

# The Financial Crisis, Systemic Risk and Macro-prudential Supervision

Philipp Hartmann

European Central Bank, DG Research

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# Introduction

- We currently experience a truly **systemic financial crisis**
- Has brought to the fore the need to better develop the **macro-prudential** dimension of supervision and regulation
- Many issues and challenges for policy makers, researchers and the interaction between the two
  - How well do we understand systemic risks?
  - How can we detect them early?
  - Which policy instruments do we have to contain them?
- Today's talk: Sketch/summarise...
  - what we know about systemic risk, macro-prudential supervision and regulation and
  - what researchers should invest in

# Outline

- **Introduction**
- **Systemic risk: Concept, different forms and academic literature**
- **How systemic risk emerged before and materialised in the crisis**
- **Macro-prudential supervision, regulation and the European Systemic Risk Board**
- **Research supporting macro-prudential supervision and regulation**
- **Conclusions**

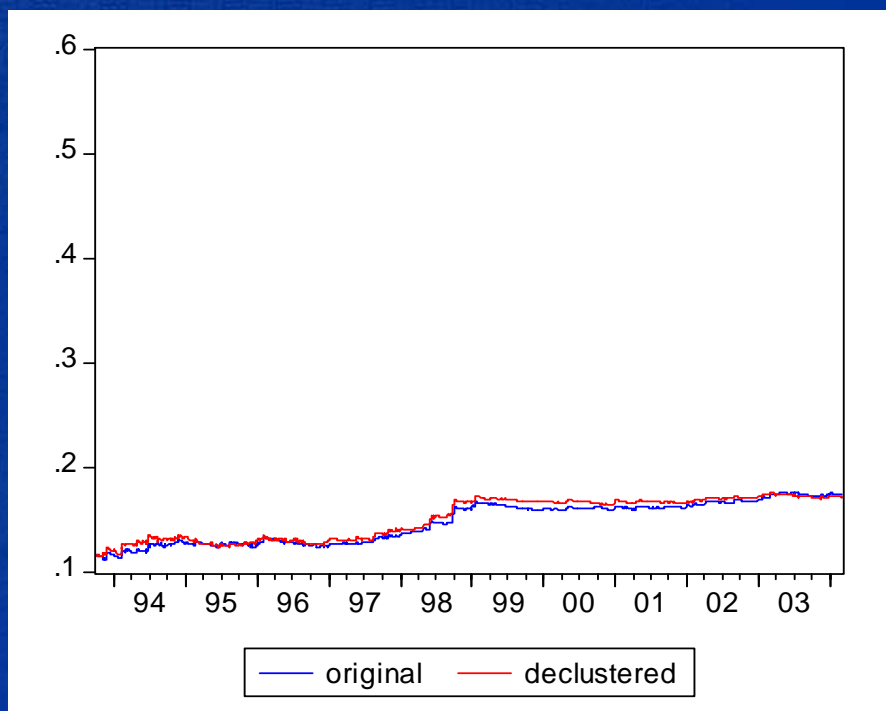
# **Systemic risk: Concept, different forms and academic literature**

# Phenomenon and concept of systemic risk

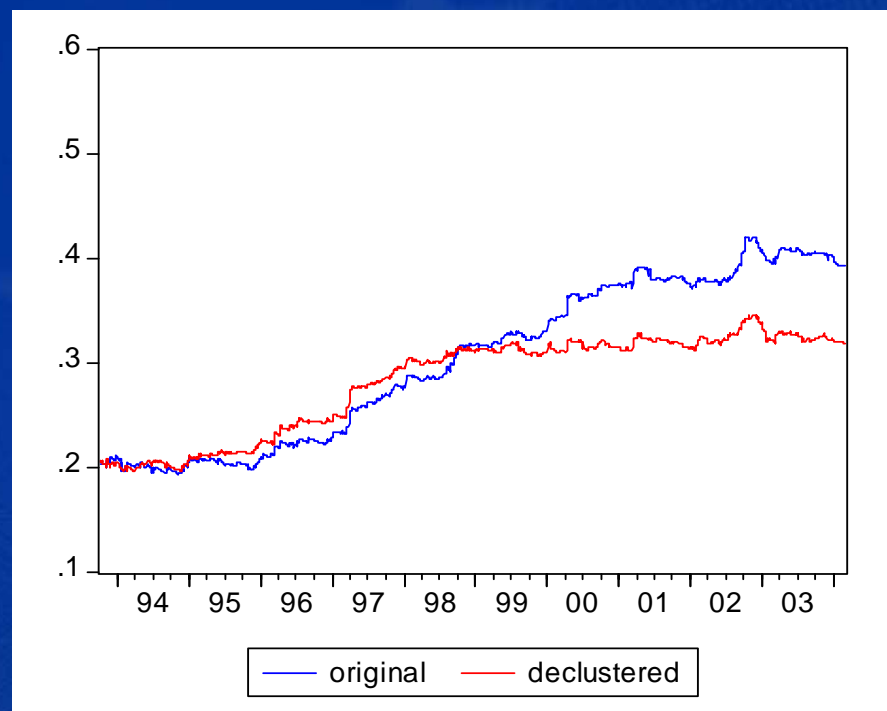
- **Origins difficult to identify (market talk, epidemiology...)**
- **Definition: Risk of experiencing a systemic event in the strong sense (De Bandt and Hartmann, 2000, for CGFS 1997; De Bandt, Hartmann and Peydro, forthcoming)**
- **Systemic event: Some trigger leads to problems in a larger number of financial intermediaries or markets (including infrastructures) – some market failure(s) must be behind**
- **Gauge for severity: Financial system or real economy?**
  - **“Horizontal”**: **Failures** of banks (or other systemic financial institutions) or **severe malfunctioning** of key markets (“strong”)
  - **“Vertical”**: **Material reduction** in economic growth (“strong”)
- **SR is an **extremely complex** concept and phenomenon, but there is already an active literature**

# Banking system risk measure (stock extremes)

## Euro area (N=25)

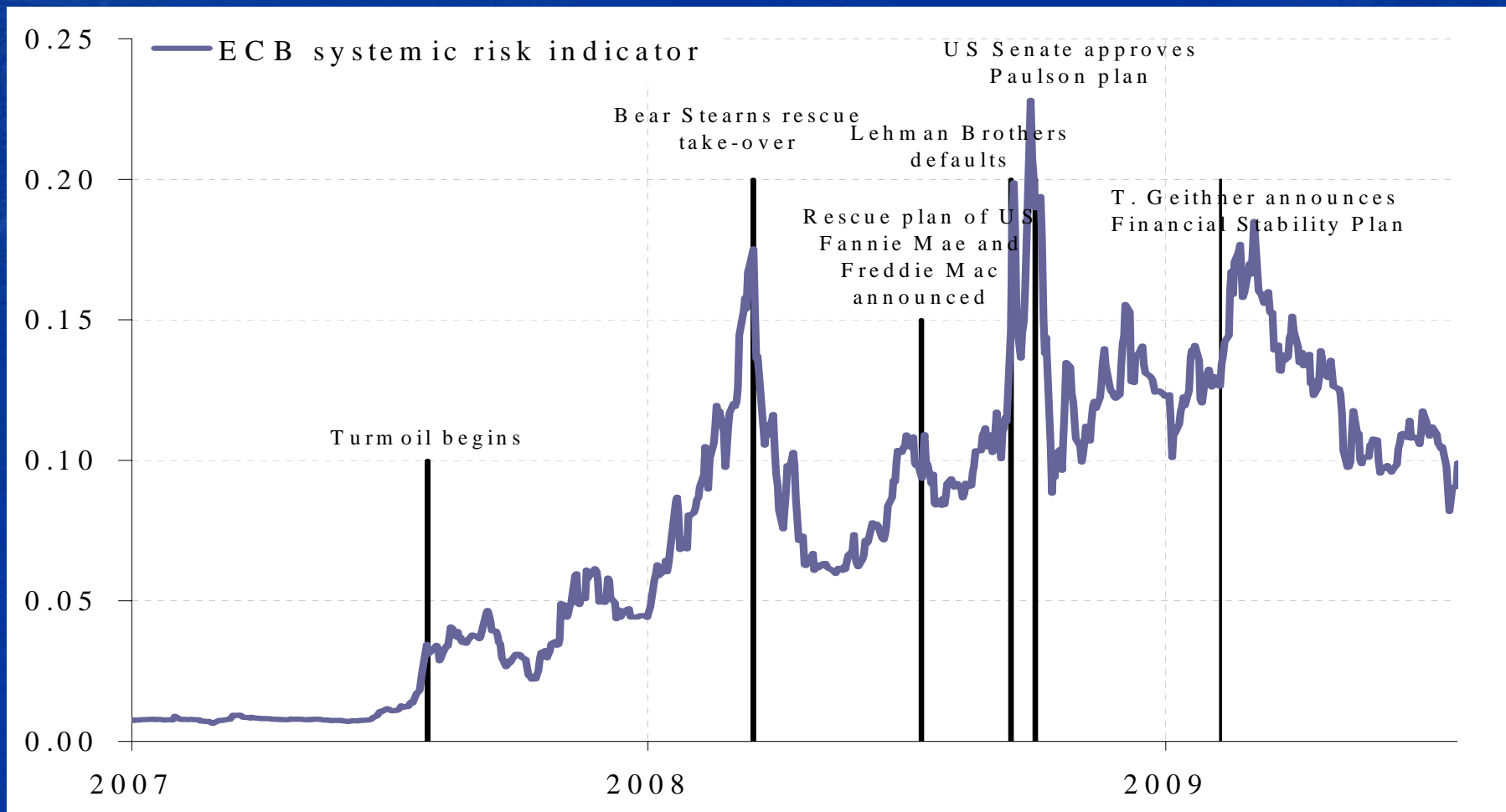


## United States (N=25)



- **Multivariate extreme spillover risk among large and complex banking groups (Hartmann, Straetmans and de Vries, 2005)**
- **Recursive estimations of 25-dimensional dependence parameter ( $1/N$ =indep.,  $1$ =asy.dep.) for extreme stock price crashes**

# Banking system risk measure (CDS spreads)



- Probability at least 2 out of 14 large EU banks fail over the following two years (ECB FSR Dec. 2007, EU banking stability, 2009)

# Ultimate sources of systemic risk

- **Which market imperfections contribute to systemic risk?**
  - Incomplete markets
  - Asymmetric and imperfect information
  - Externalities
  - Public good character of systemic stability
  - (Multiple equilibria)
- **Which features make financial systems particularly fragile?**
  - Information intensity of financial contracts
  - Balance-sheet structures of intermediaries (maturity mismatch, leverage etc.)
  - High degree of connectedness
- **Powerful feedbacks and amplification: Non-linearities**

# Three forms of systemic risk I

- **SR 1: Supposedly idiosyncratic shock causing contagion**
  - **Physical exposures (Allen and Gale, 2000; Freixas, Parigi and Rochet, 2000)**
  - **Asymmetric information (King and Wadhvani, 1990; Kodres and Pritsker, 2002)**
  - **(Multiple equilibria)**
  - **Amplification: Fire sales of illiquid assets (Cifuentes, Shin and Ferrucci, 2005)**
- **SR 2: Macro shock causing simultaneous problems**
  - **US banking crises in the 19th century (Gorton, 1988)**
  - **Early early warning indicators literature (Demirguc-Kunt and Detragiache, 1998)**
  - **Two explanations: (i) Bank liabilities not conditional on asset values (Hellwig, 1994), (ii) moral hazard (Kane, 1989)**

# Three forms of systemic risk 2

- Information problems can lead to the breakdown of the interbank market (Heider, Hoerova and Holthausen, 2008)
- **SR 3: Small or “arbitrary” change causes imbalances to unravel**
  - Early descriptions of **pro-cyclicality** and asset bubbles (Minsky, 1977; Kindleberger, 1978)
  - Role of herding behaviour (Scharfstein and Stein, 1990)
  - Too low interest rates for too long relax lending standards and encourage risk taking (Jimenez et al., 2007)
  - Changes in risk change leverage/balance sheets in a pro-cyclical way (Adrian and Shin, 2008; Greenlaw et al., 2008)
  - Pro-cyclical capital requirements (Kashyap and Stein, 2004)
  - Mutually reinforcing downward spirals of market and funding liquidity (Brunnermeier and Pedersen, 2009)

# How systemic risk emerged before and materialised in the crisis

# Short overview of the crisis I

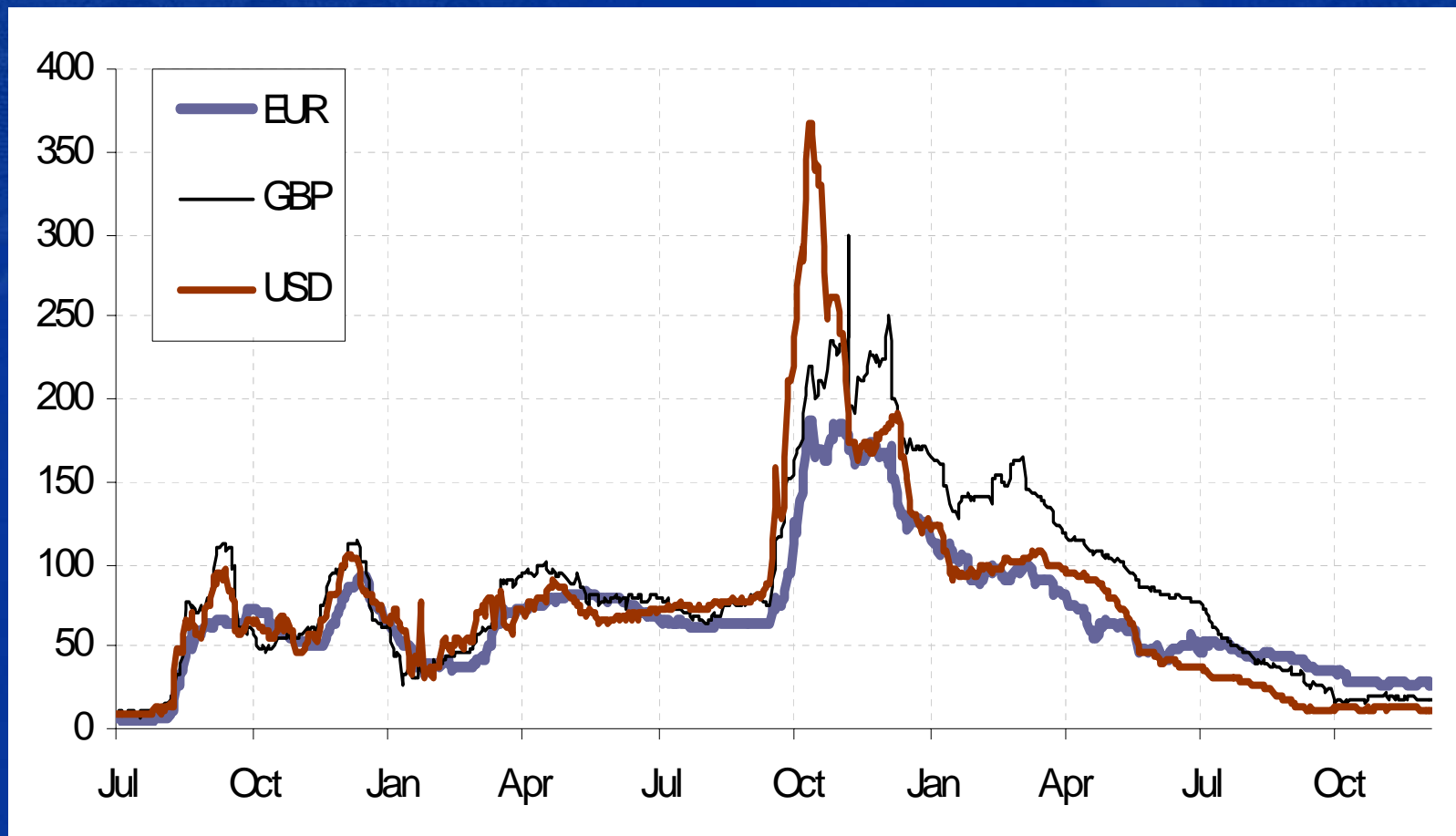
- Sources: Building up of imbalances
  - **Macro**: Global imbalances and low interest rates
  - **Financial**: High liquidity, low volatility and risk premiums
  - **“Search for yield” and herding behaviour** fuelled complex and opaque credit innovations and enhanced leverage (e.g. OBSVs)
  - Incentive (governance, short-termism, compensation, regulatory arbitrage etc.), valuation and risk management problems
- Triggers: Emerging tensions in credit markets
  - Main factor: 2006-07 rising **delinquencies in US “sub-prime”** mortgages
  - **06/07**: Break down of 2 Bear Stearns hedge funds and rising CDS premiums
  - Generalised **re-pricing of risk** (ABS und CDO ratings, AAA CDO index tranches)

# Short overview ... 2

- Emergence of systemic risk
  - 08/07: Sharp increase in money market rates and volatility
  - Failures/bailouts of some medium-sized banks
  - Central bank intervention necessary as major **money markets became dysfunctional**
  - But medium-term money market rates remain stubbornly high
- “Waves” of tensions and relaxations (09/07-08/08)
  - Increasing losses of LCFIs
  - Problems of monoline credit insurers
  - 03/08: **Bear Stearns** takeover (“too complex to fail”)
  - 07/08: Rescue plan for Fannie Mae and Freddie Mac
  - Economic slowdown in **US** and significant uncertainty in **EU**

# Crisis phases illustrated in term market

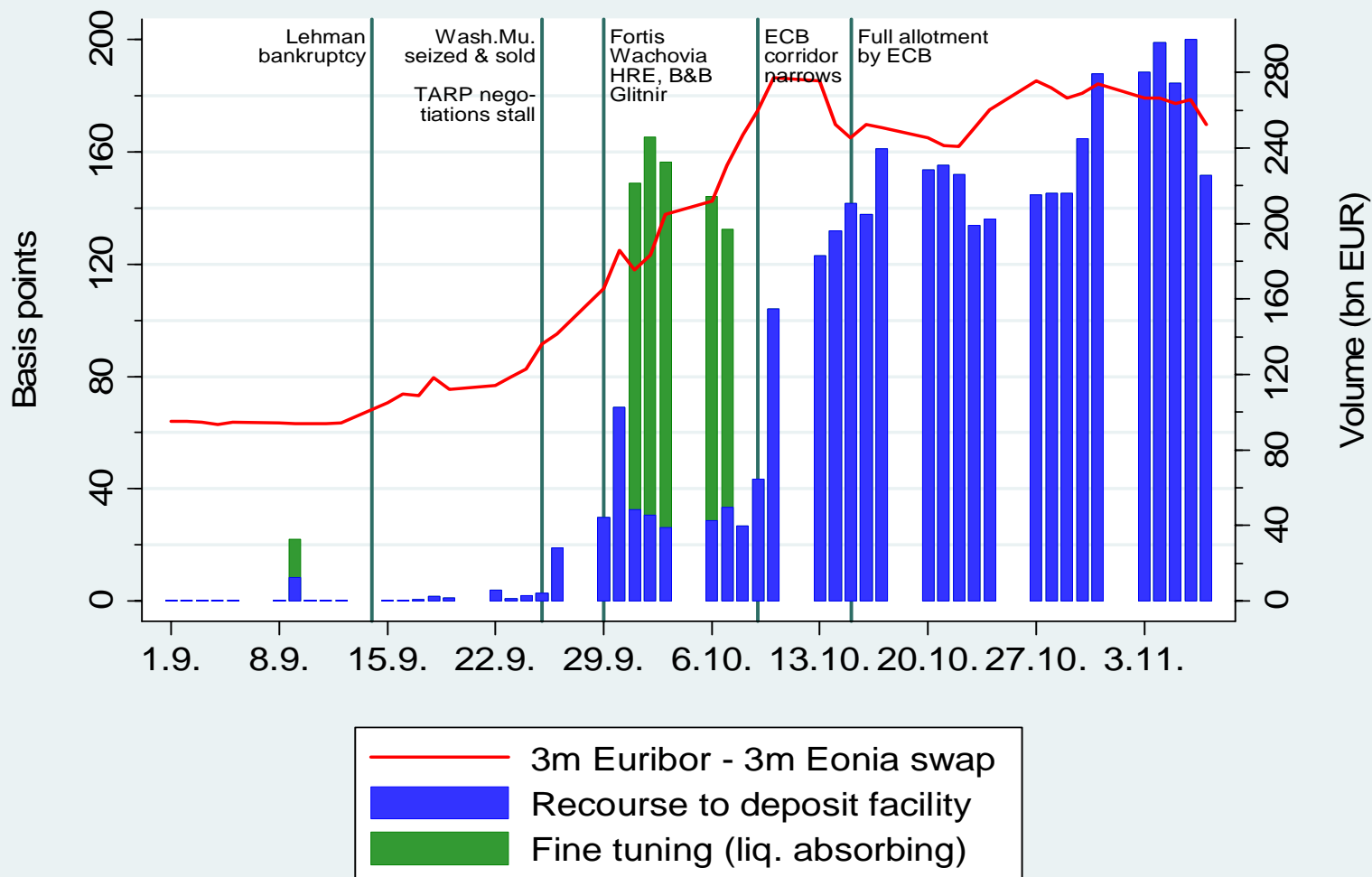
## 3-month LIBOR minus OIS rates (basis points)



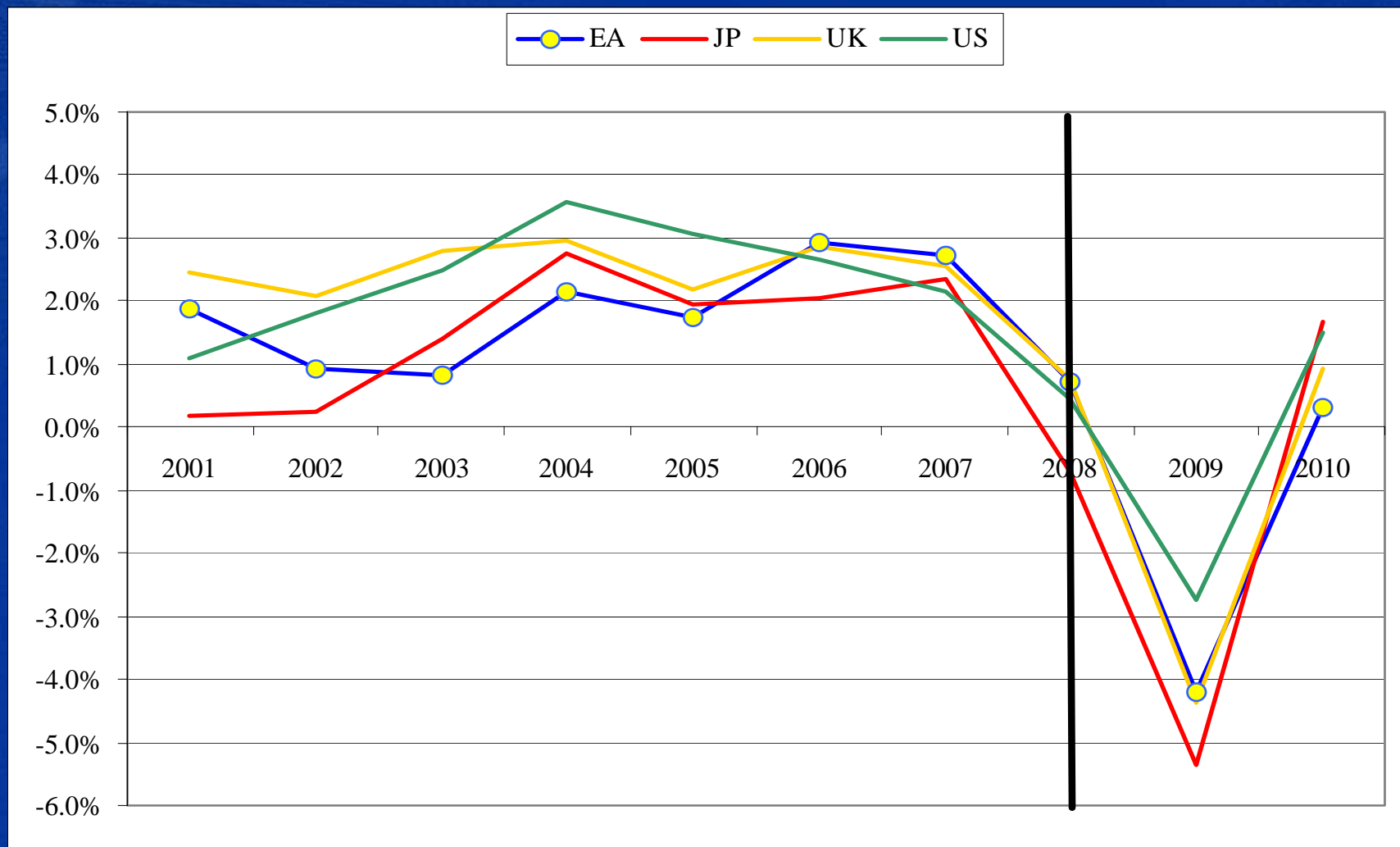
# Short overview ... 3

- General loss of confidence in 09/08
  - Important factor: **Lehman Brothers** failure
  - Dramatic further increase of medium money market spreads
  - “Conservatorship” of Fannie Mae und Freddie Mac
  - Bailout of **AIG** and takeover of **Washington Mutual**
  - Announcement and negotiations about **TARP**
  - End of the **US** investment banking model
  - Transmission to Europe
    - **Dexia, Fortis, HBOS, Hypo Real Estate, Royal Bank of Scotland** etc.
    - Economic downturn also reaching Europe
  - Transmission to emerging market economies
- Since then **progressive worsening of the economic outlook worldwide**

# Transition to systemic crisis



# Sharp deterioration of growth outlook (GDP)



# National stabilisation programs (bn. EUR)

(bn. EUR)	Ceilings				(30 November 2009)
	Capital injections	Guarantees	Asset purchase/swaps	Total commitment	Ceilings Commitment (% of GDP)
Germany <sup>2)</sup>	56	400	73	529	24%
Spain	-	100	50	150	15%
France	22	320	-	342	18%
Italy <sup>3)</sup>	12	-	50	62	4%
Netherlands	37	200	21	258	52%
<b>Euro-Area</b>	<b>186</b>	<b>1,677</b>	<b>310</b>	<b>2,173</b>	<b>26%</b>
United Kingdom	86	273	-	359	37%
Switzerland	4	-	41	45	13%
<b>Europe Total</b>	<b>302</b>	<b>2,149</b>	<b>72</b>	<b>373</b>	<b>26%</b>
Australia	-	602	-	602	97%
USA	599	998	1,223	2,820	26%
<b>Total</b>	<b>901</b>	<b>3,749</b>	<b>1,294</b>	<b>5,944</b>	<b>26%</b>

# National stabilisation programs (bn. EUR)

(bn. EUR)	Issued or injected <sup>1)</sup>				(30 November 2009)	
	Capital injections	Guarantees	Asset purchase/swaps	% of the Total commitment	Issued or injected Commitment (% of GDP)	
Germany <sup>2)</sup>	26	180	17	42%	10%	
Spain	0	52	19	48%	7%	
France	9	101	-	32%	6%	
Italy <sup>3)</sup>	1	-	-	1%	0%	
Netherlands	14	104	-	46%	24%	
<b>Euro-Area</b>	<b>73</b>	<b>643</b>	<b>41</b>	<b>33%</b>	<b>9%</b>	
United Kingdom	84	154	218	127%	47%	
Switzerland	-	-	41.2	92%	12%	
<b>Europe Total</b>	<b>161</b>	<b>848</b>	<b>300</b>	<b>80%</b>	<b>21%</b>	
Australia	-	115	-	19%	18%	
USA	265	272	220	27%	7%	
<b>Total</b>	<b>426</b>	<b>1,235</b>	<b>519</b>	<b>37%</b>	<b>10%</b>	

# **Macro-prudential supervision, regulation and the European Systemic Risk Board**

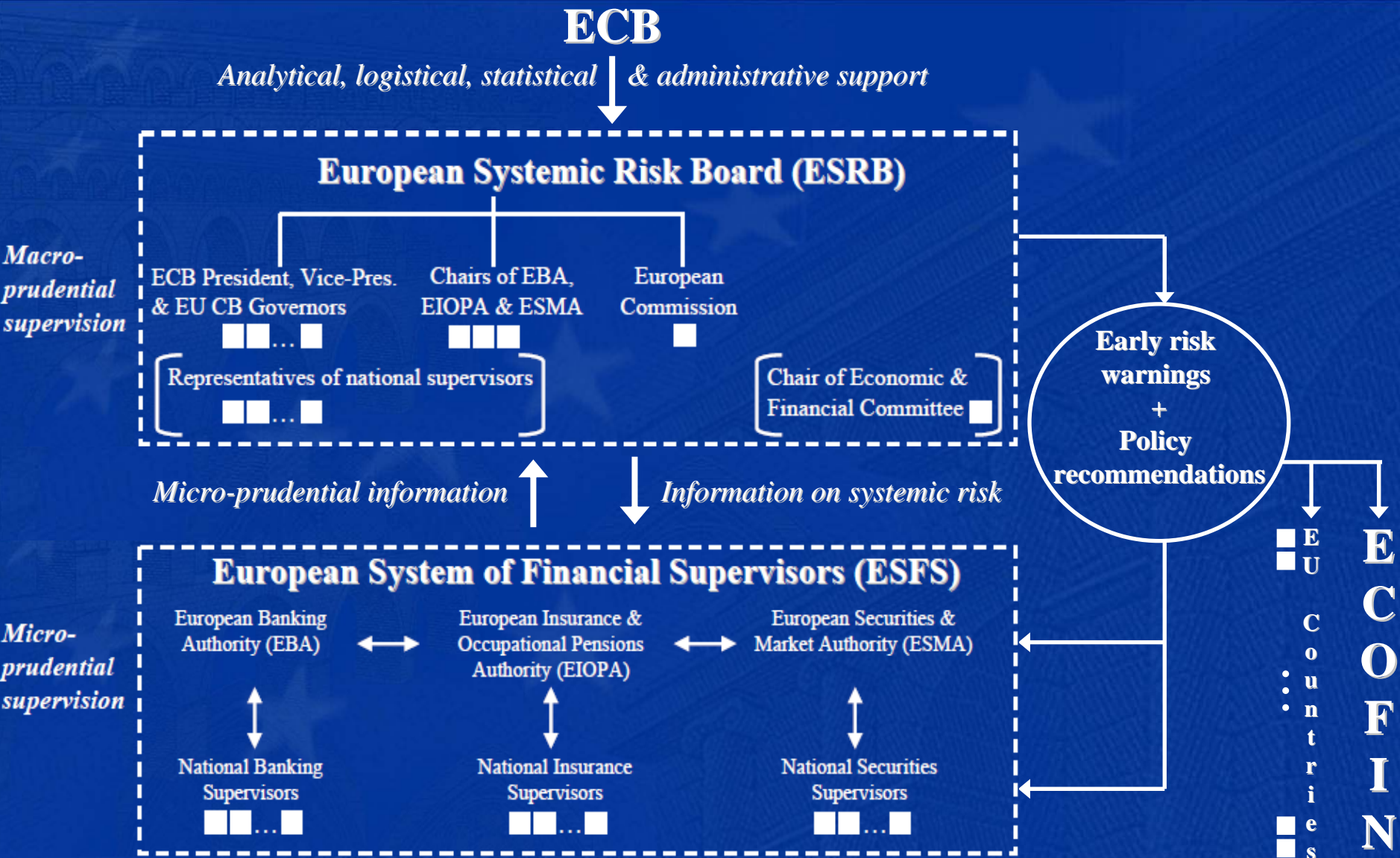
# Macro-prudential supervision

- Public oversight that aims at identifying and containing systemic risks
- Financial system and economy at large
- Term first mentioned in **Cross Report** on “Recent **innovations** in international banking” (1986)
- Influential **speech by Crockett** “Marrying the micro- and macro-prudential dimensions of financial stability” (2000)
- Micro-prudential supervision: Oversight of specific intermediaries or markets
- A lot of practical material to build on (in particular from CB and IMF FSRs), but analytical models and research-based policy tools at a low state of development (e.g. simulation and forecasting models)

# Macro-prudential regulation

- Public regulations that aim at maintaining systemic stability
- As distinct from monetary (and other macro-economic) policy, “**new**” policy area
- *Challenge 1*: Hardly any analytical foundations so far
  - What is the effect of regulations on the system as a whole?
  - Important start: **2009 Geneva Report** on “The fundamental principles of financial regulation”
- *Challenge 2*: Hard to separate from micro-prudential regulation (practically, regulations tend to apply to individual intermediaries or users)
- Distinguish from micro-prudential regulation **by objective**
- Overall both dimensions are **closely related**

# Proposed EU supervisory structure



# Proposed US supervisory structure

## US TREASURY

*Support with information & resources through full-time expert staff*



## Financial Services Oversight Council (FSOC)

Secretary of the Treasury

Director of National  
Bank Supervisor

Chairman  
of SEC

Chairman  
Of FDIC

Chairman of the  
FED Board  
of Governors  
(Systemic regulator,  
Tier 1 FHCs)

Director of Consumer  
Financial Protection Agency

Chairman  
of CFTC

Director  
of FHFA

- *Facilitate info. sharing & coordination*
- *Identify emerging risks*
- *Advise the Federal Reserve on the identification of systemic firms*

- *Gather info. from any financial firm & responsibility for referring emerging risks to attention of regulators*

# Research supporting macro-prudential supervision and regulation

# Analytical tools to detect systemic risks

- Early warning signal models
  - Macro stress-testing models (micro ST for LCFIs)
  - Contagion/spillover models
  - Contingent-claim flow-of-funds accounts models
  - Financial stability indicators, including composite indicators of financial system stress
  - Other models (including for firms and households)
  - Role of macro-econometric forecasting models
- Limited knowledge and reputational risks: **Need diversified tool kit**

# Fundamental research on systemic risk

- We need aggregate models with realistic features of financial instability (present DSGE models not)
- Need to cover all systemically important components of financial systems and, ideally, link to the economy at large
- **Integration of finance and macro-economics**
  - Make finance models more aggregate (monetary policy etc.)
  - Introduce financial sectors and instability in macro models (default risk, liquidity risk, nonlinearities, regime changes etc.)
- Calibrated general equilibrium financial stability models (Goodhart, Sunirand and Tsomocos, 2005, 2006)
- Developing a “work horse” model could help with
  - Forecasting
  - Stress testing
  - Macro-prudential regulatory impact studies (next slide)

# Macro-prudential regulatory research

- **Broad frameworks to study the impact of regulation at the system level (needs to build on fundamental research; see previous slide)**
- **Non-bank financial intermediaries (Insurance, reinsurance, pension funds, hedge funds, private equity firms etc.)**
  - **Systemic importance**
  - **Regulation**
- **Macro-prudential aspects of market regulation and accounting**
- **Macro-prudential aspects of payment, clearing and settlement systems**

# Conclusions

# Conclusions

- Current experience shows that systemic financial crises can happen and have dramatic real effects
- Developing **macro**-prudential supervision and regulation is an important priority for policy
- New policy bodies are created or old ones reformed
- Identifying and assessing **systemic risks** is extremely complex, but we have some tools and concepts
- Macro-prudential **regulation** (countering systemic risk) is a little explored area, a lot of ground work to be done
- **Research** could assume an extremely important role, but needs to invest significantly (in academia and policy institutions)
- Integrating finance and macro an important basis

# Thank you for your attention!

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# Annex

# An evolving international architecture

- **Political impulses**
  - **G20 largely replacing G7**
- **Standard setting/rule making**
  - **Financial Stability Board leading/coordinating**
  - **Basel Committee, International Association of Securities Commissions, International Association of Insurance Supervisors, International Association of Deposit Insurers etc.**
  - **Industry bodies etc.**
- **Enforcement, surveillance and lending: IMF**
  - **Financial stability objective and capital account oversight?**
  - **Significant extension of resources**
- **Complementary monitoring, reporting and discussions**
  - **BIS, Committee on Global Financial System, OECD WP3 etc.**

# Downward revisions of growth forecasts

## Euro area

	Release/Update	2008		2009		2010	
ECONOMIST	10-Jan-09	0.7	(-0.2)	-1.4	(-0.5)	-	-
Survey of Prof. Forecasters 2009Q1	15/21-Jan-09	-	-	-1.7	(-2.0)	0.6	(-0.8)
Eurosystem Staff Projections	05-Mar-09	0.8	-	-3.2/ -2.2	(-2.2/ -2.2)	-0.7/ 0.7	(-1.2/ -0.8)
OECD	31-Mar-09	0.7	(-0.3)	-4.1	(-3.5)	-0.3	(-1.5)
CONSENSUS ECONOMICS	14-Apr-09	0.7	(-0.2)	-3.4	(-1.4)	0.3	(-0.4)
IMF	30-Apr-09	0.9	(-0.1)	-4.2	(-2.2)	-0.4	(-0.6)
European Commission	08-May-09	0.8	(-0.1)	-4.0	(-2.1)	-0.1	(-0.5)
EURO ZONE BAROMETER	13-May-09	0.7	(-0.1)	-3.4	(-1.5)	0.2	(-0.5)

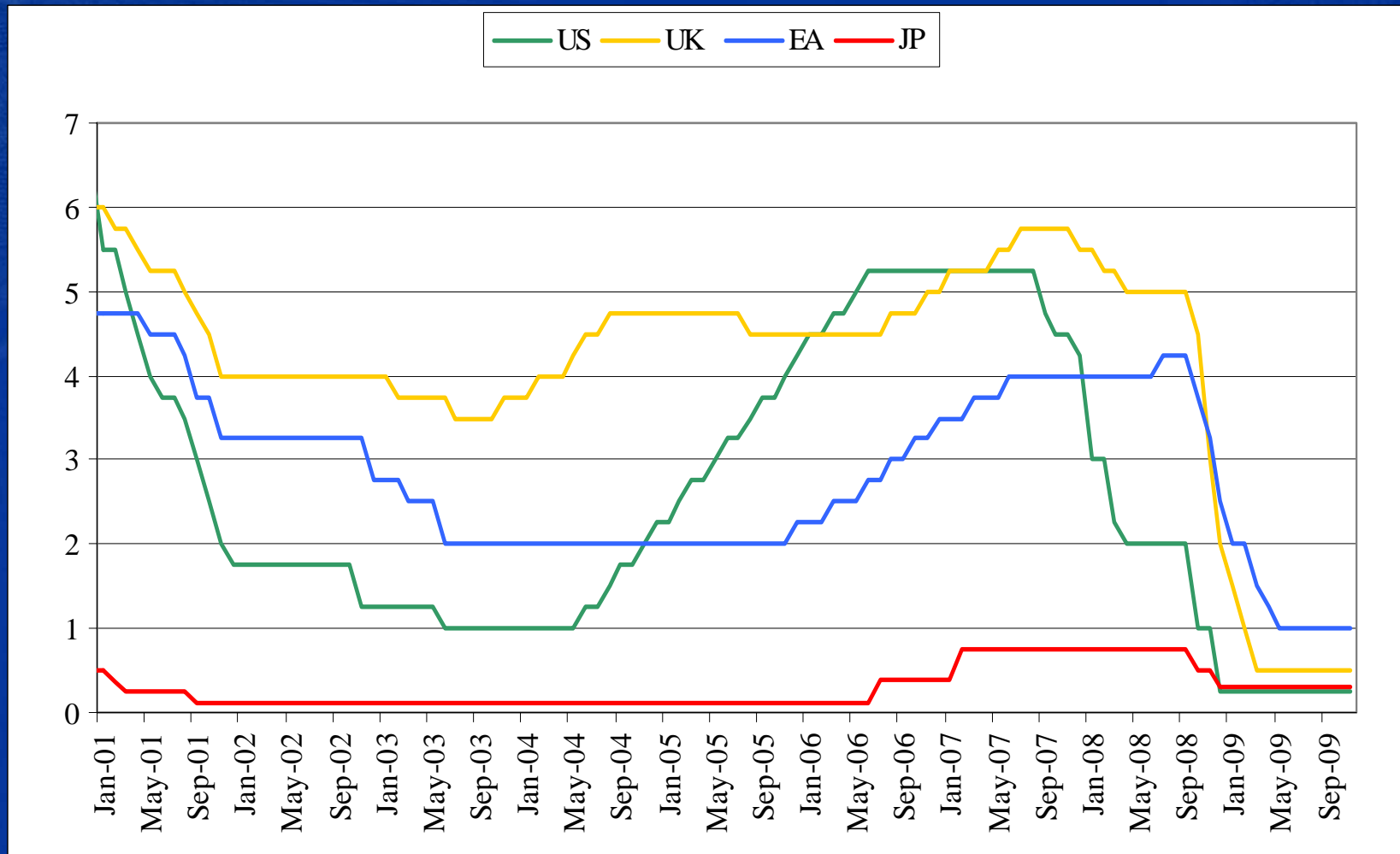
# Budgetary support to economic activity

% of GDP	Change in budget deficit 2008/10		
	Total	Change in cyclically adjusted balance	Estimated impact automatic stabilisers
Austria	-5.0	-2.5	-2.5
Belgium	-4.6	-2.2	-2.4
Cyprus	-6.6	-5.0	-1.6
Finland	-9.0	-5.0	-4.0
France	-4.9	-3.2	-1.6
Germany	-5.0	-2.1	-2.9
Greece	-4.5	-2.4	-2.1
Ireland	-7.5	-4.4	-3.1
Italy	-2.6	-0.3	-2.3
Luxemburg	-6.7	-3.6	-3.1
Malta	0.2	1.3	-1.0
Netherlands	-6.8	-3.4	-3.4
Portugal	-5.3	-4.0	-1.3
Slovakia	-3.7	-0.4	-3.3
Slovenia	-5.2	-1.0	-4.2
Spain	-6.0	-4.1	-1.9
<b>Euro area-16</b>	<b>-4.9</b>	<b>-2.5</b>	<b>-2.4</b>
<b>United Kingdom</b>	<b>-7.9</b>	<b>-5.7</b>	<b>-2.3</b>
<b>EU-27</b>	<b>-5.2</b>	<b>-2.8</b>	<b>-2.4</b>

# Composition of stimulus measures

share (%) in terms of budgetary impact	Total	Composition of stimulus measures (2009-2010)			
		Measures aimed at households	Labour market measures	Measures aimed at businesses	Public investment
<b>Euro area-16</b>	<b>1.8</b>	<b>0.9</b>	<b>0.1</b>	<b>0.3</b>	<b>0.5</b>

# Monetary policy (policy rates, %)



# Inflation developments (CPIs)

