDING TO									FUNDING FROM									
INSTITUTION NAME	NET FUNDING	TOTAL FUNDING TO		DUE FROM DTIs and NBFIs		SECURITIES ACQUIRED UNDER REPURCHASE AGREEMENTS		SHARES	OTHER (including receivables/ items in course of collection)		TOTAL FUNDING FROM		DUE TO DTIs and NBFIs		SECURITIES SOLD UNDER REPURCHASE AGREEMENTS		OTHER (including interest/items in course of payment etc.)		'FUNDING TO' AS A PERCENTAGE OF TOTAL ASSETS AND OFF-BALFUM	'FUNDING FROM' AS A PERCENTAGE OF TOTAL ASSETS AND OFF-BALFUM
		SECURED	UNSECURED	SECURED	UNSECURED	SECURED	UNSECURED		SECURED	UNSECURED	SECURED	UNSECURED	SECURED	UNSECURED	SECURED	UNSECURED	SECURED	UNSECURED		
DTI#1	383,922	477,804	20,018		18,044	476,428		1,974	1,376		113,900	-			113,801		98		1.5%	0.3%
DTI#2	119,448	-	119,448		119,448						-	-							0.4%	-
SD#1	1,628	-	1,628		1,628						-	-							0.0%	-
LI#1	-	-	-								-	-							-	-
LI#3	51,746	51,746	-			51,617			129		-	-							0.2%	-
	-	-	-								-	-							-	-
	556,745	**529,550**	**141,094**	**-**	**139,121**	**528,046**	**-**	**1,974**	**1,504**	**-**	**113,900**	**-**	**-**	**-**	**113,801**	**-**	**98**	**-**	**2.0%**	**0.3%**

9. Market Risk Assessment for NBFIs

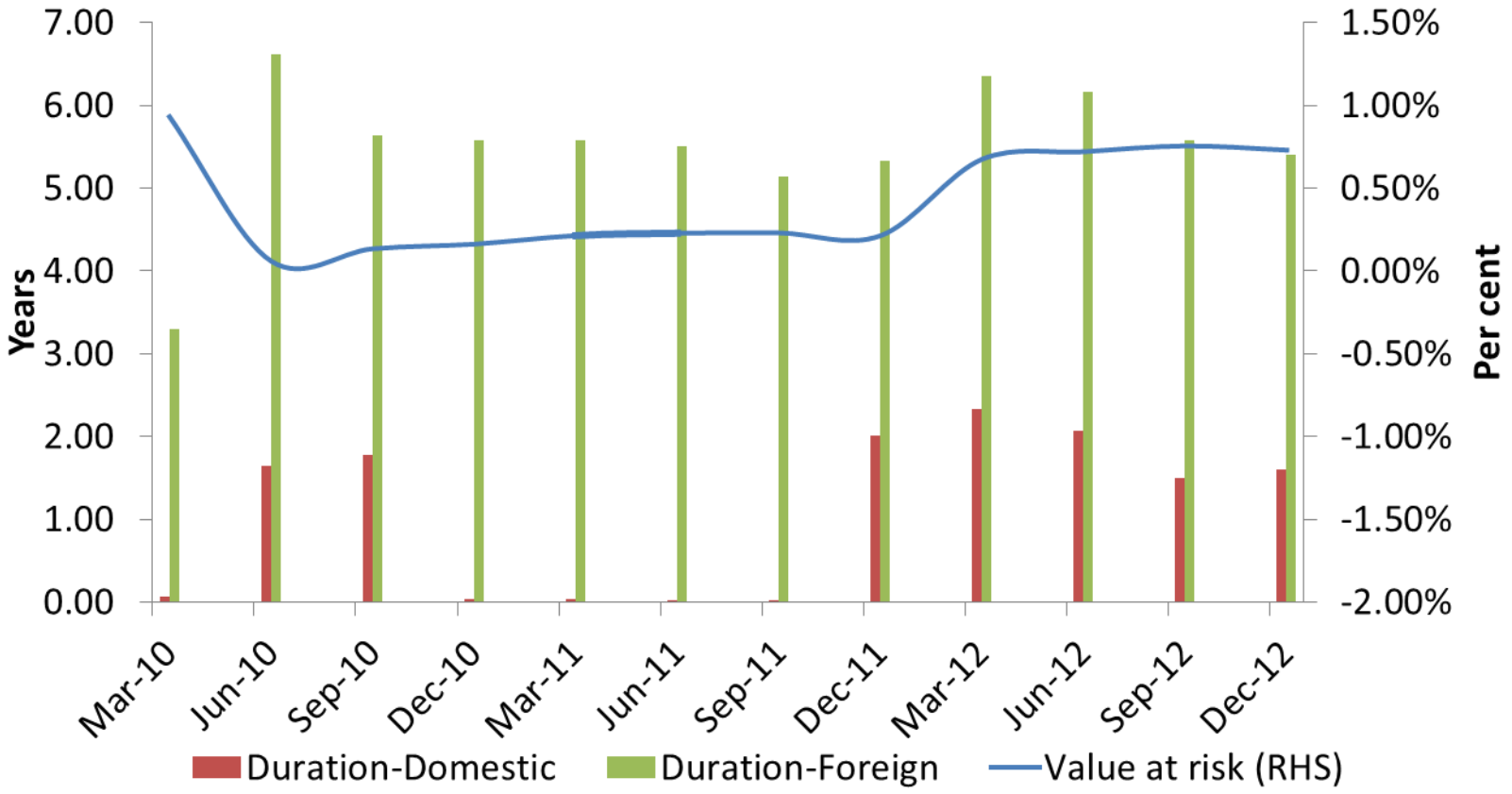
BOJ Value at Risk assumptions

- Macroprudential supervision is concerned with two dimensions of aggregate risk
- The 99 per cent 10-day VAR of a financial institution which reflects volatility in the daily rate of return, relative to which the institution's investment portfolio return is expected to fall below only 1 per cent of the time.
- It summarizes the downside risk to the institution's investment portfolio due to changes in financial variables such as bond yields, currency rates and stock prices over a stipulated period.
- All three VaR approaches are applied, ie., historical simulation, analytical and Monte Carlo simulation.

Value at risk results for SDs



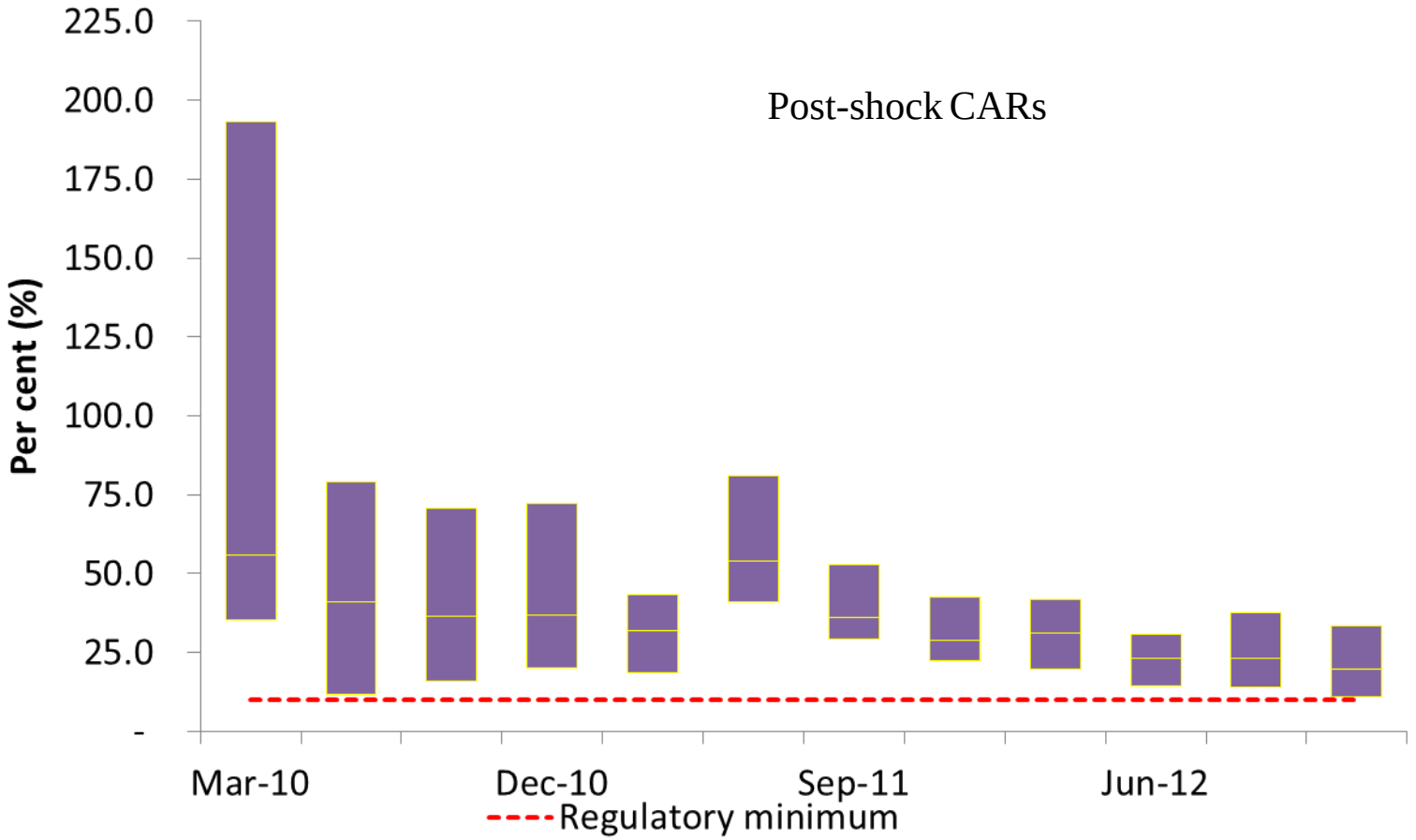
Value at risk results for LIs



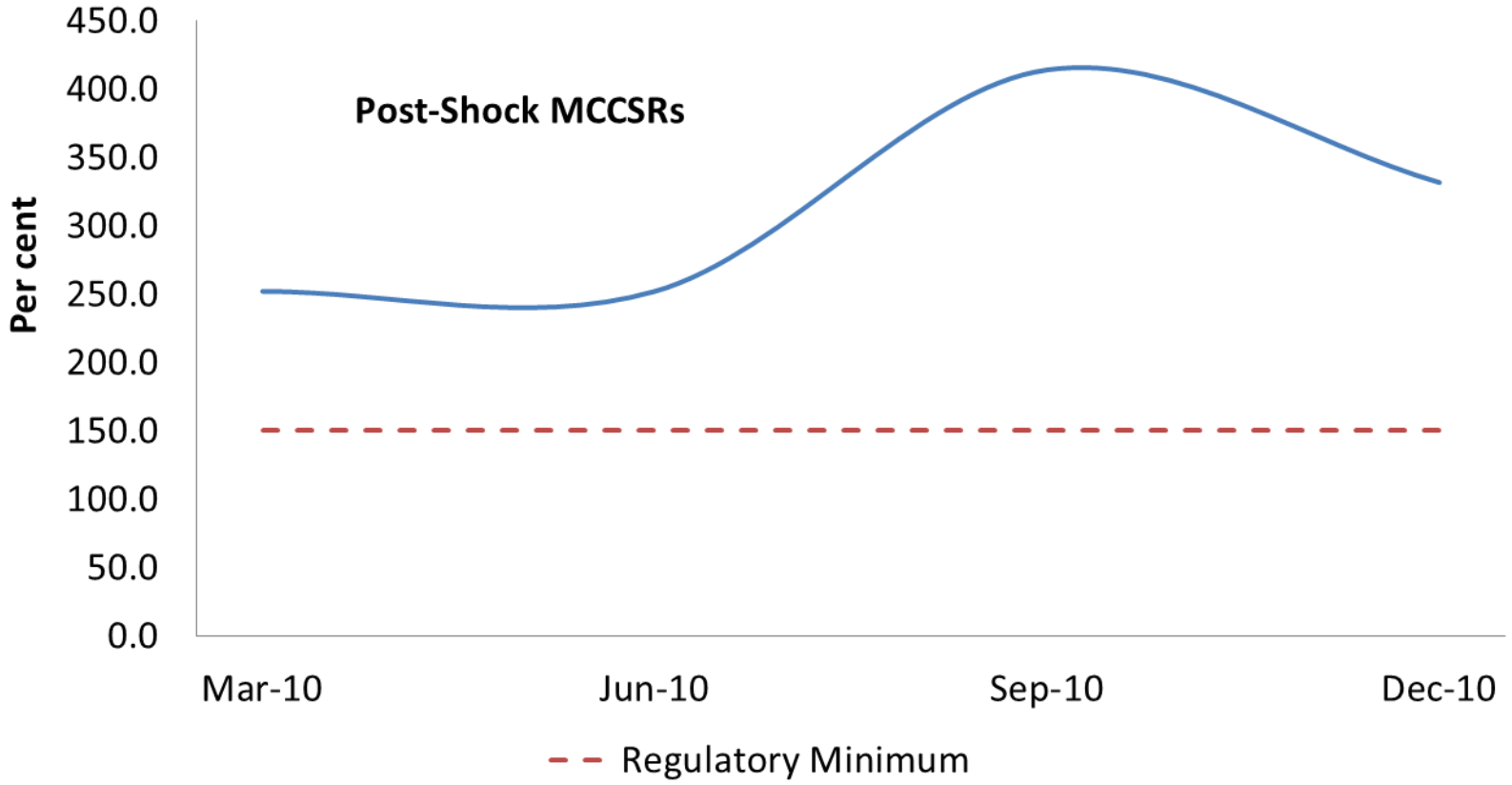
BOJ interest rate risk stress test assumptions

- Repricing buckets: (1) 0 – to 30 days, (2) 31 – to 90 days, (3) 91 to 365 days, (4) 1 year – 2 years, (5) 2 years – 5 years (6) 5 years – 10 years, (7) 10 years – 15 years, (8) 15 – 20 years, (9) over 20 years.
- Each of the net short and long positions are weighted by a proxy duration factor, which accounts for the sensitivity of the value of each of the repricing buckets to a change in interest rates.
- Range of shocks of 1100 bps to 1500 bps applied to domestic securities portfolio and 100 bps to 500 bps applied to domestic deposits and loan portfolio.
- Correlations of 25.0 per cent between domestic and foreign denominated securities and 17.0 per cent between all other domestic assets and all other foreign denominated assets based on historical period of stress.
- Net interest income gain/(loss) represents changes in net interest income from interest sensitive net assets as result of the application of the hypothetical shock.
- Fair value gain/(loss) represents changes in the fair value of domestic & foreign interest rate sensitive securities as result of the application of the hypothetical shock.

Interest rate stress test results for SDs



Interest rate stress tests for LIs



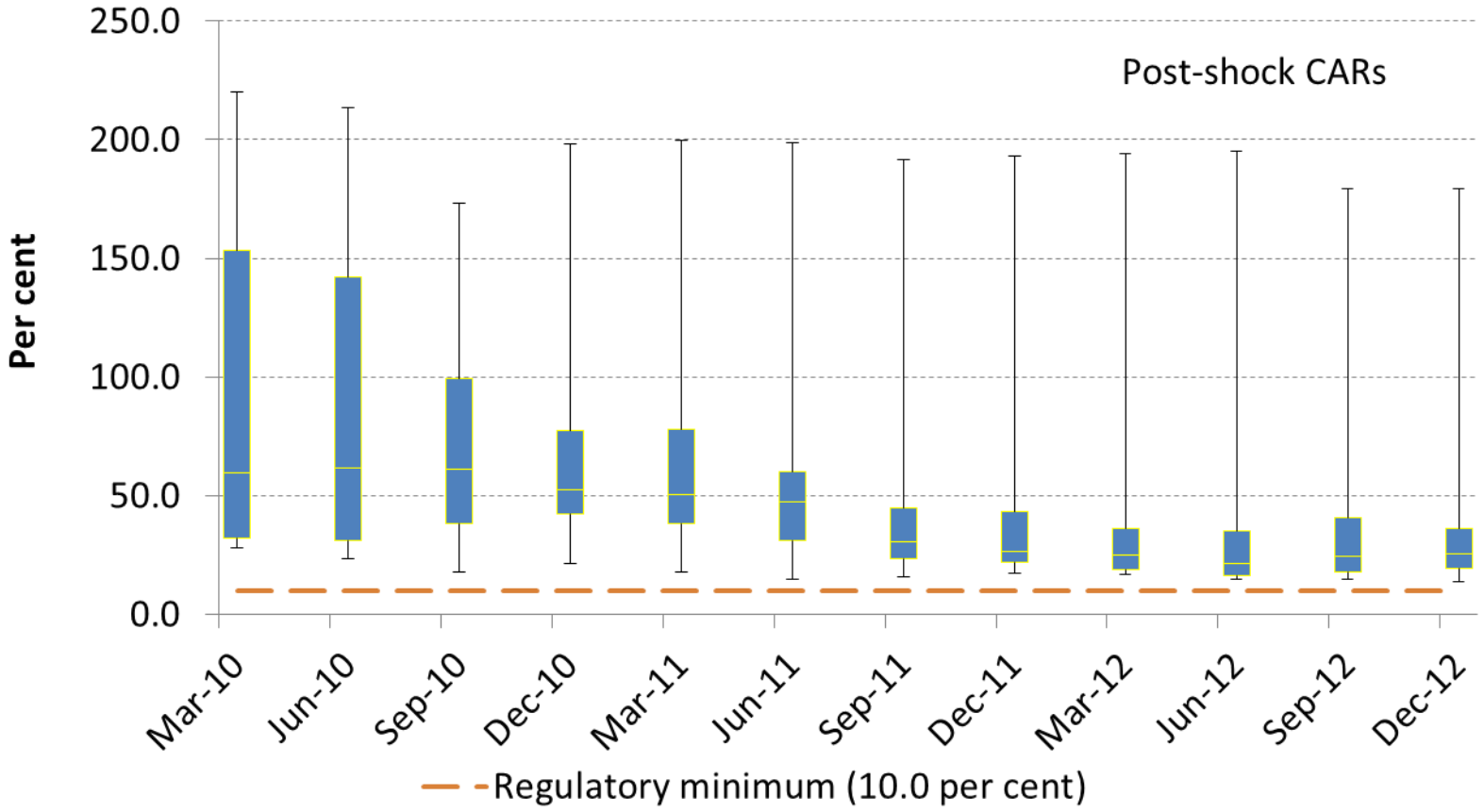
BOJ FX rate stress test assumptions

- The net open position is computed as the sum of the net spot positions, net forward positions and guarantees. Thereafter, the foreign exchange exposure is determined as the maximum of the long and short net open positions across all currencies.

- Hypothetical shocks to the relevant exchange rates are applied to each of the net open positions. The impact of the resulting foreign exchange gain or loss on profitability and capital adequacy are then evaluated.

- Shocks applied firstly to the exchange rate between the local currency and the US dollar. The corresponding exchange rates of the local currency vis-à-vis the Euro, the Canadian dollar and the Pound Sterling were then incorporated based on historical correlations during a period of stress.

FX rate stress test results for SDs

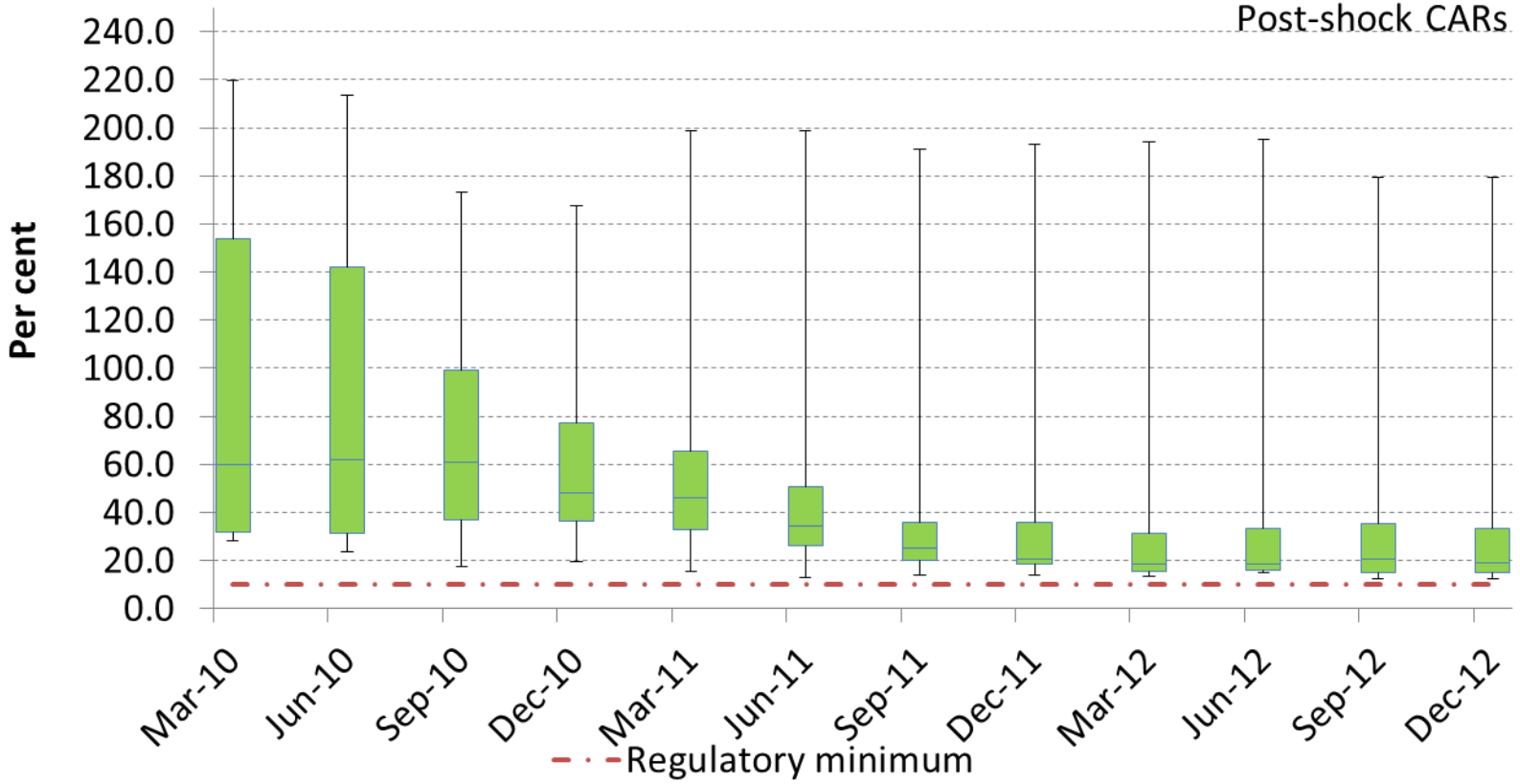


10. Liquidity Funding Risk Assessment for NBFIs

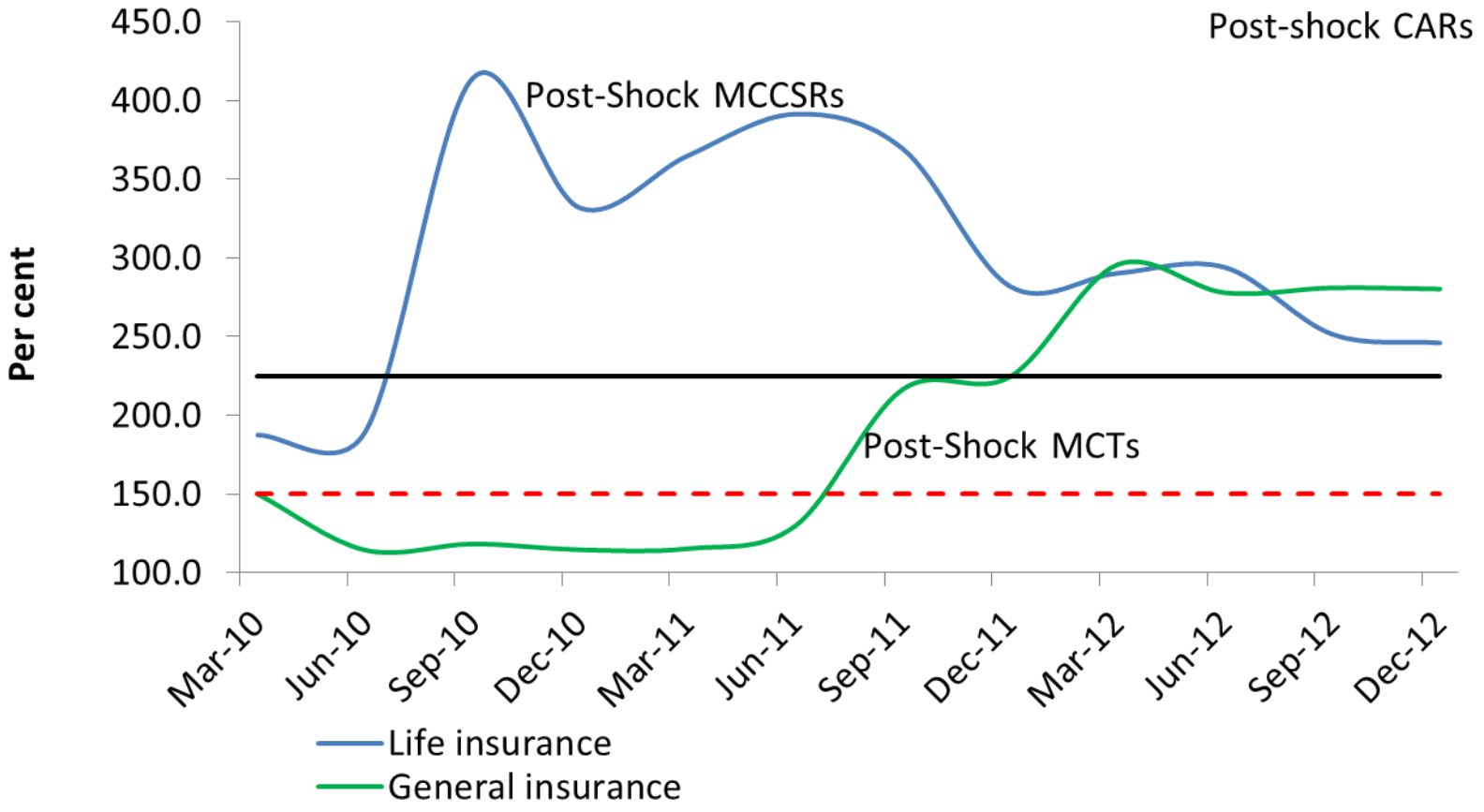
BOJ liquidity funding risk stress test assumptions

- Hypothetical reductions are applied directly to the liability base of the NBFI (eg, repos, lapse rate, low interest rates).
- Assets are assumed to be liquidated, in order of liquidity, so as to satisfy the demand.
- Haircuts are applied to non-liquid assets to satisfy further declines in liabilities.
- In order to meet the obligation of a 20.0% to 100.0% short-term liabilities (eg, maturing within 0-30 days), there are assumed 'hair cuts' on the following categories of assets: Non-liquid investments (25%), Accounts Receivables (25%), Loans & Adv. (25%) Fixed Assets (50%) and Other Assets (50%).
- The resulting impact on capital adequacy is then evaluated.

Liquidity funding stress test results for SDs



Liquidity funding stress tests for ICs



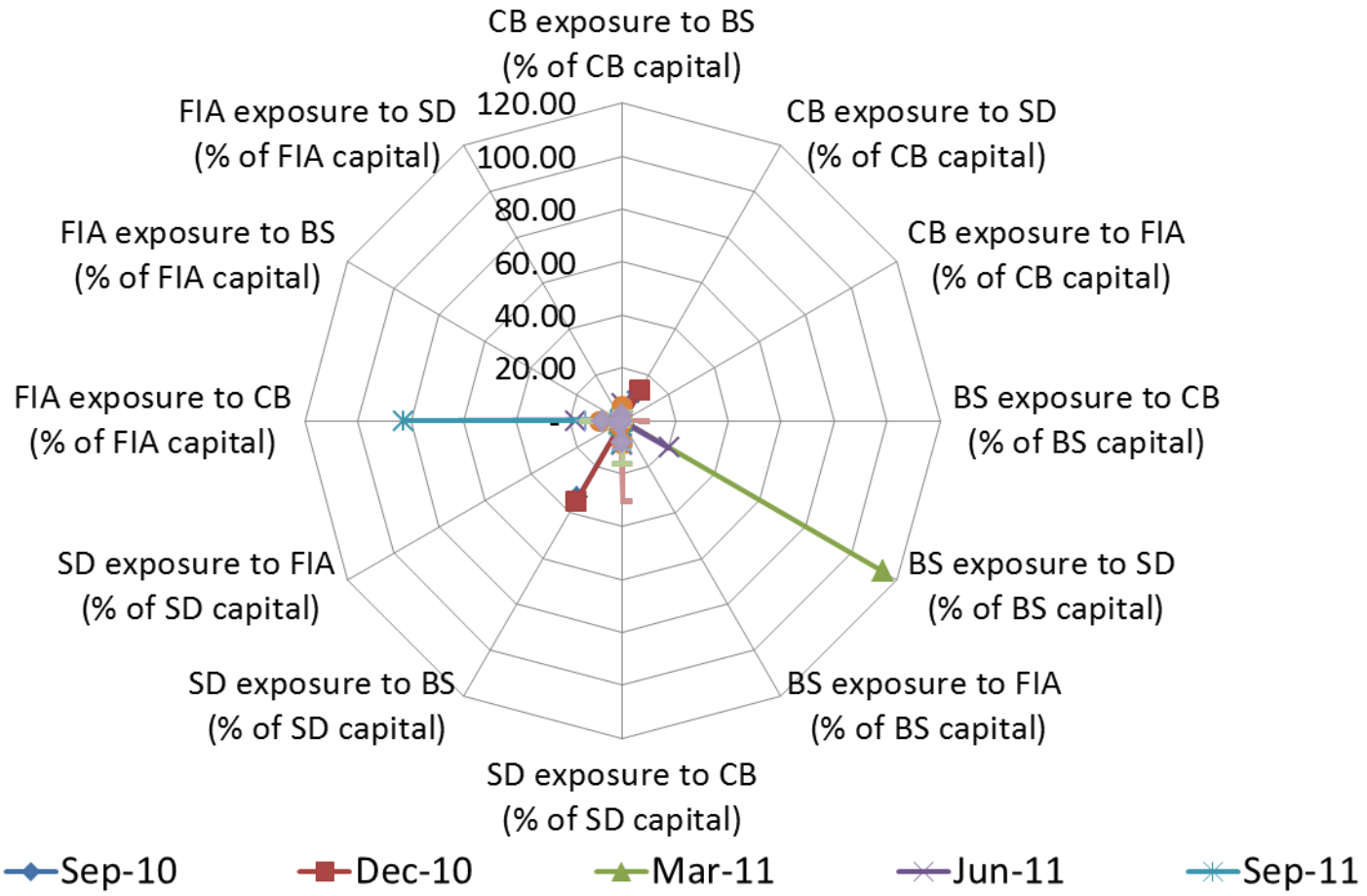
11. Contagion Risk Assessment

BOJ contagion stress test assumptions

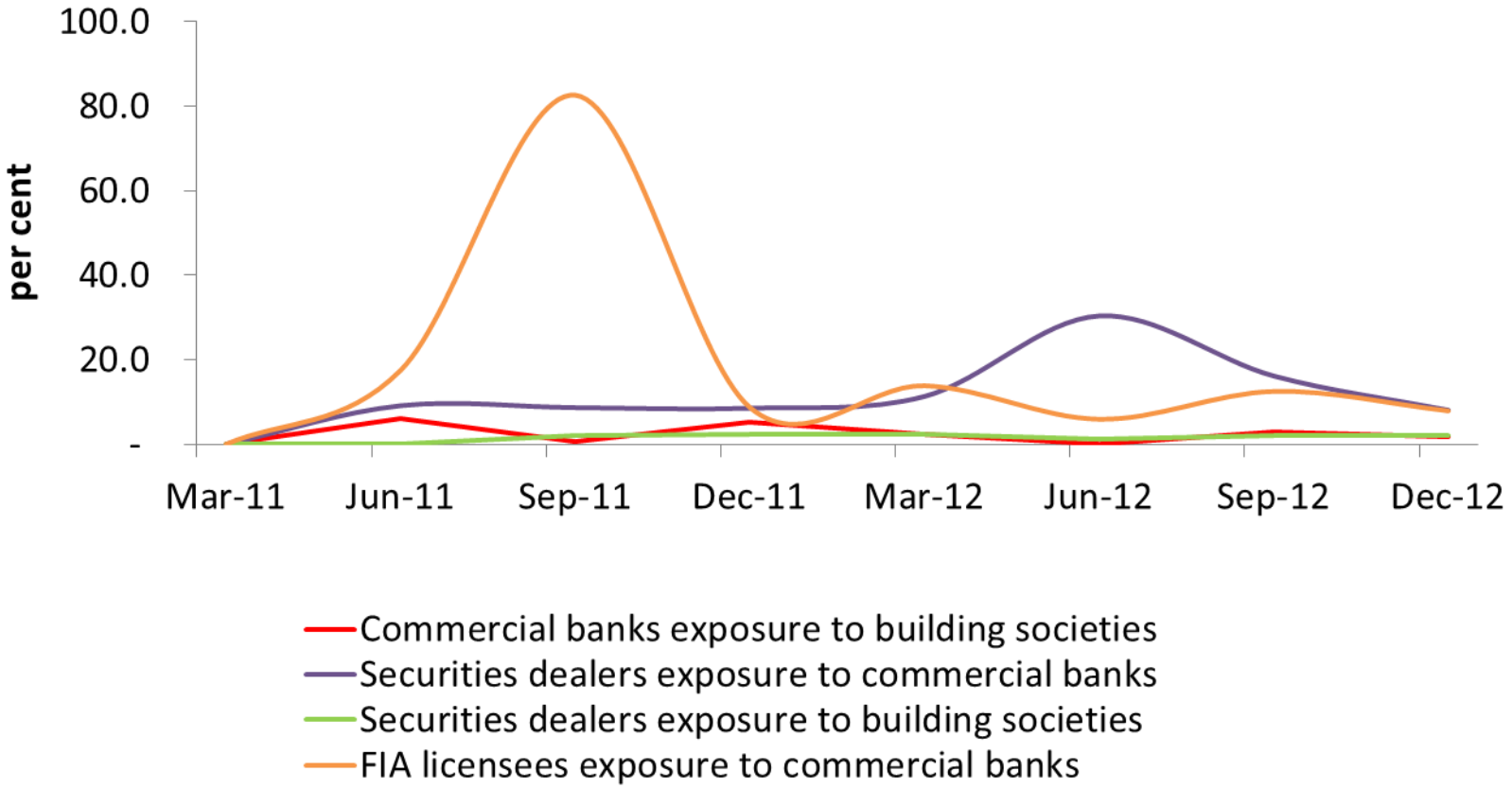
- Contagion stress tests rely on a matrix of bilateral exposures, which provides information on the exposure of each FI to other financial institutions

1. 'Macro-Contagion' focuses on those DTIs and NBFIs that become insolvent subsequent to the 'Aggregate Stress Test'. The purpose of this stress test is to determine the impact of interbank net credit exposure relationships on institutions' CAR after the application of shocks from the Aggregate Stress Test.
   - The Aggregate Stress Test framework involves an assessment of the simultaneous impact of: increases in interest rates, currency depreciation, credit quality deterioration and liability outflow
2. 'Pure Contagion' assess the system impact from the random failure of DTIs and NBFIs.

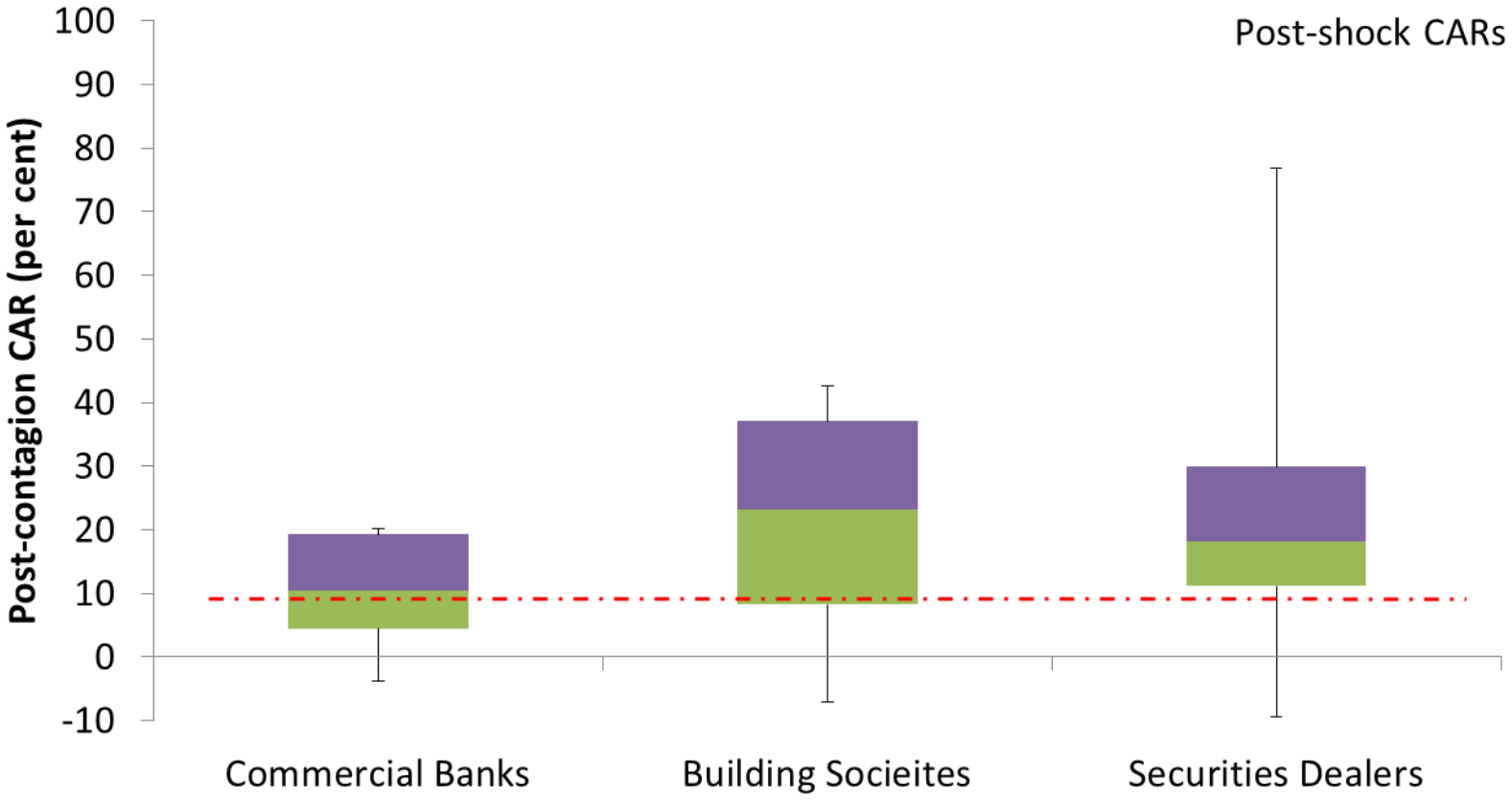
System contagion by sector (as a % of capital)



Net credit exposure-to-capital by sector



Scenario: Impact on CAR of the failure of institution(s) on financial entity with large net credit exposure



Thank you for your attention!