



**Stanford**  
Center for International  
Development

**Working Paper No. 74**

**Trade Liberalization and  
the Lender of Last Resort**

by

**Philip Brock\***

December 2000



Stanford University  
John A. and Cynthia Fry Gunn Building  
366 Galvez Street | Stanford, CA | 94305-6015

---

\* Associate Professor, Department of Economics, University of Washington

## Trade Liberalization and the Lender of Last Resort

Philip L. Brock  
University of Washington  
Seattle, WA

### Abstract

Trade liberalizations create conditions conducive to a financial crisis. Previous work has emphasized the role of moral hazard when a central bank guarantees financial system liabilities following a liberalization. This paper emphasizes the importance of “time-to-build” considerations that create financial fragility following a trade liberalization. Financing constraints during the adjustment period create a need for liquidity provision by central banks that is conceptually distinct from a blanket guarantee on bank liabilities. The control of bank moral hazard becomes politically difficult as traditional instruments, which rely on constraining the growth of banks, come into conflict with the increased credit demands of the liberalized economy.

*“In truth, there has been a great deal of loose talk about tariffs and crises.”*

Frank W. Taussig (1931), *The Tariff History of the United States*

## 1. Introduction

The conjunction of tariff changes and economic crises has fascinated economists for many years. Articles by Bates and Krueger (1993), Rodrik (1994), and Tornell (1995) suggest that economic crises may be required for trade liberalizations to become politically feasible. But other work, such as Krueger (1978), Little et al. (1993) and Corbo (1988) has emphasized the tightening of trade restrictions as a response to crises, such as the Great Depression or the world fall in commodity prices in 1952-53. Going in the opposite direction, research on the 1931 Smoot-Hawley tariff by Eichengreen (1989), Irwin (1998) and others has attempted to quantify the impact of increased protection on the severity of the Great Depression. Economists, with few exceptions, have yet to explore the link between trade liberalizations and economic crises.

A debate over tariffs and crises took place in mid-nineteenth century United States. Tariff policy had fluctuated between the prohibitive tariffs of the 1828 Tariff of Abominations, the nine-year gradual tariff reduction of the 1833 Compromise Tariff Act, and the reimposition of restrictive tariff policy in 1842 followed by liberalization in 1846 and again in 1857. According to Taussig (1931, p. 131), “The protectionists tell us that the compromise tariff caused the disastrous crises of 1837 and 1839; that the high tariff of 1842 brought back prosperity; that depression again followed the passage of the act of 1846, and that the panic of 1857 was precipitated by the tariff act of 1857.” But Taussig himself took the position that “As a rule, the tariff system of a country operates neither to cause nor to prevent crises. They are the results of conditions of exchange and production on which it [the tariff system] can exercise no great or permanent influence.” A similar debate took place in Chile, where the tariff reductions of 1854 and 1874 were blamed for the financial crises of 1860 and 1878 (see Llona 1990, Pinto 1956).

The modern position on trade liberalization and economic crises stresses the importance of pursuing appropriate macroeconomic policies to accompany trade reforms. Trade liberalization will lead to crisis only if inappropriate macro and financial sector policies are followed. Two indirect channels have been suggested for the link between trade reform and

financial crisis. The first one focuses on the credibility of trade reforms (Calvo 1987, Calvo and Mendoza 1994). Trade reforms that are perceived to be temporary will induce intertemporal substitution in consumption and investment that produces a worsening of the current account relative to a perceived permanent trade reform. However, as Calvo and Mendoza (1994) observe, “these models only produce the initial conditions leading to reserve losses, and do not explain runs against financial assets.” That is, these models do not provide a good link between tariff reform and financial crises.

A second indirect channel stresses the role of moral hazard in bank regulation in open economies. Of the recent papers on moral hazard arising from bank guarantees in open economies (see, e.g., Burnside, Eichenbaum, and Rebelo, 1999), only the paper by McKinnon and Pill (1996) has emphasized the link between trade liberalization and moral hazard: “[W]e start with the premise that real-side reform—such as trade liberalization, utility privatization, or domestic deregulation—is fully credible in the eyes of the private sector. Reforms raise the potential productivity of new investment above the levels attainable before the reform.” Due to implicit or explicit government guarantees on domestic and foreign bank liabilities, bank financing of new investments produces overborrowing and an increased likelihood of a government bailout of the banks. McKinnon and Pill note that removal of guarantees on bank liabilities would solve the moral hazard problem, but argue that such a policy change would not be credible because of central bank commitments to preserve the payments system.

Could there be a more direct link between trade liberalization and financial crisis? In this paper I explore the role of the supply of liquidity by the financial system during the period that follows a trade liberalization. In doing so, I draw on recent models of financial crises that work within a three-period financial contracting framework popularized by Diamond and Dybvig (1983). Within this framework period 0 can be thought of as the time of the trade liberalization, period 1 as the time of outward-oriented investment, and period 2 as the emergence of the export economy. Financial contracts take the *ex ante* distribution of liquidity shocks into account and may result in the liquidation in period 1 of some projects that have a positive present value. This analytical framework provides flexibility for addressing issues that are raised by financial crises. I will especially emphasize the decisions played by central banks following trade liberalizations and leading up to the financial crises.

To explore empirically the connection between trade liberalization and financial crisis, I examine the experience of the United States in the 1830s and Chile in the 1970s. These two cases necessarily provide a restricted comparison group. However, the two countries' experiences share a number of striking similarities as well as some important differences. Among the similarities are the following: gradual unilateral trade liberalization leading to a uniform tariff, fiscal surplus, large capital inflows followed by financial crisis, real exchange rate appreciation followed by depreciation, temporary reversal of liberalized trade policies following the crisis, and default on external debt. Among the important differences are those relating to 140 years of institutional structure: there was no IMF in the 1830s, central banking functions were rudimentary in the U.S., and the U.S. monetary system functioned within the constraints of the gold standard, while Chile devalued its fixed exchange rate during the financial crisis. Examination of these two countries' experiences may therefore provide insights into behavior that bridges different historical periods and financial settings.

Section 2 examines explanations and evidence on the causes of the financial crises in the two countries. Section 3 fills out the paper's conceptual framework regarding the role of central banks during the period following a trade liberalization. The section draws on a number of recent papers to highlight the importance of moral hazard when an economy shifts its production structure away from an inward-looking orientation and begins to undertake investments which with time will create an outward-oriented economy. Section 4 turns to evidence from Chile and the United States regarding the time-to-build hypothesis of financial fragility. Section 5 concludes.

## 2. Tariff Reform and Financial Crisis in Chile and the United States

On September 11, 1973 the military staged a coup in Chile and announced their intent to dismantle the excesses of state intervention in the economy. During the first three years following the coup, the average tariff was lowered from about 90 percent to about 27 percent. Equally significant, import licenses, prior import deposits, and import prohibitions were virtually eliminated. In the succeeding three years to mid-1979, tariffs were lowered to a uniform 10 percent rate (with the exception of automobiles). Within the next three years, however, the

collapse of the Chilean financial system and a deep economic recession created pressure to reverse the liberalization. A number of import surcharges were instituted in late 1982 followed by the increase in the uniform tariff to 20 percent in June 1983. Protectionist policies culminated in a 35 percent tariff in September 1984 that was combined with import surcharges and a 120-day minimum financing requirement for imports (de la Cuadra and Hachette 1991 and Edwards and Lederman 1998). Beginning in 1985, a policy reversal allowed the gradual reduction of tariffs to 11 percent by 1991.

Table 1  
Chilean Trade Balance and Tariff Rates

	Trade Balance (\$US millions)	Exports (\$US millions)	Imports (\$US millions)	Average Tariff Rate (percent)
1974	357	2151	1794	67
1975	70	1590	1520	44
1976	643	2116	1473	33
1977	34	2185	2151	22
1978	-426	2460	2886	14
1979	-355	3835	4190	10
1980	-764	4705	5469	10
1981	-2677	3836	6513	10
1982	63	3706	3643	10
1983	986	3831	2845	20
1984	363	3651	3288	35
1985	849	3804	2955	22
1986	1100	4199	3099	22

Table 1 shows figures on the trade balance during the period of tariff reductions. After the average tariff fell to 14 percent in 1978, the trade balance turned negative for four years. This was the period of the economic boom in Chile following the opening of the economy. The

trade deficit reflected an excess of investment over domestic saving, and by 1981 that excess amounted to about ten percent of Chile's GDP. The deficit reverted to surplus in 1982 following the devaluation of the peso and the economy's slide into recession. The trade balance remained in surplus for the next five years as the economy dealt with the aftermath of a severe financial crisis.

On November 24, 1832 South Carolina announced (in the form of a decree law) its intention to nullify the federal tariff beginning in February, and called up its militia to prepare for armed conflict. In the ensuing three months, Congress reached an agreement for the gradual dismantlement of the "American system" of import substitution that had reached its zenith in the late 1820s. Between 1833 and 1842 the Compromise Tariff set out a schedule of gradual tariff reductions and conversion of specific duties into tariff equivalents that resulted in a uniform 20 percent tariff in July 1842. During 1842 protectionist pressure, fueled by a deep economic recession, resulted in the passage of the September 1842 tariff. According to Taussig (1931, p. 113), "Though distinctively protective...it [the 1842 tariff] had not such a strong popular feeling behind it as had existed in favor of the protective measures of 1824, 1828, and 1832." Four years later the 1846 tariff liberalized much of the 1842 tariff, with further liberalization taking place in the 1850s.

Table 2 shows the evolution of the tariff rates during the period. The Compromise Tariff initially lowered tariffs at the beginning of 1834 by one tenth of the difference between their initial level and 20 percent. Additional tenths (each equal in size to the 1834 reduction) were taken off in 1836, 1838, and 1840. At the start of 1842 three tenths were taken off with the final three tenths removed at the beginning of July 1842. During this period a number of goods, including especially iron rails for railroads, were admitted duty free. Consequently, average tariffs on all goods fell from 30 percent in 1832 to 16 percent in 1837, while average tariffs on dutiable goods fell from 43 percent to 29 percent.

Figure 1 shows the lending booms that took place in the United States and Chile during the periods following the trade liberalizations. In the United States bank assets rose at an annual rate of 19 percent between 1834 and 1837, while in Chile net bank assets rose at an annual rate of 29 percent between 1979 and 1982. Bank assets in the United States fell by fifty percent between 1839 and 1843, while net bank assets (i.e., assets minus central bank "bailout" loans)

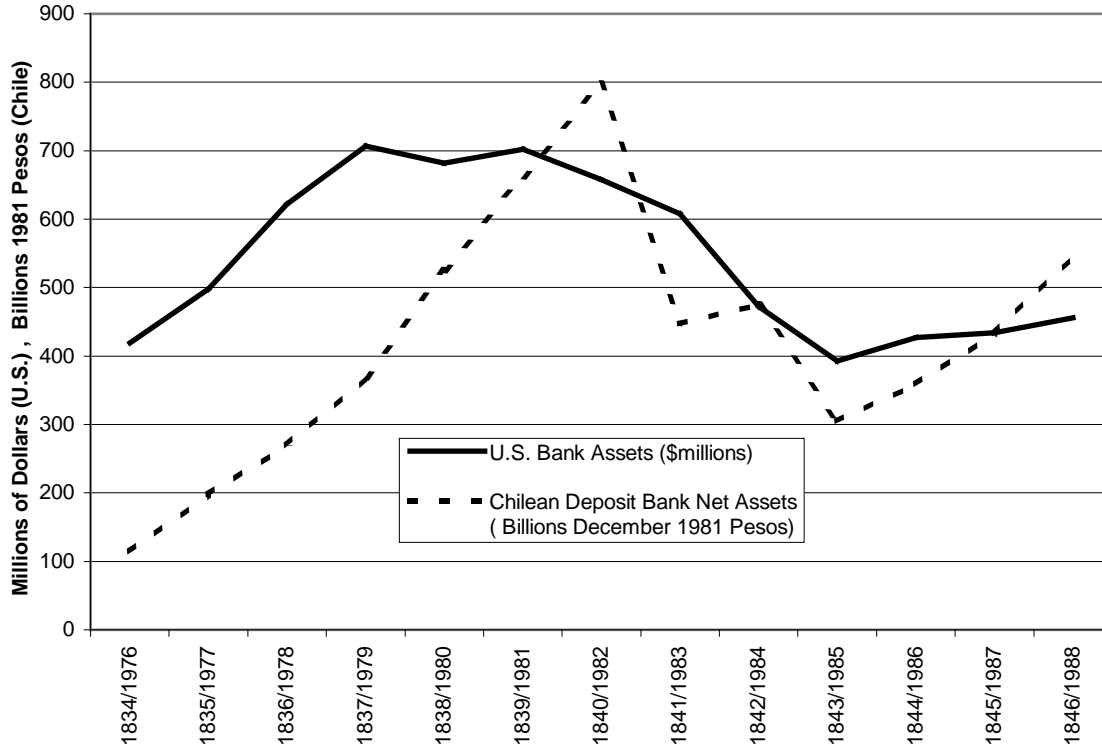
Table 2.  
U.S. Trade Balance and Implicit Tariff Rates, 1830-1845

	Merchandise Trade Balance (\$mill)	Exports (\$mill)	Imports (\$mill)	Dutiable Imports (\$mill)	Free Imports (\$mill)	Ratio of Duties Calculated to Total Imports (percent)	
						Dutiable	Free and Dutiable
1832	-13	62	75	68	7	43.0	30.0
1833	-13	70	83	63	20	38.3	29.0
1834	-6	81	87	47	40	40.2	21.8
1835	-22	100	122	64	58	40.4	21.3
1836	-52	107	159	89	70	34.9	19.5
1837	-19	94	113	62	51	29.2	16.1
1838	+9	96	87	48	38	41.3	23.1
1839	-44	102	146	81	65	31.8	17.6
1840	+25	112	86	44	42	34.4	17.6
1841	-11	104	115	58	57	34.6	17.4
1842	+4	92	88	65	23	25.8	19.0
1843	+40	78	37	26	12	29.2	20.1
1844	+3	100	96	80	17	36.9	30.5

in Chile fell by 60 percent between 1882 and 1885. The asset contraction in the United States was accompanied by the failure of about 200 banks (out of 900) at a cost paid by depositors, while in Chile the net asset contraction associated with the bailout of banks' bad loans created a future tax liability to Chilean taxpayers.



Figure 1. Net Asset Growth of Banks in the United States and Chile



Sour

ces: U.S. Bank Assets: U. S. Department of Commerce. *Historical Statistics of the United States: Colonial Times to 1970, Part 2*. Washington, D.C., 1970, Series X 580-587.

Chilean Deposit Bank Net Assets: International Monetary Fund, *International Financial Statistics*. Net Assets are Total end-of-year Assets (the sum of lines 20 through 22f) minus Credit from Monetary Authorities (line 26g). The nominal figures for each year are deflated by the December CPI deflator, which is taken from Banco Central de Chile, *Indicadores Economicos y Sociales 1960-1988*, Santiago, 1989.

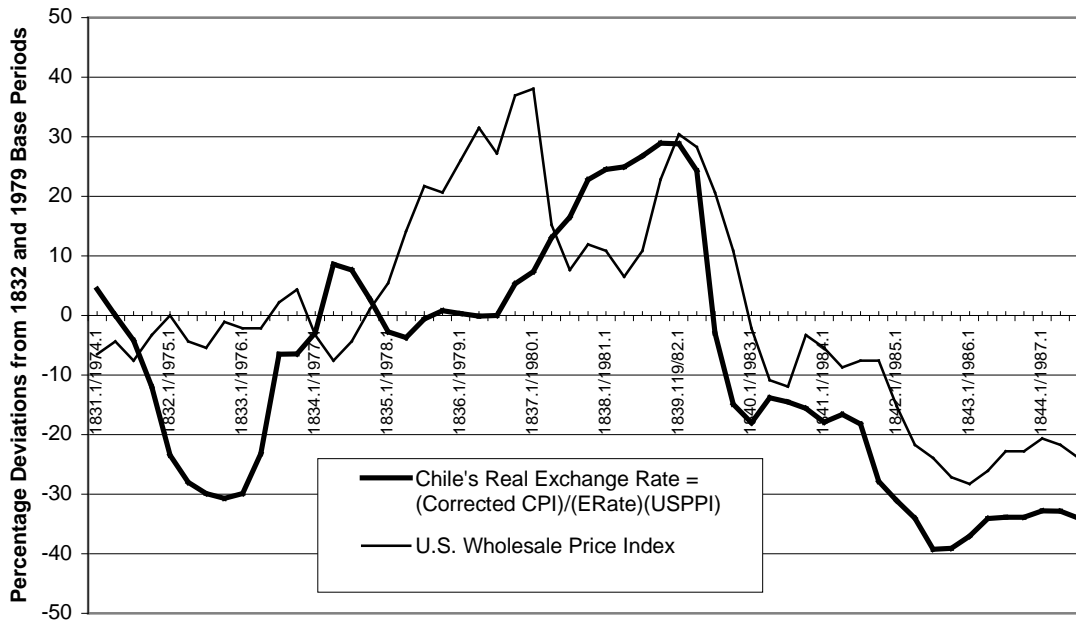
The United States entered into an economic boom during 1835 and 1836, with the trade deficit in 1836 representing approximately five percent of GDP. Financial panic in 1837 was followed by a pause in growth in 1838. Restored convertibility of the financial system permitted large capital inflows in 1839 prior to renewed financial distress that lasted from 1840 through 1844. The economy ran an overall large trade surplus between 1840 and 1844 in response to the financial distress and economic recession.

Simultaneously with the lending boom in each country was an appreciation of the real exchange rate, as shown in Figure 2. In Chile the appreciation began in the second half of 1979 after the exchange rate was fixed at 39 pesos per dollar on June 30. In the two and one half years between July 1979 and January 1982 the Chilean wholesale price index rose by 42 percent while the consumer price index rose by 68 percent. In the United States the appreciation began in the last quarter of 1834. In the two and one half years between August 1834 and February 1837, the U.S. wholesale price index rose by 47 percent.

The end of Chile's real appreciation began with the devaluation of the exchange rate on June 15, 1982. The real depreciation hit an eighteen month plateau in mid-1983 until a major devaluation in September 1984 initiated a final decline. The end of the U.S. real appreciation occurred simultaneously with suspension of bank convertibility during the Panic of May 1837. Resoration of convertibility in early 1839 produced a secondary appreciation of the real exchange rate that ended in the last quarter of 1839 when the Second Bank of the United States closed amid widespread bank failures. The real depreciation took place by a fall in the price level rather than by a depreciation of the exchange rate. The price level hit a plateau for about eighteen months before the announced bankruptcy of the Second Bank set off a new wave of bank failures during the first half of 1842. During 1842 prices resumed their downward fall before reaching their nadir at the start of 1843.

There are obvious striking similarities in tariff policies, trade account movements, lending booms and busts, and real exchange rate movements in Chile and the United States. The most obvious difference is the manner by which the real depreciations took place (depreciation of the nominal exchange rate in Chile versus a fall in the price level in the United States). Are the similarities by chance, or are there common factors at work in the two episodes that produce similar outcomes? I next turn to explanations for the financial crises that have been offered by two different sets of economists: one set is comprised of economists who have studied financial crises in Chile and other developing countries while the other set is comprised of economic historians who have studied nineteenth century U.S. economic history.

**Figure 2. Chile's Real Exchange Rate (1974-87) and U.S. Wholesale Price Index (1831-44)**



### *Two Inflations Under Fixed Exchange Rates*

When Chile fixed its exchange rate at 39 pesos/dollar at the end of June 1979, monetary authorities had expected that the price level would quickly stabilize. This did not happen. In the next two years wholesale prices rose by 60 percent while consumer prices rose by 67 percent. Even taking into account the 26 percent increase in the U.S. producer price index during the same period, Chile quickly developed a seemingly overvalued exchange rate. All accounts of the subsequent financial crisis must take into account the inflation under the fixed exchange rate, because the downward correction in the price level that began in the second half of 1981 raised real interest rates and put severe strains on the financial system.

A common explanation of the inflation in Chile under the fixed exchange rate is Chile's use of backward-looking wage indexation. Dornbusch, Goldfajn, and Valdés (1995, p. 228), along with many others, have expressed the belief that the real appreciation of Chile's exchange rate and subsequent rise in real interest rates in 1981 and 1982 can be explained by inertial real wages: "disinflation was unsuccessful because of explicit indexation....Thus, as backward-

looking indexation implied major wage increases, the fixed currency led almost automatically to overvaluation.”

Wage indexation may have imparted inertia to the price level, but Table 3 shows that actual wage increases outstripped mandated minimum increases throughout the period 1977-1982, often by substantial amounts. Over the entire period between July 1976 and August 1981 nominal wage growth (938 percent) was over 60 percent greater than the mandated minimum increase (539 percent).

Table 3  
Wage Increases in Chile: 1976-1981

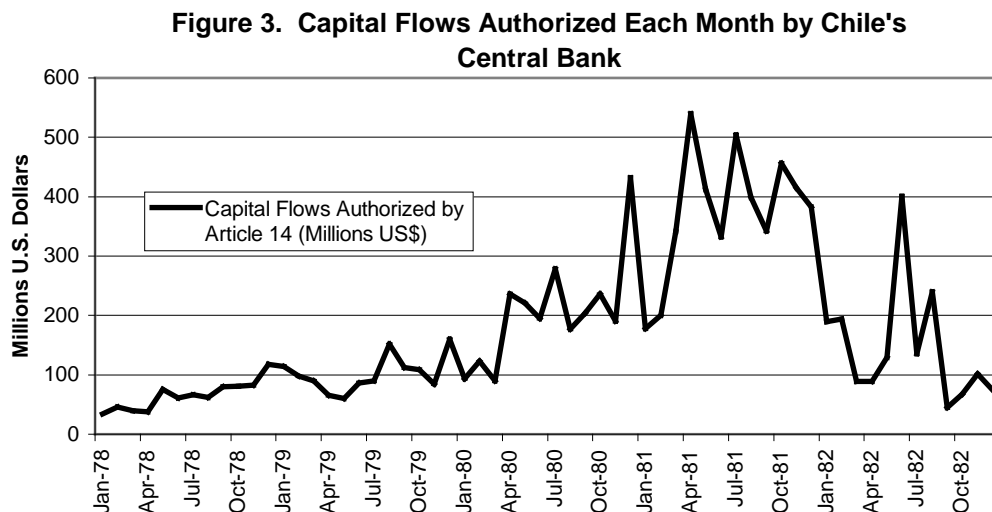
	Mandated Minimum Nominal Wage Increase (percent)	Actual Nominal Wage Increase (percent)		Mandated Minimum Nominal Wage Increase (percent)	Actual Nominal Wage Increase (percent)
7/1/76-9/1/76	26	30.0	7/1/78-12/1/78	12	16.7
9/1/76-12/1/76	18	23.8	12/1/78-3/1/79	6	8.0
12/1/76-3/1/77	19	21.4	3/1/79-7/1/79	11	14.0
3/1/77-7/1/77	18	23.2	7/1/79-12/1/79	18	23.1
7/1/77-12/1/77	18	24.2	12/1/79-4/1/80	8	9.1
12/1/77-3/1/78	8	9.1	4/1/80-10/1/80	14	17.7
3/1/78-7/1/78	10	15.8	10/1/80-8/1/81	14	21.0
			Cumulative 7/1/76-8/1/81	539	938

Sources: Edwards and Edwards (1987, p. 148) for mandated minimum nominal wage increase. Banco Central de Chile (1989, pp. 217-219) for actual nominal wage increase.

Harberger (1984) has pointed out that during 1979-1981 unemployment was falling at the same time that real wages were rising, so that the indexation of wages only became a binding

constraint in the second half of 1981 as the economy's growth rate began to slow. By June 1982 the government had repealed the indexation of wages. Edwards (1986) and Morandé (1988) also express a more guarded assessment of the role of indexed wages in Chile's post-1979 inflation, placing greater emphasis on the capital inflows that followed the liberalization of the capital account during 1979 and 1980. Edwards (1986) suggests that the maintenance of a fixed exchange rate and wage indexation was only a mistake after the capital inflows began to dry up in late 1981.

Morandé (1988) makes an even stronger case that wage indexation did not lead to the real appreciation of the exchange rate in Chile. He finds that "virtually exogenous massive capital inflows" were primarily responsible for the peso's real appreciation between 1976 and the first of half of 1982. Figure 3 shows the monthly inflows for banks (which represented about 80 percent of total private borrowing) approved by the Central Bank between 1978 and the end of 1982. Morandé finds that the sharp cessation of those capital inflows in late 1981 forced the real devaluation during the second half of 1982. This story of exogenous capital flows is also emphasized by Calvo, Leiderman and Reinhart (1990) and in Calvo's (1995) model of herd behavior among international investors.



The explanation of an exogenous shock caused by the cessation of capital inflows is closely connected to the role played by other shocks to the Chilean economy. The price of copper halved between 1980 and 1982 at the same time that real international interest rates rose, compounding the Chilean economy's adjustment to the higher oil prices caused by the second oil shock.

In August 1834, following approval by the U.S. Congress, the United States switched from a *de facto* silver standard to a *de facto* gold standard. The world relative price of silver to gold at that time was about 15.7:1. The U.S. mint ratio, which had previously been 15:1 was raised to 16:1. At the time of the change, no gold coins circulated in the United States, so the effective devaluation of the silver dollar was about two percent ( $16/15.7$ ). By changing the mint ratio, the U.S. joined Great Britain on the gold standard.

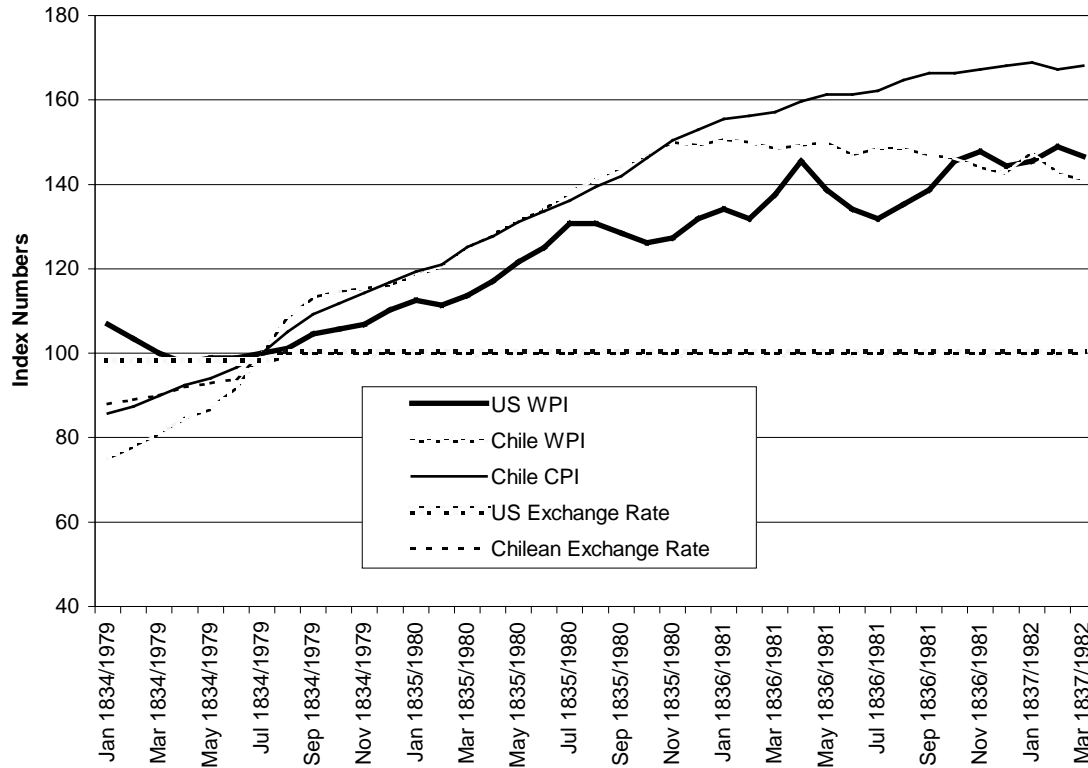
At the time of the switch in the mint ratio the price level had been mildly declining. Beginning in August 1834 the U.S. wholesale price index rose by almost 40 percent over the next two years, as shown in Figure 4. This price rise has been the subject of much debate among economic historians, the same way that Chile's inflation has been the subject of debate among economists. Temin (1967) has argued that the U.S. inflation was due to the retention of Mexican silver imports that had previously been exported to China. Between 1834 and 1837 the stock of specie in the U.S. rose by over 70 percent. Inflation accompanied the retention of the silver, but as Temin noted, the retention depended on capital imports from the U.K. that made possible a level of spending consistent with the greater stock of specie. Temin summarizes his explanation as follows:

One can as easily say that the capital imports permitted the United States to retain the Mexican silver as that the cessation of silver shipments to China enabled the United States to import capital from Britain. The two events together produced the inflation.

As with Chile, attention has also focused on the “exogenous” nature of the capital flows from Britain as a cause of the U.S. inflation of the 1830s. Smith and Cole (1935, p. 42) are among many who point out that following British disillusionment with South American loans in the 1820s, the United States of the early 1830s became attractive to British investors. The attraction was increased by the success of the Erie Canal and the potential for similarly high returns on other infrastructure projects. Smith and Cole (1935, p. 68), as well as Macesich (1960), emphasize the capital inflows as the cause of the U.S. inflation:

During the period of international borrowing by American states and business enterprises, the general level of domestic commodity prices rose relative to that of imported commodity values – the divergence being particularly great at the

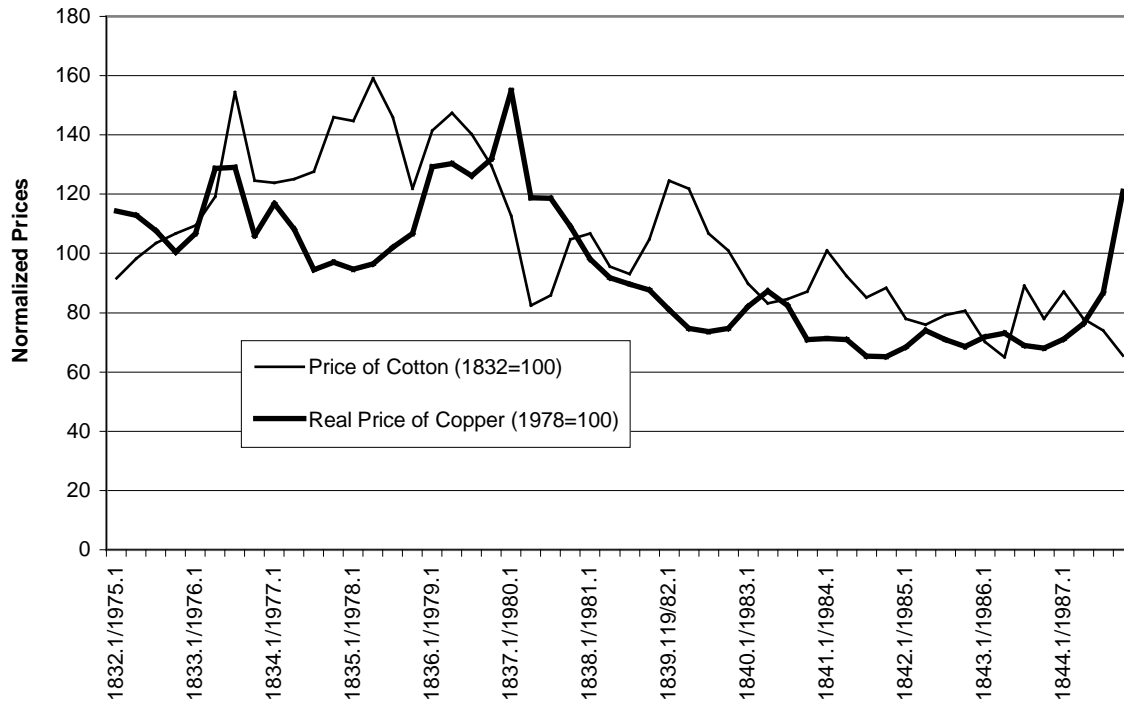
**Figure 4. Inflation Under Fixed Exchange Rates:  
The United States (1834-37) and Chile (1979-82)**



height of this borrowing movement in 1836-37. Subsequently, with the reversal of conditions and the apprehension by British investors of American securities...the level of domestic prices fell more sharply than that of imported goods.

The comparison with Chile shows that upward price inertia was not plausibly a factor in the U.S. inflation. As with Chile, the cessation of capital flows was closely correlated with a terms-of-trade shock and a rise in international interest rates. Figure 5 shows a comparison of the price of cotton in the 1830s with the price of copper in the late 1970s and early 1980s. Prior to each financial crisis, the price of the leading export fell by about 40 percent. In Chile's case, copper accounted for 46 percent of export earnings during 1979-1981 while cotton accounted for 57 percent of U.S. export earnings during 1835-1837.

**Figure 5. Price of Cotton (1832-44) and Real Price of Copper (1975-1987)**



In summary, large capital inflows can plausibly explain both inflations, while the U.S. price deflation and Chilean real exchange rate depreciation were caused by the cessation of the capital inflows. These capital inflows were closely related to the two lending booms shown in Figure 1. Besides external causes of the lending booms, many economists have stressed internal causes related to moral hazard in banking. To these internal causes I now turn.

### *Moral Hazard and the Lending Booms*

Central banks generally offer implicit or explicit guarantees on bank deposits and other financial system liabilities. These guarantees may cause banks to take on undue risks, including foreign exchange risk and asset risk, which make the banks prone to financial crisis. Moral hazard in banking is a common theme that has been explored in explanations of the financial crises in Chile and the United States.

Diaz Alejandro (1986), Edwards (1985), Arellano (1984), and Barandiaran (1983) all make the point that implicit state deposit insurance coupled with lack of supervision over lending activities created a problem of moral hazard in the Chilean banking system. All four of the



above authors argue that the rescue in 1977 of all depositors and other creditors of Banco Osorno, a medium-sized bank that went bankrupt, provided a de facto guarantee of deposit insurance even when the government itself continued to claim that it would not rescue banks in the future. Harberger (1985) also argues that the financial crisis arose because banks, from the time of their privatization in 1975, carried with them a large portfolio of bad loans that gave rise to a false demand for credit that raised real interest rates, placing serious strains on other enterprises.

In the United States, the problem of moral hazard is generally associated with the actions of the Second Bank of the United States. Throughout the 1820s the Second Bank had developed a method of monitoring banks by using its position as the government's fiscal agent to accumulate large quantities of bank notes. It presented these bank notes to the issuing banks with the demand for payment in specie (silver or gold). The policy encouraged banks to remain liquid and prevented an over-issuance of bank notes.

Following the passage of the 1833 Compromise Tariff Act, President Jackson announced his intention to withdraw all United States funds from the Second Bank. During the following two years, the government withdrew its funds from the Second Bank and deposited them with a number (about 80) of state deposit banks. At the termination of the so-called Bank War in 1834, Nicholas Biddle (the Second Bank's president) declared that the Second Bank would no longer monitor state banks by requiring specie in exchange for bank notes (Temin, p. 60).

At the same time, the government had to create a new deposit bank system to handle fiscal revenues. In December 1834 Daniel Webster introduced Congressional legislation to impose a 25 percent reserve requirement on all deposit banks (Timberlake 1978, p. 46). The bill was narrowly defeated by opponents who argued that such a requirement would sabotage the new system. The Treasury secretary furthermore urged the deposit banks to lend with the public monies. By 1836 it appeared that specie reserve ratios of the deposit banks had fallen to low levels (Timberlake, p. 47). Many historians—including Schlesinger (1945), Meyers (1960), and Hammond (1957)--place the origins of the lending boom and inflation with the loose regulatory standards resulting from the Bank War.

The consequences of moral hazard in banking are limited by the credibility and extent of the government's guarantee to bank creditors. Dooley (1998) points out the importance of fiscal accounts for the credibility of the government's guarantee. Dooley (1998) and Brock (1992)

both emphasize the size of the government's "bailout" funds for the potential costs of moral hazard.

Chile had run a primary fiscal surplus beginning in 1975 and continuing through 1981. Moreover, the government ran a significant total surplus (including debt service) during the three years of the credit boom and inflation (1979-1981). The United States government had paid off its debt by 1833 and began to accumulate surplus revenue, which Congress voted to distribute to the states in 1836. According to Ratchford (1942, p. 85),

When Congress finally voted to 'loan' this surplus to the states, it added the climax to a long series of events which had raised the enthusiasm for borrowing and spending to a fever pitch. Even those states which did not wish to borrow were having funds thrust upon them; they could hardly be blamed if they regarded the federal funds as manna from heaven. Also, if Uncle Sam was so generous in prosperous times surely he would not desert them if they incurred a debt and later found repayment difficult.

In addition, the United States had paid off the Revolutionary War debt of the states, so that there was precedent for assuming that the federal government would take responsibility for state debts incurred during the 1830s.

Finally, in both Chile and the United States the commitment to a fixed exchange rate with the major creditor country may have been an important signaling device by the government. Valdés (1994) believes that fixing the exchange rate in 1979 was an important financial guarantee by the government. Indeed, after the 1982 devaluation the government subsidized debt repayments by dollar debtors. Similarly, the 1834 change in the U.S. mint ratio served to integrate U.S. capital markets more closely with British capital markets by placing both currencies on the gold standard.

In essence, then, a strong case can be made that in both Chile and the United States moral hazard in banking was a significant problem. Implicit government guarantees permitted the moral hazard to take on a macroeconomic importance it would not otherwise have had. And it is likely that fiscal surpluses, combined with measures that fixed the exchange rates to the main creditor countries' currencies, also helped to create the lending booms in the two countries.

This head-to-head comparison of Chile and the United States has shown that the financial crises can plausibly be explained as the result of exogenous capital flows, changes in the terms of trade, poor financial regulation, and virtuous fiscal and exchange rate policy. Indeed, given that the intersection between economic historians studying the United States and economists studying Chile is the null set, the agreement of the two groups of economists on common explanations of the lending booms and financial crises is striking.

Is this all there is to the two crises? Are there other factors that play a role in the crises? In particular, is trade liberalization a pervasive background factor contributing to the crises, or is it merely of second order importance to our understanding of the periods in question? The next section builds a conceptual framework in which trade liberalizations create financial fragility.

### 3. Trade Liberalization and Financial Crisis: A Conceptual Framework

What were the consequences of the two periods of trade reform with regard to the inflations and financial crises in Chile and the United States? The evidence on the microeconomic response of manufacturing to trade liberalization in Chile indicates that those industries with the highest initial levels of nominal tariff protection in 1976 suffered the greatest declines in output by 1979 (De la Cuadra and Hachette 1991, p. 258), as shown below in Table 4.

Several recent studies (Roberts 1996, Levinsohn 1999, and Pavcnik 2000) have made use of plant level data from 1979-1986 that was gathered by the Chilean National Statistics Institute. The data shows weak evidence that the exportable manufacturing sector increased in importance relative to the import-competing and nontradeable sectors between 1979 and 1986. More importantly, the data show a tremendous amount of job churning within sectors, and that this churning is highest in the exportable sector, followed by the importable and nontradeable sectors. Levinsohn (1999, p. 335-6) argues that, "If one plausibly believes that Chile's comparative advantage is in industries that are labor intensive and thus involve relatively low sunk start-up costs, this pattern is quite intuitive. An implication, which may generalize to other developing countries, is that trade liberalization promotes high turnover industries, and thus creates more churning in the job market." Levinsohn goes on to emphasize that "If one associates Japan with the notion of lifetime employment, Chile during liberalization is at the other end of the spectrum."

Table 4. Impact of Trade Liberalization on Chilean Manufacturing Production (1976-1979)

<i>Subsector</i>	<i>Production impact (% change)</i>	<i>Nominal tariff 1976 (%)</i>	<i>Production impact ranking</i>	<i>Tariff ranking</i>
Metal products	-64.7	45	1	2
Electrical and nonelectrical machinery	-58.7	40	2	4
Rubber products	-55.1	38	3	5
Basic metal industries	-53.9	60	4	9
Textiles	-44.7	46	5	1
Shoes and clothing	-44.6	44	5	3
Nonmetal mineral products	-27.9	33	7	7
Beverages	-20.6	29	8	10
Chemicals	-18.8	34	9	6
Tobacco	-15.5	23	10	15
Printing and publishing	-12.7	33	11	7
Paper and paper products	14.8	29	12	10
Food products	25.9	26	13	14
Wood and wood products	32.6	27	14	12
Furniture	61.7	27	15	12

Spearman rank correlation coefficient is 0.7821 (99% confidence level)

Source: De la Cuadra and Hachette (1991), p. 258

The growth of export industries in both the United States and Chile required time to build infrastructure and prepare land for export crops such as cotton and wheat in the U.S. and fruit and timber in Chile. As an example, between 1974 and 1989 Chilean fruit growers dramatically expanded land planted in apples and table grapes, as shown in Table 5. In addition, about 5,900 hectares of canning peaches (a priority under the previous import-substituting governments) was rooted out and converted into either nectarines (for export) or table grapes. At the time of the 1982 crisis, much of the newly-planted land was not yet producing.

Table 5. Chilean Exports of Apples and Table Grapes

Land Planted (has.)	1965	1974	1982	1989
Apples	8,486	11,350	17,662	25,860
Table Grapes	5,451	4,250	17,363	47,700
Exports (tons)				
Apples	12,264	11,526	101,641	316,800
Table Grapes	6,816	12,698	83,185	693,000

Source: Chilean Development Corporation.

At any given moment in time, most economies can be characterized as having some investments in the planning stages, some in the building stage, and some (perhaps many) in the producing stage. Indeed, most well-established companies have investments simultaneously in all three stages. If a viable project in the building stage needs financing beyond what was initially anticipated, the company can use some of the cash flow from its mature projects. A mature economy can generally provide financing to new investments so that they are not abandoned part way through completion because of lack of liquidity.

A major trade liberalization, however, alters an economy's production structure and firms' planned investments. At the time of the liberalization, the import-competing sector begins to contract so that cash flows from existing investments cannot be counted on as a source of liquidity for new exportable investments. Outside financing of new investments becomes more difficult, and there is a danger that creditors may restrict the amount of funds that are directed toward the exportable sector.

In the past several years, a number of papers on financial crises have based their models on a three-period framework which in a general sense goes back to Diamond and Dybvig's (1983) model of bank runs. Although none of these papers discusses trade liberalization or trade policy, the three-period approach is useful for sorting out the financing issues that accompany the implementation of trade reforms. In a three-period world, a trade liberalization at period 0 creates opportunities for new investments, assuming that financing can be arranged. As the investments are being built in period 1 a financial crisis may occur (for several reasons related to

liquidity shocks) and the new investments may end up partially abandoned in the absence of new funding. In period 2 a successful liberalization realizes the fruition of the new investments, but an unsuccessful liberalization must bear the costs of the abandoned projects. This stylized three-period “time-to-build” sequence seems to fit economies that are in the process of structural change, such as a trade liberalization.

To make these time-to-build models of financial crises work, there must be a random demand for liquidity in period 1. It is this liquidity demand that gives rise to financial intermediaries in these models. In the Diamond-Dybvig (1983) model--and in later extensions by Allen and Gale (1998, 2000), Gale and Vives (2000), and Chang and Velasco (2000)--liquidity management comes on the liability side of the banks, since some depositors have random liquidity needs in period 1. In the Hölmstrom-Tirole (1998) model—as well as in the recent models by Diamond and Rajan (2000) and Caballero and Krishnamurthy (2000a)--liquidity management occurs on the asset side of the banks, since firms have random additional financing requirements in period 1. Locating the source of the liquidity disturbance at the level of the firm is attractive, given the empirical evidence in Chile that increased “churning” of jobs is an important part of an economy’s adjustment to a trade liberalization. Such churning may partially reflect random liquidity shocks that face firms as they adjust to the outward-oriented environment.

In these latter three models entrepreneurs cannot pledge the full value of the firms’ output due to moral hazard and legal constraints. As a result, liquidity may be insufficiently supplied to firms that need it. In addition, a premium on liquidity will cause firms to invest too much in period 0 and liquidate too much in period 1, rather than make fewer investments in period 0 and arrange for a line of credit in period 1. Firms overinvest in period 0 as a way of self-insuring when liquidity is apt to be at a premium in period 1.

There are circumstances in these models in which projects will be liquidated when they should not be from a social point of view. Governments may be able to intervene in the supply of liquidity, but the intervention is not as simple as the introduction of deposit insurance into the Diamond and Dybvig (1983) model. In Hölmstrom and Tirole (1998), the government can issue government bonds by virtue of its power to tax second-period consumption. These bonds provide liquid claims, which are especially valuable as a hedge against aggregate shocks in period 1.

Caballero and Krishnamurthy (2000b), on the other hand, show that an illiquid government bond market may cause central bank open market operations to backfire.

The “time to build” literature on financial crises concentrates on moral hazard in firms’ behavior as it relates to financial contracts and the structure of financial intermediaries. Liquidity provision by a central bank (or treasury) may prevent the inefficient liquidation of firms during a financial crisis. This is the “lender of last resort” function newly-defined to include the issue of liquid government debt. On the other hand, McKinnon and Pill (1996), Krugman (1998), Dooley and Shin (2000) and many others have expressed concern regarding the moral hazard created by the presence of implicit or explicit government guarantees on the banking system. Guarantees may create the incentive for banks to operate with an overly risky balance sheet. When the contracting constraints (stressed by liquidity models) on the asset side of banks create financial fragility and potentially inefficient liquidations of firms, and when implicit or explicit central bank guarantees simultaneously create a moral hazard, the central bank’s role as lender of last resort becomes a balancing act.

Hölmstrom and Tirole’s (1998) framework is especially useful for thinking about the public supply of liquidity. In their model, idiosyncratic liquidity shocks result in period-1 financing needs by firms. Financial intermediaries, unlike stock markets, can pool many borrowers and provide liquidity in the form of a credit line. When liquidity shocks are aggregate disturbances, on the other hand, financial intermediaries cannot provide liquidity insurance, since firms demand liquidity simultaneously in the event of a negative shock.

Hölmstrom and Tirole examine the role of government debt in a world with systematic liquidity shocks. Government debt adds liquidity because the government can commit to tax consumers when firms’ liquidity needs are high. Non-contingent government debt provides this liquidity insurance, but state-contingent government debt can do better by incurring the deadweight costs of taxation only when liquidity is needed. In an economy characterized by aggregate liquidity shocks, banks play a different role than in standard analyses, since there is no special information-gathering function for banks regarding the verification of idiosyncratic shocks. Banks now hold government debt as centralized managers of liquidity for firms. Although Hölmstrom and Tirole do not mention this, if banks were to hold state-contingent government debt, they would look much like banks that enjoy a government deposit guarantee, which is a form of state-contingent claim on the government. But because Hölmstrom and Tirole

assume that the provision of liquidity to firms does not create a moral hazard (entrepreneurs cannot consume funds), state-contingent claims on the government help rather than hurt the economy.

At this point, the line blurs between those who stress the moral hazard associated with government guarantees on bank liabilities and those who stress the government's role in providing liquidity to the financial system. In this paper I hypothesize that trade liberalizations make the oversight of banks' liquidity more difficult for central banks. With diversifiable liquidity shocks, the enforcement of prudential regulations follows well-understood standards (such as capital, assets, management, equity, and liquidity standards). With highly correlated liquidity shocks to firms, banks will not be equipped to withstand a large negative liquidity shock. This will interfere with bankers' incentives to monitor idiosyncratic risk (see, e.g., Dewatripont and Tirole 1994). Central bank provision of liquidity (as opposed to prudential oversight) then becomes important. If the provision of that liquidity is constrained, there will be a liquidity premium. As in Hölmstrom and Tirole (1998) and Caballero and Krishnamurthy (2000b), firms (and banks) will have the incentive to invest too much early in the liberalization process, thereby increasing the likelihood of a financial crisis.

An additional element of the paper's thesis is that the government provision of liquidity during the crisis may also involve a temporary increase in tariffs as a way of increasing the profits and liquidity of import-competing and nontradeable firms.

#### 4. The Control of Moral Hazard by Weak Central Banks

Moral hazard exists on both sides of banks' balance sheets. The strength of the financial contracting models is in their characterization of financial contracts between lenders and borrowers. Financial intermediaries arise as a response to the moral hazard problem associated with providing funds to borrowers. Debt contracts with credit line features emerge from many of these models. On the other hand, the time-to-build financial contracting models ignore the problem of regulatory moral hazard. The problem is circumvented because, for example, demand deposits provide discipline in Diamond and Rajan (2000), a bank can only invest in one asset in Allen and Gale (1998, 2000), and a bank can costlessly provide liquidity in Holmstrom and Tirole (1998).



Nevertheless, liquidity risk and asset risk of banks are two main sources of regulatory moral hazard. First, banks can hold too few liquid assets to cover the liquidity shocks facing investments. Second, banks can invest in risky projects or fail to monitor those projects. In economies with weak supervisory agencies, these risks are primarily handled by two instruments. The first is the reliance on high reserve requirements to enforce bank liquidity. In Chile reserve requirements on demand deposits began at levels of 85 percent in 1976 while rates on time deposits were 55 percent. In the United States banks operated with reserve ratios (specie to bank notes plus deposits) of about 20 percent.

The second instrument is the imposition of credit ceilings. Chile employed credit ceilings on banks until May 1976 as a way of constraining credit growth. Credit ceilings act as a marginal 100 percent reserve requirement. That is, once the ceiling has been reached, any new deposit growth is turned into required reserves. In the United States of the 1830s, both the Second Bank and the Suffolk Bank of Boston acted as clearinghouses for other banks. Both banks followed the practice of redeeming bank notes for specie at the issuing banks. In ways similar to a credit ceiling, specie redemption limited rapid loan growth. For example, a bank seeking to increase lending by issuing bank notes to borrowers would quickly have to pay specie to the Second Bank or the Suffolk Bank in exchange for the notes that ended up with the two clearinghouses.

Capital controls can play a similar role in limiting the growth rate of bank loans. After eliminating credit ceilings in 1976, the Chilean Central Bank relied on capital controls to limit the expansion of credit by the banking system. Another weak supervisory authority in the United States, the FSLIC, attempted to limit the flow of brokered deposits to S&Ls in 1984, but was rebuffed by the U.S. Court of Appeals. Limits on the flow of brokered deposits, like capital controls, might have provided a crude method of controlling asset risk in the S&L industry. Figures taken from the balance sheets of S&Ls in 1984 indicate that fast-growing thrifts were more apt to hold riskier asset portfolios and to rely on more volatile sources of funding.<sup>1</sup>

---

<sup>1</sup> White (1991, pp. 103-104) shows that the fastest growing thrifts in 1984 placed far less reliance on residential mortgages than slow-growing thrifts (53% versus 68.1%), and far more reliance on commercial mortgages (10.8% versus 6.6%), land loans (5.8% versus 1.2%), nonmortgage loans (5.0% versus 3.7%) and direct equity investments in real estate (1.2% versus 0.2%). Fast-growing thrifts placed far less reliance on retail deposits than slow-growing thrifts (59% of liabilities versus 80.9%) and far more reliance on large denomination brokered deposits (18.1% versus 7.3%) and short-term repurchase agreements (10.4% versus 2.4%).

Although it is common to view prudential regulation as imposed on the banking system by supervisory agencies, in the United States of the early 1830s banks in New England voluntarily submitted to the specie redemption policy of the Suffolk Bank. Belonging to the Suffolk Bank clearinghouse was a commitment device that was of value to banks because it raised the value of their bank notes and increased the area of their circulation (see Calomiris and Kahn 1996).

Suppose an economy is initially growing slowly with a protective trade regime. There are relatively few new investments compared to ongoing production, so liquidity demands on banks are small. Prudential regulation consists of reserve requirements and credit ceilings. Capital controls on external finance generally reinforce quantitative restrictions on imports.

Liberalization of the trade regime will create a new set of investments. Removal of quantitative import restrictions will allow agents to import at will, subject only to the availability of external finance. Credit ceilings, capital controls, or specie redemption policies will become onerous to those who wish to invest in the new economy. Political pressure will push for the removal of the crude, but effective, tools for prudential supervision. In the United States the strong political pressures working to cripple the Second Bank were closely allied with the Compromise Tariff and the westward expansion of the economy.

In Chile the Central Bank was weakened by its rescue of the Savings and Loan System in 1975. Credit expansion associated with the rescue effort accounted for roughly two thirds of the Central Bank's total credit expansion between 1976 and 1978. The Central Bank did not have the resources or expertise to monitor banks. As De la Cuadra and Valdés document, it was not until 1980 that the Superintendency of Banks began to collect information on the largest debtors of the banking system. The Central Bank also did not have extensive resources to intervene in banks.

After the Central Bank eliminated credit ceilings in 1976, it gradually relaxed capital controls and reduced reserve requirements. Global limits on foreign indebtedness by banks were eliminated in June 1979 and monthly flow limits were eliminated in April 1980. Reserve requirements on demand deposits were lowered from 85 percent in 1976 to 10 percent by the end of 1980, while reserve requirements on short-term time deposits were lowered from 55 percent to 4 percent during the same time period. Regarding the political pressure on the Central Bank to loosen capital controls during this period, De la Cuadra and Valdés (pp. 20-21) write:

The business community, in general, and some academic economists strongly attacked the central bank's policy. The business community blamed the policy for delaying a decline in the interest rate and for discriminating among borrowers, since those better connected to banks had access to cheaper financing....Finding little support for its stance, the monetary authority eventually opened the capital account without restrictions—except for the prohibition of foreign loans with an average maturity of less than two years and the imposition of reserve requirements on foreign loans with maturities of between twenty-four and sixty-five months. This opening of the capital account occurred in April 1980 and was followed by large capital inflows during the remainder of the year and during 1981.

In both the United States of the 1830s and Chile, political pressures created partly by the opening of the economies led to the abandonment of crude tools for the control of moral hazard in banking. The abandonment was followed by large capital inflows, trade deficits, and diminished supplies of liquid assets by banks. During the period of large capital flows to the U.S. (1835-1837, 1839) and Chile (1978-81) many investments were undertaken that fit into the “time-to-build” view of the adjustment to a trade liberalization. The problem for regulators was that traditional tools for controlling moral hazard—such as credit ceilings, capital controls, and bank notes for specie exchanges—were not compatible with a high growth economy. In a political sense, the welfare gain from permitting fast credit growth to take advantage of new investments created by the opening of the economies exceeded the welfare loss from abandoning traditional tools of prudential oversight. Those same political factors pushed reserve ratios downward in the U.S. and Chile, thereby making banks less liquid. If most of the liquidity risk was non-diversifiable, then one could argue, a la Hölmstrom and Tirole, that state-contingent aid to the banks was a more efficient use of government resources than imposing high reserve requirements.

An implication is that more sophisticated supervisory tools could allow for rapid credit growth and keep bank moral hazard in check following a trade liberalization. The sorts of things that would be needed are risk-weighted capital requirements, more highly trained bank

supervisors, more accurate information about bank's loans and other balance sheet items, actively-traded markets for bank stocks, and the use of subordinated debt.

In the absence of more sophisticated bank supervision, the aftermath of a period of high growth and financial crisis will see a return to crude ways of controlling moral hazard by controlling growth. In the United States, a period of free banking followed the financial crises in 1837 and 1839. Under free banking, a 100 percent reserve requirement was placed on bank notes. Bank notes were backed by state bonds, so that loan growth depended on deposit growth. Under this system, bank notes were relatively safe although deposits were not. In Chile, the new banking law adopted in 1986 contained a number of sophisticated measures to control moral hazard. But there was also a throwback to cruder tools in the use of a 100 percent marginal reserve requirement on demand and short-term deposits when those deposits exceed 250 percent of a bank's capital.

In summary, credit ceilings, borrowing controls, and note redemption policies are crude, but effective tools for controlling regulatory moral hazard. However, these tools all work by limiting the growth of banks. Credit ceilings and note redemption act as 100 percent marginal reserve requirements and thus, in addition, promote liquidity of the banks. In a "time to build" world, these tools are ill-equipped to handle a rapid expansion of bank credit to finance new investments. Regulatory insistence on enforcing standards will be met by political pressure to drop the use of those tools. When the tools are dropped, more sophisticated tools need to be put into place, such as risk-weighted capital requirements, improved information reporting by banks, high quality audits, and the use of subordinated debt. In the absence of more sophisticated tools, the scrapping of the crude tools can easily lead to a lending boom with moral hazard showing up in the form of illiquid banks with overly risky loans.

## 5. Conclusion

How should a lender of last resort behave during a trade liberalization? In this paper I have put forward the thesis that trade liberalizations create the appropriate conditions for a financial crisis. Prior to the liberalization, production is characterized by sheltered firms. Liquidity shocks are small and much of investment is self-financed. In this setting, banks

provide short-term trade credit. To the extent that there is moral hazard in banking, central banks can ensure in various ways that banks remain sufficiently liquid.

After the trade liberalization, the economy will move from a self-financing structure with overlapping generations of investments to a time-to-build export-oriented production structure. There will be increased demand for longer-term credit. Churning in the economy will rise as the import-competing sector consolidates and the export sector expands. In this phase, the lender of last resort cannot control bank moral hazard easily. Restrictions on the growth of credit will interfere with the “time to build” aspects of the economy. If the increase in bank liabilities takes the form of foreign loans, rather than domestic deposits, then foreign liquidity shocks will become undiversifiable for the banking sector. As in Holmstrom and Tirole, *ex ante* commitments by banks to provide liquidity to firms will be more problematic and may require the government to supply liquidity (either in the form of government bonds or in contingent guarantees of liquidity). This contingent supply of liquidity may create incentives for banks to become less liquid than they otherwise would.

After the transition phase to an export economy is completed, the economy returns to an overlapping generations of investments structure, with less need for external financing and with greater internally generated funds for new projects. Prudential supervision of banks may return to a greater emphasis on the control of credit expansion by liquidity-based instruments.

In summary, the prudential supervisory functions of the lender of last resort are temporarily altered by the time-to-build characteristics of the trade liberalization. I contrast this thesis with the view that trade liberalizations and crises have no connection, and with McKinnon and Pill’s (1996) thesis that government deposit insurance is the cause of a financial crisis following a trade liberalization. In addition, recent work on lending booms of the sort experienced by the United States and Chile (Gourinchas, Valdés, and Landerretche 1999; Aghion, Bacchetta, and Banerjee 1999; Schneider and Tornell 2000; and Caballero and Krishnamurthy 2000b) has made no reference to trade liberalizations as a contributing factor to financial crises.

There are a number of relevant issues that the paper has not addressed. First, in both the United States and Chile there was a shortening of the maturity of foreign borrowing that took place prior to the banking collapses. During 1838 Nicholas Biddle set up an agency that floated one-year bonds on the European market with the Second Bank’s guarantee. During 1982 the

Central Bank of Chile removed reserve requirements on short-term foreign borrowing. Diamond and Rajan (2000) emphasize that this shortening of maturity is consistent with a liquidity-shock model of investment, and that the shorter maturity represents a necessary increase in the fragility of the banks to counter moral hazard.

Second, unlike the United States in 1842, the higher tariffs in Chile in 1983-85 did not have a noticeable impact on the recovery of the economy. In Chile the process of negotiating partial debt forgiveness with foreign banks began in 1985, and this process improved the balance sheets of banks. In the United States, in contrast, foreign debts were not forgiven. It may be that temporary tariffs and debt forgiveness are alternative ways of improving the liquidity of an economy in the aftermath of a crisis.

Third, unlike the structure of existing three-period financial contracting models described in this paper, a trade liberalization is a policy measure rather than an exogenous technology that creates profitable projects. That means that the political economy of pressure groups must be acknowledged as an untreated element of the “time to build” thesis linking trade liberalizations to financial crises.

## References

- Aghion, Philippe, Philippe Bacchetta, and Abhijit Banerjee. 1999. Capital Markets and the Instability of Open Economies (manuscript).
- Allen, Franklin and Douglas Gale. 1998. Optimal Financial Crises. *Journal of Finance* 53: 1245-84.
- Allen, Franklin and Douglas Gale. 2000. Optimal Currency Crises (manuscript prepared for the November 1999 Carnegie-Rochester Conference on Public Policy).
- Arellano, José Pablo. La Difícil Salida al Problema del Endeudamiento Interno. *Estudios CIEPLAN* 13: 5-25.
- Barandiarán, Edgardo. 1983. La Crisis Financiera Chilena. Centro de Estudios Públicos Documento de Trabajo No. 6.
- Bates, Robert and Anne Krueger, eds. 1993. *Political and Economic Interactions in Economic Policy Reform: Evidence from Eight Countries*. Cambridge, MA: Basil Blackwell.
- Brock, Philip L. 1992. The Macroeconomic Consequences of Loan-Loss Rollovers. In P. Brock, ed., *If Texas were Chile: A Primer on Banking Reform*. San Francisco, ICS Press.
- Burnside, Craig, Martin Eichenbaum, and Sergio Rebelo. 1999. Hedging and Financial Fragility in Fixed Exchange Rate Regimes. NBER Working Paper 7143.
- Caballero, Ricardo and Arvind Krishnamurthy. 2000a. Emerging Market Crises: An Asset Markets Perspective (manuscript).
- Caballero, Ricardo and Arvind Krishnamurthy. 2000b. International Liquidity Management: Sterilization Policy in Illiquid Financial Markets (manuscript).
- Calomiris, Charles and Charles Kahn. 1996. The Efficiency of Self-Regulated Payments Systems: Learning from the Suffolk System. *NBER Working Paper* 5442.
- Calvo, Guillermo. 1995. Varieties of Capital-Market Crises. Inter-American Development Bank Working Paper Number 306.
- Calvo, Guillermo, Leonardo Leiderman, and Carmen M. Reinhart. 1990. Capital Inflows and Real Exchange Rate Appreciation in Latin America. *IMF Staff Papers* 40: 108-51.
- Chang, Roberto and Andrés Velasco. 2000. Banks, Debt Maturity and Financial Crises. *Journal of International Economics* 51: 169-94.

- Corbo, Vittorio. 1988. Problems, Development Theory, and Strategies of Latin America. In G. Ranis and T.P. Schultz, eds., *The State of Development Economics: Progress and Perspectives*. New York: Basil Blackwell.
- Corbo, Vittorio and Stanley Fischer. 1994. Lessons from the Chilean Stabilization and Recovery. In B. Bosworth, R. Dornbusch, and R. Labán, eds., *The Chilean Economy: Policy Lessons and Challenges*. Washington, D.C.: Brookings Institution.
- Corbo, Vittorio and Jose Miguel Sanchez. 1985. Adjustments by Industrial Firms in Chile During 1974-82. *World Development*.
- De la Cuadra, Sergio and Dominique Hachette. 1991. Chile. In D. Papageorgiou, M. Michaely, and A. Choksi, eds., *Liberalizing Foreign Trade: Volume I, Argentina, Chile, and Uruguay*. Cambridge, MA: Basil Blackwell.
- De la Cuadra, Sergio and Salvador Valdés. 1992. Myths and Facts about Financial Liberalization in Chile: 1974-1983. In P. Brock, ed., *If Texas were Chile: A Primer on Banking Reform*, San Francisco: ICS Press.
- Dewatripont, Matias and Jean Tirole. 1994. *The Prudential Regulation of Banks*. Cambridge, MA: MIT Press.
- Diamond, Douglas W. and Philip H. Dybvig. 1983. Bank Runs, Deposit Insurance, and Liquidity. *Journal of Political Economy* 91: 401-19.
- Diamond, Douglas W. and Raghuram G. Rajan. 2000. Banks, Short Term Debt and Financial Crises: Theory, Policy Implications and Applications. NBER Working Paper 7764.
- Diaz Alejandro, Carlos F. 1986. Good-Bye Financial Repression, Hello Financial Crash. *Journal of Development Economics*.
- Dooley, Michael P. 1998. A Model of Crises in Emerging Markets. International Finance Discussion Papers Number 630, Board of Governors of the Federal Reserve System.
- Dooley, Michael P. and Inseok Shin. 1999. Private Inflows when Crises are Anticipated: A Case Study of Korea (manuscript).
- Dornbusch, Rudiger, Ilan Goldfajn and Rodrigo O. Valdés. 1995. Currency Crises and Collapses. *Brookings Papers on Economic Activity* 2: 219-70.
- Edwards, Sebastian. 1985. Stabilization with Liberalization: An Evaluation of Ten Years of Chile's Experiment with Free-Market Policies, 1973-1983. *Economic Development and Cultural Change* 33: 223-54.
- Edwards, Sebastian. 1986. Monetarism in Chile, 1973-1983: Some Economic Puzzles. *Economic Development and Cultural Change* 34: 535-59.



- Edwards, Sebastian and Alejandra Cox Edwards. 1987. *Monetarism and Liberalization: The Chilean Experiment*. Cambridge, MA: Ballinger Publishing Company.
- Edwards, Sebastian and Daniel Lederman. 1998. The Political Economy of Unilateral Trade Liberalization: The Case of Chile. NBER Working Paper 6510.
- Eichengreen, Barry. 1989. The Political Economy of the Smoot-Hawley Tariff. In R. Ransom, ed., *Research in Economic History*, Volume 12: 1-43. Conn.: JAI Press, 1989.
- Gale, Douglas and Xavier Vives. 2000. Dollarization, Bailouts, and the Stability of the Banking System (manuscript).
- Gourinchas, Pierre-Olivier, Rodrigo Valdés, and Oscar Landerretche. 1999. Lending Booms: Some Stylized Facts (manuscript).
- Hammond, Bray. 1957. *Banks and Politics in America, from the Revolution to the Civil War*. Princeton: Princeton University Press.
- Harberger, Arnold. 1984. La Crisis Cambiara Chilena de 1982. *Cuadernos de Economia* 63: 123-36.
- Harberger, Arnold. 1985. Observations on the Chilean Economy, 1973-83. *Economic Development and Cultural Change* 33: 451-62.
- Holmström, Bengt and Jean Tirole. 1998. Private and Public Supply of Liquidity. *Journal of Political Economy* 106: 1-40.
- Irwin, Douglas. 1998. The Smoot-Hawley Tariff: A Quantitative Assessment. *Review of Economics and Statistics* 80: 326-34.
- Krueger, Anne O. 1978. *Liberalization Attempts and Consequences*. Cambridge, MA: Ballinger Publishing Company.
- Levinsohn, James. 1999. Employment Responses to International Liberalization in Chile. *Journal of International Economics* 47: 321-44.
- Little, Ian, Richard Cooper, Max Corden, and Sarath Rajapatirana. 1993. *Boom, Crisis, and Adjustment: The Macroeconomic Experience of Developing Countries*. New York: Oxford University Press.
- Llona, Agustin. 1990. *Chilean Monetary Policy: 1860-1925*. Ph.D. Dissertation, Boston University, Boston, MA.
- Macesich, George. 1960. Sources of Monetary Disturbances in the United States, 1834-1845. *Journal of Economic History* 20: 407-34.

- McKinnon, Ronald I. and Huw Pill. 1996. Credible Liberalizations and International Capital Flows: The "Over-Borrowing Syndrome". In T. Ito and A. Krueger, eds., *Financial Deregulation and Integration in East Asia*. Chicago: University of Chicago Press.
- Meyers, Marvin. 1960. *The Jacksonian Persuasion*. Stanford: Stanford University Press.
- Morandé, Felipe. 1988. Domestic Currency Appreciation and Foreign Capital Inflows: What Comes First? Chile, 1977-82. *Journal of International Money and Finance* 7: 447-66.
- Morandé, Felipe. 1992. The Dynamics of Real Asset Prices, the Real Exchange Rate, Trade Reforms and Foreign Capital Inflows: Chile, 1976-1989. *Journal of Development Economics* 39: 111-39.
- Pavcnik, Nina. 2000. Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants. NBER Working Paper 7854.
- Pinto, Anibal. 1959. *Chile, Un Caso de Desarrollo Frustrado*. Santiago: Editorial Universitaria.
- Ratchford, B.U. 1941. *American State Debts*. Durham, NC: Duke University Press.
- Roberts, M. 1996. Employment Flows and Producer Turnover in Three Developing Countries. In M. Roberts and J. Tybout, eds., *Producer Heterogeneity and Performance in the Semi-Industrialized Countries*. Oxford: Oxford University Press.
- Rodrik, Dani. 1994. The Rush to Free Trade in the Developing World: Why So Late? Why Now? Will It Last?. In S. Haggard and S. Webb, eds., *Voting for Reform: Democracy, Political Liberalization, and Economic Adjustment*. New York: Oxford University Press.
- Schlesinger, Arthur M., Jr. 1945. *The Age of Jackson*. Boston: Little, Brown.
- Schneider, Martin and Aaron Tornell. 2000. Lending Booms and Speculative Crises (manuscript).
- Smith, Walter and Arthur Cole. 1935. *Fluctuations in American Business, 1790-1860*. Cambridge, MA: Harvard University Press.
- Stanwood, Edward. 1903. *American Tariff Controversies in the Nineteenth Century*. Boston: Houghton, Mifflin and Company.
- Taussig, Frank W. 1931. *The Tariff History of the United States*. New York: G.P. Putnam's Sons.
- Temin, Peter. 1969. *The Jacksonian Economy*. New York: W.W. Norton and Company.

Tornell, Aaron. 1995. Are Economic Crises Necessary for Trade Liberalization and Fiscal Reform? The Mexican Experience. In R. Dornbusch and S. Edwards, eds., *Reform, Recovery, and Growth: Latin America and the Middle East*. Chicago: University of Chicago Press.

White, Lawrence J. 1991. *The S&L Debacle: Public Policy Lessons for Bank and Thrift Regulation*. New York: Oxford University Press.