Chinese Silver Standard Economy
and the 1929 Great Depression

abstract

It is often said that the silver standard had insulated the Chinese economy from the Great Depression that prevailed in the gold standard countries during the 1929-35 period. Using econometric testing and counterfactual simulations, we show that if China had been on the gold standard (or on the gold-exchange standard), the balance of trade of this semi-closed economy would have been ameliorated, but the general price level would have declined significantly. Due to limited statistics, two important factors (the GDP and industrial production level) are not included in the analysis, but the general argument that the silver standard was a lifeboat to the Chinese economy remains defensible.

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1 Proposition

"The gold standard of the 1920s set the stage for the Depression of the 1930s by heightening the fragility of the international financial system. The gold standard was the mechanism transmitting the destabilizing impulse from the United States to the rest of the world. The gold standard magnified that initial destabilizing shock. It was the principal obstacle to offsetting action. It was the binding constraint preventing policymakers from averting the failure of banks and containing the spread of financial panic. For all these reasons, the international gold standard was a central factor in the worldwide Depression. Recovery proved possible, for these same reasons, only after abandoning the gold standard" (Eichengreen 1992:xi). This view was shared by other studies such as Eichengreen and Sachs (1985), Hamilton (1988), Bernanke and James (1991).

This "golden fetters" hypothesis suggests that the 1929 Great Depression "gives the gold standard a major role in its causation and transmission" (Temin 1993:87). The world gold standard system prevailed between 1870s and the early 1930s can be seen as equivalent to a fixed exchange rate regime that tied gold block countries together. The international transmission of the Great Depression functioned roughly as follows. On the commodity side, the fixed exchange rate under the gold standard transmitted negative demand shocks; while on the financial side, banking panics and currency crises were spread internationally via this "golden fetters" mechanism. If the gold standard had such an important impact on the industrialized economies, then it would be of interest to understand the role played by the silver standard in the Chinese economy during the Great Depression period.

Had China been on the gold standard (or on the gold-exchange standard) during the Great Depression period, the exchange rates between Chinese dollar and other foreign currencies would have been fixed. Actually China remained on the silver standard until November 1935, this allowed her exchange rate to be floating vis-à-vis the gold countries, thus making a big difference in the performance of the Chinese economy. Under the silver standard, the exchange rate between Chinese dollar and US dollar, for instance, was determined by the relative price of silver and gold, but under the gold standard, the exchange

rates between the two currencies were fixed at a determined rate according to their relative contents of gold.

Under the silver standard, the slump of world silver price depreciated the Chinese dollar, which was helpful for her exports; moreover, the depreciation attracted foreign capital inflow. Both effects may improve her balance of payments. Significant inflow of silver also helped to sustain the general price level. So if China remained on the silver standard during the Great Depression period, the shock of world depression would be much less serious than the case if she adopted the gold standard. It was therefore often claimed that the silver standard had played a significant firewall role for the Chinese economy. The relationships between the Great Depression and the Chinese economy are presented as Chart 1.

[Chart 1 about here]

Owing to the lack of reliable and consistent statistics, this study investigates only four selected factors: price level, balance of trade, exchange rate and silver price. Some of the important elements presented in Chart 1 such as the industrial production, agricultural production, stock market index, silver in/outflow and interest rate are not included. We have already five determinants in the model: world production level (YW), balance of trade (BT), exchange rate (EX), silver price (SP) and wholesale price index (P), adding other factors such as interest rate and silver in/outflow would complicate econometric testing and counterfactual simulations. Moreover, some statistics are only partially available for the analysis (such as the stock market index), or highly unreliable (such as the industrial production),[1] or they are not representative enough (such as the interest rates, available from Shanghai and some major cities only).

Under such constraints, we focus on evaluating the impact of Great Depression on her balance of trade and price level if China shifted to the gold standard (or the gold-exchange standard) before 1929. In other words, if China had had the "golden fetters" as other gold

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[1] Another reason to exclude the industrial production index is that the industrial sector occupied only a minor share in the Chinese economy, we believe that shifting from the silver to the gold standard would not affect much of the Chinese industrial structure. Had the effect been significant, it should have been reflected in her

block countries, what would have happened to her trade balance and price level? This paper is organized as follows. In Section 2 we present various visions on the Chinese economy under the Great Depression and our views on these arguments. Section 3 explains the data used and the models specified for econometric testing. Using the results in Section 4, we conduct some counterfactual simulations to examine the possible Chinese economic performance under the gold standard. Section 5 compares the experience of China with some European countries, especially Spain who was also not on the gold standard. In the concluding Section 5 we argue that the silver standard may have played a silver lifeboat role, rather than as silver fetters.

2 Visions of the Chinese economy under the Great Depression

2.1 Fisher (1934)

Irving Fisher thought that "…sustain depressions are largely of monetary origin." He used data from 27 countries for the period 1929-33, constructing 13 impressive charts to support several well-specified arguments. "…The three facts: (1) that countries on the same monetary standard have similar price movements; (2) that countries not on the same monetary standard do not have similar price movements; (3) that any country changing from one monetary standard to another changes its prices level accordingly—make the case for the monetary transmission of price level changes fairly complete. … This logic is analogous to the logic behind hydrostatics. … that the presence or absence of the canal connection or the breaking of that connection explains why the levels are alike, different, or change. This analogy is well nigh perfect except as to fluidity". In his view, "China was having something like a boom with rising prices, during 1930 and the first half of 1931. One of the most important phases of the situation relates to silver. … apparently due in large part to the fact that prices on the silver standard … have not undergone the deflation which occurred elsewhere. Moreover, the falling value of silver made imports relatively more costly and served to stimulate many local industries much as a protective tariff does" (Fisher 1934:18, 9, 17). Our empirical results in

exports/imports, and we can see these effects from the figures and tables related with the balance of trade.

this paper support Fisher's findings almost 70 years ago.

2.2 Friedman and Schwartz (1963)

The impact of the Great Depression on China occupied a minor passage in Friedman and Schwartz (1963:134, 361-2). They proposed the following thesis. "A striking, more recent, example of how much of an advantage it can be is furnished by China's experience from 1929 to 1931. Because it was on a silver standard, it avoided almost entirely the adverse consequence of the first two years of the worldwide depression, which began in 1929". Their explanation was: "The key role of fixed exchange rate in the international transmission mechanism is cogently illustrated by the case of China. …As a result, it had the equivalent of floating exchange rate with respect to gold-standard countries. A decline in the gold price of silver had the same effect as a depreciation in the foreign exchange value of Chinese *yuan* [meaning "dollar"]. The effect was to insulate Chinese internal economic conditions from the worldwide depression. …Hence the prices of goods in terms of silver could remain approximately the same. …From 1929 to 1931, China was hardly affected internally by the holocaust that was sweeping the gold-standard world, just as in 1920-21, Germany had been insulated by her hyperinflation and associated floating exchange rate". Their thesis needs to be proved with evidence, and its dynamic mechanism also needs to be examined. Was China's stable price level really attributed to the mechanism as asserted by Friedman and Schwartz? To examine such is the main objective of this paper.

2.3 Myers (1989)

"We do not have any detailed study of China's economic development between 1929 and 1936, …Yet conventional wisdom claims that the Chinese economy suffered greatly because of that economic setback. More recent scholarship has tried to alter this interpretation. But the standard studies on this period argue that world depression caused the Chinese economy to contract after 1931, greatly reduced domestic prices, and induced a tremendous outflow of silver from the country. …Contrary to the conventional wisdom, … widespread economic

decline did not take place. This alternative interpretation is based on new statistical estimates, unpublished research by various scholars now in progress, and the historical record. … China simply did not experience any national economic depression as the world depression deepened" (Myers 1989:253, 273-4). A major merit of Myers' paper is that he offered nine tables with aggregated statistics of the present Chinese GDP, industrial and agricultural production indices, trade volumes, deficits, silver import/export, money supply to support the above argument. He offered a different perspective but did not explain why and how China was insulated from the Great Depression. An econometric exercise to explain this proposition is needed.

2.4 Wright (1991)

"The impact of the world depression in China was less severe than in the developed world. Indeed some deny China suffered from a 'depression' at all. …Nevertheless, three factors meant that the government was still confronted with an economic crisis. First, the output figures alone underestimate the impact of the downturn, as the main effect was on prices, profits and especially the incomes of peasants involved in the market economy. Second, the political crisis was more serious than might be indicated just by aggregate national statistics, …Third and most important, whatever the statistics show in hindsight, the literature at the time portrayed a situation of chronic crisis. …The decline in the value of its silver currency protected China to a large extent from 1929 to late 1931… After the British and Japanese abandonment of the gold standard late in that year, however, China entered a period of deflation, … Recovery began late that year [1935], though only from November 1936 did there begin a sustained and continuing rise in both prices and output, and 1937 showed very strong growth in the modern sector" (Wright 1991:651-2). The picture offered by Wright is much more balanced. He understands the overall trend of the economy, he is careful about the "literature at the time portrayed a situation of chronic crisis", he also indicates the role of the silver standard before and after 1931 when major countries left the gold standard.[2]

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[2] As an extended study, Wright (2000:733-4) finds that "The World Depression certainly did not induce major

The above four studies have presented different visions of the Chinese economy under the Great Depression. These studies also reveal that it is insufficient to explain the Chinese economy under Great Depression from the viewpoint of the silver standard alone. There are countless and increasing number of studies debating on the causes, spread, impacts and recovery of the American Great Depression, and we think the same will be true in the case of China. In this paper we single out the silver standard as a key variable, which is an important factor but still insufficiently understood.

3 Methodology

The insulating role played by the silver standard is analyzed in two steps. First, we use a Transfer Function Model (TFM), a time series model with the dynamics of some exogenous variables (see Box and Jenkins 1976), to estimate the monthly data (1929.1-1935.12), by which we expect to illustrate the causality between economic performance and the silver standard. Then, we use the estimated results to conduct counterfactual simulations to show what might have happened if China had been under the gold standard.

3.1 Data

Five monthly series are used for econometric testing: exchange rate (EX), balance of trade (BT), silver price in New York (SP), wholesale price index (P) and world production index (YW). See Table A1 for statistic series and Appendix 1 for data sources and definitions. EX and BT are used as the main indicators of China's external sector,[3] and P is a key indicator of the domestic economy. These three variables are endogenous to our model. YW and SP are

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economic dislocation in the Upper Yangzi or Yun-Gui macroregions. Only relative small sectors of those economies were integrated into the national or international economies, and of those only some suffered serious disruption. On the other hand, at least in the Upper Yangzi, there was a substantial restructuring, as the province joined other areas in China and Japan in having to reduce its income from and its dependence on sericulture. … Thus the outside world, through the Depression, affected pockets, but only pockets of the regional economies".

[3] During the 1930s, the whole trade sector (domestic and external) only occupied about 7% of Chinese national production, her foreign trade was even less important in this semi-closed economy.

treated as exogenous variables for two obvious reasons: (1) the minor share of China's foreign trade in the world trade volume; (2) world's silver prices were quoted in London and New York, not in Shanghai. Granger causality test will be used to verify this specification.

3.2 Model specifications

Let the vector Y_t be the endogenous variable vector [BT_t EX_t P_t], and X_t be the exogenous variable vector [YW_t SP_t]. Consider the following vector autoregressive model:

(1) $$[I - \Gamma(L)]Z_t = C + \varepsilon_t$$

Where Z_t is the stacked vector of Y_t and X_t; L is the lag operator; $\Gamma(L)$ is the (5 × 5) parameter matrix with k lags; C is a constant term; ε_t is the error vector which follows the assumptions $E(\varepsilon_t) = 0$, $E(\varepsilon_t \varepsilon_t') = \Omega$ (where Ω is a diagonal matrix whose diagonal elements are all positive). Before estimating the model, the optimum lag order of the model k should be identified. Likelihood ratio test (LRT) is used to determine the best order. As shown in Panel I of Table 1, they are conducted from the null hypothesis of lag order 1 to see if it can be rejected. If not, one more order should be added and run the test again. This recursive process will be completed when the inferences of serial tests provide enough information to decide the lag orders.

[Table 1 about here]

Panel I in Table 1 presents the likelihood ratio statistics for the lag order identification. It indicates that the null hypothesis of lag order 1 (see row 1 in the column r) is rejected (its p-value is 0.04%, much less than the 5% level of significance [= 37.7]). But from lag two (2) to lag four (4), the null hypothesis cannot be rejected, suggesting that the lag order r in model (1) should be two (2). We shall use this for the estimations and simulations.

Using the order identified for the VAR model, we run the Granger causality test to justify the exogeneity of vector X_t (Hamilton 1994:303). Model (1) can be expressed in block matrix form:

(2) $$\begin{bmatrix} I - \Theta(L) & \Phi(L) \\ \Xi(L) & I - \Lambda(L) \end{bmatrix} \begin{bmatrix} Y_t \\ X_t \end{bmatrix} = C + \varepsilon_t$$

As proposed by Granger (1969), the one-way causality "*X* causes *Y*" is defined as: *Y* depends on the past values of *X*, but *X* is independent of the values of past *Y*. This also means that *X* is exogenous in the time series sense. To verify such an exogenity, we run LRT for the hypothesis

(3) $H_0: \Xi(L) = 0$

If (3) cannot be rejected, the exogenity hypothesis is valid. As shown in Panel II of Table 1, the statistics obtained is 16.65, lower than the 5% critical value of χ^2_{12} (= 21.0), confirming the null hypothesis of exogenity.

Some prior restrictions should be considered in the model specifications. Firstly, in the balance of trade variable (BT), although China was under the silver standard, the price of export and import goods used in this study are calculated from the exchange rate of Chinese currency, not directly from the silver price. Therefore, we set the all coefficients of SP to be zero in the BT equation. We use the likelihood ratio test to evaluate if it is appropriate to impose the restrictions. The test statistics (= 2.38, see Table 1 Panel III) is less than the critical value for 5% χ^2_3 (= 7.81), suggesting that it is statistically acceptable to impose the restrictions. Secondly, the actual series of BT reveals a seasonal pattern in the first three months of each year, this was due to the Lunar New Year holidays that can be in any one of the first two months. So we add three dummy variables, JAN, FEB and MAR, to capture this particular seasonal effect.

With the above results, the final transfer function model (TFM) in matrix form can be expressed as:

(4)

$$
\begin{bmatrix}
1-\alpha_1^{11}L-\alpha_2^{11}L^2 & -\alpha_1^{12}L-\alpha_2^{12}L^2 & -\alpha_1^{13}L-\alpha_2^{13}L^2 \\
-\alpha_1^{21}L-\alpha_2^{21}L^2 & 1-\alpha_1^{22}L-\alpha_2^{22}L^2 & -\alpha_1^{23}L-\alpha_2^{23}L^2 \\
-\alpha_1^{31}L-\alpha_2^{31}L^2 & -\alpha_1^{32}L-\alpha_2^{32}L^2 & 1-\alpha_1^{33}L-\alpha_2^{33}L^2
\end{bmatrix}
\begin{bmatrix} EX_t \\ BT_t \\ P_t \end{bmatrix}
=
\begin{bmatrix} C_1 \\ C_2 \\ C_3 \end{bmatrix}
$$

$$
+
\begin{bmatrix}
\beta_0^{11}+\beta_1^{11}L+\beta_2^{11}L^2 & \beta_0^{12}+\beta_1^{12}L+\beta_2^{12}L^2 & 0 & 0 & 0 \\
0 & \beta_0^{22}+\beta_1^{22}L+\beta_2^{22}L^2 & \gamma_1 & \gamma_2 & \gamma_3 \\
\beta_0^{31}+\beta_1^{31}L+\beta_2^{31}L^2 & \beta_0^{23}+\beta_1^{23}L+\beta_2^{23}L^2 & 0 & 0 & 0
\end{bmatrix}
\begin{bmatrix} SP_t \\ YW_t \\ JAN_t \\ FEB_t \\ MAR_t \end{bmatrix}
+
\begin{bmatrix} \varepsilon_t^1 \\ \varepsilon_t^2 \\ \varepsilon_t^3 \end{bmatrix}
$$

3.3 Estimation results

The ordinary least square (OLS) estimations of model (4) are presented in Table 2, the main findings are as follows. First, in the EX equation, an important feature is that the exchange rate (EX) is positively correlated with the current silver price (SP_t), its *t*-statistics (6.13) is far greater than the upper bound of the critical value.

[Table 2 about here]

Second, in the BT equation, only the two lagged BT variables and two of the three seasonal dummies are significant, all the other coefficients are insignificant. The coefficients of YW are expected to be positive, implying that stronger (weaker) world demand should be helpful (harmful) to the Chinese trade balance. But all the YW coefficients are insignificant, suggesting that the Chinese balance of trade was inelastic to the changes in world economic performance. Another important issue is how the instability of exchange rate (due to world silver price fluctuation) may affect her trade balance. In Table 2, both the EX and BT equations suggest that this relationship is statistically insignificant. This is an important and complex issue that needs further analysis. In Appendix 2 we calculate the elasticities of exports and imports when the exchange rate adjusted, and test the conditions for the overall effects on trade balance when the exchange rate is unstable. The result, consistent to the findings in Table 2, suggests that the currency appreciation would increase the Chinese balance of trade, which is an unconventional case. As expected, two of the dummy variables JAN and MAR are significant with very high coefficients, reflecting the influence of seasonal pattern on BT.

Finally, in the price (P) equation, a main finding is that the current silver price (SP) is significantly related to the general price level, but in a negative way. This is an important feature for a currency under the silver standard. As a silver-based currency, when silver price rise, the value of Chinese dollars appreciates. Consequently, her purchasing power will be higher; while the price level, especially for the imported goods, will fall. Another reason for this negative correlation is that it is profitable to export silver out of China when the current

silver price is higher, this silver outflow may lower Chinese silver (money) stock, thus lowering price level.

The above results can be summarized as follows. (1) Chinese exchange rate was mainly determined by the world silver price. (2) Her trade balance was insensitive to the world economic crisis; also, the appreciation of Chinese currency was not harmful to her trade balance. (3) Domestic price level was significantly and negatively related to the world silver price changes.

4 Counterfactual scenarios

The results in Table 2 are used for counterfactual simulations. We set the counterfactual exchange rate between the Chinese dollar and US dollar during 1929-35 as 100 Chinese dollars = US$ 42.02 dollars, which was the average exchange rate between January 1929 and October 1929 (as shown in Figure 1). We would like to see how this counterfactually fixed exchange rate (representing if China had been under the gold standard), would have affected the Chinese balance of trade and price level.

[Figure 1 about here]

4.1 Balance of trade and price level: actual and simulated

Figure 2 plots the actual trend (under the silver standard, in bold line) and the simulated trend (under the gold standard) of trade balance in China. The actual trend shows that, generally speaking, the balance of trade was improving between 1931 and 1935, unaffected by the world depression. In the counterfactual case, trade balance would rise significantly between 1931 and 1934 under the gold standard assumption. This result seems unusual but it can be partly explained by the gap of the two exchange rate trends in Figure 1.

The counterfactual trend (under the gold standard assumption) is always above the actual trend (under the silver standard), which means that, under the gold standard, Chinese exchange rate would be seriously overestimated, especially during the 1930-3 period. As we can see in Appendix 2, the elasticity of exchange rate (EX) relative to BT is positive, implying that the overestimation of Chinese currency will generate a simulated BT trend

higher than the actual one. In other words, the gold standard could be helpful to the Chinese trade balance. Quite possibly so, but as well known, foreign trade occupied only a small share in this semi-closed economy, we should not infer from this evidence that the gold standard was favorable to the overall economy.

[Figure 2 about here]

Another more striking but much less surprising evidence is shown in the case of price level (Figure 3). The actual trend (under the silver standard) shows that the price level was climbing until mid-1931, totally unaffected by the world depression. Then it kept declining until the end of 1935. In terms of index, the price level dropped about 30.5% from August 1931 (the highest point) to July 1935 (the lowest point). This is quite different from the pattern of leading gold standard countries as reported by Temin (1993). In Figure 2 of his study, the wholesale price index in 1929 (taken as 100) dropped to about 70 for the US in 1933, about 75 for the UK in 1933, and about 57 for France in 1935. This suggests that the silver standard had partly insulated China from the price depression in these gold standard countries.

[Figure 3 about here]

On the other hand, as the simulated trend in Figure 3 shows, her price level would have fallen sharply had China adopted the gold standard. Under this assumption, the price level would have started to drop from 1930, which is 18 months earlier than the actual trend. But a good thing under the gold standard is that the simulated price trend would have recovered from the early months of 1933, which is about two years earlier than the actual trend (under silver standard). Incidentally, this earlier 1933 recovery can also be found in the cases of the US and UK, as shown in the Figure 2 of Temin (1993). This coincidence may serve as another evidence proving that if China had adopted the gold standard, her recovery would have had a similar rhythm as that in other gold countries.

4.2 China and Italy compared

The causes, spread, impacts and recovery of the 1929 Great Depression in the leading

countries (US, UK, Germany, France) have been the subject of many studies. To compare the Chinese case with these countries is inappropriate simply because the scale of economy and the level of economic development are incomparable. Moreover, economic historians are familiar with the evidence from these countries, so it would be less interesting to compare the Chinese case with these leading economies. Italy is selected here for comparison because the story of Italian Great Depression is less well known, and that the Italian statistics from Mattesini and Quintieri (1997:290-1, Table A2a) are complete and ready for comparison. The two countries are compared in Figures 2 and 3 (in terms of continuous trends) and in Table 3 (in terms of yearly percentage changes).

Interestingly, the Italian balance of trade had a similar trend as the case of China under the gold standard assumption (see the simulated trend in Figure 2). In the case of Italy, the general trend shows a remarkable growth between 1929 and 1933, which then remained stable between 1934 and 1935. Italy was on the gold standard but her trade balance did improve during the world depression era. The same would have been the case if China had adopted the gold standard. We doubt if this can be explained only in terms of monetary standard and the exchange rate, or it was the industrial structure that mattered more; this should be an interesting topic to investigate.

[Table 3 about here]

The Italian price trend plotted in Figure 3 shows that it began to fall from 1929 until mid-1934, from an index of about 105 in early 1929 down to about 64 in mid-1934. This pattern is similar to the simulated Chinese price trend (under the gold standard assumption). Table 3 expresses this phenomenon in terms of annual growth rates. Under the gold standard, both the Chinese case and the Italian evidence suggest that the gold standard did more harm to the price level than the non-gold standard during the 1929-33 Great Depression.

5 International comparison

Choudhri and Kochin (1980) compared economic performance in three patterns of country during the Great Depression. (1) Four small European gold countries (Belgium, the

Netherlands, Italy, and Poland); (2) Spain that operated on flexible exchange rates (as the case of China); (3) Three Scandinavian countries (Denmark, Finland, and Norway) that started out on the gold standard but suspended the gold standard soon after the UK decided to leave the gold standard in September 1931. Their Figures 1 and 2 confirmed the arguments on the insulation capabilities of the flexible exchange rate system: (1) Spain had reasonable stable index of money supply, visibly better than the Scandinavian countries; while the gold countries had quite unstable money supply trend during the 1928-33 period. (2) This pattern is also true for the index of industrial production as well as for the index of wholesale prices.

It would be instructive to compare more about the experiences of Spain and China. Spain never adopted the gold standard, the convertibility of paper money into gold and/or silver was maintained until 1883, no resumption took place thereafter. Like the case of China, the exchange rate of the Spanish peseta fluctuated in terms of gold throughout the world gold standard system era. Although we do not have detailed statistics to show the similarities and differences between China and Spain, the following excerpts may provide instructive lessons from this non-gold standard country.

"The Spanish dictator of the 1920s, Primo de Rivera, was wise enough not to try his hand with gold parities and the following Republic—or all its proclaimed financial 'orthodoxy'—learned very quickly that it was wiser to leave the peseta alone" (Faini & Toniolo 1992:137-8). "Spain tried to fix the peseta in the late 1920s as France and Italy stabilized their currencies, but the deflationists lacked the political muscle. The government continued to run deficits which were monetized by healthy banks. … Very few banks failed, and the experience is not thought of as a panic. The Bank of Spain acted as a lender of last resort, … It did have to raise Spanish interest rates to protect the value of the peseta, but it continued to lend freely… Spain avoided the Depression by never being on the gold standard." (Temin 1989:92, 97).

This was a good aspect of Spain's non-gold standard economy during the 1929-35 period, but there was also a dark side of not being on gold, as described by Martín-Aceña (1994:136, 156-60). "…to remain formally out of the gold standard regime [during

1880-1914], although not exceedingly damaging, was certainly inconvenient. Spain could, and should, have joined the international monetary system. … Inconvertibility and exchange rate variability introduced a higher risk in Spain's international transactions, both on trade and on capital account, and the country faced greater difficulties in balance of payments adjustment. By being off the gold standard, the Spanish monetary regime was partly detached from the international system and the Spanish economy remained to a large extent isolated from the world economy." In his view, "the Spanish monetary and financial authorities adopted the wrong course of action at a crucial time. The only way to benefit fully from the expansion of world trade and international investment that took place in the 30 years before 1914 was to be on the gold standard, … Because Spain remained off the gold standard, …the result was one of the lowest rates of industrialization in Western Europe."

A less extreme view is offered by García-Iglesias (1999). Spain by not adopting the gold standard during 1880-1913 has "insulated the country from international shocks and allowed it to take many advantages of the international regime of fixed exchange rates without actually committing to it. … while Portugal, due to its fixed exchange rate regime, suffered permanent shocks. Prices, in Spain, but not in Portugal, adjusted to deviations from the long-run. … The economy was insulated from shocks and, after 1898, its integration into the world economy was faster than during the nineteenth century. … Prices stabilized, the exchange rate appreciated, and the low interest rate was similar to the European ones. The country was moving toward the international markets, and domestic depression was avoided. … The low-risk, low-return policy followed by Spain came with a trade off. The implicit cost was reflected in the lower growth rate for the entire period in comparison to other Southern European countries."

Carlson (1999:484) was "more skeptical of the conclusion that Spain experienced slower growth as a result of being on a silver standard. … There are two main reasons to believe that being on a silver standard might have slowed economic growth in Spain. First, being on a silver standard could have increased exchange risk to foreign investors and people involved in international trade. Second, it could have allowed the government to cover deficits by

printing money to finance a deficit and thereby create inflation. But whether or not this was true for Spain is an empirical question."

From the above debates, it seems that, like China, Spain also faced a big problem of "To be or not to be on the gold standard?" Arguably, it might not be favorable for Spain not being on gold before 1914, but to remain off gold was certainly an advantage for her during the 1929-33 Great Depression period. The case of China was different, she could not and should not being on gold. Her gold stock, economic structure and many other socio-economic factors did not allow her to do so. This is another big story to be treated in another paper (Lai and Gau 2000).

6 Silver lifeboat, not silver fetters

As a major silver-using country, to remain on or to depart from the silver standard was a big dilemma for Chinese decision-makers when facing the world gold standard system that prevailed until the early 1930s. Due to limited and sometimes unreliable statistics, a general equilibrium analysis is not feasible in this paper. Within a partial equilibrium framework, we still have two important factors, GDP and industrial production level, not included in the analysis. The evidence from trade balance (Figure 2) and price level (Figure 3) suggests that the silver standard was unfavorable to the Chinese trade balance in this semi-closed economy, but it was certainly a lifeboat to the general price level in China during the 1929-34 world Great Depression period. Had China adopted the gold standard before 1929, she might have fallen into the golden trap as other gold block countries (US, UK, Germany, France, Italy) did.

Appendix 1

Data sources and definitions (see Table A1 for the corresponding series)

BT: Balance of trade. Deficit (-) or surplus (+) between exports and imports, in million

Chinese dollars. Source: *Statistics Monthly (tungji yuebao)* , 1932-6. The monthly data

of exports and imports are available only after October 1931, data before October 1931

is extrapolated from the monthly average of 1932-36.

JAN, FEB, MAR: These three dummy variables are used to capture the seasonal effects on trade balance during the first three months of each year.

EX: Exchange rate. US dollars per 100 Chinese dollars. Source: *Statistics Monthly (tungji yuebao),* 1932-6.

M: Value of imports in million Chinese dollars. Source: *Statistics Monthly (tungji yuebao, 1932-6)*; data before October 1931 is extrapolated from the monthly average of 1932-6.

P: Wholesale price index, 1926 = 100. Source: *Statistics Monthly (tungji yuebao)*, 1932-6.

SP: New York silver price, cents per ounce. Source: *Statistics Monthly (tungji yuebao)*, 1932-6.

X: Value of exports in million Chinese dollars. Source: *Statistics Monthly (tungji yuebao)*, 1932-6. Data before October 1931 is extrapolated from the monthly average of 1932-6.

YW: World production index, 1928 = 100. Source: Mattesini and Quintieri (1997:290-1).

Appendix 2

The exchange rate and the balance of trade

The balance of trade is defined as BT $\equiv$ X $-$ M. Taking the differential on both sides,

$$\frac{\partial BT}{\partial EX} = \frac{\partial X}{\partial EX} - \frac{\partial M}{\partial EX} = \frac{X \cdot M}{EX} \left(\frac{\eta_x}{M} - \frac{\eta_M}{X} \right)$$

where η_x η_m are the elasticities of exchange rate relative to exports and imports, respectively. The condition for BT to increase due to currency appreciation is:

(1) $$\left(\frac{\eta_x}{M} - \frac{\eta_M}{X} \right) > 0$$

We calculate the elasticities η_x η_m by the following regressions (*t*-ratio in parenthesis)

$ln(X_t) = 11.245 - 0.012\ ln(EX_t)$
           (16.45)*   (-0.06)
$ln(M_t) = 13.088 - 0.400\ ln(EX_t)$
           (24.92)*   (-2.56)*

We have η_x = -0.012 and η_m = -0.400. Using the monthly average of X (81.93 million

Chinese dollars) and M (124.91 million) from 1929 to 1935 to calculate the condition for

Equation (1) above. We obtain

$$\left(\frac{-0.012}{124.91} - \frac{(-0.400)}{81.93}\right) = 0.0048 > 0$$

This suggests that when the Chinese currency appreciated, the decrease in value of imports

would be greater than that of exports, so the overall effects of Chinese currency appreciation

on trade balance would be positive.

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Table 1   Likelihood ratio statistics for the TFM model

I. Testing for the order of lags

Model: Equation (1)
H_0: k = r, H_A: k = r + 1
$Z_t = [\ EX_t\ \ BT_t\ \ P_t\ \ SP_t\ \ YW_t\ ]$

r	Test statistics	p-value (based on χ^2_{25})
1	56.067	0.04%**
2	37.533	5.14%
3	20.982	69.36%
4	26.588	37.68%

II. Testing for exogeniety

Model: Equation (2) with restriction (3).

Test statistics	p-value (based on χ^2_{12})
16.654	16.31%

III. Testing for prior restriction
Null model: See Equation (4)

Test statistics	p-value (based on χ^2_3)
2.382	49.70%

Note: All the test statistics are treated by Sims's correction on the number of observations (Sims 1980).
     **: significant at the 5% level.

Table 2 Estimations of the TFM model

Dependent variable	EX_t	BT_t	P_t
Intercept	1.034 (0.271)	18.774 (0.515)	6.510 (1.250)
EX_{t-1}	0.740 (5.186)**	-1.211 (-1.011)	-0.166 (-0.852)
EX_{t-2}	0.186 (1.238)	1.582 (1.379)	-0.015 (-0.071)
BT_{t-1}	0.008 (0.898)	0.968 (10.833)**	0.006 (0.469)
BT_{t-2}	-0.007 (-0.792)	-0.443 (-5.208)**	0.003 (0.257)
P_{t-1}	0.040 (0.379)	0.386 (0.343)	1.035 (7.124)**
P_{t-2}	-0.046 (-0.444)	-0.868 (-0.803)	-0.113 (-0.799)
SP_t	0.512 (6.127)**		-0.192 (-1.679)*
SP_{t-1}	-0.355 (-2.495)*		0.032 (0.163)
SP_{t-2}	-0.163 (-1.453)		0.164 (1.070)
YW_t	0.066 (0.707)	-1.071 (-1.120)	0.130 (1.023)
YW_{t-1}	-0.059 (-0.384)	1.116 (0.708)	-0.101 (-0.480)
YW_{t-2}	0.016 (0.168)	-0.036 (-0.037)	0.063 (0.486)
Jan		-12.298 (-1.735)*	
Feb		9.680 (1.369)	
Mar		-42.168 (-6.421)**	
Adjusted R^2	0.957	0.755	0.962
D.W.	2.127	2.458	1.960

Note: *t*-ratios in parentheses. * and **: significant at the 10% and 5% level respectively.

Table 3 Percentage changes in balance of trade (BT) and WPI: China and Italy compared (1930-5)

		1930	1931	1932	1933	1934	1935
Chinese BT	Under silver standard	-63.15%	-24.30%	-3.34%	15.39%	32.62%	30.63%
	Under gold standard	-7.41%	28.63%	54.59%	58.74%	-75.98%	-42.78%
Italian balance of trade		**3.84%**	**4.70%**	**5.90%**	**4.03%**	**3.44%**	**1.76%**
Chinese WPI	Under silver standard	9.64%	10.52%	-10.50%	-8.63%	-6.10%	-1.00%
	Under gold standard	-0.66%	-13.82%	-17.67%	-8.04%	6.90%	6.45%
Italian WPI		**-10.87%**	**-13.31%**	**-6.37%**	**-8.82%**	**-2.13%**	**10.23%**

Sources: Italian BT and WPI (Mattesini and Quintieri 1997:290-1); Chinese BT and WPI (Table A1).

Table A1   Original data

	YW (1928 = 100)	BT (million Chinese dollars)	EX (US $ per 100 Chinese dollars)	SP (US cents per ounce)	P (1929 = 100)
1929: 1	104.18	-20.18	44.79	57.00	97.52
1929: 2	103.53	-29.80	44.34	56.25	98.96
1929: 3	105.33	-81.45	44.38	56.38	99.74
1929: 4	109.13	-99.73	43.51	55.75	98.86
1929: 5	109.79	-77.06	42.39	54.38	98.39
1929: 6	112.31	-49.15	40.46	52.44	98.77
1929: 7	109.60	-6.29	40.91	52.63	99.15
1929: 8	108.84	-15.19	40.94	52.63	100.49
1929: 9	107.44	-13.33	39.78	50.75	102.22
1929:10	105.80	-20.09	38.74	50.00	102.99
1929:11	99.73	-9.43	38.84	49.63	101.74
1929:12	95.13	7.85	38.92	49.00	101.17
1930: 1	97.62	-45.06	35.30	44.81	103.85
1930: 2	98.90	-48.80	34.22	43.56	106.73
1930: 3	97.36	-102.02	32.99	41.81	106.73
1930: 4	98.13	-121.07	33.61	42.50	106.63
1930: 5	95.84	-99.82	32.03	40.94	106.44
1930: 6	92.73	-71.15	23.76	34.13	112.67
1930: 7	88.91	-28.16	26.39	34.38	115.45
1930: 8	86.42	-35.64	27.53	35.25	114.69
1930: 9	86.15	-33.60	28.85	36.25	113.54
1930:10	83.64	-40.89	27.99	35.81	110.66
1930:11	81.61	-32.54	28.12	36.00	109.41

1930:12	80.18	-16.47	25.45	32.38	108.93
1931: 1	79.17	-42.18	22.46	29.38	114.78
1931: 2	81.50	-47.92	20.66	26.88	122.17
1931: 3	82.14	-105.55	22.70	29.25	120.92
1931: 4	82.20	-126.12	22.30	28.38	121.02
1931: 5	81.34	-102.54	22.15	28.00	122.26
1931: 6	78.86	-71.46	20.64	26.63	123.89
1931: 7	77.52	-24.59	21.94	28.00	122.17
1931: 8	74.66	-33.15	21.30	27.50	124.95
1931: 9	73.30	-30.98	21.57	27.88	123.89
1931:10	72.60	-84.80	22.77	29.75	121.69
1931:11	72.39	-83.35	23.58	31.13	119.67
1931:12	72.23	-86.66	23.60	30.25	116.80
1932: 1	69.98	-86.35	23.08	29.81	114.40
1932: 2	67.99	-30.95	23.98	30.13	113.54
1932: 3	66.55	-68.29	23.22	29.75	112.77
1932: 4	63.98	-121.79	21.80	28.25	111.91
1932: 5	62.46	-107.53	21.14	27.75	110.95
1932: 6	61.61	-65.94	20.88	27.63	108.93
1932: 7	59.99	-62.22	20.23	26.75	107.21
1932: 8	60.93	-74.93	20.91	28.00	106.73
1932: 9	64.50	-60.39	21.10	27.63	105.29
1932:10	66.20	-70.58	21.09	27.38	104.23
1932:11	65.54	-64.07	20.77	27.00	102.51
1932:12	66.13	-54.34	19.63	25.13	103.08
1933: 1	66.81	-39.73	19.75	23.38	104.14
1933: 2	66.53	-63.17	20.11	25.88	103.18
1933: 3	65.39	-101.75	20.56	27.50	102.32
1933: 4	68.82	-109.99	20.44	28.63	100.21
1933: 5	75.14	-100.23	24.19	34.06	99.92
1933: 6	82.27	-59.90	25.88	35.69	100.21
1933: 7	86.37	-40.70	28.63	37.25	99.15
1933: 8	82.04	-48.87	27.88	36.00	97.52
1933: 9	78.69	-40.09	24.38	38.75	96.28
1933:10	76.47	-46.67	29.69	38.63	96.18
1933:11	74.47	-41.97	32.94	42.94	95.80
1933:12	75.93	-40.80	33.25	43.50	94.36
1934: 1	79.47	-54.68	33.75	44.25	93.21
1934: 2	81.64	-44.72	34.13	45.25	93.97
1934: 3	82.06	-59.31	34.25	45.88	92.63
1934: 4	82.12	-59.84	34.25	45.50	90.71
1934: 5	82.72	-45.66	32.38	44.63	91.00
1934: 6	81.24	-37.09	32.63	45.13	91.77
1934: 7	78.26	-28.62	33.63	46.38	93.11
1934: 8	76.68	-30.20	34.88	49.63	95.70
1934: 9	76.40	-35.79	35.38	49.50	93.30
1934:10	78.40	-36.34	35.69	53.00	92.15
1934:11	78.82	-33.75	34.06	54.50	94.26
1934:12	83.20	-28.45	33.94	54.63	94.93
1935: 1	85.80	-34.76	34.31	54.38	95.32

1935: 2	85.17	-25.17	35.60	54.56	95.80
1935: 3	86.21	-57.83	37.72	58.88	92.44
1935: 4	85.81	-62.26	39.41	67.63	91.96
1935: 5	85.79	-55.35	41.35	74.69	91.10
1935: 6	85.56	-50.30	40.88	72.50	88.32
1935: 7	85.90	-18.42	39.56	67.75	86.78
1935: 8	87.02	-10.85	37.00	65.63	88.12
1935: 9	89.24	-8.43	37.13	65.38	87.36
1935:10	92.97	-12.78	36.75	65.38	90.23
1935:11	94.09	-12.20	29.75	65.38	99.06
1935:12	95.62	5.35	29.75	60.25	99.06

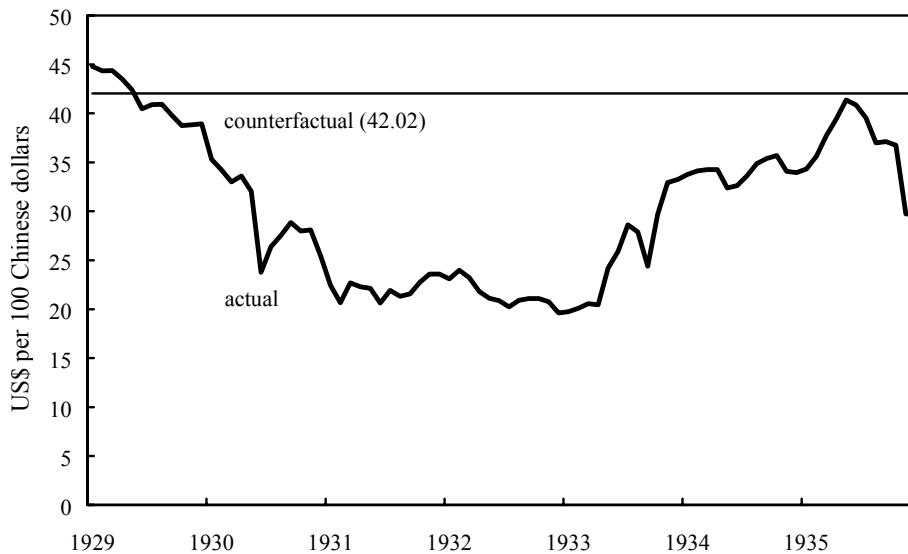See Appendix 1 for data sources and definitions.

Figure 1 Actual and counterfactual exchange rate of Chinese dollar, 1929-35
Note: Counterfactual trend of the exchange rate is fixed at 100 Chinese dollars = US$ 42.02, which is the
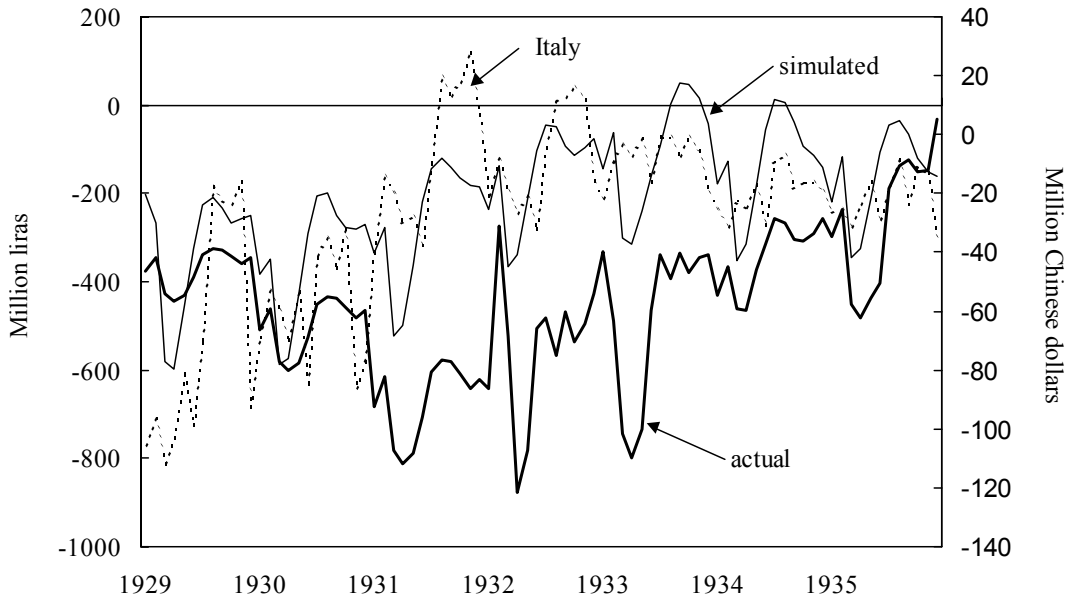average exchange rate between January 1929 and October 1929.
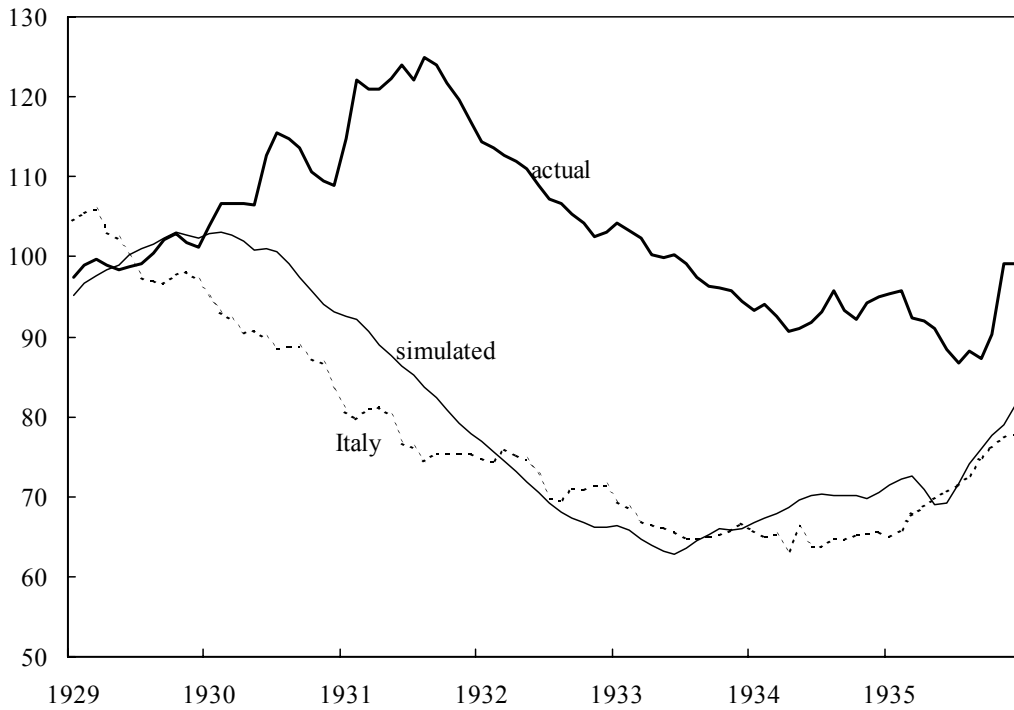
Figure 2 Balance of trade: China and Italy, 1929-35

Figure 3 WPI in China and Italy, 1929-35 (1929 = 100)