The Gnomes of Zürich and the New York Bankers' Panic of 1907[1]

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EEA Congress
27 August 2025

[1] The usual disclaimer applies.

[2] Monetary Policy Analysis, Swiss National Bank

Motivation

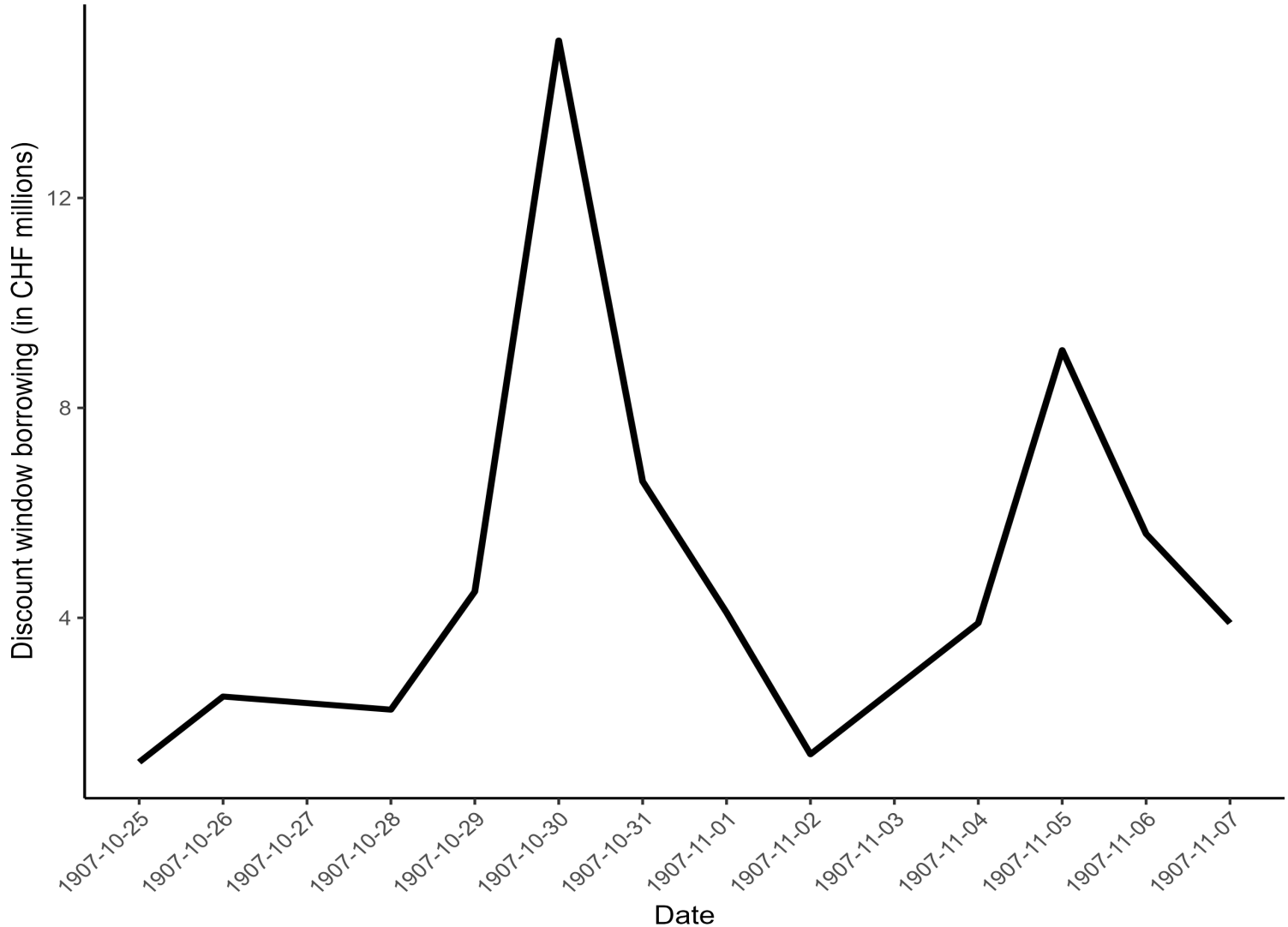
- Domestic banking crises can cause international financial market turmoil
- Lessons from history valuable: banking crises rare events
- First age of globalization (1880 - 1914) particularly interesting (Flandreau and Zumer, 2004) for comparisons with recent past
- "Panic of 1907": New York financial crisis with US-wide and international effects

What happened in in the "Panic of 1907"?

- Trusts (early shadow banks) and banks associated with trusts got into trouble (Sprague, 1908; Fohlin, Gehrig, Haas, 2020)
- Key events:
  - collapse of United Copper on 16 October 1907
  - bankruptcy of Knickerbocker Trust on 22 October 1907
- International spillovers?
  - Yes, after suspension of convertability of deposits into gold a couple of days after key events (Noyes, 1909; Moen and Tallmann, 2018)
  - Why?
    - Premium on cash (dollars) = foreign currency premium $\Rightarrow$ gold flows from Europe to New York
    - European central banks took measures against gold outflows to the US, e.g. increasing interest rates

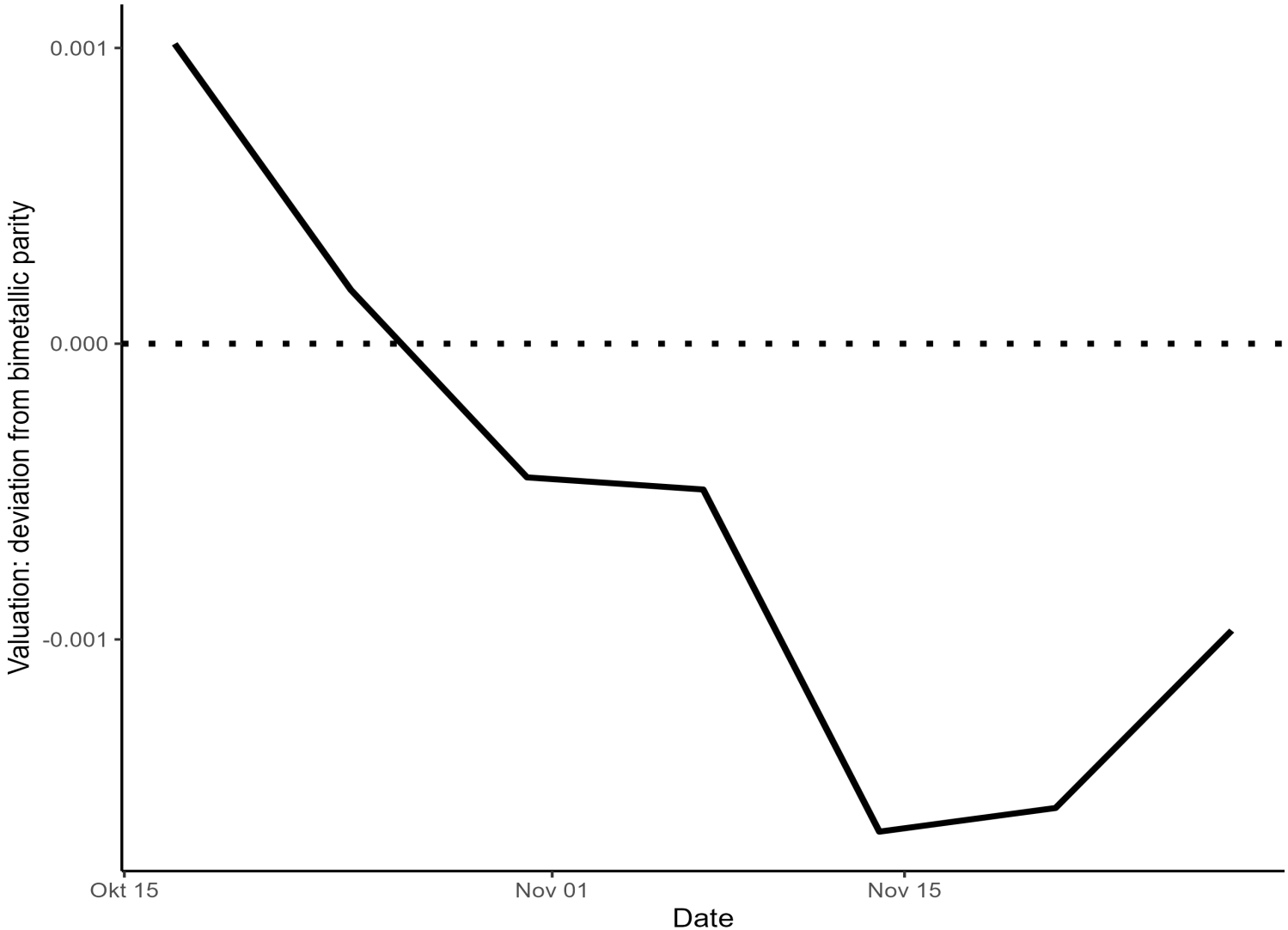
Meanwhile in Switzerland...(1 of 2)

Increase in discount window borrowing around time of deposit convertability suspension



Meanwhile in Switzerland...(2 of 2)

Swiss franc depreciation = shrinking money supply after United Copper collapse



What I do

- First study of **daily stock returns** on foreign (Swiss) stock market during Panic of 1907
- Evaluating market-wide effects (returns, illiquidity)
- **Event studies** assessing whether **key events** associated with **abnormal returns** on stocks of firms from different economic sectors
- **Hypothesis**: Returns on **Swiss banks' stocks** reacted more negatively to key events than the overall market
  $\Rightarrow$ **negative abnormal returns**
- **Why?**
  - Swiss banks with substantial US asset holdings (Schmid and Meier, 1977)
  - Signs of heightened funding risks of banks during Panic of 1907

What I find

- Pattern of international spillovers as told by Swiss banks' abnormal stock returns:
  - first and largest effects around United Copper failure
  - drop in abnormal returns after collapse of Knickerbocker Trust
  - some negative effects from restriction on deposit convertability
  - recovery in the days of European central banks raising discount rates, in line with Rodgers and Payne (2014)
- Banks' stock returns significantly affected one or two days after key events
- No cross-sectoral (banks vs others) differences in abnormal returns over several days [not shown]
- Little effects on market return, but liquidity deteriorated [not shown]

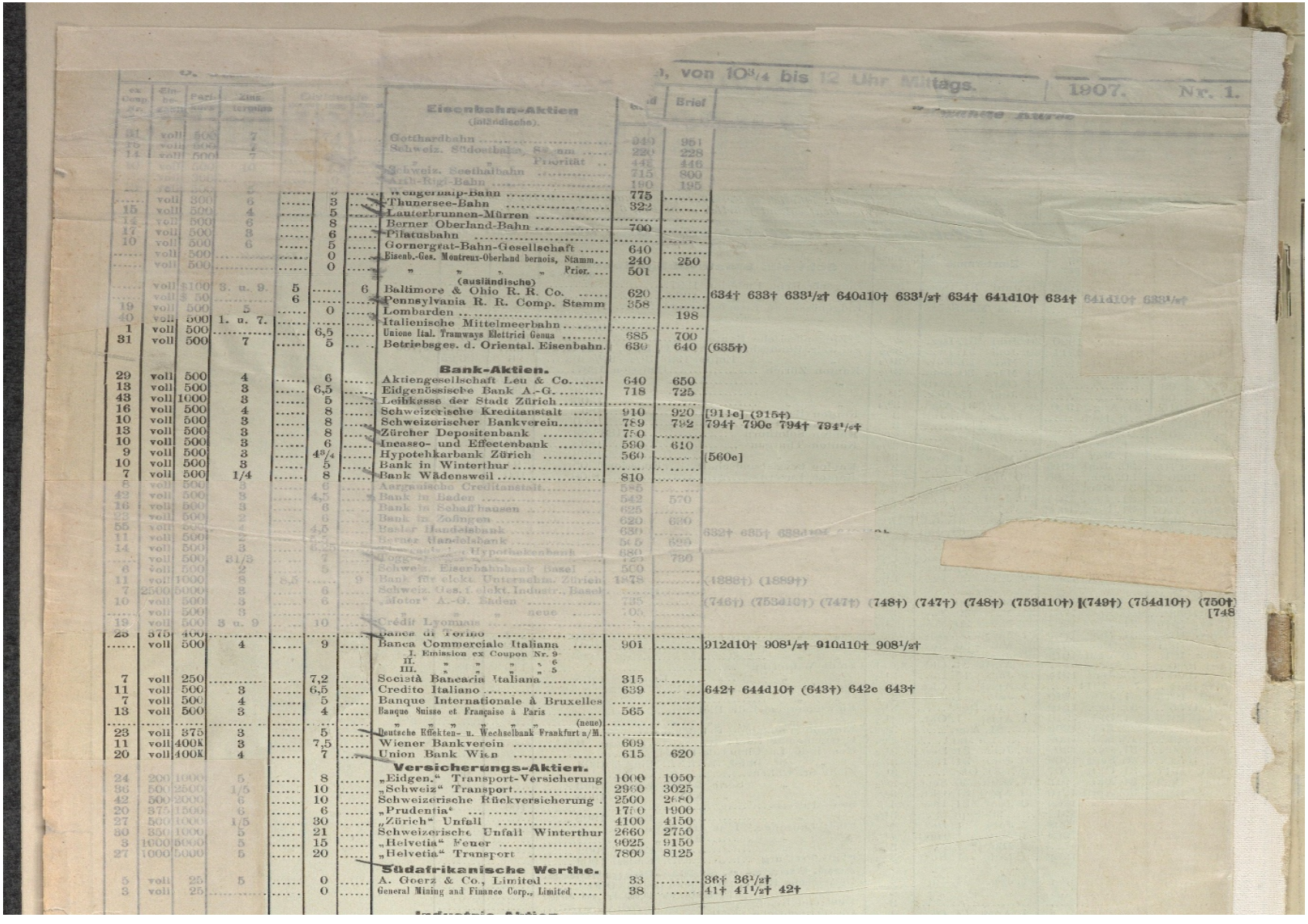
Related literature

- Role of networks, regulation, shadow banks and information asymmetries in spreading the panic across the US
  - Fohlin, Gehrig, Haas (2020), Fohlin and Lu (2021), Hansen (2014), Jaremski and Wheelock (2023), Moen and Tallmann (1992), Sprague (1908)
- The relation to the real economy
  - Frydman, Hilt, Zhuo (2015), Purchart (2015)
- International (financial) implications
  - Bordo, Redish, Rockoff (2015), Mishkin and White (2014), Moen and Tallmann (2018), Noyes (1909), Rodgers and Payne (2014), this paper

Data: general information

- Population of shares traded on Zurich exchange from 1905 to 1909
- Source: Kursblatt der Zürcher Börse
  - daily bid and ask prices for stocks (no closing prices)
    - could be spot or futures trade
  - disctinction between different sectors: banks, industrials, insurances, railways
  - book value per share
  - capital events, e.g., issuance of new equity
  - market commentary
- Number of shares for each listed firm from Finanzjahrbuch Schweiz

Sources: Kursblatt der Zürcher Börse



Kursblatt der Zürcher Börse, von 10 3/4 bis 12 Uhr Mittags. 1907. Nr. 1.

ex Coup. Nr.	Einheit	Fact.	Zins-termine			Eisenbahn-Aktien (inländische).	Geld	Brief	
	voll	500			7	Gotthardbahn	940	951	
	voll	500			4	Schweiz. Südostbahn, Stamm	220	228	
	voll	500			7	„ „ Priorität	445	446	
						Schweiz. Seethalbahn	715	800	
						Arth-Rigi-Bahn	190	195	
						Wengernalp-Bahn	775		
	voll	300			6	3 Thunersee-Bahn	322		
15	voll	500			4	5 Lauterbrunnen-Mürren			
14	voll	500			6	8 Berner Oberland-Bahn	700		
17	voll	500			3	6 Pilatusbahn			
10	voll	500			6	5 Gornergrat-Bahn-Gesellschaft	640		
	voll	500				0 Eisenb.-Ges. Montreux-Oberland bernois, Stamm	240	250	
	voll	500				0 „ „ „ „ Prior.	501		
						(ausländische)			
	voll	$100	3. u. 9.		5	6 Baltimore & Ohio R. R. Co.	620		634† 633† 633½† 640d10† 633½† 634† 641d10† 634† 641d10† 633½†
	voll	$ 50			6	Pennsylvania R. R. Comp. Stamm	358		
19	voll	500	5		0	Lombarden		198	
40	voll	500	1. u. 7.			Italienische Mittelmeerbahn			
1	voll	500			6,5	Unione Ital. Tramways Elettrici Genua	685	700	
31	voll	500	7		5	Betriebsges. d. Oriental. Eisenbahn.	630	640	(635†)
						Bank-Aktien.			
29	voll	500	4		6	Aktiengesellschaft Leu & Co.	640	650	
13	voll	500	3		6,5	Eidgenössische Bank A.-G.	718	725	
43	voll	1000	3		5	Leihkasse der Stadt Zürich			
16	voll	500	4		8	Schweizerische Kreditanstalt	910	920	[911e] (915†)
10	voll	500	3		8	Schweizerischer Bankverein	789	792	794† 790e 794† 794½†
13	voll	500	3		8	Zürcher Depositenbank	750		
10	voll	500	3		6	Incasso- und Effectenbank	590	610	
9	voll	500	3		4¾	Hypothekarbank Zürich	560		[560e]
10	voll	500	3		5	Bank in Winterthur			
7	voll	500	1/4		8	Bank Wädensweil	810		
6	voll	500	3		6	Aargauische Creditanstalt	585		
42	voll	500	3		4,5	Bank in Baden	542	570	
16	voll	500	3		6	Bank in Schaffhausen	625		
23	voll	500	2		6	Bank in Zofingen	620	630	
55	voll	500	4		4,5	Basler Handelsbank	630		632† 635† 638d10†
11	voll	500	2			Bernerr Handelsbank	565	590	
14	voll	500	3		6,5	Basler Hypothekenbank	680		
	voll	500	31/3		7	Hypothekenbank	720	730	
6	voll	500	2		5	Schweiz. Eisenbahnbank Basel	500		
11	voll	1000	8	8,5	9	Bank für elektr. Unternehm. Zürich	1878		(1888†) (1889†)
7	2500	5000	3		6	Schweiz. Ges. f. elektr. Industr., Basel			
10	voll	500	3		6	„Motor" A.-G. Baden	735		(746†) (753d10†) (747†) (748†) (747†) (748†) (753d10†) (749†) (754d10†) (750†) [748
	voll	500	3			„ „ „ neue	705		
19	voll	500	3 u. 9		10	Crédit Lyonnais			
25	375	400				Banca di Torino			
	voll	500	4		9	Banca Commerciale Italiana	901		912d10† 908½† 910d10† 908½†
						I. Emission ex Coupon Nr. 9			
						II. „ „ „ „ „ 6			
						III. „ „ „ „ „ 5			
7	voll	250			7,2	Società Bancaria Italiana	315		
11	voll	500	3		6,5	Credito Italiano	639		642† 644d10† (643†) 642e 643†
7	voll	500	4		5	Banque Internationale à Bruxelles			
13	voll	500	3		4	Banque Suisse et Française à Paris	565		
						„ „ „ „ „ (neue)			
23	voll	375	3		5	Deutsche Effekten- u. Wechselbank Frankfurt a/M.			
11	voll	400K	3		7,5	Wiener Bankverein	609		
20	voll	400K	4		7	Union Bank Wien	615	620	
						Versicherungs-Aktien.			
24	200	1000	5		8	„Eidgen." Transport-Versicherung	1000	1050	
86	500	2500	1/5		10	„Schweiz" Transport	2960	3025	
42	500	2000	6		10	Schweizerische Rückversicherung	2500	2680	
20	375	1500	6		6	„Prudentia"	1750	1900	
27	500	1000	1/5		30	„Zürich" Unfall	4100	4150	
30	350	1000	5		21	Schweizerische Unfall Winterthur	2660	2750	
3	1000	5000	5		15	„Helvetia" Feuer	9025	9150	
27	1000	5000	5		20	„Helvetia" Transport	7800	8125	
						Südafrikanische Werthe.			
5	voll	25	5		0	A. Goerz & Co., Limited	33		36† 36½†
3	voll	25			0	General Mining and Finance Corp., Limited	38		41† 41½† 42†
						Industrie-Aktien.			

Data used in empirical analysis

- Stock price ($P_{i,t}$) = midpoint of bid and ask prices
- Return: $R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$
- Market capitalization (market cap) = no. of shares times price
  - to construct value-weighted market index
- Focus of empirical analysis: Firm-level returns during acute crises period. Normal? Abnormal?

Abnormal stock returns (Campbell, Lo, MacKinlay, 1997)

Market model for security i:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \tag{1}$$

with R_{it} return on stock of firm i and R_{mt} the market return (value-weighted return on broad stock market index).

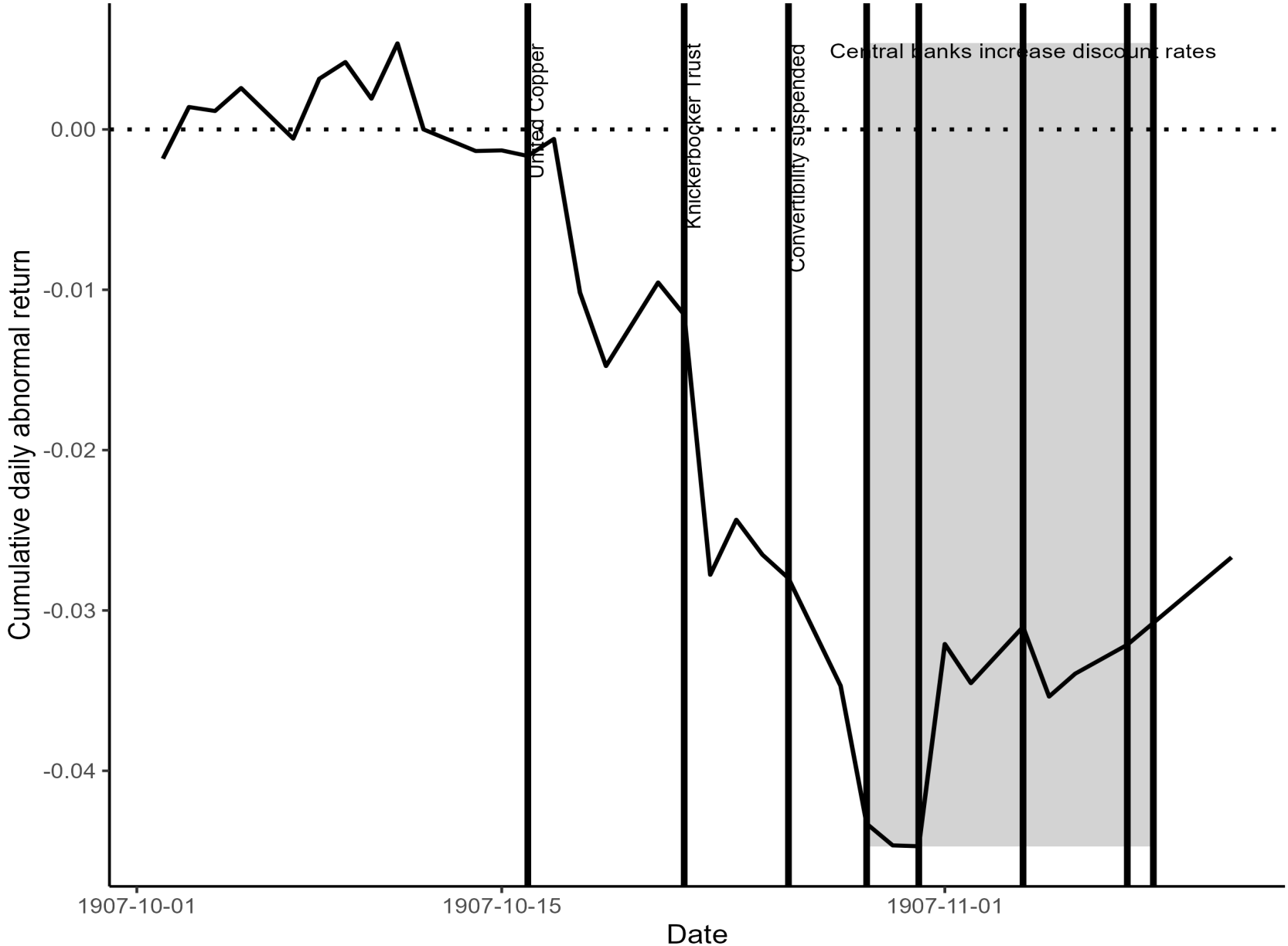
- estimate α_i and β_i in pre-event window
- use estimates $\hat{\alpha}_i$ and $\hat{\beta}_i$ to calculate abnormal return (AR) in event window τ

$$R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau} \tag{2}$$

Cumulative abnormal stock returns (Campbell, Lo, MacKinlay, 1997)

- Pre-event window: from 3 January 1905 until 21 trading days before collapse of Knickerbocker Trust
- Event window τ: 20 days before and after Knickerbocker Trust bankruptcy
- Calculating cumulative abnormal returns (CAR) of different sectors:
  - average ARs across securities (distinguishing between sectors)...
  - ...and sum over time to get CARs of banks, industrials, etc.

Keep calm and carry on? Swiss banks' CARs



Are abnormal returns significant?

Empirical framework

- Again market model for security i:

$$R_{it} = \alpha_i + \beta_i R_{mt} + eventdummies_t + \epsilon_{it} \quad (3)$$

  - event dummies taking values of 1 on day of event and 0 otherwise.
  - Specify dummies for one day (two days, three days) after United Copper, Knickerbocker Trust and deposit convertability events

- Estimates of dummies interpretable as abnormal return (Gibbons, 1980)
- Estimated over sample period January 1905 to December 1907

Are abnormal returns significant?

	Banks	Industrials
(Intercept)	-0.0003^{***}	-0.0002
MarketReturn	-0.0000	0.0004
d.copper	-0.0000	0.0010
d.copper.a1	0.0002	-0.0014
d.copper.a2	-0.0047^{***}	0.0033
d.copper.a3	-0.0007	0.0001
d.knicker	-0.0002	0.0009
d.knicker.a1	-0.0040^{***}	0.0003
d.knicker.a2	0.0006	-0.0018
d.knicker.a3	0.0003	0.0001
d.clha	-0.0005	0.0020
d.clha.a1	-0.0017	-0.0005
d.clha.a2	-0.0025^{*}	0.0000
d.clha.a3	-0.0002	-0.0009
d.boe	0.0002	-0.0009
d.boe.a1	0.0018	-0.0006
d.boe.a2	-0.0003	0.0030
d.boe.a3	0.0010	0.0006

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Conclusions

- International spillover of Panic of 1907 to financial markets started earlier than suggested by previous studies
- Statistically significant responses of Swiss banks' stock prices one or two trading days after key events
- No significant reponses for other sectors
- However, no persistent cross-sectoral differences in abnormal returns on banks' stocks vs other sectors [not shown]
- Little effects on market return but liquidity deteriorated [not shown]