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A NEW WAY TO ASSESS BANKING COMPETITION

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Abstract

This paper proposes a new empirical framework to measure banking competition. The method developed delivers a robust monotonic relationship between the measure and toughness of price competition. Furthermore, the proposed competition measure can be readily applied to other industries.

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1 Introduction

The current global economic and financial crisis has brought at the center of the debate the restructuring and reshaping of the banking industry. Two opposite views share the debate. On one hand, there are several arguing that tougher competition may foster banks to undertake riskier choices increasing likelihood of bank failure (e.g. Canoy et al., 2001; Vives 2010; Beck et al., 2010). On the other hand, others promote a more liberalized banking industry, as they advocate that more intense competition will enhance social welfare by making available to firms loans at lower interest rates as well as to households higher deposit rates (Cetorelli 2001).

The method to assess competition in the banking industry that I propose in this paper, is more informative as well as being less empirical demanding than the competition measures developed in the existing literature. Building on two very general theoretical frameworks (Sutton 1991; Etro 2006, 2008) I propose a new empirical measure of banking competition based on market structure. This new empirical measure of competition involves two steps: i) estimation of the lower bound to concentration (Sutton 1991) which refers to symmetric collusive equilibria involving single product firms, and ii) calculating the distance from the observed market structure to the lower bound. The theoretical framework shows that for both exogenous sunk costs and endogenous sunk costs industries, as well as for markets with asymmetric firms, and industries with the presence of first mover advantage, equilibrium market structure is higher as price competition becomes tougher. As a result, the distance to the lower bound to concentration has a positive relationship with toughness of competition.

Measures of banking competition in the existing literature suffer from numerous limitations. For instance, competition measures based on concentration and market structure, are generally used within the Structure-Conduct-Performance (SCP) framework, where market structure is seen as exogenous which is often not the case. The usual interpretation is that a more concentrated banking market will lead to substantial market power; in contrast, we have evidence of fragmented banking markets underlying 'soft competition' (Ausubel 1991; Calem and Mester 1995; Shaffer 1999), whereas there can be concentrated banking markets whose firms' conduct is highly competitive (Shaffer 1993; Shaffer and DiSalvo 1994; Shaffer 2002).

In addition, there have developed measures of competition directly linked to firm's conduct within the tradition of the NEIO literature, such as Bresnahan (1982, 1989) and Lau (1982) develop the Bresnahan-Lau conduct parameter λ. Rosse and Panzar (1977) and Panzar and Rosse (1982, 1987) derive the *H-statistic*[1]. These measures are not free from shortcomings. For instance, Corts

[1] The *H-statistic* is the sum of the revenue's elasticities with respect to the input prices. Empirically, it resolves to estimate a reduced-form revenue equation, where revenue is regressed against input prices and other control variables.

(1999) and Shaffer (2004) elucidate limitations of the Bresnahan-Lau conduct parameter, while Bikker, Shaffer and Spierdijk (2012) uncover and point out to a number of shortcomings making the *H-statistic* an unreliable measure of competition.

Another popular way of assessing competition is based on the price-cost-margin (Lerner index). Unfortunately, the Lerner index is highly data demanding, requiring information on prices and marginal costs which are often difficult to obtain. Furthermore, Boone (2008) remarks that there is no monotonic relationship between intensity of competition and price-cost-margin, as when intensity of competition increases the price-cost-margin may do so. Moreover, price-cost-margins may increase not for improved market power but because of elasticity of demand, need to recover fixed costs, economies of scale and monopsony power (Elzinga and Mills 2011).

The rest of the paper is organized as follows. Section 2 uses the Sutton and Etro's theoretical frameworks. Section 3 introduces the new empirical measure of banking competition. Section 4 concludes.

2 Theoretical Framework

Exogenous sunk costs industries can be modeled as a two stage model[2] where firms first decide simultaneously whether to enter or not, then all those entered compete in prices. Consider homogeneous goods and in the first stage firms that enter pay a given sunk cost k. In the second stage, the outcome is a vector of profits $\pi_i(s_1, \ldots, s_i, \ldots, s_N, S, t)$ where s_i is the market share of firm i, S represents market size and t is the toughness of price competition. As standard in the literature, I assume that π_i is increasing in s_i, $\partial\pi_i/\partial S > 0$, and $\partial\pi_i/\partial t < 0$. In addition, let define a concentration measure C that is increasing in s_i.

In the first stage equilibrium concentration C^* results from the usual free entry condition, given by $\pi_i(s_i, S, t) = k$ for each firm i. It is very straightforward to see that an increase of t will lead to a higher value of C^*; this is because as profits decrease as t increases, then to restore the free entry condition posing profits equal to k, we need an increase of s_i.

For exogenous sunk costs industries with multiproduct firms and horizontal product differentiation, the positive relationship between toughness of price competition and concentration still holds, with the difference that we will get multiple equilibria and C^* will be higher.

In the case of endogenous sunk costs industries, competition is normally modeled as three stage model: i) in stage 1, entry decisions occur; ii) in stage 2, firms make demand-enhancing or cost-reducing investments in sunk costs (e.g. R&D, advertising); iii) firms compete in prices. Here

[2] The analysis is based on Symeonidis (2000a).

the impact of t on concentration is indeterminate; that is, C^* may rise or fall as a rise in t affects also stage 2 investments. Therefore, a reduction of endogenous sunk costs outlays following a rise in t will cause a decrease in concentration which may or may not compensate the initial rise in concentration caused by the rise of t. Whereas, if an increase in t determines a rise in endogenous sunk outlays or these do not change, C^* will increase. However, Symeonidis (2000a, 2000b) provides strong empirical evidence that concentration increases following an intensification of price competition also in endogenous sunk costs industries.

Define C^∞ as the lower bound to concentration[3], and define $D = C^* - C^\infty$ as the distance to the lower bound. It is clear that this measure has a positive relationship with intensity of competition for both exogenous and endogenous sunk costs industries. However, within Sutton's framework, a market may lie above the lower bound not only because of fierce price competition, but also because of asymmetric firms[4] and first mover advantage.

Etro (2006, 2008) shows that in case of endogenous entry, market leaders will be always more aggressive than followers under both competition in quantity and competition in prices in markets with asymmetric firms (e.g. a firm may undertake a preliminary investment in order to gain a competitive advantage in the market) and first mover advantage. Therefore, from Etro's theoretical framework, we deduce that cases of firms asymmetries and first mover advantage cause a tighter competitive environment, thus t rises determining an increase of C^*; more specifically, the leaders will obtain larger market shares because of their aggressive behavior in the competition stage.

3 New measure of banking competition

The empirical measure of banking competition is given by D which, as seen in the previous section, increases as price competition becomes tighter. The data required is only about market size (measured by population or total assets) and market shares for constructing a concentration index.

The measure can be estimated in two steps:

i) Step 1 – estimation of the lower bound to concentration;

ii) Step 2 – compute the distance between observed market structure and lower bound as $D = C^* - C^\infty$.

One way to estimate the lower bound is using stochastic frontier analysis. This technique is robust to outliers and allows low concentration disequilibria. The following equation may be estimated:

[3] This is the asymptotic level of concentration when market size tends to ∞, and involves symmetric collusive equilibria.

[4] The lower bound refers to identical firms.

$$ln(C/(1-C))_i = \beta_0 + \beta_1/\ln(S)_i + \nu_i + \varepsilon_i \qquad (1)$$

The dependent variable is the natural logarithm of the logistic transformation of a concentration index, and $0 < C \leq 1$. β_0 and β_1 are coefficients to be estimated. The odds transformation ratio for the dependent variable is employed for ensuring that predicted values of limiting level of concentration are between 0 and 1 as well as to prevent heteroscedasticity. The variable S denotes market size. The reciprocal of natural logarithm of size employed in (1) (e.g. Sutton 1991; Ellickson 2007) allows C^{∞} to depend solely on the intercept term[5].

The econometric framework consists of two-error structures: a two sided error term (ν_i) with a normal distribution for allowing low concentration disequilibria, and a one sided error (ε_i) which can assume half normal, truncated normal, and standard exponential distributions. As alternative, a fix lower bound may be estimated[6].

4 Concluding remarks

In this paper, I propose a new empirical framework to measure banking competition, which is more robust theoretically and less data and econometric demanding than existing methods. Therefore, this paper contributes to the ongoing debate about the restructuring of the banking industry and may be important to antitrust policy. In addition, the method proposed can be readily applied to other industries as well.

[5] $C^{\infty} = e^{\beta_0}/(1 + e^{\beta_0})$

[6] See Sutton (1991) and, for example, Ellickson (2007) for estimating a fix frontier.

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