

An International Monetary Explanation of the 1929 Crash of the New York Stock Exchange

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1. Introduction

The cause of the Great Depression is one of the most studied topics in economic history. Explanations include the 1929 stock market crash (Mishkin 1978, Romer 1990), an autonomous decrease in consumption (Temin 1976) and accordingly a rise in savings (Degorce and Monnet 2020), a rise in tariffs (Meltzer 1976, Crucini and Kahn 1996), debt-deflation (Fisher 1933), non-monetary effects of banking crises (Bernanke 1983), and most famously the failure of monetary policy to offset the decline in the money supply due to banking panics (Friedman and Schwartz 1963).

Unfortunately, the literature on the Great Depression has been forced to debate the role of the crash in the Depression without an explanation of the crash. The literature has abundantly debated whether the stock market crash was due to a bubble bursting, but so far a convincing explanation is missing (White 1990, Klein 2001).

The issue in discussing the role of the crash in the depression, without an explanation of the crash, is the effect on the real economy may be confounded by a third variable, explaining both the crash and the depression.

Galbraith (1955) and Kindleberger (1978) explain the crash as a fire sale due to the sudden removal of brokers' margin loans based on qualitative evidence. This paper quantitatively documents the collapse of liquidity and traces the removal of speculative funds to an international monetary explanation. Faced with a dwindling gold reserve due to a negative trade balance and an overvalued pound, the Bank of England was forced to increase its discount rate in September 1929 and succeeded in attracting back to Europe international capital employed in New York. Capital and gold flowed back to core European countries and threatened the gold positions of countries on the periphery of the gold standard. As markets tested countries' ability to remain on the gold standard, some currencies lost their credibility. Consequently, these countries' debts floated in New York depreciated and investors likely to hold these debts removed liquidity from the market.

2. Evidence

2.1 A Liquidity Crisis

Specifically, I use three measures (proportion of stocks without bids, bid-ask spreads, and mispricings on cross-listed stocks respectively figures 1 to 3) to show the New York Stock Exchange suffered from liquidity problems in the crash. These liquidity issues are due to liquidations on brokers' loans as intradaily stock returns dropped after margin call hours (figure 4). Stocks with the largest decrease in liquidity as measured by increases in bid-ask spreads were associated in repeated cross-sections to the largest declines in returns (table 1). Funds loaned on demand to brokers were shifted to demand deposits and subsequently removed. These new results lend support to studies arguing brokers' loans were the cause of excessive speculation and their sudden removal caused the crash (White 1990, Rappaport and White 1993).

I obtained these new results either by applying modern measures to existing data, such as in the case of bidless stocks and bid-ask spreads, or by personally collecting new data by hand when needed, as in the case of the mispricings (collected data for Boston and Chicago, previously uncollected) or of intradaily returns (previously uncollected). The simple repeated cross-sectional exercise is also, to the best my knowledge, novel.

2.2. An International Monetary Explanation

I then turn to the gold standard to find an explanation for the sudden removal of liquidity. Central bank archives provide evidence Montagu Norman in London resorted to contractionary monetary shocks to fight speculation in New York because the bubble was attracting international capital and the flows endangered Britain's participation in the gold standard.

The following quotes obtained from Bank of England archives stand out as particularly troubling. The governor of the Bank of England, Montagu Norman, believed, as soon as February 1929 that the gold standard was at risk and thus contractionary monetary shocks were justified. While visiting New York in February 1929, Norman sent a confidential telegram to his colleagues in London: "with 1929 comes threats of such New York imports as would require high or penal Bank Rates elsewhere as a protection. In other words a scramble for gold is threatened. This threat arises from credit position in United States as shown particularly by abnormal Call and Time Rates which rates appear to be due to Stock Exchange speculation. Harrison [FRBNY] wisely ignores speculation as such but for months past has worried about credit position hoping that steady pressure would have been corrective. All in vain. Moment has come for action which I think must be unexpected and cooperative."¹ Therefore, the Governor of the Bank of England was calling in confidential telegrams between Bank of England officials, as soon as February 1929, for coordinated contractionary monetary shocks against the NYSE.

After increasing the Bank Rate on September 26th, 1929, funds started flowing back to Europe as evidenced by the dollar depreciating against the major European currencies (figure 5). Norman was only satisfied with his actions once the stock market crashed. On Black Thursday, Norman sent a confidential telegram to Harrison: "Recent liquidation in your Stock Market and reduction in call money rates have been satisfactory and have helped to re-establish international position. Result of our 6.5% rate has been satisfactory and omitting normal South African Gold we anticipate adequate arrivals within two months."²

Norman used contractionary monetary shocks specifically against the NYSE. He was satisfied in private confidential telegrams of his actions, but also recognized his responsibility in public. One week after the crash, Norman recognized the rate's effect in front of the Committee of Treasury: "the Governor stated that the raising of the Bank Rate to 6.5% on the 26th September had almost immediately achieved its purpose and seemed largely to have contributed to the changes that had taken place on the New York Stock"³

British monetary policy shocks in 1929 had large causal effects on NYSE stock returns (table 2) as measured by heteroskedasticity-based estimators as in Rigobon and Sack (2004).

Two transmission channels appear to have played a role. First, a direct transmission channel: foreign balances were removed from New York banks (figure 6) and the dollar depreciated against major European currencies until it reached gold export points on the day of the crash. Gold left to Europe for the first time since June 1928.

Second, as fears the United States would start drawing gold on South America increased and as South America lost gold to Europe, Latin American currencies dropped against the dollar (figure 7) and those countries' gold-denominated debts depreciated strongly in New York (figure 8). A number of Latin American countries would subsequently leave the gold standard and default on their debts. Some evidence is then given investors likely to hold these debts removed their loans to brokers, thus amplifying the liquidity crisis (figure 9 and table 3).

Again, these novel results were obtained by personally hand-collecting exchange rates in daily frequency across markets and collecting debt market prices in New York. Previous researchers

¹ Bank of England archives, Series OV32-5, February 4, 1929.

² Bank of England archives, Series OV32-5, October 24, 1929.

³ Bank of England, Committee of Treasury Minutes, October 30, 1929, p.176, first partially mentioned in Sayers (1976, p. 299).

had not seen the depreciation of the dollar against European currencies because they often collected exchange rates in monthly frequency, in which case the dollar is stable at month-end in September after the rate rise and lower at month-end in October after the crash with apparently no link between the two episodes.

3. Discussion

One contribution of this paper is to quantitatively confirm classical authors' qualitative account of the crash. Galbraith (1955)'s methods were criticized because he relied excessively on contemporary newspapers. Modern students of economics turning to Galbraith's book for an explanation of the greatest stock market crash in U.S. history may be disappointed by what appears to be a lack of rigor. In this regard, this paper fills a gap in the literature by providing a more robust and quantitative examination of Galbraith (1955)'s thesis the crash was a liquidity crisis caused by margin calls on brokers' loans.

Galbraith was right, but the second section shows his book missed a significant part of the story as it ignored the role of the gold standard in the crash. Galbraith and Kindleberger did not write specifically about the role of the international monetary system and of short-term foreign funds in the 1929 crash, but both had the intuition foreign funds were involved as they mentioned the role of foreign funds in brokers' loans placed by New York City banks.

White (1990) also focused on brokers' loans in a domestic perspective and he does mention the Bank of England's discount rate rise as a possible factor, though noting the quantity of brokers' loans did not decrease following the rate decision. While this point stands, a counter-argument is it took nearly a month for exchange rates to reach a gold point and for Latin American exchange rates to collapse. The timings of the collapse in Latin American exchange rates, the dollar's gold point against a major European currency, and the removal of brokers' loans then do coincide.

Concerning the previous literature on the presence of a bubble, this paper remains agnostic because the evidence is mixed. The fact that markets reacted quickly to macroeconomic monetary developments lends support to the hypothesis fundamentals did matter, as McGrattan and Prescott (2004), Santoni (1987), and Sirkin (1975) argued. Financial markets were to some extent clairvoyant as bond markets sold off bonds of periphery countries which would default years later and foreign exchange markets sold off currencies of countries leaving the standard in the following months.

However, stock market investors are different from bond investors and foreign exchange operators. The latter may be more sophisticated than stock market investors such that responding to fundamentals in one market does not imply the stock market also advanced on fundamentals. Additionally, the argument can be made that selling periphery currencies contributed to countries leaving the gold standard and depreciated the value of the associated bonds such that markets were not particularly clairvoyant and instead beliefs were self-fulfilling.

Concerning the relation between the stock market crash and the Great Depression, this paper fills an important gap as it provides an explanation for the crash which is related to an explanation of the Depression: faulty contractionary monetary policy aimed at defending the gold standard and price stability at the cost of financial stability.

Monetary policy does appear to be a confounder of the crash's effect on the Great Depression. One strand of the literature emphasizes the uncertainty channel (Romer 1990) by which uncertainty about future incomes due to the crash led to precautionary savings. International monetary instability, foreign funds leaving New York, and Latin American countries leaving the gold standard, might have been a part of the uncertainty.

Arguably, the average consumer is unlikely to perceive international monetary forces but then the average consumer is not the one engaging in significant precautionary savings. Measuring the degree to which the source of uncertainty was international and monetary is left for further research.

More generally, this paper fits in a larger corpus of works arguing the gold standard caused the Depression. Temin (1989) argues structural flaws in the interwar gold standard made an

international monetary contraction and deflation almost inevitable, while leaving the gold standard early was associated to a faster recovery from the Depression (Eichengreen and Sachs 1985).

Rather than simply arguing the Bank of England committed a policy mistake, the more important argument is that the gold standard caused the crash as the Federal Reserve Bank of New York and the Bank of England were forced to increase discount rates to safeguard Britain's participation.

The counterfactual, the road not taken, might have been to let the pound depreciate to its market price, decreasing Britain's purchasing power, but making British exports more competitive and restoring Britain's trade balance. Consequently, Latin American countries might not have been able to return to the gold standard and thus their bonds might have priced in currency risk right at issuance, resulting in higher yields to maturity at issuance, thereby potentially reducing the amount of debt issued by Latin American governments, and thus contractionary monetary shocks in Britain might not have induced exchange rate and foreign debt instability.

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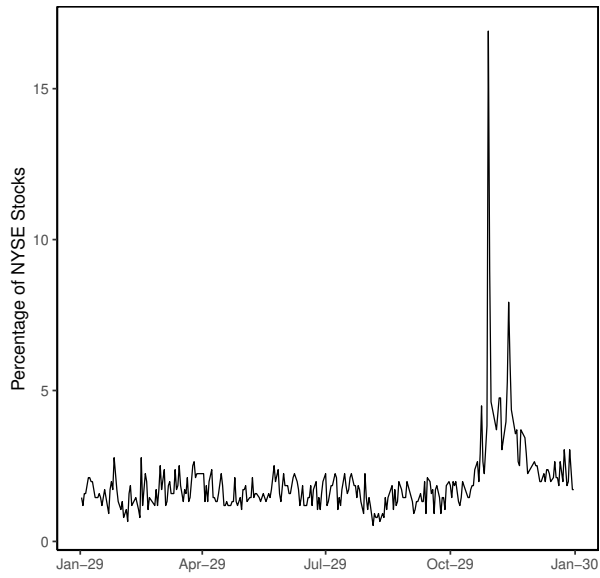


FIGURE 1. BIDLESS NYSE STOCKS IN 1929

Note: Proportion of stocks without a bid in 1929 in daily frequency.

Source: Data are from CRSP.

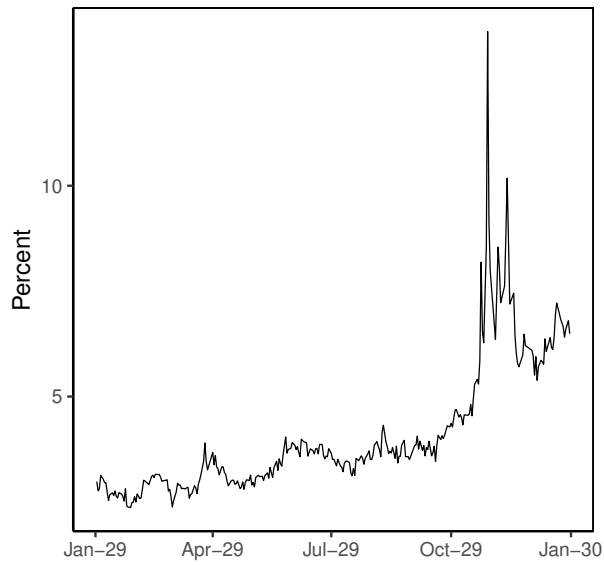


FIGURE 2. QUOTED BID-ASK SPREADS OF NYSE STOCKS IN 1929

Note: Proportional quoted bid-ask spreads are differences between ask and bid quotes divided by mid-quotes, which are the average of the bid and the ask quotes. The mean spread across all stocks is reported in daily frequency.

Source: Data are from CRSP.

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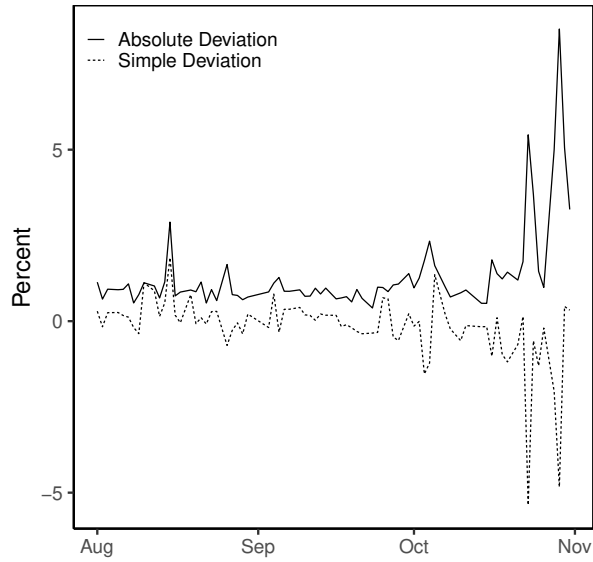


FIGURE 3. MISPRICINGS ON THE NYSE AUGUST TO OCTOBER 1929

Note: Average simple or absolute difference between NYSE and regional closing prices in percent of NYSE prices across 30 cross-listed stocks on the NYSE and either in Boston or Chicago, in daily frequency.

Source: Data are from CRSP for NYSE stocks and from the New York Times for Boston and Chicago.

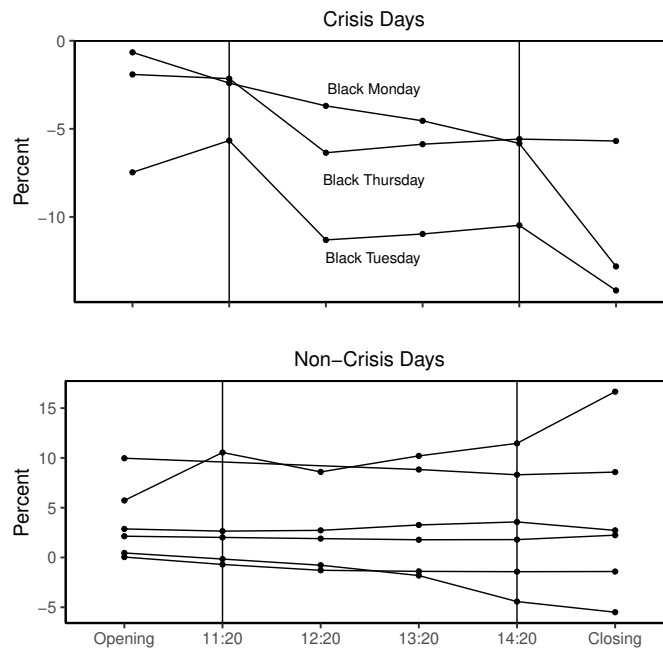


FIGURE 4. INTRADAILY RETURNS OF 80 NYSE STOCKS IN THE FORTNIGHT OF THE CRASH

Note: The average return across 80 of the most active NYSE stocks in percent of the previous day's closing price is reported by the hour from Monday, October 21st to Friday, November 1st, 1929. Vertical solid lines at margin call hours. Crises days are Black Thursday, October 24th, Black Monday, October 28th, and Black Tuesday, October 29th. *Source:* Data are from the Chicago Daily Tribune.

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TABLE 1—CROSS-SECTION OF STOCK RETURNS AND BID-ASK SPREADS

	Dependent variable: Daily Returns					
	Constant	Bid-Ask	Δ Bid-Ask	N	R^2	F Statistic
Black Thursday	-3.611	-0.262		642	0.073	50.26
	(0.403)	(0.037)				
	-4.408		-0.390	642	0.146	109.7
	(0.325)		(0.037)			
Black Monday	-7.714	-0.150		639	0.022	14.11
	(0.489)	(0.040)				
	-7.615		-0.518	639	0.189	148.6
	(0.389)		(0.043)			
Black Tuesday	-9.922	-0.284		530	0.037	20.48
	(1.161)	(0.063)				
	-9.748		-0.721	530	0.252	177.7
	(0.877)		(0.054)			

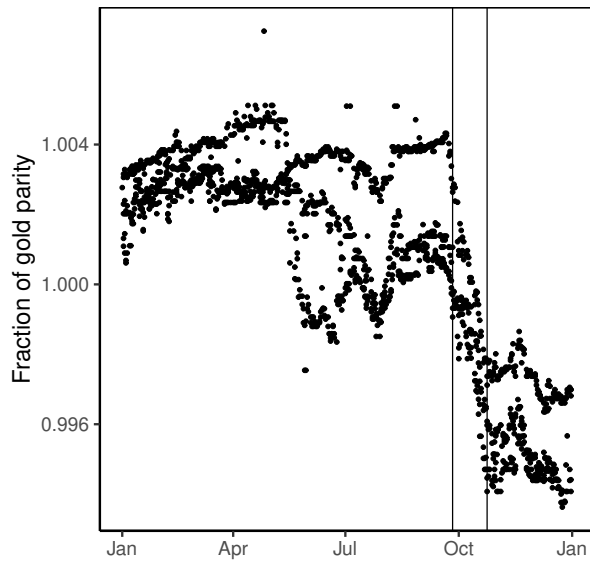


FIGURE 5. MARK, POUND, OR FRANC PER DOLLAR IN LONDON, PARIS, NEW YORK, OR BERLIN IN 1929

Note: Exchange rates are in daily frequency and expressed as a fraction of gold parity, the first vertical line is on September 26, 1929, and the second vertical line is on October 24, 1929. Two financial centers per pair.

Source: Data are from Bank of France archives (series 1377200101).

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TABLE 2—RESPONSE OF NYSE STOCK RETURNS TO BRITISH MONETARY POLICY IN 1929 (LONDON MONEY MARKET RATES INSTRUMENTED BY HETEROSKEDASTICITY).

	$\hat{\alpha}_{het}^i$		$\hat{\alpha}_{het}^{all}$		O.I. restrictions test	
	Coef	Std Dev	Coef	Std Dev	J-test	P-value
Overnight	0.884	(2.387)	0.877	(2.589)	0.034	0.853
Short Periods	-2.596	(1.099)	-2.354	(0.910)	0.130	0.717
Bank Bills 2mo	-7.014	(1.533)	-6.821	(1.378)	0.205	0.650
Bank Bills 3mo	-5.921	(1.096)	-5.781	(1.014)	0.160	0.688
Bank Bills 4mo	-8.167	(2.852)	-7.965	(2.732)	0.253	0.614
Bank Bills 6mo	-8.075	(2.195)	-7.906	(2.141)	0.308	0.578
Observations	88		88			

Note: The first four columns report the point estimates and standard deviations of the coefficient of interest with the latter in parentheses obtained by applying a two-step GMM estimator. The final two columns report the J-test statistic and associated p-value of the over-identifying restrictions test. Each row reports the estimates using an alternative measure of London money market rates.

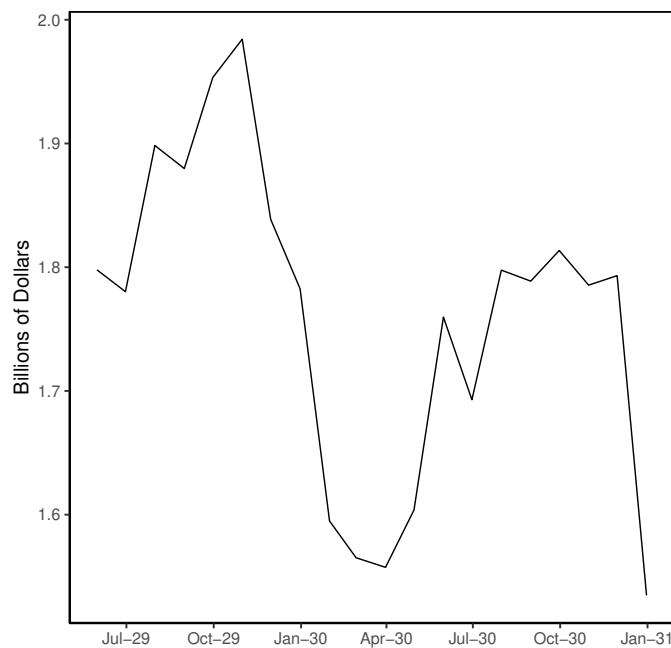


FIGURE 6. NEW YORK CITY MEMBER BANKS' FOREIGN DEPOSITS AND LOANS MAY 1929 – DECEMBER 1930

Note: New York member banks' foreign deposits and loans on foreign funds are reported in monthly frequency.

Source: Data are from the Confidential Report to the Federal Reserve Board, Eugene Meyer Papers, Foreign Funds in NY, 1929-33, Subject File, Box 120, Folder 8, p.3-11. Source begins in May 1929.

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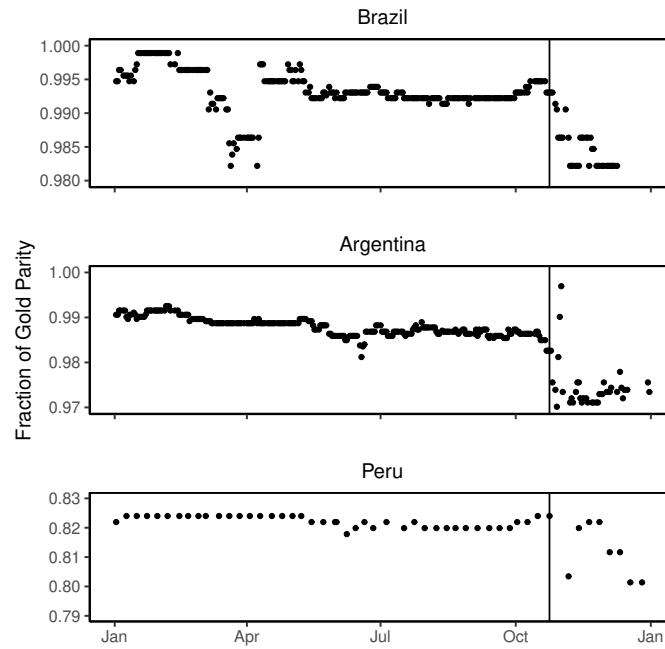


FIGURE 7. EXCHANGE RATES OF SELECTED LATIN AMERICAN COUNTRIES AGAINST THE DOLLAR IN 1929

Note: The exchange rates in New York are reported in daily frequency and in fraction of gold parity, which is simply dividing the spot rate by the gold parity rate. Modified vertical axes. Vertical line on Black Thursday, October 24, 1929.

Source: Data are from the Bank of France archives (series 1377200101).

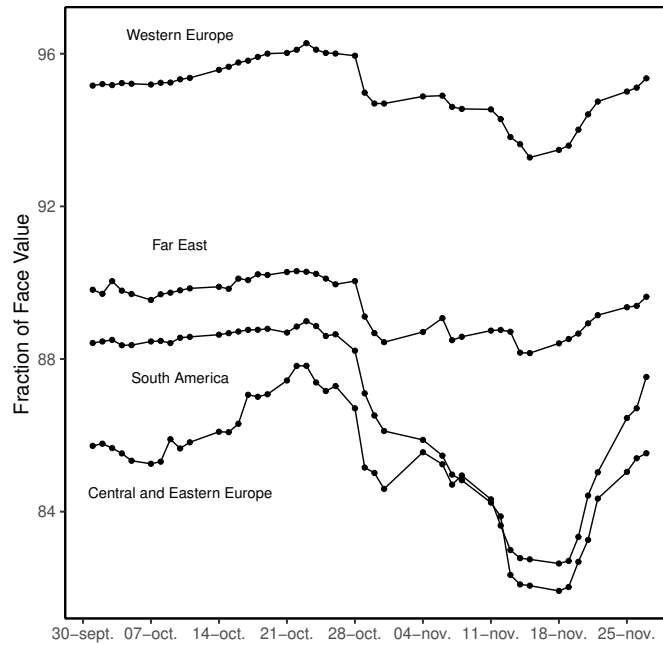


FIGURE 8. PRICE AVERAGES OF FOREIGN BONDS TRADING ON THE NYSE OCTOBER TO NOVEMBER 1929

Note: The average prices of foreign bonds quoted on the NYSE in fraction of their face value are reported in daily frequency by region from October to November 1929.

Source: Data are from the New York Times.

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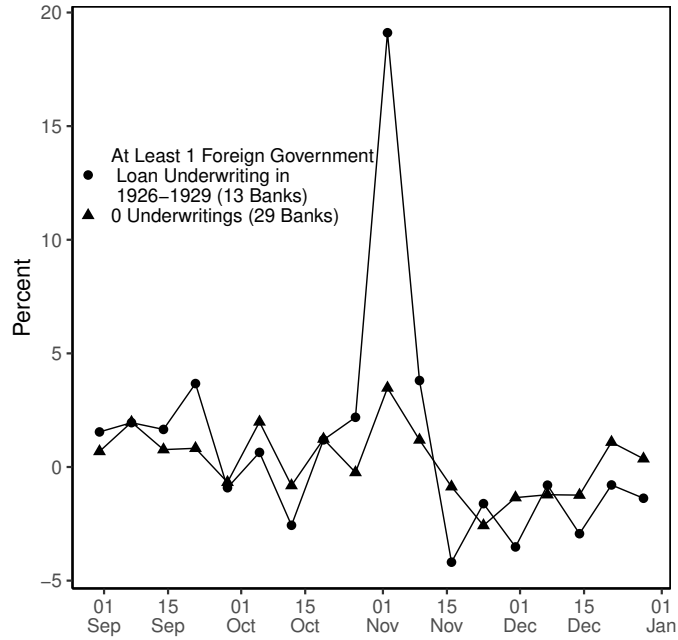


FIGURE 9. GROWTH RATE OF DEPOSITS OF NEW YORK CITY BANKS SEPTEMBER TO DECEMBER 1929

Note: The average weekly growth rate of deposits of New York City banks are reported in percent separating banks into two groups depending on whether banks participated in at least one foreign government loan underwriting in the previous three years.

Source: Data are from the Commercial and Financial Chronicle.

TABLE 3—CROSS-SECTION OF NEW YORK CITY BANKS' DEPOSIT GROWTH RATES

Dependant Variable	Δ Deposits (%)
Constant	17.266 (10.308)
Dummy:	13.269
At least one foreign government loan underwriting in 1926-1929	(5.034)
Total Assets (\$m)	0.002 (0.005)
Debt-to-Equity	-0.484 (0.779)
Loans-to-Assets	-17.801 (11.662)
Cash-to-Assets	-2.404 (13.401)
Observations	42
R ²	0.3717
Adjusted R ²	0.2844
Residual Std. Error	11.44 (df = 36)
F Statistic	4.259 (df = 5; 36)

Note: The weekly growth rate of New York City banks and trusts' deposits in the week of the crash is regressed on balance sheet variables obtained from contemporary newspapers including the Wall Street Journal, the New York Times, the Commercial and Financial Chronicle, and local newspapers.