Sudden Stops and Liability Dollarization: Evidence from Asia's Financial Intermediaries

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Abstract: Before the currency crisis of 1997-1998, East Asian financial intermediaries borrowed heavily in international markets. During the crisis, the intermediaries' stock market value declined sharply, and a sizable fraction of the institutions were closed or nationalized. We find that 1) the stocks of intermediaries with large international debt exposure performed poorly during the crisis; 2) more short-term international debt outstanding was associated with a higher probability of bankruptcy; 3) among those intermediaries that survived, more long-term international debt was associated with a lower equity return; and 4) higher international debt, especially short-term international debt, was associated with a more severe contraction in the assets and liabilities of the intermediaries. This evidence supports the "sudden stop" and "liability dollarization" theories of emerging market financial crises. It indicates that both the sudden withdrawal of funds by international creditors and the foreign currency nature of international debt damage the financial system, and exacerbate the decline in the financing of investment.

Keywords: Sudden Stops, Liability Dollarization, Financial Intermediaries, Asian Financial Crisis.

JEL Classification: F32, F34, G15, G20

Introduction

Recent episodes of financial crises have stimulated a large body of research on capital markets in developing economies. Two branches of this literature examine the role of international capital markets as a propagation channel for financial crises. On the one hand, theories of "sudden stops" emphasize the volatility of foreign lending to emerging markets (see Calvo 1998). A sudden outflow of capital from a small economy requires structural adjustment that can result in a decline in output.[1] On the other hand, theories of "liability dollarization" emphasize the foreign currency denomination of international debt. Virtually all external debt in emerging markets, in East Asia or otherwise, is denominated in foreign currencies (see Eichengreen and Hausmann 1999). Following an exchange rate devaluation, foreign currency debt becomes more expensive to repay. This effect can jeopardize corporate balance sheets and lead to bankruptcies.[2]

Our goal in this study is to examine the empirical evidence for these theories. We use firm-level data to estimate the cross-sectional determinants of the performance of financial intermediaries in five East Asian economies (Indonesia, Korea, Malaysia, Taiwan, and Thailand) during the Asian financial crisis, paying special attention to the role of international debt. Because firm-level accounting data on foreign currency liabilities are scarce, and accounting standards and reporting requirements differ across countries, we use a data source that allows us to construct measures of outstanding international debt based on published, primary-market data on foreign market bonds, Eurobonds, and syndicated bank loans.

Because this data contains the issue and maturity dates of the international debt, we can distinguish the effects of a "sudden stop" in lending from those of the "liability dollarization" channel. In particular, we split the international debt of all firms into two parts: 1) short-term debt that came due during the crisis; and 2) long-term debt that was issued before, but came due after the crisis. Firms that have high exposure to short-term international debt should be more sensitive to sudden stops. At the same time, firms with unhedged foreign currency debt should be exposed to an exchange rate depreciation through the liability dollarization channel, even if that debt were long-term in nature. We find evidence in support of both effects: short-term international debt was strongly associated with the probability that financial intermediaries would be closed or

[1] A number of authors, including Calvo and Mendoza (2000), Calvo and Reinhart (1999), Christiano, Gust, and Roldos (2002), Cook and Devereux (2001), and Mendoza (2001), explore the real effects of sudden stops in lending.

[2] The impact of foreign currency debt on financial crisis and monetary policy has been extensively studied by Aghion, Bannerjee, and Bacchetta (2000, 2001), Allen and Gale (2000), Bris and Koskinen (2002), Burnside, Eichenbaum, and Rebelo (2001), Caballero and Krishnamurthy (2003), Céspedes, Chang, and Velasco (2000), Choi and Cook (2002), Cook (2000), Devereux and Lane (2000), and Jeanne and Wyplosz (2003), among others.

nationalized; and of those intermediaries that survived the crisis, long-term international debt was significantly associated with poor financial performance. Moreover, intermediaries with short-term international debt significantly cut their assets and loans during the crisis.

The finding that international debt (whether short or long term) matters for the performance of financial intermediaries following an exchange rate depreciation is not *a priori* obvious, for these firms can potentially hedge their foreign exchange exposures in financial markets, or offset them through cash flows that come from foreign-currency-denominated assets. Indeed, Krueger and Yoo (2002) and Dooley and Shin (2000) argue that the Korean banking system did not face any currency mismatch as a result of their foreign currency borrowings, and Ize and Levy-Yeyati (2003) argue that bank-level liability dollarization is consistent with optimal risk management in a number of emerging markets. Glick and Hutchison (1999) find that banking crises are likely to precede currency crises, but currency crises do not lead to banking crises. Arteta (2003) also finds that countries that have larger mismatches between foreign currency deposits and domestic currency assets are not more likely to experience severe banking or currency crises. Kho and Stulz (2000) study the currency exposure of the banking sector in five East Asian countries during the Asian financial crisis. They find that currency exposures had a negative impact on the sector's stock returns only in Indonesia and the Philippines.

Papers that study the effect of foreign currency debt on the performance of emerging market firms during crises have concentrated on non-financial firms. Some work contradicts the liability dollarization hypothesis. Bleakley and Cowan (2002) find that in the 1990s, although their book net worth declined, Latin American non-financials with high levels of foreign debt had relatively high investment and profits during depreciations. They argue that export firms that benefit from an exchange rate depreciation are also more likely to have foreign currency debt. Luengnaruemitchai (2003) finds that East Asian non-financials with high levels of foreign currency debt also had relatively high levels of investment during the Asian financial crisis. Other work has more ambiguous results. Galindo, Panizza, and Schiantarelli (2003) survey a series of papers that examine the impact of foreign currency debt on the investment of Latin American firms. Most of the studies in the survey find that the impact is negative. Echeverry et al. (2003) find that Columbian firms with high foreign currency debt have low profits during recessions, although foreign currency debt is not associated with investment. Allayannis, Brown, and Klapper (2003) find that hedged foreign currency debt was associated with worse financial performance during the East Asian crisis than were domestic currency debt or unhedged foreign currency debt. Harvey and Roper (1999) argue that the adverse balance sheet effects of firms' foreign currency debt exacerbated the Asian financial crisis. Aguiar (2002) finds that Mexican intermediaries with a large share of their short-term debt denominated in foreign currencies had relatively low levels of investment in years following the peso depreciation of 1994. Claessens, Djankov and Xu (2000)

and Claessens, Klingebiel, and Laeven (2001) show that East Asian firms with high shares of short-term debt had low profitability during the Asian financial crisis, and Forbes (2002) finds that highly leveraged non-financial firms do poorly following large depreciations. Bris, Koskinen, and Pons (2002) examine recent episodes of financial crises, and show that after a crisis has occurred, Asian firms' profitability declines and leverage increases further, but European and Latin American firms display clearer signs of recovery.

We focus on financial firms, as theories of financial crises with sudden stops and liability dollarization emphasize the role played by these institutions. Before a crisis, financial intermediaries borrow internationally in foreign currencies to make risky domestic loans, exposing themselves to the liquidity risk of "sudden stops" in international capital flows, and the exchange rate risk due to "liability dollarization". Bank credit is an important source of finance in emerging markets, so the impact of the crisis on banks is important for the real economy. Moreover, currency crises can have significantly different implications for financial intermediaries than for other firms. Financial intermediaries typically have very high leverage and are particularly susceptible to market imperfections caused by asymmetric information. At the same time, financial firms may not have substantial export businesses that can directly benefit from an exchange rate devaluation. On the other hand, financial institutions may have greater access than non-financial corporations to derivatives that hedge risk, although Burnside, Eichenbaum, and Rebelo (2001) argue that East Asian financial intermediaries ignore these opportunities.

Testing the determinants of stock market performance in a population of firms with a high percentage of bankruptcies presents a number of estimation issues. In principle, intermediaries with a complete loss of equity value could be treated as corner solution outcomes. However, we find strong evidence that the firm-level characteristics that determine the probability of bankruptcy affect the financial performance of surviving companies in a different manner. Thus, we estimate the determinants of the probability of failure independently from the determinants of the surviving intermediaries' performance. Specifically, we estimate the determinants of the probability of failure with a Probit specification, and the determinants of the stock market performance of surviving intermediaries with linear models corrected for selection (see Heckman 1979). We find that short-term international debt is associated with the likelihood that a financial institution failed (i.e., be closed or nationalized with a total loss for investors) during the crisis, and long-term international debt is correlated with the stock market performance of the institutions that survived. International debt is also negatively associated with the growth rate of an intermediary's assets during the crisis. This finding reflects the reduction in the availability of financing to domestic firms. Other aspects of a financial institution's balance sheet such as a low asset size, a high leverage, and a high share of risky assets such as loans and securities are also associated with poor crisis period performance.

The rest of the paper is organized as follows. Section II discusses the data we use in this study, and provides various summary statistics. Section III estimates several statistical models of firm performance during the Asian financial crisis. We use stock returns as well as various balance sheet variables as measures of financial performance. We pay special attention to the role of international debt, and its short- and long-term components. Section IV concludes.

II Data

A. Aggregate Data

1. Foreign Currency Debt

Information on new issues of debt in international financial markets is reported by the IFR Platinum database (from Thomson Financial). This data includes the face value, issue dates, and maturity dates of foreign market bonds, Eurobonds, and syndicated bank loans. Figure 1 shows the total foreign currency debt issued in international markets by financial corporations in Indonesia, Korea, Malaysia, Taiwan, and Thailand for each year between 1990 and 1999. In all countries but Taiwan, there is a surge in international debt issued by financial intermediaries in the years preceding the crisis. In the cases of Korea and Thailand, the lending boom peaks in 1995. In the cases of Indonesia and Malaysia, capital flows to financial institutions increase until 1997. The flows of international lending to the financial sectors of these four countries in 1997 is above the level in 1994, and contracts suddenly in 1998. In Taiwan, by contrast, the amount of international debt continues to increase until 1998.

2. Financial Markets

After June 1997, we observe exchange rate depreciations and stock market declines in all five countries. We report two country-level measures of this financial crisis in Table 1, Panel A. Each is drawn from Standard & Poor's Emerging Market Data Base.

1) *MKTR:* The annualized net returns (with dividends reinvested) on the S&P IFCG Index between July 1, 1997 and December 31, 1998, measured in local currency.
2) *DEPR:* The annualized net growth rate in the spot exchange rate with the US dollar between July 1, 1997 and December 31, 1998.

Indonesia suffers the largest, while Taiwan the mildest, exchange rate depreciation. The extent of depreciation of the Korean Won, the Malaysian Ringgit, and the Thai Baht are intermediate cases and are similar in scale. Malaysia experiences the sharpest decline in its stock market (measured in local currency), whereas the decline in the Taiwan stock market is the mildest.

B. Firm-Level Data

We extract data from the Pacific Capital Markets (PACAP) database for 303 corporations in the financial sectors of Indonesia, Korea, Malaysia, Taiwan, and Thailand. We only include companies for which stock prices are available in June 1997, and balance sheet data is available from 1996, the financial year prior to the crisis.[3] Among the 303 firms, PACAP has continuously reported monthly stock returns for 205 of them between July 1997 and December 1998, the period we define as the crisis period. We refer to these 205 intermediaries as Type 1 intermediaries. There are 36 Type 2 intermediaries that cease to trade for some time during the crisis, but resume trading by December 1998 or some time afterwards. Thus, the crisis-period stock returns for Type 2 intermediaries cannot be calculated due to missing data. Another 62 intermediaries (which we refer to as Type 3 intermediaries) cease trading during the crisis, and are identified through a variety of media sources as being closed or nationalized by the authorities.

1. Measure of Financial Performance

We classify stock market performance in two ways.

3) *RETURN:* the net, annualized local currency returns for Type 1 intermediaries. We compound monthly returns (with dividends reinvested) over the 18 months between July 1997 and December 1998. For Type 2 intermediaries, this variable is coded as missing. We code the net return of Type 3 intermediaries (which are closed or nationalized) as equal to –1, indicating a total loss in value.

4) *FAIL:* a dummy variable coded as 1 for Type 3 intermediaries, and coded as 0 for Type 1 and Type 2 intermediaries.

We calculate the growth rate of a number of balance sheet items (also obtained from PACAP), including book equity, assets, and total liabilities, as additional measures of firm performance during the crisis. The growth rate of the book value of equity is a natural counterpart to the growth rate of the market value of equity as measured by the stock market return. The asset growth of financial intermediaries reflects the availability of credit for domestic firms, and liability growth shows the ability of financial intermediaries to attract funds.

5) *EQUITY GROWTH:* the net annualized local currency growth rate of net worth between the end of year 1996 and the end of year 1998 balance sheets.

6) *ASSET GROWTH:* the net annualized local currency growth rate of total assets between the end of year 1996 and the end of year 1998 balance sheets.

7) *LIABILITY GROWTH:* the net annualized local currency growth rate of total liabilities between the end of year 1996 and the end of year 1998 balance sheets.

[3] We select firms that PACAP associates with financial industries. The actual terminology differs across countries, but we categorize the following as financial industries: “Banks”, “Banking”, “Banking and

Due to the crisis, many of the intermediaries' balance sheets are unavailable at year end 1998. We show the average growth rate for the surviving intermediaries in Table 1, Panel C. The average growth rate of book value over the crisis is approximately -4%. The decline in stock markets is much steeper than the decline in the book value of net worth. The market assessment of the value of assets may fall faster during a crisis than the accounting value of assets. After many years of rapid growth, both the assets and liabilities of Asia's financial intermediaries come to a sudden stop during the financial crisis. The average growth rate of assets is essentially zero, while the average annualized growth rate of liabilities is less than 1%.

2. Balance Sheet Entries

To normalize foreign exchange losses, we use variables drawn from the end of financial year 1996 balance sheets reported in PACAP. Each variable is converted into US dollars using the exchange rate at the onset of the crisis in June, 1997.

8) *EQUITY:* the US dollar value of net worth in 1996.

9) *ASSET:* the US dollar value of total assets in 1996.

10) *LIABILITY:* the US dollar value of total liabilities in 1996.

There is substantial variation in the size of the intermediaries in our sample. The smallest intermediary (an Indonesian insurance company) has *ASSET* equal to US$10 million. The largest is Maybank, which has *ASSET* of almost US$70 billion. The average intermediary has assets of approximately US$4.5 billion, liabilities of US$4.2 billion, and accounting net worth of US$0.3 billion.

We also obtain the total value of stocks outstanding for each firm from PACAP.

11) *CAP:* the US dollar value of the market capitalization of common stocks in June 1997.

We then construct a measure of financial value as the sum of book liabilities plus market capitalization.

12) *VALUE:* the sum of *LIABILITY* and *CAP*.

PACAP divides the assets of financial institutions into five categories: i) Loans; ii) Investments; iii) Cash; iv) Other Assets; and v) Tangible Assets. We construct two variables that measure the structure of assets.

13) *LOAN:* the US dollar value of loans in the financial year end of 1996.

14) *PAPER:* the US dollar value of securities in the financial year end of 1996.

We construct ratios of some of the above variables as controls for the risk faced by banks besides international debt exposure. We report the means and standard deviations of these ratios in Table 1, Panel B. The average ratio of liability to assets is approximately 0.8; financial institutions are

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Insurance", "Insurance", "Finance", "Finance and Securities", "Securities", "Other Financial Services", "Merchant Banks", and "Mutual Funds".

highly leveraged as a matter of course. Loans and securities are among the riskier assets held by financial institutions. The share of assets in this form may help determine bank risk. The average intermediary has about 50% of their assets in loans and 25% in securities. We also calculate a measure of the market valuation of firms relative to their accounting value of assets, $VALUE/ASSET$. We find that East Asia's financial intermediaries have an average market value that is 110% of the book value of their assets, and the variance among firms is large.

An additional source of equity risk we consider is liquidity risk. We construct a measure of turnover to control for stock market liquidity.

15) *TURNOVER:* the average monthly value of stocks traded (over the period 1993:1–1997:06) relative to stock market capitalization.

We find that the average turnover across companies is equal to eight percent.

C. International Debt Exposure

We use the debt listed in the IFR Platinum database to calculate the pre-crisis international debt position of each firm. We define the following variables, which are all measured in US dollars.

16) *IDEBT:* the sum of the face value of the foreign currency debt issued before July 1997, and with a maturity date after June 1997.

17) $IDEBT^{98}$: the sum of the face value of the foreign currency debt issued before July 1997, and with a maturity date between July 1997 and December 1998.

18) $IDEBT^{LT}$: the difference between *IDEBT* and $IDEBT^{98}$.

We measure international debt exposure as the direct losses due to the increase in the domestic currency cost of repaying the face value of foreign currency debt, where the increase is a result of the crisis-period exchange rate depreciation.

19) *FXLOSS:* the product of *IDEBT* and *DEPR,* the annualized net depreciation rate of the domestic currency (with respect to the US dollar) over the period June 1997 to December 1998.

20) $FXLOSS^{98}$: the product of $IDEBT^{98}$ and *DEPR*.

21) $FXLOSS^{LT}$: the product of $IDEBT^{LT}$ and *DEPR*.

Multiplying *IDEBT* by the net depreciation of the exchange rate is equivalent to calculating the difference between the domestic currency cost of repaying the foreign debt at the end-of-period exchange rate and the cost of repayment at the beginning-of-period exchange rate, and then converting this quantity back into US dollars at the initial exchange rate. We annualize for consistency with our measures of financial performance, namely, annualized stock returns and annualized growth rates of various balance sheet entries. We convert these measures of foreign exchange losses back into US dollars using the beginning-of-period (June 1997) exchange rates, for

we will normalize these variables by balance sheet items that are converted into US dollars using exchange rates on the same date.

D. Sector Data

We are interested in examining more closely the distribution of international debt exposure among East Asian firms. We classify these financial intermediaries into four sectors: *Banking, Insurance, Securities,* and *Other*. In each country but Taiwan, PACAP directly classifies intermediaries that belong to the *Banking* or *Insurance* sector. For Taiwan, we classify financial intermediaries that have the word "bank" or "insurance" in their name into the respective *Banking* or *Insurance* sector. Of the remaining financial institutions, we classify them in the *Securities* sector if 50% or more of their assets are classified by PACAP as investments in securities. *Other* is the residual category, and includes finance companies and leasing intermediaries. In our sample, there are 87 intermediaries in the *Banking* sector, 57 in the *Insurance* sector, 44 in the *Securities* sector, and 115 in the *Other* sector.

Descriptive statistics by country and by sector are reported in Table 2. Approximately 40% of the financial intermediaries in our sample have issued some debt in international markets. However, there are considerable variations across sectors and countries. Only about 10% of the intermediaries in Malaysia and Taiwan have positive levels of *IDEBT*. The figure is 40% in Korea, and nearly 60% in both Indonesia and Thailand. Two-thirds of the intermediaries classified as banks have positive international debt, but none in the insurance industry has any. One-quarter of the intermediaries in the *Securities* sector, and half of the intermediaries in the *Other* category have positive international debt.

For those intermediaries that have outstanding international debt as of the beginning of the crisis, roughly 40% of the debt is short term (i.e., comes due before the end of the crisis), as the average ratio of $IDEBT^{98}$ to *IDEBT* for firms with positive international debt is .4. Thai and Indonesian intermediaries have the highest shares of short-term international debt, at 54% and 41% respectively.

In terms of dollar values, the *Banking* intermediaries, especially those in Korea and Thailand, have the highest international debt levels. The average East Asian bank has *IDEBT* equal to US$300 million while the average Korean and Thai bank has *IDEBT* that exceeds US$600 million. Banks in the remaining three countries have much smaller international debt levels. The level of international debt for *Securities* intermediaries is considerably lower, averaging US$21 million.

In Table 2, we report $FXLOSS/CAP$, the foreign exchange losses relative to pre-crisis stock market capitalization. The increase in the cost of international debt repayment is large; the annualized rise in the domestic currency price of repaying foreign currency debt is nearly 26% of

the market capitalization of the average intermediary. The largest average direct loss measured by the ratio of *IDEBT* to *CAP* is in Thailand. Indonesia suffers the largest exchange rate depreciation, which magnifies the size of foreign exchange losses. In Malaysia and Taiwan, foreign exchange losses from international debt exposure are very small. Across sectors, foreign exchange losses are most severe in the *Other* sector, followed by the *Banking* and *Securities* sectors. Korean merchant banks and Thai finance companies (most of which are in the *Other* sector) have heavy debt to international financial markets relative to their capitalization. In Indonesia, international debt exposure is most severe in the *Securities* sector.

For the Type 1 intermediaries (i.e., those intermediaries for which PACAP has uninterrupted records of monthly stock returns over the crisis period), the average annualized local currency returns (*RETURN*) ranges from -8% in Korea to -69% in Indonesia. Of course, returns measured in US dollars are significantly lower. By necessity, we omit the companies that go out of business (the Type 3 intermediaries), and the companies whose stocks cease trading for a considerable period during the crisis (the Type 2 intermediaries). Among the Type 1 intermediaries, the variation in returns is considerable. The minimum return is -95%, but some intermediaries experience positive net returns of 400%. The cross-sectional standard deviation of the returns in Korea and Thailand is especially large. In particular, those Korean and Thai intermediaries in the *Securities* sector that did not fail actually had relatively high returns over the crisis.

Table 2 also shows the breakdown by country and sector of intermediaries that failed. Twenty percent of the overall sample of intermediaries is classified as being closed or nationalized. However, none of the 25 financial intermediaries in Taiwan, and only two of the 52 intermediaries in Malaysia fall into this category. By contrast, fully 40% of Thai financial intermediaries are classified as failed. In both Korea and Indonesia, this figure is approximately 20%. Examining across sectors, we find that only two out of 57 insurance intermediaries failed during the crisis. It is the intermediaries in the *Other* category that exhibits the highest frequency of failure. This pattern is most pronounced in Thailand, where 60% of the intermediaries in the *Other* category failed. Korean merchant banks and Korean intermediaries in the *Securities* category also had a high frequency of failure. The rates of failure in Indonesia's *Banking*, *Securities*, and *Other* sectors are also high.

III Statistical Models of Crisis Performance

In this section, we examine the effects of international borrowing on the performance of financial intermediaries during the Asian financial crisis.

A. Tobit Models of Stock Returns

First, we study the relationship between an intermediary's foreign exchange losses on international debt and its crisis-period stock market return. Stock market returns are a useful measure of financial performance, as they should incorporate both the net worth effects that arise from the higher cost of repaying foreign currency debt, as well as any potential positive effects that an exchange rate depreciation may have on the domestic currency value of foreign income or assets. From Table 2, we see that the average $\frac{FXLOSS}{CAP}$ is 26%, while the average *RETURN* is -27%. In other words, for an average firm in our sample, its foreign exchange losses due to international debt are comparable in size with its losses in equity value, where both losses are measured relative to the initial equity value of the firm. This observation suggests that the foreign exchange losses due to liability dollarization are promising candidates to quantitatively explain the negative crisis-period stock market returns of these firms.

For the moment, we ignore the Type 2 intermediaries (whose crisis-period returns are missing), and estimate the effect of foreign exchange losses on the performance of the remaining 267 intermediaries. We use the following Tobit specification, where r_j is a latent variable, and α_C is a country-specific intercept.

$$r_j = \alpha_C + \beta \frac{FXLOSS_j}{CAP_j} + \varepsilon_j$$
$$RETURN_j = r_j \text{ if } r_j > -1, \quad RETURN_j = -1 \text{ if } r_j \le -1. \tag{3.1}$$

We can think of the left-hand side variable as the change in the domestic currency value of equity divided by the initial value of equity, and the right-hand side variable as the change in the domestic currency cost of debt repayment, also normalized by the initial value of equity.[4] Thus, we can interpret β as the drop in equity value associated with each dollar of foreign exchange losses as a result of the higher cost of international debt repayment.

We report the estimate of $\beta = -0.55$ in Table 3, Column A[1]. This estimate is interesting along two dimensions. First, the coefficient is significant at the 1% critical value, indicating that international debt was strongly associated with poor financial performance during the crisis. Second, the coefficient is significantly less than 1 in absolute value, so each additional dollar needed for debt repayment is associated with a less than one-for-one decrease in a firm's stock market value. One explanation for this finding is that some of the foreign exchange risk from

[4] Note that even though both *FXLOSS* and *CAP* are measured in US dollars (converted from local currencies using the June 1997 exchange rates), the ratio, *FXLOSS*/*CAP*, is not affected by this choice of the currency of denomination.

international borrowing may have been hedged, either naturally (through holdings of foreign currency assets) or artificially (through financial derivatives). Another possibility is that it is the healthier financial intermediaries, which can perform better relative to other firms, that have better access to international debt before the crisis.

Bongini, Claessens, and Ferri (2001) and Bongini, Ferri, and Kang (2000) find that several traditional risk factors are important determinants of the crisis-period performance of East Asia's financial intermediaries. To control for the effects of these factors, we incorporate them in the Tobit specification.

$$r_j = \alpha_C + \beta \frac{FXLOSS_j}{CAP_j} + X_j\gamma + \varepsilon_j$$
$$RETURN_j = r_j \text{ if } r_j > -1, \quad RETURN_j = -1 \text{ if } r_j \le -1 \tag{3.2}$$

The vector of control variables, X_j, includes overall leverage, $LIABILITY/ASSET$, so that we can distinguish the effects of international debt from other debt; financial value relative to book value, $VALUE/ASSET$, in order to control for pre-crisis expectations; the share of assets that is loans, $LOAN/ASSET$, and the share of assets that is securities, $PAPER/ASSET$, to control for the varying riskiness of assets; ln*(ASSET)* to control for the ability of large financial institutions to diversify risk and mobilize public support; and *TURNOVER* to measure any liquidity effects in financial markets. We report estimates of γ and β in Table 3, Column A[2]. The coefficient on $FXLOSS/CAP$ is statistically significant at the 1% critical value even after controlling for these risk factors.

We find that the coefficient on $LIABILITY/ASSET$ is negative and significant at the 1% critical value, so that high overall leverage is negatively associated with crisis-period performance. The coefficient on $LOAN/ASSET$ is negative and significant at the 5% level, while the coefficient on $PAPER/ASSET$ is insignificantly different than zero. Perhaps due to their less transparent and illiquid nature, the effect of loans on firm performance differs from that of securities. The coefficient on pre-crisis financial valuation, $VALUE/ASSET$, is negative and statistically significant at the 5% level. One explanation for this finding is that the negative macroeconomic outlook brought about by the crisis may affect the valuation of growth stocks most severely. Alternatively, if the crisis was associated with the collapse of a stock market bubble, the most overvalued intermediaries would fall the farthest. The coefficient on *TURNOVER* is negative and significant at

the 10% critical value. Equities that were very liquid in the pre-crisis period had lower returns during the crisis. On the other hand, the coefficient on ln(*ASSET)* is not significant.

The impact of international debt on crisis performance may operate through the "liability dollarization" channel, the "sudden stop" channel, or both. To differentiate the two channels we split $FXLOSS/_{CAP}$ into a short-term component, $FXLOSS^{98}/_{CAP}$, and a long-term component, $FXLOSS^{LT}/_{CAP}$. Firms with short-term international debt that needs to be rolled over should be exposed to the risk of a sudden stop. On the other hand, the market value of a firm with unhedged foreign currency debt (i.e., "dollarized" liabilities) should be exposed to exchange rate depreciations, even if the principal on that debt is not due for some time. In Column A[3], we report the estimated coefficients of a Tobit model in which we replace $FXLOSS/_{CAP}$ by $FXLOSS^{98}/_{CAP}$ and $FXLOSS^{LT}/_{CAP}$.

We find that the coefficients on $FXLOSS^{98}/_{CAP}$ and $FXLOSS^{LT}/_{CAP}$ are significant at the 5% and 10% critical value respectively. By allowing the coefficients on $FXLOSS^{98}/_{CAP}$ and $FXLOSS^{LT}/_{CAP}$ to differ from one another, there is little impact on the estimates of the other coefficients. The coefficients on short-term and long-term debt are approximately equal, and similar in size to the estimate from the regression reported in Column A[2], in which these two coefficients are restricted to be equal. The fact that long-term international debt has an equally negative impact on returns as does short-term international debt argues against the idea that the crisis was driven solely by the sudden refusal of international capital markets to roll over existing short-term debt.

The Tobit model strengthens inference by assuming that those determinants that cause observed stock returns to be low among surviving financial institutions are the same ones that increase the probability that an institutions will fail. We can test the validity of this assumption by the Fin-Schmidt (1984) likelihood ratio test. Specifically, we test the hypothesis that the coefficients of the index function that determines the probability of failure are the same as the coefficients of the linear model that explains the stock returns of the surviving intermediaries. We reject this hypothesis with a p-value of less than .001. This strong rejection suggests that it is more appropriate to conduct inference on the probability of failure and the stock returns of surviving intermediaries separately.

To address this concern, we first examine a Probit model for the probability that a financial institution was closed or nationalized (i.e., that it was a Type 3 firm).

B. Probit Models of Failure

We begin by defining a binary variable, $FAIL_j$, which takes on the value of one if financial institution j is a Type 3 firm, and zero otherwise. We also define an unobserved index variable, f_j, as a linear function of various determinants of firm failure:

$$f_j = \alpha + \beta \frac{FXLOSS_j}{CAP_j} + X_j\gamma + Y_C\delta + \varepsilon_j \quad \varepsilon_j \sim N(0,1)$$
$$FAIL_j = 1 \text{ if } f_j \geq 1, \quad FAIL_j = 0 \text{ if } f_j < 1 \tag{3.3}$$

Since none of the Taiwanese financial intermediaries has failed, a Taiwan country dummy will perfectly predict the dependent variable. For this reason, we do not include any country-specific intercepts in the model. Instead, we include a set of country-level measures of the severity of the crisis, namely, the annualized depreciation rate and stock market index return. For a firm from country C, we control for $Y_C = \{DEPR_C\ MKTR_C\}$. We report the coefficient estimates and their standard errors in Column B[1] of Table 3.

First, we find that the coefficient on international debt exposure is positive and significant at the 5% critical value. This finding is consistent with the results we obtain from the Tobit model. Multiplying the marginal effect by the standard error of $FXLOSS/CAP$ suggests that a one-standard-deviation increase in international debt exposure is associated with an increased probability of failure of about 7%. As 20% of the intermediaries in our sample failed, this effect of international debt exposure is substantial.

We also find that the coefficient on $VALUE/ASSET$ is negative and significant at the 5% critical value. This result implies that a higher pre-crisis valuation is associated with a lower likelihood of failure. By contrast, the Tobit model indicates that a high pre-crisis valuation is associated with *poorer* crisis period performance. Overall leverage, $LIABILITY/ASSET$, is a statistically and economically significant determinant of the probability of failure. We also find that the asset composition of a financial institution is important. The coefficients on $LOAN/ASSET$ and $PAPER/ASSET$ are both significant at the 1% level. The hypothesis that the two coefficients are equal cannot be rejected at the 10% level. The fact that loans (as a share of assets) are not a significantly stronger predictor of closure during the crisis than holdings of other risky investments such as securities may seem surprising. Based as they are on private information, loans are often viewed as being more conducive to the insider dealings that characterize cronyism or poor assessment of default risk by individual financial intermediaries. In addition, loans are typically less liquid than securities. We also find that ln(*ASSET*) is significant at the 10% level; large financial

intermediaries are less likely to close during the crisis. At the aggregate level, neither the depreciation rates nor the market-level stock returns are significant.

We then estimate a Probit model that splits international debt exposure into short- and long-term components, but is otherwise identical to model (3.3). We report the estimation results in Column B[2]. In this model, the coefficient on $FXLOSS^{98}/CAP$ is positive and significant at the 5% level, but the coefficient on $FXLOSS^{LT}/CAP$ is insignificant. Thus, we find that short-term international debt helps explain firm failure, but its long-term counterpart does not. Note that this finding is in contrast with the results we obtain from the Tobit model, which suggests that short- and long-term international debt has similar impact on firm performance. The different conclusion we obtain here reinforces the results of the Fin-Schmidt test that we need to consider the determinants of firm failure separately from the determinants of surviving firms' stock returns.

C. Selection-Corrected Models of Surviving Firms' Stock Returns

We now turn to the performance of those intermediaries for which we can observe returns throughout the crisis. Of the 303 intermediaries in our sample, there are 205 (the Type 1 intermediaries) that fall into this category. We estimate a linear function of stock returns corrected for selection using a Probit selection equation.

$$\begin{aligned} RETURN_j &= \alpha_C + \beta \frac{FXLOSS_j}{CAP_j} + \gamma X_j + \varepsilon_j \\ select_j &= \alpha^s + \beta^s \frac{FXLOSS_j}{CAP_j} + X_j \gamma^s + Y_C \delta^s + \omega_j \end{aligned} \tag{3.4}$$

Firm j is a Type 1 intermediary (i.e., $RETURN_j > -1$) if $select_j$ is greater than 1. Using a likelihood ratio test, we can reject the hypothesis that the two error terms in model (3.4) are uncorrelated at the 1% level. This result suggests that it is important to control for selection.

We report the maximum likelihood estimates and standard errors of the coefficients in model (3.4) in Table 3, Column C[1]. We include the country-level macroeconomic indicators, $Y_C = \{DEPR_C\ MKTR_C\}$, rather than country-specific intercepts in the selection equation, again because none of the Taiwanese intermediaries has failed. Though conceptually different, the selection equation here and the Probit equation reported in Column B[1] have similar implications. Generally, the variables that are significant in the Probit model in Column B[1] are also significant in the selection equation here (though naturally, the coefficients are of opposite signs). A few differences are noteworthy. First, in the selection equation, logged asset size is significant at the 1% critical value. Since the coefficient on the same variable is only significant at the 10% level in the Probit equation, the significance we obtain here suggests that small financial intermediaries are very likely to be Type 2 intermediaries, whose returns are unobservable for some period of time

during the crisis. Similarly, the coefficient on exchange rate depreciation is significant at the 1% level here, but insignificant in the Probit equation. This difference suggests that the degree of exchange rate depreciation is an important factor in determining if a firm is a Type 2 intermediary. We also find that $VALUE/ASSET$ and $PAPER/ASSET$ are no longer significant in the selection equation.

In the return equation of specification (3.4), the coefficients on $FXLOSS/CAP$ and $LIABILITY/ASSET$ are significant at the 1%, and the coefficient on $VALUE/ASSET$ is significant at the 5% level (see Column C[1]). Comparing the results here with those from Column B for the Probit model, we see that even though $VALUE/ASSET$ is negatively associated with the performance of intermediaries that did not fail, it is positively associated with the probability of avoiding failure.

In Column C[2], we report estimates from a model that includes $FXLOSS^{98}/CAP$ and $FXLOSS^{LT}/CAP$ instead of $FXLOSS/CAP$. For the selection equation, the coefficient on $FXLOSS^{98}/CAP$ is negative and significant at the 5% level, but the coefficient on $FXLOSS^{LT}/CAP$ is insignificant. Thus, consistent with the results from the Probit equation, we find that short-term international debt is significantly associated with firm failures (and interruptions in the report of stock returns). For the return equation, by contrast, the coefficient on $FXLOSS^{LT}/CAP$ is negative and significant at the 5% level, but the coefficient on $FXLOSS^{98}/CAP$ is insignificant. Thus, even though the long-term international debt is not subject to "sudden stops", it still has a negative impact on firm performance. This finding is consistent with the hypothesis that foreign-currency liabilities affect firm value negatively in the event of an exchange rate depreciation (the "liability dollarization" channel). Short-term international debt is relatively less important for firms that survived the crisis. For the entire sample of 303 firms, foreign exchange losses from short-term international debt are approximately 14% of initial equity; for the Type 1 firms, this number drops to less than 6%. This observation may be the reason why we are unable to find a significant relationship between short-term debt and crisis-period returns for these firms.

D. Balance Sheet Variables as Measures of Financial Performance

Instead of focusing on stock returns, this section uses a number of balance sheet variables to measure financial performance, and examines if an intermediary's international debt exposure affects the growth rates of these variables over the crisis. Specifically, we use selection-corrected models to examine the relationship between the growth rate (from financial year end 1996 to

financial year end 1998) of a balance sheet entry (BSE), and an intermediary's foreign exchange losses normalized by the 1996 level of the same BSE. All balance sheet entries are measured in US dollars.

$$BSE\ \ GROWTH_j = \alpha + \beta \frac{FXLOSS_j}{BSE_j} + X_j\gamma + \varepsilon_j \tag{3.5}$$

Again, there is a natural interpretation for the coefficient on *FXLOSS* when we normalize it by the initial level of the dependent growth rate variable. Specifically, the coefficient β represents the dollar change in the balance sheet entry associated with each extra dollar needed for international debt repayment that occurs because of the currency depreciation. It is important to correct for selection, as a significant fraction of the firms (including all Indonesian firms) in our sample do not report their 1998 balance sheets in PACAP. As before, the selection equation takes a Probit form, and includes the same dependent variables as the selection equation in model (3.4). To conserve space, we do not report results from the selection equations.

The three balance sheet items we examine are the book value of equity, assets, and liabilities. The book value of equity is a natural alternative to stock returns as a measure of financial performance. Table 4, Column D[1] reports the maximum likelihood estimates of the coefficients when we use this variable as the balance sheet entry. We find that the coefficient on foreign exchange losses is significant at the 5% level. Note that the effect of international debt on the book value is larger than its effect on the market value of equity (see the return equation on Table 3, Column C[1]). Even at the 10% critical value, $PAPER/_{ASSET}$ is the only significant control variable. We split $FXLOSS/_{EQUITY}$ into a short-term debt and a long-term debt component. From Column D[2], we see that the coefficients on the two components are insignificant, but are similar in size to the coefficient on $FXLOSS/_{EQUITY}$ in Column D[1].

The assets of financial intermediaries are of special interest, as they represent, to a substantial extent, credit issued to the domestic economy. In Table 4, Column E[1] we report selection-corrected estimates when the balance sheet entry is total assets. The coefficient on $FXLOSS/_{ASSET}$ is significant at the 1% critical value. Moreover, the coefficient is above six (in absolute value), indicating that each dollar in foreign exchange loss is associated with a decline in assets of over six dollars. Because financial intermediaries are highly leveraged and each dollar of capital backs up multiple assets, capital losses may result in a more-than-one-for-one contraction in banks assets. Although the average foreign exchange loss due to international debt is smaller than 2% of assets, this multiplier process implies that these losses can be associated with declines in assets that are much more substantial. Once again, we split the losses due to foreign exchange rate

exposure into $FXLOSS^{98}/ASSET$ and $FXLOSS^{LT}/ASSET$. We find that the effect of short-term international debt exposure is much stronger than that of long-term exposure. From Column E[2], we see that the multiplier on the short-term variable is above 20 (in absolute value) and is significant at the 1% critical value.

Next, we use total liabilities as the balance sheet entry. We find that foreign exchange losses due to international debt exposure are associated with contractions in liabilities, with a multiplier of above 5 (see Column F[1]). We also find that short-term international debt exposure is associated with a large and significant contraction in liabilities, while long-term international debt exposure has a positive but insignificant relationship with the growth in liabilities (see Column F[2]). An exchange rate depreciation has countervailing effects on the liabilities of intermediaries with international debt. The depreciation increases the domestic currency value of foreign-currency-denominated liabilities. Yet, the damage to the intermediaries' balance sheets will lead them to reduce their optimal level of leverage.

Turning our attention to the control variables, we find that both the assets and liabilities of intermediaries with large asset bases and high financial valuations relative to book value shrank by significantly less during the crisis. Intermediaries with high loan-to-asset ratios shrank by significantly more. The hypothesis that the residuals from the *BSE GROWTH* equation and the selection equation are uncorrelated is not rejected when the balance sheet entry is book equity, but is strongly rejected (at the 1% critical value) when it is either assets or liabilities.

E. Pre-Crisis International Debt

Another question of interest is what causes international debt exposure to be so high in East Asia prior to the crisis. A measure of financial intermediaries' willingness or ability to borrow internationally is the ratio of international debt to total liabilities. We find that the average share of international debt to liabilities is relatively small; the average financial intermediary has international debt of less than 4% of liabilities. We regress $IDEBT/LIABILITY$ on country dummies and firm-specific variables, using a Tobit specification with a lower bound of zero on international debt. The results in Table 4, Column G show that intermediaries with high leverage rely relatively heavily on international debt. At the same time, large intermediaries seem better able (or more willing) to access international debt markets; the coefficient on ln(ASSET) is significant at the 1% level. Interestingly, intermediaries with high levels of loans as a share of assets have relatively low levels of $IDEBT/LIABILITY$. East Asia's financial intermediaries may face a relatively weak demand for foreign currency loans. As a result, financial intermediaries that try to avoid currency mismatches between their assets and liabilities may have been reluctant to borrow in foreign currencies to finance domestic currency loans.

Finally, we re-estimate the Tobit specification of stock returns reported in Table 3, Column A[2], adding the ratio $IDEBT/LIABILITY$ as a proxy for those characteristics that cause an intermediary to borrow heavily in international debt markets. The results in Table 4, Column H show that even after we control these characteristics, foreign exchange losses are still associated with negative returns. In fact, the coefficient on $FXLOSS/CAP$ becomes even larger after these characteristics are controlled for.

IV Conclusion

We can summarize our findings as follows. First, foreign exchange losses stemming from international debt exposure were strongly associated with negative stock returns during the Asian financial crisis, even after controlling for other risk factors. Second, each dollar of foreign exchange losses was associated with losses in equity value that are substantially less than one dollar. Third, short-term international debt was associated with the probability of bankruptcy, and long-term international debt was associated with the negative returns of the firms that survived. Fourth, international-debt-induced foreign exchange losses were associated with contractions in the assets of financial intermediaries, and the magnitude of the contractions was a large multiple of the size of the foreign exchange losses. Finally, such contractions in assets were most closely associated with short-term international debt exposure.

Our results stress the importance of examining, both jointly and separately, the impact of firm-level variables on the probability of failure during financial crises, and on the performance of companies that survive. Variables often affect the likelihood of bankruptcy in different ways than they affect the returns of surviving firms. For example, we find that intermediaries with high market-to-book values prior to the Asian crisis were less likely to go bankrupt, but had significantly lower returns if they survived.

The issuance of short-term international debt by East Asian intermediaries in the mid-1990s is strongly associated with the wave of bankruptcies observed in the region, and with the sharp slowdown in intermediation that occurred during the crisis. This observation alone cannot prove that the crisis was caused by an exogenous stop in capital flows into East Asia from international markets. It does indicate, however, that the effects of the crisis were exacerbated by short-term borrowing. We also interpret the strong association between long-term international debt and the negative stock returns of non-bankrupted intermediaries to indicate that some properties of international debt beyond its short-term volatile nature affect its issuers in negative ways. One obvious property of international debt in this regard is the fact that it is issued in foreign currencies,

and can adversely affect firm value following an exchange rate depreciation. Mendoza (2001) offers a theoretical model in which foreign currency debt exacerbates the effects of international financial panics.

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Figure 1. Financial Debt Flows to Asia's Financial Intermediaries

The figure shows, at the country level, annual time series of the face value of new foreign-currency debt issued in international markets by Asia's financial intermediaries.

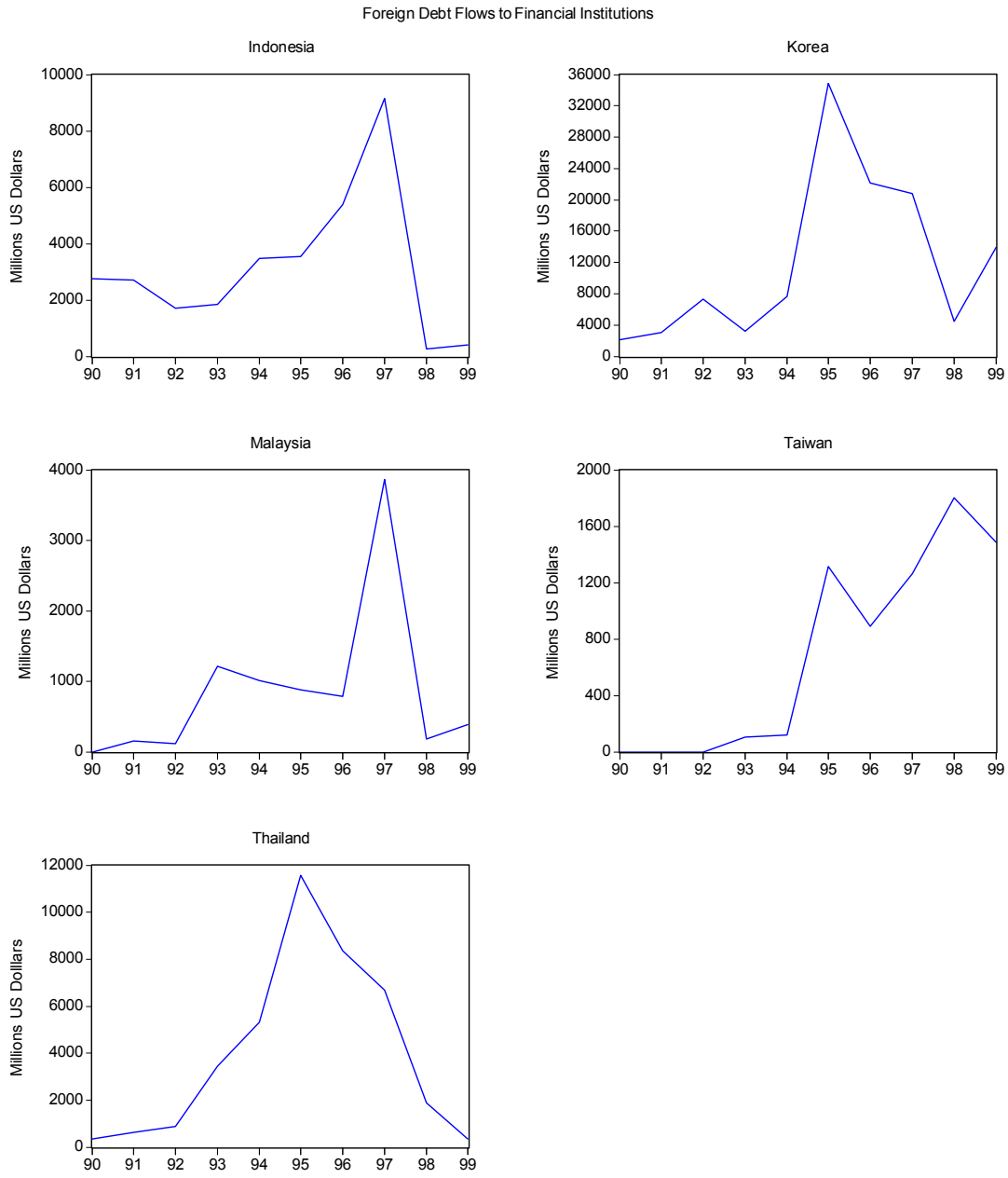

Table 1. Aggregate Descriptive Statistics

Panel A reports the country-level, annualized depreciation rate relative to the US dollar (*DEPR*), and the annualized return on the stock market index (*MKTR*). Panel B reports sample means and standard deviations for some control variables from firms' 1996 balance sheets. It includes leverage (the ratio of liabilities to assets, *LIABILITY/ASSET*), market valuation (the ratio of the sum of market capitalization plus liabilities to book assets, *VALUE/ASSET*), and the riskiness of assets (the ratio of loans to assets, *LOAN/ASSET* and securities to assets, *PAPER/ASSET*), and stock market turnover (*TURNOVER*). Panel C reports the US dollar value of market capitalization (*CAP*), and three balance sheet entries (BSEs), i.e., the book value of equity, assets, and liabilities, on the 1996 balance sheets and their subsequent annualized growth rates over 1997 and 1998. We also report the size of foreign exchange losses due to total, short-term, and long-term international debt relative to each of the BSEs.

Panel A			***Panel B***	
	COUNTRY VARIABLES		*CONTROLS*	
	DEPR	*MKTR*		Mean (S D)
Indonesia	1.51	-0.313	$LIABILITY/ASSET$	0.803 (.20)
Korea	0.236	-0.101	$VALUE/ASSET$	1.101 (.43)
Malaysia	0.335	-0.369	$LOAN/ASSET$	0.489 (.28)
Taiwan	0.101	-0.211	$PAPER/ASSET$	0.278 (.24)
Thailand	0.268	-0.275	*TURNOVER*	0.083 (.08)

Panel C					
Balance Sheet Entry (BSE)	*Growth Rate*	*Level (in US$ millions)*	$\frac{FXLOSS}{BSE}$ Mean (S D))	$\frac{FXLOSS^{98}}{BSE}$	$\frac{FXLOSS^{LT}}{BSE}$
CAP	-0.116 (.64)	US$215.08 (822.31)	0.26 (.62)	0.205 (.67)	0.180 (.44)
EQUITY	-0.037 (.44)	US$352.03 (514.73)	0.150 (.47)	0.061 (.17)	0.089 (.35)
ASSET	0.000 (.31)	US$4,531.47 (8906.26)	0.017 (.06)	0.006 (.02)	0.010 (.05)
LIABILITY	0.009 (.35)	US$4,181.19 (8447.03)	0.020 (.08)	0.007 (.02)	0.013 (.07)

Table 2. Sector-Level Descriptive Statistics

This table shows sample means for stock returns and outstanding international debt broken down by country and sector. The variables are the number of intermediaries in each country and sector (*N*), the percentage of intermediaries that have positive levels of international debt, the average percentage of debt that came due during the crisis period for those firms which had positive international debt ($IDEBT^{98}/IDEBT$), the average amount (in millions of US dollars) of outstanding international debt (*IDEBT*), the foreign exchange losses relative to pre-crisis market capitalization ($FXLOSS/CAP$), the annualized return over the period July, 1997 to December, 1998 (*RETURN*), and the percentage of intermediaries that failed during the crisis (*FAIL*).

				Averages:			
	N	% with *IDEBT> 0*	$\frac{IDEBT^{98}}{IDEBT}$	*IDEBT (US$ Million.)*	$\frac{FXLOSS}{CAP}$	*RETURN*	*FAIL*
Indonesia	**37**	**57%**	**41%**	**$44**	**0.37**	**-0.69**	**20%**
Banking	22	77%	43%	$52	0.43	-0.69	16%
Insurance	8	0%	.	$0	0.00	-0.61	4%
Securities	5	60%	15%	$67	0.77	-0.73	23%
Other	2	50%	86%	$73	0.09	-0.61	31%
Korea	**103**	**43%**	**23%**	**$207**	**0.16**	**-0.08**	**17%**
Banking	23	83%	19%	$665	0.20	-0.35	9%
Insurance	12	0%	.	$0	0.00	-0.25	0%
Securities	33	18%	32%	$14	0.05	0.32	30%
Other	35	54%	25%	$158	0.30	-0.15	14%
Malaysia	**52**	**13%**	**22%**	**$25**	**0.00**	**-0.47**	**4%**
Banking	15	40%	9%	$80	0.01	-0.45	0%
Insurance	9	0%	.	$0	0.00	-0.39	0%
Securities	1	0%	.	$0	0.00	-0.49	0%
Other	27	4%	100%	$3	0.00	-0.51	7%
Taiwan	**25**	**8%**	**0%**	**$17**	**0.00**	**-0.33**	**0%**
Banking	13	15%	0%	$32	0.00	-0.37	0%
Insurance	7	0%	.	$0	0.00	-0.29	0%
Securities	2	0%	.	$0	0.00	-0.30	0%
Other	3	0%	.	$0	0.00	-0.27	0%
Thailand	**86**	**59%**	**54%**	**$ 162**	**0.55**	**-0.08**	**40%**
Banking	14	100%	42%	$625	0.32	-0.35	36%
Insurance	21	0%	.	$0	0.00	-0.05	0%
Securities	3	67%	100%	$36	0.11	0.15	0%
Other	48	73%	57%	$105	0.89	0.03	60%
Total	**303**	**41%**	**39%**	**$127**	**0.26**	**-0.27**	**20%**
Banking	87	67%	30%	$308	0.22	-0.45	16%
Insurance	57	0%	.	$0	0.00	-0.25	4%
Securities	44	25%	40%	$21	0.13	0.01	23%
Other	115	49%	47%	$94	0.46	-0.25	31%

Table 3. Financial Performance: Part I

This table reports the coefficient estimates and standard errors from three specifications: a) a Tobit model of stock returns, R, treating failed intermediaries as a corner outcome, R = -1; b) a Probit model of the probability that a financial intermediary would fail; and c) a selection-corrected model of the stock returns of surviving intermediaries. Each regression includes either foreign exchange losses relative to market capitalization ($FXLOSS/CAP$), or the foreign exchange losses due to short-term and long-term debt ($FXLOSS^{98}/CAP$ and $FXLOSS^{LT}/CAP$). Additional control variables include liabilities to assets ($LIABILITY/ASSET$), financial value relative to assets ($VALUE/ASSET$), loans to assets ($LOAN/ASSET$), securities to assets ($PAPER/ASSET$), (logged) asset size (ln(*ASSET*)), and average monthly value of stocks traded relative to market cap (*TURNOVER*). Significant coefficients at the 1%, 5%, and 10% levels are marked with ♠, ♥, and ♦ respectively.

Model	[A] Tobit			[B] Probit		[C] Selection Corrected			
Dependent Variable	*RETURN*			*FAIL*		Select	*RETURN*	Select	*RETURN*
	[1]	[2]	[3]	[1]	[2]	[1]		[2]	
$\frac{FXLOSS}{CAP}$	-0.554♠ (0.114)	-0.336♠ (.107)		0.338♥ (.162)		-0.539♠ (.190)	-0.296♠ (.110)		
$\frac{FXLOSS^{98}}{CAP}$			-0.316♥ (.159)		0.806♥ (.341)			-0.751♥ (.360)	-0.084 (.180)
$\frac{FXLOSS^{LT}}{CAP}$			-0.361♦ (.186)		-0.177 (.336)			-0.384 (.350)	-0.355♥ (.170)
$\frac{LIABILITY}{ASSET}$		-1.416♠ (.281)	-1.413♠ (.281)	2.144♥ (.925)	2.193♥ (.926)	-1.438♠ (.480)	-1.396♠ (.260)	-1.726♠ (.510)	-1.319♠ (.250)
$\frac{VALUE}{ASSET}$		-0.265♠ (.101)	-0.264♠ (.101)	-1.613♥ (.759)	-1.509♥ (.758)	-0.225 (.160)	-0.229♥ (.090)	-0.090 (.280)	-0.250♠ (.090)
$\frac{LOAN}{ASSET}$		-0.552♥ (.225)	-0.558♥ (.228)	3.163♠ (.817)	3.038♠ (.822)	-0.979♠ (.370)	-0.465♥ (.220)	-1.089♥ (.480)	-0.390 (.200)
$\frac{PAPER}{ASSET}$		-0.142 (.261)	-0.143 (.261)	2.322♠ (.890)	2.245♥ (.893)	0.198 (.490)	-0.104 (.240)	-0.122 (.520)	-0.004 (.230)
ln*(ASSET)*		0.049 (.033)	0.049 (.033)	-0.132♦ (.082)	-0.135♦ (.082)	0.263♠ (.050)	0.091♠ (.030)	0.302♠ (.060)	0.076♠ (.030)
TURNOVER		-1.010♦ (.605)	-1.015♦ (.605)	0.281 (1.586)	0.072 (1.615)	0.881 (1.670)	-0.891 (.600)	0.382 (1.420)	-0.806 (.570)
MKTR				1.512 (1.574)	1.795 (1.591)	-0.763 (1.140)		-1.024 (1.190)	
DEPR				0.190 (.167)	0.229 (.168)	-0.351♠ (.120)		-0.333♥ (.130)	
N	267	267	267	303	303	303	205/303	303	205/303

Table 4. Financial Performance: Part II

Columns [D]–[F] report selection-corrected coefficient estimates and standard errors from models of the growth rates of three balance sheet entries (BSEs); the BSEs are book value of *EQUITY*, *ASSETS*, and *LIABILITIES*. The control variables include foreign exchange losses relative to market capitalization ($FXLOSS/CAP$), or the foreign exchange losses due to short-term and long-term debt ($FXLOSS^{98}/CAP$ and $FXLOSS^{LT}/CAP$). Additional control variables include liabilities to assets ($LIABILITY/ASSET$), financial value relative to assets ($VALUE/ASSET$), loans to assets ($LOAN/ASSET$), securities to assets ($PAPER/ASSET$), (logged) asset size (ln(*ASSET*)), and average monthly value of stocks traded relative to market cap (*TURNOVER*). Column [G] reports a Tobit regression of the determinants of the share of an intermediary's liabilities that is international debt ($IDEBT/LIABILITY$). Column [H] reports a Tobit model of returns similar to Table 3, Column A[2], but also controls for $IDEBT/LIABILITY$. Significant coefficients at the 1%, 5%, and 10% level are marked with ♠, ♥, and ♦ respectively.

	Annualized Growth Rate of Balance Sheet Entry 1996-1998:						Tobit	
Dependent Variable	[D] *EQUITY*		[E] *ASSET*		[F] *LIABILITY*		[G] $\frac{IDEBT}{LIABILITY}$	[H]*RETURN*
	[1]	[2]	[1]	[2]	[1]	[2]		
$FXLOSS/BSE$	-0.576♥ (.290)		-6.384♠ (2.300)		-5.268♠ (1.750)			-0.490♠ (.160)
$FXLOSS^{98}/BSE$		-0.523 (.870)		-21.544♠ (4.030)		-18.072♠ (3.440)		
$FXLOSS^{LT}/BSE$		-0.544 (.440)		-1.682 (2.850)		0.311 (2.410)		
$LIABILITY/ASSET$	0.247 (.240)	0.267 (.240)	-0.169 (.160)	-0.191 (.170)	-0.235 (.170)	-0.249 (.170)	0.396♠ (.099)	-1.445♠ (.280)
$VALUE/ASSET$	0.174 (.120)	0.176 (.120)	0.292♠ (.070)	0.378♠ (.080)	0.445♠ (.080)	0.483♠ (.080)		-0.263♠ (.100)
$LOAN/ASSET$	0.040 (.200)	0.062 (.200)	-0.530♠ (.160)	-0.640♠ (.130)	-0.508♠ (.140)	-0.527♠ (.140)	-0.198♠ (.062)	-0.501♥ (.230)
$PAPER/ASSET$	0.429♦ (.230)	0.438♦ (.230)	-0.130 (.170)	-0.077 (.170)	-0.184 (.170)	-0.035 (.180)	0.066 (.064)	-0.171 (.260)
ln(*ASSET*)	0.005 (.030)	0.003 (.030)	0.073♠ (.020)	0.105♠ (.020)	0.081♠ (.020)	0.108♠ (.020)	0.041♠ (.009)	0.048 (.030)
TURNOVER	-0.713 (.470)	-0.713 (.480)	-0.042 (.330)	0.329 (.350)	-0.024 (.360)	0.376 (.380)	-0.015 (.171)	-1.012♦ (.610)
$IDEBT/LIABILITY$								1.018 (.700)
N	181/266	181/266	195/266	195/266	194/266	194/266	303	267