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An ABC Guide to Provincial Lending Patterns in China

Progress and Prospects

Abstract: Given its nonperforming loan ratio of over 20 percent in 2007 and its concentration on poorer areas, the Agricultural Bank of China (ABC) seemed an unlikely candidate for a successful initial public offering. The major capital injection the bank received in November 2008 was preceded by signs of a reduced proclivity to lend to loss-making state-owned enterprises over the 1998–2007 sample period, however. Despite some evidence of redistributive lending practices, ABC’s prospects may not be any worse than those of the other big state-owned banks that undertook IPOs from 2005 to 2006.

In spite of growing competition from foreign banks and smaller Chinese banks, five large state-owned commercial banks (SOCBs) still account for more than half of the total assets in China’s banking system. Four of these five—the Bank of China (BOC), the Bank of Communications (BOCOM), the China Construction Bank (CCB), and the Industrial and Commercial Bank of China (ICBC)—had initial public offerings (IPOs) in 2005–6. Only the Agricultural Bank of China (ABC) remained entirely in state hands, and, unlike the other SOCBs, it made little progress in reducing its nonperforming loan (NPL) levels. As late as 2007, ABC’s NPL ratio stood at 23.5 percent, as compared to the NPL ratios for BOC, CCB, and ICBC, which ranged between 2.7 percent and 3.1 percent, as shown in

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Table 1. Moreover, there seemed little evidence that ABC's lending patterns were becoming any less redistributive over time even as lending by BOC, CCB, and ICBC appeared to have become more market-oriented (Burdekin and Tao 2009). With ABC's own IPO having finally been accomplished in July 2010, it is more important than ever to reassess whether there is any evidence that ABC made any meaningful change in its lending strategy.

Following a RMB130 billion (US\$19 billion) capital infusion in November 2008 from Central Huijin, a subsidiary of China Investment Corporation, the nation's sovereign wealth fund, ABC's reported NPL level fell from 23.5 percent at year-end 2007 to just 4.32 percent at year-end 2008. Meanwhile, profits increased over 17 percent and its capital adequacy ratio reached 8.04 percent (*People's Daily Online*, April 27, 2009).¹ On May 20, 2009, ABC issued RMB50 billion in subordinated debt through China's interbank market. This represented ABC's first external financing on the open market and broke the national record for a single issuance of credit debt. The subordinated debt includes ten-year and fifteen-year fixed-rate bonds, and a ten-year floating-rate bond. The ten-year fixed-rate bonds totaled RMB20 billion with a coupon rate of 3.3 percent, the fifteen-year fixed-rate bonds totaled RMB25 billion with a 4 percent coupon rate, and the ten-year floating-rate bonds totaled RMB5 billion with a 0.6 percent premium over the one year fixed-deposit interest rate in China—for an initial one-year interest rate of 2.85 percent (www.abchina.com). This set the stage for a full IPO with listings in both Hong Kong and Shanghai, initially raising US\$19.2 billion in July 2010 and reaching a world record of US\$22.1 billion after incorporating over-allotment options. A mass frenzy by investment bankers began well in advance of the event:

“This is the big one and everyone on the street has been waiting for it,” said an executive at a Wall Street firm involved in the deal. “Over the last two years there is not a single head of any international investment bank who has gone to Beijing and not stopped for a cup of tea and a chat about the deal with the Agricultural Bank.”²

Not long ago, the idea of ABC's enjoying such financial market prominence would have been unimaginable. The central government's emphasis on ABC maintaining the flow of funds to the rural economy and poorer areas of the country had continued even after the other SOCBs adopted their new shareholding structures, severely constraining ABC's ability to rein in its NPLs and achieve improved profitability. Even now, ABC's post-IPO potential rests upon its finding ways to balance profitability with ongoing political pressure to expand its rural programs, a special challenge not shared by the other SOCBs (Cheng 2009). In this article, we nevertheless find that, while some evidence of redistributive lending patterns remains, ABC's SOE-based lending appears to have become less prevalent over the 1998–2007 period. Indeed, our empirical evidence lends some support to the premise that ABC is becoming more similar to the other SOCBs that had successful IPOs in 2005–6.

Table 1

Nonperforming Loan Ratios for Big Four State-Owned Banks, 2000–2009

NPL %	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
ABC	2.91	4.32	23.5	23.4	26.3	26.8	30.7	36.7	41.4	—
BOC	1.52	2.65	3.1	4.0	4.6	5.1	15.9	22.4	27.5	26.5
CCB	1.50	2.21	2.8	3.3	3.8	3.7	9.1	15.4	19.4	19.9
ICBC	1.54	2.29	2.7	3.8	4.7	19.1	21.3	25.5	29.8	34.4
SOCB aggregate	1.80	2.81	8.05	9.22	10.5	15.6	17.8	23.1	25.4	—

Sources: The 2008–9 ABC data are from the central government’s audit report (www.gov.cn/gzdt/2010-04/29/content_1595629.htm) and Sohu (<http://stock.sohu.com/20100505/n271923930.shtml>). 2008–9 BOC, CCB, and ICBC data are from their 2009 annual reports (www.boc.cn, www.ccb.com, and www.icbc.com.cn/icbc, respectively), and aggregate data are from the China Banking Regulatory Commission Web site (www.cbrc.gov.cn). The 2006–7 data are from *An Evaluation of Commercial Banks’ Competitiveness* (2008) and the China Banking Regulatory Commission Web site. The 2001–5 data are as listed in Barth and Caprio (2007, 43) and the China Banking Regulatory Commission Web site. The 2000 figures are Bankscope data given by García-Herrero, Gavilá, and Santabábara (2006, 350).

Note: The aggregate totals for 2007–9 also incorporate BOCOM, which was reclassified as a “large state-owned bank” in April 2007.

Lending Practices Since the 1998 Abolition of the Credit Plan

Like BOC, CCB, and ICBC, ABC first became accountable for its own profits and losses in 1994, when its old state-directed policy loans were transferred to the Agricultural Development Bank of China.³ The SOCBs continued to be subject to the government's credit plan to finance state-owned enterprises (SOEs), however, and formal funding requirements were not lifted until 1998. Even after 1998, the historical burden of prior bad loans plus ongoing protection of many SOEs continued to hamper full commercialization of the SOCBs. State-owned banks were still allocating 75 percent of their short-term loans to SOEs in 2003 (Chiu and Lewis 2006, 208). An ongoing concentration of bank lending in favor of the provinces where SOEs are dominant was identified by Dobson and Kashyap (2006, 125–26). Meanwhile, Barth and Caprio (2007, 26) point to SOEs and collective enterprises receiving nearly half of total corporate loans despite contributing little more than a quarter of gross domestic product (GDP).

Under the pre-1998 credit plan, forced loans to SOEs fueled soaring NPL growth. The practice of assigning loan quotas to every region under each year's credit plan further boosted the allocation of funds to SOEs because regions with low-growth potential also tended to be the most dependent on SOEs. Phillips and Kunrong (2005) show that, on average, provinces with greater SOE shares in industrial production experienced lower growth rates.⁴ Slower-growth provinces with higher SOE concentrations tend to be relatively rural and located in China's interior. The 1998 lifting of the credit plan, and the formal elimination of minimum loan quotas for each region, was intended to increase the independence of the loan portfolios of the SOCBs. The theoretical framework set out in Burdekin and Tao (2008) suggests that, to the extent that the SOCBs have been taking advantage of their increased freedom to pursue profit maximization since 1998, this should be evidenced in reduced emphasis on lending to SOEs (and increased lending to the private sector) and less emphasis on the weaker economic regions. This article uses provincial-level data through 2007 to examine whether the support for such a change in lending patterns, previously observed for BOC, CCB, and ICBC through 2005 (Burdekin and Tao 2009), is now being reflected in ABC's lending behavior.

Table 2 shows how the overall loan distribution of ABC, BOC, CCB, and ICBC across China's thirty-one provinces, municipalities, and administrative regions evolved after 1998, based on a grouping that divides these entities into high-, middle-, and low-income tiers according to the annual per capita GDP of each region.⁵ Although more marked changes in the loan allocation pattern are apparent for CCB and ICBC, ABC's lending allocation to the richer provinces increased somewhat from 47.2 percent in 1998 to 54.2 percent in 2007.⁶ ABC's rural base is reflected in the allocation of more than 22 percent of total lending to the poorest provinces throughout the period, essentially holding steady from 23.1 percent in 1998 through 23.6 percent in 2007. By contrast, the share of lending to the poorer

Table 2

Loan Allocation of ABC Compared to Big Four State-Owned Banks

	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
ABC										
High tier	54.2%	53.4%	52.3%	52.4%	52.2%	52.8%	50.9%	50.2%	48.2%	47.2%
Mid tier	22.2%	23.0%	24.1%	24.7%	24.0%	21.0%	25.1%	27.0%	29.1%	29.7%
Low tier	23.6%	23.7%	23.6%	22.9%	23.8%	26.2%	24.0%	22.8%	22.7%	23.1%
BOC										
High tier	—	—	—	66.5%	64.3%	64.2%	64.8%	67.4%	62.8%	63.0%
Mid tier	—	—	—	19.5%	21.2%	20.8%	18.8%	20.6%	23.3%	23.3%
Low tier	—	—	—	14.0%	14.5%	15.0%	16.4%	12.1%	13.9%	13.7%
CCB										
High tier	—	—	57.9%	61.4%	57.8%	58.4%	59.6%	58.8%	56.5%	54.0%
Mid tier	—	—	23.0%	21.0%	21.4%	21.8%	20.4%	22.5%	23.9%	26.3%
Low tier	—	—	19.1%	17.5%	20.8%	19.8%	20.0%	18.7%	19.6%	19.8%
ICBC										
High tier	—	—	—	57.8%	58.1%	56.3%	57.9%	57.6%	54.9%	54.0%
Mid tier	—	—	—	23.3%	22.6%	23.2%	22.5%	24.6%	26.0%	26.8%
Low tier	—	—	—	18.9%	19.3%	20.5%	19.6%	17.8%	19.1%	19.1%

Sources: *Almanac of China's Finance and Banking*, *China Statistical Yearbook*, and the Agricultural Bank of China Web site.

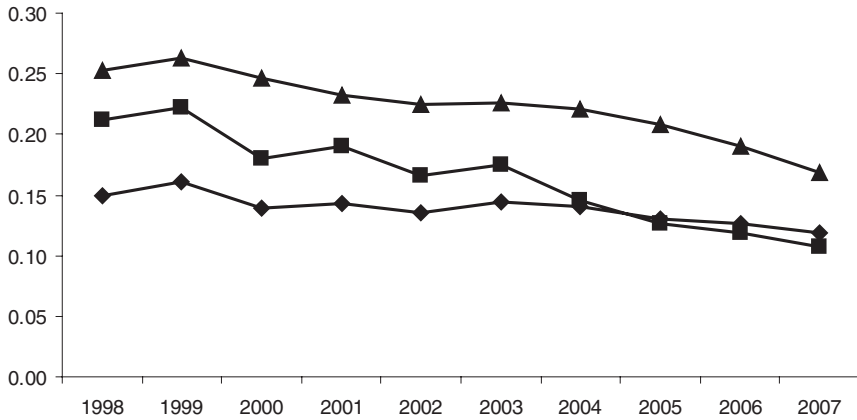
Notes: China's 31 provinces, municipalities, and administrative regions are divided into three tiers according to their relative rankings based on each year's provincial nominal per capita GDP. Foreign currency loans and deposits are included from 2000 with the US\$ amounts converted into RMB using the annual average exchange rate value.

provinces fell below 20 percent for both CCB and ICBC, and below 15 percent for BOC, by 2004.

Another way to look at the allocation of funds is to consider the ratio of loans to nominal provincial GDP. By comparing the three tiers, we can see if proportionately more lending is going to the poorer or to the richer provinces. In this respect, ABC has maintained a greater issuance of loans relative to GDP for the poorest provinces (Tier 3) than for the richer provinces, as shown in Figure 1. This is quite different from the experiences of BOC, CCB, and ICBC (Burdekin and Tao 2009). A relatively heavy loan allocation to the poorer, typically more rural areas where ABC's branches are concentrated is perhaps inevitable given ABC's traditional focus. It is notable, however, that Figure 1 reveals little tendency for the size of the over-allocation to the poorest provinces to fall after the 1998 reforms. Although the absolute level of the ratio declined across all three income tiers, the gap between Tier 3 lending and lending to the higher income tiers actually rose in the early 2000s before narrowing only slightly between 2003 and 2007. This casts at least some doubt on the notion that ABC was taking advantage of the greater freedom to exploit potentially more profitable lending opportunities in the richer areas of the country.⁷

In light of the concern with the negative effects of cutting back on lending to poorer parts of China (Cheng 2009; Cheng and Degryse 2007), it is easy to see why ABC seemingly made little effort to shift the focus of its lending activity outside these areas. While the other SOCBs were left to focus almost exclusively on urban lending, ABC remained bound by its historical "Three Agriculture" lending focus, encompassing "Agricultural Industrialization, Agricultural Area Urbanization, and Agricultural Loans for Farmers." This essentially forced ABC to set up branches in every village to meet its government-mandated goals. ABC's nearly 24,000 branches in 2010 remained by far the most among the SOCBs, with ICBC a distant second at 17,000 branches despite having the larger asset base. Not only has ABC been faced with many redundant offices and employees, but also its rural borrowers tended to treat the loans as a fiscal subsidy, with correspondingly little expectation of repayment. In spite of the entry of new lenders into the rural credit market, including microlending programs, regulator pressure on ABC to maintain its rural presence is reflected in the fact that "Initial ABC plans for stock market listing were rejected partly because they neglected the rural market" (Gale 2009, 68).

By the end of the third quarter of 2009, ABC's outstanding loans to agriculture-related projects and rural areas stood at RMB1.1269 trillion and RMB1.1841 trillion, respectively, up by 52 percent and 66 percent over the preceding two years (www.abchina.com). As part of ABC's plans for going public, the China Banking Regulatory Commission (CBRC), on May 21, 2009, announced new regulatory guidelines for peeling off the "Three Agriculture" operations, relying in part upon the aforementioned November 2008 capital injection (which left Central Huijin and the Ministry of Finance each with a 50 percent stake in ABC). This provided for a special "Three Agriculture" department within ABC, using an independent accounting system.⁸ In

Figure 1. Agricultural Bank of China's Average Ratio of Loans to Nominal Provincial GDP

Note: Tier 1 is the highest income group; Tier 2 is the middle income group; and Tier 3 is the lowest income group.

March 2010, ABC Chairman Xiang Junbo stated that the “effective reform of the rural finance operations has provided further impetus to the initial public offering” (Wang and Jiao 2010). The robust profit growth of 26.3 percent in 2009 was accompanied by a further decline in the bank’s NPL ratio to 2.91 percent and a reported capital adequacy ratio of 10.07 percent. The accompanying rapid credit expansion remains a possible source of concern, however, with ABC issuing US\$152 billion worth of new loans in 2009.

Disaggregated Provincial-Level Analysis of ABC Lending

Park and Sehart (2001) pointed to pre-1998 SOCB lending as redistributive and driven, at least in part, by ties to the government’s loss-making SOEs that tended to play a more important role in the poorer regions of China. Subsequent empirical analysis by Burdekin and Tao (2008) suggests ongoing SOE-based lending by ABC, while disaggregated province-by-province analysis suggested that ABC lending, if anything, became more redistributive over the 1994–2005 period. In the provincial-level analysis summarized below, we use updated data through 2007 to examine whether ABC’s lending patterns changed in the immediate lead-in to the bank’s reorganization as a joint-stock company. We consider the ratio of loans to bank deposits and the ratio of loans to provincial GDP as well as total lending growth. Bank lending has been highly correlated with deposits in China, and the

loan-to-deposit ratio allows us to focus on lending increases over and above the accompanying growth in the deposit base. Meanwhile, the ratio of bank lending to provincial GDP picks up lending increases that outstrip overall income expansion in the province where the bank is operating. These ratios offer alternative ways of capturing lending increases that, insofar as they do more than simply keep pace with the sizeable gains in the deposit and income base seen in many provinces over our sample period, are more likely to reflect meaningful changes in bank-lending behavior.

Figure 2 suggests that there is a generally positive relationship between ABC's loan-to-deposit ratios and the SOE shares of provincial output over the 1998–2007 sample period.⁹ This relationship changes substantially over time, however, and the strong positive relationship evident at the beginning of the sample in 1998 appears to have been entirely eliminated by 2007. Essentially the same inferences follow if we compare SOE shares with the provincial loan/GDP ratio and overall loan-growth rate (results available from the authors upon request). This suggests that, at least at the provincial level, a real shift in behavior may have occurred, and that by 2007, ABC's lending was no longer disproportionately weighted toward provinces with greater SOE concentrations.

A progressive decline in the correlation between SOE shares and the loan-to-deposit ratio is confirmed in Table 3, which shows the correlation declining every year, from a peak of 0.564 in 1998 to a low of -0.042 in 2007. The correlations between SOE shares and the loan/GDP ratio and loan-growth rate also decline substantially after 1998. The correlation with the loan/GDP ratio declines from 0.571 in 1998 to just 0.175 in 2007. Meanwhile, the correlation with the loan-growth rate drops from 0.457 into negative territory—but in this case alone, the major shift appears to occur right after the 1998 reforms rather than being spread out over time. In all instances, however, a sizeable correlation with the SOE share, in the neighborhood of 0.5 in 1998, is seen to be greatly reduced by 2007. Moreover, in two cases out of three, there is actually a negative correlation at the end of the sample period.

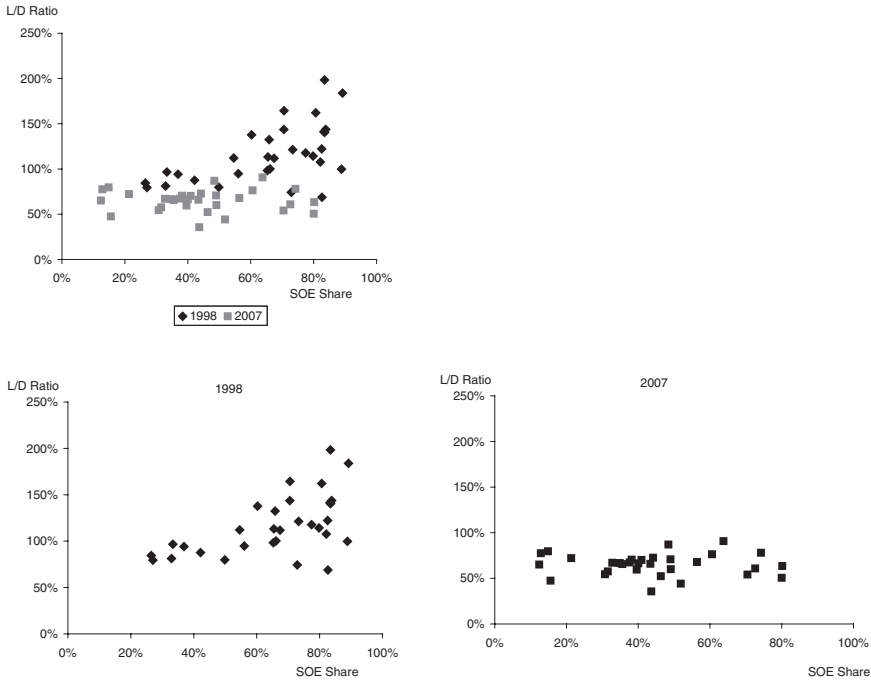
In testing these relationships econometrically, we estimate the following basic empirical framework:

$$\frac{Loan}{Deposit}_{it} = \beta_0 + \beta_1 SOE\ Share_{it} + \beta_2 Per\ Capita\ GDP_{it} + \beta_3 Total\ Deposits_{it} + \beta_4 Trend_t + \varepsilon_{it}$$

$$\frac{Loan}{GDP}_{it} = \beta_0 + \beta_1 SOE\ Share_{it} + \beta_2 Per\ Capita\ GDP_{it} + \beta_3 Total\ Deposits_{it} + \beta_4 Trend_t + \varepsilon_{it}.$$

The subscript i varies by province, and the subscript t denotes time in years. A time trend is included in the regression in order to take into account possible drift over time. This same specification is also estimated using the loan to GDP ratio as the dependent variable. Under panel estimation with fixed effects, the regression covers thirty-one provinces from 1998 to 2007 for 310 observations. Clustered standard errors are reported throughout in order to allow for lending rates by province

Figure 2. Scatter Plots of Provincial Loan-to-Deposit Ratio and SOE Shares, 1998 and 2007



featuring some clustering over time and not being entirely independent events. In Table 4, the baseline results in the first column for each dependent variable are followed by expanded specifications discussed further below.¹⁰ The coefficient on per capita GDP is positive and significant, at the 95 percent confidence level or better in two out of three regressions with the loan-to-deposit ratio, suggesting a tendency to lend more to richer provinces, *ceteris paribus*. This variable is always insignificant with the loan/GDP ratio, however. There is a positive response to total deposits in the first column, while the negative and significant coefficient on the time trend is consistent with tightening lending rates, and likely higher lending standards, over time.

Although the overall SOE share is insignificant in the baseline results, this variable encompasses a wide range of operational standards ranging from loss-making firms with low productivity and profitability to more successful firms. The specifications reported in the second column for each of the two dependent variables allow ABC's lending to respond not just to the total share of SOE production in a given province but also to the performance of these enterprises, as reflected in three measures provided in the *Almanac of China's Finance and Banking*. These

Table 3

Correlation Coefficients of SOE Share and ABC Lending Rates

SOE Share vs.	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Loan-to-deposit ratio	0.564	0.551	0.475	0.437	0.348	0.297	0.239	0.122	0.057	-0.042
Loan/GDP ratio	0.571	0.539	0.464	0.422	0.408	0.454	0.416	0.357	0.249	0.175
Loan growth rate	0.457	-0.536	-0.196	-0.341	-0.024	-0.072	-0.329	-0.339	-0.437	-0.284

Note: The figures reflect the simple correlation between provincial SOE shares and each of the three alternative measures of bank lending for every individual year in the sample period. The SOE share is measured by the industrial output of state-owned and state-held enterprises divided by the industrial output of SOE and non-SOE producers above designated size.

Table 4

Panel-Fixed-Effect Estimation of ABC Lending Rates by Province, 1998–2007

Independent variable	Dependent variable					
	LD ratio	LD ratio	LD ratio	LD ratio	LGD ratio	LGD ratio
SOE share	-0.137 (0.272)	-0.289 (0.291)	0.360 (0.357)	0.0658 (0.0783)	0.0424 (0.0804)	0.139** (0.0548)
Per capita GDP	13.98*** (3.390)	13.83*** (2.923)	19.88 (13.62)	0.902 (0.955)	0.967 (1.035)	-0.245 (3.494)
Total deposits	9.377** (3.837)	6.165 (4.042)	1.303 (10.58)	2.436 (1.568)	2.200* (1.245)	16.37*** (3.369)
SOE asset/output ratio relative to total provincial ratio		-0.0616 (0.107)	-0.0543 (0.121)		-0.0114 (0.0442)	-0.0373 (0.0407)
SOE labor productivity relative to total provincial productivity		0.0515 (0.0399)	-0.00991 (0.0380)		-0.00214 (0.0165)	0.00605 (0.0107)
SOE value-added relative to total provincial value added		-0.502*** (0.182)	-0.323 (0.236)		-0.126** (0.0590)	-0.118 (0.0746)

Time trend	-0.0931*** (0.0110)	-0.0959*** (0.0115)	-0.0374 (0.0278)	-0.0113*** (0.00269)	-0.0117*** (0.00244)	-0.00242 (0.00772)
Trend × SOE share			-0.0700* (0.0347)			-0.0118 (0.0104)
Trend × per capita GDP			-0.566 (0.794)			0.0861 (0.209)
Trend × total deposits			0.00856 (0.752)			-1.221*** (0.215)
Constant	1.180*** (0.184)	1.848*** (0.286)	1.251*** (0.385)	0.169*** (0.0560)	0.334*** (0.0865)	0.223*** (0.102)
Number of observations	310	310	310	310	310	310
R ²	0.736	0.751	0.764	0.504	0.533	0.614

Note: ***, **, and * denote significance at the 99%, 95%, and 90% confidence levels, respectively, and clustered robust standard errors are in parentheses.

comprise the relative share of total assets to industrial output, SOE labor productivity relative to overall labor productivity in the province, and finally, SOE value-added relative to total provincial value-added.¹¹ All three measures explicitly compare SOE performance to non-SOE performance in each province.

There is a negative response to the value-added measure for both the loan-to-deposit ratio and the loan/GDP ratio, and the coefficient is in each case significant at the 95 percent confidence level or better. To the extent that higher value-added shares imply more efficient and productive enterprises, this finding suggests that ABC has been lending proportionately more to the weaker SOEs. It is unclear whether this can necessarily be ascribed to a deliberate strategy on ABC's part, however, as weaker enterprises are more likely to need funds, and thus some of this effect may be demand-driven rather than supply-driven. Otherwise, the asset/output ratio and relative labor productivity are insignificant in each case. Finally, the time trend is negative and significant, as before, and the indicated effects of per capita GDP are unchanged—but the response to total deposits is now positive and marginally significant at the 90 percent confidence level for the loan/GDP ratio, while insignificant for the loan-to-deposit ratio.

The final specification for both the loan-to-deposit ratio and loan/GDP ratio (shown in the third column under each dependent variable in Table 4) adds interactive time-trend terms that allow responses to the SOE share, per capita GDP, and total deposits to change over time. Each of these extra terms represents the original right-hand-side variable multiplied by the time trend, in accordance with a procedure suggested by Farley and Hinich (1970) as a generalized way of testing for shifting slope coefficients over time.¹² Significant time-trend effects for Chinese banks have previously been noted by Burdekin and Tao (2008) and by Jia (2009), who found evidence of improving SOCB loan/asset and deposit/loan ratios over the course of his 1994–2004 sample period. Although some effects are rendered insignificant by the addition of the extra terms, the overall significance of the time-trend interaction variables is confirmed by *F*-tests.¹³ Interestingly, the results reveal a negative and significant coefficient on the time interaction with the SOE share in the case of the loan-to-deposit ratio, offering some support for a declining response to the SOE share over the sample period (although this effect is significant only at the 90 percent confidence level). The coefficient on the overall SOE share is now positive and significant for the loan/GDP ratio (at the 95 percent level confidence), while the significant response to total deposits is combined with a negative time-interaction effect, implying an initially positive reaction that subsequently diminishes over time.

A possible concern is that the findings laid out in Table 4 could be driven by outliers where SOEs are especially dominant. Accordingly, we ran our regression model again after excluding two provinces, Gansu and Xinjiang, which represent extremes where the SOE share of output exceeded 80 percent throughout our sample period. Table 5 reveals that this leaves intact all the significant effects found for the full sample. The only difference is that the Table 5 results now yield more

Table 5

Panel-Fixed-Effect Estimation of ABC Lending Rates 1998–2007, Excluding Gansu and Xinjiang

Independent variables	Dependent variables					
	LD ratio	LD ratio	LD ratio	LGDP ratio	LGDP ratio	LGDP ratio
SOE share	-0.327 (0.294)	-0.501 (0.326)	0.285 (0.356)	0.0950 (0.0699)	0.0810 (0.0748)	0.116** (0.0523)
Per capita GDP	14.59*** (3.688)	14.37*** (3.112)	19.63 (14.60)	0.893 (0.868)	0.974 (0.932)	-0.265 (3.613)
Total deposits	10.83** (4.008)	7.288* (4.084)	2.123 (11.21)	2.211 (1.597)	2.129 (1.273)	16.51*** (3.259)
SOE asset/output ratio relative to total provincial ratio		-0.0555 (0.119)	-0.0490 (0.137)		-0.009 (0.0450)	-0.0351 (0.0404)
SOE labor productivity relative to total provincial productivity		0.0600 (0.0435)	-0.0157 (0.0389)		-0.006 (0.0163)	0.008 (0.0108)

(continues)

Table 5 (continued)

Independent variables	Dependent variables					
	LD ratio	LD ratio	LD ratio	LGDP ratio	LGDP ratio	LGDP ratio
SOE value-added relative to total provincial value added	-0.510*** (0.184)	-0.288 (0.244)	-0.109* (0.0577)	-0.0098*** (0.00221)	-0.116 (0.0739)	-0.116 (0.0739)
Time trend	-0.103*** (0.0119)	-0.0325 (0.0269)	-0.0099*** (0.00190)		-0.006 (0.00699)	-0.006 (0.00699)
Trend × SOE share		-0.0917** (0.0339)			-0.00585 (0.00888)	-0.00585 (0.00888)
Trend × per capita GDP		-0.544 (0.855)			0.0996 (0.220)	0.0996 (0.220)
Trend × deposits		-0.0640 (0.804)			-1.203*** (0.210)	-1.203*** (0.210)
Constant	1.306*** (0.196)	1.986*** (0.302)	1.286*** (0.379)	0.145*** (0.0485)	0.286*** (0.0728)	0.225*** (0.0993)
Number of observations	290	290	290	290	290	290
R ²	0.738	0.755	0.776	0.504	0.530	0.615

Note: ***, **, and * denote significance at the 99%, 95%, and 90% confidence levels, respectively, and clustered robust standard errors are in parentheses.

consistent support for a positive effect of total deposits on the loan-to-GDP ratio, now significant in both columns 1 and 2. The overall pattern of results remains very robust to the exclusion of the most SOE-dependent provinces.

As shown in Table 6, the value-added ratio, like relative labor productivity, tends to be negatively correlated with the overall SOE share in the province. This is consistent with provinces with higher SOE concentrations having, on average, weaker SOEs. At the same time, the positive correlations between both performance measures and provincial per capita GDP suggest, on average, lower SOE performance levels in poorer provinces.¹⁴ There is, for example, a consistent positive correlation (ranging between 0.300 and 0.486 over the sample period) between the value-added ratio and the provincial per capita GDP. Thus, greater ABC lending to provinces where the SOE value-added ratio is lower suggests not only that weaker SOEs get a greater share of the funds, but also is consistent with an ongoing redistributive lending pattern in that lower value-added ratios are preponderantly found in lower-income provinces.

Conclusion

Our regression results suggest that even though ABC's lending patterns may not be closely linked to overall provincial SOE shares, there is some evidence of lending concentrated on a particular subgroup of SOEs with relatively low value-added ratios. The overall degree of SOE-based lending appears to have unambiguously declined since 1998, however, based on the shrinking year-by-year correlations and the negative time-trend interactions seen in the panel regression results for the loan-to-deposit ratio. This offers at least some hope that ABC's balance sheet will not necessarily regress to the poor condition that it attained prior to the November 2008 government-led capital injection. The lending pressures on ABC nevertheless remain greater than those faced by the other big SOCBs given ABC's concentration in poorer areas that are both more dependent on SOEs and have weaker SOE performers likely to remain in dire need of ABC loans.

While more data will reveal whether the apparent change in ABC's lending behavior is here to stay, a complicating factor remains the extent to which political connections may play a role in driving any remaining SOE-based lending on the part of ABC and other SOCBs. Shih (2004) draws attention, for example, to the prior consistently lower loan-to-deposit ratios for the province of Liaoning relative to the neighboring province of Jilin from 1978 to 1998. Even though Liaoning had a high concentration of SOEs, the greater availability of funds in Jilin may be explained by its leaders' much closer ties to the central government elite. Ties to the ruling party almost certainly remained an important influence on bank lending after 1998 as well (Dobson and Kashyap 2006, 126–27), but could not be incorporated in our formal analysis owing to the lack of any consistent series on this politically charged factor.

With regard to post-IPO performance, another factor not incorporated in our

Table 6

Correlations Between SOE Performance Measures and Overall Provincial SOE Shares and GDP Levels

<i>6a. Total Assets/Industrial Output Ratio for SOEs Relative to Ratio for SOEs and Non-SOEs Combined</i>											
Performance ratio vs.	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
SOE share	0.265	0.330	0.370	0.287	0.224	0.115	-0.099	0.042	0.087	0.129	
Per capita GDP	-0.007	-0.039	-0.166	-0.242	-0.020	0.226	0.258	0.108	0.179	0.220	
<i>6b. Overall Labor Productivity (in RMB per Person per Year) for SOEs Relative to Productivity for SOEs and Non-SOEs Combined</i>											
Performance ratio vs.	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
SOE share	0.115	-0.330	-0.488	-0.583	-0.621	-0.626	-0.624	-0.579	-0.508	-0.504	
Per capita GDP	-0.068	0.293	0.303	0.286	0.309	0.371	0.398	0.424	0.381	0.438	
<i>6c. Value Added/Gross Industrial Output Ratio for SOEs Relative to Ratio for SOEs and Non-SOEs Combined</i>											
Performance ratio vs.	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	
SOE share	-0.862	-0.805	-0.764	-0.803	-0.787	-0.779	-0.645	-0.250	-0.270	-0.344	
Per capita GDP	0.486	0.450	0.459	0.323	0.328	0.411	0.456	0.392	0.300	0.405	

empirical analysis is the potential long-term balance-sheet damage associated with the sharp loan acceleration by ABC, and the other SOCBs, following the onset of the global financial crisis. There is a danger of renewed NPL buildup insofar as the government-encouraged lending boost is undone by the additional commercial risks incurred (Liu 2009). In attempting to offset the strain on bank balance sheets resulting from as much as US\$1.4 trillion in overall new loans, ABC's IPO is to be accompanied by follow on share offerings and convertible bond issues by BOC, BOCOM, CCB, and ICBC aimed at generating as much as US\$45 billion for these four banks on top of the funds raised by ABC itself (Lewis 2010). Meanwhile, particular concerns regarding the exposure of the SOCBs to China's booming real estate markets led each bank to complete a stress test on its mortgage exposure. The April 2010 results suggested that, whereas BOCOM, CCB, and ICBC could withstand home price declines of 30 percent or greater, ABC could only handle a 20 percent drop (Shi 2010). Given the extreme gains that had been seen in China's property markets, this relatively narrow margin did not seem likely to help ABC's chances of matching the returns realized by the other SOCBs after their earlier IPOs.¹⁵

Notes

1. Whereas the other SOCBs had already achieved capital adequacy ratios above 10 percent, ABC's capital adequacy ratio remained sunk at -18.88% in 2007 (*An Evaluation of Commercial Banks' Competitiveness* 2008).

2. See Lewis 2010.

3. For more details on past banking reforms and ongoing developments among World Trade Organization members, see Burdekin and Kochanowicz (2008); Cheng (2009); Kwong (2009); and Lo and Ng (2009). Regarding legal and regulatory challenges, see the comprehensive treatment in Barth, Zhou, Arner, Hsu, and Wang (2007).

4. At the same time, Hasan, Wachtel, and Zhou (2009) find that the size of the private sector had a strong influence on provincial growth from 1986 to 2002. Other significant factors included the protection of property rights, political pluralism, and capital market depth.

5. All data utilized in this article are drawn from the *Almanac of China's Finance and Banking*, the *China Statistical Yearbook*, and the Agricultural Bank of China Web site.

6. BOC, CCB, and ICBC data do not extend as far because their provincial lending data were no longer reported in the *Almanac of China's Finance and Banking* after 2004 (and also could not be obtained from individual bank Web sites).

7. Podpiera (2006) suggests that the other SOCBs could also have done more to take advantage of the opportunities available in the richer regions, with all of the SOCBs losing market share to other financial institutions in those provinces featuring more profitable SOEs. Meanwhile, SOCB efficiency levels and prudential levels continued to lag behind China's joint stock banks (Ariff and Can 2008; Fu and Heffernan 2007; Lin and Zhang 2009; Matthews, Zhang, and Guo 2009; Shih, Zhang, and Liu 2007). Some recent data suggest at least limited progress in closing the gap (Jia 2009) and achieving higher profitability (Lu, Fung, and Jiang 2007), however.

8. The ongoing importance of "Three Agriculture" loans was confirmed in ABC's commitment to support farmers and promote agricultural industrialization through rural infrastructure construction. In its efforts to alleviate capital shortages in rural infrastructure construction, ABC initially selected seven provinces and regions—Zhejiang, Henan, Shandong, Guanxi, Sichuan, Gansu, and Shanxi—as experiments and expanded its new initiative

to the whole nation in 2010 (www.abchina.com). As noted by Cheng (2009), the various innovations adopted by ABC, aimed at increasing the profitability of its rural lending programs, nevertheless remain unlikely to match the returns realized in urban business.

9. This analysis defines SOE shares as the industrial output of state-owned and state-held enterprises divided by the industrial output of SOE and non-SOE producers above a designated size. Analogous relationships are seen if we instead divide SOE industrial output by provincial GDP (results available upon request).

10. We were unable to capture movements in total loan growth using this panel regression framework—producing no significant coefficients and an R^2 below 0.01—perhaps because of the greater noise associated with year-to-year fluctuations in this growth rate.

11. More precisely, the three measures are defined as (a) the total assets/industrial output ratio for SOEs relative to the ratio for SOEs and non-SOEs combined; (b) overall labor productivity (in RMB per person per year) for SOEs relative to productivity among SOEs and non-SOEs combined; and (c) the ratio of value added to gross industrial output for SOEs relative to the ratio for SOEs and non-SOEs combined.

12. Unlike standard dummy variable and Chow tests, this procedure provides for a change that occurs gradually over the sample period (Howe and Upton 1992).

13. The set of time-trend interactions is shown to be significant at the 95 percent confidence level or higher in each case. The exact F -test statistics are 3.76 for the loan-to-deposit ratio and 11.70 for the loan/GDP ratio.

14. The positive correlation between the total asset/output ratio and SOE shares also suggests weaker performance in areas with greater SOE concentrations. The negative correlation between the total asset/output ratio and per capita GDP reverses over time, suggesting a rise in the total asset ratio, and less efficient operations in the stronger regions of China. However, this rising ratio may well simply reflect a failure by the SOEs to match the improvements registered by the private sector and does not necessarily reflect a decline in absolute performance levels in the stronger regions.

15. Of these earlier cases, post-IPO performance by BOCOM and ICBC delivered significant abnormal returns, while CCB's performance was mixed and BOC lagged the market (Lo and Ng 2009). This past record certainly offered no assurance of outperformance, notwithstanding the government backing enjoyed by ABC and the other SOCBs.

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