THE PRO-CYCLICAL IMPACT OF BASLE II ON EMERGING MARKETS AND ITS POLITICAL ECONOMY

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INTRODUCTION

Over the last 25 years there has been a slow realization that what matters for a successful economy, one that delivers rapidly improving living standards for all, is not only the exact calibration of the *instruments* of policy, but also the *institutions* of policy.

One of the most important institutional frameworks is the national and international regulatory regime for banking. The role of banks went through a period of neglect in the late 1990s, when storming equity markets provided much of the new money flowing to big business, especially in the developed economies. But, now as then, most businesses and entrepreneurs are too small to raise money on the stock market and most depend on bank finance. A well-functioning banking system is essential to economic growth. This is even more the case in developing countries with underdeveloped financial markets (see Singh, 1997)**.** Japan may have the second largest stock market in the world but a wrecked banking system has strangled economic growth. In industrial and emerging economies, stock markets are not substitutes for banks; we need them both.

The right regulatory regime for banks is critical to the economic vitality of nations and international markets**.** But when judged from the perspective of the main market failures that should be addressed by banking regulation, the new regime outlined in the Basle Committee's second capital accord (Basle II) is not right; it is complex where it should be simple, it focuses on processes when it should be driven by credit outcomes, it is implicitly pro-cyclical, when it should be explicitly contra-cyclical, it relaxes the discipline on systemically important banks when it should tighten that discipline, it is supposed to more accurately align regulatory capital to the risks that banks face, yet in the case of lending to developing countries it ignores the proven benefits of diversification. One consequence of this will be an inappropriately large increase in the costs of such lending to developing countries, as well as a likely reduction in its volume. It is possible that this is just bad luck. It is more probable that it relates to the political economy of Basle II and the odd composition of the Basle Committee on Banking Supervision.

Whilst we have strong reservations about the likely shape of the final Accord, the proposals contain a number of important positive features, particularly in the standardized approach. From the perspective of developing countries, positive features of Basle 2 refer, for

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example, to the removal of the OECD/non-OECD distinction and the reduction of the excessive incentive towards short-term lending to lower rated borrowers.

However, a number of major concerns exist about the proposed Internal Ratings Based (IRB) approach within Basle 2, and its negative impact on developing economies:

(i)   It would significantly overestimate the risk of international bank lending to developing countries, primarily because it would not appropriately reflect the clear benefits of international diversification which such lending has in terms of reducing risk. A further reason why at present the IRB approach would inappropriately discourage international bank lending to developing countries is because even large international banks lack the data on developing countries required for IRB modeling.

The combination of these factors is likely to cause an excessive increase in regulatory capital requirements on international lending to developing economies, creating a risk that bank lending to them could be sharply reduced, and a significant part of the remaining lending could see its cost increased. This is contrary to the stated objective of G-10 governments to encourage private flows to developing countries, and use them as an engine for stimulating and funding growth. This is particularly the case at present as all capital flows to developing countries –and especially bank lending– have fallen sharply in the past six years, posing a constraint on growth.

(ii)   It would accentuate the pro-cyclicality of bank lending, which is damaging for all economies, but particularly so for fragile developing ones, which are more vulnerable to strong cyclical fluctuations of financing.

In June 2004, the Basle Committee on Baking Supervision published the Basle 2 Capital Accord.

The implementation of Basle 2 for European banks and investment houses will be done via the Capital Adequacy Directive (CAD) 3, which has to be approved by the European Parliament, as legislation, based on the suggestions of the European Council. As this is a democratically more accountable process than that of the Basle Committee (see below), this opens up at the time of writing some possibility that the interests of developing countries could hopefully be taken more into account.

Furthermore, whilst Europeans will implement Basle 2 fully (not just for banks but also for investment houses), the United States will implement it "a la carte", applying Basle 2 only or mainly to the largest and most international banks; the rest of US banks will stay on Basle 1 to avoid negative consequences of Basle 2. Furthermore, where Basle 2 will be implemented in the US, it will be done so more slowly that in the original schedule.

In Section 1 we discuss alternative explanations for the final features of Basle 2; this will focus on the political economy of the Basel Committee's decisions. In Section 2, we examine the

likely impact of the new Accord on the cost and quantity of bank lending to developing countries. In Section 3, we consider whether these changes are justified objectively. In Section 4, we conclude and consider proposals for avoiding a negative impact on the developing world of both the current Basel proposals.

1. If not justified, then why…..

When the outcome of any major process is examined, one means of assessing the degree of influence wielded by the various players is to determine who wins and who loses. As we discuss in more detail below, the 'winners' from the Basel II process are clearly the most sophisticated banks and the large, highly rated corporations in developed countries. The former will see their overall level of regulatory capital decline as they move to the internal ratings based (IRB) approaches, particularly if their loan portfolio has a large proportion of highly rated borrowers. The latter will see the pricing and terms on which they are able to obtain bank loans improve considerably, as the level of regulatory capital that banks must put aside for such loans falls sharply. The 'losers' in the process are again clear: lower rated sovereign, corporate and bank borrowers. Given that these belong disproportionately to developing countries, we can conclude that an unambiguous loser from the Basel process will be the developing world.

This likely outcome could be the result of one of two things: first, as the Basel Committee and its supporters argue, it could be the essentially unintended outcome of a more accurate measurement of risk. Second, it could be the product of excessive influence of the financial and business sectors in the developed world.

Given that, as we show below, Basle 2, in a number of key respects, does not provide an accurate measurement of risk, (and in particular it does not reflect at all the international diversification benefits of lending to developing countries), we are forced to consider the second of these alternatives. However, the question remains: how could the large financial and business sectors in developed countries influence the Accord in this way? We suggest two factors that may shed light on this issue.

a)   Governance

The Basle Banking Committee members are from Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States (that is basically the G-10 plus Switzerland). Each of these countries is represented by their central bank, and by the authority responsible for banking supervision in that country, where this is not the central bank. The composition reflects the world political order in the middle of the twentieth century. In contrast with other Basle Committees, where at least some representation of developing countries has been introduced, there is no representation of developing nations on the Basle Banking Committee. Thus, the Basel Banking Committee is one of the international ad-hoc bodies with the worst problem of representation of a large part of the world –the developing and emerging countries.

It is true that the Basle Banking Committee does liaise with a group of 13 non-G10 countries, including Russia and China, which meets every two months to review developments

and comment on current work. However, this consultative group of developing and transition economies has no clear mechanisms of influence on Committee decisions. It is useful to be consulted, but it is no substitute to having a seat at the decision-making table. Indeed, we argue that Basle II appears to be the result of excess influence by the large financial institutions domiciled in the countries represented on the Committee. The new Accord is to their benefit and to the detriment of emerging market borrowers and developing countries not represented on the Committee. It will probably reduce flows to developing economies and make the remaining flows more expensive and susceptible to sudden stops.[1] However, while the new Accord is clearly to the benefit of large financial institutions in developed countries, by what mechanism has their influence been exerted? That is, how have the regulators that sit on the Basel Committee come to champion the interests of the very institutions they are supposed to be regulating?

b)   Influence by the regulated on the regulators; the political economy of Basel

One of the most difficult tasks facing regulators of any industry is to avoid excessive influence against the public interest by those they are supposed to be regulating-regulatory capture. The heavier the regulation and the fewer the number of players in an industry the bigger the incentives are for the industry to try and influence the regulator. Banking is heavily regulated and a small number of large players invariably dominate banking systems. Just 12 banks dominate international banking worldwide.

Regulators are intelligent and hard working. However, they are generally not as expert in the conduct of banking as the bankers. Furthermore, bankers have the resources and the incentive to pay for the studies that better inform their positions. Regulatory costs create a countervailing lobby against regulation. In the end, through superior expertise and information, regulators often become persuaded of the bankers' position. This is the most perfect and least visible form of influence –a capture of minds.

The principal way to observe the influence of minds is to step back from the detail and observe the miss-match between the points of regulation and the points of market failure that regulation should be addressing. Ideally, these points should meet and the wider they miss each other the more likely regulators and regulation have been subject to excessive influence.

In identifying the market failure that needs to be addressed by the international bank regulators there are three characteristics about banks that we need to know.

i.   *Systemic risks, discipline and large banks*

As is well discussed in the financial literature, banks pose systemic risks. Banks are leveraged: they lend several times their capital. They are in the *business* of mismatching duration and credit risks: they borrow cash short-term to lend to individuals and companies often on longer terms. As such, they play a key role in financing and supporting overall economic activity. They are at the centre of the payments system: their loans are often used as collateral for

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[1] For an early analysis on capital surges and abrupt stops in emerging markets see Ffrench-Davis and Griffith-Jones (1995).

other loans, so that if one large bank pulls its loan early, a whole pack of cards could come tumbling down. The bigger the bank, the bigger the systemic risks.

One of the consequences of the systemic implications of a failure of a big bank is that there is a loss of internal discipline as banks become too big to fail. Therefore, big banks are typically rescued, if their solvency is threatened, whilst smaller banks (e.g. Barings in the UK in 1995) are not, when the systemic risk is judged as minimal.

ii. *Local knowledge*

A key point about banking is that it is part of the information industry. One of the most visible consequences of the collapse of information costs in society as a whole has been the disappearance of local branches: form-filling in face-to-face meetings is no longer a cost-effective way of gathering information when digital banking means every dollar or pound you spend or save can be monitored daily and fed through a computer program searching for patterns.

We have discussed the problem of the growing 'data divide' between developed and developing countries above. The increasingly quantified and depersonalized approach to banking in developed countries cannot be simply adopted in an internationally active bank's dealings with developing countries, however. The data is simply not yet available. This data took many years of painstaking collection in the US and Europe. The parameters of the models into which the data is fed have also been tested, retested and refined over a long period of time. However, this is not the only approach to the measurement of credit risk: local knowledge is essential. Indeed, the highly quantitative systems now common in the largest of banks could never have been constructed without this local knowledge of their own markets.[2]

iii. *Uncertainty, herding and pro-cyclical behavior*

Banks exhibit herd behavior. Herding is a response to uncertainty.[3] Most banks can be characterized as thinking that others know something they do not know and then the best policy is to follow them. It is also a response to the institutional dangers of being wrong and alone. Being wrong and in company is not as uncomfortable as it should be. If you are wrong and in company, you cannot easily be singled out for punishment by the markets or courts, and if you and the crowd are so spectacularly wrong that you are in danger of bringing down the financial system, you may even get bailed out by the monetary or fiscal authorities.

Herding and uncertainty lead to pro-cyclical lending. If the economy starts to speed up, asset values rise and risks appear to fall, these developments may be just typical of a cycle that will shortly turn down, or they may be a result of some exciting permanent technological change or reform. It could be either. Opinion is evenly divided; risks are not.

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[2] The Grameen Bank in Bangladesh illustrates this point well, with an added twist. Grameen's success underscores an interesting distinction between sophistication and effectiveness of credit risk management. Grameen lends small amounts of cash to women engaged in cottage industries or small agribusinesses. Previously bankers did not lend to poor women, which meant that they did not have a credit history, nor did they have any collateral, yet Grameen's credit risk management was highly successful. Knowing your customers is key to good banking; precisely how you do, it is less so.

[3] For more literature on herding see Shiller (2000).

If a bank extends more credit to the new sector, or region or country, it appears bold and part of the future. If the decision turns out to be a mistake, it is in respectable company. If instead it backs a narrow cyclical view of the world, resisting the new trend, it will appear hesitant and part of the past. If it sticks to this view and it turns out to be a mistake, it is wrong and alone, vulnerable to be punished by the financial markets.

These asymmetries in total risk mean that in the up cycle bankers are biased to backing the new sector or new country. Indeed, the market begins to punish those seen to be slow to catch on, forcing the more reluctant to lend too. Boldness is virtuous. At some point, however, the sector or country is smothered by over-lending and there may be a crash. In the crash, the earlier optimism is seen to be irresponsible; the bezzles associated with all booms are laid bare.[4] Prudence is the new virtue. The market now rewards banks, which are prepared to let opportunities go by if the risks are uncertain.

We have identified three aspects of banking that need to be addressed by regulation: first, the bigger the bank the more the systemic risk; second, good banking is about using superior, perhaps internal, information about local risks, and third, bank assessments of risk are inherently pro-cyclical. This suggests that good banking regulation should:

(i)   place additional regulatory costs and scrutiny on the big, systemically important banks;
(ii)   encourage banks with superior local information;
(iii)   use measures of inherent risk that, for example, do not chase booms and busts and emphasize the diversification and spread of risks.

Basle II does almost the precise opposite. This raises the suspicion that the Basle Accord has been excessively influenced by the large international banks that it is supposed to regulate. This is of course exactly what Basle II does look like. There is complexity where there should be simplicity. There is also a lower capital requirement (an implicit subsidy) to those with quantitative internal risk assessments, without much attention to whether or not these assessments work. Whether the Basle Committee has been excessively influenced by the large banks or not, we can never be sure. What is of concern is that the points of regulation do not meet the points of market failure, and they miss in a way that benefits those that regulation should be toughest on. Equally, or more seriously, the new regulation may inappropriately and unfairly harm developing countries, the weakest in the world economy.

The implications of this outcome are significant and harmful to financial stability. Use of models on their own does not keep banks away from bad lending. Moreover, *common* internal processes across financial institutions lead to financial instability. The principal implications of quantitative internal risk assessments are daily, price-sensitive risk limits which require a bank to reduce its exposure to risk when the estimated probability of losses rise as a result of a decline in the price of an asset, or a rise in the volatility or correlation of asset prices. When a handful of banks use these systems, everyone may be better off. However, if every bank uses them, and they have herded into similar positions, then when a price decline causes one bank to hit its risk limit,

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[4] See, Galbraith (reprinted 1997).

other banks hit theirs too. As many banks try to sell the same asset at the same time, prices plummet and volatility and correlation soar, causing the risk limits of more banks to be hit.[5]

As long as market participants herd, which they have been doing for as long as markets have existed, the spread of sophisticated risk systems based on the daily evolution of market prices may *spread* financial instability and will certainly promote pro-cyclicality. Basle II worsens each of the market failures it should be designed to correct.

Apart from the alignment of market failure with intervention, another measure of a system is how well it serves its most vulnerable members. If Basle II makes the flow of credit more unstable and pro-cyclical everywhere, as discussed above, this will have a bigger negative impact on developing countries, whose fragile economies and banking systems are more vulnerable to strong cyclical fluctuations of bank lending. Second, as shown above, the current Basle II proposals are likely to inappropriately increase the cost –and reduce the supply of– bank lending to developing countries.

There has also been concern that the assumptions recommended for calculating the probability of default will excessively raise the regulatory cost of lending to small and medium enterprises (SMEs). This issue was of particular concern to German officials and bankers where bank lending to SMEs plays an important role for that sector and for the economy as a whole. In response to these concerns, and intense lobbying, the draft Accord was amended so that lending to borrowers with less than Euro 50 million in annual sales received an average reduction in capital requirements of about ten percent relative to large companies. It was argued, that this was consistent with the principle of risk-weighted capital requirements because the probability of default was less correlated amongst SMEs than large enterprises. A bank with a loan portfolio that is well diversified across a large number of SMES will face lower overall risk at the portfolio level than one focussed on a few larger borrowers. The result of the empirical work discussed in section 3 suggests strongly that a similar modification is justified with respect to international diversification. *In order to accurately align regulatory capital with the actual risks a bank might face, the accord should take account of this portfolio level effect.* Given the changes already made to the proposals with respect to companies and SME lending, as well as the fact that the changes we propose would seem to have at least as solid an empirical basis, there are no theoretical, empirical or practical reasons why changes should not be made to incorporate the benefits of international diversification. Of course, one key difference is that German SMEs had a representative on the Basle Committee and developing country borrowers did not.

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[5] For a more detailed discussion, see Persaud (2003).

2. The impact of the Basle 2 proposals on developing countries

One of the primary aims of the proposed new Basel capital accord is to better align regulatory capital with actual risks. Critics of the 1988 accord have argued that the regulatory capital that is required is not sufficiently 'granular' to reflect the variable levels of risk associated with loans to different types of borrowers. In particular, it has been argued that the regulatory capital required for loans to the higher rated borrowers is too high. Consequently, one immediate effect of the current proposals, if implemented as Basle 2, will be to reduce the required regulatory capital for loans to the highest rated borrowers. However, as the Basel Committee has also argued that the overall level of regulatory capital in the system should remain at the current 8% level, this can only be achieved by increasing the required capital for lower rated borrowers. The level of this increase will thus be most marked for the lowest rated borrowers. It is universally accepted, therefore, that an unavoidable impact of the proposals, if the IRB approach were adopted, will be to increase regulatory capital requirements for lower rated borrowers, with the lowest rated borrowers seeing the sharpest increase. Whilst this is accepted, there is no consensus as to the exact impact this will have on the pricing and terms of loans to such borrowers, although it is expected that pricing will generally improve for high rated borrowers and deteriorate for lower rated borrowers.

Table 1 gives estimates of the impact on the capital required per £100 for sovereigns of different ratings. In addition, it presents estimates of the impact on spreads, assuming (i) constant returns to capital, and (ii) binding capital requirements. Consequently, they should be viewed as the upper bound –or maximum possible– increase in spreads.

(Insert table 1)

As can be seen from table 1, the cut-off point –where the change in spreads becomes positive; that is, there is an increase in costs– is at BB-. After this point the change in spreads increases dramatically as the borrowers rating deteriorates.

The actual impact on the cost and quantity of bank lending to developing countries will clearly be determined by the extent to which regulatory capital requirements are a binding constraint. At this stage, it is not possible to say precisely what the impact on the costs of lending to lower rated borrowers will be, since the exact relationship between the level of regulatory capital and the pricing and terms of loans are not fully known. However, we can establish the upper and lower bounds: If, for example, changes in regulatory capital are passed on in a fully binding way, then the estimates of changes to spreads in table 1 will correspond with changes in price. Thus, for countries rated B (B-) –such as Brazil– regulatory capital per US$100 lent would increase from the current figure of US$8 to US$21. Assuming the same risk-adjusted returns are demanded as under the existing Accord, this would equate to an increase in spreads of 1,165 basis points. Similarly, for countries rated CCC, the increase in regulatory capital per £100 lent will be from US$8 to US$31. Again, assuming fully binding requirements and constant risk-adjusted returns, this would produce an increase in spreads of 2,041 basis points. For unrated sovereigns with higher implied probabilities of default, the increases would, of course, be

substantially higher than this figure. This obviously includes the great majority of countries in sub-Saharan Africa, for example.

As shown in table 2, the Basel Committee itself estimates that loans to corporates rated B- will require a capital increase from US$8 to US$20.8 for US$100 lent. This amounts to the requirement to set aside 20.8% of the loaned sum for loans to borrowers of this credit rating. For corporate borrowers rated CCC, the required regulatory capital would be approximately 29%. In contrast, a loan to a borrower rated AA- would require only 1.28% to be set aside as regulatory capital, relative to the current 8%.[6] Clearly, the estimates from the Basel Committee would imply similar maximum increases in spreads to that seen in table 1, if the same assumptions are adopted.

(Insert table 2)

As pointed out above, the estimates given in tables 1 and 2 should be seen as maximum possible increases. Clearly regulatory requirements are unlikely to be fully binding in practice, with the result that the increase in costs is likely to be lower than the maximum figures given. One factor that should be taken into account in this respect is the possibility that banks may choose to use off-balance sheet transactions, and thereby bypass the regulatory requirements entirely.

The strongest –and most often used– argument against these changes being passed on, however, is that banks price loans on the basis of their own calculation of economic capital, rather than of regulatory capital.[7] Given that the aim of the Basel Committee is to bring regulatory capital requirements into line with economic capital requirement, it is argued that the reforms will have no impact on the pricing of loans. A study by the Bank of England (Hayes, Saporta and Lodge, 2002) argues, largely based on this assumption, that the proposals are likely to have only a minor impact on the pricing and/or quantity of loans to emerging markets. However, this argument presupposes that the use of economic capital is uniform across all major banks that are actively engaged with emerging and developing country borrowers.

A recent study by PriceWaterhouse Coopers,[8] surveyed a cross-section of the most sophisticated European banks. They concluded that, far from being uniform, economic capital is only fully integrated into the business practice of less than half of those surveyed. This suggests strongly that, for at least more than 50% of European banks, pricing cannot be based on calculations of economic capital. We would therefore expect regulatory capital to have a strong

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[6] Similar estimates can be found in Powell (2002).

[7] Economic capital is the quantity of capital required to support the risk inherent in any banking activity – credit risk, market risk, or operational risk. It is thus closely related to Risk-Adjusted Return on Capital (RAROC) calculations. As a standardized measure, it allows a bank to compare directly the relative attractiveness, in terms of the risk/reward trade-off, of diverse potential opportunities. Regulatory capital is simply the quantity of capital that the regulatory authorities stipulate must be set aside for different banking activities. By making regulatory capital more risk-sensitive, therefore, the new Accord will bring it more closely into line with banks' own economic capital assessments.

[8] Presented at the CBC Banking and Financial Services Symposium, London, June 25, 2003.

impact on the pricing and terms of loans for these banks, thereby creating a significant average impact across the system.[9]

Secondly, there is both theoretical and empirical evidence that banks tend to keep a buffer of capital above the minimum required for regulatory purposes. As a result, if regulatory capital increases for a certain category of borrowers (e.g. developing country ones) the capital that banks will allocate for lending to them will increase by the amount required plus the given mark-up.

Finally, the argument that regulatory capital does not influence banks' behaviour is somewhat absurd, as precisely the aim of Basel 2 is to modify capital so it reflects risk more precisely, with a view to banks modifying their lending decisions

3. Are the increases of regulatory capital and likely cost of credit justified?

The Basel Committee, and supporters of the proposals in general, argue that the increases in capital requirements for lower rated borrowers, that are an integral feature of the proposals, are entirely justified on the basis of a more accurate assessment of risk. They use the same argument to justify any increase in the cost of loans for lower rated borrowers, although they contend that a large increase is unlikely. Is this position valid?

From our perspective, there are two serious flaws in this argument. The first relates to the failure of the proposals to take account of the benefits of international diversification. The second problem concerns data problems in developing countries, which prevents an accurate assessment of the creditworthiness of borrowers, and leads to a tendency to 'assume the worst'. In combination, these factors are likely to create a situation where the regulatory capital requirements associated with loans to developing country borrowers will seriously *overestimate* the risks of such lending.

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[9] A study by a leading international risk management consultancy, Mercer Oliver Wyman (Garside and Peterson, 2003), concludes that the new Accord will produce: *An increase in credit spreads for higher risk segments such as mid-market lending, SMEs, low-rated sovereigns, and specialized lending.*

a)   Diversification

It has long been argued that one of the major benefits of investing in developing and emerging economies is their relatively low correlation with mature markets. Recent empirical research has demonstrated that this is clearly the case (Griffith-Jones et al., 2003). Consequently, clear benefits –at the portfolio level– would accrue to banks with well-diversified international portfolios. That is, a bank with a loan portfolio that is distributed widely across a range of relatively uncorrelated markets, is less likely to face simultaneous problems in all of those markets, than a bank with loans concentrated in a smaller number of relatively correlated markets. Therefore, in order to accurately align regulatory capital with the actual risks a bank might face, the Accord should take account of this portfolio level effect: the capital requirements for a bank with a well-diversified international loan portfolio should reflect the lower total risk than for a more concentrated portfolio. At present, the proposals contain no such considerations, suggesting that, in this area at least, capital requirements will not accurately reflect risk.

The argument of differential correlations between developed and developing markets has been extensively tested, first with specific regard to international bank lending and profitability and, secondly, in a macroeconomic sense (see table 3). All our results offer strong –statistically significant-- support for the validity of this position. The tests performed –using a variety of variables, over a range of time periods– provide robust and unequivocal evidence in support of the diversification hypothesis.

(Insert table 3)

In the case of spreads on syndicated bank loans, which are a proxy for the probability of default, they have had a greater tendency to rise and fall together *within* the developed regions than between developed and developing regions. Over the sample period (1993 to 2002), a bank with a loan portfolio that was well diversified across the major developed and developing regions, would have enjoyed diversification benefits at the portfolio level. Similarly, over the same sample period, the profitability of banks in developed markets are correlated with each other, but negatively correlated with those in developing markets.

An analysis of macro variables tells the same tale. Consequently, if the incidence of non-performing loans (NPLs) in an economy is, at least partially, inversely related to the rate of GDP growth, then banks with a portfolio of loans diversified between developed and developing country borrowers would be less likely to experience a sharp increase in NPLs across the portfolio simultaneously. Similar implications can be drawn if we take movements in short-term interest rates as a proxy for the business cycle or long-term interest rates as a proxy for underlying inflation risks.

For many market practitioners, movements in government bond prices and yields are seen as strong indicators of both economic fundamentals and market views on the economic prospects of each country. The fact that developed country bond prices move in step to a far greater extent than do developed and developing country prices, suggests a closer correlation between both economic fundamentals in developed countries and market sentiment towards them. The evidence of lower correlation between developed and developing stock markets also supports this view.

These results are supported by additional recent research conducted at State Street. Using 10 emerging and 10 developed country equity markets we find a similar result (see table 4). Emerging markets are highly correlated with each other and for equity markets, more so than developed markets. This is even more apparent in periods of financial stress and it is this feature of emerging markets that has made many discount their diversification benefit. However, over both short and long periods (one week to three years) emerging equity markets are less correlated with developed markets than developed markets are with themselves. A bank with a portfolio of developed equity markets would have a less diversified investment or loan portfolio than if it were invested in companies from developed *and* emerging markets.

(Insert table 4)

More recently, we have had the opportunity to access the data of one of the largest internationally diversified banks.[10] We obtained information on Non-Performing Loans and Provisions amounts. While the variables presented in table 4 correspond to publicly available information, the data obtained from this bank is proprietary and has been collected with precise care. It is data that reflects in a more concise manner the riskiness of an internationally diversified portfolio. The results obtained are presented in table 5.

(Insert table 5)

Let us recall that the null hypothesis to be tested was: H_0: M_x equals M_y; H_1: M_x different M_y

We observe that the null hypothesis in both cases is rejected at the 5% significance level. The outcome is consistent with our previous results from independent datasets, which strongly suggest that a bank's loan portfolio that is diversified internationally between developed *and* developing country borrowers would benefit in terms of lower overall portfolio risk, relative to one focused exclusively on lending to developed countries. In order to test this hypothesis in the specific context of a bank's loan portfolio, we undertook a simulation exercise to assess the potential unexpected[11] loss resulting from a portfolio diversified within developed countries, and one diversified across developed and developing regions.

(Insert table 6)

As can be seen from table 6, the unexpected losses simulated for the portfolio focused on developed country borrowers are, on average, 23% higher than for the portfolio diversified across developed and developing countries.

Further simulations we have carried out (Griffith-Jones, Segoviano and Spratt, 2004), using a dataset from Moody's for U.S. banks showed again that capital requirements were

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[10] We were asked to keep the source of the data confidential.

[11] Expected losses are those that a bank estimates will experience on its portfolio over a given time period; they should ideally be covered by provisioning. Unexpected losses is the amount by which actual losses exceed expected losses; they could be covered by economic and/or regulatory capital.

significantly lower (in this case by 19%) if the benefits of diversification are incorporated into the IRB approach than if they are not. Furthermore, it is very interesting that if the benefits of diversification are incorporated, the simulations clearly show that the variance over time of capital requirements is significantly smaller than if these benefits are not incorporated. Therefore introducing the benefits of geographical diversification <u>significantly decreases, though it does not eliminate</u>, the higher pro-cyclicality that the IRB approach will imply. This difference, though not preventing difficulties, may well be significant enough to prevent a "credit crunch".

A potentially significant issue, which has been raised in this regard, is the fact that correlations are not constant over time. The danger, of course, is that correlations within emerging markets increase dramatically in crises, as contagion spreads the crisis from one country or region to another. In this instance, it is possible that a portfolio diversified across a range of emerging and developing regions, might be hit simultaneously in all of the emerging market areas. In order to assess the validity of this argument, we extended our analysis to check what would happen to diversification effects during crises times in the three separate periods (see Annex 2). Our results demonstrate that for each of the analyzed variables in each period concerned, the mean correlation between "developed" and "developing" countries is lower than the mean correlation between "developed" and "developed" countries. Given this evidence, we can conclude that the diversification benefits obtained through a well diversified portfolio of developed and emerging markets still hold in crises periods. As would be expected, the magnitude of the diversification benefits is lower in crisis periods than in non-crisis periods.

b)   <u>The growing 'Data Divide'</u>

An important issue, that has received relatively little attention to date, relates to the increasingly quantified approach to credit risk, and the reliance of this process on accurate data of sufficient historical length. It is likely that the process of reforming the Basel Capital Accord will accelerate this process. Indeed, a number of commentators have argued that this acceleration is already well under way, as banks seek to upgrade their internal systems so to be eligible for the IRB approaches.[12]

Under the Foundation [13] IRB framework a bank is required to provide its own estimates of probability of default (PD), with supervisory authorities providing estimates of loss given default (LGD), exposure at default (EAD), and maturity (M). Under the Advanced IRB approach, banks are required to provide estimates of all of these inputs, subject to meeting minimum standards. However, in order for a bank's estimate of PD to be acceptable as an input,

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[12] In order to be eligible for the IRB approaches a bank must satisfy its national supervisory authorities that it meets minimum quantitative and qualitative criteria as set out in the Third Consultative Package (CP3) issued by the Basel Committee on Banking Supervision (2003).

[13] The Foundation IRB approach is the preparatory stage before a bank moves to the Advanced IRB approach. As such, supervisory authorities set a number of the key inputs in the earlier stage. Once a bank has demonstrated its ability to perform adequately under the Foundation approach, and established the robustness of the estimates required for the Advanced approach, it is able to proceed to the Advanced framework.

the length of the underlying historical observation period used must be at least five years for at least one source[14].[15]

For estimates of LGD:

Estimates of LGD must be based on a minimum data observation period that should ideally cover at least one complete economic cycle but must in any case be no shorter than a period of seven years for at least one source.[16]

For the most sophisticated internationally active banks, that have well-developed systems of this sort, the historical data that underlies their estimates is derived from developed markets, and is integral to calculations of economic capital upon which they price their loans. As major banks have told us, the availability of these underlying data inputs in developing countries is far lower than in the developed markets. One consequence of this is that banks that wish to employ such systems in emerging markets must, in the absence of reliable data, make very conservative assumptions about potential borrowers; in effect, they 'assume the worst', and the pricing of loans reflects this. Thus banks that employ quantitative systems of this sort in emerging markets have an inbuilt tendency to overestimate the risks involved in such lending, in the absence of data of comparable quality to that available in developed countries. It is noteworthy that these are the banks that have tended to withdraw from straight syndicated or bilateral lending to developing countries. The explanation for this retreat commonly stresses the fact that the spreads available are insufficient to compensate the banks for the risks they face in these markets. However, as discussed above, these 'risks' –while not illusory– may well appear greater than they actually are, due to the lack of reliable data. Therefore, although the spreads available may not compensate investors for the worst possible risks they might face –i.e. a 'conservative' assessment of risk, or 'assuming the worst'– they may well be appropriate for the likely real-world outcome.

However, the fact that spreads on syndicated lending are lower than those that these models produce suggests that the banks that are still involved in syndicated or bilateral lending are pricing these loans more generously than calculations of economic capital would imply, probably because their use of qualitative judgement makes them measure risk in those countries more realistically. Consequently, as the aim is to raise regulatory capital to levels compatible with economic capital for *all* major banks, then the banks that are currently pricing loans on a more realistic basis to economic capital –and are thus market-makers in the sense of determining the market price– will face regulatory capital requirements that will 'bite', thereby forcing them to increase the costs and/or decrease the supply of loans to these markets.

One accepted outcome of the Basel process is that banks, which previously had not, are investing significantly in quantitative systems compatible with the calculation of economic capital. The likely outcome of this will indeed be to increase the spreads required to persuade those banks to lend.

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[14] As sources of data a bank is permitted to use (i) their own internal data, (ii) data from external sources such as ratings agencies, or (iii) pooled data from the banking industry.
[15] CP3, paragraph 425.
[16] CP3, paragraph 434.

Indeed, the Basel Committee has given explicit advice for banks estimating the inputs required for IRB calculations when data quality is poor. The following is typical of this advice: *In general, estimates of PDs, LGDs and EADs are likely to involve unpredictable errors. In order to avoid over-optimism, a bank must add to its estimates a margin of conservatism that is related to the likely range of errors. Where methods and data are less satisfactory and the likely range of errors is larger, the margin of conservatism must be larger.*[17]

An alternative to this approach, of course, is for banks to simply cease lending to markets where the quality of data is insufficient to enable a robust IRB framework to be operated. Therefore, a bank operating under an IRB approach faces two options in relation to lending to developing countries; (i) withdraw from lending, which would reduce supply of loans or (ii) adopt a conservative approach to assigning borrowers to PD bands, which would increase cost, as banks will "assume the worst" about those borrowers' creditworthiness. Furthermore, these factors are likely also to affect negatively the potential for future lending. Banks that are not currently engaged in lending to developing countries, and choose to adopt the IRB framework, will be effectively precluded from entering these markets in the future by the data limitations we have described.

4. Conclusion and policy proposals

It seems to be no coincidence that the critical stakeholder in the international banking system not represented on the Basle Committee –developing countries– receive the rawest deal from the new Basle accord. It is no surprise that the one group that appears to have excessively influenced the Basle Committee, are the most powerful financial institutions domiciled in countries represented on the Committee. Our four policy proposals are designed to address this issue, as well as the other key problems that have been identified above.

a)   <u>Governance</u>

The outcome of Basle II seems to relate to the composition of the Committee. Given that the Basle Capital Accord is a global standard that is likely to have a very large impact on emerging economies, and that emerging markets are critical to the global economy, the composition of the Basle Committee needs to be changed. A more sensible composition would reflect global GDP. To include all the ten largest economies would bring in China, India, Brazil and either Mexico or Russia to the Committee. The new countries are critical to the global economy and to cross-border bank lending. This new composition would have the virtue of powerful economic logic behind it, and would counter-balance the influence of the large international banks domiciled in developed countries.

Alternatively, the current membership could remain and India, China and Brazil could be added. Additionally, one or two representatives of developing country regions (Asia, Latin America and Africa) could be added for a four-year period. There could then be rotation for different countries to be represented (from each of the three regions). The principle would be similar to the one under which the Executive Boards of the IMF and World Bank operate.

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[17] CP3, paragraph 413.

Particularly, but not only, if the latter formula is adopted, developing country representatives could be supported by a small permanent technical secretariat, that would contribute both expertise and continuity. In fact, the lack of such a secretariat at present is an important institutional gap.

Whatever the solution, concrete steps need to be taken as soon as possible to start changing the composition of the Committee to increase its legitimacy, especially in the light of the recent serious problems of Basle II. Indeed, we suggest that the Committee start meeting with a representative group from emerging countries (such as its own consultative group or members of the G-24 that represent developing countries at the IMF) to establish a process whereby emerging countries can quickly become full members of the Basle Banking Committee. This is urgent. The shortcomings of running the mid-2^{0th} century world economy, using the 19th century world order are becoming greater over time. A Basle Committee with appropriate representation from the world economy would not just result in fairer system, but also in a more stable financial system with welfare enhancing effects for all.

b)   Diversification

The proposed Basle II does not explicitly take account of clear international diversification benefits of lending to developing countries, despite these being widely recognized and confirmed by our research described above. We feel that unless the proposal is amended, capital requirements will –in this respect– not accurately reflect risk, and will unfairly and inappropriately penalize developing countries. It therefore seems important that as soon as possible, the Basel Committee incorporate the benefits of international diversification into the new Accord. The Committee has already recognized the impact of differential asset correlation on the appropriate level of capital requirements in its modification with respect to SMEs. Our empirical results strongly suggest that a similar modification is justified with respect to internationally diversified lending, especially when one considers the fact that our evidence is as least as strong as that used to support the modification with respect to SMEs.

We recognize the fact that SME lending has "special characteristics", which justified the modification. However, our argument is precisely that lending to developing and emerging economies also has similar characteristics. López (2002) argues that large firms are more susceptible to systemic risk than are SMEs: the higher weight given to idiosyncratic factors in the latter thus justifies the modification. However, if one defines 'systemic risk' in a global sense as associated with global business cycles, then the fact that developing and emerging economies are less correlated with industrialized business cycles –as our results clearly show– demonstrates that these economies are also less susceptible to systemic risk. Furthermore, the life span of many SMEs is inevitably short, whilst that of most countries is intrinsically otherwise. This suggests that creditors have a greater chance of recovering their assets from the latter, thereby enhancing the diversification benefits yet further. Consequently, if a modification was justified with respect to SME lending, it is difficult to see why one is not justified in the case of developing and emerging economies.

The results of our simulation show that the unexpected losses for the portfolio focused on developed country borrowers are, on average, about 23% higher than for the portfolio diversified

across developed and developing countries. As a specific proposal in this area, we would suggest an adjusting factor be incorporated into the Accord. This would be applied at the portfolio level, and could function in a tapered fashion. Our empirical results suggest that a fully diversified bank would qualify for a reduction of approximately 23% of required capital. This reduction would then decline as the level of diversification fell, reaching zero for an undiversified bank. Such a modification would be relatively straightforward to introduce, would not add to the complexity of the Accord, but would ensure a more accurate measurement of risk. Alternatively, the modification could be integrated into Pillar 1 of the Accord through the development of a separate developing country curve. This would be similar to the modification produced for SMEs and would be calibrated to produce a similarly tapered reduction in capital as in the adjusting factor described above.

As well as reducing the required capital for loans to borrowers in developing countries, in the context of an internationally diversified portfolio, such an adjusting factor or separate curve would also provide an incentive for banks to maintain or increase their level of international diversification, in response to an accurate measurement of risk.

One simple practical proposal to incorporate the benefits of international diversification is to introduce a correction coefficient to Basle 2 (that would increase as diversification grows), so that regulatory capital would be defined based on the one factor model currently proposed in Basle 2 multiplied by this coefficient.

Capital adjusted for diversification = Capital defined by the one factor Basle 2 model x Correction coefficient

Thus, an internationally diversified bank would multiply its total regulatory capital by a coefficient to correct for international diversification. Such a correction coefficient has been calculated with real data by the Spanish bank BBVA (BBVA 2004); it measures the error made when using a single factor model –such as that to be used in Basle 2- when in fact there are two factors affecting diversification of portfolio (geographical areas, emerging vs. non emerging economies). The correction factor is estimated as the ratio between the capital calculated with the two factor model and the capital obtained with the single factor; as shown in BBVA (2004) and Griffith-Jones, Segoviano and Spratt (2004), the correction factor increases as diversification grows.

Adoption of such a correction factor would: a) produce a more accurate measure of risk than under current proposals; and, b) prevent the current overestimation of risk in Basle 2 for international borrowers –particularly those in developing countries.

c)   Dealing with pro-cyclicality

Introducing benefits of international diversification will not only lead to a more accurate measurement of risk. It will also reduce the pro-cyclicality of capital requirements through time, which will both allow smoothing of bank lending - and therefore some smoothing of economic cycles in both developed and developing countries. It should also help strengthen stability of banks, especially the large international ones, which is clearly a key economic objective, and an absolutely central one for G-10 regulators.

It should be stressed that introducing the benefits of geographical diversification will reduce, but certainly not eliminate, the increase in pro-cyclicality that Basle 2 will bring. As a result, it would be highly desirable to introduce, before or simultaneously with Basle 2, measures that would further compensate for this increased pro-cyclicality. Such measures could include mandatory forward looking provisions for latent risks, approach already adopted by the Spanish authorities, as well as more discrete cycle-neutral prudential provisions (for an in-depth discussion, see Ocampo and Chiappe, 2003).

d)   Overcoming the data divide by allowing long transition under standardised approach

The Basel Committee has recognised the problem of differential data quality in different jurisdictions. Although it is stated that: "Once a bank adopts the IRB approach for part of its holdings, it is expected to extend it across the entire banking group. This is subsequently qualified: Once on IRB, data limitations may mean that banks can meet the standards for the use of own estimates for LGD and EAD for some but not all of their asset classes/business units at the same time".[18]

As a result, the Basel Committee concedes that: "Supervisors may allow banks to adopt a phased roll-out of the IRB approach across the banking group". However, this phased roll-out must be of a limited duration: "A bank must produce an implementation plan, specifying to what extent and when it intends to roll-our IRB approaches across significant asset classes and business units over time. The plan should be exacting, but realistic, and must be agreed with the supervisor".[19]

It is essential, if the negative impacts linked to data described above are to be avoided, that banks are given the time to accumulate data of sufficient quality and duration in different markets. That is, an internationally active bank should be free to employ the standardised approach in their lending to those developing countries where the data limitations are such to make adoption of the IRB approaches impractical. Furthermore, there should be no arbitrary limit set on the length of this period. Rather, the IRB approaches should not be adopted in lending to developing countries until it can be proved that the underlying data that are inputs into the framework are of sufficient quality and comprehensiveness. This transition period could also provide the space for more sophisticated full credit risk models to be developed, which could then make effective use of the better data available from developing countries. These models would, among other aspects, explicitly incorporate the benefits of international diversification.

These modifications would encourage a narrowing of the 'data divide' described above. In contrast, the proposals as they stand are more likely to encourage a widening and deepening of this divide.

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[18] CP3, paragraph 225.
[19] CP3, paragraph 227.

Annex 1. Data and sources

Countries analyzed:

Developing Countries: Argentina, Brazil, Bulgaria, Chile, Ecuador , Indonesia, Korea, Malaysia, Mexico, Nigeria, Panama, Peru, Poland, Philippines, Russia, Thailand, South Africa, Venezuela.
Developed Countries: Canada, Germany, Japan, France, Italy, Spain, United Kingdom, U.S
Others: Finland, Greece, Ireland, Portugal, Singapore.

Table 1: Variables analyzed:

Grouping	Code	Description	Time Period	Freq	Source
Financial Sector	**ROA**	Return on Assets (banks)	1988-2001	Annual	**The Banker**
Financial Sector	**ROC**	Return on tier one capital (banks)	1988-2001	Annual	**The Banker**
Financial Sector	**Syndicated**	Syndicated Loans Spreads	93-02	Monthly	BIS
Bonds	**GBI**[1]	Global Bond Index	87-02	Daily	JP Morgan/Reuters
Bonds	**EMBI**[2]	Emerging Market Bond Index	87-02	Daily	JP Morgan/Reuters
Bonds	**EMBI+**[3]	Emerging Market Bond Index Plus.	87-02	Daily	JP Morgan/Reuters
Stocks	**IFC G**[4]	S&P International Finance Corporation (Global)	90-02	Daily	IFC/S&P
Stocks	**IFC I**[5]	S&P International Finance Corporation (Investable)	90-02	Daily	IFC/S&P
Stocks	**COMP**	Developed countries listed above: composite stock indexes	90-02	Daily	Reuters
Macro	**GDP**	GDP Growth Rate	85-00	Six-Monthly	IMF, World Bank (Author's own calculations)
Macro	**GDP HP**	Hodrick-Prescott decomposition of GDP	50-98	Annual	National Data (Author's own calculations)
Macro	**STIR**	Short term nominal interest rate	85-00	Six-Monthly	National data (BIS) or IMF, IFS
Macro	**STIRR**	Short term real interest rate	85-00	Six-Monthly	National data (BIS) or IMF, IFS

[1] The GBI consists of regularly traded, fixed-rate, domestic government bonds. The countries covered have liquid government debt markets, which are freely accessible to foreign investors. GBI excludes floating rate notes, perps, bonds with less than one-year maturity, bonds targeted at the domestic markets for tax reasons and bonds with callable, puttable or convertible features.
[2] Included in the EMBI are US dollar denominated Brady bonds, Eurobonds, traded loans and local debt market instruments issued by sovereign and quasi-sovereign entities.
[3] EMBI+ is an extension of the EMBI. The index tracks all of the external currency denominated debt markets of the emerging markets.
[4] IFC G (Global) is an emerging equity market index produced in conjunction with S&P. The index does not take into account restrictions on foreign ownership that limit the accessibility of certain markets and individual stocks.
[5] IFC I (Investable) is adjusted to reflect restrictions on foreign investments in emerging markets. Consequently, it represents a more accurate picture of the actual universe available to investors.

Annex 2. Correlations in Three Crisis Periods: Developed/Developed & Developed/Developing

Table A.1. Syndicated loan spreads under crises periods

Row	SYNDICATED	Total Time Series	94-4 to 99-1	94-4 to 95-4	97-3 to 98-4
1	Mean Correlation (Deved/Deving)	0.141	0.129	0.087	0.229
2	Mean CorrelationDeved/Deved	0.375	0.135	0.143	0.479
3	Ratio Mean Correlations	0.375	0.954	0.609	0.477
4	Ratio Volatilities	1.739	2.771	4.300	2.514

Table A.2. Global Bond Index-Emerging Market Bond Index under crises periods

Row	GBI-EMBI+	Total Time Series	94-4 to 99-1	94-4 to 95-4
1	Mean Correlation (Deved/Deving)	0.532	0.397	0.698
2	Mean Correlation (Deved/Deved)	0.783	0.571	0.823
3	Ratio Mean Correlations	0.679	0.694	0.849
4	Ratio Volatilities	1.656	2.400	1.716

Table A.3. GDP under crises periods

Row	GDP-HP	Total Time Series	94-4 to 99-1
1	Mean Correlation (Deved/Deving)	0.020	0.114
2	Mean Correlation (Deved/Deved)	0.351	0.409
3	Ratio Mean Correlations	0.056	0.279
4	Ratio Volatilities	1.696	2.256

Tables A.1 to A.3 demonstrate that for each of the analyzed variables, the mean Correlation between "Developed" and "Developing" Countries is lower than the mean correlation between "Developed" and "Developed" countries.

It is interesting to see from these results that, as would be expected in crises periods, developing countries become relatively riskier in comparison to developed countries. This is illustrated in row 4, which measures the ratio of volatilities given by the Standard deviation of the developing countries divided by the standard deviation of the developed countries. We observe that this ratio increases in crises periods.

Finally, we observe that the ratio given by the mean correlation of "Developed" and "Developing" divided by the mean correlation of "Developed" and "Developed" countries. Increases in crises periods. This implies that diversification benefits are in fact aminorated in crises periods, however, they still remain. This is observed by the fact that the ratio never reaches a value of 1 or greater.

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Table 1. Estimates of Impact on Required Capital & Sovereign spreads		
Rating	Capital Required per £100	Estimated Spread Change*
A+	1.18	-42.65
A	1.89	-38.22
A-	1.89	-38.22
BBB+	2.96	-62.96
BBB	4.03	-49.68
BBB-	5.04	-36.97
BB+	5.61	-119.56
BB	7.76	-11.92
BB-	8.86	+43.24
B+	11.79	+331.38
B	19.08	+969.78
B-	21.31	+1165
CCC	31.33	+2041.13
Source: Weder and Wedow (2002).		
* Estimates the change in spread needed to produce the risk-adjusted returns achieved under the existing Accord.		

Table 2. Basel Committee's Estimates of Changes to Corporate Risk Weights			
Rating	Probability of Default (PD)[20]	Approximate Corporate Risk Weights	Capital Required per £100*
AAA	0		
AA+	0		
AA	0		
AA-	0.03	14.75%	£1.28
A+	0.02		
A	0.05	20.03%	£1.60
A-	0.05	20.03%	£1.60
BBB+	0.12	30.20%	£2.42
BBB	0.22	50.00%	£4.00
BBB-	0.35	60.00%	£4.80
BB+	0.44	67.00%	£5.36
BB	0.894	90.00%	£7.20
BB-	1.33	110.00%	£8.80
B+	2.91	140.00%	£11.20
B	8.38	210.00%	£16.80
B-	10.32	260.00%	£20.80
CCC	21.32	360.00%	£28.80

Source: The Basel Committee's CP3: "Illustrative IRB Risk Weights". The percentages given are relative to the current 8% capital requirement. Thus, a 200% estimate equates to a capital requirement of 16% of the loan value.
* Relative to current figure of £8

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[20] S&P's one year average PD.

Table 3. Correlation Coefficients of Financial and Macroeconomic Variables: Developed/developed & Developed/developing.

Variable	Time-Period	Frequency	Developed/ Developed Mean Correlation Coefficient	Developed/ Developing Mean Correlation Coefficient	Test Statistic (H0:Mx=My) Critical Value of 0.05% one-tailed test in parentheses
Syndicated	1993-2002	Monthly	0.37	0.14	3.33 (3.29)
ROA	1988-2001	Annual	0.10	-0.08	4.40 (3.29)
ROC	1988-2001	Annual	0.14	-0.11	6.92 (3.29)
GDP	1985-2000	Six-monthly	0.44	0.02	9.08 (3.29)
GDP HP	1950-98	Annual	0.35	0.02	9.41 (3.29)
STIR	1985-2000	Six-monthly	0.72	0.23	11.09 (3.29)
STIRR	1985-2000	Six-monthly	0.66	0.22	10.93 (3.29)
GBI-EMBI	1991-2002	Daily	0.78	0.53	5.45 (3.29)
GBI-EMBI	1991-97	Daily	0.90	0.74	4.64 (3.29)
GBI-EMBI	1998-2002	Daily	0.42	0.09	5.87 (3.29)
IFCI-COMP	1990-2000	Daily	0.58	-0.15	7.83 (3.29)
IFCG-COMP	1990-2000	Daily	0.58	-0.17	8.06 (3.29)

Key: Syndicated - Syndicated Loan Spreads, ROA – Return on Assets, ROC – Return on tier one capital, GDP – GDP Growth Rate, GDP HP – Hodrick-Prescott decomposition of GDP, STIR – Short term nominal interest rate, STIRR – Short term real interest rate. GBI – Global Bond Index, EMBI – Emerging Market Bond Index, EMBI+ - Emerging Market Bond Index Plus, IFC G – S&P International Finance Corporation (Global), IFC I – S&P International Finance Corporation (Investable), COMP – Developed countries composite stock indices. For further details see Annex 1.

Table 4. Correlation matrix using daily correlations of equity returns between emerging markets and developed markets, 1992-2002

1 week returns	Emerging	Developed
Emerging	0.0008	0.0003
Developed	0.0003	0.0004

3 year returns	Emerging	Developed
Emerging	0.4274	-0.0132
Developed	-0.0132	0.0745

Source: Bloomberg, State.

a) Countries included in analysis: Developed – Australia, Canada, France, Germany, Italy, Japan, Norway, Switzerland, UK, US. Emerging – Argentina, Brazil, Chile, Indonesia, Jordan, Korea, Mexico, Taiwan Thailand and Turkey.

Table 5. Average correlation coefficients and statistical tests for proprietary data from a large internationally diversified bank

Variable	Time-Period	Frequency	Developed/ Developed Mean Correlation Coefficient	Developed/ Developing Mean Correlation Coefficient	Test Statistic (H0:Mx=My) Critical Value of 5% one-tailed test in parentheses
Non-Performing Loans	1998-2002	Annual	0.71	-.19	3.09 (1.86)
Provisions	1998-2002	Annual	0.55	-.14	2.14 (1.86)

Table 6. Comparison of globally diversified and globally undiversified portfolios

1. Diversified developed/developing			2. Diversified developed			
Total Exposure = 117,625,333			Total Exposure = 117,625,333			
Percentile	Loss value	Unexpected loss (%)	Percentile	Loss value	Unexpected loss (%)	Percentage Difference
99.8	22,595,312	19.21	99.8	27,869,349	23.69	+23.34