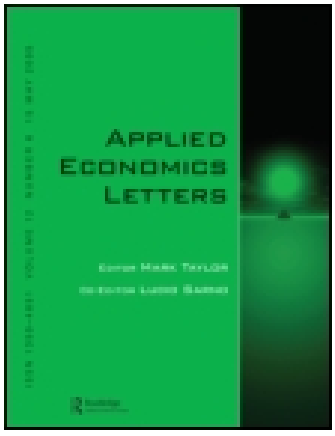

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Did financial crisis alter the level of competition in the EMU banks?

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Did financial crisis alter the level of competition in the EMU banks?

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The goal of this article is to empirically assess the level of competition in the European Monetary Union (EMU) banking sector. The empirical findings provide sufficient evidence in favour of a monopolistic competition regime. The industry structure of the banking sector seems to have been left unaltered after the adoption of the euro currency and the recent financial crisis with the estimated values of the *H*-statistic range between zero and unity.

Keywords: banking; monopolistic competition; panel data; financial crisis

JEL Classification: G21; C23; L10

I. Introduction

The ongoing financial crisis poses many challenges but also provides an opportunity to enhance efforts for constructive banking consolidation. Many government officials are keen on restructuring and reshaping of the banking industry at a pan European level targeted at the increase of its competitiveness. However, the role of competition in financial sector is a controversial issue. On the one hand, it is argued that fierce competition may foster banks to undertake risk increasing the likelihood of a bailout, while on the other hand, a more liberalized banking industry may enhance social welfare (Tabacco, 2013).

There is a plethora of studies assessing the level of competition in the banking industry by employing non-structural measures such as the Lerner index, the *H*-statistic or the Boone indicator.[1] However, none of these studies have investigated the impact of financial crisis on the level of banking competition. This is of striking importance since many European Monetary Union (EMU) countries have already launched structural reforms directed towards their business environment while at the same time supporting their financial sector to mitigate the crisis (Mamatzakis *et al*., 2013).

The goal of this article is to conduct an empirical analysis of the competitive conditions in the EMU banking system in the light of the recent financial crisis. The analysis employs a widely used methodology put forward by Panzar and Rosse (1987) and draws upon a comprehensive panel data set of EMU banks spanning the period 1996 to 2011.[2] This method is a valuable tool for assessing market conditions, mainly owing to its simplicity and transparency, without lacking efficiency (Delis, 2010).

The contribution of this article is twofold. First, by applying an array of panel data econometric techniques, it attempts to assess the level of competition in the EMU. Second, and most importantly, it tries to fill the gap in the banking literature by providing evidence on the evolution of banking competition in EMU during the present financial crisis, an issue not adequately covered by previous studies.

[1] For an extensive review, see Andrieş and Căpraru (2013).
[2] The *H*-statistic is smaller than 0 for a neo-classical monopolist or collusive oligopolist, it ranges between 0 and 1 for a monopolistic competitor and is equal to unity for a competitive price-taking firm. However, negative values of *H*-statistic may indicate competitive behaviour (Bikker *et al*., 2012).

Table 1. Empirical results

	[1996–2011]	[1996–2000]	[2001–2007]	[2008–2011]	[1996–2011]	[1996–2000]	[2001–2007]	[2008–2011]
Variables	ln(II)	ln(II)	ln(II)	ln(II)	ln(TI)	ln(TI)	ln(TI)	ln(TI)
OLS								
Intercept	11.413* (8.16)	18.306* (6.08)	13.407* (6.52)	17.492* (5.39)	10.201* (8.95)	13.759* (5.45)	11.963* (6.77)	20.025* (9.48)
$\ln(X_1)$	0.428* (2.74)	1.438* (2.38)	−0.675* (–3.81)	−0.735** (–1.95)	0.343* (2.45)	0.507* (2.97)	0.508* (3.34)	−0.763* (–2.22)
$\ln(X_2)$	1.137*** (1.57)	−3.048* (–3.05)	1.704*** (1.61)	0.647 (0.43)	1.911* (3.50)	1.993* (2.38)	2.693* (2.97)	−0.255 (–0.26)
$\ln(X_3)$	−0.997*** (–1.43)	2.309* (2.31)	−0.184 (–1.20)	0.486*** (1.53)	−1.937* (–3.39)	−1.615** (–1.93)	−2.375* (–2.81)	1.993 (1.43)
$\ln(Y_1)$	−2.895* (–10.17)	−2.674* (–5.14)	−2.972* (–7.63)	−3.560* (–7.90)	−2.691* (–10.51)	−2.868* (–6.57)	−2.846* (–8.50)	−3.136* (–7.60)
$\ln(Y_2)$	1.848* (4.81)	2.340* (3.68)	0.796*** (1.52)	0.641 (0.74)	−0.076 (–0.23)	−0.383 (–0.72)	−0.884** (–1.96)	−1.113*** (–1.59)
$\ln(Y_3)$	−0.004 (–0.21)	−0.014 (–0.43)	−0.012 (–0.42)	−0.024 (–0.77)	0.031*** (1.67)	0.020 (0.75)	0.019 (0.76)	0.008 (0.30)
***H*-statistic**	**0.57**	**0.70**	**0.84**	**0.40**	**0.32**	**0.88**	**0.83**	**0.97**
Observations	254	84	117	53	255	84	117	54
Adjusted R^2	0.39	0.43	0.46	0.67	0.44	0.51	0.54	0.71
Wald test $\{H_0 = 0\}$	3.65** [0.06]	9.79* [0.00]	6.58* [0.00]	11.33* [0.00]	1.60 [0.20]	10.41* [0.00]	4.26** [0.04]	27.82* [0.00]
Wald test $\{H_0 = 1\}$	2.10 [0.15]	2.86*** [0.09]	0.17 [0.67]	4.24** [0.04]	7.48* [0.00]	2.29 [0.13]	0.19 [0.66]	12.41* [0.00]
PGLS_FE								
Intercept	2.542* (15.01)	1.243* (4.04)	1.881*(7.93)	3.012**(2.27)	2.732*(15.93)	1.977*(6.71)	1.869* (8.05)	4.937*(7.19)
$\ln(X_1)$	0.543* (33.25)	0.651*(22.54)	0.483*(21.96)	0.617*(20.72)	0.380*(20.21)	0.456*(17.07)	0.286*(11.99)	0.412*(16.40)
$\ln(X_2)$	0.225*(2.97)	0.067(0.58)	0.013(0.12)	0.200***(1.73)	0.147*(2.36)	0.081 (0.70)	−0.124 (–1.20)	0.297*(17.59)
$\ln(X_3)$	0.119***(1.58)	0.048(0.38)	0.183***(1.86)	−0.237***(–1.73)	0.180*(2.50)	0.144 (1.21)	0.365*(3.57)	−0.197*(–2.58)
$\ln(Y_1)$	−0.052**(–2.46)	−0.168**(–2.91)	0.010(0.26)	0.090(0.82)	−0.001(–0.05)	−0.106 (–1.38)	−0.007 (–0.22)	0.230*(2.74)
$\ln(Y_2)$	0.172*(4.84)	0.216*(3.65)	0.269*(5.20)	0.570**(2.17)	0.059(1.34)	0.182*(2.99)	0.226*(3.86)	−0.063(–0.43)
$\ln(Y_3)$	0.974*(134.09)	0.981*(67.13)	0.969*(110.57)	0.915*(11.37)	0.969*(143.69)	0.983*(67.03)	0.976*(108.34)	1.018*(44.67)
***H*-statistic**	**0.89**	**0.77**	**0.68**	**0.58**	**0.71**	**0.68**	**0.53**	**0.51**
Observations	254	84	117	53	255	84	117	54
Adjusted R^2	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Wald test $\{H_0 = 0\}$	531.61* [0.00]	197.69* [0.00]	201.24* [0.00]	10.99* [0.00]	425.79* [0.00]	154.50* [0.00]	119.80* [0.00]	152.08* [0.00]
Wald test $\{H_0 = 1\}$	8.69* [0.00]	18.61* [0.00]	45.088* [0.00]	5.79** [0.02]	72.92* [0.00]	33.76* [0.00]	96.43* [0.00]	4.44** [0.04]

PGLS_RE								
Intercept	4.426* (3.53)	6.583* (4.06)	3.791* (2.92)	15.331* (8.15)	5.307* (4.05)	7.111* (4.61)	5.241* (3.70)	18.800* (9.60)
$\ln(X_1)$	0.520* (8.27)	0.951* (5.19)	0.520* (8.85)	0.553* (8.46)	0.353* (5.65)	0.694* (3.84)	0.356* (5.48)	0.372* (5.48)
$\ln(X_2)$	0.296 (0.67)	0.276 (0.51)	0.903*** (1.60)	0.267 (0.66)	0.836*** (1.51)	0.539 (0.99)	1.649* (2.63)	0.722*** (1.73)
$\ln(X_3)$	−0.114 (–0.23)	−0.165 (–0.26)	−0.968*** (–1.63)	−0.539 (–1.16)	−0.694 (–1.27)	−0.440 (–0.68)	−1.764* (–2.69)	−0.028 (–0.06)
$\ln(Y_1)$	−0.536** (–2.09)	−0.643* (–3.00)	−0.321 (–1.37)	−0.497** (–1.99)	−0.589* (–2.35)	−0.578* (–2.71)	−0.554** (–2.07)	−0.321 (–1.24)
$\ln(Y_2)$	0.728* (2.57)	−0.046 (–0.16)	0.262 (0.73)	0.707 (1.33)	0.387 (1.33)	−0.046 (–0.16)	−0.054 (–0.13)	−0.226 (–0.41)
$\ln(Y_3)$	0.758* (18.28)	0.607* (8.53)	0.775* (14.72)	0.075 (1.01)	0.702* (17.01)	0.591* (8.71)	0.664* (11.97)	0.125*** (1.60)
***H*-statistic**	**0.70**	**1.06**	**0.45**	**0.28**	**0.49**	**0.79**	**0.24**	**1.06**
Observations	254	84	117	51	255	84	117	54
Adjusted R^2	0.75	0.77	0.85	0.82	0.73	0.74	0.79	0.67
Wald test $\{H_0 = 0\}$	10.64* [0.00]	17.84* [0.00]	4.65** [0.03]	0.60 [0.44]	4.79** [0.03]	10.01* [0.00]	1.02 [0.31]	7.92* [0.00]
Wald test $\{H_0 = 1\}$	1.91 [0.17]	0.059 [0.80]	6.70* [0.01]	3.89** [0.05]	5.02** [0.03]	0.68 [0.41]	10.17* [0.00]	0.03 [0.86]
Hausman test	269.18* [0.00]	133.72* [0.00]	227.95* [0.00]	15.49* [0.01]	329.74* [0.00]	152.97* [0.00]	346.04* [0.00]	72.64* [0.00]

Notes: OLS = Ordinary least squares, PGLS_FE = Pooled generalized least squares with fixed effects, PGLS_RE = Pooled generalized least squares with random effects. The use of the fixed-effects specification is justified after a Hausman test for each model. Figures in parenthesis denote the *t*-statistic. Figures in square brackets denote *p*-values. *, ** and ***: Significant at 1%, 5% and 10% levels, respectively.

II. Methodology

As shown by Bikker *et al*. (2012), the use of total assets as a proxy for bank size has lead to a biased estimate of the *H*-statistic. For this reason, in contrast to other related studies (De Bandt and Davis, 2000; Claessens and Laeven, 2004; Yildirim and Philippatos, 2007; Andrieş and Căpraru, 2013), we estimate the following unscaled price and revenue equations:

$$\ln(II_{it}) = a + \beta_1 \ln(X_{1,it}) + \beta_2 \ln(X_{2,it}) + \beta_3 \ln(X_{3,it}) + \gamma_1 \ln(Y_{1,it}) + \gamma_2 \ln(Y_{2,it}) + \gamma_3 \ln(Y_{3,it}) + \varepsilon_{it} \quad (1)$$

$$\ln(TI_{it}) = a + \beta_1 \ln(X_{1,it}) + \beta_2 \ln(X_{2,it}) + \beta_3 \ln(X_{3,it}) + \gamma_1 \ln(Y_{1,it}) + \gamma_2 \ln(Y_{2,it}) + \gamma_3 \ln(Y_{3,it}) + \varepsilon_{it} \quad (2)$$

where α and ε_{it} are the constant and the error term, respectively.

Our data set is drawn from the Bankscope database. The interpretation of the variables comes as follows. II_{it} is the interest income and TI_{it} is the total income (sum of gross interest revenues plus other operating noninterest revenues). $X_{1,it}$ is the ratio of interest expenses to total deposits and money market funding as a proxy for the average funding rate, $X_{2,it}$, is the ratio of personnel expenses to total assets as an approximation of the wage rate and $X_{3,it}$ is the ratio of other operating and administrative expenses to fixed assets as a proxy for the price of physical capital.

Moreover, $Y_{1,it}$ is the ratio of equity to total, $Y_{2,it}$ is the ratio of net loans to total assets and finally $Y_{3,it}$ represents fixed to total banking assets. The sum of the three elasticities ($H = \beta_1 + \beta_2 + \beta_3$) yields the *H*-statistic.

III. Results and Discussion

Regarding the magnitude of the relevant point elasticities, we infer that the coefficient of the average funding rate ($\ln X_1$) is positive and statistically significant in nearly all of the specifications (Table 1). This indicates that the higher the interest expenses, relative to deposits and money market funding, paid by banks the more the allocation of revenues. Although the sign and the level of significance for the rest of the input prices ($\ln X_2$ and $\ln X_3$) vary over the distinct sub-samples, in most cases they appear to have a positive and statistically significant impact on price and revenue respectively.

The EMU banking sector can be characterized by the existence of a monopolistic competition regime since the values of the *H*-statistic range between 0 and 1. Regarding the distinct sub-samples, it is highlighted that the value of the *H*-statistic generated by the PGLS_FE methodology dropped slightly after the formulation of the EMU (from 0.77 to 0.68). However, the OLS method does not confirm the relevant finding (from 0.70 to 0.84). Despite the controversial outcome due to the lack of ordinality in the *H*-statistic, an increase (decrease) in its value does not necessarily imply an increase (decrease) in the level of competition (Bikker *et al*., 2012). It is worth mentioning that the magnitude of the *H*-statistic is smaller when we use total revenues as a dependent variable (0.53 and 0.83, respectively).

The recent financial crisis and the relevant stabilization policies adopted by the member states and the European Central Bank seem to have left unaltered the level of banking competition as indicated by the *H*-statistic which does not exceed unity. However, the value of the *H*-statistic during the crisis period (2008 to 2011) shows a slight decline but remained below unity with its magnitude estimated to be 0.58 and 0.51 respectively. This decline could be attributed to the process of banking consolidation and the movement of bank activities from traditional financial business to off-balance sheet activities.

IV. Conclusions

Despite the existence of the recent financial crisis, the EMU banking sector is not characterized by the absence of competitive behaviour. It is important to note that, the euro zone countries experienced a slight but significant decline in banking competition after the formulation of the EMU and the recent financial crisis. The State aid provided to the EMU banks during the period of financial instability seems to have left unaltered the industry structure since the *H*-statistic showed a modest decrease but remained below unity. Despite the existence of a monopolistic competition banking environment during the crisis, the EMU countries must focus their policies on fostering competition between banks through improving regulation and supervisory framework.

References

Andrieş, A. M. and Căpraru, B. (2013) The nexus between competition and efficiency: the European banking industries experience, *International Business Review* (Article in press). doi:10.1016/j.ibusrev.2013.09.004

Bikker, J. A., Shaffer, S. and Spierdijk, L. (2012) Assessing competition with the Panzar-Rosse model: the role of scale, costs, and equilibrium, *The Review of Economics and Statistics*, **94**, 1025–44.

Claessens, S. and Laeven, L. (2004) What drives bank competition? Some international evidence, *Journal of Money*

Credit and Banking, **36**, 563–83. doi:10.1353/mcb.2004.0044

De Bandt, O. and Philip Davis, E. (2000) Competition, contestability and market structure in European banking sectors on the eve of EMU, *Journal of Banking and Finance*, **24**, 1045–66. doi:10.1016/S0378-4266(99)00117-X

Delis, M. (2010) Competitive conditions in the Central and Eastern European banking systems, *Omega*, **38**, 268–74. doi:10.1016/j.omega.2008.09.002

Mamatzakis, E., Kalyvas, A. N. and Piesse, J. (2013) Does regulation in credit, labour and business matter for Bank performance in the EU-10 economies?, *International Journal of the Economics of Business*, **20**, 341–85. doi:10.1080/13571516.2013.835981

Panzar, J. C. and Rosse, J. N. (1987) Testing for 'monopoly' equilibrium, *The Journal of Industrial Economics*, **35**, 443–56. doi:10.2307/2098582

Tabacco, G. (2013) A new way to assess banking competition, *Economics Letters*, **121**, 167–9. doi:10.1016/j.econlet.2013.07.028

Yildirim, H. S. and Philippatos, G. C. (2007) Restructuring, consolidation and competition in Latin American banking markets, *Journal of Banking and Finance*, **31**, 629–39. doi:10.1016/j.jbankfin.2006.06.008