

FINANCIAL LIBERALIZATION AND FINANCIAL DEPTH IN CHINA

James Laurenceson and J.C.H. Chai
University of Queensland

1. Introduction

The familiar McKinnon-Shaw approach to the role of finance in economic development argues that financial depth and economic performance in many developing countries is low due to government interventions in the financial sector (McKinnon: 1973; Shaw:1973). The common practice of repressing interest rates at below market determined levels is contended to be particularly damaging for several reasons. When interest rates are fixed at low levels, there is little incentive for economic units to hold surplus in the form of financial assets. Thus the supply of investible funds will be limited. Such controls also mean that the interest rate cannot be used as a mechanism to ration credit and discriminate between investment projects of differing yields. At low interest rates, low yield investment activities may still be able to attract credit. A policy of financial liberalization resulting in higher real interest rates is therefore espoused in order to institute a virtuous cycle of increased savings, improved investment efficiency and higher rates of economic growth.

The role of the financial sector in China's economic development since reforms began in 1978 is a curious one. The standard view presented in the literature is that the Chinese financial sector remains highly repressed and, "essentially unreformed" (Cheng, et al:1997, p. 204). Two points are emphasized. Firstly, as was the case prior to 1978, most savings deposits are still held within the dominant state banking system (Table 1). Secondly, most of the loans extended by the state banking system continue to be allocated towards state owned enterprises, despite the fact these firms lag behind the non-state sector in efficiency terms (Table 2). Because of this lingering situation, financial reform is frequently cited as a weak link in China's economic transition (Lardy: 1998).

Table 1: The Structure of China's Financial System - Unit: 100 Million Yuan (% share in parentheses)

	Loans of Financial Institutions				
	1978	1986	1990	1993	1995
State Banks	1850(97.6)	7591(90.4)	15167(85.6)	26443(80.2)	39250(77.9)
Other Banks				382(1.2)	1205(2.4)
RCC's	45(2.4)	569(6.8)	1413(8.0)	3144(9.5)	5234(10.4)
UCC's		20(0.2)	249(1.4)	777(2.4)	1929(3.8)
TIC's		218(2.6)	891(5.0)	2052(6.2)	2410(4.8)
FC's				155(0.5)	367(0.7)

	Deposits with Financial Institutions				
	1978	1986	1990	1993	1995
State Banks	1135(87.2)	5355(82.7)	11645(78.8)	21827(73.8)	38783(72.4)
Other Banks				459(1.6)	1600(3.0)
RCC's	166(12.8)	962(14.8)	2145(14.5)	4297(14.5)	7173(13.4)
UCC's		30(0.5)	310(2.1)	1340(4.5)	3357(6.3)
TIC's		130(2.0)	674(4.6)	1584(5.4)	2499(4.7)
FC's				51(0.2)	121(0.2)

Notes: RCC's - Rural Credit Cooperatives; UCC's - Urban Credit Cooperatives; TIC's - Trust and Investment Companies; FC's - Finance Companies.

Source: *Almanac of China's Finance and Banking* (both Chinese and English editions) (various years).

Table 2: State Banking Lending to the Non State Sector (% of total state bank loans)

	Years	(%)
	1978	8.9
	1980	10.5
	1985	12.4
	1990	12.3
	1995	7.7
	1996	7.6

Note: Non-state lending comprises of loans to urban and township enterprises, individual enterprises and the agricultural sector (Hsiao: 1983, p. 29; McKinnon: 1994, p. 451).

Source: *Almanac of China's Finance and Banking* (both Chinese and English editions)(various years).

However, by many other measures there can be no doubt that China has undergone considerable financial liberalization. Certainly the impressive rates of financial deepening and economic growth are suggestive of such a process (Table 3). The control of financial resources has also experienced rapid decentralization; from the central authorities to the local authorities and households, and the state sector to the non-state sector (Chai: 1990, p. 151). Changes in the composition of savings are reflective of this growing decentralization (Table 4). Financial institutions have proliferated and diversified (Table 1), and financial products have become more varied (Chai: 1997, p. 127). We later also describe how controls over the pricing of financial products, and the intermediation and allocation of credit have all been significantly relaxed.

Table 3: Growth Rate of GDP and Financial Depth in China

Years	GDP(%) ¹	Financial Depth (Measure One) ²	Financial Depth (Measure Two) ³
1978	11.7	.25	.19
1979	7.6	.33	.26
1980	7.8	.37	.29
1981	4.5	.41	.33
1982	8.5	.43	.35
1983	10.2	.46	.37
1984	15.2	.50	.39
1985	13.5	.54	.43
1986	8.8	.62	.50
1987	11.6	.67	.54
1988	11.3	.64	.50
1989	4.1	.67	.54
1990	3.8	.79	.65
1991	9.2	.86	.71
1992	14.2	.91	.75
1993	13.5	1.00	.84
1994	12.6	1.00	.85
1995	10.5	1.04	.90
1996	9.6	1.11	.98

Notes: 1 GDP growth rate expressed in comparable prices. 2 Financial depth is measured as broad money (money + quasi money) divided by nominal GDP. Broad money includes the sum of currency outside the banks plus demand, time savings and foreign currency deposits of residents other than the central government. 3. Financial depth here is measured as broad money minus currency in circulation, divided by nominal GDP. Demetriades & Luintel (1996) argue that without deducting currency in circulation, we are left with primarily a measure of monetisation, not financial depth (p.360).

Source: SSB, *China Statistical Yearbook* (various years); IMF, *International Financial Statistics* (various years)

Table 4: Composition of Savings in China, 1978-1991 (% of GDP)

Years	Total	Household	Enterprise	Budgetary
1978	33.2	1.1	17.0	15.1
1979	34.6	3.1	21.4	10.0
1980	32.3	4.4	20.7	7.3
1981	30.3	3.4	20.0	6.6
1982	31.6	7.5	18.7	5.4
1983	31.5	9.9	15.9	5.7
1984	32.8	14.4	11.8	6.6
1985	34.5	13.4	14.0	7.0
1986	36.1	14.4	15.9	5.8
1987	39.1	16.2	18.4	4.5
1988	38.0	17.0	17.8	3.2
1991	40.4	18.7	19.9	1.8

Source: Chai (1997), p. 118.

Therefore the trend in financial liberalization in China is not immediately clear. The purposes of this paper are two-fold. Firstly, it attempts to shed light on the complex issue of whether in fact meaningful financial liberalization has taken place. We begin with a discussion concerning trends in the three fundamental financially repressive policies in China; interest rate controls, intermediation controls and credit allocation controls. An overall financial repression index for the reform period is then constructed which captures changes in these underlying policy variables. This index reveals that apart from periods of official economic austerity programs in 1985, 1989-1991 and 1994, a steady decline in financial repression has eventuated.

Given this liberalization, the observed rapid rate of financial deepening may not be so surprising. Our second objective then is to estimate an econometric equation in order to investigate this relationship further. The results of this analysis are supportive of the notion that the rapid build up of financial assets in China can in part be attributed to the financial liberalization that has taken place.

2. Financial Liberalization in China

2.1. Interest Rate Controls

The pre-reform period has been described as the "dark ages for interest rates" (Yi:1994, p. 77). During this time interest rates were fixed at negligible levels and rarely varied. In general, financial liberalization should ultimately be revealed indirectly through rising real interest rates. Once interest rate ceilings are removed and financial institutions can begin competing for loanable funds, there will be an upward pressure on the deposit rate of interest. Lending rates will also then be free to accurately reflect risk. It has therefore become common for researchers to analyze interest rate trends as a guide to determining whether in fact liberalization has taken place. Table 5 shows the typically presented movements in real deposit and lending rates in China since 1978.

Table 5: Real Interest Rates in China, 1978 - 1996(%)

Year	NDR	NLR	ORPI	RDR	RLR
1978	3.24	5.04	0.7	2.52	4.31
1979	3.78	5.04	2.0	1.75	2.98
1980	5.04	5.04	6.0	(-)0.91	(-)0.91
1981	5.40	5.04	2.4	2.93	2.58
1982	5.67	7.20	1.9	3.70	5.20
1983	5.76	7.20	1.5	4.20	5.62
1984	5.76	7.20	2.8	2.88	4.28
1985	5.72	7.74	8.8	(-)1.91	(-)0.97
1986	7.20	7.92	6.0	1.13	1.81
1987	7.20	7.92	7.3	(-)0.09	(-)0.81
1988	7.68	8.28	18.5	(-)9.13	(-)8.62
1989	11.12	11.15	17.8	(-)5.67	(-)5.65
1990	10.02	10.16	2.1	7.76	7.89
1991	7.92	8.88	2.9	4.88	5.81
1992	7.56	8.64	5.4	2.05	3.07
1993	9.41	9.87	13.2	(-)3.35	(-)2.94
1994	10.98	10.98	21.7	(-)8.81	(-)8.81
1995	10.98	11.52	14.8	(-)3.33	(-)2.86
1996	9.21	11.04	6.1	2.93	4.66

Notes: The nominal deposit rate of interest (NDR) is measured by the official one year saving time deposit rate for urban and rural households. The nominal loan rate (NLR) is measured by the official one year working capital loan rate for state owned enterprises. When the nominal interest rate changed during a year, a weighted average has been constructed. The real interest rate (RDR, RLR) is calculated as $(1 + \text{Nominal Interest Rate}) / (1 + \text{Expected Inflation}) - 1$. Expected inflation is proxied by current inflation as measured by the overall retail price index (ORPI).

Source: *Almanac of China's Finance and Banking* (both Chinese and English editions)(various years).

The real interest rate on both one year time deposits and working capital loans has become negative on several occasions when inflation escalated. A rising trend is certainly not observable. For some this serves as evidence that no meaningful financial liberalization has taken place. This conclusion however should be viewed with caution for several reasons. With respect to deposit rates, in September 1988 the Chinese authorities implemented the "Long Term RMB Value Protected Savings Deposit Plan" (World Bank: 1990, p. 54). Under this plan, long term savings deposits (maturity period of 3 years or greater) in the state banking system became "inflation proofed" through the linking of the nominal return to changes in the overall retail price index. This policy ensured that the real return on long term deposits remained strongly positive even during periods of high inflation (McKinnon: 1994, p.453). For example, when inflation averaged 18.2% over 1988 and 1989, the effective return on long term savings deposits was increased to over 20% (Table 6).

Table 6: Effective Return on 3 Year Time Deposits

	Nominal Rate	Cost of Living Adjustment	Effective Return
1988:IV	9.72	7.28	17.00
1989:I	13.14	12.71	25.85
1989:II	13.14	14.59	25.73
1989:III	13.14	13.64	26.78
1989:IV	13.14	8.36	21.50

Source: *Almanac of China's Finance and Banking* (Chinese edition): 1990, p. 187.

Therefore, while the state banking system may not have been given any independence in setting deposit rates, the rate administered by the government ensured that savings deposits remained an attractive financial product to hold. It should also be noted that non bank financial institutions (NBFIs) have been granted greater flexibility in determining deposit rates. For example, in the late 1980's rural credit cooperatives were allowed to charge deposit rates up to 70% higher than the official rate. Urban credit cooperatives and trust and investment companies were given a 20% upward margin (World Bank: 1990, p. 25, 146; Yang: 1996, p. 30). In comparison with other developing countries, China's ability to maintain positive real deposit rates has been widely acknowledged (Mehran, et al: 1996, p.68).

With respect to lending rates, it should be remembered that the figures presented in Table 5 are the official lending rates used by state banks when extending loans to state owned enterprises. This is effectively a minimum rate for loans. The actual nominal rate charged can vary significantly from this minimum depending on the recipient of the loan and the financial institution extending it. As with deposit rates, the state banking system has had the least flexibility in determining their own lending rates. However even within the state banking system there has been a trend towards liberalization. The People's Bank of China first allowed some flexibility in 1983 when floating interest rates were introduced for certain types of working capital loans (World Bank: 1988, p.264). Floating rates meant that financial institutions could autonomously set interest rates within a specified bank around the official rate. In 1988 this system was expanded significantly with state banks being able to float their lending rates for working capital up to 30% above the official rate (World Bank: 1990, p. 25). Since the period of austerity in 1989, the allowable margin for state banks has been set at 20%. In addition, loans extended to non-state enterprises are typically levied with higher interest rates (ACFBEE: 1997, p. 181).

At times, rural credit cooperatives have been, able to charge interest rates on working capital loans up to 90% higher than the official rate (World Bank: 1990, p.25). More recently

the margin has been set at 60% for rural credit cooperatives and 30% for urban credit cooperatives (Mehran, et al: 1996, p. 46). The extra flexibility afforded to NBFIs amounted to a de-facto liberalization for the state banking system. This is because until financial reforms in 1994 many NBFIs were attached to state banks (Yi:1994, p. 255). It became common practice for state banks to channel business through associated NBFIs in order to avoid more rigid controls over their operations (Dipchand, et al: 1994, p. 110). The establishment of a relatively free inter-bank market in 1986 also represented an important means by which state banks could lend to NBFIs and earn higher rates of return on loanable funds (World Bank: 1990, p. 30; Kumar: 1997, p. 11,12).

Direct capital raising markets have also become increasingly popular during the reform period with rates of return in these markets being considerably higher than that offered by most financial intermediaries. Since 1984 a number of local enterprises have been able to issue shares and corporate bonds. Initially these shares functioned very much like bonds in that they conferred no ownership rights on the holder and in many instances offered a guaranteed rate of return (Tam:1991, p. 520). The rate of return on enterprises shares rose as high as 20-40% during 1985-1986 and 50-100% in 1988 (Mehran, et al: 1996, p. 30,31). The return on corporate bonds can be up to 40% higher than the yield on savings deposits with corresponding terms (ACFBEE: 1997, p. 185).

Rising disposable incomes and continued regulation of formal financial institutions have also provided the incentive for the development of unregulated informal financial markets. It has been estimated that up to two thirds of all rural credit in China is extended through informal channels (Feder, et al: 1989, p. 511; Ghate: 1992, p. 860).

Tam (1991) cites sample survey evidence showing that interest rates in informal markets were generally in excess of 20% per annum (p. 517). In addition, while most state banking sector loans are allocated to state owned enterprises in the first instance at the minimum interest rate, this may not be the final rate at which credit funds are intermediated. Instead of using allocated funds directly for their own investment, there have been numerous reports of state owned enterprises on-lending at higher interest rates for profit (World Bank: 1938, p. 323; World Bank: 1990, p. 30; Yang: 1996, p. 154). The interest rate for such lending reached between 20-25% in 1989 (World Bank: 1990, p. 31).

2.2 Intermediation Controls

In many developing countries financial institutions are often required to hold reserves with the central bank which are well in excess of that which can be justified on prudential

grounds. This is generally a quasi fiscal measure on the part of government aimed at collecting seigniorage revenue. While it may be effective for this purpose, the degree to which financial institutions can effectively perform an intermediary role is adversely affected. High reserve requirements can mean that potentially productive financial resources are left idle. The profitability of banks will also be reduced as the interest paid on reserve funds is often less than that which could be realised in the market place.

Formal reserve requirements in China were first introduced in 1984, coinciding with the introduction of a two tiered banking system in which the People's Bank of China was instituted as the central bank (Chai: 1997, p. 122,129). Following their introduction, reserve requirements have almost doubled. In 1985 the reserve requirement was set at 10%. Since 1989, state banks have effectively been required to hold 18-20% of all deposits in the form of reserves with the central bank (Mehran, et al:1996, p. 44). It is unlikely however that this rise in reserve requirements would have increased financial repression by reducing the overall level of intermediation provided by the state banks. This is because for a variety of reasons, China's state banks have generally held reserves which were well in excess of that legally required (Girardin: 1997, p. 59). Reserve requirements have therefore not been a binding constraint on the state banking system's lending at the margin.

Direct controls such as credit ceilings specified in the annual credit plan have been of far greater consequence. This traditional tool of credit control set limits on the total lending of each financial institution and sub-ceilings for certain categories of loans (World Bank: 1990, p. 37). The credit plan meant that even if financial institutions were able to collect more deposits, their ability to increase lending was restricted. The extent to which the details of the credit plan have actually been enforced has varied considerably during the reform period. For example, after strictly enforcing credit quotas in 1985 in response to accelerating inflation, credit ceilings effectively became indicative targets in 1986 and excessive lending was not penalized (World Bank: 1988, p. 298). In this period there also began a trend towards allowing financial institutions to extend additional loans if more deposits could be collected (Chai: 1997, p. 124). Once again increasing inflation in 1989 meant that credit ceilings became mandatory. However since 1992 the trend has been away from direct controls and by 1995 only the major state banks remained subject to credit ceilings (Mehran, et al: 1996, p. 42, 50). In 1998, credit ceilings for the state banks were also abandoned in favor of asset-liability management (PBC: 1998, p.14).

2.3 Controls Over Credit Allocation

The allocation of credit in China has also traditionally been determined through the

credit plan. It specified in a detailed manner the sources and use of funds by economic sectors and types of enterprises (Chai: 1981, p. 41). As with the credit ceilings contained in the plan, the extent to which the allocative details have been enforced has varied considerably. During the mid 1980's the details became indicative and sectoral credit allocation was largely discontinued. Local bank branches were given greater latitude with respect to loan approvals instead of merely applying directives issued by their headquarters. Projects approved by the state plan no longer obtained automatic credits and banks retained a right of refusal (Chai: 1997, p. 124,130). While the periods of austerity saw a temporary recentralization of lending decision making power and an increase in the level of directed credit the trend has clearly been towards allowing financial institutions greater autonomy. Financial reforms in 1994 saw the formation of three policy banks whose purpose it was to allow the rest of the state banking system to concentrate on commercial lending. The Commercial Banking Law and General Lending Rules published in 1995 also emphasised the need for financial institutions to conform to commercial criteria in their lending (ACFBE: 1996, p. 182-199, 244-260). Dai Xianglong, governor of the People's Bank on China, recently stated that by the end of 1998, the state banking system would be completely free of government intervention in their lending decisions (SCMP: 4th May: 1998).

Determining the actual level of credit directed by the government in China is made impossible by a lack of data an accepted definition as to what constitutes policy directed credit. However a useful indicator of the degree of government involvement in the lending decisions of financial institutions can be attained by applying two simplifying assumptions to the available data. Firstly, we assume that all the credit extended by the state banking system to the state owned enterprises is directed. Secondly, we assume that all the lending of NBFIs is not directed. NBFIs are far more independent in their operations and have in general come outside the plans of the central government and central bank (Yi:1994, p. 255).¹

The intensity of government involvement in the allocation decisions of China's financial sector is then taken to be state bank loans to state owned enterprises, divided by the total lending of state banks and NBFIs. This data is presented in Table 7 and indicates a gradual decline in directed credit since 1978. The data also accurately captures the known temporary increases in directed credit during periods of economic austerity.

¹ Not all state bank loans to state owned enterprises would be policy directed. Some state owned enterprises would no doubt be able to attract credit even in a totally liberalised financial system. Similarly, not all loans extended by NBFIs would be free from government interference, especially at the local government level. These components however cannot be separated from the available statistics.

Table 7: Intensity of Directed Credit in China's Financial Sector

	Years	(%)
	1978	88.89
	1979	88.42
	1980	86.55
	1981	86.22
	1982	85.86
	1983	85.23
	1984	80.14
	1985	81.95
	1986	78.54
	1987	75.64
	1988	74.10
	1989	75.25
	1990	75.21
	1991	74.44
	1992	72.18
	1993	70.85
	1994	72.76
	1995	71.97
	1996	71.65

Notes: NBFIs consist of rural credit cooperatives, urban credit cooperatives, trust and investment companies and finance companies. Aggregated data for urban credit cooperatives and trust and investment companies began in 1986. Data for finance companies began in 1993.

Source: *Almanac of China's Finance and Banking* (both Chinese and English editions)(various years).

2.4 The Overall Trend in Financial Liberalization in China

In order to gain an overall picture of the trend in financial liberalization, we follow Demetriades & Luintel (1996, 1997) in constructing a financial repression index using the statistical method of principal components. Principal component analysis linearly transforms a set of positively correlated variables into a new, smaller set of variables which are termed principal components. These principal components are not correlated with one another and are ordered in terms of the amount of variance in the original variables they explain. Therefore, the first principal component frequently explains the vast majority of variance in the initial set of variables.²

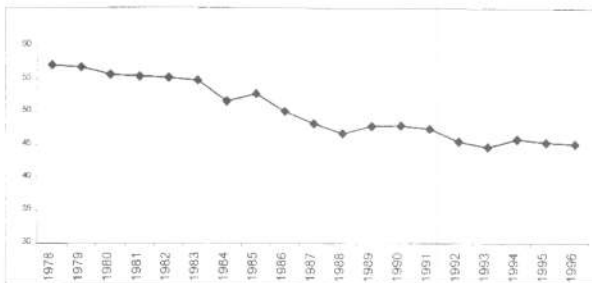
For our index we organize data concerning the three avenues of financial repression discussed above. Interest rate controls are captured using a dummy variable that is assigned a value of 1 when interventions in the pricing of credit are highly rigid. Therefore, in light of the earlier discussion it is assigned a value of 1 until 1987. We also use a dummy

² See Duntamen (1989) for an excellent discussion of principal component analysis.

variable to capture changes in intermediation controls where a value of 1 indicates that credit ceilings were strictly enforced. A value of 1 is therefore assigned for 1978-1985, 1989-1991 and 1994. Trends in credit allocation controls are captured by the intensity of directed credit given in Table 7. All data relating to the financial repression index is presented in Appendix One.

Principal components analysis reveals that the first principal component accounts for 80% of the variance in these three underlying policy variables. This component can also be interpreted as an overall measure of financial repression given that it assigns relatively equal weights to each of the policy variables; 0.5704 for interest rate controls, 0.5268 for intermediation controls and 0.6301 for credit allocation controls. All variables are highly correlated with the first principal component; 0.88 for interest rate controls, 0.81 for the intermediation controls and 0.97 for the credit allocation controls. Figure 1 shows a graphical representation of the financial repression index with the policy variable data being linearly transformed according to the weightings suggested by the first principal component. The index shows that apart from the periods of official economic austerity in 1985, 1989-1991 and 1994, there has been a gradual liberalization of the Chinese financial sector during the reform period.

Figure 1: Financial Repression Index for China, 1978-1996



In summary, the view that China's financial sector has not undergone significant liberalization would seem incorrect. Such a view appears to be based on a frustration by various interest groups³ with the gradual approach taken by the Chinese authorities rather than factual evidence. While the level of government involvement in the financial sector

3 In particular, foreign governments and financial institutions.

remains high by Western standards, it has lessened considerably in terms of a Chinese historical perspective.

3. The Relationship Between Financial Liberalization and Financial Depth in China

We now turn to the question of whether the financial liberalization that has taken place has contributed to China's impressive rate of financial deepening. The McKinnon-Shaw hypothesis suggests this should be the case. To empirically test this relationship, the standard regression equation presented in the literature specifies that financial depth is a function of real GDP per capita, the real rate of interest and the density of financial institutions (Demetriades & Luintel: 1997, p. 314). Thus financial liberalization is measured indirectly via changes in the real interest rate.

This standard formulation however may be deficient. Recent theoretical advances (see Demetriades & Luintel: 1996, 1997; Hellmann, et al: 1997) argue that the relaxation of financially repressive policies themselves may have direct effects on financial deepening which are in addition to their indirect effects, namely a rise in the real rate of interest. In the McKinnon-Shaw framework, financial institutions are treated as perfect competitors which transform deposits into loans at no cost. In this way financial institutions are assumed to behave passively, which then allows the analysis to be focused on the willingness of surplus units to hold financial assets in response to interest rate changes. The reality however is that the financial system in developing countries is rarely competitive. This is clearly the case in China where the state banking system continues to hold a dominant market share (Table 1) and each state bank continues to concentrate lending in a particular sector of the economy. Stiglitz (1994) also noted that most financial transactions are characterised by asymmetric information and this can create market power for a particular financial institution even when other are present in the market.

When we relax the assumption of perfect competition, there exists considerable scope for financial institutions to respond to repressive policies in ways not allowed for in the standard McKinnon-Shaw framework. Specifically, changes in the level of financial depth may occur without any change in the deposit rate of interest. Financially repressive policies may directly affect financial depth by (1) changing the willingness of financial institutions to raise deposits by non-interest rate methods, and (2) changing the willingness of surplus units to hold financial assets independent of movements in the real interest rate (Demetriades & Luintel: 1997, p. 312,313). For example, interest rate controls and other interventions such as high reserve requirements and directed credit programs will influence the marginal cost and marginal revenue structure of financial institutions. Such changes in underlying

profitability may induce financial institutions to alter their deposit collecting behavior by using non-interest rate methods such as marketing drives and branch proliferation (*ibid.*, p. 311, 312). The emerging "financial restraint" school of thought argues that interest rate controls may actually increase the willingness of economic agents to hold surplus with financial institutions (see Stiglitz & Uy: 1996; Hellmann, et al: 1997). One way this may occur is that by regulating the deposit-loan interest rate spread, the stability and profitability of financial institutions can be enhanced. This could lead to savers having greater confidence in financial intermediaries. In constructing an econometric equation it therefore becomes important to allow for the possibility that financially repressive policies may have direct effects on financial depth in addition to the standard indirect channel of the real interest rate. The simplest method of addressing this issue is by including our index of financial repression as an independent variable (Demetriades & Luintel: 1996,1997).

In our econometric modeling, we use the autoregressive distributed lag (ADL) approach to cointegration as outlined in Pesaran & Shin (1997) & Pesaran & Pesaran (1997). This approach has several desirable features over earlier methods. Firstly, because an ADL model is an encompassing single equation model, it can be applied irrespective of whether the individual regressors are integrated of order 0 or 1. Secondly, it has been demonstrated that the ADL approach yields superior estimates of long run coefficients, and diagnostic tests of the estimated equation are more reliable (Gerrard & Godfrey: 1998, p. 235). A further benefit is that based on an underlying ADL model, we can derive a dynamic error correction model (ECM) through a simple linear transformation (Banarjee, et al: 1995, p. 51). The advantage of the ECM formulation is that, while retaining the long run equilibrium information, parameters describing the extent of short run adjustment are immediately provided for by the regression.

The ADL (p, q_1, q_2, \dots, q_k) model is of the form (Pesaran & Pesaran: 1997, p. 393)

$$\phi(L, p)y_t = \sum_{i=1}^k \beta_i(L, q_i)x_{it} + \delta' w_t + \mu_t \quad [1]$$

where

$$\begin{aligned} \phi(L, p) &= 1 - \phi_1 L - \phi_2 L^2 - \dots - \phi_p L^p \\ \beta_i(L, q_i) &= \beta_{i0} + \beta_{i1} L + \dots + \beta_{iq_i} L^{q_i} \end{aligned} \quad i = 1, 2, \dots, k \quad [2]$$

where L is the lag operator such that $Ly_t = y_{t-1}$, is the number of regressors, p is the lag

length associated with the dependent variable, q is the lag length associated with the independent variable and \mathbf{w}_t is a $s \times 1$ vector of deterministic variables such as the intercept term.

In our regression, the independent variable y_t is financial depth (LFD). Financial depth is measured as broad money minus currency in circulation, divided by nominal GDP. This data is presented as the second measure of financial depth in Table 3. Without deducting currency in circulation, we primarily have a measure of monetization, not financial depth (Demetriades & Luintel: 1996, p. 360). Broad money and currency in circulation data are sourced from the International Monetary Fund's *International Financial Statistics*. The independent variables x_{it} include real GDP per capita (LGDPGAP), the real interest rate ($L(1+RIR)$), financial institution density (LDEN) and our financial repression index (LFRI). The data for real GDP per capita and financial institution density is found in the *China Statistical Yearbook*. In calculating financial institution density we resort to using the number of persons employed in the financial sector per thousand of population. Employment statistics are used because data concerning the number of financial institution branches is unfortunately incomplete. To measure the real interest rate, we use the real one year saving time deposit rate presented in Table 5.⁴ Data for our financial repression index is found in Appendix One. All data is log transformed so that elasticity's are immediately provided by the regression output.

The long run coefficients for these lagged, non-deterministic variables are calculated as

$$\hat{\theta}_i = \frac{\hat{\beta}_i(1, \hat{q}_i)}{\hat{\phi}(1, \hat{p})} = \frac{\hat{\beta}_{i0} + \hat{\beta}_{i1} + \dots + \hat{\beta}_{i\hat{q}_i}}{1 - \hat{\phi}_1 - \hat{\phi}_2 - \dots - \hat{\phi}_{\hat{p}}} \quad i = 1, 2, \dots, k \quad [3]$$

where \hat{p} and $\hat{q}_i, i=1, 2, \dots, k$ are the selected estimated values for p and $q_i, i=1, 2, \dots, k$.

By rearranging our estimated ADL $(\hat{p}, \hat{q}_1, \hat{q}_2, \dots, \hat{q}_k)$ model, we obtain the error correction model

$$\Delta y_t = -\phi(1, \hat{p})EC_{t-1} + \sum_{j=1}^k \beta_{j0} \Delta x_{jt} + \delta' \Delta \mathbf{w}_t - \sum_{j=1}^{\hat{p}-1} \phi_j^* \Delta y_{t-j} - \sum_{i=1}^k \sum_{j=1}^{\hat{q}_i-1} \beta_{ij}^* \Delta x_{i,t-j} + \mu_t \quad [4]$$

where the error correction term is given by

$$EC_t = y_t - \sum_{i=1}^k \hat{\phi}_i x_{it} - \hat{\psi}' \mathbf{w}_t \quad [5]$$

⁴ The regression was also estimated using an unweighted average of the 1 year and 3 year (inflation indexed) time deposit rate of interest. There were no statistically significant differences in the results.

The coefficient of the error correction term, $\phi(1, \hat{p})$, indicates how much of the disequilibrium in the previous period is corrected for in the current period. The larger its value, the quicker the return to long run equilibrium.

A priori we would expect the long run coefficients of GDP per capita, the real interest rate and financial institution density to be positive. The sign of the coefficient to the financial repression index variable could vary depending on the manner in which financial sector controls have influenced the behavior of financial institutions in collecting deposits and the willingness of savers to supply them.

Given our use of annual data and limited sample size (1978-1996), we only allow the variables in our general ADL model to be lagged by a maximum of one period. As recommended by Pesaran & Pesaran (1997), we retain the last observation in order to test the predictive performance of the model (p. 304). In the first stage of the ADL approach we test for a long run relationship between the variables under investigation. This is attained by computing the F statistic for testing the significance of the lagged levels of the variables in the error correction form of the underlying ADL model. The calculated F statistic is 4.62. At a 95% significance level, the critical value bounds for this equation is 2.850 - 4.049 (Pesaran & Pesaran: 1997, p. 478). Thus we can reject the null hypothesis of no long run relationship between the included variables, irrespective of their individual orders of integration.

Knowing that a spurious regression will not take place, we move to the second stage of estimation. Using a search procedure based on our general ADL (1, 1, 1, 1, 1) model, the ADL (1, 1, 1, 0, 0) model was unanimously selected by all available model selection criterion. The long run coefficients and other relevant statistical output corresponding to this model are presented below.

Independent Variable: LFD (Financial Depth)

Regressor	Long Run Coefficient	Standard Error	P Value
LGDP/CAP	1.53	.40	.004
L(1+RIR)	2.75	.85	.010
LDEN	-.75	.67	.290
LFRI	-.59	1.05	.587
INPT	-7.92	3.42	.046

Note: INPT is the intercept term

Goodness of Fit: $\bar{R}^2 = .99$

Overall significance of Regression (F-Test): $F = 353.00$; P value = .000

Diagnostic Tests:

Serial Correlation (Lagrange Multiplier): $\chi^2(1) = .046$; P Value = .829

Specification and Functional Form (Ramsey's Reset Test): $\chi^2(1) = .040$; P Value = .841

Heteroskedasticity (based on the regression of squared residuals on squared fitted values): $\chi^2(1) = 2.13$; P Value = .145

The model explains financial depth extremely well during the observation period. This is particularly pleasing given that the diagnostic tests do not reveal any statistical pathologies. The signs of all coefficients conform to *a priori* expectations except for financial institution density, which is also not statistically significant. These two factors suggest an inadequacy in the data that was resorted to for measuring this variable. Real GDP per capita and the real interest rate are particularly important in explaining financial depth in China. The coefficient of the real interest rate variable suggests that in the long run a 1% rise in the real deposit rate of interest increases financial depth by 2.75%. Although not statistically significant, the negative sign on the financial repression index variable does indicate that if anything, financially repressive policies dissuaded Chinese financial institutions from actively seeking to mobilize savings. The liberalization that has taken place may have led to greater efforts being made in this regard.

The ECM output corresponding to the above ADL(1,1,1,0;0) model is given below.

Independent Variable: Δ LFD (Change in Financial Depth)			
Regressor	Long Run Coefficient	Standard Error	P Value
Δ LGDP/CAP	-.46	.51	.393
Δ L(1+RIR)	1.01	.21	.001
Δ LDEN	-.48	.37	.212
Δ LFRI	-.38	.64	.564
Δ INPT	-5.15	2.56	.070
ECM _{t-1}	-.65	.12	.000

Goodness of Fit(\bar{R}^2) = .87

Overall significance of Regression ($F_{5,11}$) = 22.02 P Value = .000

The ECM model also explains changes in financial depth well over the observation period with the overall regression being highly significant. It suggests that the real rate of interest is the key determining factor in explaining short run changes in financial depth. The error correction term is highly significant and possesses quite a large coefficient, indicating that the specified relationship returns to equilibrium quickly following a short run shock. That is, 65% of the disequilibrium in the previous year is corrected for in the current year. These results are certainly in accordance with the disintermediation experiences of 1988 and 1993. In response to sharply declining real interest rates during these times, Chinese savers began withdrawing their money from the banking system. However as real interest rates were restored to positive levels following the implementation of the indexation policy, they rapidly resumed their savings build up.

Finally, it should be noted that while the underlying ADL model does explain movements in financial depth well during the observation period and did pass formal tests for parameter stability (CUSUM and CUSUMSQ tests), it showed limited predictive performance. This outcome is not surprising and is no doubt related to the limited sample size.

4. Concluding Comments

China has experienced gradual financial liberalization since 1978. While econometric results do need to be treated with some caution given the data constraints, the results are in accordance with the McKinnon-Shaw proposition that this liberalization has contributed to financial deepening. In the case of China, it appears that the primary channel through which this process has occurred is the real interest rate. Therefore, by largely maintaining positive real interest rates on savings deposits in the state banking system and allowing considerable interest rate flexibility amongst the NBFIs and direct capital markets, the

Chinese authorities have positively contributed to the rate of financial depth. In doing so, the rate of economic growth is likely to have been bolstered (Levine:1997).

While financial liberalization appears to have had positive effects on the level of financial depth it should not automatically be assumed that it has also improved the efficiency with which these financial resources have been allocated between alternative investments. This is an important topic of future research. The greater autonomy of local authorities and enterprises in investment decisions, coupled with the greater role of financial institutions in the allocation of investment resources appears sound in theory since central authorities do not have sufficient information to make detailed investment decisions. However, financial liberalization in a transitional economy where prices are still distorted and enterprise budget constraints remain soft does not necessarily improve investment efficiency. In fact it may worsen it (Chai: 1997, p.136). Some preliminary investigations have suggested this to be the case (Laurenceson & Chai:1998).

Appendix One
Data For Financial Repression Index (FRI)

Years	IRC	CIC	CAC	FRI
1978	1	1	88.89	57.11
1979	1	1	88.42	56.81
1980	1	1	86.55	55.63
1981	1	1	86.22	55.42
1982	1	1	85.86	55.20
1983	1	1	85.23	54.80
1984	1	1	80.14	51.59
1985	1	1	81.95	52.73
1986	1	0	78.54	50.06
1987	1	0	75.64	48.23
1988	0	0	74.10	46.69
1989	0	1	75.25	47.94
1990	0	1	75.21	47.92
1991	0	1	74.44	47.43
1992	0	0	72.18	45.48
1993	0	0	70.85	44.64
1994	0	0	72.76	45.85
1995	0	0	71.97	45.35
1996	0	0	71.65	45.15

Notes: IRC, CIC and CAC denote interest rates controls, credit intermediation controls and credit allocation controls respectively. FRI is the financial repression index. It is equal to:

$FRI_t = 0.5704 (IRC_t) + 0.5268 (CIC_t) + 0.6301 (CAC_t)$. The weights are given by the first principal component.

References

- Almanac of China's Finance and Banking* (ACFB) (Chinese Edition and English Editions)(various years), People's China Publishing House, Beijing.
- Banerjee, A, Dolado, J, Galbraith J, Hendry, D(1995), *Cointegration, Error correction and the Econometric Analysis of Non-stationary Data*, Oxford University Press, New York.
- Chai, J.C.H (1981), "Domestic Money and Banking Reform in China", *Hong Kong Economic Papers*, No. 14 pp. 37-52.
- Chai, J.C.H (1990), "Is China Becoming a Leading Pacific Economy?" in D. Cassel and G. Heidck, eds, *China's contemporary Reforms and Development Strategy*, Baden - Baden, Nomos.
- Chai, J.C.H (1997), *China: Transition to a Market Economy*, Clarendon Press, Oxford.
- Cheng, H, Fong, H, Mayer, T (1997), "China's Financial Reform and Monetary Policy: issues and strategies", in Joint Economic Committee, Congress of the United States, eds, *China's Economic Future*, M.E. Sharpe, New York.
- Demetriades, P, Luintel, K (1996), "Banking Sector Policies and Financial Development in Nepal", *Oxford Bulletin of Economics and Statistics*, Vol. 58, No.2, pp.355-372.
- Demetriades, P, Luintel, K (1997), "The Direct Costs of Financial Repression: Evidence from India", *Review of Economics and Statistics*, Vol. 79, No.2, pp. 311-320.
- Dipchand, C, Zhang, Y, Ma, M (1994), *The Chinese Financial System*, Greenwood Press, Westport.
- Duntamen, G (1989), *Principal Components Analysis*, Sage, London.
- Feder, G, Lau, L, Lin, J, Luo, X (1989), "Agricultural Credit and Farm Performance in China", *Journal of Comparative Economics*, Vol. 13, pp. 508-526.
- Ghate, P(1992), "Interaction Between the Formal and Informal Financial Sectors: The Asian Experience", *World Development*, Vol. 20, No. 6, pp. 859-872.
- Hellman, T, Murdock K, Stiglitz J(1997), "Financial Restraint: Toward a New Paradigm", in M. Aoki, H. Kim and M. Okuno-Fujiwara, eds, *The Role of Government in East Asian Economic Development*, Clarendon Press, Oxford.
- Hsiao, K(1983), *Money and Banking in the Chinese Mainland*, Chung-Hua Institution for Economic Research, Taipei.
- Gerrard, W, Godfrey, L(1998), "Diagnostic Checks for Single Equation Error Correction and ADL Models", *Manchester School*, Vol. 66, No. 2, pp. 222-237.
- Girardin, E(1997), *Banking Sector Reform and Credit Control in China*, OECD Development Centre, Paris.
- Kumar, A(1997), *China's Non-bank Financial Institutions: Trust and Investment Companies*, World Bank Discussion Paper No. 358, The World Bank, Washington, DC.
- Laurenceson, J, Chai, J.C.H.(1998), "Financial Liberalization and Investment Efficiency in China" mimeo, University of Queensland, Brisbane.
-

-
- Lardy, N(1996). "Banking in China's Economic Reforms", Testimony Statement before the Committee on Banking and Financial Services, U.S. House of Representatives, March 20th.
<http://www.brook.edu/PA/HOT/LARDY2.HTM>
- Lardy, N(1998), *China's Unfinished Economic Revolution*, Brookings Institution Press, Washington, D.C.
- Levine, R(1997), "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature*, Vol. 35, pp. 688-726.
- McKinnon R(1973), *Money and Capital in Economic Development*, Brookings Institution, Washington, D.C.
- McKinnon R(1994), "Financial Growth and Macroeconomic Stability in China, 1978-1992: Implications for Russia and Other Transitional Economies", *Journal of Comparative Economics*, Vol. 18, pp. 438-469.
- Mehran H, Quintyn M, Nordman, T, Laurens, B (1996), *Monetary and Exchange System Reform in China: an experiment in gradualism*, IMF, Washington, D.C.
- People's Bank of China(PBC) (various years), *China Financial Outlook*, China Financial Publishing House: Beijing.
- Pesaran, M, Pesaran, B(1997), *Working with Microfit 4.0: an interactive approach*, Oxford University Press, Oxford.
- Pesaran, M, Shin, Y(1997), "An Autoregressive distributed Lag Modelling Approach to Cointegration Analysis" in S. Strom, A. Holly, P. Diamond, eds, *Centennial Volume of Ragnar Frisch*, Cambridge University Press, Cambridge.
<http://www.econ.cam.ac.uk/faculty/pesaran/ADL.pdf>
- Shaw, E(1973), *Financial Deepening in Economic Development*, Oxford University Press, New York.
- South China Morning Post(SCMP).
- State Statistical Bureau(SSB)(various years), *China Statistical Yearbook*, China Statistical Publishing House, Beijing.
- Stiglitz, J(1994), "The Role of the State in Financial Markets", *Proceedings of the World Bank Annual Conference on Development Economics*, 1993, pp. 19-52.
- Stiglitz, J, Uy, M(1996), "Financial Markets, Public Policy, and the East Asian Miracle", *The World Bank Research Observer*, Vol. 11 No. 2, pp. 249-276.
- Tam, O. K(1991), "Capital Market Development in China", *World Development*, Vol. 19, No.5, pp. 511-532.
- World Bank(1988), *China: Finance and Investment*, The World Bank, Washington, D.C.
- World Bank(1990), *China: Financial Sector Policies and Institutional Development*, The World Bank, Washington, D.C.
- Yang, H(1996), *Banking and Financial Control in Reforming Planned Economies*, St Martin Press, New York.
- Yi, G(1994), *Money Banking and Financial Markets in China*, Westview Press, Boulder.
-

Abstract

This paper first investigates whether any meaningful financial liberalization has taken place in China since economic reforms began in 1978. An index of financial repression is constructed for this purpose. It shows that apart from official economic austerity programs in 1985, 1989-1991 and 1994, a steady decline in financial repression has eventuated. The paper then investigates whether this financial liberalization has contributed to financial deepening as the McKinnon-Shaw hypothesis suggests should be the case. An econometric autoregressive distributed lag model (ADL) is estimated to shed light on this issue. Financial depth is modeled as a function of real GDP per capita, the real interest rate, financial institution density and our financial repression index. The results show that over the period 1978-1996, financial depth has been strongly influenced by real GDP per capita and the real interest rate. An error correction model (ECM) derived from the ADL model reveals that the real rate of interest is a particularly important factor in explaining short run fluctuations in financial depth. The results are therefore generally supportive of the McKinnon-Shaw hypothesis.

LA LIBÉRALISATION ET L'INTENSIFICATION FINANCIÈRE EN CHINE

Résumé

L'article se propose avant tout d'établir si, à partir de l'introduction des réformes économiques en Chine en 1978, il y a eu une libéralisation financière significative. Dans ce but, on a construit un index de répression financière qui indique, que, à part les programmes d'austérité économique officiels en 1985, 1989-91 et 1994, il y a eu une baisse durable de la répression financière. Sur la base de cette démonstration, on a vérifié si la libéralisation financière a contribué à l'intensification financière qu'on pourrait s'attendre d'après l'hypothèse McKinnon-Shaw en utilisant un modèle économétrique autoregressif à retards échelonnés (ADL). L'intensification financière est représentée dans le modèle comme fonction du PNB réel par tête, du taux d'intérêt réel, de la densité des institutions financières et de l'index de répression financière. Les résultats indiquent que, dans la période 1978-1996, l'intensification financière a été fort influencée par le PNB réel par tête et par le taux d'intérêt réel. Un modèle de correction des erreurs (ECM) dérivé du modèle ADL révèle que le taux d'intérêt réel est un facteur particulièrement important pour les fluctuations à court terme de l'intensification financière. Dans l'ensemble, les résultats confirment l'hypothèse McKinnon-Shaw.

