Working Paper
Abstract

Capital adequacy regulations or quantity restrictions on bank portfolios put forward by the Basle Committee on Banking Supervision have virtually become an international standard of prudential regulation. Recent proposals aim at extending this approach to market risks, in particular to foreign exchange risk. The present paper provides a critical analysis of proposals to introduce foreign exchange position limits on a uniform cross-country basis, focusing on their effectiveness and their possible impact on the functioning of both mature and developing foreign exchange markets. Theoretical considerations are underpinned in the paper with descriptions of existing or proposed regulations, in a broad range of both industrial and developing countries. Experiences with the use of foreign exchange position limits in developing countries provide insight into their widespread use for other than prudential purposes, in particular to support exchange rate and exchange control policies.

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Summary

In light of the internationalization of banking and the more general liberalization of financial markets, together with the increased importance of floating exchange rates, the Basle Committee on Banking Supervision and the European Union took steps recently to harmonize national prudential regulations on foreign exchange risk by applying the capital-adequacy approach already adopted for the 1988 Basle Accord on credit risk. The increasing number of developing countries liberalizing their foreign exchange markets has also led to consideration of quantitative restrictions on banks' capacities to take open foreign exchange positions. This paper explores the theoretical considerations behind these regulations and restrictions, and evaluates their effectiveness and possible impact on the workings of foreign exchange markets, based on a sample study of 41 developed and developing countries.

Possible spillovers (or expected external costs) from failures in one jurisdiction to another provide a rationale for coordinating regulations in countries with internationally active banks. However, because it is not established that the Basle approach decreases international systemic risk, optimal coordination could involve considering both the abolition and introduction of capital-adequacy regulations.

This paper suggests that the proposal to amend the 1988 Basle Accord on foreign exchange risk—although potentially improving harmonization of banking regulations—contains several problems. Market risks related to foreign exchange business would not be comprehensively covered, and disincentives would discourage the use of the more market-based method to determine position limits, and thus the exercise of modern portfolio management. These shortcomings stem partly from anticipated adverse effects on exchange rate volatility of the uniform use of the proposed simulation technique which, in turn, points to a policy dilemma that can arise in attempting to establish prudential foreign exchange risk regulations while managing exchange rates.

In addition, the theoretical literature does not clearly indicate whether the capital-adequacy approach is applicable to developing countries. Optimal timing of reform suggests that it might not be advantageous for an incipient foreign exchange market to introduce restricting regulations. Nevertheless, 26 developing countries in the sample collected use foreign exchange position limits, although often for reasons other than prudential regulation. Some limit banks' long positions more than their short positions in order to alleviate devaluation pressures, clearly contradicting prudential considerations. Moreover, at least one developing country has lowered position limits in order to increase interbank trading activity. The experience of these countries suggests that there is a need—perhaps not limited to developing countries—to distinguish prudential exposure limits from position limits used as capital controls.
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I. Introduction

Foreign exchange risk management of financial institutions first came to the fore with the internationalization of the banking business during the 1960s. The advent of the floating exchange rate environment in the early 1970s considerably increased exchange risk for international players, a fact which was suddenly brought to the attention of the general public by the failure of the German Herstatt Bank in 1974. The main reason for this bankruptcy was the large positions the bank had taken in the foreign exchange market, which turned against it (von Hagen 1992). One indicator of the importance of the disruption that this single event caused in the international financial markets is the unusual deviation from covered interest rate parity, observed throughout the world in the aftermath of the crisis. Since then, most regulators in industrial countries have limited banks' potential to take open foreign exchange positions.

However, most recently the international financial community seems to have entered a new era of foreign exchange risk regulations. On the one hand, the G-10 and the European Union have pushed forward to harmonize national regulations. Moreover, an increasing number of developing countries are moving to introduce foreign exchange position limits, at the same time as they make their currencies more convertible and develop domestic foreign exchange markets. The purpose of the present paper is twofold. First, it discusses the recent proposals to harmonize exchange risk regulations in industrial countries. Second, it analyzes the current foreign exchange position regulations in developing countries. Given the lack of theoretical knowledge about banking regulation in developing countries, one aim is to provide a basis to draw some inferences for the better use of foreign exchange (forex) risk regulations in those countries.

The paper is organized as follows. Section II briefly reviews the theoretical literature on banking regulation in industrialized countries and develops an argument for the international coordination of national legislation. Since the recent proposals to harmonize national forex risk regulations in a large number of industrial countries are formulated in a capital adequacy framework, i.e., establishing quantity restrictions on bank portfolios varying with the amount of own funds, the paper puts emphasis on the question of the effectiveness of these restrictions in general in achieving reduced bank failure probabilities and derives some basic conditions they have to meet in order to do so. 1/ These conditions provide criteria for the evaluation of concrete applications of this approach to different risk types in bank portfolios, for example, forex risk. Section III first describes the content of the recent proposals to

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1/ This paper deals mainly with capital adequacy regulations in the proper sense, although one has to keep in mind that they are only a special case of quantity restrictions. Therefore, the theoretical results usually apply to these restrictions in general, whether they relate to banks' own funds or not.
harmonize forex risk regulations in G-10 countries and the European Union and then focuses on how they perform with respect to the criteria developed in the previous section. The section continues with a brief glance at current regulations in industrial countries other than those of the G-10 and the European Union. Furthermore, the possible effects of the proposals on the functioning of the foreign exchange market are analyzed. The section on developing countries, Section IV, looks at foreign exchange position limits from a broader perspective than that of purely prudential considerations. It starts out by identifying differences between financial systems in developing and industrial countries, and briefly discussing some implications of these differences for the theoretical findings of Section II. The main part of the section describes the current foreign exchange position regulations in a sample of 28 developing countries and some experiences with them. It closes with a discussion of the use of exposure regulations in the early stages of a forex interbank market.

Some major findings of the paper are that the capital adequacy approach, popular in international coordination of banking regulations in general, has a relatively weak theoretical basis and it has not yet been established that it can be designed in a way that reduces international systemic risk. In particular, the recent proposals to harmonize foreign exchange risk regulations in industrial countries have several problems, which suggest the need for revision. Experiences in developing countries show that forex position limits, although proposed for prudential banking regulations, are often introduced (asymmetrically) for other purposes, such as the support of certain exchange rate policies. However, they point to a fundamental conflict which can arise between prudential regulations and exchange policies in both industrial and developing countries. The possible use of foreign exchange exposure limits for exchange control purposes raises the issue of delineating prudential regulations from currency inconvertibility.

II. Theory of International Banking Regulation

Traditionally, banks have the macroeconomic task of intermediating savers and investors. They fulfill this task by realizing several microeconomic transformation functions: (1) liquidity (or maturity) transformation, i.e., banks borrow by taking short-term deposits and lend by giving long-term credits; (2) size transformation, meaning that they finance large investments projects by putting together many small deposits; and (3) disclosure (or information) transformation, meaning that banks screen and monitor real investment projects so that savings are channeled to the most profitable users. As a consequence of the development of the modern financial markets, performing this last transformation function is now considered the banks' most important intermediation activity (Diamond, 1984). However, by granting credits they also serve as an important source of money creation.
There are a number of historical examples, given in Dowd (1994), where banks were relatively free from government intervention. However, in most periods and countries, particularly today, they have been subject to very specific regulations, raising the question of the justification for such special treatment. Most economists could probably agree that the special nature of banks derives from the relationship between the importance of their role in the functioning of the economy and their exposure to specific risks that could entail this role being seriously compromised. These risks begin with the vulnerability of individual banks to runs, and extend to the vulnerability of the banking sector as a whole to cumulative crises.

In performing its first transformation function a bank guarantees a good deal of its depositors almost unlimited liquidity, although many of its assets cannot be liquidated in the short run. By definition, depositors cannot intervene in the bank’s management in order to reinforce their contractual arrangement, but only to withdraw their funds. On the other hand, the possibility of hidden action (moral hazard) by the managers, together with coordination problems among depositors (free-riding), impedes them from writing or monitoring the necessary contracts for efficient risk-allocation of the banks’ overall portfolios. Thus, if expectations are endogenous and no precautionary arrangements are imposed from outside, even runs on sound banks can occur (Chari and Jagannathan, 1988). 1/ The next question is how these information asymmetries between the depositors (the principals) and the bank managers (the agents) not only can produce inefficiencies in the choice of investment projects, but also threaten the stability of the financial sector. 2/

Bank crises occur for two related reasons. First, banks find it necessary to borrow and lend heavily among each other to do their business of intermediation, creating a complex network of credit relationships within the financial sector itself. Second, depositors' expectations of their own bank's situation are not independent of what is happening in other banks. Hence, one bank’s failure can trigger others’ failures, either because the latter have assets with the former, or because depositors react to the news of a run going on elsewhere. Through these mechanisms, the failure of a bank, either sound or unsound, can cause a temporarily self-reinforcing chain-reaction that can possibly affect many sound banks. 3/ Banking crises are an interesting example of how allocative inefficiencies and destabilization can work together. The suboptimality of risk allocations makes individual bank failures and their multiplicative external costs more likely. In other words, the probability that a considerable part of the

1/ For a model where bank runs occur without information asymmetries, see Diamond and Dybvig (1983).
3/ However, because of "flight to quality" by the depositors, contagion will stop at some point before the whole banking sector is erased.
total stock of wealth is erased and the intermediation process between savings and investment, as well as the provision of liquidity to firms and households, is disrupted ("credit crunch"), and therefore growth and welfare suffer, is higher than without any agency problems. However, this view is certainly too simplistic since it ignores two basic factors. One, governments step in with regulation, and two, the market participants themselves develop mechanisms of protection spontaneously. Since the paper is mainly concerned with government regulations, it will focus on the first factor. 1/

Regulators have reacted in five basic ways to the allocational and stability problems discussed: 2/

-- Limiting market entry to increase the "franchise value" of banking licenses;

-- Monitoring banks' activities with a view to shutting them down when they are insolvent;

-- Providing emergency liquidity assistance for solvent banks in times of unexpected withdrawals (lender of last resort);

-- Insuring deposited amounts against bank failures; and

-- Explicitly restricting licensed banks' business, ranging from the prohibition of certain activities to capital adequacy requirements.

In most industrialized countries, a mix of all five instruments is used (Gale 1982).

As the major problems in banking regulation come from the expected external costs of bank failures, standard economic reasoning suggests that the optimal economic policy should aim at equalizing expected private and social costs. If this argument is correct, then this should decrease the individual banks' portfolio riskiness, and thus, lower systemic risk. The

1/ For a discussion of the second factor, see Dowd (1994). Kaufman (1987) points to a third factor. He argues that bank runs not only have costs but also benefits in that they force governments to step in and evaluate the "true" net worth of each bank, removing the information asymmetries between managers and depositors about the soundness of the banks.

2/ Distributional considerations seem often to play a role as well since policymakers may find it undesirable that the savings of small depositors are at risk of being swept away by a crisis. In this paper we only want to deal with allocational and stabilization issues in banking. However, other means might be considered more adequate for distributional purposes than banking regulation.
standard policy response to such an externality problem would be to implement a tax system with individual banks' tax rates depending on their capital, risk management skills, and portfolio risk. Unfortunately, management skills and certain aspects of portfolio risks are hard to measure. Moreover, the level of the rate schedule might be difficult to justify. However, there does not seem to be the political willingness either to attempt to respond to the externality problem with a risk tax scheme.

The overall goal of equalizing (expected) social and private costs in banking implies that any policy response to the externality problem—be it a tax regime or some other scheme—should meet the subgoal of comprehensiveness, i.e., all risks (in the context of the respective total portfolio) must be considered. If not, economically rational banks would shift their activities to the unregulated risks, leaving the externality or stability problem unresolved. The comprehensiveness requirement is to be understood in a static as well as in a dynamic sense. That is to say, it should not only cover risks coming from standard instruments but should also be readily adjustable to new types of risks arising from innovations. Similarly, coherence is implied, meaning that equal risks should be treated equally (or unequal risks unequally). Of course, at the same time the regulation should not negatively affect other factors determining the banking sector's efficiency. One is that it should not impede competition. This means it should not create "undue" barriers to market entry or discourage incumbent banks from developing and applying sophisticated risk management techniques. 1/
The latter implies, e.g., that it should not impede or give disincentives to diversification in portfolio management. Furthermore, the regulatory burden on banks should be held at a minimum, given that the goals can still be achieved. This is related to the optimal "dosing" of the tax implicit in any regulation. If it is too high, then bank business would be unnecessarily constrained or, in the case where dynamic comprehensiveness is not met, there are incentives for banks to develop instruments which are not, or only partly, covered by the regulation in order to avoid its costs or gain additional returns to compensate for them. 2/

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1/ Some economists draw from empirical support for the "charter value hypothesis" (Keeley 1990), claiming a negative correlation between monopoly rents in banking and the riskiness of bank portfolios (as measured by capital ratios), the conclusion that market entry to banking should be restricted. Saunders and Wilson (1994) provide econometric evidence that the "charter value hypothesis", although valid in the United States after 1952, does not fit the data between 1893 and 1952.

It is beyond the scope of this paper to provide a thorough discussion of all national regulatory practices regarding these criteria. However, some problems associated with the government interventions may be pointed out. In many industrialized countries one finds a (semi) public deposit insurance scheme with fixed premia per currency unit deposited (Dale, 1984). Small deposits are explicitly covered, but observers generally regard most large deposits as implicitly insured, since governments are usually ready to bail out big banks in trouble ("too big to fail" argument). In fact, such an arrangement removes the possibility of crises in practically all bank-run models, such as Chari and Jagannathan (1988) or Diamond and Dybvig (1983). But this benefit comes at a cost. It does not solve the principal-agent problem, but only transforms it in a multi-stage form. The monitoring task is shifted from depositors to the insurer, but the latter's managers do not risk their own funds but ultimately those of taxpayers, most of them being bank depositors. Moreover, as Merton (1977) points out, the value of insurance to the deposit issuer is increasing in its asset risk and decreasing in its capitalization. Hence, insured banks will engage in riskier activities on the asset side while maintaining as little capital as possible. As long as the insurer is not pricing the contracts he offers according to the risk characteristics of each insured bank, increased risk-taking will make deposit insurance very costly. This feature underlines Kareken and Wallace's (1978) claim that a regulation leads to the need for additional regulation. 1/

It does not come as a surprise then, that many of the industrialized countries attempt to put a cap on the riskiness of bank portfolios, e.g., through some sort of minimum capital requirement related to assets. However, economic theory and evidence make a strong case against limits on simple capital-to-assets ratios. Thus, Lackman (1986, p. 589) summarizes the early economic literature by stating that "the economic rationale for the concept is virtually non-existent" and that "empirical studies of capital adequacy have turned up little evidence to support the use of these concepts." 2/ The model of Koehn and Santomero (1980) puts it in terms of modern portfolio theory. Managements optimizing the expected utility of bank portfolios would react to an external limit on their capability to leverage by decreasing the share of less risky assets and increasing the share of more risky assets in their portfolio. While for more risk averse managers the increase in asset risks will be lower than the decrease in the risks related to the restriction on leveraging, for less risk averse managers it will be the other way round. Therefore, the effect of simple capital ratios on the average probability for bank failures is ambiguous, the actual sign depending on the distribution of attitudes toward risk among bank managers in the economy.

1/ See also Di Cagno (1990, p. 99).
2/ Similarly, Di Cagno (1990, p. 9) states: "In most of the models which investigate the effect of capital-ratio regulation on the portfolio behavior of commercial banks, the results of a higher required capital ratio are ambiguous in terms of the average probability of failure."
On the other hand, results for more sophisticated capital adequacy ratios are more constructive for bank regulation. Kim and Santomero (1988) show in a similar portfolio-selection framework that a vector of "theoretically correct" risk-weights for a linear measure of assets in the denominator of the capital-to-assets ratio can be found, such that the adverse reshuffling of portfolios, possibly increasing failure risks, is avoided. However, if the weights in the risk-related capital ratio deviate from the "correct" ones, then the regulation can be counterproductive as in the case of a simple ratio. Interestingly, the "theoretically correct" risk weights derived by Kim and Santomero (1988) only depend on the risk-return structure of banks' assets and deposits and the maximum acceptable bank insolvency risk chosen by the regulator, but not on individual bank's risk aversion (or other aspects of their preferences).

Elaborating on some restrictive assumptions of the above theories Rochet (1992, p. 1160) argues that, in complete markets, even risk-related "capital regulations (at least of the usual type) are a very poor instrument for controlling the risk of banks; they give incentives for choosing 'extreme' asset allocations, and are relatively inefficient for reducing the risk of bank failures". Moreover, he finds that actuarially determined, i.e., risk-related, deposit insurance premia are the "correct" instrument. This can be interpreted as one version of the portfolio-risk tax to counter external costs of bank failures suggested above.

In the case of incomplete financial markets, Rochet (1992, pp. 1155ff.) finds that the general result from Kim and Santomero (1988) is repeated, if risk-weights are not completely "market-based". However, if risk weights are proportional to the betas, as known from standard portfolio theory--i.e., related to the covariability of the respective assets' return with that of the market portfolio--then failure probabilities decrease without inducing banks to select portfolios inefficiently. Hence, if market incompleteness is a reasonable approximation, this latter result could be taken as an argument for a comprehensive "market-based" capital adequacy regulation. On the other hand, if regulators are already able to estimate all risks related to individual banks' assets, then one could also use them to determine market-based deposit insurance premia and abolish additional capital adequacy requirements. However, with incomplete markets, it might or might not turn out that this is a more efficient solution. Further theoretical research is certainly necessary on this issue.

1/ Since the 1988 Basle Accord (CBRSP 1987) is an example of capital adequacy regulation limited to credit risks of banking assets alone, this would provide a theoretical basis for the 1993 proposal to amend the Basle Accord for market risks (BCBS 1993b), although even after its introduction "marking to the market", as opposed to "historical cost accounting", would remain fairly incomplete. For a discussion of the problems related to marking to the market in capital adequacy regulations, see Dewatripont and Tirole (1993, Chap. 10.3).
From the previous paragraphs it should be clear that, although the coordination process between savings and investments through financial intermediaries is not at all perfect, it cannot be taken for granted that the national regulatory efforts are adequate to remove the imperfections or even do not aggravate imperfect market outcomes. This might be due to the lack of knowledge about banking markets' functioning (including, in particular, the risk-return structure of bank portfolios) or incentive problems in the political area. However, the next section will be mainly concerned with one effort by national regulators to harmonize their rules on an international level. A question, before switching to more operational issues, is whether there is a theoretical basis for the international coordination of national banking regulations. Continuing the argument outlined in the paragraphs on national regulation above, the main point of international concern is spillovers from bank failures in one jurisdiction to others. From the point of view of pure economic efficiency, it makes no difference whether possibly contagious bank failures hurt domestic or foreign depositors. However, the existence of nation states with different regulatory frameworks, limited to the respective jurisdictions, may induce additional allocational inefficiencies into the international financial system.

When national policymakers decide on their national frameworks, they care, at best, about the welfare of their own citizens because this matters for their re-election and for the major part of their income. However, in times when banks are lending heavily and borrowing internationally, setting up branches and subsidiaries at home and in foreign countries, one country's regulation automatically influences the behavior of banks in its own and in many other jurisdictions. Standard microeconomic reasoning suggests that, if the number of relevant countries is not too large and if national policymakers negotiate national regulations, taking the positive or negative effects of each country's scheme on all others into account, world welfare could be increased. The argument is usually made in terms of "regulatory dumping", or "competitive deregulation" as Dale (1984, p. 172) calls it. For example, offshore banking centers are accused of keeping prudential supervision at a low level in order to attract subsidiaries of foreign banks, gambling that the protective arrangements of the parent bank's country activate in case of problems. However, based on the arguments outlined above, one could argue the other way around. Countries with possibly risk-enhancing "over-regulation" may impose an (expected) external cost on countries with successful but more light-handed supervisors. Whatever the reason for international externalities through national bank regulations, "regulatory dumping" or "overregulation", they represent a standard argument for international coordination. Considering the experiences with efforts in harmonizing different countries' banking regulations, it has to be discussed whether ex post coordination through the market is actually less efficient than ex ante coordination through

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1/ Dale (1984, Chap. 1) and Gardener (1991) survey the development of international banking.
government negotiations and international agreements. Whatever the scheme, its main objective should be to equalize national and global costs between different states. If the solution is harmonization, then it should meet the requirements enumerated above for national regulations as well.

The establishment of the Basle Committee on Banking Supervision (BCBS) in 1974 apparently was the first effort on international cooperation in banking regulation on a multilateral basis. It was the immediate reaction of regulators to the German Herstatt Bank's failure in the same year and the following extended discussion of the distribution of its international costs. Only the occurrence of such a concrete disruption seems to have moved national regulators to react to the new financial interdependencies which had emerged during the 1960s, and to the new risk structure related to the appearance of the floating exchange rate regime in the early 1970s.

The Committee's activities can be classified into three parts: (1) information exchange; (2) distribution of supervisory responsibilities, and (3) regulatory minimum standards. The order of presentation of these activities corresponds to the chronology of the Basle Committee's evolution. It also roughly corresponds to the order in the Committee's decisions' regulatory force (Hayward 1992). Altogether, it appears to have followed a logical evolution as regards the externality problem mentioned above. First, the developments in international financial markets and other countries' supervisory practices have to be understood. Then, given that national regulations exist and that banking systems are interrelated, it has to be decided in which area each country is responsible and which country should bear part of the costs in case of a problem, in order to avoid loopholes in the supervisory system. In fact, this second stage led to the so-called Basle Concordat of 1975 and its revision in 1983 after the Banco Ambrosiano affair revealed differences in the Concordat's interpretation. Finally, if regulatory externalities are perceived to render the international allocation of banking risks suboptimal, national policies have to be adjusted.

Apparently, something similar to this was the Committee's conclusion that led to the production of the Basle Accord of 1988 containing a minimum capital requirement for banks' credit risks, as measured by a weighted sum of assets, of 8 percent (CBRSP 1987). Today this regulation, which became

1/ The original name of the Basle Committee, which is located at the Bank for International Settlements, was Committee on Banking Regulations and Supervisory Practices (CBRSP). Its members are the 11, G-10 countries Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, United Kingdom, United States, plus Luxembourg. Each country is represented by its central bank and other bodies, if they exist, that are responsible for banking regulation. Decisions are usually taken by unanimous agreement among the members. However, they have not the status of international "hard" law (Hayward, 1991, p. 67f.; Norton, 1991, p. 94).
fully effective at the end of 1992, has almost achieved the status of an international banking regulation standard. Many non-G-10 industrial countries have also adopted these rules, and several developing countries apply similar ones. 1/ Hayward (1992, p. 187) claims that "there can be few banks operating internationally which are not subject to capital adequacy requirements consistent with the agreement of July 1988". Current efforts point to the Accord's extension to some market risks. The Committee's April 1993 paper contains sections on bond price, equity price and exchange rate risk, although only the forex part proposes binding minimum regulations. It seems that the negative reactions of banks, expressed during the consultative process, have delayed its final approval and might result in a revised proposal ("Searching for Consensus...", 1994).

Very recently, the Basle Committee turned its attention to risks related to derivatives in general, and further credit-risk related off-balance sheet items (BCBS 1994b, BCBS 1994a). Although for the moment there seems to be no general capital adequacy accord for derivatives in sight, the 1988 Accord already considered some credit risks related to derivatives, and the April 1993 proposal for its amendment to market-risks--subject of the discussion in Section III--included currency forwards and currency options. 2/

The 1988 Basle Accord formulated two broad objectives to be achieved by the introduction of minimum standards for national capital adequacy regulations. 2/ First, and according to one official of the Basle Committee (Hayward, 1991, p. 68f.) more importantly, the Committee wanted "to achieve a strengthening in the capital resources of international banks in order to help strengthen the stability of the international banking system". Secondly, it wanted "to remove an important source of competitive inequality for banks operating internationally" (CBRSP 1987, p. 1). In the first place, it has to be analyzed how these two aims relate to the economically derived goal system formulated above.

1/ Price Waterhouse (1991) gives a detailed description of the Basle Accord's transformation in national regulations in 23 industrial countries, including not only the G-10 and the rest of the EU, but also Australia, Austria, Finland, Hong Kong, New Zealand, and Norway. Other countries having introduced the Basle rules, or very similar guidelines, by early 1991 are Aruba, Bermuda, Indonesia, Israel, Malaysia, Nigeria, Saudi Arabia, and Turkey. This list is certainly much longer today. The recent establishment of regional groupings of supervisors might further increase the Accord's international impact in the near future (Hayward 1991, p. 72f.). Interestingly, three off-shore financial centers (Guernsey, Isle of Man, and Jersey) are reported to have either lowered formerly existing requirements to adjust to the Basle Accord, or introduced a more restrictive capital adequacy rule of 10 percent to prevent this (Price Waterhouse 1991, pp. 66-68).


2/ Although not explicitly stated in the text, the same overall goals should apply to the Accord's proposed amendment to market risks (BCBS 1993).
At first sight, the aim of increasing (the ratio of) capital (to asset risk) seems to be clearly related to the equalization of social and private costs. Ceteris paribus, the higher the capital bases of banks, the lower the probability of bank insolvencies and the weaker the impact of individual failures on other banks. However, a review of the theoretical literature on capital adequacy regulations indicates as mentioned above, that if imposed improperly, they can increase bank failure risks and, as a result, the probability of international external costs can go up.

Concerning the second aim of "leveling the playing field", Scott and Iwahara (1994, p. 1) deny that differences in capital adequacy regulations are an important source of competitive inequality, finding that "competitive advantages between banks in two countries are caused primarily not by differences in capital ratios but by differences in comparative advantage, the fundamentals of each economy, and government support in the form of safety net policies", meaning that deposit insurance and government mechanisms supply banks with capital, in the form of debt or equity, on more favorable terms than would be available in the private market. Moreover, international differences in accounting rules and tax regimes make the effect of the introduction of the same capital adequacy regulation in two different countries asymmetric. Both aspects led Scott and Iwahara (1994, p. 69) to conclude that "it would be an accident ... if the Accord made even a modest contribution to diminishing competitive inequality between U.S. and Japanese banks".

Mayer (1980, pp. 8-12) has argued, although in a different context, that competitive equality between different types of financial institutions is not an operational concept. Since one cannot say whether one type of financial institution has, in sum, greater privileges through regulation than another, it should rather be replaced by an equality-to-customers criterion which turns out to be equivalent to allocational efficiency. The latter requires that equal activities should be treated equally, which is not necessarily the same as treating different institutions equally. From this perspective, when "leveling the playing field" is interpreted in a meaningful way, it is equivalent to the efficiency criteria developed above.

Another meaning which could be given to the demand for competitive equality is to counter "regulatory dumping". As argued before, this is one version of the international externality argument and, hence, the aim is to equalize private and social (or global) costs in banking. In sum, the Basle Committee's two goals--although in a somewhat misleading formulation--can be roughly compatible with the main goal of national and international banking regulation, which is the efficient allocation of risks on all levels. However, it should be clear from the previous discussion that the regulatory approach chosen by the Committee has a rather weak basis. Whether it can be effective in achieving more stable financial systems critically depends on

However, the empirical evidence collected by Scott and Iwahara is limited to a comparison of Japan and the United States.
the choice of correct "market-based" risk weights and on the precise measurement of asset (and liability) values. The distribution of assets in four credit-risk classes by the Basle Accord, with one weight for each class, appears to be very approximate. Additionally, Hook (1994) provides evidence from the Texas banking crisis of the 1980s for the variation of counterparty risk over time, a feature that the fixed-weight approach of the Basle Accord cannot address. Moreover, the zero weight assigned to domestic government bonds is sometimes considered to be overly optimistic, inciting banks to invest in government bonds rather than to lend to the private sector (Hook, 1994, p. 6). Finally, the low emphasis on market-value accounting (as opposed to historical-cost accounting) and the incomplete treatment of risks—in particular the almost complete ignorance of portfolio effects (correlations between different assets)—adds further qualifications concerning the possible effectiveness of the scheme. However, one would like to base conclusions on empirical insights as well. Since these are largely absent, especially for risk-related capital adequacy regulations, there is no choice other than to rely on theory. 

At the current state of knowledge, the latter suggests that one has to consider seriously the possibility that capital adequacy regulations of the Basle-type could be counterproductive. Bearing this in mind, more operational issues of proposals to include internationally harmonized foreign exchange risk regulations in the capital adequacy framework may be considered.

III. Foreign Exchange Exposure Limits: Issues in Industrial Countries

In the previous section, theoretical arguments for national and international banking supervision, and the capital adequacy approach of prudential regulations were reviewed. The main conclusion was that this approach, if realized improperly, can easily be counterproductive. Both the G-10 and (the rest of) the European Union are currently taking steps to extend international capital adequacy regulations to market risks, i.e., risks originating in price fluctuations of instruments held in banks' portfolios (BCBS 1993b, Conseil des Communautés Européennes 1993). Although not removing important shortcomings of the original Basle Accord on credit risks, the findings of the previous section suggest that the extension to market risks can, if done properly, improve the international regulatory scheme on balance. Since, apart from purely prudential issues, this paper is mainly concerned with effects of prudential regulation on the working of the foreign exchange market, the discussions are limited to the exchange risk aspects, in Section 4 of the new Basle Proposal.

1/ Regarding the state of knowledge, the only existing empirical literature in this area relates to the question of whether national capital adequacy regulations actually led to an increase of banks' capital stocks, without consideration of possible changes in their risk policies. This literature was reviewed by Di Cagno (1990, pp. 85-95) and found to be inconclusive.
1. Proposals for improving prudential regulation

The Basle forex proposal's philosophy is that a bank has to conduct a policy assuring that in the bulk of cases involving possible losses resulting from exchange rate changes, there must be enough capital to compensate for these losses and, therefore, to guarantee the solvency of the bank. The issue of the adequacy of the definition of capital needs to be distinguished from that of forex risk, and its measurement which is discussed here. Foreign exchange exposure in general has two components: the position's amount and the respective exchange rate variability. Therefore, the Basle Committee proposed, first, a method to calculate net single currency positions. Second, it leaves a choice for national regulators to allow banks to add them up into a net (overall) foreign exchange position and ensure that the total does not exceed a certain percentage of their capital, or to simulate scenarios of potential losses from them so as to ensure that they are covered by capital at a "high level of confidence."

For any single foreign currency, the net open position is calculated by summing up the single positions spot (including accrued interest), forward, and in options. It is important that both trading positions, as a consequence of a bank's activity as foreign exchange dealer, and other positions, as a consequence of its commercial banking activities in different currencies, are taken into account. Forward positions are recommended to be measured either at current spot rates or discounted in net present values. Offsetting spot-option positions (hedge) can be simply carved out of the whole calculation by banks not dealing in options. Others have to use the portfolio-delta technique. However, national supervisors can "consider more advanced approaches for capturing the risks" (BCBS 1993b, p. 36).

For the single currency positions' transformation into a measure of overall currency risk, and for the determination of the adequate amount of capital, the proposal leaves a choice between two different methods. The first, called the shorthand method, aggregates the single-currency positions in a net global position which has to be partly covered by capital. The second, called a simulation method, calculates hypothetical profits and losses for all positions from historical exchange rate data and requires those to be covered by capital in almost all cases. The shorthand position measure is the maximum of the sum of all net long foreign currency positions.

1/ The option delta measures the effect of marginal changes in the price of the underlying, here a foreign currency, on the value of the option, e.g., Cox and Rubenstein (1985) show how the same principle can be used to measure the effects of price changes of the underlying on the value of a portfolio of options.
and the sum of all net short foreign currency positions. 1/ The Basle Committee considers that a capital requirement of 8 percent on this net open position "would ensure an adequate level of protection against losses for most portfolios" (BCBS 1993b, p. 39). The implied forex exposure limit is 1,250 percent of capital. For the alternative method, it is proposed that simulations are run with exchange rates during the preceding five years, and with an assumed position holding period (to be rolled on daily) of two weeks (10 working days). The Committee considers that a minimum capital requirement should cover 95 percent of the losses occurring in these simulations. To this number, a mark-up of 3 percent of the net open position from the shorthand method (called "scaling factor") has to be added as an additional risk-buffer. This is intended to achieve a rough equivalence in "toughness" between both methods (BCBS 1993b, p. 42).

The Basle Committee's proposals are, in principle, quite similar to the EC Capital Adequacy Directive 93/6 (Conseil des Communautés Européennes 1993), which is currently to be transformed into national laws by the countries of the European Union. However, several differences are noticeable. First, while the EC Directive directly applies to banks and some other financial institutions, the Basle Committee's competence is limited only to banks. 2/ Related to this, on the liability-side of the balance-sheet, EU countries will be allowed to permit banks to cover forex risk with tier-3 capital (additional classes of subordinated and unsecured debt). 3/ Third, in measuring the forex positions' risk potential, banks in EU countries can reduce the capital charge by taking particular exchange rate correlations or intergovernmental exchange rate arrangements into account. In particular, when the shorthand position measure (analogous to that of the Basle Proposal) is used, then offsetting long and short positions in two "narrowly" correlated currencies will require a capital

1/ This measure was adopted from the current practice of the Bank of England. This and two other "shorthand" measures, their underlying assumptions on the correlations between different exchange rates, and their relative adequacy for different developing countries will be discussed in Section IV, although all three measures originate from practices in industrial countries.

2/ Initially the Basle Committee and the International Organization of Securities Commissions (IOSCO) tried to coordinate their efforts to issue a joint proposal for banks and nonbank financial institutions. However, when the IOSCO did not come up with its proposal, the Committee went ahead alone, which seem to have disturbed the relationship between both bodies ("Banks Warned on Linking Bonuses to Profits", 1994).

3/ For slight differences in the notion of tier-3 capital between the Basle Committee and the European Union see BCBS (1993, pp. 10-12) and Conseil des Communautés Européennes (1993, Article 2 [23-26]) and Annexe V). Roughly speaking, tier-1 capital comprehends shareholders' equity and disclosed reserves. Tier-2 capital is tier 1 plus revaluation reserves and loan loss reserves, as well as some parts of subordinated debt. Tier-3 capital is tier-2 plus additional classes unsecured, subordinated debt.
charge of only 4 percent of the respective position's amount—implying a forex exposure limit of 2,500 percent of capital. Moreover, if the exchange rate of two currencies is related through a legally binding intergovernmental contract, then the capital on offsetting long and short positions in these currencies can be as low as half the maximum percentage change allowed for the respective exchange rate in the arrangement times the amount of those positions (8 percent for non-offsetting positions). Fourth, the Directive also allows for a simulation approach, but gives more degrees of freedom concerning its specification. For example, the simulations can also be done with an observation period covering the preceding three years, but then the confidence interval has to be of the order of 99 percent (instead of 95 percent with data five years back). The option of a reduced capital charge for currencies with binding exchange rate arrangements can also be applied to the selected simulation method. 1/ Finally, and most importantly, there is no "scaling factor" to be added on the capital charge resulting from any of the chosen simulation methods. 2/

How do these two proposals for regulating banks' foreign exchange exposures perform with respect to the criteria developed in Section II? 3/ It would seem that once a capital adequacy regulation is chosen, risks should be included comprehensively. The market risk proposal is a logical extension of the Basle Accord since 1988 on credit risks in this direction. Admittedly, other important banking risks, such as business-cycle risk for noninterest income, political risk, or fraud risk, are quite difficult to assess. However, the current accord on credit risk and the proposal on market risks already contain considerable gaps. One of these gaps is that for currency forwards only the spot exchange rate risk component is taken into account, while the risk resulting from changes in international interest rate differentials and the possible interactions of both through

1/ Even more reduced capital charges can also be applied to offsetting positions in EU countries' currencies participating in stage II of European Monetary Union. The minimum capital requirement amounts to 1.6 percent of these positions' amounts (exposure limit: 6,250 percent of capital). However, the recent disruption in European exchange markets and the subsequent enlargement of exchange rate bands might have rendered this passage obsolete.

2/ The EC Directive has to be transformed in national legislations by June 1995 and be fully effective in January 1996. The Basle Proposal mentions an extended transitional period to implementation at the end of 1996 at the earliest (BCBS 19936).

3/ Only the Basle Proposal will be discussed in the rest of this section, and the EC directive will be mentioned only if a particular point does not apply to the Basle Proposal.
arbitrage activity seem to be left out. 1/ Another concerns currency options, for which risk potential is considered through the portfolio delta that measures the risk coming from marginal changes in spot exchange rates. But option values are also due to risks from changing deltas (convexity or gamma risk), changing spot rate volatilities (vega risk), changing interest rates (rho risk), and changes in the remaining time-to-maturity (theta risk), which all except the last belong in the area of market risks. 2/ Although still a relatively small part of all foreign exchange transactions, options and other leveraged instruments showed the most dramatic development among all instruments in the forex market (BIS 1993). Therefore, the incomplete treatment of the risks inherent in leveraged instruments is not negligible from a static point of view. Even worse, because of its enormous liquidity the forex market seems to play a leading role in many financial innovations, such as exotic options, that create new and combine old risks in ever more complex ways. Therefore, from a dynamic point of view, the traditional structure of risk measurement of the Basle Proposal will undoubtedly be outdated soon.

What about coherence? The shorthand measure puts all currencies on the same footing. When, for example, a German bank switches from a French franc position to that in U.S. dollars, the capital charge would remain unchanged, although obviously the position's riskiness has changed. As described above, the EC Directive, in contrast to the Basle Proposal, takes some aspects of differences in currency risks into account, though still in a very approximate manner. Taylor (1994, p. 14) observes that the Basle market-risk proposal, as a whole, "is fundamentally flawed by depending on a classification of instruments and not risk types". This can lead to a tendency to consider one (or at best a few) risk source(s) per instrument type and possibly to a quite asymmetric treatment of the same risk type with different instruments. The more that derivatives, which usually include a multiplicity of (market) risks, advance, the more problematic might become the classification according to instruments.

1/ The Committee's consultative paper on the "Measurement of Banks' Exposure to Interest Rate Risk" (BCBS 1993a, pp. 15f.) mentions forward foreign exchange positions in relation to interest rate risk. However, it is a paper on "best supervisory practice" without the possible regulatory impact of the forex-risk proposal, and makes no reference to possible interactions between exchange-rate and interest-rate risk through, for example, uncovered interest-rate parity.

2/ See Cox and Rubenstein (1985) for a deeper discussion of these concepts. The exchange-rate-risk proposal (BCBS 1993b) makes only a short reference to them on page 35, while the "Risk Management Guidelines for Derivatives" (BCBS 1994b) focus on sensitizing senior managers to the general risks of derivatives without providing details of the different market risks. However, the recent studies by the Group of Thirty (Global Derivatives Study Group 1993, 1994) and by the United States General Accounting Office (1994) already cover most of the relevant issues.
The third requirement is that a regulatory scheme should not give strong disincentives for "good" (foreign exchange) risk management (incentive compatibility). The Basle Proposal's performance on this score is probably the most severely criticized. The shorthand measure can be calculated with comparatively low costs. However, it performs very poorly on principles of modern portfolio management. Well-performed portfolio management can decrease overall risk by adding new forex positions (diversification). Under the shorthand method, adding a new foreign currency position will either increase the capital requirement or leave it unchanged. This suggests that banks should be rather encouraged to use the simulation method (or even develop more advanced techniques, possibly also using short-run exchange-rate forecasts). However, the "scaling factor", which increases the capital requirement found with simulations (at 95 percent confidence) by 3 percent times the overall open position according to the shorthand measure, instead does the opposite. This is because such a factor "would deliver approximate equivalence in terms of toughness of the capital requirement for a portfolio of average riskiness between the shorthand and the simulation methods" (BCBS 1993b, p. 42), and the latter is more costly to implement. The EC Directive does not contain such an additional risk buffer for the simulation techniques it is proposing.

Although the consultative proposal does not explain why the Basle Committee considered it necessary to equalize roughly the capital charges between institutions using one of these two methods, which differ that much in their precision to evaluate forex portfolio risk, the following aspects seem to have contributed to its decision to "scale up" the capital requirement from the simulation method. One is that some bank regulators felt uncomfortable with the idea that 5 percent of possible losses would not be covered by capital. The capital requirement for the shorthand measure was chosen to be relatively high. Similarly, a cautious attitude with respect to the reliability of historical exchange rate data used for the simulations of potential losses played a role. Furthermore, some national regulators were concerned that smaller, less sophisticated banks could lose part of their business. In order to establish "competitive equality" between larger and smaller banks they prefer to see the capital requirement for the simulation method increased.

Why then did the Basle Committee not simply widen the confidence interval for the coverage of potential losses to, say, 99 percent? Simulations run as background studies for its discussions showed that, because of the skewedness of the empirical distributions of exchange rates ("trends"), capital charges derived from the proposed simulation method would be asymmetric with respect to short and long positions. As is explained in more detail in the next subsection, this feature of the approach can increase exchange rate volatility in the foreign exchange market. Moreover, the background studies showed that a widening of the confidence interval reinforces the asymmetry of capital charges and therefore the possible adverse effect on exchange rate stability.
The next criterion, the minimization of the regulatory burden on banks, is to be used with caution, since a capital adequacy approach which is comprehensive, coherent, and incentive compatible, will probably be more costly than the "shorthand regulation" put forward by the Committee. However, the general approach of capital adequacy, together with the particularities of market risks compared to credit risks (Levonian, 1994, pp. 4f.), makes for some strange costs for banks. Imagine that an American bank, whose capital is denominated in U.S. dollars, has a completely balanced foreign exchange position, i.e., that long and short positions in each currency sum to zero. One can then look at the example of only one foreign currency. If this currency appreciates, the forex capital ratio deteriorates, although no loss occurs since capital losses with short positions are offset by capital gains with long positions. Thus, banks have to take additional measures in order to protect themselves against this perverse effect. To do justice to the Committee proposal, it has to be mentioned that it permits banks to exclude positions taken for protection against those deteriorations of the capital ratio, from the calculation of the (shorthand) overall currency position (BCBS 1993, p. 37). However, the protection itself produces costs and, additionally, can lead to capital losses if the domestic currency appreciates.

There remains the issue of correct "dosage" of the regulation. Levonian (1994) presents a test of the adequacy of the 8 percent capital requirement based on data of the positions of the banks in the 12th district of the American Federal Reserve System (San Francisco) in the six most important foreign currencies in December 1990, 1991 and 1992. He finds that, using the Basle shorthand measure, a capital requirement of slightly less than 4 percent would cover all losses up to three standard deviations from the mean (a confidence level of 87 percent assuming a normal distribution of bi-weekly exchange rate changes), and therefore concludes that "the proposed level of capital coverage appears to be very conservative" (Levonian, 1994, p. 16). This might be taken as a hint that the regulation would force banks to hold unnecessarily high capital stocks, compared to their foreign exchange portfolio risk. Since the "scaling

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1/ Even if one considers that, first, historically observed exchange rate changes could underestimate likely fluctuations in the future and, second, that the distribution of exchange rate changes seem to be leptokurtic rather than normal, i.e., that the normal distribution assumption implies an underestimation of the probabilities for exchange rate realizations far away from the mean, these two aspects can hardly account for all of the difference between the Basle limit and the one coming out from Levonian's simulation. As Mueller et al. (1990, pp. 1189f.) have shown, the kurtosis of the distribution of exchange rate changes monotonically, i.e., decreases with the considered price-change interval. While half-hourly and daily price changes are clearly leptokurtic, the distribution of weekly changes may already have a kurtosis quite close to zero.
factor" aims at equalizing the capital requirements found by using the shorthand method and that found by using the simulation method, the point applies to both techniques.

2. Some country examples

To give some information on current practices in industrial countries not included in Goldstein et al. (1993, Table 3), Table 1 shows the existing foreign exchange risk regulations in five non-G10/non-EU countries, namely Australia, Austria, Finland, New Zealand, and Norway. The most apparent feature of Table 1 (and of Goldstein, et al. [1993] is that current forex exposure limits are much more restrictive than those of the Basle Proposal and the EC Directive--at least in countries where explicit limits exist. This is more surprising as the Basle Proposal's 8 percent capital requirement was found to be rather conservative (Levonian, 1994).

One consequence could be that the regulatory impact of the proposed or new minimum forex risk regulations could remain relatively limited, as many countries even in the G-10 or the EU are not forced to lower (increase) their capital requirements (exposure limits). However, while Austria, Finland, and Norway as members of the European Economic Area (EEA) will have to adjust their regulations to those of the European Union in the near future, the remaining two will be able to choose if they wish to adopt the Basle forex-risk proposal--if endorsed by the Committee--or not to harmonize. The experience with the 1988 Basle Accord on credit risk would suggest that they will largely follow the G-10 exchange risk regulations.

Nevertheless, the Reserve Bank of New Zealand has recently issued a new policy statement proposing the complete abolition of foreign exchange exposure limits (Reserve Bank of New Zealand 1994, p. 29). This is envisaged together with a general switch to a public disclosure regime that obliges locally incorporated banks and branches of overseas banks to publish a large amount of information formerly only reported to the central bank on a confidential basis. The information comprehends, *inter alia*, credit concentration, related party exposure, capital positions according to the Basle Accord of 1988, exposures to market risks--including not only the *foreign exchange position* but also equity and interest rate risk exposure--and exposure to other banks. The authorities of New Zealand state that this approach can contribute to the soundness of the banking system through greater emphasis on market discipline, together with a limited core of prudential regulation and some modifications in supervision (*ibid.*, p. 6). In order "to maintain international credibility and to avoid possible costs to the banking system which could arise from a discontinuation of the BIS capital adequacy framework", the application of the Basle Accord on credit risk is not abolished (*ibid.*, p. 12). Apparently trying to reduce moral hazard, "neither the Government nor the Reserve Bank in any sense "underwrites" the soundness of individual banks" (*ibid.*, p. 6).
<table>
<thead>
<tr>
<th>Country</th>
<th>Limits on Net Foreign Exchange Positions</th>
<th>Limit on Overall Foreign Exchange Position</th>
<th>Definition of Overall Foreign Exchange Position 1/</th>
<th>Reference Quantities in Case of Individual or Relative Limits 2/</th>
<th>Timely Enforcement of Limits 3/</th>
<th>Foreign Exchange Exposure Regulations for Nonbank Financial Institutions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-10 countries</td>
<td>None</td>
<td>1250 percent</td>
<td>MAP (including all on- and several off-balance-sheet items (currency forwards, options, swaps, certain guarantees); currency-option positions are considered using the portfolio-delta technique).</td>
<td>Tier-2 capital</td>
<td>Not explicitly determined, but several indications that daily enforcement envisaged.</td>
<td>Area of the International Organization of Securities Commissions (IOSCO) which did not issue a proposal yet. Cooperation between the Basle Committee and the IOSCO were disturbed when efforts for a joint proposal broke down in 1993 (&quot;Banks Warned...&quot; 1994).</td>
<td>Basle Committee leaves a choice between this &quot;short-hand method&quot; and a &quot;simulation method&quot;, described in the main text; the proposal suggests &quot;minimum requirements&quot;, i.e., national regulators could introduce more restrictive rules; banks' critical reactions to the proposal (&quot;Searching for Consensus...&quot; 1994) seem to have delayed its introduction and may lead to a new proposal later this year; introduction of the final agreement is not expected before January 1996.</td>
</tr>
<tr>
<td>European Union</td>
<td>None</td>
<td>1250 percent</td>
<td>MAP (including all on- and several off-balance-sheet items (currency forwards, currency and other options, swaps, certain guarantees); currency-option positions are considered using the portfolio-delta technique).</td>
<td>Tier-3 capital</td>
<td>Not explicitly determined, but several indications that daily enforcement envisaged.</td>
<td>Directive requires the same minimum rules for banks and other financial institutions (investment companies).</td>
<td>EU allows a choice between the method described and two &quot;simulation methods&quot;; similar to that of the G-10 proposal (the reduced capital adequacy in case of legally binding exchange-rate arrangements can also be applied to those); when a financial institution exceeds the limit, it has to report this to its authorities; the directive is currently transformed into national laws/rules by the governments of the EU; it provides minimum requirements for national regulators.</td>
</tr>
<tr>
<td>Australia</td>
<td>None</td>
<td>Individual limit for each authorized forex dealer.</td>
<td>MAP (including all on- and several off-balance-sheet items, but excluding structural positions).</td>
<td>Individual limits based on capital, proficiency in forex dealing, internal management controls, and dealer's market profile.</td>
<td>End of day</td>
<td>Procedure for setting and enforcing overnight limits applies also to non-banks authorized to deal in foreign exchange.</td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td>None</td>
<td>(1) 30 percent</td>
<td>(1) GAP of items becoming due in any quarter at least three quarters ahead (2) GAP of items becoming due in any semester at least one year ahead (includes forwards, accrued interest, guarantees; hedged positions excludable).</td>
<td>Tier-3 capital</td>
<td>End of day</td>
<td>...</td>
<td>Austrian National Bank may reduce these limits by up to 10 percent and add instruments to be included in the calculation of open positions if new risks arise from developments in the foreign exchange market.</td>
</tr>
</tbody>
</table>
Table 1 (concluded). Summary of Foreign Exchange Exposure Regulations in Industrial Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Limits on Net Single Foreign Exchange Positions</th>
<th>Limit on Overall Foreign Exchange Position</th>
<th>Definition of Overall Foreign Exchange Position</th>
<th>Reference Quantities in Case of Individual or Relative Limits</th>
<th>Timely Enforcement of Limits</th>
<th>Foreign Exchange Exposure Regulations for Nonbank Financial Institutions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>1 percent 1/</td>
<td>1 percent 1/</td>
<td>MAP (including all on- and off-balance-sheet items, except structural positions; options are considered using the portfolio-delta technique. Forward positions also include cross-currency contracts.)</td>
<td>Tier-2 capital</td>
<td>Both limits are for end of day; overall position against Dank is also computed as a moving average over 2 business days, which must not exceed $4 at the end of each day.</td>
<td>Other credit institutions (such as finance companies) authorized to deal with foreign loans face explicit foreign currency position limits.</td>
<td>Smaller banks have operational limits deviating from the general rules; &quot;consolidation&quot; with respect to forex positions includes parent banks and their foreign branches, but not domestic and foreign subsidiaries; Finland experienced a crisis at EFB (Eesti-Offsite Pank) in 1991, one of the two dominant commercial banks, due to imprudent forex position taking in one foreign non-bank subsidiary; because of the limited consolidation rules this behavior did not violate Finnish forex exposure regulations; as a member of the European Economic Area, Finland is currently working on harmonising its forex exposure regulation with the rules in the European Union, this is expected to be finished in early 1996.</td>
</tr>
<tr>
<td>New Zealand</td>
<td>None</td>
<td>40 percent</td>
<td>MAP (including all on- and off-balance-sheet items, except structural positions; options are considered using the portfolio-delta technique.)</td>
<td>Tier-1 capital</td>
<td>End of day</td>
<td>None</td>
<td>Expectedly during the fourth quarter of 1993 the Reserve Bank of New Zealand will abolish the explicit forex exposure limit and switch to a public disclosure regime, where banks will be obliged to disclose comprehensive information on their forex positions (and other risks) to the general public; public reporting requirements will be much the same as those formerly stipulated by the Reserve Bank on a confidential basis; the new regime does not include a requirement for internal forex position limits of banks.</td>
</tr>
<tr>
<td>Norway</td>
<td>10 percent</td>
<td>(1) 10 percent</td>
<td>(1) MAP</td>
<td>Capital</td>
<td>...</td>
<td>All financial institutions which have to be authorized by Norges Bank to engage in forex activity are due to these limits (this includes, apart from banks, mortgage and finance companies).</td>
<td>The Bank of Norway (1994) reports 28 cases for 1993 where limits were violated (25 cases), mainly concerning the 10 percent limit on the net position in the most actively traded single currencies (DM, FFr, USS); as a member of the EEA Norway will have to harmonise its forex risk regulation with EU standards.</td>
</tr>
</tbody>
</table>


1/ GAP (gross aggregate position): sum of the absolute amounts of all net single currency positions; MAP (maximum aggregate position): sum of all net long single currency positions or sum of all net short single currency positions, whatever the greater; NAP (net aggregate position): sum of all net single currency positions (long +; short -); NAL (net aggregate long position): GAP if long; NAL (net aggregate short position): GAP if short.
2/ Tier 1: shareholders' equity, disclosed reserves; tier 2: tier 1 plus revaluation reserves, loan loss reserves and parts of subordinated debt; tier 3: tier 2 plus additional classes of unsecured, subordinated debt. Capital definitions are given whenever possible, but differences in national accounting standards imply that they are not always comparable.

4/ Member countries of the EU can apply an even less restrictive limit of 625 percent of capital to offsetting positions in two currencies participating in phase II of European Monetary Union.
5/ Is considered to be confidential by the Bank of Finland and cannot be reported here.
3. Effects on foreign exchange markets

The basic function of the foreign exchange market is to provide international traders and investors (as well as tourists) with the possibility of acquiring the currencies needed for their transactions and managing their exchange rate risk. In order to contribute to the global maximization of welfare, the market should be efficient in doing this. By efficient it is meant that the market should be liquid, broad, competitive, and stable. Liquidity means overall transaction volume is sufficiently large and transaction frequency is so high that any single transaction can be realized instantaneously without having a significant impact on the price. Broadness has mainly to do with the availability of the financial instruments that are necessary for the exchange rate risk management of firms operating internationally. Price competition between foreign exchange dealers lowers transaction costs, as reflected by bid-ask spreads, to the level "justified" by the production costs of exchange services. Finally, by stable is meant that exchange rate movements do not largely reflect changes in (self-fulfilling) expectations, unrelated to economic fundamentals. Economists' perceptions of now largely unregulated international foreign exchange markets, as they exist in industrial countries, are that they perform well on these scores, with the notable exception of exchange rate volatility, where the opinions are divided.

Against the background of this knowledge, one should check whether the prudential regulations proposed for regulating banks' foreign exchange position-taking can have significant effects on the efficiency of the forex market operations. An optimistic interpretation of these regulations would be that they do not hurt efficiency. On the contrary, by limiting the potential of banks to engage in speculation on exchange rate movements, they could contribute to the forex market's stability. A more pessimistic view would be that, although imperfect for attaining prudential aims, they provide obstacles to forex dealing and international commercial bank businesses.

The foreign exchange market is a spontaneous dealership market, mainly working through electronic communication systems. Any dealer has to be ready to quote prices, implying readiness to trade at those prices at any instant for two reasons. First, if he did not quote prices or refused to trade he would quickly lose all his business. Second, dealers usually learn

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1/ For a theoretical and empirical discussion of the determinants of transaction costs in the foreign exchange market, as measured by bid-ask spreads, see Hartmann (1994, Section 2). As conventional wisdom would suggest, the impact of exchange rate volatility on forex spreads is positive, and that of competition, negative. Increased transaction volume, except perhaps in the very short run, should decrease transaction costs.

from their (private) order flow where "the market is going". This informational aspect of the order flow is an important tool for their price competition with other dealers. The pressure not to refuse orders implies that their foreign exchange positions can fluctuate considerably in the very short run, i.e., before these positions are squared through further transactions in the interbank market. As a consequence, if forex position limits are too restrictive, then they can prevent dealers from standing ready to make a market at any time, decreasing the liquidity of the foreign exchange market. However, if the welfare costs of a decrease in exchange market liquidity are lower than the costs of undue risk-taking, then this decrease is as it should be. Although the Basle forex risk regulation was found to be quite restrictive, concerning the relation between loss risks and the required stock of capital, international forex markets in industrial countries are already so liquid that any impact should be negligible. Since the limits would be enforced only at the end of each business day (BCBS 1993b, p. 9), dealers could accommodate their positions relatively freely during the day. Also, many existing regulations are already more restrictive than the proposed or new minimum requirements.

As pointed out in the previous section, the Basle Proposal scores relatively badly on the comprehensiveness criterion. By choosing an approach that considers types of financial instruments rather than risk types, it does not meet static comprehensiveness and will be vulnerable with respect to dynamic comprehensiveness. Given the relatively high capital requirements, it provides incentives for banks to develop instruments which serve to circumvent the forex regulation rather than to improve exchange risk sharing. In some sense, this would increase market broadness, but in a quite unfortunate manner. Assuming that the research budget of a bank is more or less stable, then efforts to develop "fancy" innovations to avoid existing regulations will decrease the funds going into the development of instruments which meet better the exchange risk management needs of the bank's customers.

It was already discussed in the previous section that a Basle-type regulation would decrease the capability of banks to compete through improvements in the quality of risk management. Since the dealing room is usually a profit center in the bank (Tygier, 1983, p. 60) this decrease in competitiveness can have a direct effect on dealer spreads, or push them to engage in speculative activities not covered by the regulation to compensate for a narrower profit margin. Hence, the major problem with the Basle scheme, that it is insensitive to the quality of risk management, is also a reason for concern about the efficiency of the foreign exchange market. However, whether a possible impact of decreased competition in risk management techniques will have a significant impact on transaction costs is an empirical question.

One major concern with the foreign exchange market is the high volatility of exchange rates and the fact that exchange rate movements are hard to explain by changes in the economic fundamentals (Krugman, 1988). This is often explained by speculation, based on short-term expectations,
which can become self-fulfilling. Moreover, as the recent experience with the European Monetary System has shown again, central banks are not able to defend a fixed exchange rate arrangement when "the market" expects the rates to have become "unrealistic". An important factor in the destabilizing effects of foreign exchange speculation in a floating as well as in a fixed regime environment is that many market participants are able to take very large positions. Thus, limiting banks' abilities to take currency positions might contribute to the efficiency of the foreign exchange market by limiting destabilizing speculation.

The main counterargument against this interpretation of Basle-like schemes is that they are often limited to commercial banks. First, banks usually do not take (trading) positions as large as those taken by some other players in the market and, second, these other players can continue to invest in currencies as before. Goldstein et al. (1993, pp. 5-7) compare the regulations for currency exposure of different financial institutions in six major industrial countries. ¹/ Although the introduction of the Basle market risk proposal would submit all commercial banks in the G-10 countries (plus Luxembourg) to the same minimum prudential limits, hedge funds, nonfinancial corporations, and non-EC securities houses could continue to take positions as they wished. Moreover, other different types of investment funds (including pension and mutual funds) are often less restricted in their acquisition of foreign currency assets or liabilities by their national regulators than commercial banks. On the other hand, many empirical studies have found an apparent lack of international risk sharing between residents of different countries. ²/ Increasing limits for all types of financial institutions to invest in different currencies could contribute to this inefficient international allocation of risks. Finally, speculation has not only negative aspects. Speculators provide a good deal of the huge liquidity of the foreign exchange market among industrial countries and, as Friedman (1953) pointed out, their activity can also be stabilizing in a floating-rate framework. ³/

The potentially adverse impact of a standardized simulation method on exchange rate stability has already been mentioned in the discussion of the arguments for the "scaling factor". The intuition for this phenomenon is as follows: suppose that national regulators (or banks) chose the Basle

¹/ The countries considered were France, Germany, Italy, Japan, United Kingdom and United States. Regulations for the European Union as a whole were also reported.

²/ These studies are enumerated for example in Obstfeld (1993) and Dumas (1994).

³/ For a model which shows how speculators can function as the source for dealers to quickly refinance their open positions, resulting from their customer business, see Black (1991) and Hartmann (1994). However, Bingham (1992) and others note that forex turnover exceeds by many times that which would be "justified" by international trade, direct investment, and investments in international securities markets.
simulation method as the only one to limit foreign exchange risk in relation to capital. A long position in a currency which has depreciated over the last five years will thus be considered "riskier" than a short position, leading banks to hold this currency rather short, while a currency with the opposite long-term trend will instead tend to be held long. This is not to say that this currency is objectively riskier but rather that since its historical distribution of exchange rate changes is skewed to the right, i.e., as devaluations appear to be more likely than revaluations, the simulation method will punish long positions with higher required capital than short positions. Most importantly, if the simulation technique is standardized by the regulator (time horizon, holding period, etc.) the evaluation of the "riskiness" of a currency position in this sense is the same for any bank. Consequently, under the assumption made above, the forex exposure regulation can reinforce exchange rate movements and, thus, increase exchange rate volatility. 1/ Put in another way, the regulation can function as a coordination device for "expectations", as if they were based on a kind of long-run technical analysis and can, therefore, become one source of sun-spot equilibria in the foreign exchange market, away from equilibria "justified" by economic fundamentals. 2/ The EU Directive on financial institutions' forex positions limits the potential for those effects by giving a greater choice with respect to the specification of the simulation techniques, for example, concerning the period of historical exchange rate data.

IV. Foreign Exchange Position Limits: Issues in Developing Countries

1. Theoretical foundations of capital adequacy regulations in developing countries

Monetary and financial systems of developing countries obviously differ from those in the developed world. Differences relate to private behavior together with the state of the market institutions, and to the behavior of governments toward this behavior and institutions. First, financial markets are less developed than those in industrial countries. In the early stages of development, financial systems are dominated by banks and organized bond, equity, or even forward markets are almost absent or rather illiquid. Second, the banking system is less competitive; the number

1/ I am grateful to Kazushige Taniguchi to have drawn my attention to this aspect.
2/ See Allen and Taylor (1992) for a survey of the use of technical analysis in the foreign exchange market, which is much more important for short-run exchange rate forecasts. "Real" technical analysis is not standardized and, hence, the techniques applied by different market participants vary considerably. The argument is similar to that made about the effect of the use of portfolio insurance (program trading) in stock markets.
of banks is limited and they often do not cover rural areas. Lack of human and technical resources as well as lack of competition keep financial skills at lower levels. Information is less perfect and more asymmetric than in industrial countries, and undiversified production structures in less developed countries can be reflected in little diversification of bank portfolios. Finally, poverty and depressed economies result in lower savings levels that naturally restrict the scope of banking and other financial markets.

On the other hand, developing countries' financial systems are often characterized by a high degree of government involvement in directing savings to sectors thought to be essential for the development process. Often this implies "financial repression", i.e., interest rates below their equilibrium value, and attempts to direct credit explicitly to particular investment projects. In addition, currency inconvertibility insulates the real and the financial sector from the rest of the world. As governments cannot accept further weakening of the financial sector through individual failures, banks in developing countries are often burdened with bad assets and are kept solvent by government or simply nationalized. The problem of bad debts on the asset side of commercial banks' balance sheets is particularly severe in Central and Eastern European Countries in transition to a market economy (Tirole forthcoming, p. 130). On the basis of the lack of diversification through the weak productive sector and capital controls, together with those bad loans, it may be argued that banks are riskier in these countries than in the developed world (Caprio and Summers 1994, p. 7).

Also, by encouraging the banking sector to listen to and rely on the government, rather than to address its situation by acting in the market, policymakers can contribute to the imperfections of the banking sector. In sum, banks in many developing countries appear to be less efficient than those in most industrialized countries in channeling savings to the most productive investments and more vulnerable to risks. This is all the more severe when governments contribute to an unstable macroeconomic environment through inflationary policies which increase risks resulting from price level and interest rate variability.

There seems to be no theory that explicitly addresses capital adequacy regulations for developing countries. However, in a first step, the underlying assumptions of the models described in Section II and the implications of deviations from the situation in those countries may be investigated. All the models discussed assume perfectly competitive portfolio maximizing managers and do not address the agency problem between them and shareholders. These assumptions might be particularly unrealistic for developing countries, but it is not clear a priori to which outcome their relaxation would lead in theory. Further, one could argue that complete markets are a reasonable approximation for industrial countries, while incomplete markets fit better the situation in developing countries. Thus, one could apply Rochet's (1992) conclusions, implying that the better instrument for industrial countries is risk-related deposit insurance, and that risk-related capital adequacy regulations could be applied in developing countries. However, given the imperfect functioning of capital
markets in many developing countries, estimates of portfolio-betas, as a
basis for "correct" risk-weighting, might be exposed to very high error
probabilities.

There is one important argument brought to the fore by proponents of
applying western regulatory standards to developing countries. The
educational effect of those standards on risk management in banks is
emphasized. However, the possible benefits in terms of an increased
awareness of certain risks can come at a cost. As pointed out above, these
regulations imply some disincentives in terms of modern portfolio management
theory, especially when they are incomplete or when they ignore diversifica-
tion. These disincentives might weigh more heavily in less developed
markets, where diversification is already low and the market participants
still have to "discover" their optimal risk-management techniques.

There remains the issue of harmonization. At the current stage, the
interdependence of developing countries' banking systems with the outside
world and among themselves is comparatively low. This implies that, in
general, there is no urgent need for harmonizing banking regulations. On
the other hand, there might be some exceptions, especially when countries
envisage, or have already realized, regional integration. This might be the
case for some states of the former Soviet Union and the Baltics. However,
the harmonization of the legal framework for the respective countries' financial systems might be less important in the early stages of increased integration than the liberalization of trade and payments systems among these countries.

In conclusion, it would appear that current economic theory does not
provide adequate tools to decide whether risk-related capital ratios are
more or less applicable to developing countries than to industrial
countries. However, given the problems encountered in their applications in the developed world, strict application of the same principles to less advanced economies must be attempted with reservation. 1/

2. Experiences with foreign exchange position limits

In order to discuss current foreign exchange exposure regulations in
developing countries and compare them to those in the industrial world,
information on 35 developing countries has been collected. The data reported in Table 2 cover Hong Kong, Indonesia, Korea, Malaysia, Papua New Guinea, the Philippines, and Thailand, from Asia; The Bahamas, Brazil, Chile, Guatemala, and Paraguay, from Latin America; Algeria, Egypt, The Gambia, Ghana, Guinea, Mozambique, Turkey, and Zambia from Africa and the Middle East; as well as Croatia, Estonia, Hungary, Moldova, Poland,

1/ For an analysis of considerations and assumptions made by the Basle Committee when choosing the risk-weights for the 1988 credit-risk Accord and possible differences between them and those necessary in non-G-10 countries see Dziobek et al. (1994).
Russia, Slovakia, and Uzbekistan as examples of countries in transition to market economies from Central and Eastern Europe, and the former Soviet Union and Baltics. The choice of these countries was determined by the availability of information on foreign exchange exposure limits, which implies that the situations in countries where there is some sort of private sector market for foreign exchange are reviewed. 1/ Not reported in the table are Bulgaria, Kenya, Lebanon, Sierra Leone, Trinidad and Tobago, and Uganda, where no limits exist (or are completely unenforced), as well as Madagascar where a forex exposure regulation is currently being developed. 2/

Developing countries have introduced foreign exchange exposure limits for several reasons. 3/ First, and apparently most importantly, they serve exchange rate policy purposes. Countries may want to develop a domestic (interbank) foreign exchange market to support current account liberalization. On the other hand, they may try to avoid destabilizing effects on the exchange rate through position-taking by foreign exchange dealers. Therefore, they specify maximum long positions/minimum short positions, deemed to be large/small enough that dealers can still provide the necessary liquidity to the market. In other cases, forex position limits seem to be used to signal the creditworthiness of a country. When they are asymmetric, favoring long positions and discouraging short positions, this might contribute to improving the overall net foreign asset position of a country that wants to demonstrate its ability to service foreign debt. Prudential concerns are the second main motivation. The argument is that dealers might not fully understand the risks and manage them in an adequate manner, when the foreign exchange market is still very undeveloped. If the regulator does not protect banks against unduly risky positions, they are likely to jeopardize the stability of the banking sector. Moreover, given the poor quality of banks' balance sheets in many developing countries, regulators fear that managers will resort to currency speculation, trying to save the bank with a go-for-broke strategy. The possibility of such behavior may be particularly high when there is a general financial liberalization in the country. This second argument corresponds to the externality problem outlined in Section II of the paper. A third reason for the introduction of forex position limits is to avoid

1/ Many developing countries with tight exchange controls and dominance of the central bank in the forex business have practically zero-position limits for private commercial banks. With the exception of Algeria, the data set does not include these countries.

2/ Also, not reported in the table is Singapore, which has no formal foreign exchange exposure limits for commercial banks. Nonetheless, the general minimum capital adequacy ratio of 12 percent is 4 percent higher than that of the 1988 Basle credit-risk accord to cover, *inter alia*, foreign exchange risks. Further supervisory practices in Singapore are described in Nieto (1994a, p. 6).

2/ See also Quirk et al. (1987, p. 8).
### Table 2. Summary of Foreign Exchange Position Regulations in Developing Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Limits on Net Single Foreign Exchange Positions</th>
<th>Limit on Overall Foreign Exchange Position</th>
<th>Definition of Overall Foreign Exchange Position</th>
<th>Reference Quantities in Case of Individual or Relative Limits</th>
<th>Timely Enforcement of Limit(s)</th>
<th>Foreign Exchange Exposure Regulations for Nonbank Financial Institutions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>0</td>
<td>0</td>
<td>n.s.</td>
<td>n.s.</td>
<td>End of day</td>
<td>...</td>
<td>Two position limits are due to practically full foreign exchange surrender requirements for banks at the end of each day; since banks do not engage in foreign exchange transactions on their own account, they consider that they have no exchange rate risk, which is borne by the Central Bank of Algeria.</td>
</tr>
<tr>
<td>Bahamas</td>
<td>None</td>
<td>(1) Spot: BS500,000</td>
<td>(1) Spot MAF</td>
<td>n.s.</td>
<td>End of week (Wednesday)</td>
<td>...</td>
<td>Additional spot positions can be held as hedge for forward positions on notice to the central bank; the regulation does not apply to offshore banks in The Bahamas.</td>
</tr>
<tr>
<td>Chile</td>
<td>None</td>
<td>(1a) Spot: BS500,000</td>
<td>(1b) Spot MAF</td>
<td>Daily (1)</td>
<td>... (2)</td>
<td>(2) Several types of authorized investment and finance companies face the following daily limits: short: 0 *long: US$1 million; authorized travel agencies face a daily forex position limit of US$200,000.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2a) if long:</td>
<td>(2b) if short:</td>
<td>For short position limits in both markets:</td>
<td></td>
<td></td>
<td>(2) Generally, non-bank financial institutions are not allowed to engage in foreign exchange operations, but there are some exceptions (including the copper mining company CODELCO).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>US$50 million</td>
<td>US$10 million</td>
<td>distribution of banks in 5 size categories, based on a measure of net worth (&quot;patrimonio liquido ajustado&quot;).</td>
<td></td>
<td></td>
<td>Notwithstanding the general forex exposure limit for banks, there is a Decree-Law, dating from 1974, which allows agents to extend the NAL until the total of paid capital and reserves, according to the Central Bank of Chile, this regulation focuses on agents who want to invest in Chile and keep their funds denominated in, or indexed to, foreign currencies in order to protect themselves against peso devaluations; Chilean accounting data suggest that there are very few off-balance-sheet operations, compared to other countries.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>US$50.75 million</td>
<td>US$10.75 million</td>
<td>&quot;Patrimonio liquido ajustado&quot;.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>US$50.125 million</td>
<td>US$10.125 million</td>
<td>PLA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>US$50 million</td>
<td>US$10 million</td>
<td>until US$10 million</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>US$2.50 million</td>
<td>until US$5 million</td>
<td>US$10 to US$25 million</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>US$2.25 million</td>
<td>until US$5 million</td>
<td>US$25 to US$50 million</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>US$1 million</td>
<td>until US$100 million</td>
<td>more than US$100 million</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) relates to the "official" market, and (2) to the (much less important) "tourist" market; the exchange rate differential between two markets was recently negligible; long positions exceeding the limits must be deposited (no later than two days after their occurrence) with the central bank at positive interest rate.
<table>
<thead>
<tr>
<th>Country</th>
<th>Limits on Net Single Foreign Exchange Positions</th>
<th>Limit on Overall Foreign Exchange Position</th>
<th>Definition of Overall Foreign Exchange Position 1/</th>
<th>Reference Quantities in Case of Individual or Relative Limits 2/</th>
<th>Timely Enforcement of Limit(s)</th>
<th>Foreign Exchange Exposure Regulations for Nonbank Financial Institutions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croatia</td>
<td>None</td>
<td>30 percent</td>
<td>MAP (including on-balance-sheet items, accrued interest and forwards in foreign currencies, as well as domestic-currency items indexed to an exchange rate).</td>
<td>Capital</td>
<td>End of day</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Egypt</td>
<td>10 percent</td>
<td>(1) 20 percent</td>
<td>(1) MAP</td>
<td>(1) tier-2 capital</td>
<td>(1) ...</td>
<td>Authorized non-bank forex dealers face a limit of US$20,000 per LE 1 million of capital on their working balances.</td>
<td>Limits (1) and (3) are set by the Bank Control Department for prudential reasons, and limit (2) is set by the Foreign Department to restrict foreign exchange speculation with regard to the exchange policy of the Central Bank of Egypt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) 10 percent</td>
<td>(2) MAL</td>
<td>(2) capital-legal reserves</td>
<td>(2) n.a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) 0.95 ≤ y ≤ 1.05</td>
<td>(3) y = ratio of foreign currency assets to liabilities.</td>
<td>(3) n.a.</td>
<td>(3) ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td>(1) 18 major currencies: 10 percent</td>
<td>30 percent</td>
<td>GAP (excluding deutsche mark position).</td>
<td>Capital</td>
<td>End of day</td>
<td>...</td>
<td>Estonia operates a currency board with a peg to the deutsche mark.</td>
</tr>
<tr>
<td></td>
<td>(2) others: 5 percent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gambia (The)</td>
<td>Individual limits</td>
<td>Overall working balances.</td>
<td>Individual limits based on past forex turnover and committed obligations.</td>
<td>Weekly</td>
<td>Working balance limit for foreign exchange bureaus is £50,000.</td>
<td>In 1993 the Bank of Ghana reduced the limit for each size category by about half to the mentioned levels; this measure, aiming at increasing foreign exchange turnover in the interbank market, seems to have no significant impact on its activity.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td>None</td>
<td>(1) US$100,000</td>
<td>MAL (includes all uncommitted forex activities, committed obligations can be covered by provisions).</td>
<td>Distribution of banks in 3 size categories based on passed forex turnover and total assets.</td>
<td>End-of-day limits, but compliance only enforced for the weekly average over end-of-day positions.</td>
<td>Forex bureaus, not linked to commercial banks, do not currently face position limits; other non-bank financial institutions do not deal in foreign exchange and seem to have no important positions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) US$200,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3) US$300,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guatemala</td>
<td>None</td>
<td>25 percent</td>
<td>MAL</td>
<td>Paid capital + reserves</td>
<td>End of day</td>
<td>Finance companies face the same limit as banks; forex bureaus' limit is 100 percent of capital.</td>
<td></td>
</tr>
<tr>
<td>Country</td>
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<td>----------------------------------------------</td>
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<td>-----------------------------</td>
<td>-------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Guinea</td>
<td>None</td>
<td>60 percent</td>
<td>MAL</td>
<td>Paid capital only</td>
<td>Weekly</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Hong Kong</td>
<td>10 percent</td>
<td>15 percent</td>
<td>MAP</td>
<td>Capital</td>
<td>End of day</td>
<td>Only proficient local banks enjoy these maximum limits; foreign banks' branches face different limits.</td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>5 percent</td>
<td>20 percent</td>
<td>...</td>
<td>Capital + reserves</td>
<td>End of day intra-day positions have to be maintained within &quot;prudent limits&quot;</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>25 percent</td>
<td>20 percent</td>
<td>MAP</td>
<td>Capital</td>
<td>End of day</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Korea</td>
<td>None</td>
<td>...</td>
<td>(1) MAL (spot and forward, excluding the long positions taken to hedge in country capital or operating funds). (2) NAS (spot and forward). (3) spot short: the greater of US$5 million and 5 percent of export bills.</td>
<td>n.a.</td>
<td>End of day</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>None</td>
<td>Individual limits, ranging from RM 10 to RM 150 million</td>
<td>GAP (over total assets and liabilities, including forward positions)</td>
<td>Absolute limits based on bank resources, volume of forex business and proficiency in forex dealing</td>
<td>End of day</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

Overall foreign exchange positions have to be reported at the end of the day before the day of the weekly foreign exchange auction by the Central Bank of the Republic of Guinea; positions exceeding the limit are punishable with 2 percent of daily interest; the government intends to shift from the present auction system to a free interbank forex system no later than end-October 1994.
<table>
<thead>
<tr>
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<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moldova</td>
<td>10 percent</td>
<td>25 percent</td>
<td>NAF (including a list of on-balance-sheet items, but without foreign currency denominated securities or off-balance-sheet items)</td>
<td>Own capital</td>
<td>Forex positions exceeding the limits can be carried from one business day until the close of the next business day, without triggering any reaction by the regulator (although supposed to be intra-day limits).</td>
<td>...</td>
</tr>
<tr>
<td>Mozambique</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>None</td>
<td>30 percent</td>
<td>... (includes on-and off-balance-sheet items, such as forward positions).</td>
<td>&quot;Shareholder funds&quot;</td>
<td>...</td>
<td>Limits for foreign exchange bureaus</td>
</tr>
<tr>
<td>Paraguay</td>
<td>None</td>
<td>(1) if long: 100 percent</td>
<td>(1) NAL</td>
<td>Statutory capital * reserves - unpaid losses.</td>
<td>Daily</td>
<td>Non-bank financial institutions are not regulated, but their forex exposure seems to be rather limited</td>
</tr>
<tr>
<td>Philippines</td>
<td>Foreign currency liabilities have to be completely covered by short-term assets in the same currency.</td>
<td>None in addition to single currency limits.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>At any time</td>
<td>The Central Bank of Paraguay has changed the limits step by step in the last years, from US$300,000 to US$500,000 in 1989 and then to 50 percent of capital in 1993; only in 1994 it moved to the asymmetric limits; while the old regulations aimed at &quot;adapting the exchange regime to monetary policy&quot;, the new ones try to &quot;promote the stability of the free exchange market and the financial system&quot;.</td>
</tr>
<tr>
<td>Poland</td>
<td>15 percent</td>
<td>30 percent</td>
<td>NAP</td>
<td>Capital</td>
<td>End of day</td>
<td>The regulation relates to the new foreign currency deposit system (April 1993); commercial banks, as opposed to thrift banks, can cover up to 30 percent of their foreign currency liabilities with instruments denominated in other (non-local) currencies than those of the liabilities; excesses of foreign currency assets over liabilities are unlimited.</td>
</tr>
</tbody>
</table>

"Shareholder funds" refers to Shareholder funds. 
"Own capital" refers to Own capital. 
"Statutory capital" refers to Statutory capital. 
"Reserves - unpaid losses" refers to reserves - unpaid losses. 
"Daily" refers to Daily.
"End of day" refers to End of day.
"At any time" refers to At any time.
"End of day" refers to End of day.
"Intra-day limits" refers to Intra-day limits.
"Non-bank financial institutions are not regulated" refers to Non-bank financial institutions are not regulated.
<table>
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<th>Foreign Exchange Exposure Regulations for Domestic Financial Institutions</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian Federation</td>
<td>None</td>
<td>$100,000 if capital &lt; Rub 1 billion</td>
<td>MAF (only positions acquired in the domestic forex market and during the current calendar year are included)</td>
<td>Own funds + reserves</td>
<td>End of day</td>
<td>Regional branches of authorized banks have to report explicit limits to the territorial branches of the Central Bank of the Russian Federation (CBR), all together compatible with the overall limits of the mother bank; some forex market participants report that enforcement of the limits by the CBR is almost absent and recent dollar weaknesses put position-taking institutions in trouble, in particular those with cross-currency positions.</td>
<td></td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>10 percent (convertible currencies)</td>
<td>25 percent</td>
<td>MAF</td>
<td>Capital</td>
<td>End of day</td>
<td>While limits (1) through (3) are implemented for prudential reasons, (4) aims at mitigating devaluation pressures and increasing official forex reserves by preventing banks from building up long positions reaching limit (2); only commercial banks with overall short forex positions have access to daily fixing operations of the central bank; the Bratislava forex market, though developing, is still in a preliminary stage with no more than 3 to 4 actively dealing banks.</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>None</td>
<td>25 percent</td>
<td>Tier-1 capital</td>
<td>End of day</td>
<td></td>
<td>Foreign branches and subsidiaries are not subject to these limits; the limits on finance companies are reported to be motivated by &quot;instability in the currency markets&quot; (&quot;Central Bank Softens...&quot; 1994).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1) If long: 25 percent</td>
<td>(1) &quot;overall net open position&quot; (including derivative contracts)</td>
<td></td>
<td>(3) US$50 million (long)</td>
<td></td>
<td>(3) serves exchange control purposes, a similar limit of US$100,000 is imposed on each person.</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 (concluded). Summary of Foreign Exchange Positions Regulations in Developing Countries

| Country   | Limits on Net Single Foreign Exchange Positions | Limit on Overall Foreign Exchange Position | Definition of Overall Foreign Exchange Position $1/ | Reference Quantities in Case of Individual or Relative Limits $2/ | Timely Enforcement of Limit(s) | Foreign Exchange Exposure Regulations for Nonbank Financial Institutions | Remarks                                                                 |
|-----------|-----------------------------------------------|------------------------------------------|-------------------------------------------------|---------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------|
| Turkey    | (1) $0.75 \leq x \leq 1.15$                   | (2) $0.8 \leq y \leq 1.1$                | \begin{align*} (1) & x \text{ ratio of total foreign assets to total foreign liabilities in each single (convertible) currency,} \\ (2) & y \text{ ratio of total foreign assets to total foreign liabilities over all (convertible) foreign currencies,} \\ (3) & z \geq 0.1 \text{ ratio of short-term foreign assets to short-term foreign liabilities;}
\end{align*} (all 3 ratios do not include forward contracts and other foreign contingencies). | n.a.                                                                           | The limits apply to all Turkish banks and non-bank financial institutions | The limits for $x$ and $y$ are reported to be changed frequently by the Central Bank of the Republic of Turkey, without exceeding the limits mentioned (Erdilek 1994); the authorities are currently preparing a switch to a capital adequacy regulation for commercial banks with a single-currency limit of about 20 percent of own funds and an aggregate position limit of 50 percent of own funds, probably including forward and other contingent instruments; banks and other financial institutions are due to partial surrender requirements concerning their own forex earnings and total surrender requirements with respect to forex receipts from Turkish exporters; banks have also to keep fractional reserves for forex deposits at the central bank. |
| Uzbekistan | 5 percent                               | 20 percent                             | MAP                                             | Equity capital                                                  | .....                          | .....                                                                     | Aggregating the individual limits gives a net forex position limit of US$15 million for the banking sector as a whole; the Bank of Uzbekistan reports a considerable increase in domestic market turnover lately; a recent central-bank circular states that some commercial banks do not adhere to the limits and threatens to disqualify those banks, found to have taken forex positions exceeding their limits, from dealing on the day the excess is discovered. |
| Zambia     | None                                     | Individual limits                      | MAP (including on- and off-balance-sheet items)  | End of day                                                      | Forex bureaus face a maximum net aggregate position limit of US$50,000. | The limits apply to all Turkish banks and non-bank financial institutions | The limits apply to all Turkish banks and non-bank financial institutions |


\[1/ \text{GAF (gross aggregate position): sum of the absolute amounts of all net single currency positions; MAP (maximum aggregate position): sum of all net long single currency positions or sum of all net short single currency positions, whatever the greater; NAP (net aggregate position): sum of all net single currency positions (long +; short -); NAL (net aggregate long position): MAP if long; NAS (net aggregate short position): MAP if short.} \]

\[2/ \text{Tier 1: shareholders' equity, disclosed reserves; tier 2: tier 1 plus revaluation reserves, loan loss reserves and parts of subordinated debt; tier 3: tier 2 plus additional classes of unsecured, subordinated debt. Capital definitions are given whenever possible, but differences in national accounting standards imply that they are not always comparable.} \]
market-cornering in uncompetitive market structures. If the number of banks of different sizes—as in many developing countries—is small a large bank might be able to take positions large enough to move the exchange rate in the direction necessary to realize capital gains. Position limits can therefore serve to prevent powerful market participants from doing so. Fourth, position limits are sometimes intended to increase trading activity in relatively dormant domestic forex markets. When limits are lowered, i.e., made more restrictive, such that banks are obliged to sell the positions exceeding them during or at the end of the day to others, then ceteris paribus trading volume and trading frequency among dealers must increase. Finally, certain limits are used to render monetary policy execution easier, by limiting fluctuations in national foreign currency reserves.

With the three exceptions of Algeria, The Bahamas, and the Philippines, all developing countries in the sample relate their position limits to some measure of the value of banks. Usually, these are own funds or adjusted net worth, e.g., tier-1 or tier-2 capital (Brazil, Chile, Croatia, Egypt, Estonia, Guatemala, Guinea, Hong Kong, Hungary, Indonesia, Malaysia, Moldova, Papua New Guinea, Paraguay, Poland, Russian Federation, Slovak Republic, Thailand, and Uzbekistan). 1/ Ghana uses total assets rather than capital and Egypt, Slovakia, and Turkey apply assets-to-liabilities ratios. 2/ Sometimes, past foreign exchange turnover is the reference quantity (Ghana, Malaysia, and Zambia). Hong Kong and Malaysia are the only developing countries in the sample where the quality of foreign exchange management is taken into account in the limits. In almost all cases of capital adequacy regulations, the rules are applied homogeneously to all banks. Brazil, Ghana, and the Russian Federation decided to establish size categories, by which absolute limits are applied uniformly to each bank of one category. Only Malaysia and Zambia are reported to set purely individual limits, while the Russian Federation applies them to the largest banks.

1/ Because of ambiguities about the different definitions of capital and differences between national accounting standards these measures are very difficult to compare. Whenever possible, the definitions given by the national regulations have been translated into the tier system of the Basle Committee.

2/ Assets-to-liabilities-ratio limits can be transformed into net aggregate position limits, to be defined rigorously below, with some basic algebra. Their relative restrictiveness compared to capital adequacy regulations depends on the ratio of capital to the sum of total forex assets (liabilities). For example, a net aggregate long position (NAL) limit of 10 percent of capital is more restrictive than an assets-to-liabilities ratio of 1.1 if and only if the ratio of capital to total forex liabilities is smaller than 1.
In general, position limits relate to the overall position in all foreign currencies, but several developing countries, such as Egypt, Estonia, Hong Kong, Hungary, Indonesia, Moldova, Poland, Slovakia, Turkey, and Uzbekistan add limits on net positions in each single foreign currency. Only the Philippines has exclusively single currency limits, although in the form of liquidity ratios. Moreover, while single-currency limits are always net, i.e., the absolute amount of the difference between assets and liabilities in the particular currency, the aggregation to overall currency positions differs considerably. The most common approach, e.g., in The Bahamas, Brazil, Chile, Egypt, Ghana, Guatemala, Guinea, Indonesia, Korea, Moldova, Paraguay, the Russian Federation, the Slovak Republic, and Zambia, simply puts all foreign currency positions on some common denominator, usually the home currency or the U.S. dollar, and calculates the absolute value of the difference between notional assets (long) and notional liabilities (short). Following Levenian (1994) this difference may be called the net aggregate position (NAP). An apparent feature of this technique is that long and short positions are netted against each other, independently from the currency in which they are denominated. For multiple foreign currency portfolios, this implies the assumption that the correlation coefficient between any two exchange rates is equal to 1, implying that the cross-currency risks are ignored. The apparent risk of this approach is illustrated by reports about large losses made by several Russian forex dealers when the U.S. dollar weakened against the deutsche mark.

Two countries, Estonia and Malaysia, completely avoid netting of long and short positions in different currencies. Their approach, called gross aggregate position (GAP) by Levenian (1994), calculates the net position in each currency as a first step, and then adds the absolute amounts of all single-currency positions. A regulator applying this technique assumes a correlation coefficient of minus 1 between any two exchange rates. Finally, Croatia, Hong Kong, Poland, and Uzbekistan use a compromise between these two extremes, which was also chosen by the Commission of the European Union and the Basle Committee for the G-10 (under the name shorthand measure). As described in Section II, they ask banks to calculate their net position in each currency, but then all long net foreign currency positions have to be added up, as well as all short net foreign currency positions.

1/ Trivially, limits on all single currency positions imply an overall position limit. However, overall limits are usually chosen to be smaller than the sum of all single currency limits.

2/ Since Japanese banks had for a long time most of their foreign exchange positions in U.S. dollars, this was the technique applied by the Bank of Japan when the G-10 market risk proposal was developed at the Basle Committee.

3/ This seems to be the most conservative of all "shorthand" measures used for overall currency exposure. Since it was regulatory practice in Germany when the Basle market risk proposal was discussed, it became known as the Bundesbank method.
The greater of the absolute value of both sums is taken as the overall open position. Therefore, it has been named maximum aggregate position (MAP). As, e.g., Levonian (1994, p. 7) shows more formally, MAP is the arithmetic average of NAP and GAP. The Slovak Republic has limits for both NAP and GAP, implying a limit for GAP as well. All developing countries in the sample, except one, compute the overall position for all foreign currencies. Only Estonia excludes positions in deutsche mark, since it operates a currency board with a peg to the German currency. No information is available as to how The Gambia, Hungary, Papua New Guinea, or Thailand, aggregate their single currency positions.

Further differences in the calculation of foreign currency positions of banks in developing countries arise from the financial instruments which are included or excluded. As with capital definitions, it is difficult to make inter-country comparisons of this, since the available information is very incomplete. All data acquired is reported in Table 2. It is interesting to ask whether or not off-balance-sheet items, such as currency forwards, or structural positions such as stakes in foreign banks or fixed assets in foreign countries, are included.

A particularly interesting feature is whether foreign exchange position limits are applied symmetrically to long and short positions, or asymmetrically. While most industrial countries, as well as the regulations in Algeria, The Bahamas, Croatia, Estonia, Hong Kong, Hungary, Indonesia, Moldova, Poland, the Russian Federation, and Zambia treat long and short positions equally, some developing countries seem to be less restrictive on short than on long positions (Chile, Egypt, Ghana, Guatemala, Guinea, and Turkey). Others favor rather long positions compared to short positions (Brazil, Korea, Paraguay, the Philippines, and Thailand). For the former countries, there could be several motivations to do so. One is to limit devaluation pressures on the domestic currency. Another is not to limit domestic banks' borrowing abroad in order to have maximum access to foreign funds. Finally, where the limits apply only to long positions, the authorities might either consider that local banks could not borrow abroad anyway, making short position limits irrelevant, or are not aware of the risk potential in short positions in case of domestic currency depreciations. The latter countries might want to attract foreign exchange reserves, possibly as a signal of their international creditworthiness. Additionally, if the possibility of a devaluation is given a higher probability than that of an appreciating domestic currency, then prudential considerations might suggest a more restrictive limit on short positions than on long positions.

This reveals a fundamental goal conflict between prudential forex risk regulations and certain exchange policies, already encountered in the discussion about the possible impact of a general application of the Basle

\[1\] Since this is practice in the United Kingdom it became also known as the Bank of England approach.
simulation method on the volatility of the foreign exchange market. Suppose that, as in many developing countries, domestic currency depreciations are more likely than appreciations. Then prudential considerations require more restrictive limits on short foreign currency positions than on long positions. However, this gives banks more scope to sell the domestic currency for foreign currencies than vice versa, possibly implying devaluation pressure on the former and countering attempts to stabilize it. This conflict is most visible in the current regulation of the Slovak Republic. While one department of the National Bank of Slovakia sets limits favoring an overall long position (limits (2) and (3) in Table 2), another department sets an assets-to-liabilities ratio with the intention of keeping overall long positions below the prudential limit and potentially keeping it even below the prudential limit for the overall short position (limit (4)). One lesson is that the asymmetry of position limits can indicate the motivations of the respective authorities, whether they are of prudential or other character.

Most developing countries use forex position regulations with overnight limits, i.e., banks have to remain within the limits at the end of each business day. Four countries use weekly limits. While The Bahamas enforces the limits on each Wednesday, and Guinea the day before the weekly forex auction, banks in Ghana have to remain within the limit on weekly average over end-of-day positions. (No further information is available on The Gambia's weekly limit.) Intra-day limits are applied by three countries. The strictest one might be that of the Philippines. Indonesia uses some intra-day limits in addition to the general end-of-day limits. Moldova announces intra-day limits, but enforcement is bi-daily. Although there is only very little explicit evidence that the announced limits can be violated by banks, enforcement seems to be generally weaker than the pure regulatory texts suggest. In particular, intra-day monitoring of banks' positions will be quite impossible for the supervisory authorities. Violations of limits might first cause a warning to square the excess position no later than some deadline, or the requirement for an explanatory report. However, the regulatory texts in some countries explicitly mention the possibility of withdrawing the forex dealing license, or even the banking license.

Especially when exposure limits are intended to limit the volatility of the domestic exchange rate, their effectiveness will depend on their application to all (big) players in the foreign exchange market. This may--apart from commercial banks--include nonbank financial institutions. As far as they are not taking or giving deposits on a large scale, they might be of less concern with respect to systemic risk in the financial system of a country. For two reasons, available information on their limits is quite limited. First, as in many industrial countries, their regulations differ from those of commercial banks. Second, many developing countries have either much fewer securities houses or finance companies than countries in the industrial world, or none at all. On the other hand, many countries require explicit authorization for any financial institution engaging in foreign exchange dealing, and authorized institutions often fall automatically under the general forex exposure regulation. However, foreign
exchange risk is not necessarily limited to forex dealers for obvious reasons. In Turkey, all nonbank financial institutions are subject to the same limits as commercial banks, while finance and investment companies in Brazil, Guatemala, and Thailand face different limits. We found evidence of position limits for forex bureaus (or travel agencies) only in Brazil, Egypt, The Gambia, Guatemala, Mozambique, and Zambia.

How do developing countries' overall exposure limits compare to those in industrial countries in terms of restrictiveness? Whether or not developing countries' position-to-capital limits are more or less restrictive depends on the definition of the overall currency position, the definition of capital, and the amount of the percentage limit. In terms of the average existing limits there is no clear-cut difference between both types of countries in the sample, although the introduction of the Basle Proposal and the transformation of the EC Directive would give a number of industrial countries the scope to considerably decrease the restrictiveness of their limits in the future. However, existing limits in developing countries appear to be scattered much more widely than those in industrial countries.

3. Position limits and the development of foreign exchange markets

One fundamental difference between the two sets of countries examined in this paper is that industrial countries already possess deep and broad interbank foreign exchange markets, while many developing countries do not have a well-functioning private market and some of them are trying to establish a framework within which it can evolve. This raises the issue of the impact of foreign exchange exposure limits on the scope for development of a still infant forex market. As it turns out, policymakers face a distinct trade-off. On the one hand, too restrictive regulations may choke the weak market, while on the other, rapid introduction of new financial instruments and techniques might come with an increase in systemic risk.

The economic history of the now-industrialized world suggests that foreign exchange dealing flourishes best where it is relatively free of governments' regulations (de Cecco, 1992). This is evident with respect to pure exchange controls which are designed to limit currency transactions originating in the individual rational behavior of economic agents. It is less obvious that foreign exchange exposure limits, which are usually put forward for prudential reasons, can function as a softer instrument to limit speculation and other "undesired" currency transactions. As argued above, supporting exchange policies is--apart from exchange risk regulation--one major motivation for forex exposure limits. Apparently, the limitation of stocks is intended to prevent flows from reaching a certain undesired extent. Since the formal limits do not differentiate between transactions countering other government aims and those that do not, they can limit dealers' capacities to make a market (on both sides of the market) even when it is not "undesirable" from the governments' point of view. Also, the chance of being exposed to restrictions might prevent some potential dealers
from entering the market. The simple point is that foreign exchange exposure limits, especially when they are very restrictive, can be an obstacle for a young market to develop.

However, policymakers sometimes seem to take the opposite position. It is argued that, by limiting the capacity of dealers to hold large stocks and forcing them to sell them in the market, turnover and transactions frequency can be increased. When gathering the data on exposure limits in developing countries we found Ghana to be a typical example of an explicit policy along these lines. Ghana introduced a floating rate system in 1986 and switched from the early auction-based system to an interbank foreign exchange market in March 1992. At the same time, banks were put in three categories according to their size, and an open position limit for each category was established in U.S. dollars. \(^1\) About a year later, the Bank of Ghana concluded that the limits have been "too high" since activity in the interbank market was still quite weak, and thus lowered them by about 50 percent (slightly more for banks in categories 1 and 3, i.e., the smallest and the largest banks). This policy and the "Existing Guidelines on the Interbank Foreign Exchange Market in Ghana" (a note prepared by the central bank in which overall long positions are described as "unutilized foreign exchange holdings") seem to suggest that these exposure limits are rather considered as a form of surrender requirement by the authorities, analogous to those usually applied in auction-based foreign exchange regimes. The difference, however, is that positions in excess of the limits do not have to be sold to the central bank but can be traded to other participants in the interbank market.

According to the Bank of Ghana, there has been no significant impact on interbank trading since the change was made a year ago. One possible explanation is readily available from McDonald and Lum (1994, p. 13). They found that the "Bank of Ghana uses moral suasion to hold the exchange rate down in the interbank market, which usually leads to a shortage of foreign exchange in the interbank market". On the other hand, the central bank tends to appear as a net seller in the market in order to meet the perceived "needs" of commercial banks for their customer transactions and its target for official reserves (McDonald and Lum, 1994, p. 16). Hence, the most basic supply-demand analysis provides a reason why the Ghanaian forex interbank market does not grow. In addition, although some surrender requirements have been removed in September 1993, a major part of the export proceeds from gold and cocoa—which together account for more than 80 percent of Ghana's total export receipts—still go directly to the

\(^1\) Apart from the amounts of the limits the early regulation seems to have been much like the current one, reported in Table 2.
central bank. 1/ This considerably restrains the liquidity basis for the private forex market and may explain why even lowered exposure limits are not binding.

In sum, the case of Ghana provides an example where the lowering of forex position limits did not have the envisaged effects, although it does not provide general evidence on the inappropriateness of this measure. On one hand, the ineffectiveness may have resulted from the general shortage of foreign exchange through the surrender requirements described. On the other hand, the tightening of the limits does not seem to have done any harm to the liquidity of the interbank market either. 2/ Nonetheless, if explicit (or implicit) measures were not taken to hold the exchange rate down, the rationale for the policy of using exposure limits to "squeeze" interbank transactions out of the market could turn out to be unnecessary.

Another dimension in which an immature foreign exchange market can develop is the broadness of the market. In the context of developing countries, the most urgent innovation to provide international traders with the possibility to hedge their exchange risk is the development of a functioning market for forward cover (Quirk et al., 1988). Basic conditions for such a market to emerge are a liquid spot market--also a sign of the existence of international traders or investors establishing the potential demand--and the possibility for dealers to borrow and lend freely in the currencies in which the forward contracts are to be written. The latter guarantees that the dealers are not prevented from hedging their risks from written forward contracts for customers with spot transactions in the interbank market. Apart from the general factors, discussed in the context of a spot market above, foreign exchange exposure regulations only pose a problem for the development of such a market if they include currency forwards in the calculation of an open position, but do not allow them to be offset by spot transactions. No country is found to apply this approach.

One policy option with respect to avoiding the problems associated with too much regulation of new and weak interbank foreign exchange markets is highlighted by the case of Trinidad and Tobago. In April 1993, it switched from a fixed exchange rate system to a floating rate regime with exchange rates determined by imply and demand conditions in an interbank market. At the same time, all exchange controls, relating to both current and capital transactions, were abolished. New banking regulations were

1/ More precisely, the surrender requirement for gold is 40 percent and that for cocoa 98 percent (IMF 1994, pp. 192f.).

2/ However, if one has confidence in McDonald's and Lum's (1994, p. 3) assertion that "genuine interbank transactions are virtually nonexistent" in Ghana, then this would have been hard to achieve. These authors point out that the low turnover in genuine interbank trading is a general feature of developing but relatively free African foreign exchange markets. As a consequence, exchange rates are rather determined by dealer-customer relationships than by interbank transactions.
adopted later in the year, but they only mention the possibility for the introduction of forex exposure limits without making use of this option. From the outset, commercial banks demonstrated extreme prudence; for example, the inflow of the newly permitted foreign currency deposits of residents was backed fully in almost all cases and the banks therefore avoided taking any noteworthy overall currency positions. This can be explained by the newness of the system for the market participants. In the period from January to August 1994, the commercial banks have continued to exhibit risk-averse behavior with respect to foreign currency exposure. However, it is expected that as they gain greater familiarity and confidence in the new system, the extreme risk aversion will diminish. Should the banks begin to move in the direction of excessive risks the current legislation gives the central bank the authority to introduce at short notice, and without additional legislative approval, prudential limits on forex position-taking.

This example might suggest that prudential limits on commercial banks' foreign exchange positions need not be introduced in the very early stage of a developing forex market, and therefore possible adverse effects of introducing regulations avoided. Regulators can monitor the behavior of dealers through a reporting system on forex positions and take more formal measures with respect to foreign exchange risk when market practices become a source of systemic risk. If made to work properly, the system allows for early intervention long before high-risk market activity gives rise to crises.

V. Conclusions

The present paper has discussed issues related to foreign exchange risk regulations in both, industrial and developing countries. With respect to the former countries, the theoretical foundations of banking regulation in general and quantity restrictions, in the form of capital adequacy rules, on banks' portfolios in particular have been reviewed. This provides some criteria for evaluating the effectiveness of this approach, directly applicable to current and proposed foreign exchange risk regulations, such as the recent proposal by the Basle Committee for Banking Supervision. Based on the available information on 35 countries, regulations in the developing world have also been discussed. For both types of countries, possible impacts of forex position limits on the working and development of foreign exchange markets have been examined.

It has been found that the capital-adequacy approach, used in international coordination of banking regulations in general, has a relatively weak theoretical basis, and it has not yet been established that the particular specifications resulting from political negotiations are adequate to remove welfare-decreasing international externalities. In addition, the Basle Committee's recent proposal to harmonize foreign exchange risk regulations has several problems on a more operational level, suggesting the need for revision. The main points of critique are the
disincentives it gives to modern portfolio management and its focus on instruments rather than risk types. For developing countries, a major finding from the available information is that forex position limits, although proposed for prudential regulation, are often introduced (asymmetrically) for purposes of exchange rate policy, e.g., to limit (potential) devaluation pressure on the domestic currency. Moreover, many developing countries use a measure of foreign exchange exposure that allows the offsetting of long positions in one foreign currency by short positions in another foreign currency, possibly inducing inexperienced banks to neglect cross-currency risks. Finally, comparisons with industrial countries show the forms and magnitudes of position limits in developing countries to be more diverse. Introduction of the Basle forex risk proposal, and the transformation of the recent EU capital adequacy directive, gives several industrial countries the possibility to relax foreign exchange position limits.

Another major result of the paper is the potential conflict between prudential foreign exchange risk regulations and governments' exchange rate policies. Widely harmonized simulation techniques to determine prudential exchange risk coverage in industrial countries could increase exchange rate volatility. Similarly, asymmetrically fixed absolute prudential limits in developing countries, based on general expectations that the domestic currency will not likely appreciate, could push dealers to take positions, thus increasing devaluation pressures. However, if forex position limits can also be used for exchange rate or reserve policies, then their relationship to currency inconvertibility has to be clarified. In the case of zero-position limits, for example, as implied by full foreign exchange surrender requirements, the answer seems to be relatively clear. In other cases, the border line between convertibility issues and prudential needs is harder to determine. The relative restrictiveness of position limits and the direction and degree of asymmetries between limits on long and short positions can be used to draw practical guidelines. Working out some general principles seems to be a natural task for the International Monetary Fund as the "guardian" of the international monetary system.
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