Globalization, heterogeneity, and imperfect information
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Chapter 3

Short-Term Debt of Emerging Markets

3.1 Introduction

Like the Mexican peso crisis in 1994, one major trigger of the crises in East-Asia and later in Russia and Brazil and other Latin-American countries is the fact that the affected countries had too many short-term foreign currency denominated liabilities compared to their short-term assets.\(^1\) The afflicted countries faced a boom-bust cycle in asset markets before the currency crisis and in all these countries financial intermediaries seem to have been key players. This suggests that the Asian crisis was brought on by financial excess and then financial collapse (Krugman, 1998, p.3).

Indeed most of the key elements of the crises in Indonesia, Malaysia, South Korea, Thailand, and the Philippines were also present during the crisis in 1994 in Mexico and in Chile in 1982 (Edwards 1998, p.34). These elements include the presence of a rigid exchange rate policy, marked overvaluation, a large current account deficit, reckless lending by conglomerate-controlled banks, poor bank supervision, and a major asset bubble. Sachs (1998a, p.1) argues that the process that leads to financial crises starts with an overvalued exchange rate as a result of internal or external macroeconomic events, followed by a defense of the exchange rate which results in a drain of the reserves held by the central bank, after which the depletion of reserves often in combination with a devaluation, triggers a panicked outflow by foreign creditors holding short-term claims (see also Radelet and Sachs, 1998a and 1998b). A similar process underlined the crisis in Mexico

\(^1\)Chang and Velasco (1998a, 1999) build theoretical models relating the crisis to illiquidity, discuss policy implications, and apply them empirically to East-Asia (see also Rodrik and Velasco, 1999).
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at the end of 1994 (Sachs et al., 1996a, 1996b, 1996c).

Creditor panic, resulting in a refusal to roll-over short-term debt, is clearly related to unsustainable levels of short-term debt reflected in high short-term debt to reserves ratio's. As a consequence, short-term capital flows have been identified as a leading indicator, and according to some the major cause, of recent financial crises, as has also been discussed in Chapter 2 (see Furman and Stiglitz (1998), Greenspan (1999), and Summers (1999)). Indeed, Dasgupta, Ratha, Botman, and Narain (2000), using a vulnerability indicator of crises based on a weighted average of exchange rate, interest rate, and reserve changes, support the view that short-term debt to reserves ratio's above unity raises the probability of a crisis significantly. Except for Malaysia, the countries most affected by the financial turmoil in Asia all experienced such a large degree of illiquidity right before the crises, as can be seen in Figure 1.1 in the Introduction.

Such an asset-liability mismatch due to high short-term debt to reserves ratio's, can easily result in a situation of illiquidity, making the countries involved vulnerable to creditor panic. The reasons why emerging market economies can fall into such a, possibly self-fulfilling, financial crisis include fiscal profligacy, exchange rate mismanagement, financial liberalization, weaknesses in the domestic banking sector, and international financial shocks (Sachs, 1995b).

One important additional factor increasing the likelihood of a financial crisis is the extent to which there is a maturity mismatch between assets and liabilities. A maturity mismatch increases the vulnerability of the financial system to both domestic and external shocks (see also Chapter 5). Even if assets and liabilities are balanced overall, as is often required, there is usually maturity transformation (see Sachs, 1995b, p.6). Indeed a bank's business is to engage in maturity transformation, so that liabilities are short-term and its assets are longer run and this in turn could call for some form of deposit insurance. Especially if the assets and liabilities are denominated in different currencies, long-term assets can only be liquidated at some cost, and if the value of the assets reflects over-investment, vulnerability is large.

Indeed in the Mexican crisis of late 1994 the infamous Tesobonos, short-term dollar-denominated government debt, played an important role. Since these dollar obligations were larger than the dollar foreign exchange reserves, Mexico became very vulnerable to a creditor panic. Moreover, because the liabilities were dollar denominated, the Banco de Mexico was unable to stand behind the government's obligations via a line of domestic credit (see Sachs (1995b, p.7) and Sachs et al. (1996a), (1996b), and (1996c)).

Calvo and Reinhart (1999) argue that some countries, especially the Scandinavian ones, that were affected by the currency turmoil during the ERM crisis in 1992, shared
many of the symptoms that are typical antecedents of currency and banking crises. Nevertheless, none of the countries involved in the ERM crisis lost access to international capital markets, while emerging market economies did.

A crisis in one country, reinforced by the capital market’s response to this crisis, may trigger crises elsewhere as well. These contagion effects can arise for example because of trade and financial linkages as well as perceived similarity of countries’ fundamentals which makes foreign investors lump dissimilar markets together into a single ‘asset class’. Also, as is the subject of Chapter 4, the collapse of one fixed exchange rate regime after successful speculation increases speculative funds implying faster coordination among speculators to force the abandonment of the fixed parities of other countries that have overvalued exchange rates. Also, herd behavior based on imperfect information, so that the action of one investor conveys information to others, could give rise to a series of balance of payments crises. Herd behavior gives rise to correlated trading schemes that can be reinforced by relative compensation schemes of fund managers such that beating the market is less profitable than the loss associated with being beaten by the market.

Thus large amounts of foreign debt, especially if this debt has a short-term nature, makes countries vulnerable to a sudden loss of confidence. However, short-term debt could in principle offer many benefits to both developed, developing, and emerging markets. For example, it is often argued that short-term debt is related to financing trade and restricting short-term capital flows in one way or another may therefore seriously hamper the international exchange of goods and services. Also, short-term capital flows could offer a country temporary relief when faced with an adverse shock. Again, because short-term debt could allow a country to smooth consumption, this implies that emerging markets have to be careful in designing policies that restrict capital flows.

The purpose of this chapter is twofold. First of all, since short-term debt seems to have played such an important role during the latest financial crises, as has also been argued in Chapter 2, we ask ourselves: what factors determine the maturity structure of external debt? In other words, which factors affect the choice of whether to lend or borrow short-term. Second, do short-term capital flows really behave in such a way as to allow a country to smooth consumption? Thus, is short-term debt mainly counter-cyclical, acting as a buffer against adverse shocks, or pro-cyclical, reinforcing the volatility in the domestic economy and requiring additional domestic adjustment in the face of both domestic and external shocks?

The chapter continues in Section 3.2 with analyzing the principal determinants of the maturity structure of total bank lending to emerging markets. Section 3.3 considers the empirical evidence. In Section 3.4 we examine whether short-term debt is pro-cyclical
or counter-cyclical. These two sections provide us with the necessary apparatus to judge whether short-term debt can be qualified as being mainly benign or malign. Section 3.5 concludes and discusses the options available to policymakers for dealing with any excessive volatility on financial markets resulting from hazardous short-term debt levels.

### 3.2 Factors that Affect the Maturity Structure of External Bank Debt

The 1990s marked a dramatic surge in private-to-private capital flows from the industrial countries to emerging markets. The push (supply) and pull (demand) factors behind the surge in private capital flows in the 1990s are already well documented. An interesting question is, what factors caused short-term flows to grow faster than total capital flows, and especially rapidly in the case of international banking flows as was observed in Chapter 2. To rephrase the question, why were international banks lending, and why were developing countries borrowing, at excessively shorter terms in the 1990s?

Table 3.1 outlines a number of factors that may have affected the maturity structure of bank debt, drawing on a survey of literature as well as from the discussion in Section 2.2 of the definition and trends of capital flows to developing countries. These factors are summarized using a two-way classification: cyclical, structural and policy factors, and within each of these categories push versus pull factors, although the categories are by no means mutually exclusive and we will be unable to include all of them in our regressions.

*Structural factors:* Since the mid-1980s, emerging economies have undergone dramatic structural changes. The latter half of the eighties saw a resolution of the debt crisis in Latin-America and the restoration of market access. But none of these countries necessarily had re-established track records. Therefore, increased borrowing requirements because of faster growth was most easily met on a short-term basis. During this period East-Asia recovered from a sharp recession of the mid-eighties. Many countries in both Asia and Latin-America began a process of comprehensive structural reforms, including lowering barriers to external trade, opening up domestic sectors to foreign investment, and liberalization of the capital account that permitted greater international mobility of capital. In addition, fastly growing economies were undergoing rapid growth in financial intermediation, hastened by deregulation of the banking sector in many countries which allowed banks to borrow from abroad and lend to domestic customers. Public debt gave

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3.2. Factors that Affect the Maturity Structure of External Bank Debt

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<th>Structural Factors</th>
<th>Pull Factors</th>
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<tr>
<td>New technology and telecommunication improved information sharing and reduced transactions costs.</td>
<td>Greater trade openness increased trade volumes and led to larger trade credits.</td>
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<tr>
<td>Technological innovation and new financial instruments enabled risk monitoring and management of complex portfolios.</td>
<td>Capital account liberalization and deregulation of domestic banks allowed borrowing from abroad.</td>
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<td>More competition in the banking sector intensified the search for profits outside industrial countries.</td>
<td>Deregulation of domestic sectors permitted foreign investment and higher need for working capital finance.</td>
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<td>Deregulation of pension funds in industrial countries allowed investing abroad in emerging markets.</td>
<td>Rising per capita incomes and declining indebtedness improved market access.</td>
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<td>Financial development led to a deeper domestic debt market.</td>
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<th>Cyclical Factors</th>
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<td>Low and declining interest and inflation rates in industrial countries encouraged investment in developing countries.</td>
<td>High interest rates and rapid growth in emerging markets, often accompanied by high returns from asset booms, attracted short-term capital inflows.</td>
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<td>Exchange rate and current account imbalances as a result of fast economic growth.</td>
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<td>Substitution of domestic loans by borrowing from abroad to take advantage of lower interest rates.</td>
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<td>Populist policies during election times can lead by bunching of debt payments.</td>
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<th>Institutional and Policy Factors</th>
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<tr>
<td>DIS regulation on capital adequacy encouraged short-term exposures.</td>
<td>Tax and other incentives for short-term borrowing (e.g. BIRF).</td>
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<td>Corruption may affect bailout decisions.</td>
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Table 3.1: Potential determinants of the maturity structure of external bank debt.
way to private debt as a number of public enterprises were privatized and as governments in emerging markets, particularly those in East-Asia, began to pay off debt using fiscal surpluses. But such private borrowers were relatively new borrowers and, therefore, access was limited to shorter-term borrowing. A number of countries were rated by credit rating agencies and rising per capita incomes and falling indebtedness along with investor friendly policies improved their access to global capital markets.$^3$

The 1990s were also a period of important changes in industrial countries. The technological revolution improved communication and information sharing which allowed international banks to expand lending worldwide. In addition, these banks faced declining returns and intensified competition in home markets, intensifying the search for profits in markets abroad. But the same developments and regulatory changes also pressured banks to be generally much more risk-averse to longer-term investments and therefore to seek an expansion primarily in shorter-term lending. Financial regulations were modified allowing pension funds and mutual funds to invest in emerging markets while FDI also increased, reducing opportunities for bank lending at the longer-end. This, together with technical innovation and emergence of new financial instruments, also enabled richer and faster risk assessment of portfolios involving a wider range of asset classes, where financial institutions were generally shifting away from client-based relationship lending to wholesaling, again favoring shorter-term investments.

Increased trade flows was an especially important factor in the 1990s. Short-term suppliers credit was extended by industrial country lenders to finance imports - typically of essential commodities such as oil, critical inputs, food and medicines - by the developing countries. Consequently, a positive relationship is expected between trade openness and short-term debt (Gooptu and Peria, 1992).

Deregulation of domestic industries by reducing taxes on profits and eliminating barriers to entry by new firms, including allowing more foreign ownership of domestic equity, promoted FDI flows to emerging markets in the nineties. This was helped to a great extent by the most critical policy development in developing countries: the deregulation of financial sectors and the opening and liberalization of capital accounts, thereby permitting banks and other financial institutions to borrow heavily abroad. This process tilted the maturity of debt in favor of the shorter-term in two ways. Firstly, short-term debt tended to rise in association with working-capital needs for FDI and, secondly, longer term bank debt declined or did not rise as much as it was converted to equity and FDI at the margin.

The level of indebtedness (indicated by the debt/GDP ratio) of a country may also

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$^3$See also Botman and Caramazza, (2001).
3.2. *Factors that Affect the Maturity Structure of External Bank Debt*

have a positive influence on short-term debt (with a time lag) because of creditworthiness effects. High levels of indebtedness beyond certain thresholds increases country risk and reduces access to longer term financing, thus raising the share of short-term debt in total debt (Rodrik and Velasco, 1999). Most developing countries still had relatively high levels of indebtedness by the end of the 1980s, therefore limiting access to longer-term loans. Total debt of the Baker-initiative countries increased until the end of 1987 from $250 bln. in 1980 to $450 bln. in 1987, although starting in 1988 there was a gradual decline. Related to the value of exports the top of debt occurred in 1986, but even in 1988 the value was double of that in 1980 (315% compared to 165%). On the other hand, during the 1990s, decreasing indebtedness and rising per capita incomes improved market access and, together with the development of a deeper domestic debt market, is expected to lengthen the maturity of external bank debt in emerging markets.

*Cyclical factors:* The post-Volcker era saw a fall in inflation and interest rates in industrial countries, further lowered by a cyclical recession in 1991. This is credited in many studies to be the most important push factor behind the initial surge in global liquidity expansion and capital flows to the developing countries. Absence of good investment opportunities at home, and high short-term interest rates and booming economies in developing countries, as in East-Asia, prompted rapid growth in short-term banking flows. Conversely, many of these economies in developing countries needed credit from abroad to finance cyclically high investment rates (which were in excess of already high domestic saving rates, particularly in Asia) and decided to borrow short-term to take advantage of relatively low foreign interest rates. Besides high investment, fast economic growth in general tends to increase the current account deficit as higher consumption needs are partly satisfied through increased imports. This in turn increases external indebtedness.

An interesting question is, why does a lowering of interest rates and expansion of liquidity promote lending at the short-end? The answer seems to lie within the nature of the yield curve: a reduction in the short-term rate does not always lead to a proportionate decline in long-term rates, because expectations about the longer-term inflation and growth, and risks in general, are revised at a much slower pace than short-term expectations. In other words, the short-end of the yield curve tends to 'rotate' around a center that is located towards the longer-end. In this case, a reduction in short-term rates leads to a shortening of the maturity of debt.

Finally, among other cyclical variables, election cycles may affect the maturity structure of debt, as decisions to roll-over old debt or extend new short-term debt are influenced

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by political risks. As Rodrik and Velasco (1999) note, there is often a ‘bunching’ of amortizations in the window between elections and the corresponding transfer of power.

**Institutional and policy factors:** Domestic policies in developing countries as well as developments in prudential regulation in G-10 countries also affected the maturity structure of debt. Sustained growth in East-Asia during the 1986-1996 period led to over-confidence and excessive risk-taking on the part of lenders and borrowers alike. Besides euphoria about the potential of emerging markets, credit risk mechanisms also became relaxed because of excess liquidity. A large number of banks borrowed short-term to on-lend to domestic customers with medium or long-term maturities.

Such an asset-liability mismatch was also encouraged by the tendency of many central banks in developing countries to peg exchange rates and engage in sterilization efforts. Sterilization attempts held the short-term interest rates high at home, attracting more short-term flows, while additions to reserves through the interventions led to the illusion of lower liquidity risks in foreign currency terms (GEP (1998), Calvo (1998), and Montiel and Reinhart (1999)).

Among other things, the concentration of short-term debt in some countries was a result of policy. South Korea actively discouraged long-term investments in equity, while Thailand encouraged short-term bank debt through the Bangkok International Banking Facility (BIBF). Chile and Malaysia, on the other hand, had policies that discouraged short-term borrowing and, as was discussed in Chapter 2, are found to be at the bottom end of the list of top recipients of short-term debt. In regard to lenders, recent experiences with rescue packages may also have encouraged excessive risk taking by banks, especially with regard to short-term loans to other banks. For example, during the Swedish banking crisis, in 1992, the government guaranteed loans to local banks. Also, during the Mexican crisis, the rescue package emphasized honoring short-term paper to prevent default. Such instances have led investors to believe that short-term debt would be honored in future rescue efforts in the event of a crisis. Thus, lending to local banks - which on-lent to domestic corporates - rose on the belief that these banks had the backing of their governments.

It is also believed that maturity structure of debt has been influenced by differential treatment of short-term debt in prudential regulations. According to existing BIS regulations on minimum capital adequacy for banks, short-term lending to non-OECD countries carries a risk weight of 20 percent compared to 100 percent for lending of over one-year maturity. Thus, reducing the term of an interbank loan to a non-OECD counterparty from 13 months to 12 months or less would reduce the risk weight from 100 percent to
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20 percent.\(^5\) The BIS targets were to be achieved by 1992, even though the initiative began earlier, in 1988. There are not such biased capital incentives for lending to OECD countries.

This treatment of lending to non-OECD countries was designed to reflect the greater risk associated with longer-term commitments. However, there is some evidence that this differential treatment of short- and long-term debt has encouraged short-term debt contracts with the intention of rolling over at the end of one year (or less). Pair-wise comparisons of lending to equally rated OECD and non-OECD countries do indicate a greater concentration of short-term lending to the latter (BIS 1997, p.25).

Also, overvaluation of the exchange rate may have affected the maturity profile of debt. Although most short-term debt was foreign currency denominated, overvaluation and the expectations of a devaluation could increase the probability of default, shortening the maturity structure of external debt. Finally, corruption and cronyism in the debtor countries may have affected the maturity structure of debt by generating expectations of bail-outs and rising country risks. The higher the corruption level, the higher will be the share of short-term debt in total debt (Rodrik and Velasco, 1999).

3.3 The Empirical Evidence

The complex interaction outlined above between push and pull factors on the one hand, and structural, cyclical, and institutional factors on the other, raises the question: did these factors significantly and substantially affect the share of short-term debt in total debt? An attempt to answer this question was made by estimating an econometric equation, using panel data, for a number of developing countries for the years 1988-1998, expanding on the basic model and earlier results reported in Rodrik and Velasco (1999). The countries in the panel account for over 80% of total short-term debt to all developing countries. Due to lack of data availability, we were unable to include and operationalize all variables included in Table 3.1 in our empirical analysis.

3.3.1 The Explanatory variables

The explanatory variables employed for explaining the share of short-term debt of our developing countries in total claims of BIS banks are:

\(^5\)The new capital adequacy framework, currently being debated, does not propose any changes in the existing standards (see BIS, 1999).
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- **Structural variables**: a dummy for capital account restrictions which takes the value 1 in the presence of restrictions and 0 otherwise, the share of imports respectively exports in GDP, the level of indebtedness (debt/GDP ratio), and the stage of financial development (M2/GDP ratio);

- **Cyclical variables**: the growth rate of GDP in the emerging market as well as the growth rate for industrial countries as a group, the change in interest rates in industrial countries (as operationalized via dollar LIBOR), and growth in the exchange rate; and,

- **Institutional and policy factors**: a dummy for BIS capital adequacy regulations that takes the value 1 during 1991-98 and 0 in the preceding period.

Besides these factors, we included the one-period respectively two-period lagged dependent variable, which deals with any non-stationarity in our series, and an index expressing a country's vulnerability to a financial crisis. Including additional lags of both the dependent and other explanatory variables, did not significantly contribute to the explanation of the maturity structure of external debt. Before presenting the regression results, we will first discuss the expected signs of the explanatory variables.

**Lagged dependent variables.** The magnitude of the coefficients, if significantly different from zero, of the one respectively two periods lagged dependent variable provide us with information about the short-run and long-run implications of shocks to the determinants of the maturity structure of external debt. The sign of the coefficients will tell us what the dynamics of the maturity structure looks like. Persistence in the maturity structure is expected, for example, because a high share of short-term debt in total debt could increase risk perception by investors and therefore continues stimulating lending at the shorter-term. Also, the structural and institutional explanatory variables by their nature would give rise to persistency, while the cyclical variables are expected to give rise to a mean-reverting component in the dynamics of the maturity structure. In this case, we would expect the one-period lagged dependent variable to have a positive coefficient, and the two-period lagged dependent variable a negative coefficient, implying a stable dynamic process.

**Capital account convertibility.** Capital account convertibility is expected to shorten debt maturity. For this purpose, we will use a dummy that takes a value of 1 if there are capital account restrictions and 0 otherwise. (This dummy is developed using various issues of the IMF publication on Exchange Arrangements and Exchange Restrictions, published annually.) As a consequence, we expect the dummy to have a negative coefficient. Opening the capital account facilitates investment flows of all kinds; but in particular,
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it tends to encourage short-term debt flows relatively more than long-term debt flows. On the one hand, it facilitates frequent trading activities in financial markets and allows investors to take advantage of interest rate differentials; on the other hand, by allowing foreigners to own domestic equity, it leads to some substitution of longer-term bank loans for non-debt flows. The share of short-term debt in total debt would, therefore, rise when restrictions on capital account transactions are lifted.

Trade openness. Among the main structural factors of rapid growth of shorter-term bank lending we expect to find trade openness. Rodrik and Velasco (1999), found a negative relationship between the ratio of trade, defined as imports plus exports, to GDP and the maturity structure. They suggested that higher trade openness improves a country’s creditworthiness and access to medium- and long-term financing. The main weakness in this argument is that more trade may not necessarily be associated with an improvement in creditworthiness if the result is a higher current account deficit. Their argument about the riskiness of lending is better captured by separating trade in its two components. Then imports to GDP are expected to have a positive sign via trade credits, while including the ratio of exports to GDP could be interpreted as a measure of creditworthiness and should have a negative sign.

In fact, many of the variables included in our regressions operate as an indicator of creditworthiness. Besides the ratio of exports to GDP, total debt to GDP, growth in the exchange rate, and the vulnerability to a crisis indicator can be interpreted in this fashion. In general one would expect that higher creditworthiness improves access to longer-term financing at more attractive terms and therefore would lengthen the maturity structure of external bank debt. Lower creditworthiness, for the same reason, is initially expected to shorten the maturity structure. However, if creditworthiness deteriorates below a certain threshold, one would expect to see a lengthening of the maturity structure as investors are no longer willing to lend even at the shorter-end or roll-over existing short-term claims. Such a non-linear relationship between risk-perception and the maturity structure will be studied more deeply in the next section. Thus, apart from crisis episodes, we would in general expect a negative relationship between creditworthiness and the share of short-term debt in total external bank debt.

Total debt to GDP. Concerning the ratio of total debt to GDP, one would expect to see a difference between Latin-America and East-Asia. Total debt to GDP has been high for the former, while being relatively unimportant for the latter. As a consequence, we would expect the ratio of total debt to GDP to have shortened debt maturity in Latin-America while confidence in medium- and longer-term financing should not have been hampered in East-Asia.
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\[ \frac{M2}{GDP} \]. Also, as suggested by Rodrik and Velasco (1999), the degree of financial development \( \frac{M2}{GDP} \) should have a positive effect on short-term debt, as the latter plays a useful role in fostering efficient financial intermediation. Besides reversed causality in their argumentation, this relationship is not obvious for short-term external debt, especially when the financial deepening is taking place alongside capital account liberalization which is leading to displacement of bank loans by equity such as FDI flows as well as de-intermediation of external bank loans on one hand, and global liquidity expansion on the other. In that event, short-term debt and monetary deepening may be inversely related. Such non-debt flows expanded rapidly as a result of excess liquidity in mature markets putting pressure on domestic currencies to appreciate. Many central banks responded by intervening in the foreign exchange markets to prevent an appreciation of their currencies, as a result of which domestic liquidity expanded rapidly (despite sterilization efforts). Thus, growth in the money supply coincided with a displacement of bank debt, contributing to a lengthening in the maturity. As a consequence we would expect a negative relationship between \( \frac{M2}{GDP} \) and the share of short-term debt in total debt.

**Growth variables.** An important cyclical factor affecting the flow of short-term debt is expected to be the growth rate of GDP in an emerging market. One would expect that the faster a countries' own growth rate, the higher external borrowing and especially the need for short-term financing of investment and consumption needs. Besides a countries' own economic performance, a higher growth rate in the industrial world tends to increase debt at the shorter end in emerging markets for several reasons. Increased integration of capital markets has always been associated with rapid growth in the world economy (see Bordo et al. (1998)) and such integration has increasingly favored capital flows at the shorter end (see Chapter 2). Also, growth in industrial countries tends to promote foreign direct investment in emerging markets which, through both inter-company loans mediated through the banking system and working capital needs, tends to shorten the maturity structure. Furthermore, faster growth in mature economies increases export opportunities of emerging markets which in turn requires larger export credits which have a short-term nature. Finally, better opportunities at home may increase the willingness of lenders to take risk by increasing their short-term exposure to emerging markets.

**Interest rates.** Lower interest rates in industrial countries are expected to lead to a shortening of debt maturity. Consistent with the observation that short-term debt has increasingly become the driver of total debt, as discussed in Chapter 2, a significant inverse relationship is expected between interest rates in the industrial countries and the maturity of their involvement in the developing world. Low interest rates in the industrial countries led to a surge of capital flows to the emerging markets in the 1990s. This was
also the period of rapid globalization and capital account liberalization in the developing world which promoted both direct investment (FDI) as well as other equity investments. This provided an opportunity for foreign banks and their customers to channel long-term investments into equity and FDI, while relatively shorter term investments were channeled as loans.

This had three implications: a) FDI and equity flows surged while bank loans declined in importance (Musse et al. 1999); b) the variation in total bank loans became highly correlated with variations in short-term loans; and, consequently, c) loan maturity shortened considerably. Concerning the relationship between FDI and the maturity structure, some complementarity is expected. For example, long-term FDI flows often bring in short-term flows to meet working capital needs. This is even more true in the presence of explicit tax benefits to short-term flows as in the case of Thailand. Since trade and FDI are highly correlated, any shortening effect of trade openness on the maturity of external debt should be attributed to increased needs for trade credits, working capital needs for FDI, as well as other factors.

Exchange rate. Since most of the loans were foreign currency denominated we would expect a limited effect of the exchange rate on the maturity structure. Nevertheless, depreciation of the exchange rate makes servicing of the outstanding debt more expensive in domestic currency terms for the borrower (see also Chapter 5). As a consequence, exchange rate growth could increase the probability of default and therefore is an indicator of the riskiness of foreign lending. From this point of view we would expect a positive coefficient.

BIS regulation. As mentioned above, the BIS regulation gave a higher risk weight to longer term loans. Therefore, we expect that the Basle regulation of capital adequacy led to a shortening of debt maturity. We tried to test the effect of BIS regulations by using a dummy for the period 1991-1998. As the capital adequacy standard had to be achieved by 1992, we postulate the dummy to be positive; i.e. the Basle regulation is expected to have shortened the maturity structure of external bank debt.

Vulnerability indicator. The vulnerability index consists of interest rate, reserves, and exchange rate changes weighted by their respective standard deviations. More vulnerability to a crisis is then assumed to be reflected in an overvalued exchange rate, losses of reserves, and precautionary increases in the interest rate. As was argued above, lower creditworthiness initially shortens the maturity structure. However, if creditworthiness deteriorates too much, indicating risk of a crisis, higher vulnerability is expected to lengthen the maturity of debt. This reflects unwillingness of investors to roll-over short-term claims in the presence of higher probabilities of default. Above, we expected the ratio of total
debtt to GDP, exports to GDP, and growth in the exchange rate all to refer to relatively ‘small’ changes in risk perception. On the other hand, the vulnerability to a crisis indicator is much better suited to reflect unusual times of high risk perception and therefore is expected to have a negative sign.

3.3.2 Regression Results

Selected regression results are presented in Table 3.2 for three country groupings: all 33 countries, Latin-America, and East-Asia. The results are robust to different specifications and are consistent with the main factors identified earlier in the narrative. We estimated our dynamic panel data model using fixed effects by utilizing the White estimator which provides consistent standard errors in case of heteroskedasticity which may arise in our heterogeneous sample of countries (see Baltagi, 1995). Also, in theory, our estimation procedure yields consistent estimates of the coefficients. Some explanatory variables are lagged to reduce the risk of multi-collinearity. The basic framework extends and improves the analyses in Dasgupta et al. (2000) who used a static model and did not correct for the possibility of heteroskedasticity. Besides the ratio of total debt to gdp, the shares of public, private, respectively bank debt in total debt were included as explanatory variables in that study as well. As a consequence, the estimation results reported there suffered from multicollinearity leading to non-robustness of the results.

The coefficients of the one respectively two periods lagged dependent variable point to the importance of persistence in the maturity structure of external debt. The magnitude of the auto-regressive coefficients imply a stable process for the dependent variable. In particular, after a permanent (temporary) shock to the maturity structure there is a gradual return to the new (old) ‘equilibrium’ level. This persistence reduces the room for maneuver for policymakers in emerging markets in case they want to implement policies aimed at lengthening the maturity structure of external bank debt.

A one-percentage point increase in the ratio of imports to GDP, increases the share of short-term in total debt by 0.126 percentage point. Confirming our expectation, more imports tend to shorten the maturity structure and this effect operates through trade

\[6\] See note 1 in Chapter 2 for the list of countries included in each grouping.

\[7\] The data for the explanatory variables were obtained from various issues of International Financial Statistics, International Monetary Fund, Washington DC.

\[8\] Given the limited size of our sample, it is not possible to exploit the advantage of estimating a random coefficients model to take account of possible heterogeneity.

\[9\] If the number of periods is small, the autoregressive coefficients will be underestimated. We abstain from using General Method of Moments estimation (GMM) since the number of cross-section units (i.e. countries) is small, especially for our regional analyses.
### 3.3. The Empirical Evidence

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<tbody>
<tr>
<td>Share of short-term in total external bank debt</td>
</tr>
<tr>
<td>Share of short-term in total external debt (lagged one period)</td>
</tr>
<tr>
<td>Share of short-term in total external debt (lagged two periods)</td>
</tr>
<tr>
<td>Growth of GDP</td>
</tr>
<tr>
<td>Growth in industrial countries' GDP</td>
</tr>
<tr>
<td>The ratio of M2 to GDP (lagged)</td>
</tr>
<tr>
<td>Total debt to GDP (lagged)</td>
</tr>
<tr>
<td>Share of imports in GDP</td>
</tr>
<tr>
<td>Share of exports in GDP</td>
</tr>
<tr>
<td>Change in LIBOR</td>
</tr>
<tr>
<td>Capital account convertibility dummy* (lagged)</td>
</tr>
<tr>
<td>Dummy for BIS regulation**</td>
</tr>
<tr>
<td>Growth in the exchange rate (lagged)</td>
</tr>
<tr>
<td>Index vulnerability to a crisis</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
</tr>
<tr>
<td>N</td>
</tr>
</tbody>
</table>

Note: p-values in brackets. * 1 if a restriction is in place, ** 1 for the years 1991-98.

Table 3.2: Determinants of the maturity structure of external debt (original maturity, 1988-1998).
credits. Also as expected, the results in Table 3.2 show consistently that more exports
lengthen the maturity structure possibly reflecting better access to longer term financing.
Using current account deficits as an explanatory variable instead of imports and exports
separately confirmed these findings; i.e. in results not reported in Table 3.2 we found a
positive relationship between the current account deficit and the share of short-term debt
in total external bank debt.

Faster domestic GDP growth indeed shortens the maturity structure. Although in
general statistically insignificant, the results on the growth rate in industrial countries
as well as for international interest rates indicate that the maturity structure of external
bank debt is not only determined by domestic economic conditions. This in turn, besides
the persistence noted earlier, further restricts the room for maneuver for policymakers in
emerging markets.

Contrary to Rodrik and Velasco (1999), we indeed find a negative relationship between
(lagged) financial deepening and the maturity structure of external debt. This negative
effect of financial intermediation is only statistically significant in Latin-America, possibly
reflecting better regulatory policies.

Also we find that the coefficient of the dummy for capital account convertibility is
negative and significant for the overall sample. Remember that this dummy takes the
value one if restrictions are in place. From this point of view it is noteworthy that all East-
Asian countries in our sample either had restrictions in place until 1998 or, for Indonesia
and Malaysia, introduced them again during the crisis; i.e. after 1996. Interestingly, for
Latin-America capital account convertibility is entirely unrelated to the maturity structure
of external bank debt at least during the period 1988-1998. Possibly the experience with
the debt crisis in the 1980s had made investors reluctant to replace loans by non-debt
flows.

The coefficient of the BIS dummy is positive and highly significant for the overall
sample and for Latin-America, but not for East-Asia. For Latin-America the large positive
effect of the dummy may partially reflect debt rescheduling alongside the impact of BIS
regulations.

Growth in the exchange rate does not matter for the maturity structure. Another
variable expressing risk perception, total debt to GDP, indeed shortened the maturity
structure of external bank debt in Latin-America, while for East-Asia the low overall level
of indebtedness is associated with higher creditworthiness and therefore better access to
longer term financing.

The vulnerability to a crisis indicator can indeed be interpreted as a measure of more
extreme conditions although interpretation may be clouded by simultaneity considera-
3.3. **The Empirical Evidence**

tions. In case a country finds itself exposed to higher vulnerability investors are not only no longer willing to provide new loans even at the shorter end, but also refuse to roll-over existing short-term claims. The latter may be one mechanism behind the observed stability in the dynamics of the maturity structure.

### 3.3.3 Additional Factors Affecting the Maturity of External Bank Debt

Besides the factors discussed and reported above, we tried a number of other variables that in principle could affect the maturity structure of external debt. One of the variables tried was growth in the stock market index. With respect to the financial crises in East-Asia it is often argued that part of the external debt was used to finance investment in the property sector. If this is the case, the country becomes extra vulnerable to illiquidity since such assets are longer term, denominated in the home currency, and possibly the value of the assets is overvalued because of over-investment as reflected in a property sector bubble.

Unfortunately, data limitations do not allow one to break-up the growth in the aggregate stock market index into its sectoral components. Also, the stock market for many emerging markets in our sample started to develop as late as in the beginning of the 1990s further limiting data availability. The coefficient on the growth rate in the aggregate stock market index was $-0.003$ and significant at the 1% level for Latin-America and $-0.016$, but insignificant, for East-Asia. These results seem to indicate that disintermediation improves liquidity and offers alternatives to, especially short-term, financing to the private sector, in turn reducing the incentive to borrow externally and lengthening the maturity structure.

Also, as expected, preliminary results reveal that debt maturity depends inversely on both the level and the slope of the yield curve in the industrial countries. Furthermore, we regressed the risk rating as provided by Institutional Investor against all the variables reported in Table 3.2, and used the residual as an additional explanatory variable in the regression for the maturity structure. Although this residual has a positive coefficient (0.484) and is significant for the 33 emerging markets at the 1% level, it remains difficult to interpret this result. Since the Institutional Investor risk rating is made-up of eco-

\[10\] For example, when the 3-month US t-bill rate and the spread between 3 year and 3 month rates are included as explanatory variables its coefficients are respectively $-2.13$ and $-1.89$ and both are significant at 1%. However, as $N = 137$ for the case of 33 countries this should be interpreted as preliminary evidence only.
nomic, financial, and political factors and since we included the residual after the above mentioned regression, this effect mainly captures political risk and its associated effect on the maturity structure. A larger residual implies that a larger extent of the variation in the risk rating is due to political developments. Since the coefficient on the residual is positive, more political uncertainty shortens the maturity structure of external inter-bank debt.

Summing up the results so far then, if growth in short-term debt is mainly due to successful domestic economic conditions requiring increased funding, for example to finance investment needs, then, if this success is maintained and combined with adequate asset-liability management, higher short-term debt may be sustainable and desirable (see for example, Chuhan et al. (1993)). On the other hand, if short-term debt is mainly driven by external factors, such as fluctuations in international interest rates and industrial country growth rates or changes the regulatory framework, short-term debt levels may easily prove unsustainable if the international environment changes (see Calvo, Leiderman, and Reinhart (1993) and Fernandez-Arias (1994)).

Our study supports viewing short-term debt as being due to a mixture of these two views. Short-term debt is related to both positive causes like domestic output growth and trade openness as well as related to policies under the control of domestic policymakers such as the extent of capital account convertibility. But be careful: to a large extent shorter maturities are related to external factors such as growth in industrial countries, international interest rates, and changes in risk perception and regulation by foreign authorities. Since the maturity structure shows a lot of persistence and given that control over it is not only related to domestic economic management, policymakers in emerging markets are well advised to pay careful and precautionary attention to the share of short-term claims in total external bank debt.

3.4 The Cyclical Nature of Short-Term Capital Flows

3.4.1 Short-Term Debt: stabilizing or destabilizing?

One important theoretical reason for the beneficial role of short-term capital flows is that in principle they could offer relief to countries requiring additional financing in the face of an adverse domestic shock. This financing offers residents of the recipient country with the opportunity to smooth their consumption in the presence of fluctuating incomes. If short-term capital flows indeed act in this counter-cyclical way, proposals to limit capital inflows become more costly. As opposed to its potential counter-cyclical nature stands
3.4. The Cyclical Nature of Short-Term Capital Flows

The view that short-term capital flows tend to be pro-cyclical, reinforcing volatility and requiring increased domestic adjustment in the light of shocks. Therefore, the question of whether short-term capital flows are pro- or counter-cyclical has consequences for viewing such flows as stabilizing or destabilizing. This has in turn important implications for the debate of whether the positive aspects of short-term debt weigh-up against their potential volatility.

Although we focus attention on refusal of foreign creditors to provide new loans and roll-over existing ones, these effects may be reinforced by domestic capital flight. Indeed, when there is full currency convertibility there is no reason to treat short-term debt owed to foreign and domestic creditors differently. In Chapter 5 of this thesis we take an explicit look at the distinctive roles for resident and international investors during episodes of capital flight.

Edwards (1998), argues that capital inflows into Latin-America follow a cyclical pattern. During the late 1970s and early 1980s capital was abundantly available, while during most of the 1980s capital was dried up. After domestic economic conditions started to improve (American interest rates were falling, and old debt problems got worked-out in the beginning of the 1990s) capital inflows again reached such large levels that one can again qualify them as abundant (see Calvo, Leiderman, and Reinhart, 1996). In fact, during the 1980s the region was transferring (in net terms) almost 30 percent of its exports as debt service to the rest of the world. On the other hand, during the 1990s official capital flows (IMF, World bank, IDB, and the US government) played the role of an insurance company providing some of these countries (Mexico in particular) with relief whenever a bad state of nature occurred.

So far we already got some idea about whether short-term capital flows seem to be counter-cyclical or pro-cyclical. We saw that faster growth in emerging markets was a robust explanation for shorter maturities. A further illustration of the cyclical nature of capital flows can be obtained by plotting the growth rate of short-term debt and GDP growth for the years 1988-1998. The results for some selected countries are shown in Figure 3.1. For these countries there seems to be a close and positive relation between the growth rates in short-term debt and in GDP. Also, except for South Korea, short-term debt grows faster than total debt, indicating that the maturity structure was shortening during almost the entire period.

In principle, the same factors that affect the maturity structure of external bank debt (as reported in Table 3.2) are expected to affect the growth rate of short-term debt. The factors that were presumed to shorten the maturity are also expected to raise the growth rate in short-term debt. The central relationship we are interested in
for answering the question of cyclicality of short-term debt, however, is the relationship between the growth rate in short-term debt and domestic GDP growth. In addition to the explanatory variables of Table 3.2, we add growth in the terms of trade because we want to investigate the relationship between shocks to the terms of trade and short-term capital flows later. For, exports of emerging markets are often heavily biased towards goods (such as primary commodities, oil) that are exposed to large price fluctuations and, in light of these fluctuations, we are interested in determining whether the response of capital flows to these countries is stabilizing or destabilizing.

Figure 3.1: *Cyclicality of short-term and total debt (original maturity).*

We did not include the dummy for BIS capital adequacy requirements since the change in the Basle regulations is expected to have shortened the maturity structure permanently, while affecting the growth of short-term debt to emerging markets only once. The graphical results above about pro-cyclical behavior of the growth rate of short-term debt in general are confirmed by our empirical analyses as reported in Table 3.3. Again, we estimated using White consistent standard errors and used a fixed effects specification. All the variables are expressed as deviations from their respective country-specific means
to account for a trend in the series since we no longer included any lagged dependent variables.

Whether or not one takes deviations from country-specific means, the coefficients have the same magnitude. However, their interpretation changes in a, for our purposes, desirable way. The reasoning is as follows. To analyze the cyclical nature of short-term debt, one would ideally want to look at positive respectively negative shocks to, for example, growth rates in GDP. Then, if in both cases the estimated coefficient is positive (negative) this points to pro-cyclicality (counter-cyclical). That is, as long as the downward shock in GDP growth rates refers to GDP growth rates actually being negative. Unfortunately, there are insufficient observations of negative growth rates in our sample. As a consequence, the best we can do is check whether the growth rate of short-term debt is above (below) its country-specific mean whenever GDP growth is above (below) its country specific mean.

As one can see from Table 3.3, a one-percent point increase in the growth rate of domestic GDP, increases the growth rate of short-term debt by 2.7% points. This significantly positive relationship between domestic output growth and short-term debt growth is found for our sample of 33 emerging markets, as well as for Latin-America and East-Asia. Growth in the terms of trade proves to have generally an insignificant effect, although improvements in this variable significantly increase the growth rate of short-term debt in East-Asia. Concerning the international environment, lower international interest rates as well as faster growth in industrial countries provoke increased short-term capital flows to emerging markets for similar reasons as mentioned in the previous section. As a consequence, financial integration confronts policymakers with difficulties for macroeconomic management given that the sustainability of capital flows does not entirely depend on a countries’ own economic performance.

These regression results again point into the direction of pro-cyclical behavior of short-term capital flows. Additional inspection of our data revealed that there has been an increase in pro-cyclicality over time especially for East-Asia. This is to be expected given that, for this region, during the recent crises output growth collapsed at the same time as capital flew out of the region. Furthermore, for this region growth in Japan seems to be much more important for growth in short-term capital flows than the growth rate in the US (a coefficient of 4.126 versus 0.819 with the former being significant and the latter not). In short, the disappointing growth performance in Japan may have contributed to the financial crises in East-Asia because Japanese savings were needed internally. Also, interest rates in mature economies behave in a counter-cyclical fashion, while for many developing countries and emerging markets they tend to be mainly pro-
## Table 3.3: Determinants of the growth rate of short-term debt (original maturity, 1988-1998)

<table>
<thead>
<tr>
<th>Growth rate of short-term debt</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LAC</td>
</tr>
<tr>
<td>Growth of GDP</td>
<td>2.609</td>
</tr>
<tr>
<td></td>
<td>[0.000]</td>
</tr>
<tr>
<td>Growth in industrial countries' GDP</td>
<td>14.818</td>
</tr>
<tr>
<td></td>
<td>[0.000]</td>
</tr>
<tr>
<td>The ratio of M2 to GDP (lagged)</td>
<td>-0.188</td>
</tr>
<tr>
<td></td>
<td>[0.789]</td>
</tr>
<tr>
<td>Total debt to GDP (lagged)</td>
<td>-0.156</td>
</tr>
<tr>
<td></td>
<td>[0.149]</td>
</tr>
<tr>
<td>Share of imports in GDP</td>
<td>0.268</td>
</tr>
<tr>
<td></td>
<td>[0.694]</td>
</tr>
<tr>
<td>Share of exports in GDP</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>[0.666]</td>
</tr>
<tr>
<td>Change in LIBOR</td>
<td>-2.802</td>
</tr>
<tr>
<td></td>
<td>[0.000]</td>
</tr>
<tr>
<td>Capital account convertibility dummy* (lagged)</td>
<td>-2.715</td>
</tr>
<tr>
<td></td>
<td>[0.542]</td>
</tr>
<tr>
<td>Growth in the terms of trade</td>
<td>-0.102</td>
</tr>
<tr>
<td></td>
<td>[0.749]</td>
</tr>
<tr>
<td>Growth in the exchange rate (lagged)</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>[0.014]</td>
</tr>
<tr>
<td>Index vulnerability to a crisis</td>
<td>-3.356</td>
</tr>
<tr>
<td></td>
<td>[0.164]</td>
</tr>
<tr>
<td>Adj $R^2$</td>
<td>0.10</td>
</tr>
<tr>
<td>N</td>
<td>317</td>
</tr>
</tbody>
</table>

Note: p-values in brackets. All variables are expressed as deviations from their mean; * 1 if a restriction is in place.
3.4. The Cyclical Nature of Short-Term Capital Flows

When we analyze the interaction between shocks and short-term capital flows, we are actually looking at booms and downturns instead of the cyclical nature in general. A positive (negative) shock is defined here as a realization of the variable of interest in excess of (below) the mean growth rate plus (minus) one standard deviation of the country in question. In case short-term capital flows are mainly used for consumption smoothing purposes we would expect that a booming domestic economy reduces short-term capital inflows. During a downturn we would expect to observe, instead, increasing short-term capital inflows. Table 3.4 reports the results.

Concerning shocks to GDP, the picture that emerges is that short-term capital flows again are pro-cyclical. For, a positive shock to GDP raises the growth rate of short-term debt substantially and more or less significantly. For a negative shock, defined as a growth rate in GDP below the mean minus one standard deviation of GDP growth, the coefficient is 1.101. Since the independent variable is defined in terms of its deviation from the mean, and given the definition of the negative shock, the values of the independent variable are negative. As a consequence, the positive coefficient tells us that after an adverse shock, the growth rate of short-term debt falls below the mean, a clear indication of the pro-cyclical nature of short-term capital flows.

We saw in Table 3.3 that in general there is a positive, although insignificant, relationship between improvements in the terms of trade and international lending to emerging markets. This positive relationship is more or less confirmed for our 33 emerging markets.
Chapter 3. Short-Term Debt of Emerging Markets

<table>
<thead>
<tr>
<th>Countries</th>
<th>The growth rate of short-term debt</th>
<th>The growth rate of investment times</th>
<th>the share of investment in GDP</th>
<th>Adj. $R^2$</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAC</td>
<td>1.247</td>
<td>[0.174]</td>
<td>[0.314]</td>
<td>0.07</td>
<td>304</td>
</tr>
<tr>
<td>EAP</td>
<td>6.64</td>
<td>[0.527]</td>
<td>[0.227]</td>
<td>0.15</td>
<td>73</td>
</tr>
</tbody>
</table>

Note: p-values in brackets. All variables included in Table 3, besides domestic GDP growth, were included as well.

Table 3.5: The ‘benign’ view of pro-cyclicality (original maturity, 1988-1998).

In Table 3.4. A large improvement in these countries' terms of trade increases their short-term indebtedness, again pointing in the direction of short-term capital flows not being primarily used to smooth consumption. Instead these flows reinforce booms increasing the volatility in developing countries, while a large deterioration in external competitiveness reduces short-term debt growth even more.

In short, capital flows to emerging markets increase volatility, complicate macroeconomic management, and since such flows are determined by both domestic conditions and the international environment the sustainability of capital flows is not entirely under control of the recipient country possibly exposing the country to increased financial vulnerability.

One could give a positive twist to the pro-cyclical nature of short-term capital flows though. Although they do not seem to facilitate consumption smoothing, pro-cyclical capital flows may be ‘benign’. Benign in the sense that required financing for investment purposes follows a pro-cyclical nature. During favorable times, domestic investment increases and one way to finance this is by borrowing (short-term) from abroad. Also, during a recession required financing for investment purposes is lower. Then one would expect capital flows to be pro-cyclical and although they reinforce volatility in this case as well, there is less of a problem because this pro-cyclicality is demand driven by investment needs.

Although we already saw that short-term capital flows are influenced by both demand ('pull') and supply ('push') factors, and thus that their pro-cyclical nature cannot be entirely benign, we have to account for the fact that at least part of this pro-cyclicality can be driven by demand factors related to investment needs. Suppose that the positive relationship between GDP growth and growth in short-term debt can be completely attributed to domestic investment. Then we could replace GDP growth in the regressions reported in Table 3.3 by growth in investment after correcting for the share of investment in GDP. The results of such a regression are reported in Table 3.5.

Compared to the coefficient on GDP growth as reported in Table 3.3, growth in in-
3.4. The Cyclical Nature of Short-Term Capital Flows

Investment can account for more or less half of the pro-cyclical relationship between growth in GDP and growth in short-term capital flows although for East-Asia, the positive relationship between short-term capital flows and GDP growth comes via this investment channel. For example, the coefficient for our 33 countries is 1.247 for growth in investment, while it is 2.699 for GDP growth. Although even the relationship between growth in investment and growth in short-term debt does not have to be entirely benign, it does show that capital flows being mainly pro-cyclical can be a consequence of the desires of borrowers, as well be related to the risk-perception of lenders.

Concerning this risk perception, Table 3.4 reports the effect of a shock in the vulnerability index on growth in short-term debt. As can be seen, a large increase in the vulnerability to a crisis translates into a large drop in short-term debt while a large decrease in the vulnerability has a positive effect on growth of short-term debt, although much smaller. The vulnerability index is one indirect way of measuring possible risk perception by investors and from this point of view the a-symmetry between positive and negative changes in vulnerability is clearly in line with the credit rationing literature. We will further explore this in the next section.

3.4.3 Risk Perception and Pro-Cyclicality

There are some theoretical reasons why short-term debt may indeed tend to be pro-cyclical rather than counter-cyclical and, besides financing needs for investment and exports, they are related to the issues that arise with financial intermediation under imperfect information (see Stiglitz and Weiss, 1981). So far, we already found that high risk perception, possibly due to an adverse internal or external shock, as operationalized in the total debt to GDP ratio and the share of exports in GDP, exerted a positive effect on short-term debt relative to total debt. On the other hand we argued for non-linearities in the response of the maturity structure to changes in credit worthiness. For, the vulnerability indicator referring to crisis periods, showed that higher risk perception lengthens the maturity of external bank debt. This influence of risk perception may be the underlying cause for any pro-cyclicality of short-term debt: fast output growth increases credit worthiness and improves access to longer-term financing; on the other hand during a downturn, risk perception increases and short-term debt goes up. When the downturn becomes a recession, vulnerability to a crisis increases and the emerging market loses access to financing even at the shorter end.

Thus, a crisis itself and the information revealed during the crisis both affect the risk-perception of investors. Moreover, large and small shocks reveal information to different
Chapter 3. Short-Term Debt of Emerging Markets

extents. If, after a large adverse shock, it is revealed that the government faces many contingent liabilities\(^{11}\) that are not reflected in the budget, such a shock will increase the perceived risk because things may be much worse than thought on the basis of official statistics. This gives a reason for why risk perceived by lenders may go up a lot after a negative shock resulting in ex-post lending that falls short of ex-ante borrowing requirements. This is especially true for developing countries that depend heavily upon foreign financing, and often have opaque ownership structures, limited information disclosure, and weak regulatory and enforcement systems (see Global Development Finance, 1999, Box 2.4, p.34). In this sense, Sachs (1998) argues with respect to the crises in Asia, that the depletion of reserves often followed by the inevitable devaluation of the currency revealed to investors holding short-term claims on the domestic financial sector that their investments were more risky than previously expected.

Summarizing this relationship between risk perception by lenders and pro-cyclicality of capital flows, we argued for changing risk perception as one of the possible causes for short-term debt being positively related to an emerging markets’ economic performance. During ‘good’ times, risk perception decreases and investors are willing to increase their exposure to emerging markets. Borrowers taking account of the increased availability of funds may want to increase their exposure to cheaper short-term debt, especially if decreased risk perception is reflected in short-term rates earlier or more than in long- and medium-term interest rates. Also, after a large adverse shock, risk-perception can increase so much both because of the direct impact of the shock, the uncertainty created, and the information revealed because of the shock being large. Then lenders may refuse to roll-over debt coming due and may be unwilling to provide new loans even at the shorter end of the maturity distribution.

Such an a-symmetric response of the risk-rating to positive versus negative shocks is exactly what one would expect in light of the credit rationing literature, especially in an international context. For, if the precepts of positive shocks are shared between both lenders and borrowers while potential losses of a negative realization in fundamentals is mainly concentrated at the lending side, one would expect larger upgrades in risk perception than downgrades in the face of similar positive respectively negative shocks.

The channel from credit worthiness to pro-cyclicality depends crucially on the relationship between risk perception and economic performance in emerging markets. Tables 3.6 and 3.7 present some results concerning this relationship. Ideally one would like to

\(^{11}\)Which include the implicit guarantees offered to the financial system, the clean-up of liabilities prior to privatization, the losses and obligations of the central bank, local governments, state-owned and large private entities and budgetary and extra-budgetary agencies.
### 3.4. The Cyclical Nature of Short-Term Capital Flows

#### Table 3.6: Risk perception and GDP growth rates, 1988-1998.

<table>
<thead>
<tr>
<th>Countries</th>
<th>Above average GDP growth</th>
<th>Below average GDP growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>0.529</td>
<td>1.17</td>
</tr>
<tr>
<td>LAC</td>
<td>0.38</td>
<td>0.99</td>
</tr>
<tr>
<td>EAP</td>
<td>1.09</td>
<td>1.83</td>
</tr>
</tbody>
</table>

Note: p-values in brackets.

#### Table 3.7: Elasticity of the risk rating with respect to above and below average GDP growth, 1988-1998.

<table>
<thead>
<tr>
<th>Countries</th>
<th>Growth in the risk rating</th>
<th>LAC</th>
<th>EAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth</td>
<td>0.991</td>
<td>1.183</td>
<td>1.382</td>
</tr>
<tr>
<td>[0.000]</td>
<td>[0.000]</td>
<td>[0.000]</td>
<td></td>
</tr>
<tr>
<td>Growth in industrial countries</td>
<td>-0.992</td>
<td>-2.292</td>
<td>-0.427</td>
</tr>
<tr>
<td>[0.012]</td>
<td>[0.008]</td>
<td>[0.069]</td>
<td></td>
</tr>
<tr>
<td>Log GNP per capita</td>
<td>0.373</td>
<td>1.024</td>
<td>4.196</td>
</tr>
<tr>
<td>[0.827]</td>
<td>[0.748]</td>
<td>[0.045]</td>
<td></td>
</tr>
<tr>
<td>Imports as a fraction of GDP</td>
<td>0.04</td>
<td>-0.028</td>
<td>-0.136</td>
</tr>
<tr>
<td>[0.624]</td>
<td>[0.944]</td>
<td>[0.662]</td>
<td></td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.28</td>
<td>0.43</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Note: p-values in brackets. All variables are expressed as deviations from their mean, estimated using fixed effects.

Use interest rate spreads as an indication of risk-perception but due to lack of a consistent series which is available from at least 1988 onwards, we use the risk rating as collected by the Institutional Investor. According to the rating provided by Institutional Investor, a higher risk rating refers to higher creditworthiness; i.e. a higher rating implies lower risk-perception.

The results in Tables 3.6 and 3.7 suggest that if a countries’ GDP growth is above its average growth, risk perception by investors decreases. If there is a positive shock to GDP growth, risk perception improves. Whenever there is a large adverse shock to GDP growth, the risk rating falls. For the coefficient in this case is 1.17 and the explanatory variable (GDP growth) is expressed in terms of its deviation from its mean and given our definition of a negative shock the independent variable takes on negative values (i.e. is below the mean). The fact that the coefficient is largest for a negative shock for our 33 emerging markets as well as for the regions LAC and EAP provides some support for the view that risk perception is not necessarily a symmetric function of a countries’ economic
performance. Finally, risk perception can be seen to be a relative concept since perceived creditworthiness of emerging markets depends negatively on the growth performance in more mature economies. External economic conditions (industrial country growth rates) seem to be important for assigning risks to lending to Latin-America, while for East-Asia increasing import shares can be identified as one factor reducing creditworthiness.

3.5 Conclusion

High short-term debt relative to international reserves has been identified as a leading indicator if not the main cause of the recent financial crises in Mexico in 1994, in East-Asia, and later in Russia and Brazil. As a consequence, the question of why emerging markets often accumulate large amounts of short-term debt becomes important, possibly contributing to future crisis prevention. This chapter analyzed the determinants of the maturity structure of external debt of developing countries as well as the question of whether short-term capital flows tend to be stabilizing or destabilizing. The key messages are:

1. The maturity of all banking debt has shortened dramatically in the nineties. High levels of short-term lending to emerging markets reflects both push (supply) and pull (demand) factors which are either of a cyclical or structural nature. In addition, policy factors in industrial countries and in borrowing developing countries have played important roles in shortening the maturity of banking debt flows to developing countries. On the ‘push side’, international banks have faced more competition at home and had therefore turned (at least before the Asian crises) to lending to developing countries as a means of raising their profitability. A shorter maturity of such lending inevitably accompanied such rapidly rising exposure to developing countries. Second, lower interest rates at home as well as the growth performance in industrial countries also pushed banks to lend short-term abroad. Third, on the policy side, capital adequacy regulations promoted short-term lending by attaching lower risk weights to such lending. This is also heightened by past international rescue efforts that have tended to give precedence to and protect short-term claims in order to reduce systemic risks, but which have led to potentially serious moral hazard problems.

2. Not all shortening of the maturity structure was due to push factors alone. On the ‘pull’ side, increased levels of trade that accompanied greater openness of countries was associated with rising demands for short-term borrowing, especially in
the form of trade credits. Second, cyclically rapid growth in the 1990s in several important emerging countries, like in East-Asia, also resulted in rapid growth in demand for short-term financing, not unusually accompanied by asset booms that may partly explain the phenomenon of growing maturity mismatches. Third, a policy of financial opening and rapid financial integration drew domestic banks to borrow heavily from abroad (Thailand’s Bangkok International Banking Facility and Korea’s deregulation of foreign borrowing while remaining controls over equity flows) and this borrowing has been associated with a shortening of maturity.

3. The evidence suggests that short-term bank lending tends to be pro-cyclical to shocks in emerging markets and subject to sudden large reversals when the credit-worthiness of countries deteriorates. Since short-term capital flows tend to strengthen booms and harden bursts, it becomes even more important for policymakers in emerging markets and developing countries to implement automatic stabilizers and counter-cyclical policies.

4. Thus, the results above support viewing short-term capital flows as a mixed blessing. On the one hand, such flows are associated with trade, FDI, and growth. On the other hand, their sustainability is not entirely under the control of policymakers in emerging markets and their pro-cyclical nature exposes these countries to increased volatility and vulnerability to financial crises.

In light of the pro-cyclical nature of private short-term capital flows, and our finding that this seems to be related to risk perception by lenders, it is interesting to note that Dasgupta and Ratha (1999) have found that lending to emerging markets by international financial institutions does seem to be counter-cyclical, acting as a lender-of-last-resort, although lending by these institutions may affect the incentives of private borrowers and lenders in a perverse way. The presence of these institutions may increase the probability that emerging markets run into financial distress, but their counter-cyclical lending may also play a useful role when developing countries lose access to the international capital markets when they face a large adverse shock.

Easy policy solutions for dealing with surges in capital inflows are not available. For example, one way to offset the effects of capital flows on the domestic money supply is through sterilization. Sterilization has been used by almost all countries in Latin-America and was usually carried out through the sale of bank securities (see Edwards, 1998). However, sterilization can be very costly for the central bank as interest rate earnings on international reserves are much lower that the interest paid on its own securities (see Calvo, 1991). Moreover, the high interest rates on securities may attract further capital
inflows, in turn increasing reserves and pressure on the real exchange rate further. Montiel and Reinhart (1999) indeed provide evidence that sterilized intervention has increased total capital flows through short-term capital, while it does not affect portfolio flows and foreign direct investment. Among other policy factors, pursuit of strong sterilization policies (in support of relatively fixed or pegged exchange rates) thus potentially attracted more short-term capital flows.

A second way to manage undesirable capital inflows is by imposing some form of capital controls. In fact, many countries have experimented with one form of control or the other. In Chile, the restrictions take the form of minimum stay requirements for direct investment inflows. Moreover, other forms of capital inflows are subject to non-interest bearing reserve requirements (for more details see Edwards, 1998). In Colombia, restrictions take the form of a variable reserve requirement on foreign loans, except trade credit, to the private sector. Although in both countries these forms of capital controls seemingly have not resulted in lower volumes of capital inflows, the maturity structure of these inflows has been shifted towards flows that are not affected by these implicit taxes (see Montiel and Reinhart, 1999).

Malaysia's experiment with taxing capital outflows allowed for a policy that lowered domestic interest rates while maintaining a fixed exchange rate. Stimulating capital outflows to limit net capital inflows on the other hand may only increase capital inflows. For, risks as perceived by investors may decrease because they can always leave if the economic conditions worsen (see Laban and Larrain, 1997). Also capital flight by domestic (privileged) parties after an adverse shock may increase financial vulnerability (see Frankel and Schmukler (1996) and Kaufmann, Mehrez, and Schmukler (1999), for the role of domestic parties before and during periods of capital flight), which is the subject of Chapter 5.

Increasing foreign equity ownership in developing countries, especially in financial institutions, may be one option to reduce the vulnerability of these countries to changes in investor sentiment (see Obstfeld, 1998). Hedging is an alternative instrument, for both lenders and borrowers, to reduce exposure to exchange rate, terms of trade, or interest rate risks. It may be possible for countries to limit the fluctuations in capital flows with some forms of controls, while at the same time benefiting from increased risk-sharing through options, forwards, and futures. Thus, does one really need additional external financing in times of a bad shock to take full account of the insurance character of the capital market, or can a country also insure itself by using these derivatives to prevent the actual need of extra external financing?

On the other hand, it is also important to notice that financial derivatives allow for highly leveraged, speculative, positions. Moreover, they may decrease transparency,
increase the market power of some parties, and together with the difficulties in enforcing certain derivative contracts and transactions may increase systematic risk. Even if banks hedge their exposure to risks, the corporate sector may not, thereby taking account of the interest rate spread while perceived exchange rate risk is small. Then banks are indirectly exposed to exchange rate, interest rate, and terms of trade fluctuations as well since credit risk will be affected. Related to this, and especially if there is a large degree of currency convertibility, introducing capital controls should be targeted at limiting all short-term borrowing instead of just external short-term borrowing.

In short, participation in the 'global capital market' could seriously complicate macroeconomic management if growth rates of short-term debt are pro-cyclical while easy policy solutions to counter these effects are not available. In this light, an important difference between developed (OECD) and emerging market economies comes from the degree of domestic adjustment offered by automatic stabilizers such as taxes and transfers and one would expect that developing countries need more external financing when faced by a negative shock than more mature economies (see Easterly, Islam, and Stiglitz, 1999). As a consequence, imposing counter-cyclical macroeconomic policies in emerging markets may be one effective way of dealing with the volatility imposed by pro-cyclical capital flows.