

# International Financial Flows in the New Normal: Key Patterns

Natacha Valla (EIB)

wiiw seminar on Policy Perspectives for European Integration

8 July 2016

1. Introduction
2. Common beliefs about capital flows
3. Establishing stylised facts in the New Normal (bird's eye view)
4. Understanding financial “networks”
5. Policy implications



## 2 Common views about capital flows

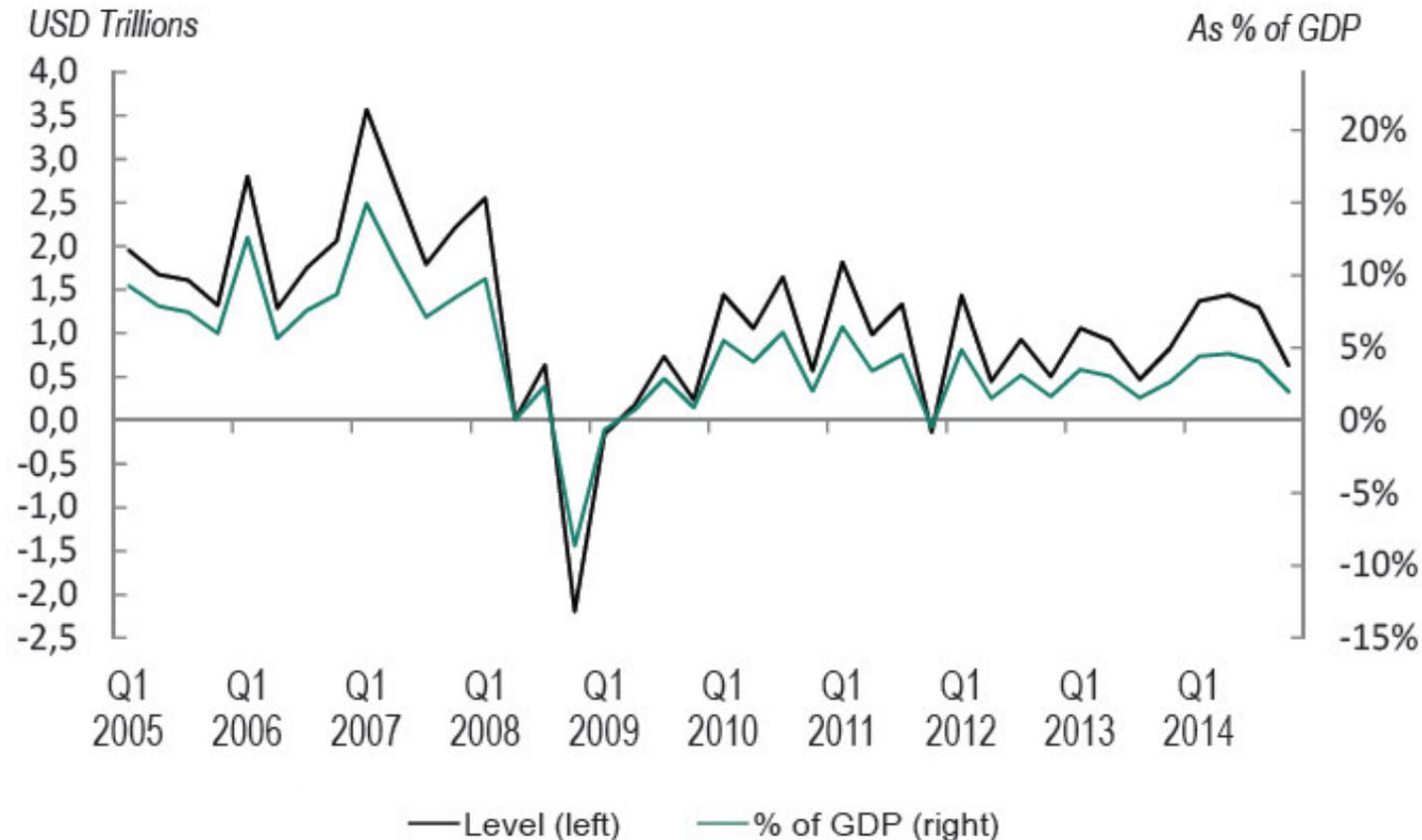
1. Financial globalisation mirrored trade integration
2. Pre-crisis: solid network of financial centers (London, NY, Tokyo...), advanced economies
3. Financial vulnerabilities often associated with currency crisis of commodity prices
4. Since 2008, emerging economies became vulnerable
5. Euro area refragmented

# Stylised facts in the New Normal

1. Look at 40 countries (EMs and AEs)
2. Focus on gross rather than just net flows
3. Check changes in
  1. Magnitude
  2. Geographic
  3. Sectoral composition
  4. Volatility
4. Data sources
  1. Balance of Payments
  2. BIS Locational Banking Statistics
  3. TIC data

# The Great Retrenchment has persisted

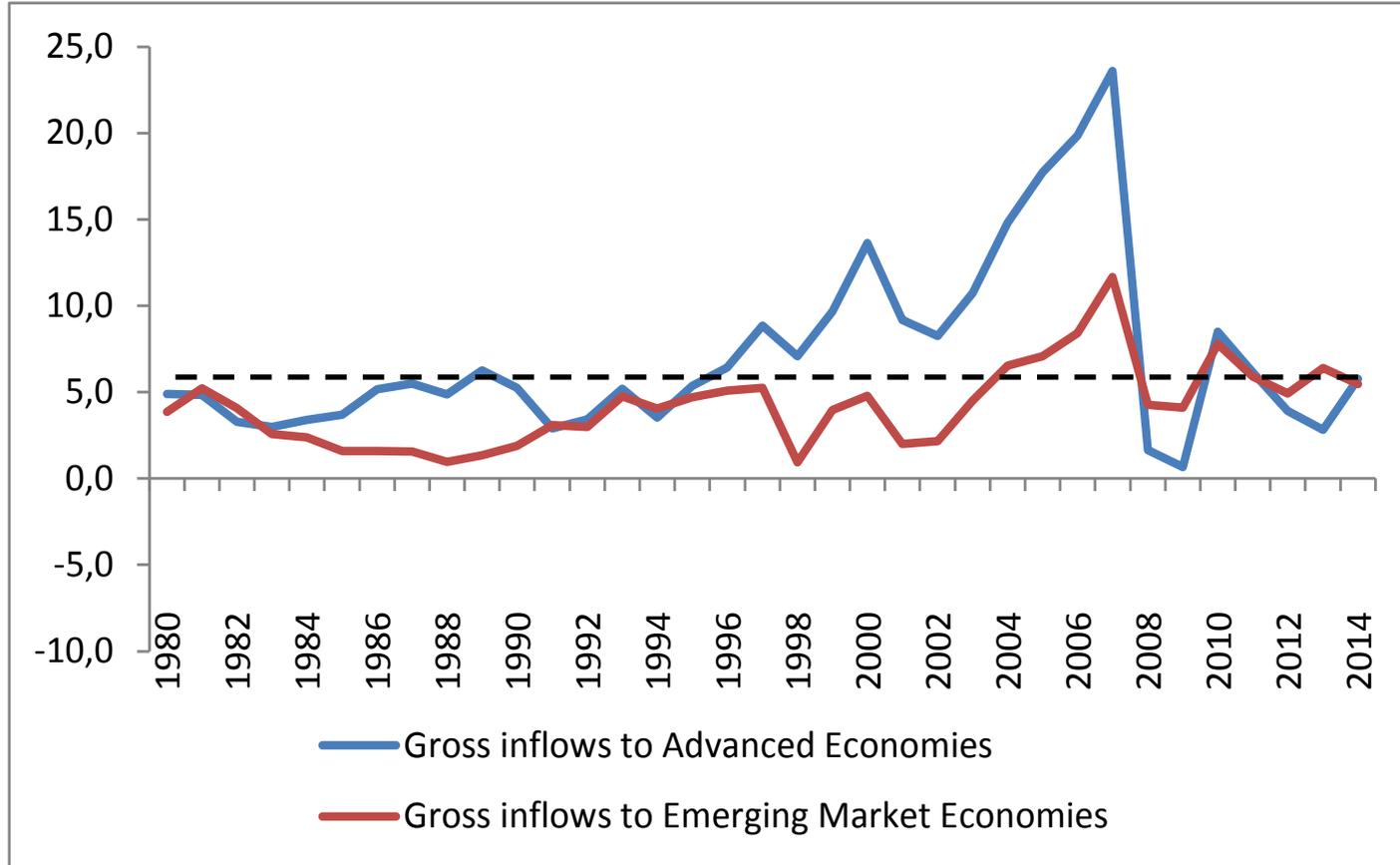
## Global gross capital flows



Source: Bussière, Schmidt and Valla, 2016.

# Gross Capital Flows are fairly procyclical

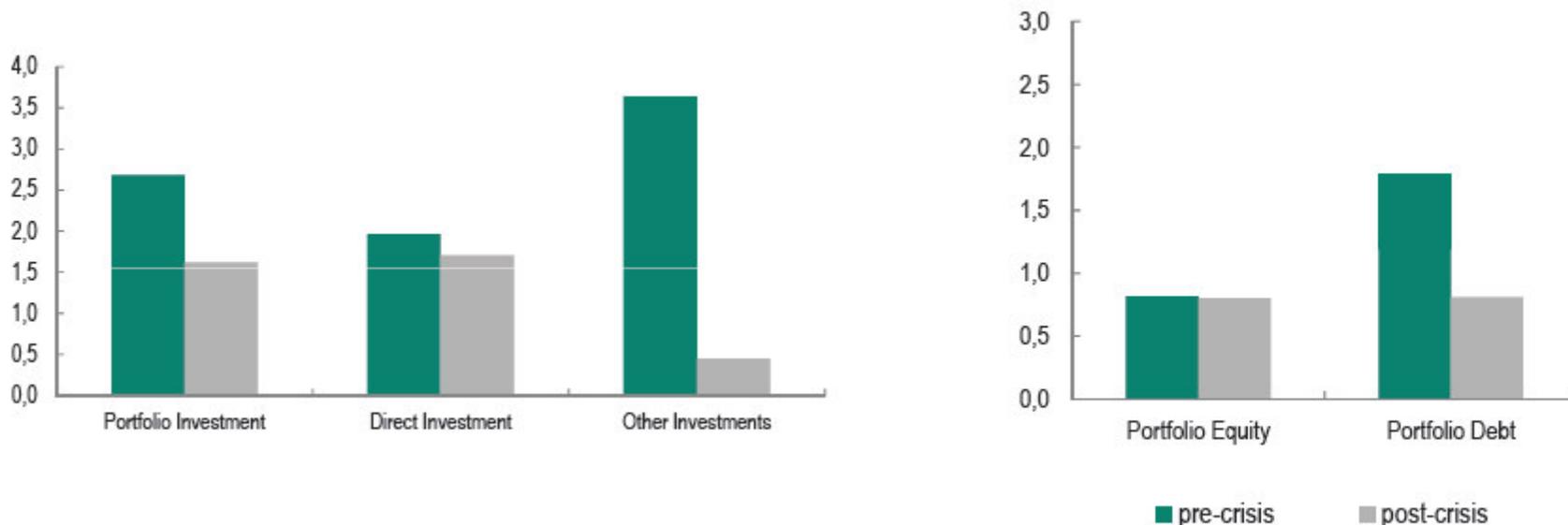
## Gross inflows in advanced and emerging market economies (% GDP)



Source: Bluedorn et al. (2013).

# Not all flows have been equally retrenching...

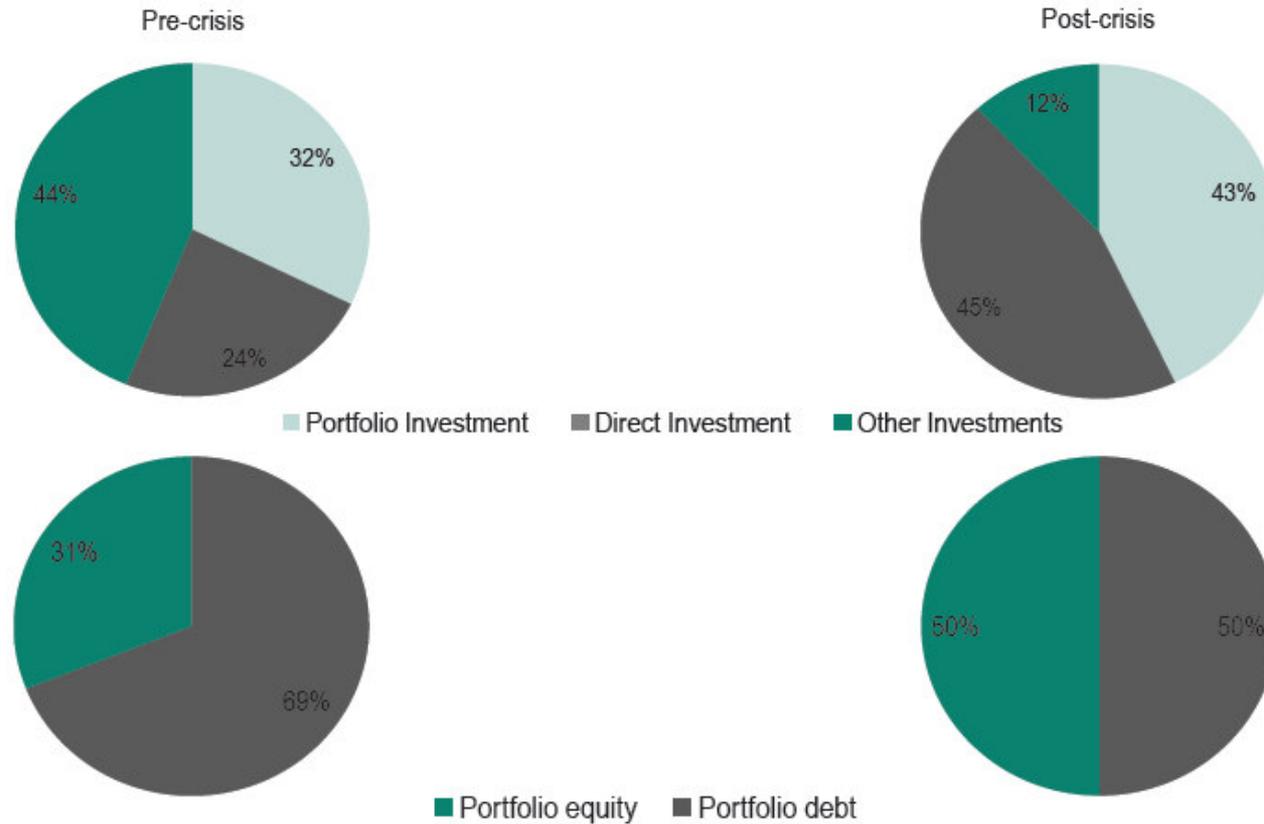
## Global gross financial flows by category before and after the crisis (% of GDP)



Source: IMF Balance of Payments (BoP) statistics and authors' calculations.

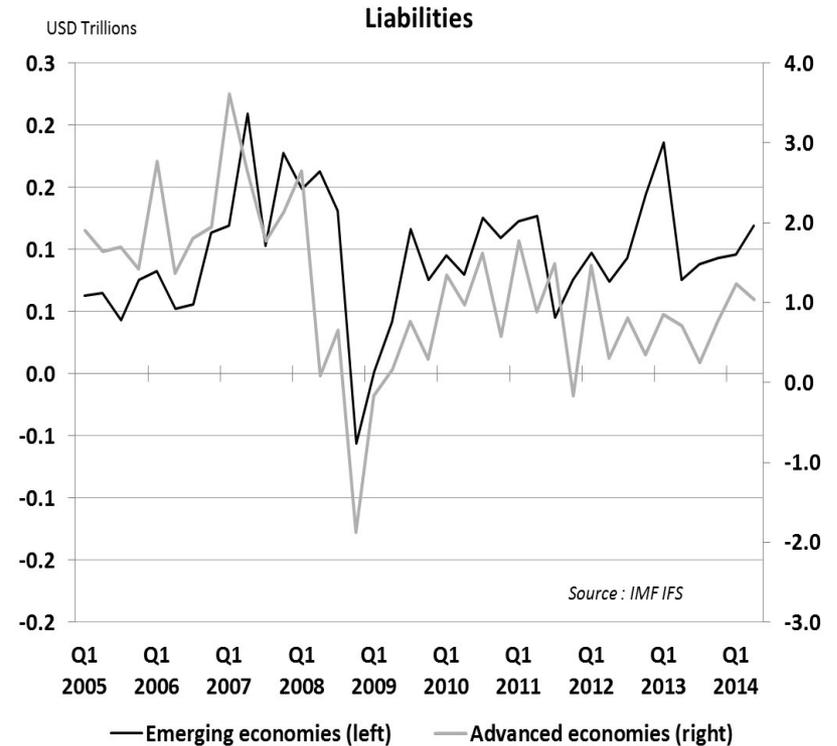
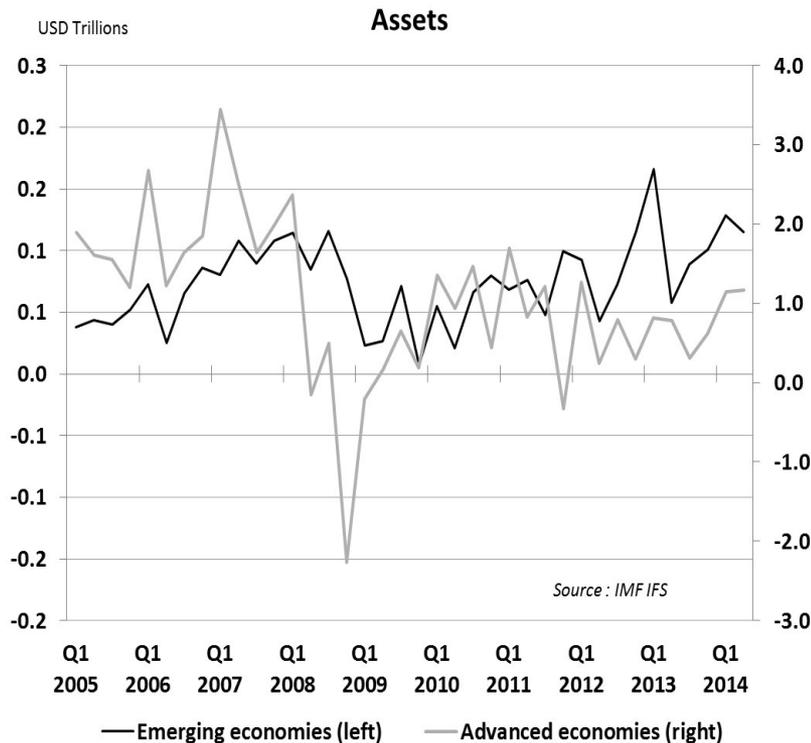
# ...and the composition of flows has changed

## Composition of global financial flows by category before and after the crisis (%)



Source: IMF Balance of Payments (BoP) statistics and authors' calculations.

# Emerging world intensified outward investment

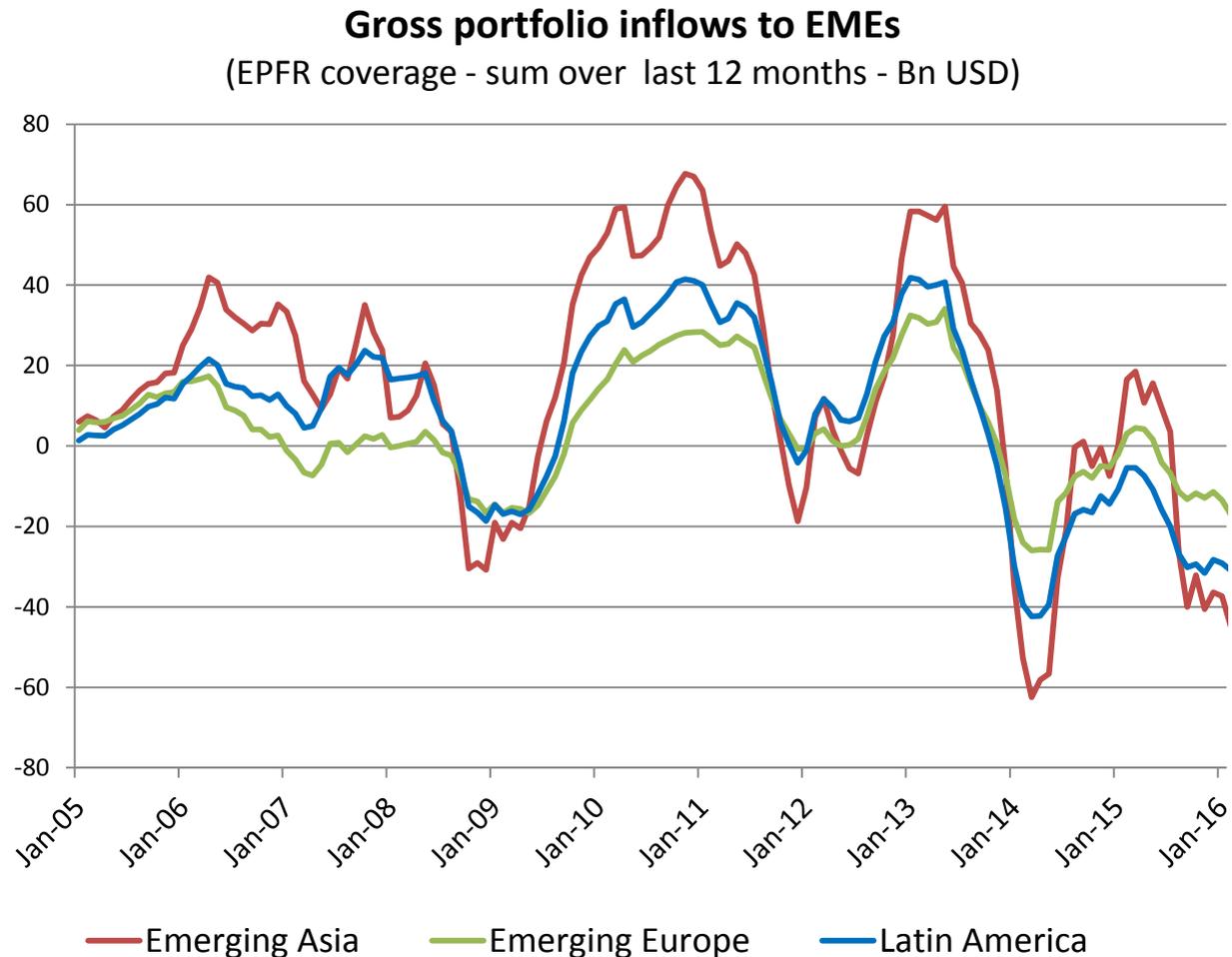


# In fact, global retrenchment ratios hide opposite dynamics

	<b>(B-A)/A</b>				<b>(B-A)/GDP_A</b>		
	<b>Assets</b>	<b>Liabilities</b>	<b>Total</b>		<b>Assets</b>	<b>Liabilities</b>	<b>Total</b>
<b>Advanced</b>	-53,4%	-52,1%	-52,7%	<b>Advanced</b>	-4,7%	-4,9%	-9,6%
<b>Emerging</b>	57,9%	50,2%	53,5%	<b>Emerging</b>	2,9%	3,4%	6,3%
<b>World</b>	-50,0%	-48,3%	-49,1%	<b>World</b>	-4,3%	-4,5%	-8,8%

Note: Periods: Pre-crisis: 2005Q1 - 2007Q2, Post-crisis: 2010Q2 - 2014Q2.

# More recently, capital have flown out of EMEs



Source: EPFR.

# Clear volatility episodes can be identified

Chart B1. Total, net TIC flows  
(12 month rolling sum, USD bn)

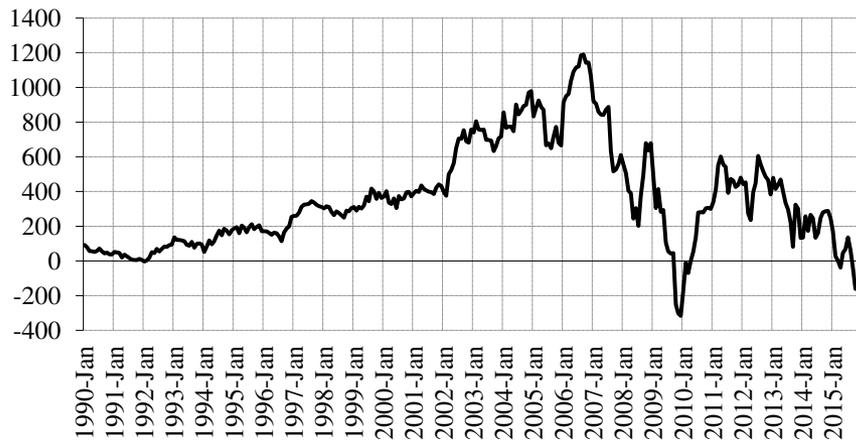
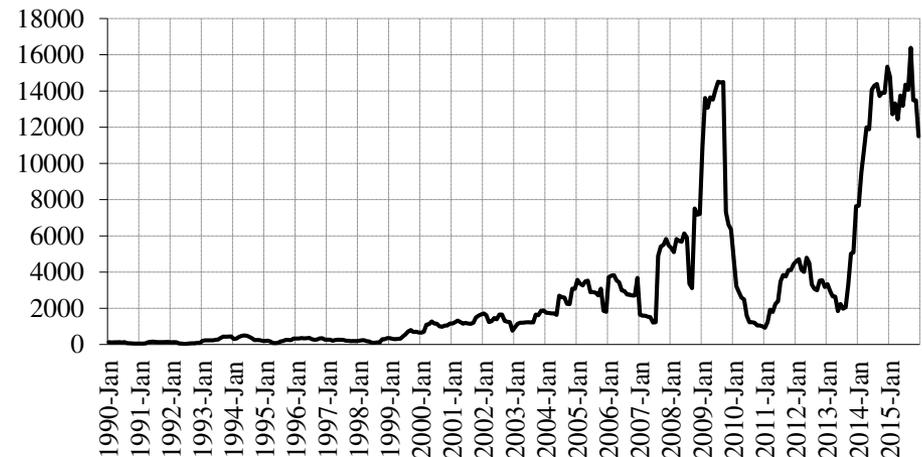


Chart B2. Variance, net TIC flows  
(12 month rolling window)



Source: Treasury International Capital data, US Treasury.

# Summing-up stylised facts

- Financial slowdown since sudden stop ( $\sim 8\% \rightarrow 3\%$  of global GDP)
- Procyclical gross capital flows
- Demise of debt in the broad sense
- Resilience of equity in the broad sense too
- New structure of capital flows ( $\sim 2/3$  E,  $1/3$  D)
- Persistent retrenchment only for advanced economies
- But emerging still “small” ( $\sim 1.5/10$ )

# Explanatory factors

- Weaker economic activity (in line with geographic composition)
- Lower magnitude of global imbalances / trade slowdown
- Deleveraging by private agents, especially banks
- Capital controls / slower pace of liberalization may affect the overall dynamics of gross flows
- Risk aversion (cf. CGFS, 2011)
- Regulation and macroprudential measures

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# International Sectoral Portfolios

Natacha Valla, Romain Rancière, Jonas Heipertz

Vienna, July 8, 2016

# Introduction

- Cross-border investment positions: up tremendously since the 1970s
- Lane-Milesi-Ferretti (2003)
- Larger role for asset price and exchange rate valuations
- International macro literature: strong Current Account (CA) focus as a measure of external solvency and financing (intertemporal budget constraint)
- More recently: literature moved away from CA
- New focus: change in Net Foreign Asset Positions
- But there is very little on how different sectors and intermediaries behave

# Roadmap

- Literature
- Data
- Stylized Facts
  - ▶ Sectoral external portfolios
  - ▶ Sectoral linkages
- Empirical analysis: Shock diffusion through sectoral network

## Preview of results

- A structural reshuffling has taken place in cross border flows
- Insurance companies (IC) and to a lesser extent (nm) mutual funds have taken over the cross border business
- These “new” sectors behave differently (IC liabilities more idle (flows) and less sensitive (valuation))
- ...but their portfolios are more vulnerable to valuation volatility...
- ...and the “granular” residual explain a bigger share of aggregate fluctuations

# Literature

## International investors as a network

- Interdependencies across financial intermediaries seen as a network
- Cross-holdings of securities: complex system (liability of a sector = = asset in another balance sheet)
- Greenwood, Landier and Thesmar (2015)

# Data

## Protide - Universe of French portfolio investments

- Database on security holdings collected by the **Banque de France** from direct and custodian reportings
  - ▶ Exhaustive data on security holdings by French residents
  - ▶ Frequency is quarterly, from 2008Q1 to 2015Q3 (but we stop in 2014)
  - ▶ Stocks at market value are collected; flows are computed from stock variations and estimation of the impact of valuation and other change (reclassifications)
  - ▶ Direct investments are removed from the database
- High level of granularity
  - ▶ Security-by-security database, with information about the characteristics of each security (including instrument type, nationality of the issuer)
  - ▶ For each security, holdings are broken down by economic sector (19 of them)
  - ▶ Example of datastructure:
    - {*Security x, Spain, Shares, Insurances*}
    - {*Security y, Germany, Debt, Non-MM mutual funds*}
    - {*Security z, United-States, Certificates of Deposit, Banks*}

# Data

## Uniqueness of Protide

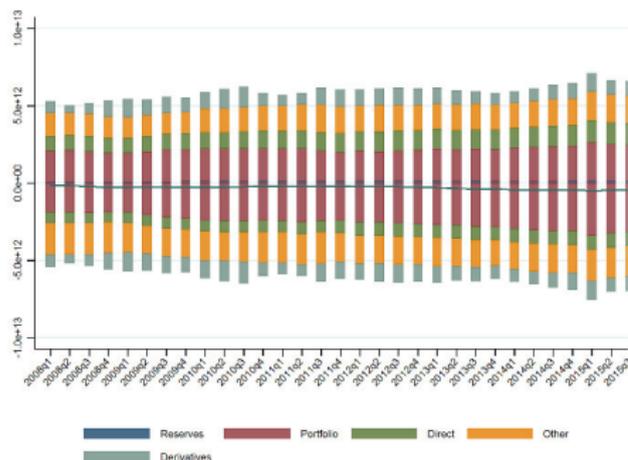
- Build on security-level information for all securities held or issued by French entities
  - ▶ Security Type
    - ★ Sector Issuer of Security (Domestic or Foreign sector)
    - ★ Sector Holder of Security (Domestic or Foreign Sector)
  - ▶ Integrated Domestic and Foreign Portfolios with both Assets and Liabilities. Full characterization of changes in assets and liabilities by sector-instrument
    - ★ Flows
    - ★ Price Changes
    - ★ Currency Value Changes
  - ▶ Full range of cross-holding: across sectors, between sector / rest of the world, between domestic / foreign sectors (for EA countries only)
  - ▶ Quarterly Data from 2008Q1 to 2014Q4
  - ▶ Only part of the richness of the data has been exploited yet

# Data Alternative

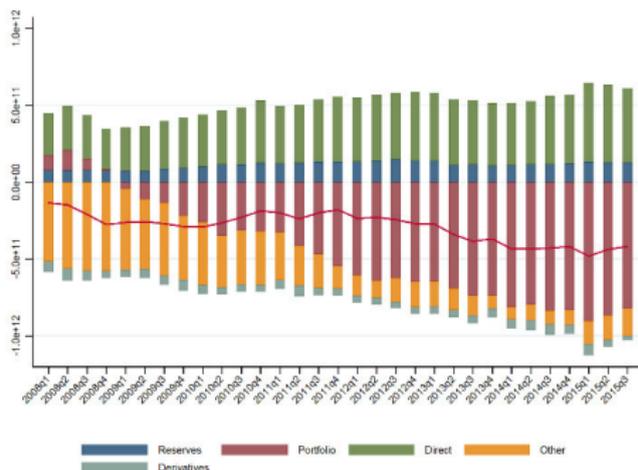
- CPIS: international portfolio holdings
  - ▶ Sectoral dimension for a small sample of countries and very recent years (Sector information only on security holder, not on issuer, and not both)
    - ★ Only International Portfolios (no integration with domestic portfolios)
    - ★ Only Asset Positions no Flows or Valuations
  - ▶ Flows of Funds (e.g. US)
    - ★ Portfolios of Sectors (Assets and Liabilities)
    - ★ Rest of World as Additional Sector
    - ★ No break down between Domestic and Foreign Portfolio at the sector level

# Stylized Facts

## France's International Investment Position



Asset and Liabilities



Net

# Stylized Facts

## France's IIP - Valuation



Foreign Asset Valuation (w/ derivatives)

Foreign Liability Valuation (w/ derivatives)

Figure: IIP valuation France - 2008.1 to 2015.3

# Stylized Facts

## Constructing sectoral portfolios

$$\underbrace{\sum_{k=1}^6 (b_{a,k} + e_{a,k})}_{\text{Domestic Assets}} = \underbrace{\sum_{k=1}^6 (b_{l,k} + e_{l,k})}_{\text{Domestic Liabilities}}$$

$$\underbrace{nep}_{\text{Net Ext. Pf.}} = \underbrace{\sum_{k=1}^6 (b_{a,k}^* + e_{a,k}^*)}_{\text{Asset Portfolio (}ap_k\text{)}} - \underbrace{\sum_{k=1}^6 (b_{l,k}^* + e_{l,k}^*)}_{\text{Liability Portfolio (}lp_k\text{)}}$$

$$nep_{k,t} - nep_{k,t-1} = \underbrace{f_{k,t}}_{\text{Net New Flows}} + \underbrace{\Delta Val(nep_{k,t-1})}_{\text{Valuation Change (}p, FX\text{)}}$$

## Stylized Facts: French External portfolio Sectoral Contributions (in % of GDP)

Sector	2008.1			2014.1		
	A	L	Net	A	L	Net
Public	1.4%	32.4%	-31.0%	1.5%	56.6%	-55.1%
Corporations	2.4%	30.8%	-28.4%	2.6%	38.9%	-36.3%
Insurance	26.8%	1.9%	24.9%	33.1%	0	32.5%
Households	2.6%	0	2.6%	3.0%	0	3.0%
Banking	41.1%	25.5%	15.6%	31.9%	31.4%	0.5%
Other FI	26.8%	5.0%	21.9%	28.4%	9.6%	18.8%
Total	100.3%	95.6%	4.7%	101.3%	137.0%	-35.7%

**Table: Contributions in percentage of GDP to external portfolios - Contribution of less than one percent of GDP are rounded to zero**

- Net external position
  - Sharp deterioration 08-14
  - Public (-24% GDP), Banks (-15%), Corporates (-8%)
  - Insurance companies in contrast (+8%)
- External assets and liabilities
  - Gross assets stable
    - Banks (-9%) compensated by insurance (+6)
  - Gross liabilities deteriorated (41% GDP)
    - Surge in public sector liabilities (24%), corporations (8%) and banks/OFIs (10%)

# External equity and debt portfolios

## Sectoral contributions (% of GDP)

2008: E>0, D<0. E stable, D deteriorates. Bulk of E: NFC; of D: banks, public.

### Panel A: Equity

	2008.1			2014.1		
	A	L	Net	A	L	Net
Public	0.71%	0	0.71%	0.74%	0	0.74%
Corporations	1.08%	22.92%	-21.84%	1.34%	24.54%	-23.19%
Insurance	2.41%	1.35%	1.06%	3.81%	0.17%	3.64%
Households	1.34%	0	1.34%	1.37%	0	1.37%
Banking	4.49%	4.14%	0.35%	5.04%	3.50%	1.55%
Other FI	14.80%	3.93%	10.87%	15.27%	6.33%	8.94%
Total	24.22%	32.34%	-8.12%	27.95%	34.54%	-6.59%

### Panel B: Debt

	2008.1			2014.1		
	A	L	Net	A	L	Net
Public	0.69%	32.40%	-31.71%	0.75%	56.57%	-55.82%
Corporations	1.32%	7.88%	-6.56%	1.22%	14.33%	-13.11%
Insurance	24.42%	0.56%	23.86%	29.30%	0.40%	28.91%
Households	1.27%	0	1.27%	1.62%	0	1.62%
Banking	36.65%	21.36%	15.29%	26.83%	27.86%	-1.02%
Other FI	12.05%	1.03%	11.02%	13.10%	3.28%	9.82%
Total	76.04%	63.23%	12.81%	73.37%	102.43%	-29.06%

# Stylised facts 3&4

- **Debt versus Equity (net)**
  - Debt explains the deterioration of the net position
  - Especially public sector (-24% of GDP), banks (-16%), NFCs (-6.5%)
  - Insurance companies in contrast (+8%)
- **Debt versus Equity (assets and liabilities)**
  - No variation in equity
  - Some decline in debt assets (banks down, insurance up)
  - Strong deterioration in debt liabilities (+39% of GDP)
  - Deterioration mostly public (+24%), banks (+7.5%), corporates (+6.5%)

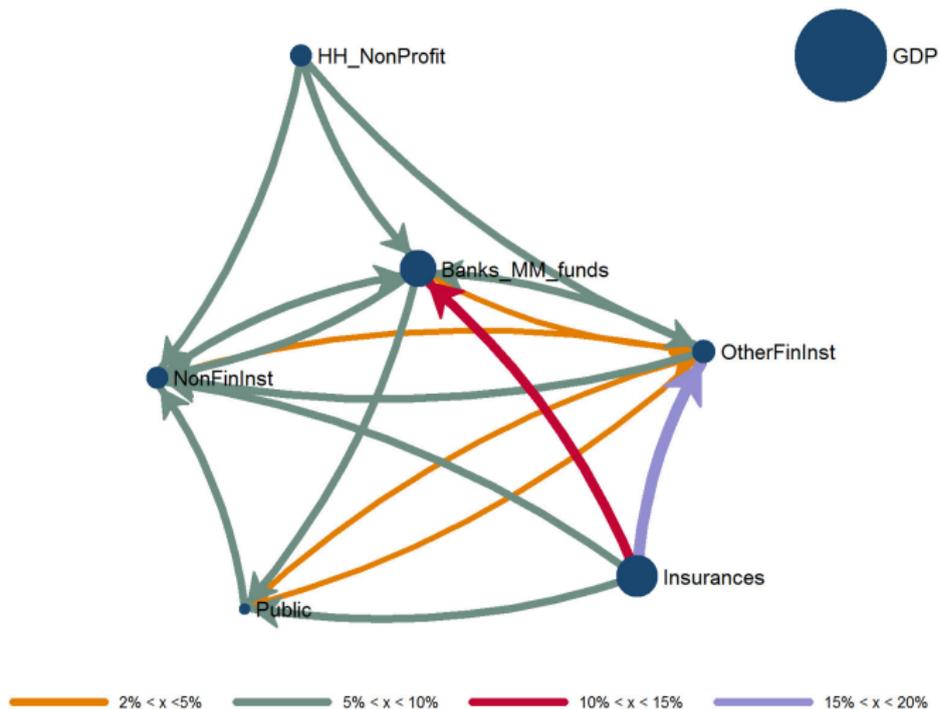
# Net external portfolio position changes 2008/2014

## Sectoral contributions (in % of GDP)

Sector	Debt			Equity			Total Net
	A	L	Net	A	L	Net	
Public	0	+26%	-26%	0	0	0	-26%
Banking	-7.8%	+6.5%	-14.3%	0	0	0	-14.3%
Insurance	+4.9%	0	+4.9%	+1.4%	-1%	+2.4%	+7.3%
Other FI	+1%	+2.2%	-1.2%	0	+2.4%	-2.4%	-3.6%
Corporations	0	+6.5%	-6.5%	0	+1.6%	-1.6%	-0.8%
Households	0	0	0	+2.4%	0	+2.4%	+2.4%
Total	-1.8%	+41.2%	-43%	3.8%	+3%	+0.8%	-42.2%

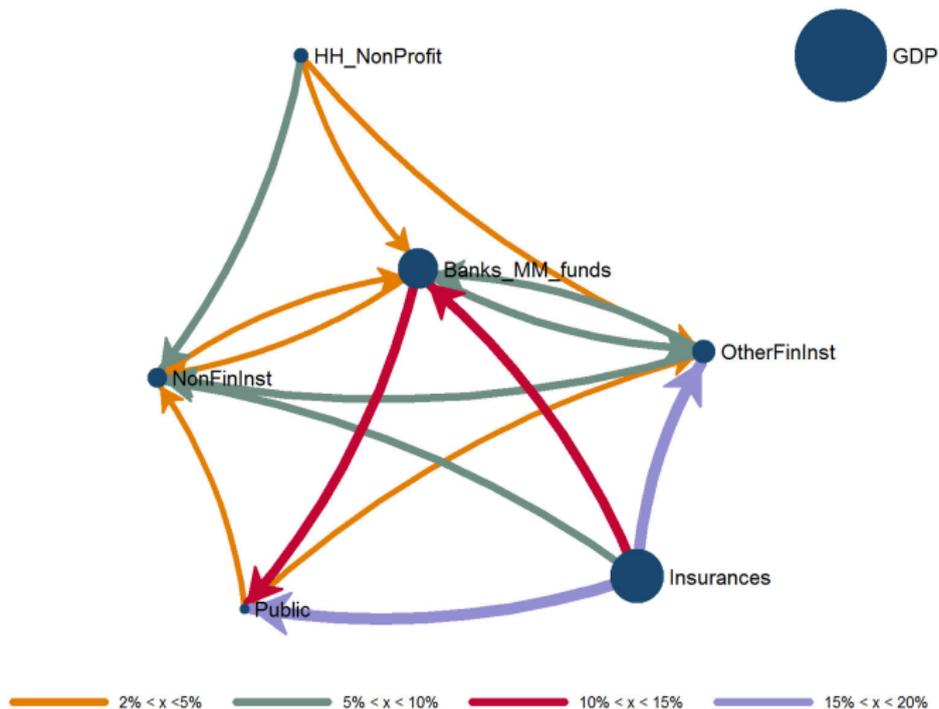
# Stylized Facts: Intersectoral Linkages

## Domestic - 2008.1



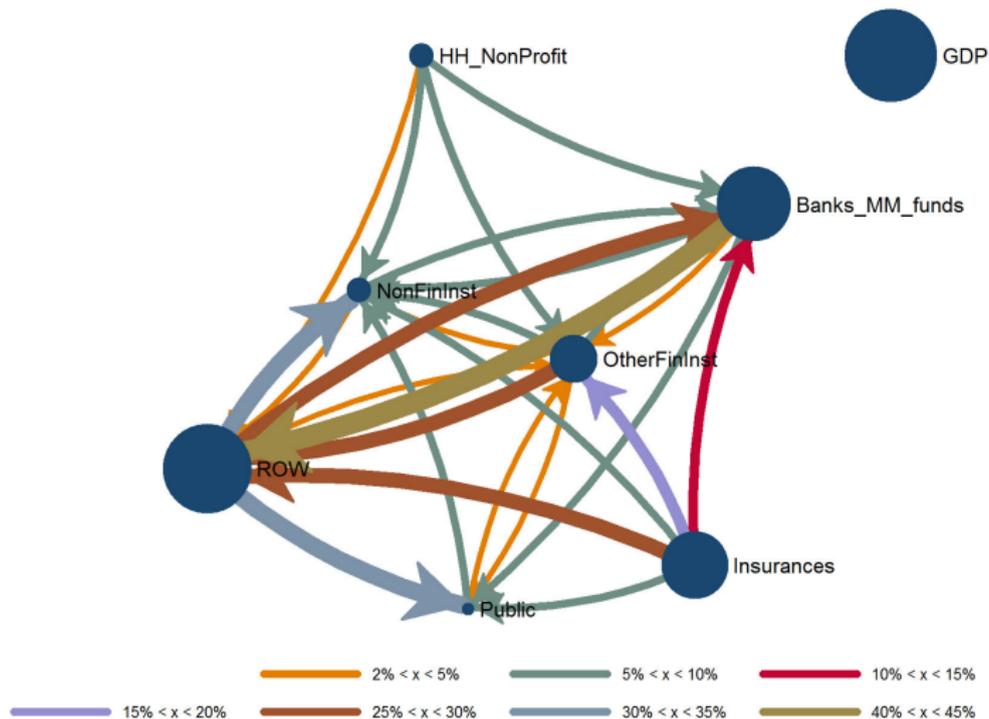
# Stylized Facts: Intersectoral Linkages

## Domestic - 2014.1



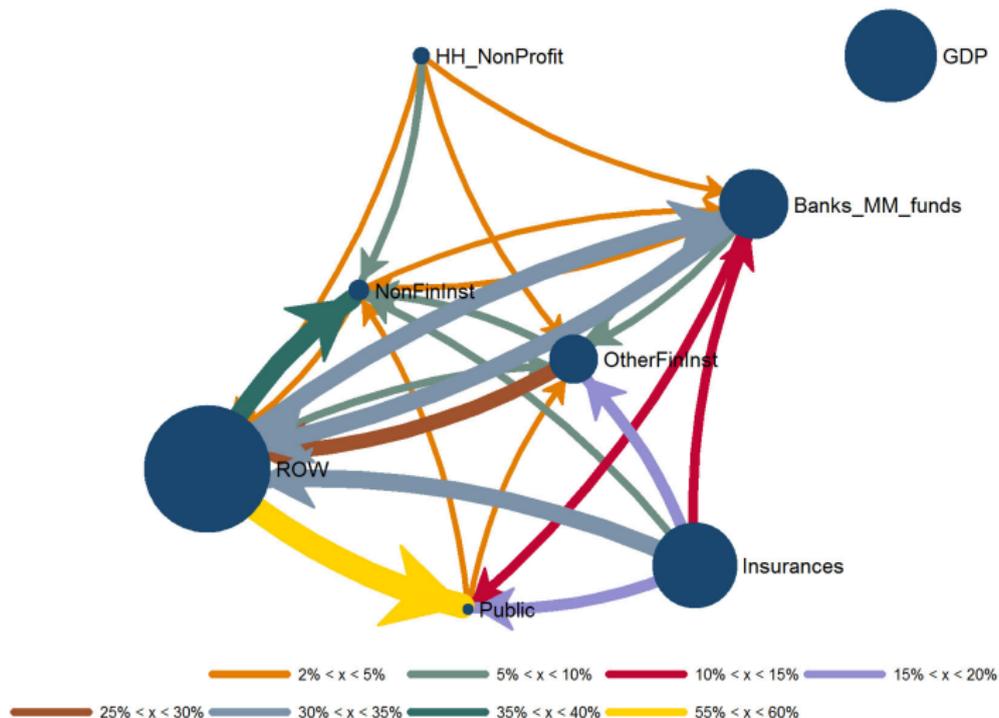
# Stylized Facts: Intersectoral Linkages

## Domestic with ROW - 2008.1



# Stylized Facts: Intersectoral Linkages

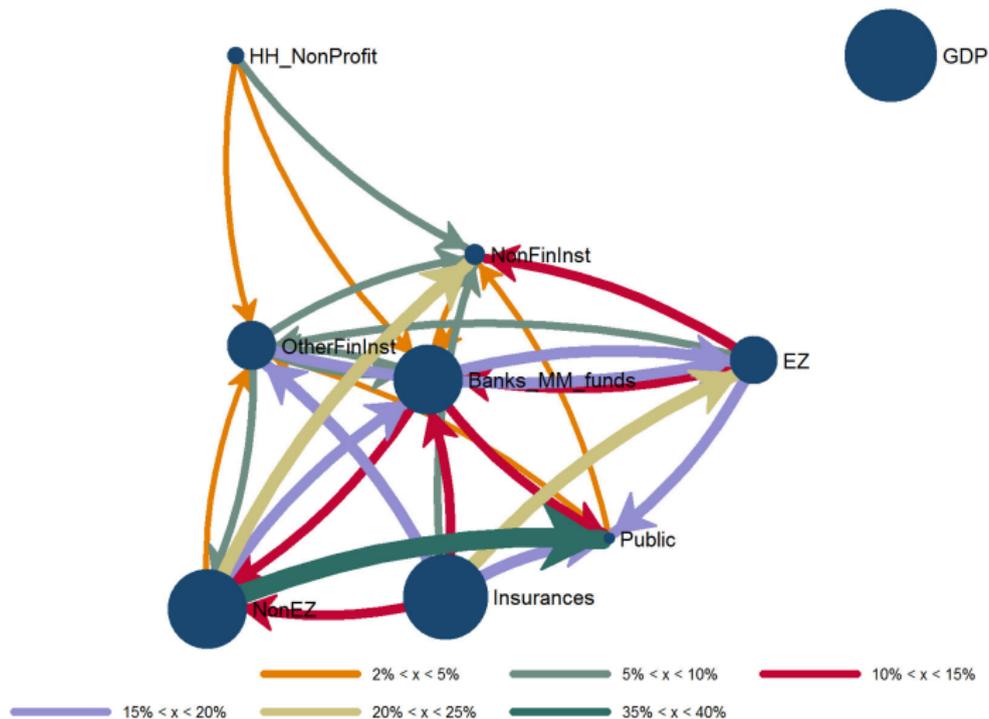
## Domestic with ROW - 2014.1





# Stylized Facts: Intersectoral Linkages

## Domestic with EZ/NonEZ - 2014.1



# Shock diffusion through sectoral network

## Motivation

- There is a large literature on shock propagation in financial networks (e.g. Allan/Gale 2000). This literature however **commonly focuses on networks of individual banks** and propagation is confined to default events.
- In **sectoral networks**, default of a whole sector is very unlikely. Castrén and Rancan (2014) therefore assume **one-for-one transmission** of shocks hitting a sector's assets to its emitted equity. (Due to data limitations sectoral linkages however had to be estimated from flow-of-funds data.)

In the following, we propose a simple model of shock propagation through bilateral security holdings. In particular, instead of assuming one-for-one transmission, we estimate a **coefficient of price-comovement** between a sectors security assets and liabilities using the "from-whom-to-whom" information in Protide.

# Shock diffusion through sectoral network

## The model

We index sectors by  $j = 1, 2, \dots, J$  and model the valuation rate of securities emitted by sector  $j$ ,  $\gamma_{j,t}$  as

$$\gamma_{j,t} = \alpha_j + \beta_j \sum_{j'=1}^J \omega_{j,j',t} \gamma_{j',t} + \epsilon_{j,t}$$

where

- $\sum_{j'=1}^J \omega_{j,j',t} \gamma_{j',t}$  is the valuation rate of sector  $j$ 's security portfolio.  $\omega_{j,j',t}$  is the share of securities emitted by sector  $j'$  in the total assets of sector  $j$ .
- $\epsilon_{j,t}$  captures sector-specific liability price changes unrelated to security assets.
- $\beta_j$  is the coefficient for price-comovement between security asset and liabilities.

# Shock diffusion through sectoral network

## Reduced form

### Diffusion of security price shocks through the network

- First, we write the above system of equations in matrix notation defining:

$$\gamma_t = \underbrace{(\gamma_{j,t})}_{J \times 1}, \quad \epsilon_t = \underbrace{(\epsilon_{j,t})}_{J \times 1}, \quad \omega_t = \underbrace{(\omega_{j,j',t})}_{J \times J}, \quad \alpha = \underbrace{(\alpha_j)}_{J \times 1}, \quad \beta = \underbrace{\text{diag}[\beta_j]}_{J \times J}, \quad \Omega_t(\beta) = \underbrace{(\beta' \omega_t)}_{J \times J}$$

as:

$$\gamma_t = \alpha + \Omega_t(\beta)\gamma_t + \epsilon_t$$

- Second, we solve for the reduced form to determine how sector-specific shocks propagate through the network:

$$\gamma_t = [I - \Omega_t(\beta)]^{-1} \alpha + [I - \Omega_t(\beta)]^{-1} \epsilon_t$$

$[I - \Omega_t(\beta)]^{-1}$  is called Leontief inverse (see e.g. Acemoglu et al. 2012)

# Shock diffusion through sectoral network

## Identification

We estimate the shock diffusion model by **Two-Step GMM**. For identification, the number of parameters to estimate must be at least as big as the number of moment conditions.

We consider the following **five sectors**: MFIs, corporations, other financial institutions (insurances, NMMF), the government, and the rest of the world.

- **Number of parameters** to estimate:

$$N_p = 5 + 5 + 5 * (5 + 1)/2 = 25$$

corresponding to the number of parameters in  $\alpha$ , in  $\beta$  and in the variance-covariance matrix of  $\epsilon_t$ .

- The **number of observed moments** in equation:

$$N_m = 5 + 5 * (5 + 1)/2 = 20$$

corresponding to the number of first order moments and the number of second-order moments.

Without further restrictions on parameters the model is not identified.

# Shock diffusion through sectoral network

## Restrictions

- 1 Sectoral shocks  $(\epsilon_{j,t})$  have zero mean:

$$\mathbb{E}[\epsilon_t] = 0$$

- 2 and are uncorrelated with the same variance  $\sigma^2$ .

$$\Sigma_\epsilon = \begin{pmatrix} \sigma^2 & 0 & 0 & 0 & 0 \\ 0 & \sigma^2 & 0 & 0 & 0 \\ 0 & 0 & \sigma^2 & 0 & 0 \\ 0 & 0 & 0 & \sigma^2 & 0 \\ 0 & 0 & 0 & 0 & \sigma^2 \end{pmatrix}$$

This amounts to  $N_r = 5 * (5 + 1)/2 - 1 = 14$  restrictions. The model is **over-identified**, with 9 overidentifying restrictions.

# Shock diffusion through sectoral network

## Results - Estimates

	Mean	Propagation	Sigma
MFI	0.0017 (0.0299)	0.4894*** (0.0011)	0.0001***
ROW	0.0016 (0.0285)	0.587*** (0.001)	
CORP	-0.0017 (0.0283)	1.5316*** (0.0012)	
OFI	0.0003 (0.054)	1.2959*** (0.0016)	
GG	0.0065 (0.0464)	-0.1143*** (0.0026)	

**Interpretation:** For all sectors except the government, assets and liability valuation move in the same direction. The counter-cyclicality of government liabilities is consistent with flight to quality and safe haven.

# Shock diffusion through sectoral network

## Results - Shock diffusion

To determine how shocks propagate through the network, we look at the reduced form (in particular the Leontief inverse)

$$\gamma_t = [I - \Omega_t(\beta)]^{-1} \alpha + [I - \Omega_t(\beta)]^{-1} \epsilon_t$$

The **diffusion of shock** varies over time, since bilateral exposures ( $\omega_{j,j',t}$ ) change. For example in **2008.1**:

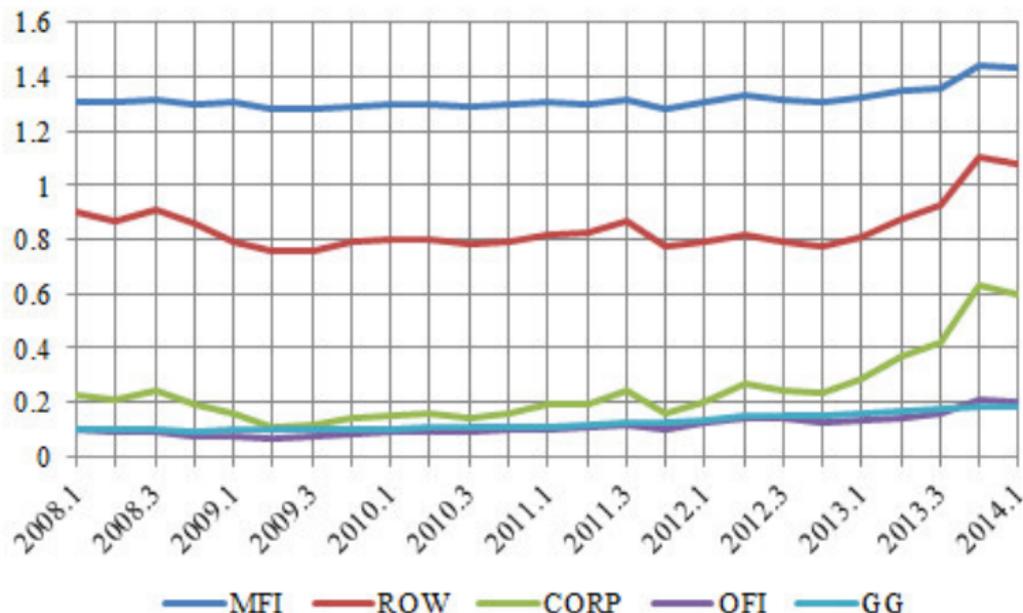
	MFI	ROW	CORP	OFI	GG
MFI	1.31	0.90	0.23	0.10	0.10
ROW	0.16	2.33	0.18	0.06	0.06
CORP	2.62	3.79	3.92	0.99	0.43
OFI	1.01	2.82	1.04	1.66	0.33
GG	-0.23	-0.37	-0.32	-0.11	0.96

**Read:** The impact of a shock on government liabilities of 1 ppt is associated with a **0.10** ppt increase in liabilities emitted by banks.

# Shock diffusion through sectoral network

## Results - Variation over time

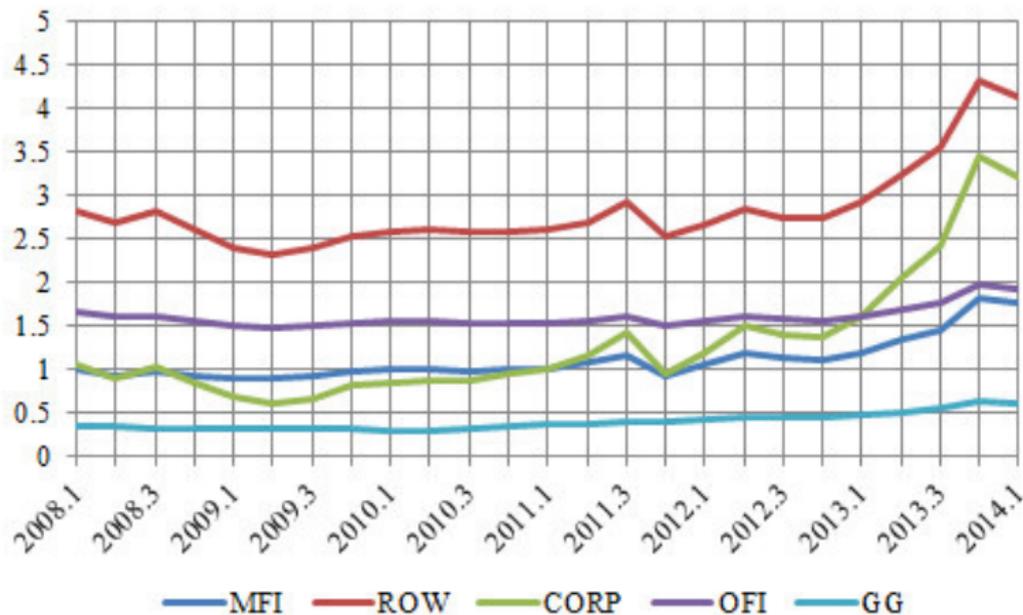
Impact of shocks originating in other sectors on **MFI**s liability valuation. The red line describes the impact on MFI liabilities of a 1 ppt shock to liabilities emitted by the ROW.



# Shock diffusion through sectoral network

## Results - Variation over time

Impact of shocks originating in other sectors on **OFI**:



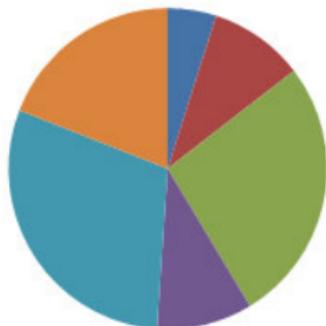
# Conclusion

- 1 The sectoral composition of international portfolios matters for (financial) stability. **Insurance companies**: soon the need to mitigate systemic risk?
- 2 The diffusion of shocks originating in the ROW and in the real sector to the financial system (MFI and OFI) seems to increase over time (especially since 2011.4).
- 3 Next: broaden the dataset? Geographically, type of financial instruments, etc.
- 4 Work in progress: Allow for auto-correlation in error terms.

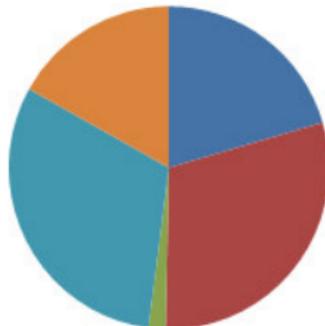
## Extra slide

### Sectoral portfolios: the big picture (domestic + foreign)

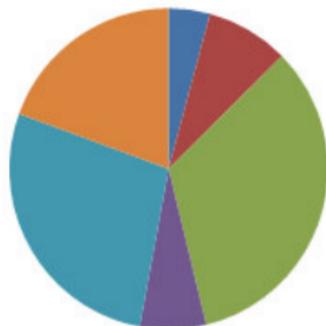
**A: 2008.1 - 267.4% GDP**



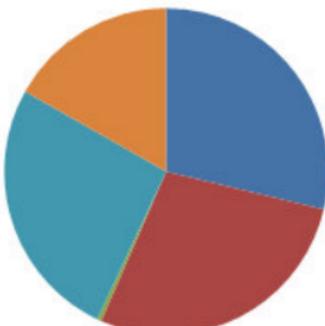
**L: 2008.1 - 262.7% GDO**



**A: 2014.1 - 272.1% GDP**



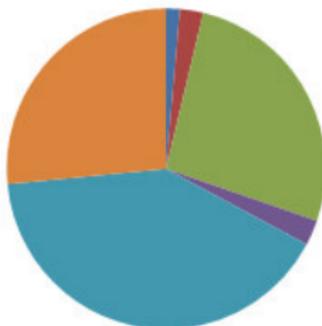
**L: 2014.1 - 307.8% GDP**



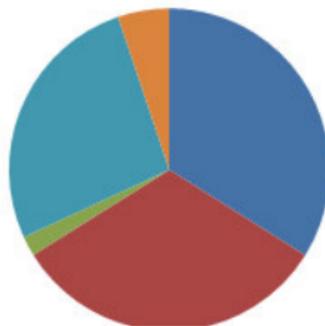
## Extra slide

# Sectoral Portfolios: the big picture (foreign only)

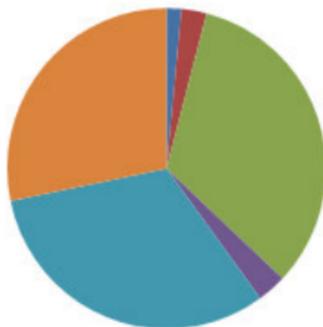
**A: 2008.1 - 100.3% GDP**



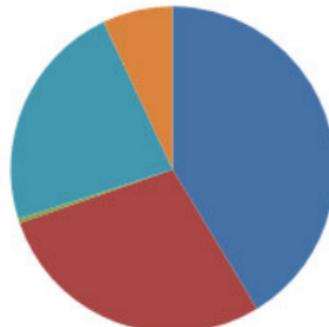
**L: 2008.1 - 95.6% GDO**



**A: 2014.1 - 101.3% GDP**



**L: 2014.1 - 137.0% GDP**



1. Introduction
2. Common beliefs about capital flows
3. Establishing stylised facts in the New Normal (bird's eye view)
4. Understanding financial “networks”
5. Policy implications

# Policy Implications

1. Non-bank financial intermediaries and the financial ecosystem
2. Bank-sovereign feedback loop
3. Bank resolution and non performing assets
4. Euro area fragmentation and CMU