Are foreign banks better at measuring and managing risks? Evidence from European credit markets

Carlo Milani
BEM Research – Rome (Italy)
University of Rome Tre

Econometric Research in Finance Workshop 2017 - SGH Warsaw School of Economics
15 September 2017

Agenda

- **Introduction**
- **Database description**
- **Empirical model**
- **Results**
  - *Hard information (transactional lending) effect*
  - *Soft information (relationship lending) effect*
  - *The combined effect of soft and hard information*
  - *Community banks effect*
  - *Community banks' dynamic effect*
- **Conclusions and policy implications**

Introduction – research questions

With the realization of the **European Banking Union** in 2014, an important step towards a unique financial market and an effective monetary policy at the European level was taken.

However, **a more integrated** European banking system is not necessarily synonymous with a **more stable** one. Some problems could arise from the coordination process between euro area countries and non-euro area European Union (EU) countries (e.g. Brexit).

Claessens and Van Horen (2012), reviewing the foreign banking performance studies and considering several measures of performance (profitability, profit and cost efficiency, loan quality, loan growth), find ambiguity in the literature:

- **15 studies** in which **foreign banks perform better** than domestic banks
- **9 studies** report **worse performance measures** or no statistically significant difference
- In **11 studies** the evidence is **ambiguous**

<u>Research questions:</u>

How the greater integration among European banking markets affects financial stability?

Are foreign banks better at measuring and managing risks?

Introduction – contributions (1)

Few studies focus on the **effect of foreign banks' presence in the European countries** (Berger et al., 2000; Havrylchyk and Jurzyk, 2011; Miller and Richards, 2002; Vander Vennet, 1996, 2002), and, to the best of my knowledge, no studies consider **how the greater integration among European banking markets affects financial stability**

Using 2015 data from the **European Banking Authority** (EBA), I am able to consider the bank's credit portfolio at the European country level, so I can test for the **impact of foreign banks on the loan quality** in a highly integrated banking market

Introduction – contributions (2)

I also contribute to the existing literature by testing two debated hypotheses (Goldberg et al., 2000):

H1. Cream-skimming lending strategy

Foreign banks "**cherry pick**" only the most lucrative domestic customers, leaving more risky ones to domestic institutions, applying the so-called cream-skimming lending strategy (Detragiache et al., 2008);

H2. Risk management superiority

Foreign banks improve the quality, pricing and availability of financial services (Levine, 1996). They are able to **export their greater ability to measure and manage risk effectively**, thanks to more advanced **technology** and economies of scale in **risk diversification**. They are also able to export better practices in **supervision**, **regulation** and **transparency rules**. Finally, they are less susceptible to **political pressures** and less inclined to lend to **connected parties**

Introduction – main findings

1. I find evidence that **foreign banks have lower default rates than domestic institutions**
2. My **results are in favour of the risk management superiority hypothesis** and against the cream-skimming lending strategy hypothesis
   a) Foreign banks that apply **transactional lending technologies** appear to be in a better position to select quality borrowers
   b) greater physical and cultural distance helps in the underwriting procedures, a signal that related/connected-party transactions play a large part in explaining the lower quality in European countries
   c) foreign banks show a better ability to measure and manage risk thanks to **higher manager performance**
   d) Foreign banks also seem to be able to **export better practices in supervision, regulation and transparency rules**
   e) I also find evidence, albeit not robust, that the entrance of foreign banks into market in which there is not perfect competition increases **competition** and allows an improvement in the **borrower selection**

Database description

Data set collected by the EBA during the **EU-wide stress testing in 2016**

My sample is made up of **51 holding banks operating in Europe**, 37 from euro area countries and 14 from Denmark, Hungary, Norway, Poland (**PKO Bank Polski**), Sweden and the UK

I consider the bank's credit portfolio at the European country level.
The banks in my sample are **active on average in 4.5 European credit markets** (including their domestic country) through their branches or subsidiaries.
In this way I build a two-dimensional panel data in which, on one side, there are the 51 banks examined by the EBA in the 2016 stress test and, on the other, there are all the European banking markets in which these banks operate.

The data at the country level are from the World Bank database and Thomson-Reuters.

Empirical model

Using a **random-effect estimator**, with robust standard errors clustered by bank, I estimate the following equation:

$$\text{defrateTOT}_{i,c} = k + \gamma_1 \cdot \text{Dforeign}_{i,c}$$
$$+\delta_1 \cdot \text{cet1}_i + \delta_2 \cdot \text{banksize}_i + \delta_3 \cdot \text{banksize}_i^2 + \delta_4 \cdot \text{cet1gov}_i + \delta_5 \cdot \text{markrisk}_i$$
$$+\beta_1 \cdot \text{creditgdp}_c + \beta_2 \cdot \text{listed}_c + \beta_3 \cdot \text{bench}_c + \beta_4 \cdot \text{insolvcost}_c + \varepsilon_{i,c}$$

where the dependent variable, *defrateTOT*, is the ratio between **the defaulted credit exposures and the sum of the defaulted and non-defaulted overall credit exposures** (both the numerator and the denominator are risk unweighted) for bank *i* operating in country *c.*

The main important variable is ***Dforeign***, that is equal to 1 if the headquarter of the *i*-th bank is not in the European country *c* and 0 in the case of domestic banks.

A negative (positive) γ_1 may signal that foreign banks are more (less) efficient in the selection of borrowers.

Empirical model – control variables (1)

I include two types of exogenous variables:

- bank-specific variables (lower case *i*)

  - **cet1**, equal to the CET1 ratio. According to the banking capital regulation debate, banks with a lower capital ratio are likely to be more risk loving, mainly because managers may have the incentive to leverage the bank to spread profits on a narrower equity base (Tarullo, 2008)

  - **banksize**, equal to the logarithm of the sum of i) total assets and ii) off-balance sheet items (e.g. guarantees). I allow for non-linearities by including the square of the variable

  - **marketrisk**, the share of market risks over risk-weighted assets. I consider this variable to capture the effect of the business mix

Empirical model – control variables (2)

- country-specific variables (lower case *c*) that refer to the country in which the bank operates

  - **creditgdp**, which is the difference between the levels of financial resources provided to the private sector as a percentage of GDP (credit intensity) in 2014 and in 2006. Lower credit intensity could signal countries that were affected by a credit bubble in the period before the 2007–2008 financial crisis.
  - **listed**, which is the number of listed companies per 1,000,000 people. This variable captures the financial depth of a country.
  - **bench** is the average level of the interest rate on the benchmark government bond with 10 years of maturity in 2011. I consider 2011 because it is the year with the greatest tension on government bonds in the euro area, particularly in the so-called GIPSI countries (Greece, Ireland, Portugal, Spain and Italy).
  - **insolvcost** is the cost of the bankruptcy proceedings involving domestic entities (it is recorded as a percentage of the value of the debtor's estate). This variable is considered as a proxy for bankruptcy procedures' inefficiency.

Results. Main evidence on the effect of foreign banks on default rates

Model	I	II	III	IV	V	VI
Dependent var.	defrateTOT	defrateCOR	defrateRET	defrateTOT	defrateCOR	defrateRET
Dforeign	-0.016**	-0.032**	0.055*	-0.012	-0.024*	0.060
	[0.008]	[0.014]	[0.032]	[0.008]	[0.013]	[0.037]
Dforeign×Dperipheral	-	-	-	-0.021**	-0.044**	-0.032
				[0.009]	[0.019]	[0.043]
…						
$\frac{\partial defrateBS}{\partial Dforeign}\Big\vert_{Dperipheral=1}$	-	-	-	-0.033***	-0.068***	0.028
Overall R-squared	0.218	0.271	0.064	0.225	0.275	0.062
F statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Number of banks	51	51	50	51	51	50
Obs.	221	220	211	221	220	211

- Foreign banks appear to be more efficient in the selection of borrowers in the overall credit portfolio (model I), mainly thanks to better selection with respect to corporate (model II)
- No better selection in the case of retail (model III)
- The impact is stronger in peripheral countries (Italy, Spain, Ireland, Hungary and Poland) (models IV-V)

- This effect is mainly driven by **credit to corporations** and is stronger in **European countries with economic and financial gaps**.
- This evidence signals that foreign banks are better able to select **less opaque borrowers**, as in the case of corporations, while for less transparent customers, as in the case of retail, they have a lower ability to select high-quality borrowers

Results. Technology availability effect

- I include a variable that expresses the share of the overall credit portfolio for which the **advanced internal-based** (A-IRB) model has been used (*irbaTOT*)

- The derivative of *defrateTOT* with respect to *Dforeign* is negative and significant in the correspondence of the *irbaTOT* median value and the third quartile in the sample (model I).
- The marginal effect of *Dforeign* on *defrateTOT*, when only peripheral European countries are considered, is negative and highly significant for usage of the A-IRB model at the median value of the distribution and even stronger for the third quartile of *irbaTOT* (model II)
- The derivative of *defrateCOR* with respect to *Dforeign* is negative, highly significant and with a magnitude that increases with the share of the corporate credit portfolio for which the A-IRB model is used (*irbaCOR*) (model III).

Model	I	II	III
Dependent var.	defrateTOT	defrateTOT	defrateCOR
Dforeign	-0.015	-0.015*	-0.023
	[0.013]	[0.008]	[0.020]
Dforeign×irbaTOT	-0.003	-	-
	[0.016]		
Dforeign×Dperipheral×irbaTOT	-	-0.022	-
		[0.014]	
Dforeign×irbaCOR	-	-	-0.019
			[0.022]
$\frac{\partial defrateBS}{\partial Dforeign}\Big\vert_{irbaBS\ median}$	-0.016**	-0.027***	-0.037***
$\frac{\partial defrateBS}{\partial Dforeign}\Big\vert_{irbaBS\ 3rd\ quartile}$	-0.017**	-0.032***	-0.040***
Overall R-squared	0.219	0.220	0.270
F statistic (p-value)	0.000	0.000	0.000
Obs.	221	221	220
Number of banks	51	51	51

- These outcomes signal that a **more intense diffusion of transactional lending technologies** helps foreign banks in improving their selection and monitoring processes.
- This evidence is **in favour of hypothesis H2**

Results. Related/connected-party transaction effect

- I include
  i) the **flight distance** between European countries' capitals (*Lflight*);
  ii) the **length of the borders** between contiguous European countries (*Lborder*);
  iii) a dummy variable equal to 1 if the home and host countries share the same official **language** (*Dlanguage*);
  iv) a dummy variable equal to 1 if people in the home and host countries believe in the same **religions** (*Dreligion*)

Dep. var. : defrateTOT

Model	I	II	III	IV
Dforeign	0.113**	-0.025***	-0.017**	-0.014
	[0.049]	[0.007]	[0.008]	[0.010]
Dforeign×Lflight	-0.019***	-	-	-
	[0.007]			
Dforeign×Lborder	-	0.004**	-	-
		[0.002]		
Dforeign×Dlanguage	-	-	0.007	-
			[0.014]	
Dforeign×Dreligion	-	-	-	-0.009
				[0.009]
$\frac{\partial defrateBS}{\partial Dforeign}\Big\vert_{distance\ median}$	0.014	-0.017**	-0.010	-0.023***
$\frac{\partial defrateBS}{\partial Dforeign}\Big\vert_{distance\ 3rd\ quartil}$	-0.022***	-0.001	-	-
Overall R-squared	0.234	0.245	0.219	0.221
F statistic (p-value)	0.000	0.000	0.000	0.000
Number of banks	51	51	51	51
Obs.	221	221	221	221

- These outcomes seem to show that **physical and cultural proximity reduces the capacity of foreign banks to select high-quality borrowers**. Only **languages** appear to be a **cultural barrier** that limits the selection and monitoring processes
- This evidence is **in favour of hypothesis H2**

Results. Bank corporate governance effect (1)

- I include

i) The **age of the CEO** (*CEOage*). Age is found by several scholars to be a factor that affects risk behaviour;

ii) The **number of years for which the CEO has been in office** (*CEOyear*). Bank boards can learn quickly about CEOs' abilities and then remove CEOs with poor performance (Defond and Park, 1999);

iii) a dummy variable equal to 1 if the **CEO was replaced during 2015 or up to August 2016** (the EBA published the 2016 EU-wide stress test results on 29th July) and 0 otherwise (*DCEOend*). A replaced CEO is a signal of poor management performance.

- Foreign banks that are led by an **elderly manager are more risk averse** (model II)
- CEOs who stay in power for a **longer period of time** seem to have better abilities and/or to be **more risk adverse** (model III)
- Only foreign banks with a **CEO who has not been replaced** are able to improve their underwriting procedures (model V)

- The evidence about bank corporate governance seems **to support hypothesis H2**

Results. Bank corporate governance effect (2)

Dep. var. : defrateTOT

Model	I	II	III	IV	V
Dforeign	-0.019**	0.068	-0.020**	-0.023	-0.019*
	[0.009]	[0.090]	[0.009]	[0.019]	[0.011]
CEOage	0.000	0.001	-	-	-
	[0.001]	[0.001]			
Dforeign×CEOage	-	-0.002	-	-	-
		[0.002]			
CEOyear	-	-	-0.002*	-0.002*	-
			[0.001]	[0.001]	
Dforeign×CEOyear	-	-	-	0.000	-
				[0.002]	
DCEOend	-	-	-	-	-0.011
					[0.015]
Dforeign×DCEOend	-	-	-	-	0.004
					[0.017]
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{CEO\ index\ 1st\ quartile}$	-	-0.012	-	-0.021	-
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{CEO\ index\ median}$	-	-0.013	-	-0.021*	0.000***
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{CEO\ index\ 3rd\ quartile}$	-	-0.025**	-	-0.019**	-
Overall R-squared	0.177	0.181	0.190	0.190	0.180
F statistic (p-value)	0.000	0.000	0.000	0.000	0.000
Number of banks	45	45	45	45	45
Obs.	199	199	199	199	199

Results. Bank regulation (1)

- I include

i) The overall **financial conglomerates' restrictiveness** in the country where the bank has its headquarter (*restricHOME*). This variable measures the extent to which banks may own and control non-financial firms, the extent to which non-financial firms may own and control banks and the extent to which non-bank financial firms may own and control banks. With this variable is possible to test the extent to which the home country regulation deals with the related-lending problem;

ii) the degree to which actions are taken to mitigate bank **moral hazard** in the country where the bank has its headquarter (*moralhazHOME*). This variable is measured taking into account whether banks receive funding from the government, whether there is a deposit guarantee scheme and/or coinsurance mechanism and how they are financed.

- I find that the effect is negative and decreasing for higher values of both bank regulation indexes. This result is evidence that **banks with stronger home country bank regulation standards** put more effort into their **selection and monitoring procedures**
- The evidence seems **to support hypothesis H2**

Results. Bank regulation (2)

Dep. var. : defrateTOT

Model	I	II	III	IV
Dforeign	0.059	0.014	-0.026***	-0.019**
	[0.041]	[0.023]	[0.008]	[0.008]
Dforeign×restricHOME	-0.015*	-	-	-
	[0.008]			
Dforeign×moralhazHOME	-	-0.024*	-	-
		[0.013]		
Dforeign×restricGAP	-	-	-0.005	-
			[0.005]	
Dforeign×moralhazGAP	-	-	-	-0.015*
				[0.009]
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{reg.index\ average}$	-0.025***	-0.018**	-0.026***	-0.018**
Overall R-squared	0.233	0.258	0.484	0.250
F statistic (p-value)	0.000	0.000	0.000	0.000
Number of banks	51	51	38	47
Obs.	180	212	122	197

Results. Bank competition (1)

- I include

i) The **H-statistic** or Panzar–Rosse statistic (Panzar and Rosse, 1982, 1987). This variable measures the elasticity of banks' revenues relative to their input prices based on 2014 bank data. It is equal to 1 under perfect competition, less than or equal to 0 under a monopoly and between 0 and 1 when the system operates under monopolistic competition;

ii) The **Boone indicator** (Boone, 2001; Boone et al., 2005; Hay and Liu, 1997; Schaeck and Čihák, 2010). This indicator is calculated as the elasticity of profits to marginal costs based on 2013 bank data. The rationale behind the variable is that higher profits are achieved by more efficient banks. Hence, the more negative the Boone indicator, the higher the degree of competition;

iii) The **Lerner index** (Demirgüç-Kunt and Martínez Pería, 2010). This indicator measures the market power in the banking market as the difference between output prices and marginal costs (relative to prices) based on 2010 bank data. Higher values of the Lerner index indicate less bank competition

- I find contrasting results

- Based on the **H-statistic and the Boone indicator**, in banking markets in which the **competition is low**, the effect of the **presence of foreign banks on the default rates is negative and significant**

- On the other hand, the **Lerner index shows the opposite result**. Only for a higher level of competition the derivative of the default rate with respect to *Dforeign* negative and significant. However, the Lerner index could be affected by some limitations. As remarked by Oliver et al. (2006), a bank's risk-taking approach could have an impact on the Lerner index estimation.

Results. Bank competition (2)

Dep. var. : defrateTOT

Model	I	II	III	IV	V	VI
Dforeign	-0.015*	-0.033**	-0.015*	-0.017*	-0.016*	-0.033*
	[0.008]	[0.017]	[0.008]	[0.009]	[0.008]	[0.017]
H-statistic	0.015	-0.006	-	-	-	-
	[0.020]	[0.033]				
Dforeign×H-statistic	-	0.029	-	-	-	-
		[0.030]				
boone	-	-	0.107*	0.273**	-	-
			[0.056]	[0.117]		
Dforeign×boone	-	-	-	-0.208	-	-
				[0.144]		
lerner	-	-	-	-	0.099	0.036
					[0.163]	[0.176]
Dforeign×lerner	-	-	-	-	-	0.086
						[0.064]
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{comp.index\ 1st\ quartile}$	-	-0.017**	-	-0.010	-	-0.025**
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{comp.index\ median}$	-	-0.014	-	-0.011	-	-0.016*
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{comp.index\ 3rd\ quartile}$	-	-0.012	-	-0.021*	-	-0.010
Overall R-squared	0.168	0.169	0.226	0.231	0.223	0.226
F statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Number of banks	51	51	51	51	51	51
Obs.	213	213	221	221	221	221

Results. Legal and institutional gap effect *(1)*

- I include

i) **Regulatory quality** (*regqualGAP*). This variable captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development;

ii) **Political stability and the absence of violence/terrorism** (*polstabGAP*). This index measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism;

iii) **Voice and accountability** (*voiceGAP*). This variable captures perceptions of the extent to which a country's citizens are able to participate in selecting their government as well as freedom of expression, freedom of association and free media;

iv) **Government effectiveness** (*goveffGAP*). This index captures perceptions of the quality of public services, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies;

v) **Rule of law** (*ruleoflawGAP*). This indicator captures perceptions of the extent to which agents have confidence in the quality of contract enforcement, property rights, the police and the courts as well as the likelihood of crime and violence

- When the **host country governance conditions are better** than the home ones, the presence of foreign banks have a **negative and highly significant effect on default rates**
- On the other hand, when the **host governance conditions are worse** than the home ones, the marginal effect is **negative and mildly significant only for the regulatory quality indicators**
- This result could be interpreted as evidence that **European countries have to reach a higher level of institutional maturity to exploit the advantages of banking integration**

Results. Legal and institutional gap effect *(2)*

Dep. var. : defrateTOT

Model	I	II	III	IV	V
Dforeign	-0.015*	-0.011	-0.012	-0.012	-0.012
	[0.008]	[0.010]	[0.008]	[0.008]	[0.009]
Dforeign×regqualGAP	0.014	-	-	-	-
	[0.011]				
Dforeign×polstabGAP	-	0.036**	-	-	-
		[0.018]			
Dforeign×voiceGAP	-	-	0.044**	-	-
			[0.021]		
Dforeign×goveffGAP	-	-	-	0.025	-
				[0.016]	
Dforeign×ruleoflawGAP	-	-	-	-	0.025*
					[0.013]
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{legal\ index\ 1st\ quartile}$	-0.017**	-0.024***	-0.020***	-0.018**	-0.019***
$\frac{\partial defrateTOT}{\partial Dforeign}\Big\vert_{legal\ index\ 3rd\ quartil}$	-0.013*	-0.006	-0.008	-0.010	-0.009
Overall R-squared	0.230	0.251	0.237	0.236	0.242
F statistic (p-value)	0.000	0.000	0.000	0.000	0.000
Number of banks	51	51	51	51	51
Obs.	221	221	221	221	221

Conclusions and policy implications

Conclusions

1. I find that **foreign banks appear to have a better capacity to select quality borrowers**. When foreign banks are involved in the European domestic credit markets, they show a significantly lower default rate
2. Considering several possible mechanisms, I find **evidence in favour of the risk management superiority hypothesis** and against the cream-skimming lending strategy hypothesis

Policy implications

- **A more integrated European banking market is able to increase financial stability**, also overcoming the problem of coordination between the euro area countries and the non-euro area European Union
- However, **European countries have to reach a higher level of institutional maturity to exploit the advantages of banking integration** (Bruno and Hauswald, 2014)

Thanks for the attention!

Carlo Milani
BEM Research, Rome (Italy)
University of Rome Tre

Email c.milani@bemresearch.it