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Risk Exposures in International and Sectoral Balance Sheets

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Introduction

- Trend growth in gross scale of international and sectoral balance sheets
- Balance sheet dynamics: financial flows; valuation effects
- "Balance sheet" recessions; debt overhang; debt restructuring
- International data: IIP; CPIS; CDIS; UN; BIS
- Sectoral data: sectoral financial accounts

Outline

- Risks in International Balance Sheets
  - Net external stock imbalances
  - Composition of foreign assets/liabilities
  - International currency exposures
- Risks in Sectoral Balance Sheets
  - Net sectoral financial positions
  - Sector-by-sector balance sheet analysis

Net External Stock Imbalances

- Crisis risk
- Sudden stops; rollover risk
- NIIP
- Net debt; Net equity
- Role of valuation effects (stabilising or destabilising?)

Stock-Flow Adjustments

$$NIIP_t - NIIP_{t-1} = CA_t + SFA_t$$

$$SFA_t = NETVAL_t + NETOTH_t$$

SFA: Stabilising or Destabilising?

$$SFA_{it} = \alpha + \beta NETFLOW_{it} + \varepsilon_{it}$$

$$SFA_{it} = \alpha + \delta SFA_{it-1} + \varepsilon_{it}$$

Composition of Foreign Assets/Liabilities

- Expansion in scale of international balance sheet (especially, advanced economies)
- Debt-equity mix; maturity; currency composition; geography; sectoral allocation
- 'Granular' analysis
- Asymmetry: advanced versus developing countries
- Lane and Milesi-Ferretti (2001, 2007, 2013)

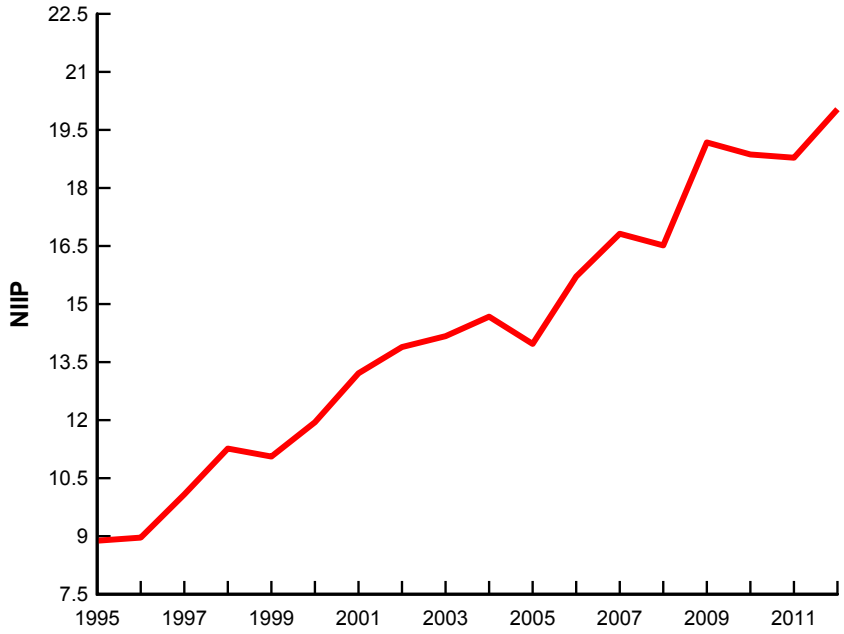

Figure 1: Net International Investment Position Global Index. Note: Average of global net creditor and net debtor positions, expressed as a ratio to global GDP. Based on updated version of Lane and Milesi-Ferretti (2007).

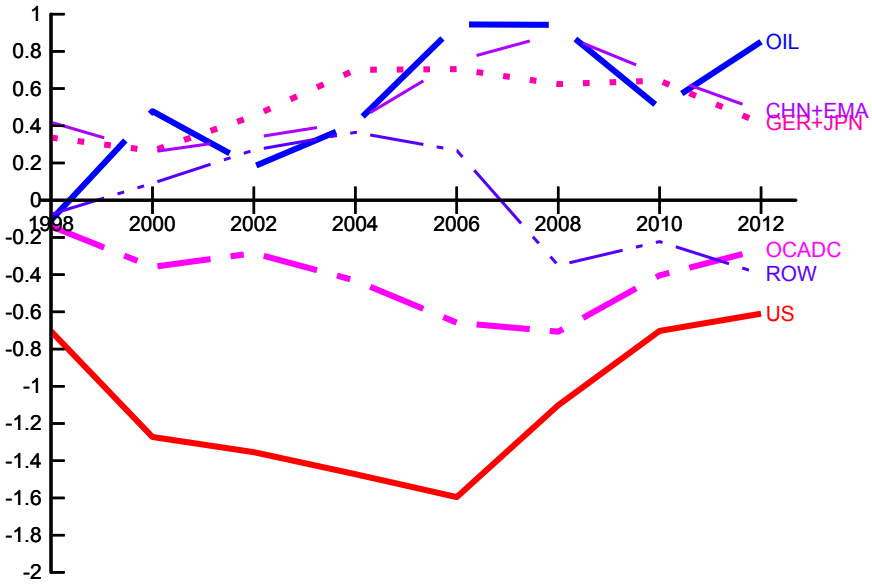

Figure 2: Global Current Account Imbalances, 1998 to 2012. Note: Based on World Economic Outlook (October 2013). CHN+EMA = China, Hong Kong SAR, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan Province of China, Thailand; DEU+JPN = Germany and Japan; IP = industrial production; OCADC = Bulgaria, Croatia, Czech Republic, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Turkey, United Kingdom; OIL = oil exporters; ROW = rest of the world; US = United States.

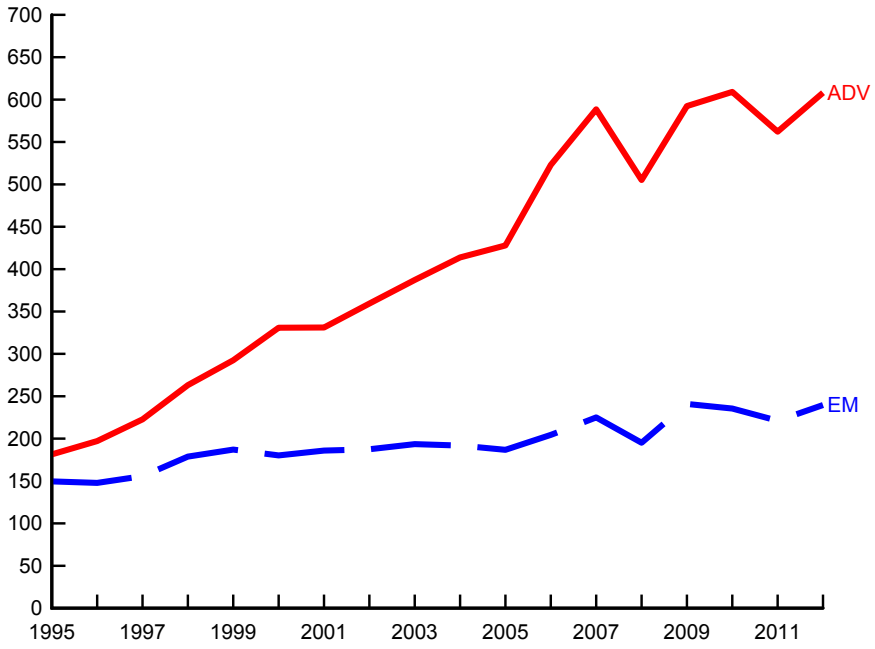

Figure 3: International Financial Integration (IFI) Ratios: Advanced and Emerging Economies, 1995-2012. Note: IFI ratio is sum of foreign assets and foreign liabilities, expressed as a ratio to GDP. Based on updated version of Lane and Milesi-Ferretti (2007).

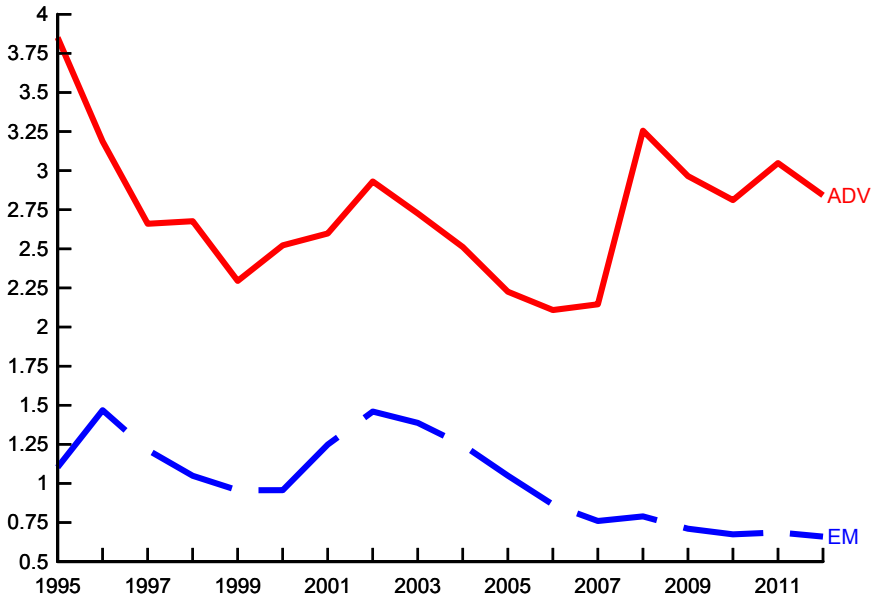

Figure 4: Debt-Equity Ratios in Foreign Liabilities: Advanced and Emerging Economies, 1995-2012. Note: Based on updated version of Lane and Milesi-Ferretti (2007).

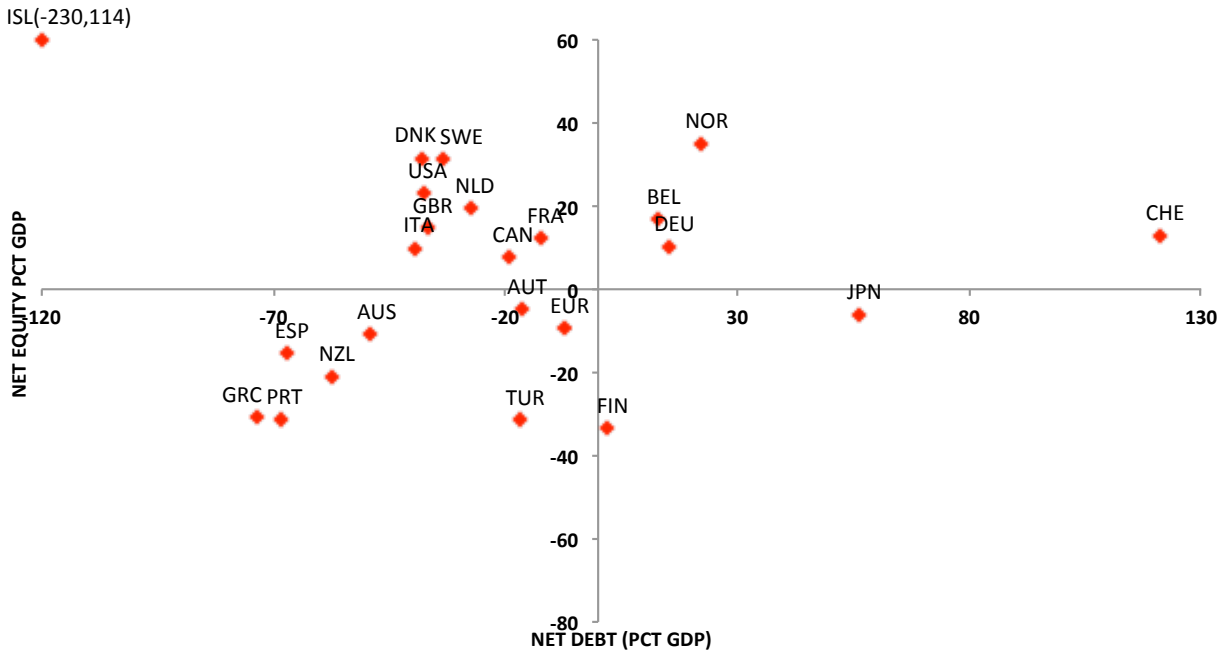

Figure 5: Net Debt and Net Equity Positions: Advanced, 2007. Note: Ratios to GDP. Based on updated version of Lane and Milesi-Ferretti (2007).

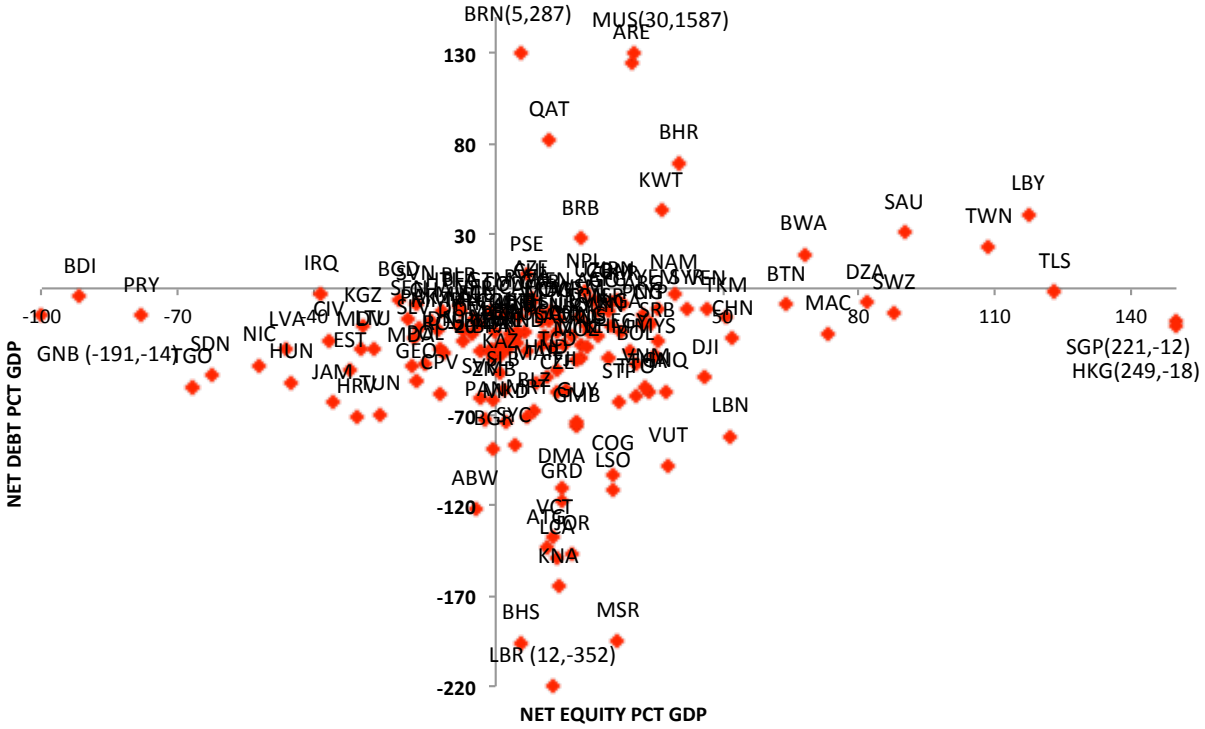

Figure 6: Net Debt and Net Equity Positions: Emerging Markets, 2007. Note: Ratios to GDP. Based on updated version of Lane and Milesi-Ferretti (2007).

Table 1: Stock-Flow Adjustments in Net International Investment Position: Euro Area

	2002-2007		
	△NIIP	SUMFLOW	SFA
Austria	-8.2	-10.0	-18.2
Belgium	7.6	-8.6	-1.0
Finland	-7.9	-19.4	-27.3
France	-4.8	1.1	-3.6
Germany	23.4	-22.3	1.1
Greece	-74.1	33.3	-40.8
Ireland	-11.5	11.1	-0.4
Italy	-19.7	7.2	-12.5
Netherlands	7.7	-28.9	-21.2
Portugal	-62.6	33.8	-28.8
Spain	-62.0	26.3	-35.7
	2007-2011		
	△NIIP	SUMFLOW	SFA
Austria	13.1	-11.9	1.3
Belgium	31.0	3.5	34.5
Finland	38.6	-5.4	33.3
France	-18.6	6.9	-11.6
Germany	1.3	-23.0	-21.7
Greece	26.3	45.5	71.8
Ireland	-66.4	10.7	-55.6
Italy	3.2	11.5	14.7
Netherlands	36.4	-22.4	13.9
Portugal	-8.7	35.5	26.7
Spain	-4.8	20.9	16.1

Note: SUMFLOW and SFA refer to cumulative net financial flow and stock-flow adjustment term respectively (ratios to GDP). Source: Based on IMF BOP data and updated version of Lane and Milesi-Ferretti (2007).

Table 2: Are Stock-Flow Adjustments Stabilising?

	(1) EA 0207	(2) EA 0711	(3) EA 0711	(4) ADV 0207	(5) ADV 0711	(6) ADV 0711
α	-15.10***	6.40	-10.30	-0.15***	0.003	-0.06
	(3.90)	(8.20)	(9.50)	(.03)	(.07)	(.07)
SUMFLOW0207	0.43**			0.19*		
	(.16)			(0.10)		
SUMFLOW0711		-0.71*			0.89	
		(.32)			(-1.20)	
SFA0207			-1.35**			-0.20
			(.44)			(.37)
R^2	0.40	0.24	0.49	0.10	0.09	0.003
N	12	12	12	31	31	31

Note: OLS regressions. EA is euro area 12 sample, ADV is 31 country sample of advanced countries. SFA is stock-flow adjustment, SUMFLOW is cumulative net financial flow. Robust standard errors in parentheses. ***, **, * refer to significance at 1, 5 and 10 percent levels respectively.

International Currency Exposures

- Valuation impact of currency movements
- Foreign-currency debt and exchange rate policies
- Shifting exposures over time
- Lane and Shambaugh (2010); Benetrix et al (2013)
- "Financial" exchange rate indices
- Aggregate FX exposures

Aggregate FX Exposures

$$FX^{AGG} = \omega^{A} s^{A} - \omega^{L} s^{L}$$

$$(s^{A} = A / A + L)$$

$$(-1 \leq FX^{AGG} \leq 1)$$

$$NETFX = FX^{AGG} * IFI$$

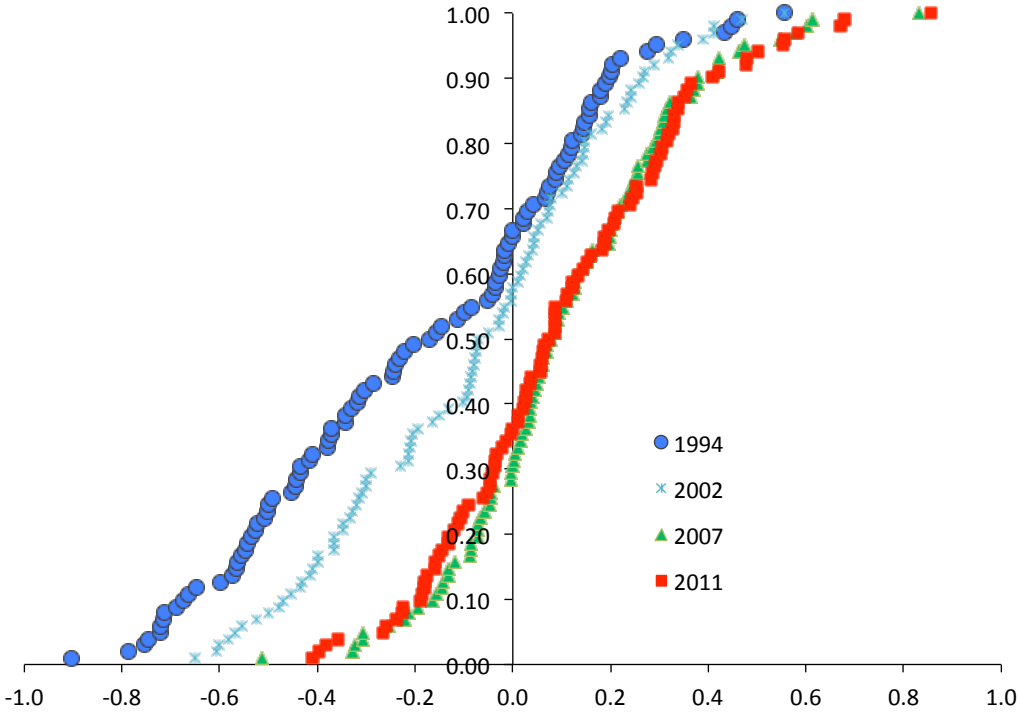

Figure 7: FXAGG Index: Cross-Country Distribution. Note: Drawn from Benetrix and Lane (2013).

Table 3: International Currency Exposures

	1994	2002	2007	2011	N
			FXAGG		
All	-0.16	-0.06	0.08	0.08	102
Advanced	0.05	0.05	0.08	0.10	22
Emerging	0.01	0.07	0.23	0.19	28
Developing	-0.42	-0.22	0.01	-0.03	52
			NETFX		
All	-0.15	-0.05	0.17	0.14	102
Advanced	0.06	0.18	0.39	0.40	22
Emerging	0.01	0.10	0.35	0.27	28
Developing	-0.47	-0.28	0.02	-0.03	52

Note: FXAGG is index of aggregate foreign currency exposure. NETFX is ratio of net foreign currency assets to GDP. N: number of countries. Based on Benetrix and Lane (2013).

Sectoral Balance Sheets

- Financial Corporates (FC)
- Non-Financial Corporates (NFC)
- Households (HH)
- Government (GOVT)
- Rest of World (Linked to IIP)
- [Non-consolidated; consolidated]

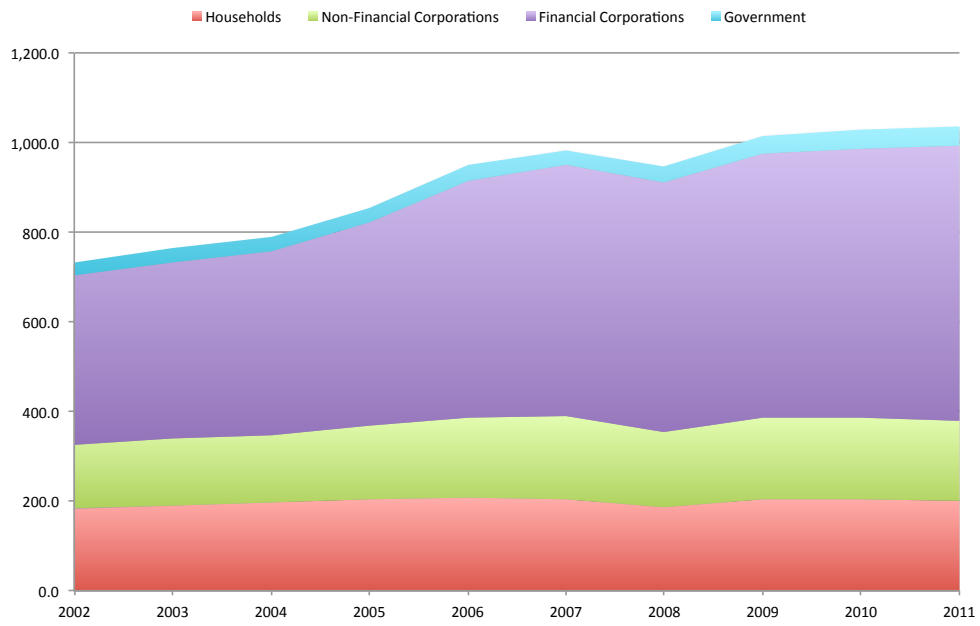

Figure 10: Sectoral Composition of Financial Assets in the Euro Area, 2002-2011. Source: Eurostat.

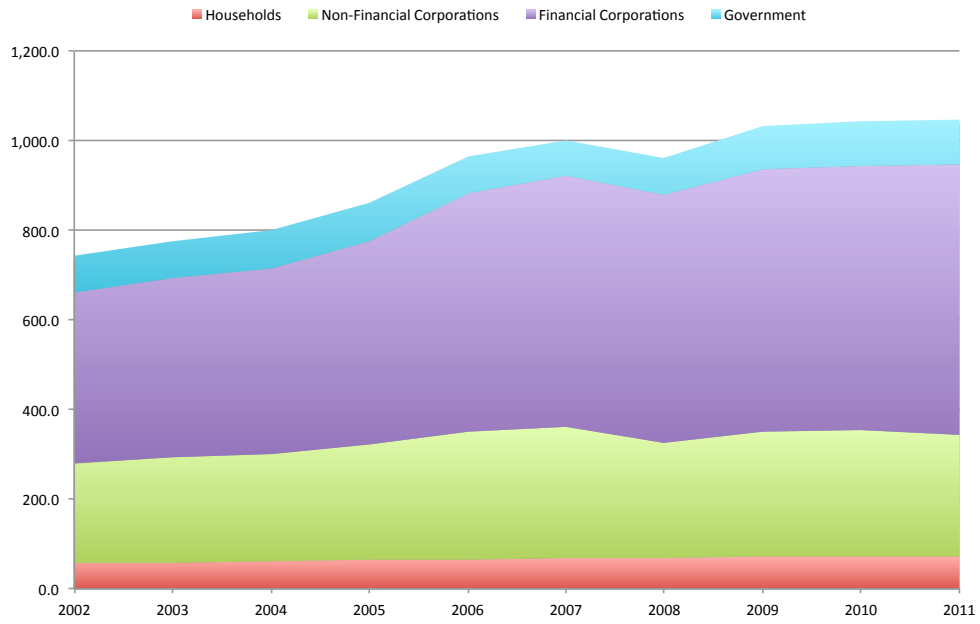

Figure 11: Sectoral Composition of Financial Liabilities in the Euro Area, 2002-2011. Source: Eurostat.

Net Sectoral Financial Positions

$$NIIP = NFINA^{FC} + NFINA^{NFC} + NFINA^{HH} + NFINA^{GOVT}$$

$$SFA^{NIIP} = SFA^{FC} + SFA^{NFC} + SFA^{HH} + SFA^{GOVT}$$

Table 4: Stock-Flow Adjustments: Correlation Matrices

	HH	NFC	FC	GOVT	ROW
		2002-2007			
HH	1.00				
NFC	-0.55	1.00			
FC	-0.01	-0.28	1.00		
GOVT	-0.16	-0.37	0.20	1.00	
ROW	-0.31	-0.40	-0.30	0.13	1.00
		2007-2011			
HH	1.00				
NFC	-0.60	1.00			
FC	-0.36	0.21	1.00		
GOVT	-0.55	0.18	0.23	1.00	
ROW	0.41	-0.71	-0.75	-0.35	1.00

Note: Pair-wise correlations across stock-flow adjustment terms for each sector. HH: households; NFC: non-financial corporates; FC: financial corporates; GOVT: government; ROW: rest of world. Source: Eurostat.

Table 5: Stock-Flow Adjustments: 2002-2007 and 2007-2011

Households	-0.10
Non-Financial Corporates	-0.55
Financial Corporates	-0.50
Government	-0.23
Rest of World	-0.68

Note: Correlation in stock-flow adjustment terms for 2002-2007 and 2007-2011 for each sector.

Financial Sector

- Net aggregate position typically small
- Large intra-sectoral positions
- Asset-side risks; Liability-side risks
- Growth in cross-border financial linkages; global liquidity as a driver of balance sheet growth
- Role of foreign-owned banks
- Non-bank funding sources; Non-bank intermediation

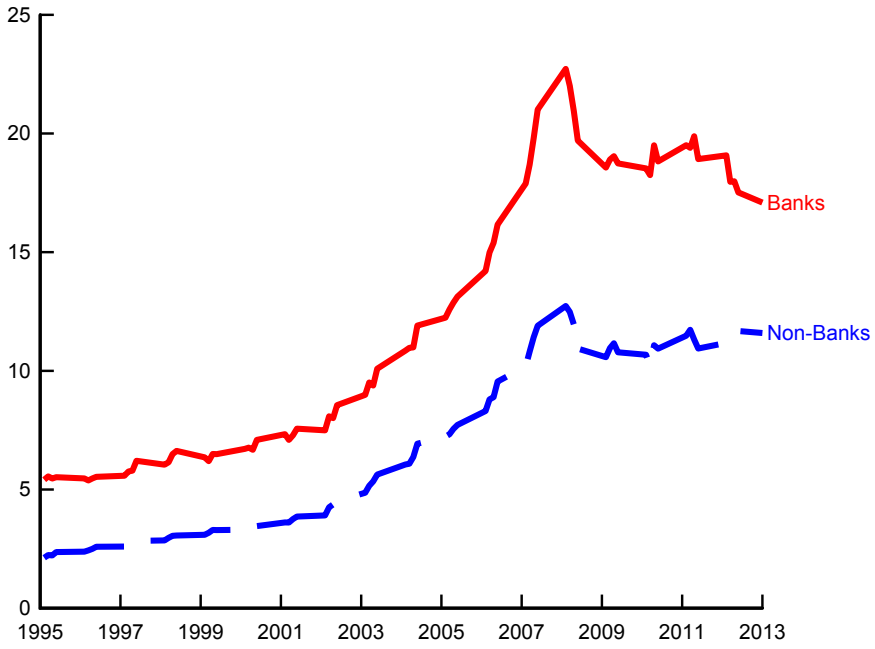

Figure 8: External Assets of BIS-Reporting Banks, 1995.1-2013.2. Note: Based on Table 1 of BIS Locational Banking Statistics. Banks and Non-Banks refer to sector of the counterparties.

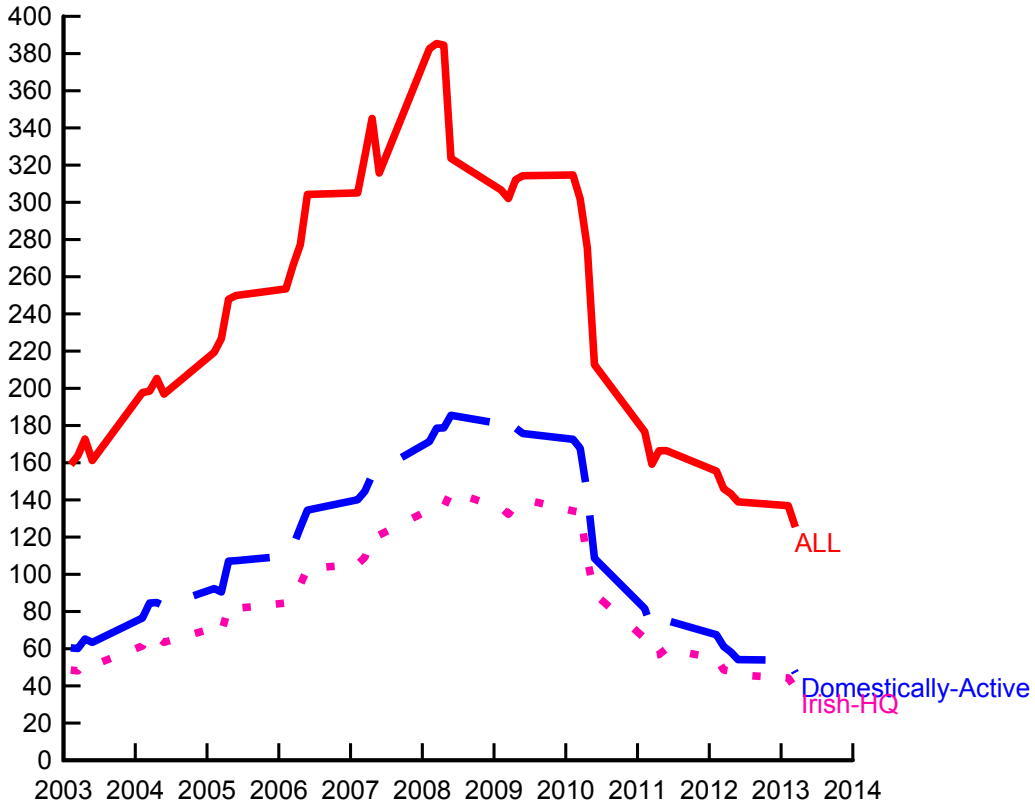

Figure 9: Foreign Liabilities of Irish Banks, 2003.1 to 2013.2. Note: Expressed as ratios to GDP. ALL: Irish-resident banks; Domestically-Active: substantial lending to Irish counterparties; Irish-HQ: banks headquartered in Ireland. Source: Central Bank of Ireland.

Non-Financial Corporates

- Exporters versus domestic firms
- Foreign-owned firms versus locally-owned firms
- Construction sector (correlated with HH sector)
- Firm size distribution
- Sources of non-bank funding

Households

- Net HH wealth and consumption dynamics
- Non-financial assets (housing)
- Present value of future earnings
- Variation in composition of financial assets
- Variation in household debt
- Cross-sectoral implications of HH debt relief

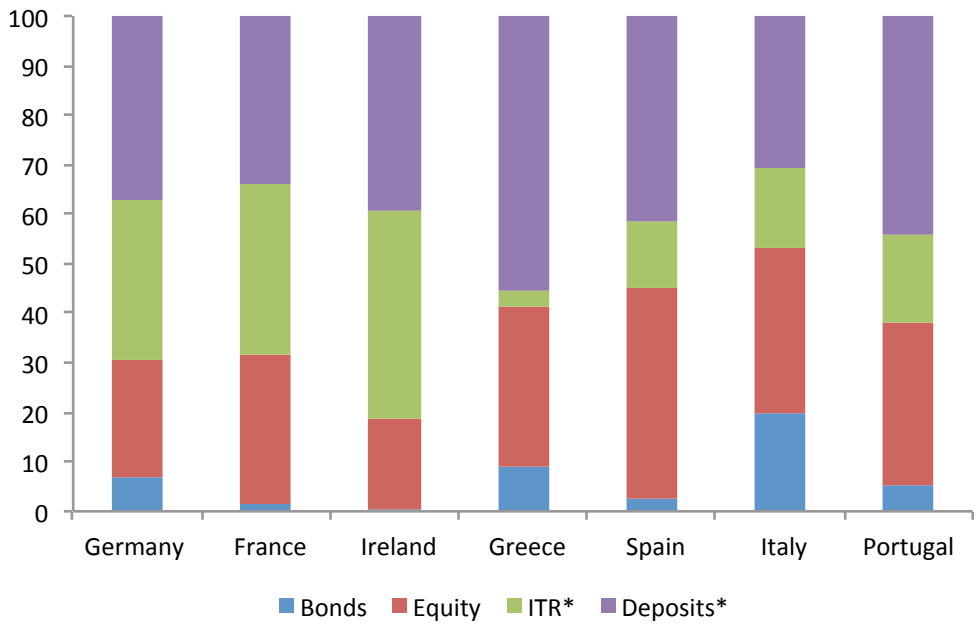

Figure 12: Composition of Household Financial Assets, 2007. Note: Bonds denotes "securities other than shares" category; ITR denotes "insurance technical reserves" category; Deposits* includes residual "other receivables" category in addition to "deposits" category. Source: Eurostat.

The Government Balance Sheet

- Comprehensive view of government balance sheet (financial assets; contingent liabilities; implicit liabilities)
- Consolidation with central bank
- Present value of future tax revenues
- Public balance sheet and crisis management (bailouts)
- Cross-sectoral impact of sovereign default risk (banks, households, NFCs, ROW)

Table 6: Impact of Financial Crisis on Government Balance Sheets: Euro Area

	2009	2010	2011	2012
Assets (€ billions)	211	387	349	362
Loans	26	25	29	46
Securities other than shares	80	296	223	216
Equity	105	116	97	100
Liabilities (€ billions)				
Loans	39	245	212	191
Securities other then shares	182	224	242	336
Contingent Liabilities (€ billions)				
Guarantees	691	473	491	490
Securities issued under liquidity schemes	5	8	3	3
Special Purpose Entities	78	99	83	86
Assets (%GDP)	2.4	4.2	3.7	3.8
Liabilities (%GDP)	2.5	5.1	4.8	5.5
Contingent Liabilities (%GDP)	8.7	6.3	6.1	6.1

Note: Source is Eurostat (2013).

Conclusions

- Risk analysis of balance sheets: opportunities and pitfalls
- Net positions; inter-sectoral and intra-sectoral cross-holdings; role of valuation channel
- Data gaps: ultimate beneficial ownership; sub-sectoral disaggregation
- Stronger theoretical foundations (difficult – nonlinearities; interconnections)