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Country Creditor Rights, Information Sharing, and Commercial Banks' Profitability^{*}

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Abstract

We analyze commercial banks' profitability (return on equity, ROE) at different levels of creditor rights and an aggregate score of information sharing in terms of credit bureaus. After controlling for bank size and some macroeconomic variables, the results indicate that profitability is higher and more persistent when creditors are well protected. Furthermore, the presence of a (public or private) credit bureau increases the persistence of ROE, but higher levels of information sharing foster competition and erode future profitability.

1. Introduction

In this paper, we study the effects of creditor-rights protection and information sharing on the level and persistence of commercial banks' profitability around the world using firm-level data for more than 100 countries during the period 1996–2003. To study the influence of the creditor legal environment, we employ the “creditor-rights” index proposed by La Porta et al. (1997, 1998), which measures the legal rights of creditors against defaulting debtors in different jurisdictions. The information-sharing score is constructed starting from Shleifer's Database.

Our empirical strategy is twofold. To run ROE firm-level regressions by year, first we explain ROE in terms of creditor rights and information sharing, controlling by size and macroeconomic variables, then we add current ROE as an independent variable to find out the effect of the variables mentioned on the ROE persistence, using the next-year ROE as dependent variable.

The results can be summarized in brief. First, we find that the most profitable banks are from countries without credit bureaus and with the strongest creditor-rights protection. Second, lower levels of information sharing are associated with higher current and future profitability, supporting the idea that credit bureaus make a more competitive market. Third, creditor-rights protection is positively associated with current ROE, and the highest persistence of ROE corresponds to banks located in countries with the strongest protection. And finally, ROE persistence increases in economies without credit bureaus when they establish one, but declines when another

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credit bureau appears in the country, suggesting that competitive pressure is very strong in the banking industry. That is, information sharing among banks stimulates more competition by lowering their informational rents.

Our work is related to previous studies of legal origin, information sharing in credit markets, and profit persistence. The evidence in this paper differs from those in three significant respects. First, rather than considering country-aggregate tests of credit markets, we build upon firm-specific measures of profitability. Second, in addition to studying the effects of contemporaneous variables, we develop a test of next-period bank performance. Third, while previous studies have checked how creditor rights and information sharing affect aggregate credit or the availability and cost of firm credit, we investigate the implications of that interaction between information sharing and creditor-rights protection on commercial banks' profitability. Our findings provide a new piece of economic reasoning in the puzzle of banks' performance conditioned by creditor rights and information sharing.

The next section of the paper presents the main related evidence found in the literature about the legal environment, creditor rights, and profitability. Section 3 presents the data used in the study and the basic results about the effects of the variables on profitability. Section 4 examines profitability across banks and countries. Section 5 concludes.

2. Literature Review

Differences in legal protection of investors and creditors are important to explain why firms are financed and owned differently in different countries. La Porta et al. (1998) find that richer countries and common law countries have the biggest capital markets and the strongest legal protection.

Creditor rights are more complex than shareholder rights because there may be different types of creditors with different interests, and protecting the rights of some creditors reduces the rights of others. On the other hand, there are two general creditor strategies of dealing with a defaulting firm: liquidation and reorganization, which require different effective rights. Consequently, La Porta et al. (1998) score creditor rights in both cases and add up the scores to create a creditor-rights index, using five creditor-rights variables.

Some researchers have emphasized that culture proxies, such as religion, are also helpful in understanding how creditor rights are enforced across countries (Stulz and Williamson, 2003), but Djankov et al. (2007) show that religious variables are no longer significant when the legal origin is added. Their results also show that the existence of public registries that permit information sharing between lenders improves the system and mitigates lesser legal protection.

Previous research has shown four important effects of information sharing. First, the existence of credit bureaus improves the banks' knowledge of applicants' characteristics and allows better estimations of repayment probabilities, which, at least partially, solves the adverse selection problem, reducing default rates (Pagano and Jappelli, 1993; Brown et al., 2009). Though an interest rate decrease is a commonly accepted effect, Karapetyan and Stacescu (2009) show that it depends on the type of signal resulting from monitoring: good (bad) signal borrowers will get lower (higher) interest rates. Second, credit bureaus may reduce the banks' appro-

priation of informational rents. The informational advantage confers to banks some market power over their customers, so several banks may be very profitable in a context of no information sharing (Pagano and Jappelli, 1993; Padilla and Pagano, 1997; Niemeyer, 2003). Third, credit bureaus act as a mechanism that disciplines borrowers in order to maintain a good reputation with the generality of lenders, and it is also a way to avoid excessive lending when each borrower may patronize several banks. These effects reduce the moral hazard problem (Vercammen, 1995; Padilla and Pagano, 1997, 2000; Gehrig and Stenbacka, 2000; Bennardo et al., 2007; Brown and Zehnder, 2007). And finally, the degree of privacy protection has historically affected the development of credit bureaus. On the other hand, public intervention is more likely where creditor rights are poorly protected (Jappelli and Pagano, 2000, 2002; Brown and Zehnder, 2007).

As for the influence of the legal environment and information sharing on banks' performance we have found scarce but revealing evidence. A couple of recent works empirically test the significant and interactive effects of both institutional features. Brown et al. (2009) find that in countries with worse protection of creditor rights, information sharing improves both credit access (more abundant credit) and loan contract terms (cheaper credit), especially for more opaque firms. Consistent with the previously mentioned results of Djankov et al. (2007), Houston et al. (2010) find that bank risk taking is less sensitive to creditor rights in the presence of good information sharing.

Consequently, three positive effects on profitability could be expected from information sharing and an additional one from better creditor rights protection:

- an increase in the number of loans with good signal borrowers, as more accurate predictions of individual loan defaults can be made by banks;
- a decrease in the number of loans with bad signal borrowers, for which banks' private information was poor;
- a decrease in the number of loans with multi-bank borrowers when the global credit risk of the borrower is outside the acceptable limits for banks;
- higher recovery rates in the event of default, as with stronger creditor rights lenders are more likely to grab collateral, force repayment, or even gain control of a debtor that is in financial distress (Houston et al., 2010).

But these effects have to be considered within real country-specific scenarios in which market powers introduce subtle variations in the resultant influence of the factors concerned. Thus, in bank services, profitability persistence may reflect the existence of impediments to competition and informational opacity, as Mathisen and Buchs (2005) explore for a non-competitive market structure in the Ghanaian banking system.¹ Petersen and Rajan (1995) find that concentration of credit markets makes creditors more likely to finance credit-constrained firms because it is easier for these creditors to internalize the benefits of assisting the firms. Without barriers to entry and asymmetric information, relatively high performance by a bank would be eliminated reasonably quickly as other financial firms enter the market. For example, Lensink and Murinde (2006) show that, after some point, foreign bank entry

¹ This structure, along with other market characteristics, constitutes an indirect barrier to entry, thereby shielding the large profits in the Ghanaian banking system. Mathisen and Buchs (2005) suggest that the non-transparent fee structure of banks helped to shield the bank market structure from competition.

starts to stimulate aggregate investment as a consequence of increasing competitiveness. Consistent with the findings of Mulligan and Shleifer (2005), more regulations can be expected in civil law countries, where the incremental fixed costs of introducing and administering new regulations are lower.² In addition, persistence may reflect some sensitivity to regional or macroeconomic shocks (Mathisen and Buchs, 2005).

Considering the empirical evidence gathered so far, we could expect more credit business for banks in countries with information sharing and with strong creditor-rights protection.³ However, as countries establish private and public mechanisms to share information more efficiently, informational asymmetries tend to disappear and lenders can do their business more safely, adding competitive pressures to the lending market. Hence, as the country develops, private and public information sharing mechanisms may foster competition, causing a reduction of banks' profitability persistence. Improvements in creditor rights and judicial efficiency increase aggregate lending, owing to a reduction of credit risk (repayment rates are higher). However, the impact of judicial efficiency on the average interest rate is ambiguous. Interest rates can either increase or decrease depending on the competitive structure of banks and some other factors (Jappelli et al., 2005). Finally, it is necessary to control for the effects of macroeconomic shocks on banks' profitability.

3. Data

We gather data on 103 countries and 796 commercial banks from 1996 to 2003. We employ three firm-level variables from BankScope Database. Profitability is measured by the return on equity (*earnings/book value of equity*) of the current year (*ROE*) and of the following year (computed as $FROE_t = ROE_{t+1}$); to control for the bank's size we employ the logarithm of total assets (*logta*).

The creditor-rights index (*cr*) follows that constructed by La Porta et al. (1997, 1998) and Djankov et al. (2007) for 133 countries.⁴ The creditor-rights index measures four powers of secured lenders in bankruptcy: first, whether there are restrictions, such as creditor consent, when a debtor files for reorganization; second, whether secured creditors are able to seize their collateral after the petition for reorganization is approved (in other words, whether there is no 'automatic stay' or 'asset freeze' imposed by the court); third, whether secured creditors are paid first out of the proceeds of liquidating a bankrupt firm; and finally, whether a manager is responsible for running the business during the reorganization. A value of one is added to the index when a country's laws and regulations provide each of these powers to secured lenders. The creditor-rights index aggregates the scores and varies between 0 (poor creditor rights) and 4 (strong creditor rights).

The information-sharing score (*agreginfo*) measures the tendency to share information between lenders. We construct this score from 0 (no information sharing)

² Mulligan and Shleifer (2005) argue that the pervasive administrative state introduced in France by its revolution lowered the fixed costs of incremental regulations.

³ One potential problem is that banks can operate in various countries. However, loan portfolios tend to be home-biased (Méon and Weill, 2005)

⁴ Data available on the following webpage:

http://post.economics.harvard.edu/faculty/shleifer/Data/dataset_creditpaper_Nov_05.xls

Table 1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	Country Year Obs.
<i>FROE</i>	4340	0.109	0.117	-0.446	0.491	-
<i>ROE</i>	5099	0.110	0.118	-0.446	0.491	-
<i>logta</i>	5324	14.452	2.189	7.601	20.648	-
<i>interest</i>	4479	0.138	0.119	0.018	1.468	653
<i>gdp</i>	5156	0.032	0.025	-0.105	0.135	756
<i>inf</i>	5156	0.043	0.095	-0.036	3.650	756
<i>loggppc</i>	5156	12.060	2.267	6.993	15.218	756
<i>agreginfo</i>	5326	0.987	0.630	0	2	788
<i>cr</i>	5019	2.029	1.029	0	4	649

Notes: *FROE* is next year Return on Equity; *ROE* is the Return on Equity; *logta* is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *gdp* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggppc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing) 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights). The last column displays the number of country year observations for all those by country variables.

to 2 (strongest information sharing), adding one (two) if the country has a public registry or a private bureau (both) in the current year. We obtain this information from Shleifer's Database.

The interest rate data (*interest*) are from the IMF's International Financial Statistics (Yearbooks 2004 and 2005, line 60p) and measure the interest rate of the bank's prime lending in the country (year average).

To control for other country variables, we use the annual percentage change of gross domestic product in constant prices (*GDP*), the logarithm of gross domestic product per capita in constant prices (*loggppc*), and the annual percentage change of inflation (*inf*). All of these variables are from IMF World Economic Outlook (September 2005 Edition).

Table 1 shows the summary statistics of the firm-year variables and the number of country-year observations for the variables concerned. To exclude spurious financial ratios, we have deleted commercial banks with an ROE in the top and bottom two percent. This leaves us with 5,099 commercial bank-year observations in the sample. The sample period contains moments with high instability in the markets, such as the Russian crisis in the late 1990s. For this reason, the control variables are very disperse, showing important economic shocks that may affect banks' earnings. Taken together, the summary statistics present highly volatile bank profitability, with moderate levels of creditor rights across the world, but with an important presence of credit bureaus.

Table 2, Panel A, reports the number of banks and countries in each level of the creditor-rights score by year, showing stable behavior in protection across countries. Panel B displays the parallel numbers for information sharing, showing a gradual increase of credit bureaus internationally. But profitability is very different from one country to another, as *Table 3* shows. This table lists the average ROE, the standard deviation, and the number of observations in each country. Also, it shows the mean values of the creditor index and the information-sharing score. The most profitable

Table 2 Number of Countries and Banks by Year

Panel A: By Creditor Rights Score							
Year		Very Low (0)	Low (1)	Medium (2)	High (3)	Very High (4)	<i>Total</i>
1996	Countries	6	21	18	22	8	75
	Banks	31	99	149	135	44	458
1997	Countries	7	20	21	23	8	79
	Banks	33	109	164	152	47	505
1998	Countries	7	21	20	23	8	79
	Banks	35	113	184	220	46	598
1999	Countries	7	21	24	22	8	82
	Banks	39	122	211	232	44	648
2000	Countries	7	22	26	20	8	83
	Banks	47	216	223	158	45	689
2001	Countries	7	22	29	19	8	85
	Banks	50	224	249	152	45	720
2002	Countries	7	21	29	19	8	84
	Banks	51	220	262	150	44	727
2003	Countries	7	20	28	19	8	82
	Banks	47	132	315	144	36	674
Total Bank-Country Observations		333	1,235	1,757	1,343	351	5,019

Panel B: By Information Sharing Index					
Year		No Information (0)	Some Information (1)	Strong Information (2)	<i>Total</i>
1996	Countries	37	40	14	91
	Banks	149	264	76	489
1997	Countries	36	44	15	95
	Banks	164	279	97	540
1998	Countries	33	47	15	95
	Banks	131	393	109	633
1999	Countries	34	48	17	99
	Banks	129	420	137	686
2000	Countries	34	50	17	101
	Banks	128	458	146	732
2001	Countries	34	51	18	103
	Banks	136	470	155	761
2002	Countries	31	53	19	103
	Banks	136	479	155	770
2003	Countries	29	53	19	101
	Banks	118	450	147	715
Total Bank-Country Observations		1091	3,213	1,022	5,326

case is Zambia with an ROE of 44.6%. This country has a strong level of creditor rights, but, in contrast, has no credit bureau, hence banks might be able to obtain strong monopolistic rents.

On the other side, we have those that are evolving badly, located in Asia (Thailand and Japan). These are countries with medium levels of creditor rights and

Table 3 Mean Values of ROE, Creditor Rights Score, and Information Sharing Score by Country

Country	ROE	sd.	Freq.	cr	Agreg-info	Country	ROE	sd.	Freq.	cr	Agreg-info
AE	0.154	0.0364	39	2	1	LI	0.072	0.0809	2		0
AR	0.073	0.1156	24	1	2	LK	0.138	0.0525	38	2	1
AT	0.085	0.0217	30	3	2	LT	0.043	0.1546	23	1.96	1
AU	0.134	0.0377	71	3	1	LU	0.162	0.0282	12		0
BB	0.135	0.0398	8		0	LV	0.062	0.0502	5	3	0.13
BD	0.167	0.1273	107	2	1	MA	0.102	0.0436	38	1	1
BE	0.083	0.2532	3	2	2	MC	0.186	0.0398	8		0
BH	0.118	0.0565	36		0	MD	0.206	0.0999	36	2	0
BM	0.123	0.0629	15		0	MT	0.099	0.0692	32		0
BO	0.077	0.1126	32	2	2	MU	0.162	0.0244	15		0
BR	0.116	0.1435	78	1	1.89	MW	0.333	0.0660	14	2.50	0
BW	0.349	0.0938	16	3	1	MX	0.056	0.3161	11	0	1
CA	0.133	0.0355	72	1	1	MY	0.113	0.0496	31	3	2
CH	0.086	0.0547	43	1	1	NA	0.261	0.0377	7	2	1
CL	0.132	0.1073	44	2	2	NG	0.203	0.1232	119	4	0.70
CN	0.159	0.1004	37	2	0.68	NI	0.268	0.0759	8	4	1
CO	0.096	0.1215	61	0	1	NL	0.153	0.0280	8	3	1
CR	0.126	0.0650	33	1	2	NO	-0.006	0.1360	11	2	1
CY	0.065	0.1140	24		0	NP	0.224	0.1352	65	2	1
CZ	0.138	0.1135	6	3	0.50	OM	0.147	0.0877	28	0	0
DE	0.058	0.1080	96	3	2	PA	0.144	0.0456	20	4	1
DK	0.106	0.0467	292	3	1	PE	0.094	0.1012	53	0	2
EC	0.084	0.1262	33	0	1	PH	0.073	0.0701	101	1	0.78
EE	0.222	0.1308	8		0	PK	0.117	0.1111	105	1	1.64
EG	0.135	0.1133	167	2	1	PL	0.077	0.1225	86	1	0.57
ES	0.147	0.0349	111	2	2	PT	0.155	0.0408	27	1	2
FI	0.140	0.0799	20	1	1	PY	0.086	0.1456	8	1	2
FR	0.120	0.0837	70	0	1	QA	0.163	0.0542	31		0
GB	0.108	0.1536	31	4	1	RO	0.148	0.0564	7	1.71	1
GH	0.331	0.1114	18	1	1	RU	0.129	0.1783	20	1.40	0
GR	0.120	0.0894	68	1	1	SA	0.172	0.0647	56	3	1
HK	0.115	0.0775	56	4	1	SD	0.160	0.1158	31		0
HN	0.129	0.0930	81	2	0.82	SE	0.165	0.0392	16	1	1
HR	0.068	0.1060	123	3	0	SG	0.095	0.0234	16	3	0.25
HU	0.183	0.1473	16	1	1	SI	0.052	0.1269	22	3	1
ID	0.104	0.1276	129	2.19	1	SK	0.133	0.1667	18	2	0.88
IE	0.175	0.0491	32	1	1	SR	0.197	0.1060	16		0
IL	0.062	0.0419	69	3	1	SV	0.093	0.1026	40	3	2
IN	0.177	0.0821	215	2	0	SZ	0.105	0.1389	8		0
IR	0.109	0.0288	2	2	1	TH	-0.012	0.1883	43	2.23	0.77
IS	0.125	0.0504	18		0	TN	0.114	0.0474	73	0	1

Country	ROE	sd.	Freq.	cr	Agreg-info	Country	ROE	sd.	Freq.	cr	Agreg-info
IT	0.073	0.1003	143	2	2	TR	0.150	0.1597	41	2	2
JM	0.178	0.1248	23	2	0	TT	0.223	0.0434	24		0
JO	0.078	0.0799	69	1	1	TW	0.006	0.1274	138	2	2
JP	-0.008	0.0937	489	1.82	1	UA	0.083	0.0992	8	2	0
KE	0.172	0.1748	51	4	1	US	0.104	0.0760	67	1	1
KN	0.105	0.0547	8		0	UZ	0.035	0.0174	3	2	0
KR	0.044	0.1273	50	3	1	VE	0.220	0.1443	68	3	1
KW	0.140	0.0657	48	3	0.25	ZA	0.157	0.1698	7	3	1
KZ	0.154	0.1079	66	2.34	0	ZM	0.446	0.0384	2	1	0
LB	0.169	0.0666	41	4	1	ZW	0.273	0.0930	7	4	0
LC	0.115	0.0537	4		0	Total	0.110	0.118	5099	2.03	0.99

Notes: The Table reports the country averages of ROE, cr a agreginfo. For a better interpretation of ROE, standard deviation and frequency are also provided. ROE is the Return on Equity; agreginfo is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); cr is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

Table 4 Means, Standard Deviations and Frequencies of ROE by Year and Creditor Rights Score (cr)

year	Very Low (0)	Low (1)	Medium (2)	High (3)	Very High (4)	Total
1996	0.124	0.134	0.151	0.113	0.196	0.138
	0.120	0.096	0.111	0.077	0.108	0.101
	30	93	137	130	41	431
1997	0.116	0.127	0.148	0.095	0.182	0.129
	0.102	0.095	0.126	0.106	0.138	0.116
	33	105	157	145	46	486
1998	0.088	0.107	0.126	0.066	0.165	0.102
	0.115	0.100	0.122	0.127	0.109	0.122
	35	108	171	197	44	555
1999	0.092	0.115	0.135	0.074	0.137	0.106
	0.128	0.111	0.112	0.107	0.159	0.118
	38	114	191	226	42	611
2000	0.076	0.068	0.119	0.103	0.189	0.101
	0.141	0.109	0.129	0.111	0.123	0.123
	47	208	213	156	43	667
2001	0.099	0.047	0.111	0.094	0.175	0.091
	0.094	0.122	0.139	0.105	0.132	0.129
	50	213	239	145	44	691
2002	0.122	0.049	0.101	0.105	0.152	0.090
	0.080	0.124	0.140	0.091	0.119	0.125
	51	212	253	142	40	698
2003	0.136	0.121	0.110	0.137	0.156	0.122
	0.082	0.110	0.106	0.101	0.101	0.105
	46	130	311	140	33	660
Total	0.106	0.085	0.121	0.095	0.170	0.108
	0.109	0.117	0.125	0.107	0.126	0.119
	330	1183	1672	1281	333	4799

Table 5 ROE by Year and Information Sharing Score

PANEL A: Means, Standard Deviations and Frequencies of ROE by Year and Information Sharing Score (*agreginfo*)

year	No Information (0)	Some Information (1)	Strong Information (2)	Total
1996	0.158	0.137	0.112	0.139
	0.112	0.102	0.073	0.102
	138	248	76	462
1997	0.155	0.123	0.109	0.130
	0.113	0.121	0.094	0.115
	159	267	95	521
1998	0.130	0.101	0.086	0.104
	0.105	0.127	0.111	0.120
	117	366	107	590
1999	0.141	0.104	0.098	0.109
	0.123	0.122	0.087	0.116
	120	392	136	648
2000	0.141	0.100	0.084	0.104
	0.110	0.124	0.113	0.121
	119	445	144	708
2001	0.137	0.089	0.065	0.093
	0.094	0.130	0.130	0.127
	131	455	145	731
2002	0.147	0.082	0.073	0.092
	0.103	0.121	0.137	0.124
	130	466	143	739
2003	0.165	0.114	0.118	0.123
	0.082	0.099	0.123	0.103
	113	441	146	700
Total	0.147	0.103	0.091	0.110
	0.106	0.120	0.114	0.118
	1027	3080	992	5099

the existence of credit bureaus. It is probable that more competition exists here than in other countries without information sharing. Another possible explanation points to macroeconomic shocks (in the sample period Asia was affected by macroeconomic shocks that could have eroded banks' earnings).

As *Table 4* shows, the more creditor rights exist, the more profitable banks get. In fact, banks in countries with strong creditor rights tend to show more stable (and positive) earnings, while banks' profitability takes more extreme values in countries with little creditor protection. We have 330 banks in countries with the weakest creditor rights and an average ROE of 10.6%, compared with 333 banks in countries with the strongest creditor rights and an average ROE of 17.6%. These results are consistent year by year and reflect the fact that banking business is safer and more profitable in those countries where more creditor protection exists.

In *Table 5, Panel A*, we present data classified by the level of information sharing. As expected, the more information there is, the less profitability banks achieve. Year by year, banks in countries with no information sharing are more profitable, according to the existence of informational asymmetries as a source of monopolistic

PANEL B: One-way ANOVA

Source	SS	df	MS	F	Prob > F
Between groups	1.896	2	0.948	69.83	0
Within groups	69.176	5096	0.014		
Total	71.072	5098	0.0139		

rents. The pool sample shows an average ROE of 14.7% for banks in countries without credit bureaus, 10.3% if a private or public bureau exists, and 9.1% if both types exist.

One-way ANOVA (*Table 2, Panel B*) is used to test for differences between the three groups of information-sharing scores. The significant F value of 69.83 tells us that the mean values of ROE are not equal across information-sharing levels, though it does not tell us where the differences are. In the next section we explore the nature of the relation between ROE and information-sharing scores.

4. Cross-Country Creditor Rights and Commercial Banks' Profitability

In this section, we present the cross-sectional results on the determinants of ROE in 103 countries. Our empirical test is based on a cross-section analysis of commercial banks' profitability and assesses the sensitivity of current ROE to creditor rights, to information sharing in the country, to bank size, and to a number of other country-specific variables. We run the following regression:

$$ROE_{i,t} = \alpha_0 + \alpha_1 \log ta_{i,t} + \sum_{j=1}^4 \alpha_{1+j} \text{Economy}_{ci,t}^j + \alpha_6 cr_{ci,t} + \alpha_7 \text{agreginfo}_{ci,t} + \varepsilon_{it} \quad (1)$$

The economic control variables are:

- economic growth: gross domestic product (annual change),
- economic wealth: log GDP per capita,
- primary source of earnings (interest rates): lending rates,
- financial instability: inflation (annual rate).

We then measure profitability persistence and the effect of the same explanatory variables on profitability persistence by running the following regression:

$$ROE_{i,t+1} = \alpha_0 + \alpha_1 ROE_{i,t} + \alpha_2 \log ta_{i,t} + \sum_{j=1}^4 \alpha_{2+j} \text{Economy}_{ci,t}^j + \alpha_7 cr_{ci,t} + \alpha_8 \text{agreginfo}_{ci,t} + \varepsilon_{it} \quad (2)$$

Note that the dependent variable is represented by the following year's return on equity at the individual bank level. In this expression, as α_1 approaches unity, ROE gets more persistent.

As a first assessment of whether return on equity is higher and more persistent in countries with better creditor rights, we look at the correlation between the variables. The correlation matrix is reported in *Table 6*. We find that the more creditor-rights protection there is, the greater is current and future profitability. Higher levels of current and future profitability are associated with lower levels of information shared, supporting the idea that credit bureaus add competition pressure to lenders. Furthermore, the correlations show that macroeconomic instability, as proxied by inflation, is positively associated with current and future profitability, while gross domestic product per capita is negatively associated with ROE, indicating that richer

Table 6 Correlation Matrix: Pairwise Correlation Coefficients between the Variables

	<i>FROE</i>	<i>ROE</i>	<i>logta</i>	<i>interest</i>	<i>gdp</i>	<i>inf</i>	<i>loggdppc</i>	<i>agreginfo</i>	<i>cr</i>
<i>FROE</i>	1								
<i>ROE</i>	0.6100*	1							
<i>logta</i>	-0.1488*	-0.1352*	1						
<i>interest</i>	0.1953*	0.2187*	-0.3389*	1					
<i>gdp</i>	0.1109*	0.1350*	-0.0562*	0.1278*	1				
<i>inf</i>	0.1215*	0.1220*	-0.0365*	0.2722*	-0.0389*	1			
<i>loggdppc</i>	-0.0881*	-0.0936*	0.1426*	-0.1825*	-0.3257*	-0.1027*	1		
<i>agreginfo</i>	-0.1554*	-0.1493*	0.2271*	0.0251	0.0036	-0.1439*	-0.1346*	1	
<i>cr</i>	0.0798*	0.0892*	-0.0858*	-0.0385*	0.0086	0.1116*	-0.0669*	-0.1130*	1

Notes: * Significant at 5%.

FROE is next year Return on Equity; *ROE* is the Return on Equity; *logta* is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *gdp* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggdppc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

countries with stable economies have more competitive markets with fewer business opportunities for lenders. The correlations between these national characteristics confirm that it is important to control for them in assessing the impact of current ROE on next-period ROE.

After matching the available information for explanatory and dependent variables we end up with a sample size of 4,340 bank-years for the estimation of the ROE regressions. While some variables, such as gross domestic product, are available for all sampled banks, others, such as ROE, have a smaller coverage. As a result of lower data availability, the number of banks for which we were able to obtain data for the explanatory and dependent variables was limited to a total of 3,983 bank-years when current ROE is the dependent variable and 3,356 bank-years when next-year ROE is the dependent variable.

Table 7 presents the regressions of current ROE on the creditor-rights index, information sharing, size, and economic control variables. The three columns show: (1) pooled OLS estimates, (2) bank fixed effects, and (3) bank and country fixed effects. For the three types of regressions, the results confirm a negative relation between profitability and information sharing and a positive relation between profitability and creditor-rights protection, in line with the basic results obtained in our previous section. Also, most of the independent variables (except size) are significant for explaining contemporaneous profitability. That is, interest rates, gross domestic product (GDP), GDP per capita, and inflation are very significant variables using pooled OLS analysis, and only GDP drops when we perform panel data analyses. Consequently, an increase in lending rates, economic growth, and inflation foster improved bank profitability, which is consistent with more banking business being generated by economic growth and development in general, as well as by higher intermediation margins.

As the most commonly accepted drivers of bank profitability are intermediation spread and loan losses, by substituting current ROE by loan loss provision, and

Table 7 Cross-Sectional Estimates: Current ROE

Variables	Pooled OLS. Dependent: Current ROE	Panel Regression. Dependent: Current ROE	Panel Regression. Dependent: Current ROE
	(1)	(2)	(3)
<i>logta</i>	-0.00130 [-1.437]	-0.00461 [-0.980]	-0.00398 [-0.846]
<i>interest</i>	0.181*** [10.31]	0.0965*** [2.649]	0.0970*** [2.666]
<i>gdp</i>	0.590*** [6.711]	0.249*** [3.054]	0.248*** [3.053]
<i>inf</i>	0.135*** [3.996]	0.0596 [1.305]	0.0605 [1.327]
<i>loggdppc</i>	-0.00320*** [-3.531]	0.0733*** [2.661]	0.0721*** [2.620]
<i>agreginfo</i>	-0.0229*** [-6.609]	-0.0359*** [-4.001]	-0.0360*** [-4.019]
<i>cr</i>	0.00923*** [5.190]	0.0121*** [2.836]	0.0121*** [2.832]
<i>Constant</i>	0.120*** [6.492]	-0.734** [-2.299]	-0.728** [-2.284]

Observations	3,983	3,983	3,980
R-squared		0.015	0.015
Adjusted R-squared	0.100		
Number of Banks		645	644
Bank FE		YES	YES
Country FE			YES

Notes: *t*-statistics in brackets; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

ROE is the Return on Equity; *logta* is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *GDP* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggdppc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

then by interest margin, as the dependent variable in the regressions, we try to identify the channel through which profitability is affected by creditor rights and information sharing. *Table 8* shows the results for the same previously run three types of regressions. While we cannot observe any effect of information sharing or creditor-rights protection on loan loss provision (columns 1, 2, and 3), there is a clear effect on the intermediation spread (columns 4, 5, and 6), confirming competition as a cause of changes in profitability. Creditor-rights protection is a significant variable whatever the type of regression, though only pooled OLS analysis shows a significant effect of information sharing on the intermediation spread.

Table 8 Effects of Information Sharing and Creditor Rights on Loan Loss Provision and Interest Margin

Variables	Pooled OLS. Dependent: Loan Loss Provision over Assets	Panel Regression. Dependent: Loan Loss Provision over Assets	Panel Regression. Dependent: Loan Loss Provision over Assets	Pooled OLS. Dependent: Interest Margin over Assets	Panel Regression. Dependent: Interest Margin over Assets	Panel Regression. Dependent: Interest Margin over Assets
	(1)	(2)	(3)	(4)	(5)	(6)
<i>logta</i>	-0.000745*** [-3.129]	-0.00561*** [-3.487]	-0.00563*** [-3.491]	-0.00407*** [-17.51]	-0.00616*** [-7.230]	-0.00615*** [-7.201]
<i>interest</i>	0.0391*** [8.938]	0.0952*** [8.154]	0.0952*** [8.150]	0.112*** [25.69]	0.0358*** [5.485]	0.0358*** [5.485]
<i>gdp</i>	0.0209 [0.946]	0.0157 [0.579]	0.0157 [0.578]	-0.170*** [-7.793]	-0.0551*** [-3.693]	-0.0551*** [-3.692]
<i>inf</i>	0.000261 [0.0536]	-0.0109* [-1.696]	-0.0109* [-1.696]	-0.0114** [-2.347]	0.0198*** [5.510]	0.0198*** [5.509]
<i>loggdppc</i>	0.000937*** [4.009]	0.00582 [0.648]	0.00584 [0.650]	-0.000626*** [-2.720]	0.0224*** [4.601]	0.0224*** [4.594]
<i>agreginfo</i>	0.00113 [1.267]	0.00289 [0.991]	0.00290 [0.992]	0.00292*** [3.361]	0.000921 [0.570]	0.000918 [0.567]
<i>cr</i>	0.000466 [1.012]	-0.00124 [-0.867]	-0.00124 [-0.866]	0.00201*** [4.398]	0.00179** [2.240]	0.00179** [2.238]
<i>Constant</i>	0.00140 [0.288]	0.00731 [0.0704]	0.00727 [0.0701]	0.0868*** [18.38]	-0.156*** [-2.789]	-0.156*** [-2.787]
Observations	3,912	3,912	3,909	4,135	4,135	4,132
R-squared		0.030	0.030		0.045	0.045
Adjusted R-squared	0.032			0.282		
Number of Banks		634	633		644	643
Bank FE		YES	YES		YES	YES
Country FE			YES			YES

Notes: *t*-statistics in brackets; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

logta is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *gdp* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggdppc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

Concerning the profitability persistence analysis, *Table 9* presents regressions of next-period ROE on current ROE, creditor rights, information sharing, size, and economic control variables. First, we consider the pooled sample in Panel A. Current ROE explains a large amount of next-period ROE (high persistence). Some macro-economic variables remain important. More specifically, the existence of current high interest increases future profitability and, as the country becomes richer (in terms of GDP per capita), future ROEs decline. This may reflect a more competitive

Table 9 Cross-Sectional Estimates: Next Year ROE**Panel A: Regressions by Creditor Rights Index**

	pooled sample	<i>cr</i> = 0	<i>cr</i> = 1	<i>cr</i> = 2	<i>cr</i> = 3	<i>cr</i> = 4
	<i>FROE</i>	<i>FROE</i>	<i>FROE</i>	<i>FROE</i>	<i>FROE</i>	<i>FROE</i>
<i>ROE</i>	0.563 (23.44)**	0.63 (8.55)**	0.351 (6.24)**	0.563 (14.38)**	0.45 (9.35)**	0.656 (7.50)**
<i>logta</i>	-0.001 (1.37)	-0.005 (2.41)*	0.002 (1.69)	-0.002 (0.94)	0.003 (2.22)*	0.003 (0.76)
<i>interest</i>	0.047 (2.43)*	-0.176 (2.83)**	0.042 (1.33)	-0.074 (2.18)*	0.219 (3.99)**	0.031 (0.25)
<i>gdp</i>	0.069 (0.95)	0.137 (0.38)	-0.184 (1.29)	-0.115 (0.7)	0.238 (2.00)*	-0.453 (2.71)**
<i>inf</i>	0.041 (1.3)	-0.446 (1.42)	0.329 (4.87)**	0.045 (0.77)	-0.139 (2.47)*	0.031 (0.31)
<i>loggdppc</i>	-0.002 (3.03)**	-0.005 (1.39)	-0.008 (4.42)**	-0.001 (0.43)	-0.007 (3.47)**	0.005 (1.33)
<i>agreginfo</i>	-0.01 (3.36)**	0.006 (0.61)	-0.003 (0.25)	-0.017 (3.79)**	-0.013 (2.24)*	-0.013 (0.84)
<i>cr</i>	0.002 (1.31)					
<i>Constant</i>	0.088 (5.46)**	0.209 (3.51)**	0.1 (2.90)**	0.121 (3.59)**	0.066 (2.75)**	-0.032 (0.34)
Observations	3356	212	875	1078	916	275
<i>R</i> -squared	0.39	0.52	0.32	0.39	0.35	0.50

Notes: Robust *t* statistics in parentheses; * significant at 5%; ** significant at 1%.

FROE is next year Return on Equity; *ROE* is the Return on Equity; *logta* is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *gdp* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggdppc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

environment in developing countries, which erodes monopolistic rents. Furthermore, the existence of credit bureaus lowers future ROEs, although the creditor-rights index is not statistically significant.

To explore the impact of creditor-rights protection more deeply, we run cross-sectional regressions by each level of the creditor-rights index. In countries with little protection, high interest rates are associated with a decline in next-period profitability. By contrast, in countries with more creditor protection, interest rates make a positive contribution to profitability. This is consistent with the idea that low protection may increase the losses from default events and the volatility of lenders' earnings.

As for the profitability persistence, it is not clear how it changes in different contexts. For this reason, we make additional cross-sectional time series regressions, not reported here, and we find that the highest persistence of ROE corresponds to banks in countries with the strongest creditor-rights protection. This is consistent with the cross-sectional regressions reported in *Table 9, Panel A*: the coefficient of current ROE in countries with a creditor-rights value of 4 is the highest (0.65).

Table 9 Cross-Sectional Estimates: Next Year ROE

Panel B: Regressions by Information Sharing Score

	pooled	<i>agreginfo</i> = 0	<i>agreginfo</i> = 1	<i>agreginfo</i> = 2
	<i>FROE</i>	<i>FROE</i>	<i>FROE</i>	<i>FROE</i>
<i>ROE</i>	0.563 (23.44)**	0.496 (6.99)**	0.554 (18.91)**	0.477 (7.89)**
<i>logta</i>	-0.001 (1.37)	0.004 (1.93)	-0.001 (1.17)	0.002 (1.3)
<i>interest</i>	0.047 (2.43)*	0.08 (1.24)	0.096 (2.82)**	-0.066 (1.93)
<i>gdp</i>	0.069 (0.95)	0.029 (0.19)	-0.017 (0.18)	0.081 (0.42)
<i>inf</i>	0.041 (1.3)	0.083 (2.37)*	-0.035 (0.7)	0.128 (0.74)
<i>loggdppc</i>	-0.002 (3.03)**	0.01 (4.22)**	-0.005 (4.79)**	-0.007 (3.18)**
<i>agreginfo</i>	-0.01 (3.36)**	0 (.)	0 (.)	0 (.)
<i>cr</i>	0.002 (1.31)	0.012 (2.74)**	0.004 (1.96)	-0.024 (4.47)**
<i>Constant</i>	0.088 (5.46)**	-0.162 (3.64)**	0.106 (5.43)**	0.153 (3.81)**
Observations	3356	557	2246	553
<i>R</i> -squared	0.39	0.41	0.41	0.27

Notes: Robust *t* statistics in parentheses; * significant at 5%; ** significant at 1%.

FROE is next year Return on Equity; *ROE* is the Return on Equity; *logta* is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *gdp* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggdppc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

In *Table 9, Panel B* we analyze in detail the influence of information sharing. Persistence of ROE increases from economies without credit bureaus to countries with a private or public one; however, when both types exist, ROE is less persistent. This may reflect the fact that banks obtain big information benefits in environments of strong informational asymmetries, but improvements in the availability of information add more competitive pressure and lower the informational rents of established banks when those asymmetries are relaxed.

Furthermore, in countries without credit bureaus, better creditor rights tend to increase future bank profitability. This is consistent with banks operating amid strong informational asymmetries but facing a safer market. Panel B also indicates that higher gross domestic product gives an impulse to next-period return on equity in countries with information restrictions. However, in the presence of credit bureaus, richer countries tend to exhibit less commercial bank profitability. This supports the idea that in richer countries, information tends to increase the competitive pressure, whereas in

Table 10 Fixed Effects Panel Estimates: Next year ROE

Panel A: Change in Creditor Rights Index from 1996–1999 to 2000–2003

Variables	No Change	Change	Change	
			Increase	Decrease
<i>ROE</i>	0.198*** [0.0192]	-0.150*** [0.0451]	-0.175 [0.277]	-0.101** [0.0477]
<i>Logta</i>	-0.0226*** [0.00480]	-0.0473** [0.0238]	0.0768 [0.144]	-0.0530** [0.0253]
<i>Interest</i>	-0.0171 [0.0358]	-0.604** [0.252]	1.029 [3.029]	-0.424 [0.283]
<i>gdp</i>	0.00607 [0.0769]	-1.554*** [0.387]	-2.894 [2.799]	-1.602*** [0.396]
<i>Inf</i>	-0.0631 [0.0452]	0.120 [0.405]	2.193 [3.617]	0.284 [0.512]
<i>loggdpcc</i>	0.0856** [0.0299]	0.243 [0.275]	1.421 [6.638]	0.352 [0.339]
<i>agreginfo</i>	-0.0151* [0.00864]	0.0475 [0.0666]		0.0563 [0.0661]
<i>cr</i>	-0.0493 [0.0409]	0.00138 [0.00548]	0.518 [0.333]	-0.000172 [0.00544]
<i>Constant</i>	-0.456 [0.331]	-2.773 [4.124]	-21.82 [93.14]	-4.299 [5.062]
Observations	2,813	541	19	522
R-squared	0.060	0.122	0.686	0.104
Banks	513	124	4	120

Notes: Standard errors in brackets; *** $p < 0.001$, ** $p < 0.05$, * $p < 0.1$.

FROE is next year Return on Equity; *ROE* is the Return on Equity; *logta* is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *gdp* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggdpcc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

poorer countries, banks' earnings are affected by increases in wealth more than by increases in competition.

Given that creditor protection may not have an immediate effect on bank profitability, we divided the whole period into two sub-periods: 1996–1999 and 2000–2003, in order to check if those countries with creditor-rights changes from the first to the second sub-period show a remarkable change in profitability persistence. Furthermore, we analyze the effect of both positive and negative changes in creditor protection. Using fixed-effects panel data to get *Table 10*, our results in Panel A show lower persistence when the creditor protection level is different. We emphasize the negative coefficient of information sharing when creditor protection stays unchanged. In Panel B, the same type of regression has been run to analyze differences in profitability persistence in the presence of information-sharing changes. Though only positive changes are present in the sample, our panel data analysis confirms

Table 10 Fixed Effects Panel Estimates: Next year ROE

Panel B: Change in Information Sharing Score from 1996–1999 to 2000–2003

Variables	No Change	Change	Change	
			Increase	Decrease
<i>ROE</i>	0.113*** [0.0196]	0.135** [0.0459]	0.135** [0.0459]	
<i>logta</i>	-0.0222*** [0.00538]	-0.0420*** [0.0119]	-0.0420*** [0.0119]	
<i>interest</i>	-0.0689* [0.0399]	0.136 [0.103]	0.136 [0.103]	
<i>gdp</i>	-0.103 [0.0870]	-0.156 [0.231]	-0.156 [0.231]	
<i>inf</i>	-0.0827 [0.0526]	0.0187 [0.106]	0.0187 [0.106]	
<i>loggdppc</i>	0.0810** [0.0326]	0.234** [0.104]	0.234** [0.104]	
<i>agreginfo</i>		-0.00938 [0.0121]	-0.00938 [0.0121]	
<i>cr</i>	0.00547 [0.00394]	-0.178** [0.0604]	-0.178** [0.0604]	
<i>Constant</i>	-0.564 [0.368]	-1.772 [1.275]	-1.772 [1.275]	
Observations	2,847	507	507	no obs.
<i>R</i> -squared	0.023	0.102	0.102	
Banks	533	104	104	

Notes: Standard errors in brackets; *** $p < 0.001$, ** $p < 0.05$, * $p < 0.1$.

FROE is next year Return on Equity; *ROE* is the Return on Equity; *logta* is the logarithm of the Bank's Total Assets; *interest* is the percent interest rate, banks prime lending; *gdp* is the gross domestic product measured in annual percent changes (constant prices); *inf* is the annual percent change of inflation; *loggdppc* is the logarithm of gross domestic product per capita (constant prices); *agreginfo* is the Information Sharing Score (Public Registry or Private Bureau), and it takes three values: 0 (no information sharing), 1 (the country has a Public Registry or a Private Bureau) or 2 (strongest information sharing: the country has a Public Registry and a Private Bureau); *cr* is the Creditor rights aggregate score. It varies between 0 (poor creditor rights) and 4 (strong creditor rights).

more profitability persistence when the information-sharing level is higher. In this panel, we emphasize the negative coefficient of the creditor protection variable when information sharing increases. It suggests a certain substitution effect, as previous literature points out, which we put down to a higher level of competitiveness.

Taken together, the evidence found suggests a causal relationship between creditor-rights protection (the legal system) and informational asymmetries with regard to current and future commercial bank profitability. In general, our results show that economic shocks and other conditions may change the degree of competition in the market.

5. Concluding Remarks

This paper presents evidence on the effects of creditor-rights protection and information sharing on the level and persistence of commercial banks' profitability, using firm-level data for more than a hundred countries during the period 1996–2003.

Concerning the level of profitability, our estimates show that, as hypothesized, the most profitable banks come from countries without credit bureaus and with strong creditor-rights protection. These results are consistent with the idea that countries with better investor protection (richer common law countries) develop bigger capital and credit markets, but it is necessary to control for informational asymmetries because of the interconnection of the two factors as regards their effect on bank performance. Our results support previous evidence found by Brown et al. (2009) and Houston et al. (2010). A complementary analysis (*Table 8*) suggests that part of this variation comes from the effect of creditor protection and information sharing on the interest spread (confirming competition as a cause of changes in profitability). It is also worth noting that lower levels of information sharing are associated with higher future profitability, supporting the idea that in countries without credit bureaus the informational advantage confers to banks some market power over their customers, while information-sharing agreements tend to increase the intensity of competition.

Concerning the influence of the economic control variables, banks operating in countries with high interest rates tend to show high levels of profitability. However, as the country becomes richer, future ROEs decline, possibly because of increasing competition. Also, these differences might reflect a significant variation in domestic government financial needs. In other words, banks may employ government securities as a source of large steady profits. In addition, large deficit financing through the issuance of treasury bills crowds out the private sector by capturing banks' investments and may also put pressure on interest rates, making access to bank lending even more difficult for the private sector.

As for our results for persistence of profitability, in general, banks from countries with the strongest creditor-rights protection and without information sharing seem to have more persistence in profitability. In *Table 9*, the size of the coefficient for current ROE varies widely across the groups made for creditor protection (Panel A). Panel B shows that profitability persistence tends to increase from countries without credit bureaus to countries that have established one. By contrast, persistence of profitability diminishes from countries with one credit bureau to countries with more than one credit bureau. In other words, our results suggest that when a credit bureau is established, credit markets become bigger and more active, improving the persistence of banks' earnings. But after some time (and with a certain degree of information), other financial firms enter the market and reduce the banks' appropriation of informational rents and the gains of a bigger market.

Nevertheless, it is important to note that variation in both the persistence and the levels of profitability could arise from sources other than competition. Although macroeconomic shocks were controlled for in this study, there could be estimation biases arising from the inclusion of only commercial banks, the use of accounting rates of return, or the short length of the time series data.

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