

Wholesale funding runs

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 - Repurchase agreements, interbank debt, certificates of deposit

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 - Tarullo (2014): “*The LCR [liquidity coverage ratio] should also encourage banks to reduce the use of very short-term wholesale funding that increases buffer [of high-quality assets] requirements.*”

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- **Empirical work challenging prevailing view**
 - No freeze in U.S. or European repo market
 - No freeze in U.S. Fed funds market after Lehman failure

- **Market freezes: Funding dries up for good and bad banks**
 - Noisy information
 - Information on bad banks used to infer quality of good banks
 - Asymmetric information
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 - Several large wholesale markets did not freeze
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- → Suggestive of cross-sectional reallocation

■ **Testable hypothesis: Reallocation is random**

- Lenders cannot distinguish between good and bad banks
- “Good” and “bad” on future outcomes, not on observables
- Two dimensions of reallocation

- **Runs in the European wholesale funding market**
 - Unsecured euro-denominated certificates of deposits
 - No market freeze over the 2008-2014 period
 - Cross-section of bank-specific runs

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- Weaker on observable characteristics
- Runs forecast lower future performance
- Future well-performing banks increase funding during market stress

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- **Stress episodes characterized by **reallocation**, not freezes**
 - Evidence inconsistent with asymmetric/noisy information

■ Certificate of deposit (CD) contract

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- Initial maturity between one day and one year
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■ CD dataset

- From Banque de France, over 2008-2014 period
- 1,383,202 ISIN-level observations, with 838,703 individual ISINs
- All events affecting an ISIN: issuance, re-issuance, buybacks
- Volume and maturity data; no price data.
- French market, Euro-denominated contracts only

The euro-denominated CD market

■ French CD market is large

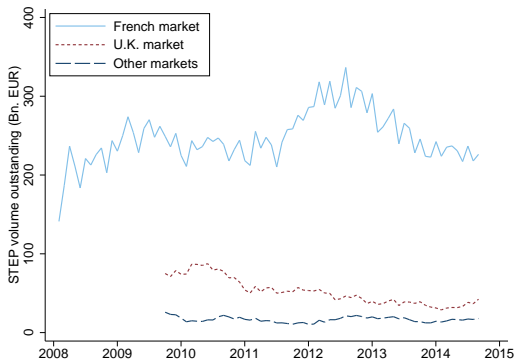
- Second largest CD market in the world, after U.S., before U.K.
- Largest market for euro-denominated contracts
- More than 80% of all euro-denominated CDs

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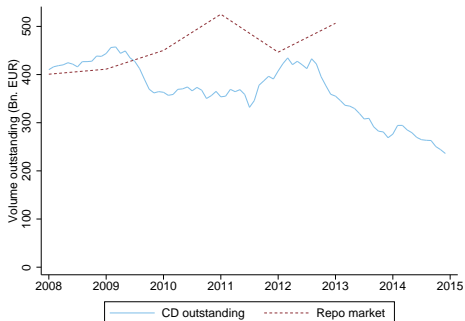
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■ Assessment of relative size (based on STEP subsegment)



■ Similar size as the repo market

- Repo data from Mancini, Ranaldo, Wrampelmeyer (RFS, 2015)
- Repo data prone to double counting



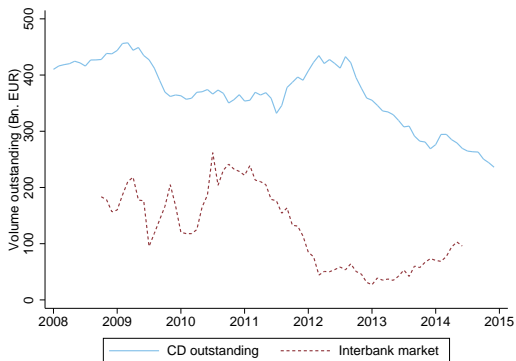
- **Larger than ECB main refinancing operations (MROs)**

- MROs: one-week collateralized lending operations.



- **Larger than the unsecured interbank market**

- Data inferred from TARGET 2 payments
- Interbank data from de Andoain et al. (2015)



■ CD issuers

- 276 individual issuers
- 196 French, 80 non-French (mostly from IT, DE, UK, NL, IE)
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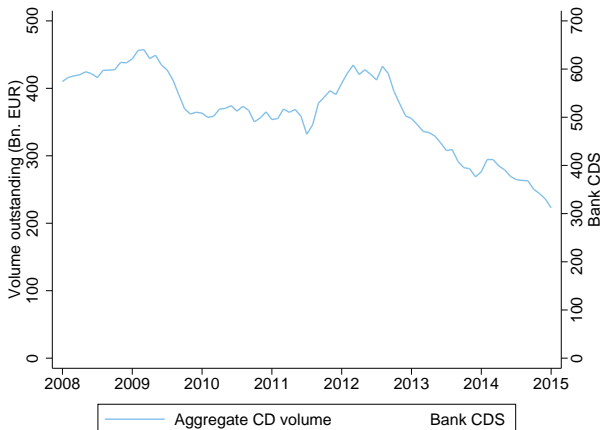
■ Matching with balance sheet and market data

- 263 issuers matched with balance sheet data from Bankscope
- Short-term credit ratings, primarily from Fitch
- Stock price and CDS spread data from Bloomberg

The absence of market freeze

- **No system-wide drop in volume**

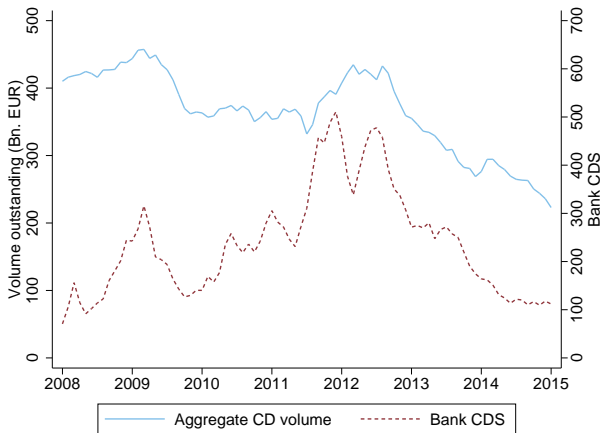
- Neither during the financial crisis nor with the European debt crisis



The absence of market freeze

- **No system-wide drop in volume**

- ... Even when CDS spreads increase
- No system-wide drop in the maturity of new issues [\[See data\]](#)



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■ Demand driven?

- Unlikely that one source of funding becomes cheaper → [\[See yields\]](#)
- Maturity shortening before runs. → [\[See table\]](#)

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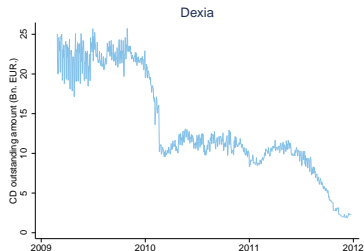
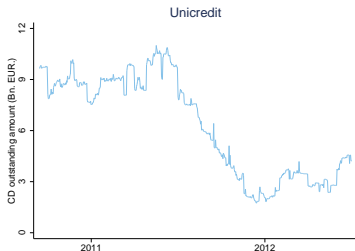
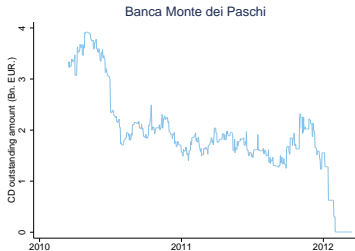
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■ 79 runs, including 33 full runs

■ 2 full and 2 partial runs



Timeline of full runs

■ 2011 has most full runs



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■ Banks facing a run are weaker on observables

	One year before run		Two years before run	
	Diff. from mean	Diff. from median	Diff. from mean	Diff. from median
ROA	-1.249*** [0.000]	-0.577*** [0.000]	-0.271 [0.230]	-0.150** [0.018]
Net income / Assets	-0.014*** [0.000]	-0.006*** [0.000]	-0.003 [0.301]	-0.002** [0.018]
Impaired loans / Equity	55.879*** [0.001]	52.790*** [0.006]	22.362 [0.174]	11.234* [0.054]
Equity / Assets	-0.036*** [0.007]	-0.033*** [0.000]	-0.032** [0.015]	-0.024*** [0.000]
Tier 1 / RWA	6.886* [0.054]	-0.664 [0.718]	7.350* [0.034]	0.590 [0.181]
Regulatory cap. / RWA	8.166* [0.088]	-0.453 [0.910]	8.354* [0.072]	0.331 [0.216]
CDS spread	82.180 [0.249]	110.245** [0.014]	0.041 [0.999]	10.584 [0.402]
Short-term credit rating	-0.424*** [0.005]	-0.474** [0.011]	-0.320** [0.036]	-0.118 [0.179]

- **Weaker on observables**

- Lower profitability
- Lower asset quality
- Lower capitalization
- Higher credit risk

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■ Similar business models

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■ Similar business models

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■ Regulatory capital higher or insignificant

- Consistent with Acharya, Engle, Pierret (2014)

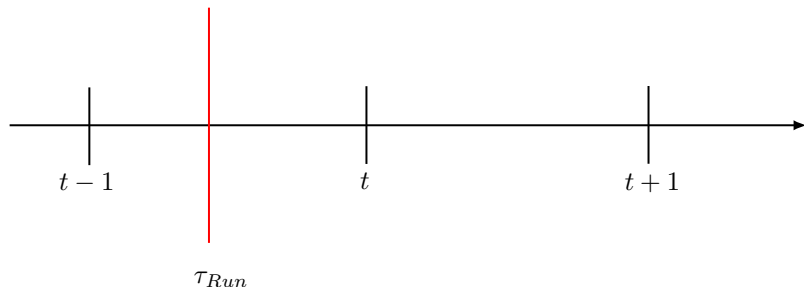
■ Base regression

$$\Delta Y_{it} = \beta_0 \mathbb{1}\{t-1 \leq \tau_{Run_i} < t\} + \beta_1 \text{Size}_{i,t-1} + \beta_2 \text{Controls}_{i,t-1} + \beta_3 \text{Controls}_{c,t-1} + FE_c + FE_t + \varepsilon_{i,t},$$

- $\Delta Y_{it} = Y_{it} - Y_{it-1}$
- ΔROA main dependent variable
- β_0 coefficient of interest

Runs predict future bank characteristics

$$\Delta ROA_t = ROA_t - ROA_{t-1}$$



■ Facing a run predicts a decrease in ROA

Dependent variable: $\Delta ROA = ROA_t - ROA_{t-1}$

	Baseline		Share CD	Crisis
Run	-0.341** (0.135)	-0.508*** (0.139)	-0.874*** (0.176)	-0.610*** (0.143)
Size _{t-1}		-0.018 (0.025)	-0.004 (0.025)	-0.017 (0.025)
ROA _{t-1}		-0.713*** (0.038)	-0.717*** (0.037)	-0.717*** (0.038)
Impaired / Loans _{t-1}		-0.025*** (0.009)	-0.026*** (0.009)	-0.026*** (0.009)
GDP growth		38.957*** (4.969)	37.561*** (4.955)	38.732*** (4.954)
Run * Share CD ∈ [4%, 9%]			0.372 (0.407)	
Run * Share CD ≥ 9%			0.351 (0.302)	
Run * Crisis				0.133 (0.192)
Adj. R ²	-0.001	0.407	0.415	0.411
N. Obs.	948	684	684	684

- **Reverse causality**
 - Can runs *cause* decreases in ROA?

■ Reverse causality

- Can runs *cause* decreases in ROA?

■ Three solutions

- Use changes in impaired loans as dependent variable → [\[See results\]](#)
- Interact *Run* dummy with share of CD funding → [\[See results\]](#)
- Banks do not downsize significantly → No fire sales [\[See results\]](#)

- **Predictability extends to longer-term outcomes**
 - ΔROA and impaired loans at 2-year horizon

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- **Predictability extends to longer-term outcomes**
 - ΔROA and impaired loans at 2-year horizon
- **Predictability remains with high market stress**
 - Interact *Run* dummy with *Crisis* dummy (2011-2012) [\[See results\]](#)
- **Runs predict high-frequency market outcomes**
 - Baseline regression with ΔCDS and excess stock return

- Facing a run predicts an increase in CDS spread
 - Predicts negative excess stock return, but insignificant

Δ CDS spread

	6 months		1 year	
Run	36.443** (15.748)	49.033*** (17.577)	43.824* (25.510)	61.896** (28.891)
Size _{t-1}		-0.707 (0.901)		-1.680 (1.770)
ROA _{t-1}		-2.354 (1.552)		3.948 (2.756)
Impaired / Loans _{t-1}		-2.041** (0.787)		-2.410** (1.180)
GDP growth		-1214.823* (650.329)		-2187.64 (1437.262)
Adj. R ²	0.570	0.585	0.563	0.573
N. Obs.	2,099	956	1,937	956

- **Issuance in excess of the market**

$$E_{it} = \left[\log(CD_{it}) - \log(CD_{i,t-1}) \right] - \left[\log(CD_{mt}) - \log(CD_{m,t-1}) \right]$$

- CD_{it} : Outstanding amount by i in month t
- CD_{mt} : Aggregate size of CD market in month t

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■ Probit specification

$$\Pr(I_{it} = 1 | X_t) = \Phi(\beta_0 \Delta ROA_{it} + \beta_1 \text{Controls}_{i,t-1} + \beta_2 \text{Controls}_{c,t-1} + FE_c + FE_m)$$

- $I_{it} = 1$ if E_{it} above median or 75th percentile

- **Banks increasing ROA increase relative CD funding**
 - ... Regardless of whether market is stressed

Dependent variable:
Prob. of CD issuance in excess of the market

	Above median	Above 75th percentile
Δ ROA	0.024*** (0.005)	0.031** (0.014)
N. Obs.	10,979	10,979

■ Run Index

$$RunIndex_t = \frac{\sum_i R_{it}}{CD_{mt}},$$

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- CD_{mt} : Aggregate CD market size at t
- Computed at monthly frequency → [\[See index\]](#)

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■ Interact ΔROA with quantiles of Run Index

- If effect magnified → Accelerated reallocation
- If effect disappears → Suggests contagion

■ Reallocation magnified when market stress is high

- ... Increasing in quantiles of the Run Index

Dependent variable:
Prob. of CD issuance in excess of the market

	Above median		Above 75th percentile	
Δ ROA	0.024*** (0.005)	0.018** (0.009)	0.031** (0.014)	0.016*** (0.006)
Δ ROA * Run Index in Quartile 2		-0.003 (0.016)		0.008 (0.006)
Δ ROA * Run Index in Quartile 3		0.033*** (0.012)		0.039 (0.033)
Δ ROA * Run Index in Quartile 4		0.048** (0.020)		0.030** (0.015)
N. Obs.	10,979	10,979	10,979	10,979

- **Periods of stress characterized by accelerated reallocation**
 - No market freeze
 - Reallocation not random → From bad to good banks
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- **Lender of last resort most likely to benefit weakest banks**
 - Consistent with empirical evidence (Drechsel et al. JF 2015))
 - ... But in contrast with received theory

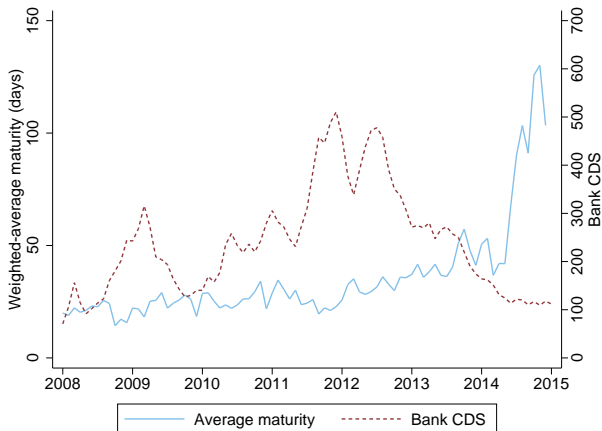
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- **Beneficial effect of runs (Calomiris & Kahn, 1991)?**
 - Runs predict performance → Monitoring induces ex ante discipline?
 - Maturity shortening → Increased monitoring?
 - No direct evidence of ex ante disciplining effect

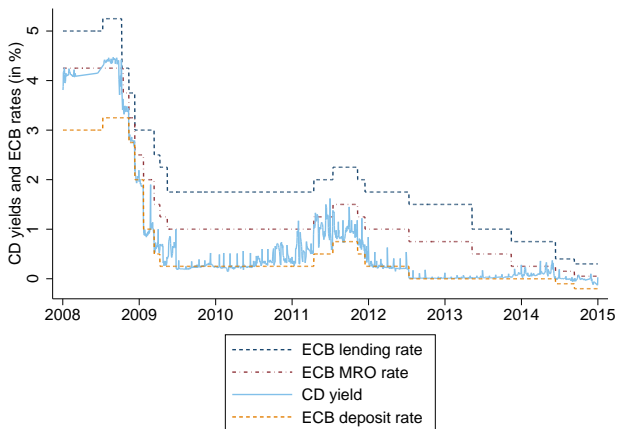
Average maturity of new issues

- No system-wide drop in average maturity



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■ Yields on CDs with initial maturity up to 7 days



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- **Maturity of new issues shortens before runs**
 - Within-issuer variation, with time fixed effects

Dependent variable:
Weighted average maturity of new issues

	<i>Panel A: Partial and full runs</i>	<i>Panel B: Full runs only</i>
$\tau - 1$	-24.660*** (2.281)	-29.732*** (4.521)
$\tau - 2$	-17.278*** (3.939)	-30.198*** (6.004)
$\tau - 3$	-12.134*** (1.699)	-14.664*** (4.742)
$\tau - 4$	-7.628 (4.902)	-11.610 (7.368)
$\tau - 5$	-7.506* (3.750)	-3.930 (5.243)
$\tau - 6$	-0.689 (4.132)	15.504*** (3.858)
Adj. R^2	0.166	0.165
N. Obs.	11,420	11,420

Runs predict future bank characteristics

■ Facing a run predicts an increase in impaired loans

Dependent variable: Δ Impaired loans / Loans

	Baseline		Share CD	Crisis
Run	0.582*** (0.139)	0.507*** (0.138)	0.640*** (0.177)	0.612*** (0.151)
Size _{t-1}		-0.038 (0.025)	-0.042* (0.025)	-0.040 (0.025)
ROA _{t-1}		-0.011 (0.038)	-0.010 (0.038)	-0.007 (0.038)
Impaired / Loans _{t-1}		-0.017* (0.009)	-0.017* (0.009)	-0.017* (0.009)
GDP growth		-24.918*** (5.044)	-24.463*** (5.068)	-24.706*** (5.031)
Run * Share CD \in [4%, 9%]			-0.490 (0.385)	
Run * Share CD \geq 9%			-0.233 (0.306)	
Run * Crisis				-0.052 (0.093)
Adj. R ²	0.100	0.140	0.140	0.145
N. Obs.	676	675	675	675

■ Effect not magnified for banks with large CD exposure

Dependent variable: $\Delta ROA = ROA_t - ROA_{t-1}$

	Baseline		Share CD	Crisis
Run	-0.341** (0.135)	-0.508*** (0.139)	-0.874*** (0.176)	-0.610*** (0.143)
Size _{t-1}		-0.018 (0.025)	-0.004 (0.025)	-0.017 (0.025)
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■ Facing a run does not predict a decrease in size

Dependent variable: Δ Size

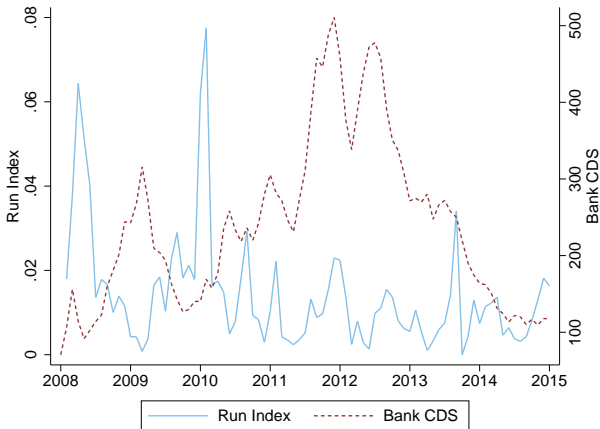
	Baseline		Share CD	Crisis
Run	-0.039 (0.035)	-0.014 (0.013)	-0.008 (0.017)	-0.019 (0.018)
Size _{t-1}		-0.005** (0.003)	-0.005** (0.002)	-0.005** (0.002)
ROA _{t-1}		0.008** (0.003)	0.008** (0.003)	0.008** (0.003)
Impaired / Loans _{t-1}		-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
GDP growth		0.028 (0.497)	0.054 (0.500)	0.014 (0.497)
Run * Share CD \in [4%, 9%]			-0.009 (0.041)	
Run * Share CD \geq 9%			-0.017 (0.030)	
Run * Crisis				0.008 (0.007)
Adj. R^2	0.031	0.197	0.195	0.198
N. Obs.	950	685	685	685

■ Predictability remains when market stress is high

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- Captures number and magnitude of runs
 - Both partial and full



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