Credit, Labor, and Political Unrest: Evidence from 1930s China

Fabio Braggion
CentER - Tilburg University

Department of Finance
PO Box 90153, NL 5000 LE Tilburg, The Netherlands
E-mail: f.braggion@tilburguniversity.edu

Alberto Manconi*
Bocconi University

Department of Finance
Via Roentgen 1, 20136 Milan, Italy
E-mail: alberto.manconi@unibocconi.it

Haikun Zhu
CentER - Tilburg University

Department of Finance
PO Box 90153, NL 5000 LE Tilburg, The Netherlands
E-mail: h.zhu@tilburguniversity.edu

* Corresponding author. We thank Paul Beaudry, Richard Burdekin, David Chambers, Matthieu Chavaz, Stefano Della Vigna, Michael Koetter, James Kung, Luigi Guiso, Debin Ma, Chris Meissner, Kris Mitchener, Lyndon Moore, Randall Morck, Steven Ongena, Nicola Pavanini, Bruno Parigi, Jacopo Ponticelli, Raghu Rau, Jean-Laurent Rosenthal, Patricia Stranahan, Eugene White, Noam Yuchtman, participants at the 2015 ABFER, Financial History Workshop (Amsterdam), 2015 Mitsui Finance Symposium, 3rd Annual HEC Paris Workshop on Banking, Finance Trade and the Real Economy, the 2015 Frontiers in Chinese Economic History, the 2015 European Economic Association, the 4th International Symposium on Quantitative History, the 2016 Economic History Association, 2016 Financial Management Association conferences, the 11th Swiss Winter Conference on Financial Intermediation, and seminar participants at Cambridge University – Judge Business School, EIEF, University of Lancaster, University of Padua, University of St. Gallen, and University of Warwick, for useful comments. We are grateful to the Economic History Association and the European Banking Center for financial support. The *Netherlands Organization for Scientific Research* (*NWO*) generously supported Braggion through its VIDI Grant Program during the writing of this paper. Zhu thanks the Institute for New Economic Thinking for the financial support from research grant #INO16-00023.

Credit, Labor, and Political Unrest: Evidence from 1930s China

Abstract

Do economic shocks inflame political unrest? To answer this question, we study a natural experiment from 1930s China, where the 1933 U.S. Silver Purchase program acts as a shock to bank lending. This setting eliminates potential confounding effects of policy, narrows the set of relevant social actors (factory workers and the Communist Party), and provides an exogenous shock to credit, limiting the scope for reverse causality. We assemble a novel, hand-collected dataset of loan contracts between banks and individual firms, labor unrest episodes, and underground Communist Party penetration. We show that the Silver Purchase shock results in a severe credit contraction, and that firms borrowing from banks with a larger exposure to the shock experience increased labor unrest and Communist Party penetration among their workers. These findings contribute to understanding the socio-political consequences of credit, and more in general economic, shocks.

Keywords: Silver Purchase program, bank lending, political unrest, financial history.
JEL: G01, G21, N15, N25.

I. Introduction

Can economic shocks inflame political unrest? Versions of this question often feature in the academic debate in economics, political science, and history, as well as among the general public. Examples include whether tight money and credit led to the development of populist movements in 19th century United States (Friedman and Schwartz (1963), pp. 116-117; Rodrik (2017)); whether the Great Depression drove the Nazis to power in 1930s Germany (Feinstein, Temin, and Toniolo (1997), pp. 120-124); and more recently, whether the economic slowdown that followed the Eurozone crisis of 2010-11 fueled the popularity of populist movements in southern Europe.[1]

Despite its relevance, the question does not yet have a clear answer in the literature. That is because a test of the relationship between the economy and the emergence of political unrest poses at least three challenges. First, inference is typically confounded by the presence of fiscal and monetary authorities, whose policies may pursue social objectives.[2] Second, present-day political unrest has been associated with extremist movements, whose ideological base is often vaguely delineated.[3] It is thus hard to trace extremist support to a specific social class exposed to economic hardship. Third, causality can run both ways: political unrest itself can exacerbate labor relations (Kennan (1986)), or worsen investment prospects (Blattman and Miguel (2010)), thus reducing employment and output. As a result, it is difficult to determine whether political instability precedes or follows aggregate movements in the economy.

Our study addresses these challenges, studying the effects of a shock to the credit market in 1930s China. First, in our setting the link between policy and the economy is

[1] See, for instance, "Populism: What Happens Next?" Financial Times, 9 January 2015.

[2] For instance, the Federal Reserve is charged with conducting monetary policy "so as to promote effectively the goals of maximum employment" together with "stable prices, and moderate long-term interest rates." See the Federal Reserve Reform Act of 1977 and the Full Employment and Balanced Growth Act of 1978. Passarelli and Tabellini (2017) provide a general theory of how political unrest may affect government policies.

[3] Delimiting the social support for right-wing parties in Europe is notoriously challenging (Arzheimer (2009)), and the voter base of modern fringe movements transcends traditional boundaries between the political right and left (Cramer Walsh (2012), Jacoby (2014)). More recent work shows how the support to populist movements is associated with a number of electors' characteristics (Becker, Fetzer, and Novy (2016), Guiso et al. (2017)).

much looser than today: the fledgling Republic of China lacked a central bank regulating money supply and credit, and private ones issued money and loans.[4] Second, the main radical movement in 1930s China, the Communist Party, had a well-defined social target in the urban areas: the working class, and in particular factory workers, whose alienation and violent protests were considered a precondition to the revolution.[5] Third, we isolate the effect of the credit shock via a natural experiment, triggered by the U.S. 1933 Silver Purchase program. Undertaken for purely U.S. domestic reasons, and independent of Chinese economic conditions, the Silver Purchase raised the price of silver worldwide and drained the Chinese silver stock. Because China was on the silver standard, the credit capacity of its banks was tied to their silver reserves; we thus use the Silver Purchase shock to identify changes in credit supply.

We provide micro-econometric evidence of the shock's impact on political unrest, based on hand-collected archival information on credit, labor relations, and extremist political activity in 1930s China. Our data reconstruct a Chinese "credit registry" for the period 1931-1935, and document firm-level labor unrest episodes in three major Chinese cities (Nanjing, Shanghai, and Tianjin), as well as Communist Party penetration among workers at firms located in Shanghai.

We exploit cross-sectional variation in the exposure of lenders and borrowers – banks and firms – to the Silver Purchase shock to identify the direct effect of credit rationing on political unrest in two forms: labor unrest episodes and Communist Party penetration. Our empirical strategy is articulated in two steps. First, we ask if rising silver prices and outflows affect lending, and banks with a larger exposure to the Silver Purchase shock (lower pre-1933 silver reserves) curb credit after 1933. Second, we study whether labor unrest episodes and the spread of Communism in Chinese firms relate to their banks' silver reserves. If banks exposed to the Silver Purchase shock cut lending, firms borrowing

[4] Government budgets at the time were limited, and fiscal policy was not generally considered a tool to mitigate economic shocks, especially in an emerging economy such as the Republic of China.

[5] In a speech given on June 30, 1949, to commemorate the 28th anniversary of the Chinese Communist Party, Chairman Mao Zedong declared: "The people's democratic dictatorship needs the leadership of the working class. (…) The entire history of revolution proves that without the leadership of the working class revolution fails and that with the leadership of the working class revolution triumphs."

from them face tighter financial constraints, which limit investment and lead to pay cuts and layoffs, increasing the likelihood of labor unrest and Communist support. Our evidence supports these arguments.

While throughout the analysis we pay great attention to identification and what we can and cannot conclude in causal terms, our main results are immediately visible in the data. Chinese credit sharply contracts over 1933-35: credit-to-GDP drops by about 15%, and credit-to-deposits by 10%.[6] As we show in Figure 1, this is driven by banks with lower pre-1933 silver reserves (panel A). Firms borrowing from these banks, in turn, experience increased labor unrest intensity and Communist party penetration. By 1935, labor unrest episodes (panel B) and Communist penetration (panel C) are about twice more likely than at firms borrowing from banks with large reserves.

Our tests exploit the wealth of micro-level information in our data to interpret these facts in a causal sense. First, we show that banks with lower pre-1933 silver reserves reduce lending volumes after 1933. Because we are able to observe bank-firm lending relationships, we can absorb credit demand with borrowing-firm fixed effects: the *same* firm, borrowing from multiple banks, experiences restricted lending from those banks that are more exposed to the Silver Purchase. Therefore, the shock's first-order effect appears to be credit rationing.

Second, we look at political unrest. As a first gauge, we document that firms that are more exposed to the Silver Purchase shock experience a disproportionate increase in labor unrest after 1933. We measure a firm's exposure by the pool of pre-1933 silver reserves of banks with branches near the firm's location. Smaller "reserve pools" are associated with a larger increase in labor unrest intensity. Our estimates imply that borrowers with access to the smallest reserve pools experience a 30% larger increase in the number of labor unrest episodes, and a 58% longer average episode duration, in comparison to firms borrowing from banks with the largest reserve pools.

[6] Cheng (2003, Appendix II), Liu (1946, Table 1), and Appendix A of this paper.

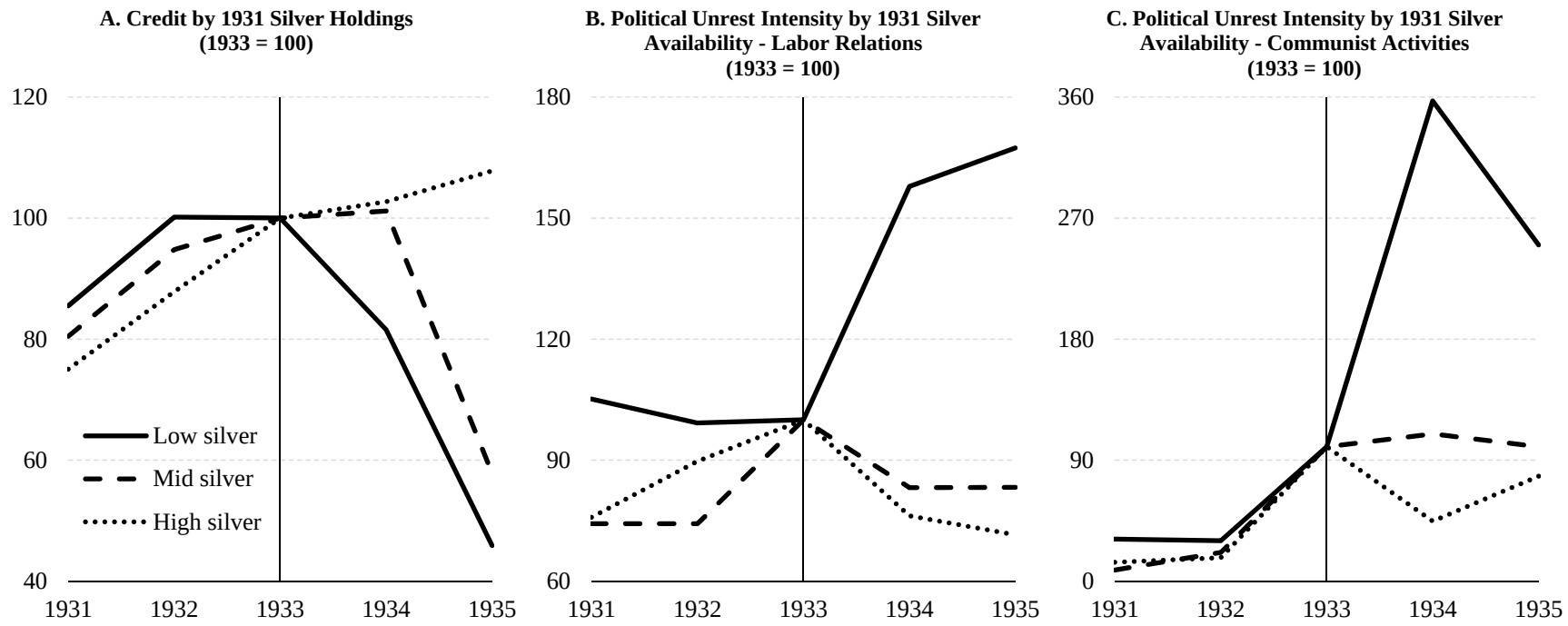


Figure 1 Chinese Credit and Political Unrest Intensity, 1931-1935

Panel A reports the Chinese banks' aggregate dollar lending over the 1931-1935 period, broken down into components due to banks with low (below the 25th percentile), high (above the 75th percentile), and medium *Excess silver*. All series are normalized such that the 1933 value equals 100. The credit data are based on the bank balance sheet data discussed in Section IV.A. Panel B plots the average number of labor unrest episodes per plant, and panel C plots the number of plants in which support for communist activities was detected, as a fraction of membership of the communist-sponsored union (Shen (1987, p.143) and Stranahan (1998, p.154)), in both cases based on the level of silver holdings available at banks in the plants' vicinity, *Excess silver pool*, as described in Section IV.B, again normalized such that the 1933 value equals 100. The figures show that, after the Silver Purchase program is initiated, banks with lower excess silver holdings in 1931 reduce lending relative to banks with larger holdings. Furthermore, firms and plants with a greater exposure to the Silver Purchase shock – in the vicinity of banks with lower excess silver reserves – experience intensified labor unrest episodes and increased communist activities after 1933.

The second measure of political unrest is Communist Party penetration. Our regressions show that firms with access to the smallest reserve pools experience a 3 to 6% larger increase in communist penetration, relative to firms with access to the largest reserve pools. Limited access to credit resulting from the Silver Purchase, thus, has important political consequences, exacerbating labor relations and, to a more modest extent, expanding the reach of the Communist Party.

Additional tests rule out alternative interpretations of our findings. First, the effects we uncover are unlikely driven by omitted factors affecting East Asian economies in the 1930s. Comparing industries exposed to versus isolated from international trade, to assess the impact of a mechanical currency appreciation driven by the Silver Purchase, we find statistically indistinguishable effects across the two groups. This suggests that an exchange rate channel is unlikely behind our results, and alleviates concerns about a worldwide trend towards greater instability associated with the 1930s Great Depression: international trade exposure does not appear to mediate our effects. In addition, we find no evidence of similar effects in Hong Kong, the closest economy to 1930s China. Finally, our results are robust to excluding firms related to Japanese interests, suggesting that they are not driven by Japanese political interference.

Second, we address the potential endogenous selection of banks into high and low pre-1933 silver reserves groups. We exploit a unique feature of 1930s China's monetary system, the parallel circulation of a traditional currency backed by copper, whose availability is exogenously determined by the geographical distribution of copper mines. Copper coins circulated locally and were typically used to clear small transactions, as a substitute to Chinese silver dollars, in regions with a relative abundance of copper. We use copper availability at local mines as an instrument for the demand for silver-backed currency, and thus pre-1933 reserves. Instrumental variables estimation confirms our results, indicating that they are not driven by selection.

Our paper speaks to the growing literature that relates economic shocks to social and political outcomes (de Bromhead, Eichengreen, and O'Rourke (2013); Dube and Vargas (2013); Bai and Jia (2016)). A number of studies look at cross-sectional country-

level data (Besley and Persson (2011); Funke, Schularick, and Trebesch (2016); Miguel, Satyanath, and Sergenti (2004); Ponticelli and Voth (2014)). While we focus on a credit shock, our findings can be generalized to any shock affecting firms' investment prospects. Moreover, focusing on the Silver Purchase episode, and using micro data, helps us identify a causal channel running from a negative economic shock – the 1930s Chinese credit crunch – to political unrest. We also contribute to the literature on the economic determinants of labor unrest (Kennan (1986); Naidu and Yuchtman (2015)). A general challenge for this literature is that the likelihood of labor unrest and firm behavior are jointly determined. Our empirical framework allows us to examine how an exogenous shock to the firm's access to credit affects labor unrest propensity.

Our work also provides a new account of the effects of the Silver Purchase on the Chinese economy. Friedman and Schwartz (1963) and Friedman (1992) argue that the Silver Purchase program had a severe economic impact on the Chinese economy, as well as, in the words of Milton Friedman, "contribut[ing], if perhaps only modestly, to the success of the communist revolution" (Friedman (1992)). In contrast, Brandt and Sargent (1989) and Rawski (1993) argue that Chinese banks could maintain a steady credit supply, by drawing on alternative reserve instruments such as government bonds. Our micro-level evidence suggests that this did not prevent credit rationing. Furthermore, while we cannot document a direct link to the 1949 communist takeover, we do show evidence suggesting that the shock exacerbated labor relations, and (to a lesser extent) extended the reach of the underground Communist Party.

Finally, we contribute to the literature on the real effects of bank liquidity shocks. This literature has focused on the identification of credit supply effects, e.g. via natural experiments (Khwaja and Mian (2008); Schnabl (2012); Chodorow-Reich (2014); Cingano, Manaresi, and Sette (2016)). Our setting combines a plausibly exogenous shock – the U.S. Silver Purchase – with micro-level data on labor unrest and political extremism, providing evidence on so far unexplored real effects of credit shocks.

The remainder of the paper is organized as follows. Section II provides the historical background. Section III presents the data. Section IV presents our tests. Section V discusses the interpretation of our results. Section VI concludes.

II. Historical Background

A. Credit and silver in 1930s China

In the early 1930s, Chinese banks are divided into two categories, "modern" and "native." There are around 200 "modern" domestic banks in China, with over 1,300 branches (Liu (2007)). These banks can issue currency (e.g. to make loans), subject to a reserve requirement: the bank must hold silver reserves corresponding to at least 60% of the nominal amount of banknotes it issues (the remaining 40% consisting of government bonds). In order to make a new loan, thus, the bank can draw on its reserves in excess of the 60% threshold, or purchase silver on the market to back the lending amount exceeding its reserves. Silver reserve ratios range from 60% to 100% and are around 70% on average, so that different banks have a different exposure to the Silver Purchase shock (also see next section).[7]

The four largest modern banks – Central Bank of China, Bank of China, Bank of Communications, and Farmers Bank of China – have a closer relationship with political power, and perform duties such as placing Treasury bonds on the market (Tamagna (1942, p. 121)). There is, however, no central bank in the modern sense, entrusted to set interest rates or to regulate the money supply.

The "native" banks are smaller, operate locally, and often lack limited liability (Tamagna (1942, p. 57-59)). They mainly circulate banknotes issued by the modern banks. In addition, they issue in their own name banknotes backed by copper, for local circulation (Tamagna (1942, p. 68)). Although our data do not include native banks (to the best of our

[7] Silver reserves are reported on the assets side of bank balance sheets, *at the official parity established by the Treasury*. This implies that any increase in the market price of silver does not increase the asset value of the bank. The only way a bank could capitalize the increase in silver prices is by redeeming some banknotes and recording in the balance sheet the corresponding amount of silver at the market price. This would, effectively, reduce the money supply.

knowledge, no records of their balance sheets and loans survive), we exploit their issuance of copper-based currency in a robustness check in Section V.

B. The Silver Purchase program

The Silver Purchase program is initiated in May 1933 with an amendment to the Farm Relief Bill, establishing that the U.S. government can monetize silver (in addition to gold) to back a money supply expansion. The Roosevelt administration orders U.S. mints to buy all newly produced U.S. silver at 64.64 cents per ounce, at a time when the market price is 44 cents (Friedman and Schwartz (1963, p. 483)). The world price of silver nearly doubles in the space of two years, reaching about 70 cents per ounce in New York in 1935 (Figure 2.A).[8]

The Roosevelt administration undertakes the Silver Purchase program to accommodate lobbying in the senate by the so-called "silver bloc."[9] Between 1928 and 1932, the price of silver has dropped by 30%, and silver producers increasingly demand Federal intervention to reverse this trend. Out of 14 silver-bloc Senators, 12 are Democrats like Roosevelt, and strongly advocate policies to raise silver prices. Their interests are also backed by states with large agricultural sectors, which aim to increase inflation and raise agricultural prices. In 1934, the Silver Purchase Act further empowers the Federal Government to purchase silver at home and abroad.

Rising silver prices have a visible impact on Chinese reserves, as large amounts are exported to take advantage of the high market price. The Chinese silver stock growth rate takes a sharp downward turn after 1933, reducing the stock by about 15% by 1935 (Figure 2.B).[10]

[8] The London price of silver registers a similar rise as on the New York Market over this period (Rawski (1984)).

[9] The "silver bloc" states are: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah (Kreps (1934, p. 246), cited by Friedman (1992)).

[10] Foreign banks are among the main drivers of the silver outflow from China. While historically foreign banks provide silver to Chinese banks, after the enactment of the Silver Purchase Program, they largely sell it to foreign buyers (Tamagna, 1949, p. 103-4). After 1933, the silver holdings of foreign banks based in Shanghai drop by about one half, corresponding to over 20% of the total silver holdings of banks based in Shanghai (Appendix Figure A.2).

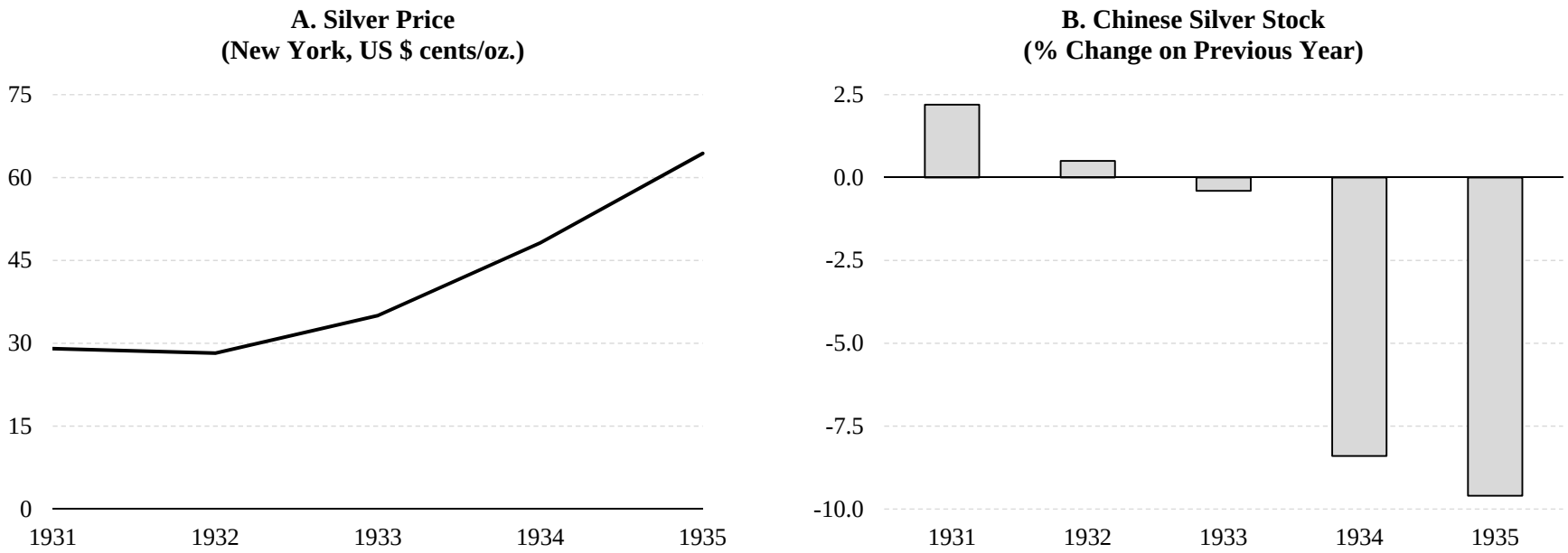


Figure 2 Silver Prices and Changes in Chinese Silver Stock, 1931-1935
Panel A reports the silver price quotes in New York over the period 1931-35 (source: *Economy Xun Kan* (经济旬刊); Vol. 4, No. 13, p. 11). Panel B reports yearly percentage changes in the Chinese stock of silver reserves (source: Rawski (1984)).

Unable to stem the outflow, the Chinese government finally abandons the silver standard in late 1935. An official announcement is made in November, declaring all silver to be government property. All silver exchange is forbidden, and paper banknotes are issued one-to-one against the silver Chinese dollars in circulation.[11]

Our analysis explores credit as a channel through which the silver outflow may have an impact on political unrest. While the economic historiography debates whether the silver purchase program materially reduced the Chinese money supply (see Rawski (1984) and Brandt and Sargent (1987), as well as Appendix A.1), our mechanism relies exclusively on the decline of silver reserves documented in Figure 2.B. We present a model describing it in greater detail in Appendix A.2.

C. Limited impact of confounding events in 1931-1935

In 1931-1935 China enjoys a relatively stable government and internal politics (Cheng (2003, p. 67)). Moreover, we find that the only major external event, the 1931 Japanese invasion of Manchuria, does not appear to have a tangible impact on credit provision in the main urban areas covered by our sample data, which are located far from it.

In 1928 the Nationalist government led by Chiang Kai-shek reunifies the country after a decade of civil war, bringing along a period of relative stability that allows the economy and the banking sector to grow (Cheng (2003, pp. 67-70)). There are still skirmishes in rural areas with various guerrilla groups, but the Nationalists effectively control most of the country, especially the urban areas where economic activity concentrates. In particular, the data in our sample focus on cities under Nationalist control, free of guerrilla episodes in 1931-35.

Ho and Li (2013) document that the only major political event in this period is the Japanese invasion of Manchuria, which begins on 18 September 1931.[12] The invasion

[11] Before 1935, the Chinese government imposes high export duties on silver, with the aim of curbing profits on silver exports. Official Chinese customs data show that the silver outflow is close to zero during 1935. However, smuggling makes this regulation ineffective: estimated silver smuggling amounts between 1934 and 1936 are roughly 250 million Chinese silver dollars. Towards the end of 1935, at the end of our sample period, the Chinese government becomes the controlling shareholder of two "modern" banks, the Bank of China and the Bank of Communication, in an attempt to boost the credit capacity of the two institutions (Cheng (2003, p. 99)).

[12] The only other two major events in the 1921-42 period identified by Ho and Li (2013) are the 1927 Northern Expedition and the 1937 Sino-Japanese war; both take place well outside our sample period.

raises concerns about the solvency of the Chinese government, leading to a partial restructuring of Treasuries in February 1932.

This event alone appears unlikely to have a major impact on our tests, for four reasons. First, it happens at the beginning of our sample period, with little detectable impact on credit provision. In fact, the aggregate credit-to-GDP ratio slightly increases between 1931 and 1933 (Cheng (2003) and Liu (1946), as well as Appendix Figure A.1). Second, the restructuring involves a reduction of coupon rates and an extension of maturities, while face values remain unchanged (Cheng (2003, p. 124)). Treasuries can form up to 40% of bank reserves, on the basis of their *face value* (see Appendix A.2). Thus, the restructuring requires no adjustment to the outstanding amount of currency. Third, the time series of Chinese sovereign debt yields does not exhibit a strong reaction to the event. In fact, the spread relative to British Gilts slightly *drops* towards the end of 1931 (Goetzmann, Ukhov, and Zhu (2007); Ho and Li (2013)). Fourth, Manchuria itself has very limited relevance for the Chinese banking industry in the early 1930s: no modern banks are headquartered there, no loans in our sample are made to firms operating in Manchuria, and although several banks have branches in Manchuria, those branches account for only about 2% of the total number of bank branches in the country.[13]

One last potential challenge is that banks may cut loans collateralized with Treasury bonds. Our data, however, reveal that less than 2% of outstanding loans have Treasury bonds as collateral in the first place. We also find a very low correlation (0.05) between banks' silver reserves and loan collateralization with Treasuries.

In sum, other events taking place over 1931-1935 have only a modest effect on credit provision. The Silver Purchase shock is the major event with affecting credit during our sample period.

III. Data

We build our analysis on five main sources providing information on: (1) Loan contracts; (2) Bank balance sheets; (3) Labor unrest episodes; and (4) Underground Communist Party activities at our sample firms. All of our data refer to the years starting in 1931 and ending in November 1935, when the Republic of China abandons the silver standard.

[13] Data on bank and bank branches' location are retrieved from the *Chinese Banker's Yearbook* (全国银行年鉴).

A. Loan contracts

Individual loan information is collected from provincial and city archives in seven Chinese major provinces/cities: Beijing, Chongqing, Guangzhou, Nanjing, Shandong, Shanghai, and Tianjin. These areas are chosen because of their economic importance in inter-war China: Beijing was the former imperial capital, with considerable industrial activities; Chongqing and Guangzhou are among the oldest and largest trading harbors; Nanjing is the capital city; Shandong is a major industrial and farming province in North China with a large population; Shanghai and Tianjin are the main financial centers. Individual loan contracts report the issuing bank's name, the identity of the borrowing firm, the loan amount, issue date, and for a subset of the contracts also additional terms such as interest rate, duration, collateral, or the purpose of the loan. The loan amount is the most widely populated data item, so we focus on it for our tests.

In total, the sample covers 579 industrial loans, made by 32 financial institutions to 151 individual plants, associated with 139 firms. The mean (median) loan in our sample amounts to 273,000 Chinese dollars (44,000 Chinese dollars).[14] The lenders in this set appear to be representative of the domestic banking sector in 1930s China, and comprise three large banks (Bank of China, Central Bank of China, and Bank of Communications), 27 other modern banks, and two other financial institutions (Shanghai Trust Co., Ltd.; and Joint Savings Society of Yienyieh, Kincheng, Continental and China & South Sea Bank).[15]

Based on the available information from the loan contracts, our sample borrowers are also representative of the 1930s Chinese economy. They span 17 different industries, out of a total of 27 industries based on the International Labor Organization 1923 classification in use in 1930s China.[16] The most important industries in our sample are transportation, services, and textiles (25%, 22%, and 12% of the aggregate loan volume,

[14] As a benchmark, Zhang (2011) reports an average hourly wage for a male worker in Shanghai in 1931-33 of about Ch$0.10, and a 70-hour working week, implying a yearly wage of Ch$364.

[15] We are able to recover 792 individual loan contracts, out of which 579 can be matched to banks covered by our data. Among these loans, we exclude 52: 47 loans to non-profit institutions (universities, colleges, and high schools), four loans received by the *Hunan Flood Committee* (湖南水灾善后委员会, a charity), and one loan contract with unreadable identifying information. All the results are robust to including these 52 loan contracts.

[16] We add a residual category "Other" for one contract, in which the borrowing firm operates across multiple industries (Power and utilities, Services, and Construction). In addition, there are 103 contracts with no available industry classification, which we still use in our analysis.

respectively), consistent with the massive railway construction underway during the period (Ma and Zhang (2007)), as well as the historical role of textiles in Chinese industrial development (Young (1971, p. 306)).

B. Bank balance sheet data

Bank balance sheet data are retrieved from the *Chinese Banker's Yearbook* (全国银行年鉴), published by the Bank of China, and the *Bankers' Weekly* (银行周报), a review published by the Shanghai Banking Association on a weekly basis from May 1917 through to March 1950. Each issue contains the annual reports of both national and regional banks, as well as the leading trusts.[17]

We complement these data with information from two additional sources: the *Financial and Commercial Monthly Bulletin of the Bank of China* (FCMB, 中外商业金融汇报) issued by the Bank of China from 1934 to 1939, and Liu (2007). The FCMB is a widely adopted, reliable source providing data on the Chinese banking sector during the first half of the 20th century. It reports data on banks' banknote issuance and the related silver stock.[18] Liu (2007) reports complementary information on bank location and capital.

From these sources, we retrieve data on bank total assets, equity, cash holdings, outstanding loans, deposits, net income, retained earnings, banknotes issuance, and silver reserves. The key variables of interest in our analysis are $Silver$, the (log-)stock of silver held by the bank, $Excess\ Silver$, defined as the natural logarithm of the difference between the bank's silver stock and the 60% silver reserve requirement, and $Excess\ reserves\ (Y/N)$, an indicator variable equal to 1 if the bank's silver stock is (strictly) greater than the 60% requirement. Our data contain complete balance sheet information for 138 institutions (126 banks and 12 other financial institutions), accounting in the aggregate for 76% of Chinese outstanding loans as of 1931-1933.

We present descriptive statistics in Table 1. Prior to the implementation of the Silver Purchase program, there is significant cross-sectional dispersion in the level of silver reserves for our sample banks. The average bank has silver reserves of 3.7 million Chinese

[17] In 1930s China, trusts engage in financial intermediation activities, including collecting deposits, extending loans, and selling insurance. They do not materially differ from banks in terms of savings and lending practices, so we include them in our data (all the findings are robust to excluding them).

[18] The *Financial and Commercial Monthly Bulletin of the Bank of China* (中外商业金融汇报) is issued by the research department of the Bank of China (中国银行总管理处经济研究室).

dollars. The minimum silver reserve we observe is exactly zero dollars, for the 51 banks in our sample that do not issue any banknotes, while the maximum value is 129 million dollars.[19] Around 62% of those banks that issue banknotes hold exactly the 60% minimum silver reserve; the remaining banks hold excess reserves, ranging between 60-100%, with an average level of 70% and a standard deviation of about 10% of the total currency issued.

Table 1 Bank Balance Sheets and Loans – Summary Statistics

Panel A reports summary statistics on balance sheet data for the banks in our sample. All figures are expressed in thousands of Chinese dollars. Panel B provides summary statistics for the loan contracts in our sample. Loan amounts are expressed in thousands of Chinese dollars. The number of loans in each industry is based on contracts with identifiable industry information, according to the International Labor Organization (1923) classification. The data are hand-collected, and retrieved from a number of archival sources described in greater detail Sections III.A and III.B.

A. Bank Level Variables (Chinese $000)					
	N	**Mean**	**St. dev.**	**Min**	**Max**
Total assets	523	36,151	118,324	67	1,342,242
Equity	527	2,976	7,839	23	103,845
Cash	519	2,647	8,410	0	87,409
Total loans	517	17,193	46,475	34	509,600
Notes issuance	494	4,737	15,504	0	161,000
Silver reserves	366	3,728	12,515	0	129,000
Deposits	508	25,704	86,457	9	992,941
Net income	517	301	1,093	-291	14,822
1931 Silver reserves	505	1,932	7,205	0	64,440
1931 Excess silver reserves	505	229	1,194	0	10,722
1931 Excess reserves	505	0.19	0.39	0	1
Return on equity (%)	517	10	9	-38	63
Cash to assets ratio (%)	519	7	8	0	59
Equity to assets ratio (%)	522	21	16	1	91
No retained earnings	527	0.09	0.28	0	1
No notes banks	690	0.37	0.48	0	1

[19] We retain in the sample banks that do not issue banknotes, as they constitute a useful control group. Results remain unaltered if exclude them from the sample.

B. Loan Contract Characteristics					
	N	**Mean**	**St. dev.**	**Min**	**Max**
Loan Amount (Chinese $000)	579	273	758	0.40	9,000
Loan Contracts by Industry					
Transportation	145	Chemistry	13	Construction	1
Services	125	Retail	9	Wood products	1
Textiles	68	Agriculture	8	Other	1
Power & utilities	28	Finance	6		
Specials (hospital, school, etc.)	23	Glass products	4		
Mining	21	Machinery	3		
Food	18	Paper products	2		

C. Labor unrest

Information on labor unrest episodes in major Chinese cities around the Silver Purchase program is retrieved from surveys on labor relations set up by the Republic of China's central government and local authorities. These records provide information about labor unrest episodes revolving around disagreements between employers and employees, which in a number of cases involve acts of violence. These data are available for three major cities: Nanjing, Shanghai, and Tianjin. We retrieve the Nanjing data from the surveys *Industrial Disputes in Nanjing 1932-1934* (南京市之劳资纠纷统计) and *Industry Disputes in Nanjing 1935* (民国二十四年南京市劳资纠纷统计), which record cases that are reported and processed by the Bureau of Social Affairs of the city of Nanjing. Information about Shanghai is retrieved from the survey *Industrial Disputes in Shanghai since 1928* (近五年来上海之劳资纠纷), conducted by government of greater Shanghai between 1931 and 1935.[20] We complement these data with information from the surveys *Strikes and Lockouts in Shanghai since 1918* (近十五年来上海之罢工停业) for the period 1931-1932, and *Strikes and Lockouts in Shanghai in the Past Four Years* (近四年来上海的罢工停业) for 1933-1935. Regarding Tianjin, we use information available in the

[20] For the years between 1933 and 1935, we retrieve the survey data from the *International Labor Bulletin* (国际劳工通讯; 1934-1941, No. 5 Issue 6, June 1937), compiled by the Chinese Branch of the International Labor Organization.

International Labor Bulletin (国际劳工通讯; 1934-1941). These data are complemented with additional information retrieved from two newspapers, the *Yishi Bao* (益世报; a Tianjin daily) and the *Shen Bao* (申报; a Shanghai newspaper covering stories from other parts of China).

We identify in total 1,209 episodes of labor unrest between 1931 and 1935 (Table 2.A). For episodes taking place in Shanghai, the data report information on the underlying reason. As illustrated in Figure 3, the majority are related to worsening economic conditions: the top causes are layoffs (56%) and salary disputes (21%).

D. Communist activities

The final piece of data is about underground Communist Party activities at Shanghai factory plants during our sample period. We obtain these data from the Shanghai Municipal Police Files, 1894-1949 (henceforth, SMP files). The SMP files contain the records of the British-run municipal police force in Shanghai, which investigates and reports on subversive activities in the city, including communist ones.

The SMP files do not have a standardized format, as they are mostly internal reports documenting the work of this special police force. We focus on two types of documents: arrests of communist supporters and intelligence reports. The arrests provide information about individuals who are taken into custody by the Shanghai Municipal Police. In particular, these reports indicate the name of the firm where the arrested individual works. The intelligence reports describe the activities of undercover agents who infiltrate communist cells in Shanghai. They provide detailed accounts of the cells' meetings, including lists of firms or factories that a given cell targets for recruitment into the party. They also investigate a small number of strikes and labor unrest episodes, for a connection to communist activities.

This archival work results in a list of Shanghai firms penetrated or targeted by communists during our sample period. From these records, we find that about 96 plants, belonging to 65 firms (corresponding to 159 plant-year observations) have communist sympathizers among their workers, or have been targeted by the communists for recruitment.

Table 2 Political Unrest – Summary Statistics

The table reports summary statistics on political unrest from Shanghai, Tianjin, and Nanjing. Panel A summarizes first the political unrest intensity in terms of the number of labor unrest episodes, the duration of the episodes, and if communist activities are detected at a given firm. Information on the available silver pool for a given firm is also reported. For labor unrest episode duration and communist activities, due to data availability the sample is restricted to Shanghai firms. Panel B reports a breakdown of the causes of labor unrest cases in Shanghai. The labor unrest episodes data in Shanghai are retrieved from surveys "Strikes and lockouts in Shanghai since 1918 (近十五年来上海之罢工停业)" (1931-32), "Strikes and lockouts in Shanghai in the Past Four Years (近四年来上海的罢工停业)" (1933-35), "Industry Disputes in Shanghai since 1928 (近五年来上海之劳资纠纷)" (1931-32), conducted by the Bureau of Social Affairs of the city government of greater Shanghai, and the survey "Industry Disputes in Shanghai in the Past Four Years (近四年来上海的劳资纠纷)", published by the International Labor Bulletin (1933-35). The labor unrest episodes data in Tianjin are hand collected from several newspapers described in the text. The labor unrest episodes data in Nanjing are retrieved from surveys "Industry Disputes in Nanjing 1932-1934 (南京市之劳资纠纷统计)" and "Industry Disputes in Nanjing 1935 (民国二十四年南京市劳资纠纷统计)", published by the "*Labor Monthly*" journal (劳工月刊). The underground communist activities record among Shanghai firms are collected from the SMP files, as described section III.D.

A. Political Unrest and Access to Silver Reserves

	N	Mean	St. dev.	Min	Max
No. of labor unrest episodes	8,632	0.14	0.56	0	10
Duration of labor unrest episodes (Shanghai)	7,500	2.82	14.65	0	319
Communist activities Y/N (Shanghai)	7,500	0.02	0.14	0	1
1931 Silver pool (Chinese $000)	8,715	7,616	2,133	5,487	15,788
1931 Excess silver pool (Chinese $000)	8,715	912	320	622	2,124
1931 Excess reserves pool	8,715	0.47	0.09	0.38	0.82

B. Causes of Labor Unrest (for Shanghai)

Causes	No. Episodes
Layoffs	564
Salary	217
Work conditions	111
Union activities	39
Other	84
Total	1,015

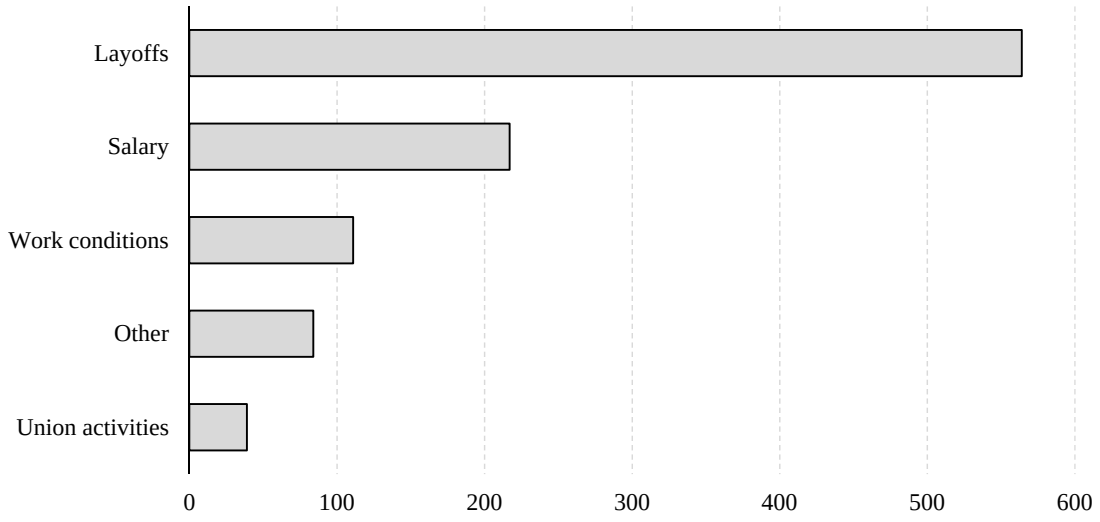


Figure 3 Causes of Labor Unrest Episodes, 1931-1935
The figure reports the causes of labor unrest episodes taking place in Shanghai during the period 1931-1935, corresponding to Table 2.B. The labor unrest data are retrieved from surveys "Strikes and lockouts in Shanghai since 1918 (近十五年来上海之罢工停业)" (1931-32), "Strikes and lockouts in Shanghai in the Past Four Years (近四年来上海的罢工停业)" (1933-35), "Industry Disputes in Shanghai since 1928 (近五年来上海之劳资纠纷)" (1931-32), conducted by the Bureau of Social Affairs of the city government of greater Shanghai, and the survey "Industry Disputes in Shanghai in the Past Four Years (近四年来上海的劳资纠纷)", published by the International Labor Bulletin (1933-35).

IV. Empirical Analysis and Results

We use our data to test the impact of the credit shock on political unrest. Our empirical strategy is articulated in two parts. First, we test if the U.S. Silver Purchase program leads to a contraction of lending in China. Second, we test if there are political consequences to the credit shock, in terms of labor unrest and Communist Party penetration.

A. Impact of the Silver Purchase program on lending

In order to make a loan, a bank needs to draw on its silver reserves in excess of the 60% requirement, or acquire additional silver on the market. A higher market price of silver, thus, increases the cost of lending for the bank, particularly for banks with ex ante lower silver reserves. As a result, banks that are more exposed to the Silver Purchase shock, i.e. with lower pre-1933 silver reserves, will drive the post-1933 credit contraction.

We use three alternative measures of silver reserves: the bank's 1931 (log-)silver holdings ($Silver$), the difference between the bank's silver holdings and 60% of their outstanding banknotes in 1931 ($Excess\ Silver$), and an indicator variable equal to 1 if the

bank's silver stock is (strictly) greater than the 60% requirement in 1931 ($Excess\ reserves\ (Y/N)$).[21] These measures are consistent with the predictions of a simple model we present in Appendix A.2, which rationalizes bank lending in 1930s China. The model predicts that the amount of loans issued by a bank depends on the bank's silver holdings and on whether it exceeds the 60% silver reserve requirement.

We first regress the (log-)loan volume from the banks' balance sheets on these variables, estimating:[22]

$$L_{bt} = \alpha + \beta Silver_{b,1931} + \gamma Post_t \times Silver_{b,1931} + \delta' x_{bt} + \varepsilon_{bt} \quad (1)$$

The dependent variable is the natural logarithm of the dollar amount of loans made by bank b in year t. We regress this variable on an indicator $Post$, equal to 1 in the years subsequent to the U.S. Silver Purchase program (1933 onwards), the bank's 1931 silver reserves $Silver$ (or $Excess\ silver$), and an interaction term, as well as a vector x of control variables, including firm × time fixed effects, i.e. allowing for a different firm-specific intercept before and after the 1933 shock. A positive γ coefficient in equation (1) indicates that banks with larger silver reserves before the shock extend larger loans after 1933. We estimate (1) by collapsing the data down to bank averages before and after 1933, to be immune to the Bertrand, Duflo, and Mullainathan (2004) critique, and first differencing, i.e. we run:[23]

$$\Delta L_b = \alpha + \gamma Silver_{b,1931} + \delta' \Delta x_{bt} + \varepsilon_{bt} \quad (1')$$

where Δ denotes first differences, so that ΔL_b is the change in average log-loans from before to after 1933 for bank b.

The estimates, reported in Table 3, are consistent with the evidence from Figure 1, and with the notion that the Silver Purchase Program leads to a credit contraction: banks with lower reserves reduce their lending volumes after 1933. The result holds across all three proxies for a given bank's exposure to the shock ($Silver$, $Excess\ silver$, and

[21] Whenever the 1931 silver reserves value is not available, we use in its stead the 1932 value. We use the earliest available silver reserves to guarantee that they are pre-determined relative to the Silver Purchase shock of 1933; analogous results are obtained if we use the 1931-1933 average reserves instead (available upon request).

[22] In these tests, we exclude the amount of loans extended to the government from each bank's total loan volume. Our results hold, quantitatively and statistically, if we do not exclude loans to the government.

[23] Equivalently, we may not collapse the data and estimate a panel regression with fixed effects, clustering the standard errors. This approach delivers similar results, reported in Appendix C.

$Excess\ reserves$ (Y/N)), but the economic magnitudes are best assessed by looking at $Excess\ reserves$. The coefficient estimate of 0.13 (specifications (6)-(7)) implies that, in comparison to banks that are less exposed to the shock (i.e., having 1931 silver reserves in excess of the 60% threshold), banks that are immediately exposed to it reduce their loans by 13% more per year on average during the period 1934-1935.

These results suggest a severe impact of the shock on credit provision. The estimates are based on the entire population of modern banks operating in China during the sample period, and are thus free from any selection or survivorship bias. They could, however, be confounded by credit demand effects associated with individual firms. For instance, banks with larger silver reserves might tend to lend to more efficient firms, or less risky firms with a lower exposure to the international economic crisis of the 1930s. This would also predict higher lending growth for banks with larger silver reserves – but due to credit demand, not supply.

To address this identification challenge, we turn to our data on matched bank-firm individual loan contracts. Following the literature on bank liquidity shocks (Khwaja and Mian (2008); Schnabl (2012)), we absorb the impact of credit demand by controlling for firm fixed effects, interacted with time, in the following specification:

$$L_{fbt} = \alpha_{f0} + \alpha_f \times Post_t + \beta Silver_{b,1931} + \gamma Post_t \times Silver_{b,1931} + \delta' x_{fbt} + \varepsilon_{fbt} \quad (2)$$

where the dependent variable is the natural logarithm of the dollar amount lent to firm f by bank b in year t. Again, a positive γ coefficient indicates that banks with larger silver reserves before the shock make larger loans after 1933; as before, we estimate (2) by collapsing the data down to firm-bank pair averages before and after 1933.

Identification in equation (2) mostly originates from the cross-sectional differences in our sample banks' 1931 silver reserves. Banks with a larger amount of pre-shock silver reserves are better able to absorb the liquidity shock, and are thus less likely to ration credit after 1933. As Khwaja and Mian (2008), we then restrict the sample to the set of firms that borrow from at least two banks, allowing us to control for firm fixed effects.

Table 3 Silver Reserves and Credit around 1933 – Bank-Level
The table reports the estimates of:

$$\Delta L_b = \alpha_b + \beta Silver\ reserves_b + \gamma' \Delta x_b + \varepsilon_b$$

The dependent variable is the change in the natural logarithm of the overall loans ($Total\ loans$) extended by bank b around 1933 (post-1933 average minus pre-1933 average). The variable $Silver\ reserves$ is the natural logarithm of bank's silver reserves in 1931 (or the value in 1932 if not available, specifications (1)-(3)). We alternatively define it as the log-amount of silver reserves in excess of the mandatory 60% reserves (specifications (4)-(5)), or as an indicator variable equal to 1 if a given bank has silver-to-notes ratio strictly above 60%, and 0 otherwise (specifications (6)-(7)). x is a vector of control variables, including bank size, equity ratio, cash to bank assets ratio, return on equity, and an indicator for no retained earnings. Following Bertrand, Duflo, and Mullainathan (2004), the equation is estimated on changes around 1933, after collapsing and time-averaging the data before and after 1933. Specifications (3), (5) and (7) also include banks that do not issue banknotes throughout the sample period (and add an indicator for no notes issuance). All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the bank level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Silver	0.124	0.125	0.129				
	(0.039)	(0.047)	(0.044)				
Excess silver				0.391	0.400		
				(0.073)	(0.070)		
Exc. res. (Y/N)						0.130	0.133
						(0.041)	(0.041)
Δ Bank size		0.076	0.048	0.074	0.045	0.108	0.085
		(0.087)	(0.073)	(0.095)	(0.087)	(0.084)	(0.076)
Δ Equity ratio		-0.006	-0.005	-0.005	-0.004	-0.005	-0.005
		(0.004)	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)
Δ Cash ratio		-0.002	-0.003	-0.002	-0.003	-0.003	-0.003
		(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Δ ROE		0.004	0.003	0.005	0.004	0.004	0.004
		(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Δ No ret. earn.		0.045	0.015	0.079	0.038	0.063	0.028
		(0.082)	(0.054)	(0.077)	(0.052)	(0.068)	(0.048)
No notes			-0.015		-0.027		0.007
			(0.031)		(0.031)		(0.031)
Intercept	0.034	0.020	0.018	0.042	0.038	0.002	-0.001
	(0.022)	(0.029)	(0.024)	(0.026)	(0.022)	(0.024)	(0.021)
N	47	46	80	46	80	46	80
R^2	0.12	0.30	0.33	0.30	0.33	0.40	0.40

Table 4 Silver Reserves and Credit around 1933 – Loan-Level
The table reports the estimates of:

$$\Delta L_{bf} = \alpha_f + \beta Silver\ reserves_b + \gamma' \Delta x_{bf} + \varepsilon_{bf}$$

The dependent variable is the change in the natural logarithm of loans ($Loan\ amount$) extended by bank b to firm f (average after 1933 minus average prior to 1933). The variable $Silver\ reserves$ is the natural logarithm of the bank's silver reserves in 1931 (or the value in 1932 if not available (specifications (1) and (4)), the log-amount of silver in excess to compulsory reserves (specifications (2) and (5)), or an indicator variable equal to 1 if a given bank has silver-to-notes ratio above 60%, and 0 otherwise (specifications (3) and (6)). x is a vector of control variables. In addition, columns (4)-(6) include borrowing firm fixed effects. Following Bertrand, Duflo, and Mullainathan (2004), the equation is estimated on changes around 1933, after collapsing and time-averaging the data before and after 1933. We focus on banks that issue banknotes. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the bank level.

	OLS			FE		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver	0.121			0.176		
	(0.049)			(0.057)		
Excess silver		0.078			0.100	
		(0.020)			(0.031)	
Excess reserves (Y/N)			0.282			0.309
			(0.149)			(0.150)
Δ Bank size	0.011	0.201	0.159	0.357	0.660	0.558
	(0.519)	(0.440)	(0.511)	(0.260)	(0.292)	(0.344)
Δ Equity ratio	-0.059	-0.026	0.006	-0.018	0.039	0.082
	(0.052)	(0.046)	(0.047)	(0.039)	(0.035)	(0.058)
Δ Cash ratio	-0.034	-0.033	-0.035	-0.016	-0.015	-0.016
	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.008)
Δ ROE	-0.009	0.009	0.018	-0.011	0.015	0.027
	(0.029)	(0.024)	(0.029)	(0.014)	(0.013)	(0.019)
Δ No ret. earnings	-0.387	-0.120	-0.134	-0.442	-0.147	-0.202
	(0.328)	(0.357)	(0.401)	(0.281)	(0.248)	(0.303)
Intercept	-0.491	0.080	0.127	-0.732	0.146	0.266
	(0.390)	(0.161)	(0.159)	(0.411)	(0.144)	(0.174)
Firm f.e.	N	N	N	Y	Y	Y
N	306	306	306	229	229	229
R^2	0.02	0.02	0.02	0.84	0.84	0.83

We report the estimates of (2) in Table 4. They are consistent with our earlier results: banks with a larger exposure to the Silver Purchase program (lower pre-1933 silver reserves) are quicker to cut down lending. The point estimates are remarkably stable across specifications with and without firm fixed effects. Focusing again on the coefficient on $Excess\ reserves\ (Y/N)$, they imply that banks immediately exposed to the Silver Purchase shock curb lending by about 30% more than banks with excess silver reserves. Moreover, our empirical strategy alleviates the potential confounding effect of loan demand by individual firms. The presence of borrowing firm fixed effects in the regression equation implies that the *same* firm, borrowing from two different banks, will experience a larger drop in lending from the bank with lower silver reserves, i.e. greater exposure to the shock.

Taken together, these findings provide the first block of evidence for our analysis. The scarcity of silver in China, driven by the U.S. Silver Purchase program, leads to a reduction in credit, the more severe the lower pre-1933 silver reserves. The credit contraction is unlikely to be explained by demand conditions, supporting a causal interpretation for our evidence.

B. Impact on political unrest

Next, we look at the consequences of the Silver Purchase program shock on political unrest, focusing on labor unrest episodes and Communist Party penetration.

In the first place, supporting an impact of credit contraction on political unrest, we find that it is closely related to economic conditions at the firms where we observe it (as opposed to more general alternatives such as civil rights or political freedom). As illustrated in Figure 4, the majority of labor unrest episodes in our data are due to layoffs or salary disputes. General work conditions also play a significant role. We rarely find labor unrest motivated by other causes. Moreover, for a subsample of cotton mills where more detailed information is available, we find that worsening economic conditions are related to the silver shock. In particular, firms borrowing from low-silver reserves banks are more likely to lay off workers (see Appendix Table C.4).

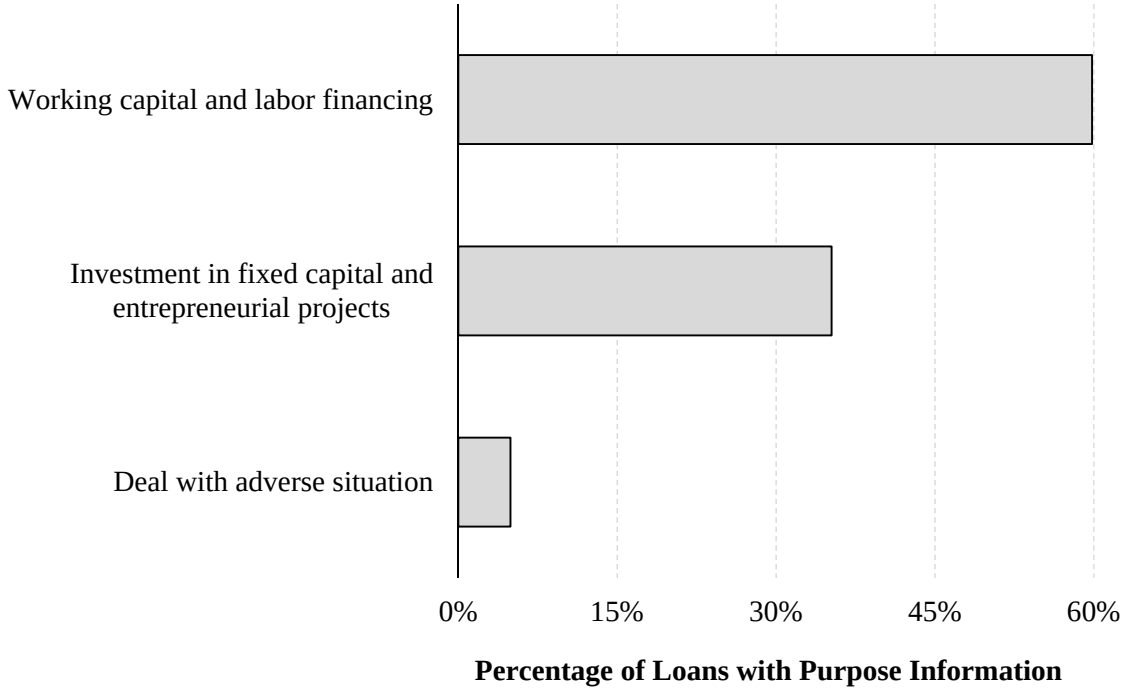


Figure 4 Loan Purpose, 1931-1935
The figure reports the frequency of loan purposes in our sample, as a percentage of the number of loans with available purpose information. There are 244 loans with available loan purpose information. The sample comprises the set of loan contracts described in section III.A, with available loan purpose information.

It also appears that the loans in our sample are evenly distributed between financing investments projects and working capital and/or wage payments (see Figure 4). In both cases, a credit supply cut may have an impact on the labor force either because planned investment projects need to be scrapped or because the firm lacks the resources to maintain production.

In our political unrest tests, we rely on the fact that 1930s Chinese firms borrow primarily from banks headquartered near them, or with branches in their proximity, as argued by the literature on relationship lending (Petersen and Rajan (2002); Degryse and Ongena (2005)) and verified in our data (see below). Building on this idea, we develop an index of local silver reserves availability around each firm f in our sample, as an inverse distance-weighted average of bank silver reserves:

$$Silver\ pool_f = \sum_b \frac{Silver_b/d(f,b)}{\sum_b 1/d(f,b)} \quad (3)$$

where $Silver_b$ denotes the log-1931 silver reserves of bank b, and $d(f,b)$ is the distance between firm f and bank b (or its branches), measured in km.

$Silver\ pool$ is larger if banks in the vicinity of firm f have larger silver reserves. Similarly, we define $Excess\ silver\ pool$, a weighted average $Excess\ silver$, and $Excess\ reserves\ (Y/N)\ pool$, a weighted average $Excess\ reserves\ (Y/N)$. Importantly, these measures capture the capacity of the pool of *potential* lenders of firm f to absorb the Silver Purchase shock, as opposed to its actual lenders, which we discuss below.

We then relate the index to the measures of political unrest intensity. We estimate:

$$Unrest_{ft} = \alpha + \beta Silver\ pool_{f,1931} + \gamma Post_t \times Silver\ pool_{f,1931} + \delta' x_{ft} + \varepsilon_{ft} \quad (4)$$

where, depending on the specification, $Unrest$ indicates the (log-)number of labor unrest episodes at firm *f* in year *t*, the duration of these episodes, or a dummy variable that takes the value of 1 if firm *f* experiences communist activities in year *t*. As before, we collapse the sample to plant averages before and after 1933 following Bertrand, Duflo, and Mullainathan (2004) and estimate (4) on changes. The control variables x alternatively include city-district, industry, and firm nationality fixed effects.

We examine labor unrest episodes in Table 5. Specifications (1)-(3) of panel A focus on the (log-)number of labor unrest episodes in a given year, specifications (4)-(6) on their duration. Across all specifications, $Silver\ pool$, $Excess\ silver\ pool$, and $Excess\ reserves\ (Y/N)\ pool$ are negatively associated with the number of labor unrest episodes and their duration. This is consistent with the notion that firms that have access to a smaller pool of silver reserves are more exposed to the shock, and experience intensified labor unrest. The effect is also important in economic terms: firms with the lowest $Excess\ reserves\ (Y/N)\ pool$ experience a 30% higher increase in the number of labor unrest episodes after 1933 than firms with the highest $Excess\ reserves\ (Y/N)\ pool$; the corresponding difference in terms of unrest episode duration is 58%.[24]

[24] These effects are estimated as follows. The minimum value of $Excess\ reserve\ pool$ is 0.38, and the maximum 0.82 (Table 2.A). Based on the coefficient estimate of –0.675 from Table 5.A (specification (3)), this implies a $-0.675 \times (0.38 - 0.82) = 30\%$ higher increase in the number of labor unrest episodes for firms at the lowest level of $Excess\ reserve\ pool$, relative to firms at the highest level. The effect on the duration of unrest episodes is estimated similarly.

Table 5 Impact of the Liquidity Shock on Political Unrest – Labor Relations
The table reports the estimates of:

$$\Delta Labor\ unrest_f = \alpha + \beta\ Silver\ pool_f + \gamma' x_f + \varepsilon_f$$

In panel A, the dependent variable is either the change in the natural logarithm of the number of labor unrest episodes at firm f in columns (1)-(3), or the change in the natural logarithm of the duration of unrest episodes in firm f in columns (4)-(6) (average after 1933 minus average prior to 1933). The variable S$ilver\ pool$ is the inverse distance-weighted average silver reserves around firm f (columns (1) and (4)), the inverse distance-weighted average of the silver amount in excess of the 60% minimum reserve requirement, in columns (2) and (5) ($Excess\ silver\ pool$), or the inverse distance-weighted average of the indicator variable taking the value of 1 if a given bank has silver-to-notes ratio above 60%, and 0 otherwise, in columns (3) and (6) ($Excess\ reserves\ pool$). All specifications include city district, industry, and firm nationality fixed effects. In panel B, column (1), we report the estimates of:

$$Relation_{fb} = \alpha\ Distance_{fb} + \varepsilon_f$$

The variable $Relation$ is an indicator variable taking the value of 1 if a given bank-firm pair has a lending relationship, and 0 otherwise. The variable $Distance$ is the natural logarithm of 1 plus the distance (measured in km) between a given bank-firm pair. In columns (2)-(4), the sample is restricted to bank-firm pairs where we observe a lending relationship, and we directly link labor unrest at the firms to their bank lenders' silver holdings. Following Bertrand, Duflo, and Mullainathan (2004), all regressions in panel A, and specifications (2)-(4) in panel B, are estimated on changes around 1933. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the firm level.

A. Full sample

Dep. variable:	**$\Delta\log(1 + Number\ of\ labor\ unrest\ episodes)$**			**$\Delta\log(1 + Duration)$**		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver pool	-0.246			-0.611		
	(0.065)			(0.244)		
Exc. silver pool		-0.229			-0.602	
		(0.056)			(0.207)	
Exc. res. pool			-0.675			-1.326
			(0.208)			(0.783)
District f.e.	Y	Y	Y	Y	Y	Y
Industry f.e.	Y	Y	Y	Y	Y	Y
Nationality f.e.	Y	Y	Y	Y	Y	Y
N	1,743	1,743	1,743	1,500	1,500	1,500
R^2	0.12	0.12	0.12	0.08	0.08	0.08

Table 5 Impact of the Liquidity Shock on Political Unrest – Labor Relations; continued
B. Existing bank-firm relationships

Dep. variable:	**Relation (Y/N)**	$\Delta\log(1 + Number\ of\ labor\ unrest\ episodes)$		
	(1)	(2)	(3)	(4)
Distance	-0.018			
	(0.007)			
Silver		-0.027		
		(0.014)		
Excess silver			-0.024	
			(0.013)	
Excess reserves (Y/N)				-0.180
				(0.085)
City f.e.	Y	Y	Y	Y
N	1,899	60	60	60
R^2	0.01	0.09	0.09	0.13

Panel B of Table 5 reports two sets of tests. First, in column (1) we validate the conjecture that firms tend to borrow from the banks that are geographically closer to them. We rely on information on existing lending relationships from our loan contracts data, and regress an indicator variable equal to 1 if a given firm borrows from a given bank on the Euclidean log-distance between the firm and the bank (in km), and indicators for the firm's location (city).[25] Confirming the conjecture behind our approach in panel A, we find a strong negative relation between distance and the likelihood of a lending relationship: a 10% closer bank is 0.18% more likely to have a lending relationship. In our data, a firm has a lending relationship, on average, with 4% of the banks with a branch located in its city, implying that the estimated effect of distance is material.

Second, we validate our tests of panel A by looking at actual lending relationships. In this case, the sample size shrinks, because we are restricted to working with firms and banks where information is available from our loans data. Nonetheless, in columns (2)-(4)

[25] The unit of observation in column (1) is a bank branch-firm pair. For each bank, we include in the sample the branch that is closest to the firm. The dependent variable takes the value of 1 if a given branch belongs to a bank that has a lending relationship with the firm, and 0 otherwise.

we are able to detect a relation between silver reserves and lending outcomes in line with the results described in panel A. Across all silver holdings measures, we find a negative relationship between silver reserves and the post-1933 number of labor unrest episodes.[26] Firms borrowing from banks without excess reserves experience an 18% higher increase in the number of labor unrest episodes after 1933 than firms with access to excess reserves, economically close to the effects implied by the estimates of panel A.

We then turn to communist penetration as a measure of political unrest. Table 6 relates silver reserves to the probability that a firm experience underground Communist Party activities. Although positive as could be expected, at 13.5% the correlation between the frequency of labor unrest episodes and communist activities is not high, suggesting that they capture different facets of political unrest. Again, we find a negative relationship between communist activities and access to silver reserves. Whether communist activities propagate because workers at firms with little access to silver reserves spontaneously radicalize, or because the Communist Party targets exposed firms to recruit their workers, this result suggests a causal channel from credit provision to the spread of political unrest.

The estimates imply that firms with access to the smallest pool of excess reserves (i.e. with the lowest $Excess\ reserves\ (Y/N)\ pool$) experience a 3 to 6% larger increase in communist penetration after 1933. In terms of statistical significance, the results are weaker compared to the labor unrest results and, in particular, they are not significant for $Excess\ reserves\ (Y/N)\ pool$. A number of factors may account for this: communist activities were strongly repressed in Shanghai during the 1930s and the Communist Party itself was underground, making our dependent variable particularly noisy. Building on these arguments, we conservatively interpret our estimates as a lower bound on the relationship between the Silver Purchase shock and Communist Party penetration.

In sum, we find a robust impact of the Silver Purchase shock on labor relations and the likelihood of labor unrest episodes. We also find an impact on underground communist activities consistent with the labor unrest effect; however, in this case the estimated effect is weaker.

[26] Data on the duration of labor unrest episodes is only available for Shanghai, which restricts our sample. In unreported tests, we find a negative, but statistically not significant, relation between silver reserves and labor unrest episode duration. We omit these tests to conserve space; but they are available upon request.

V. Alternative Explanations and Discussion

In this section, we discuss tests to rule out alternative interpretations of our findings, as well as their external validity. First, we compare industries exposed to and isolated from world markets, as a check for mechanical exchange rate effects and the impact of the worldwide Great Depression. We also discuss a falsification test based on data from neighboring Hong Kong, where banks did not face a mandatory reserve requirement to issue banknotes, and whether labor unrest episodes might have been driven by the 1932 "Shanghai incident." Second, we use instrumental variables estimation to rule out effects due to self-selection of banks into high- and low-silver reserves groups. Finally, we briefly discuss the external validity of our findings.

A. Exchange rates and the Great Depression; East Asia-wide factors; Shanghai incident

The Silver Purchase program is announced in the midst of the Great Depression. The global decline in demand, thus, could affect Chinese firms. Moreover, because of the silver standard, the rise in silver prices leads to an appreciation of the Chinese dollar, hurting the competitiveness of Chinese exporters. Both effects predict a generalized contraction of Chinese credit demand.

But neither mechanism appears, in fact, to account for our findings. First, it is simply not clear why their effects should be more pronounced on banks with lower silver reserves, or the firms that borrow from them. Second, the loan-level estimates control for firm fixed effects, which capture firms' credit demand. As a third argument against the alternative interpretation, we present further evidence by comparing firms with different exposure to international trade, splitting industries between Traded and Non-Traded sectors. Both mechanisms outlined above predict stronger effects in the Traded sector.

Table 6 Impact of the Liquidity Shock on Political Unrest – Communist Activities
The table reports the estimates of:

$$\Delta Communist\ activities_f = \alpha + \beta Silver\ pool_f + \gamma' x_f + \varepsilon_f$$

The dependent variable is the change in the indicator variable equal to 1 if firm f is involved in communist activities (average after 1933 minus average prior to 1933). Due to data availability, the sample contains Shanghai firms only. The variable S$ilver\ pool$ is the inverse distance-weighted average silver reserves around firm f (specifications (1)-(3)), the inverse distance-weighted average of the log-amount of silver in excess to compulsory reserves, in specifications (4)-(6) ($Excess\ silver\ pool$), or the inverse distance-weighted average of the indicator variable equal to 1 if a given bank has silver-to-notes ratio above 60%, and 0 otherwise, in specifications (7)-(9) ($Excess\ reserves\ pool$). Specifications (2), (5) and (8) include industry, and firm nationality fixed effects. Specifications (3), (6) and (9) include city district, industry, and firm nationality fixed effects. Following Bertrand, Duflo, and Mullainathan (2004), the equation is estimated on changes around 1933, after collapsing and time-averaging the data before and after 1933. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the firm level.

Dep. variable: $\Delta Communist\ activities$									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Silver pool	-0.085	-0.058	-0.056						
	(0.049)	(0.032)	(0.043)						
Excess silver pool				-0.083	-0.058	-0.062			
				(0.049)	(0.028)	(0.034)			
Excess reserves pool							-0.167	-0.109	-0.061
							(0.132)	(0.105)	(0.144)
Intercept	0.551			0.363			0.070		
	(0.313)			(0.209)			(0.054)		
District f.e.	N	N	Y	N	N	Y	N	N	Y
Industry f.e.	N	Y	Y	N	Y	Y	N	Y	Y
Nationality f.e.	N	Y	Y	N	Y	Y	N	Y	Y
N	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
R^2	0.00	0.23	0.24	0.01	0.23	0.24	0.00	0.23	0.24

Table 7 presents the estimates. We find similar results as in the overall sample: Banks with lower pre-1933 silver reserves reduce lending to firms in both Traded and Non-Traded sectors (columns (1)-(3)). The coefficient estimate on the interaction term between 1931 silver reserves and the Traded sector indicator is insignificant in all three specifications. When looking at political unrest (columns (4)-(9)), we also find similar results as in the overall sample; we find significantly *weaker* effects for Traded-sector firms, contradicting the alternative argument. These findings suggest that the exchange rate and Great Depression channels are unlikely driving our results.

To generalize these arguments and rule out a spurious correlation with economic events that may have affected the whole East Asia, other than the Silver Purchase program, we also conduct a falsification test focusing on Hong Kong, as the economy closest to China in geographic and cultural terms. We rely on data on lending from the archives of HSBC, the main lender in the city-state at the time.[27]

In the 1930s, Hong Kong is also on a silver standard: only silver coins have legal tender, and only minted silver can be used to pay taxes. Banks are allowed to issue banknotes, but these do not have the status of legal tender and, crucially, they are not required to be backed by silver reserves. Since the legal reserve requirement is the key driving force behind the credit contraction in 1930s mainland China, we should expect no such contraction in Hong Kong.

We use lending amounts in HSBC's balances sheets, standardized by total assets and deposits, and track them over the period 1931-1935. We report our detailed findings in Appendix Figure A.1. In sum, we find that credit does not contract in Hong Kong, unlike in the Republic of China. If anything, we observe stable credit until 1934, and an increase in lending in 1935.

Finally, we verify that Japanese influence in parts of Shanghai does not drive our labor unrest and communist penetration results. This possibility relates to the so-called Shanghai incident where, in January 1932, the Japanese secret service staged a beating of Japanese Buddhist monks to justify military action against China. Japanese influence on

[27] In 1931, banknotes issued by HSBC corresponded to 82% of the total banknotes issued in Hong Kong.

Chinese firms concentrated in the Zhabei (闸北) district in Shanghai. Excluding Zhabei district firms from our sample does not materially alter our findings. These results are reported in Appendix Tables C.8 (labor unrest) and C.9 (communist penetration).

B. Selection into high- and low-reserves groups and instrumental variables estimation

A further challenge might be that silver reserves are not randomly assigned to banks. In principle at least, they may be correlated with unobserved factors, related e.g. to the banks' clientele and/or business model, affecting lending policies and the probability of labor unrest. Our results so far considerably raise the bar for a "selection" explanation of this sort. Since we observe *changes* in credit and labor unrest intensity after 1933, whatever unobserved sorting variable may drive our results must change precisely around the start of the Silver Purchase program, and must not be captured by the firm fixed effects tests reported in Table 4.

To further alleviate concerns about selection, we resort to instrumental variables estimation. We exploit a unique feature of 1930s China's monetary system: the parallel circulation of a traditional currency, issued by the "native" banks, and backed by copper instead of silver. The use of copper as a monetary base dates back to about 1100 BC (Kann (1927, pp. 403-404)). In the 1930s, copper-backed money circulates only locally, and it is mainly used to clear small transactions (Tamagna (1942, p. 68)). It is, however, not a trivial quantity: Rawski's (1984) estimates indicate that it corresponds to about 20% of the silver-backed monetary base.

We conjecture that the relative abundance of copper at mines near the headquarters of a given *modern* bank determines the availability of copper-backed currency. Further, if people use the copper-backed currency as a substitute for Chinese silver dollars, greater availability of copper should associate with lower silver reserves, as the modern bank may face a lower demand for silver-backed currency for transaction purposes.

Table 7 Traded vs. Non-traded Sectors: Credit and Political Unrest around 1933

The table reports the estimates of regressions following specifications (4)-(6) of Table 4 in columns (1)-(3); specifications (1)-(3) of Table 5.A in columns (4)-(6); and specifications (3), (6) and (9) of Table 6 in columns (7)-(9). All specifications include the additional variables $Traded\ sector$ (an indicator equal to 1 for traded-products industrial sectors) and the interaction term $Traded\ sector \times Silver\ reserves$ (columns (1)-(3)) or $Traded\ sector \times Silver\ pool$ (columns (4)-(9)). Specifications (1)-(3) include a borrowing firm fixed effects. Specifications (4)-(9) include city district, industry and firm nationality fixed effects. Following Bertrand, Duflo, and Mullainathan (2004), all regressions are estimated on changes around 1933. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the bank level in columns (1)-(3), and at the firm level in columns (4)-(9).

Dependent var.	$\Delta\log(1 + Loan\ amount)$			$\Delta\log(1 + Number\ of\ labor\ unrest\ episodes)$			$\Delta Communist\ activities$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Silver	0.183			-0.613			-0.209		
	(0.062)			(0.113)			(0.080)		
Silver ×	-0.041			0.437			0.178		
Traded sector	(0.046)			(0.108)			(0.088)		
Excess silver		0.103			-0.569			-0.210	
		(0.038)			(0.101)			(0.076)	
Excess silver ×		-0.011			0.399			0.171	
Traded sector		(0.046)			(0.098)			(0.082)	
Excess reserves (Y/N)			0.275			-1.370			-0.476
			(0.148)			(0.327)			(0.202)
Excess reserves (Y/N) ×			0.397			0.876			0.499
Traded sector			(0.362)			(0.294)			(0.231)
Control var.	Y	Y	Y						
Firm f.e.	Y	Y	Y						
District f.e.				Y	Y	Y	Y	Y	Y
Industry f.e.				Y	Y	Y	Y	Y	Y
Nationality f.e.				Y	Y	Y	Y	Y	Y
N	229	229	229	1,743	1,743	1,743	1,500	1,500	1,500
R2	0.84	0.84	0.83	0.14	0.14	0.13	0.24	0.24	0.24

We build an index of the local $Copper\ pool$ in the same spirit as $Silver\ pool$ defined above, as the natural logarithm of the inverse distance-weighted-average copper capacity in the three copper mines nearest to a given bank. To the extent that the availability of copper mines near a given bank's headquarters is exogenous to credit provision and to political unrest *in Nanjing, Shanghai, and Tianjin* (which are generally far from the bank's headquarters), our instrument meets the exclusion restriction.

The first-stage regressions reported in Appendix Table C.3 validate our conjecture, and the relevance of the instrument: where copper abounds, banks hold smaller silver reserves. The first-stage F test statistic is also large, suggesting that our instrument is not weak.

Table 8.A presents the second-stage estimates. They confirm our earlier findings: banks with lower 1931 silver reserves reduce credit provision after the 1933 Silver Purchase shock. In Table 8.B, we present the results for political unrest, defining an index of the available copper pool around a given firm in a way analogous to the previous index. The second-stage regressions are presented in Table 8.B for political unrest intensity (log-number of labor unrest episodes, and communist activities indicator).[28] A larger pool of available silver reserves at the firm's lenders is, again, negatively associated with the (log-)number of labor unrest episodes, and communist activities indicator. Overall, these tests suggest that selection is not a main driver of our results.

C. External validity

Because our results are based on data from 1930s China, it is important to discuss the extent of their external validity. That depends on whether modern credit shocks can be similar in magnitude to the Chinese one of 1933-35, and on whether a modern society will respond similarly to a shock of similar size.

The answer to the first question is yes. Chinese credit-to-GDP drops by about 15% over 1933-35 (Cheng (2003, Appendix II), Liu (1946, Table 1), and Appendix A). This value is very close to the drops experienced by Finland in 1991 (13%), Turkey in 2000

[28] Again, to conserve space we relegate a corresponding test looking at the duration of labor unrest episodes to Appendix Table C.2.

(18%), Spain in 2010 (10%), all identified by Laeven and Valencia (2012) as recent banking crises.[29]

As for the second question, one key ingredient to the answer is labor mobility. If workers are able to move and seek employment at firms that are not credit-constrained, a shock such as the Silver Purchase program should generate less social tension in a modern economy. Labor mobility in 1930s China, however, is not especially limited compared to modern China. Regulatory restrictions on internal migration, in fact, are less stringent in 1931-35 than today.[30] Moreover, internal migration is not uncommon in 1930s China. In 1935, immigration inflow (outflow) as a fraction of total population is 16% (13%), quite comparable with the 1995-2000 average of 13% (10%).[31]

Of course, this conclusion must be moderated by a number of other factors beyond the scope of our analysis, such as the government's willingness and ability intervene to attenuate the negative effects of economic shocks.

VI. Conclusions

Using a novel, hand-collected dataset and a natural experiment from 1930s China, we provide new micro-econometric evidence on the socio-political consequences of negative economic shocks. We exploit the 1933 U.S. Silver Purchase program, which, acting as a drain on silver worldwide, generates a credit contraction in the Republic of China, on the silver standard in the 1930s. We find that (i) banks more exposed to the shock (with lower pre-1933 silver reserves) are quicker to cut lending after 1933, and (ii) labor unrest episodes and Communist Party penetration at firms borrowing from exposed banks increase in intensity after 1933, relative to other firms. The level of detail of our micro-data suggests

[29] Data on credit-to-GDP for these episodes are retrieved from the World Bank's website.

[30] According to the *Household Registration Law* (户籍法), passed in 1931, individuals can register at a new location after living there for 6 years, and there is no further discrimination between temporary and permanent residents. In contrast, formally registering as a Shanghai resident in the 2010s requires at least 7 years of residence, minimum professional qualifications and social security contributions; temporary residents, moreover, face severe welfare discrimination (Li and Ren (2011)).

[31] Total Shanghai population for 1935 is retrieved from *Statistics Monthly. No 32.* (统计月报； 32 号), compiled by Statistics Bureau of the Guangxi (广西省政府统计局). Immigration inflow and outflow are obtained from *Police Monthly* No. 3, Roll 3 (警察月刊;第三期第三卷), compiled by the Shanghai Police Bureau (上海市公安局第一科). Data for modern Shanghai are obtained from Fan (2005), and from the 5th National Population Census of the People's Republic of China.

a causal interpretation of our findings. Our evidence is consistent with credit rationing having a material impact on political unrest.

Table 8 Credit and Political Unrest around 1933 – IV Estimation, 2nd Stage
Panel A reports the estimates of:

$$\Delta L_{bf} = \alpha_f + \beta Silver\ reserves_b + \gamma' \Delta x_{bf} + \varepsilon_{bf}$$

following the same specifications as in columns (4)-(6) of Table 4. $Silver\ reserves$ is instrumented by copper availability $Copper\ pool$, defined as the natural logarithm of distance-weighted average copper capacity in the closest 3 copper mines around bank b. x is the vector of control variables used in Table 4. Panel B reports the estimates of:

$$\Delta Political\ unrest_f = \alpha + \beta Silver\ pool_f + \gamma' x_f + \varepsilon_f$$

following the same specifications as in columns (1)-(3) of Table 5.A. $Silver\ pool$ is instrumented by copper availability $Copper\ pool$, defined as the inverse distance-weighted average of the natural logarithm of copper capacity in the nearest 3 copper mines to a firm's closest bank b. Columns (1)-(3) present the results for Δlog(1 + Number of unrest episodes), columns (4)-(6) present the results for ΔCommunist activities. All variables are time-averaged before and after 1933, and are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the bank level in panel A, or at firm level in panel B.

A. Dep. variable: Δ*L* (2nd stage)			
	(1)	(2)	(3)
Silver	0.334		
	(0.109)		
Excess silver		0.301	
		(0.113)	
Excess reserves (Y/N)			0.864
			(0.298)
Control var.	Y	Y	Y
Firm f.e.	Y	Y	Y
N	229	229	229
First-stage F-stat	10.20	3.88	17.69

Table 8 Credit and Political Unrest around 1933 – IV Estimation, 2nd Stage; continued

B. Dep. variable: $\Delta Political\ unrest$ (2nd stage)						
	$\Delta\log(1 + Number\ of\ labor\ unrest\ episodes)$			$\Delta Communist\ activities$		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver pool	-0.593			-0.141		
	(0.273)			(0.135)		
Excess silver pool		-0.523			-0.125	
		(0.242)			(0.120)	
Excess reserves pool			-1.874			-0.430
			(0.864)			(0.414)
District f.e.	Y	Y	Y	Y	Y	Y
Industry f.e.	Y	Y	Y	Y	Y	Y
Nationality f.e.	Y	Y	Y	Y	Y	Y
N	1,743	1,743	1,743	1,500	1,500	1,500
First stage F-stat	132.82	132.31	105.14	129.75	124.33	115.40

References

Arzheimer, K., 2009, Contextual Factors and the Extreme Right Vote in Western Europe, *American Journal of Political Science* 53, 259–275.

Bai, Y. and R. Jia, 2016, Elite Recruitment and Political Stability: The Impact of the Abolition of China's Civil Service Exam, *Econometrica* 84, 677–733.

Becker, S. O., T. Fetzer, and D. Novy, 2016, Who Voted for Brexit? A Comprehensive District-Level Analysis, Working paper, Warwick University.

Bertrand, M., E. Duflo, and S. Mullainathan, 2004, How Much Should We Trust Differences-In-Differences Estimates? *Quarterly Journal of Economics* 119, 249–275.

Besley, T and T. Persson, 2011, The Logic of Political Violence, *Quarterly Journal of Economics* 126, 1411–1445.

Blattman, C., and E. Miguel, 2010, Civil War, *Journal of Economic Literature* 48, 3–57.

Brandt, L., and T. J. Sargent, 1989, Interpreting New Evidence about China and U.S. Silver Purchases, *Journal of Monetary Economics* 23, 31–51.

Burdekin, R. C. K., 2008, U.S. Pressure on China: Silver Flows, Deflation, and the 1934 Shanghai Credit Crunch, *China Economic Review*, 19, 170–182.

Cheng, L., 2003, *Banking in Modern China: Entrepreneurs, Professional Managers, and the Development of Chinese Banks, 1897-1937*, Cambridge University Press, Cambridge, MA.

Chodorow-Reich, G., 2014, The Employment Effects of Credit Market Disruptions: Firm Level Evidence from the 2008-9 Financial Crisis, *Quarterly Journal of Economics* 129, 1–59.

Cingano, F., F. Manaresi and E. Sette, 2016, Does Credit Crunch Investment Down? New Evidence on the Real Effects of the Bank-Lending Channel. *Review of Financial Studies* 29, 2737–2773.

Cramer Walsh, K., 2012, Putting Inequality in Its Place: Rural Consciousness and the Power of Perspective, *American Political Science Review* 106, 517–532.

de Bromhead, A., B. Eichengreen and K. H. O'Rourke, 2013, Political Extremism in the 1920s and 1930s: Do German Lessons Generalize?, *Journal of Economic History* 73, 371–406.

Degryse, H., and S. Ongena, 2005, Distance, Lending Relationships, and Competition, *Journal of Finance* 60, 231–266.

Dube, O. and J. F. Vargas, 2013, Commodity Price Shocks and Civil Conflict: Evidence from Colombia, *Review of Economic Studies*, 80, 1384–1421.

Fan, C. C., 2005, Interprovincial Migration, Population Distribution, and Regional Development in China: 1990 and 2000 Census Comparisons, *Professional Geographer* 57, 295–311.

Feinstein, C, P. Temin and G. Toniolo, 1997, *The European Economy Between the Wars*, Oxford University Press, Oxford.

Friedman, M., 1992, Franklin D. Roosevelt, Silver and China, *Journal of Political Economy* 100, 62–82.

Friedman, M., and A. Schwartz, 1963, *A Monetary History of the United States, 1867-1960*. Princeton University Press, Princeton, NJ.

Funke, M., M. Schularick and C. Trebesch, 2016, Going to Extremes: Politics After Financial Crises, 1870-2014, *European Economic Review* 88, 227–260.

Goetzmann, W. N., A. D. Ukhov, and N. Zhu, 2007, China and the World Financial Markets 1870-1939: Modern Lessons from Historical Globalization, *Economic History Review* 60, 267–312.

Guiso, L., H. Herrera, M. Morelli and T. Sonno, 2017, Demand and Supply of Populism, Working paper, EIEF.

Ho, C.-Y. and D. Li, 2014, A Mirror of History: China's Bond Markets, 1921-1942, *Economic History Review* 67, 409–434.

Jacoby, W. G., 2014, Is There a Culture War? Conflicting Value Structures in American Public Opinion, *American Political Science Review* 108, 754–771.
Kann, E., 1927, *The Currencies of China*, Ishi Press International.
Kennan, J., 1986, The Economics of Strikes. In Ashenfelter, O., and R. Layard, eds., *Handbook of Labor Economics*, Vol. 2, Elsevier, Amsterdam, 1091–1237.
Khwaja, A. I., and A. Mian, 2008, Tracing the Impact of Bank Liquidity Shocks, *American Economic Review* 98, 1413–1442.
Kraus, R. A., 1980, *Cotton and Cotton Goods in China, 1918-1936 (Vol. 28)*, Garland Pub., New York.
Kreps, T. J., 1934, The Price of Silver and Chinese Purchasing Power, *Quarterly Journal of Economics* 48, 245–287.
Laeven, L., and F. Valencia, 2012, Resolution of Banking Crises: The Good, the Bad, and the Ugly, Working paper, International Monetary Fund.
Leavens, D. H., 1939, *Silver Money*. Principia Press, Bloomington (IN).
Li, T., and Y. Ren, 2011, *The Reform of Hukou System in Chinese Cities and the Social Inclusion of Floating Population* (城市户籍制度改革与流动人口社会融合), *South China Population* 105, 17–23.
Lin W. Y., 1936, *The New Monetary System of China. A Personal Interpretation*. Kelly and Walsh, Shanghai.
Liu, K. X, 2007, 1927-1937 *Chinese Banks' Statistics* (1927-1937 年中资银行再统计), *Researches in Chinese Economic History* 1, 48–58.
Liu, T.-C., 1946, *China's National Income, 1931-36 – An Exploratory Study*, The Brookings Institution, Washington, D.C.
Ma, L. H., and F. Zhang, 2007, *Railroad Planning and Construction of the Nanjing National Government in the Early Period* (南京国民政府初期的铁路规划和建设), *Chang'an University Journal* 9, 83–90.
Mano, R. C. and M. Castillo, 2015, The Level of Productivity in Traded and Non-Traded Sectors for a Large Panel of Countries. IMF Working 15/48.
Miguel E., S. Satyanath and E. Sergenti, 2004, Economic Shocks and Civil Conflict: An Instrumental Variables Approach, *Journal of Political Economy* 112, 725–753.
Naidu, S. and N. Yuchtman, Forthcoming, "Labor Market Institutions in the Gilded Age of American Economic History", in L. Cain, P. Fishback and P. Rhode, eds., *The Oxford Handbook of American Economic History*, Oxford University Press, Oxford.
Passarelli, F. and G. Tabellini, 2017, Emotions and Political Unrest, *Journal of Political Economy*, 125, 903-946.
Petersen, M. A. and R. G. Rajan, 2002, Does Distance Still Matter? The Information Revolution in Small Business Lending, *Journal of Finance* 57, 2533–2570.
Ponticelli, J., and H. Voth, 2014, Austerity and Anarchy: Budget Cuts and Social Unrest in Europe, 1919-2008, Working paper, Universitat Pompeu Fabra.
Rawski, T., 1984, Estimates of China's money supply, 1910-1936, Working paper, University of Pittsburgh.
Rawski, T. G., 1993, Milton Friedman, Silver, and China, *Journal of Political Economy* 101, 755–758.
Rodrik, D., 2017, Populism and the Economic of Globalization, Working paper, Harvard University.
Sargent, T. J., and N. Wallace, 1982, The Real-Bills Doctrine versus the Quantity Theory: A Reconsideration, *Journal of Political Economy* 90, 1212–1236.
Schnabl, P., 2012, The International Transmission of Bank Liquidity Shocks: Evidence from an Emerging Market, *Journal of Finance* 67, 897–932.
Shen, W. Z., 1987, *Controversies in Labor Movement History* (工运史鸣辩录). Shanghai Academy of Social Sciences Publisher: Shanghai.
Stranahan, P., 1998, Underground. The Shanghai Communist Party and the Politics of Survival, 1927-1937. Rowman & Littlefield Publishers: Oxford.

Tamagna, F., 1942, *Banking and Finance in China*, Institute of Pacific Relations, New York.
Young, A. N., 1971, China's Nation-Building Effort, 1927-1937. Hoover Institution Press: Stanford University.
Yu, J. Q., 1937, *Chinese New Monetary Policy*, The Commercial Press, Shanghai.
Zhang, Z., 2011, Wages and Life of the Shanghai Class in Modern Times: An Analysis Based on 1930s Survey (近代上海工人阶级的工资与生活-以 20 世纪 30 年代调查为中心的分析), *China Economic History* 2, 6–10.

Appendices

Appendix A.

Interpreting the Effects of the Silver Purchase Program: Framework

A.1 Economic historiography of the Silver Purchase program

The argument that the Silver Purchase Program had negative effects on the Chinese economy can be traced back to contemporary commentators such as Lin (1936, pp. 5-77) and Leavens (1939, pp. 293-312). Friedman and Schwartz (1963) and Friedman (1992) argue that the Silver Purchase program had a devastating impact. As silver was at the basis of the Chinese monetary standard, an outflow of silver corresponded to both a contraction in the money supply and an appreciation of the Chinese dollar vis-à-vis major foreign currencies. The decline in money supply produced a sharp reduction of imports, domestic consumption, and investment. At the same time, rising silver prices corresponded to an appreciation of the Chinese dollar, with detrimental effects on exports. Compared to 1929, the export value of China's major goods such as silk and tea was down by 65% in 1935 (Yu (1937, pp. 224-225)).

Brandt and Sargent (1989) recognize that the Silver Purchase program led to an increase of silver prices and an outflow of silver from China. However, they argue that the program had mainly an effect on relative prices, but not on the real economy. With higher silver prices, Chinese banks could back up the same, or an even larger, amount of paper money with any given amount of silver. Brandt and Sargent (1989) further argue that Chinese banks exploited the arbitrage opportunity offered by higher silver prices and sold part of the silver abroad. As a result, they replaced part of their silver reserves with Republic of China Treasury bonds.

Brandt and Sargent's (1989) argument rests on two assumptions. First, Chinese Treasury bonds were "as good as silver" to back up the currency (i.e. the perceived risk of sovereign default was very low). This has become known as the "real bills" doctrine (e.g. Sargent and Wallace (1982)). Second, prices in China were flexible enough to insulate the real economy from any adverse effects of the outflow of silver and deflation. Consistent with this hypothesis, they show that M1 declines as a result of the outflow of Silver, but M2 remains constant or even increases during the 1930s. They also present macroeconomic evidence showing only a mild decline in GPD and other macroeconomic aggregates.

Burdekin (2008) presents evidence supporting the Friedman and Schwartz (1963) and Friedman (1992) line of argument. He highlights how geographical differences in China are important in explaining the unfolding of the Silver Purchase shock. Shanghai, for instance, received large quantities of silver from the interior and, as a result, it was partially insulated from the shock until 1934. Internal areas experienced a sharp outflow of silver already starting in 1933, leading banks into financial distress and sharply reducing the price level. He also presents macroeconomic time series evidence that links the silver purchase program to deflation, exchange rate appreciation, and bank distress in China.

The evidence we present in the text is in line with this interpretation. In addition, we find that, at the macroeconomic level, credit sharply contracts in China after 1933, based on a variety of aggregate measures. Figure A.1 summarizes this evidence, showing that credit-to-GDP drops by nearly 15% between 1933 and 1935 (panel A), while aggregate credit-to-deposits and credit-to-total bank assets ratios drop by about 10% (panel B). Moreover, the credit contraction appears circumscribed to the Republic of China. There is no evidence, for instance, of a comparable credit contraction in neighboring Hong Kong. Based on data available for HSBC, at the time the largest credit institution in Hong Kong, it appears that credit provision, in fact, increased there between 1933-35 (panel C).

At the end of the day, whether or not the Silver Purchase program had an impact on the Chinese real economy remains an empirical question. We examine in our tests a specific consequence of it: the silver outflow's effect on credit provision and social stability. To the extent that silver was used to back the currency, an outflow of silver would drain banks of the necessary resources needed to support lending, thus leading to a credit crunch. Below we present a simple model, nesting the Friedman and Schwarz (1963) and Brandt and Sargent (1989) interpretations, which can be directly linked to our empirical analysis.

A.2 Impact of the Silver Purchase program on lending

We consider a simple model illustrating the impact of the Silver Purchase program on the Chinese credit market, encompassing both the Friedman and Schwartz (1963) and Friedman (1992) interpretation and the alternative interpretation of Brandt and Sargent (1989).

In 1930s China, modern banks serve two key roles: they generate the money supply, by issuing bank notes, and credit, by making loans. Consider for simplicity a bank financed entirely by bank notes, in an amount N. Under a pure silver standard, banknotes should be 100% backed by an equivalent amount of silver. In practice, the law allows the bank to issue a volume of notes larger than its silver reserves S, as long as the silver reserves ratio $\sigma = S/N$ is equal to $\bar{\sigma} = 60\%$ or greater. The remaining $(1-\sigma)N$ is "collateralized" by Treasury bonds with a total face value B. Banks convert bonds into banknotes, valuing bonds at their face value, which we normalize to 1.[32]

[32] This assumption is based on historical evidence. Cheng (2003, p. 160) reports that banks converted Treasury bonds into banknotes valuing the bonds at their face value (even when they traded below par), but usually bonds were recorded on the assets of the banks at their market values. Between 1927 and 1928, the Nationalist government also introduced legislation intended to regulate the banking sector. In particular, the registration of new financial institutions had to follow new and detailed procedures, and banks were subject to capital requirements (Chen (2003), p. 90-91). The government also created a banking supervisory authority, called Bureau of Financial Supervision, with the intention of investigating the business of all the Chinese banks. However, the authority had neither the power nor the capacity to carry out its duties. While the four largest banks played a relevant role in placing treasury bonds on the market, there was no modern central bank entrusted to set interest rates or regulate the money supply.

Suppose now that Treasury bonds can be purchased on the market at a price $p_B \leq 1$, so that the market value of the bank's reserves is $S + p_B B$.[33] Having issued bank notes for a value N, the bank has a surplus $N - S - p_B B$ that can generate loans L; simple manipulations show that $L = (1 - p_B)\frac{1-\sigma}{\sigma}S$. Thus, if government bonds trade at their face value and $p_B = 1$ (or if a 100% silver reserve is mandated), in this simplified setting the bank only generates the money supply, but not credit. This situation corresponds to the interpretation of Brandt and Sargent (1989), where shocks to the silver supply will not have any impact on lending.

The ability to make loans derives from the "arbitrage" between the face and market value of the non-silver collateral. However, to the extent that the bank's silver reserves do not cover the full amount of bank notes in circulation N, the bank is exposed to a "run." If all holders of banknotes want to convert them into silver, the bank has a silver shortage $(1 - p_B)(1 - \sigma)N$. Let π denote the probability of a run, and assume that the bank faces a quadratic cost $\frac{\gamma}{2}[(1 - p_B)(1 - \sigma)N]^2$ in the event of a run. This can be interpreted either as the bank requiring an equity injection to overcome the shortfall or as an early liquidation of the outstanding loans.

Summing up, the bank finances with an amount of notes N its investment in reserves $S + p_B B$ plus loans L, facing the expected cost of a run equal to $\pi\frac{\gamma}{2}[(1 - p_B)(1 - \sigma)N]^2$. Denoting the marginal return on loans by r_L, the bank's profit function is thus: $\Pi(\sigma, S) = r_L L + S + p_B B - N - \pi\frac{\gamma}{2}[(1 - p_B)(1 - \sigma)N]^2$. Expressing all the relevant quantities in terms of S and the reserve ratio σ, the bank's optimization problem is:

$$\max_{\sigma}(r_L - 1)(1 - p_B)\frac{1-\sigma}{\sigma}S - \pi\frac{\gamma}{2}\left[(1 - p_B)\frac{1-\sigma}{\sigma}S\right]^2. \qquad \text{(A.1)}$$

The bank's optimal reserve and lending policy is thus determined, subject to the reserves constraint $\sigma \geq \bar{\sigma} = 60\%$.

Assume, as in Khwaja and Mian (2008), a linear loan demand $r_L = \bar{r} - \alpha_L L$, which the bank takes as given (i.e. a competitive credit market). Under this assumption, solving (A.1) the bank holds a fraction of silver reserves:

$$\hat{\sigma} = \max\left\{\bar{\sigma}, \left[1 + \frac{\bar{r}-1}{S(1-p_B)(\alpha_L+\pi\gamma)}\right]^{-1}\right\}. \qquad \text{(A.2)}$$

If the reserves constraint is not binding, it will make an amount of loans equal to:

$$\hat{L} = (\alpha_L + \pi\gamma)^{-1}(\bar{r} - 1). \qquad \text{(A.3)}$$

If the reserves constraint is binding, $\hat{\sigma} = \bar{\sigma}$ and the bank makes an amount of loans:

$$\hat{L}' = (1 - p_B)\frac{1-\bar{\sigma}}{\bar{\sigma}}S. \qquad \text{(A.3')}$$

Thus, if collateral other than silver is "as good as silver" ($p_B = 1$), as assumed by Brandt and Sargent (1989), shocks to the silver supply cannot affect the credit market – they just

[33] We are using silver as the numeraire, so that p_B is in fact the market price of government bonds relative to the market price of silver.

affect the money supply. In contrast, if $p_B < 1$, shocks to the silver supply will be reflected in the credit supply as soon as the reserves constraint becomes binding.

These observations allow us to understand the impact of the Silver Purchase. Suppose that the above model is played over two dates $t = 0, 1$ (before and after the Silver Purchase). At each date the bank can lend on the credit market, and firms demand loans; assume that, prior to the Silver Purchase, the bank's reserves constraint is not binding, i.e. $S > \bar{\sigma}N$, and the credit market equilibrium is described by (A.3).

At $t = 1$, the bank's silver reserves are hit by a shock bringing them down to $S - \Delta S$, so that the bank might need to adjust its lending decisions.[34] The shock to reserves captures the attempt by banknotes holders to convert them into silver, to profit from the Silver Purchase. It is apparent from the above expressions that the silver shock will affect equilibrium loans only if the bank becomes constrained; this requires $(S - \Delta S) < \bar{\sigma}(N - \Delta S)$, i.e. $\Delta S > \frac{\bar{r}-1}{(1-\bar{\sigma})(1-p_B)(\alpha_L+\pi\gamma)}$. In that case, the change in equilibrium lending becomes:

$$\Delta\hat{L} = (1 - p_B)\frac{1-\bar{\sigma}}{\bar{\sigma}}(S - \Delta S) - \frac{\bar{r}-1}{\alpha_L+\pi\gamma}. \quad \text{(A.4)}$$

Thus, a lower pre-1933 level of silver reserves S is associated with a larger reduction in lending $\Delta\hat{L}$.

To take the above expression to the data, we follow Khwaja and Mian (2008) and Schnabl (2012) and we assume that, while each bank i lends to only one firm j, any given firm can borrow from multiple banks. Furthermore, we allow for a shock to loan demand bringing it to $\bar{r}_j + \Delta\bar{r}_j - \alpha_L L$, so that the above expression becomes:

$$\Delta L_{ij} = (1 - p_B)\frac{1-\bar{\sigma}}{\bar{\sigma}}(S_i - \Delta S) - \frac{\bar{r}_j+\Delta\bar{r}_j-1}{\alpha_L+\pi\gamma}. \quad \text{(A.5)}$$

Rewriting the above expression more compactly, we thus estimate, in section IV.A:

$$\Delta L_{ij} = \delta S_i + \eta_j + \varepsilon_{ij}, \quad \text{(A.6)}$$

i.e. regress changes in loans from bank i to firm j around the Silver Purchase program on the bank's pre-shock silver holdings S_i, including borrowing firm fixed effects η_j. As we discuss in the text, the above is equivalent to a differences-in-differences setup, where the bank's pre-Silver Purchase program silver reserves are the treatment.

[34] Equivalently, one could rewrite the model having the bank purchase additional silver on the market in order to make new loans, so that a rise in the market price of silver restricts the lending supply. This would have identical predictions on the impact of the Silver Purchase program on banks with high and low ex ante silver reserves (in this case, of course, the numeraire would necessarily be a variable other than silver, e.g. government bonds).

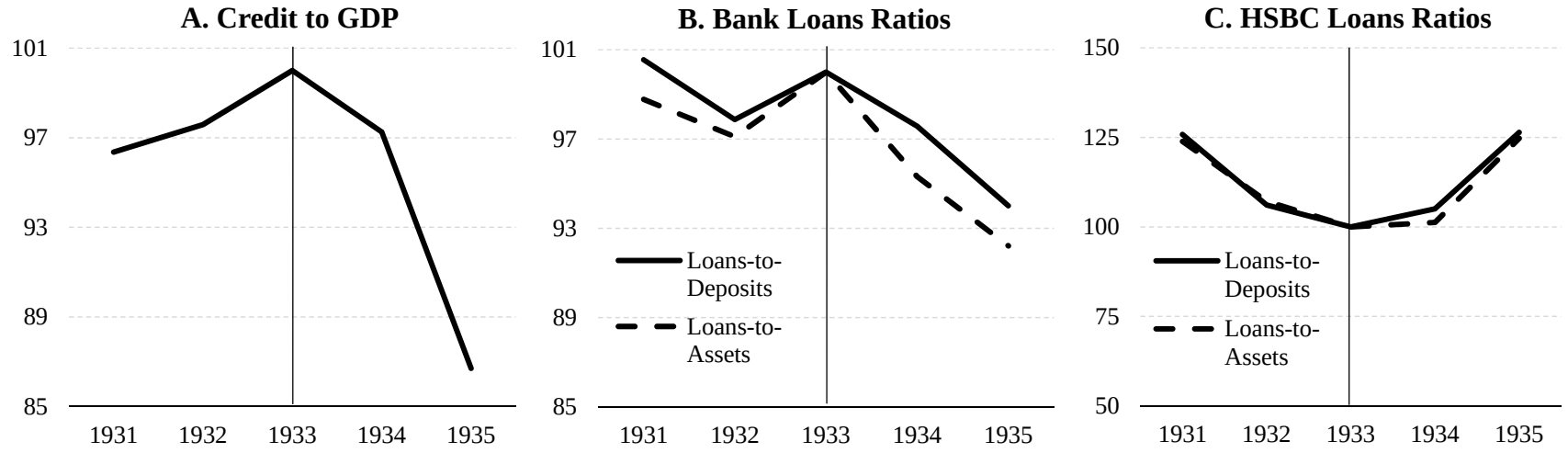


Figure A.1 Aggregate Credit in China and Hong Kong, 1931-1935

The graphs report measures of aggregate credit provision in the Republic of China and neighboring Hong Kong over the sample period. Panel A plots the total credit-to-GDP ratio for the Republic of China, rescaled so as to take the value of 100 in 1933. Total credit is the aggregate of the loans data reported on bank balance sheets, used throughout; GDP is based on manufacturing output from factories (Brandt and Sargent (1989), Table 5). Panel B plots two additional ratios, again for the Republic of China: total loans-to-deposits and total loans-to-assets. Total loans are obtained as the aggregate of the loans data reported on bank balance sheets, used throughout; and deposits and total assets data are retrieved from Cheng (2003), Appendix II. Panel C plots the same ratios, scaled in the same way, for the largest bank operating in Hong Kong, HSBC. The data of HSBC loans, deposits and assets comes from HBSC's balance sheets (HSBC historical archives, 1931-1935).

Figure A.2 Silver Flows, Foreign Banks in Shanghai (1929-1935)
The graph report the net percentage change (flow) in silver holdings of non-Chinese banks in Shanghai between 1929 and 1935. It indicates that silver holdings decline after the enactment of the Silver Purchase Program in 1933. Data on foreign banks' silver holdings are retrieved from Tamagna (1949, p. 104).

Appendix B.

Variable Definitions

Variable	Definition
Total loans	The total annual amount of outstanding loans of a bank in a given year (expressed in units of Ch$ 10 millions, in the tests in Table 3).
Loan amount	The loan amount granted by a bank to a firm (expressed in units of Ch$ 10 thousands in Tables 4, 7, and 8).
Number of unrest episodes	Number of labor unrest episodes that occur at a given plant in a given year.
Duration	Number of days of labor unrest that a given plant experiences in a given year.
Communist activities	An indicator variable that takes the value of 1 if a given firm is mentioned in the Shanghai Municipal Police files in relation to either (1) The arrest of at least one of his employees for allegedly communist activities or (2) Being targeted for penetration by a communist cell in Shanghai.
Silver	The silver reserves of a bank measured in 1931, or the earliest available date prior to 1933 (in our sample, never later than 1932).
Excess silver	The silver reserves in excess of the mandatory requirement of 60% of outstanding banknotes issued by a bank in 1931, or the earliest available date prior to 1933 (in our sample, never later than 1932).
Excess reserves (Y/N)	An indicator variable that takes the value of 1 if a bank has silver-to-notes ratio above 60% in 1931, or the earliest available date prior to 1933 (in our sample, never later than 1932), and 0 otherwise.
Traded sector	An indicator variable that takes the value of 1 if a firm belongs to one of the following sectors: Chemicals, Textile, Clothing, Food, Concrete & Glass, Leather, Machines & Metal, Paper & Printing, Transportation tools manufacture, Wood, Farming, and Other manufacture (Mano and Castillo (2015)).
Silver pool	The inverse distance-weighted average silver reserves around a given firm's plant. For each firm plant f in the sample, it is computed as: $$Silver\ pool_f = \sum_b \frac{Silver_b/d(f,b)}{\sum_b 1/d(f,b)}$$ where $Silver_b$ denotes the silver reserves of bank b as of 1931, or 1932 if not available, and $d(f,b)$ the distance between plant f and bank b (measured in km).
Excess silver pool	The inverse distance-weighted average excess silver reserves around a given firm's plant. For each firm plant f in the sample, it is computed as: $$Excess\ silver\ pool_f = \sum_b \frac{Excess\ silver_b/d(f,b)}{\sum_b 1/d(f,b)}$$

	where $Excess\ silver_b$ denotes the excess silver reserves of bank b as of 1931, or 1932 if not available, and $d(f, b)$ the distance between plant f and bank b (measured in km).
Excess reserves pool	The inverse distance-weighted average of an indicator variable taking the value of 1 if a given bank has silver-to-notes ratio above 60%, and 0 otherwise. For each firm plant f in the sample, it is computed as: $$Excess\ reserves\ pool_f = \sum_b \frac{Excess\ reserves_b / d(f,b)}{\sum_b 1/d(f,b)}$$ where $Excess\ reserves_b$ denotes the dummy variable taking the value of 1 if silver-to-notes ratio of bank b as of 1931, or 1932 if not available is above 60%, and $d(f, b)$ the distance between plant f and bank b (measured in km).
Copper pool (Loans)	The inverse distance-weighted average copper capacity of the nearest 3 copper mines around the headquarters of a given bank.
(w.a.) Copper pool (Labor unrest and Communist activities)	The inverse distance-weighted average copper capacity of the nearest 3 copper mines to a given firm's closest bank.
Bank size	Total amount of bank's equity.
Equity ratio	Bank equity divided by total assets (expressed in percentage points).
Cash ratio	Bank cash holdings divided by total assets (expressed in percentage points).
ROE	Bank net income divided by bank equity (expressed in percentage points).
No ret. earnings	An indicator variable that takes the value of 1 if a given bank has 0 retained earnings in a given year, and 0 otherwise.
No notes	An indicator variable taking the value of 1 if a given bank has not issued any bank notes, and 0 otherwise.
Relation	An indicator variable taking the value of 1 if a given bank-firm pair has relation, and 0 otherwise.
Distance	Distance, measured in kilometers, between a bank branch and a plant.
Layoff (Table C.4)	An indicator variable that takes the value of 1 if a given cotton mill laid off any employees in a certain year, and 0 otherwise.

Appendix C.

Additional Tests

This appendix contains additional results that are omitted from the main text of the paper for brevity.

Tables C.1 and C.2 report estimates corresponding to the models presented in Tables 7 and 8.B respectively, with the log-duration of labor unrest episodes as the dependent variable.

Table C.3 reports the first-stage estimates associated with the IV estimates reported in Table 8.A and 8.B.

Table C.4 reports the estimates of a regression of the change in layoffs at a given company's plant around 1933, on the availability of silver reserves. In this case, the sample is restricted to a set of cotton mills for which we were able to retrieve data on employment. The information on these cotton mills is obtained from Kraus (1980). These estimates document that firms with access to potential lenders with a smaller pool of silver reserves curb employment.

Tables C.5, C.6, C.7, and C.8 report the estimates of panel regressions with fixed effects, corresponding to the models estimated in Tables 3, 4, 5.A, and 6. In this case, the data are not collapsed and time-averaged before and after 1933, but the standard errors are clustered.

Tables C.9 and C.10 report the estimates of models identical to the ones reported in Tables 5.A and 6, excluding from the sample firms located in the Zhabei (闸北) district in Shanghai, which may be affected by Japanese interests. The estimates are very close to the ones in Tables 5.A and 6, suggesting that Japanese interference is unlikely related to our results.

Table C.1 Traded versus Non-traded Sectors: Labor Relation around 1933 – Unrest Episode Duration

The table reports the estimates of regressions following specifications (4)-(6) of Table 5.A. All specifications include the additional variables $Traded\ sector$ (an indicator equals to 1 if sectors produce tradable products) and $Traded\ sector \times Silver\ pool$. The regressions in all columns include city district, industry and firm nationality fixed effects. Following Bertrand, Duflo, and Mullainathan (2004), all regressions are estimated on changes around 1933. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the firm level.

Dependent var.	$\Delta\log(1 + Duration)$		
	(1)	(2)	(3)
Silver	-0.273		
	(0.557)		
Silver × Traded sector	-0.394		
	(0.608)		
Excess silver		-0.272	
		(0.522)	
Excess silver × Traded sector		-0.379	
		(0.566)	
Excess reserves (Y/N)			-0.598
			(1.457)
Excess reserves (Y/N) × Traded sector			-0.874
			(1.593)
District f.e.	Y	Y	Y
Industry f.e.	Y	Y	Y
Nationality f.e.	Y	Y	Y
N	1,500	1,500	1,500
R^2	0.08	0.08	0.08

Table C.2 Impact of the Liquidity Shock on Labor Relations – IV Estimation, 2nd Stage – Unrest Episode Duration

The table reports the estimates of:

$$\Delta Labor\ unrest_f = \alpha + \beta\ Silver\ pool_f + \gamma' x_f + \varepsilon_f$$

following the same specifications as in columns (4)-(6) in Table 5.A. $Silver\ pool$ is instrumented by copper availability $Copper\ pool$, defined as the inverse distance-weighted average of the natural logarithm of copper capacity in the nearest 3 copper mines to a firm's closest bank b. All columns include city district, industry, and firm nationality fixed effects. Following Bertrand, Duflo, and Mullainathan (2004), the equation is estimated on changes around 1933. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the firm level.

	Dep. variable: $\Delta\log(1 + Duration)$ (2nd stage)		
	(1)	(2)	(3)
Silver pool	-2.540		
	(1.013)		
Excess silver pool		-2.261	
		(0.908)	
Excess reserves pool			-7.756
			(3.068)
District f.e.	Y	Y	Y
Industry f.e.	Y	Y	Y
Nationality f.e.	Y	Y	Y
N	1,500	1,500	1,500
First stage F-stat	129.75	124.33	115.40

Table C.3 Credit and Political Unrest around 1933 – IV Estimation, 1st Stage
Panel A reports the first-stage estimates of Table 8.A. The first stage is specified as:

$$Silver\ reserves_b = \eta_f + \delta Copper\ pool_b + \mu' \Delta x_{bf} + \nu_{bf}$$

All specifications include a full set of borrowing firm fixed effects. The standard errors, reported in parentheses, are clustered at the bank level. Panel B reports the first stage estimates of Table 8.B and Table C.1. The first stage is specified as:

$$Silver\ pool_f = \alpha\ (w.a.)\ Copper\ pool_b + \gamma' x_f + \varepsilon_f$$

All specifications include city district, industry and firm nationality fixed effects. Specifications (1)-(3) correspond to specifications (1)-(3) of Table 8.B; specifications (4)-(6) correspond to specifications (4)-(6) of Table 8.B. The standard errors, reported in parentheses, are clustered at the firm level. All variables are time-averaged before and after 1933. All variables are defined in detail in Appendix B.

A. Dep. variable: *Silver reserves* (1st stage)			
	Silver	Excess silver	Excess reserves (Y/N)
	(1)	(2)	(3)
Copper pool	-4.872	-5.417	-1.884
	(1.526)	(2.750)	(0.448)
Control var.	Y	Y	Y
Firm f.e.	Y	Y	Y
N	229	229	229
R^2	0.71	0.38	0.69

B. Dep. variable: *Silver Pool* (1st stage)						
	Silver pool	Excess silver pool	Excess reserves pool	Silver pool	Excess silver pool	Excess reserves pool
	(1)	(2)	(3)	(4)	(5)	(6)
(w.a.) Copper pool	-0.142	-0.161	-0.045	-0.172	-0.193	-0.056
	(0.012)	(0.014)	(0.004)	(0.015)	(0.017)	(0.005)
District f.e.	Y	Y	Y	Y	Y	Y
Industry f.e.	Y	Y	Y	Y	Y	Y
Nationality f.e.	Y	Y	Y	Y	Y	Y
N	1,743	1,743	1,743	1,500	1,500	1,500
R^2	0.89	0.89	0.92	0.41	0.38	0.45

Table C.4 Shanghai Cotton Mill Operation and Silver Availability – Layoffs
The table reports the estimates of:

$$\Delta Layoff_f = \alpha + \beta\ Silver\ pool_f + \gamma' x_f + \varepsilon_f$$

The dependent variable is the change in the indicator variable that equals 1 if a cotton mill laid off workers in a given year, and 0 otherwise (average after 1933 minus average prior to 1933). The variable $Silver\ pool$ is the inverse distance-weighted average silver reserves around firm f (columns (1)-(2)), the inverse distance-weighted average of the silver amount in excess to compulsory reserves, in columns (3)-(4) ($Excess\ silver\ pool$), or the inverse distance-weighted average of the indicator variable taking the value of 1 if a given bank has silver-to-notes ratio above 60%, and 0 otherwise, in columns (5)-(6) ($Excess\ reserves\ pool$). Specifications (2), (4) and (6) include firm nationality fixed effects. Following Bertrand, Duflo, and Mullainathan (2004), the equation is estimated on changes around 1933. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the firm level.

Dep. variable: $\Delta Layoff$						
	(1)	(2)	(3)	(4)	(5)	(6)
Silver pool	-0.981	-0.976				
	(0.338)	(0.345)				
Excess silver pool			-0.728	-0.723		
			(0.234)	(0.237)		
Excess reserves pool					-3.327	-3.248
					(2.112)	(2.163)
Intercept	6.561		3.349		1.594	
	(2.261)		(1.080)		(0.975)	
Nationality f.e.	N	Y	N	Y	N	Y
N	38	38	38	38	38	38
R^2	0.08	0.09	0.09	0.09	0.04	0.04

Table C.5 Silver Reserves and Credit around 1933 – Bank-Level (No Collapsing)
The table reports replication of estimation in Table 3, without collapsing and time-averaging the data before and after 1933. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the bank level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Silver × Post	0.119	0.140	0.136				
	(0.039)	(0.028)	(0.029)				
Excess silver × Post				0.391	0.382		
				(0.079)	(0.080)		
Excess reserves (Y/N) × Post						0.131	0.134
						(0.036)	(0.037)
Control var.	N	Y	Y	Y	Y	Y	Y
Bank f.e.	Y	Y	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y	Y	Y
No notes bank × Year f.e.	N	N	Y	N	Y	N	Y
N	214	211	365	211	365	211	365
R^2	0.99	0.99	0.99	0.99	0.99	0.99	0.99

Table C.6 Silver Reserves and Credit around 1933 – Loan-Level (No Collapsing)
The table reports replication of estimation in Table 4, without collapsing and time-averaging the data before and after 1933. All columns include bank-plant pair, year and firm-year fixed effects. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the bank level.

	(1)	(2)	(3)
Silver × Post	0.159		
	(0.047)		
Excess silver × Post		0.116	
		(0.029)	
Excess reserves (Y/N) × Post			0.351
			(0.140)
Control var.	Y	Y	Y
Bank-plant pair f.e.	Y	Y	Y
Year f.e.	Y	Y	Y
Firm × Year f.e.	Y	Y	Y
N	1,077	1,077	1,077
R^2	0.84	0.84	0.84

Table C.7 Impact of the Liquidity Shock on Political Unrest – Labor Relations (No Collapsing)
The table reports the replication of estimation in Table 5.A, without collapsing and time-averaging the data before and after 1933. All columns include plant, year, district-year, firm industry-year, and firm nationality-year fixed effects. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the firm level.

Dep. variable:	$\Delta\log(1 + Number\ of\ labor\ unrest\ episodes)$			$\Delta\log(1 + Duration)$		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver pool × Post	-0.243			-0.611		
	(0.065)			(0.244)		
Excess silver pool × Post		-0.227			-0.602	
		(0.056)			(0.207)	
Excess reserves pool × Post			-0.673			-1.326
			(0.208)			(0.783)
Plant f.e.	Y	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y	Y
District × Year f.e.	Y	Y	Y	Y	Y	Y
Industry × Year f.e.	Y	Y	Y	Y	Y	Y
Nationality × Year f.e.	Y	Y	Y	Y	Y	Y
N	8,632	8,632	8,632	7,500	7,500	7,500
R^2	0.49	0.50	0.49	0.43	0.43	0.43

Table C.8 Impact of the Liquidity Shock on Political Unrest – Communist Activities (No Collapsing)

The table reports the replication of estimation in Table 6, without collapsing and time-averaging the data before and after 1933. Columns (1), (4), and (7) include plant and year fixed effects. Columns (2), (5), and (8) include plant, year, firm industry-year, and firm nationality-year fixed effects. Columns (3), (6), and (9) include plant, year, district-year, firm industry-year, and firm nationality-year fixed effects. All variables are defined in detail in Appendix B. The standard errors, reported in parentheses, are clustered at the firm level.

Dep. Variable: Δ*Communist activities*									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Silver pool × Post	-0.085			-0.083			-0.167		
	(0.049)			(0.049)			(0.132)		
Excess silver pool × Post		-0.058			-0.058			-0.109	
		(0.032)			(0.028)			(0.105)	
Excess reserves pool × Post			-0.056			-0.062			-0.061
			(0.043)			(0.034)			(0.144)
Plant f.e.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year f.e.	Y	Y	Y	Y	Y	Y	Y	Y	Y
District × Year f.e.	N	N	Y	N	N	Y	N	N	Y
Industry × Year f.e.	N	Y	Y	N	Y	Y	N	Y	Y
Nationality × Year f.e.	N	Y	Y	N	Y	Y	N	Y	Y
N	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
R^2	0.42	0.51	0.51	0.42	0.51	0.51	0.42	0.51	0.51

Table C.9 Impact of the Liquidity Shock on Political Unrest – Labor Unrest (Excluding Zhabei District)
The table reproduces the estimates of Table 5.A, excluding firms located in the Zhabei (闸北) district in Shanghai.

Dep. variable:	$\Delta\log(1 + Number\ of\ labor\ unrest\ episodes)$			$\Delta\log(1 + Duration)$		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver pool	-0.242			-0.604		
	(0.071)			(0.268)		
Excess silver pool		-0.224			-0.588	
		(0.061)			(0.226)	
Excess reserves pool			-0.627			-1.138
			(0.223)			(0.842)
District f.e.	Y	Y	Y	Y	Y	Y
Industry f.e.	Y	Y	Y	Y	Y	Y
Nationality f.e.	Y	Y	Y	Y	Y	Y
N	1,497	1,497	1,497	1,254	1,254	1,254
R^2	0.12	0.12	0.12	0.08	0.08	0.08

Table C.10 Impact of the Liquidity Shock on Political Unrest – Communist Activities (Excluding Zhabei District)
The table reproduces the estimates of Table 6, excluding firms located in the Zhabei (闸北) district in Shanghai.

Dep. Variable: Δ*Communist activities*									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Silver pool	-0.086	-0.066	-0.069						
	(0.050)	(0.036)	(0.042)						
Excess silver pool				-0.085	-0.065	-0.073			
				(0.051)	(0.032)	(0.035)			
Excess reserves pool							-0.158	-0.113	-0.074
							(0.133)	(0.116)	(0.143)
Intercept	0.557			0.370			0.065		
	(0.324)			(0.219)			(0.055)		
District f.e.	N	N	Y	N	N	Y	N	N	Y
Industry f.e.	N	Y	Y	N	Y	Y	N	Y	Y
Nationality f.e.	N	Y	Y	N	Y	Y	N	Y	Y
N	1,254	1,254	1,254	1,254	1,254	1,254	1,254	1,254	1,254
R^2	0.00	0.26	0.27	0.01	0.26	0.27	0.00	0.26	0.26

Appendix D.

Data on Loans, Labor Unrest Episodes, and Underground Communist Activities

This Appendix presents excerpts from our primary sources of data:

- Loan contracts (Figure D.1);
- Survey data on labor unrest episodes (Figure D.2);
- SMP files on underground communist activities in Shanghai (Figure D.3).

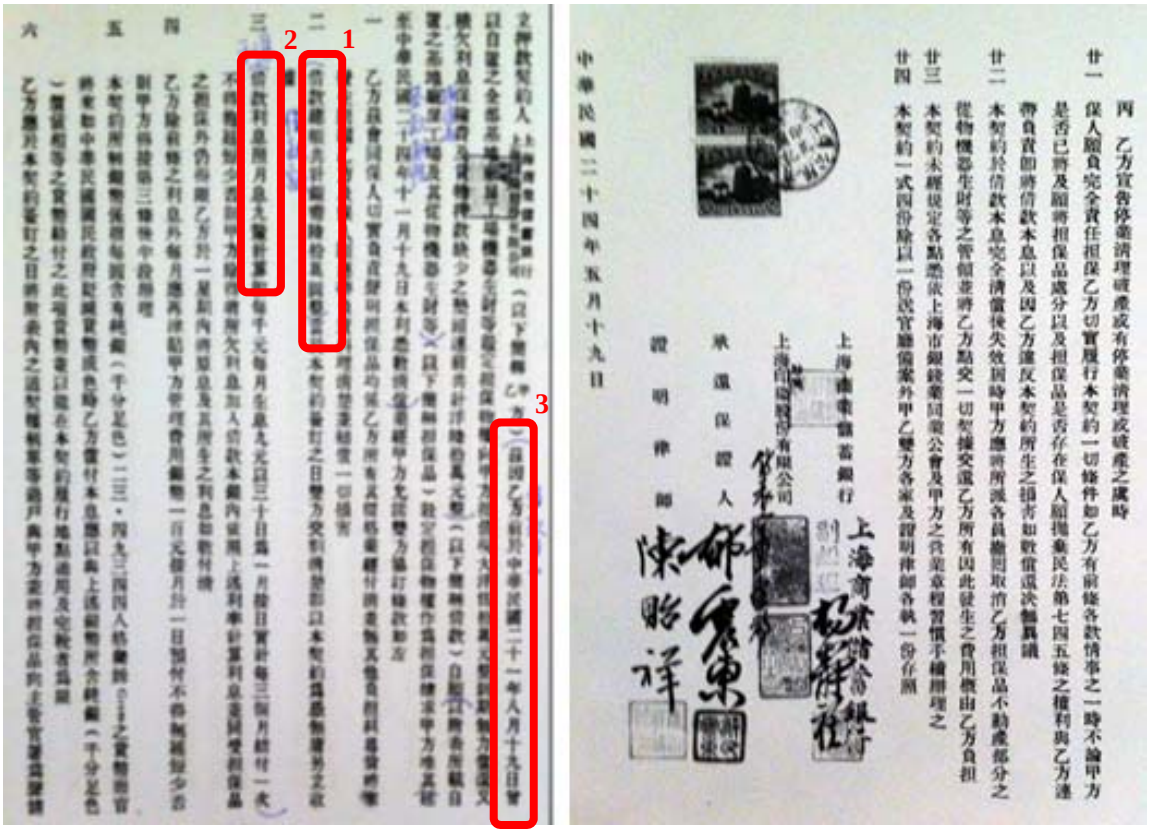


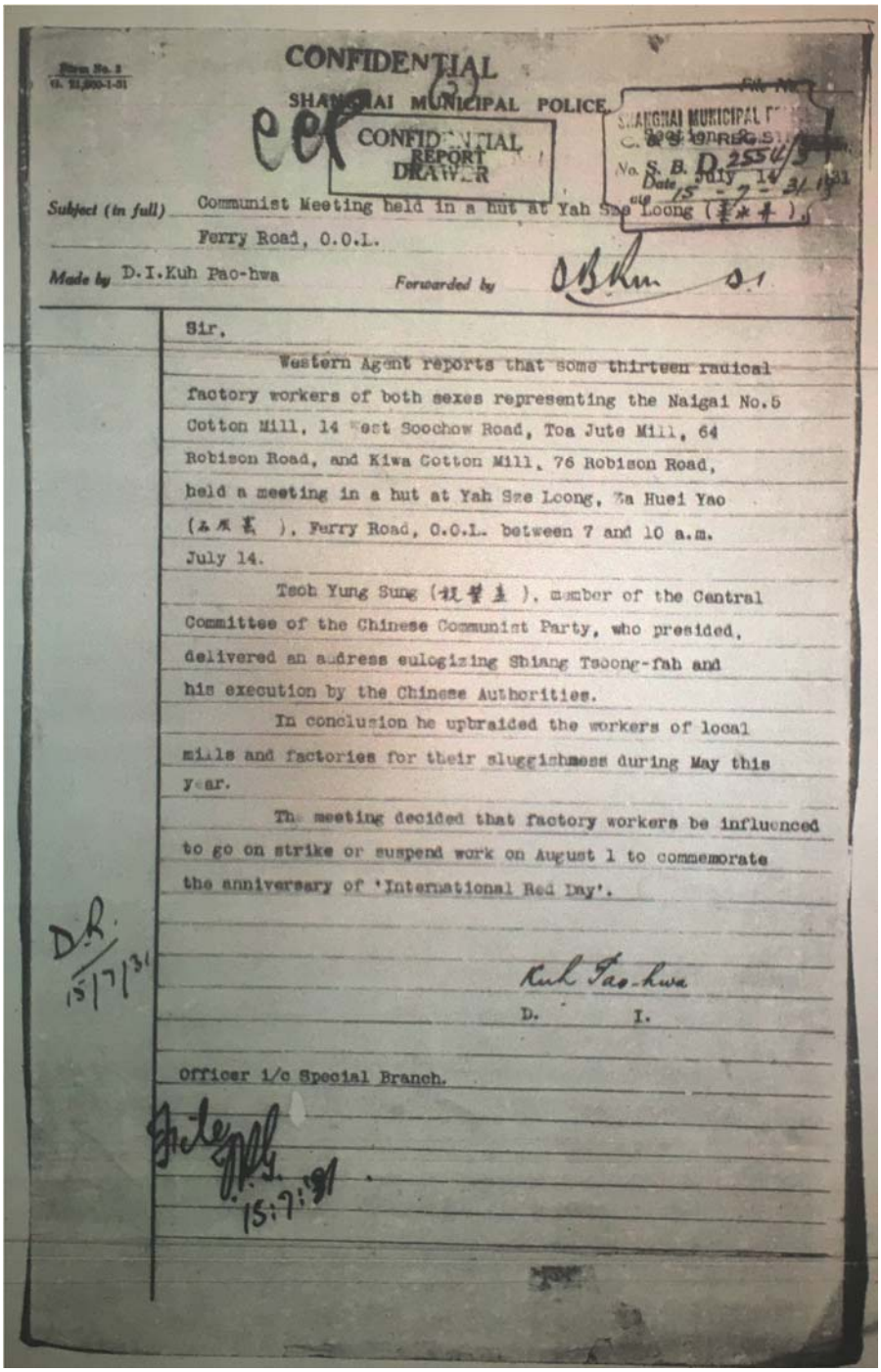
Figure D.1 Sample loan contract – excerpt

The figure shows the first and last pages of one of the loan contracts in the sample. The loan is made by Shanghai Commercial and Savings Bank to Shanghai Print and Dye Co. (上海印染股份有限公司). The page on the left reports the loan amount (600,000 Chinese dollars, red circle 1.), the interest rate (0.9% on a monthly basis, red circle 2.), and the date of the contract (19 August 1932, red circle 3.). The page on the right reports the signatures of the loan officer, a firm representative, a guarantor, and the notary on the loan.

年 月	案件號數	案由	業務分類	資方國籍	關係廠數	關係工數	糾紛日數	調處者	結果
	927	華商公共汽車公司開除聚衆鬧滑之工友 AII3a	汽车 C I V	中	1	男 1	1月9日至 1月14日止 計5日	社會局	准予開除 C
	928	永安紡織公司第二廠開除有意作弊之工友 AII3a	紡織 B III 10	中	1	男 1 女 1	1月12日至 2月20日止 計40日	勞資調解委員會	女工一名准記過一次復工男工一名准予開除 B
	929	三星棉鐵工廠開除工作怠惰之工友 AII3a	棉織 B III 10	中	1	男 1	1月12日至 1月28日止 計17日	社會局	准記大過兩次復工 B
	930	[illegible]工作怠惰之工友 AII3a	絲織 B III 10	中	1	男 4	1月13日至 1月22日止 計10日	同上	該職工等自行辭退 C
	931	華商公共汽車公司工會要求新工人[illegible]契約 AII3a	汽车 C I V	中	1	男 2	1月13日至 1月 6日止 計14日	同上	准予訂立雇用契約工會不得干涉 C
	932	商務印書館四工會要求開放門戶 AII3b	印刷 B III 14	中	1	男 2,500 女 450	1月14日至 1月17日止 計4日	勞資調解委員會	[illegible] B
	933	裕茂鋸木廠開除工作不良之工友 AII3a	鋸木 B III 1	中	1	男 2	1月14日至 2月9日止 計27日	社會局	其中一名准由資方[illegible]四十元解雇一名准由資方設法安插 B
	934	商務印書館四工會反對工作新標準 AII5b	印刷 B III 14	中	1	男 2,500 女 450	1月15日至 1月21日止 計7日	勞資調解委員會	[illegible] B

Figure D.2 Shanghai survey of labor unrest episodes – excerpt

The figure shows an excerpt from the survey *Industrial Disputes in Shanghai since 1928* (近五年来上海之劳资纠纷), conducted by the Bureau of Social Affairs of the city government of greater Shanghai between 1931 and 1932, and used in the analysis. Each row in the table refers to an individual labor unrest episode. The table's columns report the episode's date (col. 1), the id of the case (col. 2), the motivation for the episode (col. 3), the industry of the affected company (col. 4) and its nationality (col. 5), the number of factories involved in the episode (col. 6), the number of workers involved in the episode (col. 7), the duration of the episode (col. 8), the office handling the episode (col. 9), and its final outcome (col. 10).



CONFIDENTIAL

SHANGHAI MUNICIPAL POLICE.

CONFIDENTIAL REPORT DRAWER

SHANGHAI MUNICIPAL POLICE C.I.D. REGISTRY No. S. B. D. 2554/31 Date July 14 31

Subject (in full) Communist Meeting held in a hut at Yah Sze Loong (亞斯龍), Ferry Road, O.O.L.

Made by D.I.Kuh Pao-hwa Forwarded by

Sir,

Western Agent reports that some thirteen radical factory workers of both sexes representing the Naigai No.5 Cotton Mill, 14 West Soochow Road, Toa Jute Mill, 64 Robison Road, and Kiwa Cotton Mill, 76 Robison Road, held a meeting in a hut at Yah Sze Loong, Ta Huei Yao (大會堯), Ferry Road, O.O.L. between 7 and 10 a.m. July 14.

Tsoh Yung Sung (祖榮生), member of the Central Committee of the Chinese Communist Party, who presided, delivered an address eulogizing Shiang Tsoong-fah and his execution by the Chinese Authorities.

In conclusion he upbraided the workers of local mills and factories for their sluggishness during May this year.

The meeting decided that factory workers be influenced to go on strike or suspend work on August 1 to commemorate the anniversary of 'International Red Day'.

Kuh Pao-hwa

D. I.

Officer i/c Special Branch.

D.R. 15/7/31

15.7.31

Figure D.3 Shanghai Municipal Police records – excerpt

The figure shows an excerpt from the Shanghai Municipal Police records used in the analysis, reporting the findings of an agent infiltrated in the underground Communist Party. The excerpt, dated 15 July 1931, summarizes the meeting of a party cell. At the meeting, cell members were instructed to "go on strike or suspend work on August 1 to commemorate the anniversary of 'International Red Day.'"