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## **Can China Meet The Banking Openness Challenge Without Significant Harm?**

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### **Abstract**

The particular features of the Chinese banking system have so far allowed the country to avoid a systemic banking crisis despite strong microeconomic imbalances and distortions. The fundamental determinants of banking crises as well as empirical research focusing on developing countries have allowed the identification of macro and microeconomic determinants of such crises. By focusing on the time-profile of such determinants and using the best binomial model for signaling such crises, this paper refines the analysis and allows using the model for China over the next decade. The set of significant macroeconomic and financial determinants of banking crises in developing economies includes high non-performing loans, excessive growth in investment and consumption, falling return on average assets in banks, low inflation and rising current account deficits, with a combination of these variables providing a good early warning signal of banking crises. Making a large range of plausible assumptions for China's economic framework to 2015, we show that accelerating reforms in the Chinese banking required by WTO requirements will not allow the country to avoid a large banking shock. This crisis will appear in the very short-term if China fully meet the planned total openness, but will also prove less costly than if authorities defer the adjustment and circumvent their international commitments.

Key words: Banking crises, Early warning systems, Developing countries, China

JEL codes: C25, F30, G21

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## **1. Introduction**

After a period of relative calm under the Bretton Woods system, banking crises have reappeared in the early 1970s and have become more frequent. The crises in Chile (1981-83), Mexico (1994), South East Asia (1997-98), Russia (1998) or Turkey (2001) have reminded policy makers of the potential cost of such banking crises in terms of growth, welfare and budget. It has given a new impetus to research on the determinants and management issues of such crises, both in multilateral organizations, Central Banks and supervisory institutions and academia. There has been a new emphasis on quantitative research dealing with early warning systems for banking crises, much less developed than research on foreign exchange crises. These researches have focused on identifying common determinants of crises (macroeconomic fundamentals or microeconomic and institutional fragilities), examining contagion channels, analyzing twin crises or again assessing the impact of deposit insurance.

Many of the recent crises have occurred in developing countries, and their economic and social costs appear to be much more devastating than in industrialized countries. One important aspect of the recent empirical econometric studies devoted to developing countries' banking fragilities is the existence of a causal link between domestic financial liberalization and the vulnerability of banking systems, which is all the more important when domestic liberalization is associated with external openness to international capital flows.

Despite the recurrent weaknesses of its banking system, China has been able to register a very high economic growth with no apparent macroeconomic and without suffering any severe banking adjustment. The Chinese authorities saw the Asian crisis of 1997-98 as a wake-up call for bank reform. The initial steps in such reforms were somewhat hesitant and operated on an ad-hoc basis, but the movement has accelerated over the past two to three years, with a clear re-affirmation by the new political leadership of the importance of the issue. At a moment when World Trade Organization (WTO) agreements require a significant opening to foreign financial institutions and when calls for international capital liberalization are growing by the day, this paper intends to assess overall systemic risks of China's banking system in the medium-term.

After a short survey of the existing literature on banking crises, we rapidly describe the key features of China's banking system, its weaknesses inherent to the long history of policy management, its challenges and its current state some months before its further openness. We then build a simulation tool aimed at predicting banking crisis in a specific macro framework, which allows to derive very interesting temporal stylize facts of banking crises. Lastly, we inject plausible assumptions of the exogenous variables used in the model to test the likelihood of a banking crisis in China over the medium-term.

## **2. Banking crises in developing countries: a short survey of the literature**

The theoretical background of banking crises can be very rapidly summarized around the two following points:

- Information asymmetry between lenders and borrowers, coupled with mimetic behaviors and the banking competition structure, leads to a weakening of risk assessment in banks' allocation strategies (loans distribution, but also security holdings), rapid accumulation of assets and a euphoric phase in the credit cycle, usually associated with increasing mismatches between assets and liabilities (duration, currency or counterparts' quality mismatch). The increasing risks taken by banks is encouraged by the perceived moral hazard or institutional protection, and by diminishing returns associated with a higher competition between banks.
- Tolerance for weak credit institutions and poor lending practices is enhanced by a weak institutional framework, poor supervision functions at the regulatory bodies, limited enforcement of rules and controls, usually associated with a low level of capital in credit institutions.

In developing countries, such fundamental reasons for potential shocks in banking systems are compounded by governance issues, both between regulators and credit institutions, and within banks. The relatively high concentration of credits across a limited number of large local companies, low levels of credits to consumers, and, in many instances, opaque but strong relations between bank owners and the corporate structure of the country, accelerate the increase in risks taken by banks. If this is accompanied by a significant integration in international capital flows, and if banks' refinancing can induce large exposures to the exchange rate, traditional economic policy dilemma can encourage further risk taking behaviors and the asset-liability mismatches.

Many recent research papers have tried to identify, on an empirical basis, the respective importance of such diverse factors in the eruption of banking crises. Following the research on the so-called "twin crises" (banking and currency crises), started by Kaminsky and Reinhart in 1995, Demirgüç-Kunt and Detragiache (1997) conducted the first empirical analysis of banking crisis determinants on a panel 65 developing and developed countries, from 1980 and 2004. They found that the probability of a banking crisis is heightened by some stylized macroeconomic imbalances (low growth, high inflation, high interest rates) and institutional features (weak law and order, and deposit insurance). Later researches by the same authors showed the adverse impact of financial liberalization (1998) on this probability, especially when institutions suffers patent weaknesses; explicit deposit insurance schemes increases further the likelihood of a crisis, especially when associated to moral hazard (i.e. when the deposit insurance has an extensive coverage, when it is funded and when it is run by public authorities).

To build an early warning system tool, Hardy and Pazarbasioglu (1998) extended the set of possible macroeconomic leading indicators. To the factors previously identified by Demirgüç-Kunt and Detragiache, they found that a decrease in the ICOR (Incremental Capital Output Ratio) ratio, strong credit growth, high capital inflows and an adverse terms of trade shock are also accurate leading indicators in early-detecting banking crises.

Hutchinson and McDill (1999) also tried to extract determinants and leading indicators of banking crises. Based on a large panel of developing economies (from 1975 to 1997), they highlighted the adverse impact of a decline in asset prices, while reinforcing evidences of the negative roles of low growth, financial liberalization, deposit insurance and low central bank independency.

The negative roles of rapid development in bank lending and financial liberalization are also highlighted in the widely cited article of Kaminsky and Reinhart (1998). Trying to identify common factors and links between banking and currency (“twin”) crises, they also found that banking crises traditionally precede currency ones, through a negative sequence between booms in credits provided by the banking system and in capital inflows, and an overvaluation exchange rate, that are followed by a recession.

Looking now at the tools used in these empirical studies of banking crises, econometricians have traditionally applied multivariate logistic (Logit) functional forms on a binary variable, which takes the default value of zero or one in case of crises, even though multivariate Probit models have also been used. The emphasis was mostly to highlight significant determinants of crises more than systematically testing alternative functional forms on such a binary variable.

The list of episodes of banking crises built by Caprio and Klingebiel (1996) was the root source of many of the other lists used in most of the empirical studies on banking crises, although Demirgüç-Kunt and Detragiache (1997) and Lindgren, Garcia and Saal (1996) and Ho (2004) have built alternative lists based on alternative definitions of banking crisis: share of non-performing loans, extensive bank runs, emergency public measures and nationalizations for the first; runs or substantial portfolio shifts, collapse of corporates or large-scale government interventions for the second; alternative approach differing from traditional approaches that rely on market events through the application of Markov regime-switching models on an index of monetary market pressure (IMMP) for the latter. Although the latter is technically quite interesting and may pave the way for further quantitative developments in identifying banking crisis (with similar techniques than the ones used to date business cycles and more particularly recessions), the author clearly concludes that, at this stage, the application of regime-switching models to crisis identification is subject to the same problems than common procedures.

The latest version of the list from Caprio and Klingebiel (2003) therefore seems to be the most reliable one. It presents information on 117 systemic banking crises, defined as much or all bank capital being exhausted that occurred in 93 countries since the late 1970s. It also provides information on 51 non-systemic or borderline banking crises in 45 countries during that period. A large part of experts-judgment, based on their research and previous versions of that list, has been used in this compilation.

### **3. A quick look at the state of the Chinese banking system**

This section does not aim at providing an exhaustive survey of the Chinese banking system, but intends more simply to stress the major weaknesses in one of the country’s main Achilles’ heels. Such weaknesses have indeed been the main reason for this empirical study, if only because the sheer international integration of China in the world economy suggests that any significant banking crisis there could have wider systemic repercussions, and because of the country’s commitment under WTO to pursue its opening to foreign financial institutions.

From a microeconomic angle, the current business model of Chinese banks is not viable in a context of sustained credit growth, even at a pace now slower than during the past decade. Such credit growth was made possible by the history of policy-directed lending, deficient or

inexistent risk analysis processes and a huge global leverage effect. The current ROA (Return On Assets) does not enable banks to keep their capital adequacy ratios without having permanent capital infusion and conversely almost no profit/dividend distribution. This is evidenced by the following features<sup>2</sup>: (i) with only 23% of short-term liabilities funding liquid assets, the banks indeed have a large maturity mismatch in their balance sheets. (ii) The liquidity issue is partly compensated by the low transformation ratio, which is also pointing to difficulties in finding attractive uses for the large deposits received. The situation is highly homogeneous across the different banks. (iii) Individual banks are also fairly spread around the mean capital strength, but with a larger “tail distribution”. On average, the capital strength remains low, only slightly above 4%. (iv) There is a very similar pattern for profitability as for capital strength, including on the very low average level (0.33%), clearly meaning that Chinese banks do not benefit from the high leverage on limited capital.

From a macroeconomic perspective, the excessive credit leverage in the economy is obvious: at more than USD 3,081 bn in September 2005, total domestic credits amounted to more than 150% of GDP, while ten years of stellar growth have left non-performing loans (NPLs) amounting to 15% of total credits according to official figures (closer to 25% according to international rating agencies). Furthermore, the reality of the loan quality improvement, measured through the rapid decline in reported non-performing loans ratios over the past two years, from 23% of total loans at the end of 2002 to 15.6% at the end of 2004, is highly questionable. Doubts arise because the choice of criteria to determine the classification of loans along the 5 categories defined by the CBRC (China Banking Regulatory Commission) is left to individual banks, because the decline in ratios was largely due to the rapid increase in total credit extended by banks during this period (almost 50% of the total outstanding loans have been extended during the past 3 years only). It means that any future cyclical slowdown would create a new wave of non-performing loans as a mechanical result of the past credit euphoria, the expected consequences of the past over-investment, and the persistent pressures on corporate margins, possibly at a time when the total credit expansion slows significantly.

This banking background is associated with an increasing number of critical financial situations in State Owned Enterprises (SOEs) and the progressive implementation of China’s WTO commitments. In particular, the expected full liberalization in foreign banks activities as of January 1<sup>st</sup>, 2007, is pushing the authorities on the way of a more active restructuring of the banking sector. Most observers agree that the Chinese authorities saw the Asian crisis of 1997-98 as a wake-up call for bank reform. They also recognize that the initial steps in such reforms were more hesitant and largely on an ad-hoc basis, but that the movement has accelerated over the past 2-3 years, with a clear re-affirmation by the new political leadership of the importance of the issue. Overall, about USD 260 bn of government funds have been used to strengthen the banking sector through re-capitalization and the establishment of defeasance vehicles (the four Asset Management Companies, AMCs, bought CNY 1,300 bn of NPLs at about 50% of face value). The current approach on bank reform can be summarized through three headings: regulatory reform and institutional infrastructure improvement, governance and management changes, and capital strengthening. For the latter, the most visible aspects are the following: foreign participations, IPOs (Initial Public Offerings), openness and strengthening of banks’ capital, transfer of NPLs and, more generally, transfer of banks’ deposits towards markets.

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<sup>2</sup> These elements are derived from a comprehensive analysis of the Chinese banking system conducted by TAC in 2005.

As a conclusion of this section, it is interesting to note that Caprio and Klingebiel included China in their benchmark list of banking crises, with systemic crises recorded at the end of the 1990s when the four large State-owned commercial banks were deemed insolvent, non-performing loans were estimated at 50 percent of gross loans, and net latent losses computed at a staggering USD 428 billion or 47 percent of its GDP. However, this episode did not translate into a full-blown crisis, maybe in part because of the very strict controls on all banking activities, the non-convertibility of the currency and the limits on foreign banks' activities. In the next section, we therefore develop a simulation quantitative tool for the Chinese "specific" case in order to determine whether or not the WTO challenge induces a significant risk on the Chinese road to orderly growth or, by extension, whether the current acceleration in bank reform will be enough to avoid such a collapse.

#### 4. Data and Simulation tool

Taking into account the preceding survey on banking crises literature, the positioning of our research is to make an updated exploration in banking crises determinants, while bearing in mind the final objective of this study, i.e. building an empirical tool aimed at simulating the risks of a systemic banking crisis in China. The direct methodological implication of this is that we have reconciled a "fresh" or pragmatic stance, i.e. selecting explanatory variables without much *a priori* on what has been highlighted as the most significant determinants in previous researches, while retaining only the ones that are the most easy to simulate in a coherent medium-term scenario exercise. We thus impose ourselves to determine the relevant factors in banking crises prediction through a Principal Components Analysis (PCA) applied to the most exhaustive as possible set of possible-cum-predictable determinants. The second main methodological contribution of this study to the research on banking crises is the systematic test between alternative binomial functional forms for the selection of the model that provides the highest predictive power, instead of *a priori* taking a Logit or a Probit model.

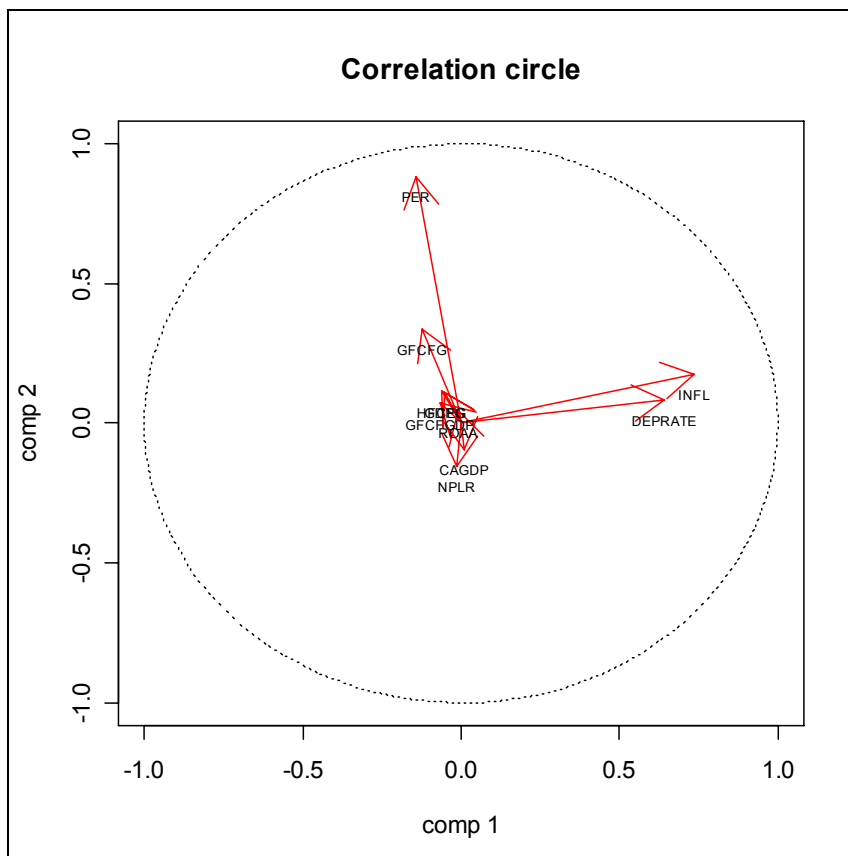
Given the non-convincing characteristic of the newly developed quantitative research on banking crises dating, we retain the latest version of Caprio and Klingebiel crisis dates. We focus our research on episodes of systemic banking crises that could have something similar to what China could encounter (we calibrate our model on the detection of what the authors call a systemic banking crises, not on borderline ones), and then we retain the following list of 19 developing countries (see Table 1). Due to conceptual and data availability purposes, we take the recent 1993-2002 period for each country, i.e. a 10-year window that covers the most significant of systemic crises in the developing world in a recent past. Overall, our panel of usable data contains 168 observations. In a first step, we do simply partition the sample into crisis (80) and non-crisis (88) years.

Table1. Countries included in the sample

Argentina	Ecuador	Malaysia	Thailand
Brazil	Indonesia	Mexico	Turkey
Bulgaria	Japan	Nigeria	Ukraine
Chile	Korea, Rep.	Philippines	Vietnam
China	Lithuania	Russia	

To select a reduced set of exogenous variables, we apply a standard factors reduction technique, namely a Principal Components Analysis. It is then possible to evaluate the evolution and contribution of the respective dynamics to the whole evolution of factors. The following chart (Chart 1) presents the results obtained from the PCA through the so-called correlation circle. This method clearly identifies two major components, which explain 77.4% of the movements on banking crises determinants (49.6% is explained by the first – horizontal – component and 27.8% by the second – vertical - component). Most of the first component is clearly explained by the highly correlated inflation and nominal (deposit) interest rate variable. Moreover, the second component is essentially explained by the price-earnings ratio and, in a lesser extent, growth in investment.

Chart 1. PCA Correlation Circle



The chart above only shows factors that have the highest explanatory power; although the four variables upper-cited would probably be sufficient to explain in an acceptable way banking crises, we decide to retain the following list of ten factors, be it only because 22.6% of the variances are explained by other components, because the “cumulative” composition of the principal components does not allow for the elimination of one of the ten final variables, because they are the more adapted to a China macro-simulation perspective, but also because this set of variables will prove to have the highest explanatory power on a empirical basis.

Table 2. List and sources of explanatory variables

CODE	COMPLETE VARIABLE NAME	SOURCES
ROAA	Return On Average Asset	Bankscope / The Banker
PER	Price-Earnings Ratio	S&P
NPLR	Non Performing Loans Ratio	Bankscope / The Banker
gY	GDP growth rate	World Bank - WDI
gI	Investment growth rate	World Bank - WDI
gC	Consumption growth rate	World Bank - WDI
IY	Investment over GDP ratio	World Bank - WDI
CAY	Current Account balance over GDP ratio	IMF - WEO
INFL	Inflation rate (CPI)	World Bank - WDI
DIR	Deposit interest rate	IMF - IFS

A banking crisis “score” is then computed as a simple linear combination of these factors, as shown in formula [1]. The complementary log-log asymmetrical functional form of this generalized linear model is chosen among alternative binomial transformations on an accuracy criterion of prediction, and is estimated through a Maximum Likelihood technique.

$$[1] \quad SCORE_t = f(ROAA_t, NPLR_t, gY_t, gI_t, gC_t, IY_t, CAY_t, INFL_t, DIR_t, PER_t)$$

The probability of banking crisis is then evaluated through the following transformation of our “banking score”:

$$[2] \quad PROB_t = 1 - \exp(-\exp(SCORE_t))$$

The empirical tests on the model are very satisfying, as testified by the following table or so-called “confusion matrix” with, in line, the predicted state of the banking system (either in systemic crisis or not) and, in row, its observed state. Our model thus covers 87.8% of the crises, predicts a false crisis only 4.5% of the times, and shows an overall 92.2% accuracy (i.e. ratio of good predictions over the total number of observations).

Table 3. Predictive power of the model

	Observed state of the banking system		
	Crisis	Non Crisis	
Predicted state of the banking system	Crisis	70	3
	Non Crisis	10	85
Overall accuracy of the model:		92.2%	
Coverage ratio:		87.8%	
Signal-to-noise ratio:		95.5%	

## 5. Stylized facts during systemic banking crisis times

In order to emphasize temporal stylized facts of periods surrounding banking crisis episodes, we now fraction our sample around six items: non crisis (NC) and crisis (C) years, 2

years preceding the crisis (noted C-2), one year before the crisis appears (C-1), the post-crisis year (C+1) and two years after the crisis (C+2). Our samples then contains 47.6% of banking crises (C) observations, 3.9% of C-2, 3.9% of C-1, 10.1% of C+1, 6.8% of C+2 and 30.1% of NC observations. In the Tables 4 and 5 are presented the mean average values of each of the determinants for each period.

Table 4. Temporal profile of financial determinants

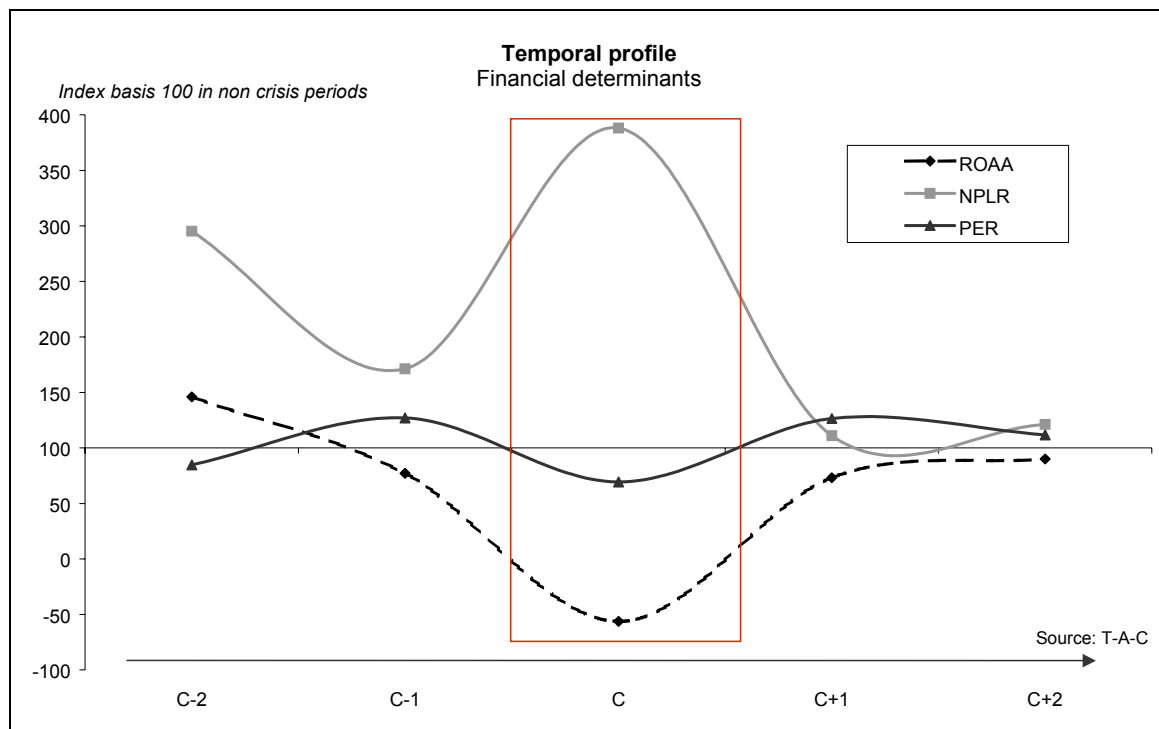
	ROAA (%)	NPLR (%)	PER (%)
C-2	2.0	8.8	16.8
C-1	1.1	5.1	25.3
C	-0.8	11.5	13.8
C+1	1.0	3.3	25.2
C+2	1.2	3.6	22.2
NC	1.4	3.0	19.9

Table 5. Temporal profile of macroeconomic determinants

	GDP growth (%)	Invest. growth (%)	Invest. ratio (% GDP)	Cons. growth (%)	CA ratio (% GDP)	Inflation (%)	Dep. interest rate (%)
C-2	5.2	9.6	30.5	5.9	0.2	9.2	8.7
C-1	6.6	10.3	27.6	8.0	1.9	8.8	9.8
C	2.0	-3.1	24.0	1.5	3.9	13.7	15.3
C+1	4.4	3.4	22.4	4.4	-3.2	11.2	16.9
C+2	6.1	7.5	23.6	6.8	-4.0	17.1	19.9
NC	5.6	8.4	26.4	5.1	-2.4	19.6	20.5

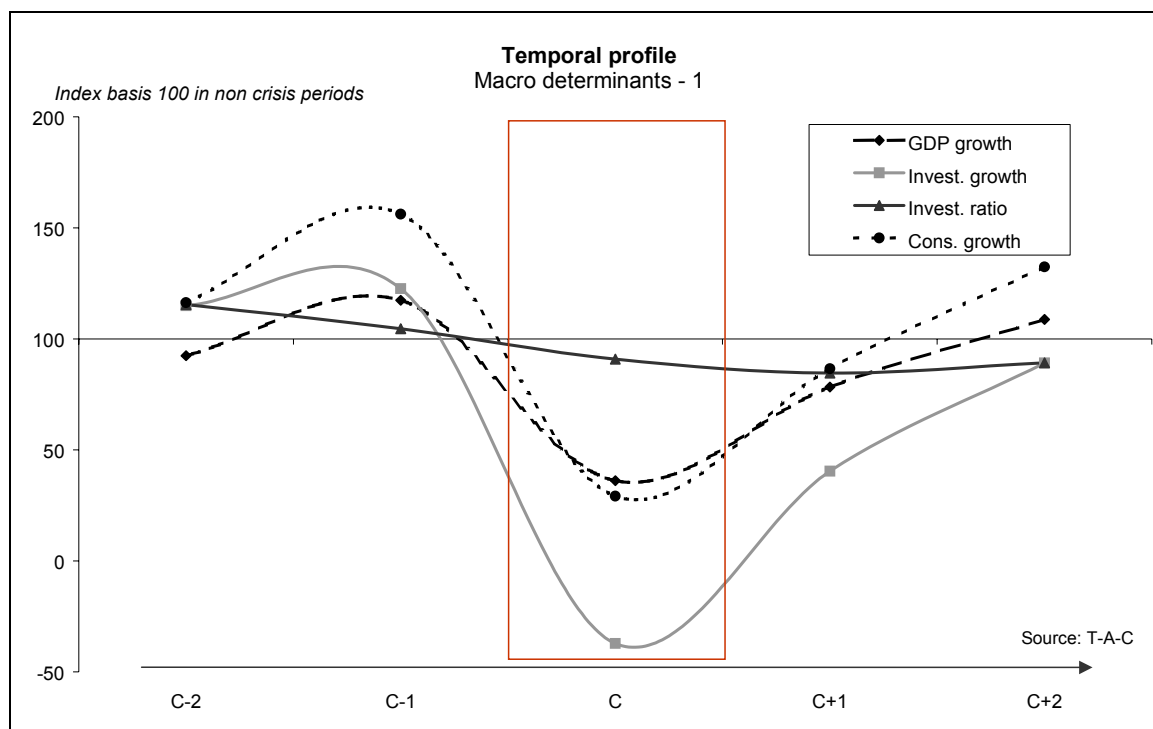
As in an economic standpoint China strongly differs from most of emerging markets today and then from most of the economies included in the sample (e.g. its near-50% investment-over-GDP ratio has no comparison, or it has very low inflation today, especially with compared with a sample that includes Latin American countries), we present these results in a normalized format in the Chart above, which allows to assess the main deformations of banking crises determinants before, during and after such crisis episodes, with compared to normal behavior of these fundamentals during years that are not included in windows around crisis periods (non crisis years).

Chart 4. Normalized temporal profile of financial determinants - 1



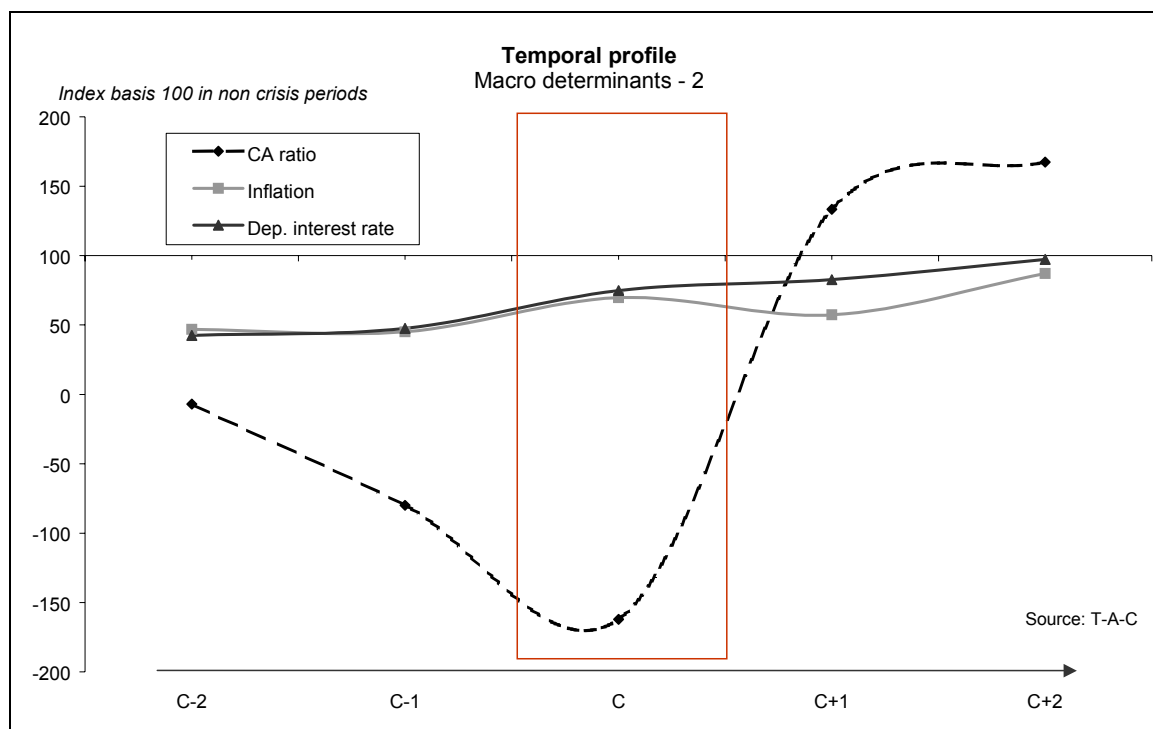
The non-performing loans ratio (over gross loans) shows the deepest deformation during crisis and pre-crisis periods. Indeed, on average in our sample, this ratio is three times higher than the mean average during years out of crisis periods. However, the harshest increase occurs only during the crisis years, while there is generally a relative decline in the NPLs ratio one year before the crisis. Therefore, more than its dynamics, it is the level of the non performing loans ratio that is a good predictor of banking crises, but with a “poor timing performance”. We also note that this ratio tends to go back to “normal” levels as soon as the exit from the crisis, probably due to aggressive treatments of bad loans at the end of crises included in our sample. The two years before a banking crisis period is also characterized by a ROAA that declines from a level 1.5 times higher than the non-crisis average two years before the crisis to a level well below this average. After a substantial fall in the crisis period, it rises strongly the year after the crisis, but without going back to non-crisis territories even two years after such an episode. Lastly, the price-earnings ratio (PER) generally crosses its non-crisis average by 30% one year before a systemic crises occurs. After a moderate decline during the crisis (relatively to deformation in the two previous financial determinants, despite in absolute terms there is a 30% loss in the value of this ratio), we can observe a rebound in the global P/E ratio of the economy, above “normal” values.

Chart 3. Normalized temporal profile of macro determinants - 1



GDP, investment and consumption post similar growth profiles with, again, a strong break in the dynamics during the crisis year. Nevertheless, some important nuances must be highlighted. First, the acceleration in the pace of household consumption growth is more pronounced one year before the crisis when compared to GDP and foremost investment since, one year before the materialization of a banking collapse, private consumption grows 1.5 times more rapidly than its non-crisis average, against 1.23 times for investment and 1.17 times for GDP, although the latter comes from lower values in the preceding year. Moreover, on average on our sample, only consumptions post negative growth rates in crisis periods. Symmetrically, the largest the pre-crisis and crisis deformations, the more impressive is the post-crisis recovery: this is the case for consumption growth, even though two years after the crisis it has not yet recovered its average pace of expansion. The investment rate is very strong (16 percentage points above normal territories). Furthermore, the pre-crisis year shows a decrease in the investment rate two years before the crisis (downward trend that stops only two years after the crisis). The important conclusion is that the peak does not occur just prior to the crisis, but two years before. Lastly, the chart shows that recovery in investment rate during the post-crisis years is slow: while the trough (22.4%, i.e. a 4 percentage points fall compared with the non-crisis period value, and 8 percentage points below the peak) occurs during the first post-crisis year, the figure is still 4 percentage points below the non-crisis period average two years after the crisis.

Chart 4. Normalized temporal profile of macro determinants - 2



An interesting finding is that inflation and nominal interest rates are below their average in crisis times (including the two-year windows preceding and following the crisis). Crisis periods are then characterized by an acceleration in inflation and deposit interest rates, which last until at least two years after the crisis has ended. Inflationary problems are thus more a consequence of the post-crisis adjustment than a cause. With non-performing loans, price earnings ratio and consumption growth rate, the current-account-over-GDP ratio is the variable that exhibits the strongest deformation. Pre-crisis periods are indeed characterized by fast-growing current account deficits (respectively 0.2%, 1.9% and 3.9% of GDP two years, one year and during the banking crisis, against a -2.4% average when the country is out of crisis problems).

## 6. Application to China: is the Dragon ready to stumble?

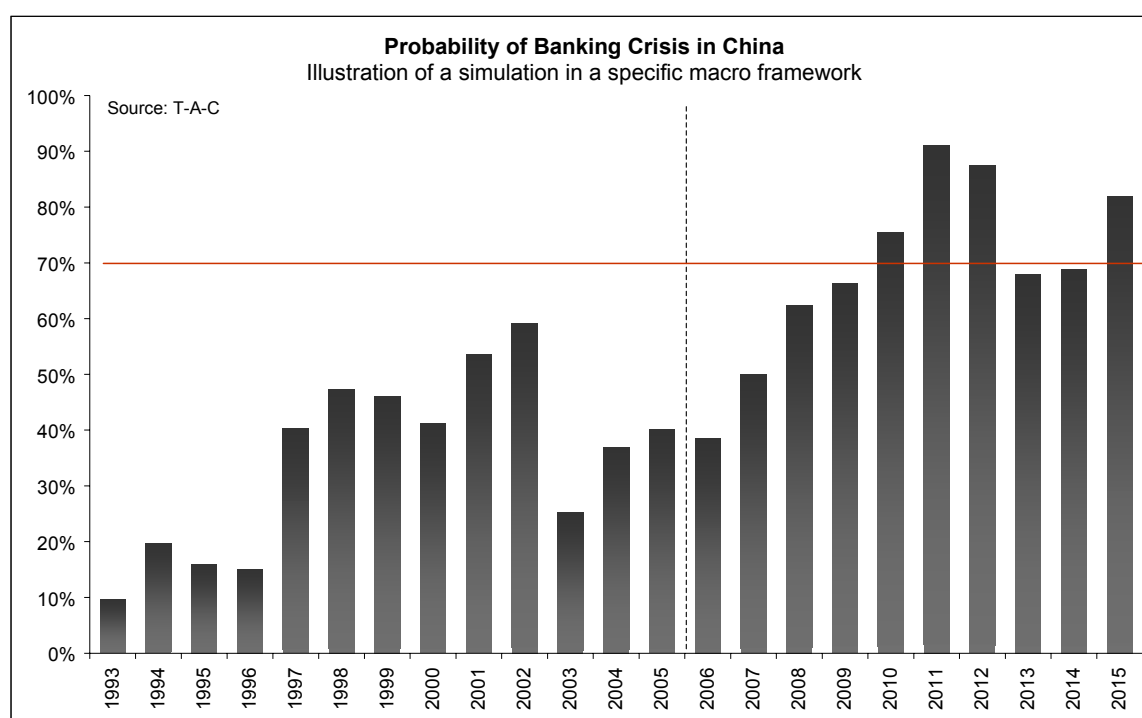
From heating growth rates of macro fundamentals to low inflation, low interest rates and high non performing loans, China meets several of the stylized facts presented here above, but the Chinese proportions rarely find pairs in the history of developing countries. In the next paragraphs, we therefore present the results of our banking crisis model by simulating the probabilities of systemic banking crisis under different polar scenarios or coherent set of macro assumption, from now on to 2015.

Making precise forecasts for each of the factors used in our banking crisis tool over the medium- to long-term is a daunting task. Forecasters have proved so many times wrong when making assumptions about the future Chinese developments, that it is clearly more adequate to test different scenarios than to try to forecast the precise occurrence or not of a potential shock in the banking system. We have simulated two polar or archetypal macro scenarios, with the starting points of such archetypal images of China's future defined by the key issues that the country is facing today, as recognized by both domestic authorities and most

observers of the Chinese scene. Such issues include the capital accumulation increase, the exchange rate and foreign exchange reserve management, and geographic / social rebalancing policies. From a list of plausible answers to these challenges, we draw a couple of polar “sets of answers” that are coherent between themselves and include a very large range of the possible foreseeable evolutions between now and 2015. In each scenario, a temporal profile is drawn for the ten exogenous variables.

In a first scenario, the full compliance to WTO commitments and then the full openness to foreign participants in the domestic banking system at the beginning of 2007 pushes the banking score above the critical 70 level<sup>3</sup> as soon as in 2006, and the authorities decide to confront the problem “head-on” and accept an implicit but managed crisis. In an opposite scenario, where WTO commitments concerning the banking sector are diluted, circumvented or even re-negotiated when they come into force in 2007, the continued use of banks as vehicles for rebalancing policies adds to the macro factors to induce a gradual rise in the banking score, with a banking crisis starting somewhere between 2010 and 2011. As an illustration, on the chart below (Chart 5) is presented the simulation (retroactive and prospective) of the probability that China encounters a serious banking crisis in this second extreme scenario, derived from our model presented in section 5.

Chart 5. Banking score for China in the *Pi* scenario, 1993-2015



The simulations show a clear causal relationship between the extent and timing of financial liberalization, and both the timing and the cost of the banking crisis. Thus, the more rapidly and largely China opens its banking system to foreign participation, the more rapidly the economy enters a phase of banking crisis, but the less costly for the economy it is. In a low liberalization scenario, the treatment of the crisis simulated is indeed similar to a scenario where China fully and immediately meets the WTO requirements, but the fact that the

<sup>3</sup> When building the banking crisis model, we did calibrate the binomial model on a benchmark 70% threshold, which empirically gave the best statistical quality / accuracy.

distortions are stronger because of the delayed nature of the systemic adjustment implies a stronger macroeconomic adjustment, and the decrease in the probability of banking crisis allowed by the “imposed” banking treatment is limited, the score moving back into critical territories at the end of our simulation period (2015).

## **7. Conclusions**

Banking crises in emerging economies have multiplied over the past 20 years, and their social and economic costs have been massive. The theoretical unfolding of such crises do not differ from the traditional framework designed for industrialized countries, but some specific features like governance issues and concentration of borrowers make things far worse in developing countries.

The case of China is even more particular: the size of the country, the very strong State institutions’ dominance of the banking and financial sectors, acute governance issues, a high financial leverage, and the coming into application of the country’s WTO commitments in the financial industry combine to make a potential banking crisis the weakest point in the country “risk analysis”. In parallel, the implication of a systemic banking crisis in China would have far reaching consequences, if only because of the extent of international interbank financing, the high level of capital and portfolio speculation currently observed in the country, the strong relation between the financial industry in China and performances in Hong Kong, and the latter full immersion in global capital flows.

Most of the variables identified as being good predictors of a banking crisis in China were already present in the early 90s... but no full-fledge crisis occurred. Using a signaling tool for banking crisis tested over a sample of developing countries, and making a large range of plausible assumptions on explanatory variables for the next 10 years, we show that a large banking shock is unavoidable in China, whatever the macroeconomic scenario and environment in which the banking system will run.

The focus should therefore clearly be on the regulatory and supervision aspects of China’s banking system, coupled with potential transformation in bank decision processes. The ability of the authorities to solve the issues by merely repeating recapitalization exercises or transferring non performing assets to the Treasury would merely postpone the day of reckoning. However, such a deep change in banks’ processes and regulation could collide with the new Chinese leadership desire to allocate more resources to under-developed areas and the rural sector. Institutional changes are therefore urgently required, and it may well be wiser for the authorities to smooth the implementation of WTO commitments over the next few years, explicitly or not.

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