

ST/ESA/2001/DP.16

DESA Discussion Paper No. 16

The Supply of Credit by Multinational Banks in Developing and Transition Economies: Determinants and Effects

Christian E. Weller

March 2001

DESA Discussion Paper Series

DESA Discussion Papers are preliminary documents circulated in a limited number of copies and posted on the DESA web site <http://www.un.org/esa/papers.htm> to stimulate discussion and critical comment. This paper has not been formally edited and the designations and terminology used do not imply the expression of any opinion whatsoever on the part of the United Nations Secretariat. Citations should refer to a "Discussion Paper of the United Nations Department of Economic and Social Affairs."

Christian E. Weller

Christian E. Weller is an Economist in the Economic Policy Institute (EPI), Washington, D.C. and Non-resident Fellow, Center for European Integration Studies, University of Bonn. This paper was prepared while Mr. Weller was a consultant to the Finance and Development Branch, Development Policy Analysis Division, Department of Economic and Social Affairs. The views and interpretations in this paper do not necessarily represent the views of the United Nations. Comments should be addressed to the author at the Development Policy Analysis Division, Rm. DC2-2120, United Nations, New York, N.Y. 10017. Additional copies of the paper are available from the same address.

Authorized for distribution by **Ian Kinniburgh**,
Director
Development Policy Analysis Division
United Nations

Acknowledgements

I am especially grateful to Mark Scher for his many conversations about this paper and his encouragement overall. The paper would not exist in this form if it had not been for him. I am also grateful to the participants in the expert group meeting organized by the Department of Economic and Social Affairs on development and the financial sector, the research seminar at the Center for European Integration Studies and the EPI research seminar for stimulating and inspiring discussions of earlier drafts. I am particularly indebted to Adrian Tschoegl for his helpful comments and suggestions on earlier drafts. All remaining errors are my sole responsibility.

Abstract

The entry of multinational banks (MNBs) into the developing and transition economies is expected to create more market discipline for domestic banks, thus making them more efficient and enhancing financial stability. But is this the case? Using data from the Bank for International Settlements and the International Monetary Fund, I first try to determine which factors tend to increase MNB lending activity in emerging economies and then I look at the impact of MNBs on credit supply (and informally on financial stability) in a substantial sample of economies. I conclude that domestic banks respond to increased MNB competition for the low-risk segment of the market with lower overall lending (measured as a ratio to GDP), especially in the early stages of international financial competition. However, when MNBs have acquired a large market share, domestic bank lending tends to rise with, or complement, MNB lending, in particular to the enterprise sector.

Key words: Multinational banks, credit supply, emerging economies, transition economies

JEL classification code: F4, G2

Introduction

Financial policy recommendations for developing and transition economies, particularly in the wake of the recent financial crises, have included a push for more international competition. Meanwhile, by the end of 1997, rules bearing on international investment by multinational banks (MNBs) were negotiated in the General Agreement on Trade in Services (GATS) at the World Trade Organization. These factors, however, are in the nature of additional impulses to a process that has been underway longer. That is, while both cross-border lending and foreign investment in banking have grown in recent decades, banks in industrialized economies have increasingly emphasized the latter. By mid-1998, whereas banks in member countries of the Bank for International Settlement (BIS) had lent a total of \$850 billion abroad, loans of their branches and subsidiaries had grown to \$242 billion, in particular to “emerging economies”, that is, developing and transition economies.¹ These loans have on average doubled or even tripled in all areas of the world since the mid-1980s. In a number of countries, MNBs now have a sizable market share, for example, close to 20 per cent of banking market assets in Chile and Argentina.

A number of different views exist on the impact of MNBs on credit supply and financial stability in emerging economies. Proponents of more financial competition assert that MNB entry increases market discipline, the efficiency of domestic banks, and thereby financial intermediation and the supply of credit (Fry, 1995). Greater efficiency in loan allocation should stabilize the banking system, as banks become better at evaluating borrowers. Others, however, also argue that a growing MNB presence may induce domestic banks to lend more, but for riskier projects as they become less prudent in their activities under mounting competitive pressures (Demirgüç-Kunt and Detragiache, 1998). In this view, expanding loan exposure of domestic banks leads to greater financial instability from more speculative financing in the wake of greater international financial competition. Thirdly, the opposite argument,

namely that domestic banks tend to lend less if they are facing more international competition, as one would expect with an “infant industry”, has also been put forth (Weller, 2000). By virtue of a reduced credit exposure, banks in economies that open to MNB investment could become more stable.

With international agreements such as GATS in place to pave the way for even greater MNB presence in emerging economies, understanding the exact impact of MNBs on credit supply and financial stability is obviously not only of academic interest. If the impact of international financial competition is to raise the amount and effectiveness of credit by making domestic banks more efficient, more international barriers to the movement of MNBs should fall. However, if the impact of international financial competition is to reduce the amount of credit available for investment or to increase the amount for speculative financing, policy makers might want to proceed cautiously with further reductions in policy guidance of such capital movements.

To understand the impact of a growing MNB presence on emerging economies, I provide first some background on MNBs and investigate determinants of MNB lending in section II. I continue by discussing the effects of MNB lending on domestic credit supply and financial stability in section III. Finally, a few concluding remarks follow in section IV.

The extent of MNB presence in emerging economies

MNBs are understood here as banks that establish operations in more than one country. Hence, MNBs are also sometimes referred to as foreign banks and are included in the general category of foreign direct investment (FDI) in financial services. In contrast, international banks are banks that operate across international borders, but that do not establish a physical presence in other countries. MNB operations can come in different forms, namely as branch offices, subsidiaries, joint ventures, or strategic partnerships. Branch offices,

¹ The term “emerging economies” is sometimes used to denote the developing and transition economies that are particularly successful in attracting foreign capital inflows; the term will be used here, however, simply as a shorthand for “developing and transition economies”.

for instance, are an integral part of the mother company; that is, they have no capital of their own. Subsidiaries, however, are separate corporate entities that are fully owned by the mother company, but chartered in the host economy. Similarly, joint ventures are separate corporate entities owned jointly by more than one mother company. For instance, Dresdner Bank and Banque Nationale de Paris have been establishing a number of joint ventures in emerging economies over the past few years. Finally, MNBs may establish a strategic partnership by buying a major stake in an already existing domestic bank. The main difference between the various operational forms of MNBs is their regulatory treatment. Banks that are domestic corporate entities may receive a different treatment than banks that are not.

Most research efforts on MNBs are hampered by their limited scope as they tend not to include more than two or three countries, and are mainly focused on the United States, Japan or other Asian economies. So far, consistent data across countries which would allow for a comparison of MNB presence has been lacking. The BIS' *Consolidated International Banking Statistics* is an improvement, as it includes semi-annual data on international as well as multinational bank developments for a total of 184 countries and territories from 1985 to the present.² What is, however, gained in compatibility across countries is traded off against the drawback that the BIS provides only aggregated data for each economy without distinguishing loans by national origin of MNBs. Similarly, the data do not allow a distinction between the aforementioned different forms of MNB operations. Thus, while a study using this data set offers a comprehensive view of MNBs in a large sample of emerging economies, its scope in investigating the determinants of MNB presence or its impact on host economies is limited by the aggregated nature of the data. Still, much can be learned.

The recent growth of MNBs

Figures compiled from *Consolidated International Banking Statistics* highlight the growth in MNBs. By the end of 1997, 107 of 167 emerging economies and territories reported MNB operations. The largest recipient of MNB credit was Latin America (see table 1). Further, while Asia experienced a steady growth of MNB loans between 1985 and 1997, the upward trend only manifested itself in the Middle East and Africa in the 1990s.³ Their growth rates pale, though, compared to those in Latin America and Eastern Europe. Not only has MNB credit grown rapidly, it has also expanded faster than MNB deposit taking, thereby making MNBs mostly net importers of capital (table 1).

While MNB credit has grown faster than international bank credit in all areas, MNB credit was still a fraction of international bank credit, i.e., below 10 per cent in Eastern Europe and the Middle East, below 20 per cent in Asia and Africa, and about 22 per cent in Latin America. Moreover, MNB credit has generally been a small share of total loans and deposits in emerging economies (see table 2).

The determinants of MNB credit supply

While the numbers reveal a growing interest of MNBs in emerging economies, the question remains as to what to attribute the recent growth in MNB credit supply.⁴ Some of the earlier research on MNBs provides interesting insights into the motivations for MNB entry and operations in emerging economies. Most of the earlier research is based upon an application of the theory of multinational corporations (MNCs) to banking (Dunning, 1980; Gray and Gray, 1981). Among the motivations, some host economy characteristics have been found to be significant. These include current account balances (Terrell, 1979; Goldberg and Saunders, 1981; Sabi, 1988, 1994), interest rate differentials (Khoury, 1979), the exchange rate

2 Offshore banking centres and developed countries are not included.

3 MNB loans and deposits from the BIS exclude foreign currency loans. Thus, where foreign currency loans are allowed, the loan figures understate the actual size of MNB operations.

4 Multilateral agreements, such as GATS, have made it easier for MNBs to move abroad. A greater ability to internationalize operations, however, should not be confused with a greater willingness of MNBs to do so, as this depends on economic factors as well as regulatory aspects.

Table 1
Summary statistics for multinational banks by year and geographical area
(Millions of dollars)^a

	Local MNB credit					Net local assets (MNB credit - MNB deposits)				
	Eastern Europe	Latin America	Middle East	Africa	Asia	Eastern Europe	Latin America	Middle East	Africa	Asia
1985	77	9773	2608	3499	15130	0	2332	-15	298	6022
1986	275	12728	2960	3397	14454	72	2199	-32	-4	3691
1987	367	14308	3152	3696	17308	32	2474	-109	71	6516
1988	365	14358	3345	4478	17454	18	-807	-58	20	6164
1989	379	13420	1582	3852	23332	69	2028	58	18	6910
1990	420	15312	1908	4525	27472	55	2302	227	-67	9345
1991	708	16668	1932	3953	30461	-28	3160	52	-16	10570
1992	518	21385	2246	4054	36395	156	5700	106	-131	13327
1993	1358	24908	4368	4732	45417	526	6128	-133	-375	14822
1994	7818	30357	4852	6575	51836	3457	7804	-6	-899	17227
1995	8295	44276	5393	8180	56517	2901	10649	508	-91	18446
1996	15849	64089	5615	6862	64949	5538	16245	568	714	21158
1997	24499	123040	6836	6988	73260	7562	24530	-1505	502	16093
1997 MNB market share	14.27	16.93	0.41	9.13	4.63	-	-	-	-	-

Source: BIS, *Consolidated International Banking Statistics*; IMF, *International Financial Statistics*.

^a Credit and deposits at year-end in domestic currency on the books of local affiliates of foreign banks, converted into dollars at market exchange rates.

(Goldberg and Saunders, 1981), market size (Terrell, 1979; Khoury, 1979), demand for MNB products (Cho, 1985), servicing MNCs (Fieleke, 1977; Goldberg and Saunders, 1981; Khoury, 1980), underdeveloped banking markets (Terrell, 1979; Khoury, 1979; Guillén and Tschoegl, 1999), the presence of other MNBs (Ball and Tschoegl, 1982; Engwall and Wallenstål, 1988; Jacobsen and Tschoegl, 1999; Guillén and Tschoegl, 1999), economic growth (Sabi, 1988, 1994), and country risk (Sabi 1988, 1994). Similarly, characteristics of the originating economy seem to matter for MNBs to expand operations abroad, such as the market size of the originating economy (Terrell, 1979; Khoury, 1979) or saturated home markets (Guillén and Tschoegl, 1999). Finally, firm-level characteristics appear to play a significant role, such as an MNB's knowledge of international operations and of the host economy (Ball and Tschoegl, 1982; Ursacki and Vertinsky, 1992), or its reserve ratio (Terrell, 1979; Goldberg and Saunders, 1981).

In this paper, I can build on the earlier work only

to a certain degree. For one thing, the aggregated nature of my data set does not allow me to further address characteristics of either the originating economy or the multinational bank itself. Hence, I will focus for the remainder of this paper on the influence of factors related to the host economy. Second, most of the earlier research has analyzed the factors determining the entry of MNBs into host economies. Since I am specifically interested in the supply of credit by MNBs after they have entered, I will use a theoretical framework that is more appropriate to this task. In particular, I use a well-established credit supply function and augment it by host economy characteristics that are theoretically and empirically relevant.

I start from a model of credit supply by banks under credit rationing (Greenwald and Stiglitz, 1990; Stiglitz and Weiss, 1981). In the standard equation, each bank's supply of credit depends positively on its deposit base, its capital base, the opportunity costs of lending and on borrowers' collateral. However, while my data set provides information on deposits collected by MNBs in each economy, the ownership of MNBs operating in an

Table 2
Multinational and international banking statistics by geographical area, 1985-1997

	Eastern Europe		Latin America		Middle East		Asia		Africa	
Average growth of MNB credit (per cent per year) ^{a,b}	739.5		133.38		34.75		31.16		140.26	
Average MNB share of credit market (percentage) ^b	2.11		8.02		1.6		2.96		2.79	
Average MNB share of deposit market (percentage) ^b	2.41		9.26		2.81		3.4		7.52	
Average growth of international bank loans (per cent per year) ^b	10.65		7.44		17.17		16.74		2.15	
Average ratio of MNB credit to international bank credit (percentage) ^b	9.15		21.6		6.5		12.14		17.65	
<i>Memorandum items:</i>										
Sub-groupings of countries and periods	Without MNBs	With MNBs	Without MNBs	With MNBs	Without MNBs	With MNBs	Without MNBs	With MNBs	Without MNBs	With MNBs
Average growth of enterprise credit/GDP (per cent per year) ^a	-4.79	-0.85	-3.03	-3.8	-0.76	0.69	-0.16	4.52	0.2	-1.14
Average growth of total credit/GDP (per cent per year) ^a	-2.28	-0.62	1.57	-5.05	-2.18	-1.67	0.16	2.51	-0.81	0.02

Sources: Same as table 1.

Note: See annex 1 for definition of variables.

^a Averages only include countries in which MNBs were present.

^b Domestic currency value of loans at end of year, reconverted from dollar figures of BIS, using current exchange rate.

emerging economy cannot be traced from the data at hand. Thus, data are not available on the consolidated capital base of MNBs in an economy or on the MNBs' opportunity cost of funds.⁵ On the other hand, given the level of aggregation, I can use per capita GDP as a proxy for borrowers' collateral.

Besides these standard factors, other factors may determine the supply of credit by MNBs. First, to the degree that MNB credit depends on capital injections by its foreign owners, it is a form of international capital flow. Consequently, factors that we would consider to be relevant in attracting capital inflows in general may also play a role here. These include a host economy's current account balance and its exchange rate. A larger current

account deficit indicates a greater inflow of foreign capital and hence potentially a larger credit supply by MNBs. The impact of changes in the exchange rate, however, is not clear cut. On the one hand, an appreciating real exchange rate increases the returns in foreign currency on an already existing investment — either an appreciating nominal exchange rate raises the foreign currency value of a given level of profit, or relatively high local inflation with a fixed exchange rate raises the amount of profit in local and thus foreign currency. On the other hand, an appreciating real exchange rate increases the costs of placing new foreign funds in the local economy, as these funds buy less real goods and services in local money.⁶ Hence, the

5 Using any *single* variable, such as a local T-bills rate or money-market rate, as the opportunity cost of lending would have required eliminating more than half the observations, owing to data availability issues, and this would have rendered the econometric results rather problematic. As a consequence, however, there are no "price" variables in the MNB credit supply equation and any subsequent exercises might seek to remedy this problem.

6 A priori, the prices of equity in existing local banks could lead or lag the inflation rate and so no general conclusion can be drawn on the cost of acquiring existing banks.

net impact of appreciation on MNB credit supply is uncertain.

Further, operating in a foreign economy requires country specific knowledge, which may be costly to obtain, especially since it may take time to gather the relevant information. Hence, MNBs tend to focus on certain market segments, whose costs of servicing are low. The evidence on MNB lending activities indicates that MNBs severely ration their credit, extending loans mainly to MNCs, large domestic corporations and sometimes high net worth individuals (Brainard, 1990). One reason, as noted above, that MNBs enter a new economy is to provide services to MNCs that are already their customers in other parts of the world. Further, MNBs provide credit services that other banks are either less familiar with or that they cannot provide, such as foreign currency loans, acceptances and guarantees related to international trade, or syndicated loans (Brainard, 1990; Euh and Baker, 1990). Due to the nature of these services, large domestic corporations become MNB clients, whereas small and medium-sized enterprises (SMEs) are less likely to be sought after as clients, given the smaller volume and number of services they would utilize. Finally, MNBs may offer their credit services to high net worth individuals in part to attract their deposits (Brainard, 1990).

Past evidence suggests that MNBs have typically not expanded their activities beyond these market segments. For instance, when competition in traditional MNB market segments increased in the Republic of Korea in the 1980s, some MNBs shut down their operations. Other MNBs expanded their activities in areas where competition was not as fierce, such as services to high net worth individuals, customized financing packages for corporate clients or foreign currency loans (Brainard, 1990; Euh and Baker, 1990).

On the other hand, this may be changing. Recently market segments that were largely ignored by MNBs are getting a second look, as MNBs enter

strategic partnerships with local banks. Since 1995, Banco Santander SA, Banco Bilbao Vizcaya SA and Banco Central Hispano have bought large shares of almost 30 large banks in more than 10 Latin American countries in order to offer banking services to formerly underbanked markets, such as SMEs and lower-income individuals (WSJ, 10 September 1997; Guillen and Tschoegl, 1999).

The fact that MNBs are foreign owned and that managers and owners of MNBs are relatively unfamiliar with the local market has implications for their loan supply in emerging economies.⁷ That is, MNBs may look for signals that it is sound to invest in each economy that differ from the signals sought by domestic banks. Such signals may be proxied simply by the size of an economy, the existence of a ready market for MNB products (such as MNCs), or the presence of other MNBs. A large population may entice MNBs to seek a relatively large presence — not so much to serve the population directly as to serve large businesses that serve the population. Thus, we include the population as a measure of potential market size. Also, MNBs may be attracted if the domestic banking sector is not developing fast. We take the ratio of bank loans to bank deposits as an indicator of the shallowness or depth of the domestic banking sector and thus of profit opportunities for MNB entry or expansion (Terrell, 1979). Further, FDI flows can serve as an indicator of the stock of MNC operations, one of the sectors served by MNBs (Fieleke, 1977; Goldberg and Saunders, 1981; Khoury, 1981). Larger FDI inflows should be associated with a larger credit supply by MNBs. Finally, if the MNBs in a country already have a large supply of loans outstanding, newcomers may feel confident about also building a large loan portfolio or compelled by competitive pressures to do so (Ball and Tschoegl, 1982; Engwall and Wallenstål, 1988; Jacobsen and Tschoegl, 1998; Guillén and Tschoegl, 1999).

Following the above discussion we use the following equation to analyze the credit supply by MNBs in emerging economies:

⁷ Obviously, the unfamiliarity can be reduced by entering strategic partnerships with local banks, which have been growing in number lately, as noted above.

$$\frac{MNBCredit}{GDP} it = a + b1 \left(\frac{MNBDeposits}{GDP} \right) it + b2 \left(\frac{GDP}{Population} \right) it + b3 \left(\frac{GDP}{Population} \right) it - 1 + b4 \left(\frac{CurrentAccount}{GDP} \right) it + b5 e_{it} + b6 Population_{it} + b7 \left(\frac{BankCredit}{BankDeposits} \right) it + b8 \left(\frac{FDI}{GDP} \right) it + b9 \left(\frac{MNBCredit}{GDP} \right) it - 1 + \mu_{it} \quad (1)$$

with *MNBCredit* as total local currency loans of MNBs, *GDP* as gross domestic product (GDP) in current prices, *MNBDeposits* as local currency deposits of MNBs, *GDP*

as “real” GDP, *Population* as population, *Current Account* as the current account balance, *e* as the “real” exchange rate, *BankCredit* as the sum of all bank loans to private and public enterprises and to the government, *BankDeposits* as the sum of all time and demand deposits at banks, *FDI* as foreign direct investment flows, and μ as the error term (see table 3 for summary statistics on several variables).⁸

The ratio of MNB credit to GDP is chosen here as the dependent variable, rather than MNB credit to total credit, for two reasons. First, there is some evidence that a growing presence of MNBs has an adverse effect on the domestic credit supply (Weller, 2000). Hence, relating MNB loans to total credit would overstate the presence of MNBs. There is no such negative connection between MNB loans and GDP.

Table 3
Selected summary statistics, 1985-1997

	All countries	Eastern Europe	Middle East	Latin America	Asia	Africa
MNB credit/GDP _{it}	3.248 (5.11)	1.166 (1.883)	1.863 (2.920)	5.308 (6.423)	2.168 (1.881)	2.41 (4.957)
Bank capital/GPD _{it}	4.894 (4.250)	4.811 (3.925)	7.508 (6.130)	5.116 (4.169)	5.894 (3.992)	2.547 (3.149)
Deposits/GDP _{it}	29.442 (19.402)	25.442 (15.875)	53.548 (24.515)	33.221 (17.777)	34.354 (16.187)	20.755 (13.160)
Total credit/GDP _{it}	41.907 (36.390)	43.409 (26.064)	64.892 (36.471)	51.480 (50.343)	44.776 (25.929)	28.795 (22.904)
Enterprise credit/GDP _{it}	25.096 (18.528)	28.030 (20.648)	30.876 (15.238)	34.136 (16.513)	29.406 (24.295)	12.874 (8.001)
Current account/GDP _{it}	-4.985 (13.656)	-3.760 (6.880)	-2.695 (24.910)	-6.625 (14.551)	-3.087 (7.488)	-5.233 (11.759)
Bank credit/Bank deposits _{it}	123.59 (106.949)	136.127 (62.131)	102.004 (44.026)	135.073 (154.114)	136.495 (147.062)	112.654 (55.322)
Exchange rate _{it} ^a	10.170 (172.111)	7.978 (54.984)	24.380 (226.077)	20.453 (308.027)	1.538 (15.405)	5.117 (31.632)
FDI/GDP _t	1.736 (5.878)	1.453 (2.098)	0.579 (1.112)	2.723 (4.411)	1.367 (1.832)	1.451 (8.304)
GDP/Population _{it} ^b	98.875 (22.281)	92.755 (14.320)	104.981 (25.320)	98.413 (26.893)	102.867 (16.093)	96.765 (20.650)

Sources: Same as table 1.

Note: Figures in per cent, except as noted; data are full sample period means (standard deviations in parentheses).

a Average annual percentage change

b Individual country data are indices, 1990=100 (see annex 1). Data are mean levels; thus, since the mid-point of the sample is 1991, the average annual growth rate of a region is the mean minus 100.

Second, since my interest here is to establish determinants of the importance of emerging economies for MNBs, their operations should be related to the economy and not the financial market. As MNBs are entering underdeveloped financial markets, their presence should be seen in relationship to the potential share of the economy they could serve, and not the probably much smaller share of the economy that the financial sector actually serves.

Following the earlier discussion, the ratio of MNB deposits to GDP and an expression involving real per capita GDP as a proxy for collateral (or creditworthiness) would be the available standard explanatory variables for the credit supply. I expect MNB loans relative to GDP to be larger the greater are MNB deposits. The expression involving *Gdp/population* is meant as a simple distributed lag model of expected real per capita income over the future, when new loans would be outstanding.

The variables related to the fact that MNB credit may embody international capital flows are the exchange rate and the current account balance relative to GDP. While the sign for the effect of the exchange rate is a priori indeterminate, as noted above, I expect the supply of credit to grow if the current account balance deteriorates.

Finally, the factors determining the supply of MNB credit that are related to the fact that MNBs are foreign owned are the host economy's population, the ratio of bank loans to bank deposits, the volume of MNB credit in the previous period and concurrent FDI flows. I would expect all of these variables to be positively related to MNB credit supply.

As changes in credit may be endogenously related to MNB presence, the regression is estimated using two stage least squares, with the lagged ratio of credits to deposits as instrument. I begin my analysis of the determinants of MNB presence by including country fixed effects only. The results are presented in regression (1) in table 4, showing that the MNB credit supply is greater when there is a larger MNB deposit

base and higher per capita GDP, which are expected standard results. Further, of the external capital flow determinants, only the exchange rates are significant and positive, indicating that MNB credit is larger with a lower-valued currency. Finally, MNBs seem to have larger local loan books when FDI flows are greater.

It remains to investigate the robustness of these results. In recent years a number of multilateral agreements have made it easier for MNBs to enter emerging economies. For instance, the completion of the Uruguay round of the General Agreement on Tariffs and Trade in 1994 and the subsequent ratification of the GATS in 1997 were two such events that have eased access for MNBs into a wide array of economies. To control for such global changes, we add time fixed effects. The results in regression (2) of table 4 show my estimates to be unchanged, both with respect to significance and size of the explanatory variables.⁹

Another way to examine the robustness of my results is to reduce the estimation equation sequentially by eliminating the least significant variable in each step.¹⁰ My regression results in table 5 show that our earlier results are robust, and that only four variables are in all cases significant in determining the credit supply of MNBs, namely FDI flows, the exchange rate, the deposits of MNBs and GDP per capita lagged one period. Further, not only does the significance of the parameters remain rather stable, but so does also the size of the estimated coefficients.

While the results presented in tables 4 and 5 are comparative static in nature and not truly dynamic, they suggest a set of time-related hypotheses. One is that MNBs will increase their loans in response to a depreciating exchange rate. A depreciation of one standard error can be associated with an (eventual) increase of MNB loans of 1.89 percentage points relative to GDP (calculated from data in tables 3 and 4). Indeed, my results seem to generalize certain recent experiences. In particular, after the Mexican peso crisis in 1995, MNB loans in Mexico grew 1.14 per cent relative to GDP, more than twice as fast as their average growth for Mexico of

9 Results in columns (3) to (8) of table 4 will be discussed below.

10 We report the results for the estimations that include only country fixed effects. Adding time fixed effects changes the order of deletion slightly, but does not affect the size or significance of the estimated coefficients.

Table 4
Determinants of MNB credit supply by region

Dependent variable:	MNB credit/GDP							
	All countries		Africa		Latin America		Asia	
	(1) LSDV	(2) LSDV	(3) LSDV	(4) LSDV	(5) LSDV	(6) LSDV	(7) LSDV	(8) LSDV
MNB deposits/GDP _{it-1}	0.361*** (0.057)	0.365*** (0.057)	0.331*** (0.184)	0.220 (0.208)	0.394*** (0.081)	0.366** (0.081)	0.655*** (0.213)	0.730*** (0.230)
GDP/Population _{it}	-0.003 (0.014)	-0.010 (0.014)	-0.007 (0.036)	-0.076* (0.044)	-0.009 (0.027)	-0.022 (0.028)	-0.001 (0.033)	-0.005 (0.038)
GDP/Population _{it-1}	0.023* (0.012)	0.024* (0.012)	0.019 (0.031)	0.057** (0.028)	0.020 (0.020)	0.030 (0.022)	0.005 (0.033)	0.001 (0.038)
Current account/GDP _{it}	0.016 (0.028)	0.011 (0.028)	-0.039 (0.129)	0.040 (0.136)	0.030 (0.040)	0.027 (0.041)	0.024 (0.043)	-0.001 (0.056)
Exchange rate _{it}	0.011** (0.004)	0.010** (0.004)	-0.013 (0.023)	-0.014 (0.024)	0.015*** (0.005)	0.014*** (0.005)	0.016*** (0.006)	0.015 (0.010)
Population _{it}	3.30e-09 (1.11e-08)	-1.11e-10 (1.16e-08)	-2.84e-07 (3.68e-07)	-1.55e-06* (7.69e-07)	1.01e-07 (1.07e-07)	1.62e-08 (1.21e-07)	4.61e-09 (5.47e-09)	3.06e-09 (7.07e-09)
Bank credit/Bank deposits _{it}	-0.002 (0.006)	0.001 (0.006)	-0.013 (0.036)	-0.004 (0.041)	-0.002 (0.007)	0.003 (0.007)	0.027** (0.011)	0.034** (0.013)
FDI/GDP _{it}	0.158*** (0.055)	0.130** (0.057)	0.281 (0.278)	0.420 (0.261)	0.120* (0.071)	0.080 (0.077)	0.255** (0.103)	0.237** (0.116)
MNB credit/GDP _{it-1}	0.025 (0.039)	0.024 (0.040)	-0.039 (0.081)	-0.045 (0.083)	0.262*** (0.090)	0.222** (0.092)	0.079 (0.169)	0.026 (0.189)
Constant	-2.954 (9.438)	1.462 (4.178)	2.396 (5.641)	63.176** (29.629)	-9.870*** (2.625)	2.545 (18.973)	-2.950 (1.919)	-3.293 (2.557)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	361	361	74	74	165	165	82	82
Adjusted R-squared	0.923	0.927	0.887	0.928	0.936	0.942	0.816	0.837

Note: Standard errors in parentheses below coefficients.

* Significance at 10 per cent level; ** Significance at 5 per cent level; *** Significance at 1 per cent level.

LSDV: Least squares, dummy variables, i.e., no random effects.

0.48 per cent over the full sample time period.

The econometric results also suggest that MNBs tend to have a larger presence where a ready market already exists, as indicated by the estimated parameter for FDI flows relative to GDP. In particular, an increase in FDI inflows relative to GDP by one standard deviation results in MNB loans rising 0.93 percentage points relative to GDP.

The interpretation given here for the FDI variable, however, is not the only one possible. That is, it seems important to address the question of the direction of causality between MNB credit and MNC presence. Sabi (1988, 1994), for instance, suggests, as we did, that MNBs follow their clients into the host economy. This, however,

contrasts with Ursacki and Vertinsky's (1992) findings that MNBs may actually pave the way for their MNC clients. With the present data set and exercises, the usefulness of Granger causality analysis is reduced, which leaves us to first regress MNB credit relative to GDP on its own value lagged twice and on FDI inflows lagged twice, and then to regress FDI flows on its own value lagged twice and on MNB credit lagged twice. The regression results in table 6 show that FDI inflows are a better predictor of MNB presence than the other way around, suggesting that MNBs are largely followers of MNCs and not leaders.

Clearly, the determinants of MNB presence may vary from region to region due to location,

Table 5
Determinants of MNB credit supply with sequential elimination

Dependent variable:	MNB credit/GDP					
	(1) LSDV	(2) LSDV	(3) LSDV	(4) LSDV	(5) LSDV	(6) LSDV
MNB deposits/GDP _{it-1}	0.361*** (0.057)	0.361*** (0.057)	0.360*** (0.057)	0.359*** (0.056)	0.503*** (0.057)	0.506** (0.057)
GDP/Population _{it}	-0.003 (0.014)	-0.002 (0.014)	-	-	-	-
GDP/Population _{it-1}	0.023* (0.012)	0.023* (0.012)	0.022*** (0.007)	0.021*** (0.007)	0.017** (0.007)	0.015** (0.007)
Current account/GDP _{it}	0.016 (0.028)	0.017 (0.027)	0.019 (0.027)	0.021 (0.027)	0.023 (0.028)	-
Exchange rate _{it}	0.011** (0.004)	0.011** (0.004)	0.011** (0.004)	-0.010*** (0.004)	0.009** (0.004)	0.009** (0.004)
Population _{it}	3.30e-09 (1.11e-08)	-	-	-	-	-
Bank credit/Bank deposits _{it}	-0.002 (0.006)	-0.002 (0.006)	-0.002 (0.006)	-	-	-
FDI/GDP _{it}	0.158** (0.055)	0.159*** (0.055)	0.159*** (0.054)	0.164*** (0.053)	0.185*** (0.057)	0.176*** (0.056)
MNB credit/GDP _{it-1}	0.025 (0.039)	0.025 (0.039)	0.025 (0.039)	0.025 (0.039)	-	-
Constant	-2.954 (9.438)	-0.811 (4.739)	-4.523** (2.228)	0.402 (0.724)	0.172 (0.728)	0.240 (0.723)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	361	361	365	366	434	434
Adjusted R-squared	0.923	0.923	0.922	0.804	0.765	0.761

Note: Standard errors in parentheses below coefficients.

* Significance at 10 per cent level; ** Significance at 5 per cent level; *** Significance at 1 per cent level.

LSDV: Least squares, dummy variables, i.e., no random effects.

historical ties, or cultural differences. Hence, I estimate the equation for Latin America, Asia, and Africa separately.¹¹ The results given in regressions 3-8 in table 4 show that only one variable, namely the MNB deposit base, is significant in all three cases; that is, there are some interesting regional differences. In Latin America, the exchange rate and the past level of MNB loans are significant determining factors for MNB credit supply. These results suggest that the frequent currency crises in the region and the financial sector reforms they set in motion may have helped to raise the market share of MNBs to its current level, which is the highest among

emerging economies. Our results also confirm earlier findings that, in the case of some Latin American economies, the previous presence of MNBs matters for their current activities (Guillén and Tschoegl, 1999). Finally, in Asia, the exchange rate, FDI flows and the ratio of bank loans to deposits as an indicator of profit opportunities, aside from MNB deposits, seem to determine MNB credit supply. Thus, our results confirm earlier findings, at least for the case of Asian economies, wherein “profit opportunities” in the host economy seem to matter for the supply of credit by MNBs (Sabi, 1988, 1994).

11 The Middle East and Eastern Europe are excluded due to the small sample size.

Table 6
Some evidence on casualty between MNBs and business FDI

Dependent variable:	MNB credit/GDP _t			FDI/GDP _t		
	(1) Random Effects	(2) LSDV	(3) LSDV	(4) Random Effects	(5) LSDV	(6) LSDV
MNB credit/GDP _{it-1}	0.550*** (0.041)	0.253*** (0.041)	0.261*** (0.041)	0.055 (0.034)	0.027 (0.038)	0.021 (0.038)
MNB credit/GDP _{it-1}	0.309*** (0.040)	0.101** (0.041)	0.105** (0.041)	-0.005 (0.033)	-0.056 (0.039)	-0.064 (0.039)
FDI/GDP _{it-1}	0.035 (0.048)	0.050 (0.047)	0.036 (0.048)	0.540*** (0.040)	0.293*** (0.089)	0.261*** (0.045)
FDI/GDP _{it-2}	0.072 (0.044)	0.119** (0.048)	0.113** (0.049)	0.193*** (0.038)	0.089** (0.044)	0.061** (0.044)
Country fixed effects	No	Yes	Yes	No	Yes	Yes
Year fixed effects	No	No	Yes	No	No	Yes
F-Statistics	2044.24 (0.000)	21.83 (0.000)	44.20 (0.000)	932.47 (0.000)	18.86 (0.000)	13.89 (0.000)
Hausman Test		2024.85 (0.000)			890.62 (0.000)	

Note: Standard errors in parentheses below coefficients. For test statistics, probability of falling below critical value in parentheses.

* Significance at 10 per cent level; ** Significance at 5 per cent level; *** Significance at 1 per cent level.

LSDV: Least squares, dummy variables. For LSDV regression, the F-Statistics are reported, while the Chi-squared statistics are reported for GLS random effects.

Multinational banks, finance constraints and financial stability

What is the impact of MNB entry and MNB operations on the domestic economy in emerging economies? In the previous section, I argued that MNBs focus their activities on limited market segments, which raises the question whether this concentration of MNBs has any effect on the behavior of domestic banks. Does it force them to become more efficient to compete with MNBs? Or does it leave them with less premium clients, and therefore more exposed to default risk? How does this impact on the supply of credit and financial stability?

Based on the financial liberalization (FL) framework, it is often suggested that allowing easier foreign entry will enhance the efficiency of domestic banks. In McKinnon's (1973) and Shaw's (1973) discussion of the apparent excess demand for credit in less industrialized economies, a number of measures to deregulate financial markets were proposed, among them the elimination of market entry restrictions. MNB entry is particularly welcome, since it supposedly introduces

market discipline and brings in foreign expertise, banking know-how and bank capital.

However, the standard FL view of international competition ignores the crucial value of information for financial firms. In general, as borrowers and lenders do not have perfect information about each other, borrowers cannot obtain all the finance that they would demand for their investments at the given interest rates (Stiglitz and Weiss, 1981; Gertler, 1988; Bernanke 1993). With the addition of international financial competition, a number of different outcomes are possible that can effect the supply of bank credit, and possibly the stability of the domestic banking system.

A priori, the effect of a greater MNB presence on a domestic bank's credit supply depends on the bank's net worth. As will be argued below, if a bank's net worth stays *above* a safety threshold, the bank will *not increase* its loans in response to new foreign competition unless its net worth grows; however, if its net worth falls *below* that safety threshold, the bank will *increase* its loans in response to the new competition, particularly for high risk projects, as it stands to lose

little or nothing. The difficulty for banks above the threshold is that the new competition reduces their ability to raise their net worth, while it raises the riskiness of their loan portfolios and hence they may restrict their lending.

There are two steps in this argument. First, in liberalizing economies, domestic banks are newcomers to an unregulated market environment and hence should be seen as an infant banking industry with large capital needs. However, more competition lowers interest rate spreads and thus earnings, which are the most important source of new capital. MNBs, of course, can be an effective agent of the new competition. In one of the most comprehensive studies of the profitability of domestic banks and MNBs, the authors find that “an increase in the share of foreign banks leads to a lower profitability of domestic banks” (Claessens, Demirgüç-Kunt, and Huizinga, 1998). Thus, earlier findings by Terrell (1986) are supported, who found that banks in economies that allow MNB entry have lower gross interest margins and lower pre-tax profits. This limits the ability of domestic banks to raise capital, as other sources, such as public capital injections or equity issues, may be presumed not to be available.

The second step in the argument pertains to the banks’ loan portfolios. With constant capital and without a reduction in lending, greater competition raises the chance of bank failure because of lower profit margins. This risk might be contained by emphasizing less risky loans over riskier ones, or by reducing lending overall. Lending to MNCs or large domestic corporations is clearly less risky than to others, such as rural producers, SMEs or start-up companies. However, MNBs possess a competitive advantage in serving these less risky market segments due to their reputation or their international orientation. By virtue of their competitive disadvantages, then, domestic banks are left more exposed to riskier market segments than before the international competition arrived. Consequently, few alternatives remain for domestic banks to reduce their now-greater risk other than to reduce their loans.

A decline of enterprise credit by domestic banks in the face of greater MNB presence will then cause an overall credit decline if MNBs do not compensate for this decrease. As already noted, MNBs

will substitute for domestic banks in serving certain groups of customers, but MNBs are unlikely to enter those market segments which require intensive country specific knowledge. Thus, if domestic banks reduce their loans to these latter segments — comprising the majority of the banking sector in most economies — total enterprise credit falls.

In fact, credit decreases in connection with increased international competition have been observed in some cases. In the Republic of Korea, concerns like those above led policy makers to require that MNBs lend 35 per cent of their loans to SMEs (Euh and Baker, 1990). Similar lending requirements were not introduced in Hungary, where the majority of the country’s banks have become foreign owned. Real credit in Hungary declined 35 per cent from 1989 to 1994 and the financial constraints of some Hungarian borrowers became a concern (Anderson and Kegels, 1998). Although much else was occurring during these years of transition to market economy, foreign banks were bolstering the capacity of the Hungarian financial system to operate in a market-oriented way and may have thereby contributed to the credit tightening through market-type credit evaluation. Finally, it was found that in Poland both newly created and privatized banks reduced their loans in conjunction with the growing MNB presence, which thereby contributed to lowering total credit in Poland as well (Weller, 2000).

Up to now, I have focused on the possibility that MNB entry leads to a credit contraction. Alternatively, MNB entry may result in a credit expansion, possibly for unsustainable, speculative purposes. While the FL approach argued that international competition forces banks to become more efficient, some recent authors have suspected a destabilizing role of MNB entry (BIS, 1997; Kaminsky and Reinhart, 1996; Demirgüç-Kunt and Detragiache, 1998). The BIS (1997:13) argues, for instance, that “financial institutions ... often lack the experience to manage risks, and in the face of stronger competition, institutions will tend to be pushed towards riskier investments.”

The increased riskiness could occur for several reasons, including competitive pressures, poor capitalization of domestic banks, or “deregulation euphoria”. Obviously, MNB entry raises the number of

banks and thus the competitive pressures on domestic banks. Should they seek to maintain their market share, domestic banks may extend credit to borrowers or projects of lesser quality, thus increasing automatically the default risk in their portfolios (Darity and Horn, 1988). The factor that may push banks with poor capitalization into seeking out high risk, high return projects is the same one discussed above that induces lower lending by better capitalized banks, namely a decline in earnings. In this case, poorer profit expectations may push a bank's franchise value so low as to leave it *de facto* bankrupt. Such banks simply stand to lose little or nothing from taking on larger portfolio risk. Finally, "deregulation euphoria" may lead banks to become overly optimistic about borrower quality and extend their loans to less creditworthy projects.

If the overall riskiness of bank portfolios rises, undesirable macroeconomic consequences could ensue. This is seen once the MNB entry is viewed as part of the broader FL package, which includes the elimination of interest rate ceilings, the reduction of lending restrictions and other domestic deregulation, and capital account liberalization. Previously credit constrained sectors may thus now receive more funding because higher real interest rates on loans promise more profits. More credit might in turn increase investment, both for productive and speculative projects. These real and financial expansions might then attract overseas investors, which may lead to an appreciation of the exchange rate, attracting even more capital. However, rather than ending in a stable equilibrium, these changes may merely produce a temporary period of tranquility (Minsky, 1986). The initial boom may lay the foundation for later instabilities. For instance, liberalization may encourage short-term speculative finance, thereby raising the chance of borrower default. Similarly, a continuously overvalued currency hurts exporters and may lead to a deterioration in the current account balance. Hence, real and financial sectors may ultimately grow apart, until borrower defaults rise, the currency depreciates and banking-sector instabilities follow suit.

One possible role of MNBs in such a destabilizing cycle is that they increase the optimism

among lenders and thereby fuel an unsustainable credit expansion. The presence of overseas capital may be seen by domestic banks as a "stamp of approval" for the economic success of an economy. In other words, domestic investors may interpret more financial service FDI as a signal of sound economic fundamentals, thereby inducing them to lend more than they otherwise would. In sum, the entry of MNBs can impact both credit supply and financial stability. On the one hand, domestic banks may want to reduce their risk exposure by lowering their loan exposure; on the other hand, domestic banks may want to raise their expected revenue streams by lending more to riskier activities. As will be discussed below, while credit contractions may dominate in the early stages of FL and foreign entry, credit expansion may become dominant at a later stage.

Empirical relationships of MNBs and domestic credit growth

The regional statistics on MNBs in table 2 above included supplementary data that distinguishes sub-periods of time before and after the entry of MNBs into each country.¹² One obvious question is whether there is a difference in credit growth before and after MNB entry. The measures shown in table 2 are enterprise credit — the sum of credit to private and public enterprises — and total credit, both expressed as a ratio to GDP. After MNB entry, credit growth relative to GDP tends to be higher than before, except for Latin America, where the total credit to GDP ratio declines about 5 per cent per year. Moreover, in the Middle East and Eastern Europe total credit relative to GDP continued to shrink after the entry of MNBs. Further, even though total credit after MNB entry grew slightly in Africa, it is one out of two areas — the other being Latin America — where enterprise credit shrank after MNBs were present (see table 2).

While the credit supply thus seems to generally improve in the presence of MNBs, the issue remains whether MNB presence can be linked to the changed growth of credit supply. In 24 out of 88 countries, total credit was positively correlated with MNB presence.

12 Entry defined as year MNB data begin to be reported by BIS.

However, in 19 out of 88 countries, the credit supply was negatively correlated with MNB presence. Hence, we cannot draw any conclusions from the simple descriptive statistics about the connection between MNB presence and credit supply.

One hypothesis to explain the conflicting evidence is that, while MNB presence may initially result in less credit supply, it may later be associated with credit expansion and even with riskier loans. If so, one should be able to observe a growth in the likelihood of banking crises, the longer MNBs are present in emerging economies. To investigate this possibility, the data set was split up so as to give a sense of the link between MNB presence and crises. A year is qualified as a crisis year for a country if its banking system shows either significant problems or experiences a crisis (Lindgren, Garcia and Saal, 1996). There are 95 different events that were classified as banking crises up to 1996, with 52 cases in which MNBs were present. To see the effect of degrees of MNB activity on a country, we further distinguish between cases in which there is any MNB credit, or if MNBs have at least a 1 per cent, a 2 per cent, or a 3 per cent credit market share. The frequency of crises is then calculated for the first five years, the second five years, and any years beyond the first ten years of MNB presence.

Table 7 shows that MNB presence is loosely connected with the occurrence of a crisis. While the probability of a banking crisis hovers around 4 per cent for the first 5 years of MNB presence, it increases to 5-6 per cent for the second 5 years, before it declines to 3-5 per cent for the years after the first ten years. In other words, there is some reason to suspect that the presence of MNBs may initially have a stabilizing impact on domestic financial systems, while international financial competition may become destabilizing over time.

There are also indications that MNBs participate in the lending “euphoria” that typically precedes a financial crisis. In particular, MNB lending grows above average in the year leading up to a crisis (see table 8).¹³ While the growth rate of MNB loans is on average 32.46 percentage points below their mean during tranquil periods two years prior to a crisis, it is 40.41 percentage points higher one year prior to a crisis. Further, MNB credit market share grows above its tranquil period average in the year just before a crisis, which indicates that MNBs are expanding their loans faster than domestic banks.

The fact that MNBs expand their loans faster than domestic banks prior to a crisis may raise the overall default risk and increase the chance of a crisis (Kaminsky and Reinhart, 1996; Demirgüç-Kunt and Detragiache, 1998). The main link between more credit and instability is

Table 7
Frequency of banking crises in the presence of MNBs, 1985-1996
(Percentage)

Overall frequency of banking crises	Frequency of banking crisis occurring with MNBs present		
	First 5 years with ...	Second 5 years with ...	Third 5 years and beyond with ...
		... no minimum credit market share	
5.6	3.7	6.1	3.2
		... at least 1 per cent credit market share	
5.9	4.3	5.8	5.1
		... at least 2 per cent credit market share	
5.8	4.0	6.2	4.6
		... at least 3 per cent credit market share	
6.0	4.2	5.4	5.1

Source: See annex 2.

13 The figures in table 8 are calculated by first defining the crisis period as the five years centred on the actual crisis year. Then, the average for the non-crisis period is taken. Following that, the difference between a variable one or two years before the crisis and its mean during the whole non-crisis period is calculated. Finally, the mean of this difference for the crisis periods is reported in table 8.

Table 8
MNB growth and MNB market share in years prior to banking crises
 (Percentage point deviation from non-crisis periods)

	Deviation from average during non-crisis times	
	MNB market share growth	MNB lending growth
2 years prior to crisis year	-2.37	-32.46
1 year prior to crisis year	0.95	40.41

Source: See text.

overly optimistic expectations resulting in the expansion of credit to market segments of lower quality. Such optimistic expectations may be aided by a growing MNB presence, possibly because domestic lenders see the activities of MNBs as a “stamp of approval” for the performance of the domestic economy. Thus, while MNBs may initially raise stability through their effect in reducing domestic credit, they may also help to raise lenders’ expectations and foster imprudent lending practices.

Regression analysis

So far, the figures indicate no clear link between MNBs and credit supply, although there is some indication that the financial sectors of emerging economies may become more unstable the longer MNBs are present and the more they grow. However, I can further investigate the impact of MNBs on credit supply and on stability through a credit supply function derived from a standard credit supply model under credit rationing (Greenwald and Stiglitz, 1990). The estimation equation, a variation on equation 1, looks as follows:

$$\begin{aligned}
 \frac{EnterpriseCredit}{GDP} it = a + b1 \left(\frac{BankCapital}{GDP} \right) it + b2 \\
 \left(\frac{Deposits}{GDP} \right) it + b3 \left(\frac{GDP}{Population} \right) \\
 it - 1 + b4 \left(\frac{MNBCredit}{GDP} \right) it + b5 \left(\frac{MNBCredit}{GDP} \right)^2 \\
 it - 1 + b6 \left(\frac{EnterpriseCredit}{GDP} \right) it - 1 + \mu_{it}
 \end{aligned} \quad (2)$$

where *EnterpriseCredit* is the credit supply to private and public firms, *BankCapital* is the total bank capital, *Deposits* are all bank deposits, *GDP* is nominal GDP, *Gdp* is “real” GDP, *Population* is the current population, *MNBCredit* is the credit lent out by all MNBs, and μ is the error term.

As our argument pertains to commercial loans, our dependent variable is enterprise credit, i.e., the sum of bank credit to private and public enterprises, relative to GDP. We include its lagged value as an explanatory variable, which is meant to control for omitted variables. Later, we re-estimate the regression using total credit as the dependent variable. As most credit is enterprise credit (as can be seen in table 3 above), the effect of international financial competition on enterprise credit may be large enough to have a significant impact on the total credit supply.

In its basic form, bank lending is supposed to depend, *inter alia*, on the bank’s capital, its deposit base and the collateral its borrowers can provide (see discussion of equation 1). Consequently, we expect that the credit supply depends positively on bank capital and deposits, and on per capita GDP as a proxy for borrower performance and thus collateral capacity. Further, to model the ambiguous effect that MNB presence may have on credit supply, we include both a linear and a quadratic term for MNB presence. As discussed above, we expect MNB presence to affect credit supply negatively when MNBs are small, and increasingly more positively as MNBs grow.

Since deposits may be endogenously related to credit supply, we estimate the regression by using two stage least squares, where the lagged value of deposits serves as instrument. We begin by estimating the regression with dummy variables to control for country fixed effects. The results in regression (1) in table 9 show that all variables have either the expected sign or are insignificant.

Most importantly for my purposes, the MNB variables are both significant with the expected sign, suggesting that MNBs lower the supply of credit as long as they are small, and have a positive influence on the supply of credit to enterprises as their lending activity becomes larger. More precisely, according to the estimated parameters in column 1 of table 9, if MNB

Table 9
Enterprise credit supply with MNBs present

Dependent variable:	Enterprise credit/GDP _t			
	(1) LSDV	(2) LSDV	(3) LSDV	(4) LSDV
				<i>Memorandum item:</i> Logarithmic specification
Bank capital _t /GDP _{it}	1.6666*** (0.1925)	1.6536*** (0.1930)	1.7230*** (0.2007)	0.2251*** (0.0440)
Deposits _{it}	0.0185 (0.1165)	0.0271 (0.1170)	0.0022 (0.1254)	-0.3083 (0.2607)
GDP/Population _{it-1}	0.1509*** (0.0225)	0.1547*** (0.0239)	0.1665*** (0.0246)	0.2786*** (0.0871)
Enterprise credit/GDP _{it-1}	0.5406*** (0.0474)	0.5479*** (0.0483)	0.5535*** (0.0494)	0.8717*** (0.1221)
MNB credit/GDP _{it-1}	-0.5406** (0.2212)	-0.5663** (0.2235)	-0.5703** (0.2345)	-0.0268* (0.0154)
MNB credit/GDP ² _{it-1}	0.0170* (0.0091)	0.0167* (0.0092)	0.0158* (0.0094)	N/A
Logged time trend _{it}	N/A	N/A	3.9589 (5.8842)	0.0899 (0.2491)
Constant	-41.5759*** (7.1684)	-42.9744*** (7.7939)	-34.4382** (18.7875)	-0.1585 (0.3966)
Country dummies	Yes	Yes	Yes	Yes
Year dummies	No	Yes	Yes	Yes
Number of observations	275	275	260	259
Adj. R-squared	0.9447	0.9447	0.9452	0.9139
F-Statistics	124.15	96.31	319.06	1508.83

Note: Standard errors in parentheses below coefficients.

* Significance at 10 per cent level; ** Significance at 5 per cent level; *** Significance at 1 per cent level.

LSDV: Least squares, dummy variables, i.e., no random effects).

credit grows relative to GDP in a country, *ceteris paribus*, the ratio of enterprise credit to GDP falls until the MNB credit ratio reaches 15.9 per cent of GDP, after which a rising MNB credit ratio becomes associated with a higher ratio of enterprise credit to GDP. To take an example, if MNB loans are at the all-period, all-country average of 3.25 per cent of GDP (see table 3) and if they increase by 2 percentage points relative to GDP, then the supply of enterprise credit would decline by 0.86 percentage points relative to GDP (assuming no change in other independent variables). Only if MNB presence is larger than 15.9 per cent of GDP, which is the case for 10 countries out of 112, does the impact of further MNB loan growth on enterprise credit turn positive, according to these results.

To account again for global changes affecting all countries, we add time fixed effects, with the results in regression (2) of table 9 showing my estimates unchanged, both with respect to significance and size of the explanatory variables.

Aside from changes over time that affect all economies, countries may undergo shifts in their policies regarding MNBs that at times are separate from changes in other economies. Such individual policy changes — often in the form of more financial liberalization — are not captured by time fixed effects and may only be partially accounted for by the inclusion of deposits and per capita GDP in the regression. Hence, I add a time trend for each country individually, starting with the year when MNB credit is first reported. Such a

trend should pick up the learning by the banking system of a country in response to international financial competition and related liberalization measures; i.e., it seems only reasonable to assume that as institutions become more adept at operating in the new, more competitive environment, their responses become gradually less pronounced. In other words, such a trend may not be in a linear form, but rather a log form. Adding this logged time trend to the previous regressions provides us with regression (3) of table 9. The results show that the previous estimates are robust (and the new variables are not statistically significant), still indicating a U-shaped relationship of MNB loans and total enterprise credit, albeit with the minimum ratio of enterprise credit to GDP, *ceteris paribus*, occurring when MNB credit amounts to 18.0 per cent of GDP in the previous period.

Another way to test the robustness of the results is to re-estimate the equation employing a logarithmic specification. Obviously, the squared term of international financial competition disappears in this specification, although this exercise shows again an overall negative relationship of enterprise credit to MNB credit. Also, all other results reappear in this specification. However, using Theil's (1971) residual variance criterion on the larger residual sum of squares for the logarithmic model and the smaller residual sum of squares for the levels model, we obtain a test value of 2.08, which is F distributed with 210 degrees of freedom in both the numerator and the denominator, suggesting that the levels model is the more appropriate specification at the 1 per cent level.

Given that there is a negative effect of increased MNB loans on the total supply of enterprise credit, the question arises whether this carries over to a negative effect on overall credit. Taking a similar approach to the enterprise credit equation, we estimate the impact of MNB presence on the supply of total credit in regressions (1) through (4) in table 10. My results show that when country and time fixed effects as well as country specific trends are accounted for, there is a negative, albeit now linear, response to increases in

MNB credit; more precisely, based on parameter estimates in column 3 of table 10, for each increase of MNB credit relative to GDP in the previous period to the tune of one standard deviation, *ceteris paribus*, there is a decline in total credit of 3.13 percentage points relative to GDP.¹⁴ Put differently, the econometric results say that the negative response of enterprise credit to growing MNB credit seems to be strong enough to lower total credit when MNB credit is relatively small, while the positive impact of larger MNB loans on the supply of enterprise credit that we observed when MNB credit is relatively large does not appear to translate into more total credit.

Implications

In the majority of emerging economies, the ratio of MNB loans to GDP is below the threshold discussed above and thus an increased presence of MNBs would be expected to be associated with a lower ratio of enterprise credit and total credit to GDP. If this is the case, it is hard to see how increased international financial competition per se could cause banking systems to become more fragile than they would from liberalization without foreign entry. On the contrary, because of their overall impact in reducing the credit exposure of domestic banks, MNBs may help to stabilize the local banking systems, at least assuming the banks do not raise the average riskiness of their loans as the size of the portfolio shrinks. The fact that we observe a greater chance of banking crises the longer MNBs are present in emerging economies may simply be correlated with other macroeconomic trends.

However, aside from helping to stabilize domestic banking systems, there may be other consequences of reduced ratios of credit to GDP. In particular, a smaller supply of credit may have a negative impact on growth as it finances less investment (Calvo and Corricelli, 1993; Odedokun, 1996). Thus, a growing MNB presence in an emerging economy may put a damper on its economic growth.

14 Calculating Theil's residual variance criterion to compare the two specifications we obtain an F-distributed test statistic of 6.18 with 392 d.f. in the numerator and 401 d.f. in the denominator. Thus, the levels specification is again the more appropriate one at the 1 per cent level.

Table 10
Total credit supply with MNBs present

Dependent variable:	Total credit/GDP _t			
	(1) LSDV	(2) LSDV	(3) LSDV	(4) LSDV
				<i>Memorandum item:</i> Logarithmic specification
Bank capital _t /GDP _{it}	2.2208*** (0.2569)	2.2631*** (0.2405)	2.3105*** (0.1748)	0.1544*** (0.0233)
Deposits/GDP _{it}	-0.5493*** (0.1601)	-0.3394** (0.1615)	-0.2946* (0.1748)	0.0542 (0.0849)
GDP/Population _{it-1}	0.1151*** (0.0306)	0.1084*** (0.0284)	0.1099*** (0.0307)	0.1767*** (0.0543)
Total credit/GDP _{it-1}	0.6803*** (0.0426)	0.6227*** (0.0435)	0.5981*** (0.0457)	0.6512*** (0.0403)
MNB credit/GDP _{it-1}	-0.7003** (0.3491)	-0.7444** (0.3221)	-0.6131* (0.3379)	-0.0293*** (0.0097)
MNB credit/GDP ² _{it-1}	-0.0147 (0.0120)	0.0156 (0.0111)	0.0126 (0.0126)	N/A
Logged time trend	N/A	N/A	-13.1471** (5.3887)	-0.2519 (0.1027)
Constant	-10.6046*** (7.2558)	-39.4429*** (12.0485)	76.5135 (19.5644)	0.4112** (0.1958)
Country dummies	Yes	Yes	Yes	Yes
Year dummies	No	Yes	Yes	Yes
Number of observations	515	515	478	467
Adj. R-squared	0.9042	0.9193	0.9227	0.9253
F-Statistics	77.77	255.47	75.96	3193.5

Note: Standard errors in parentheses below coefficients.

* Significance at 10 per cent level; ** Significance at 5 per cent level; *** Significance at 1 per cent level.

LSDV: Least squares, dummy variables, i.e., no random effects).

Another question is whether firms are likely to differ in experiencing MNB-related domestic finance constraints. Domestic banks can reduce their loans to all their borrowers at the same rate or they can reduce their loans to some more than others. Given that loans to some borrowers cost less to arrange and that some are less risky than others, it is likely that domestic banks will reduce these types of loans to a lesser degree than more costly and higher risk loans if they can. Arguably, loans to smaller borrowers are among the more costly and often riskier ones. Hence, SMEs or start-up companies are more likely to experience finance constraints than larger, more established firms.

Toward additional research and policy conclusions

I have studied in this paper the determinants of the credit supply by MNBs in emerging economies. I found that aside from MNB deposits, the past economic performance of the host economy (as embodied in per capita GDP), as well as the exchange rate and FDI flows are significant determinants of MNB credit supply. Regarding FDI flows, while the economic performance of the host economy seems to matter, the existence of a ready market in the form of the presence of multinational corporations seems to be highly relevant. This helps to

confirm a number of other studies, which have over the years pointed to the fact that MNBs in all parts of the world focus on serving their existing clients, namely MNCs. Regarding exchange rates, it was found that MNB credit supply was lower when a currency had appreciated and was larger when the currency had been devalued. This suggests a hypothesis that might be explored through a more explicit dynamic model that changes in MNB loans may signal changes in the sustainability of a host economy's exchange rate.

I also saw an impact of MNB presence on overall credit supply to enterprises in emerging economies. It appears that domestic banks lower their total credit exposure by reducing their commercial loans in response to increased competition from MNBs. SMEs and start-up companies may be particularly negatively affected by such domestic credit constraints in the face of a new or larger MNB presence.¹⁵ However, after MNBs attain a substantial presence, domestic

credit growth seems to complement growth in MNB activity. In some cases, in fact, the growth rate of MNBs has been so rapid that within a short time span MNBs have gained a sizable market share, and sometimes even a majority share of the domestic banking sector.

It is conceivable — and future research might test — that the presence of MNBs is needed to hold FDI in the long run. Moreover, in the wake of the recent financial crises, FDI flows — and among them FDI in financial services — may be considered more stable than short-term portfolio flows. As far as emerging economies depend on international capital for their development,

MNB entry may hence offer a desirable alternative to portfolio investment. On the other hand, the ability of MNBs to move foreign funds in and out of the country through inter-affiliate short-term lending can be a serious source of instability, warranting explicit regulatory oversight. There are thus several pros and cons to MNB operations in emerging economies which need to be considered by policy makers.

Before weighing different policy options, however, one further aspect should be kept in mind. Considering that MNB activity is a matter of international trade as well as domestic banking development, implementing domestic financial policy measures may be complicated by bilateral or multilateral agreements, such as GATS. Emerging economies may thus now be more vulnerable to adverse decisions in trade disputes concerning policy matters that are actually motivated by a domestic financial perspective (Bown, 1999).

The key seems to be to determine appropriate regulatory actions that lower the adverse effects of MNB entry. For instance, recent studies on MNB presence suggest that MNBs that have entered joint ventures or strategic partnerships with domestic banks are more likely to serve market segments that are typically finance constrained, such as start-up companies or SMEs. Hence, encouraging or requiring such partnerships — as far as this can be achieved in accordance with international agreements — may help to reduce the drawbacks and foster the benefits of MNB entry.

15 The positive side to this credit restraint is that banks reduce their risk exposure in the face of more international financial competition, which strengthens the stability of the domestic banking system. On the other hand, the riskiness of domestic banking would have been raised in the first place by the liberalization-*cum*-MNB entry.

References

- Aliber, Robert, 1984, International Banking: A Survey, *Journal of Money, Credit and Banking*, November: 661-712.
- Anderson, Ronald W., Kegels, Chantal, 1998, *Transition banking: Financial development of Central and Eastern Europe*, Oxford and New York: Oxford University Press
- Balino, Tomas and V. Sundararajan, 1991, *Banking Crises: Cases and Issues*, Washington DC: International Monetary Fund.
- Balino, Tomas, 1991, The Argentine Banking Crisis of 1980, in T. Balino and V. Sundararajan, eds., *Banking Crises: Cases and Issues*, Washington DC: International Monetary Fund.
- Ball, Clifford and Adrian Tschoegl, 1982, The Decision to Establish a Foreign Branch or Subsidiary: A Speculation of Binary Classification Procedures, *Journal of Financial and Quantitative Analysis*, September: 411-424.
- Bank for International Settlements (BIS), 1997, *Financial Stability in Emerging Market Economies*, Report of the Working Party on Financial Stability in Emerging Market Economies, Basle: Bank for International Settlements.
- Bank for International Settlements, 1997, *Financial Stability in Emerging Market Economies*, Report of the Working Party on Financial Stability in Emerging Market Economies, Basle: Bank for International Settlements.
- Bernanke, Ben, 1993, Credit in the Macroeconomy, *Federal Reserve Bank of New York Quarterly Review*, Spring 1993: 50-70.
- Bodin de Moraes, Pedro, 1989, Foreign Banks in the Brazilian Economy in the 1980's, United Nations – Economic Commission for Latin America and the Caribbean, New York: UN.
- Bown, Chad P., 1999, The Economics of Trade Disputes, the GATT's Article XXIII and the WTO's Dispute Settlement Understanding, unpublished manuscript, Brandeis University.
- Brainard, Lawrence J., 1990, Capital Markets in Korea and Taiwan: Emerging Opportunities for Foreign Banks, *Journal of Asian Economics* 1, No. 1: 173-177, 1990.
- Business Week, 1983, How Foreign Banks Still Get Rich in Brazil, August 22, 1983.
- Calvo, Guillermo and Fabrizio Coricelli, 1993, Output Collapse in Eastern Europe, *IMF Staff Papers* 40, 1: 32-52, March 1993
- Cho, Kang Rae, 1985, *Multinational Banks: Their Identities and Determinants*, Ann Arbor MI: UMI Research Press
- Cho, Kang Rae, 1990, Foreign Banking Presence and Banking Market Concentration: The Case of Indonesia, *Journal of Development Studies*, 27, 1: 98-110, October 1990
- Claessens, Stijn, A. Demirgüç-Kunt, and H. Huizinga, 1998, How Does Foreign Entry Affect the Domestic Banking Market?, *Policy Research Working Paper #1918*, Washington DC: World Bank.
- Cypher, James, 1996, Mexico: Financial Fragility or Structural Crisis?, *Journal of Economic Issues* 30, 2: 451-461.
- Darity, William, Jr. and Bobbie L. Horn, 1988, *The Loan Pushers: The Role of Commercial Banks in the International Debt Crisis*, Cambridge, MA: Harper and Row, Ballinger.
- Demirgüç-Kunt, Asli and Enrica Detragiache, 1998, Financial Liberalization and Financial Fragility, *Policy Research Working Paper #1917*, Washington DC: World Bank.
- Dunning, John, 1980, Toward an Eclectic Theory of International Production: Some Empirical Tests, *Journal of International Business Studies*, Spring/Summer:9-31.
- Eichengreen, Barry, Andrew K. Rose, and Charles Wyplosz, 1995, Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks, *Economic Policy*, October 1995:251-312.
- Engwall, Lars, Marquardt, Rolf, and Tschoegl, Adrian E., 1999, Foreign Bank Penetration of Newly Opened Markets in the Nordic Countries, unpublished manuscript, Wharton School, University of Pennsylvania
- Engwall, Lars, and Wallenstål, 1988, Tit for Tat in Small Steps: The Internationalization of Swedish Banks, *Academy of Management Review* 14, 4:532-550.
- Euh, Yoon-Dae and James C. Baker, 1990, *The Korean Banking System and Foreign Influence*, London and New York: Routledge
- Faruqi, Shakil, 1994, *Financial Sector Reforms, Economic Growth, and Stability*, Washington DC: World Bank.
- Fieleke, Norman, 1977, The Growth of U.S. Banking Abroad: An Analytical Survey, *Federal Reserve Bank of Boston, Conference Series, Key Issues in International Banking*, 18: 9-40.
- Fry, Maxwell, 1995, *Money, Interest, and Banking in Economic Development*, 2nd Edition, Baltimore MD: Johns Hopkins University Press.
- Gertler, Mark, 1988, Financial Structure and Aggregate Economic Activity: An Overview, *Journal of Money, Credit and Banking* 20, 3:560-588 (August 1988).
- Goldberg, L.G., and A. Saunders, 1980, The Causes of U.S. Banks Expansion Overseas: The Case of Great Britain, *Journal of Money, Credit and Banking*, November: 630-643.
- Goldberg, L.G. and A. Saunders, 1981, Determinants of Foreign Banking Activity in the US, *Journal of Banking and Finance*, 5:678-684.
- Gray, J., and P. Gray, 1981, The Multinational Bank: A Financial MNC?, *Journal of Banking and Finance*, March: 33-63.
- Greenwald, Bruce, and Joseph E. Stiglitz, 1990, Macroeconomic Models with Equity and Credit Rationing, in Glenn Hubbard, ed., *Asymmetric Information, Corporate Finance, and Investment*, Chicago IL: NBER.
- Grubel, G.H., 1977, A Theory of Multinational Banking, *Banco Nazionale del Lavoro: Quarterly Review*, December: 349-363.
- Guillén, Mauro F. and Tschoegl, Adrian, 1999, The New Conquistadoras? The Spanish Banks in Retail Banking in Latin America, unpublished manuscript, Wharton School, University of Pennsylvania.
- Jacobsen, Siv Fagerland and Tschoegl, Adrian, 1999, The Norwegian Banks in the Nordic Consortia: A Case of International Strategic Alliances in Banking, Industrial and Corporate Change, forthcoming.
- Kaminsky, Graciela and Carmen M. Reinhart, 1996, *The Twin Crises: The Causes of Banking and Balance-of-Payments Problems*, International Finance Discussion Papers #544, Washington DC: Board of Governors of the Federal Reserve System.
- Khoury, Sarkis, 1980, *Dynamics of International Banking*, New York: Praeger Publishers.
- Khoury, Sarkis, 1979, International Banking: A Special Look at Foreign Banks in the U.S., *Journal of International Business Studies*, Winter:36-52.

- Khoury, Sarkis, and Robert Piroge, 1983, An Economic Analysis of the Demand for Trade Loans from Multinational Banks, *Business Economics*, September: 40-45.
- Kim, Taehoo, 1990, *Internationalization of Banking: With Special Reference to the Case of Korea*, *Journal of Economic Development* 15, 1:63-82, June 1990.
- Kim, In Kie, 1982, *Foreign Banks and Monetary Policy*, *Journal of Economic Development*, 175-194, July 1982
- Lindgren, Carl-Johan, Gillian Garcia, and Matthew Saal, 1996, *Bank Soundness and Macroeconomic Policy*, Washington DC: International Monetary Fund.
- McKinnon, Ronald, 1973, *Money and Capital in Economic Development*, Washington DC: The Brookings Institution
- Minsky, Hyman P., 1986, *Stabilizing an Unstable Economy*, New Haven: Yale University Press.
- Nascimento, Jean-Claude, 1991, Crisis in the Financial Sector and the Authorities' Reaction: The Philippines, in T. Balino and V. Sundararajan, eds., *Banking Crises: Cases and Issues*, Washington DC: International Monetary Fund.
- Odedokun, M. O., 1996, Alternative Econometric Approaches for Analysing the Role of the Financial Sector in Economic Growth: Time-Series Evidence from LDCs, *Journal of Development Economics* 50, 1:119-146, August 1996
- Odle, Maurice, 1981, *Multinational Banks and Underdevelopment*, New York: Pergamon.
- Perez-Campanero, Juan and Alfredo Leone, 1991, Liberalization and Financial Crises in Uruguay, 1974-87, in T. Balino and V. Sundararajan, eds., *Banking Crises: Cases and Issues*, Washington DC: International Monetary Fund.
- Sabi, Manijeh, 1996, Comparative Analysis of Foreign and Domestic Bank Operations in Hungary, *Journal of Comparative Economics* 22:176-188.
- Sabi, Manijeh, 1994, Motivational Factors for the Establishment of U.S. Banks in Developing Countries, *Social and Economic Studies* 43 (2):91-105
- Sabi, Manijeh, 1988, An Application of the Theory of Foreign Direct Investment to Multinational Banking in LDCs, *Journal of International Business Studies* 19: 443-447.
- Sabirin, Syahril, 1991, Indonesia's Financial Reforms: Challenges in the 1990s for Its Banking and Financial Markets, *Journal of Asian Economics* 2, 2: 383-397, 1991.
- Saunders, Anthony, 1986, Why Banks Go Abroad, *Skandinaviska, Enskilda Banken Quarterly Review*, 1:4-8.
- Shaw, Edward, 1973, *Financial Deepening in Economic Development*, New York NY: Oxford University Press.
- Shea, Jia-Dong, 1994, Taiwan: Development and Structural Change of the Financial System, In H.T. Patrick and Y.Ch. Park, Eds., *The Financial Development of Japan, Korea, and Taiwan*, New York: Oxford University Press, 1994
- Sheng, Andrew, 1996, *Bank Restructuring: Lessons from the 1980s*, Washington DC: World Bank
- Stiglitz, Joseph and Andrew Weiss, 1981, Credit Rationing in Markets with Imperfect Information, *American Economic Review* 71: 393-410, June 1981
- Terrell, Henry, 1979, U.S. Banks in Japan and Japanese Banks in the U.S.: An Empirical Comparison, *Federal Reserve Bank of San Francisco, Economic Review*, Summer:18-30.
- Terrell, Henry, 1986, The Role of Foreign Banks in Domestic Banking Markets, in H. Cheng, ed., *Financial Policy and Reform in Pacific-Rim Countries*, Lexington MA: Lexington Books.
- Theil, Henri, 1971, *Principles of Econometrics* New York: Wiley.
- Tschoegl, Adrian, 1987, International Retail Banking as a Strategy: An Assessment, *Journal of International Business Studies* 19 (2): 67-88.
- UNCTC, 1982, *The Regulation of Transnational Banks in Developing Countries*, New York; UNCTC.
- UNCTC, 1981, *Transnational Banks: Operations, Strategies and Their Effects in Developing Countries*, New York: UNCTC.
- Ursacki, Terry and Ilan Vertinsky, 1992, *Choice of Entry Timing and Scale by Foreign Banks in Japan and Korea*, *Journal of Banking and Finance*, Vol. 16 (1992): 405-521.
- Velasco, Andres, 1991, Liberalization, Crisis, Intervention: The Chilean Financial System, 1975-85, in T. Balino and V. Sundararajan, eds., *Banking Crises: Cases and Issues*, Washington DC: International Monetary Fund.
- Wall Street Journal (WSJ), 1991, Foreign Banks in South Korea, November 29, 1991.
- Wall Street Journal (WSJ), 1997, Foreign Banks Target the Little Guy in L.A., October 09, 1997.
- Wall Street Journal (WSJ), 1992, Foreign Banks Post 37 per cent Rise in Earnings in South Korea for '91, April 06, 1992.
- Wall Street Journal (WSJ), 1995, Foreign Banks Profit in Korea, January 30, 1995.
- Weller, Christian, 2000, "Financial Liberalization, Multinational Banks and Declining Real Credit: The Case of Poland," in *International Review of Applied Economics*, vol. 14, No. 2 (Spring 2000).
- Weller, Christian, 1999a, *The Finance-Investment Link in a Transition Economy: Evidence for Poland from Panel Data*, University of Bonn, Center for European Integration Studies Working Paper B 4, March 1999.
- Weller, Christian, 1999b, *The Connection Between More Multinational Banks and Less Real Credit in Transition Economies*, University of Bonn, Center for European Integration Studies Working Paper B 8, April 1999.
- Weller, Christian, and Mark Scher, 1999, *Multinational Banks and Development Finance*, University of Bonn, Center for European Integration Studies Working Paper B 16, September 1999.
- Yang, Ya-Hwei, 1994, Taiwan: Development and Structural Change of the Banking System. In H. T. Patrick and Y. Ch. Park, Eds., *The Financial Development of Japan, Korea, and Taiwan*, New York: Oxford University Press.

Annex 1. List of variables

Variable	Description
Table 2 variables:	
Average growth rate of MNB credit	For each country in a region, percentage change in stock of MNB loans in local currency at end of year relative to the stock at the end of the previous year (BIS dollar data converted into local currency using end-year exchange rates from IMF). Regional data calculated as average of relevant country data in the year, weighted by GDP in dollars (data of IMF); period regional average is average over period of annual regional data.
Average credit market share of MNBs	For each country in a region, MNB loans in local currency at end of year (BIS dollar data converted into local currency) relative to total credit (IMF data in local currency), as a percentage. Regional averages built up as for growth rate of MNB credit.
Average deposit market share of MNBs	MNB deposits in local currency at end of year (BIS dollar data converted into local currency) relative to total deposits (IMF data in local currency), as a percentage. Regional averages built up as for growth rate of MNB credit.
Average growth rate of international bank loans	Percentage change in end-year stock of loans made by banks in BIS reporting area to borrowers in given recipient economy (BIS data in dollars). Regional averages built up as for growth rate of MNB credit.
Average ratio of MNB credit to international bank credit	For each country at year end, MNB credit relative to international bank credit (BIS dollar data), as a percentage. Regional averages built up as for growth rate of MNB credit.
Average growth of enterprise credit/GDP	For each country and year, percentage change in ratio of enterprise credit at year end to GDP of the year relative to same ratio in previous year (IMF data). Regional averages built up as for growth rate of MNB credit.
Average growth of total credit/GDP	For each country and year, percentage change in ratio of total credit at year end to GDP of year relative to same ratio in previous year (IMF data). Regional averages built up as for growth rate of MNB credit.
Variables in other tables:	
MNB credit/GDP _{it}	The amount of local MNB loans in economy <i>i</i> in local currency at the end of year <i>t</i> relative to GDP in year <i>t</i> (BIS loan data in dollars reconverted into local currency at end-year exchange rates).
MNB deposits/GDP _{it}	The amount of local MNB deposits in economy <i>i</i> in local currency at the end of year <i>t</i> relative to GDP in year <i>t</i> (BIS deposit data in dollars reconverted into local currency at end-year exchange rates).
Bank capital/GDP _{it}	Total capital of banks in country <i>i</i> at end of year <i>t</i> relative to GDP in year <i>t</i> (IMF data).
Deposits/GDP _{it}	Total bank deposits in country <i>i</i> at end of year <i>t</i> relative to GDP in year <i>t</i> (IMF data).
Enterprise credit/GDP _{it}	Total bank credit to enterprises in country <i>i</i> at end of year <i>t</i> relative to GDP in year <i>t</i> (IMF data).

Annex 1. List of variables (cont'd)

Variable	Description
Total credit/GDP _{it}	Total bank credit in country <i>i</i> at end of year <i>t</i> relative to GDP in year <i>t</i> (IMF data).
Bank credit/bank deposits _{it}	Total bank credit in economy <i>i</i> at the end of period <i>t</i> as a ratio to total bank deposits in that economy at the same time, expressed as a percentage (IMF data).
Current account/GDP _{it}	Current account balance of economy <i>i</i> in period <i>t</i> (dollar data converted into local currency at end of year exchange rates) relative to GDP of respective economy in period <i>t</i> (data of IMF).
Real exchange rate _{it} (e _{it})	Dollar exchange rate of economy <i>i</i> at the end of year <i>t</i> deflated by ratio of CPI of that economy in that year relative to CPI of US, indexed to 1990=100 (data of IMF).
FDI/GDP _{it}	Foreign direct investment flows of economy <i>i</i> in year <i>t</i> in dollars converted to local currency at end of year exchange rates, as a ratio to GDP of respective economy in year <i>t</i> (IMF data).
GDP/population _{it}	GDP of economy <i>i</i> in year <i>t</i> in current local prices deflated by CPI index of that country for that year, divided by population of that year, expressed as an index, 1990=100 (this definition puts the effect of cross-country differences in 1990 GDP per capita into the country constants in the panel data regressions).

Annex 2. List of emerging economies and their banking crises

Country	MNB Loans by Mid-1998	Banking Crisis from 1985 to 1996	Market Share of MNBs when Banking Crisis Occurred
<u>Eastern Europe</u>			
Bulgaria	23	1995	
Czech Republic	5103	1994	4.82
Slovakia	599	1991	
Hungary	4363	1987	
Poland	7512	1991	8.05
Romania	286	1990	
Armenia	511	1994	
Estonia	50	1992	
Kazakhstan	64	1991	
Latvia	12	1995	
Russia	2356	1992	
Ukraine	21	1994	
Uzbekistan	8	1993	
<u>Latin America and Caribbean</u>			
Argentina	20327	1989; 1995	n.a.; 5.42
Belize	65		
Bolivia	90	1986; 1994	n.a.; 0.17
Brazil	61965	1994	5.26
Chile	12120		
Colombia	5140		
Costa Rica	81	1994	0.53
Dominica	56		
Dominican Rep.	298	1992	12.79
Ecuador	185	1995	2.07
El Salvador	264	1989	0.55
Grenada	42		
Guatemala	41		
Guyana	31	1993	
Haiti	88	1994	21.63
Honduras	33		
Jamaica	1442	1994	96.11
Mexico	18889	1994	1.81
Paraguay	611	1995	15.08
Peru	1268		
St. Lucia	178		
St. Vincent	53	1994	34.78
Suriname	35		2.03
Trinidad/Tobago	770		
Turks/Caicos	35		
Uruguay	1434		
Venezuela	6411	1994	1.93

Annex 2. List of emerging economies and their banking crises (cont'd)

Country	MNB Loans by Mid-1998	Banking Crisis from 1985 to 1996	Market Share of MNBs when Banking Crisis Occurred
<u>Middle East</u>			
Egypt	919	1994	0.23
Iran	3		
Israel	4		
Jordan	95	1989	0.56
Oman	532		
Qatar	116		
Saudi Arabia	29		
United Arab Emirates	4988		
Yemen	50		
<u>Africa</u>			
Algeria	1083	1990	0.75
Angola	546	1991	
Benin	40	1988	1.05
Botswana	8	1994	
Burkina Faso	25	1988	
Burundi	18	1994	0.53
Cameroon	101	1989, 1996	1.91; 12.08
Cape Verde	1	1995	
Chad	3	1992	
Comoros	1		
Congo	42	1994	0.32
Congo, Dem. Rep.	46		3.73
Ivory Coast	335	1988	2.29
Djibouti	43	1991	
Ethiopia	47	1994	
Gabon	135	1995	4.97
Gambia	6	1985	
Ghana	395		
Guinea	63		
Kenya	267	1993	15.54
Lesotho	107	1988	
Madagascar	82	1988	
Malawi	3		
Mali	27	1987	
Mauritania	36	1991	
Mauritius	133	1996	
Morocco	1202		
Mozambique	8	1988, 1994	0.49; n.a.

Annex 2. List of emerging economies and their banking crises (cont'd)

Country	MNB Loans by Mid-1998	Banking Crisis from 1985 to 1996	Market Share of MNBs when Banking Crisis Occurred
<u>Africa (cont'd)</u>			
Namibia	6		
Niger	11		
Nigeria	329	1991	0.54
Rwanda	7	1991	0.77
Senegal	159		
Somalia	2	1990	
South Africa	3573	1985, 1989	1.21
Sudan	26		
Swaziland	3	1995	
Tanzania	27	1988	0.63
Togo	7	1989	
Tunisia	428	1991	0.50
Uganda	4	1990	
Zambia	73	1994	
Zimbabwe	255	1995	1.32
<u>Asia</u>			
Bangladesh	120	1987	
Brunei	839	1986	
China	1196		
Fiji	55	1995	
French Polynesia	439		
India	9642	1991	4.44
Indonesia	2327	1992	2.79
South Korea	10399	1986	5.76
Macao	98		
Malaysia	5413	1985	9.15
Nepal	27		
New Caledonia	445		
Pakistan	2723		
Papua New Guinea	62	1989	
Philippines	3381		
Sri Lanka	156	1992	2.14
Taiwan	11999		
Thailand	7296		
US Pacific Islands	95		
Vietnam	384		

Sources: BIS, *Consolidated International Banking Statistics*; IMF, *International Financial Statistics*; Lindgren, Garcia and Saal, 1996.

DESA Discussion Papers

- No. 1 ***Public versus Private Provision of Pensions***
By Larry Willmore, December 1998
- No. 2 ***Inefficiencies of Global Capital Markets***
By Hugh Stretton, December 1998
- No. 3 ***Greening the National Accounts: Approach and Policy Use***
By Peter Bartelmus, January 1999
- No. 4 ***Unpaid Work and Policy-Making Towards a Broader Perspective of Work and Employment***
By Joke Swiebel, February 1999
- No. 5 ***Trends in Consumption and Production: Selected Minerals***
By Oleg Dzioubinski and Ralph Chipman, March 1999
- No. 6 ***Trends in Consumption and Production: Household Energy Consumption***
By Oleg Dzioubinski and Ralph Chipman, April 1999
- No. 7 ***Promoting Sustainable Production and Consumption: Five Policy Studies***
By Tarcisio Alvarez-Rivero, Ralph Chipman and Erik Bryld, April 1999
- No. 8 ***Regulation Policies Concerning Natural Monopolies in Developing and Transition Economies***
By S. Ran Kim and A. Horn, March 1999
- No. 9 ***Tourism development in the Lao People's Democratic Republic***
By Sayo Yamauchi and Donald Lee, June 1999
- No.10 ***Import Elasticities Revisited***
By Pingfan Hong, September 1999
- No.11 ***Resources for Social Development: Additional and Innovative Resources***
By Anthony Clunies-Ross, March 2000
- No.12 ***Export Processing Zones in Cuba***
By Larry Willmore, May 2000
- No.13 ***Three Pillars of Pensions? A Proposal to End Mandatory Contributions***
By Larry Willmore, June 2000
- No.14 ***The Underlying Constraints on Corporate Bond Market Development in Southeast Asia***
By Krishnan Sharma
- No.15 ***Bank-firm Cross-shareholding in Japan: What is it, why does it matter, is it winding down?***
By Mark Scher