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Banks, the IMF, and the Asian crisis

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Abstract

This paper examines the impact of the Asian crisis on bank stocks. In the second half of 1997, Western banks outperformed their stock markets. In contrast, East Asian bank indices incurred losses in excess of 60% in each of the crisis countries. Most of these poor performances are explained by stock market movements in the crisis countries. After taking into account these movements, currency exposures affected banks adversely only in Indonesia and the Philippines. Except for the Korean program, which affected positively bank stocks in all countries in our sample but one, IMF programs had little effect on bank values.

JEL classification: F33; F36; F42; G15; G21

Keywords: Banks; IMF; Asian crisis

1. Introduction

For most observers, banks have been at the heart of the Asian crisis. For instance, Hamann (1999, p. 9) states that ''the Asian crisis differed from previous financial crises that created a need for the IMF's assistance. It was rooted primarily in financial system vulnerabilities and other structural weaknesses.''

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However, the reasons given for the importance of banks in this crisis differ widely across observers. For some, currency crises led to banking crises in the affected countries. With this view, banks had accumulated large currency exposures based on the belief that there was little exchange rate risk. When exchange rates collapsed, they suffered large losses on their currency exposures. For others, banks were one important contributing factor to the Asian crisis. Asian local banks are accused of making too many unsound loans and moral hazard is blamed for this behavior. Delhaise (1998, p. 35) argues that ''It was generally accepted before the crisis that most banks would be rescued if they ran into trouble.'' Western banks are blamed for first lending too much and then for contributing to the credit crunch by lending too little. For instance, Wolf states that the East Asian banking crisis was ''promoted by overgenerous lending from financial institutions in advanced countries.''[1] The IMF and governmental bailouts have been blamed for creating incentives for banks to take on too much risk, including foreign exchange (FX) rate risk.[2] As one observer puts it, ''These bankers took the opportunity to make very risky, profitable loans, knowing that if the loans went bad, the IMF or the US government would bail them out.''[3]

These various views of the Asian crisis raise important questions: Did bank shareholders get hurt because of the crisis? Did the crisis pose a threat to the banking systems in Western countries? Can exchange rate changes explain the performance of Asian banks? Did specific events in the Asian crisis affect bank shareholders? How were banks affected by the announcement of IMF programs? Did IMF programs have systemic benefits or did they help only those banks with exposures in the countries benefiting from the programs? To examine these questions, we examine the returns to bank shareholders from January 15, 1997 to July 15, 1998. Our examination uses Datastream banking indices for four Western countries (the US, France, Germany, and the UK) and for six Asian countries (Indonesia, Japan, Korea, Malaysia, Philippines, and Thailand). We also investigate the returns of the three US banks that took a lead role in the renegotiations of Korean debt, namely the Chase Manhattan Bank, Citibank, and JP Morgan.

We find that during our sample period, shareholders of East Asian banks incurred dramatic losses. For instance, an investor who had invested US$1 at the start of our sample period in Korea's bank index would be left at the end of our sample period with 14.7 cents. An investor who had invested US$1 in Indonesia's bank index would be left with 3.3 cents. The story is very different for the Western banks. An investor who invested US$1 at the start of our sample period in

[1] Financial Times, Wednesday, October 21, 1998, p. 14.

[2] In a recent paper, Burnside et al. (1999) develop a theoretical model where implicit guarantees make it advantageous for banks not to hedge foreign currency exposures arising from their financing.

[3] The quote is from Chung Hoon Lee, president of the Korea America Economic Association, in *Economists blame short-term loans for Asian crisis* by Louis Uchitelle, New York Times, January 8, 1999.

the US bank index would have had US$1.73 at the end of our sample period. In contrast, an investment of US$1 in the US market index at the start of our sample period would have netted US$1.54 at the end of our sample period. A simple explanation for why Western banks were not affected more by the crisis is that their exposures were small enough that the impact of the crisis was offset by good news in other parts of their businesses. With this explanation, if the East Asian crisis mattered at all for Western banks, we should find that on days of adverse events in East Asia, Western bank stocks should have performed poorly.

We then try to understand why the performance of East Asian bank common stocks during our sample period is so poor. We regress dollar bank excess returns on stock market excess returns, currency excess returns, and interest rate changes. Even though East Asian banks perform poorly, banks in Korea, Indonesia, and Thailand do not have abnormal returns (ARs) over the period from July 1997 to the end of January 1998 once we account for the performance of their national markets. An explanation advanced in the assessments of the Asian crisis is that banks had large currency exposures because of their use of offshore funding. This view has led some to argue that banks should be required to borrow and lend in the same currency.[4] We investigate this explanation by estimating exposures of bank indices to exchange rate changes. Our estimates show that after taking into account market returns, currency returns do not seem to contribute to the poor performance of East Asian banks except for Indonesia and the Philippines. It is important to understand that these estimates do not mean that exchange rate changes did not have an adverse impact on banks. We show that decreases in the value of East Asian currencies affect stock markets adversely, so that adverse currency movements affect banks through their impact on stock markets. Our results mean, however, that the currency crises did not have an impact on banks beyond their overall impact on the economy, so that there was nothing unique about the exposure of banks to exchange rates.

Since Western banks performed well over our sample period and since East Asian banks performed poorly, we try to understand the impact of the crisis by examining how bank stocks were affected by various events of the crisis. Such an approach might allow us to find traces of the crisis in the returns of Western banks that get swamped by positive news over our sample period and to find which events can explain the poor performance of Asian banks. We select events over the whole sample period that were important in the chronology of the Asian crisis and investigate whether they are associated with significant ARs for banks. We find little evidence of important impacts of Asian crisis events on banks across countries with this approach. There are only five event periods where we can reject the hypothesis that banks have ARs equal to zero across countries with a *p*-value of 0.05 or better. The only period in 1997 corresponds to the announce-

[4] See Hall's comments in Furman and Stiglitz (1998, p. 124).

ment of the IMF program in Korea. The other periods are in January 1998. One of these periods in 1998 coincides with the Peregrine debacle and another with the IMF agreement with Indonesia. The announcement of the IMF program in Korea had a positive impact on banks across most countries, which is inconsistent with the view that bailouts are fully anticipated. However, the impact of IMF actions for US banks is large only for the banks with the highest exposures. IMF actions, therefore, do not appear to have significant systemic effects on Western banks. Rather, they simply ensure that banks with exposure are more likely to be repaid without benefiting banks that do not have exposures.

The paper is organized as follows. In Section 2, we present our data and discuss the returns of banks over our sample period. We explore the exposures of banks to exchange rates and interest rates, as well as the exposure of Western banks to East Asia. In Section 3, we consider the returns of banks over key events during the Asian crisis. In Section 4, we investigate the returns of individual American banks. We conclude in Section 5.

2. Bank returns over the sample period

We consider a sample period that starts on January 15, 1997 and ends on July 15, 1998. This period of exactly 18 months includes all the important events of the Asian crisis. The data we use consist of the historical Datastream retail banking and market indices for the sample countries.[5] The Datastream industry indices are produced according to the same criteria across countries and are therefore comparable. These indices are value-weighted. They are not comprehensive and are composed of the larger firms. Throughout the study, we also use data on exchange rates and on interest rates. Table 1 provides a summary of the data we use. Fig. 1 shows the evolution of the banking indices in dollars during our sample period.

The lesson from Table 1 is that Western banks did well during our sample period while Asian banks performed poorly. For all Western countries, the average returns on the banking indices in excess of the risk-free rate were positive during our sample period. Furthermore, for these countries, the average returns on the banking indices exceeded the average returns on the country indices. The bottom line from this is that there is no evidence that the Asian crisis affected the Western banks in a way that their shareholders would have suffered. The opposite is the case for the banks in the East Asian countries. In these countries, the average returns of the banking indices were negative and were lower than the returns of the

[5] Datastream has two different series of sector indices. One series is recalculated as index components changes and the other series is not recalculated. The series that are not recalculated used here have neither a survival bias nor a backfilling bias over our sample period because they were obtained before April 1999. In April 1999, Datastream reconstructed the series in a way that created a backfilling bias and a survival bias.

market indices. Japan was not a crisis country, but Japanese banks had negative returns lower than the negative returns of the Japanese market during our sample period. Consequently, the experience of Japanese banks was more similar to the experience of banks in crisis countries than it was to the experience of banks in Western countries.

Exposures of developed country banks to Korea, Indonesia, Malaysia and Thailand were US$90 billion for European Union banks, US$20 billion for US banks, and US$85 billion for Japanese banks at the end of 1997.[6] Roughly half the exposures were short-term loans in the middle of 1997. The total assets of the banks from the US, the European Union, and Japan in the middle of 1997 as reported by the IMF were of the order of US$20 trillion. Exposures to the crisis countries were therefore less than 1% of assets. In terms of capital, Japanese banks had the highest exposures, which raises the question we attempt to answer later of whether their poor performance during the crisis can be explained by the fact that they had higher exposures than the Western banks. Some estimates show that the exposure to Asian emerging markets for Japanese banks was in excess of their capital. In contrast, the exposure of US banks to Asian emerging markets was about 30% of capital in the middle of 1997. This was less than for German banks (60%) or French banks (45%). Another way to evaluate these exposures is as fractions of the market value of the equity of the banks that form the Datastream indices. From this perspective, a complete loss of the loans from US banks to Indonesia, Korea, Malaysia and Thailand existing at the end of June 1997 would have amounted to a loss of less than 4% of the market value of the equity of all the US banks that belong to the Datastream index of retail banks. For the European Union banks, the loss would have been less than one-fourth of their equity value. Finally, it would have been less than one-sixth of the equity value of the Japanese banks. Obviously, a total loss of the loans was never a possibility, so our exposure estimates provide upper bounds of the losses if the banks' exposures arise only from loans. It is important to note that all these exposures are computed using loans only. For banks, off-balance sheet exposures have grown dramatically. There is no data on the off-balance sheet exposures of banks to the crisis countries. However, some banks made large losses on derivatives whose counterparties were in crisis countries.

The returns of the Asian banking indices were dramatically different from the returns of Western banking indices. For all Asian countries, including Japan, banking indices had negative daily average returns as shown in Table 1 so that their shareholders experienced losses. These losses were particularly substantial for the crisis countries and exceeded the losses on the market index in Asian countries. Panel B of Table 1 compares total losses of the indices for the five crisis

[6] See IMF (1998, pp. 134–135).

Table 1
Summary statistics (in percent) of daily equity excess returns and FX excess returns for the period from January 15, 1997 to July 15, 1998 (390 days)
Equity indices are from the Datastream Global indices, and their excess returns are calculated as logarithmic daily dollar returns in excess of the 1-day return on the 7-day Eurodollar deposit. FX rates are also from the Datastream quoted by the Reuter, and their excess return is calculated as the 1-day interest rate of that currency compounded by the FX rate change relative to the US dollar, minus the 1-day return on the 7-day Eurodollar deposit.

Panel A. Summary statistics of variables used

Variables	Mean	Standard deviation	Minimum	Maximum
UK equity market index excess return	0.080	0.801	−3.062	3.326
UK banking industry index excess return	0.090	1.459	−5.102	4.931
Germany equity market index excess return	0.112	1.156	−5.453	4.397
Germany banking industry index excess return	0.143	1.528	−6.160	7.258
France equity market index excess return	0.107	1.038	−3.879	4.954
French banking industry index excess return	0.175	1.550	−4.885	5.612
US equity market index excess return	0.096	0.981	−6.839	4.284
US banking industry index excess return	0.126	1.315	−6.955	4.046
Japan equity market index excess return	−0.076	1.616	−5.889	7.487
Japan banking industry index excess return	−0.151	2.497	−8.664	12.066
Korea equity market index excess return	−0.287	4.394	−21.753	26.896
Korea banking industry index excess return	−0.507	4.886	−21.806	25.899
Indonesia equity market index excess return	−0.539	5.682	−39.700	23.098
Indonesia banking industry index excess return	−0.888	7.127	−36.973	33.026
Thailand equity market index excess return	−0.406	3.583	−15.379	15.436
Thailand banking industry index excess return	−0.476	4.309	−14.674	20.985

Malaysia equity market index excess return	−0.416	3.351	−13.711	22.440
Malaysia banking industry index excess return	−0.530	4.166	−13.339	30.178
Philippines equity market index excess return	−0.290	2.462	−10.186	13.445
Philippines banking industry index excess return	−0.326	2.424	−10.329	13.773
Excess return on BP holding	−0.002	0.492	−1.865	2.033
Excess return on DM holding	−0.037	0.557	−2.064	2.030
Excess return on FF holding	−0.035	0.547	−2.015	2.027
Excess return on JY holding	−0.057	0.804	−3.013	4.354
Excess return on Korea won holding	−0.046	2.392	−12.717	21.968
Excess return on Indonesia rupiah holding	−0.276	4.224	−21.205	22.828
Excess return on Thailand baht holding	−0.071	1.557	−6.791	6.503
Excess return on Malaysia ringgit holding	−0.115	1.425	−6.548	6.713
Excess return on Philippines peso holding	−0.087	1.262	−11.850	3.867
Δ (Eurodollar)	0.009	1.491	−7.847	17.662
Δ (Eurodollar − Euroyen)	0.004	3.096	−15.626	19.268

Panel B. Holding period returns (%) on bank and market indices over the sample period

Period	Index	UK	Germany	France	US	Japan	Korea	Indonesia	Thailand	Malaysia	Philippines
January 15, 1997–July 15, 1998	Bank	50.84	85.25	109.95	73.22	−41.19	−85.3	−96.67	−83.44	−86.5	−70.2
	Market	44.76	64.41	61.05	54.48	−21.02	−65.3	−87.03	−78.26	−79.0	−65.8
	Difference	6.08	20.84	48.90	18.73	−20.17	−19.9	−9.64	−5.18	−7.4	−4.4
July 2, 1997–January 30, 1998	Bank	17.24	25.31	25.88	14.40	−32.50	−61.1	−93.98	−64.75	−82.2	−68.4
	Market	14.19	5.2	7.78	10.13	−24.34	−51.9	−82.63	−54.39	−68.0	−58.5
	Difference	3.05	20.11	18.11	4.2	−8.16	−9.1	−11.35	−10.36	−14.2	−9.8
February 2, 1998–April 9, 1998	Bank	15.10	16.96	42.32	20.52	−7.81	−18.4	43.10	19.12	65.08	49.25
	Market	15.52	19.90	22.90	13.63	−3.46	−7.2	36.55	13.91	34.53	29.57
	Difference	−0.42	−2.9	19.41	6.8	−4.35	−11.1	6.54	5.21	30.55	19.68

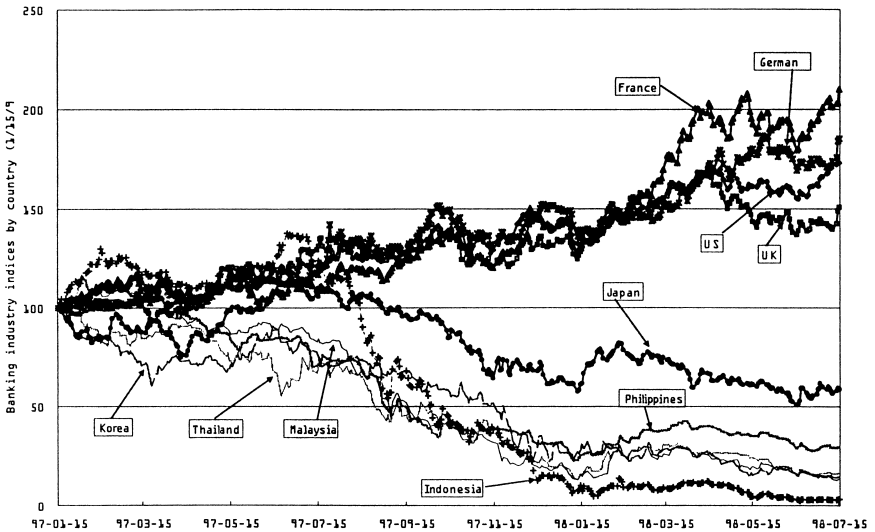

Fig. 1. Banking industry indices by country for the period from January 15, 1997 (= US$100) to July 15, 1998.

countries. In all cases, the losses were devastating. Fig. 2 shows the evolution of the bank and market indices for these countries. There is little evidence of a fall in bank stock prices relative to the market index in the first 6 months of 1997 except for Korea. In all other countries, bank stocks collapsed when the market collapsed.

Looking at Fig. 2, it is hard to make the case that there was a bank crisis unfolding before the currency crisis starting from the middle of 1997. This suggests that the poor performance of banks should be due to the currency collapse and to the deterioration of expectations about future economic activity that accompanied the collapse. There could be at least three reasons for this. First, the profits of banks increase with the level of economic activity so that bank stocks suffer when news indicates that economic growth will be lower. Second, banks were holding marketable securities and this exposure increased before the crisis (see World Bank, 1998, p. 40). The value of these marketable securities would fall as the stock market falls. Third, banks are exposed to exchange rate changes because of their activities, so that they make losses if they have net short positions in foreign currencies when their country's currency collapses.

Banks used offshore financing extensively. This offshore financing was generally short-term and dollar-denominated. The banks would then turn around and make domestic loans. When domestic loans were denominated in local currency, banks would bear currency risk directly. Since local interest rates were generally higher than offshore rates, being long in the domestic currency and short in the foreign currency could be highly profitable as long as exchange rates remained

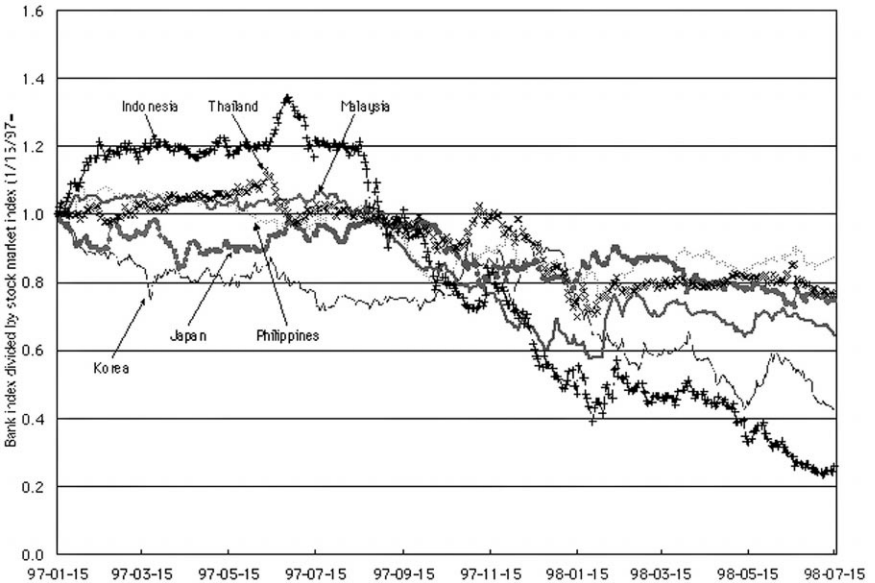

Fig. 2. Bank index divided by stock market index for Asian countries from January 15, 1997 (= US$100) to July 15, 1998.

relatively stable. The apparently large exposures resulting from this practice have been blamed for the banks' problems. For instance, the World Bank (1998, p. 35) states that ''The organizational design and special incentives of Thailand's Bangkok International Banking Facility (BIBF) contributed, to a great degree, to Thailand's crisis.'' If loans financed in foreign currency were also denominated in foreign currency, banks still had an indirect foreign currency exposure despite having long and short positions in foreign currency because large currency changes made it less likely that borrowers would repay their loans.

Bank balance sheets offer a poor measure of the bank's exchange rate exposures.[7] They do not tell us whether exchange rates affect banks through fee-generating businesses. They ignore option features in loan contracts that affect currency exposures, such as protective covenants. Further, banks have many off-balance sheet derivatives positions, some of which are designed to hedge balance sheet exposures. We therefore focus directly on measures of the exchange rate exposures of banks obtained from equity returns. To obtain such measures, we regress bank

[7] Burnside et al. (1999, p. 7) review the data sources and the evidence on exposure of emerging market banks. They point out that ''Given data limitations, it is not possible to precisely measure the extent to which large net foreign asset positions were hedged in the different crisis countries.''

Table 2
Estimates of the SUR model of banking industry excess returns on contemporaneous instruments
The following SUR models are estimated in a system for 10 countries' banking industry indices over the period from January 15, 1997 to July 15, 1998 (390 days):

$$R_{pt} = (\alpha_0 + \alpha_1 \delta_t) + (\beta_0 + \beta_1 \delta_t) R_{mt} + \sum_{k=1}^{K} (\gamma_{0,k} + \gamma_{1,k} \delta_t) X_{kt} + \varepsilon_t,$$

where R_{pt} is the logarithmic daily dollar return on the Datastream banking industry indices for each of the 10 countries, and R_{mt} is the corresponding stock market index return. Both returns are in excess of 1-day return on the 7-day Eurodollar deposit. δ_t is the interactive dummy for the Asian crisis period from July 2, 1997 to January 30, 1998. X_{kt} includes the daily dollar excess returns on the currency holdings (BP, DM, FF, and JY), the changes in the 7-day Eurodollar rate and the spread between the 7-day Eurodollar rate and Euroyen rate, lags of the Western variables due to the time zone difference, and daily dollar excess returns on each of the five Asian countries' currencies (Korea won, Indonesia rupiah, Thailand baht, Malaysia ringgit, Philippines peso). *p*-values are in brackets. *F*-tests in Panel B are testing for the sum of the two coefficients for each variable.

Coefficient estimates	UK	Germany	France	US	Japan	Korea	Indonesia	Thailand	Malaysia	Philippines
Panel A. SUR estimates										
Adjusted R^2 (OLS)	0.739	0.681	0.627	0.724	0.845	0.789	0.844	0.894	0.894	0.797
(1) α_0: Intercept	−0.042 [0.40]	−0.033 [0.57]	0.013 [0.84]	0.006 [0.90]	−0.087 [0.18]	−0.279 [0.06]	−0.197 [0.29]	−0.041 [0.67]	0.133 [0.14]	0.036 [0.61]
α_1: Crisis dummy	0.018 [0.82]	0.124 [0.18]	0.087 [0.38]	0.011 [0.88]	0.095 [0.36]	0.146 [0.54]	−0.400 [0.18]	−0.064 [0.67]	−0.488 [0.00]	−0.272 [0.02]
(2) β_0: Own market excess returns	1.687 [0.00]	1.022 [0.00]	1.189 [0.00]	1.188 [0.00]	1.689 [0.00]	1.074 [0.00]	0.700 [0.00]	0.964 [0.00]	1.302 [0.00]	0.862 [0.00]
β_1: Crisis dummy	−0.063 [0.55]	0.022 [0.79]	−0.050 [0.60]	−0.106 [0.15]	−0.143 [0.10]	−0.127 [0.16]	0.192 [0.07]	0.301 [0.00]	−0.108 [0.09]	−0.051 [0.40]
(3) $\gamma_{0,1}$: Excess returns on BP	−0.665 [0.00]	0.025 [0.86]	−0.005 [0.98]	−0.022 [0.85]	0.186 [0.27]	0.477 [0.22]	0.286 [0.55]	0.040 [0.87]	0.006 [0.98]	0.114 [0.54]
$\gamma_{1,1}$: Crisis dummy	0.205 [0.26]	0.173 [0.38]	−0.105 [0.63]	−0.055 [0.73]	−0.060 [0.79]	−0.495 [0.35]	−0.451 [0.49]	0.132 [0.69]	0.137 [0.66]	−0.076 [0.77]
(4) $\gamma_{0,2}$: Excess returns on DM	−0.082 [0.90]	0.536 [0.50]	0.093 [0.91]	−0.677 [0.28]	−0.160 [0.86]	−1.629 [0.43]	0.084 [0.97]	1.176 [0.37]	−1.094 [0.38]	−0.914 [0.37]
$\gamma_{1,2}$: Crisis dummy	0.464 [0.73]	−6.466 [0.00]	−1.024 [0.55]	−0.490 [0.69]	−0.431 [0.82]	1.225 [0.77]	0.903 [0.87]	−5.955 [0.03]	0.721 [0.78]	−1.582 [0.45]
(5) $\gamma_{0,3}$: Excess returns on FF	0.184 [0.79]	−0.442 [0.58]	−0.026 [0.98]	0.599 [0.35]	0.293 [0.75]	1.807 [0.40]	0.446 [0.87]	−1.135 [0.40]	1.140 [0.38]	1.044 [0.32]
$\gamma_{1,3}$: Crisis dummy	−0.529 [0.69]	6.022 [0.00]	0.799 [0.64]	0.621 [0.62]	0.291 [0.88]	−1.356 [0.75]	−1.103 [0.84]	5.774 [0.03]	−0.891 [0.73]	1.424 [0.50]
(6) $\gamma_{0,4}$: Excess returns on JY	0.051 [0.44]	0.052 [0.50]	−0.025 [0.77]	0.006 [0.92]	−0.743 [0.00]	−0.357 [0.09]	−0.389 [0.14]	−0.036 [0.78]	0.064 [0.62]	−0.123 [0.24]
$\gamma_{1,4}$: Crisis dummy	0.033 [0.77]	0.000 [1.00]	0.096 [0.49]	−0.065 [0.52]	0.273 [0.16]	0.488 [0.15]	0.403 [0.35]	0.126 [0.55]	−0.232 [0.27]	0.588 [0.00]
(7) $\gamma_{0,5}$: Δ (Eurodollar)	−0.001 [0.99]	0.040 [0.52]	0.035 [0.61]	0.043 [0.39]	0.026 [0.73]	−0.238 [0.18]	−0.176 [0.42]	0.068 [0.54]	−0.026 [0.80]	0.033 [0.70]
$\gamma_{1,5}$: Crisis dummy	0.034 [0.59]	0.026 [0.72]	−0.034 [0.67]	−0.033 [0.58]	−0.072 [0.43]	0.325 [0.11]	0.239 [0.35]	−0.148 [0.25]	−0.161 [0.19]	−0.061 [0.54]
(8) $\gamma_{0,6}$: Δ(Eurodollar − Euroyen)	−0.008 [0.79]	−0.008 [0.80]	0.011 [0.75]	−0.063 [0.02]	−0.037 [0.36]	−0.085 [0.35]	−0.023 [0.84]	−0.011 [0.84]	0.038 [0.48]	0.011 [0.80]
$\gamma_{1,6}$: Crisis dummy	−0.003 [0.93]	−0.061 [0.11]	−0.022 [0.60]	0.060 [0.05]	0.072 [0.12]	−0.012 [0.91]	0.094 [0.48]	0.054 [0.41]	−0.047 [0.46]	0.009 [0.86]

(9)$\gamma_{0,7}$: Lag of (3)					−0.079 [0.64]	0.838 [0.03]	−0.459 [0.34]	0.100 [0.67]	0.216 [0.35]	−0.197 [0.29]
$\gamma_{1,7}$: Crisis dummy					0.013 [0.95]	−1.249 [0.02]	0.585 [0.36]	0.444 [0.17]	−0.087 [0.78]	−0.025 [0.92]
(10)$\gamma_{0,8}$: Lag of (4)					0.214 [0.82]	−1.691 [0.42]	1.735 [0.51]	1.284 [0.33]	−0.095 [0.94]	−0.225 [0.82]
$\gamma_{1,8}$: Crisis dummy					1.510 [0.41]	1.145 [0.78]	−2.733 [0.60]	−1.384 [0.60]	−1.473 [0.56]	−2.612 [0.19]
11)$\gamma_{0,9}$: Lag of (5)					0.162 [0.86]	1.251 [0.56]	−2.485 [0.36]	−1.096 [0.42]	0.175 [0.89]	0.312 [0.76]
$\gamma_{1,9}$: Crisis dummy					−1.593 [0.39]	−0.533 [0.90]	2.839 [0.59]	1.004 [0.71]	1.114 [0.66]	2.568 [0.21]
(12)$\gamma_{0,10}$: Lag of (7)					0.040 [0.60]	0.205 [0.23]	0.004 [0.99]	0.058 [0.59]	0.023 [0.83]	−0.040 [0.63]
$\gamma_{1,10}$: Crisis dummy					−0.063 [0.47]	−0.255 [0.21]	0.011 [0.97]	−0.112 [0.37]	−0.175 [0.15]	0.089 [0.36]
(13)$\gamma_{0,11}$: Lag of (8)					−0.006 [0.88]	−0.062 [0.48]	−0.057 [0.61]	−0.012 [0.83]	−0.011 [0.83]	0.030 [0.49]
$\gamma_{1,11}$: Crisis dummy					0.052 [0.25]	0.089 [0.39]	0.107 [0.41]	0.036 [0.58]	0.066 [0.29]	−0.034 [0.50]
(14)$\gamma_{0,12}$: Excess returns on own currency						−0.092 [0.61]	0.717 [0.00]	0.188 [0.04]	−0.187 [0.09]	0.168 [0.16]
$\gamma_{1,12}$: Crisis dummy						0.168 [0.42]	−0.396 [0.01]	−0.320 [0.01]	−0.087 [0.56]	−0.041 [0.76]

Panel B. F-test statistics for the sum of the two coefficients for each variable

$F_{(1,\ 3660)}$										
H_0: $\alpha_0 + \alpha_1 = 0$	0.152 [0.70]	1.649 [0.20]	1.662 [0.20]	0.088 [0.77]	0.008 [0.93]	0.512 [0.47]	6.463 [0.01]	0.778 [0.38]	9.687 [0.00]	6.633 [0.01]
H_0: $\beta_0 = 1$	88.420 [0.00]	0.128 [0.72]	9.215 [0.00]	12.320 [0.00]	109.068 [0.00]	1.320 [0.25]	14.128 [0.00]	0.807 [0.37]	36.754 [0.00]	8.544 [0.00]
H_0: $\beta_0 + \beta_1 = 1$	68.179 [0.00]	0.635 [0.43]	3.710 [0.05]	2.683 [0.10]	94.414 [0.00]	0.713 [0.40]	2.351 [0.13]	49.812 [0.00]	23.472 [0.00]	23.043 [0.00]
H_0: $\gamma_{0,1} + \gamma_{1,1} = 0$	14.450 [0.00]	2.218 [0.14]	0.571 [0.45]	0.537 [0.46]	0.675 [0.41]	0.003 [0.96]	0.141 [0.71]	0.612 [0.43]	0.455 [0.50]	0.051 [0.82]
H_0: $\gamma_{0,2} + \gamma_{1,2} = 0$	0.112 [0.74]	20.176 [0.00]	0.403 [0.53]	1.211 [0.27]	0.133 [0.72]	0.012 [0.91]	0.046 [0.83]	4.287 [0.04]	0.028 [0.87]	1.890 [0.17]
H_0: $\gamma_{0,3} + \gamma_{1,3} = 0$	0.090 [0.76]	17.476 [0.00]	0.271 [0.60]	1.300 [0.25]	0.127 [0.72]	0.015 [0.90]	0.020 [0.89]	3.946 [0.05]	0.012 [0.91]	1.809 [0.18]
H_0: $\gamma_{0,4} + \gamma_{1,4} = 0$	0.894 [0.34]	0.250 [0.62]	0.403 [0.53]	0.525 [0.47]	9.605 [0.00]	0.233 [0.63]	0.002 [0.97]	0.285 [0.59]	1.044 [0.31]	12.260 [0.00]
H_0: $\gamma_{0,5} + \gamma_{1,5} = 0$	1.065 [0.30]	3.027 [0.08]	0.000 [0.99]	0.109 [0.74]	0.959 [0.33]	0.661 [0.42]	0.226 [0.63]	1.500 [0.22]	8.559 [0.00]	0.297 [0.59]
H_0: $\gamma_{0,6} + \gamma_{1,6} = 0$	0.474 [0.49]	14.644 [0.00]	0.263 [0.61]	0.064 [0.80]	2.311 [0.13]	3.332 [0.07]	1.122 [0.29]	1.660 [0.20]	0.073 [0.79]	0.620 [0.43]
H_0: $\gamma_{0,7} + \gamma_{1,7} = 0$					0.192 [0.66]	1.442 [0.23]	0.087 [0.77]	6.309 [0.01]	0.380 [0.54]	1.785 [0.18]
H_0: $\gamma_{0,8} + \gamma_{1,8} = 0$					1.205 [0.27]	0.023 [0.88]	0.049 [0.82]	0.002 [0.97]	0.523 [0.47]	2.678 [0.10]
H_0: $\gamma_{0,9} + \gamma_{1,9} = 0$					0.824 [0.36]	0.040 [0.84]	0.006 [0.94]	0.002 [0.97]	0.351	
H_0: $\gamma_{0,10} + \gamma_{1,10} = 0$					0.287 [0.59]	0.221 [0.64]	0.013 [0.91]	0.754 [0.39]	6.152 [0.01]	1.022 [0.31]
H_0: $\gamma_{0,11} + \gamma_{1,11} = 0$					3.788 [0.05]	0.242 [0.62]	0.560 [0.45]	0.529 [0.47]	2.833 [0.09]	0.029 [0.87]
H_0: $\gamma_{0,12} + \gamma_{1,12} = 0$						0.508 [0.48]	10.813 [0.00]	2.057 [0.15]	7.280 [0.01]	3.368 [0.07]

index returns on returns of foreign currency positions in Table 2. We use dollar returns for all countries to make our results comparable.

To understand whether there was something unique about bank FX exposures, we have to account for the impact of FX shocks on aggregate economic activity. Since stock prices are forward-looking, we have to take into account changes in expected future economic activity when the market participants learn about such changes. The return to a country's stock market provides a forward-looking measure of changes in expected future economic activity. We therefore account for shocks to aggregate economic activity through the exposure of banks to their country's stock market and use the dollar excess return of the local stock market as a control variable. Given the importance that Eichengreen and Rose (1997), as well as others, attribute to changes in interest rates in the US in banking crises, we include as our explanatory variables changes in the US interest rate as well as changes in the US–yen interest rate spread. The interest rates used are Euro rates with a 7-day maturity obtained from Datastream. A FX rate excess return is defined as the dollar return on a risk-free investment in that currency over the return on a risk-free investment in the US. For the exchange rate excess returns, we use exchange rate returns in dollars for the crisis currencies as well as those of the Western countries and of Japan. We include the Western currencies in our regressions since banks could have exposures to these currencies through their borrowings from banks in these countries. We assume that a risk-free investment in a country earns the shortest maturity money market rate in that country that we can get from Datastream. Because of the time zone differences between Asia and the Western countries, it is important to use both contemporaneous and lagged variables for the Western variables. Remember that the Asian markets for day $t+1$ are already closed when the Western markets open for the same day. This means that changes in these variables that take place during trading hours in the West cannot be incorporated in the Asian share prices on day $t+1$. In contrast, changes that took place on day t during trading hours in the West can only be incorporated in Asia during day $t+1$. The period with the most dramatic changes in stock markets and exchange rates is the period from the Thai baht devaluation on July 2, 1997, through the end of January 1998. We define this period as the crisis period and allow the exposures to differ from the Thai baht devaluation to the end of January 1998. The regressions we reproduce are estimated with a seemingly unrelated regression (SUR) specification that allows for contemporaneous correlation across 10 countries.[8] We examined the robustness of our results using other regression specifications. In particular, we estimated the regressions using ordinary least squares and forcing the exposures to be constant over the

[8] We use the same data source and same regression specification as Dewenter and Hess (1998), but we use daily returns because of our focus on the Asian crisis.

whole sample period. Our conclusions are not altered if we use these different specifications.

The results in Table 2 are striking. The intercept estimates are insignificant across all 10 countries, and similarly for their crisis dummies except for Malaysia and the Philippines. This indicates, together with the high adjusted R^2, that our explanatory variables describe the bank excess returns quite well. However, the explanatory variable that is the most important in explaining bank excess returns is the excess return on the stock market index of the country in which banks are located. The coefficient on this variable, β_0, is significant in all countries. It exceeds one for all Western bank indices.[9] This means that, in general, a 1% return on the market index implies a return on the bank index in excess of 1%. Since Western stock markets performed well during the period we consider, the high β_0 coefficient implies that Western banks should have outperformed their respective stock markets. Japanese banks also have an exposure to the local market that exceeds one. In that case, however, the market did poorly, so Japanese banks would be expected to perform worse than the Japanese stock market, which they did. Note, however, that during the crisis period, the intercept for Japanese banks is higher but not significantly so. It does not seem, therefore, that the crisis contributed to the poor performance of Japanese banks directly. Turning next to the crisis countries, all countries have significant market exposures. We allow for the market exposure to differ during the crisis period, so that $\beta_0 + \beta_1$ provides us with an estimate of the relation between the market return and the bank index return during the crisis period. The *F*-tests for the sum of β_0 and β_1 in Panel B of Table 2 show that the total coefficient on the market during the crisis period significantly exceeds one in Thailand and Malaysia, is about one in Korea and Indonesia, and is significantly lower than one in the Philippines. Based on these coefficients, one would expect banks to perform poorly in all the crisis countries, but to underperform the market only in Thailand and Malaysia.

There is a large literature that examines the currency exposure of firms in Western countries. The surprising result of this literature is that exchange rate exposures are small and often insignificant after taking into account the exposure of firms to the stock market.[10] We call currency exposures estimated taking into account aggregate stock market returns ''net-of-market currency exposures'' in the following. As discussed above, however, there are good reasons to think that net-of-market currency exposures for Asian banks might have been quite large and

[9] Dewenter and Hess (1998) estimate regressions using the same Datastream indices for banks in a number of countries using monthly data from January 1984 to March 1996. They find coefficients on the domestic market that are comparable to ours.

[10] See Griffin and Stulz (1999) for a study of exchange rate exposures for developed countries that uses the Datastream indices and provides further references to the literature.

could have played an important role in their problems.[11] The returns in our regressions are measured in dollars. The coefficient that measures the net-of-market exposures of the dollar return of banks to their own currency is $\gamma_{0,12}$. Our regressions include the dollar return on the stock market index of the bank's country. Consequently, a fall in the market index in dollars caused by a fall in the dollar value of the local currency affects the bank return in dollars through the local stock market exposure of the bank. The net-of-market currency exposures therefore measure the impact on dollar bank returns of changes in the exchange rate that cannot be explained by the impact of changes in the exchange rate on the dollar return of their local market. As a result, if a change in the dollar value of the local currency has no impact on the local currency value of the stock market index and no impact on the local currency value of the bank index, the net-of-market exposure coefficient would be zero. A positive net-of-market currency exposure coefficient means that an appreciation of the local currency has a positive effect on the dollar return of a bank in addition to its impact through its effect on the dollar return of the stock market in the bank's country.

For Western banks, the net-of-market exposures to the exchange rates of Western countries, as measured by coefficients in rows (3)–(5) of Table 2, are generally insignificant. There are only two exceptions. First, British banks are hurt by an appreciation of the pound for the whole sample period, in that their net-of-market exposure coefficient on the excess return of the pound in dollars, $\gamma_{0,1}$, is significantly negative. German banks appear to have a large negative coefficient for the DM excess return, $\gamma_{1,2}$, during the crisis period. Turning to the crisis countries, we find that the net-of-market own-currency exposures as measured by $\gamma_{0,12}$ are insignificant for Korea and the Philippines. They are significantly positive for Indonesia and Thailand, but significantly negative for Malaysia. The net-of-market exposure coefficient for Indonesia is large, 0.717, while the other net-of-market exposure coefficients are less than 0.2 in absolute value. The way to understand the coefficient on the own-currency return for Indonesian banks is that a 1% depreciation of the Indonesian rupiah leads to a decrease in the value of the Indonesian bank stock index relative to the Indonesian stock market index of 0.717%. Griffin and Stulz (1999) report evidence on net-of-market exchange rate exposure coefficients for more than 300 industries in developed economies and never find coefficients that large in absolute value. However, we cannot conclude from this that FX depreciation explains the poor performance of banks in

[11] Using dollar returns does not change the interpretation of the regressions for the exposure coefficient. Suppose that a bank finances itself in dollars and has domestic currency assets. The dollar value of its liabilities is not affected by changes in the exchange rate, but the value of its assets is. In this case, with risk-free assets in local currency, the impact of an unexpected change in the value of the exchange rate on equity is the product of (value of assets/value of equity) and the change in the exchange rate, which would be quite large because of the leverage. As the bank finances itself more in domestic currency, the coefficient on the exchange rate falls because domestic currency liabilities hedge assets denominated in domestic currency.

Indonesia and Thailand. Remember that we allow the exposures to differ during the crisis period from July to the end of January. Hence, to find out the impact of the depreciation on banks after taking into account general stock market movements, we have to add the two net-of-market exposure coefficients, $\gamma_{0,12}$ and $\gamma_{1,12}$. For Indonesia, we have a positive exposure for the whole period and during the crisis period. Hence, a depreciation of the Indonesian rupiah has an adverse effect on Indonesian banks controlling for the return of the Indonesian market in dollars. Paradoxically, however, the net-of-market currency exposure coefficient is significantly lower during the crisis period, so that during the crisis, a 1% depreciation of the rupiah leads to an AR of 0.321% for Indonesian banks, where we define an AR as a return that could not be predicted based on general stock market movements of the country. The net-of-market exposure of Philippine banks during the crisis is also significantly positive, but the coefficient is 0.127, so that a 1% depreciation of the Philippine peso leads to an AR of Philippine banks of 0.127%. For Thailand, the net-of-market exposure to the Thai baht of the banks is negative during the crisis period. In other words, net-of-market exchange rate exposure helped rather than hurt Thai banks during the crisis period, in that it made them perform better relative to the Thai stock market. This result is surprising in that Thai banks are generally viewed as a key example of banks using short-term foreign currency financing. In the case of Malaysia, the net-of-market exposure is negative as well. This is consistent with the view expressed by Furman and Stiglitz (1998) that FX exposures of banks in Malaysia were low because of government policies.[12] It follows from our analysis that the only countries where FX movements can help explain why banks performed worse than their local market are Indonesia and the Philippines.

To understand why we might reach a conclusion about bank exposures that differs from conventional wisdom, it is important to remember that balance sheet exposures are only part of the story when one is evaluating currency exposures of banks. Short of knowing all the derivatives positions of a bank as well as its balance sheet exposure, one cannot accurately assess that bank's currency exposure. In addition, it is possible that the currency collapses created large losses for banks, but the market expected these losses to be made up through bailouts. In this case, currency exposures would create accounting losses but not equity value losses. Without accounting data for the banks in our sample, we cannot explore this possibility.

Some have argued that we do not find much of a role for currency changes on banks beyond their impact on aggregate economic activity as measured by the stock market because the capital markets were inefficient and did not correctly incorporate the impact of currency changes in bank values. For instance, one view is that investors could not possibly know what currency exposures were on a day-to-day basis. We address this issue in several ways. Using daily returns as we

[12] See Furman and Stiglitz (1998, p. 97).

do in the regressions reported here opens the possibility that pricing mistakes or slow adjustment could explain the low net-of-market currency exposures. To check this, we estimated regressions with leads and lags of exchange rate returns as well as regressions using weekly returns. We also estimated regressions allowing for non-linear effects of exchange rate changes and regressions where the only explanatory variables were market returns and exchange rate changes. None of these additional regressions changes our conclusions.

A final difficulty with our estimates is that we had changes in exchange rate regimes for the crisis countries. Up to some date, the exchange rate was pegged. After that date, the country has a floating exchange rate. As a result, we could do a poor job of capturing exchange rate effects because our sample period incorporates a period where the exchange rate fluctuates little. If this were an explanation for our results, then the estimates of net-of-market own-currency exposures for Thailand, the Philippines, and Malaysia during the crisis period should be estimated precisely because for these countries, the crisis period corresponds to a floating exchange rate period. However, for Thailand and Malaysia, we do not find significant positive net-of-market own-currency exposures during the crisis period. In Section 3, we also find that measuring net-of-market exposures during days of sharp exchange rate changes does not alter our conclusions either.

Our approach assumes that the market return captures common effects of exchange rate shocks across industries. Since banks are part of the market index, our procedure would underestimate the impact of exchange rate shocks on banks if exchange rate shocks do not have a pervasive effect across industries but mostly have an effect on banks and if banks have a non-trivial weight in the market index. The reason for this is that part of the bank-specific effect of exchange rates would be captured by the market return because banks are part of the market. The weights of banks in the Datastream country indices at the start of our sample period go from 3.26% for Indonesia to 35.28% for Thailand. This means that if the exchange rate shocks had no impact outside of banks, we would understate the impact of exchange rate shocks on banks substantially in the case of Thailand. However, in the case of Thailand, we find that banks benefited from depreciation of the local currency so that the bias discussed here would make our results even more surprising. In the case of Korea, the weight of banks in the index is 12.47%. This weight is 14.45% in the case of Malaysia and 23.23% in the case of the Philippines. For these countries, therefore, the bias in our estimates would be small in the unlikely event where exchange rate shocks have no common effects across industries and would not be large enough to alter our conclusions.

In Table 2, we also allow for an impact of interest rate changes on the equity of banks. The coefficients on changes in the Eurodollar rate, $\gamma_{0,5}$ and $\gamma_{1,5}$ are insignificant for banks in all countries. The coefficients on the dollar–yen interest rate spread, $\gamma_{0,6}$ and $\gamma_{1,6}$, are insignificant in all countries except for US banks. This suggests that the banking crisis in East Asia is atypical, in that it cannot be attributed to interest rate changes in developed countries in contrast to the

evidence reported by Eichengreen and Rose (1997) who argue that high interest rates in developed countries are generally strongly associated with the onset of banking crises.

From our analysis, there is no support for the view that currency movements were consistently important determinants of the performance of banks in the crisis countries once one takes into account the stock market returns in these countries. Given the many statements made about the importance of the currency exposures for the East Asian banks, our results are surprising. However, our results do not mean that currency movements were not important for banks through their impact on stock markets. What our estimates of net-of-market exposures show is that there was nothing special about bank FX exposures during the crisis period in that bank performance is explained by the market's performance and that currency returns add little, if anything, to that explanation. In Table 3, we estimate how exchange rate movements are related to the performance of East Asian stock markets. We use the same estimation approach as in Table 2, but now the dependent variable is the dollar excess return of stock markets as opposed to the dollar excess return of bank indices. Except for the stock market, the explanatory variables are the same as in the regressions of Table 2. Since the dependent variable is a dollar excess return, a 1% own-currency depreciation that has no impact on the local stock market decreases the dollar value of the index by 1%. This means that for a currency depreciation to be associated with losses in the local stock market in local currency, it has to be that the 1% own-currency depreciation decreases the dollar value of the stock market index by more than 1%. Consequently, the coefficient on the own-currency excess return has to exceed one for the correlation between local currency stock returns and local currency value to be negative. We therefore test the hypothesis that the own-currency exposure of East Asian stock markets exceeds one. We find that for all East Asian countries during the crisis, there is a negative relation between stock market returns and currency returns in local currency. For instance, a 1% unexpected depreciation of the Korean won relative to the dollar is associated with a 1.419% unexpected drop in the dollar value of the Korean stock market. This means that a 1% unexpected depreciation of the Korean won is associated with approximately a 0.4% decrease in the local value of the stock market. Our regressions cannot establish causation but these results are consistent with the view that currency crises affected stock markets negatively in the East Asian countries. To reiterate our main result, however, if currency crises affected banks adversely, there is no systematic evidence that they did so more for banks than for stock markets in general.

3. The returns of bank indices around crisis events

In this section, we evaluate the returns of bank indices around crisis events. To do that, we estimate the regressions of Table 2 without the crisis dummy for the

Table 3
Estimates of the SUR model of market excess returns on various instruments
The following SUR models are estimated in a system for 10 countries' market excess returns over the period from January 15, 1997 to July 15, 1998 (390 days):

$$R_{mt} = (\alpha_0 + \alpha_1 \delta_t) + \sum_{k=1}^{K} (\gamma_{0,k} + \gamma_{1,k} \delta_t) X_{kt} + \varepsilon_t,$$

where R_{mt} is the logarithmic daily dollar return on the Datastream stock market index returns for each of the 10 countries, in excess of 1-day return on the 7-day Eurodollar deposit. δ_t is the interactive dummy for the Asian crisis period from July 2, 1997 to January 30, 1998. X_{kt} includes the daily dollar excess returns on the currency holdings (BP, DM, FF, JY, and the currency for each of the five Asian countries [Korea won, Indonesia rupiah, Thailand baht, Malaysia ringgit, Philippines peso]), the changes in the 7-day Eurodollar rate and the spread between the 7-day Eurodollar rate and Euroyen rate, and lags of the Western variables due to the time zone difference. *p*-values are in brackets. *F*-tests in Panel B are testing for the sum of the two coefficients for each variable.

Coefficient estimates	UK	Germany	France	US	Japan	Korea	Indonesia	Thailand	Malaysia	Philippines
Panel A. SUR estimates										
Adjusted R^2 (OLS)	0.170	0.119	0.059	0.057	0.454	0.649	0.762	0.455	0.553	0.430
(1) α_0: Intercept	0.087 [0.07]	0.203 [0.00]	0.182 [0.01]	0.119 [0.06]	0.049 [0.53]	−0.306 [0.08]	−0.140 [0.44]	−0.518 [0.00]	−0.213 [0.15]	−0.124 [0.31]
α_1: Crisis dummy	−0.024 [0.76]	−0.165 [0.15]	−0.166 [0.12]	−0.086 [0.39]	−0.133 [0.29]	0.156 [0.57]	−0.113 [0.70]	0.628 [0.03]	−0.028 [0.91]	−0.194 [0.32]
(2) $\gamma_{0,1}$: Excess returns on BP		0.039 [0.83]	−0.257 [0.13]	−0.170 [0.29]	0.122 [0.55]	−0.310 [0.49]	−0.180 [0.70]	0.113 [0.80]	0.032 [0.93]	−0.041 [0.90]
$\gamma_{1,1}$: Crisis dummy		−0.327 [0.19]	0.117 [0.61]	0.211 [0.33]	−0.349 [0.21]	−0.722 [0.23]	0.335 [0.60]	−0.242 [0.69]	−0.060 [0.91]	0.021 [0.96]
(3) $\gamma_{0,2}$: Excess returns on DM	0.687 [0.29]		−1.927 [0.03]	−0.463 [0.59]	0.586 [0.59]	−1.145 [0.63]	1.523 [0.55]	−2.976 [0.22]	1.378 [0.51]	1.326 [0.44]
$\gamma_{1,2}$: Crisis dummy	−1.164 [0.37]		−1.291 [0.47]	−1.128 [0.51]	1.122 [0.62]	0.927 [0.85]	−1.626 [0.76]	2.218 [0.66]	−5.403 [0.20]	−4.947 [0.16]
(4) $\gamma_{0,3}$: Excess returns on FF	−0.687 [0.31]	−1.737 [0.08]		0.296 [0.74]	−0.694 [0.54]	0.511 [0.84]	−1.590 [0.55]	3.274 [0.19]	−1.607 [0.45]	−1.384 [0.43]
$\gamma_{1,3}$: Crisis dummy	0.589 [0.65]	1.790 [0.36]		0.740 [0.67]	−1.392 [0.54]	−0.809 [0.87]	0.887 [0.87]	−3.101 [0.54]	5.149 [0.23]	4.232 [0.24]
(5) $\gamma_{0,4}$: Excess returns on JY	0.086 [0.18]	0.111 [0.25]	0.148 [0.10]	0.117 [0.17]		0.719 [0.00]	0.009 [0.97]	−0.098 [0.69]	0.103 [0.63]	0.037 [0.83]
$\gamma_{1,4}$: Crisis dummy	0.053 [0.62]	0.299 [0.06]	−0.073 [0.62]	−0.080 [0.57]		−0.872 [0.03]	0.881 [0.04]	0.157 [0.70]	−0.004 [0.99]	0.162 [0.57]
(6) $\gamma_{0,5}$: Δ (Eurodollar)	0.011 [0.83]	0.081 [0.30]	0.098 [0.18]	0.039 [0.57]	0.083 [0.37]	0.174 [0.39]	−0.053 [0.81]	0.017 [0.94]	−0.022 [0.90]	−0.167 [0.25]
$\gamma_{1,5}$: Crisis dummy	−0.013 [0.83]	0.000 [1.00]	−0.123 [0.15]	−0.158 [0.05]	−0.080 [0.46]	−0.360 [0.13]	0.224 [0.37]	0.042 [0.86]	0.037 [0.85]	0.255 [0.13]
(7) $\gamma_{0,6}$: Δ (Eurodollar − Euroyen)	0.012 [0.67]	−0.048 [0.24]	−0.062 [0.10]	−0.048 [0.19]	0.036 [0.45]	0.093 [0.38]	−0.002 [0.99]	0.006 [0.95]	−0.077 [0.39]	0.011 [0.89]
$\gamma_{1,6}$: Crisis dummy	−0.001 [0.99]	0.040 [0.40]	0.058 [0.19]	0.052 [0.21]	−0.046 [0.41]	−0.077 [0.53]	0.051 [0.69]	−0.108 [0.38]	0.036 [0.73]	−0.040 [0.64]
(8) $\gamma_{0,7}$: Lag of excess returns on BP					−0.052 [0.79]	0.411 [0.35]	0.245 [0.60]	−0.046 [0.92]	−0.023 [0.95]	−0.305 [0.32]
$\gamma_{1,7}$: Crisis dummy					0.257 [0.32]	−0.220 [0.71]	−0.026 [0.97]	−0.075 [0.90]	0.128 [0.80]	0.456 [0.27]
(9) $\gamma_{0,8}$: Lag of excess returns on DM					1.062 [0.32]	1.503 [0.53]	0.191 [0.94]	−2.561 [0.29]	1.031 [0.62]	0.075 [0.96]
$\gamma_{1,8}$: Crisis dummy					−1.413 [0.50]	−3.173 [0.50]	4.558 [0.36]	12.740 [0.01]	−1.057 [0.80]	2.671 [0.42]

(10) $\gamma_{0,9}$: Lag of excess returns on FF					−1.137 [0.30]	−1.558 [0.53]	0.071 [0.98]	2.829 [0.26]	−0.993 [0.64]	0.053 [0.98]
$\gamma_{1,9}$: Crisis dummy					1.142 [0.59]	3.329 [0.49]	−5.472 [0.28]	−13.909 [0.00]	0.866 [0.83]	−3.055 [0.37]
(11) $\gamma_{0,10}$: Lag of Δ (Eurodollar)					0.034 [0.70]	0.172 [0.38]	0.012 [0.95]	0.000 [1.00]	0.012 [0.95]	−0.106 [0.44]
$\gamma_{1,10}$: Crisis dummy					−0.063 [0.53]	−0.482 [0.04]	−0.085 [0.72]	−0.208 [0.37]	−0.262 [0.18]	0.129 [0.42]
(12) $\gamma_{0,11}$: Lag of Δ Eurodollar − Euroyen)					−0.034 [0.44]	−0.020 [0.84]	0.043 [0.68]	0.053 [0.61]	−0.087 [0.31]	0.025 [0.72]
$\gamma_{1,11}$: Crisis dummy					−0.008 [0.88]	0.030 [0.80]	−0.094 [0.45]	−0.112 [0.35]	0.149 [0.14]	−0.097 [0.25]
(13) $\gamma_{0,12}$: Excess returns on own currency	0.753 [0.00]	2.436 [0.01]	2.467 [0.01]		1.257 [0.00]	1.552 [0.00]	0.974 [0.00]	1.353 [0.00]	1.558 [0.00]	1.307 [0.00]
$\gamma_{1,12}$: Crisis dummy	−0.205 [0.22]	−2.814 [0.14]	0.774 [0.67]		0.450 [0.01]	−0.133 [0.45]	0.238 [0.00]	0.230 [0.17]	0.193 [0.23]	−0.164 [0.33]

Panel B. F-test statistics for the sum of the two coefficients for each variable

$F_{(1, 3680)}$										
H_0: $\alpha_0 + \alpha_1 = 0$	1.135 [0.29]	0.186 [0.67]	0.040 [0.84]	0.188 [0.66]	0.739 [0.39]	0.490 [0.48]	1.217 [0.27]	0.246 [0.62]	1.649 [0.20]	4.289 [0.04]
H_0: $\gamma_{0,1} + \gamma_{1,1} = 0$		3.044 [0.08]	0.833 [0.36]	0.080 [0.78]	1.500 [0.22]	6.459 [0.01]	0.128 [0.72]	0.097 [0.76]	0.006 [0.94]	0.005 [0.95]
H_0: $\gamma_{0,2} + \gamma_{1,2} = 0$	0.184 [0.67]		4.385 [0.04]	1.195 [0.27]	0.770 [0.38]	0.003 [0.96]	0.001 [0.98]	0.031 [0.86]	1.189 [0.28]	1.402 [0.24]
H_0: $\gamma_{0,3} + \gamma_{1,3} = 0$	0.008 [0.93]	0.001 [0.97]		0.495 [0.48]	1.121 [0.29]	0.005 [0.95]	0.023 [0.88]	0.002 [0.97]	0.901 [0.34]	0.847 [0.36]
H_0: $\gamma_{0,4} + \gamma_{1,4} = 0$	2.658 [0.10]	10.281 [0.00]	0.400 [0.53]	0.107 [0.74]		0.240 [0.62]	7.124 [0.01]	0.035 [0.85]	0.133 [0.72]	0.787 [0.38]
H_0: $\gamma_{0,5} + \gamma_{1,5} = 0$	0.004 [0.95]	2.886 [0.09]	0.318 [0.57]	8.085 [0.00]	0.003 [0.96]	2.321 [0.13]	1.723 [0.19]	0.224 [0.64]	0.022 [0.88]	1.006 [0.32]
H_0: $\gamma_{0,6} + \gamma_{1,6} = 0$	0.539 [0.46]	0.143 [0.71]	0.047 [0.83]	0.052 [0.82]	0.124 [0.72]	0.065 [0.80]	0.564 [0.45]	2.647 [0.10]	0.600 [0.44]	0.458 [0.50]
H_0: $\gamma_{0,7} + \gamma_{1,7} = 0$					1.395 [0.24]	0.236 [0.63]	0.278 [0.60]	0.091 [0.76]	0.095 [0.76]	0.297 [0.59]
H_0: $\gamma_{0,8} + \gamma_{1,8} = 0$					0.038 [0.85]	0.167 [0.68]	1.205 [0.27]	5.971 [0.01]	0.000 [0.99]	0.909 [0.34]
H_0: $\gamma_{0,9} + \gamma_{1,9} = 0$					0.000 [1.00]	0.186 [0.67]	1.546 [0.21]	7.014 [0.01]	0.001 [0.97]	1.077 [0.30]
H_0: $\gamma_{0,10} + \gamma_{1,10} = 0$					0.331 [0.56]	6.803 [0.01]	0.364 [0.55]	3.231 [0.07]	6.477 [0.01]	0.087 [0.77]
H_0: $\gamma_{0,11} + \gamma_{1,11} = 0$					2.388 [0.12]	0.029 [0.87]	0.617 [0.43]	0.906 [0.34]	1.341 [0.25]	2.726 [0.10]
H_0: $\gamma_{0,12} + \gamma_{1,12} = 0$	24.386 [0.00]	0.052 [0.82]	4.351 [0.04]		142.329 [0.00]	556.829 [0.00]	940.205 [0.00]	184.348 [0.00]	260.926 [0.00]	192.974 [0.00]
H_0: $\gamma_{0,12} + \gamma_{1,12} = 1$	16.563 [0.00]	0.692 [0.41]	2.080 [0.15]		24.418 [0.00]	48.561 [0.00]	28.799 [0.00]	24.998 [0.00]	47.995 [0.00]	3.013 [0.08]

Table 4
Estimates of the CARs of banking industry excess returns around news announcements
The following SUR models are estimated in a system for 10 countries' banking industry indices over the period from January 15, 1997 to July 15, 1998 (390 days):

$$R_{pt} = \alpha_0 + \beta_0 R_{mt} + \sum_{k=1}^{K} \gamma_{0,k} X_{kt} + \sum_{j=1}^{J} D_j \phi_{jt} + \varepsilon_t,$$

where R_{pt} is the logarithmic daily dollar return on the Datastream banking industry indices for each of the 10 countries, and R_{mt} is the corresponding stock market index return. Both returns are in excess of 1-day return on the 7-day Eurodollar deposit. X_{kt} includes the daily dollar excess returns on the currency holdings (BP, DM, FF, and JY), the changes in the 7-day Eurodollar rate and the spread between the 7-day Eurodollar rate and Euroyen rate, lags of the Western variables due to the time zone difference, and daily dollar excess returns on each of the five Asian countries' currencies (Korea won, Indonesia rupiah, Thailand baht, Malaysia ringgit, Philippines peso). ϕ_{jt} is a dummy variable taking a value of $1/n$ for the jth event days shown below, or zero, otherwise. Thus, the parameter estimate D_j represents a CAR for the jth event days. We only reproduce the estimates of D_j since the parameters estimates are similar to those of Table 2. p-values are in brackets. F-tests in the last column are joint tests across 10 countries.

Estimates of CARs	UK	Germany	France	US	Japan	Korea	Indonesia	Thailand	Malaysia	Philippines	$F_{(10, 3445)}$
D_1 (970514–970516: $n = 3$)	−0.112 [0.93]	1.319 [0.39]	0.322 [0.85]	−0.572 [0.64]	−1.920 [0.27]	−0.089 [0.98]	−2.155 [0.65]	0.635 [0.80]	1.339 [0.58]	−1.794 [0.35]	0.368 [0.96]
D_2 (970522–970526: $n = 3$)	1.237 [0.35]	−0.532 [0.73]	0.747 [0.65]	0.421 [0.73]	1.299 [0.46]	5.983 [0.14]	2.351 [0.63]	−0.001 [1.00]	−3.546 [0.15]	2.499 [0.20]	0.842 [0.59]
D_3 (970618–970620: $n = 3$)	2.661 [0.04]	−2.478 [0.10]	−2.167 [0.19]	0.498 [0.68]	1.407 [0.42]	−2.831 [0.48]	4.360 [0.36]	−4.286 [0.09]	−0.405 [0.87]	−1.873 [0.33]	1.582 [0.11]
D_4 (970626–970630: $n = 3$)	−0.468 [0.72]	−1.446 [0.34]	−1.842 [0.26]	−2.047 [0.09]	1.101 [0.53]	1.377 [0.73]	−1.214 [0.80]	−3.584 [0.16]	1.202 [0.62]	2.733 [0.16]	0.946 [0.49]
D_5 (970701–970703: $n = 3$)	−0.523 [0.69]	−0.689 [0.65]	−0.587 [0.72]	1.597 [0.19]	0.172 [0.92]	−0.160 [0.97]	−1.565 [0.74]	−0.476 [0.86]	0.036 [0.99]	0.281 [0.88]	0.240 [0.99]
D_6 (970711–970715: $n = 3$)	0.619 [0.64]	1.236 [0.42]	−0.109 [0.95]	−1.571 [0.20]	2.173 [0.22]	−0.724 [0.86]	2.131 [0.66]	0.668 [0.80]	2.829 [0.25]	2.724 [0.18]	0.704 [0.72]
D_7 (970723–970729: $n = 5$)	−0.085 [0.96]	−0.704 [0.72]	5.504 [0.01]	2.117 [0.18]	−0.936 [0.68]	5.134 [0.33]	−0.125 [0.98]	−2.535 [0.45]	−0.375 [0.91]	1.838 [0.47]	1.151 [0.32]
D_8 (970804–970806: $n = 3$)	−0.352 [0.79]	−2.392 [0.12]	1.263 [0.45]	−0.391 [0.75]	4.735 [0.01]	1.853 [0.65]	−3.110 [0.52]	−0.536 [0.84]	−0.119 [0.96]	−1.246 [0.52]	1.197 [0.29]
D_9 (970808–970812: $n = 3$)	−1.397 [0.29]	2.818 [0.07]	0.505 [0.76]	0.180 [0.88]	1.551 [0.38]	−0.282 [0.94]	2.235 [0.64]	−0.770 [0.77]	0.598 [0.81]	−0.056 [0.98]	0.593 [0.82]
D_{10} (970813–970815: $n = 3$)	0.120 [0.93]	0.824 [0.59]	−0.251 [0.88]	1.743 [0.16]	−1.062 [0.55]	−0.204 [0.96]	3.747 [0.44]	2.199 [0.40]	0.051 [0.98]	1.100 [0.57]	0.434 [0.93]
D_{11} (970819–970821: $n = 3$)	−0.447 [0.73]	2.233 [0.14]	−0.371 [0.82]	−0.731 [0.55]	2.533 [0.15]	0.158 [0.97]	−11.693 [0.02]	0.901 [0.73]	0.312 [0.90]	−1.799 [0.35]	1.157 [0.32]
D_{12} (970919–970922: $n = 2$)	−0.967 [0.36]	1.488 [0.23]	0.851 [0.53]	−0.265 [0.79]	−0.528 [0.71]	1.152 [0.73]	0.783 [0.84]	−0.194 [0.93]	−1.493 [0.46]	−1.576 [0.32]	0.456 [0.92]
D_{13} (971007–971009: $n = 3$)	−1.633 [0.21]	−0.493 [0.75]	1.695 [0.30]	−0.503 [0.68]	−1.420 [0.41]	2.873 [0.47]	−2.164 [0.65]	−3.899 [0.13]	−2.045 [0.41]	3.709 [0.05]	1.257 [0.25]

D_{14} (971030–971103: $n = 3$)	−0.582 [0.65]	−1.317 [0.39]	−1.649 [0.31]	−1.485 [0.22]	0.733 [0.67]	−0.287 [0.94]	−3.299 [0.49]	6.962 [0.01]	−3.027 [0.22]	2.385 [0.22]	1.504 [0.13]
D_{15} (971104–971106: $n = 3$)	−0.214 [0.87]	−0.276 [0.86]	−1.702 [0.30]	0.441 [0.72]	−3.151 [0.07]	−1.983 [0.63]	−0.432 [0.93]	0.418 [0.87]	0.325 [0.89]	−0.102 [0.96]	0.492 [0.90]
D_{16} (971114–971118: $n = 3$)	−0.787 [0.55]	−0.567 [0.71]	0.052 [0.97]	0.122 [0.92]	−0.020 [0.99]	−0.572 [0.89]	−4.842 [0.31]	3.374 [0.19]	2.179 [0.37]	−0.819 [0.67]	0.422 [0.94]
D_{17} (971119–971124: $n = 4$)	−2.350 [0.12]	−0.241 [0.89]	2.605 [0.17]	0.719 [0.61]	0.415 [0.84]	3.127 [0.50]	−0.344 [0.95]	−2.780 [0.35]	−3.869 [0.17]	1.056 [0.63]	0.881 [0.55]
D_{18} (971128–971202: $n = 3$)	1.934 [0.14]	−1.412 [0.36]	−1.293 [0.43]	2.036 [0.10]	0.814 [0.64]	−1.640 [0.69]	−2.045 [0.67]	−3.492 [0.18]	−2.589 [0.29]	−3.844 [0.05]	1.330 [0.21]
D_{19} (971203–971208: $n = 4$)	1.680 [0.27]	4.968 [0.01]	4.448 [0.02]	1.881 [0.19]	2.568 [0.20]	12.503 [0.01]	5.942 [0.29]	2.848 [0.34]	−0.154 [0.96]	−4.503 [0.05]	3.134 [0.00]
D_{20} (971212–971216: $n = 3$)	1.617 [0.22]	2.054 [0.18]	−0.311 [0.85]	0.081 [0.95]	2.470 [0.16]	6.289 [0.13]	−9.879 [0.04]	−1.159 [0.66]	0.768 [0.75]	1.766 [0.38]	1.489 [0.14]
D_{21} (971217–971219: $n = 3$)	−0.380 [0.78]	2.303 [0.14]	−2.177 [0.20]	0.146 [0.91]	−1.286 [0.48]	0.159 [0.97]	−9.762 [0.05]	−3.153 [0.24]	−6.655 [0.01]	−1.218 [0.54]	1.610 [0.10]
D_{22} (971223–971226: $n = 4$)	−0.214 [0.89]	−1.674 [0.37]	−3.072 [0.13]	−0.636 [0.67]	−1.091 [0.65]	0.156 [0.98]	3.747 [0.57]	0.179 [0.96]	4.301 [0.20]	1.843 [0.49]	0.538 [0.86]
D_{23} (971229–971231: $n = 3$)	0.087 [0.95]	−2.199 [0.19]	−1.092 [0.54]	−0.449 [0.74]	0.034 [0.99]	2.282 [0.66]	−6.059 [0.32]	−1.874 [0.56]	6.363 [0.04]	0.470 [0.85]	0.849 [0.58]
D_{24} (980101–980105: $n = 3$)	−0.473 [0.72]	−2.474 [0.11]	0.156 [0.92]	−0.063 [0.96]	0.583 [0.74]	−0.765 [0.85]	1.439 [0.77]	−1.613 [0.53]	−4.080 [0.10]	−3.175 [0.10]	0.871 [0.56]
D_{25} (980108–980112: $n = 3$)	−1.500 [0.25]	−3.162 [0.04]	−3.727 [0.02]	−2.163 [0.08]	0.399 [0.82]	−7.191 [0.08]	8.762 [0.07]	−7.855 [0.00]	−1.398 [0.57]	0.137 [0.94]	3.124 [0.00]
D_{26} (980113–980114: $n = 2$)	0.826 [0.44]	0.189 [0.88]	1.000 [0.46]	1.460 [0.15]	1.226 [0.39]	−4.001 [0.23]	−14.557 [0.00]	−0.611 [0.77]	−2.426 [0.23]	−1.425 [0.37]	1.939 [0.04]
D_{27} (980115–980116: $n = 2$)	0.824 [0.44]	−0.175 [0.89]	0.663 [0.62]	−0.009 [0.99]	0.199 [0.89]	−2.463 [0.45]	18.166 [0.00]	1.575 [0.45]	−1.614 [0.42]	−0.142 [0.93]	2.376 [0.01]
D_{28} (980128–980130: $n = 3$)	2.287 [0.08]	1.779 [0.24]	−0.055 [0.97]	−0.696 [0.57]	−0.139 [0.94]	0.804 [0.84]	−0.302 [0.95]	4.138 [0.12]	−0.034 [0.99]	−6.425 [0.00]	1.979 [0.03]
D_{29} (980213–980218: $n = 4$)	2.209 [0.14]	−1.576 [0.37]	1.045 [0.58]	−0.005 [1.00]	−1.025 [0.61]	−4.192 [0.36]	−1.738 [0.75]	−4.690 [0.11]	−1.428 [0.61]	−0.166 [0.94]	0.802 [0.63]
D_{30} (980306–980310: $n = 3$)	−0.035 [0.98]	−2.409 [0.11]	1.105 [0.50]	−0.150 [0.90]	1.350 [0.43]	−1.713 [0.67]	1.493 [0.75]	0.154 [0.95]	−1.057 [0.66]	−1.353 [0.48]	0.520 [0.88]
D_{31} (980320–980323: $n = 2$)	−1.570 [0.14]	0.482 [0.70]	−1.791 [0.18]	−1.615 [0.10]	−0.713 [0.61]	−0.324 [0.92]	−6.118 [0.12]	−1.467 [0.48]	1.303 [0.51]	0.056 [0.97]	0.989 [0.45]
D_{31} (980320–980323: $n = 2$)	−1.570 [0.14]	0.482 [0.70]	−1.791 [0.18]	−1.615 [0.10]	−0.713 [0.61]	−0.324 [0.92]	−6.118 [0.12]	−1.467 [0.48]	1.303 [0.51]	0.056 [0.97]	0.989 [0.45]
D_{32} (980325–980327: $n = 3$)	0.524 [0.69]	2.927 [0.05]	2.930 [0.07]	−0.836 [0.49]	−2.124 [0.22]	0.051 [0.99]	6.632 [0.17]	2.420 [0.34]	−1.195 [0.62]	2.826 [0.14]	1.311 [0.22]
D_{33} (980407–980409: $n = 3$)	1.278 [0.33]	0.727 [0.64]	−0.414 [0.80]	−0.326 [0.79]	−1.089 [0.53]	−6.494 [0.11]	−2.360 [0.62]	−1.666 [0.52]	0.473 [0.85]	0.787 [0.68]	0.590 [0.82]

intercept but with dummy variables that capture the returns of bank indices around crisis events that cannot be explained by the independent variables used in Table 2. This means that we estimate the impact of crisis events on the return of bank indices net of the impact of FX changes, interest rate changes, and domestic market returns. Table 4 shows the estimates for the various events of the crisis, which are again obtained using the SUR specification. The traditional event study approach in finance uses only the market return as the independent variable. However, here we wanted to make sure that we understood the extent to which events affect returns in addition to the change in other variables. Admittedly, there is some arbitrariness in how one selects event windows in a study like this one. A difficulty with defining event windows is that it is not always clear when an event takes place. For instance, an event taking place on day t in the US gets incorporated in stock prices in Korea on day $t + 1$. Also, an event could take place at date t in Korea, but only be announced after the market closes so that it shows up in stock returns at date t in the US and date $t + 1$ in Korea. We therefore extend our event windows to make sure that they include enough days to allow for differences in time zones. The event windows we use in our estimation are described in Appendix A. We also investigate ARs for individual days.

Our approach consists of estimating the ARs of bank indices during periods corresponding to important events in the Asian crisis. We perform this estimation for 10 bank indices. The problem with such an approach is that during the periods we focus on, other events could affect bank indices besides those of the Asian crisis. Hence, we could find significant ARs that have nothing to do with events of the Asian crisis. Further, it could be that most of the information about the crisis are too small to have much of an impact on stock prices, even though the cumulative impact of events might be significant. Cornell and Shapiro (1986) studied the impact of the debt crisis of the 1980s on stock prices and found that they could not identify days that had significant impacts on stock prices. Yet, when they looked at yearly returns, they found that the performance of banks was related to their exposure. We also fail to find significant ARs because of insufficient power in our tests. Table 1 shows that the volatility of stock returns differs across countries and is large among the crisis countries. This means that ARs of same size could be significant in one country but not in another and that ARs that are economically significant might not be statistically significant.

Another study investigates returns on specific days for the Asian crisis. Kaminsky and Schmukler (1998) look at days with large market returns and then investigate whether these large returns can be explained by contemporaneous events. They find that agreements with international organizations are generally contemporaneous with large returns. However, their study focuses on market returns. In contrast, our study focuses on ARs of banks. Remember that we define ARs as returns that cannot be predicted based on the evolution of the stock market. Hence, if bank values fall only because the stock market falls, the AR is zero in the following analysis irrespective of why the stock market fell. In this case, a fall

in the stock market brought about by a currency depreciation could lead to a fall in bank values, but there would be nothing ''bank-specific'' about the impact of the currency depreciation on bank values. Consequently, our analysis is designed to estimate the impact of currency changes that is unique to banks as opposed to the impact of those changes that affect the whole economy. Further, we investigate ARs on important dates of the Asian crisis, whereas they select the dates based on market returns. Their approach is different because they seek the answer to the question of whether markets were acting rationally, whereas we try to understand whether specific events had an economic impact.

Rather than considering a chronology of events, we discuss first the impact on banks of the initial event in each country where the central bank gives up on defending the existing exchange rate regime and lets the exchange rate drop substantially. We then turn to events associated with IMF programs.

3.1. The currency devaluations

For Thailand, the initial devaluation was announced on July 2. We therefore consider a window from July 1 to 3. Table 4 shows that the ARs of banks in the UK, France, Germany, and Japan were all less than 1% in absolute value and insignificant. For the US, the AR was 1.60%, but also insignificant. For the crisis countries, the ARs of banks were less than for the US banks in absolute value and were insignificant.

The Philippines abandoned their peg on July 11, and on July 14, the Malaysian central bank abandoned the defense of the ringgit. We use an event window from July 11 to 15. The ARs of the Western banks were trivial and insignificant, with the US banks having the highest AR in absolute value at -1.57% with a p-value of 0.20. All Asian countries, except for Korea, experienced positive ARs. The highest ARs were for Malaysia and the Philippines. They were slightly above 2.7% for both countries, but insignificant. The problem is, however, that the currency events took place at the same time that the IMF extended a program to help the Philippines on July 14, so that it could be that the positive ARs were due to the IMF program. Table 5 provides estimates of ARs on these individual days. If letting the currency fall has a positive effect on banks, we should observe a positive AR on banks in the Philippines on July 11 and a positive AR on banks in Malaysia on July 14. The AR for the bank index in the Philippines on July 11 was 1.81% with a p-value of 0.18, but it was -2.84% the preceding day with a p-value of 0.01. The AR for the bank index in Malaysia on July 14 was a trivial 0.85%, but it was 2.32% on the following day with a p-value of 0.10. Based on this evidence, there is no reason to suspect that these devaluations had strong adverse impacts on bank values.

The Indonesian rupiah plunged on August 14 after Indonesia gave up managing the exchange rate. The story for the banks of developed countries is similar to what happened with Thailand. For the UK, France, Germany, and Japan, the AR

Table 5
Estimates of the ARs of banking industry excess returns on each day of the currency devaluations
The following SUR models are estimated in a system for 10 countries' banking industry indices over the period from January 15, 1997 to July 15, 1998 (390 days):

$$R_{pt} = \alpha_0 + \beta_0 R_{mt} + \sum_{k=1}^{K} \gamma_{0,k} X_{kt} + \sum_{j=1}^{J} D_j \phi_{jt} + \varepsilon_t,$$

where R_{pt} is the logarithmic daily dollar return on the Datastream banking industry indices for each of the 10 countries, and R_{mt} is the corresponding stock market index return. Both returns are in excess of 1-day return on the 7-day Eurodollar deposit. X_{kt} includes the daily dollar excess returns on the currency holdings (BP, DM, FF, and JY), the changes in the 7-day Eurodollar rate and the spread between the 7-day Eurodollar rate and the Euroyen rate, lags of the Western variables due to the time zone difference, and daily dollar excess returns on each of the five Asian countries' currencies (Korea won, Indonesia rupiah, Thailand baht, Malaysia ringgit, Philippines peso). ϕ_{jt} is a dummy variable taking a value of one for the jth event day shown below, or zero, otherwise. Thus, the parameter estimate D_j represents an AR for the jth event day. We only reproduce the estimates of D_j since the parameters estimates are similar to those of Table 2. p-values are in brackets. F-tests in the last column are joint tests across 10 countries.

Estimates of ARs	UK	Germany	France	US	Japan	Korea	Indonesia	Thailand	Malaysia	Philippines	$F_{(10, 3645)}$
D_1 (970701: Thailand −1)	0.555 [0.46]	−0.325 [0.72]	−1.076 [0.26]	0.869 [0.21]	0.152 [0.88]	−0.290 [0.90]	−0.563 [0.84]	0.306 [0.84]	−0.314 [0.82]	0.653 [0.56]	0.476 [0.91]
D_2 (970702: Thailand 0)	−0.872 [0.24]	1.001 [0.26]	0.993 [0.30]	0.420 [0.55]	−0.406 [0.68]	0.094 [0.97]	−0.254 [0.93]	0.138 [0.93]	−0.021 [0.99]	0.713 [0.52]	0.466 [0.91]
D_3 (970703: Thailand +1)	−0.416 [0.59]	−1.401 [0.13]	−0.503 [0.61]	0.304 [0.67]	0.435 [0.67]	0.157 [0.95]	−0.483 [0.87]	−0.795 [0.62]	0.649 [0.65]	−1.073 [0.35]	0.446 [0.92]
D_4 (970710: Philippines −1)	−0.573 [0.45]	−0.194 [0.83]	0.160 [0.87]	0.254 [0.72]	−1.103 [0.27]	0.375 [0.87]	−3.114 [0.28]	−0.327 [0.83]	1.474 [0.30]	−2.841 [0.01]	1.115 [0.35]
D_5 (970711: Philippines 0)	−0.317 [0.67]	1.710 [0.06]	−0.569 [0.56]	−0.116 [0.87]	−0.099 [0.92]	0.991 [0.67]	1.912 [0.51]	−0.603 [0.69]	−0.142 [0.92]	1.814 [0.18]	0.825 [0.60]
D_6 (970714: Malaysia 0)	−0.517 [0.49]	−0.381 [0.67]	0.068 [0.94]	−0.498 [0.48]	1.903 [0.06]	−0.515 [0.83]	−2.806 [0.33]	1.158 [0.45]	0.845 [0.56]	1.224 [0.28]	0.831 [0.60]
D_7 (970715: Malaysia +1)	1.347 [0.07]	−0.048 [0.96]	0.372 [0.70]	−0.992 [0.16]	0.228 [0.82]	−1.324 [0.57]	3.468 [0.23]	0.276 [0.85]	2.321 [0.10]	0.668 [0.56]	1.007 [0.44]
D_8 (970813: Indonesia −1)	0.658 [0.39]	−0.253 [0.78]	0.544 [0.58]	0.661 [0.35]	0.284 [0.78]	−1.754 [0.46]	−0.543 [0.85]	1.528 [0.32]	0.622 [0.66]	−0.208 [0.86]	0.368 [0.96]
D_9 (970814: Indonesia 0)	0.354 [0.64]	0.804 [0.38]	−0.481 [0.62]	0.081 [0.91]	−1.481 [0.15]	2.653 [0.26]	1.706 [0.56]	−0.795 [0.60]	−0.126 [0.93]	0.415 [0.72]	0.562 [0.85]
D_{10} (970815: Indonesia +1)	−0.853 [0.26]	0.378 [0.68]	−0.145 [0.88]	1.081 [0.13]	0.349 [0.73]	−0.920 [0.70]	1.841 [0.53]	1.805 [0.24]	0.049 [0.97]	0.562 [0.62]	0.655 [0.77]
D_{11} (971114: Korea −1)	0.055 [0.94]	−1.281 [0.15]	−0.010 [0.99]	−1.073 [0.12]	−0.275 [0.78]	1.037 [0.65]	−1.782 [0.53]	1.790 [0.23]	0.483 [0.73]	−0.419 [0.71]	0.815 [0.61]
D_{12} (971117: Korea 0)	−0.711 [0.35]	−0.027 [0.98]	−0.268 [0.78]	0.764 [0.28]	0.966 [0.35]	−1.543 [0.51]	1.818 [0.53]	0.163 [0.91]	0.108 [0.94]	−0.378 [0.74]	0.414 [0.94]
D_{13} (971118: Korea +1)	−0.219 [0.77]	0.720 [0.42]	0.248 [0.80]	0.432 [0.54]	−0.713 [0.47]	−0.287 [0.90]	−4.905 [0.09]	1.740 [0.25]	1.794 [0.21]	0.339 [0.76]	0.726 [0.70]

of banks was less than 1% in absolute value. For the US banks, the AR was 1.74% with a *p*-value of 0.16 in Table 4. Banks in Indonesia had an insignificant AR of 3.75%. The returns of the banks of the other crisis countries were positive, except for Korea where banks have a trivial negative AR. None of these ARs is significant. From this, no case can be made that this event had an adverse effect on banks in crisis countries once the impact on the market and the exchange rate is taken into account.

The last currency to abandon its peg was the won on November 17. We estimate the ARs for a window from November 14 to 18. Over that window, no bank index in developed countries experienced an AR greater than 1% in absolute value. Korean banks had an insignificant AR of −0.57%. The Indonesian banks lost 4.84%, but the Thai banks gained 3.37% and the Malaysian banks gained 2.18%. None of the ARs is significant.

The last period of interest with respect to currency movements is the period of the currency meltdown of late July that led Mahathir to blame ''rogue speculators.'' We use an event window from July 23 to 29. This window starts with the ringgit reaching a 38-month low on July 24 and ends when Thailand called the IMF on July 28. Malaysian banks did not have much in the way of ARs during this period. While French, US and Korean banks experienced economically large ARs, only the French bank index had a significant positive AR. Thai banks had a negative AR of −2.53%, but this AR is not significant.

The bottom line from our analysis is that there is no evidence that banks performed poorly during periods of large depreciations. One could even argue that these periods were reasonably good for banks. This is especially clear for the US banks that have a cumulative abnormal return (CAR) of 4.01% over the five events discussed above using the data in Table 4. Further, all countries, except for Indonesia and the UK, also have positive CARs over these windows. The conclusions from our analysis do not change if we exclude exchange rate changes as independent variables.

3.2. IMF programs

Except for Malaysia, all crisis countries received IMF programs. The first program was the one for the Philippines. On July 14, the IMF offered almost US$1.1 billion of financial support to the Philippines. As discussed earlier, we estimated a window from July 11 to 15 in Table 4. While the ARs for Western banks are mixed, but small in absolute value over that period, no bank index in Asia except for Korea had a negative AR during that period. Because this period was also one with exchange rate events, we investigate the ARs on July 14 in Table 6, which corresponds to the day of the IMF program agreement for the Philippines. The announcement seems to leave no trace on Western banks. However, Asian banks experienced positive ARs, except for those of Korea and Indonesia. The only significant AR was the one for Japanese banks, which was 1.91% with a *p*-value of 0.06.

Table 6
Estimates of the ARs of banking industry excess returns on each day of the IMF program announcements
The following SUR models are estimated in a system for 10 countries' banking industry indices over the period from January 15, 1997 to July 15, 1998 (390 days):

$$R_{pt} = \alpha_0 + \beta_0 R_{mt} + \sum_{k=1}^{K} \gamma_{0,k} X_{k,t} + \sum_{j=1}^{J} D_j \phi_{jt} + \varepsilon_t,$$

where R_{pt} is the logarithmic daily dollar return on the Datastream banking industry indices for each of the 10 countries, and R_{mt} is the corresponding stock market index return. Both returns are in excess of 1-day return on the 7-day Eurodollar deposit. X_{kt} includes the daily dollar excess returns on the currency holdings (BP, DM, FF, and JY), the changes in the 7-day Eurodollar rate and the spread between the 7-day Eurodollar rate and Euroyen rate, lags of the Western variables due to the time zone difference, and daily dollar excess returns on each of the five Asian countries' currencies (Korea won, Indonesia rupiah, Thailand baht, Malaysia ringgit, Philippines peso). ϕ_{jt} is a dummy variable taking a value of one for the jth event day shown below, or zero, otherwise. Thus, the parameter estimate D_j represents an AR for the jth event day. We only reproduce the estimates of D_j since the parameters estimates are similar to those of Table 2. p-values are in brackets. F-tests in the last column are joint tests across 10 countries.

Estimates of ARs	UK	Germany	France	US	Japan	Korea	Indonesia	Thailand	Malaysia	Philippines	$F_{(10, 3465)}$
D_1 (970711: Philippines −1)	−0.266 [0.72]	1.727 [0.05]	−0.532 [0.57]	−0.053 [0.94]	0.012 [0.99]	0.799 [0.72]	1.895 [0.49]	−0.786 [0.56]	−0.165 [0.90]	1.757 [0.19]	0.808 [0.62]
D_2 (970714: Philippines 0)	−0.492 [0.51]	−0.371 [0.68]	0.061 [0.95]	−0.452 [0.51]	1.912 [0.06]	−0.616 [0.78]	−3.044 [0.27]	1.074 [0.43]	0.960 [0.48]	1.163 [0.30]	0.860 [0.57]
D_3 (970715: Philippines +1)	1.328 [0.08]	−0.075 [0.93]	0.376 [0.69]	−0.957 [0.17]	0.264 [0.79]	−1.177 [0.60]	3.533 [0.20]	0.186 [0.89]	2.242 [0.10]	0.607 [0.59]	1.022 [0.42]
D_4 (970804: Thailand −1)	0.411 [0.58]	−1.066 [0.23]	0.541 [0.56]	−0.287 [0.68]	1.153 [0.24]	1.149 [0.60]	−0.139 [0.96]	−0.353 [0.79]	0.800 [0.55]	−0.080 [0.94]	0.472 [0.91]
D_5 (970805: Thailand 0)	−0.735 [0.33]	−0.562 [0.53]	−0.448 [0.63]	−0.635 [0.36]	1.951 [0.05]	−0.266 [0.90]	−0.809 [0.77]	0.132 [0.92]	0.600 [0.66]	−0.569 [0.61]	0.664 [0.76]
D_6 (970806: Thailand +1)	−0.109 [0.89]	−0.825 [0.36]	0.924 [0.33]	0.487 [0.49]	1.350 [0.18]	0.695 [0.76]	−1.424 [0.61]	−0.577 [0.67]	−1.420 [0.30]	−0.491 [0.67]	0.601 [0.81]
iD$_7$ (970808: Thailand −1)	−1.218 [0.11]	1.845 [0.04]	0.282 [0.77]	−0.650 [0.36]	0.649 [0.52]	0.547 [0.81]	−1.135 [0.68]	−0.366 [0.79]	−0.458 [0.74]	−1.592 [0.17]	0.982 [0.46]
D_8 (970811: Thailand 0)	0.674 [0.37]	0.179 [0.84]	0.421 [0.65]	1.140 [0.10]	1.698 [0.09]	−0.931 [0.68]	3.174 [0.25]	−0.081 [0.95]	−0.638 [0.64]	0.500 [0.66]	0.887 [0.54]
D_9 (970812: Thailand +1)	−0.957 [0.20]	0.702 [0.43]	−0.302 [0.75]	−0.280 [0.69]	−0.771 [0.44]	−0.097 [0.97]	0.206 [0.94]	−0.281 [0.83]	1.260 [0.35]	0.500 [0.66]	0.446 [0.92]
D_{10} (971030: Indonesia −1)	−0.168 [0.82]	−0.464 [0.60]	−1.648 [0.08]	−0.929 [0.18]	−0.199 [0.84]	3.131 [0.16]	0.911 [0.74]	3.592 [0.01]	0.373 [0.78]	1.308 [0.24]	1.368 [0.19]
D_{11} (971031: Indonesia 0)	−1.036 [0.17]	−0.110 [0.90]	−0.371 [0.70]	−0.190 [0.79]	0.751 [0.45]	2.434 [0.28]	−1.046 [0.71]	1.059 [0.44]	−3.716 [0.01]	0.106 [0.93]	1.300 [0.22]
D_{12} (971103: Indonesia +1)	0.571 [0.44]	−0.675 [0.45]	0.407 [0.66]	−0.336 [0.63]	0.281 [0.78]	−6.043 [0.01]	−2.951 [0.29]	2.571 [0.06]	0.205 [0.88]	0.899 [0.43]	1.528 [0.12]
D_{13} (971119: Korea −2)	0.630 [0.40]	1.144 [0.20]	1.256 [0.18]	1.012 [0.14]	−0.178 [0.86]	−0.852 [0.70]	−0.088 [0.97]	−1.254 [0.35]	−1.752 [0.19]	1.471 [0.19]	1.101 [0.36]

D_{14} (971120: Korea −1)	−1.553 [0.04]	−0.518 [0.56]	0.222 [0.81]	0.000 [1.00]	−1.622 [0.10]	4.394 [0.05]	−1.099 [0.69]	1.272 [0.34]	3.752 [0.01]	−0.495 [0.66]	2.022 [0.03]
D_{15} (971121: Korea 0)	−0.580 [0.44]	−0.381 [0.67]	0.237 [0.80]	−0.422 [0.54]	2.015 [0.04]	1.054 [0.64]	−0.380 [0.89]	−0.566 [0.67]	−0.974 [0.48]	0.570 [0.61]	0.651 [0.77]
D_{16} (971124: Korea + 1)	−0.915 [0.23]	−0.486 [0.59]	0.888 [0.35]	0.164 [0.81]	0.279 [0.78]	−1.347 [0.55]	1.597 [0.56]	−2.506 [0.06]	−4.429 [0.00]	−0.494 [0.66]	1.608 [0.10]
D_{17} (971128: Korea −1)	1.203 [0.11]	−0.267 [0.77]	−1.434 [0.13]	−0.282 [0.69]	1.469 [0.15]	−4.020 [0.08]	0.047 [0.99]	0.813 [0.55]	−0.594 [0.67]	0.008 [0.99]	1.217 [0.27]
D_{18} (971201: Korea 0)	−0.255 [0.74]	0.059 [0.95]	0.349 [0.71]	2.027 [0.00]	1.003 [0.32]	−3.453 [0.13]	0.810 [0.77]	−1.543 [0.26]	0.347 [0.80]	−1.170 [0.30]	1.315 [0.22]
D_{19} (971202: Korea + 1)	1.113 [0.15]	−1.194 [0.19]	−0.079 [0.93]	0.217 [0.76]	−1.560 [0.12]	6.143 [0.01]	−2.229 [0.42]	−2.210 [0.11]	−1.843 [0.18]	−2.372 [0.04]	2.266 [0.01]
D_{20} (971203: Korea −1)	−0.286 [0.71]	0.471 [0.61]	0.702 [0.47]	0.533 [0.46]	0.689 [0.51]	4.201 [0.07]	1.851 [0.52]	1.277 [0.36]	0.284 [0.84]	−0.257 [0.83]	0.713 [0.71]
D_{21} (971204: Korea 0)	0.338 [0.65]	0.170 [0.85]	0.852 [0.36]	0.923 [0.18]	−0.117 [0.91]	−0.065 [0.98]	−0.485 [0.86]	5.528 [0.00]	−2.078 [0.14]	−1.580 [0.17]	2.509 [0.01]
D_{22} (971205: Korea + 1)	0.442 [0.55]	2.120 [0.02]	0.460 [0.62]	0.077 [0.91]	0.475 [0.63]	0.461 [0.84]	0.208 [0.94]	0.053 [0.97]	−2.280 [0.10]	−2.216 [0.05]	1.224 [0.27]
D_{23} (971208: Korea + 2)	1.048 [0.16]	2.324 [0.01]	2.220 [0.02]	0.356 [0.61]	1.267 [0.21]	7.314 [0.00]	5.053 [0.07]	−4.051 [0.00]	2.870 [0.04]	−0.312 [0.78]	4.435 [0.00]
D_{24} (980107: IMF Nego −1)	−0.608 [0.42]	−0.309 [0.73]	−3.624 [0.00]	−1.157 [0.10]	−1.163 [0.24]	−2.157 [0.33]	3.501 [0.20]	−3.165 [0.02]	−0.388 [0.78]	−1.356 [0.23]	3.269 [0.00]
D_{25} (980108: IMF Nego 0)	−0.879 [0.24]	−1.011 [0.26]	−2.775 [0.00]	−1.320 [0.06]	0.867 [0.38]	−4.106 [0.07]	7.200 [0.02]	−3.245 [0.02]	−1.236 [0.37]	−2.203 [0.05]	3.815 [0.00]
D_{26} (980109: IMF Nego +1)	−0.861 [0.25]	−1.390 [0.12]	−0.331 [0.72]	0.595 [0.40]	0.524 [0.60]	−3.732 [0.09]	1.204 [0.66]	−2.179 [0.10]	−0.733 [0.59]	0.541 [0.64]	1.063 [0.39]
D_{27} (980112: Nego +2)	0.243 [0.75]	−0.815 [0.36]	−0.750 [0.43]	−1.477 [0.03]	−1.096 [0.27]	0.372 [0.87]	0.974 [0.72]	−2.476 [0.07]	0.630 [0.64]	1.144 [0.31]	1.228 [0.27]
D_{28} (980113: IMF Nego +3)	0.551 [0.46]	0.609 [0.50]	0.605 [0.52]	0.253 [0.72]	0.159 [0.87]	−2.676 [0.23]	−7.976 [0.00]	1.812 [0.18]	2.121 [0.12]	−0.061 [0.96]	1.505 [0.13]
D_{29} (980114: IMF Nego +4)	0.222 [0.77]	−0.459 [0.60]	0.474 [0.61]	1.248 [0.07]	1.164 [0.24]	−1.357 [0.54]	−6.449 [0.02]	−2.020 [0.14]	−4.515 [0.00]	−1.044 [0.36]	2.266 [0.01]
D_{30} (980115: IMF Nego +5)	−0.209 [0.78]	−0.085 [0.92]	0.486 [0.60]	0.057 [0.93]	0.154 [0.88]	0.447 [0.84]	1.186 [0.67]	−5.739 [0.00]	−0.743 [0.58]	−1.847 [0.10]	2.161 [0.02]
D_{31} (980116: IMF Nego +6)	1.006 [0.18]	−0.209 [0.82]	0.190 [0.84]	−0.068 [0.92]	0.180 [0.86]	−2.743 [0.22]	17.214 [0.00]	7.419 [0.00]	−0.662 [0.63]	1.681 [0.13]	7.394 [0.00]

The next program was the one for Thailand. We have two different windows. The first window is from August 4 to 6. It captures the announcement of the austerity measures in Thailand responding to the suggestions of the IMF. ARs for that event window are small and insignificant at the 10% level for all bank indices except for a 1.95% AR for Japanese banks with a *p*-value of 0.05. Thai banks earned an insignificant 0.13%. The second event window covers the announcement of the program on August 11, so that it goes from August 8 to 12. US and Japanese banks had significant positive ARs on August 11. The banks in crisis countries had ARs of less than 1% in absolute value and all are insignificant.

A program for Indonesia was announced on October 31. We use a window from October 30 to November 3. During that window, all banking indices, except those for Thailand, the Philippines, and Japan, have negative insignificant ARs. Indonesian and Malaysian banks experienced the biggest losses during that period and they slightly exceed 3%. Thai banks experienced a large gain of 7.22%. French, German, and American banks lost between 1% and 2%. Japanese banks that had an exposure in excess of US$20 billion in Indonesia had a small insignificant positive AR on the announcement day. American banks had a small negative AR. Indonesian banks lost an insignificant 1.05%. The hypothesis, that the ARs across countries were equal to zero on October 31, is not rejected.

Following the announcement of the IMF program on October 31, Indonesia had a number of negotiations with the IMF leading to further agreements and clarifications. In particular, on January 15, 1998, Suharto signed an agreement with the IMF. We look at three different windows in Table 4: from January 8 to 12, from January 13 to 14, and finally, from January 15 to 16. For all these windows, we can reject the hypothesis that bank ARs are equal to zero across countries. During the first window, there were substantial concerns about reaching an agreement between developed country banks and Indonesian corporations. On January 9, the New York Times had a negative headline on Indonesia. The Peregrine bank collapse on January 12 in Hong Kong was unrelated to the IMF program in Indonesia. An equally weighted portfolio of Western banks lost 2.83% with a *p*-value of less than 0.01 during the first window (not reported in the table) and made small but positive gains during the next two windows. US banks lost 2.16% during the first period, which is significant at the 10% level. Korean banks lost a dramatic 7.19%. Thai banks lost 7.86%. In contrast, Indonesian banks gained 8.76%. During the window corresponding to the IMF agreement announcement, the returns to Western banks were trivial, but Indonesian banks earned 18.17% on January 15 and 16 after having lost 14.56% on January 13 and 14. During March 1998, issues surrounding the IMF agreement with Indonesia were prominent. A meeting between the IMF and Indonesia took place on March 21 after Indonesia gave up a plan of using a currency board on March 20. US banks lost a significant 1.62% during that window and Indonesian banks lost 6.12% with a *p*-value of 0.12 from March 20 to 23. A new agreement between the IMF and Indonesia took place on April 8. No bank index had a significant AR for an event

window from April 7 to 9. All Asian banks except for Malaysia and the Philippines had negative ARs during this window, with Korean banks losing 6.49% and Indonesian banks losing 2.36%.

Korea announced that it would seek help from the IMF on November 21. We consider an event window from November 19 to 24 (November 22 and 23 correspond to a weekend). Table 4 shows that this window has positive ARs in five countries and negative ARs for the rest. Banks in Korea earned an insignificant 3.13% over that window. Banks in the UK earned an AR of −2.35% with a *p*-value of 0.12. Looking at daily ARs in Table 6 gives a clearer picture. On November 21, all Western banks had insignificant ARs of less than 0.6% in absolute value. Japanese banks had a large significant AR of 2.02% with a *p*-value of 0.04. Korean banks made a significant gain of 4.39% on November 20 and an insignificant gain of 1.05% on November 21. For November 24, we can reject the hypothesis that ARs of banks across the world were equal to zero with a *p*-value of 0.10. Malaysian and Thai banks all had significant negative ARs on that day at the 10% level.

The IMF program for Korea was accepted at the beginning of December. On December 1, an agreement was announced by Korea, but this collapsed the next day. A more definitive agreement was announced on December 4. We therefore use two windows in Table 4. The first one is from November 28 to December 2 and the second one is from December 3 to 8. All countries, except for Malaysia and the Philippines, had positive ARs for the second window, which is the one corresponding to the acceptance of the program. These ARs are significant with *p*-values of 0.05 or better in three countries: Germany had an AR of 4.97% with a *p*-value of 0.01, France had an AR of 4.45% with a *p*-value of 0.02, and Korea had an AR of 12.50% with a *p*-value of less than 0.01. US banks had an AR of 1.88% with a *p*-value of 0.19. No country, except for the Philippines and Malaysia, had an AR of less than 1.6%. The results for the first window are more mixed. The reason for this turns out to be straightforward. This window includes both good news and bad news for the IMF program. A good approach to obtain an estimate for the US is to look at *New York Times* headlines. On December 1, the *New York Times* had a front page headline stating that Korea had agreed to a huge bailout. The AR for the US banks on that day is shown on Table 6 and was 2.03% with a *p*-value of less than 0.01.

4. The experience of US banks with high exposures

The general conclusion that emerges from the event study is that devaluations cannot explain the poor performance of banks in Asia and generally, when IMF program announcements convey information, that information is positive. We saw evidence that Western banks were affected by events in Asia, especially the announcements related to the IMF program in Korea. If we are correct in

Table 7
Estimates of the CARs of three US banks' excess returns around news announcements
The following SUR models are estimated in a system for three US banks' excess returns (Chase, Citicorp, and JP Morgan) over the period from January 15, 1997 to July 15, 1998 (390 days):

$$R_{pt} = \alpha_0 + \beta_0 R_{mt} + \sum_{k=1}^{K} \gamma_{0,k} X_{kt} + \sum_{j=1}^{J} D_j \phi_{jt} + \varepsilon_t,$$

where R_{pt} is the logarithmic daily dollar return on one of the US bank stocks (from Datastream), and R_{mt} is the corresponding US stock market index return. Both returns are in excess of 1-day return on the 7-day Eurodollar deposit. K_{kt} includes the daily dollar excess returns on the currency holdings (BP, DM, FF, and JY), and the changes in the 7-day Eurodollar rate and the spread between the 7-day Eurodollar rate and Euroyen rate. ϕ_{jt} is a dummy variable taking a value of $1/n$ for the jth event days shown below, or zero, otherwise. Thus, the parameter estimate D_j represents a CAR for the jth event days. We only reproduce the estimates of D_j since the parameters estimates are similar to those of Table 2. p-values are in brackets. F-tests next to the last column are joint tests across three banks. The last four columns show the results for the three equal-, value-weighted three-US bank portfolios, US bank index excluding the three banks, and the difference.

Estimates of CARs	Chase	Citicorp	JP Morgan	$F_{(3,\,1047)}$	EW three-bank portfolio	VW three-bank portfolio	Bank index without three banks	VW three banks − index without three
D_1 (970514–970516: $n=3$)	−3.647 [0.14]	−0.668 [0.85]	−0.004 [1.00]	0.985 [0.40]	−1.439 [0.53]	−1.627 [0.53]	−0.215 [0.83]	−1.412 [0.54]
D_2 (970522–970526: $n=3$)	1.229 [0.62]	0.168 [0.96]	−0.060 [0.98]	0.117 [0.95]	0.446 [0.85]	0.426 [0.87]	0.203 [0.84]	0.223 [0.92]
D_3 (970618–970620: $n=3$)	−0.149 [0.95]	1.590 [0.64]	−0.124 [0.96]	0.128 [0.94]	0.439 [0.85]	0.613 [0.81]	0.529 [0.60]	0.084 [0.97]
D_4 (970626–970630: $n=3$)	−2.263 [0.36]	−0.799 [0.82]	−3.352 [0.19]	0.749 [0.52]	−2.138 [0.35]	−1.804 [0.48]	−1.890 [0.06]	0.086 [0.97]
D_5 (970701–970703: $n=3$)	2.792 [0.26]	2.694 [0.44]	1.643 [0.52]	0.450 [0.72]	2.377 [0.30]	2.620 [0.31]	1.161 [0.25]	1.459 [0.53]
D_6 (970711–970715: $n=3$)	−0.486 [0.84]	−4.225 [0.22]	−1.533 [0.55]	0.593 [0.62]	−2.081 [0.36]	−2.491 [0.33]	−1.612 [0.11]	−0.880 [0.70]
D_7 (970723–970729: $n=5$)	1.902 [0.55]	1.526 [0.73]	4.422 [0.19]	0.625 [0.60]	2.617 [0.38]	2.096 [0.53]	1.846 [0.16]	0.250 [0.93]
D_8 (970804–970806: $n=3$)	−2.219 [0.37]	1.731 [0.62]	−1.306 [0.61]	0.771 [0.51]	−0.598 [0.79]	−0.189 [0.94]	0.627 [0.53]	−0.816 [0.72]
D_9 (970808–970812: $n=3$)	2.724 [0.27]	1.786 [0.61]	0.347 [0.89]	0.463 [0.71]	1.619 [0.48]	1.819 [0.48]	−0.637 [0.53]	2.456 [0.29]
D_{10} (970813–970815: $n=3$)	3.775 [0.13]	2.839 [0.42]	1.361 [0.60]	0.784 [0.50]	2.658 [0.25]	2.855 [0.27]	1.475 [0.15]	1.380 [0.55]
D_{11} (970819–970821: $n=3$)	1.653 [0.50]	−0.620 [0.86]	−0.644 [0.80]	0.344 [0.79]	0.130 [0.95]	0.172 [0.95]	−0.443 [0.66]	0.615 [0.79]
D_{12} (970919–970922: $n=2$)	−0.615 [0.76]	−0.447 [0.87]	2.409 [0.25]	0.790 [0.50]	0.449 [0.81]	−0.103 [0.96]	−0.968 [0.24]	0.865 [0.64]

D_{13} (971007–971009: $n=3$)	0.465 [0.85]	0.907 [0.79]	−1.409 [0.58]	0.242 [0.87]	−0.012 [1.00]	0.294 [0.91]	−0.871 [0.38]	1.165 [0.61]
D_{14} (971030–971103: $n=3$)	−3.678 [0.13]	−2.814 [0.41]	−2.373 [0.35]	0.785 [0.50]	−2.955 [0.19]	−3.044 [0.23]	−0.662 [0.51]	−2.382 [0.30]
D_{15} (971104–971106: $n=3$)	1.375 [0.58]	2.323 [0.50]	1.993 [0.44]	0.247 [0.86]	1.897 [0.41]	1.833 [0.47]	0.627 [0.53]	1.206 [0.60]
D_{16} (971114–971118: $n=3$)	−2.894 [0.24]	−0.113 [0.97]	−1.951 [0.45]	0.701 [0.55]	−1.653 [0.47]	−1.343 [0.60]	0.214 [0.83]	−1.556 [0.49]
D_{17} (971119–971124: $n=4$)	1.640 [0.56]	−0.894 [0.82]	0.608 [0.84]	0.244 [0.87]	0.451 [0.86]	0.316 [0.91]	0.780 [0.50]	−0.465 [0.86]
D_{18} (971128–971202: $n=3$)	2.857 [0.25]	4.835 [0.16]	2.904 [0.26]	0.796 [0.50]	3.532 [0.12]	3.935 [0.13]	1.124 [0.26]	2.811 [0.22]
D_{19} (971203–971208: $n=4$)	1.179 [0.68]	8.380 [0.04]	0.540 [0.86]	1.852 [0.14]	3.366 [0.20]	4.447 [0.13]	2.536 [0.03]	1.911 [0.47]
D_{20} (971212–971216: $n=3$)	−1.048 [0.67]	−0.716 [0.83]	1.290 [0.61]	0.280 [0.84]	−0.158 [0.94]	−0.503 [0.84]	0.620 [0.53]	−1.123 [0.62]
D_{21} (971217–971219: $n=3$)	−0.048 [0.99]	2.180 [0.54]	1.099 [0.68]	0.200 [0.90]	1.077 [0.65]	1.143 [0.66]	−0.447 [0.66]	1.591 [0.50]
D_{22} (971223–971226: $n=4$)	1.303 [0.67]	−1.647 [0.70]	−0.611 [0.85]	0.247 [0.86]	−0.318 [0.91]	−0.467 [0.88]	−0.559 [0.65]	0.092 [0.97]
D_{23} (971229–971231: $n=3$)	−1.516 [0.57]	−1.763 [0.64]	−4.438 [0.11]	0.876 [0.45]	−2.573 [0.30]	−2.095 [0.45]	0.675 [0.53]	−2.770 [0.27]
D_{24} (980101–980105: $n=3$)	2.789 [0.26]	2.745 [0.42]	2.482 [0.33]	0.525 [0.67]	2.672 [0.24]	2.686 [0.29]	−0.655 [0.51]	3.341 [0.14]
D_{25} (980108–980112: $n=3$)	−1.990 [0.42]	−3.767 [0.27]	−4.840 [0.06]	1.211 [0.30]	−3.532 [0.12]	−3.256 [0.20]	−3.372 [0.00]	0.116 [0.96]
D_{26} (980113–980114: $n=2$)	−0.928 [0.64]	2.411 [0.39]	1.288 [0.54]	0.716 [0.54]	0.923 [0.62]	1.007 [0.63]	2.062 [0.01]	−1.055 [0.57]
D_{27} (980115–980116: $n=2$)	0.384 [0.85]	0.057 [0.98]	−0.599 [0.78]	0.070 [0.98]	−0.053 [0.98]	0.054 [0.98]	0.206 [0.80]	−0.152 [0.94]
D_{28} (980128–980130: $n=3$)	0.122 [0.96]	−0.141 [0.97]	−2.714 [0.29]	0.515 [0.67]	−0.911 [0.69]	−0.482 [0.85]	−0.511 [0.61]	0.029 [0.99]
D_{29} (980213–980218: $n=4$)	1.327 [0.64]	−0.680 [0.86]	0.120 [0.97]	0.152 [0.93]	0.256 [0.92]	0.152 [0.96]	−0.240 [0.83]	0.392 [0.88]
D_{30} (980306–980310: $n=3$)	−2.397 [0.33]	−1.815 [0.60]	−2.592 [0.31]	0.471 [0.70]	−2.268 [0.32]	−2.190 [0.39]	0.731 [0.46]	−2.921 [0.20]
D_{31} (980320–980323: $n=2$)	−2.349 [0.24]	−3.149 [0.26]	−0.541 [0.80]	0.675 [0.57]	−2.013 [0.28]	−2.415 [0.24]	−1.013 [0.21]	−1.402 [0.45]
D_{32} (980325–980327: $n=3$)	0.842 [0.73]	−0.471 [0.89]	−0.438 [0.86]	0.107 [0.96]	−0.023 [0.99]	−0.025 [0.99]	−0.670 [0.50]	0.645 [0.78]
D_{33} (980407–980409: $n=3$)	−3.061 [0.21]	−7.743 [0.03]	−2.155 [0.40]	1.709 [0.16]	−4.319 [0.06]	−4.967 [0.05]	−0.233 [0.82]	−4.734 [0.04]

attributing the positive ARs to the announcement of IMF programs, it should be the case that banks with greater exposure should be affected more by these events. We therefore investigate the experience of three US banks: Chase, JP Morgan, and Citicorp. We form an equally weighted portfolio of these three banks and estimate the returns for the event-windows discussed in Section 3. We also investigate Chase separately because it had the largest exposures. In addition to the events of Section 3, we also consider the earnings announcement events to evaluate the ability of the market to understand the implications of the Asian events for the banks. If the market underestimated the impact of the crisis on banks, earnings announcements would be informative.

4.1. Currency devaluations

Table 7 shows that Chase earned 2.79% over the window corresponding to the Thai baht devaluation on July 2 with a *p*-value of 0.26. The equally weighted portfolio of Chase, Citicorp and JP Morgan earned 2.38% with a *p*-value of 0.30. The devaluation of the peso decreased the equally weighted portfolio by slightly more than 2%. Interestingly, however, the loss was only 0.02% on the day of the devaluation. Chase then earned 3.78% when the rupiah devalued on August 14 with a *p*-value of 0.13. For that event, the equally weighted portfolio earned 2.66% with a *p*-value of 0.25. When the won devalued on November 17, Chase lost 2.89% with a *p*-value of 0.24, while the equally weighted portfolio fell by 1.65%. During the period of the dramatic fall in the ringgit (July 23–29), the equally weighted portfolio earned 2.62% with a *p*-value of 0.38. We estimated the CAR associated with the days when it was announced that the five currencies would no longer be defended. For Chase, these 5 days had a CAR of 5.09% from Table 7. For Citicorp, the AR was 2.72%. Finally, for JP Morgan, the AR was 3.94%. This evidence suggests, therefore, that the events corresponding to the abandonment of the defense of parities and massive devaluations of the five currencies were positive events for the three US banks.

4.2. IMF announcements

Table 8 shows that the Philippines program announced on July 14 had no information for the equally weighted portfolio. The banks had insignificant positive ARs at the announcement of the Thai program on August 11 and insignificant negative ARs at the announcement of the Indonesian program at the end of October. On December 1, Chase earned 3.65% with a *p*-value of 0.01. It lost 0.96% on December 2 when it looked like the IMF program was in trouble. It then earned 0.38% the next day and 1.83% on December 4. To put things in perspective, the AR of Chase on December 1 was the highest AR of Chase for the month of December 1997 and January 1998. No other crisis event during that period had such an effect on Chase. The value-weighted portfolio earned a highly

significant 4.55% on December 1, lost 0.81% the next day, and gained 0.36% on December 3 and 3.27% on December 4 with a *p*-value of 0.02. In total, this amounted to more than 7% of the market value of these three banks. Again, no other day during December or January and no other event during our whole sample period has a higher AR for the equally weighted portfolio than the AR on December 1. One might be concerned that other news explains the ARs corresponding to the days discussed in this paragraph. However, news published in newspapers cannot explain these ARs. The *Wall Street Journal* index had no news about Citicorp and Chase in early December. It had news about JP Morgan, namely the suspension of traders for possible price manipulation on December 2 and a realignment of duties of high aides on December 5.

An important question is whether the announcement of the Korean IMF programs had a general positive impact on banks because of a reduction in systemic risk or just affected positively the banks with exposures in Korea. Table 8 makes it possible to answer that question. In that table, we compute ARs for two pieces of the Datastream US retail banking index. The first piece is the AR on a value-weighted portfolio of the three banks discussed in this section. The second piece is the value-weighted portfolio of the other banks in the Datastream index. The AR on the banks that did not have much of an exposure to Korea was insignificant and less than 1% for each announcement. Hence, there is a dramatic difference in the impact of the announcements related to Korea's IMF program between the banks with the highest exposure and the other banks in the Datastream index. This suggests that the benefit of the program for banks is restricted to the banks with exposure. It is inconsistent with the view that such programs are justified because of their benefit in reducing systemic risk.

4.3. Earnings announcements

An important question is whether the market correctly interpreted the implications of the Asian crisis for the banks discussed in this section. On December 10, 1997, JP Morgan warned that its earnings were hurt by the behavior of the markets. This pre-announcement of earnings had a strong effect on the three banks discussed in this section. JP Morgan had a negative AR of −3.18% on December 10 with a *p*-value of 0.04 (not reported). Chase had a negative AR of −3.49% on December 10 with a *p*-value of 0.02. Citicorp had an AR of −4.62% with a *p*-value of 0.03 on December 10. The banks' earnings were affected by market turmoil that decreased their trading income. When earnings were subsequently announced, however, they had no significant effects on the stock price of these banks. The earnings pre-announcement of JP Morgan therefore conveyed substantial information about the banks that was not available to investors beforehand. Strikingly, however, this earnings pre-announcement did not have a significant impact on the Datastream bank index for the US. On December 10, the AR on that index was −0.97% and insignificant.

Table 8
Estimates of the ARs of three US banks' excess returns on each day of the IMF program announcements
The following SUR models are estimated in a system for three US banks' excess returns (Chase, Citicorp, and JP Morgan) over the period from January 15, 1997 to July 15, 1998 (390 days):

$$R_{pt} = \alpha_0 + \beta_0 R_{mt} + \sum_{k=1}^{K} \gamma_{0,k} X_{kt} + \sum_{j=1}^{J} D_j \phi_{jt} + \varepsilon_t,$$

where R_{pt} is the logarithmic daily dollar return on one of the US bank stocks (from Datastream), and R_{mt} is the corresponding US stock market index return. Both returns are in excess of 1-day return on the 7-day Eurodollar deposit. X_{kt} includes the daily dollar excess returns on the currency holdings (BP, DM, FF, and JY), and the changes in the 7-day Eurodollar rate and the spread between the 7-day Eurodollar rate and Euroyen rate. ϕ_{jt} is a dummy variable taking a value of one for the jth event day shown below, or zero, otherwise. Thus, the parameter estimate D_j represents an AR for the jth event day. We only reproduce the estimates of D_j since the parameters estimates are similar to those of Table 2. p-values are in brackets. F-tests next to the last column are joint tests across three banks. The last four columns show the results for the three equal-, value-weighted US bank portfolios, US bank index excluding the three banks, and the difference.

Estimates of ARs	Chase	Citicorp	JP Morgan	$F_{(3,\ 1053)}$	EW three-bank portfolio	VW three- bank portfolio	Bank index without three banks	VW three banks − index without three
D_1 (970711: Philippines −1)	0.301 [0.83]	−0.724 [0.71]	0.364 [0.80]	0.163 [0.92]	−0.020 [0.99]	−0.201 [0.89]	0.163 [0.77]	−0.365 [0.78]
D_2 (970714: Philippines 0)	−0.270 [0.85]	0.096 [0.96]	−1.158 [0.42]	0.288 [0.83]	−0.444 [0.73]	−0.255 [0.86]	−0.813 [0.15]	0.558 [0.66]
D_3 (970715: Philippines +1)	−0.373 [0.79]	−3.435 [0.08]	−0.550 [0.70]	1.241 [0.29]	−1.453 [0.26]	−1.867 [0.20]	−0.913 [0.11]	−0.954 [0.46]
D_4 (970804: Thailand −1)	−1.520 [0.27]	−0.336 [0.86]	−0.792 [0.58]	0.487 [0.69]	−0.883 [0.49]	−0.858 [0.55]	−0.228 [0.68]	−0.629 [0.62]
D_5 (970805: Thailand 0)	−1.495 [0.28]	−0.293 [0.88]	−0.100 [0.94]	0.487 [0.69]	−0.630 [0.62]	−0.712 [0.62]	0.324 [0.57]	−1.037 [0.42]
D_6 (970806: Thailand +1)	0.892 [0.53]	2.523 [0.20]	−0.438 [0.76]	0.896 [0.44]	0.992 [0.45]	1.498 [0.31]	0.410 [0.47]	1.087 [0.40]
D_7 (970808: Thailand −1)	0.349 [0.81]	0.465 [0.82]	−0.607 [0.68]	0.162 [0.92]	0.069 [0.96]	0.204 [0.89]	−1.013 [0.08]	1.217 [0.36]
D_8 (970811: Thailand 0)	1.075 [0.44]	1.388 [0.48]	2.416 [0.09]	0.941 [0.42]	1.626 [0.21]	1.431 [0.32]	0.585 [0.30]	0.846 [0.51]
D_9 (970812: Thailand +1)	1.405 [0.31]	0.260 [0.89]	−1.426 [0.33]	1.163 [0.32]	0.080 [0.95]	0.377 [0.79]	−0.261 [0.64]	0.638 [0.62]
D_{10} (971030: Indonesia −1)	−1.934 [0.17]	−1.055 [0.59]	−1.512 [0.30]	0.762 [0.52]	−1.500 [0.25]	−1.447 [0.32]	−0.224 [0.69]	−1.223 [0.34]
D_{11} (971031: Indonesia 0)	−1.753 [0.22]	−1.918 [0.33]	−1.446 [0.32]	0.620 [0.60]	−1.706 [0.19]	−1.804 [0.22]	−0.097 [0.87]	−1.708 [0.19]
D_{12} (971103: Indonesia +1)	0.046 [0.97]	0.129 [0.95]	0.700 [0.63]	0.094 [0.96]	0.291 [0.82]	0.233 [0.87]	−0.317 [0.58]	0.549 [0.67]

D_{13} (971119: Korea −2)	3.117 [0.03]	1.757 [0.37]	2.779 [0.05]	2.198 [0.09]	2.551 [0.05]	2.468 [0.09]	0.612 [0.28]	1.856 [0.15]
D_{14} (971120: Korea −1)	−0.883 [0.53]	−0.682 [0.73]	−0.961 [0.51]	0.202 [0.90]	−0.842 [0.51]	−0.813 [0.57]	0.398 [0.48]	−1.211 [0.34]
D_{15} (971121: Korea 0)	0.338 [0.81]	−0.538 [0.78]	−0.790 [0.59]	0.213 [0.89]	−0.330 [0.80]	−0.266 [0.85]	−0.660 [0.24]	0.394 [0.76]
D_{16} (971124: Korea +1)	−0.900 [0.52]	−1.368 [0.49]	−0.346 [0.81]	0.211 [0.89]	−0.871 [0.50]	−1.012 [0.49]	0.440 [0.44]	−1.451 [0.26]
D_{17} (971128: Korea −1)	−0.118 [0.93]	0.271 [0.89]	−0.903 [0.54]	0.201 [0.90]	−0.250 [0.85]	−0.094 [0.95]	−0.104 [0.86]	0.010 [0.99]
D_{18} (971201: Korea 0)	3.646 [0.01]	5.139 [0.01]	3.679 [0.01]	3.418 [0.02]	4.155 [0.00]	4.549 [0.00]	0.779 [0.17]	3.770 [0.00]
D_{19} (971202: Korea +1)	−0.955 [0.50]	−0.903 [0.65]	−0.098 [0.95]	0.188 [0.90]	−0.652 [0.62]	−0.813 [0.58]	0.494 [0.39]	−1.307 [0.32]
D_{20} (971203: Korea −1)	0.383 [0.79]	0.760 [0.71]	−0.661 [0.66]	0.232 [0.87]	0.160 [0.90]	0.361 [0.81]	0.932 [0.11]	−0.571 [0.67]
D_{21} (971204: Korea 0)	1.833 [0.19]	4.701 [0.02]	2.295 [0.11]	2.054 [0.10]	2.943 [0.02]	3.269 [0.02]	0.897 [0.11]	2.372 [0.06]
D_{22} (971205: Korea +1)	−0.903 [0.52]	1.658 [0.40]	0.679 [0.64]	0.822 [0.48]	0.478 [0.71]	0.582 [0.69]	0.089 [0.88]	0.493 [0.70]
D_{23} (971208: Korea +2)	0.023 [0.99]	1.450 [0.46]	−1.665 [0.25]	1.115 [0.34]	−0.064 [0.96]	0.411 [0.78]	0.510 [0.37]	−0.100 [0.94]
D_{24} (980107: IMF Nego −1)	1.502 [0.28]	−0.214 [0.91]	1.183 [0.41]	0.723 [0.54]	0.823 [0.52]	0.632 [0.66]	−2.143 [0.00]	2.776 [0.03]
D_{25} (980108: IMF Nego 0)	−3.183 [0.02]	−2.570 [0.19]	−2.836 [0.05]	2.141 [0.09]	−2.863 [0.03]	−2.810 [0.05]	−1.310 [0.02]	−1.501 [0.24]
D_{26} (980109: IMF Nego +1)	1.329 [0.35]	2.065 [0.30]	1.350 [0.36]	0.493 [0.69]	1.581 [0.22]	1.646 [0.26]	−0.736 [0.20]	2.382 [0.07]
D_{27} (980112: IMF Nego +2)	−0.228 [0.87]	−3.276 [0.09]	−3.408 [0.02]	2.568 [0.05]	−2.304 [0.07]	−2.139 [0.14]	−1.384 [0.01]	−0.755 [0.56]
D_{28} (980113: IMF Nego +3)	−0.692 [0.62]	−0.887 [0.65]	2.096 [0.15]	1.444 [0.23]	0.173 [0.89]	−0.323 [0.82]	0.935 [0.10]	−1.258 [0.33]
D_{29} (980114: IMF Nego +4)	−0.132 [0.92]	3.377 [0.08]	−0.685 [0.63]	1.905 [0.13]	0.854 [0.50]	1.428 [0.32]	1.164 [0.04]	0.264 [0.84]
D_{30} (980115: IMF Nego +5)	−0.309 [0.82]	0.105 [0.96]	−0.443 [0.76]	0.061 [0.98]	−0.216 [0.87]	−0.164 [0.91]	−0.331 [0.56]	0.166 [0.90]
D_{31} (980116: IMF Nego +6)	0.780 [0.58]	0.059 [0.98]	−0.082 [0.95]	0.154 [0.93]	0.253 [0.84]	0.307 [0.83]	0.522 [0.36]	−0.215 [0.87]

The events in East Asia left little trace on the three banks when they announced their earnings for the last quarter of 1997. On January 20, 1998, JP Morgan announced that it was designating more than 10% of its exposures to South Korea, Malaysia and Thailand as non-performing. At that time, analysts were interpreting this decision as a political decision made to influence the bargaining process.[13] The non-performing positions were primarily swaps rather than loans. On January 26, Standard and Poor's (S&P) placed JP Morgan on CreditWatch ''to reflect the possibility of a modest downgrade.'' The S&P analyst stated that ''There are many reasons for this. The southeast Asian situation, on its own, would not have justified this action.'' Asked whether other banks would be downgraded, she added that ''As long as the southeast Asian crisis remains isolated to those countries which have been given bailouts by the International Monetary Fund, there will be no need to downgrade US banks''.[14]

5. Conclusion

In this paper, we examined the impact of the Asian crisis on the shareholder wealth of Western and East Asian banks. Our main conclusions are as follows.

(1) Equity investors in shares in East Asian banks made dramatic losses.

(2) The impact of the crisis on Western banks, in general, was small and was not enough to prevent these banks from outperforming their respective markets.

(3) Although much attention has been paid to the dramatic loss in value of the East Asian currencies and many have argued that this loss played a major role in the difficulties of the banks in these countries, our evidence shows that changes in exchange rates have no additional explanatory power for the performance of banks beyond their impact on general market movements in Korea, Thailand, and Malaysia. There was a direct impact of currency exposures on bank performance in the Philippines and Indonesia.

(4) We can reject the hypothesis that the initial currency collapses across East Asian countries hurt US banks. For instance, Chase Manhattan earned an AR of 5.09% across the 5 days when the East Asian countries announced that they would no longer defend their peg.

(5) In total, the IMF program announcements increased bank shareholder wealth. Of all the events we consider, the IMF program announcement with Korea stands out. It is one of five events where we find evidence that banks were significantly affected across countries. Banks with the greatest exposure in the US experienced significant ARs in excess of 7% from this announcement.

[13] See J. Authers, JP Morgan redesignates Asia loans, *Financial Times*, London edn., January 21, 1998, p. 28.

[14] See J. Authers, S&P places JP Morgan on CreditWatch, *Financial Times*, USA edn., January 27, 1998, p. 26.

(6) The IMF program in Korea benefited only those US banks with large exposures in Korea. No case can therefore be made that the IMF programs have the positive effect of somehow reducing systemic risk.

Further research should investigate more closely why the currency collapses did not hurt bank shareholder equity more directly. There are three possible explanations worth considering. First, it could be that banks were hedged more than commentators believed they were. Second, it could be that the market expected currency losses to be offset by bailouts. Third, the market might have been inefficient in incorporating information about exchange rate changes. We explored the third hypothesis to some extent and found no support for it. Detailed accounting data would be required to investigate the first two hypotheses.

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Appendix A. Brief description of news announcements on selected event days (From the website 'Asia's Currency and Economic Crisis' by Noriel Roubini, http://www.stern.nyu.edu/~nroubini/asia/AsiaHomepage.html)

May 14–15, 1997	Thailand's currency is hit by a massive attack by speculators.
May 23	Moves to save Finance One, Thailand's largest finance company, fails.
June 19	Amnuay Viravan, staunchly against devaluing the baht, resigns as Thailand's finance minister.
June 27	The Thai central bank suspends operations of 16 cash-strapped finance companies.
June 30	Thai Prime Minister Chavalit Yonchaiyudh assures that there will be no devaluation of the baht.
July 2	The Bank of Thailand announces a managed float of the baht and calls on the IMF for technical assistance. The announcement effectively devalues the baht by about 15–20% to 28.80 per dollar. This is a trigger for the East Asian crisis.
July 14	The IMF offers the Philippines almost US$1.1 billion in financial support. The Malaysian central bank abandons the defense of the ringgit.

July 24	The ringgit hits 38-month low of 2.6530 per dollar. Malaysian Prime Minister Mahathir Mohamad launches bitter attack on ''rogue speculators''.
July 26	Malaysian Prime Minister Mahathir names hedge fund manager, George Soros, as the man responsible for the attack on the ringgit. He later brands Soros a ''moron''.
July 28	Thailand calls in the IMF.
August 5	Thailand unveils austerity plan and completes revamp of finance sector as part of an IMF rescue package.
August 11	The IMF unveils a rescue package for Thailand including loans totaling US$16 billion.
August 14	Indonesia abolishes its system of managing the exchange rate through a band and allows it to float. The rupiah plunges to 2,755 per dollar. Bank Indonesia tries mopping up liquidity with high interest rates.
August 20	IMF approves a US$3.9 billion credit for Thailand. The package now totals US$16.7 billion.
September 20	Mahathir tells delegates to the IMF/World Bank annual conference in Hong Kong that currency trading is immoral and should be stopped.
September 21	Soros says, ''Dr. Mahathir is a menace to his own country''.
October 8	Indonesia says it will ask the IMF for financial assistance.
October 31	IMF gives Indonesia a US$23 billion financial support package.
November 17	South Korea abandoned its defense of the battered won.
November 20	Dashing any early hope for controlling its financial turmoil, South Korea's currency fell 10% in trading.
November 21	South Korea said it would seek a rescue package from the IMF.
December 1	South Korea and the IMF resumed talks on a rescue package after an initial deal floundered.
December 4	A record loan package led by the IMF to bail out South Korea helped calm jitters in most regional markets.
December 5	South Korea agreed to lower its economic growth to 3% in 1998 from a projected 6% under the terms of its IMF rescue package.
December 15	The IMF board meeting in Washington considers a Korean request to speed up delivery of a portion of the US$60 billion international bailout announced on December 3.
December 18	Fed up with their economy's freefall, voters in South Korea elected longtime dissident Dae-Jung Kim as president, leaving some concerned that the country's financial markets will be further battered.

December 24	The IMF said that it would make US$2 billion available to South Korea on December 30 from the US$21 billion set aside for the financially troubled country. The IMF plans to dole out another US$2 billion to Seoul on January 8.
December 30	The world's major banks (key US and German banks) prepared to join an effort to roll over a mountain of short-term debt of South Korea due on December 31. The effort is expected to help Korea manage its estimated US$100 billion in short-term debt, of which US$15 billion comes due by December 31.
January 2, 1998	While major US and European banks announced that they would allow South Korean customers more time to pay off the US$15 billion short-term debt, several smaller banks are unwilling to do the same.
January 9	Concern over Indonesia hit Asian stocks, but currencies won some support on hopes of an imminent deal between US banks and heavily indebted Indonesian companies. A proposal for the South Korean government to issue about US$25 billion in bonds won increased support at a meeting of international banks. But several major banks were still hesitant about endorsing the plan, and the Korean government indicated it needs another week to make a decision.
January 13	The IMF and Indonesia appear to be near an agreement over the IMF bailout.
January 15	Indonesian President Suharto announced wide-ranging economic reforms that, if carried out, would overturn the country's entrenched ways of doing business and curb its economic growth.
January 29	South Korean government and 13 leading international banks agreed that Korean banks can exchange their short-term non-trade credits for new loans guaranteed by the Republic of Korea with maturities of 1, 2 or 3 years, and with a floating rate of 2.25%, 2.5%, and 2.75% over the 6-month LIBOR.
February 16	The rupiah dived through 10,000 in early trade in the wake of weekend reports that the IMF had threatened to withdraw assistance to Indonesia if it adopts a currency board.
February 17	President Suharto fired Indonesia's central bank governor who have opposed government plans to create a fixed exchange rate system for the rupiah through a currency board. The IMF, the United States, Germany and Australia had all come out in opposition to such a board. The IMF has threatened to withhold further money under a US$43 billion bailout package. Separately, the IMF released a further US$2

	billion to South Korea, bringing total IMF lending to about US$15 billion so far out of its US$21 billion rescue package agreed last December.
March 9	A simmering dispute between the IMF and Indonesia cast a shadow over Pacific Rim markets, sending some regional markets down and limiting gains in others. Over the weekend, news broke that the IMF would delay the disbursement of funds to Indonesia. The rupiah plunged to as low as 12,250 per dollar.
March 21	The IMF and the Indonesian government have made ''considerable progress'' toward a new deal to counter the country's grave economic crisis.
March 26	Indonesia said that it is close to a comprehensive package of measures to lift the country out of its worst economic crisis in three decades, which Indonesia has agreed to in exchange for a US$40 billion bailout
April 8	Indonesia said that it had reached agreement with the IMF on a new package of economic reforms and targets, which the IMF would watch closely to ensure compliance.

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