

# Does Monetary Policy Impact International Market Co-Movements?

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- Major central banks have undergone (and started to unwind) unconventional monetary policies
- Ultimate effect on asset markets far from being fully understood
- Recent studies on the US market emphasize the key role played by monetary policy on domestic equities
- In this paper, we expand the discussion to spillover effects towards other markets
- Concerns in EM that QE policies may generate a monetary tsunami, currency wars, and new protectionism forms
- In particular, EM perceive monetary policy changes from DM central banks as global risk factor which could reduce EM central bank ability to control their own sovereign risk (R. Rajan)

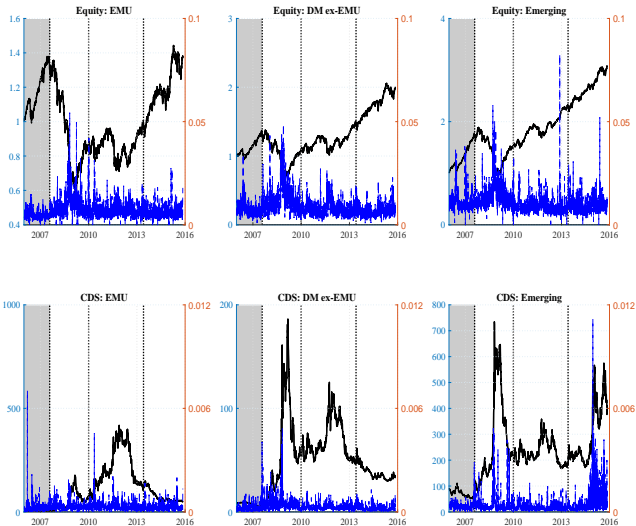
- We ask if and to what extent are recent monetary policy interventions perceived as global factors in the equity and sovereign CDS markets
- Look at the impact of FED's and ECB's announcements on the degree of co-movement of asset shocks for a panel of 39 countries benchmarked to non-announcement days
- Investigate the channel through which monetary policy news impact markets

- We ask if and to what extent are recent monetary policy interventions perceived as global factors in the equity and sovereign CDS markets
  - Look at the impact of FED's and ECB's announcements on the degree of co-movement of asset shocks for a panel of 39 countries benchmarked to non-announcement days
  - Investigate the channel through which monetary policy news impact markets
- ⇒ We find that **FED** news significantly impact the correlation structure of both equity and esp. **sovereign CDS** to both DM and esp. **EM**, making them more comove more strongly than ex-meeting days esp. during **tapering**
- ⇒ The effect of QE policies by the ECB is muted or even associated with lower comovement
- ⇒ Transmission through the degree of a country' market openness, rather than its currency exposure
- ⇒ Evidence that the net effect of monetary policy on market correlations is sizeable

- QE impact on developed countries (interest rates, equity, real economy,..): Chen, Curdia, and Ferrero (2012), Chung et al. (2012), Gambacorta, Hofmann, and Peersman (2014), and Kapetanios et al. (2012), Krishnamurthy and Vissing-Jorgensen (2011), D'Amico et al. (2012), D'Amico and King (2013), Banerjee, Latto, and McLaren (2014), Li and Wei (2013) and Pericoli and Veronese (2016)
- QE impact on emerging markets: Fratzscher, Lo Duca, and Straub (2014, 2016) and Chen, Mancini Griffoli, and Sahay (2014)
- Role of FED news on equity markets: Lucca and Moench (2015), Cieslak, Morse, and Vissing-Jorgensen (2018)
- Market integration: Bekaert and Harvey (1997, 2000), Goetzmann, Li, and Rouwenhorst (2005), Ludvigson and Ng (2009), Pukthuanthong and Roll (2009), Longstaff et al. (2011), Kapadia and Pu (2012), Namvar et al. (2016)

- Daily **equity** returns (Datastream) and changes in sovereign **CDS** (Markit)
- **Time-series:** Aug2007 to Nov2015, divided in 3 periods
  - Global financial crisis: Aug2007-Dec2009
  - Sovereign European crisis & FED QE: Jan2010-May2013
  - Tapering FED QE & ECB QE: June2013-Nov2015
- **Cross-section:** 18 DM and 21 EM, which we further group into
  - Eurozone & Developed markets outside the Eurozone,
  - EM in Europe&Middle East, Asia&Pacific, and Americas
  - Two equally-weighted indexes to measure co-movements between the two groups

# Data: time-series & cross-section



- List of ECB and FED meetings and announcements that is compiled by Rogers, Scotti, and Wright (2014, 2015) and Pericoli and Veronese (2016)
- Comprised of all scheduled and unscheduled Governing Council and FOMC meetings, combined with a series of dates where changes in QE policy were announced
- A total of 109 ECB meetings and 107 FOMC meetings the sample period
- *Event-study approach*: Work on the (-2;+2) day event window surrounding meeting date 0
- We pool all meetings, and also group them based on the market reaction
  - ▷ break down event days into those where the change in the Level factor of the Euro (resp., U.S.) yield curve falls below the first tercile (LOW), between the first and second tercile (MID), or above the second tercile (HIGH)



Degree of market comovements:

- Measured by the **fraction of overall variance explained by the first principal component**,  $P1$
- Extent to which a the cross-section of asset shocks can be explained by a single global factor – Pukthuanthong and Roll (2009)

Steps of the analysis:

- 1 Pre-filter asset data by conditional volatility (GJR-GARCH), see Forbes and Rigobon (2002)
- 2 Estimate the correlation matrix of asset data inside (All, Low, High) and outside (No) event dates, and compute  $P1$
- 3 Carry a bootstrap procedure to obtain confidence intervals under the null hypothesis of no changes in the correlation structure inside vs outside meetings

# Results: Equity

Table: Equity market comovements and central bank meetings

	Aug2007-Dec2009				Jan2010-May2013				Jun2013-Nov2015			
Panel A: ECB meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
All	34	42	43	43	43	46	41	37	36	30	32	33
EMU	68	73	72	72	71	75	72	69	73	66	69	69
DM ex-EMU	44	42	48	49	51	57	50	47	45	39	42	41
EM	21	31	31	32	33	32	28	25	27	21	22	21
EM Europe&ME	34	49	44	45	42	41	38	32	32	22	25	26
EM Asia&Pacific	31	43	43	43	43	38	39	39	39	34	37	36
EM Americas	45	47	52	47	50	52	46	44	42	44	41	39
DM Idx & EM Idx	86	91	91	91	90	92	90	86	82	72	78	82
No. Obs.	55	55	160	470	80	80	230	659	50	50	147	481
Panel B: FED meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
All	47	50	46	41	42	34	39	38	26	39	33	32
EMU	74	74	73	71	73	61	68	71	63	74	68	69
DM ex-EMU	47	54	49	49	51	46	48	48	29	49	38	42
EM	38	40	35	40	35	23	29	25	22	25	21	21
EM Europe&ME	56	53	50	42	46	32	37	33	23	38	28	24
EM Asia&Pacific	50	52	48	41	55	33	43	38	51	35	39	36
EM Americas	53	50	52	46	51	39	45	44	35	37	36	40
DM Idx & EM Idx	93	94	93	91	88	90	90	86	76	93	87	79
No. Obs.	63	60	178	452	70	70	205	684	50	48	138	490

# Results: Sovereign CDS

Table: Sovereign CDS comovements and central bank meetings

	Aug2007-Dec2009				Jan2010-May2013				Jun2013-Nov2015			
Panel A: ECB meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
All	32	39	39	42	43	57	49	44	38	24	26	30
EMU	49	63	58	57	61	76	69	66	55	43	46	47
DM ex-EMU	29	39	36	37	41	51	45	39	30	29	26	32
EM	45	51	51	53	54	64	56	51	47	36	37	38
EM Europe&ME	61	69	67	68	72	84	75	72	57	38	42	39
EM Asia&Pacific	68	66	67	69	70	72	70	70	68	66	65	68
EM Americas	78	69	75	77	87	80	81	76	81	84	80	79
DM Idx & EM Idx	82	68	77	85	75	82	80	80	78	62	66	70
No. Obs.	55	55	160	470	80	80	230	659	50	50	147	481
Panel B: FED meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
All	48	47	44	39	46	42	44	46	33	46	36	26
EMU	61	59	59	56	67	65	64	68	50	66	54	45
DM ex-EMU	39	41	37	36	39	36	39	42	41	43	40	29
EM	60	61	58	50	57	54	55	52	36	53	42	36
EM Europe&ME	72	76	72	66	82	73	77	71	49	54	47	37
EM Asia&Pacific	67	74	69	69	75	67	72	69	70	73	71	67
EM Americas	84	79	80	75	80	81	80	77	79	85	81	79
DM Idx & EM Idx	86	87	86	81	76	73	75	82	63	77	70	69
No. Obs.	63	60	178	452	70	70	205	684	50	48	138	490

## What is driving our results?

- Algebraically, changes in correlation structure must come from either:
  - changes in the loadings (eigenvectors)
  - or, in the nature of the global factor
- We find no statistical differences in the loadings around meeting days by testing

$$[L'_i L_N]_{1,1} - 1 \quad \iota = \{Low, High, All\}$$

- Namely, we do not observe shifts in countries' exposures to outside shocks
- We thus look for changes in the drivers of the first principal component

- We regress the principal component of [DM Idx & EM Idx] on the equity return and corporate default spread of U.S. (for FED) and Germany (for ECB)
- Ask whether “local” shocks in the area (US vs Europe) whose monetary policy is being revised become more globally important
- Also incorporate the USD (Eur) exchange rate against a panel of countries to test for currency effect
- Add the following controls: VIX and Variance Risk premium; TYVIX and Variance risk premium; Oil; return to Commodity index
- Look at the coefficient, its significance and (partial) R-squared

# Analysis of factor – Equity

Panel A: Equity markets comovements and ECB meetings

Period	Central Bank	$r_{Ger}$	$DEF_{Ger}$	Exch.Rate	Controls	$R^2$	partial $R^2$		
							$r_{Ger}$	$DEF_{Ger}$	Exch.Rate
Aug2007-Dec2009	ECB	<b>0.81</b>	<b>-0.14</b>	-0.01	Yes	0.63	0.36	0.07	0.00
	ex-ECB	<b>0.57</b>	-0.06	0.01	Yes	0.53	0.26	0.03	0.00
Jan2010-May2013	ECB	<b>0.70</b>	<b>-0.10</b>	0.06	Yes	0.74	0.31	0.11	0.01
	ex-ECB	<b>0.63</b>	<b>-0.12</b>	<b>0.10</b>	Yes	0.67	0.32	0.07	0.03
Jun2013-Nov2015	ECB	<b>0.60</b>	<b>-0.24</b>	-0.01	Yes	0.61	0.35	0.10	0.01
	ex-ECB	<b>0.65</b>	<b>-0.11</b>	<b>-0.06</b>	Yes	0.66	0.39	0.05	0.02

Panel B: Equity markets comovements and FED meetings

Period	Central Bank	$r_{US}$	$DEF_{US}$	Exch.Rate	Controls	$R^2$	partial $R^2$		
							$r_{US}$	$DEF_{US}$	Exch.Rate
Aug2007-Dec2009	FED	<b>0.41</b>	-0.05	<b>-0.20</b>	Yes	0.44	0.08	0.02	0.07
	ex-FED	<b>0.64</b>	<b>-0.06</b>	<b>-0.21</b>	Yes	0.46	0.17	0.02	0.07
Jan2010-May2013	FED	<b>0.60</b>	<b>-0.11</b>	<b>-0.34</b>	Yes	0.64	0.15	0.02	0.17
	ex-FED	<b>0.63</b>	-0.04	<b>-0.34</b>	Yes	0.61	0.19	0.00	0.15
Jun2013-Nov2015	FED	<b>0.76</b>	<b>-0.27</b>	-0.07	Yes	0.51	0.23	0.06	0.01
	ex-FED	<b>0.41</b>	<b>-0.13</b>	<b>-0.10</b>	Yes	0.36	0.12	0.02	0.01

# Analysis of factor – CDS

Panel C: Sovereign CDS comovements and ECB meetings

Period	Central Bank	$r_{Ger}$	$DEF_{Ger}$	Exch.Rate	Controls	$R^2$	partial $R^2$		
							$r_{Ger}$	$DEF_{Ger}$	Exch.Rate
Aug2007-Dec2009	ECB	-0.31	<b>0.20</b>	0.03	Yes	0.33	0.11	0.06	0.00
	ex-ECB	<b>-0.41</b>	<b>0.12</b>	-0.01	Yes	0.32	0.13	0.03	0.00
Jan2010-May2013	ECB	<b>-0.23</b>	<b>0.24</b>	<b>-0.28</b>	Yes	0.54	0.11	0.11	0.10
	ex-ECB	<b>-0.35</b>	<b>0.29</b>	<b>-0.22</b>	Yes	0.48	0.15	0.13	0.07
Jun2013-Nov2015	ECB	<b>-0.37</b>	<b>0.21</b>	<b>0.12</b>	Yes	0.36	0.16	0.05	0.02
	ex-ECB	<b>-0.35</b>	<b>0.13</b>	0.02	Yes	0.42	0.15	0.04	0.01

Panel D: Sovereign CDS comovements and FED meetings

Period	Central Bank	$r_{US}$	$DEF_{US}$	Exch.Rate	Controls	$R^2$	partial $R^2$		
							$r_{US}$	$DEF_{US}$	Exch.Rate
Aug2007-Dec2009	FED	-0.15	<b>0.27</b>	<b>0.13</b>	Yes	0.38	0.03	0.10	0.05
	ex-FED	<b>-0.31</b>	<b>0.14</b>	<b>0.29</b>	Yes	0.26	0.05	0.03	0.09
Jan2010-May2013	FED	<b>-0.38</b>	<b>0.11</b>	<b>0.35</b>	Yes	0.42	0.07	0.02	0.16
	ex-FED	<b>-0.42</b>	<b>0.06</b>	<b>0.43</b>	Yes	0.45	0.10	0.01	0.18
Jun2013-Nov2015	FED	<b>-0.45</b>	<b>0.24</b>	<b>0.41</b>	Yes	0.47	0.09	0.05	0.17
	ex-FED	<b>-0.15</b>	<b>0.12</b>	<b>0.11</b>	Yes	0.31	0.06	0.02	0.02

- 1 Only those announcements aimed at reducing the impact of a crisis – i.e. global financial crisis for the US and the sovereign crisis for the ECB – and the tapering of QE by the FED
- 2 Periods characterized by large QE implementation, first by the FED and then later on by the ECB, do not result in significant changes in market comovements
- 3 The importance of equity, credit, and currency news is generally stronger when a country's central bank announcements are about tapering compared to implementing QE policies
- 4 The effect is mostly pronounced for the FED, and for the sovereign CDS market



- Why do central banks' monetary policy news spill over to other countries and affect differently some groups?
- We posit two main alternative economic mechanisms:
  - An "**Information channel**": central banks' interventions act as conduit of new information on the state of the economy
  - A "**Currency exposure channel**": central banks interventions on reference rates may induce changes in exchange rates
- We test for them by grouping countries based on their ex-ante sensitivity to each channel, and ask if groups with high sensitivity display the strongest results

- Collect data on currency exposures in international markets from the BIS
- For the analysis on **Equity**, we look at the Absolute Net exposure ( $|\text{Claims} - \text{Liabilities}|$ ) of the banking sector versus Banks and Non-Banks which are denominated in Euro (for ECB) or USD (for FED), scaled by nominal GDP
- For the analysis on **CDS**, we look at the total amount of International debt securities of the General government denominated in Euro (for ECB) or USD (for FED), scaled by nominal GDP
- Data are quarterly and averaged for each country within each period
- We group countries in each period into Low and High, where Low (High) means Below (Above) the median country
- A currency explanation implies high exposure countries should be more impacted by monetary policy news

# Currency exposure channel, results

**Table:** Market comovements and central bank meetings, analysis by currency exposure

	Aug2007-Dec2009				Jan2010-May2013				Jun2013-Nov2015			
Panel A: Equity markets comovements and ECB meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
Low Corp Euro Exp	<b>25</b>	30	33	33	33	35	31	28	30	26	26	26
High Corp Euro Exp	50	58	57	57	57	<b>62</b>	57	54	49	44	45	46
Panel B: Equity markets comovements and FED meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
Low Corp USD Exp	<b>46</b>	<b>48</b>	<b>43</b>	36	<b>39</b>	28	33	32	27	<b>39</b>	33	30
High Corp USD Exp	51	54	51	49	49	45	47	46	<b>28</b>	42	35	36
Panel C: Sovereign CDS comovements and ECB meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
Low Govn Euro Exp	<b>32</b>	42	41	44	44	<b>53</b>	48	44	44	37	35	39
High Govn Euro Exp	40	47	47	48	51	<b>67</b>	59	55	41	25	30	31
Panel D: Sovereign CDS comovements and FED meetings												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
Low Govn USD Exp	46	45	42	38	41	3	38	41	44	<b>50</b>	<b>44</b>	31
High Govn USD Exp	56	55	52	47	55	52	53	56	33	<b>50</b>	39	35

⊙ If anything, results appear stronger for Low Exposure countries

- Look at a country's degree of financial and trade openness
- A country is financially close (open) if its Chinn and Ito (2006) index of capital account openness averaged during the sample period is below (resp., above) the median
- A country is closed (open) to the trading of goods if its ratio of import plus export over GDP averaged during the sample period is below (resp., above) the median
- An information story implies Open countries should be more impacted by monetary policy news, as they are more prone to incorporate outside shocks

**Table:** Market comovement and central bank meetings, analysis by openness

		Aug2007-Dec2009				Jan2010-May2013				Jun2013-Nov2015			
Panel A: Equity markets comovements and ECB meetings													
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No	
Closed	<b>36</b>	44	44	45	37	38	35	33	30	26	27	28	
Open	<b>35</b>	42	44	43	<b>51</b>	<b>55</b>	49	44	43	34	38	39	
Panel B: Equity markets comovements and FED meetings													
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No	
Closed	48	50	46	44	37	30	34	34	25	31	27	28	
Open	48	<b>51</b>	<b>47</b>	41	50	41	46	45	<b>31</b>	<b>48</b>	40	38	
Panel C: Sovereign CDS comovements and ECB meetings													
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No	
Closed	<b>29</b>	36	37	40	36	<b>48</b>	42	39	42	33	32	36	
Open	<b>37</b>	46	44	47	54	<b>67</b>	59	54	40	24	27	29	
Panel D: Sovereign CDS comovements and FED meetings													
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No	
Closed	45	45	41	38	38	37	38	41	37	<b>49</b>	<b>41</b>	34	
Open	55	52	50	44	58	50	54	56	35	<b>48</b>	<b>37</b>	25	

⊙ Results do appear stronger for Open countries

- Alternative explanation: monetary policy news move the stock market, agents rebalance their portfolios and lead to correlated movements
- Consistent with International CAPM argument
- Placebo test: restrict to days when the equity market experienced a **large shock**, defined as a return below the first quartile or above the third quartile of the within-period distribution
- Do we still observe a different effect of monetary policy news once conditioning on this set of data?

**Table:** Market comovements and FED meetings: a placebo test

	Aug2007-Dec2009				Jan2010-May2013				Jun2013-Nov2015			
Panel B: FED meetings, Equity returns												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
All	41	-	45	46	45	-	44	45	-	-	39	36
EMU	72	75	74	76	76	<b>68</b>	74	77	<b>65</b>	79	74	73
DM ex-EMU	<b>41</b>	54	45	54	50	<b>44</b>	<b>48</b>	55	<b>32</b>	55	41	46
EM	31	<b>49</b>	36	34	<b>39</b>	28	34	30	22	29	26	24
DM Idx & EM Idx	90	95	92	93	89	92	92	91	84	<b>94</b>	<b>91</b>	84
Panel D: FED meetings, CDS changes												
Countries	Low	High	All	No	Low	High	All	No	Low	High	All	No
All	50	-	45	43	47	-	46	52	-	-	<b>41</b>	30
EMU	64	67	62	60	<b>64</b>	68	<b>65</b>	72	52	<b>69</b>	56	49
DM ex-EMU	41	39	38	42	43	35	41	45	44	<b>50</b>	<b>41</b>	31
EM	62	63	60	54	59	51	56	57	41	<b>57</b>	48	40
DM Idx & EM Idx	84	90	85	84	<b>72</b>	78	<b>76</b>	84	68	83	77	72

⊙ We still see significant increase in comovements for FED ann.

## We obtain similar conclusions when:

- Using alternative event window definitions
- Using un-filtered asset data
- Using weekly data or HAC-type VCV to account for asynchronicities
- Alternative measures of co-movement (avg correlation)
- Using a latent factor approach and looking at its loading



- We show that monetary policy announcements **do** affect market comovements
- This effect is particularly evident in recent periods (characterized by the release unconventional monetary policies) for sovereign CDS
- Globalization in the financial and good markets is a conduit for degree of transmission of monetary policy shocks
- The evidence that FED announcements induce higher market co-movements, especially on sovereign CDS, supports concerns expressed by policymakers in emerging countries:
  - FED monetary policy has a strong impact on the price of sovereign risk on both developed and emerging markets
  - We do not find a similar impact for ECB interventions