

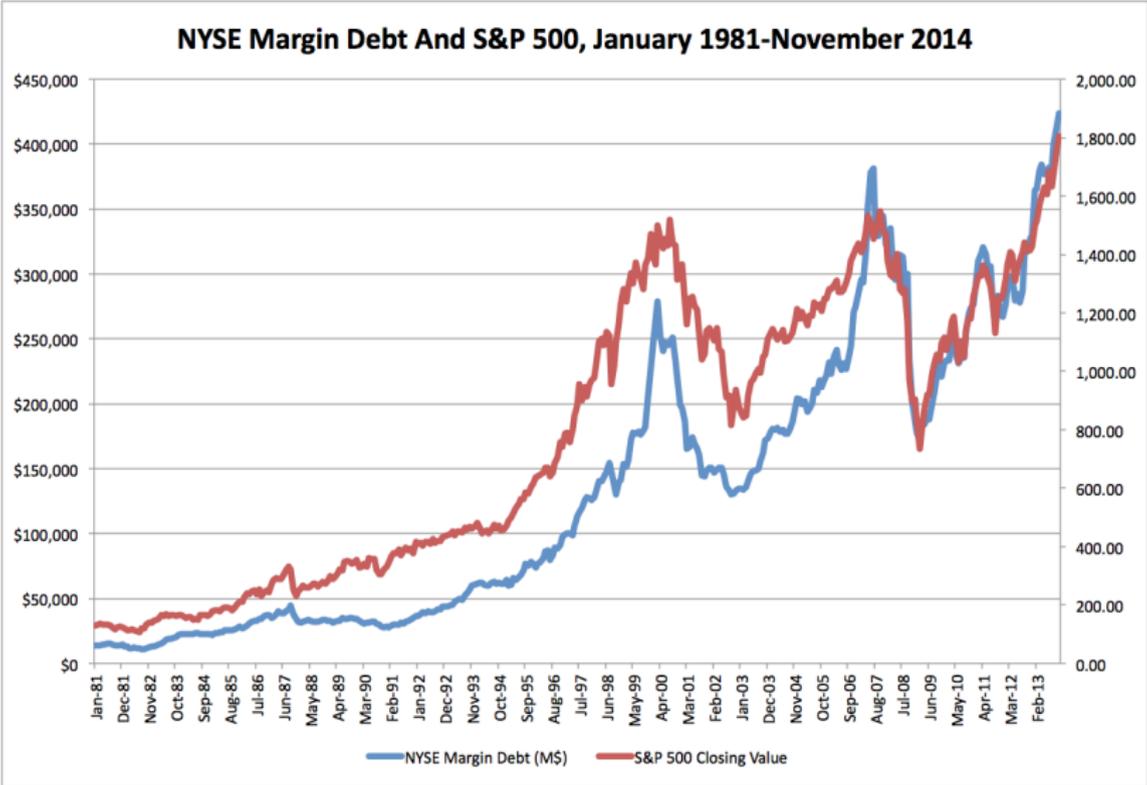
A margin call gone wrong: Credit, stock prices, and Germany's Black Friday 1927

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¹This presentation does not reflect the views of the Federal Reserve System.

Motivation



This paper:

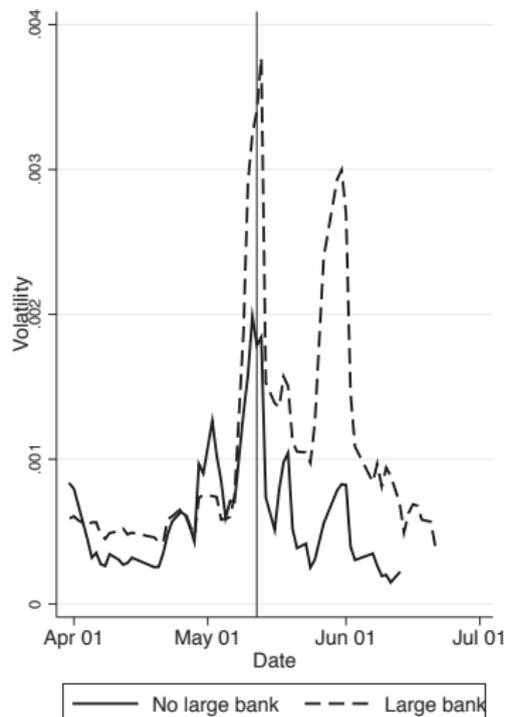
Large shock to margin lending: Germany's Black Friday 1927

- Reichsbank forced some banks to cut margin lending
- Banks forced clients to sell stocks
- Clients held mainly stocks of connected firms
- Banks differed in their need to delever

Main results:

- Stocks connected to a bank with a high need to delever:
 - Decreased 50 percent more during the stock market crash
 - Fluctuated stronger in the aftermath

Main results



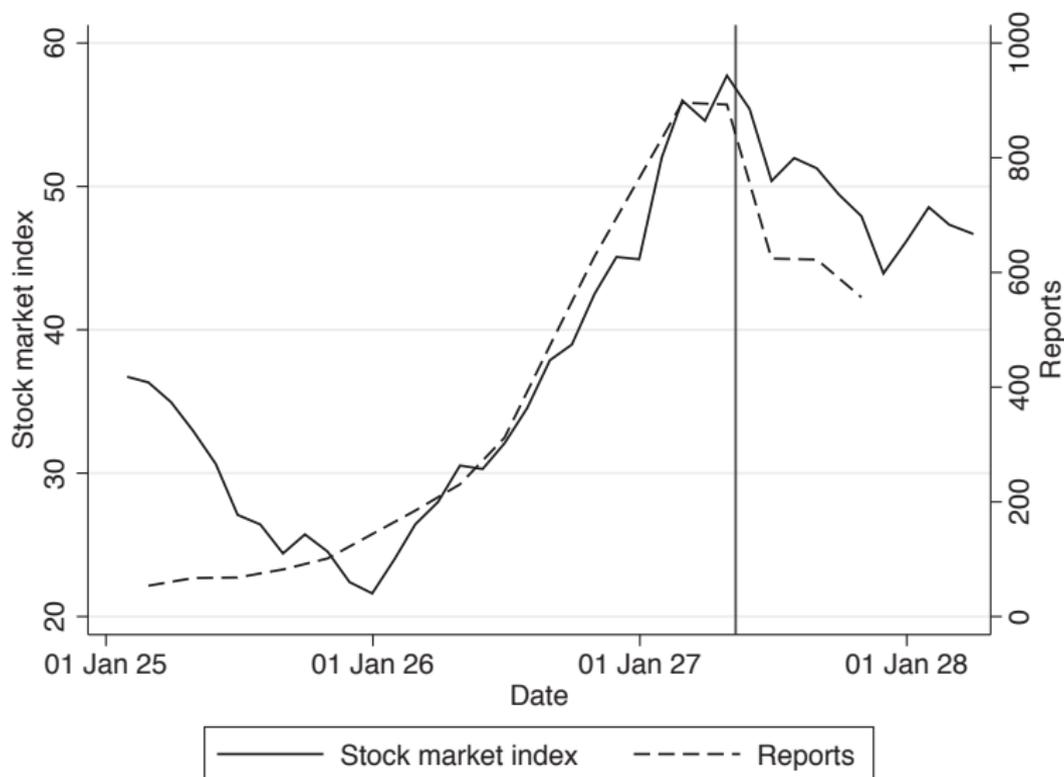
Contribution to the literature

- Fire sales and price pressure
 - Shleifer and Vishny (2011)
 - Coval and Stafford (2007), Mitchell and Pulvino (2012), Hendershott and Menkveld (2013), Anton and Polk (2014)
- Intermediary balance sheet conditions and asset prices
 - Gromb and Vayanos (2002), Brunnermeier and Pedersen (2009), He and Krishnamurthy (2012)
 - Moore (1966), Officer (1973), Hsieh and Miller (1990)
 - Adrian, Moench, and Shin (2010), Adrian and Shin (2010)

Historical background: Interwar Germany

- “Golden twenties”
- Decrease in unemployment, increase in investment
- Large capital inflows
- Stock market: 99% of its pre-WWI level in 1925, 178% in April 1927
- Stock purchases largely credit-financed

Historical background: Stock market and margin credit



Historical background: The Reichsbank's view

- Reichsbank president Schacht involved in war reparations talks
- His goal: Decrease reparations payments
- His problem: Stable German economy
- High stock prices were a politically unwanted signal

Historical background: Before the Black Friday 1927

- Schacht: Germany experiences a stock price bubble
- To prick the bubble, banks must decrease margin lending
- If banks would not decrease margin lending, Reichsbank would not redeem promissory notes, banks' major source of liquidity

Historical background: The Black Friday 1927

- Large banks issue a joint statement
- Each bank will decrease their balance sheet position of stock credit by 25 percent
- Banks issue margin calls to their clients
- Initial stock market crash followed by weeks of fire sales

Identification: Banks and firms in Germany

- Banks and firms had strong ties: creditor, advisor, supervisory board
- Banks actively traded in connected firms' stock
- Measure of these ties: Underwriter prospectuses

Identification: Portfolio bias and margin calls

- Banks' investment advice to clients: Invest in connected firms
- Clients' portfolios were biased toward these firms
⇒ When a bank issues a margin call to a client, the client is more likely to hold stocks of connected firms
- Margin calls were not issued by all banks
- Large Berlin banks issues margin calls, regional banks did not
⇒ Stocks of firms connected to large banks were more affected than other stocks

Data

- Underwriter prospectuses from German Federal Archive
- Daily stock prices from *Berliner Boersen Zeitung*
- Aggregate statistics from statistical releases of the German Reich
- Period: February 1927 - July 1927
- Sample: 145 firms, 99 connected to 6 large banks

Descriptive statistics

	Before margin call	After margin call
Returns		
Large bank	-0.0005	-0.0037
No large bank	-0.0029	-0.0055
Returns, St.Dev		
Large bank	0.026	0.041
No large bank	0.028	0.032
Volatility		
Large bank	0.00072	0.00138
No large bank	0.00068	0.00056
Excess Supply		
Large bank	0.13	0.12
No large bank	0.12	0.1
Excess Demand		
Large bank	0.36	0.3
No large bank	0.43	0.26

Variance and returns: Large vs. non-large banks

$$y_{it} = \beta * (May_t * Bank_i) + Controls_{it} + \epsilon_{it}$$

	(1) Variance	(2) Variance	(3) Returns	(4) Returns
May*Bank	0.000778*** (0.000103)	0.000684*** (0.0000963)	-0.000620 (0.00321)	-0.00141 (0.00314)
May	-0.000117 (0.0000880)		-0.00260 (0.00310)	
Bank	0.0000442 (0.0000628)		0.00236 (0.00174)	
Constant	0.000681*** (0.0000591)	0.00120*** (0.000256)	-0.00292* (0.00170)	0.0127** (0.00566)
Firm FE	No	Yes	No	Yes
Time FE	No	Yes	No	Yes
N	11273	11273	9107	9107
R ²	0.020	0.230	0.002	0.277

Variance and returns: Differences across firm size

	Returns	Returns	Returns	Volatility	Volatility	Volatility
May*Size 2	0.000979 (0.00145)		0.00129 (0.00160)	0.000225 (0.000240)		0.000170 (0.000258)
May*Size 3	0.00141 (0.00156)		0.00167 (0.00167)	0.00112*** (0.000365)		0.00106*** (0.000378)
May*Size 4	0.00248* (0.00141)		0.00264* (0.00154)	0.000779*** (0.000242)		0.000689*** (0.000257)
May* 1 UW		-0.00185 (0.00176)	-0.00258 (0.00196)		0.000601*** (0.000165)	0.000304 (0.000230)
May*2+ UW		-0.000232 (0.00172)	-0.00138 (0.00185)		0.000909*** (0.000177)	0.000512** (0.000249)
Constant	-0.0234*** (0.00293)	-0.0268*** (0.00241)	-0.0243*** (0.00297)	0.00179*** (0.000268)	0.000980*** (0.000227)	0.00249*** (0.000278)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	8970	9107	8970	11106	11273	11106
R ²	0.276	0.277	0.277	0.236	0.230	0.237

Variance and returns: Large banks

	(1) Commerz	(2) Deutsche	(3) Diskonto	(4) Danat	(5) Dresdner
Returns					
May	-0.039 (0.00253)	-0.057** (0.00187)	-0.011 (0.00230)	-0.054 (0.00200)	-0.027 (0.00191)
N	968	2026	1003	1307	1665
R^2	0.010	0.025	0.010	0.010	0.023
Variance					
May	0.036* (0.000133)	0.161*** (0.000164)	0.174*** (0.0000898)	0.147*** (0.0000852)	0.106*** (0.000103)
N	1174	2451	1248	1597	2011
R^2	0.174	0.109	0.144	0.109	0.142

Variance and returns: Large banks

	(1)	(2)	(3)	(4)
	Returns	Returns	Volatility	Volatility
Credit	0.0000234 (0.0000508)		-0.0000145*** (0.00000353)	
May*Credit	-0.0000497 (0.0000344)		0.00000119 (0.00000195)	
Credit Change		-0.0000116 (0.0000867)		0.00000517 (0.00000603)
May*(Credit Change)		0.0000743 (0.0000832)		-0.0000192*** (0.00000629)
Constant	-0.0220*** (0.00498)	-0.0205*** (0.00629)	0.00272*** (0.000498)	0.00105*** (0.000236)
Firm FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
N	6969	6969	8481	8481
R ²	0.247	0.247	0.210	0.210

IV strategy

- Possible endogeneity: Asset price movements may influence banks' credit decisions
- Use Reichsbank's threat against banks as instrumental variable:
 - Reichsbank threatened not to redeem promissory notes held by banks
 - Dependence on notes differed across banks
 - Banks with higher dependence had a larger incentive to rapidly cut margin lending

IV results

	(1)	(2)
	Returns	Volatility
abs.CreditChange	-0.0000461 (0.000276)	0.0000916* (0.0000535)
May*(abs.CreditChange)	0.0000622 (0.000210)	-0.0000832** (0.0000393)
Constant	0.00181 (0.00844)	0.00108 (0.000829)
Firm FE	Yes	Yes
Balancedate FE	Yes	Yes
N	267	264
R^2	0.611	0.550

Conclusion

- Germany 1927: Large change in lending standards induced stock market crash
- Study suggests lower bound on impact of deleveraging on asset prices
- Second-round effects cannot be addressed
- Guidance on dangers of stock market intervention