Global Shock and Foreign Bank Lending:
Choice of Home and Local Currency Loans in Indonesia

Yuki Masujima

Bloomberg L.P.

ABSTRACT

This empirical paper investigates a shock transmission path between a home country (a country where globalized banks' headquarters are located) and a host country (Indonesia as the emerging market) through the lending channel of global banks' local branches (i.e., the internal transfer channel). Using novel data of monthly individual foreign bank's balance sheet in Indonesia, I find the evidence that shocks to a parent bank and a home economy are transmitted to a host economy through the foreign banks' internal capital market. A change in a home stock market index and industrial production appears to have a negative effect on growth rates in foreign currency loans of foreign banks in the host market. On the other hand, high growth rates in the parent bank's stock price in the home market lead to an increase in foreign banks' U.S. dollar lending in the host country. This effect does not appear in local currency lending because limited hedging instruments against foreign exchange risk results in immobility of bank capital in the local currency.

1. Introduction

Global banks played a significant role in the transmission of the global crisis of 2007–2009 to emerging market economies. U.S. liquidity shocks to developed-country banking have reduced lending in local markets through contractions in cross-border lending to banks and private agents. As well, contractions in parent banks' support of foreign affiliates also played a substantial role in the crisis. (Cetorelli & Goldberg, 2009). As banks have become more globalized, shocks to their lending activities are more efficiently transmitted across countries. How are the shocks transmitted between a home country, where globalized banks' headquarters are located, and a host country, where they do banking business via local branches? Does foreign banks' lending stabilize or destabilize credit supply in emerging markets? Does a response of credit supply to financial and macroeconomic shocks differ between the foreign currency and local currency? These are important questions that should be answered.

Shocks to firm's loan demand and parent banks' capital in parent banks' home countries could have implications for local business through the lending channel in a host country. In international banking, negative shocks to the loan demand in a home economy could lead to shifting capital from a home country to a host country. Since foreign banks' credit supply in host markets depends on the home economy as well as host economy, their credit supply in host countries may be more stable than domestic banks' credit supply, which depends on only a host economy, during a crisis. For example, despite the fact that shocks to the Indonesian economy were probably the biggest among countries during the Asian crisis of 1997-98, foreign bank lending denominated in U.S. dollars did not drop by as much credit as state owned banks and local private banks did during the crisis (Figure 1, right middle).[1] In fact, most foreign banks tended to increase their lending to Latin America when economic conditions in their home countries worsened (Martinez Peria, Powell, & Hollar, 2002).

Negative shocks to a parent bank's capital could lead to less foreign currency lending because foreign banks' branches typically rely on a parent bank or financial markets to finance foreign currency (U.S. dollars). Binding risk-based capital requirements coupled with the rapid drop in the prices of parent banks' home assets resulted in a decrease

---

[1] In 1998, the real GDP growth rate dropped to -13.2 percent; the inflation rate skyrocketed to 77.6 percent; the Indonesian Rupiah per U.S. dollar was depreciated by 85 percent; non-performing loans reached almost a half of total lending. Consequently, domestic private banks and state owned banks deduced half of their loans due to write-off.

in lending by foreign banks in host countries (Peek & Rosengren, 1997).

The currency denomination for loans plays a more significant role in developing countries than in developed countries. In developing countries, foreign exchange risk directly reflects the share of foreign currency loans to total loans because instruments for hedging currency risk are usually not well developed. This foreign exchange risk is amplified if foreign currency borrowing is a main funding source for banks. Figure 1 shows the difference between foreign currency and local currency lending of foreign banks. Unlike the foreign currency loans of foreign banks, the change in trend for foreign banks' local currency lending is similar to domestic banks. In the developed world, however, currency denomination could be relatively neglected because foreign exchange risk can be hedged by derivatives such as futures, currency options, and currency swaps.

Within undeveloped foreign exchange markets, local currency lending in a host country can be regarded as immobile capital across countries, while foreign currency lending is mobile between a home and a host country. In the Indonesian case, foreign banks' Rupiah loans can be almost fully financed by their customers' deposits because the loan to deposits ratio in Rupiah is approximately 100 percent or slightly below that on average (Figure 2). Loans and deposits may be precisely balanced because banks are really concerned about hedging, but can't do it. In contrast, the loan to deposit ratio of foreign banks' branches in U.S. dollars clearly exceeds 100 percent. Thus, they must rely on internal borrowing through which shocks to their parent bank and their home country become transmitted to host countries (Figure 3). Where the above is concerned, currency denomination is important.

This empirical paper investigates the lending channel of global banks through local branches (i.e., an internal transfer channel) as a shock transmission path between Home (a country where globalized banks' headquarters are located) and Host (Indonesia as the emerging market). I extend the interstate banking model of Morgan, Rime, and Strahan (2004) to the international banking model between Home and Host by considering capital immobility in local currency lending under an undeveloped foreign exchange market. Internal capital transfer is often discussed in the context of multinational banks' asset and cash management in developed economies; most of the literature focuses on cross-border lending, which means global bank's headquarters directly provide loans to firms in other countries, rather than foreign banks' lending via local branches because local branch data is often not publically available. Since I have time-series data on the domestic and foreign

currency lending activities of individual local banks and branches of foreign banks, this paper contributes to further insight into shock transmission through internal capital and the connection between these strands of literature in the case of a developing country. The concept of the internal capital channel could be applicable to any country where foreign banks disburse foreign currency loans although this paper covers only Indonesia due to data availability.

I find the evidence that global banks' internal capital market plays a vital role in transmitting shocks to a parent bank and its home market, that is, a change in a home stock market index and industrial production appears to have a negative effect on growth rates in foreign currency loans of foreign banks in the host market. On the other hand, high growth rates in the parent bank's stock price in the home market lead to an increase in foreign banks' U.S. dollar lending in host countries, but not local currency lending owing to immobility of capital in local currencies.

The structure of this paper is as follows. In the next section, I present the theoretical background and empirical results of the literature. In section 3, data sources and data summary are described. In section 4, I describe the econometric methodologies and results. Section 5 presents the conclusion.

2. Literature Review and Theoretical Model

2.1 Literature Review

Most of the theoretical mechanisms of interaction between foreign banks entry and a host country's economic stability elaborate on the fact that lending by the subsidiaries of foreign banks will be relatively stable because it is based on the decisions of a foreign-based parent bank with an internationally diversified asset portfolio. Thus, the parent bank may stand in as the lender of last resort during the crisis period of a host country. It may also manage an internal capital market and centralized treasury operations to allocate capital and liquidity over its subsidiaries (Stein, 1997). This system contributes to stable loan supply of foreign banks in a host country when foreign branches undergo capital shocks. Compared to domestic banks, foreign bank subsidiaries may be able to recover relatively fast. Unlike unit (stand-alone) banks, members of large global banks appear to resort to funds available through conglomerates' internal capital markets to sustain their loan supply during a contraction, suggesting that the internal capital market

reduces risk due to diversification effects (Ashcraft, 2008; Ashcraft & Campello, 2007; Campello, 2002; De Haas & Van Lelyveld, 2010). Consequently, internal capital markets within global banks relax the credit constraints faced by smaller bank affiliates.

The foreign bank entry's stabilizing effect on the credit supply in a host country is also empirically explained by diversity of bank ownership. During the second half of the 1990s foreign banks that had been present in a shot country for a relatively long time exhibited stronger and less volatile credit growth than domestic banks. Furthermore, during times of a host country's crisis, diversity of ownership has contributed to greater stability of credit as foreign banks showed significant credit growth during crisis periods and thereafter (Dages, Goldberg, & Kinney, 2000). Since foreign banks viewed such economic calamities as opportunities to expand by acquisition or by growth of existing subsidiaries, they did not reduce their credit supply during adverse economic times in the host country (Goldberg, 2001; Martinez Peria, et al., 2002). Thus, diversity of bank ownership helps firms to diversify the sources of funds in a host country.

Meanwhile, under certain circumstances foreign banks may also destabilize an economy and credit market. The bank health of a parent bank is the critical element in the growth, volatility, and cyclicality of bank credit (Dages, et al., 2000). Thus, a parent bank's financial problem leads to instability in lending in a host country regardless of financial conditions of the bank's branches. In addition, a positive link between foreign bank presence and economic volatility might tentatively exist (Morgan & Strahan, 2003). If there is no restriction on capital flows, foreign banks become relatively sensitive to local business conditions as they are better able to reallocate funds outside the particular host country via internal capital markets (De Haas & Van Lelyveld, 2006). Therefore, locally-issued claims tend to be more stable than cross-border flows (Goldberg, 2005). This implies that unit bank lending might provide more stable credit than international lending does in the above cases

In the empirical study of business cycles in a home country and banking activity in a host economy, there is a negative relationship between the home country business cycle and the foreign subsidiary's credit supply. When home country conditions improve, the opportunity costs of limiting home country lending increase and banks may therefore allocate less capital to their foreign branches (De Haas & Van Lelyveld, 2006; Molyneux & Seth, 1998; Moshirian, 2001). Similarly, worsening home country conditions led banks to seek external lending opportunities (Calvo, Leiderman, & Reinhart, 1992; Hernandez &

Rudolph, 1997; Moshirian, 2001). Despite the fact that in some cases, bank lending to emerging countries is positively correlated with the economic cycles of the major industrialized countries (Jeanneau & Micu, 2002) or the push relationship may depend on the region(s) in which foreign branches are operating (Goldberg, 2001), financial conditions of a parent bank and foreign branches are not well-controlled in these studies.

While some papers also shed light on the currency mix preferred by firms (Basso, Calvo-Gonzalez, & Jurgilas, 2007; Benavente, Johnson, & Morande, 2003; Galindo, Panizza, & Schiantarelli, 2003; Kedia & Mozumdar, 2003) and the deposit dollarization of banks (Bahmani-Oskooee & Domac, 2003; Honohan & Shi, 2001), this paper focuses on the discussion of the currency denomination of loans for a developing country to the context of capital mobility of global banks' lending. Since hedging instruments of foreign exchange risk for local currency in a developing country are usually limited, loans and deposits in local currency can be regarded as immobile across countries. If capital is immobile, loan-to-deposit ratios should be smaller than 100 percent. In fact, striking differences in patterns of foreign currency borrowing between countries are explained by the loan-to-deposit ratios, openness, and the interest rate differential. (Rosenberg & Tirpák, 2008).

Moreover, the impact of macroeconomic and financial shocks on local and foreign currency lending might be different. Even if it is easier for banks to borrow in local currency rather than in dollars during times of crisis, banks will hold a relatively large amount of dollars and a relatively small amount of local currency (Machicado, 2008); a two-currency banking model illustrating the direction in which dollarization tends to move with macroeconomic shocks is shown to depend on interest rates, exchange rate risk, costly banking, initial dollarization levels, and so forth (Catao & Terrones, 2000). Thus, Under high liquidity uncertainty, banks may prefer U.S. dollar to local currency loans.

For global bank activity in emerging markets, there is no comprehensive theory which determines that parent banks trade off lending across several countries ("substitution effect") and that they support weak subsidiaries ("support effect") (De Haas & Van Lelyveld, 2010).[2] However, a useful analogue is provided by a two-country interstate model in which the negative impact of a bank capital crunch in a state on bank loans is smaller under interstate banking than under unit banking due to capital transfer from one

---

[2] Derviz and Podpiera (2007) try to study theoretically the interdependence of lending decision in different country branches as the propagation caused by delegation and precautionary motives.

state to another (Morgan, Rime, & Strahan, 2004). This model also proves that the negative impact of a firm's capital (collateral) squeezes in a state on the amount of bank loans in a home state is larger under interstate banking. In the model, an interstate bank's capital is constrained; the bank is risk-neutral and propagates shocks due to the rebalance of their interstate credit portfolios in response to state-specific shocks. Although this is an interstate model, it can be extended to international banking activity with modification. The extension of the model is explained in the next section.

2.2 Theoretical Base Model: Two-Country International Lending in the Holmstrom and Tirole Model (the HT model)

In a two-country international lending model, I show how a positive effect on firm capital (or loan demand) and a negative effect on bank capital (or loan supply) in a home country leads to contractions in lending in a host country. This shock transmission does not appear under the unit banking (i.e., no mobility of bank capital across countries). Holmstrom and Tirole (1997) provide a one-state model where bankers can choose either to prevent moral hazard by monitoring firms or to admit moral hazard by giving up monitoring. Owing to these frictions, firm collateral and bank capital determine the flow of credit and investment spending; contractions in either cause reduction in aggregate investment spending (Holmstrom & Tirole, 1997). This HT model consists of firms, banks that have a strategy to monitor firms, and investors that are unable to monitor firms. In addition to banks' own capital, banks can also work as intermediaries by collecting money from investors and disbursing money to firms' projects.

Morgan et al. (2004) develop the interstate version of the HT model, adding a second physical place ("state") where bank capital can flow. I apply the Morgan et al.'s model for international banking and then use the model to compare the impact of firm capital demand shocks and bank capital supply shocks under unit banking with international banking operations (where bank capital can flow freely across countries). Morgan et al. (2004) emphasize the impact of shocks to firms and bank capital in a home state on lending in the home state. This paper, however, focuses on the impact of shocks to firm and bank capital in a home country on lending in a host country. In general, I assume that global banks' U.S. dollar lending follows the international banking regime and that their local currency lending in a host country follows the unit banking regime due to underdeveloped foreign exchange markets (as confirmed by data presented below). Thus, banks can only monitor in their home state and are passive investors in the other state.

[7]

I proposed three hypotheses: (1) high growth rates in a parent bank's stock price (when parent and stock index moves in opposite way) in the home market increase the bank's U.S. dollar lending in a host country through their internal capital market, but not their local currency lending; (2) high growth rates in industrial production reflecting investment demand in a home country reduce banks' U.S. dollar lending in a host country, but not their local currency lending; and (3) declines in the home stock index pushes up foreign banks' U.S. dollar lending in a host country, but not their local currency lending.

These hypotheses are intuitively explained as follows. First, suppose that a parent's stock price, at least partly, reflects the bank's ability to raise new capital.[3] Then, a change in the parent bank's stock price positively affects the foreign bank's lending in U.S. dollars through internal the capital market as we see in Figure 3. However, the parent's stock price does not directly affect bank lending in Rupiah because of immobility in capital denominated in Rupiah as if it were under the unit banking regime. Currency denomination plays a vital role in distinguishing shock transmission via internal capital markets from other channels as internal capital markets determine whether or not bank capital is mobile across countries in this model. Second, suppose industrial production reflects a firm's demand for loans. Then, high production growth leads to strong demand for loans in a home country. This probably results in higher lending rates, thus global banks transfer capital from a host country to a home country. Similarly, assuming that higher return rates of the home stock index reflects higher expected returns on the firm's projects or a higher value of the firm's collateral, strong loan demand in a home country finally results in bank capital transfer from a host country to a home country.

In this paper's model setup, unlike the Morgan et al. interstate model, this model provides a framework for understanding international banking by assuming that banks perform different functions at home and abroad—-they monitor at home and are passive investors abroad, and as the relative demands for these services change, they shift capital back and forth. This setup is applied to foreign currency lending provided by global banks under international banking regime, while local currency lending provided by global banks under unit banking regime simply follows one state model in Morgan et al. (2004). I start from a unit banking model, which is applied for an international bank's local currency lending and a local bank's lending. I assume all firms, banks, and investors are risk neutral

---

[3] Credit Default Swap spreads of parent banks would be an alternative measurement to raise new capital, but they are not available for all the banks and all the sample periods.

as the same as the model in Morgan et al. (2004). Firms choose between a good project and one of two bad projects. The "good" project succeeds with probability p_H; both "bad" projects succeed with probability p_L. Define the relative likelihood of success as $\Delta p = p_H - p_L > 0$. Let I be the amount of capital that a bank invests in a firm that it monitors; they return R (per-unit invested) if they succeed and 0 if not. The two bad projects also produce different amounts of private benefit (b); type B bad projects produce a larger private benefit ($B > b$). Local banks can prevent B investments by monitoring, but not b investment. Monitoring cost c per unit of investment. Local banks must invest enough of their own capital in the project to be credible monitors.

Firms borrow from both local banks and the international banks. If the projects succeed, firms, local banks, and international banks receive Rf, Rm, and Ru. Rf must be large enough to induce the firm to choose the good project ($Rf \geq bI/\Delta p$). Rm must be large enough to induce the monitoring bank to lend ($Rf \geq cI/\Delta p$). At equilibrium, the two incentives' constraint and the firm's budget constraint will bind. The maximum pledgeable income, defined by HT as the maximum expected income per unit of investment that can be guaranteed to international banks without destroying incentives, is then equal to $p_H (R - (b + c)/\Delta p)>0$.

Under the unit banking regime, I assume that bank capital is completely immobile across Home (Source) and Host (Destination). Thus, the equilibrium in each country is the same as in the HT one-state model. Let β and γ denote the rates of return required by banks and investors, respectively. Let Kf_S be the aggregate amount of firms' capital in Home where global banks' headquarters are located, Km_S the aggregate amount of local banks' capital in Home, and Ku_S the aggregate supply of investors' capital in Home. The first two are fixed, while the third is determined so that the demand for investors' capital (the sum of the pledgeable expected returns of individual firms, discounted by γ) equals the supply of investors' capital $S(\gamma)$. Banks can finance money from investors, paying γ. Let $\gamma_S = \gamma_S(Ku_S)$ be the inverse supply function in Home. The equilibrium in the international capital market in Home requires that

(1) $\quad p_H(Kf_S + Km_S + Ku_S)(R - (b + c)/\Delta p) = \gamma_S(Ku_S) \, Ku_S.$

The equilibrium quantity of investors' capital in Home is determined by

(2) $\quad \gamma_S(Ku_S) = p_H(Kf_S + Km_S + Ku_S)(R - (b + c)/\Delta p)/ \, Ku_S.$

Thus, the equilibrium is at X in Figure 4. If there are shocks that cause investors to require higher γ_S, the shocks lead to an inward shift in $\gamma_S(Ku_S)$ and an upward shift in $p_H(Kf_S + Km_S + Ku_S)(R - (b + c)/\Delta p)$. Consequently, the investors' capital supply decreases at the new equilibrium. This is expressed as

(3) $Ku_S = p_H (- b - c + R \cdot \Delta p)(Kf_S + Km_S) / (p_H(b + c - R \cdot \Delta p) + \Delta p \cdot \gamma_S)$.

The equilibrium rates of return in bank capital markets in Home is defined by

(4) $\beta_S = p_H \cdot c(Kf_S + Km_S + Ku_S) / (Kf_S + Km_S \cdot \Delta p)$.

Similarly, Kf_D is the aggregate amount of firms' capital in Host; Km_D is the aggregate amount of local banks' capital in Host; Ku_D is the aggregate supply of investors' capital in Host.

Now, I move onto an international banking model, which is applied for an international bank's foreign currency lending. Under international banking, I assume bank capital can move freely to equalize b across Home (Source, designated by the subscript S) and Host (Destination, designated by the subscript D). Let $Ku_S{}^*$ and $Ku_D{}^*$ be capital disbursed to firms in Home and Host via international banking. Denote w_S as the share of aggregate bank capital $(Km_S + Km_D)$ invested in Home. Equilibrium with international banking is determined by these five equations:

(5) $p_H(Kf_S + w_S(Km_S + Km_D) + Ku_S{}^*)(R - (b + c) /\Delta p) = \gamma_S(Ku_S{}^*) Ku_S{}^*$

(6) $p_H(Kf_D + (1 - w_S)(Km_S + Km_D) + Ku_D{}^*)(R - (b + c) /\Delta p) = \gamma_D (Ku_D{}^*) Ku_D{}^*$

(7) $\beta_S = p_H \cdot c(Kf_S + w_S(Km_S + Km_D) + Ku_S{}^*) / (\Delta p \cdot w_S(Km_S + Km_D))$

(8) $\beta_D = p_H \cdot c(Kf_D + (1 - w_S)(Km_S + Km_D) + Ku_D{}^*) / (\Delta p \cdot (1 - w_S)(Km_S + Km_D))$

(9) $\beta_S = \beta_D$.

Solving the above, the equilibrium quantities attracted by firms in Home and Host are

(10) $Ku_S{}^* = p_H (- b - c + R \cdot \Delta p)(Kf_S + Kf_D + Km_S + Km_D) Kf_S$
              $/ [(p_H(b + c - R \cdot \Delta p) + \Delta p \cdot \gamma_S)(Kf_S + Kf_D)]$.

(11) $Ku_D{}^* = p_H (- b - c + R \cdot \Delta p)(Kf_S + Kf_D + Km_S + Km_D) Kf_D$
              $/ [(p_H(b + c - R \cdot \Delta p) + \Delta p \cdot \gamma_D)(Kf_S + Kf_D)]$.

Equation (10) implies that $Ku_S{}^*$ is determined by Kf_S and γ_S as the sum of firm capital and bank capital in Home and Host ($Kf_S + Kf_D + Km_S + Km_D$) is fixed. Similarly, equation (11) implies that $Ku_D{}^*$ is determined by Kf_D and γ_D. Then, the share of bank capital invested in Home and Host are

(12) $w_S = Kf_S / (Kf_S + Kf_D)$

(13) $w_D = (1 - p_S) = Kf_D / (Kf_S + Kf_D)$.

Equations (12) and (13) imply the shares of bank capital allocated in Home and Host are the shares of firm capital in Home and Host. Therefore, a positive shock to firm capital in Home leads to a decrease in bank capital in Host.

Figure 5 shows how shocks to a firm's capital demand (Panel A) and a bank's capital (Panel B) affect the amount of capital supply invested by banks and investors in Home and Host (L_S, L_D). Let L_S and L_D be $Km_S + Ku_S{}^*$ and $Km_D + Ku_D{}^*$. A positive shock to a firm's capital demand or firm capital (an increase in Kf_S) in Home leads to an increase in β_S in equation (7), resulting in an upward shift in demand curve D in Home (Panel A). A rise in β_S gives incentive for a global bank to transfer capital from Host to Home, ending up with a decrease in loan supply in Host. Moreover, if a negative shock to bank capital in Home (a decrease in Km_S) causes an increase in γ_S, investors' capital $Ku_S{}^*$ declines in Home, resulting in an inward shift in $S(\gamma_S)$ in Home (Panel B). A rise in β_S provides incentive for a global bank to transfer capital from Host to Home, ending up with a decrease in loan supply in Host. Thus, a negative shock to bank capital in Host leads to a smaller reduction in the amount of capital supply from banks and investors under international banking. In contrast, with unit banking as shown in equations (2) and (3), the transmission of shocks from Home to Host cannot take place. Therefore, we have the following propositions.

PROPOSITION 1: *if bank capital is mobile across countries, the positive impact of a firm's capital in Home (an increase in Kf$_S$) leads to an increase in the amount of a bank's and an investor's capital in Home and a reduction in the amount of a bank's and an investor's capital in Host.*

PROPOSITION 2: *if bank capital is mobile across countries ,the negative impact of a parent bank's capital in Home (a decrease in Km$_S$) leads to an increase in the amount of a bank's and an investor's capital in Home and a reduction in the amount of a bank's and an investor's capital in Host.*

[11]

3. Data and descriptive statistics

3.1 Data Source

The monthly balance sheet and financial statement of major local banks including foreign banks' branches at the bank level are published by Bank Indonesia every month[4]. I use this novel dataset, which on average covers approximately 80 percent of loans outstanding in the Indonesian banking sector from December 2001 to December 2008[5]. The coverage exceeds 95 percent of foreign banks' loans. Thus, the dataset covers a significant share of the Indonesian Banking sector, especially for foreign banks. Moreover, I use host lending rates and host deposit rates available at Bank Indonesia's website.[6] The advantage of this dataset is availability of interest rates by type of banks and type of use by currency. I decide to use working capital lending rates and 1-month time deposit rates as lending and deposit rates in Host. They are average rates for each type of banks. Thus, there are three lending rates for state owned banks, domestic private banks, and foreign banks.

Monthly data is most suitable for capturing a response to financial and economic shocks from a parent bank and a home country. Such a response might be unobservable in quarterly and annual data because during an ongoing global crisis, financial institutions are forced to respond to shocks much quicker than before the crisis period.[7] Monthly financial and economic data is mainly collected from International Financial Statistics unless otherwise specified. Daily exchange rates, stock prices of parent banks and stock indices of home countries are collected from Datastream (Thomson Financial).

---

[4] As of March 29, 2009, individual bank's data is available at the Bank Indonesia website (http://www.bi.go.id/web/en/Publikasi/Laporan+Keuangan+Publikasi+Bank/Bank/Bank+Umum+Konvensional/).

[5] I excluded regional government banks and private banks that are not permitted to deal with foreign exchanges. If they were included, the coverage would have been more than 90 percent in the banking sector. The coverage ratio is stable through the sample period even if the dataset is decomposed by type of banks.

[6] This is available at http://www.bi.go.id/web/en/Statistik/Statistik+Ekonomi+dan+Keuangan+Indonesia/Versi+HTML/ as of March 29, 2009.

[7] Bankscope, provided by Bureau van Dijk, is one of the most commonly used databases for research at the level of individual bank activity. The coverage of Bankscope is comprehensive and generally covers approximately 90 percent of total bank assets in each country. Although Bankscope provides the balance sheet and income statement of foreign bank's affiliates, it does not cover foreign bank's branches because they are usually not reported separately from the headquarters in consolidated financial statements. Moreover, the frequency of data is usually on an annual basis, or at most a quarterly basis.

3.2 Indonesian Banking Sector and Descriptive Statistics

The size of the Indonesian banking sector is approximately 70 billion U.S. dollars on average during the sample period (Table 1). Domestic credit (including non-bank financial institutions) to GDP ratio is 47.0% as of 2005 (World Development Indicator). This is higher than most Latin American countries (e.g., Argentina 38.3%, Mexico 35.3%), but the lowest of ASEAN's four largest economies (Malaysia 143.7%, the Philippines 50.9%, Thailand 111.1%). Thus, in this financial development measurement Indonesia ranks medium in the emerging markets. The annual loan growth rate is 22.9%, with local currency loans expanding more rapidly than foreign ones. Consequently, the share of foreign currency lending (21.6%) tends to decrease during the period. Of the three types of banks, domestic private banks enjoy the highest annual loan growth rates in local currency (28.9%) and foreign currency (18.6%). Only their market shares increase, accordingly. Foreign banks appear to rely on a parent bank or the financial market to finance foreign currency because the average loan to deposit ratio exceeds 100% (local bank deposit).

Despite the fact that Indonesia's banking sector was closed before the Asian crisis of 1997-98, the significant expansion of the foreign banking presence in the post crisis period could be evidence of openness of the banking sector (Sato, 2005). Consequently, foreign investors, sovereign wealth funds, and international organizations have been major shareholders in leading domestic banks. According to Bank International Settlements (B.I.S.), foreign banks are defined as ones with more than 50 percent foreign shareholders. However, the object of this paper is to distinguish two types of financial sources such as deposits and internal capital markets. Thus, the criterion that I use to distinguish among different types of banks is whether they manage genuine international portfolios or manage just an Indonesian portfolio.

As discussed, the mixed ownership structure made it difficult to evaluate the impacts of home factors on the lending activity of Indonesian banks taken over by more than one foreign investor. Yet in-depth analysis of ownership is not the objective of this paper. By this paper's definition, therefore, foreign banks do not include banks taken over by foreign investors even if the share of ownership exceeds 50 percent. I define foreign banks as banks founded by greenfield investment of a foreign parent bank because acquired banks were recently acquired and are not yet well-integrated. This (what) means they run

the business in Indonesia as branches of foreign banks.[8] For example, Standard Chartered Bank (United Kingdom) owned 44.5 percent of PT Bank Permata Tbk as of December 2007,[9] however the management of Standard Chartered has emphasized localized strategies in Indonesia. This implies that Bank Permata still disburses Rupiah loans that are fully covered by local customers' deposits and invests in Indonesian government bonds. Other Indonesian banks with high levels of foreign ownership are in a similar situation.

The list of individual banks is available in Appendix 1. Although there are only five state owned banks, their market share in terms of loans is more than one-third in both the currencies. The number of foreign banks covered in the dataset is twenty-two; the number of countries of foreign banks' operational scope is ten; the loan market share of each foreign bank is under 2 percent except Citibank (2.5%). Although total share of foreign banks are 10.4 percent, their share in U.S. dollars is about 40 percent. Thus, the lending market is not dominated by one or a few foreign banks. Meanwhile, their foreign currency loan to total loan ratio is much higher than state owned banks and domestic private banks[10]. Thus, foreign banks have a high presence in foreign currency lending. Since almost all the lending in foreign currency is denominated in U.S. dollars, I assume that only the U.S. dollar would be used for foreign currency lending[11]. This implies that foreign banks (except for U.S. banks) might face foreign exchange rate risks between their home currency and U.S. dollars even if they do not lend loans in the Indonesian Rupiah. Growth rates of local currency loans (LC Loan Growth Rates) mean growth rates of local currency loans denominated in the Indonesian Rupiah. Growth rates of foreign currency loans (FC Loan Growth Rates) mean growth rates of foreign currency loans denominated in U.S. dollars. The original data is shown in the Indonesian Rupiah. Thus, the value of foreign currency loans is converted to U.S. dollars by the monthly average of exchange rates from IFS.

4. Methodology and Results

4.1 Empirical Base Models

In econometric methodology, I modify De Haas and Van Leyveld (2006, 2009) who

---

[8] In the classification of Bank Indonesia, *Joint Venture Bank* and *Foreign Bank* belong to the definition of foreign banks in this paper.

[9] Ownership information is based on Bankscope, hereafter.

[10] The exception is PT Bank Ekspor Indonesia Persero (State Owned Bank), where the foreign currency loan ratio is high (45.7 %) since it is in charge of trade finance.

[11] In fact, Bank Indonesia publishes lending and deposit rates in U.S. dollars only.

also use the theoretical framework by Morgan et al (2004) to investigate how lending by multinational bank subsidiaries. In their estimations the dependent variable is the credit growth of subsidiary *i* and the independent variables include a standard set of host-country conditions and a standard set of financial characteristics of subsidiary *i* itself. To test for the presence of substitution and support effects, De Haas and Van Leyveld add a number of parent bank characteristics and the (weighted) average risk/return characteristics of the other subsidiaries of the same bank holding company.

While I use a framework similar to De Haas and Van Leyveld, I separately estimate the impacts of the above variables on the growth rates of local currency and foreign currency lending to see if a currency choice is important due to capital mobility via the internal capital market. Another difference is data frequency. I use monthly data, while De Haas and Van Leyveld opt for annual data. Moreover, I add a home exchange rate to control the effect of exchange risk for a home country. Since loan data by currency at the bank level is not available for most countries, I have to exclude variables related to the average risk/return characteristics of the other branches of the same bank holding.

I follow the selection of variables from De Haas and Van Lelyveld (2006, 2009) as a baseline except for the above points. De Haas and Van Lelyveld (2006) do not focus on the value of the unobserved bank-specific effect m_i for a particular bank, but rather in making inferences with respect to population characteristics and thus estimated the random effects model. Since I would like to pay more attention on the individual characteristics of banks, I estimate the fixed effects model, following De Haas and Van Lelyveld (2009).[12]

(14) $GR_{it} = \alpha + \beta_1 \, (\text{Lending-Deposit Rate})_{jt} + \beta_2 \, Host + \beta_3 \, Branch + \beta_4 \mathbf{Z} + \mu_i + \varepsilon_{it}$

(15) $GR_{it} = \alpha + \beta_1 \, (\text{Host} - \text{Home Lending Rate})_{kt} + \beta_2 \, Host + \beta_3 \, Branch + \beta_4 \, Home$

$\qquad + \beta_5 \, Parent_{kt} + \beta_6 \mathbf{Z} + \mu_i + \varepsilon_{it}$

where

> GR_{it} is percentage loan growth of bank *i* in month *t*;
>
> α is the intercept term;
>
> $(\text{Lending} - \text{Deposit Rate})_{jt}$ is a difference between lending rates and deposit rates in Indonesia in month *t*;
>
> $(\text{Host} - \text{Home Lending Rate})_{kt}$ is a bank's lending rate in Indonesia minus the bank's lending rates in home
>
> $\qquad$ country *k* in month *t*;
>
> *Host* consists of $HOST\_FX_t$ a monthly return rate of a value of Indonesia Rupiahs per U.S. dollar,

---

[12] Hausman test indicates that a panel with fixed effects is more appropriate than one with random effects.

HOST_IP$_t$ the monthly growth rates in industrial production index in Indonesia, *HOST_CPI$_t$* the monthly change in inflation rates in Indonesia, *HOST_SI$_t$* the monthly rate of returns for the stock index return in the Jakarta Stock Exchange in month *t*;

Branch consists of *Size$_{it}$* (the loan market share of the Indonesian banking sector by currency), *Profitability$_{it}$* (Return On Assets before income tax), *Efficiency$_{it}$* (interest margin by currency), *Liquidity$_{it}$* (liquidity assets divided by total assets of a bank), and *Solvency* (capital divided by total assets) for bank *i* in month *t*;

Home consists of *HOME_FX$_{kt}$* the monthly return rate of the value of home currency per U.S. dollar, *HOME_IP$_{kt}$* the monthly growth rates in the industrial production index of the home country, *HOME_SI$_{kt}$* the monthly rate of returns for a stock index in home country *k* in month *t*;

Parent$_{kt}$ is the monthly rate of returns for the parent bank's stock in home country *k* in month *t*;

Z consists of seasonal adjustment dummies;

μ_i is the unobserved, panel-level fixed effect for bank *i*;

ε_{it} is the idiosyncratic error, $\varepsilon_{it} \sim \text{IID}(0; \sigma^2_m)$;

$\beta_1, \ldots, \beta_5$ are the coefficients (or coefficient vectors);

$i = 1, \ldots, N$ where *N* is the number of banks in the sample;

$j = 1, 2, 3$ where the number is the type of banks (state owned, private national, foreign)

$k = 1, \ldots, M$ where *M* is the number of foreign bank nationalities in the sample;

$t = 1, \ldots, Ti$ where *Ti* is the number of months in the sample for bank *i*.

The first model (equation (14)) is an Indonesian bank model, which depends only on Host (Indonesia's) factors. The second model (equation (15)) is a foreign bank model, which depends on both Host and Home factors. Dependent variables consist of two types of loan growth rates: Local Currency Loan Growth (LC Loan Growth Rates) and Foreign Currency Loan Growth (FC Loan Growth Rates). In the first model, I expect an increase in the difference between Indonesian banks' *lending rates* and *deposit rates* in Indonesia positively affects the growth rate of loans in Indonesia as an increase in the difference indicates better opportunity in the Indonesian loan market. In the foreign bank model, the difference between Indonesian banks' *lending rates* and *deposit rates* is replaced with the difference between global banks' lending rates in Indonesia and home countries. The difference between Host and Home lending rates may suggest better lending opportunity in Indonesia than in the home country loan market. Thus, an increase in the gap may lead to capital transfer from Home to Host.

HOST variables include Indonesia's economic and financial variables that are likely

to influence the attractiveness of expanding credit in Indonesia (a home country). An increase in *HOST_IP* and *HOST_SI* implies a positive shock to the Indonesian economy, i.e., an increase in a firm's demand for capital. Thus, in both cases I expect both have positive effects on loan growth owing to an upward shift in the demand curve in the Indonesian loan market. Changes in the nominal exchange rate against the US dollar and inflation affect loan growth rates positively and negatively. Banks are likely to expand lending if inflation is lower; if the local currency depreciates against the U.S. dollar, it would be a chance to expand loans in Rupiah in Indonesia if foreign exchange markets were well-developed.

Branch variables include characteristics related to Indonesian banks and foreign bank branches in Indonesia. I expect the negative sign of the coefficient for *Size* (the loan market share of the Indonesian banking sector by currency) because loan growth rates tend to decline as the market share become high; positive for *Profitability* (Return On Assets before income tax); positive for *Efficiency* (interest margin by currency); positive for *Liquidity* (liquidity asset divided by total assets of a bank); positive for *Solvency* (capital divided by total assets). I use a 1-month lagged value of *Size, Liquidity, and Solvency* to avoid simultaneous bias.

HOME variables include a home country's economic and financial variables that might influence the attractiveness of expanding credit in Indonesia. An increase in *HOME_IP* and *HOME_SI* implies a positive shock to a home economy, i.e., an increase in a firm's demand for capital in Home. Thus, in both cases an upward shift in the demand curve in a home country's loan market leads to capital transfer from Host to Home, suggesting that both have negative effects on loan growth in Indonesia (Figure 5, Panel A). Remember, these effects should only be observed if bank capital is mobile across countries, that is, in the case of foreign currency lending, but not local currency lending. Furthermore, appreciation in a home currency's nominal exchange rate against the U.S. dollar could increase loan growth rates as banks are likely to expand lending if inflation is lower.

Parent is the rate of returns in the stock price of a parent bank in the home country. I assume the parent's stock price, at least partly, reflects the bank's ability to raise new capital. A drop in *Parent* implies a negative impact on the parent bank's solvency, resulting in a rise in investor's required rates of returns at which banks can finance capital. Thus, this leads to an inward shift in the supply curve in the home country's loan market, resulting in capital transfer from Host to Home. Therefore, a decrease in a parent stock price returns has

a negative effect on loan growth in Indonesia (Figure 5, Panel B). Similar to *HOME* variables, this effect is expected to be observed only in the case of foreign currency lending, but not local currency lending. Since a foreign bank's headquarters would not immediately respond to home shocks by making a decision on its allocation of global assets, I use 1-month lagged *Home* and *Parent* variables.[13]

Since I assume foreign currency lending is denominated in U.S. dollars, deposits in foreign banks' home countries except for U.S. banks cannot be the main financial source of foreign currency lending. Thus, I do not include deposit rates in the foreign bank model.[14] I pre-assume monthly data are more appropriate to capture a response to financial shocks from a home country than quarterly data because financial institutions usually reallocate their assets more frequently than quarterly, reflecting a change in exchange rates and asset returns. Moreover, with reference to the recent financial crisis triggered by U.S. subprime loans, multinational banks could face difficulties due to the fluctuation of their own stocks prices even though they do not update their current financial status.[15] Thus, these factors might lead to the reallocation or repatriation of loans from a host country.

Table 2 shows the impacts of host and home factors on foreign currency and local currency lending in Indonesia by type of bank: foreign banks (Panel A), state owned banks (Panel B), and private domestic banks (Panel C). State owned banks and private domestic banks do not have home factors, since only Indonesian economic and financial factors are relevant to these two types of banks. First, I look at *Host* factors and differences between *Host* and *Home* lending rates (Panel A) and between lending and deposit rates (Panel B, C). A one percent increase in the difference between *Host* and *Home* lending rates leads to a 0.03 percent increase in local currency loans by foreign banks at the 5 percent significance level. A one percent increase in inflation leads to a 1.35 percent decrease in foreign currency loans by foreign banks at the 5 percent significance level. These results are consistent with our predictions. However, the impacts of Indonesian macroeconomic factors on Indonesian banks' lending are not significant, overall.

Next, I move on to the impact of *Branch* factors. These factors appear to be more significant for all types of banks than just Indonesian macroeconomic factors. The sign of

---

[13] Banks' time-horizon of investment, which may vary by bank or by country, also determine the length of lags. Although a 1-month lag looks like too simple an assumption, it works best compared with longer lags.

[14] A model that includes the difference between lending rates and deposit rates as a proxy of the interest rate spread appears not to be significant and the separate inclusion of deposit rates does not change the sign of the coefficients of lending rates.

[15] An increase in spreads of credit default swaps (CDS) also resulted in a rapid drop in a parent's stock price.

the *Size* coefficients are negative as expected and significant for lending in both currencies except the local currency lending of state owned banks. *Profitability* is significant for foreign banks and private banks despite the fact that the sign of coefficient for *Profitability* is positive for foreign banks only. *Efficiency* follows our prediction in the case of a private bank's local currency lending. *Liquidity* is not significant for any types of banks. Since foreign banks' headquarters tend to reallocate host and home assets that are more profitable with relatively low risk, a high loan to deposit ratio of foreign branches may reflect the fact that high liquidity of assets strongly motivates foreign banks' branches to lend more under high pressure from a parent bank. However, high liquidity is not always associated with banking stability due to recent financial innovation (Wagner, 2007). *Solvency* is significant at the 1 percent level for private banks' lending in both currencies. After the Asian crisis of 1997-98, the Indonesian central bank has strongly promoted an increase in the Capital Adequacy Ratio to avoid bank failure. This discipline appears to work well. As foreign banks are able to receive capital transfer from their headquarters, *Solvency* of local branches might not be a key determinant of their lending at the branch level.

Finally, the impacts of the *Home* and *Parent* factors of foreign banks are considered to test three hypotheses. If shocks to a home economy and a parent bank are propagated to foreign banks' lending activity in Indonesia through an internal capital market, only foreign currency loans should be significant. The results of the foreign bank model show parent stock prices, Home stock index, and Home industrial production are prominent factors that determine foreign banks' lending in Host (Table 2, Panel A). When a parent's stock returns become higher, foreign banks increase foreign currency lending in a host country. The sign of the coefficients is not significant in local currency. This is because the headquarters is not the main financial source of local currency and a foreign bank's Rupiah lending works as if it were stand-alone. Thus, when a parent bank is in good condition, foreign banks expand their U.S. dollar loans in a host country, which follows the first hypothesis.[16] Furthermore, an increase in growth rates in industrial production and the stock index in Home reduces the growth rates of foreign currency lending in Indonesia. This implies that strong demand for capital in Home causes capital transfer from Host to Home, suggesting the results are consistent with the second and third hypotheses. Goldberg (2001) finds that there is substitution between claims on industrialized countries and claims on the United

---

[16] I test an impact of the current parent stock price and volatility on growth of loans. However, they are not significant in most cases. Moreover, I check the impacts of 2, 3, 4, and 5 month lags. Yet, the results are either insignificant or unstable.

States. Similar effects are observed for emerging Asia. Thus, this finding is consistent with her findings as well as my prediction based on the theoretical framework of Morgan et al. (2004). Loan demand and supply factors in Home do not significantly affect local currency lending in Indonesia. Therefore, all the hypotheses appear to be true.

4.2 Impacts of Crisis

In this section, I investigate whether foreign banks change their response to shocks to host economy, home economy, and a parent bank during the global financial crisis of 2007-08. Figure 6 shows the rates of stock returns of major parent banks from six countries and growth rates of lending at their foreign branches in Indonesia.[17] During a normal period, correlation between them is very low, at most 0.08. Yet, as the crisis becomes more severe, they begin to synchronize more closely. The correlation of rates of parent stock returns with the growth rates of foreign currency lending becomes 0.28 during the crisis. Synchronicity seems to reach its peak in September 2008, when Lehman Brothers went bankrupt. If banks have some reasons to change their lending and capital transfer strategies during a crisis period, policy makers should account for them to tackle a crisis. Therefore, it is important to investigate the impact of the crisis on banks' behavior.

To estimate the impact of the crisis on banks' behavior, I extended the Indonesian and foreign bank model by introducing a crisis dummy variable. *Crisis* dummy is 1 for the samples from August 2007 until December 2008 (the end of sample period). Thus, the coefficients of the interaction term, *Host*, *Home*, *Branch*, and *Parent factors X Crisis*, indicate the percentage of foreign banks' response to host and home variables during the crisis is different from their response during the normal periods.

Table 3 shows the impacts of host and home variables with crisis dummies on foreign currency and local currency lending in Indonesia by type of bank: foreign banks (Panel A), state owned banks (Panel B), and private domestic banks (Panel C). Overall results are consistent with the three hypotheses and basically similar to results without crisis dummies. However, the impacts of some factors on loan growth appear to be magnified or significant during the crisis only.

First, the impacts of *Home* and *Parent* variables of foreign banks are considered to test whether three hypotheses are robust even with crisis dummies introduced. The results of the foreign bank model shows parent stock prices, Home stock index, and Home

---

[17] Rates of stock returns of parent banks are 1-month lagged values.

industrial production are still important factors for the foreign currency lending of foreign banks in Host (Table 2, Panel A). While an increase in Home stock index consistently leads to a decrease in foreign currency lending in Host through the sample period, the parent stock price and Home industrial production variables are significant during the crisis period only. Moreover, the latter two variables have a greater magnitude of contagion than in a case with no crisis dummies. During the normal period, global banks might not necessarily finance additional capital to disburse capital in Host. Thus, even if the parent stock price captures how much additional capital the global bank can finance, this additional capital may not result in an increase in foreign currency loans due to demand-supply mismatch. In contrast, global banks' ability to raise new capital was extremely limited during the global financial crisis, the parent stock price might have accurately traced a change in foreign currency lending in Host. Moreover, the signs of the coefficients are not significant in local currency. Therefore, the third hypothesis is true, and the first and the second hypotheses are conditionally true.

Next, I look at *Host* factors and differences between *Host* and *Home* lending rates (Panel A) and between lending and deposit rates (Panel B, C). The host demand effect on foreign currency lending appears to be significant for foreign banks during the crisis period. The signs for Host exchange rates and inflation variables of foreign banks appear to be significant; the signs of the coefficients of the variables are different pre-crisis and mid-crisis. During a normal period, foreign banks increase the amount of their local currency lending as the Indonesian Rupiah depreciates. This is in line with the strands of literature that problems offer good investment opportunities (De Haas & Van Lelyveld, 2004; Goldberg, 2001; Martinez Peria, et al., 2002; Peek & Rosengren, 2000). However, their direction is the opposite during the crisis period, which follows the concept of Morgan et al (2004). In fact, low demand for capital in Host appears to reduce foreign currency lending in Host during the crisis period. A decrease in Indonesian industrial production results in a drop in foreign currency lending by foreign and state owned banks during the crisis period. The coefficients of state owned bank variables appear to be significant during the crisis. A one percent increase in the difference between lending and deposit rates leads to a 0.65 percent increase in foreign currency loans by state owned banks at the 5 percent significance level during the crisis. A one percent increase in inflation leads to a 13.29 percent decrease in foreign currency loans at the 5 percent significance level. These results are consistent with our predictions.

Finally, *Branch* factors may capture liquidity and solvency problems during the crisis. Some *Liquidity* and *Solvency* variables, which are not significant during the normal period, are significant during the crisis. For example, better *Liquidity* measures have positive impacts on the amount of foreign bank loans in both currencies, but only during the crisis (Table 3, Panel A). Similar effects of *Liquidity* on private banks' lending in local currency and of *Solvency* on state owned banks in both currencies are observed. Therefore, bank lending activity, regardless of the type of bank, appears to be more sensitive to *Liquidity* and *Solvency* during the crisis.

5. Conclusion

This paper investigates the determinants of growth of foreign bank loans by currency in the Indonesian banking sector, where foreign banks actively disburse loans denominated in foreign and local currency. Limited hedging instruments in the Indonesian foreign exchange markets could make bank capital in local currency immobile across countries. This may prevent shocks to the parent bank and Home factors of foreign banks from being propagated to Indonesia, while bank capital in foreign currency by international banking may provide the opportunity for more rapid growth in the Indonesian loan market than under the unit banking.

Extending the theoretical framework of Morgan et al. (2004), I proposed three hypotheses: (1) high growth rates in a parent bank's stock price in the home market increase a foreign bank's U.S. dollar lending in Indonesia through their internal capital markets, but not local currency lending (2) high growth rates in industrial production reflecting firm capital demand in a home country reduce a foreign bank's U.S. dollar lending in Indonesia, but not local currency lending (3) low rates of return in the home stock index push up a foreign bank's U.S. dollar lending in a host country, but not local currency lending. The third hypothesis is consistently valid and quite robust. The first and the second hypotheses are also confirmed during the crisis period, but they are not as robust as the second hypothesis during non-crisis periods.

In fact, a foreign bank's foreign currency lending is highly sensitive to a parent bank's stock returns. When a parent bank's stock price goes up, its foreign branch actively increases foreign currency lending in a host country. These effects are more emphasized during the crisis because the parent stock prices are probably good at capturing liquidity

and solvency risks under a scarcity of capital. Foreign bank's branches rely on a parent bank to finance U.S. dollars. Thus, foreign banks' branches easily finance U.S. dollars through a parent bank unless the home market is in turmoil. In this case, the internal capital market therefore plays an important role in the transmission of shocks to a parent bank. On the other hand, a parent bank's stock price appears not to affect a foreign bank's local currency lending. This is probably because the important financial source of a host's currency (the Indonesian Rupiah) is deposits. Thus, local currency banking of foreign banks works as if they were stand-alone.

Shocks to Home demand factors such as a home country's stock market and industrial production are also important. Home demand factors appear to have "substitution effects," that is, when an increase in capital demand in a home country leads to a decrease in capital supply in a host country. Furthermore, *Branch* factors such as the share of loan market and return on asset are consistently significant for foreign banks through the sample periods.

There appears to be a significant difference of response to macroeconomic factors between lending in local and foreign currencies. This reflects the operation of internal capital markets. This is a country study for the Indonesian banking sector only. Thus, I do not wish to over-generalize the implications of the results for other countries. However, if foreign banks' presence and the share of foreign currency lending are high, which is often observed in emerging markets and small developed economies that concentrate on the financial industry, we need to pay attention to the currency mix of lending to accurately understand the lending channel of shock transmissions.

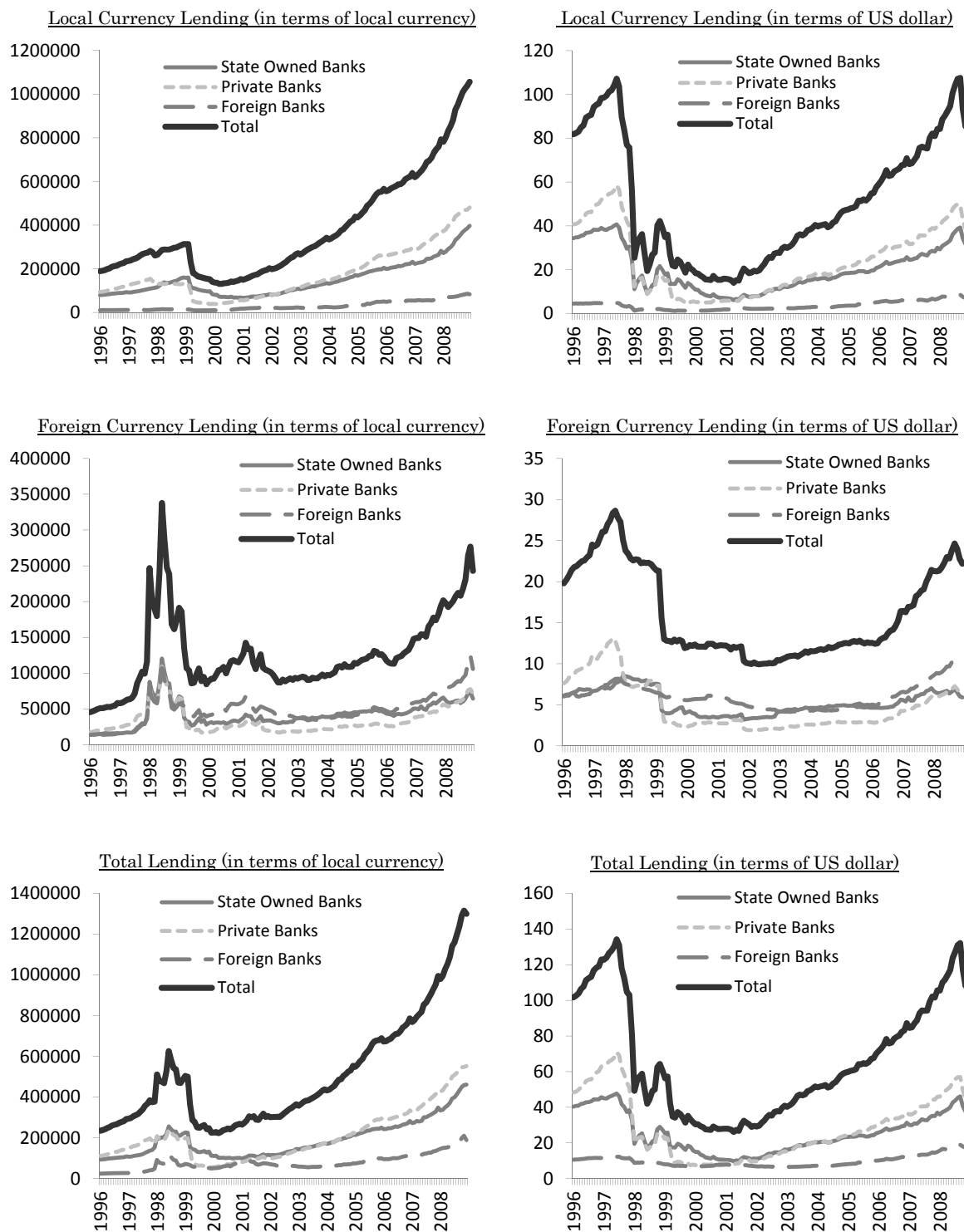Lessons from the findings are: (1) knowing the currency denomination of loans is imperative to monitor foreign banks' response to host and home shocks (2) during a home crisis, it is important to monitor a parent bank's soundness as well as the soundness of its overseas branches (3) monitoring internal capital transfer of global banks is as important as doing so for direct cross-border lending.

References

Ashcraft, A. B. (2008). Are Bank Holding Companies a Source of Strength to Their Banking Subsidiaries? *Journal of Money, Credit & Banking (Blackwell), 40*(2/3), 273-294.

Ashcraft, A. B., & Campello, M. (2007). Firm balance sheets and monetary policy transmission. *Journal of Monetary Economics, 54*(6), 1515-1528.

Calvo, G., Leiderman, L., & Reinhart, C. (1992). Capital Inflows and Real Exchange Rate Appreciation in Latin America: The Role of External Factors. *IMF Working Papers, No. 92/62*.

Campello, M. (2002). Internal Capital Markets in Financial Conglomerates: Evidence from Small Bank Responses to Monetary Policy. *Journal of Finance, 57*(6), 2773-2805.

Cetorelli, N., & Goldberg, L. S. (2009). Globalized Banks: Lending to Emerging Markets in the Crisis. *Federal Reserve Bank of New York Staff Reports, No. 377*.

Dages, B. G., Goldberg, L. S., & Kinney, D. (2000). Foreign and Domestic Bank Participation in Emerging Markets: Lessons from Mexico and Argentina. *National Bureau of Economic Research Working Paper Series, No. 7714*.

De Haas, R., & Van Lelyveld, I. (2006). Foreign banks and credit stability in Central and Eastern Europe. A panel data analysis. *Journal of Banking & Finance, 30*(7), 1927-1952.

De Haas, R., & Van Lelyveld, I. (2010). Internal capital markets and lending by multinational bank subsidiaries. *Journal of Financial Intermediations, 19*(1), 1-25.

Derviz, A., & Podpiera, J. (2007). Cross-Border Lending Contagion in Multinational Banks. *European Central Bank Working Paper Series, No. 807*.

Goldberg, L. S. (2001). When Is U.S. Bank Lending to Emerging Markets Volatile? *National Bureau of Economic Research Working Paper Series, No. 8209*.

Goldberg, L. S. (2005). The International Exposure of U.S. Banks. *National Bureau of Economic Research Working Paper Series, No. 11365*.

Hernandez, L., & Rudolph, H. (1997). Sustainability of Private Capital Flows to Developing Countries: Is a Generalized Reversal Likely? *Cuadernos de Economia (Latin American Journal of Economics), 34*(102), 237-266.

Holmstrom, B., & Tirole, J. (1997). Financial Intermediation, Loanable Funds, and the Real Sector. *The Quarterly Journal of Economics, 112*(3), 663-691.

Jeanneau, S., & Micu, M. (2002). Determinants of international bank lending to emerging

market countries. *BIS Working Papers, No. 112*.

Martinez Peria, M. S., Powell, A., & Hollar, I. V. (2002). Banking on foreigners : the behavior of international Bank lending to Latin America, 1985-2000. *World Bank Policy Research Working Paper Series*(2893).

Molyneux, P., & Seth, R. (1998). Foreign Banks, Profits and Commercial Credit Extension in the United States. *Applied Financial Economics, 8*(5), 533-539.

Morgan, D., Rime, B., & Strahan, P. E. (2004). Bank Integration and State Business Cycles*. *Quarterly Journal of Economics, 119*(4), 1555-1584.

Morgan, D., & Strahan, P. (2003). Foreign Bank Entry and Business Volatility: Evidence from U.S. States and Other Countries. *National Bureau of Economic Research Working Paper Series, No. 9710*.

Moshirian, F. (2001). International investment in financial services. *Journal of Banking & Finance, 25*(2), 317-337.

Peek, J., & Rosengren, E. S. (1997). The International Transmission of Financial Shocks: The Case of Japan. *The American Economic Review, 87*(4), 495-505.

Sato, Y. (2005). Bank restructuring and financial institution reform in Indonesia. *The Developing Economies, 43*(1), 91-120.

Stein, J. C. (1997). Internal Capital Markets and the Competition for Corporate Resources. *The Journal of Finance, 52*(1), 111-133.

Wagner, W. (2007). The liquidity of bank assets and banking stability. *Journal of Banking & Finance, 31*(1), 121-139.

Figure 1. Loan Outstanding by Type of Banks

Local Currency Lending (in terms of local currency)

Local Currency Lending (in terms of US dollar)

Foreign Currency Lending (in terms of local currency)

Foreign Currency Lending (in terms of US dollar)

Total Lending (in terms of local currency)

Total Lending (in terms of US dollar)

Source: Bank Indonesia, IFS, and author's estimation

Note: Local currency lending consists of loan outstanding in Indonesian Rupiah; foreign currency lending consists of loan outstanding in any foreign currency; total lending includes both of them. The amount of lending expressed in terms of local currency (billions of Indonesian Rupiah) and US dollar (billions of US dollar) is converted by nominal exchange rates (the end of the peirod) in International Financial Statistics.

Figure 2. Average Loan to Deposit Ratio

- - - IDR(Indonesian Banks)
- - - USD(Indonesian Banks)
——— IDR(Foreign Banks)
——— USD(Foreign Banks)
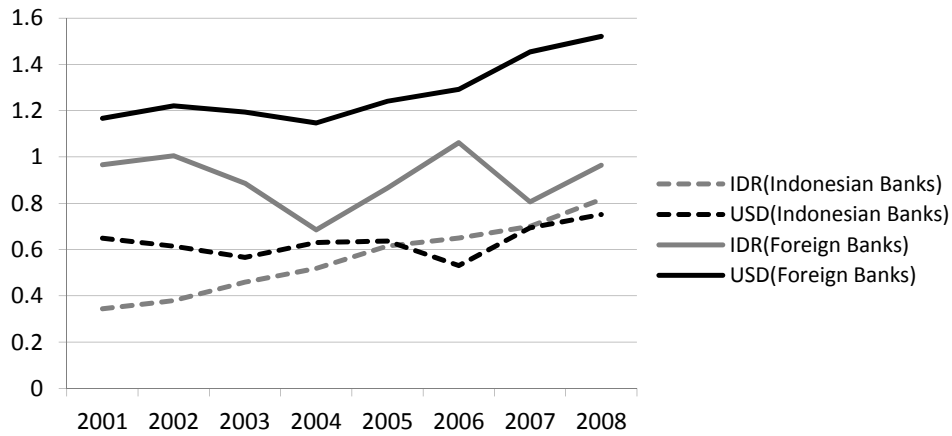
Source: Bank Indonesia, IFS, and author's estimation

Figure 3. Cross-border Shock Transmission via Internal Transfer
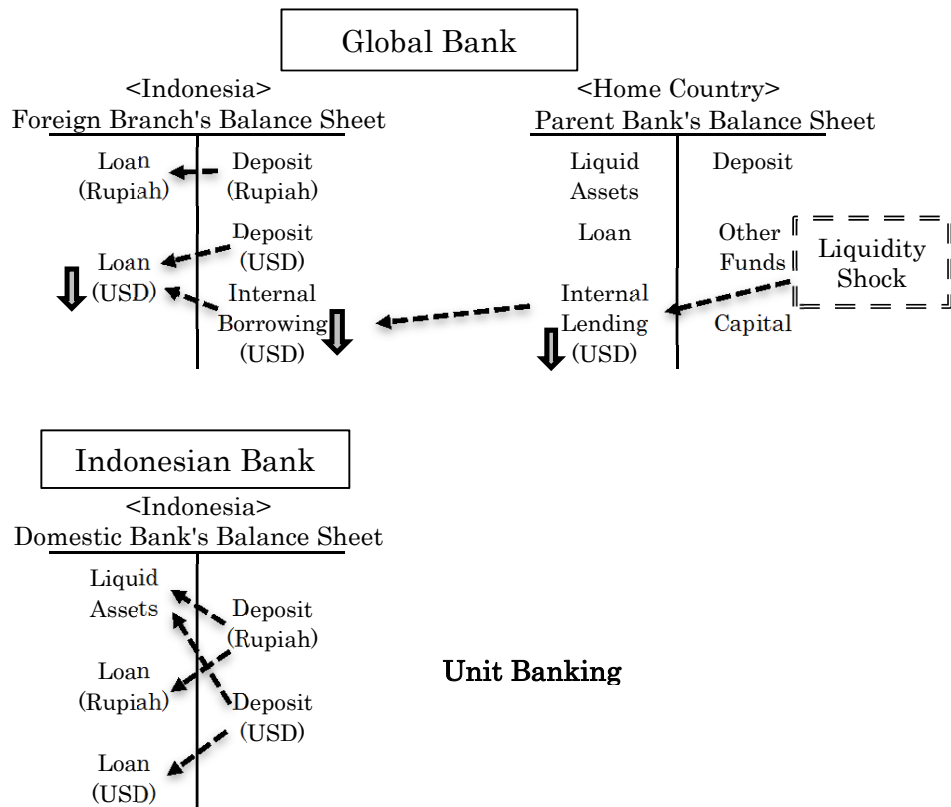
Figure 4. Increase in a Return Required by Investors
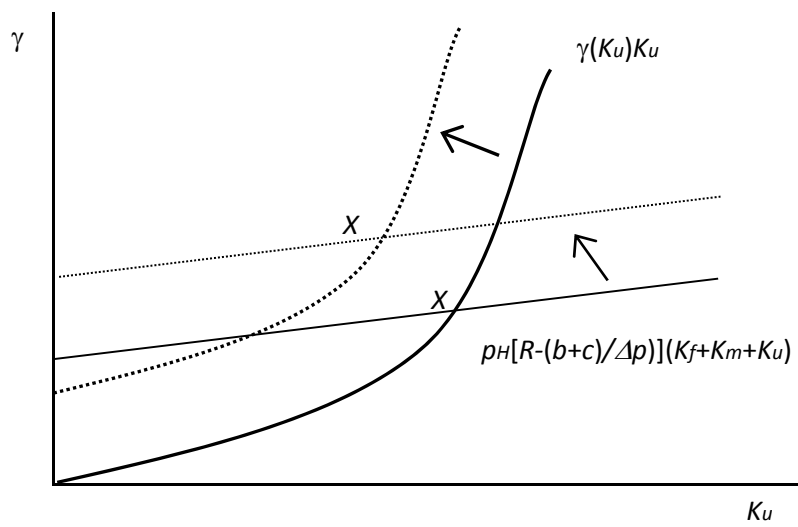
γ

$\gamma(K_u)K_u$

X

X

$p_H[R-(b+c)/\Delta p)](K_f+K_m+K_u)$

K_u

Figure 5. Positive Demand and Negative Supply Shock in Home

Panel A. Demand

Hom

Host

β

β

S

S

X

X*

Y*

Y

D

D

L_S

L_D

Panel B. Supply

Hom

Host

β

β

S

S

X*

X

Y*

Y

D

D

L_S

L_D
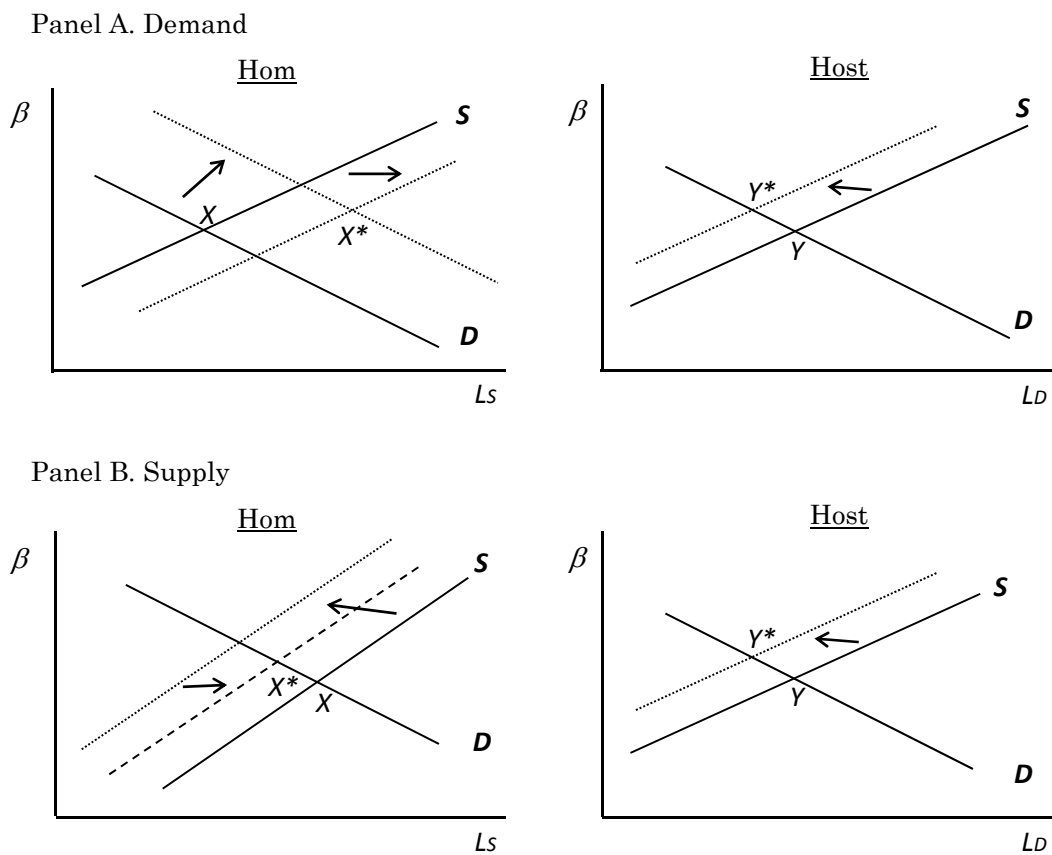
Figure 5. Positive Demand and Negative Supply Shock in Home

Panel A. Demand

Panel B. Supply

γ
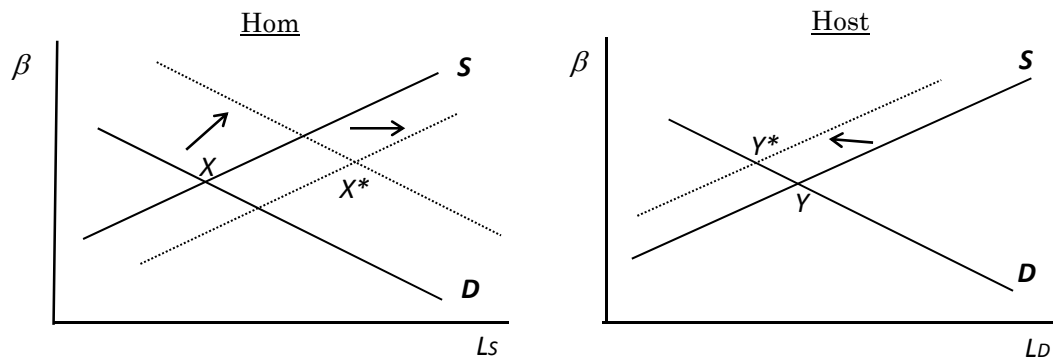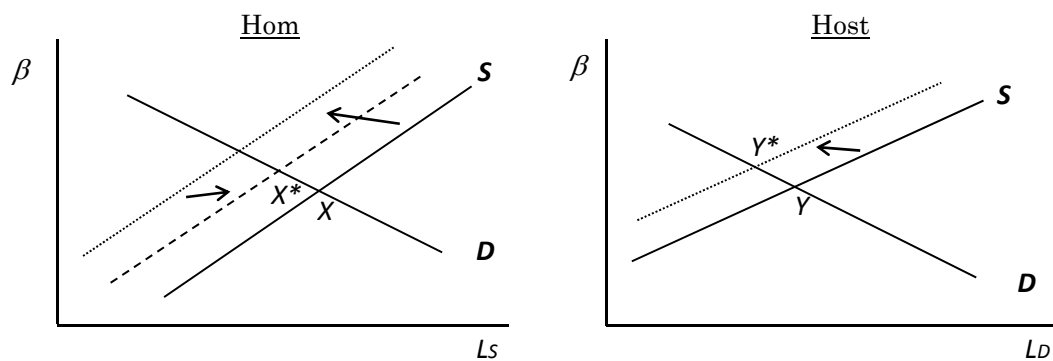
Figure 6. Parent Bank's Stock Returns and Loan Growth Rates during Crisis

Foreign Currency Lending

Local Currency Lending
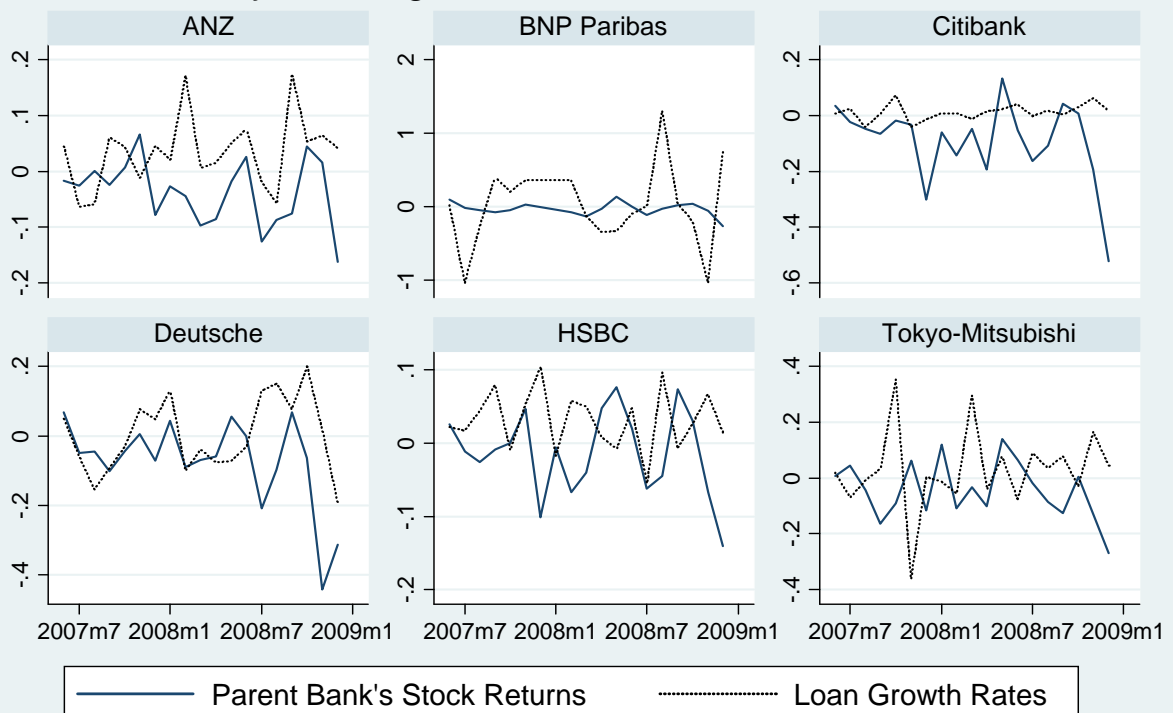
Source: Bank Indonesia, Datastream, and author's estimation

Note: Stock return rates are calculated as logarithm of 1-month lagged price divided by 2-month lagged price; loan growth rates are calculated as logarithm of the current value divided by 1-month lagged value.

Table 1. Indonesian Banking Sector Statistics

	Total lending (billions of USD)	Loan Growth Rate	Market Share	Market Share Growth Rate	Lending Rate	Deposit Rate	Loan/Deposit Ratio
Local Currency Lending							
Foreign Bank	4.5	20.5%	8.0%	-4.8%	15.5%	5.7%	90.6%
State Owned Bank	20.4	25.0%	37.3%	-1.2%	15.8%	8.3%	63.9%
Domestic Private Bank	25.4	28.9%	44.8%	1.8%	15.5%	7.2%	60.0%
Foreign Currency Lending							
Foreign Bank	2.7	10.1%	39.9%	-1.4%	8.6%	2.8%	130.4%
State Owned Bank	4.9	8.6%	35.3%	-2.8%	9.2%	3.2%	98.1%
Domestic Private Bank	3.5	18.6%	23.5%	6.2%	9.6%	3.1%	52.1%
					LC Loan Growth Rate	FC Loan Growth Rate	FC/Total Loan Ratio
Total Lending							
Banking Sector	69.4	22.9%			26.6%	11.7%	21.6%

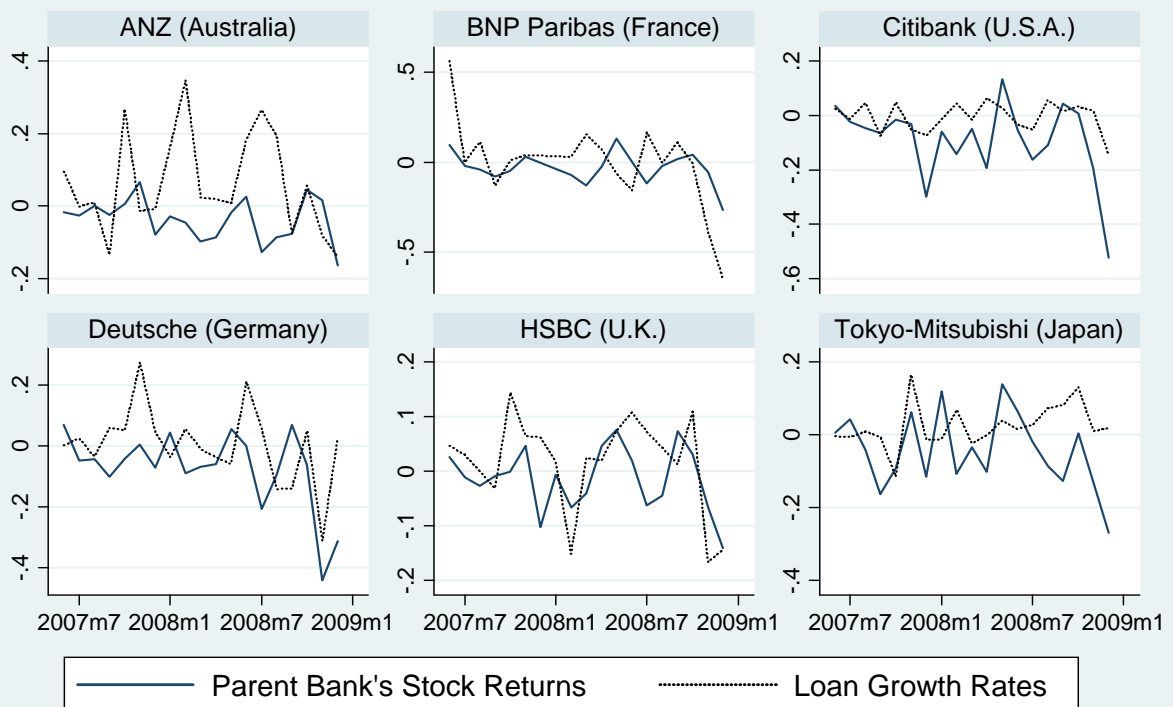Source: Bank Indonesia and author's estimation

Note: All the values and rates are the average during the sample period (December 2001 - December 2008). The sum of market share of each bank type is not 100 percent because regional government banks are excluded. Lending rates are loans for working capital. Deposit rates are for 1-year time deposit. LC and FC mean local and foreign currency, respectively.

Table 2. Impact of Host and Home Factors

	Panel A - Foreign Banks		Panel B - State Owned Banks		Panel C - Private Banks	
	(1) LC Loan Growth Rate	(2) FC Loan Growth Rate	(1) LC Loan Growth Rate	(2) FC Loan Growth Rate	(1) LC Loan Growth Rate	(2) FC Loan Growth Rate
Host-Home ΔLending Rate	0.0335** (0.0154)	0.0049 (0.0098)				
Host Lending - Deposit Rate			0.0011 (0.0048)	-0.0161 (0.0332)	-0.0183** (0.0080)	-0.0019 (0.0048)
Host %.Exchange Rate	0.3128 (0.3197)	-0.2728 (0.3301)	-0.1258 (0.0887)	-0.7283 (0.9541)	-0.0612 (0.1134)	0.1109 (0.2166)
Host %.Inflation	-0.2436 (0.5778)	-1.3452** (0.6020)	-0.0480 (0.1533)	-0.7328 (1.5632)	0.2246 (0.2051)	-0.5016 (0.3772)
Host %.Industrial Production	0.2756 (0.3036)	-0.2106 (0.3228)	0.0387 (0.0798)	0.0837 (0.8567)	0.0451 (0.1064)	0.0124 (0.2091)
Host %.Stock Index	0.0106 (0.1172)	-0.0566 (0.1360)	-0.0634** (0.0287)	-0.0239 (0.3157)	-0.0044 (0.0357)	-0.0468 (0.0709)
Size	-7.8256** (3.5938)	-3.2423*** (0.8456)	-0.1472 (0.2020)	-2.4675*** (0.5621)	-1.8329*** (0.3437)	-2.9092*** (0.5853)
Profitability	1.9978*** (0.3858)	1.3512** (0.4197)	0.5173 (0.5908)	2.9070 (4.6678)	-2.3421*** (0.6215)	-5.7427*** (1.0853)
Efficiency	-0.0418* (0.0215)	-3.2931*** (0.2700)	-0.1218 (0.1848)	-5.3999** (2.2038)	0.4494** (0.2116)	-0.0549 (0.0702)
Liquidity	0.0473 (0.0437)	0.0437 (0.0457)	-0.0637 (0.0408)	-0.5641 (0.3904)	0.0258 (0.0270)	0.0201 (0.0523)
Solvency	-0.1407 (0.0985)	0.0700 (0.1147)	-0.0033 (0.1048)	0.0466 (0.9293)	0.2405*** (0.0722)	0.5338*** (0.1370)
Home %.Exchange Rate	0.2073 (0.3009)	-0.2122 (0.3202)				
Home %.Industrial Production	0.0485 (0.0761)	-0.1967** (0.0808)				
Home %.Stock Index	-0.1568 (0.1692)	-0.4806*** (0.1447)				
Parent %.Stock Price	0.0693 (0.0800)	0.2032** (0.0652)				
Observations	1492	1453	235	234	812	812
R-squared	0.041	0.133	0.424	0.158	0.134	0.114
Number of Banks	22	22	5	4	10	10
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

Note: All the results are estimated by monthly panel regressions with individual bank's fixed effects. LC Loan Growth Rate means growth rates of total loan and local currency loan denominated in Indonesian Rupiah. FC Loan Growth Rate means growth rates of foreign currency loan denominated in U.S. dollar. "Δ" means the difference between the current rate and the last month's rate. "%." means the monthly growth rates. "X" means interaction terms with type of bank dummies. Exchange Rates of Host and Home are the values of each country's currency per U.S. dollar. Thus, they becomes higher as U.S. dollar appredates. Parent Stock Price means the stock price of a parent bank of foreign banks in a home country. *Size* is the credit market share of the Indonesian banking sector by currency. *Profitability* is Return On Asset before income tax (ROA). *Efficiency* is interest margin by currency. *Liquidity* is liquidity asset divided by total asset of a bank. *Solvency* is capital divided by total asset. The coefficients of seasonal adjustment dummies are not reported. *, **, and *** denote significance at 10, 5, and 1 percent, respectively.

Table 3. Impact of Crisis

	Panel A - Foreign Banks		Panel B - State Owned Banks		Panel C - Private Banks	
	(1) LC Loan Growth Rate	(2) FC Loan Growth Rate	(1) LC Loan Growth Rate	(2) FC Loan Growth Rate	(1) LC Loan Growth Rate	(2) FC Loan Growth Rate
Host-Home ΔLending Rate	0.0391** (0.0186)	0.0013 (0.0112)				
Host-Home ΔLending Rate X Crisis	0.0020 (0.0357)	0.0100 (0.0263)				
Host Lending - Deposit Rate			0.0043 (0.0052)	-0.0027 (0.0217)	-0.0185** (0.0083)	-0.0014 (0.0048)
Host Lending - Deposit Rate X Crisis			-0.0015 (0.0156)	0.6515** (0.2574)	0.0059 (0.0279)	-0.0491 (0.0651)
Host %.Exchange Rate	0.6302* (0.3416)	-0.3130 (0.3505)	-0.0863 (0.0952)	0.5886 (0.6620)	-0.0238 (0.1266)	0.2616 (0.2375)
Host %.Exchange Rate X Crisis	-2.9282** (1.0855)	1.1028 (1.1535)	-0.2245 (0.2689)	1.5566 (1.9683)	-0.1211 (0.3293)	-0.5853 (0.6330)
Host %.Inflation	-0.6439 (0.6088)	-1.6490** (0.6062)	0.0434 (0.1566)	0.0808 (1.0435)	0.2050 (0.2136)	-0.5709 (0.3948)
Host %.Inflation X Crisis	0.1766 (2.3117)	6.6609** (2.7471)	-0.8718 (0.7405)	-13.2851** (6.0303)	0.2313 (0.8193)	-1.0965 (1.6587)
Host %.Industrial Production	0.3579 (0.3102)	-0.4481 (0.3274)	0.0985 (0.0801)	0.2227 (0.5730)	0.0429 (0.1093)	0.1165 (0.2137)
Host %.Industrial Production X Crisis	0.2774 (0.3245)	0.8357** (0.3847)	-0.1075 (0.0905)	4.3933*** (0.8704)	0.0304 (0.1066)	-0.0720 (0.2027)
Host %.Stock Index	0.0360 (0.1410)	0.1068 (0.1525)	-0.0384 (0.0352)	0.5058** (0.2490)	0.0015 (0.0473)	0.0773 (0.0909)
Host %.Stock Index X Crisis	-0.2883 (0.3220)	-0.3430 (0.3244)	-0.0441 (0.0768)	1.2648** (0.5687)	-0.0006 (0.0900)	-0.3020 (0.2007)
Size	-8.6851** (3.6291)	-2.3787** (0.8811)	0.1949 (0.2487)	-4.0784*** (0.4440)	-2.1809*** (0.3677)	-3.2131*** (0.6144)
Size X Crisis	-4.3458 (2.9895)	-2.5979*** (0.7542)	-0.1021 (0.2439)	-3.6273*** (0.4341)	0.4459 (0.2805)	0.3935 (0.5942)
Profitability	2.0688*** (0.3849)	1.2431** (0.4105)	0.5200 (0.5977)	2.0062 (3.0595)	-2.4147*** (0.6267)	-5.8858*** (1.0924)
Profitability X Crisis	-7.7317* (4.1125)	6.4310 (4.2082)	-0.3245 (2.8462)	51.6548*** (13.8235)	1.0962 (5.5165)	2.9893 (9.9913)
Efficiency	-0.0422** (0.0215)	-3.0472*** (0.2673)	-0.1031 (0.1847)	0.7508 (1.4899)	0.4776** (0.2130)	-0.0549 (0.0708)
Efficiency X Crisis	-0.7298** (0.3281)	-11.0283*** (1.5210)	0.2367 (1.2447)	-59.3499*** (5.8312)	-3.2495 (2.6495)	0.1288 (0.3546)
Liquidity	0.0609 (0.0453)	0.0571 (0.0466)	-0.0495 (0.0473)	-0.7173** (0.2854)	0.0168 (0.0272)	0.0382 (0.0531)
Liquidity X Crisis	0.2027** (0.0846)	0.4128*** (0.0838)	-0.1153 (0.1141)	-0.4283 (0.7045)	0.1633** (0.0738)	-0.0817 (0.1222)
Solvency	-0.2225** (0.1032)	0.0864 (0.1180)	-0.0242 (0.1048)	0.6588 (0.6348)	0.2518*** (0.0755)	0.4520** (0.1434)
Solvency X Crisis	0.2155** (0.0966)	-0.4713*** (0.1097)	0.5567* (0.3252)	6.2000*** (1.6972)	-0.1816 (0.1127)	0.3154 (0.2097)
Home %.Exchange Rate	0.3787 (0.3642)	0.1159 (0.3787)				
Home %.Exchange Rate X Crisis	-0.0151 (0.6772)	-1.0702 (0.6981)				
Home %.Industrial Production	0.0336 (0.0767)	0.0641 (0.0801)				
Home %.Industrial Production X Crisis	0.1617 (0.2000)	-0.4775** (0.2021)				
Home %.Stock Index	-0.0008 (0.1953)	-0.2941* (0.1501)				
Home %.Stock Index X Crisis	-0.1229 (0.4176)	-0.4217 (0.3837)				
Parent %.Stock Price	0.0187 (0.0884)	0.0896 (0.0698)				
Parent %.Stock Price X Crisis	0.3326 (0.2175)	0.5185** (0.2167)				
Observations	1492	1453	235	234	812	812
R-squared	0.062	0.187	0.473	0.670	0.147	0.128
Number of Banks	22	22	5	4	10	10
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes

Note: All the results are estimated by monthly panel regressions with individual bank's fixed effects. LC Loan Growth Rate means growth rates local currency loan denominated in Indonesian Rupiah. FC Loan Growth Rate mean growth rates of foreign currency loan denominated in U.S. dollar. "Δ" means the difference between the current rate and the last month's rate. "Host - Home" means a Host's rate minus a Home's rate. "%." means the monthly growth rates. "X" means interaction terms with type of bank dummies and a Crisis dummy (=1 if values are in or after August 2007; otherwise, 0). Exchange Rates of Host and Home are the values of each country's currency per U.S. dollar. Thus, they becomes higher as U.S. dollar appreciates. Volatility is calculated by using annualized standard deviation of daily returns of each month. Parent Stock Price means the stock price of a parent bank of foreign banks in a home country. *Size* is the credit market share of the Indonesian banking sector by currency. *Profitability* is Return On Asset before income tax (ROA). *Efficiency* is interest margin by currency. *Liquidity* is liquidity asset divided by total asset of a bank. *Solvency* is capital divided by total asset.. The coefficients of seasonal adjustment dummies are not reported. *, **, and *** denote significance at 10, 5, and 1 percent, respectively.

Appendix 1. Statistics for Individual Banks

	Bank Type	Bank Name	Nationality	Market Share	FC Loan/ Total	Total Loan Growth	LC Loan Growth	FC Loan Growth	LC Loan/ Deposits	FC Loan/ Deposits
1	State Owned Bank	PT Bank Ekspor Indonesia Persero	Indonesia	0.7%	45.7%	5.4%	-0.1%	-1.3%	N/A	N/A
2	State Owned Bank	PT Bank Mandiri Persero	Indonesia	14.8%	11.7%	1.5%	1.8%	0.8%	36.5%	109.2%
3	State Owned Bank	PT Bank Negara Indonesia Persero Tbk	Indonesia	9.7%	10.2%	1.4%	1.7%	0.9%	42.3%	83.8%
4	State Owned Bank	PT Bank Rakyat Indonesia Persero	Indonesia	11.3%	4.1%	1.9%	2.0%	1.0%	68.9%	101.5%
5	State Owned Bank	PT Bank Tabungan Negara Persero	Indonesia	2.5%	0.0%	1.6%	2.1%	N/A	107.8%	N/A
6	Private Bank	PT Bank Buana Tbk	Indonesia	1.3%	0.9%	2.0%	2.0%	1.9%	73.1%	8.7%
7	Private Bank	PT Bank CIC International Tbk	Indonesia	0.4%	2.8%	0.8%	2.0%	-4.6%	37.3%	22.5%
8	Private Bank	PT Bank Central Asia Tbk	Indonesia	7.0%	3.1%	2.4%	2.5%	1.6%	31.8%	41.9%
9	Private Bank	PT Bank Danamon Indonesia Tbk	Indonesia	5.1%	6.2%	2.2%	2.2%	2.0%	72.1%	59.5%
10	Private Bank	PT Bank Internasional Indonesia Tbk	Indonesia	2.6%	10.4%	1.7%	2.5%	0.5%	51.5%	45.1%
11	Private Bank	PT Bank NISP Tbk	Indonesia	1.8%	9.5%	1.9%	1.8%	2.1%	82.0%	79.3%
12	Private Bank	PT Bank Niaga Tbk	Indonesia	3.7%	16.1%	2.2%	2.8%	0.8%	75.2%	95.6%
13	Private Bank	PT Bank Permata Tbk	Indonesia	2.5%	6.9%	3.3%	3.5%	2.5%	61.8%	63.3%
14	Private Bank	PT Lippo Bank Tbk	Indonesia	1.4%	5.5%	2.1%	2.3%	1.4%	33.6%	37.2%
15	Private Bank	PT Pan Indonesia Bank Tbk	Indonesia	2.5%	11.6%	1.7%	2.3%	0.3%	81.6%	67.4%
16	Foreign Bank	PT Bank BNP Paribas Indonesia Tbk	France	0.2%	66.1%	1.0%	3.3%	0.7%	202.0%	282.5%
17	Foreign Bank	Deutsche Bank AG	Germany	0.8%	13.1%	0.1%	0.6%	-0.4%	41.8%	47.8%
18	Foreign Bank	PT Bank Finconesia (commerz)	Germany	0.2%	46.4%	-0.5%	-0.7%	-0.3%	119.5%	164.8%
19	Foreign Bank	PT Bank Daiwa Perdania	Japan	0.5%	52.3%	0.9%	1.4%	0.6%	136.6%	174.9%
20	Foreign Bank	PT Bank Mizuho Indonesia	Japan	0.7%	46.7%	1.6%	1.7%	1.5%	68.1%	140.4%
21	Foreign Bank	PT Bank Sumitomo Indonesia	Japan	0.7%	51.4%	0.8%	2.7%	0.4%	83.2%	111.4%
22	Foreign Bank	PT Bank UFJ Indonesia	Japan	1.1%	66.5%	-4.3%	-2.5%	-4.5%	53.3%	212.7%
23	Foreign Bank	The Bank of Tokyo-Mitsubitshi Ltd	Japan	1.4%	52.3%	1.6%	1.1%	1.7%	125.4%	124.5%
24	Foreign Bank	PT Bank Woori Indonesia	Korea, Rep.	0.2%	39.9%	1.3%	3.1%	1.1%	14.2%	138.2%
25	Foreign Bank	PT Korea Exchange Bank Danamon	Korea, Rep.	0.2%	51.5%	0.7%	0.9%	0.6%	49.6%	150.6%
26	Foreign Bank	PT Bank Maybank Indocorp	Malaysia	0.0%	31.9%	0.0%	0.3%	-0.4%	32.7%	199.8%
27	Foreign Bank	ABN Amro Bank	Netherlands	1.0%	21.4%	0.6%	1.0%	0.3%	58.7%	56.4%
28	Foreign Bank	PT Bank ING Indonesia	Netherlands	0.2%	26.9%	-2.2%	6.0%	-14.3%	145.3%	154.2%
29	Foreign Bank	PT Bank DBS Indonesia	Singapore	0.8%	29.7%	3.5%	4.1%	2.9%	107.0%	105.3%
30	Foreign Bank	PT Bank OCBC-NISP	Singapore	0.1%	38.6%	3.6%	4.1%	3.4%	39.1%	162.9%
31	Foreign Bank	PT Bank UOB Indonesia	Singapore	0.4%	32.5%	2.4%	3.1%	1.9%	83.4%	96.4%
32	Foreign Bank	The Bangkok Bank Comp Ltd	Thailand	0.2%	59.1%	2.2%	2.9%	2.0%	101.2%	246.4%
33	Foreign Bank	HSBC	United Kingdom	1.8%	27.8%	1.2%	2.3%	0.5%	78.7%	62.5%
34	Foreign Bank	Standard Chartered Bank	United Kingdom	1.2%	20.0%	1.5%	1.1%	1.7%	69.7%	73.2%
35	Foreign Bank	Bank of America N.A	United States	0.0%	2.9%	4.1%	-2.2%	8.3%	2.6%	5.1%
36	Foreign Bank	Citibank N.A	United States	2.5%	18.7%	1.0%	1.1%	0.8%	95.4%	46.1%
37	Foreign Bank	JP Morgan Chase Bank, N.A.	United States	0.2%	7.5%	0.0%	-0.7%	2.0%	106.4%	34.4%

Note: All values are average rates for the sample period (December 2001 - December 2008). The sample period of each bank varies. Foreign banks do not include banks taken over by foreign investors even if the share of their ownership exceeds 50 percent. Foreign banks consist of Joint Venture and Foreign Banks according to the classification of Bank Indonesia. Both are founded by greenfield investment and in reality work as branches of foreign banks.