Capital Adequancy Arbitrage and Bank Competition
Research proposal:

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Introduction

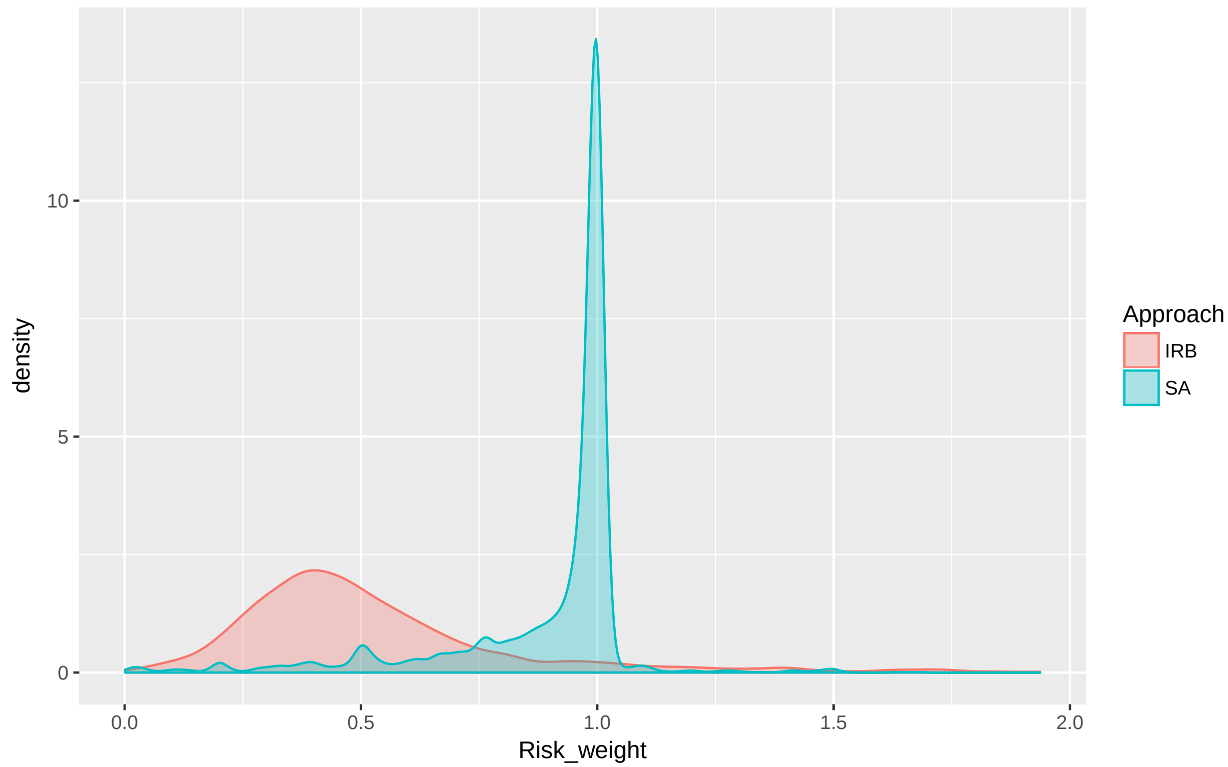
The Basel II framework introduced the possibility of banks to use, upon approval by the supervisory agency, internal risk models (internal rating-based or IRB) to calculte the risk-weights used for capital adequacy ratio. The argument in favor of IRB versus the fixed risk weights standard approach (SA) is that the IRB approach would improve banks' efficiency as "banks optimize risk weights and better account for the specific risk of each asset" (Beltratti and Paladino (2016)). Cucinelli et al. (2017) also point to the risk models having improved with the IRB approach as those models have to be approved by regulators.

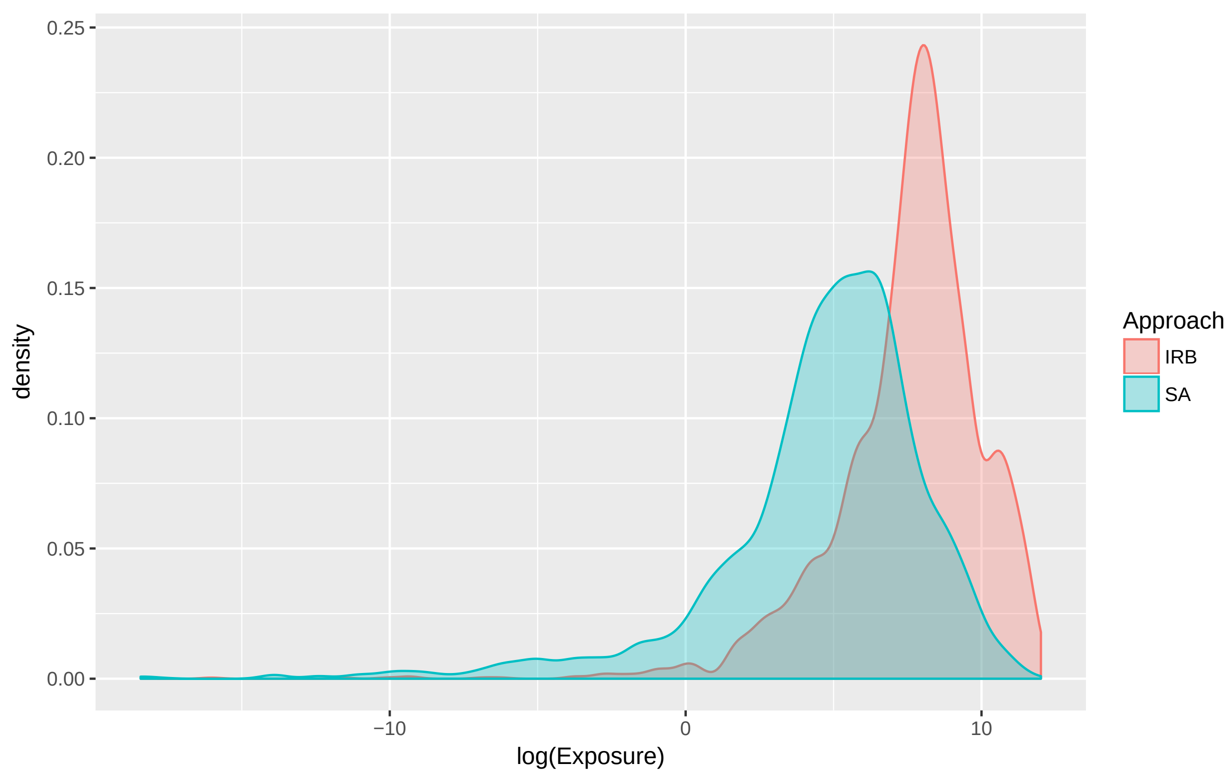
However, Döme, Kerbl, and Behn (2017) show that the location where banks are headquarted is a significant explanatory variable of risk-weights across european banks. Within the Basel II framework, those differences driven by location are unintended as they do not reflect heterogeneity in risk, but rather, point to regulatory arbitrage. In this recent literature on capital adequacy risk-weights, while some papers study the determinants of differences in risk-weights across banks (Döme, Kerbl, and Behn (2017), Beltratti and Paladino (2016) and Montes et al. (2016)) others focus on the impact of the IRB versus the SA on lending. Behn, Haselmann, and Wachtel (2016) found that, in response to an exogenous shock to credit risk, banks decrease more lending under the IRB approach relative to the SA. Behn, Haselmann, and Vig (2016) show that banks underestimate risk for portfolios under the IRB while interest rate are higher, suggesting that banks are aware of the higher risks of those loans.

My proposal is to fill the gap between those two lines in the literature: study the impact on bank lending coming from *unintended* differences in risk-weights across IRB portfolios of European banks. Following prior evidence (Behn, Haselmann, and Vig (2016), Efing (2016)) I expect a risk-taking channel to be stronger for banks headquarted in more relaxed regulatory enviroment.

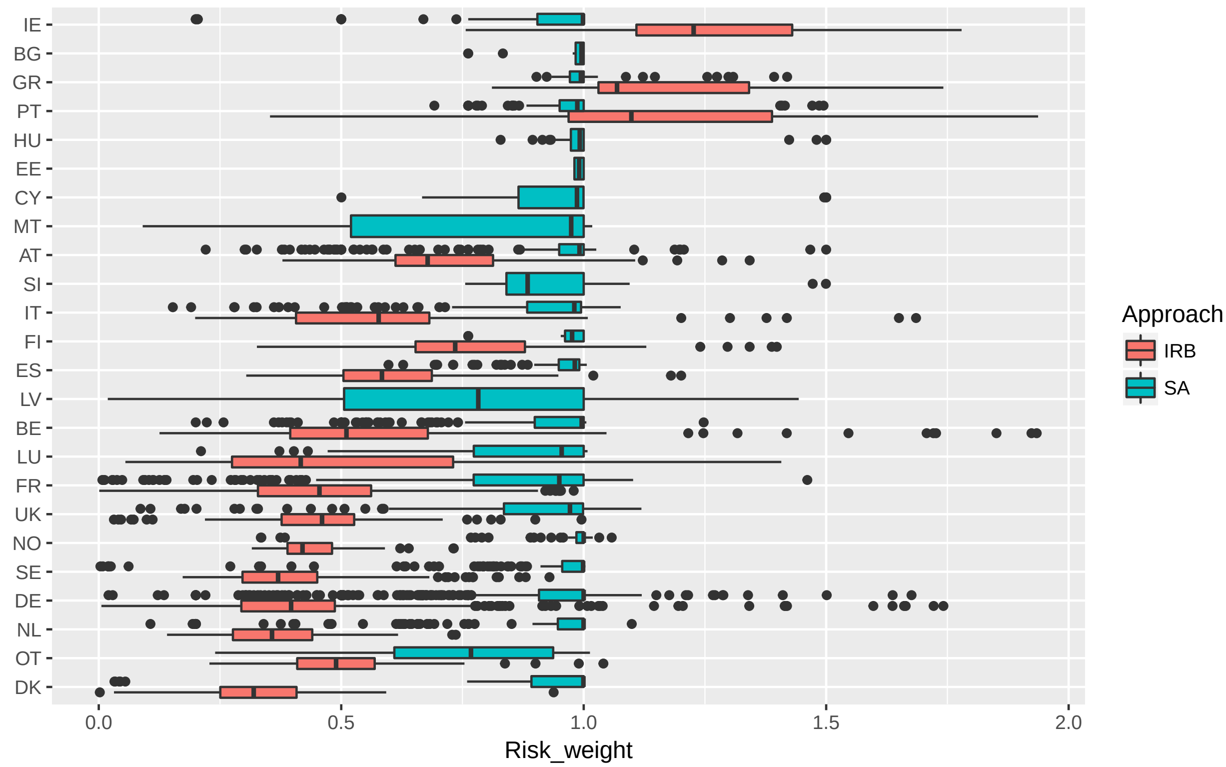
Stylized facts

The figure below shows the density function of risk weights for corporate exposures. While risk weights under the SA approach are concentrated around 100%, risk weights are more evenly distributed and concentrated at relatively lower values.





The next figures show the distributions of risk-weights for corporate exposures across headquarters and approaches (IRB and SA).



Data and empirical strategy

For the bank-level information on risk-weigths and other regulatory variables we can use the EU-wide transparency exercises. Those dataset are public available. There are in total four exercises for two periods each (December, 2012; June, 2013; December, 2014; June, 2015; December, 2015; June, 2016; December,2016 and June 2017). 132 European banks are included in the last exercise and 64 in the first. Further bank level information can be merged from the Orbis dataset.

The empirical strategy relies on comparing exposures to the same destination country from banks with different degrees of regulatory risk weight

$$Exposure_{i,c,t} = \beta_0(\hat{RW}^{SA}_{i,c,t} - RW^{IRB}_{i,c,t}) + \beta_1 NPL_{i,c,t} + \beta_2(\hat{RW}^{SA}_{i,c,t} - RW^{IRB}_{i,c,t}) \times NPL_{i,c,t} + \alpha_{i,t} + \alpha_{c,t} + \varepsilon_{i,c,t},$$

$Exposure_{i,c,t}$ is the total asset of bank i in country c at time t. $NPL_{i,c,t}$ is the amount of defaulted exposure. $RW^{IRB}_{i,c,t}$ is the risk weight of an exposure under the IRB approach. $\hat{RW}^{SA}_{i,c,t}$ is the predicted value using the characteristics of $RW^{IRB}_{i,c,t}$ from the following regression:

$$RW^{SA}_{i,c,t} = \delta_0 NPL_{i,c,t} + \alpha_{i,t} + \alpha_{c,t} + \varepsilon_{i,c,t}.$$

This variable is a proxy of what would be the risk weight under SA for an exposure that is actually calculated using the IRB approach. Hence, $\hat{RW}^{SA}_{i,c,t} - RW^{IRB}_{i,c,t}$ is our measure of regulatory risk weight strigency. Higher values indicate lower strigengy.

β_2 captures the risk-taking channel from regulatory arbitrage.

Table 1: Summary statistics

Statistic	N	Mean	St. Dev.	Min	Max
Portfolio	6,382	1.428	0.495	1	2
Country_rank	6,382	4.923	2.821	1	10
Exposure_default	2,731	630.965	2,896.457	0.000	43,530.670
Exposure	6,382	5,896.999	16,278.630	0.000	164,014.400
Risk_exposure	6,382	3,116.099	8,511.442	0.000	95,889.680
Risk_exposure_default	2,731	151.863	593.783	0.000	7,529.352
Exposure_adj	6,382	5,626.995	15,337.940	0.000	149,840.000
Risk_exposure_adj	6,382	3,051.114	8,339.071	0.000	95,889.680
Risk_weight	6,382	0.744	0.321	0.001	3.658
Default_rate	2,731	0.020	0.067	0.000	1.000
Default_rate_w	2,731	0.014	0.031	0.000	0.118

Table 2: Regression results

	Dependent variable:			
	log(Exposure)			
	(1)	(2)	(3)	(4)
Risk_weight	-4.142^{***}	-2.157^{***}	-1.593^{***}	-1.681^{***}
	(0.443)	(0.532)	(0.490)	(0.493)
ApproachSA		-2.756^{***}		
		(0.531)		
Risk_weight:ApproachSA		0.670		
		(0.747)		
Default_rate			2.005^{*}	-2.139
			(1.202)	(2.084)
Risk_weight:Default_rate				8.347^{**}
				(4.150)
Observations	6,382	6,382	2,731	2,731
R^2	0.462	0.544	0.620	0.624
Adjusted R^2	0.447	0.466	0.502	0.507
Residual Std. Error	2.593 (df = 6205)	2.548 (df = 5452)	1.799 (df = 2083)	1.791 (df = 2082)
Note:				*p<0.1; **p<0.05; ***p<0.01

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