Appendices to

"Credit and Social Unrest: Evidence from 1930s China"

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 value of China's major exports such as silk and tea was down by 65% in 1935 (Yu, 1937, pp. 224-225).

Rawski (1989, 1993) disputes Friedman's findings and asserts that the silver outflow had a negligible impact on the Chinese money supply. Moreover, the Chinese economy already experienced deflation from 1931, and in 1935 the price level rose.

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 banks could exploit the "arbitrage opportunity" provided by higher silver prices and sell 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 partly 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 linking 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 contracted in China after 1933, based on a variety of aggregate measures. Fig. 1 summarizes this evidence, showing that credit-to-GDP dropped by nearly 15% between 1933 and 1935 (panel A), while aggregate credit-to-deposits and credit-to-total bank assets ratios dropped 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.

Before 1935, the Chinese government imposed high export duties on silver, with the aim of curbing profits on silver exports. Official Chinese customs data show that the silver outflow was close to zero during 1935. However, smuggling made this regulation ineffective: estimated silver smuggling amounts between 1934 and 1936 were roughly 250 million Chinese silver dollars. Towards the end of 1935, at the end of our sample period, the Chinese government became 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).

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 unrest. To the extent that silver was used to back the currency issuance, an outflow of silver and/or an increase in its market price 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. The model formalizes the intuitive explanation provided in Section 2.2 and Table I.

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 as well as the alternative interpretation of Brandt and Sargent (1989). The model is as a variation of the liquidity risk model presented by Freixas and Rochet (2008, pp. 274-275) and derives the bank's optimal choice of silver reserves ratio and loans given quantity of silver that the bank possesses.

In 1930s China, modern banks served two roles: they generated paper money, by issuing banknotes, and credit, by making loans. Consider for simplicity a bank financed entirely by issuing banknotes, in an amount N. The bank can convert banknotes into raw silver only at the official parity established by the law and unresponsive to market prices. For simpler notation we set the silver/banknotes parity, as well as the price of silver, to 1.[1] Under a "pure" silver standard, banknotes should be 100% backed by an equivalent amount of silver. In practice, the law allowed the bank to issue a volume of banknotes larger than its silver reserves S, as long as the silver reserves ratio $\sigma = S/N$ is greater or equal than $\bar{\sigma} = 60\%$. The remaining $(1 - \sigma)N$ banknotes are "collateralized" by Treasury bonds with a total face value B. Two aspects of the regulation are important for our mechanism. First, the bank must record its silver reserves on the assets side of the balance sheet at the official silver/banknotes parity. Second, the bank's holdings of Treasury bonds are recorded on assets side of its balance sheet at their market value. In other words, the regulation allows

[1] All dollar quantities in the model are expressed in units of Chinese dollars.

the bank to rely on Treasury face values on the liabilities side (where they are "converted" into banknotes) and on market values on the assets side.[2]

This allows the bank to generate lending capacity. To see this, suppose that Treasury bonds can be purchased on the market at a price $p_B \leq 1$, so that the value of the bank's reserves is $S + p_B B$.[3] Having issued bank notes for a value N, the bank has a surplus:

$$L = N - S - p_B B \tag{A.1}$$

that can generate loans L.[4] Simple manipulations show that:

$$L = (1 - p_B)\frac{1-\sigma}{\sigma}S \tag{A.2}$$

Thus, if Treasury 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 paper money, but not credit (i.e. L equals 0). This situation corresponds to the interpretation of Brandt and Sargent (1989), where shocks to the silver supply have no impact on lending. If

[2] 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. The market prices of Chinese Treasury bonds were generally around 40% of their face value (Cheng (2003, p. 117), Ho and Li (2008, Fig. A1)).

[3] 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.

[4] Implicitly, we assume that the return on loans is always large enough, compared to other investment opportunities, that the bank is willing to make loans.

Treasury bonds trade below 1, the bank has the ability to make loans deriving from the "arbitrage" between the face and market value of the non-silver collateral.

To the extent that the bank's silver reserves do not cover the full amount of banknotes in circulation N, the bank is exposed to a "run." If every holder of banknotes wants to convert them into silver, the bank has a silver shortage equal to the amount of its outstanding loans $(1-p_B)\frac{1-\sigma}{\sigma}S$. Let π denote the probability of a run, and assume that the bank faces a quadratic cost:

$$\frac{\gamma}{2}\left[(1-p_B)\frac{1-\sigma}{\sigma}S\right]^2 \qquad \text{(A.3)}$$

in the event of a run, with $\gamma > 0$. The cost 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 banknotes N its investment in reserves $S + p_B B$ plus loans L, facing the expected cost of a run equal to $\pi\frac{\gamma}{2}\left[(1-p_B)\frac{1-\sigma}{\sigma}S\right]^2$. Denoting the marginal return on loans by r_L, the bank's profit function is thus:

$$\Pi(\sigma) = r_L L + (1-p_B)B - \pi\frac{\gamma}{2}\left[(1-p_B)\frac{1-\sigma}{\sigma}S\right]^2. \qquad \text{(A.4)}$$

The revenues of the bank are the returns on loans and the returns on the bonds backing the banknotes.[5] The costs consist of the quadratic cost of an expected run. Expressing all the relevant quantities in terms of S and the reserve ratio σ, the bank's optimization problem is:

[5] We assume that bonds are paid at par at the end of the period and their return is hence $1-p_B$.

$$\max_{\sigma}(r_L - 1)(1 - p_B)\frac{1-\sigma}{\sigma}S - \pi\frac{\gamma}{2}\left[(1 - p_B)\frac{1-\sigma}{\sigma}S\right]^2. \qquad \text{(A.5)}$$

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

Assume a linear loan demand:

$$r_L = \bar{r} - \alpha_L L, \qquad \text{(A.6)}$$

which the bank takes as given (i.e. a competitive credit market). Under this assumption, the first-order conditions of Eq. (A.5) with respect to σ results in the bank holding a silver reserves ratio:

$$\hat{\sigma} = \max\left\{\bar{\sigma}, \frac{S(\alpha+\pi\gamma)(1-p_B)}{\bar{r}+S(\alpha+\pi\gamma)(1-p_B)+1}\right\}. \qquad \text{(A.7)}$$

Eq. (A.7) implies that for banks with reserves ratio above the 60% threshold ("unconstrained" banks) there is a positive relationship between total silver (S) and their optimal silver reserves ratio ($\hat{\sigma}$). In particular, if the amount of silver declines, the silver reserve ratio also declines to absorb the outflow, leading to no change in lending.

Indeed, if the reserves constraint is not binding, the bank makes an amount of loans equal to:

$$\hat{L} = \frac{\bar{r}+1}{\alpha_L+\pi\gamma} \qquad \text{(A.8)}$$

In other words: If the bank chooses a silver reserves ratio above the 60% minimum requirement, the amount of loans granted does not depend on the amount of total silver backing banknotes. In contrast, if the reserves constraint is binding ($\hat{\sigma} = \bar{\sigma}$), the bank makes an amount of loans equal to:

$$\hat{L}' = (1 - p_B)\frac{1-\bar{\sigma}}{\bar{\sigma}}S. \qquad \text{(A.8')}$$

In this case, the loans depend on the bank's silver holdings S. Eq. (A.8') implies that 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 affect the money supply. On the other hand, if $p_B < 1$ shocks to the silver supply are reflected in the credit supply as soon as the reserves constraint becomes binding: that is, an outflow of silver reduces the amount of loans.

These observations allow us to understand the impact of the Silver Purchase. Suppose now 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 therefore the amount of loans provided is described by Eq. (A.8).

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.[6] 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 $(S - \Delta S) < \bar{\sigma}(N - \Delta S)$. If the bank has silver reserves ratio σ above the 60% minimum level, the excess reserves can be used to meet the silver outflow; thus, as implied by Eq. (A.7) and Eq. (A.8), the equilibrium loans remain constant. In contrast, if the silver reserves reach the 60% minimum level, the change in equilibrium lending becomes:

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[6] Equivalently, one could rewrite the model having the bank purchase additional silver on the market to make new loans, so that a rise in the market price of silver restricts the lending supply. This would have similar predictions on the impact of the Silver Purchase program on banks with high and low ex ante silver reserves.

$$\Delta\hat{L} = (1 - p_B)\frac{1-\bar{\sigma}}{\bar{\sigma}}(S - \Delta S) - \frac{\bar{r}+1}{\alpha_L+\pi\gamma}. \quad \text{(A.9)}$$

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:

$$\Delta L_{ij} = (1 - p_B)\frac{1-\bar{\sigma}}{\bar{\sigma}}(S_i - \Delta S) - \frac{\bar{r}_j+\Delta\bar{r}_j+1}{\alpha_L+\pi\gamma}. \quad \text{(A.10)}$$

Rewriting the above expression more compactly, we thus estimate, in Section 4:

$$\Delta L_{ij} = \delta S_i + \eta_j + \varepsilon_{ij}, \quad \text{(A.11)}$$

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.

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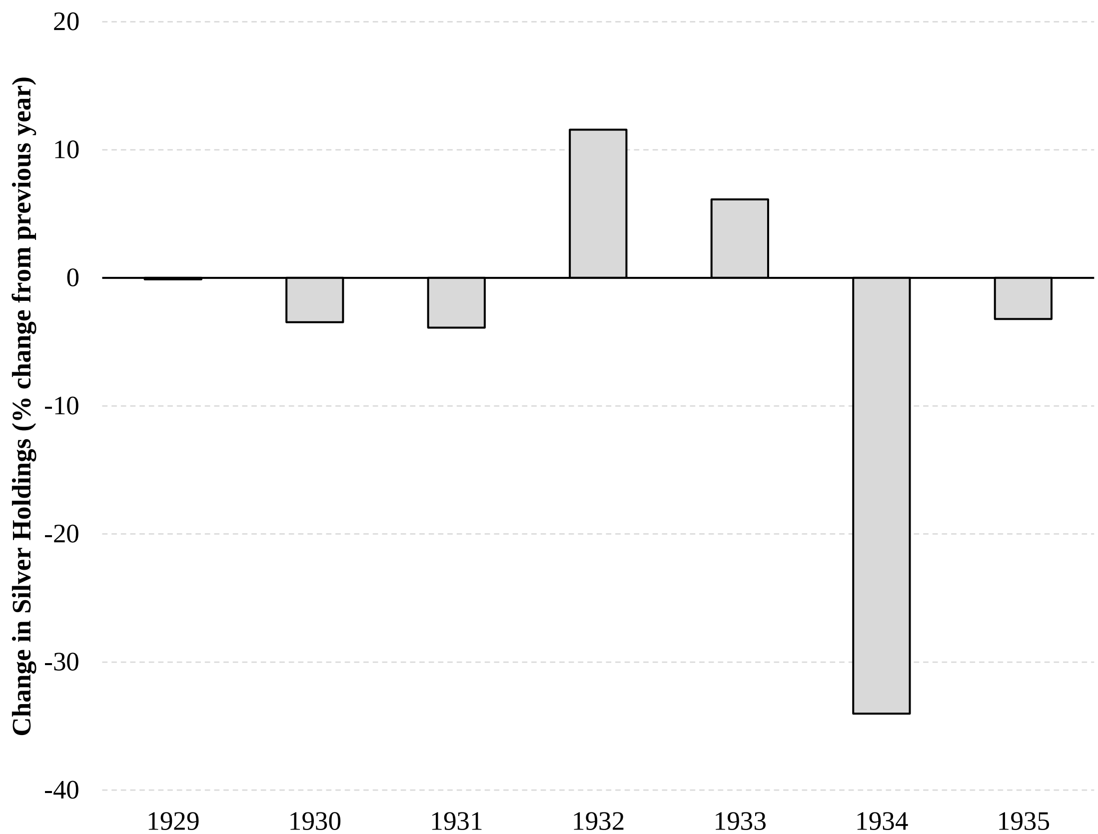


Fig. A.1. Silver flows, foreign banks in Shanghai (1929-1935). The graph reports the net percentage change (flow) in silver holdings of non-Chinese banks in Shanghai between 1929 and 1935. It indicates that silver holdings decline after the enactment of the Silver Purchase Program in 1933. Data on foreign 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 4 and 9).
Loan amount	The loan amount granted by a bank to a firm (expressed in units of Ch$ 10 thousands in Tables 5, and 8).
Number of unrest episodes	Number of labor unrest episodes that occur at a given plant in a given year.
Communist activities	Number of times 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 one if a bank has silver-to-notes ratio in excess of the 60% threshold in 1931, or the earliest available date prior to 1933 (in our sample, never later than 1932), and zero otherwise. To attenuate the potential effect of noise in the reserves data, we apply a 1% margin (i.e. the indicator equals one for reserves of at least 60.06%).

Traded sector	An indicator variable that takes the value of one if a firm belongs to one of the following sectors: Mining, 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 (Y/N) pool	The inverse distance-weighted average of an indicator variable taking the value of one if a given bank has silver-to-notes ratio above 60%, and zero otherwise. For each firm plant f in the sample, it is computed as: $$Excess\ reserves\ (Y/N)\ pool_f = \sum_b \frac{Excess\ reserves\ (Y/N)_b/d(f,b)}{\sum_b 1/d(f,b)}$$

	where $Excess\ reserves\ (Y/N)_b$ denotes the dummy variable taking the value of one 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).
Bank size	Total amount of bank's equity.
Equity to assets ratio	Bank equity divided by total assets (expressed in percentage points).
Cash to assets ratio	Bank cash holdings divided by total assets (expressed in percentage points).
ROE	Bank net income divided by bank equity (expressed in percentage points).
Deposits to assets ratio	Bank deposits divided by total assets (expressed in percentage points).
No banknotes	An indicator variable taking the value of one if a given bank has not issued any bank notes, and zero otherwise.
Distance	Distance, measured in kilometers, between a bank branch and a plant.
Operation	An indicator variable that takes the value of one if a given cotton mill lays off any employees in a given year (Table 10.A), reduces electricity consumption (Table 10.B), or cuts down production (Table 10.C), and zero otherwise.

Appendix C.

Additional Tests

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

Table C.1 reports the representativeness of the loan-level data.

Table C.2 reports estimates corresponding to the models presented in Table 4 and Table 5, including the interaction between the Big indicator (equal to one for banks in the top quartile of size distribution in 1931) and $Post$.

Tables C.3 and C.4 report estimates corresponding to the models presented in Table 4 and Table 5, including deposits to assets ratio and deposits growth as additional controls.

Table C.5 reports the probability of a lending relationship between a bank and a firm as a function of the distance between the firm and the closest branch of the bank.

Tables C.6 and C.7 report the estimates of models identical to the ones reported in Tables 6.B and 7, excluding from the sample firms located in the Zhabei (闸北), Hongkou (虹口), Yangpu (杨浦), and Baoshan (宝山) districts in Shanghai, which suffered collateral damage during the 1932 "Shanghai incident". The estimates are very close to the ones in Tables 6.B and 7, suggesting that Japanese interference is unlikely related to our results.

Table C.8 summarizes the estimates of the main tests reported in the paper, estimated by collapsing the data to pre- and post-1933 bank, bank-firm, or firm averages in the spirit of Bertrand, Duflo, and Mullainathan (2004).

Table C.9 reports estimates on the impact of Silver Purchase shock on the duration of labor unrest episodes. It follows the same specification of Table 6.B.

Table C.1

Representativeness of the loan-level data. Panel A compares the universe of Chinese banks (columns (1)-(3)) and lenders in the loan-level sample (columns (4)-(6)). Column (7) reports a t-test between the two groups. Panel B reports tests comparing the distribution of banks' market shares and their corresponding loan-sample lending shares. It reports the Pearson χ^2 and Kolmogorov-Smirnov tests for equality of the distributions, as well as the Spearman rank test for the correlation between the market shares and loan-sample shares. Panel C reports the aggregated credit allocation across industries among Chinese banks and the distribution of firm industries in the loan sample. We proxy for the aggregate credit distribution across industries by the loan shares to each industry on the annual reports of the Kincheng Banking Group (1934, 1935), and Bank of China (1932-1934), averaging the loan proportions across time for each bank, and grouping some industries to ensure the two sets of industries are homogeneous (these sources report the share of total credit for 12 industries only). Panel C reports in column (1) the weighted average of Kincheng and Bank of China industry loans, with weights proportional to the number of banks of similar size as Kincheng and Bank of China in the Chinese banks universe. We then compute the percentage of firms in each industry from the loan sample and report it in column (2). Panel D tests for the difference between the two distributions, and reports the Pearson χ^2, Spearman's rank correlation, and Kolmogorov-Smirnov tests.

Table C.1; continued

A. Bank characteristics

	Banks in balance sheets sample			**Banks in loan sample**			**t-test**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean	**Median**	**(St. Dev.)**	**Mean**	**Median**	**(St. Dev.)**	**t((1),(4))**
Bank size	0.462	0.200	(0.097)	0.724	0.465	(0.153)	3.190
Equity to assets ratio	18.487	15.082	(2.070)	14.121	12.220	(1.715)	2.197
Cash to assets ratio	6.956	4.838	(1.406)	8.533	5.825	(2.364)	1.363
ROE	9.094	7.592	(0.908)	8.781	7.576	(1.105)	0.378
Deposits to assets ratio	60.663	60.685	(2.324)	65.218	62.035	(3.053)	2.188

B. Tests on bank market shares

Pearson χ^2 test		**Spearman rank test**		**K-S test**	
(1)	(2)	(3)	(4)	(5)	(6)
χ^2	95% critical value	rho	p-value	D	p-value
19.60	35.17	0.74	0.000	0.25	0.449

Table C.1; continued

C. Distribution by firm industry

Industry	**Aggregated credit share (%)**	**Firm industry share (%)**
	(1)	(2)
Textiles	34.18	23.39
Food	11.16	6.43
Paper products	0.11	1.17
Machinery	0.22	1.17
Glass products	0.52	1.75
Construction	0.06	0.58
Chemistry	1.38	4.68
Other	1.35	1.17
Transportation and Power & Utilities	31.76	51.46
Mining	19.27	8.19
Total	100	100

D. Tests on credit distribution by industry

Pearson χ^2 test		**Spearman rank test**		**K-S test**	
(1)	(2)	(3)	(4)	(5)	(6)
χ^2	95% critical value	rho	p-value	D	p-value
4.00	16.92	0.95	0.000	0.40	0.418

Table C.2
Silver reserves and credit around 1933. The table reproduces the estimates of columns (4), (6), and (8) of Table 4 in columns (1)-(3), additionally controlling for the interaction between the Big indicator (equal to one for banks in the top quartile of size distribution in 1931) and $Post$. Columns (4)-(6) report the estimates of columns (3)-(5) in Table 5, controlling for the interaction between the Big indicator and $Post$.

	Bank Level			**Loan Level**		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver × Post	0.107*			0.150**		
	(0.064)			(0.063)		
Excess silver × Post		0.379***			0.094**	
		(0.096)			(0.040)	
Excess reserves (Y/N) × Post			0.133***			0.128
			(0.044)			(0.183)
Big × Post	0.005	0.022	-0.017	0.131	0.260*	0.381**
	(0.049)	(0.038)	(0.035)	(0.146)	(0.134)	(0.168)
Controls	Y	Y	Y	Y	Y	Y
Bank f.e.	Y	Y	Y	N	N	N
Firm × Bank f.e.	N	N	N	Y	Y	Y
Firm × Year f.e.	N	N	N	Y	Y	Y
N	400	400	400	1,145	1,145	1,145
R^2	0.99	0.99	0.99	0.84	0.84	0.84

Table C.3
Silver reserves and credit around 1933 – bank-level. The table reports the estimates of specifications analogous to columns (3)-(8) of Table 4, with additional control variables: deposits-to-assets ratio (panel A) or deposits-to-assets growth rate (panel B).

A. Additional control variable: Deposits to assets ratio

	(1)	(2)	(3)	(4)	(5)	(6)
Silver × Post	0.138***	0.115***				
	(0.038)	(0.040)				
Excess silver × Post			0.459***	0.421***		
			(0.045)	(0.053)		
Excess reserves (Y/N) × Post					0.136***	0.124***
					(0.037)	(0.036)
Deposits to assets ratio	0.006***	0.003***	0.006***	0.003***	0.006***	0.003***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Controls	Y	Y	Y	Y	Y	Y
Bank f.e.	Y	Y	Y	Y	Y	Y
N	230	400	230	400	230	400
R^2	0.99	0.99	0.99	0.99	0.99	0.99

B. Additional control variable: ΔDeposits to assets ratio

	(1)	(2)	(3)	(4)	(5)	(6)
Silver × Post	0.113**	0.097**				
	(0.042)	(0.045)				
Excess silver × Post			0.379***	0.349***		
			(0.090)	(0.097)		
Excess reserves (Y/N) × Post					0.099***	0.093***
					(0.033)	(0.034)
ΔDeposits to assets ratio	0.065	0.009	0.071	0.010	0.042	0.000
	(0.061)	(0.032)	(0.062)	(0.032)	(0.063)	(0.032)
Controls	Y	Y	Y	Y	Y	Y
Bank f.e.	Y	Y	Y	Y	Y	Y
N	176	310	176	310	176	310
R^2	0.99	0.99	0.99	0.99	0.99	0.99

Table C.4

Silver reserves and credit around 1933 – loan-level. The table reports the estimates of specifications analogous to columns (3)-(8) of Table 5, with additional control variables: deposits-to-assets ratio (panel A) or deposits-to-assets growth rate (panel B).

A. Additional control variable: Deposits to assets ratio

	FE			OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver × Post	0.181***			0.113**		
	(0.049)			(0.043)		
Excess silver × Post		0.119***			0.086***	
		(0.039)			(0.018)	
Excess reserves (Y/N) × Post			0.311**			0.275**
			(0.120)			(0.114)
Deposits to assets ratio	-0.003	-0.003	-0.002	0.000	0.001	0.002
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)
Controls	Y	Y	Y	Y	Y	Y
Firm × Bank f.e.	Y	Y	Y	Y	Y	Y
Firm × Year f.e.	Y	Y	Y	N	N	N
N	1,145	1,145	1,145	1,530	1,530	1,530
R^2	0.84	0.84	0.84	0.16	0.16	0.16

B. Additional control variable: ΔDeposits to assets ratio

	FE			OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Silver × Post	0.174***			0.142***		
	(0.052)			(0.048)		
Excess silver × Post		0.116**			0.096***	
		(0.041)			(0.023)	
Excess reserves (Y/N) × Post			0.297**			0.238*
			(0.127)			(0.126)
ΔDeposits to assets ratio	0.392	0.324	0.401	0.590	0.447*	0.554
	(0.258)	(0.430)	(0.363)	(0.372)	(0.247)	(0.353)
Controls	Y	Y	Y	Y	Y	Y
Firm × Bank f.e.	Y	Y	Y	Y	Y	Y
Firm × Year f.e.	Y	Y	Y	N	N	N
N	912	912	912	1,220	1,220	1,220
R^2	0.85	0.85	0.84	0.22	0.22	0.21

Table C.5

Lending relationships and distance. The table reports the estimates of:

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

The dependent variable $Relation$ is an indicator variable taking the value of one if a given bank-firm pair has a lending relationship, and zero otherwise. The variable $Distance$ is the natural logarithm of the distance (measured in km) between a given bank-firm pair, measured as the distance between the firm and the closest branch of the bank. The specification in column (2) includes city fixed effects. All variables are defined in detail in Appendix B. Standard errors reported in the parentheses are clustered by firm. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

	(1)	(2)
log-Distance	-0.025**	-0.021**
	(0.010)	(0.009)
City f.e.	N	Y
N	1,899	1,899
R^2	0.01	0.01

Table C.6
Impact of the liquidity shock on social unrest – labor unrest (excluding districts affected by 1932 Shanghai Incident).

The table reproduces the estimates in Table 6.B, excluding firms located in the Zhabei (闸北) district in Shanghai (columns (1)-(3)), or firms located in the Zhabei (闸北), Hongkou (虹口), Yangpu (杨浦), and Baoshan (宝山) districts in Shanghai (columns (4)-(6)).

	(1)	(2)	(3)	(4)	(5)	(6)
Silver pool × Post	-0.239***			-0.238***		
	(0.057)			(0.059)		
Excess silver pool × Post		-0.221***			-0.220***	
		(0.048)			(0.051)	
Excess reserves pool × Post			-0.621***			-0.586***
			(0.195)			(0.201)
Year f.e.	Y	Y	Y	Y	Y	Y
Plant 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	7,402	7,402	7,402	5,482	5,482	5,482
R^2	0.12	0.12	0.12	0.15	0.15	0.15

Table C.7

Impact of the liquidity shock on social unrest – communist activities (excluding districts affected by 1932 Shanghai Incident). Panel A reproduces the estimates of Table 7, excluding firms located in the Zhabei (闸北) district in Shanghai. Panel B reproduces the estimates of Table 7, excluding firms located in the Zhabei (闸北), Hongkou (虹口), Yangpu (杨浦), and Baosan (宝山) districts in Shanghai.

A. Excluding firms in Zhabei district

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Silver pool × Post	-0.084***	-0.074***	-0.072***						
	(0.024)	(0.022)	(0.026)						
Excess silver pool × Post				-0.079***	-0.067***	-0.074***			
				(0.022)	(0.019)	(0.022)			
Excess reserves pool × Post							-0.128	-0.124*	-0.069
							(0.085)	(0.072)	(0.097)
Year f.e.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Plant 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.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nationality × Year f.e.	N	Y	Y	N	Y	Y	N	Y	Y
N	6,270	6,270	6,270	6,270	6,270	6,270	6,270	6,270	6,270
R^2	0.09	0.19	0.19	0.09	0.19	0.19	0.08	0.19	0.19

Table C.7; continued

B. Excluding firms in Zhabei, Hongkou, Yangpu, and Baoshan districts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Silver pool × Post	-0.075***	-0.062**	-0.061**						
	(0.025)	(0.024)	(0.028)						
Excess silver pool × Post				-0.077***	-0.061***	-0.062***			
				(0.022)	(0.021)	(0.023)			
Excess reserves pool × Post							-0.107	-0.091	-0.054
							(0.084)	(0.073)	(0.101)
Year f.e.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Plant 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.	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nationality × Year f.e.	N	Y	Y	N	Y	Y	N	Y	Y
N	4,350	4,350	4,350	4,350	4,350	4,350	4,350	4,350	4,350
R^2	0.08	0.24	0.24	0.08	0.24	0.24	0.08	0.24	0.24

Table C.8

Collapsed form results. The table reproduces the estimates of Tables 4, 5, 6, and 7 in panel A, B, C, and D, respectively. Following Bertrand, Duflo, and Mullainathan (2004), the equations are 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. Standard errors reported in the parentheses are clustered by bank in panel A, and firm in panel B. In panel C and D, we report Conley (1999) spatially-adjusted standard errors, allowing for spatial correlation within a 2.5 km radius. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively.

Table C.8; continued

A. Silver reserve and credit around 1933 – Bank – level

	(1)	(2)	(3)	(4)	(5)	(6)
Silver	0.116**	0.105**				
	(0.046)	(0.046)				
Excess silver			0.385***	0.376***		
			(0.107)	(0.096)		
Excess reserves (Y/N)					0.128***	0.121***
					(0.040)	(0.040)
Controls	Y	Y	Y	Y	Y	Y
Bank f.e.	Y	Y	Y	Y	Y	Y
N	46	80	46	80	46	80
R^2	0.35	0.35	0.36	0.37	0.43	0.41

B. Silver reserve and credit around 1933 – Loan – level

	(1)	(2)	(3)	(4)	(5)	(6)
Silver	0.106*			0.191***		
	(0.061)			(0.060)		
Excess silver		0.080***			0.108**	
		(0.023)			(0.042)	
Excess reserves (Y/N)			0.318**			0.329**
			(0.131)			(0.140)
Controls	Y	Y	Y	Y	Y	Y
Firm f.e.	N	N	N	Y	Y	Y
N	306	306	306	229	229	229
R^2	0.02	0.03	0.02	0.84	0.84	0.83

Table C.8; continued

C. Impact of the liquidity shock on social unrest – Labor relations

	Existing bank-firm lending relationships				Full sample		
	(1)	(2)	(3)		(4)	(5)	(6)
Silver	-0.026*			Silver pool	-0.247***		
	(0.014)				(0.039)		
Excess silver		-0.021*		Excess silver pool		-0.230***	
		(0.013)				(0.034)	
Excess reserves			-0.176**	Excess reserves pool			-0.676***
			(0.084)				(0.141)
District f.e.	Y	Y	Y	District f.e.	Y	Y	Y
Industry f.e.	Y	Y	Y	Industry f.e.	Y	Y	Y
Nationality f.e.	Y	Y	Y	Nationality f.e.	Y	Y	Y
N	60	60	60	N	1,743	1,743	1,743
R^2	0.09	0.08	0.13	R^2	0.12	0.12	0.12

Table C.8; continued

D. Impact of the liquidity shock on social unrest – Communist penetration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Silver pool	-0.081***	-0.063***	-0.053**						
	(0.019)	(0.016)	(0.022)						
Excess silver pool				-0.077***	-0.060***	-0.059***			
				(0.018)	(0.013)	(0.017)			
Excess reserves pool							-0.141*	-0.117**	-0.044
							(0.077)	(0.057)	(0.090)
District f.e.	Y	Y	Y	N	N	Y	N	N	Y
Industry f.e.	Y	Y	Y	Y	Y	Y	Y	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	0.07	0.22	0.23	0.07	0.22	0.23	0.06	0.22	0.22

Table C.9
Impact of the liquidity shock on social unrest – labor relations. The table reports the estimates of:

$$Labor\ unrest_{ft} = \alpha + \beta Silver\ pool_f + \gamma Silver\ pool_f \times Post_t + \delta Post_t + \mu' x_{ft} + \varepsilon_{ft}$$

The dependent variable is the natural logarithm of the duration of unrest episodes in firm f in year t. The variable $Silver\ pool$ is the inverse distance-weighted average silver reserves around firm f (column (1)), the inverse distance-weighted average of the silver amount in excess of the 60% minimum reserve requirement, in column (2) ($Excess\ silver\ pool$), or the inverse distance-weighted average of the indicator variable taking the value of one if a given bank has silver-to-notes ratio above 60%, and zero otherwise, in column (3) ($Excess\ reserves\ pool$). $Post$ is an indicator variable equal to one for years after 1933, and zero otherwise. All specifications include year, plant, city district × year, firm industry × year, and firm nationality × year fixed effects. Conley (1999) standard errors are reported in parentheses, allowing for spatial correlation within a 2.5 km radius and for one-period serial correlation. All variables are defined in detail in Appendix B. The symbols *, **, and*** denote statistical significance at the 10%, 5%, and 1% levels respectively.

Dep. variable:	$\mathbf{log(1 + \mathit{Duration})}$		
	(1)	(2)	(3)
Silver pool × Post	-0.611***		
	(0.210)		
Excess silver pool × Post		-0.601***	
		(0.172)	
Excess reserves pool × Post			-1.326*
			(0.738)
Year f.e.	Y	Y	Y
Plant f.e.	Y	Y	Y
District × Year f.e.	Y	Y	Y
Industry × Year f.e.	Y	Y	Y
Nationality × Year f.e.	Y	Y	Y
N	7,500	7,500	7,500
R^2	0.07	0.08	0.07

Appendix D.

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

This Appendix presents excerpts from our primary sources of data:

- Loan contracts (Fig. D.1);

- Survey data on labor unrest episodes (Fig. D.2);

- SMP files on underground communist activities in Shanghai (Fig. D.3).

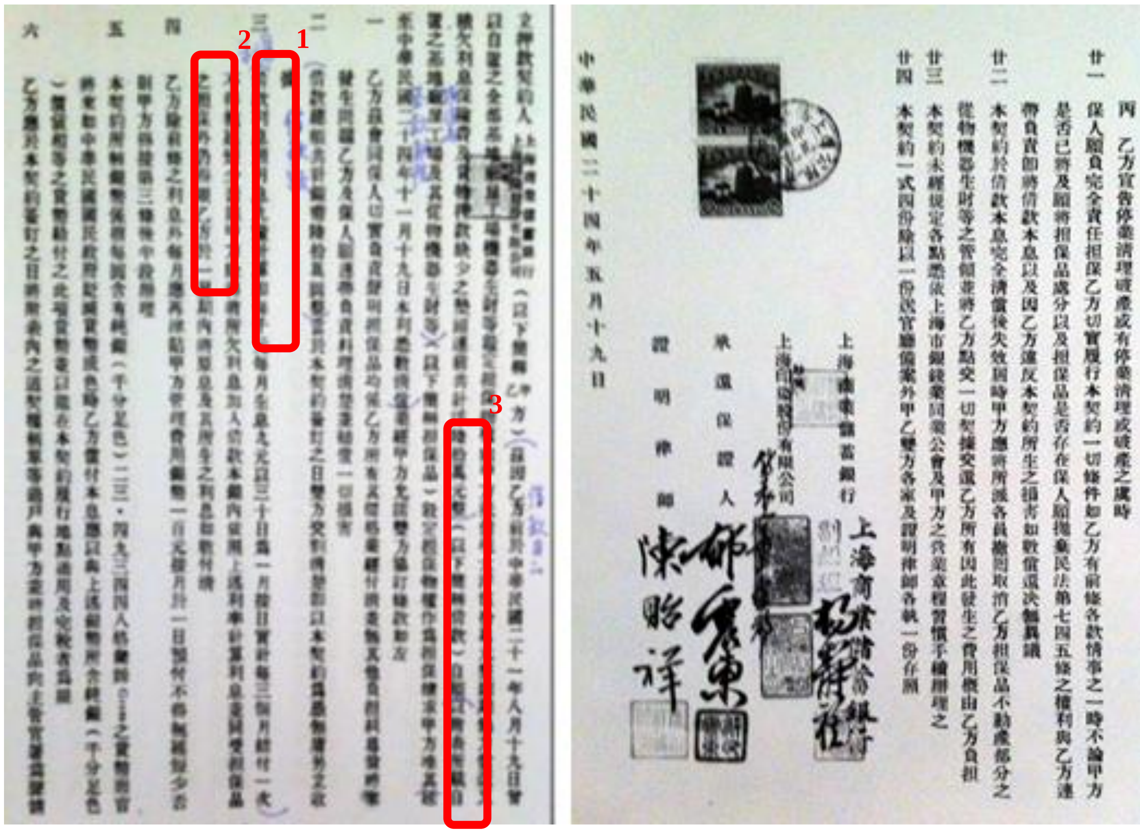
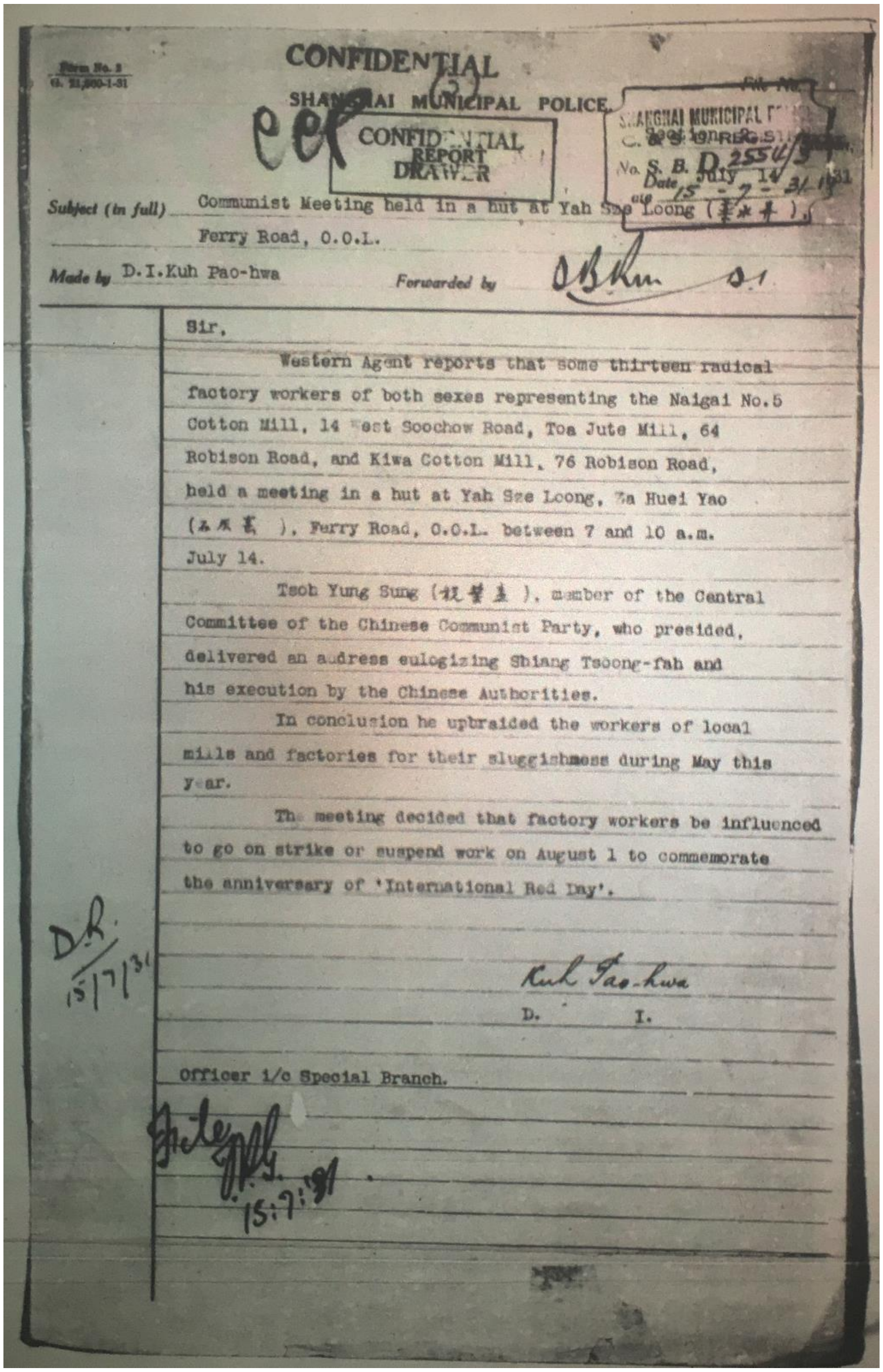


Fig. D.1. Sample loan contract – excerpt. The figure shows the first and last pages of one of the loan contracts in the sample. The loan is made by Shanghai Commercial and Savings Bank to Shanghai Print and Dye Co. (上海印染股份有限公司). The page on the left reports the loan amount (600,000 Chinese dollars, red 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	關係職工人數	糾紛日數	調處者	結果
	927	華商公共汽車公司開除聚衆賭博之工友 AII3a	汽車 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	棉紡 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	三星棉織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]布廠工作怠惰之工友 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	華商公共汽車職工會[illegible]新工人[illegible]契約 AII3a	汽車 C I V	中	1	男 2	1月12日至 [illegible]月6日止 計[illegible]日	同上	准予訂立雇用契約工會不得干涉 C
	932	商務印書館西工會要求開放門禁 AII5b	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]解雇一名准由資方設法安插 B
	934	商務印書館西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

Fig. D.2. Shanghai survey of labor unrest episodes – excerpt. The figure shows an excerpt from the official statistic Industrial Disputes in Shanghai since 1928 (近五年来上海之劳资纠纷), collected 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).



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SHANGHAI MUNICIPAL POLICE

S. B. REGISTRY

No. S. B. D. 2554/3

Date July 14 1931

Subject (in full) Communist Meeting held in a hut at Yah Sze Loong (亞★★), 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★★), Ferry Road, O.O.L. between 7 and 10 a.m. July 14.

Tsoh Yung Sung (★★★), 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.

Fig. 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.'"