

SOUNDNESS AND STRUCTURE OF INTERNATIONAL BANKING

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ABSTRACT

Using data for 2003 on capital-asset ratios and assets of the major banks by country, this paper provides averages and dispersions among and between these countries. Compliance to the Basel Accord, which requires banks to maintain a Tier One capital-asset ratio of at least 4 percent, is investigated. The paper also provides a comparison in asset concentration among the leading banks by country.

JEL Classifications: L0, L1, L8

INTRODUCTION

The purpose of this paper is to provide an assessment of the financial soundness (adequacy) of banks in various countries, and to provide a measurement of asset concentration. Some countries are highly developed; others are developing. It is hypothesized that international banks will strive to maintain uniform capital requirements (soundness) that banks may not escape comprehensive supervision. Soundness here is measured by the capital-asset ratio, considered by finance scholars as an important indicator of the health of a specific bank. Other indicators of importance deal with performance as measured by real profit growth, profit on capital, and return on assets. Profit, of course, is the main purpose of enterprises, and banks are no exception. Profits are also the main source of new capital. However, the importance of profits is secondary when compared to capital adequacy.

The second concern of the paper is measuring asset concentration. In the presence of high market concentration, a relatively small group of banks trade simultaneously across international markets, employing similar methods and conventions of analysis and behavior. Such practice may help determine the global money supply and exchange rate manipulation among the key players. For instance, the high concentration of wealth in Latin American countries, as pointed out by Rojas-Suarez and Weisbrod (1996), may cause a decline in asset values and deterioration of capital position of all banks in spite of high capital-to-risk-weighted asset ratios. The relevance of this observation on asset concentration is that the larger the concentration, the larger is the banking crisis.

Typically, studies on banking structure use data on a small number of countries employing their largest banks for analysis. Dohner and Terrell (1991) used a total of 33 banks in their sample (US 7, Canada 5, France 3, UK 4). Barth, Nolle, and Rice (1997) used the largest banks (between six and ten) for 19 countries belonging to G-10 and/or EU. Cotigent, Kramer, and Pyun (2004) used the largest

three banks in France in their sample. Instead, this paper uses a large number of countries, 65, to assess the levels of banking soundness and concentration. Furthermore, for the sake of contrast, these countries are classified into groups (developed, emerging, low-middle income, high-middle income, Middle East, Latin American, G-10, EU, and EU Accession countries) which were used in a variety of combinations to find out whether as groups they differ markedly in their structure.

SOUNDNESS

A period of worldwide economic difficulty began in the early 1970s as a result of the abolishment of the Bretton Woods system in 1971, the first oil shock of 1973, and the early steps to abandon fixed exchange rates in 1973. Short-term domestic policies led to the introduction of a financial system that could be described as poorly ordered and unstable. Governments, banks, and multinationals responded to floating exchange rates and volatile interest rates by adopting strategies to hedge against such risks. These developments helped create huge volumes of international financial transactions (Frieden 1987, Strange 1996, Sampson 1981). The big players were the large international banks and the European market with its Eurodollars and Eurocurrencies. This global banking system has had far-reaching economic and political implications for the nations of the world. Failure of a major player bank can throw the currency and interbank markets into turmoil. The soundness of such banks, because of their interconnection, is imperative.

The transition from the government-led international monetary system of the Bretton Woods era prior to the early 1970s to the market-led international system afterwards, according to Hirst and Thompson (1996), created three distinct areas of regulation. The first is through the informal (exchange of views) summit meetings of the G3 and G7, which lacked institutionalized management. The tasks of regulation still fall to the central banks of individual countries. A second arrangement was developed through international payments mechanisms by clearing and settling transactions conducted by the G-10 central banks as well as banks within the European Union. But perhaps the most significant method of bank supervision is the third arrangement, which fixed minimum capital requirements for banks involved in international transactions.

To raise capital standards, the committee on Banking Regulation and Supervisory Practices of the Bank for International Settlement, also known as the Basel Committee, which represents the central banks of G-10 countries and Luxembourg, according to Johnson (1993), was established in December 1987. In 1988 the Basel Committee established the Basel Accord defining Tier One (core) capital as (1) shareholders' equity, and (2) perpetual preferred stock, net of goodwill; and Tier Two (supplemental) as (1) perpetual and term subordinated debt, (2) mandatory convertible debt, (3) asset revaluation reserves, and (4) other supplementary items at the discretion of individual countries.

The Accord requires that Tier Two capital cannot exceed Tier One capital. As of January 1993, international banks, with the exception of Germany and Japan, maintain both Tier One and Tier Two capital equal to 4 percent of risk-weighted assets for a total capital ratio of 8 percent. Risk weights were left to the discretion of the countries concerned. An amendment in late 1995, according to Lindgren, Garcia,

and Saal (1996), recommends, besides disclosure standards, that banks be required to hold additional capital commensurate to their exposure to market risk. This action recognizes that new techniques are needed to oversee risk management because of financial innovations. Imeson (2003) indicated that the amendments known as Basel II, encouraging banks to align more closely with risk, is way behind schedule and implementation has been delayed to 2006.

The Basel Recommendations lack force of law, but countries participating are implicitly bound to implement its recommendations with the exception of G-10 countries. For these countries, the recommendations became law in 1992. The G-10 countries (actually 11) include Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, the United Kingdom and the United States. Switzerland joined the group in 1988. The supervision of the Basel requirements, however, is done by home regulatory authorities. In other words, national laws vary because the committee allows some flexibility for local authorities to implement the requirements.

Soundness, the capital-asset ratio, was chosen due to its important role in protecting depositors when banks face unexpected troubles (6,p.74-84). Banks prefer to operate with the lowest capital requirements, while regulators impose minimum requirements to limit the magnitude and scope of bank failures. In the United States, according to Koch (1986), the capital-asset ratio at the turn of the century averaged approximately 20 percent compared to rates in recent years of only 7 percent. Kaufman (1991) provides an interesting survey of capital-asset ratios for a variety of industries. Kaufman explains that banks are always being perceived as less risky than other nonfinancial enterprises, thus requiring lower capital-asset ratios to operate.

As a consequence, some banks in countries that are not associated with the Basel Accord are keen to follow the regulatory guidelines to achieve a respectable credit status. Central banks and government officials in the leading countries, according to Hirst and Thompson (1996) and Helleiner (1994), approve of regulation in international banking and financial institutions to deter bank failures and troubles such as those that occurred in the 1970s and 1980s. Examples of such financial distress are: Bankhaus Herstat in Germany, Franklin National Bank in New York, British-Israel Bank in London, all in 1974; Bankco Ambrosiano in 1982-1983; Bank of Commerce and Credit International (BCCI) in 1992; and the Barings of London in 1995. Kaufman and Kroszner (1996) estimate the costs as a percent of GDP of serious banking problems or failure to governments such as Argentina amounted to 40 in the early 1980s and between 10 and 20 in the late 1980s. In Israel, Uruguay, Bulgaria, Mexico, Spain, and Venezuela, the costs ranged between 20 and 40. In the United States, the cost was 2.5.

Kaufman (1988) has indicated that the failure of a major bank can set in motion a fear that other banks may tumble, resulting, though in most cases unjustifiably, in bank runs. Benston (1994) echoes the view that the Basel capital standard was adopted in part to safeguard the integrity of the payments system and prevent the fear of contagion on an international scale, well explained by Kaufman (1994). The perception is that a failure of a bank in one country with clients in other countries could potentially promote the collapse of the banking system in other countries. An extensive discussion of the broad macroeconomic consequences of an

unsound international banking system is found in Lindgen, Garcia, and Saal (1996). Schwartz (1995), Benston and Kaufman (1995, 1996), and Kaufman (1996) argue that capital requirements, rather than excessive regulation, safeguard against excessive risk taking for countries both individually and internationally. Garber (1996) suggests that the financial safety net worldwide provides institutions of a lender of last resort deposit insurance and prudential regulation. Prudential regulation is converging into strict capital requirements and similar accounting principles. This is, in essence, what the Basel Accord aims to accomplish.

STRUCTURE OF INTERNATIONAL BANKING

The assets data supplied by *The Banker* (2003) of the largest banks by country are employed for measuring concentration in the international banking industry by use of the Herfindahl-Hirshman (H) index. Studies of concentration in U.S. industries use similar data derived from the *Fortune 500*, the largest industrial firms. Among such works are Hexter and Snow (1970), Attaran and Saghafi (1988), Saghafi and Attaran (1990), and Deutsch and Silber (1995). Let P_i ($\sum P_i=1.00$) refer to the share of the i th bank in a country, and n refer to the number of banks. The H index weights each bank share P_i by itself

$$\begin{aligned} H &= \sum_i P_i P_i \\ &= \sum_i P_i^2 \end{aligned} \quad (1)$$

When one bank holds all shares, $H = 1.0$; when shares are held equally, $H = 1/n$. Thus, $1/n \leq H \leq 1.0$. The appeal of H , according to Jacquemin and Berry (1979), is its intuition and its ease of understanding. Note that H gives larger weights to larger banks, making it a meaningful measure of concentration, perhaps explaining the reasoning behind its use in merger guidelines by the Department of Justice-Federal Trade Commission in horizontal merger and monopolization cases in the United States (Rhoades 1997). Keyes (1995) reports that the H index is the measure of concentration chosen by the U.S. Department of Justice. The guidelines of the department classify markets accordingly into unconcentrated, moderately concentrated, and highly concentrated.

It can be shown (Clarke 1985) that the coefficient of variation,

$$V = S / \bar{P}, \quad (2)$$

where \bar{P} and S are the mean and the standard deviation, is related to H by the relationship

$$V^2 = nH - 1. \quad (3)$$

Note that

$$\bar{P} = 1/n$$

$$S = [\sum_i (P_i - \bar{P})^2 / n]^{1/2},$$

and

n = number of banks in a given country.

The standard deviation is a natural choice when measuring concentration as a deviation from the mean. In order to account for the different magnitudes in means among the countries, the coefficient of variation is used. As a measure of relative dispersion, the coefficient of variation is smallest when dispersion is least. After some algebraic manipulation (8), it can be shown that the "numbers equivalent" corresponding to a given H is

$$m = 1/H. \tag{4}$$

The nature of the measures of concentration can be understood more clearly by the concept used above, "numbers-equivalent," which is the number of equal-size firms with the same value of the concentration measure. In other words, as if the "n" firms under consideration dwindle to "m" firms by equation (4) for a given H.

DATA, PRELIMINARY OBSERVATIONS, AND RESULTS

Data

The *Banker*, begun in 1926 in London, is a publication of the daily *Financial Times*. Published monthly, it has, since 1970, provided in its July issue perhaps the most authoritative yearly listing of the world's most prominent commercial banks. Early on, the annual list consisted of the top 300, then expanded to 500, and finally to 1,000 in 1987. Banks are ranked by size of assets and soundness (capital-asset ratio). In addition, the *Banker* provides lists of the largest banks by country. The total number of banks by the list of countries exceeds 1,000. The period selected is the year 2003. The *Banker* evaluates the capital-asset ratios uniformly, reflecting the Basel regulations (Jones 1989), which measure capital by stressing the Tier One element (equity).

Preliminary Observations

Table 1 lists summaries of some financial indicators between 1990 and 2003. Aggregates for Tier One capital (Column B) for the 1,000 banks between 1990 and 2003 in trillions of current dollars ranged between 0.83 and 1.97, corresponding, respectively, to total assets in trillions of dollars of 19.9 and 43.9. The corresponding capital-asset ratios (Column F) worldwide were in percentages ranging between 4.2 and 4.5. Total pre-tax profits in 2003 (Column C) were \$252 billion, which includes net losses of \$39.3 billion incurred by Japan.

Table 2 is a breakdown of 1,000 banks based on regional classifications for 1995 and 2003. For both years, the European Union has the largest number of banks and the largest proportion of assets. A surprising observation is the magnitude of

pretax profit in 2003 for the United States, capturing almost 50 percent of total, even though the United States controlled only 16 percent of total assets. Also of note is the dominance of Japan, the United States, and the European Union in the total number of

Table 1
Summary Of Financial Indicators For The Largest 1000 Banks (1990-2003)

Year	A	B	C	D	E	F
1990	19.9	0.83	113	0.57	13.51	4.21
1991	23.1	0.99	140	0.60	14.11	4.28
1992	24.4	1.08	124	0.51	11.44	4.44
1993	26.3	1.11	127	0.50	11.10	4.52
1994	26.9	1.26	165	0.61	13.16	4.66
1995	30.3	1.42	176	0.58	12.41	4.67
1996	32.0	1.46	172	0.53	11.76	4.56
1997	32.7	1.50	216	0.66	14.45	4.57
1998	33.2	1.49	205	0.62	13.77	4.48
1999	35.5	1.68	174	0.49	10.41	4.72
2000	36.7	1.78	310	0.84	17.35	4.86
2001	37.9	1.77	317	0.84	17.91	4.67
2002	39.6	1.83	223	0.56	12.34	4.62
2003	43.9	1.97	252	0.57	12.79	4.50

Note: A = total assets (\$ trillion), B = total tier one capital (\$ trillion), C = total pre-tax Profits (\$ billion), D = pre-tax profit to assets (percent), E = pre-tax profit to tier one capital (percent), F = tier one capital: assets (percent).Source: The Banker (2003).

Table 2
Regional Summary Information For The 1,000 Banks For 1995 And 2003.

Region	Number of Banks		Tier One Capital %		Assets %		Pre-Tax Profit %	
	1995	2003	1995	2003	1995	2003	1995	2003
Japan	119	114	21	12	27	16	-10	-16
United States	156	210	16	24	11	16	34	49
Latin America	60	37	3	1	2	1	1	2
European Union	330	285	38	40	42	46	44	43
Rest of Europe	84	90	6	5	5	5	7	4
Asia ex-Japan	172	151	12	12	10	11	16	10
Middle East	59	86	2	3	1	2	3	4
Rest of the World	20	27	2	5	2	3	5	4
Total	1000	1000	100	100	100	100	100	100

Source: The Banker (1995, 2003)

Data

Table 3 shows the mean, the minimum, the maximum, and the coefficient of variation (V) of capital-asset ratios by country. An (*) identifies G-10 countries. The ratio for the United Kingdom is comparable to the United States, 11.70 vs. 9.21. On the other hand, Japan and Germany have much lower ratios. The German ratio is 4.08, and the ratio for Japan is 4.23. In the United States, each dollar of assets is supported by capital of approximately \$0.09, whereas for Japan, one dollar of assets is backed by less than \$0.05.

A comprehensive look at the disparity among the banks in their capital-asset ratios is shown in Table 3, as provided by the coefficient of variation. While the standard deviation (S) measures the dispersion from that country's mean, the coefficient of variation is a relative measure of dispersion, taking into account the magnitude of the mean. For all countries, the coefficient of variation varies between 0.09 percent in Israel and 1.89 in France.

A point of interest in this research is compliance with the Basel Accord. This is shown in Table 3, where each entry indicates the relative number of banks with ratios less than 4 percent out of the total number of banks in the list for each country. For all the countries, the ratio is approximately 0.14.

Ironically, six of the G-10 countries, which are bound by law to adhere to the Basel requirement of capital-assets ratio, are among the biggest violators. These countries are Belgium, France, Germany, Japan, The Netherlands, and Sweden, with respective proportion of their banks in non-compliance of 0.71; 0.46; 0.47; 0.40; 0.38; and 0.75. The coefficient of variation (V) corresponding to these six countries tells an interesting story regarding the dispersion in compliance among the constituent banks. The respective Vs are 0.6473; 1.8945; 0.3599; 0.2891; 0.5393; and 0.1378. The smaller numbers for Germany, Japan, and Sweden indicate that the majority of their banks maintain capital-assets ratios closer to the mean, unlike France, for instance, with $V=1.8945$. Perhaps, even though the G-10 countries are bound by the Basel Accord, comprehensive supervision, as noted earlier in this paper, is left to a home regulatory authority.

Table 4 reports for assets: the total (\$billion), the mean (\$million), minimum (\$million), and maximum (\$million), the concentration measures H (equation 1), the square of the coefficient of variation V^2 (equation 3), and the numbers equivalent (equation 4). The United States has the largest total assets of \$7.5 trillion, followed by Japan with \$6.9 trillion, followed by Germany with \$5.7 trillion. The countries with fewer banks, France and the United Kingdom, account for approximately \$3.2 trillion and \$3.7 trillion, respectively. The largest mean assets are held by banks in France for over \$246 billion. The smallest mean is held by Argentina for over \$720 million in assets.

Table 3
Capital Asset Ratios Of Major Banks By Country

Country	Mean	Min	Max	V	Compliance
Algeria	4.53	3.43	5.25	0.2136	0.33
Andorra	14.23	10.92	16.80	0.2114	0.00
Argentina	12.99	6.16	40.16	0.7996	0.00
Australia	5.06	3.84	6.77	0.1724	0.11
Austria	5.99	3.09	28.14	0.8893	0.24
Bahrain	15.61	7.49	25.29	0.4300	0.00
Belgium*	4.84	2.91	11.63	0.6473	0.71
Brazil	8.91	3.05	16.49	0.4090	0.06
Canada*	4.66	3.62	6.65	0.1767	0.10
Chile	6.47	5.18	7.62	0.1582	0.00
China	3.62	2.56	5.05	0.2328	0.67
Colombia	10.41	6.31	13.54	0.2958	0.00
Cyprus	6.03	5.16	7.06	0.1590	0.00
Czech Rep	6.51	4.96	8.79	0.2380	0.00
Denmark	5.56	3.09	11.45	0.5025	0.29
Egypt	6.65	2.92	13.79	0.5653	0.38
Finland	7.77	12.74	3.92	0.5356	0.25
France*	10.52	3.04	76.17	1.8945	0.46
Germany*	4.08	9.31	1.17	0.3599	0.47
Greece	7.66	12.90	3.42	0.4231	0.11
Hong Kong	9.25	4.67	12.94	0.2735	0.00
Hungary	9.58	5.24	20.11	0.4708	0.00
Iceland	7.05	6.18	8.30	0.1488	0.00
India	4.83	3.12	8.98	0.3097	0.33
Indonesia	7.64	4.32	16.60	0.6312	0.00
Iran	7.57	1.11	31.86	1.4435	0.71
Ireland	4.49	0.82	6.12	0.3814	0.14
Israel	5.09	4.33	5.62	0.0872	0.00
Italy*	6.16	3.25	12.01	0.3752	0.05
Japan*	4.23	1.29	10.17	0.2891	0.40
Korea	4.22	2.97	5.35	0.1697	0.38
Kuwait	9.99	8.35	12.92	0.1507	0.00
Lebanon	7.05	5.61	10.09	0.2293	0.00
Libya	8.80	2.91	18.14	0.9302	0.33
Liechtenstein	12.59	10.36	14.98	0.1837	0.00
Luxembourg	3.47	2.05	5.68	0.4238	0.67
Malaysia	10.36	4.88	49.52	1.1514	0.00
Mexico	6.01	4.29	7.70	0.2278	0.00
Morocco	9.41	7.45	10.62	0.1450	0.00
Netherlands*	5.22	2.86	13.36	0.5393	0.38
New Zealand	5.48	4.24	6.47	0.2073	0.00
Norway	6.68	4.92	11.38	0.2566	0.00
Oman	11.45	8.08	16.07	0.3615	0.00
Panama	10.94	5.05	13.91	0.3749	0.00
Peru	9.01	7.72	11.84	0.2148	0.00
Philippines	11.55	7.10	21.82	0.3239	0.00
Poland	9.13	3.48	17.58	0.4262	0.10
Portugal	6.15	4.12	11.66	0.3521	0.00
Qatar	12.81	10.54	16.04	0.2245	0.00
Russia	17.80	6.12	61.69	0.7667	0.00
Saudi Arabia	10.40	8.05	13.20	0.1688	0.00
Singapore	7.40	5.62	8.37	0.2083	0.00
South Africa	5.02	3.59	6.59	0.2186	0.20
Spain	7.10	3.52	24.38	0.4494	0.02
Sweden*	3.62	3.20	4.21	0.1378	0.75
Switzerland*	7.26	2.05	13.11	0.3520	0.09
Taiwan	7.00	2.63	40.18	0.8049	0.15

Thailand	5.38	4.55	6.57	0.1231	0.00
Trinidad & Tobago	12.92	8.75	17.31	0.3316	0.00
Tunisia	10.61	8.47	14.36	0.2551	0.00
Turkey	10.69	3.63	22.02	0.4303	0.07
UAE	15.80	7.52	27.81	0.3718	0.00
United Kingdom*	11.70	3.59	42.52	0.8496	0.03
USA*	9.21	1.95	62.65	0.7777	0.01
Venezuela	11.44	7.59	14.37	0.2469	0.00

Note: mean is capital asset ratio (%), V = coefficient of variation, Compliance = proportion of banks not in compliance with Basel Accord. An (*) refers to G-10 member country. Source: The *Banker* 2003.

Table 4
Asset Concentration Of Major Banks By Country

Country	n	Assets		Max	Concentration			
		Total	Mea n		H	V2	m	
Algeria	3	19.0	6206	5557	7116	0.3371	0.0114	2.97
Andorra	3	8.2	2728	1969	3349	0.3480	0.0439	2.87
Argentina	9	6.5	720	227	1510	0.1618	0.4565	6.18
Australia	9	630.0	69985	4500	205113	0.2094	0.8850	4.77
Austria	21	518.0	24663	830	155168	0.1740	2.6542	5.75
Bahrain	9	64.0	7115	888	29313	0.2898	1.6086	3.45
Belgium*	7	1154.0	164830	5846	404133	0.2762	0.9331	3.62
Brazil	17	227.0	13332	1413	57910	0.1369	1.3269	7.31
Canada*	10	48.0	4757	214	9857	0.1534	0.5339	6.52
Chile	6	51.4	8566	2951	16386	0.2154	0.2922	4.64
China	15	2134.0	142260	19906	577093	0.1774	1.6612	5.64
Colombia	4	11.0	2664	1236	4398	0.2949	0.1797	3.39
Cyprus	3	28.0	9302	4440	14539	0.3991	0.1972	2.51
Czech Rep	5	55.0	10980	2165	19808	0.2723	0.3616	3.67
Denmark	7	438.1	62583	1832	247325	0.3841	1.6889	2.60
Egypt	8	68.1	8515	2625	24964	0.2193	0.7544	4.56
Finland	4	293.2	73306	3685	237074	0.6710	1.6839	1.49
France*	13	3205.0	246528	1180	744882	0.1558	1.0249	6.42
Germany*	85	5723.0	57329	2796	795255	0.0664	4.6454	15.06
Greece	9	178.4	19825	2300	56728	0.1820	0.6377	5.50
Hong Kong	13	434.0	33386	1694	239513	0.3586	3.6621	2.79
Hungary	8	32.3	4038	1274	12143	0.2050	0.6404	4.88
Iceland	4	13.0	3177	2333	3876	0.2580	0.0319	3.88
India	21	274.0	13032	2872	92117	0.1436	2.0146	6.97
Indonesia	6	66.3	11046	1783	28008	0.2735	0.6409	3.66
Iran	7	200.2	28599	2986	60927	0.1896	0.3269	5.28
Ireland	7	403.0	57560	3373	152944	0.2592	0.8143	3.86
Israel	6	172.4	28733	5005	55395	0.2410	0.4462	4.15
Italy*	39	1579.2	40493	1757	294393	0.0981	2.8270	10.19
Japan*	114	6910.5	60618	2781	1080764	0.0713	7.1325	14.02
Korea	13	676.0	51981	8453	144578	0.1130	0.4686	8.85
Kuwait	7	54.0	7703	4380	17605	0.1860	0.3020	5.38
Lebanon	6	28.5	4745	3421	7146	0.1783	0.0697	5.61
Libya	3	15.0	4987	1483	8442	0.4415	0.3246	2.26
Liechtenstein	3	21.3	7104	6224	8262	0.3382	0.0145	2.96
Luxembourg	9	236.0	26174	7454	39401	0.1373	0.2359	7.28
Malaysia	13	150.1	11543	526	39385	0.1296	0.6853	7.71
Mexico	6	152.0	25332	9430	46546	0.2135	0.2811	4.68
Morocco	4	22.4	5599	3253	8696	0.2807	0.1226	3.56
Netherlands*	13	1743.0	134066	1159	583073	0.2495	2.2430	4.01
New Zealand	3	51.3	17115	11934	20472	0.3491	0.0472	2.86

Norway	13	161.0	12351	2245	55304	0.2037	1.6476	4.91
Oman	3	8.1	2691	1672	4012	0.3774	0.1323	2.65
Panama	4	13.1	3285	2402	4213	0.2608	0.0432	3.83
Peru	4	16.0	3962	2117	7258	0.3113	0.2452	3.21
Philippines	12	45.0	3723	1044	8898	0.1170	0.4041	8.55
Poland	10	92.1	9211	4673	19899	0.1292	0.2916	7.74
Portugal	9	253.1	28122	1566	69821	0.1966	0.7698	5.09
Qatar	3	12.3	4085	1687	8532	0.5312	0.5936	1.88
Russia	17	76.0	4461	522	34201	0.2313	2.9318	4.32
Saudi Arabia	10	133.0	13275	1520	28480	0.1314	0.3139	7.61
Singapore	3	196.5	65498	48403	86201	0.3523	0.0570	2.84
South Africa	5	160.2	32046	21983	45104	0.2115	0.0577	4.73
Spain	45	1277.0	28377	2696	339983	0.1395	5.2781	7.17
Sweden*	4	656.0	163915	108499	261765	0.2815	0.1261	3.55
Switzerland*	35	1953.0	55801	1421	851686	0.3178	10.1213	3.15
Taiwan	41	604.4	14741	1691	66555	0.0495	1.0279	20.22
Thailand	8	116.7	14587	3730	28962	0.1652	0.3215	6.05
Trinidad & Tobago	3	8.8	2939	4721	1037	0.4209	0.2627	2.38
Tunisia	4	8.3	2086	1138	2668	0.2696	0.0783	3.71
Turkey	15	122.0	8125	1444	23075	0.1048	0.5725	9.54
UAE	13	58.2	4479	653	10632	0.1219	0.5842	8.21
United Kingdom*	36	3690.0	102497	570	759246	0.1399	4.0349	7.15
USA*	228	7480.2	32808	309	1097190	0.0518	10.8207	19.29
Venezuela	4	16.4	4101	1761	6637	0.2947	0.1788	3.39

Note: n = number of banks, (total \$billion), mean (\$ million), H = Herfindahl Index (equation 1), V² = square coefficient of variation (equation 3), m = numbers equivalent (equation 4). An (*) refers to a G-10 country.

Source: The *Banker* 2003.

Of interest in table 4 are the concentration measures H, by equation (1); the square coefficient of variation, V², by equation (3); and the "numbers equivalent" by equation (4). For the top three countries in total assets (the United States, Japan, Germany), the "numbers- equivalent" were 19.29, 14.02, and 15.06. For France and the United Kingdom, the "numbers equivalent" were 6.2 and 7.15. Similarly, for Italy and China, the "numbers equivalent" were 10.19 and 5.64. For Bahrain and the United Arab Emirates, the "numbers equivalent" were 3.45 and 8.21, respectively. From Table 4, the greatest bank concentration is observed for Finland with H = 0.6710, V² = 1.6839 corresponding to the "numbers equivalent" m = 1.49, dwindling from n = 4 to 37 percent of its original size, due to the effects of concentration.

The 65 countries in Tables 3 and 4 are gathered in a variety of sets (See Appendix A) to detect the soundness (adequacy) of capital asset ratio and the level of concentration between the sets, employing analysis of variance. First, the comparison is between the developed (38 countries) and the emerging (27 countries). The respective means for H were 0.2277 and 0.2444 and the respective means for adequacy were 0.156 and 0.144. The respective P-values of the F-tests were 0.571 and 0.466. Thus, the conclusion is to accept the hypothesis of equality of means on both counts.

Levels of income were the second category, splitting the 65 countries into

low-middle income (14), high-middle income (18) and high income (33). The respective means for H and adequacy were 0.2301, 0.2265, 0.2410 and 0.187, 0.052, 0.181. The P-values for the respective F-tests were 0.904 and 0.103, indicating again no significant difference in means between the three groups.

Geography was the third category for classification composed of EU (15 countries), rest of Europe (12 countries), Middle East (14 countries), Latin America (9 countries), and the rest of the world (15 countries). The respective means for H were 0.2774, 0.2491, 0.2710, 0.2567 and 0.1810 with a P-value = 0.276 for the F-test, indicating no significant difference among the means. For adequacy, however, the respective ratios were 0.305, 0.031, 0.125, 0.007, and 0.144. The F-test with P-value=0.002 indicates significance among this group of countries. The Tukey simultaneous comparison t-test indicates that the EU average is significantly different from the other groups, with respective P-values of 0.0005, 0.0145, 0.0005, and 0.0250.

Because of interest in the European Union and Accession countries with and without Turkey, there were data on EU (15 countries), Accession (4) and Accession with Turkey (5). The respective values for H were 0.2274, 0.2514, and 0.2221, with P-value=0.943 for the F-test, indicating no significance. For adequacy, however, the respective values were 0.305, 0.025, and 0.034. The F-test with P-value=0.021 indicates significant difference between the members of this set of countries for the adequacy of capital-asset ratio. The Tukey simultaneous comparison t-test indicates that the EU average is significantly different from the Accession countries with and without Turkey, with respective P-values of 0.0299 and 0.0228. No significant difference was detected between the latter two categories (P-value=0.951).

But perhaps the most important comparison is between the eleven Basel Committee member countries, the G-10 marked by (*) in Tables 3 and 4 and the remaining 54 non-Basel Committee member countries in the sample of 65. Here, for G-10, the respective H and adequacy were 0.1693 and 0.065 while for the non-Basel Committee countries, the respective numbers were 0.2479 and 0.085. The respective differences were significant at P-values 0.039 and 0.064. The surprising result here is the level of soundness for G-10 countries, at 0.065 as compared to the level of the rest of the countries at 0.085. This indicates, perhaps, a strong desire by the participant non-Basel Committee countries to adhere to the Basel recommendations even though they were only implicitly bound by the requirements. Also, economic volatility in most non-Basel Committee members is higher than in the G-10 countries, making higher capital-assets ratios desirable or perhaps necessary. As indicated earlier, only the G-10 countries are bound by law to implement the Basel recommendations.

CONCLUSIONS

According to Barth, Nolle, and Rice (1997), in the recent past, the United States and many other countries such as Finland, Norway, Spain, and Sweden experienced banking difficulties. Generally, two-thirds of the IMF's 181 member countries suffered some banking crises since 1980. In developing and transition countries, the cost of resolving the banking financial difficulties reached \$250 billion,

absorbing between 10 and 20 percent of yearly national income in Venezuela, Bulgaria, Mexico, and Hungary. To grapple with the banking problems, new laws and regulations were introduced to lessen the likelihood of future problems. Among such laws were restrictions of geographical expansion through branching, mergers, and acquisitions. Many of the new laws, according to Barth, Nolle, and Rice, were consequences of cooperation and uniformity through the workings of the Basel Accord and the European Commission, the executive and administrative arm of the European Union.

This paper, through a sample of banks in many countries, examined the structure (concentration) and performance (soundness) of international banking. The paper provides statistical summaries of averages and dispersions for 65 countries. A primary theme of the paper is whether the Basel Accord, requiring that banks adhere to a Tier One capital-asset ratio of 4 percent, is being followed. The paper shows that while banks in many countries do not comply, there was substantial evidence toward compliance. Furthermore, the paper addresses the issue of relative concentration of assets of 65 countries, paying special attention to the grouping of countries into economical, geographical, developmental, and G-10 classifications.

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APPENDIX A. (Classification of Countries)

Development Groups		Income Groups			Geographic Regions					
Developed	Emerging	Low-Middle Income	High-Middle Income	High Income	Middle East	Latin America	EU	Rest of Europe	Rest of World	Accession
Argentina	Algeria	Algeria	Argentina	Andorra	Algeria	Argentina	Austria	Andorra	Australia	Cyprus
Australia	Andorra	China	Bahrain	Australia	Bahrain	Brazil	Belgium	Cyprus	Canada	Czech Rep
Austria	Brazil	Colombia	Brazil	Austria	Egypt	Chile	Denmark	Czech Rep	China	Hungary
Bahrain	China	Egypt	Chile	Belgium	Iran	Colombia	Finland	Greece	Hong Kong	Poland
Belgium	Colombia	India	Czech Rep	Canada	Israel	Mexico	France	Hungary	India	Turkey
Canada	Egypt	Indonesia	Hungary	Cyprus	Kuwait	Panama	Germany	Iceland	Indonesia	
Chile	India	Iran	Korea	Denmark	Lebanon	Peru	Greece	Liechtenstein	Japan	
Cyprus	Indonesia	Morocco	Lebanon	Finland	Libya	Trinidad & Tobago	Ireland	Norway	Korea	
Czech Rep	Iran	Peru	Libya	France	Morocco	Venezuela	Italy	Poland	Malaysia	
Denmark	Lebanon	Philippines	Malaysia	Germany	Oman		Luxembourg	Russia	New Zealand	
Finland	Libya	Russia	Mexico	Greece	Qatar		Netherlands	Switzerland	Philippines	
France	Liechtenstein	South Africa	Oman	Hong Kong	Saudi Arabia		Portugal	Turkey	Singapore	
Germany	Malaysia	Thailand	Panama	Iceland	Tunisia		Spain		Taiwan	
Greece	Mexico	Tunisia	Poland	Israel	UAE		Sweden		Thailand	
Hong Kong	Morocco		Saudi Arabia	Italy			UK		USA	
Hungary	Oman		Trinidad & Tobago	Japan						
Iceland	Panama		Turkey	Kuwait						
Israel	Peru		Venezuela	Liechtenstein						
Italy	Philippines			Luxembourg						
Japan	Russia			Netherlands						
Korea	Saudi Arabia			New Zealand						
Kuwait	South Africa			Norway						
Luxembourg	Thailand			Portugal						
Netherlands	Trinidad & Tobago			Qatar						
New Zealand	Tunisia			Singapore						

APPENDIX A. (Cont.)

Development Groups		Income Groups			Geographic Regions					
Developed	Emerging	Low-Middle Income	High-Middle Income	High Income	Middle East	Latin America	EU	Rest of Europe	Rest of World	Accession
Norway Poland Portugal Qatar Singapore Spain Sweden Switzerland Taiwan UAE UK USA	Turkey Venezuela			Spain Sweden Switzerland Taiwan UAE UK USA						

Source: UNDO 2003.

