Banking market power and its determinants: New insights from MENA countries

Mohamed Chaffai [a,*], Paolo Coccorese [b]

[a] *Faculté des Sciences Economiques et de Gestion, Sfax University, Tunisia*
[b] *Department of Economics and Statistics, University of Salerno, Italy*

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ABSTRACT

This paper evaluates the degree and determinants of banks' market power in 13 MENA countries for the years 2000 to 2018, with a special focus on customers' switching costs and banks' cost efficiency. We find that MENA banks enjoy a substantial degree of market power on the loan market, while their customers have to face remarkable costs in case of switching to other banks. Banking market power increases with the level of switching costs and is higher when credit institutions are more cost efficient, focus on the traditional intermediation activity, are smaller in size, and operate in countries where stock markets are less developed, banking markets are more concentrated, the inflation rate is lower, and GDP growth is poor. Our results are robust to alternative specifications and estimation techniques.

1. Introduction

In the banking literature of the last years, one of the most important research topics concerns the appraisal of the level of market competitiveness. Actually, even if competition represents the most desirable market structure, due to both productive and allocative efficiency that is able to guarantee, it may represent an unfeasible or even harmful situation in case of market failures (caused by, e.g., externalities or asymmetric information), which require specific intervention for improving market outcomes. Moreover, the presence of switching costs (i.e., those costs – either fixed technical costs and opportunity costs – that customers need to face when they change their suppliers) can represent a significant source of bank rents that is often believed to increase market power, and as such calls for a careful exploration.

Existing literature has generally found that MENA banking industries operate under conditions of monopolistic competition, or that the degree of competition therein is much lower compared to other world regions (for example: Al-Muharrami et al., 2006; Turk Ariss, 2009). Other investigations on the banking sector of MENA countries have considered the link between market power and stability (Turk Ariss, 2010a; Gonzalez et al., 2017; Albaity et al., 2019), the relationship between competition and bank efficiency (Apergis and Polemis, 2016), the nexus between competition and economic growth (Issa et al., 2022).

Nonetheless, only a handful of papers has tried to estimate a bank-level indicator of market power in the form of the Lerner index (equal to the difference between output price and marginal cost, divided by the output price), and – when this has occurred – they have mostly computed an aggregated measure of the Lerner index (i.e., considering all bank activities as a whole, and normally proxied by total assets). This choice has been recently criticized by Shaffer and Spierdijk (2020), because it is likely to provide an inconsistent

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* Corresponding author.
  E-mail address: Lep.chafai@fsegs.rnu.tn (M. Chaffai).

measure of banks' market power. The reason is twofold: first, they have noticed that some components of total assets can potentially overstate or understate total outputs for some banks (for example, fixed assets or deposits are included in total assets but are not considered as outputs); second, beyond the aggregation problem of total output, they observe that the aggregate Lerner index provides a consistent measure of market power only if the marginal product for all outputs is the same. As a result, they suggest testing for the separability assumption of the cost function before using an aggregate Lerner index.

This paper aims at exploring the determinants of the Lerner index of market power for 13 MENA banking industries over the years 2000 to 2018 (199 banks, 2509 observations). Our investigation contains several novelties with respect to the previous literature. Differently from most existing studies, rather than estimating an aggregate Lerner index, we calculate a product-specific Lerner index of banks' market power, which refers specifically to the loan market. This choice stems from the fact that lending represents the most important banking activity for commercial banks in MENA region: more precisely, 77.4% of their total income comes from the loan business.[1]

Furthermore, after providing a measure of the switching cost that the customers of the region have to incur if they want to change their reference bank, we investigate the link between such costs and local banks' market power on loans. In our methodological approach we follow Egarius and Weill (2016), but our analysis makes one step further under three respects. First, we try to account for possible endogeneity between switching costs and market power by estimating a dynamic model with the GMM-system method. Second, we implement a simultaneous analysis through a one-step estimation of the Lerner index on loans and its link with switching costs by employing the Kumbhakar et al. (2012) model. Third, to account for the potential simultaneity between switching costs and banks' market power, we estimate a four-equation system by means of the three-stage least squares estimation method.

Finally, as we believe that accounting for country heterogeneity is important when studying the MENA banking systems, we perform our analysis by splitting the countries into two sub-groups, namely the group of Gulf Cooperation Countries (GCC), whose relevant economic activity is linked to the oil production, and the group of non-GCCs.

Our specific focus on banks is due to the fact that, among financial intermediaries, they have always had a considerable and established role in the functioning of every market, which confirms the importance of credit institutions for the real economy. Given their foremost role in directing savings to investment opportunities, banks still remain a fundamental engine of economic growth notwithstanding the increasing weight of stock markets.

Actually, World Bank data show that in the period 2000–2017 (the last year currently available) domestic credit provided by banks to private sector (as a percentage of GDP) in MENA region increased from 36 to 56%, while it slightly fell in the OECD countries (from 88% to 79%). For sake of comparison, in the same period the market capitalization of MENA countries as a whole (still as a percentage of GDP) has remained fairly stable around 50% (48% in 2017) but increased in the OECD area from 105 to 125%. Overall, it emerges a remarkable importance of banks in the various world economies, whose weight is to be regarded as stable in more developed countries and even increasing in MENA region (especially compared to the main alternative of funding for firms).

The structure of the paper is the following. Section 2 reviews the main literature on banking competition and its measurement, with a special focus on MENA countries. Section 3 illustrates our way of calculating Lerner indices and switching costs in the banking markets. Section 4 discusses the variables and the data entering the regressions. Section 5 presents and discusses the empirical evidence, while Section 6 contains some robustness checks. Section 7 concludes.

2. Measuring the market power in the banking industry: A literature review

Assessing the degree of market power in the banking sector has always been a crucial issue in the economic literature. Actually, the behaviour of banks may have a significant impact on the stability of the financial system as a whole. According to the "competition-fragility" view, more competition among banks reduces their profits and therefore stimulates them to adopt risk-taking behaviour, with the likely effect of weakening the stability of the financial market (Berger et al., 2009). Consequently, there would be need of some market power for banks in order to avoid such scenario. The opposite "competition-stability" view maintains that, if banks enjoy significant market power, they will charge higher lending rates to firms and households, making the repayment of loans more difficult and also amplifying adverse selection and moral hazard problems. Hence, a higher degree of competition would benefit both banks and customers (Coccorese, 2017).

In order to quantify the degree of banks' market power – as well as the level of banking market competition, which can be regarded as the other side of the coin – the empirical literature makes use of two different methods. The first is the structural approach, relying on the traditional "structure-conduct-performance" (SCP) paradigm, which states that market power is higher in more concentrated markets because here it is simpler for banks to make agreements and thus gain superior profits. As a consequence, one would expect a direct relationship between industry structure and firms' earnings (Bain, 1951), i.e. between an indicator of market concentration and a proxy of performance (e.g. profits or prices). However, the empirical evidence of this strand of literature for the banking sector remains inconclusive (for some surveys, see: Gilbert, 1984; Weiss, 1990; Shaffer, 2004a), as it does not often provide clear support to such relationship.

The second method is the so-called "new empirical industrial organization" (NEIO) approach, which is based on the direct measurement of banks' conduct through theoretically-based methodologies that allow the estimation of behavioural parameters gauging the level of market power that banks are able to exercise. In this way, any indirect (likely ambiguous) inference about market power

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[1] Descriptive figures on MENA banks are based on own calculation from the data used in this study.

derived from concentration measures is ruled out, even if supplementary information on costs and demand are needed. The most frequently adopted NEIO methods within the banking studies include the mark-up test, the *H*-statistic, the Boone indicator, and the Lerner index.

With the mark-up test, a conduct parameter is estimated by means of a simultaneous equation model of demand and supply, which measures the degree of banks' market power. Particularly, it represents either a conjectural variation coefficient or the deviation of the perceived marginal revenue schedule of a bank in the industry from the demand schedule (Iwata, 1974; Bresnahan, 1982; Lau, 1982). Applications of this test to the banking sector include Toolsema (2002), Coccorese (2008), Delis et al. (2008), Rezitis (2010), Qin and Shaffer (2014), and Mirza et al. (2016).

The *H*-statistic has been introduced by Panzar and Rosse (1987) as the sum of the elasticities of revenues to factor prices, which come from the estimation of a reduced form revenue equation. On condition that firms operate at their long-run equilibrium, $H = 1$ means perfect competition (since changes in input prices are fully reflected in changes in output prices), $0 < H < 1$ denotes monopolistic competition (firms are only partially sensitive to cost changes in setting prices, hence enjoying an intermediate degree of market power over price), and $H \leq 0$ implies monopoly or collusive oligopoly (here the lack of competitive pressure allows firms to adjust prices with very little or no regard to changes in costs). It is probably the most used competition measure in recent banking studies (among others: Jeon et al., 2011; Liu et al., 2012; Weill, 2013; Anginer et al., 2014; Barbosa et al., 2015), even if latest works have questioned it as a reliable indicator of market power (Bikker et al., 2012; Shaffer and Spierdijk, 2015).

The Boone indicator (Boone, 2008) is calculated as the elasticity of firms' profits with respect to their costs: more negative values signal harsher competition as long as the latter enables more efficient firms (i.e., those with lower marginal costs) to earn relatively higher profits or market shares than less efficient competitors. It has been used for assessing the level of competition in banking markets by Van Leuvensteijn et al. (2011) and Schaeck and Cihak (2014).

The Lerner index consists in "the ratio of the divergence of price from marginal cost to price" (Lerner, 1934, p. 169), hence derives firm's market power from the difference between price and marginal cost (divided by price): it should be zero when markets are perfectly competitive, but positive (up to the theoretical limit of one) when market power allows firms to set prices above marginal cost (the latter being estimated from a standard cost function). Unlike the previous indicators, the Lerner index has the advantage of providing a firm-level measure of market power, hence allows to disentangle differences in behaviour among firms operating in the same industry.

As to the banking context, Shaffer (2004b), Delis (2012) and Beck et al. (2013) have argued that the Lerner index is positively and statistically related to other NEIO measures of competition, thus concluding that it is a valuable indicator of market power. On the other hand, Vives (2008) claims that the Lerner index is not able to appropriately capture the degree of product substitutability, while Fernandez de Guevara et al. (2005) maintain that, when banks' risk taking is not accounted for, the Lerner index tend to overestimate market power, because banks that in relative terms spend more of their resources granting credits enjoy higher margins.

Many papers have tried to measure market power in the banking sector by means of the Lerner index (for example: Fernandez de Guevara et al., 2005, 2007; Berger et al., 2009; Carbo et al., 2009; Turk Ariss, 2010a; Anzoategui et al., 2012; Delis, 2012; Beck et al., 2013; Coccorese, 2014; Efthyvoulou and Yildirim, 2014; Rakshit and Bardhan, 2019).

However, little evidence exists so far as regards the assessment of banks' market power in the MENA region by means of the estimation of aggregated Lerner indices.

Turk Ariss (2010a) investigates how banks' market power affects efficiency and stability in the developing economies by means of the estimation of conventional, efficiency-adjusted and funding-adjusted Lerner indices across the years 1999–2005. Regarding the conventional measure, among Middle East countries Saudi Arabia shows the highest value over the sample period (0.4312) and Lebanon the lowest (0.1031), while among North-African countries Tunisia exhibits a value of 0.2580. Overall, those figures are generally closely aligned across all the considered regions (around 0.30), except for Latin America and the Caribbean.

Through the study of a sample of banks across 13 Far East and Arabian Gulf countries during 2000–2006, Turk Ariss (2010b) examines the competitive conditions prevailing in Islamic and conventional banking markets. The estimation of Lerner indices indicates that a higher degree of market power prevails in the Islamic banking segment compared to the conventional one (the simple averages over the sample years are 0.51 and 0.47, respectively).

Anzoategui et al. (2010) explore the extent of bank competition in the MENA region during 1994–2008 by means of the *H*-statistic and the Lerner index, finding that banking competition in this area is lower than other regions and that it did not improve in those years. The aggregate Lerner index amounts to 0.320, but most of the MENA countries have witnessed an increase in its value, except Egypt (where it seems to have declined over time) and Morocco and Tunisia (where the hypothesis of no change cannot be rejected). In addition, the Lerner index for GCC countries is significantly higher than non-GCC countries (0.360 vs. 0.241).

Analogously, Polemis (2015) estimates both the *H*-statistic and the Lerner index for the banking sector of eight MENA countries (Algeria, Egypt, Israel, Jordan, Morocco, Oman, Saudi Arabia, and United Arab Emirates) over the period 1997–2012. The main evidence is that the prevailing regime for such industries is monopolistic competition, while the Lerner index has a mean value of 0.324 and ranges between a minimum of 0.021 (United Arab Emirates) and a maximum of 0.634 (Egypt).

More recently, Miah et al. (2020) explore the effect of switching costs on the market power and stability of Islamic and conventional banks operating in 17 countries with dual banking systems (including 8 MENA countries) for the period 2000–2016. They find that switching costs are lower for Islamic banks' customers when compared to those using conventional banks, and that higher switching costs determine more market power but less financial stability. On aggregate, the Lerner index shows a decreasing path especially in the second part of the sample period, and is higher for Islamic banks. To our knowledge, this is the first study that has examined the link between switching costs and market power in (a number of) MENA countries.

In another recent study, Rizkiah et al. (2021) also examine the effect of switching costs on bank competition for a sample including

the GCC and five Asian countries with dual banking systems during the years 2008 to 2018. They again report higher switching costs for conventional banks compared to their counterparts as well as their positive impact on Lerner indices. It is worth noting that both the above papers measure banking competition by a global measure of the Lerner index, and that, when investigating the impact of switching costs on market power, they employ standard panel data estimators without considering or testing the potential endogeneity of switching costs among other determinants.

By means of three non-structural measures (Rosse-Panzar *H*-statistic, Boone indicator, Lerner index), Issa et al. (2022) investigate the evolution and convergence of bank competition for 16 MENA countries in the years 2005 to 2014. Regarding the aggregated Lerner index, the annual value ranges between 0.410 and 0.633, and is characterized by a decreasing trend for all macro-regions (GCC countries, developing oil exporter countries, and oil importer countries) over the sample period, which – supported also by the other estimated measures – indicates enhanced banking competition that is ascribed to the increased economic integration and the financial reforms adopted in the region over the last two decades.

3. Calculating Lerner indices and switching costs: The methodological approach

3.1. The unrestricted Lerner index on loans

As we discussed earlier, the Lerner index stands as a frequently used indicator for evaluating the level of competition/market power in empirical banking studies, especially because it has the advantage of providing a bank-level measure of competitive behaviour based on the gap between output price and marginal cost.

However, most of the existing studies do not take into account the multi-product structure of banking activities. Quite to contrary, they aggregate all outputs in just one product proxied by total assets, calculate its marginal cost, and compare it to an output price that is computed as the ratio between total revenue and total assets. In such way, they obtain an aggregate Lerner index for all bank activities (e.g.: Berger et al., 2009; Turk Ariss, 2010a; Polemis, 2015). There are, on the other hand, rather few studies in banking that estimate multi-output cost functions, from which they derive one Lerner index for each output, hereafter called 'product specific Lerner index' (e.g.: Forssbaeck and Shehzad, 2015; Huang et al., 2017; Wang et al., 2020).

Recently, Shaffer and Spierdijk (2020) have provided conditions based on a test strategy that allow to distinguish between the use of an aggregate Lerner index and the use of product specific Lerner indices. This issue appears particularly important for the purposes of this paper, where we aim at assessing the competitive behaviour of MENA commercial banks in the market for loans, which represent their most important activity as actors in the financial market: measuring an aggregate Lerner index, as done in previous studies, would actually be less informative as regards banks' market power in the region.

In order to calculate a Lerner index for each bank operating in the loans market, we consider a standard translog multiproduct cost function with two outputs and three inputs. In line with the intermediation approach, we assume that banks use labour (l), physical capital (k) and financial resources (f) to produce two outputs, loans (*Loans*) and other earning assets (*Other*). Input prices are measured by labour expenses over total assets (p_l), total capital expenditure over fixed assets (p_k) and interest expenses over total deposits (p_f), respectively. Total cost (C) is the sum of the expenses on labour, physical capital and deposits.

The cost function is assumed linearly homogeneous with respect to input prices. This condition is imposed by scaling total cost C and input prices by p_f. We can therefore write the translog cost function as[2]:

$$Log\left(C/p_f\right) = \beta_0 + \beta_{y1}ln(Loans) + \beta_{y2}ln(Other) + \frac{1}{2}\beta_{yy,1}(ln(Loans))^2 + \frac{1}{2}\beta_{yy,2}(ln(Other))^2 + \beta_{yy,12}ln(Loans)ln(Other) +$$

$$\beta_{p1}ln(p_l/p_f) + \beta_{p2}ln(p_k/p_f) + \frac{1}{2}\beta_{pp,1}(ln(p_l/p_f))^2 + \frac{1}{2}\beta_{pp,2}(ln(p_k/p_f))^2 + \beta_{pp,12}ln(pl/pf)ln(pk/pf) +$$

$$\beta_{yp,11}ln(Loans)ln(p_l/p_f) + \beta_{yp,12}ln(Loans)ln(p_k/p_f) + \beta_{yp,21}ln(Other)ln(p_l/p_f) + \beta_{yp,22}ln(Other)ln(p_k/p_f) +$$

$$\beta_{y1,t}ln(Loans)T + \beta_{y2,t}ln(Other)T + \beta_{p1,t}ln(p_l/p_f)T + \beta_{p2,t}ln(p_k/p_f)T + \beta_t T + \frac{1}{2}\beta_{tt}(T)^2 + \beta_e EQUITR \tag{1}$$

It includes a time trend (*T*) capturing technical change, and the equity-to-assets ratio (*EQUITR*) for taking into account banks' risk. The marginal cost on loans MC_L is calculated by taking the derivative of the cost function with respect to loans:

$$MC_L = \frac{\partial ln(C)}{\partial ln(Loans)} \frac{Loans}{C} = \left(\beta_{y1} + \beta_{yy,1}ln(Loans) + \beta_{yy,12}ln(Other) + \beta_{yp,11}ln(p_l/p_f) + \beta_{yp,12}ln(p_k/p_f) + \beta_{y1,t}(T)\right) \frac{Loans}{C} \tag{2}$$

Hence, the Lerner index on loans (*Lerner_L*) is computed as

$$Lerner_L = \frac{w_L - MC_L}{w_L} \tag{3}$$

where w_L is the price that banks charge on loans, measured by the ratio between interest revenue and loans. According to Eq. (3), the difference between the observed loan price and the estimated marginal cost, and consequently the Lerner index on loans, is not

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[2] We here follow the notation used by Shaffer and Spierdijk (2020). For example, $\beta_{yy,1}$ refers to the quadratic term of the first output, while $\beta_{yy,12}$ refers to the cross product of output 1 and output 2. As a further example, $\beta_{yp,12}$ refers to the quadratic terms of output 1 and price 2.

necessarily positive, but it may come out to be negative in certain cases and for some observations. Shaffer and Spierdijk (2020) report three possible explanations for this outcome: (i) the marginal cost may be estimated with errors for these firms; (ii) the average price may itself be subject to measurement errors; (iii) some firms may deviate from profit maximization for some time periods.

It should be noted that in our framework it is also possible to calculate the derivative of the cost function with respect to the second output, *Other*, and derive the Lerner index on the second output, $Lerner_O$, in the same way as in Eq. (3), on condition that we have data on the price for *Other*, w_O. Unfortunately, specific data for the price of earning assets different from loans are not available for MENA banks, and, when employing the ratio of total non-interest revenues and other earning assets as a proxy for w_O, we get several proxies that are much lower than the marginal cost for the second output, MC_O, thus getting a negative Lerner index for this output in 43.5% of sample banks. As a result, we will not consider $Lerner_O$ in our analysis, also because we aim at focusing on the determinants of just the Lerner index on loans.

Shaffer and Spierdijk (2020) show that, if the outputs are aggregated regardless of the underlying cost function and then such aggregate cost function is estimated, and if the multiproduct cost function is separable in total output,[3] the resulting aggregated Lerner index is equivalent to the weighted-average of product-specific Lerner indices. For our cost model specification with two outputs, separability implies to test for the following six restrictions on the parameter estimates of Eq. (1):

$$\beta_{y1} = \beta_{y2}, \beta_{yy,11} = \beta_{yy,12}, \beta_{yy,22} = \beta_{yy,12}, \beta_{yp,11} = \beta_{yp,12}, \beta_{yp,21} = \beta_{yp,22}, \beta_{y1,t} = \beta_{y2,t} \tag{4}$$

If the tests reported in (4) reject the null assumption, the aggregate Lerner index could be not informative on banks' market power (Shaffer and Spierdijk, 2020), particularly in case the aim is to check for the determinants of market power.

To sum up, in order to estimate the Lerner index, the strategy followed in this study is first to start by estimating the multiproduct cost function, i.e. Eq. (1), then to test the restrictions on parameter estimates as reported in (4). If separability is not rejected, we can re-estimate an aggregate cost function where bank activities are proxied by one output, namely total assets, so as to derive an aggregate Lerner index that would provide a consistent measure of market power for the banking sectors under study. If separability is rejected, estimating specific Lerner indices as shown in Eq. (3) is more appropriate. In a second step, we will regress the obtained Lerner index on its determinants.

3.2. The restricted Lerner index on loans

Unlike the previous (unrestricted) Lerner index, the restricted Lerner index imposes positivity within an estimation framework employing the stochastic frontier analysis (SFA) methodology. This model has been proposed by Kumbhakar et al. (2012) and used in several papers (for example: Coccorese, 2014; Huang et al., 2017). In addition to the possibility of obtaining positive values of the Lerner index (in line with the theory), this approach also allows a one-step estimation of both the index itself and its link with possible factors affecting it by means of the Battese and Coelli (1995) SFA model.

So as to get the restricted Lerner index on loans, we follow Kumbhakar et al. (2012) and start from the inequality between output price and marginal cost of loans[4]:

$$w_L \geq MC = \frac{\partial C}{\partial Loans} \text{ and } w_L \frac{Loans}{C} \geq \frac{\partial log(C)}{\partial log(Loans)} \tag{5}$$

We add a one-sided error term $u \geq 0$ in (5) in order to transform it into an equality. This term is called 'mark-up' and actually measures the gap between output price and marginal cost. Using the cost function shown in Eq. (1), we get the following equation that allows the direct estimation of the restricted Lerner index:

$$\frac{w_L Loans}{C} = \beta_{y1} + \beta_{yy,1} ln(Loans) + \beta_{yy,12} ln(Other) + \beta_{yp,11} ln(p_l/p_f) + \beta_{yp,12} ln(p_k/p_f) + \beta_{y1,t}(T) + u \tag{6}$$

Kumbhakar et al. (2012) define the degree of market power as a fraction of the mark-up to marginal cost, a coefficient called $\theta = (w_L - MC)/MC$, which is obtained from Eq. (6) as follows:

$$\theta = \frac{u}{\left(\beta_{y1} + \beta_{yy,1} ln(Loans) + \beta_{yy,12} ln(Other) + \beta_{yp,11} ln(p_l/p_f) + \beta_{yp,12} ln(p_k/p_f) + \beta_{y1,t}(T)\right)} \tag{7}$$

The restricted Lerner index on loans is finally calculated as:

$$Lerner_L = \frac{\theta}{(1+\theta)} = \frac{u}{\left(\beta_{y1} + \beta_{yy,1} ln(Loans) + \beta_{yy,12} ln(Other) + \beta_{yp,11} ln(p_l/p_f) + \beta_{yp,12} ln(p_k/p_f) + \beta_{y1,t}(T)\right) + u} \tag{8}$$

To sum up, we can estimate the restricted Lerner index from Eq. (6) by means of a standard SFA model, adding the usual random error terms v to capture all other optimization errors out of the bank's control. The asymmetric error term u captures the mark-up: the higher is this component, the higher is the Lerner index on loans.

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[3] The multiproduct cost function is separable if $C(y_1, .., y_M, p) = C(\sum y_i, p)$. For the translog case, y_i are the logs of the outputs, and p the log of the price inputs. See Shaffer and Spierdijk (2020).

[4] As told, since we do not have a precise measure of the price of the second output, we will not examine the similar equation needed to estimate the restricted Lerner on other earning assets.

As noted before, in the mark-up specification it is also possible to include the determinants of the Lerner index, thus estimating them simultaneously. Following the Battese and Coelli (1995) SFA model, the mark-up component u is assumed to follow a truncated normal distribution $N^+(\delta_0 + Z^{'}\delta, \sigma_u^2)$,[5] where Z is a vector that includes the determinants of the mark-up (i.e., of the Lerner index). A positive (negative) sign of each determinant can be directly interpreted on the mark-up. However, the magnitude of the impact of each determinant could be calculated by taking the derivative $(\partial u/\partial z_j)$ in Eq. (8). A non-significant coefficient of a given determinant suggests that it has no impact on the Lerner index.

The estimation of the model is obtained by maximum likelihood, and the mark-up component is based on the familiar conditional Jondrow et al. (1982) method.

3.3. Switching costs in banking

Switching costs – hereafter *SC* – include all the costs that any bank customer faces when, for some economic reason, she/he decides to switch to another bank. Typically, such costs may include, for example, fixed technical or procedural costs for changing the bank (e.g., charges for closing accounts or opening new ones), which are observable at least at the customer level. It also includes other important opportunity costs for the customer (time to identify the cheaper and most appropriate bank and to close her/his position) and any other additional charges involved by unobserved extra costs associated with porting (such as the inconvenience of setting up new banking references and communicating new account details to relevant parties). The higher are these costs, the lower is the probability of the customer to change his current bank.

Switching costs appear to be high in the banking industry. Shy (2002) has estimated depositor *SC* for the three largest banks in Finland in 1977, which range between 11% and 20% of the value of deposits. Using the same approach, Egarius and Weill (2016) focus on the switching costs on loans of commercial banks for three European countries over the period 2006–2012, finding that their level is 4.70% of the value of loans in Italy, 4.09% in France, and 6.14% in Germany.

In this paper we employ Shy (2002)'s model. Consider a market with N competitors, providing the same products with different prices. Assuming zero production costs for firms, their profit function will depend on their own price and on those of their competitors in the market. Unable to find a Nash equilibrium in pure prices, Shy (2002) builds his own equilibrium concept called Undercutting Proof Property (UPP). In this way, equilibrium in prices across firms is reached when no firm in the market would undercut[6] the other firms to capture all customers in the market. The model then links *SC* for each customer to market share N_i and the prices P_i charged by each firm i.

Let the ordered market shares of the I firms in the market be:

$$N_1 > N_2 > ..... > N_I \tag{9}$$

It is assumed that each firm $i \neq I$ fears to be undercut by the smallest firm I, and for this reason it will set its price equal to the one fixed by firm I. According to the previous assumptions of the model, firm i will set its price such that its profit is:

$$\pi_i = P_I N_I \geq (P_i - SC_i)(N_i + N_I) \tag{10}$$

while the smallest firm I will set its price such that its profit is:

$$\pi_i = P_i N_i \geq (P_I - SC_I)(N_i + N_I) \tag{11}$$

In both cases, each firm of the right side of the inequality will set its highest price subject to the constraint that the firm of the other side of the inequality will not find it profitable to undercut.

So as to solve the two-equation system, Shy (2002) takes the limiting case of the equality of Eqs. (10) and (11). He deduces that, for all firms that do not have the lowest market shares, firm I being the reference from Eq. (9), *SC* is equal to:

$$SC_i = P_i - \frac{N_I P_I}{N_i + N_I} \text{ for } i = 1, 2, ..., I - 1 \tag{12}$$

while for the firm which has the lowest market share *SC* is equal to:

$$SC_I = P_I - \frac{N_1 P_1}{N_1 + N_I} \text{ for } i = I \tag{13}$$

where firm 1, which holds the highest market share, is the reference for firm I.

To sum up, to estimate the switching costs *SC* for each bank in the sample, and according to Eqs. (12) and (13), we just need the market share and the output price of each product. For example, Shy (2002) defines the market share in terms of the number of bank accounts, while output price is measured by the average fees per account. Unfortunately, this information is not available to us (as they are missing in Bankscope/BankFocus database). However, more recent studies (Egarius and Weill, 2016; Yin and Matthews, 2016) employ an aggregate price at the bank level, calculated as the ratio between either total income and total assets or interest income and

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[5] This is the so-called mean equation inefficiency determinant. It is also possible to include the determinants in the mean and variance equations. Wang (2002) suggests that the u term follows a truncated heteroscedastic normal distribution, $N^+(\delta_0 + Z^{'}\delta, \exp(\varphi_{u0} + Z^{'}\varphi_u))$.

[6] Firm i is said to undercut firm j if it sets its price at a level $P_i < P_j - SC$, where *SC* represents the switching costs of firm j's customers.

total loans.

4. Assessing the determinants of banks' market power: Variables and data

In line with previous studies on banking competition in MENA region that employ the Lerner index (e.g.: Turk Ariss, 2010a; Polemis, 2015; Miah et al., 2020; Issa et al., 2022), we focus on a sample of commercial banks belonging to 13 MENA countries that are observed between 2000 and 2018. Accounting data come from banks' statements available from the Bankscope/BankFocus database and have been complemented by information drawn from banks' website when missing for some years. Macroeconomic data are taken from the World Development Indicators database managed by the World Bank.

After cleaning the data, dropping duplicated information, excluding financial institutions that are not commercial banks, we end up with an unbalanced panel that includes 199 banks, for a total of 2852 observations. This final sample is then used to estimate a cost frontier and the Lerner indices, particularly the unrestricted Lerner index from Eq. (3) and the restricted Lerner index – based on Kumbhakar et al. (2012)'s model – from Eq. (8), along with their determinants.

4.1. The Lerner index on loans

In the first step of our estimation process for getting the Lerner index of MENA banks, we have checked whether it is more appropriate to estimate an aggregate cost function or a multiproduct cost function. Therefore, we have estimated Eq. (1) using a SFA model, and tested the separability assumption, as shown in (4), by using a Wald test.

Cost inefficiency is assumed to follow a half normal distribution, while the SFA model, which takes into account the panel structure of the data, is based on the True Fixed Effect Model of Greene (2005) in order to consider unobserved heterogeneity among banks.

The test for cost function separability is highly rejected in the sample (the Wald statistics is equal to 1569.18, with a reported p-value of 0.000). We can therefore conclude then that cost function for MENA banks is better represented by a multiproduct cost function, rather than an aggregate function of outputs. Consequently, the degree of competitiveness of the market is better assessed through specific Lerner indices rather than a global Lerner index that considers a single aggregated output proxied by total assets.

In a second step, we have estimated the specific Lerner index for loans. Table 1 reports both the unweighted and the weighted average estimates of the unrestricted (*LERNER1*) and restricted (*LERNER2*[7]) measures by country. The overall average of the unrestricted Lerner index on loans is equal to 0.427 (0.407 if we consider the weighted measure), which suggests a moderate competitive environment in MENA region. However, differences in loan market competition across countries emerge. Tunisia and Morocco have the most competitive banking markets, while banks in Qatar and Lebanon enjoy much more market power.

The results for the restricted Lerner index show an average of 0.259 (0.215 when considering the weighted measure) over the whole sample. They slightly differ in magnitude from the unrestricted version of the indicator, possibly due to the truncated nature of such index but also to the fact that, by construction, this index accounts for random shocks, which may impact the price-cost margin. This may also explain the slight difference in the ranking of the countries with respect to the competitiveness of the loan market: actually, now Algeria and Qatar are among the least competitive countries, but Tunisia and Morocco still exhibit the lowest Lerner index. However, Huang et al. (2017) also provide estimates of the Lerner index on loans that are based on both unrestricted and restricted estimation methods for European countries and show that the magnitude of the two indices differ, even if the ordering of countries is robust.

We have also calculated the average growth rate of the Lerner indices (sixth and eleventh columns of Table 1). We observe a slight decrease in most of the countries, suggesting a slight improvement in competition in the loan market. Moroccan and Palestinian banks exhibit the most decreasing growth rate path, while Egypt is the only country where competition on loans seems to have deteriorated (the increase is 3.1% and 5%, according to the way of calculating the Lerner index). The magnitude of the annual growth rates of market power indices also shows minor differences according to the definition of the Lerner index.

Overall, the evidence that we draw on the level of competition is in line with the previous literature on MENA region, even if the latter normally relies on aggregate Lerner indices and therefore provides evidence on the 'global' competition characterizing the banking systems of the area.

For example, Haque and Brown (2017), who consider a sample of 12 MENA countries for the period 2002–2012, report an average index of 0.51, and do not check whether competition has improved or not over the sample years. By considering a larger sample including 15 MENA countries over the period 2005–2014, Issa et al. (2022) find that the Lerner index in this region ranges between 0.37 and 0.40, and that its evolution over time shows a decreasing trend ranging from −1.6% to −5% according to the sub-groups of countries.

However, our estimates are much higher than those reported by Miah et al. (2020), who consider a large group of countries (11 MENA countries plus 6 other Asian and African countries) and report an average aggregate Lerner index of 0.147 for the period 2002–2016.

We finally note that the magnitude of our estimated Lerner indices on loans is broadly comparable to those obtained for other regions. As an example, in their analysis on banks of five West European countries between 1998 and 2010, Huang et al. (2017) find an average value for the Lerner index on loans ranging from 0.195 (Switzerland) to 0.820 (Germany).

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[7] The markup u term is assumed to follow a half normal distribution. SFA frontier is estimated using Eq. (6) and *LERNER2* is estimated using Eqs. (7) and (8).

Table 1
Lerner index on loans by country, 2000–2018.

Country	Unrestricted Lerner index*(LERNER1)					Restricted Lerner index (LERNER2)				
	W_mean	Mean	Min	Max	%	W_mean	Mean	Min	Max	%
Algeria	0.474	0.426	0.01	0.704	−2.7	0.283	0.341	0.041	0.754	−1.1
Bahrain	0.337	0.376	−0.015	0.649	−2.6	0.153	0.215	0.048	0.668	−2.7
Egypt	0.374	0.43	0.185	0.597	3.3	0.157	0.221	0.053	0.627	5
Jordan	0.408	0.454	0.294	0.563	0.4	0.2	0.274	0.083	0.502	1.8
Kuwait	0.481	0.47	0.305	0.615	−1.6	0.288	0.289	0.067	0.503	−0.3
Lebanon	0.454	0.497	0.314	0.695	−0.8	0.185	0.26	0.081	0.725	−1.2
Morocco	0.303	0.305	0.086	0.555	−6.1	0.146	0.165	0.059	0.354	−4.8
Oman	0.386	0.371	0.109	0.533	−3.6	0.252	0.258	0.06	0.451	−3.2
Palestine	0.425	0.407	0.135	0.658	−4	0.32	0.318	0.101	0.568	−3.8
Qatar	0.47	0.511	0.336	0.677	−0.9	0.295	0.337	0.1	0.683	−1.8
Saudi Arabia	0.499	0.485	0.196	0.631	−0.6	0.313	0.302	0.069	0.65	0.8
Tunisia	0.211	0.231	−0.009	0.489	−3	0.141	0.162	0.06	0.443	−1
United Arab Emirates	0.415	0.431	0.185	0.633	−1.5	0.241	0.286	0.05	0.647	−1.4
Average	*0.407*	*0.427*	*−0.015*	*0.704*	*−1.1*	*0.215*	*0.259*	*0.041*	*0.754*	*−0.2*

W_Mean is the weighted average of the Lerner indices (with total assets as weights), *Mean* is the unweighted average.
% is the average percentage growth rate of the Lerner indices over the period 2000–2018 (each value is the coefficient obtained by regressing, for each country, the logarithm of the Lerner indices on the trend).
   * Unrestricted Lerner indices have been winsorized at the 5th and the 95th percentiles by country.

4.2. Switching costs

Table 2 reports the two measures of average value of switching costs (*SC*) by country for the period under inspection. They are based on the estimation of the Shy (2002)'s method, according to Eqs. (12) and (13). The key variables for calculating *SC* are banks' market share on loans and the price of loans (given by the ratio of interest expenses to total loans), which deliver us what we call '*SC* on loans', in the spirit of Shy (2002). In addition, following Egarius and Weill (2016), who consider an alternative measure of *SC* based on the market share of banks calculated on total assets, we also calculate '*SC* on all banks' activities'.

The average value of the switching costs on loans activities in MENA region is equal to 0.106, which suggests that, on average, for a given customer in MENA, switching to another bank would cost quite 10.6% of the amount of loans he has with that bank.[8] Moreover, *SC* are much higher for Lebanese and Egyptian customers, but very low in Palestine and Morocco.

The two measures of *SC* are rather similar in magnitude and provide also very close results for the ranking of countries in terms of *SC*. One possible explanation is that (as we have noticed before) the main activity of commercial banks in MENA is lending: actually, in our sample the correlation coefficient between the markets shares in terms of loans and in terms of total assets amounts to 0.98.

We can compare our findings on *SC* with those of Egarius and Weill (2016), which employ the same methodology for a group of countries belonging to the Eurozone during the period 2006–2012. They find that, on average, *SC*'s on loans are 0.061, 0.041 and 0.047 for Germany, France and Italy, respectively. In other words, for a representative European customer it will cost quite 50% less to switch to another bank, compared to an average MENA customer.[9]

From Table 2, we can also see that *SC* in MENA has decreased at an average annual rate of about 2–3%. We ascribe this outcome mainly to the overall improved competition in the loan markets, as figured out from the evidence coming from Table 1. The only exception to this trend is Egypt, where *SC* increased at the significant growth rate of 2.6% per year. Again, from Table 1 we deduce that this country has also suffered from a poor competition in the banking sector, as the increasing Lerner index proves.

A major question arising from our previous data inspection, therefore, is the following: what is the link between switching costs and banking competition in the MENA region?

Customers' switching costs have been often found as a relevant factor that is able to increase banks' market power. As told, they exist when it is costly for consumers to switch from one seller to another, implying a substantial inertia of the clientele to the advantage of firms' overall business (Klemperer, 1995; Shy, 2002). In the banking industry, switching costs are often to be ascribed to asymmetric information in favour of banks linked to the specific bank-borrower relationships. Banks know the characteristics of their borrowers better than their rivals and can therefore 'lock-in' them and thus charge higher prices, since a switch to other banks of customers is likely to impose them even worse conditions (Kim et al., 2003; Yin and Matthews, 2016). All the above foreshadows a positive link

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[8] We owe this interpretation to Shy (2002), who provides a measure of the *SC* magnitude in the market for deposits of Finnish banks by looking at the ratio of switching costs to the average balance held in each bank, and concludes that "switching costs account for between 0 to 11% of the average balance a depositor maintains with the bank" (p. 81).

[9] The higher level of switching costs in MENA countries may be associated to the value of loan interest rates, which is much higher than European countries. For example, in the period 2003–2018 their average level was 3.47% in France, 3.90% in Germany and 3.87% in Italy (loans to corporations, source: European Central Bank), while in some MENA countries they are even two times or more much higher. It is the case of Egypt, where, according to the World Bank, the lending interest rate varied between 13.79% in 2002 to 9.09% in 2018, or of Lebanon, where it varied between 16.58% in 2002 and 9.09% in 2018. Another important factor affecting the level of switching costs is inflation, whose rates in MENA countries are also high, sometimes exceeding 10% for some of them.

Table 2
Switching costs by country, 2000–2018.

Country	SC on loans			SC on all banks' activities		
	Mean	Sd	%	Mean	Sd	%
Algeria	0.073	0.037	−2.7	0.072	0.042	−4.5
Bahrain	0.068	0.056	−5.4	0.066	0.063	−4.6
Egypt	0.157	0.103	2.6	0.159	0.111	2.6
Jordan	0.084	0.036	−3.3	0.085	0.037	−3.4
Kuwait	0.059	0.059	−2.7	0.054	0.06	−1.9
Lebanon	0.227	0.169	−1.7	0.227	0.184	−2.5
Morocco	0.054	0.161	−2.2	0.088	0.165	−5.4
Oman	0.044	0.023	−2.7	0.044	0.023	−2.1
Palestine	0.052	0.047	−11.1	0.05	0.047	−10.4
Qatar	0.053	0.036	−4.4	0.051	0.037	−4.5
Saudi Arabia	0.057	0.037	−4.7	0.05	0.059	−4.6
Tunisia	0.052	0.016	0.1	0.051	0.018	0.2
United Arab Emirates	0.06	0.028	−0.3	0.057	0.039	−1.4
Average	*0.106*	*0.116*	*−2.4*	*0.107*	*0.123*	*−2.7*

% is the average percentage growth rate of *SC* over the period 2000–2018 (each value is the coefficient obtained by regressing, for each country, the logarithm of *SC* on the trend).

between switching costs – here derived using the methodology suggested by Shy (2002), which delivers a bank-level indicator of such costs – and market power, and the variable *SC* represents the first determinant that we use for explaining the behaviour of the Lerner indices of MENA banks.

4.3. Other determinants of the Lerner index

The previous discussion has highlighted the importance of investigating, among the determinants of market power of MENA banks, as proxied by our estimated Lerner indices, the role of switching costs.

Banks' market power can derive also from a higher level of efficiency on the cost side (Berger, 1995; Corvoisier and Gropp, 2002; Fernandez de Guevara et al., 2005). Actually, for most efficient banks it is easier to gain more customers by slightly reducing prices, at the same time gaining higher profits since efficiency normally translates into lower costs. So as to measure cost efficiency, we avoid the use of accounting measures (like, for example, cost-to-income ratios), and employ a stochastic frontier approach that allows the estimation of bank-level efficiency scores. We expect that the latter are positively correlated to the Lerner indices. As mentioned in Section 4.1, our cost efficiency scores (*COSTEFF*) are estimated from a pooled country cost frontier, using the true fixed effect model of Greene (2005).

Another determinant of market power for banks, that we regard as important to be considered in our framework, is associated to the degree of diversification (*DIV*) characterizing their business activity. Actually, even if lending still remains the main activity for banks (and guarantees also relatively stable returns), in the recent years they have enlarged the provision of other services that help to increase their revenue especially when loan interest rates are low. However, non-traditional activities are normally characterized by a higher degree of competition among banks because they are not affected by the specificities deriving from lending relationship and hence are to be considered as quite homogeneous across sellers. Therefore, we expect that a higher diversification, here measured by the share of non-interest income over total operating income, has a negative relationship with market power.

In our estimations we also consider a group of control variables. The first bank-specific variable is the ratio of total deposits to total assets (*DEPR*). Banks with higher levels of deposits tend to rely more on activities that imply stronger personalized relationships with the clientele, which might have a positive impact on their market power because it should be easier to sell customers fee-based products and charge higher prices for them, taking advantage of both the more inelastic depositors' demand (DeYoung and Rice, 2004) and lower informational asymmetries (Delis, 2012). On the other hand, a higher deposits-to-assets ratio involves higher costs on intermediated funds, which may reduce market power, especially in normal economic periods (Delis et al., 2016). Therefore, the sign of the *DEPR* coefficient cannot be predicted a priori.

We then include the logarithm of total assets of banks (*SIZE*) to capture the role of bank size. Larger banks are likely able to enjoy higher margins because of the exploitation of economies of scale and the access to cheaper sources of funds (Delis, 2012), but smaller banks may count on close and long-lasting relationships with borrowers, due to the presence of asymmetric information, which reduces competition coming from other credit institutions. Hence, the sign of the coefficient of this variable is again not predictable.

In order to assess whether there is some competition in the financial system that banks face from capital markets, and that may reflect on their market power, we consider the ratio between stock market capitalization and GDP in each country (*MKTCAP*).

Another important variable that enters our regressions is the market share of the three largest banks (*CR3*). It represents a proxy for the level of banking markets concentration, and is useful in assessing whether, as maintained by the structure-conduct-performance paradigm (Bain, 1951), more concentrated industries allow operating banks to rely on a higher degree of market power.

As macroeconomic controls, we include inflation rates (*INFL*) and GDP growth rates (*GDPGR*). The presence of high inflation signals a higher instability and may be associated with lower market power of banks because it determines an increase of cost that induces them to raise prices for the clientele as well, even if to a lesser extent so as to only partially exploit customers' willingness to

pay in order to remain competitive. The annual rate of GDP growth helps to take into account the role of local economic development.

Finally, we add two specific dummy variables for capturing the specific impact of foreign banks (*FOREIGN*) and Islamic banks (*ISLAMIC*) on the level of the Lerner index. With respect to the first variable, a positive sign is expected in case foreign banks enter the market through the acquisition of local banks already enjoying market power, which likely ensures its preservation. By contrast, we will get a negative sign if foreign banks are able to enter markets through de novo entries or greenfield investments. In this situation, they can stimulate competition in domestic markets by making much more efforts to downwards prices and margins in order to gain market power (Delis et al., 2016). With respect to the *ISLAMIC* dummy variable, we are not able to predict its sign, since the impact of Islamic banks on the Lerner index may depend on further characteristics such as the importance of Islamic finance in the country and the competition between conventional banks and Islamic banks. Finally, the peculiarity of each national market is captured by means of a set of country dummies.

5. Empirical evidence

5.1. Results from the main model

Before proceeding with the analysis of the empirical results, we need to check the potential endogeneity between *LERNER* and the main other variables under consideration, namely *SC*, *COSTEFF*, *DIV* and *DEPR*. Since all the above variables involve important decision aspects of bank management, any shock affecting market power may reverberate on the other variables, thus we have to be careful in handling the evidence drawn from the data.

We therefore implement a Durbin-Wu-Hausman (DHW) test to verify the presence of endogeneity between each pair of variables. The results of this test are reported in Table 3, where we note the presence of strong endogeneity between *LERNER* and all the other variables.

We can now analyse the empirical evidence on the link between the Lerner index and the aforementioned determinants, which is based on the estimation of a dynamic panel model through the GMM-system method. Compared to a static model, the GMM-system approach allows to take into account the endogeneity of the variables. In addition, the choice of this estimator allows to address three more econometric issues that characterize our analysis. First, it makes possible to account for unobservable characteristics affecting market power in the price of the loan market of sample countries. Second, thanks to the GMM dynamic framework it is much easier to overcome the weak instruments problem, knowing that, in addition to the lagged Lerner variable, other key variables in the model proved to be endogenous (i.e., *SC*, *COSTEFF*, *DIV*, and *DEPR*). Third, since in our specification we include bank type variables that are time invariant, this approach – unlike the alternative difference GMM method – allows to estimate their impact on the dependent variables.

Table 4 provides the results for the two versions of the Lerner indices (unrestricted and restricted). Three models are estimated: Model (1) considers only banks' characteristics, Model (2) adds macroeconomic variables, and Model (3) includes also bank-type dummy variables. Estimating different specifications allows to check for the sensitivity of the results, with particular reference to banks' characteristics. The test on the validity of the instruments, as well the test on the absence of correlation at the second order, both provided at the bottom of this table, reassure us on the validity of the estimation method here used.

First of all, our regression results emphasize the important role played by switching costs in allowing market power. Actually, the coefficient of *SC* is positive and significant at the 1% level in all regressions, proving that, when customers find it costly to switch providers of banking services, banks are able to charge higher prices relative to their costs. This result matches with the general findings of the existing literature (e.g.: Ioannidou and Ongena, 2010; Barone et al., 2011; Egarius and Weill, 2016; Miah et al., 2020; Rizkiah et al., 2021).

As expected, more efficient banks are characterized by higher Lerner indices, hence by stronger market power, the coefficients of *COSTEFF* being positive and highly significant (in line with, among others: Fernandez de Guevara et al., 2005; Cubillas and Suarez, 2013; Ghosh, 2018; Aguilar and Portilla, 2020). Therefore, banks that better manage their cost structure benefit also from higher prices.

As to diversification, since the coefficient of *DIV* is negative and always significant at the 1% level (Cubillas and Suarez, 2013; Aguilar and Portilla, 2020; Zouaoui and Zoghlami, 2020), we find evidence that banks focusing particularly on the traditional intermediation activity (i.e., characterized by a lower share of revenues coming from non-interest sources) enjoy more market power, to be ascribed mainly to the personal lending relationship with customers and the related information asymmetries. This result is in line with the findings of Zouaoui and Zoghlami (2020), who employ a Granger causality test between revenue diversification and the Lerner index in MENA (particularly, a global Lerner on all bank's activities) and report a bi-directional causality suggesting endogeneity between these two variables. Moreover, they show that more diversification has a negative impact on banks' market power; their explanation for this result is that diversification may lead to dispersing managerial resources and competence, giving rise to higher cost of monitoring, integrating and coordinating the diverse activities and thus leading to the loss of managerial capacity to practice opportunistic prices by profitably raising the market price of financing service over the marginal cost, which reduces the bank market power.

Turning to the control variables, the deposits to assets ratio (*DEPR*) exhibits a positive impact on *LERNER*, especially in the regressions with the unrestricted index, suggesting that banks whose funding comes mainly from depositors (hence, with likely established long-term relationships) enjoy more market power. By contrast, bank size (*SIZE*) appears to have a negative and significant effect on Lerner indices. This means that smaller banks enjoy a higher degree of market power, possibly because they are rooted in local markets where they have strong ties with residents (including tight lending relationships) and their economic activities.

Table 3
The Durbin-Wu-Hausman, DHW test for endogeneity.

Variables pair	Measures of the Lerner index	Quality of Instruments Fisher Test	p-value of the DHW test	Conclusion
LERNER vs. SC	LERNER1	$F(14, 2813) = 114.87$	0.000	Endogeneity
	LERNER2	$F(14, 2801) = 114.63$	0.000	Endogeneity
LERNER vs. COSTEFF	LERNER1	$F(14, 2804) = 7.80$	0.001	Endogeneity
	LERNER2	$F(14, 2792) = 7.78$	0.000	Endogeneity
LERNER vs. DIV	LERNER1	$F(14, 2802) = 43.86$	0.000	Endogeneity
	LERNER2	$F(14, 2790) = 42.26$	0.000	Endogeneity
LERNER vs. DEPR	LERNER1	$F(14, 2802) = 59.27$	0.000	Endogeneity
	LERNER2	$F(14, 2790) = 57.07$	0.000	Endogeneity

LERNER1 and *LERNER2* are the unrestricted and restricted Lerner indices, respectively.
COSTEFF is cost efficiency, estimated through pooled countries cost frontier using the true fixed effect model.
The null hypothesis states that right hand variable in each variables pair is exogenous.

Table 4
The determinants of the Lerner index (two step GMM-system estimations).

Variables	Unrestricted Lerner (LERNER1)			Restricted Lerner (LERNER2)		
	(1)	(2)	(3)	(1)	(2)	(3)
$LERNER_{t-1}$	0.7507***	0.7528***	0.7362***	0.8085***	0.8185***	0.8044***
	0.0067	0.007	0.006	0.006	0.0052	0.0055
SC	0.1051***	0.1033***	0.1082***	0.0384***	0.0323***	0.0354***
	0.0059	0.0057	0.0054	0.0051	0.0047	0.0048
COSTEFF	0.2040***	0.2006***	0.2026***	0.1316***	0.1199***	0.1279***
	0.0094	0.0097	0.0096	0.0085	0.0086	0.0092
DIV	−0.0723***	−0.0693***	−0.0700***	−0.0640***	−0.0585***	−0.0629***
	0.0036	0.0032	0.0033	0.0042	0.0042	0.0044
DEPR	0.0743***	0.0654***	0.0648***	0.0123**	0.0026	−0.0031
	0.0065	0.006	0.0063	0.0052	0.0053	0.0057
SIZE	−0.5507***	−0.5327***	−0.5493***	−0.7638***	−0.6799***	−0.6818***
	0.0392	0.0358	0.0389	0.0292	0.0297	0.0338
CR3	0.0516***	0.0704***	0.0696***	0.0361***	0.0851***	0.0634***
	0.0066	0.0066	0.0071	0.0062	0.0063	0.0065
Macro-variables						
MKTCAP		−0.0126***	−0.0142***		−0.0357***	−0.0217***
		0.0015	0.0016		0.0012	0.0012
INFL		−0.0179*	−0.0149*		−0.0549***	−0.0576***
		0.0095	0.0095		0.0081	0.0076
GDPGR		−0.0182	−0.0214*		−0.0122	−0.0373***
		0.0128	0.0126		0.0091	0.0093
Bank Type						
FOREIGN			0.5030***			0.7294***
			0.1165			0.0991
ISLAMIC			−1.4631***			−0.7264***
			0.2188			0.1259
Constant	−6.5164***	−7.3646***	−6.6468***	4.8088***	1.465	3.1584**
	1.3875	1.3778	1.4164	1.1637	1.1459	1.2237
# Observations	2509	2509	2509	2509	2509	2509
# Banks	199	199	199	199	199	199
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ar(1)_pvalue	0	0	0	0	0	0
Ar(2)_pvalue	0.741	0.733	0.743	0.468	0.431	0.449
Hansen_pvalue	0.309	0.319	0.256	0.279	0.203	0.174

COSTEFF, SC, DEPR and *DIV* are considered as endogenous in the GMM-system estimation. Standard errors in parentheses.
Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

Table 4 makes also clear that the coefficients of bank-level variables are stable across the various models, which proves their robustness to different definitions of both the dependent variable and the specification.

The coefficient of *CR3* is positive and significant at least at the 1% level in six regressions. Therefore, there is evidence that more concentrated banking markets allow banks to exploit more market power in the loan market. This result contrasts with the recent banking studies (e.g.: Fernandez de Guevara and Maudos, 2007; Delis, 2012; Efthyvoulou and Yildirim, 2014; Rakshit and Bardhan, 2019), which provides no support to the structure-conduct-performance paradigm, and signals that in this case structural measures of competition (like market concentration) may work as reliable proxies of competition.

The level of stock market capitalization within the country (*MKTCAP*) turns out to have a negative impact on banks' market power.

Hence, in MENA region more developed capital markets act as a substitute for bank lending, which reduces the importance of banks and their ability of setting prices.

The coefficient of *INFL* show a negative and significant sign. Hence, inflation – and the related economic instability – reduces banks' ability to charge price higher than costs. Finally, the growth rate of GDP (*GDPGR*) is also negatively associated with the Lerner index, meaning that banks' market power tends to be lower with better macroeconomic conditions (Rotemberg and Saloner, 1986; Toolsema, 2004), when the economy asks for more loans and competition among banks increases, thus reducing mark-ups.

The dummy variable *FOREIGN* exhibits a positive and significant coefficient. Hence, foreign banks enjoy a higher degree of market power, all else equal. This result may be ascribed to a (at least perceived) higher service quality or may result from banking market consolidation when foreign banks enter MENA banking industries by acquiring local banks (in this hypothesis, their entry does not increase the number of banks, which may render the market more competitive).

By contrast, the *ISLAMIC* dummy variable is negative and significant, meaning that Islamic banks' presence has a significant impact on lessening banks' market power in MENA region. This result could be explained by the fact that, contrary to foreign banks, Islamic banks in MENA are de novo entry to the market: in order to stimulate the market and attract more customers, they need to make more pressure on prices and margins. Overall, this evidence conflicts with the result of Turk Ariss (2010b), who finds a positive impact of the dummy variables associated to Islamic banks on the global Lerner index. Several explanations for such discrepancy can be provided: first, her analysis covers an earlier period of time (2000–2006); second, she used a sample of GCC countries extended to other Asian countries; third, the estimation of the Lerner index is based on an aggregated measure that considers all banks' activities, i.e. total assets.

5.2. Controlling for country heterogeneity

We now re-estimate the previous dynamic model for assessing the main determinants of the Lerner index in MENA region by looking at more homogeneous groups of countries. In particular, sample countries are split into two sub-groups: Gulf Cooperation Countries (GCC), including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, and the remaining countries (non-GCC). Members of the GCC group are quite particular countries, whose economies are largely based on oil extraction with abundant liquidity, whose GDP per capita is outstanding, with high living standards, much stable economic environment (currency and prices), a booming Islamic finance and – as a result – whose banking systems are to be considered as more developed.

The results of the new estimations are provided in Table 5. They broadly confirm what we discovered in Table 4, except for the impact of *SC* on the restricted Lerner index for the GCC group, which is not significant.[10] We also note that, the magnitude of the *SC* coefficient is much higher for the GCC group than for the non-GCC group, with reference to the unrestricted Lerner index. This means that the same (absolute) increase of switching costs in GCC countries allows a higher increase of banks' market power, possibly showing a more fundamental role of credit institutions (and in general of the banking sector) in such countries. Nonetheless, the average estimated *SC* is lower for the GCC group than for the non-GCC group (0.06 vs. 0.13). In addition, we note that *DEPR* has a negative impact on the Lerner index of the GCC group, but positive on that of non-GCCs. Hence, for GCCs the intermediated funds (i.e., deposits) seem to impose higher costs, which tend to reduce banks' market power, while this does not happen for non-GCCs, perhaps due to a cheaper access to sources of funds or lower informational asymmetries.

Finally, for the most cases ownership structure and bank type seem not to have a significant and different impact on Lerner indices by sub-groups of countries. The dummy variable associated to foreign banks exhibits a positive and significant coefficient for the non-GCC group, but non-significant for the GCCs. This could be explained by the fact that in most of foreign banks in the GCC, except Bahrain, there are strong limits on foreign ownership as well on the number of branches (which is restricted to one: Al-Hassan et al., 2010). However, Islamic banks have a negative impact only in the GCC, while this is not the case for non-GCC countries. Overall, whereas the impact of banking variables on the Lerner index proves to be robust in the MENA region, some differences are found particularly with respect to bank ownership or bank type.

6. Robustness checks

6.1. Using a one-step estimation procedure

In order to further assess the reliability of our findings, we conduct a couple of robustness checks. First, we check the validity of the results with respect to the econometric method used for investigating the role of the Lerner index determinants. Particularly, instead of using a two-step GMM panel dynamic model, we switch to a one-step setting, i.e. where the Lerner index and the determinants are simultaneously estimated in the same step.

The so-called restricted Lerner index is considered, where the determinants are included in the mean of the one-sided error term of the mark-up. In addition, as shown in Table 3, the endogenous determinants (SC_{t-1}, $COSTEFF_{t-1}$, $DEPR_{t-1}$ and DIV_{t-1}) enter as lagged regressors to avoid possible simultaneity problems in the estimation results. We estimate this model for the whole sample as well as for the two sub-groups (GCCs and non-GCCs). The empirical results are presented in Table 6.

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[10] We recall that the one-step estimation method characterizing the Kumbhakar et al. (2012)'s model does not consider the potential endogeneity of the variables *SC*, *COSTEFF* and *DIV* as well as their impact on the parameter estimates. The endogeneity issue will be treated later in the robustness checks.

Table 5
The determinants of the Lerner index by sub-region (two step GMM-system estimations).

Variables	Unrestricted Lerner (LERNER1)		Restricted Lerner (LERNER2)	
	GCC	Non-GCC	GCC	Non-GCC
$LERNER_{t-1}$	0.6731***	0.6287***	0.7463***	0.7239***
	0.0115	0.0101	0.0193	0.0088
SC	0.2853***	0.2188***	0.0462	0.1241***
	0.0355	0.0159	0.04	0.0092
COSTEFF	0.4755***	0.5473***	0.2863***	0.3354***
	0.0298	0.0149	0.0233	0.0124
DIV	−0.0946***	−0.1256***	−0.1358***	−0.0760***
	0.0103	0.009	0.0082	0.0053
DEPR	−0.0686***	0.1167***	−0.0527**	0.0330***
	0.0183	0.017	0.023	0.01
SIZE	−0.5945***	−0.9354***	−0.7923***	−1.1154***
	0.1341	0.0783	0.125	0.0583
CR3	0.0886*	−0.0384***	0.0189	0.0162**
	0.0455	0.0102	0.0346	0.0079
Macro-variables				
MKTCAP	−0.0232***	−0.0162***	−0.0339***	−0.0090***
	0.0056	0.002	0.0039	0.0021
INFL	−0.2573***	0.0909***	−0.3370***	0.0635***
	0.0256	0.0131	0.0324	0.0086
GDPGR	0.0263	0.0668***	−0.0233	−0.0159
	0.0225	0.0253	0.0349	0.0208
Bank Type				
FOREIGN	0.8917	1.1656***	−1.0663	1.0855***
	4.9	0.2643	3.5458	0.1375
ISLAMIC	−2.6256**	−0.6523	−1.3665*	0.234
	1.1419	0.5062	0.8189	0.3034
Constant	−15.5345***	−22.2302***	3.6484	−5.8751***
	3.4666	2.4351	4.3528	1.592
# Observations	1005	1504	1005	1504
# Banks	78	121	78	121
Country dummies	Yes	Yes	Yes	Yes
Ar(1)_pvalue	0	0	0	0
Ar(2)_pvalue	0.353	0.517	0.0487	0.581
Hansen_pvalue	0.969	0.191	0.988	0.154

COSTEFF, SC, DEPR and *DIV* are considered as endogeneous in the GMM-system estimation. Standard errors in parentheses. Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

Overall, for the whole sample of countries the results prove to be qualitatively robust when compared to those presented in Table 5: particularly, *SC* and *COSTEFF*[11] have a positive impact on the mark-up, hence on the Lerner index, while *DIV* and *SIZE* negatively affects banks' market power. However, *DEPR* has now a negative impact in all regressions (but not significant for the GCCs). With respect to bank type and ownership, the conclusion is also the same as the one reported in Table 4 for all countries. Slight differences are found if we consider the estimations based on the restricted Lerner index for subgroups of countries. Foreign banks have a significantly lower market power within the GCC group (this variable was non-significant in Table 5), and the same happens for Islamic banks for both groups (in Table 5 the associated coefficient was not significant for non-GCCs).

6.2. Simultaneity of switching costs and Lerner indices

A second robustness check is built on the idea that the Lerner index and switching costs are simultaneously determined. Hence, instead of regressing just the Lerner index on its determinants, we have considered a system including four equations with *LERNER, SC, COSTEFF* and *DIV* as the dependent variables, respectively, so as to take into account their interdependence.[12] This four-equation system has been estimated by three stage least square (3SLS), making use of the same specification employed for assessing the

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[11] Here the cost efficiency variable, *COSTEFF*, is based on the estimation of pooled country frontier. We obtain similar results when cost efficiency scores are derived from specific countries frontier. To save space, they are not reproduced here, but could be obtained from the authors upon request.
[12] In an earlier version of the paper, simultaneity was restricted to just two equations (with *LERNER* and *SC*). We thank an anonymous referee, who suggested extending simultaneity to *COSTEFF* and *DIV* variables. To save space, we here report the evidence for all countries, but the estimates for GCC and non-GCC groups can be obtained upon request.

Table 6

The determinants of the Lerner index (one-step estimations).

Variables	All countries	GCC	Non-GCC
Log(Loans)	0.0729***	0.2280***	0.0534***
	0.0056	0.0218	0.0056
Log(Other)	−0.0263***	−0.0266	−0.0218***
	0.0048	0.017	0.0049
Log(pl/pf)	−0.0525***	0.0461**	−0.0726***
	0.008	0.0199	0.0086
Log(pk/pf)	−0.0312***	−0.0064	−0.0154**
	0.0063	0.0124	0.0077
T	0.0003	−0.0131***	0.0015
	0.001	0.0037	0.001
Constant	0.066	−2.0026***	0.1790*
	0.0886	0.5025	0.0973
Country dummies	Yes	Yes	Yes
Mark-up determinants			
SC_{t-1}	0.0062***	−0.0009	0.0047*
	0.0022	0.0061	0.0025
$COSTEFF_{t-1}$	0.0174***	0.0177***	0.0124***
	0.0035	0.0054	0.0043
DIV_{t-1}	−0.0092***	−0.0119***	−0.0135***
	0.0015	0.0022	0.0026
$DEPR_{t-1}$	−0.0044***	−0.001	−0.0075***
	0.0016	0.0024	0.0026
SIZE	−0.0328*	−0.2393***	−0.0134
	0.0173	0.0268	0.0292
CR3	−0.0002	−0.0079*	0.0012
	0.0034	0.0047	0.0049
MKTCAP	−0.0019**	0.0032***	−0.0069***
	0.0008	0.001	0.0021
INFL	0.0093**	−0.007	0.0229***
	0.0047	0.006	0.0066
GDPGR	0.0090*	0.0025	0.007
	0.0049	0.0047	0.0138
FOREIGN	0.1654***	−0.2516***	0.3957***
	0.0439	0.0817	0.0849
ISLAMIC	−0.1468***	−0.2815***	−0.2988**
	0.0484	0.0555	0.1189
Constant	−4.7446***	−3.6098***	0.296
	0.1153	0.2223	0.7261
Country dummies	Yes	Yes	Yes
# Observations	2509	1005	1504

Standard errors in parentheses. Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

determinants of the Lerner index (see Table 4).

Since the four-equation system is not based on any theoretical model explaining the relationship between *SC*, *LERNER*, *COSTEFF* and *DIV* we do not impose any exclusion restrictions. In addition, as the system is not identifiable, we introduce additional external instruments, namely the lagged variables of *SC*, *COSTEFF*, *DEPR* and *DIV* (which also have been used previously) as well as the average loan price of the group of competitors of each bank for each country and year (*AVRpy1*).

The results of the above estimations are shown in Table 7. For the *LERNER* equation, the evidence is in line with what we discovered in the baseline model (Tables 4), particularly for the variables *SC*, *COSTEFF* and *DIV*. For most of the other control variables (particularly, *SIZE*, *MKTCAP* and *ISLAMIC*) the results also prove to be robust.

On the contrary, the coefficients of *DEPR* and *CR3* are not significant, while the macroeconomic variables *INFL* and *GDPGR* now appears to have a positive impact on *LERNER*. Such differences could be ascribed both to the fact that they do not have any firm-specific dimension and to the static characteristics of the 3SLS model specification. However, the impact of bank type and ownership characteristics is quite robust.

An interesting pattern concerning reverse causality emerges from the analysis of Table 7. Particularly, by analysing the estimated coefficients of *LERNER* for the *SC, COSTEFF* and *DIV* equations (second, third, and fourth columns) we note that the sign of the impact of *LERNER* on these variables is the same as that reported the first column (i.e., of their impact on the Lerner index: see the first column), but the magnitude of the impact of *LERNER* (first row) is much more sizeable.

We also find a positive impact of *DIV, SIZE, MKTCAP* on switching costs: hence, larger and more diversified banks are better able to lock in their customers and increase the switching costs, and the same happens in countries with more developed financial markets. However, foreign banks seem to apply lower switching costs compared to domestic banks, while the opposite happens for Islamic banks. The latter evidence may derive from the product specificity of this type of banks, based on Sharia and partnership loans between

Table 7

The determinants of the Lerner index (all sample countries). *(simultaneous estimation of LERNER and SC equation, three stage least squares estimation results)*

Variables	LERNER1	SC	COSTEFF	DIV
LERNER1	–	2.069***	1.046***	−2.653***
		0.0186	0.0204	0.0244
SC	0.483***	–	−0.505***	1.282***
	0.00413		0.00827	0.0159
COSTEFF	0.956***	−1.978***	–	2.536***
	0.0168	0.0307		0.0494
DIV	−0.377***	0.779***	0.394***	–
	0.00329	0.00968	0.0081	
DEPR	−0.0124	0.0256	0.0128	−0.0329
	0.0288	0.0596	0.0301	0.0764
SIZE	−1.403***	2.903***	1.468***	−3.723***
	0.184	0.381	0.194	0.49
CR3	−0.0456	0.0942	0.0475	−0.121
	0.0479	0.099	0.0499	0.127
Macro-variables				
MKTCAP	−0.0260***	0.0537***	0.0272***	−0.0689***
	0.0096	0.0198	0.01	0.0255
INFL	0.143**	−0.296**	−0.149**	0.379**
	0.0611	0.126	0.0638	0.162
GDPGR	0.158**	−0.327**	−0.165**	0.419**
	0.0677	0.14	0.0706	0.18
Bank Type				
FOREIGN	2.739***	−5.666***	−2.865***	7.267***
	0.514	1.062	0.537	1.363
ISLAMIC	−6.175***	12.77***	6.459***	−16.38***
	0.662	1.374	0.705	1.764
Constant	−9.276*	19.18*	9.732*	−24.52*
	5.236	10.8	5.431	13.9
#Observations	2509	2509	2509	2509
R-squared	0.467	0.187	0.076	0.124
Country dummies	Yes	Yes	Yes	Yes

LERNER1 is the unrestricted Lerner, *COSTEFF* is the efficiency estimated from specific country frontiers. The regressions consider *SC, COSTEFF, DEPR* and DIV as endogenous variables. We use the following additional instruments: lagged variables of *DIV*, *COSTEFF*, DEPR, *SC*, and of the average loan prices of all the competitors of each bank within each country and year (*AVRpy1*). *R*-squared is calculated by the squared correlation coefficient between observed and predicted dependent variable in each equation. Standard errors in parentheses. Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

banks and borrowers and thus likely to make the bank-customer relationship tighter and more lengthy, which reinforces the lock-in of these banks. In addition, and according to Weill (2011) and Olson and Zoubi (2008), Islamic banks customers, once acquired, are predisposed to pay higher prices adhering to religious principles, which explains why the switching costs are higher. Overall, our results on *SC* are in line with the recent studies (e.g.: Yin and Matthews, 2016; Miah et al., 2020; Rizkiah et al., 2021).

6.3. Additional robustness checks

In this section we perform a couple of additional checks to verify the robustness of our empirical evidence.[13] We first perform a group of regressions focusing on the institutional environment as well as the regulation of the single banking markets in MENA countries. As institutional variables we employ the Index of Economic Freedom and the Index of Property Rights, both provided by the Heritage Foundation. The first indicator (*EC_FREEDOM*) is an average of twelve quantitative and qualitative factors representing pillars of economic freedom, which can be grouped in four broad categories (rule of law, government size, regulatory efficiency, open markets) and are graded on a scale from 0 to 100, with higher values meaning higher economic freedom. The second indicator (*PROPERTY*) measures the degree to which laws in each country protect private property rights and the degree to which its government enforces those laws. It also ranges between 0 and 100, with higher values signalling a more effective legal protection of property.

Regarding the characteristics of banking regulation, we build three indices that have been widely used in the recent economic literature (e.g.: Barth et al., 2004; Beck et al., 2006; Gonzalez, 2009), for which we collected the needed information from the World

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[13] We are grateful to an anonymous reviewer for suggesting these further checks.

Bank database based on various editions of the Bank Regulation and Supervision Survey (Anginer et al., 2019). We test the role of the presence and the generosity of explicit deposit insurance in a country by adding a dummy variable (*INSURANCE*) taking a value of 1 if there is explicit deposit insurance and 0 otherwise. We assess the intensity of countries' official supervision of banks (*OFFICIAL*) through an index built by adding a value of 1 for each affirmative answer to fourteen questions that aim to gauge the power of supervisors to undertake prompt corrective action, to restructure and reorganize troubled banks, and to declare a deeply troubled bank insolvent (Gonzalez, 2009, p. 742). This variable can theoretically range between 0 to 14, with higher value indicating more official supervisory power. Finally, we try to evaluate the extent to which banks in each country are allowed to take part in activities that generate noninterest income (*RESTRICT*), particularly in the securities, insurance, and real estate markets, and in the ownership and control of nonfinancial firms. Each activity can be unrestricted (value of 1), permitted (2), restricted (3), or prohibited (4), so that this index can range from 4 to 16, where higher values denote more restrictions.

Since some of these factors may be positively correlated, we first add them separately in our baseline regression in order to check whether they exert any influence on banks' market power (for sake of brevity we consider only the unrestricted Lerner index, but the evidence does not change when employing its restricted version), before including all of them in a final empirical model.

In Table 8 we provide the empirical results of the above estimations.[14] We first note that adding the institutional and regulatory variables does not change the sign and significance of the other coefficients, thus confirming the robustness of our previous evidence. Looking at the last regression (including all the above variables), we notice that, as expected, a good degree of economic freedom (*EC_FREEDOM*) and a sound protection of the rights of economic agents (*PROPERTY*), by allowing a more efficient functioning of markets and promoting a competitive background, are able to reduce banks' market power.

While *INSURANCE* seems not to have any significant impact on banks' market power, more stringent official supervision (*OFFICIAL*) reduces banks' market power, which means that a more pervasive presence of the supervisory authorities, by strictly disciplining behaviour, reduces banks' leeway and hence their exploitation of market power. For a similar reason, the positive sign of *RESTRICT* indicates that more restrictions on banking activities imply more competition. However, the signs of both *EC_FREEDOM* and *RESTRICT* reverse in the unpooled regressions.

Finally, in Table 9 we also check the robustness[15] of our results when we differentiate foreign ownership by origin, i.e. banks originating from developed countries banking systems and those coming from the MENA region, most of which are Arab banks. Foreign dummy is disaggregated into two dummies variables, *FOREIGN_DEV* (equal to one if bank's parent belongs to developed countries) and *FOREIGN_ARAB* (equal to one when bank's parent is coming from the MENA region[16]).

First, we find confirmation of our former evidence since the sign and significance of the regressors do not change (the results on the unrestricted Lerner index for *FOREIGN* in Tables 4 and 5 can be compared to those provided in Table 9). Second, we note that the *FOREIGN_DEV* dummy is negative and significant, while the *FOREIGN_ARAB* dummy is positive and significantly different from zero particularly in non-GCC countries. This means that, all else equal, foreign Arab banks are able to exploit more market power than those from other countries. We ascribe this evidence to the fact that the former group is likely to know the various domestic markets more deeply because of homogeneity of culture and society, and this factor surely represents an advantage in doing business.

This result is in line with the one found by Yildirim et al. (2021), who differentiate foreign ownership into two subgroups, i.e. banks coming from developed countries and banks coming from emerging countries. By considering the Asian banking market, these authors do not find a significant effect of market power (measured by the global Lerner index) for banks originating from advanced countries banking systems. However, they find that a higher presence of foreign banks coming from emerging countries has a positive effect on market power. Furthermore, Chaffai (2021) compares the total factor productivity in North African banking systems. He finds that foreign banks coming from developed countries are not a driver of managerial or technology transfer compared to their counterparts coming from the region. He explains this result by the fact that foreign banks from developed countries follow their customers who need to be better served and have, at the same time, high switching costs, supporting the "follow the customers assumption".[17] He also notices that French banks, which are a major player in the MENA region, have reduced their presence in Egypt in 2012 and more recently in Tunisia.

7. Conclusions and policy implications

In recent years, MENA region has undergone important reforms with the aim of fostering economic growth and achieving a higher

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[14] The total number of observations is less than 2509, due to missing institutional and banking regulation variables for some countries and years.

[15] We have performed another robustness check, particularly the estimation of a bank-level H-statistic (Panzar and Rosse, 1987) as suggested by Brissimis and Delis (2011). In line with their methodology, we have first estimated a country-level H-statistic (based on a reduced form revenue model), then we have employed a non-parametric type estimator in order to get specific H-statistics by bank, which have been finally used as the dependent variable in place of the Lerner index in our baseline model (still estimated by means of a dynamic panel GMM system). The empirical results are in line with our previous evidence, proving their robustness to this new competition indicator. All details and tables are available from the authors upon request.

[16] Notice that most of foreign banks coming from developed countries and operating in MENA are French banks, which are mainly active in North Africa (Chaffai, 2021). By contrast, in the GCCs most of foreign banks coming from developed countries are in the form of bank branches (Al-Hassan et al., 2010).

[17] According to this assumption, foreign banks follow their customers from home countries in order to provide them complex and specific banking services in the host countries. The flow of information they have on both the environment and customers enables them to reduce their marginal costs, which translates into a competitive advantage.

Table 8
The determinants of the unrestricted Lerner index (with institutional and regulation additional controls).

Variables	−(1)	−(2)	−(3)	−(4)	−(5)	−(6)
$LERNER_{t-1}$	0.8165***	0.7828***	0.7413***	0.7471***	0.7482***	0.748***
	0.0049	0.0054	0.0041	0.0029	0.0044	0.00548
SC	0.0149***	0.0485***	0.0496***	0.0520***	0.0585***	0.0503***
	0.0046	0.0049	0.0027	0.0035	0.0025	0.00475
COSTEFF	0.0419***	0.1225***	0.1312***	0.1043***	0.1557***	0.0443***
	0.0087	0.0073	0.0066	0.0073	0.0071	0.00843
DIV	−0.0863***	−0.0726***	−0.1034***	−0.1177***	−0.1006***	−0.128***
	0.0041	0.0038	0.0023	0.0022	0.0021	0.00424
DEPR	−0.0512***	−0.0166***	−0.0341***	−0.0349***	−0.0457***	−0.0725***
	0.0053	0.0053	0.0033	0.0047	0.0036	0.00455
SIZE	−0.6102***	−0.7728***	−0.9587***	−1.0855***	−1.0106***	−1.067***
	0.0267	0.0299	0.0309	0.0272	0.0229	0.0571
CR3	0.0337***	0.0573***	0.0294***	0.0231***	0.0660***	−0.0390***
	0.0069	0.0064	0.0071	0.0048	0.008	0.0109
Macro-variables						
MKTCAP	−0.0189***	−0.0222***	−0.0126***	−0.0206***	−0.0195***	−0.0154***
	0.001	0.0012	0.0009	0.0012	0.0012	0.00136
INFL	−0.0388***	−0.0876***	0.0250***	−0.0249***	0.0174***	0.0453***
	0.0063	0.0066	0.0053	0.005	0.004	0.00812
GDPGR	−0.0748***	−0.0442***	−0.0139**	−0.0043	−0.0180***	0.0125
	0.0069	0.0091	0.0061	0.0085	0.0066	0.00976
Bank Type						
FOREIGN	0.7131***	0.7195***	0.8457***	0.6941***	0.8106***	0.732***
	0.0688	0.0932	0.0928	0.0767	0.085	0.103
ISLAMIC	−0.8129***	−0.9427***	−0.7182***	−1.2205***	−1.0152***	−1.076***
	0.1147	0.1341	0.1807	0.0947	0.1108	0.18
Reg&Inst						
EC_FREEDOM	0.0350***					−0.0776***
	0.0081					0.00699
PROPERTY		−0.0595***				−0.0616***
		0.0044				0.00473
INSURANCE			0.6719***			−0.212
			0.2348			0.224
OFFICIAL				−0.5354***		−0.370***
				0.0294		0.0441
RESTRICT					0.6299***	−0.156***
					0.037	0.0393
Constant	16.4779***	9.2972***	15.8908***	27.7138***	5.7621***	48.63***
	1.1872	1.0506	1.1712	1.1621	1.2984	2.789
# Observations	2371	2458	1743	1801	1801	1684
# Banks	193	194	178	185	185	168
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Ar(1)_pvalue	0	0	0	0	0	0
Ar(2)_pvalue	0.291	0.503	0.516	0.578	0.522	0.961
Hansen_pvalue	0.24	0.249	0.643	0.42	0.496	0.751

COSTEFF, SC and *DIV* are considered as endogenous in the GMM-system estimation. Standard errors in parentheses.
Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

degree of well-being. Such reforms have also concerned the local banking sectors, which normally represent a crucial channel through which fuelling the economy. Under this respect, a matter of debate in the relevant literature is the role of competition among banks, particularly the extent to which it can promote or hinder their role of loan providers to firms and households. Actually, if stronger competition might imply higher risks for banks, thus reducing the overall stability of the sector, it is believed that less competitive markets generate welfare losses and worse conditions for customers, causing economic activity to contract.

In this paper we have tried to gauge the degree of market power – hence the overall level of competition – that has characterized the banking sector of 13 MENA countries in the years 2000 to 2018, as well as to identify the relevant factors affecting it, with a specific focus on customers' switching costs and banks' cost efficiency.

Unlike the majority of similar previous studies, which calculate industry-level indicators of competitiveness (e.g., concentration indices, *H*-statistic, Boone indicator), our contribution represents the first empirical attempt to estimate bank-level Lerner indices for the MENA region that explain market power on the specific business segment of loans (representing the most important source of revenue for banks), rather than computing aggregate Lerner indices (i.e., which assume that all banking activities are aggregated into a single indicator, normally total assets). At the same time, we try to account for endogeneity (through a system-GMM estimation) and simultaneity (through a four-equation model estimated by means of a three-stage least square approach).

Table 9
The determinants of the unrestricted Lerner index (with controls on foreign banks' origin).

Variables	All countries	GCC	Non_GCC
LERNER$_{t-1}$	0.7349***	0.6433***	0.6293***
	0.0063	0.0197	0.0111
SC	0.1081***	0.3402***	0.2567***
	0.0055	0.0375	0.0148
COSTEFF	0.2037***	0.4542***	0.5153***
	0.0101	0.0367	0.0154
DIV	−0.0701***	−0.0878***	−0.1373***
	0.0034	0.0106	0.0091
DEPR	0.0654***	−0.0793***	0.1111***
	0.0067	0.0272	0.0164
SIZE	−0.5419***	−0.2724*	−0.9105***
	0.039	0.1398	0.1227
CR3	0.0702***	0.0812*	−0.0262**
	0.0071	0.0436	0.0108
Macro-variables			
MKTCAP	−0.0146***	−0.0241***	−0.0169***
	0.0017	0.0054	0.002
INFL	−0.0170*	−0.2840***	0.0559***
	0.0094	0.035	0.014
GDPGR	−0.0204	0.0128	0.0605**
	0.0125	0.0264	0.027
Bank Type			
FOREIGN_DEV	−0.3164	−8.1334	−7.5615***
	0.3809	13.9405	2.091
FOREIGN_ARAB	0.8976***	4.9067	4.6262***
	0.216	4.321	1.131
ISLAMIC	−1.5400***	−3.0793**	−3.3211***
	0.2198	1.2089	0.998
Constant	−6.8442***	−15.7981***	−18.9567***
	1.4182	4.7979	2.9208
# Observations	2509	1005	1504
# Banks	199	78	121
Country dummies	Yes	Yes	Yes
Ar(1)_pvalue	0	0	0
Ar(2)_pvalue	0.745	0.356	0.525
Hansen_pvalue	0.23	0.957	0.169

COSTEFF, SC and DIV are considered as endogenous in the GMM-system estimation. Standard errors in parentheses.
Significance levels: *** = 0.01, ** = 0.05, * = 0.10.

Our results clearly show that MENA banks enjoy a substantial degree of market power on the loan market, as the average mark-up of the price of loans on marginal cost is about 43% of the former, while bank customers have to face remarkable costs in case they choose for switching to other lending suppliers, on average amounting to over 10% of their current loans (and with notable differences among countries). Under this respect, it comes out a significant positive association between switching costs and Lerner indices, meaning that banks can fix higher loan rates when their customers are locked into their current banking relationships.

Banks' market power appears to be higher also when credit institutions are more cost efficient, focus especially on the traditional intermediation activity, are smaller in size, and operate in countries where stock markets are less developed, banking markets are more concentrated, the inflation rate is lower, and GDP growth is poor. The above evidence is robust to alternative specifications and estimation techniques.

Our results have important policy implications. If competition in banking markets is regarded as beneficial for the overall economic performance, it is crucial to favour a reduction of switching costs imposed by banks on customers, without locking them in through imposing significant explicit costs or tightening relational ties. Under this respect, switching costs may represent a yardstick for regulators in their mission of disciplining bank behaviour and limiting their market power, which guarantees important rents. Lower switching costs can result from making information more effortless for customers who desire to switch (with respect to loan redemption conditions, loans redemption costs, takeover prices and conditions of competitors, etc.) or reducing the 'bureaucratic' barriers to the switching from one bank to another (for example, enabling the account number portability).

Of course, other important factors facilitating competition are the encouraging of new entries, so any substantial barrier should be eliminated, and a strong deregulation, as well as the support to every action that increases bank efficiency, whose fruits may then be passed on to customers in the form of lower prices and better service conditions.

Data availability

Anonymous data for sample banks are provided in Appendix A.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ememar.2023.101004.

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