On the Risk Exposure of Asia Pacific Banking Industry

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Abstract

Despite its potential benefits, financial globalization also carries some risks, especially for developing countries. The recent 1997 Asian financial crisis is such episode associated with a globalized financial system. In this paper, I examine whether there is any significant impact of the 1997 Asian crisis on the risk exposures of the banking sector for a group of Asia Pacific emerging markets. Using a conditional multi-factor asset-pricing model that allows time variation in the risk premiums, I find that the risk exposure increased during the crisis, with the greatest increase occurring for the crisis countries. However, the incremental increase in the risk exposure has diminished after the crisis. The evidence provided here indicates that the 1997 Asian crisis does not appear to have a permanent effect on the riskiness international banking industries, implying that the financial globalization is still beneficial, at least in the long run. Consequently, the main challenge for policy makers is to manage the integration process as to take full advantage of the opportunities, while minimizing its risks.

I. Introduction

For at least the past two decades, the process of financial globalization and deregulation has been rapidly advancing. The removal of many important regulatory barriers to international banking and capital mobility has tightened linkages among global financial markets. As a result, capital has flowed more freely across national borders in search of the highest risk-adjusted rates of return. However, despite the potential benefit of this burgeoning global financial system, financial globalization also carries some risks, especially for developing countries. Financial globalization appears to have facilitated the transmission of financial disturbances far more effectively than ever before and can lead to crises in countries with weak fundamentals as the economies become subject to the reaction of domestic and foreign investors. The recent 1997 Asian financial crisis is such episode associated with this new high-tech global financial system.

A number of complex factors trigged the 1997 Asian crisis, but, fundamentally, unbridled expansion and subsequent contraction of banking lending played a leading role. The potential benefits and important risks resulting from the financial globalization raise several important questions: Did the 1997 Asian crisis increase the risk exposures of the banking industry in Asia Pacific emerging countries? Are there any changes in the risk exposures *after* the crisis for Asia Pacific banking industries? To examine these questions, I rely on a multi-factor asset pricing model to investigate the impact of the 1997 Asian crisis on the time-varying market, interest rate, and foreign exchange risk exposures of nine Asia Pacific (Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand) banking industries. The focus of banking industry in this study is important not only because theories of financial crises emphasize the role played by banks and other financial institutions, but also because they are of particular importance in real and financial sectors especially in bank-based emerging markets. The finding of this study has an

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important policy implication as to whether market liberalization and deregulation are worthwhile in particular for emerging markets. If the evidence suggests that there is an overall increase in the risk exposure during the crisis for Asian emerging banking industries, but this increase is only temporary and eventually diminishes after the crisis, then it may not be a problem as far as the market liberalization and deregulation are concerned since the net gains from the financial globalization are still positive, at least in the long run. In this situation, the main challenge for policy makers is therefore to manage the integration process as to take full advantage of the opportunities, while minimizing its risks.

The empirical results indicate that on average (in absolute terms) the banking industries in Asia Pacific countries become more exposed to all three risks during the crisis, particularly for the interest rate risk. These incremental increases in the exposures resulting from the crisis have diminished after the crisis for all the risks, causing the exposures to revert back to their pre-crisis levels.

The remainder of the paper is organized as follows. Section II motivates the theoretical multi-factor asset pricing model and the econometric methodologies used to test the model. Section III discusses the data. Section IV reports and discusses the empirical results. Concluding comments are offered in Section V.

II. The Model and Methodology

In this paper, I consider a three-factor model where the three factors are world market, interest rate, and foreign exchange risks. In particular, I test the following model:

$$\begin{aligned} r_{i,t} &= (\lambda_{mkt,t-1} + \varepsilon_{mkt,t})(\beta_{i,mkt} + crisis\beta^{d}_{i,mkt} + post\beta^{a}_{i,mkt}) \\ &+ (\lambda_{\text{int},t-1} + \varepsilon_{\text{int},t})(\beta_{i,\text{int}} + crisis\beta^{d}_{i,\text{int}} + post\beta^{a}_{i.\text{int}}) \qquad \forall i = 1 \cdots\cdots N \qquad (1) \\ &+ (\lambda_{fx,t-1} + \varepsilon_{fx,t})(\beta_{i,fx} + crisis\beta^{d}_{i,fx} + post\beta^{a}_{i,fx}) + \varepsilon_{i,t} \end{aligned}$$

where $r_{i,t}$ is the raw returns of asset i in excess of the risk-free rate, "mkt", "int" and "fx" denote world market risk, interest rate risk, and foreign exchange risk, respectively. "$crisis$" is a dummy variable for Asian crisis, which is equal to one after 07/04/1997, and zero otherwise.[1] "$post$" is a post-crisis dummy variable, which is equal to one after 12/25/1998 and zero otherwise. $\beta_{i,k}$ ($\forall k = mkt, \text{int}, fx$) is the risk exposure (or beta) with respect to factor k measured over the entire sample period; $\beta^{d}_{i,k}$ ($\forall k = mkt, \text{int}, fx$) is the incremental risk exposure during the crisis, and $\beta^{a}_{i,k}$ ($\forall k = mkt, \text{int}, fx$) is the incremental risk exposure after the crisis.

The factor risk premium, $\lambda_{k,t-1}$ ($\forall k = mkt, \text{int}, fx$), specified in equation (1) are allowed to be time-varying since previous studies have shown that short- and long-horizon

[1] I assume that Asian crisis began in the first week of July 1997 and ended in the last week of December 1998.

security returns are predictable (e.g., Harvey (1991), Bekaert and Hodrick (1992), Ferson and Harvey (1991, 1993), Bekaert and Harvey (1995), among others). This predictability has been attributed to time-variation in expected returns. In light of this, the expected time-varying factor risk premium can be re-written as,

$$E[F_{k,t} \mid \Omega_{t-1}] = \lambda_{k,t-1} = \varphi_k^{'} z_{t-1} \quad \forall k \tag{2}$$

where Z_{t-1} is a vector of information variables observed at the end of time $t-1$ and φ's are time-invariant vectors of weights. Given the dynamics of factor risk premiums, I can then test whether the factor risk premiums are time varying by testing the statistical significance of the information variables in Z_{t-1}.

This specification in equation (1) has a number of important features. First, it permits me to examine whether the three factor risk exposures are individually significant during the entire sample period by testing the null hypothesis of $\beta_{i,k} = 0 \ \forall k$. Second, the inclusions of two dummy variables, *crisis* , and *post* , allow me to ask not only whether there is any incremental increase/decrease in each of the three factor risk exposures during the crisis by testing the statistical significance of $\beta_{i,k}^{d} = 0 \ \forall k$, but also whether these factor risk exposures have returned to their previous levels in its aftermath by comparing the size of $(\beta_{i,k} + \beta_{i,k}^{d} + \beta_{i,k}^{a})$ with that of $\beta_{i,k} \ \forall k$. If $(\beta_{i,k} + \beta_{i,k}^{d} + \beta_{i,k}^{a})$ is equal to or very close to $\beta_{i,k}$, it is an indication that the risk exposure for factor k has returned to its pre-crisis level after the crisis. To estimate the model, I need to simultaneously estimate the β and λ coefficients. This requires a nonlinear estimation process. I estimate the model [equations (1) and (2)] as a system of equations using an iterated NSURE technique, which is asymptotically equivalent to maximum-likelihood estimation under the assumption of normality.

III. Data and Summary Statistics

I use US dollar denominated stock returns at the weekly interval for the banking industry across 9 Asia Pacific countries– Hong Kong (*HK*), Indonesia (*ID*), Japan (*JP*), Korea (*KO*), Malaysia (*MY*), Philippines (*PH*), Singapore (*SG*), Taiwan (*TA*), and Thailand (*TH*). For the risk factors, the excess returns on Datastream world total return index (*WD*) is used to construct the world market risk, and the excess returns on JP Morgan global bond total return index (*JPMGB*) is used to reflect interest rate risk. The inclusion of the interest rate risk factor is particularly important because banks serve as a vehicle for the transmission of monetary policy (see, e.g., Hoshi et al. (1993) and Kashyap et al. (1996)) and should be sensitive to changes in interest rates. For exchange rate risk factor, I use the log-first differences of a currency index (*TWFX*). This index is a trade-weighted average of the foreign exchange values of the US dollar against the currencies of a large group of major US trading partners. It is expressed as US dollar price per unit of foreign currency, so a positive change indicates a decreasing value of the US dollar. Finally, 7-day Eurodollar deposit rate is used to compute excess returns. To model the time-varying factor risk premiums, I consider three information variables which are lagged excess dividend yield measured by the dividend yield on *WD* in excess of the 7-day Eurodollar interest rate (*DIV*), the first lag of the

respective factor return ($F_{k,t-1}$), and a constant (*Constant*). The weekly data ranges from 01/03/92 to 12/31/04, which is a 679-data-point series. However, I work with rates of return and use the first difference of the information variables and finally all the information variables are used with a one-week lag, relative to the excess return series; that leaves 677 observations expanding from 01/17/92 to 12/31/04.

Table 1 presents summary statistics of the returns for banking industry indices, risk factors, and information variable. As can be seen, the weekly mean excess returns ranging from –0.249% for *ID* to 0.288% for *HK*. Of the 9 banking industries, 5 have negative mean excess returns (*ID*, *JP*, *KO*, *TA*, and *TH*). For the standard deviations, they range from 3.652% for *HK* to 9.582% for *ID*. The poor performance of Asia Pacific national banking industries is not surprising since most of them were seriously affected by the 1997 Asian crisis. For the risk factors, the mean return is 0.086%, 0.064%, and 0.012% for *WD*, *JPMGB*, and *TWFX* , respectively. Table 1 also reports Bera-Jarque test statistics. Bera-Jarque test rejects normality of excess returns for all banking industry indices and two risk factors (*WD* and *TWFX*).

IV. Empirical Results

A. Market Risk exposures

Table 2 reports, respectively, the point estimates and robust standard errors of the market risk exposure for the full sample period (β_{mkt}), the incremental market risk exposure during the crisis (β_{mkt}^{d}) and after the crisis (β_{mkt}^{a}) for each of the 9 banking excess industry returns. The results indicate that the market risk exposures (β_{mkt}), ranging from 2.201 for *ID* to 6.971 for *KO*, with a mean of 3.887, are all positive and significantly different from zero at the 1% level in all cases. To see if there are any incremental changes in the market risk exposures during the crisis, I turn to the point estimates and the robust standard errors of β_{mkt}^{d}. As can be seen, the market risk exposure tends to rise since β_{mkt}^{d} is positive in seven of nine cases (*KO* and *MY* are the two exceptions). In particular, for *SG*, *HK*, *PH*, *TA*, *TH*, *JP* and *ID*, the market risk exposure increases by an amount between 0.101 and 1.904, but it is only significant for *ID* and *JP*. In all cases the total market risk exposure ($\beta_{mkt}+\beta_{mkt}^{d}$) remains significant, with a mean of 4.314, which is 11.00% larger than its pre-crisis level. Overall, the 1997 Asian crisis has a positive incremental impact on the market risk exposure for most of the banking industries.

After the crisis, the market risk exposure seems to have returned to its pre-crisis level with the total market risk exposures ($\beta_{mkt}+\beta_{mkt}^{d}+\beta_{mkt}^{a}$) in many cases returning remarkably closely to where they had stood before the crisis (β_{mkt}) for both groups of countries. For example, the incremental market risk exposures for *ID* and *JP*, which are significantly positive during the crisis, have become significantly negative after the crisis, suggesting a reversed incremental impact after the crisis. Further, the means of the total market risk exposures before and after the crisis are very close to each other (3.860 vs. 3.887). To

summarize, the exposure to the world market risk on average rises during the crisis, then falls back to its pre-crisis level afterwards.

B. Interest rate exposure

I now turn to the interest rate exposure. The point estimates and robust standard errors of the interest rate exposure for the full sample (β_{int}), the incremental interest rate exposure during the crisis (β_{int}^{d}) and after the crisis (β_{int}^{a}) for the 9 banking industries are shown in Table 3. Before the crisis, β_{int} is significant in all cases expect *HK* and ranges from -7.689 (*ID*) to 15.201 (*TH*), with an average (absolute) value of 5.545 (7.342) and a standard deviation of 6.864. Apparently the interest rate exposures not only have wide range than the market risk exposures, but also are generally larger in magnitude than those of the market risk exposure, suggesting that the interest rate risk has a larger impact than the world market risk does on the Asia Pacific banking industries. In terms of the sign of the interest rate exposures, it is positive in seven of nine cases.

During the crisis, the interest rate exposure falls, by an amount between 0.964 and 5.879, in five cases (*HK*, *ID*, *KO*, *PH*, and *SG*), and is significantly in three cases (*HK*, *ID*, *SG*). For the other four cases (*JP*, *MT*, *TA*, and *TH*) the interest rate exposure rises, but significantly for *JP* (2.538) only. This result is not surprising since according to Kaminsky and Reinhart (2001), Japanese banks were lending heavily during the crisis to Asian emerging markets, including crisis countries – Indonesia, Malaysia, Philippines, South Korea, and Thailand. In addition, Japanese banks were most exposed to Thailand--which is the first country to experience a crisis. The overall interest rate exposure ($\beta_{\text{int}} + \beta_{\text{int}}^{d}$) remains significant in all cases except *KO*, with an average (absolute) value of 4.863 (8.437), which is 14.90% higher than its pre-crisis level in absolute terms, suggesting that, on average, there is a positive incremental impact on the interest rate exposure due to the 1997 Asian crisis. After the crisis, there is a reversed incremental impact on the interest rate exposures for all cases as can been seen from the opposite signs of β_{int}^{d} and β_{int}^{a}. Although the coefficients of β_{int}^{a} are only significant in three cases (*HK*, *ID*, and *SG*), the overall interest rate exposure ($\beta_{\text{int}} + \beta_{\text{int}}^{d} + \beta_{\text{int}}^{a}$) still remains significant in all cases. By comparing the absolute means of the interest rate exposure in the crisis and post-crisis periods, it can be seen that the mean has dropped by 8.14% (from 8.437 to 7.750), causing the interest rate exposure to revert back to its pre-crisis level. To summarize, the interest rate exposure on average rises during the crisis, and after the crisis, the interest rate exposure appears to reverted back to its pre-crisis level.

C. Foreign exchange exposure

Considering the foreign exchange exposure, Table 4 shows that Asia Pacific banking industries are significantly exposed to the foreign exchange risk since β_{fx} is statistically significant in all cases except *ID*. The finding of large proportion of exposures to the foreign exchange risk is consistent with several previous works on exchange rate exposure of individual firms or industry portfolios (e.g., Doidge, Griffin, and Williamson (2006)). Compared to the world market risk exposures, similar to the interest rate exposures the

foreign exchange exposures not only display a wide range of values, from -13.502 (*JP*) to 1.834 (*ID*) with a standard deviation of 5.531, but also are more economically important based on the magnitudes of the exposure. In terms of the sign of β_{fx}, it is most negative (7 out of 9), implying that the banking sectors in most of the Asian emerging markets would provide investors who invest in the foreign exchange markets with the benefits of international diversification.

During the crisis, the exposure to the foreign exchange risk rises for five of nine Asia Pacific countries (*HK*, *ID*, *KO*, *PH*, and *SG*), but falls for the other four countries (*JP*, *MY*, *TA*, and *TH*), with a positive mean of 0.542. This result suggests that the 1997 Asian crisis on average has a positive incremental effect on the foreign exchange exposure for the Asia Pacific countries. Although the incremental foreign exchange exposure is only significant in two cases (*ID* and *JP*), the total foreign exchange exposure ($\beta_{fx}+\beta_{fx}^{d}$), ranging from -16.295 (*JP*) to 7.764 (*ID*), are significant in all nine cases during the crisis compared to eight cases before the crisis. The additional significant case during the crisis is *ID*, and it is the only case with a significantly positive β_{fx}^{d} (5.930), indicating that the 1997 Asian crisis has a strong and positive impact on the foreign exchange exposure of the Indonesian banking sector. After the crisis, the foreign exchange exposure falls in four cases (*HK*, *ID*, *KO*, and *MY*), and rises for the other five cases, with an average (absolute) value of -0.604 (1.162), suggesting, on average, a negative incremental effect on the foreign exchange exposure after the crisis. Although none of the coefficients of β_{fx}^{a} is significant, the total foreign exchange exposure ($\beta_{fx}+\beta_{fx}^{d}+\beta_{fx}^{a}$) has become significant in all nine cases with an average value of -7.359, which is very close to its pre-crisis level (-7.297), indicating that the foreign exchange exposure on average has reverted back to its pre-crisis level. To summarize, the foreign exchange exposure of banking industries on average tends to rise during the crisis, and revert back to its pre-crisis level afterwards.

5. Summary and conclusions

Given the fact that most of the Asian emerging markets have liberalized their financial markets in early 1990s, and the fact that financial liberalization has potential benefits but carry some risks, in this paper I have attempted to examine whether there is any significant impact of the 1997 Asian crisis on the risk exposures of the banking industry for a group of Asia Pacific emerging countries. The finding of this study has an important policy implication as to whether market liberalization and deregulation are worthwhile in particular for emerging markets.

The empirical results indicate that on average (in absolute terms) the banking industries in Asia Pacific countries become more exposed to all three risks during the crisis, particularly for the interest rate risk. These incremental increases in the exposures resulting from the crisis have diminished after the crisis for all the risks, causing the exposures to revert back to their pre-crisis levels. The evidence found in this paper indicates that the 1997 Asian crisis does not appear to have a permanent effect on the risk exposures of international banking industries, implying that the financial globalization is still beneficial, at least in the

long run. Consequently, the main challenge for policy makers is to manage the integration process as to take full advantage of the opportunities, while minimizing its risks. This task is not easy, particularly because financial globalization influences the instruments available to policy makers. In a more integrated world, governments are left with fewer policy tools and thus international financial coordination becomes more important.

Table 1: Summary statistics of returns of banking industries and risk factors

The statistics are based on weekly data from 1992:01:17 to 2004:12:31 (677 observations). The 9 excess banking industry returns are calculated from Datastream national banking industry total return indices. The excess returns on Datastream world total market return index (*WD*) is used to proxy the global market risk, JP Morgan global broad bond index (*JPMGB*) is used to proxy the global interest rate risk, and the log first difference of the trade-weighted U.S. dollar price of the currencies of major industrialized countries (*TWFX*) is used to proxy the currency risk. The conditioning variable is the excess dividend yield, measured by the dividend yield on Datastream world total market return index in excess of the 7-day Eurodollar deposit rate (*DIV*). The Bera-Jarque (*B-J*) tests normality based on both skewness and excess kurtosis and is distributed χ^2 with two degrees of freedom. * and ** denote statistical significance at the 5% and 1% level, respectively.

	Mean (%)	Std (%)	Minimum (%)	Maximum (%)	*B-J*
Asia Pacific Banking Industry					
HK	0.288	3.652	-18.544	16.563	258.46**
ID	-0.249	9.582	-68.950	46.498	2319.14**
JP	-0.191	4.523	-15.201	18.931	66.504**
KO	-0.186	8.853	-47.104	40.450	886.467**
MY	0.165	5.566	-39.741	53.261	14811**
PH	0.007	4.109	-31.447	14.642	1705.37**
SG	0.114	4.097	-34.009	22.029	4066.07**
TA	-0.020	5.135	-21.480	23.640	241.971**
TH	-0.080	6.762	-33.027	37.405	544.987**
Risk Factors					
TWFX	0.012	0.894	-2.831	3.781	13.247**
JPMGB	0.064	0.888	-2.685	2.902	0.179
WD	0.086	1.866	-9.619	7.608	214.669**
Instrument					
Rf	0.076	0.033	0.019	0.141	62.052**
DIV	-0.472	0.486	-1.322	0.468	55.858**

Table 2: Market risk exposure before, during, and after the crisis

This table reports the market risk exposures before the crisis (β_{mkt}), the incremental market risk exposure during the crisis (β^{d}_{mkt}), and after the crisis (β^{a}_{mkt}) estimated from equations (1) and (2) of the system of equations for nine Asia Pacific banking industries. In addition, the total market risk exposure during the crisis ($\beta_{mkt}+\beta^{d}_{mkt}$) and after the crisis ($\beta_{mkt}+\beta^{d}_{mkt}+\beta^{a}_{mkt}$) are also presented. The last row reports the percentage change between β_{mkt} and ($\beta_{mkt}+\beta^{d}_{mkt}+\beta^{a}_{mkt}$). Heteroscedasticity-consistent standard errors are in parentheses. Standard deviations are given in brackets. * and ** denote statistical significance at the 5% and 1% level, respectively.

	HK	***ID***	***JP***	***KO***	***MY***	***PH***	***SG***	***TA***	***TH***	**Mean**	**Abs (Mean)**
β_{mkt}	4.957	2.201	3.740	6.971	3.141	2.438	4.094	2.381	5.059	3.887	3.887
Std	(0.162)**	(0.472)**	(0.201)**	(0.438)**	(0.276)**	(0.201)**	(0.187)**	(0.258)**	(0.325)**	[1.576]	[1.576]
β^{d}_{mkt}	0.161	1.904	0.931	-0.657	-0.312	0.312	0.101	0.559	0.849	0.427	0.643
Std	(0.234)	(0.683)**	(0.292)**	(0.633)	(0.400)	(0.291)	(0.271)	(0.374)	(0.470)	[0.753]	[0.555]
β^{a}_{mkt}	0.108	-2.171	-0.709	-0.006	0.233	-0.351	-0.422	-0.483	-0.290	-0.455	0.530
Std	(0.190)	(0.552)**	(0.236)**	(0.512)	(0.324)	(0.236)	(0.219)	(0.302)	(0.380)	[0.711]	[0.649]
$\beta_{mkt}+\beta^{d}_{mkt}$	5.118**	4.105**	4.671**	6.314**	2.829**	2.750**	4.195**	2.940**	5.908**	4.314	4.314
$\beta_{mkt}+\beta^{d}_{mkt}+\beta^{a}_{mkt}$	5.226**	1.934**	3.962**	6.308**	3.062**	2.399**	3.773**	2.457**	5.618**	3.860	3.860
% change	0.054	-0.121	0.059	-0.095	-0.025	-0.016	-0.078	0.032	0.111	-0.0069	-0.0069

Table 3: Interest rate risk exposure before, during, and after the crisis

This table reports the interest rate risk exposures before the crisis (β_{int}), the incremental market risk exposure during the crisis (β^{d}_{int}), and after the crisis (β^{a}_{int}) estimated from equations (1) and (2) of the system of equations for nine Asia Pacific banking industries. In addition, the total interest rate risk exposure during the crisis ($\beta_{\text{int}}+\beta^{d}_{\text{int}}$) and after the crisis ($\beta_{\text{int}}+\beta^{d}_{\text{int}}+\beta^{a}_{\text{int}}$) are also presented. The last row of each Panel reports the percentage change between β_{mkt} and ($\beta_{mkt}+\beta^{d}_{mkt}+\beta^{a}_{mkt}$). Heteroscedasticity-consistent standard errors are in parentheses. Standard deviations are given in brackets. * and ** denote statistical significance at the 5% and 1% level, respectively.

	HK	*ID*	*JP*	*KO*	*MY*	*PH*	*SG*	*TA*	*TH*	**Mean**	**Abs (Mean)**
β_{int}	-0.394	-7.689	4.074	3.178	11.023	11.156	7.526	5.833	15.201	5.545	7.341
Std	(0.437)	(1.272)**	(0.544)**	(1.180)**	(0.746)**	(0.543)**	(0.504)**	(0.696)**	(0.876)**	[6.864]	[4.591]
β_{int}^{d}	-2.119	-5.879	2.538	-0.964	2.486	-1.769	-2.621	1.214	0.978	-0.682	2.285
Std	(0.813)**	(2.369)*	(1.013)*	(2.198)	(1.389)	(1.010)	(0.939)**	(1.296)	(1.631)	[2.578]	[1.501]
β_{int}^{a}	1.772	5.101	-1.283	0.916	-1.833	0.769	2.761	-0.040	-0.599	0.840	1.675
Std	(0.772)*	(2.248)*	(0.963)	(2.086)	(1.319)	(0.960)	(0.892)**	(1.230)	(1.550)	[2.157]	[1.514]
$\beta_{\text{int}} + \beta_{\text{int}}^{d}$	-2.513**	-13.569**	6.612**	2.214	13.509**	9.387**	4.905**	7.047**	16.179**	4.863	8.437
$\beta_{\text{int}} + \beta_{\text{int}}^{d} + \beta_{\text{int}}^{a}$	-0.741*	-8.467**	5.329**	3.130**	11.676**	10.156**	7.666**	7.007**	15.580**	5.704	7.750
% change	0.881	0.101	0.308	-0.015	0.059	-0.090	0.019	0.201	0.025	0.0287	0.0557

Table 4: Foreign exchange risk exposure before, during, and after the crisis

This table reports the foreign exchange risk exposures before the crisis (β_{fx}), the incremental market risk exposure during the crisis (β_{fx}^{d}), and after the crisis (β_{fx}^{a}) estimated from equations (1) and (2) of the system of equations for nine Asia Pacific banking industries. In addition, the total foreign exchange risk exposure during the crisis ($\beta_{fx}+\beta_{fx}^{d}$) and after the crisis ($\beta_{fx}+\beta_{fx}^{d}+\beta_{fx}^{a}$) are also presented. The last row of each Panel reports the percentage change between β_{mkt} and ($\beta_{mkt}+\beta_{mkt}^{d}+\beta_{mkt}^{a}$). Heteroscedasticity-consistent standard errors are in parentheses. Standard deviations are given in brackets. * and ** denote statistical significance at the 5% and 1% level, respectively.

	HK	***ID***	***JP***	***KO***	***MY***	***PH***	***SG***	***TA***	***TH***	**Mean**	**Abs (Mean)**
β_{fx}	0.764	1.834	-13.502	-7.779	-11.756	-9.184	-8.243	-5.152	-12.652	-7.297	7.874
Std	(0.375)*	(1.093)	(0.467)**	(1.014)**	(0.641)**	(0.466)**	(0.433)**	(0.598)**	(0.753)**	[5.531]	[4.553]
β_{fx}^{d}	1.194	5.930	-2.793	3.417	-0.363	0.481	0.059	-1.364	-1.687	0.542	1.921
Std	(0.657)	(1.913)**	(0.819)**	(1.776)	(1.123)	(0.816)	(0.759)	(1.047)	(1.318)	[2.704]	[1.869]
β_{fx}^{a}	-1.016	-3.773	1.089	-3.075	-0.082	0.245	0.002	0.014	1.156	-0.604	1.162
Std	(0.671)	(1.951)	(0.835)	(1.81)	(1.144)	(0.833)	(0.774)	(1.067)	(1.344)	[1.733]	[1.377]
$\beta_{fx}+\beta_{fx}^{d}$	1.957**	7.764**	-16.295**	-4.362**	-12.118**	-8.703**	-8.184**	-6.516**	-14.339**	-6.755	8.915
$\beta_{fx}+\beta_{fx}^{d}+\beta_{fx}^{a}$	0.942*	3.991**	-15.205**	-7.436**	-12.201**	-8.457**	-8.182**	-6.501**	-13.182**	-7.359	8.455
% change	0.233	1.176	0.126	-0.044	0.038	-0.079	-0.007	0.262	0.042	0.0085	0.0738

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