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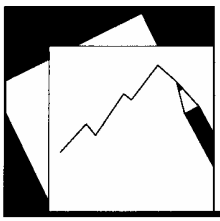

IMF Working Paper

Does Compliance with Basel Core Principles Bring Any Measurable Benefits?

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Does Compliance with Basel Core Principles Bring Any Measurable Benefits?

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Abstract

We explore the relationship between banking sector performance and the quality of regulation and supervision as measured by compliance with the Basel Core Principles for Effective Banking Supervision (BCP). Using BCP assessment results for 65 countries and 1998–2002 panel data for other variables, we find a significant positive impact of higher compliance with BCP on banking sector performance, as measured by nonperforming loans and net interest margin, after controlling for the level of development of the economy and the financial system and macroeconomic and structural factors.

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Contents Page

I. INTRODUCTION

Following the series of crises in the 1990s, an intensified attention to financial sector vulnerabilities has led to the adoption of a number of financial sector standards at the international level.[2] The Basel Core Principles for Effective Banking Supervision (BCP), introduced in 1997 by the Basel Committee on Banking Supervision, are one of the most important standards, largely due to the dominant position banks have in many financial systems as well as the potentially serious macroeconomic consequences of banking instability.[3]

The International Monetary Fund (IMF) and the World Bank have been leading the BCP compliance assessments, mostly in the context of the Financial Sector Assessment Program (FSAP).[4] The BCP assessments have been among the most rigorous, with detailed Core Principles Methodology, two assessors conducting each assessment, and a thorough review of draft assessment aiming to ensure consistency. Arrangements with cooperating supervisory agencies and central banks have ensured the participation of experienced experts in the assessments.

The introduction of international financial standards and the first assessment results have understandably generated interest in exploring the relationship between the observance of standards and the functioning of the financial sector. Recent work includes papers by Christofides, Mulder, and Tiffin (2003), who studied the impact of the observance of a variety of standards on spreads and ratings, Das, Quintyn, and Chenard (2004), who explored the link between financial sector soundness and regulatory governance, and Glennerster and Shin (2003), who focused on the effects of transparency on borrowing costs.

Despite the considerable attention BCP have received in FSAPs and other IMF work, there is limited evidence about the relationship between the compliance with BCP and the performance of the banking system. An initial attempt to explore this link was offered by Sundararajan, Marston, and Basu (2001). Their paper presented an empirical examination of the relationship between compliance with BCP (measured by a BCP noncompliance indicator constructed from the results of BCP assessments) and nonperforming loan ratios and spreads between lending and risk-free rates. Their results suggested that BCP noncompliance had no direct effect either on the level of nonperforming loans or the level of lending spread, but that it could influence credit risk and soundness indirectly through its interaction with other macroeconomic and banking sector factors. The analysis provided by Sundararajan, Marston, and Basu (2001) needs to be considered preliminary due to the rather severe limitation of data then available. Separately, Barth, Caprio, and Levine (2002) examined the relationship between specific regulatory and supervisory practices and banking sector development,

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[2] A compendium highlighting the 12 key standards for sound financial systems can be found at the Financial Stability Forum website (www.fsforum.org).

[3] A review of the Basel Core Principles has commenced recently.

[4] IMF and World Bank (2003) provides the most recent review of the FSAP program.

efficiency, and fragility and found little evidence of any impact of official supervisory power or bank activity restrictions on interest margins or nonperforming loans.[5]

This paper reexamines the relationship between banking sector performance and the quality of regulation and supervision, as measured by compliance with BCP. The basic question we address is whether following the BCP creates a regulatory and supervisory environment that helps improve banking sector performance. We use two of the common measures of banking sector performance: nonperforming loans (NPLs) and net interest margin. The level of nonperforming loans reflects the degree to which banks are able to perform one of their basic functions, i.e., collect the money they lend. While there may be different reasons for an increase in nonperforming loans, a high level of NPLs almost universally indicates serious problems in the banking sector. Net interest margin can be interpreted as a measure of the efficiency of banking sector performance, since it indicates the cost of banking intermediation that needs to be paid by banks' customers.[6]

We use a new data set and different methodology than previous literature. Using panel data from 1998 to 2002, a model explaining the variation of the ratio of nonperforming loans across 65 countries that went through the BCP assessment was estimated. Data from the 1998-2001 World Bank financial system structure database were used to estimate a model of net interest margin for the same set of countries. We include an index of BCP compliance in both models to explore whether BCP compliance has any measurable impact on banking sector performance after taking into account other determinants of NPLs and net interest margin.

Our results suggest that a higher degree of compliance with BCP has a significant positive impact on asset quality of banks (as measured by the ratio of nonperforming loans), even after taking into account the level of development of the economy and macroeconomic factors. We also find evidence that a higher degree of compliance with BCP is associated with lower net interest margin. An effort to improve compliance with BCP should therefore have a positive impact on banking sector performance across countries.[7]

The structure of the paper is as follows. The second section describes the models and data, the third section provides estimation results, and the fourth section concludes.

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[5] In a recent related paper, Demirguc-Kunt, Laeven, and Levine (2003) examined the impact of bank regulations, market structure, and national institutions on bank interest margins and overhead costs, and concluded that tighter regulations on bank entry and bank activities boost the cost of financial intermediation, along with inflation. They also found, however, that bank regulations become insignificant when controlling for indicators of economic freedom or property rights protection.

[6] Large net interest margins often indicate inefficient banking operations, high risks in lending, and monopoly power of banks and thus lower margins would be preferable. However, in some cases, over-competition could temporarily depress margins so low that financial stability may be threatened.

[7] We effectively test a joint hypothesis that (i) the quality of banking supervision and regulation matters for the performance of the banking system, and that (ii) BCP and the assessments measure the relevant features of quality of banking supervision and regulation. The theory does not offer a clear prediction of the impact of more intensive regulation and supervision on bank performance; for more detailed discussion, see Barth, Caprio, and Levine (2002).

II. Models and Data Description

A. BCP Compliance

We constructed a simple index of overall BCP compliance from assessments mostly conducted during FSAPs.[8] We use detailed information about each assessment, including a 4-grade rating for each core principle.[9] For the 65 countries in our sample, we have assigned values to assessment grades—compliant (4), largely compliant (3), materially non-compliant (2), and non-compliant (1). [10] The value of the index of overall compliance for a given country is equal to the sum of ratings for individual core principles.[11] Therefore, the actual values of the index of overall BCP compliance will be between 30 and 120, with higher values indicating a higher degree of compliance.[12]

Our sample includes 13 advanced economies, 19 emerging market countries, and 33 developing countries. Figure 1 below confirms that advanced countries achieved the highest level of BCP compliance, followed by emerging and developing countries. The variance of results, as measured by the difference between best and worst results in each group also increases from advanced to emerging and further to developing countries.

[8] Only few assessments were conducted on a stand-alone basis.

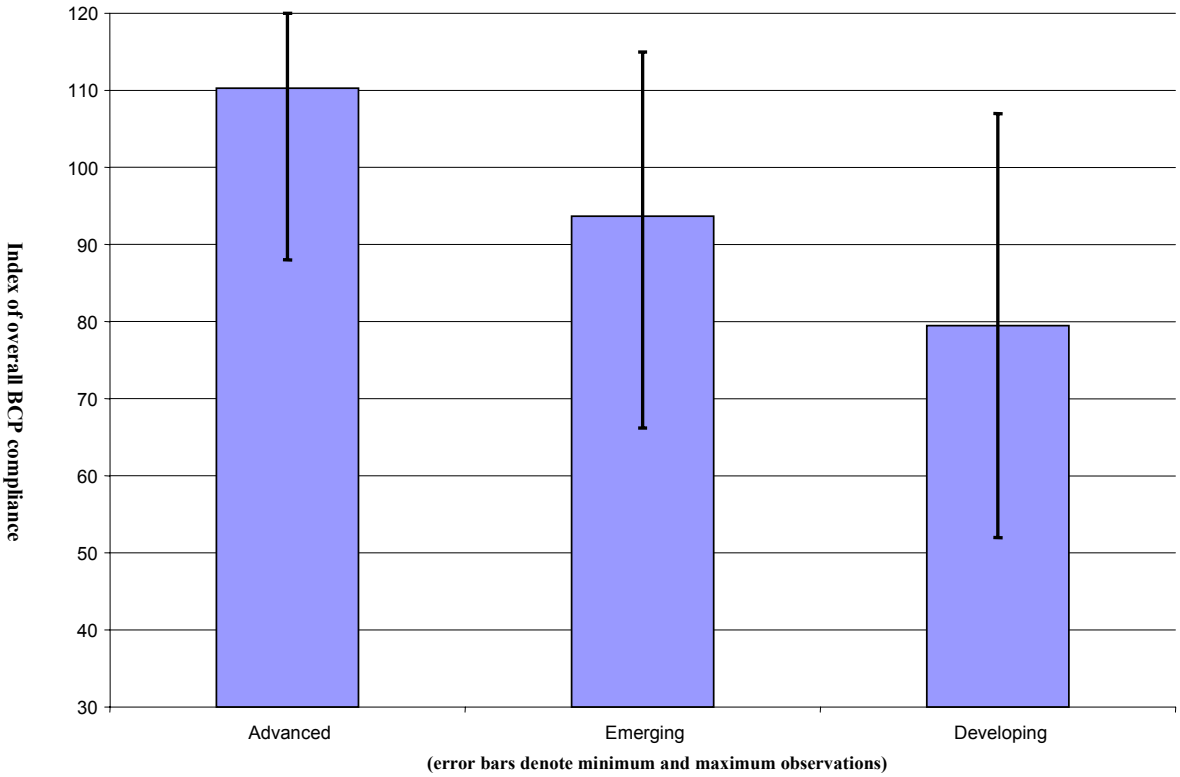
[9] The Appendix provides the list of the Basel Core Principles. See IMF and World Bank (2002) and Sundararajan, Marston, and Basu (2001) for useful background on BCP assessments.

[10] The list of countries in our sample is provided in the Appendix.

[11] In several assessments, there were some Core Principles either "not assessed" or "not applicable"; these were assigned an average value of compliance of principles with available rating for a given country, so that these countries were not penalized.

[12] We treat the 6 subcategories of Core Principle 1 (CP 1) as separate principles. This does not have any significant impact on the index—the correlation coefficient of our index (with 6 subcategories treated as separate principles) and an index with only one entry for CP 1 (equal to the average of the 6 subcategories) is 0.991.

Figure 1. Compliance with BCP by Country Group



Source: Author's calculations.

We also construct several sub-indices of BCP, using different groupings of the Core Principles and using the same procedure as described above for the overall BCP compliance. These include (i) objectives, autonomy, and powers of the supervisor (ii) licensing and structure (iii) prudential regulations (iv) methods of ongoing supervision; and (v) cross-border banking.[13] The correlation matrix of these sub-indices presented in Table 1 below suggests that the assessment results of the parts of BCP are rather closely correlated.

[13] The Appendix provides the list of the Basel Core Principles included in each of these categories.

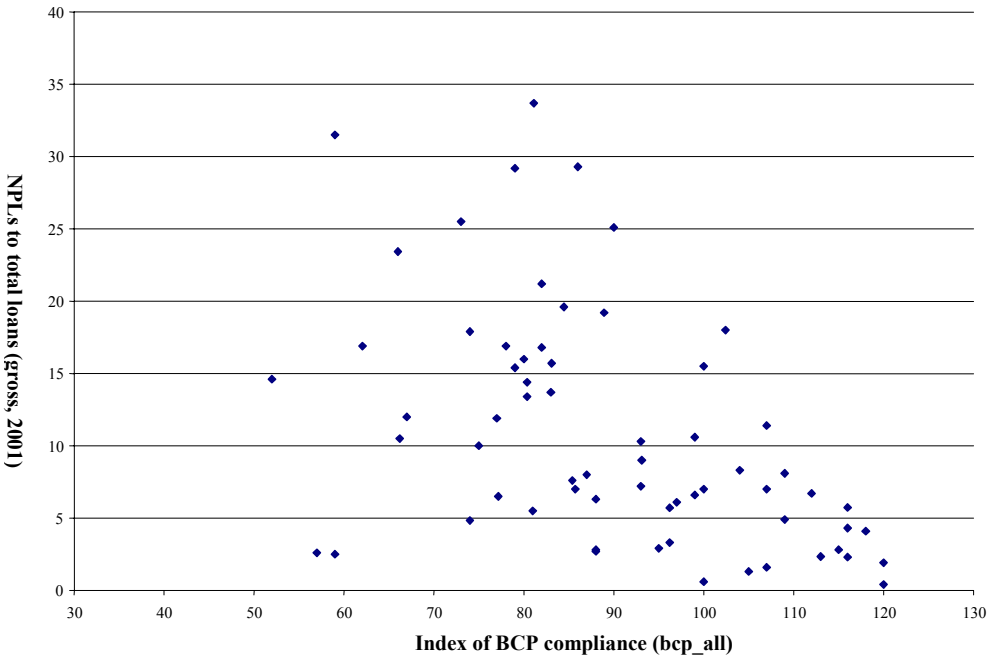
Table 1. Correlation Matrix of Main BCP Components

	Objectives, autonomy, powers	Licensing and structure	Prudential regulations	Methods of supervision	Cross-border banking	All core principles
Objectives, autonomy, powers (CP 1)	1.00	0.66	0.66	0.65	0.63	0.84
Licensing and structure (CP 2-5)		1.00	0.68	0.67	0.57	0.80
Prudential regulations (CP 6-15)			1.00	0.84	0.54	0.93
Methods of supervision (CP 16-20)				1.00	0.64	0.90
Cross-border banking (CP 23-25)					1.00	0.73
All core principles						1.00

Source: Author's calculations.

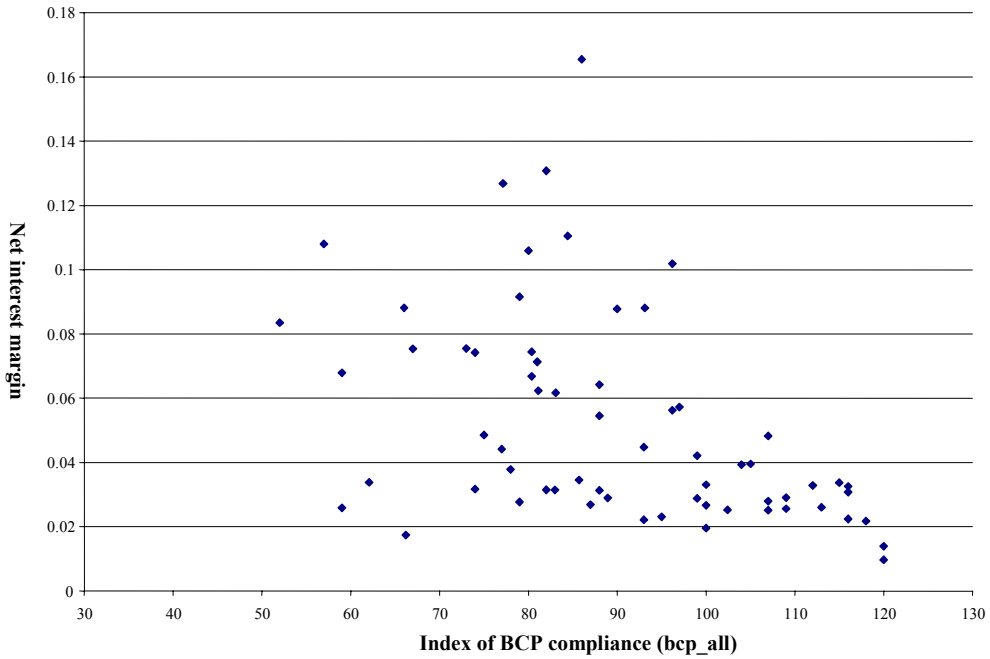
Higher degree of compliance appears to be associated with lower nonperforming loans and narrower net interest margin. Figures 2 and 3 below show that actual BCP compliance exhibits a considerable variation in our sample, from the perfect score of 120 to a rather low value of just over 50. Also, the two measures of banking performance show substantial variation across the sample. There appears to be a negative relationship between BCP compliance and the two banking measures, with high compliance being associated with more favorable outcomes—lower nonperforming loans and narrower margins. This relationship appears to be tighter for countries with higher compliance, as the dispersion of observations increases with decreasing compliance—this holds for both nonperforming loans and net interest margin.

Figure 2. Nonperforming Loans and Index of Overall BCP Compliance



Source: Author's calculations.

Figure 3. Net Interest Margin and Index of Overall BCP Compliance



Source: Author's calculations.

B. Model of Nonperforming Loans

We model the share of nonperforming loans in total loans as a function of macroeconomic variables in previous years (economic growth, changes in inflation, real interest rates, and exchange rates), a measure of compliance with BCP and variables controlling for the level of development of the economy (or of the financial sector):

$$npl_{i,t} = \alpha + \beta_1\, bcp_i + \beta_2\, growth_{i,t-1} + \beta_3\, cpi\_ch_{i,t} + \beta_4\, real\_ir\_ch_{i,t} + \beta_5\, exch\_rate_{i,t} +$$

$$+ \beta_6\, development_{i,t} + \varepsilon_{i,t} \qquad (1)$$

for panel data i = 1, …, 65 countries, t = 1, …, 5 years (1998–2002), where

bcp represents an index of compliance with BCP (two different indices, *bcp_all*, a measure of the overall compliance and *bcp_pru*, a measure of compliance with the core principles related to prudential regulations, core principles 6–15). [14] Only one observation of BCP compliance

[14] The BCP include CP 15 (Money Laundering) under Prudential Regulations and Requirements, even though it reflects market integrity rather than prudential requirements. We have calculated both indices, with and without CP 15, and found that there is virtually no difference between them (correlation coefficient of 0.993). We use the official definition and include CP 15 into the prudential sub-index.

per country is available (from one assessment for each country performed mostly from 1999–2001) and this is assumed to remain constant over the five years.[15]

growth stands for the GDP growth, we include lagged growth (t-1) into the model;

cpi_ch denotes the change of consumer inflation in the previous two years;

real_ir_ch denotes a change of real lending rates over the previous two years;

exch_rate stands for the change the country's exchange rate (we use both a change in the nominal exchange rate relative to the U.S. dollar, *exch,* and a change in the real effective exchange rate, *reer*); and

development represents a variable capturing the level of development of the country's economy or its financial system. We use the level of GDP per capita in purchasing power parity, *ppp_gdp,* as a measure of the level of development of the economy (and a proxy for the development of the country's legal and financial system) as well as the ratio of M2 to GDP, *m2/gdp,* as a proxy for the degree of development of the financial system.

The temporal structure of the model reflects the expectation that different shocks will impact nonperforming loans with different lags. Therefore, we include a contemporaneous change in the exchange rate, real GDP growth with one lag, and changes in inflation and real interest rates over two years. The Appendix provides information on data sources.[16]

We expect the parameters β_1, β_2, and β_6 to be negative, as higher compliance with BCP, higher economic growth, and higher level of economic (or financial) development can be expected to have a positive impact on asset quality in banks (i.e., lower nonperforming loan ratios). Parameter β_4 is expected to be positive, since an increase of real interest rates would be expected to worsen asset quality, making loan repayment more difficult. Parameters β_3 *and* β_4 could be either positive or negative, since the effect of accelerating inflation depends on whether its acceleration was anticipated or not, how flexible are lending rates, and whether the acceleration signals general economic instability. For the exchange rate, the effect depends on the composition of outstanding credit (i.e., the size of unhedged positions and the share of borrowers whose business benefits from a given change in the exchange rate) and large exchange rate movements can signal general economic instability as well.

One of the econometric issues we face is the problem of the quality of NPL data. First, differences in definitions across countries can result in measurement errors. Second, the actual level of NPLs could be underreported in some countries, mostly in those with weak

[15] While this is clearly a limiting assumption, it appears reasonable since the level of BCP compliance, particularly the practical application of the core principles, is unlikely to change quickly and there is likely to be a substantial time lag before any impact of changed regulation and supervision becomes observable in banking system performance.

[16] Data limitations prevented us from including a measure of government ownership and foreign ownership in the financial system. This information is available in the database provided by Barth, Caprio, and Levine (2001), but only for one point in time and for less than 50 countries in our sample. Including these two variables and using a limited sample (assuming the ownership data are constant across 1998–2002) did not change the results to any substantial extent and only the government ownership variable was statistically significant (and positive).

regulation and supervision. As for the first issue, as long as we can assume that the measurement error of the dependent variable is uncorrelated with the regressors, it can be absorbed in the disturbance of the regression and ignored. The second issue would bias our estimates of the impact of BCP compliance on NPLs downward, i.e., against us finding a significant relationship.[17]

There is an issue of potential endogeneity of bank regulation and supervision and we use instrumental variables to control for this problem. An effective instrumental variable needs to be correlated with the independent variable in question, but uncorrelated with the error term. We use two broad governance indices compiled by Kaufmann, Kraay, and Mastruzzi (2003)—an index of government effectiveness and an index of control of corruption. These indices are correlated with the index of BCP compliance, yet they are broad enough relative to the dependent variable to allow us to assume that they impact the dependent variable only through bank regulation and supervision. We also test whether these two indices are not rejected as valid instruments by the data (as described below).

The government effectiveness index is set up to measure the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. The index of control of corruption measures perceptions of corruption, with different measurement sources varying from the frequency of "additional payments to get things done," to the effects of business corruption, to measuring "grand corruption" in the political area.[18]

To estimate model (1), we use a generalized method of moments (GMM) estimator that is robust to heteroscedasticity and autocorrelation on the pooled sample. This estimator allows us to test the validity of the instruments by imposing orthogonality conditions that the instrumental variables are not correlated with the error term. The Hansen (1982) test of overidentifying restrictions can be interpreted as a test of whether the instruments are associated with the level of nonperforming loans beyond their ability to explain compliance with BCP (as a measure of bank regulation and supervision). If the null hypothesis is not rejected, then the data do not reject the validity of the instruments.[19]

We also estimate two panel data models with an adjustment for heteroscedasticity and the same instruments as above. These are (i) regression on country means over the five years (a

[17] For instance, assume that the true NPL ratio is *npl** and we can only observe an underreported ratio *npl*, with (i) a measurement error ξ independent of all other variables and the overall disturbance of the regression; and (ii) underreporting proportional to our measure of the quality of banking regulation and supervision (bcp). Then $npl^* = npl + \varphi\ (120 - bcp) + \xi$ for $\varphi > 0$, i.e., the lower quality the higher underreporting. Denote the coefficient reflecting the impact of BCP compliance on *npl** as β_1 and assume it is negative. If we use *npl* as the dependent variable in our regression instead of *npl**, we actually estimate $(\beta_1 + \varphi)$, a smaller coefficient in absolute value than if we could use *npl** since $\beta_1 < 0$ and $\varphi > 0$. The measurement error ξ will be absorbed in the disturbance of the regression.

[18] For details, see Kaufmann et al. (2003).

[19] The test statistic has chi-square distribution with two degrees of freedom (for two instruments, i.e., two overidentifying restrictions).

"between" estimator); and (ii) a random effects model, which assumes that the individual country intercepts are drawn from a common distribution.[20] For the estimates of the random effects model to be consistent, the individual intercepts cannot be correlated with independent variables. We test this correlation through the Hausman test statistic (H_0 = random effects).

C. Model of Net Interest Margin

The model of net interest margin explains the cross-country variation of the margin as a function of structural characteristics of the banking sector (overhead as an indicator of operating costs and ratio of nonperforming loans as an indicator of lending risks), a macroeconomic indicator (consumer price inflation) serving as a proxy of macroeconomic stability, a measure of compliance with BCP, and measures of the level of development of the economy and of the financial system:

$$margin_{i,t} = \alpha + \beta_1\, bcp_i + \beta_2\, overhead_{i,t} + \beta_3\, npl_{i,t} + \beta_4\, cpi_{i,t} + \beta_5\, development_{i,t} + \varepsilon_{i,t} \qquad (2)$$

for panel data i = 1, …, 65 countries, t = 1, …, 4 years (1998–2001), where

bcp represents an index of compliance with BCP, as above (again, we use both a measure of the overall compliance and a measure of compliance with the prudential core principles);

overhead stands for bank overhead costs as a share of total assets;

npl denotes a ratio of nonperforming loans;

cpi stands for the consumer price inflation; and

development represents a variable capturing the level of development of the country's economy or its financial system. Here we use (i) the level of GDP per capita in purchasing power parity, *ppp_gdp*; (ii) the ratio of M2 to GDP, *m2/gdp*; and (iii) the total financial system deposits as a share of GDP, *all_dep/gdp*.

We have also included a variable measuring concentration of the banking sector, assets of three largest banks as a share of banking system total assets, but it was not significant in any regression and we excluded it from the final model.[21] Additional information about the data is provided in the Appendix.

We expect the parameters β_2, β_3, *and* β_4 to be positive, with higher costs, higher nonperforming loans, and less stable macroeconomic environment all increasing the net interest margin banks charge. The parameters β_1 and β_5, on the other hand, would be expected to be negative, as better regulation and supervision and higher level of development of the financial system should be associated with lower intermediation costs.

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[20] We run also the basic pooled regression (equivalent to the model estimated by GMM). The fact that we have only one observation for the BCP compliance does not allow us to estimate a fixed-effects model in which the parameter at the BCP compliance variable would be identified.

[21] The same data limitations concerning government ownership and foreign ownership described for the NPL model above apply here.

As in the case of the nonperforming loans model above, we use government effectiveness and control of corruption as instrumental variables, the GMM estimator on the pooled sample, and estimate two additional panel data models.

III. RESULTS

The estimation results for the nonperforming loans model, presented in Table 2 below, suggest that compliance with the Basel Core Principles is indeed associated with a lower share of nonperforming loans.[22] Estimates of the parameter β_1 are statistically significant and negative, implying that higher observance of BCP is associated with lower nonperforming loans. This holds for both overall compliance and compliance with prudential core principles.[23] The difference in magnitude of estimated coefficients is due to the different scale of the two indices.

Most other parameter estimates have the expected sign. Higher growth in previous years helps reduce nonperforming loans, but an increase of real interest rates and an acceleration of inflation worsen bank asset quality, as measured by nonperforming loans. The impact of nominal exchange rate depreciation appears to be negative, i.e., a depreciation would have a negative impact on asset quality (higher NPLs). The exchange rate results suggest that, in our sample, the negative impact of a depreciation on asset quality due to unhedged positions is greater than its positive impact on borrowers benefiting from a weaker currency (exporters and producers of tradeable goods).[24]

Countries with higher GDP per capita tend to have lower nonperforming loans. GDP per capita expressed in purchasing power parity, used as a proxy for an overall financial and economic development, is a significant explanatory variable and the parameter estimates have the expected negative sign. A somewhat more direct measure of financial sector development, M2/GDP, was not statistically significant.

Overall, the models provide a reasonably good explanation of cross-country variation in the share of nonperforming loans. The models that attempt to explain variation across all available observations (pooled sample model) explain over 30 percent of the variation, while the "between" estimator explains over 40 percent of the variation of country means.

The estimation results for the net interest margin model are similar. The results of the GMM-estimated pooled sample model, presented in Table 3, suggest that a higher level of BCP compliance does help reduce intermediation costs (net interest margin). However, the BCP

[22] The Hausman test rejected the validity of the random effects model in almost all specifications, so we do not report the estimates here.

[23] Similar results were obtained using some other sub-components of the BCP described in Table 1 above—CPs 1-5 (objectives, autonomy, power, resources, licensing, and structure), CPs 16-20 (methods of on-going supervision), and CPs 23-25 (cross-border banking).

[24] The real exchange rate was not significant in virtually any specification. We therefore included the nominal exchange rate measure in the final model.

compliance coefficients in the model of country means is not statistically significant, even though they have the expected sign.

Most other parameter estimates in Table 2 have the expected sign and are statistically significant. Higher overhead costs clearly contribute to higher net interest margins, as does higher inflation. Also, a higher degree of development of the economy or the financial system as measured by GDP per capita is associated with lower net interest margins.[25] However, the estimated coefficient for the impact of nonperforming loans does not have the expected sign. This is difficult to explain, but it could be partly caused by the fact that it is the future probability of default that is being priced in the net interest margin, while the indicator of nonperforming loans is largely backward-looking. The explanatory power of the models is rather good, as they explain 70–75 percent of the variation in net interest margins.

We have also explored the stability of the coefficient relative to sample selection by randomly dropping the observations for 5 countries and reestimating the pooled sample model by GMM. The results appear to be rather robust, as the magnitude of the estimates remained approximately the same and they remained statistically significant. As our sample overlaps only partially with that of Sundararajan, Marston, and Basu (2001) and our methodology is considerably different, we were unable to compare the results more directly.[26]

[25] Higher M2/GDP and ratio of total financial system deposits to GDP were also associated with a lower net interest margin (when substituted for GDP per capita). We also included a measure of concentration of the banking sector into the model, but it was not statistically significant.

[26] Our sample includes 24 of the 35 countries listed by Sundararajan, Marston, and Basu (2001), partly due to exclusion of several very early assessments from our sample. These were done before the assessment methodology was fully developed. Another factor complicating the replication of their sample is the fact that only 24–29 countries were actually used in estimation according to the reported results.

Table 2. Nonperforming Loans Model: Results

	c	*bcp_all*	*bcp_pru*	*growth(-1)*	*cpi_ch*	*real_ir_ch*	*exch*	*ppp_gdp 1/*	R^2	N	OIR-test 2/
GMM/IV estimates (pooled sample) 3/											
npl (1)	31.00***	-0.17***	…	-0.42**	0.06	0.07	0.04*	-0.32***	0.33	274	5.86
	(4.81)	(0.06)		(0.18)	(0.05)	(0.05)	(0.02)	(0.08)			
npl (2)	26.14***	…	-0.35***	-0.42**	0.07	0.07	0.04*	-0.34***	0.32	274	5.67
	(3.71)		(0.13)	(0.18)	(0.05)	(0.05)	(0.02)	(0.07)			
BETWEEN estimator (OLS on means with heteroscedasticity adjustment) 4/											
npl (1)	60.56***	-0.52***	…	-0.44	0.27*	0.29*	0.01	0.02	0.43	274	…
	(15.85)	(0.19)		(0.39)	(0.14)	(0.16)	(0.06)	(0.23)			
npl (2)	45.89***	…	-1.15**	-0.44	0.26*	0.28*	0.01	-0.01	0.43	274	…
	(10.62)		(0.44)	(0.39)	(0.14)	(0.16)	(0.06)	(0.23)			

Source: Author's estimates. Standard errors in parentheses.

**** denotes significance at the 1 percent level, ** at 5 percent and * at 10 percent*

1/ Reported coefficients and standard errors multiplied by 10^3.

2/ Test of overidentifying restrictions (chi-square distribution, 2 d.f., 5 percent critical value is 6.0).

3/ Generalized method of moments estimator, robust to heteroscedasticity and autocorrelation. Indices of government effectiveness and control of corruption were used as instruments. Estimated using the GMM routine in TSP 4.5.

4/ Estimated using the PANEL routine in TSP 4.5. with an adjustment for heteroscedasticity. Indices of government effectiveness and control of corruption used as instruments.

Table 3. Net Interest Margin Model: Results

	c	*bcp_all 1/*	*bcp_pru 1/*	*overhead*	*npl 1/*	*cpi 1/*	*ppp_gdp 2/*	R^2	N	OIR-test 3/
GMM/IV estimates (pooled sample) 4/										
margin (1)	0.04***	-0.19*	...	0.68***	-0.29**	0.76***	-0.80***	0.70	241	2.98
	(0.01)	(0.11)		(0.10)	(0.18)	(0.27)	(0.22)			
margin (2)	0.04***	...	-0.64*	0.70***	-0.33*	0.75***	-0.70***	0.70	241	2.20
	(0.01)		(0.34)	(0.11)	(0.18)	(0.27)	(0.24)			
BETWEEN estimator (OLS on means with heteroscedasticity adjustment) 5/										
margin (1)	0.07	-0.45	...	0.65***	-0.40	0.91***	-0.57	0.75	241	…
	(0.05)	(0.53)		(0.11)	(0.32)	(0.24)	(0.51)			
margin (2)	0.06	…	-1.05	0.65***	-0.40	0.91***	-0.55	0.75	241	…
	(0.03)		(1.19)	(0.11)	(0.32)	(0.24)	(0.51)			

Source: Author's estimates. Standard errors in parentheses.

**** denotes significance at the 1 percent level, ** at 5 percent and * at 10 percent*

1/ Reported coefficients and standard errors multiplied by 10^3.

2/ Reported coefficients and standard errors multiplied by 10^6.

3/ Test of overidentifying restrictions (chi-square distribution, 2 d.f., 5 percent critical value is 6.0).

4/ Generalized method of moments estimator, robust to heteroscedasticity and autocorrelation. Indices of government effectiveness and control of corruption were used as instruments. Estimated using the GMM routine in TSP 4.5.

5/ Estimated using the PANEL routine in TSP 4.5. with an adjustment for heteroscedasticity. Indices of government effectiveness and control of corruption used as instruments.

IV. CONCLUSION

This paper explores the relationship between banking sector performance and the quality of regulation and supervision as measured by compliance with the Basel Core Principles. We use a new data set and different methodology than the initial attempt by Sundararajan, Marston, and Basu (2001). BCP assessment results for 65 countries are used, along with 1998–2002 panel data for nonperforming loans and other explanatory variables. For the net interest margin, we use 1998-2001 data from the World Bank financial system structure database.

We find a direct positive effect of compliance with the Basel Core Principles on the banking sector performance, as measured by the share of nonperforming loans and the net interest margin. Higher compliance with the BCP is associated with lower NPLs and lower net interest margin, suggesting that following the BCP creates a regulatory and supervisory environment that helps improve banking sector performance.

Clearly, our understanding of the interaction between banking regulation and supervision and banking sector performance and development is far from complete and there is substantial room for further research. Important data limitations continue to pose problems, most importantly the lack of consistent data on regulation and supervision over time, which would make it possible to make full use of panel data techniques and explore the impact of changes in regulation and supervision on the banking sector.

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Basel Core Principles for Effective Banking Supervision

C1 Chapter 1 Objectives, Autonomy, Powers, and Resources (CP 1)
CP1 Principle 1. Objectives, Autonomy, Powers, And Resources.
SP11 Principle 1(1). An effective system of banking supervision will have clear responsibilities and objectives for each agency involved in the supervision of banks.
SP12 Principle 1(2). Each such agency should possess operational independence and adequate resources.
SP13 Principle 1(3). A suitable legal framework for banking supervision is also necessary, including provisions relating to authorization of banking establishments and their ongoing supervision.
SP14 Principle 1(4). A suitable legal framework for banking supervision is also necessary, including powers to address compliance with laws, as well as safety and soundness concerns.
SP15 Principle 1(5). A suitable legal framework for banking supervision is also necessary, including legal protection for supervisors.
SP16 Principle 1(6). Arrangements for sharing information between supervisors and protecting the confidentiality of such information should be in place.
C2 Chapter 2 Licensing and Structure (CPs 2-5)
CP2 Principle 2. Permissible Activities.
CP3 Principle 3. Licensing Criteria.
CP4 Principle 4. Ownership
CP5 Principle 5. Investment Criteria
C3 Chapter 3 Prudential Regulations and Requirements (CPs 6-15)
CP6 Principle 6. Capital Adequacy
CP7 Principle 7. Credit Policies
CP8 Principle 8. Loan Evaluation and Loan-Loss Provisioning
CP9 Principle 9. Large Exposure Limits
CP10 Principle 10. Connected Lending
CP11 Principle 11. Country Risk
CP12 Principle 12. Market Risks
CP13 Principle 13. Other Risks
CP14 Principle 14. Internal Control and Audit
CP15 Principle 15. Money Laundering
C4 Chapter 4 Methods of On-Going Supervision (CPs 16-20)
CP16 Principle 16. On-Site and Off-Site Supervision
CP17 Principle 17. Bank Management Contact
CP18 Principle 18. Off-Site Supervision
CP19 Principle 19. Validation of Supervisory Information
CP20 Principle 20. Consolidated Supervision
C5 Chapter 5 Information Requirements (CP 21)
CP21 Principle 21. Accounting Standards
C6 Chapter 6 Formal Powers of Supervisors (CP 22)
CP22 Principle 22. Remedial Measures
C7 Chapter 7 Cross-Border Banking (CP 23-25)
CP23 Principle 23. Globally Consolidated Supervision
CP24 Principle 24. Host Country Supervision
CP25 Principle 25. Supervision Over Foreign Banks' Establishments

List of economies in the sample:

1 Albania
2 Armenia
3 Austria
4 Bangladesh
5 Bolivia
6 Brazil
7 Bulgaria
8 Cameroon
9 Colombia
10 Costa Rica
11 Croatia
12 Czech Republic
13 Dominican Republic
14 Egypt
15 El Salvador
16 Estonia
17 Finland
18 France
19 Gabon
20 Germany
21 Ghana
22 Guatemala
23 Hong Kong SAR
24 Hungary
25 Iceland
26 India
27 Indonesia
28 Ireland
29 Israel
30 Italy
31 Jamaica
32 Japan
33 Kazakhstan
34 Kenya
35 Korea
36 Kuwait
37 Kyrgyz Republic
38 Latvia
39 Lithuania
40 Luxembourg
41 Macedonia, former Yugoslav Republic of
42 Malta
43 Mauritius
44 Morocco
45 Mozambique
46 Nigeria
47 Oman
48 Peru
49 Philippines
50 Poland
51 Russia
52 Slovak Republic
53 Slovenia
54 South Africa
55 Sri Lanka
56 Sweden
57 Switzerland
58 Tanzania
59 Thailand
60 Tunisia
61 Turkey
62 Uganda
63 Ukraine
64 United Kingdom
65 Zambia

Additional data information

npl—gross nonperforming loans as a share of total gross loans; source: provisional MFD Financial Soundness Indicators database, original data from FSAPs, EDSS, and central banks' publications.

growth—real GDP growth; source: International Financial Statistics (IFS), IMF staff reports where IFS data were missing;

cpi_ch—a change of consumer price inflation in percentage points over the preceding two years, i.e., cpi_t- cpi_{t-2}; source: IFS, IMF staff reports where IFS data were missing;

real_ir_ch—a change of real lending rates in percentage points over the preceding two years, i.e., $real\_ir_t$- $real\_ir_{t-2}$; ex-post consumer price inflation used to estimate real lending rate; nominal lending rates obtained from IFS;

exch—an annual change in the nominal exchange rate relative to the US$, source: IFS.

reer—an annual change in the real effective exchange rate; source: mostly IFS, IMF staff reports to replace missing data;

ppp_gdp—the level of GDP per capita in purchasing power parity (PPP) in US$; source: William Davidson Institute Database; available only through 2001, so the 2001 data were used for 2002 GDP at PPP as well;

m2/gdp—the ratio of M2 (money + quasi money) to nominal GDP; source: IFS;

margin—net interest margin, an accounting value of bank's net interest revenue as a share of its interest-bearing (total earning) assets; source: World Bank Financial Structure Database; original data from Fitch's Bankscope database;

overhead— an accounting value of a bank's overhead costs as a share of its total assets; source: World Bank Financial Structure Database; original data from Fitch's Bankscope database;

concentr— assets of three largest banks as a share of assets of all commercial banks in the system; source: World Bank Financial Structure Database; original data from Fitch's Bankscope database;

cpi—annual consumer price inflation; source: IFS;

all_dep/gdp—demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP, calculated using the following deflation method: {(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is demand and time and saving deposits, P_e is end-of period CPI, and P_a is average annual CPI; source: World Bank Financial Structure Database; original data from IFS.