Competitive Advantage under the Basel II New Capital Requirement Regulations

I - Introduction:

This paper has the objective of introducing the revised framework for *International Convergence of Capital Measurement and Capital Standards* also know as *Basel II*. In 2004, after many years of discussions and negotiations, the Basel Committee on Banking Supervision issued regulations to secure international convergence on revisions to supervising regulations governing the capital adequacy of internationally active banks. The regulations introduced three pillars:

I. Significant strengthening of the minimum capital requirements.
II. New rules on capital supervision.
III. New rules on market discipline and financial disclosure.

We will start this paper reviewing the Basel I accord and its impact on US banking industry asset allocations and explain why these regulation have had more impact on banks' capital decisions than market discipline.

Next we will introduce the main pillars of Basel II, and the new mechanics of calculating bank capital requirements both for credit risk and operational risk.

Then we will make an analysis of Basel II on overall banking capital cushion and its consequence on banks' competitive advantages.

Finally, we will demonstrate how the new capital requirement regulation will give incentives to banks to adopt Basel II and how this will affect the financial performance of banks that do not adopt the Basel II framework.

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II - The Basel I Accord:

Before 1981, there were no explicit regulatory requirements for capital ratios in the United States. The capital adequacy of individual firms were evaluated by different federal supervisory agencies and any formulas used differed from supervisor to supervisor.

The 1980's financial institutions crises brought widespread discontent with the capital ratios of many banking institutions. The US and other developed countries, which were sharing similar concerns about their financial institutions, joined forces and issued in 1988 the "International Convergence of Capital measurement and Capital Standards", known today as the Basel I accord. This framework not only suggested a uniform model of how banks and regulatory agencies could calculate and control banks' capital requirements but also was the first model to guide banks how to quantify on and off balance sheets risk exposures.

The Basel I accord brought great changes to the structure of capital requirements then in place: In order to calculate the minimum required amount of capital, banks' asset values were weighted by a few simple credit risk factors and then risk-weighted assets were supplemented by credit-equivalent amounts corresponding to off-balance-sheet instruments. Basel I and its subsequent amendments brought the following benefits for banks' credit risk operations:

- ✓ Banks would adjust their regulatory capital ratios based on the "Risk-Based Capital" (RBC) framework, which was designed not only for items on balance sheet but also for items off balance sheet, such as letter of credits and derivatives.
- ✓ Development of sophisticated mathematical simulation methods in order to determine potential future exposure of off-balance-sheet instruments.
- ✓ RBC disciplined banks to continuously revise their capital ratios[1] in order to keep pace with the market environment changes.
- ✓ Required banks to hold capital requirements above minimum levels, in order to create a cushion against insolvency.
- ✓ The 1996 Basel I amendment introduced new guidance in order for banks to assess the market risk impact on special assets such as equities, interest rate-related instruments and foreign exchange risk.

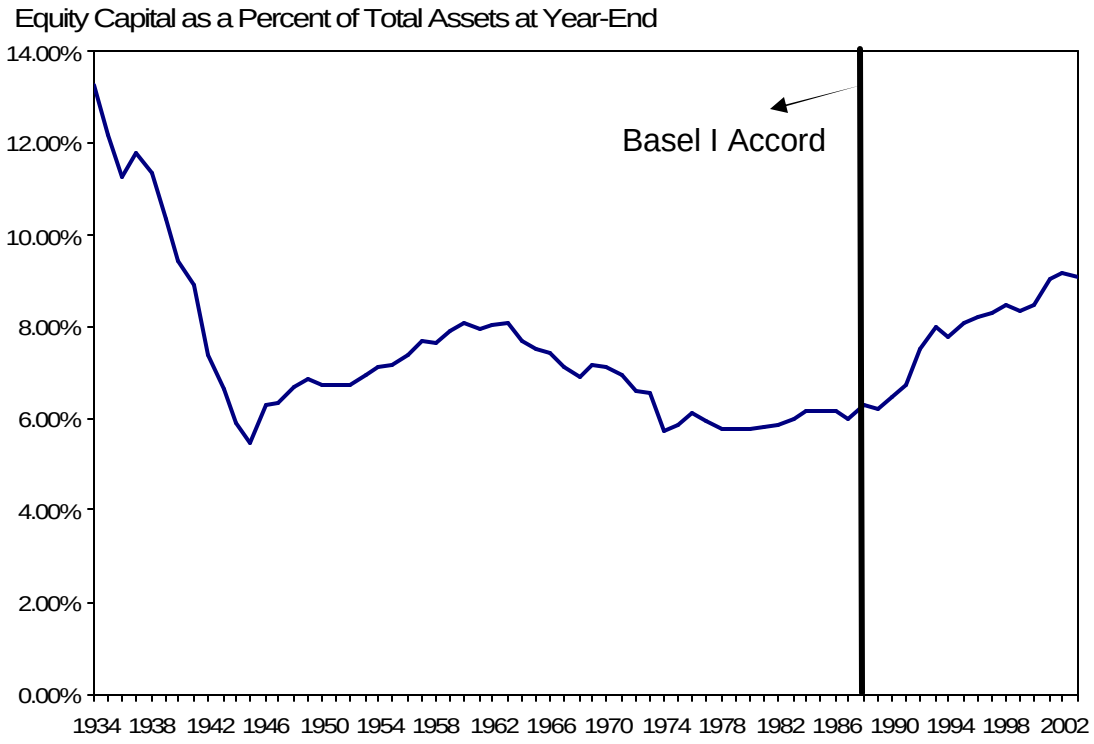
[1] Capital ratios are represented by a three-tier capital set: Tier 1 capital is the core capital of a banking institution. It includes equity capital and disclosed reserves; Tier 2 capital is a secondary and more risky capital of a banking institution and includes items such as undisclosed reserves, general loss reserves, subordinated term debt, and more; Tier 3 capital is the amount of the bank holding capital allocated for market risk. Basel I established that the sum of capital allocated on tiers 2 and 3 could not exceed the amount of capital on tier 1.

The implementation of Basel I brought three major impacts for the banking industry:

1) Increased Banks' capital requirements:

Figure 1 shows how Basel I reversed the 70's and 80's trend of reducing levels of capital:

Figure 1: US Increase of Capital Levels



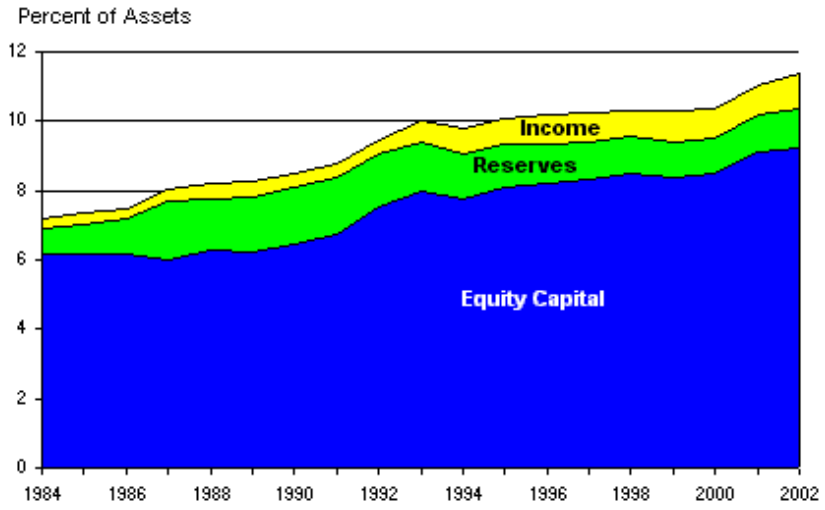
Source: FDIC

2) Induced banks to maintain capital levels above the minimum requirement of 8%:

Figure 2 shows a steady increase of banks' capital reserves much above the minimum requirement. FDIC studies[2] suggest that from 1990 to 2001 there was an increase from 86% to 97% of all FDIC insured banks that were considered well capitalized.

[2] Burhouse, Susan et al., "*Basel and the Evolution of Capital Regulation: Moving Forward, Looking Back*", FDIC (2003).

Figure 2: Increase of Capital Requirements

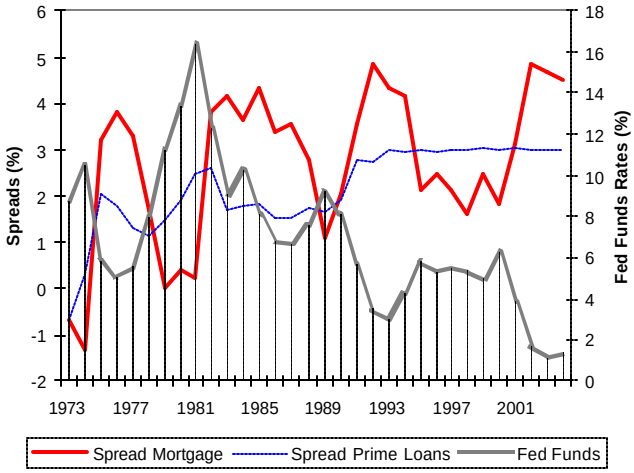


Source: FDIC Bank Call Reports

3) Capital regulations had more impact on banks than market discipline:

Basel I established a new discipline for banks in managing their credit risk. Assets, which Basel I allocated higher risk weights, ended penalizing banks with higher capital requirements and thus, higher opportunity costs. Assets, which Basel I allocated lower risk weights, ended rewarding banks with lower capital requirements. In an economical environment, where the spread between interests rates changes over time (figure 3), Basel I created a continuous asset selection problem to the banks: In order to maintain an adequate financial performance, banks have to manage their asset allocations in order to maximize profits and minimize opportunity costs.

Figure 3: US Selected Interest Rates



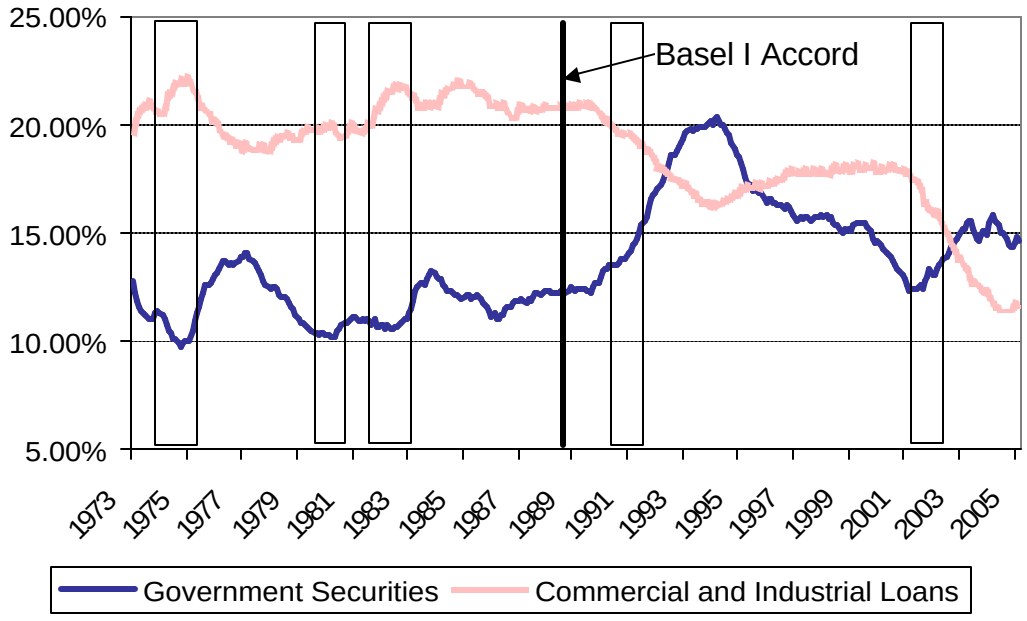
[Note: Mortgage and Prime Loans spreads to Fed Fund Rates]
Source: Federal Reserve Bank

On June 2000[3], The Bank for International Settlement (BIS) published a paper which looked for evidences that regulation had more impact on banks capital decision than did market discipline [Wall and Peterson – 1995] or market systematic risks. This paper finding will be exposed bellow.

An important feature of Basel I mandated banks to hold higher percentages of equity capital per loan than per government security. Because loans are presumably more risky than securities[4], these new capital regulations are thought to have improved the link between bank risk and bank capital. Given the common perception that equity capital is more costly than alternative funding sources such as deposits, these requirements made lending relatively more expensive than purchasing securities, thus it provided an incentive for banks to shift their portfolios away from loans[5].

Figure 4 shows how Basel I had more impact on banks balance sheet than any economic downturn. After the introduction of capital regulation in the US, domestic banks drastically reduced their investment share on Commercial and Industrial loans as compared to any previous period of economic recession.

Figure 4: All Commercial Banks portfolio allocation Share over Bank Total Asset



[Note: Boxes represents recessions]
Source: Federal Reserve H8

[3] Furfine,Craig, "Evidence on the Response of US Banks to Changes in Capital Requirements" BIS Working Papers No. 88, June 2000.

[4] Under Basel I, C&I loans had a weight of 100%, while government securities (issued by OECD countries) had a weight 0%.

[5] One explanation for this incentive lies on "The Bank Maximization Problem": Banks maximize the present discounted values of future profits, less adjustment costs, costs of issuing equity, and costs incurred via their capital position.

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Between 1989 and 1994, the share of total bank credit invested in commercial and industrial loans fell from 22.5% to under 16%, whereas the share of total bank credit invested in US government securities increased from over 15% to nearly 25%. This period of study was popularly referred to as the "credit crunch", and was characterized by a strong economic recession in the US during the beginning of the 90's. Although figure 4 trend was reversed after 1994, bank portfolios remained much less invested in commercial loans than they have been over the last 25 years.

Another interesting feature of the BIS paper is that it compares changes on bank asset allocations to changes on leverage and risk based capital requirement, changes on banks capital and changes in loan demands. This is very useful in order to assess which market forces have more impact on banks assets allocation decisions. The summary of these impacts are shown in table 1:

Table 1: Summary of simulation results

	Loan Growth	Securities Growth	Risk-based capital ratio	Leverage capital ratio	Bank's Funding Source: Equity issuing
1% Increase in Risk-Based Capital Requirement (i.e. increased caused by new regulations)	Fall by 5.46%	Rise by 35%	Rise	No effect	Rise by 0.4%
1% Increase in Leverage Capital Requirement (i.e. increase caused by new regulations)	Fall by 4.68%	Fall by 50%	No effect	Rise	Fall by 0.4%
1% Negative Shock to Bank Capital (i.e. shock caused by the market)	Fall by 5.47%	Fall by 5.47%	No effect	No effect	Rise by 0.4%
1% Negative Shock to Loan Demand (i.e. shock caused by the market)	Fall by 0.05%	Fall by 0.05%	No effect	No effect	Fall by 0.01%

Source: BIS Working Paper No. 88, June 2000, by Craig Furfine.

Table 1 shows that negative shocks to loan demand have almost no impact on banks asset allocation decision; Negative shocks to bank capital reduce banks total assets, but do not affect capital ratios; Capital requirement changes (risk-based and leverage), have a greater impact on banks assets allocation and on capital ratios than has market discipline. Table 1 is important since shows that banks that correctly develop systems to better manage capital allocation in any of above cases, may reduce opportunity costs (i.e. capital requirement) and equity funding, enhancing even further their competitive advantage in relation to banks who erroneously manage their capital allocation.

Basel I, by introducing the idea that each type of assets held by the bank has different risk weights, was successful in improving banking industry solvency and implementing a better capital management discipline. However, this framework still misses the notion that risk varies not only in relation to the type of asset (e.g. loans to corporation, loans to individuals, mortgage loans, etc.) but also in relation to the setting in which a bank performs an investment and the different credit ratings that bank's customers may have.

Advances on technology and information systems have opened the opportunity for the Basel Committee on Banking Supervision to develop new guidelines that not only would overcome Basel I deficiencies but also would give the opportunity for banks to better manage their portfolios and reduce their capital requirements.

The remainder of this paper will introduce the new capital requirements regulations (Basel II) and describe its probable impact on the banking industry.

III - Basel II - International Convergence of Capital Measurement and Capital Standards: A Revised Framework

Advances in risk management practices, technology, and banking practices have made the 1988 Basel I's approach to measuring capital less meaningful for many banking organizations. Likewise, improvements in internal processes, the adoption of more advanced risk measurement techniques, and the increasing use of sophisticated risk management practices such as securitization have changed leading organizations' monitoring and management of exposures and activities.

The Basel II Framework sets out the details for adopting more risk-sensitive minimum capital requirements for banking organizations. The new framework reinforces these risk-sensitive requirements by laying out principles for banks to assess the adequacy of their capital and for supervisors to review such assessments to ensure banks have adequate capital to support their risks. It also seeks to strengthen market discipline by enhancing transparency in banks' financial reporting[6].

This goal will be accomplished through the introduction of "three pillars" that reinforce each other and that create incentives for banks to augment the quality of their control processes. The ***first pillar*** represents a significant strengthening of the minimum requirements set out in the 1988 Accord, the ***second pillar*** sets new rules to capital supervision and the ***third pillar*** sets new rules for banks disclosures of risk exposure, capital and control processes.

In the U.S., Basel II will be mandatory only for the largest banks – those with more than $250 billion in total assets or $10 billion in international exposure. Other banks will be allowed to opt in, provided that their risk management infrastructure meets the same standards required for the mandatory banks. Banks that do not opt in will remain under the current Basel I capital regime. Another notable feature of U.S. implementation is that participating banks will be required to adopt the advanced methods of "Pillar I" for determining capital requirements for both credit and operational risk[7]. Bellow a brief discussion of those methods:

1) Internal Ratings-Based approach (IRB): Credit Risk

In a different way from Basel I in which risk exposures for diverse asset class were determined by regulators using pre-determined risk weights, IRB sets to banks the responsibility for determining their specific asset class risk exposure and also establishes guidelines to the development of an internal rating system for each individual bank customer. Only after banks are able to measure those risks, mechanical steps are in place in order to determine banks minimal capital requirements. The variables which banks must assess are the following:

[6] BIS Basle II press release of 06/26/2004

[7] Advances approaches were developed for the determination of credit risk, securitization risk, operational risk and counterparty credit risk. For more information, consult www.bis.org .

a) Risk Components:
- Probability of default (PD): represents an estimate of the long-run average of one-year default rates for each individual borrower. Each borrower will be classified in different brackets of PD in an analogous way as rating agencies such as Moody's or Standard & Poor's classifies corporate debt.
- Loss given default (LGD): Each asset class of banks portfolio, has a different LGD. This risk component represents the percentage of the write off items of bank's balance sheet that won't be recovered plus related costs of recovery.
- Maturity (M): represents how long will take to the loan to be repaid. Higher maturities represent higher risk.
- Exposure at Default (EAD): represents the amount that is in stake in the case of default.

b) Expected Losses (EL): Represented by the formula PD X LGD X EAD, this figure is the expected amount that banks must set aside as provision or allowances over loan losses[8].

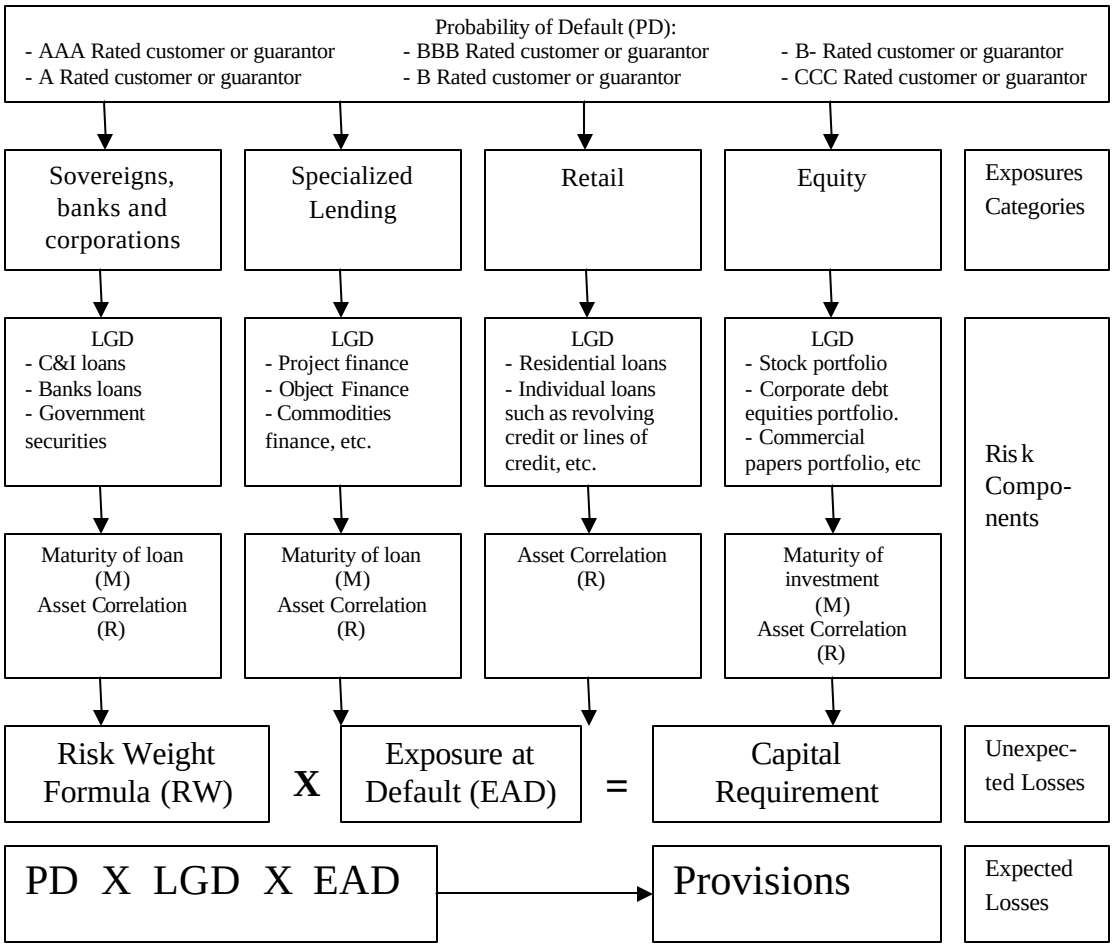
c) Unexpected Losses (UL): Under Basel II, UL is the most important factor in determining risk weights for capital requirements. Under EL guidance, a bank can predict how much must be set aside as provision. Conversely, under UL guidance, banks obtain the amount of capital that must be set aside for extraordinary events. This amount multiplied by 12.5 (i.e. 1/0.08), represents a bank ***minimum capital requirement***.

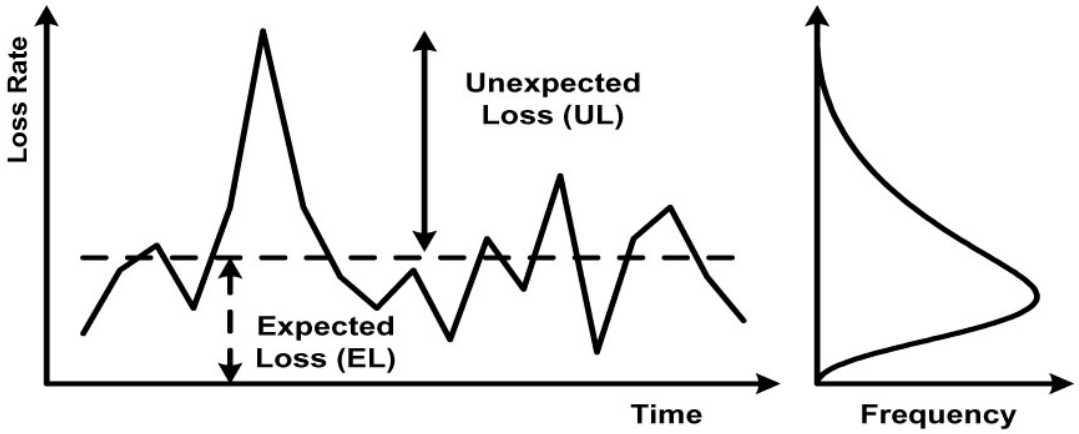
UL models are based on VAR (Value at Risk), which confidence level is fixed at 99.9%. This means that the model determines the necessary capital cushion to protect banks from losses that may exceed tier 1 and tier 2 capital level on average of once every 1000 years. This high level of confidence was chosen to protect the model against errors in the estimation of PD, LGD and EAD as well other model uncertainties.

Figure 6 gives an insight of how IRB for credit risk works:

[8] For equity, PD/LGD approach is taken in order to determine EL. For more information, go to www.bis.org.

Figure 6: IRB framework – Credit Risk

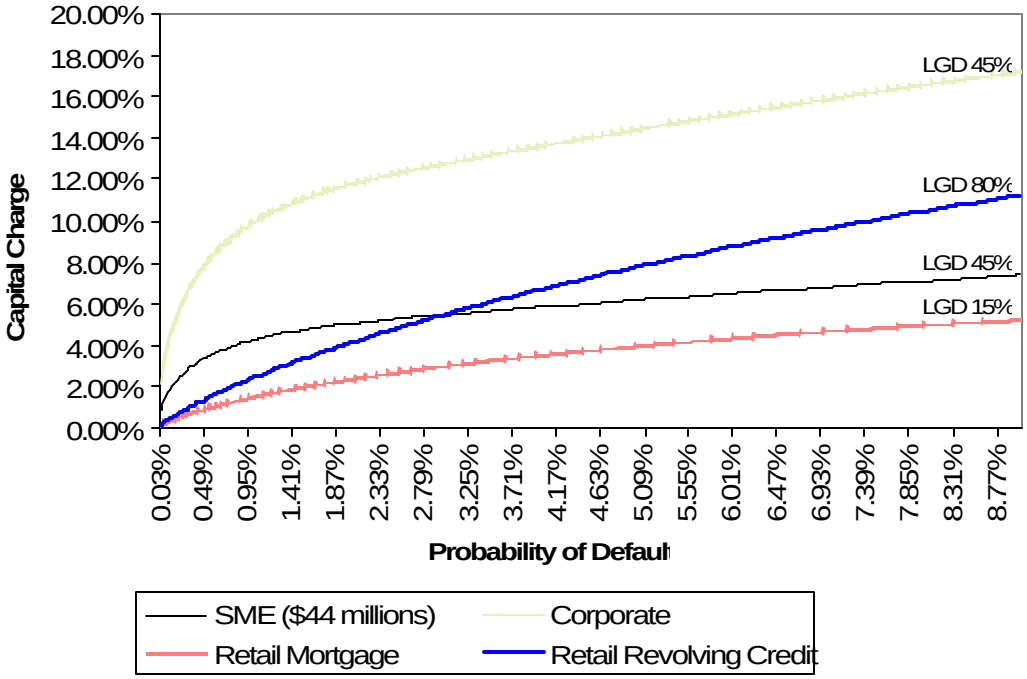




Source: FDIC

Figure 7 represents the increases on capital charges in perspective to different LGD's and PD's:

Figure 7 – Capital Charges Vs. Probability of Default



In this graph, maturity (M) was kept the same for all asset classes (5 years); Loss Given default (LGD), is different for each asset class; Exposure at Default (EAD) is the same for all. Under Basel I Corporate, Small and medium size enterprises (SME's) and Retail loans would have fixed capital charges of 8%, 8% and 4% respectively. Under Basel II IRB approach, capital charges would vary depending on the specifics PD's of borrowers, the capacity of the bank to recover defaulted loans (LGD) and the maturity of the loans.

2) Advanced Measurements Approach (AMA) - Operational Risk:

Operational risk is defined as losses associated with the following: internal and external fraud; inconsistent employment practices and workplace safety; clients, products and business practices; damage to physical assets; business disruption and system failures; execution, delivery and process management.

AMA approach will provide banks with the opportunity of identifying and assessing their exposure to operational risks. Banks that are already complying with the Sarbanes-Oxley Act of 2002 (SOX), are head start on this issue.

In order to estimate the operational risk exposure, banks will evaluate the potential losses consistent with 99.9 percent of confidence level over a one-year period. After, the institution will multiply this exposure by 12.5 (i.e.1/0.08) to obtain the risk-

weighted assets for operational risk. This figure added to risk-weighted assets for credit and market risk, will provide banks the overall regulatory capital ratio.

Bellow is an illustrative example of how much capital would be required for a bank that performs commercial and industrial loans (C&I) and real estate loans under Basel I and Basel II advanced approaches:

Under Basel I:

Loan segment	Loan amount	Weighted risk	Min capital requirement ratio	Capital requirement
Commercial & Industrial credit	$ 100	100%	8%	$ 8
Real Estate	$ 100	50%	8%	$ 4
Total Assets:	$ 200	***Weighted Average:***	***6%***	***$12***

From above table, we see that for a $ 200 loan portfolio, the bank needs to set aside 6% for capital requirements, incurring opportunities costs. An important characteristic of Basel I is that this model doesn't take into account the credit quality of the borrower, thus a bank would incur the same opportunity costs if it was to lend to a high qualified borrower or a low qualified borrower.

Under Basel II Advanced Approaches:

Under this guideline, capital requirements take into account the credit risk of the loan and the operational risk of the bank. For credit risk, capital requirements will change in accordance to bank's internal assessments of the loan portfolios' LGD (loss given default) and each client's ratings or PD (probability of default)[9]. For operational risk, capital requirements will change in accordance with the bank's assessment of losses resulting from internal processes, people, and systems or from external events. In our example the new capital requirement would be:

Loan segment	Loan amount	Weighted risk	Min capital requirement ratio	Capital requirement
Commercial & Industrial credit[10]	$ 100	3.28% to 735.31%	8%	$ 0.26 to $58.82
Real State[11]	$ 100	0.96% to 539.11%	8%	$0.08 to $43.13
Operational Risk[12]	@ $200	15%	ROE: 1.30%	$ 0.39
Total Assets	$ 200	***Weighted Average:***	***0.36% to 51.17%***	***$ 0.73 to $ 102.34***

[9] For C&I loan, the maturity, the annual revenue of the borrower and adjustments of PD also count in determining the capital requirements.
[10] Source: FDIC. Considering maturity 2.5 year, PD (from AAA to CCC) and LGD (from 10% to 90%).
[11] Considering PD (from AAA to CCC) and LGD (from 10% to 90%).
[12] For illustrative purposes, it was applied the operational risk standard approach. In the US, only the advanced measurement approach (AMA) will be adopted.

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From above table, the bank may have to set aside a figure that lies between 0.36% and 51.17% of the loan portfolio. Depending on the type of the borrower, the bank will incur in lower or higher opportunities costs compared to Basel I. Thus, Basel II rewards banks with lower capital requirements if they are able to develop a loan portfolio with low credit risk, and penalize the ones with high credit risk portfolios. Attention must be made to Operational risk add-on to the overall capital charge. If an institution doesn't develop strong internal controls in order to mitigate this risk, operational capital charges may off-set gains from reduction of credit risk capital charges.

It is estimated by the Basel II committee that possible relieves in regulatory capital are capped to 95% (2007), 90% (2008) and 80% (2009). But is important to note that a) the committee does not guarantee a reduction on capital requirements due to the introduction of Operational Risk and country's specific capital requirements regulations; and b) If capital requirement relief is achieved, it won't come cheap for banks due to extra expenditures in implementing the new system.

Nevertheless, Basel II, over time will enhance bank discipline toward risk management and measurement, and will better align regulatory capital requirements with underlying risk profiles. ***Also, Basel II will provide to markets better banks disclosures, which may reward the institutions that adopt the new guidelines with lower financing costs.***

We will continue this paper discussing the impact of Basel II regulations on the banking industry and how they may affect players' competitive advantage.

IV - Basel II Impact on Banking Industry:

We began this paper describing how new capital regulations have higher impact on banks capital allocation than market discipline. Since better management of capital represents an improvement on a firm's competitive advantage[13], the adoption of capital regulations of Basel II may enhance banks competitive advantage in relation to banks that do not adopt the new guidelines. The third and last part of this paper performs a qualitative study of how banks that do not adopt Basel II will be at a disadvantage in relation to banks that do adopt the new regulation.

We will start this study showing the Basel Committee on Banking Supervision third quantitative impact study (BIS QIS 3) performed with information provided by 74 banks which will adopt the advanced approaches of Basel II.

Table 2: Capital changes on simulation of Basel II advanced approaches

QIS 3 basis

	Group 1		
Portfolio	% of current capital	% change in capital requirement	Contribution
Corporate	30%	-14%	-4%
Sovereign[30]	1%	28%	1%
Bank	5%	16%	0%
Retail: (total)	21%	-50%	-10%
– Mortgage	11%	-60%	-6%
– Non-mortgage	8%	-41%	-3%
– Revolving	2%	14%	0%
SME (total)	18%	-13%	-3%
Equity	2%	114%	2%
Trading book	8%	2%	0%
Securitised assets	2%	129%	0%
Other portfolios			3%
General provisions			-3%
Overall credit risk		-14%	-14%
Operational risk			12%
Overall change		-2%	-2%

Source: BIS QIS 3

On table 2, we see that overall credit risk had a reduction of 14% over total capital charges, but those gains were almost off-set by the addition of operational risk. This may give a reasonable argument to regulators and critics of Basel II, that the new guidelines won't reduce at all the capital requirements for banks. But, still further studies are necessary on banking capital reduction after the adoption of the new guidelines in order to prove those arguments. For now, we cannot be too skeptical of the potential enhancements of Basel II on bank competitive advantage, mostly on the realm of better

[13] Porter, Michael E., "Capital Choices", 2000.

managing the banks credit exposures, operational exposures and the disclosure of its risk and control processes.

Bellow is some examples of how Basel II can reward the banks that adopt it and penalize the banks that don't adopt it.

1) *The cherry-picking paradigm*: On table 2, the categories that contributed most for the reduction of capital charges were retail and SME loans. It is important to note that today those items represent an average of 50% of all US commercial bank's assets. Since Basel II, improves the capability of banks in determining their credit risk exposure and the credit quality of the borrower, banks who adopt the new framework will better ***"cherry-pick"*** for potential borrowers, leaving only the "bad apples" to banks that don't adopt Basel II. In the long run, this competitive advantage will reduce Basel II banks credit risk and increase non-Basel II banks credit risk.

2) *Cheaper financing*: Under the Pillar III, Basel II banks will better disclose their risk exposures and control processes for the market. Since market reward institutions that better disclose their operations, market may reward Basel II banks with lower capital costs (both on equity and debt). Non-Basel II Banks may be penalized with higher cost of capital not only due to lower transparency, but also due to higher portfolio risks, as the ones discussed above.

3) *Real State Loans*: From 1994 to 2004, commercial banks increased their real state loan portfolio share from 24% to 31% of all bank's assets[14]. This kind of loan is considered one of the major generators of revenues for banks, not only due to interest income but also due to closing fees income. Today all banks (large, medium and small), compete in this market head-to-head with same opportunities of financing (by the Federal Home Loan Bank), same capital requirements regulations and securitization opportunities. As QIS 3 indicated, Basel II banks will be able to reduce by 60% the capital charges on this specific exposure. Thus, Basel II banks may take advantage of this opportunity, by reducing mortgage yields or closing fees, and reducing other banks market share in this segment.

While Basel II in the US will be mandatory only for the largest banks we believe that most banks, if not all banks should consider implementing the new capital adequacy guidelines to compete successfully with largest banks and their pricing strategies.
We demonstrated above, that capital regulations have higher impact on bank asset allocation than market discipline. Since better management of capital represents competitive advantage for banks, banks will improve their competitive advantage if they adopt the new guidelines of credit and operational risk management suggested by Basel II. ?

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[14] Due to past low fed funds and FHLB interest rates, we believe that the recent increase of real state loans are temporary, and may reduce back to levels around 25% of banks portfolio.