

Competition, regulation and banking industry pricing conduct in Malawi

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Abstract

This study investigates the nature of competitiveness among banks in Malawi where the industry is concentrated and the institutional base is weak. The study uses a model incorporating bank-specific, industry-specific and macroeconomic determinants of conduct and performance, based on monthly data from January 2005 to March 2014. Key findings are asymmetric conduct with collusive price leadership in lending rates and competitiveness in deposit rates and overall high spreads. Apart from dominance, collusive price leadership was facilitated by regulatory stipulations in pricing in banks' core and non-core business and an economic environment resulting in banks' high profitability and diminished competitive pressure in lending rates. Further, monopolistic competition via outreach also put upward pressure on spreads most likely via costs as the literature suggests.

Keywords: Collusive Pricing; Banks' Risk Position; Banking Industry; Conduct and Performance; Malawi.

1. Introduction

Imperfectly competitive markets invoke general fears of restricted output and monopolistic pricing which are detrimental to consumer welfare, and are associated with potential X-inefficiency and resource misallocation. For the financial services sector, as the life-blood of economic activity, excessive monopoly power would be bad especially for the economy and welfare. In order to grow and diversify their economies, underdeveloped countries need to improve financial intermediation through lower spreads that encourage savings mobilization and facilitate investment through reasonably high savings deposit rates and affordable borrowing rates (Beck & Hesse, 2006; Gockel & Mensah, 2006; Njenga & Sichel, 2012; Were & Wambua, 2013). In developed economies, collusive oligopolistic conduct tends to be addressed by strong institutions which may not be there or as strong in less developed economies (Amidu & Wilson, 2014).

This study investigates pricing conduct in the banking industry of Malawi, which is among the world's least developed economies and where the country and industry backgrounds point to an inclination of collusive behavior on the lending rates while new bank entry suggests competitiveness on deposits rates. Previous studies have identified inflation, product diversification, and bank ownership as some of the factors that affect bank profitability (Al-Hashimi, 2007; Chirwa & Mlachila, 2004; Flamini *et al.*, 2009; Folawewo & Tennant, 2008; Francis, 2013; Kanyoma, 2006). The few studies that have looked at the effect of institutions have found mixed results (Amidu & Wilson, 2014).

The theory of imperfectly competitive markets suggests that market performance can be influenced by supply and demand conditions which can influence entry and exits. The demand side, in relation to overall revenue or pricing, can be influenced by firm conduct through non-price or monopolistic competition in areas such as product differentiation and diversification which are important for financial inclusion in developing countries and can have a significant impact on banks' performance and of the economy as a whole. In the empirical literature on bank competitiveness reviewed below a number of things stand out. Firstly, most of the studies are focused on developed or emerging economies or regions where the industries had long consolidated and the issues of entry and exit are irrelevant. In contrast, the sub-Saharan African region has been subjected to recent entry-exit dynamics and exposure to new

and changing international standards. Secondly, the profile of monopolistic competition has been low, partly due to consolidated customer bases. Thirdly, many of the applications are based on cross-country panels where the operating environments are heterogeneous economically and institutionally. Fourthly, the measure of performance in most cases is profitability as an aggregate over core and non-core business.

This study contributes to a dearth of relevant empirical studies in sub-Saharan Africa even as the region is becoming increasingly important on the world stage (Tunyi & Ntim, 2016). Secondly, the country-based studies, like Chirwa and Mlachila (2004) and Beck and Hesse (2006), provide deeper and better insights about how shared institutional and operational environments can influence banks' pricing conduct. This and data possibilities also allow for better informed model specification. The study specifically offers insights into monopolistic competition and the relevance of favorably intervened non-core bank business on pricing in core business. Thirdly, the study explicitly recognizes that banks approach pricing in their core business from two different perspectives, deposits as a cost and lending rates as a revenue source which respond differently to market and non-market stimuli like opportunities provided by monetary policy, and money markets in non-core business and risk factors.

The findings, based on trend and econometric analyses, point to a weak and disarticulated institutional framework which together with the economic environment have been complicit in facilitating size/dominance collusive price-leadership, making banks very profitable and weakening the compulsion for competitiveness. The central bank pricing interventions have been directly in banks' favour in core and non-core areas. Structurally, the results indicate that though high profitability has attracted and sustained new entrants into the industry, non-price (non-cooperative) monopolistic competition would keep the new small, resulting in a market structure that has been changing only slowly with perpetuated dominance by a duopoly.

The rest of the paper is organized as follows; Section 1.1 outlines the background of the issues in Malawi; Section 2 gives the research objectives and key issues; Section 3 reviews the literature; Section 4 looks at the methodology; Section 5 contains results and the discussion, and; Section 6 concludes.

1.1. Banking in Malawi and bank pricing conduct: a preview

1.1.1 The economy

The Malawi economy is dominated by uni-modal rain-fed agriculture which accounts for 30% of GDP, 90% of exports, and engages nearly 90% of the labour-force. All these have culminated in an incidence of poverty of nearly 50% and makes food account for 51% of the Consumer Price Index (CPI). Only 19% of the adult population is banked. The wider economic implications are an urgent need to finance economic diversification and structural transformation in the face of fiscal pressure to supply basic needs, and a heavy dependence on aid flows to support the budget as well as a source of foreign reserves. In the absence of a development banking segment the commercial banking sector has been fulfilling a number of important roles. Apart from being the main supplier of credit to the private sector, it interfaces with the instruments of monetary policy in moderating the inflation and foreign exchange rate and has been a major subscriber of credit to government in order to bridge fiscal deficits.

1.1.2 Monetary and exchange rate policies and consequences

On its part, the central bank of Malawi has relied heavily on the bank rate as a key instrument of monetary policy. In an economic environment where the production of food has been precarious, inflation rates, and consequently the bank rate, have been in double digits for decades, with the exception of a short period. The foreign exchange rate regime had also been mismanaged moving from a flexible and market-determined rate to a virtually fixed one (2005-2012) culminating in the liquidity crisis in the wake of the May 2012 devaluation and float. The fixed exchange rate regime had been accompanied by other regressions in the market including the de-licensing of independent foreign exchange bureaux between 2008 and 2012.

The currency overvaluation during the fixed exchange rate regime and the subsequent withdrawal of IMF support in 2011 resulted in a worsening of foreign reserve shortages with banks having idle local currency which they channeled into longer-tenor treasury bills and other lending instruments. The devaluation in 2012 caught the banks short of liquidity when the foreign reserves became accessible but at the devalued foreign exchange rate and this fueled a bank liquidity crisis. Though brief, this experience for banks and the central bank, re-emphasised the liquidity and credit risk factors especially when banks have to respond to an already high but rising bank rate which also raises default rates.

The scarcity and importance of foreign reserves in Malawi has meant that related transactions contribute as much as 25% of banks' income (World Bank & IMF, 2008). A curious provision in the foreign exchange trading guideline imposed a maximum buying margin which the banks' Financial Services Dealers' Association embraced for uniform trading rates. The barring of independent dealers and the rents to banks from the pricing intervention¹ contributed disproportionately to banks' overall profitability with average returns on assets as high as 5.33% between 2005 and 2015 compared to global average of 1.5% (Government of Malawi, 2009).

1.1.3 Banking industry structure and pricing conduct

Since the dawn of financial liberalization in Malawi in 1987, liberalised entry raised the number of licensed banks from 2 to 11 by 2008². Although the Hirschman-Herfindhal Index (HHI) of concentration fell from 0.301 to 0.222 for deposits, and from 0.286 to 0.193 for loans between 2001 and 2013, this is still higher than the rule-of-thumb upper limit for moderate concentration which is 0.1800 (World Bank & IMF, 2008). Moreover, the oldest and largest two banks have maintained a heavy dominance in total deposits and loans accounting respectively for 56% and 48% in 2013. Although such market concentration and common membership to associations could foster collusive behavior in the lending and deposit business, this orientation has been facilitated by yet another institutional curiosity. Before 2012, only the two largest banks were required to report their maximum lending rates (MLR) and either could take the lead and the rest follow. The central bank expected the other banks to base their own MLR on an average (Ngwira, 2014). Between 2006 and 2011 the MLRs for the two largest banks were exactly the same and this was used by the rest; that is, there was collusive price leadership and followership was easier, quicker and less costly. The MLR was 32.3% in 2006, fell to 27.9% in 2007 and flattened out at 27.0% thereafter.

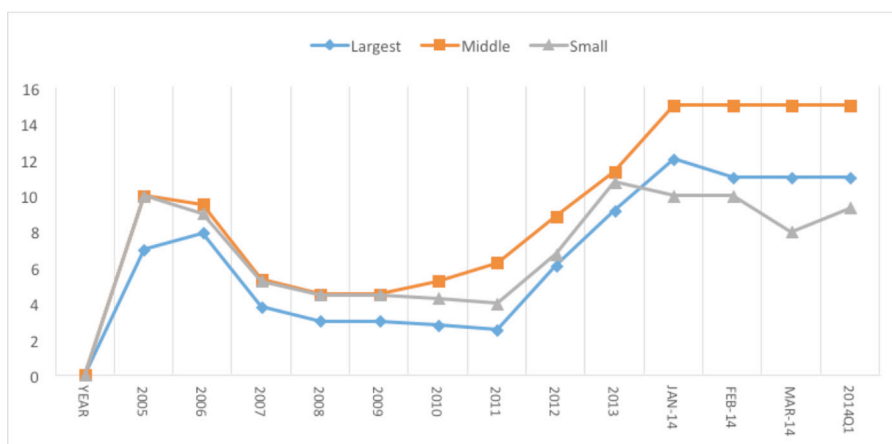
The ratcheting of standards to compliance with the Basel II level, required stipulating stricter risk management as well as greater transparency in terms

¹ The FX Trading Guideline Article 4.3.

² Four were registered before 2000 (National Bank, Standard Bank, FMB). Three more were registered by 2005, Ned Bank (2001), New Building Society Bank and Opportunity International Bank of Malawi (2003) and Malawi Savings Bank (2004) followed by First Discount House (2007) then EcoBank and Leasing and Finance Company (2008).

of products and their pricing. From January 2012, all banks had to report their own MLRs resulting in a fall-out in the MLRs not just between the leading duo but among the rest with lagged or no reaction to monetary policy stimuli (Kaluwa, 2016). Conduct on the deposits side has been asymmetrical because of obvious and intensifying competitive pressure from new entry and market share considerations (see Figure 1). As avenues of collusion in lending have been closing, competition on the deposit side has manifested itself in new products such as savings bonds and special savings accounts and in some cases interest on current account balances.

FIGURE 1: SAVINGS DEPOSIT RATES: COMPETITIVE SMALLER BANKS BUT MIDDLE BANK DOMINANCE

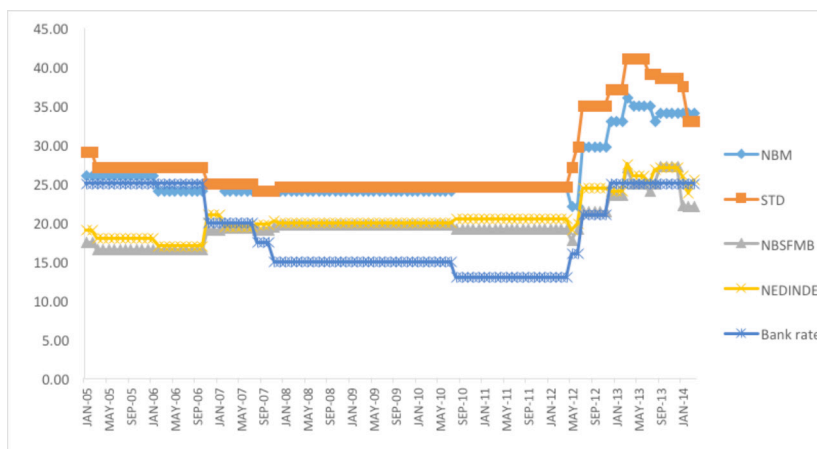


Source: Calculated from Reserve Bank of Malawi Statistics

Notes: Largest dominated by NBM (2005-Jan2014), Middle by FMB (throughout), Small by INDE (2008+). NBM=National Bank of Malawi; STD=Standard Bank; NBS=New Building Society; FMB=First Merchant Bank INDE= IndeBank; NED=NedBank. NBM and STD had shares in deposit of 26% and 25% respectively in 2012. NBS and FMB are middle-ranking with respectively 14% and 10%, and NED and INDE among the smallest, with 2% and 4% respectively.

At the back of collusive MLR, Figure 2 indicates that spreads in Malawi have been high (20+) and influenced by both the bank rate and market power, the latter as reflected in banks' market shares dominated by the two largest.

FIGURE 2: SPREADS AND BANK RATE DUALITY, HIGHEST FOR THE LARGEST, LOWER FOR MIDDLE AND SMALL

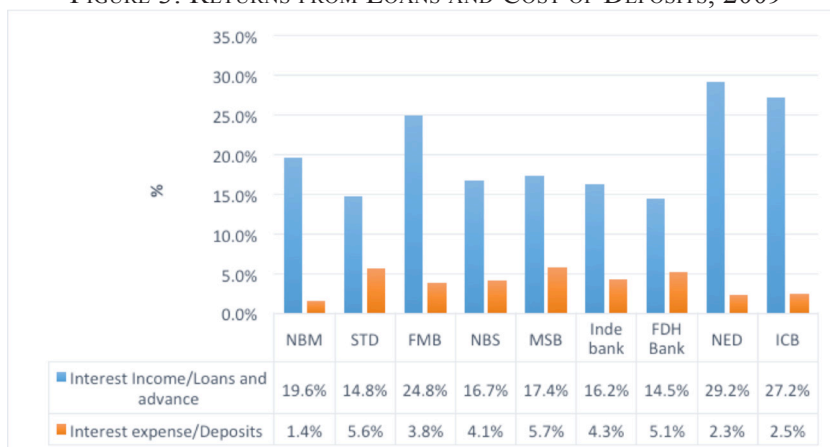


Source: Reserve Bank of Malawi

Notes: NBS/FMB and NED/INDE averages for (NBS and FMB) and (NED and INDE)

Banks are more competitive in lending; the lower the Interest Income/Loans and advances ratio while in deposits, the higher the Interest Expense/Deposits ratio. From Figure 3, the largest banks were as competitive in lending as their followers - some middle ranked banks- and definitely more so than smaller ones like NED and International Commercial Bank (ICB). For deposits one of the two largest was among the most competitive while the other among the least. From the banks' private profitability perspective, the smallest and follower banks could outperform the larger ones and so followership was not necessarily a disadvantaged position. This is another perspective of asymmetric conduct.

FIGURE 3: RETURNS FROM LOANS AND COST OF DEPOSITS, 2009



Source: Individual bank reports

1.1.4. Implications for further analyses and interpretation

The foregoing suggests a problematic institutional framework and economic environment in Malawi. When it came to matters relating to bank pricing conduct in core and non-core areas, the central bank has had no inclination to intervene, except indirectly and lately through the pricing transparency requirements of the Basel standards. Worse than this, the central bank has in fact been complicit to pricing collusion by the following actions: facilitating price leadership-followership through the selective requirement that only the largest two banks reported maximum lending rates; guidelines supporting a maximum buying rate for foreign exchange while also excluding a competitive fringe of players. The economic environment on the other hand has also been characterized by high inflation rates as a risk factor that justifies high spreads and high Treasury Bill yields from high government fiscal deficits. The late presence of the Competition and Fair Trade Commission (CFTC) allowed associations serving the interests of banks³ to take advantage of the institutional lapses. These favourable conditions became banks' "comfort zones" and can be held responsible for the banks' lack of competitiveness in lending rates as well as lending conservatism towards the private sector. These need to be taken into consideration in further analyses and interpretations.

2. Research objectives and hypotheses

This study seeks to investigate the drivers or roadblocks to bank competitiveness in Malawi in a context of high industry concentration and a weak institutional framework and economic environment. On a general level a key issue to investigate would be whether and how the assumption of collusive pricing can be statistically established and economically explained in terms of the structure of the banking industry, bank-specific characteristics, institutional/regulatory and other influences in banks' core and non-core business. Non-price competition, which can be observed at the bank level, can be beneficial for consumers and to firms whose aim would be to enhance monopoly power over pricing. For developing countries the benefits can include outreach.

3. Literature Review

3.1. Theory

The theory of market competitiveness had its major turning point in the development by Mason (1949) and Bain (1959) of the Structure-Conduct-Performance (SCP)

³ Bankers Association of Malawi and Dealers Association of Malawi.

framework, which provided a back and forth interface and interactions with subsequent applications. The SCP has four bi-directionally linked market blocs comprising the “basic conditions” of supply and demand, market “structure”, “conduct”, and “performance”. These market blocs are affected by another bloc, “government policy” which can be influenced by firm or market conduct through, for example, lobbying. Within the SCP, the concentration-profitability hypothesis which became quite influential was premised on Stigler’s (1964) expectation that oligopolistic markets with fewer firms will have an incentive to seek and succeed in attaining the most profitable pricing outcomes through collusion, express or tacit (Hannan, 1991b; Stigler, 1964).

The major critiques of the SCP and its central hypothesis can be linked to the contextual and the conceptual bases, which in more recent developments have also become inter-linked. The so-called Chicago Revisionist School (CRS) (Demsetz, 1973), contended that high profitability can result from efficiency and firms will tend to become larger on account of it and this is reflected in a positive association between concentration and profitability. The other issue concerned the role of market contestability, where it can be argued that in markets that are competitive, firms will respond to the prospects of entry (and exit).

In the more recent developments, new empirical industrial organization (NEIO) efficiency and contestability are addressed by focusing on the definition of competitive conduct and how it should be measured to reflect all market conditions. The measure of performance is based on the basic (demand and supply) conditions of the SCP to whose changes firms are supposed to respond. Firms in perfectly competitive markets will consider in their conjectures not only present but prospective competition and will therefore be more restricted in their mark-ups than those in imperfectly competitive ones. The empirical exercise could therefore involve just measuring market competitiveness. The Panzar and Rosse index is one such indicator which is based solely on inferring competitiveness out of estimated demand and supply equations. The indicator, the H-statistic, is defined as the sum of elasticities of total revenue to changes in each factor input’s price. Alternatively, these performance indicators could be related to other factors in the SCP. One application is through the Boone indicator in which efficiency is gauged through marginal cost and performance by market share and where the indicator shows better performance from greater efficiency (Boone, 2008; Panzar & Rosse, 1987).

The SCP, as an informal but quite comprehensive general framework, makes it flexible and amenable to new perspectives and accommodates some

seemingly theoretical upheavals. Under elements for structure and conduct it already provides for efficiency and also for contestability through barriers to entry. Importantly, it also takes account of institutional considerations in the “government policy” bloc which includes: regulation, incentives, and macroeconomic policies. But as originally conceived, there appears to be problems of omission or at least lack of emphasis. Underplayed issues in the SCP include the role of firms’ associations for possibly facilitating collusion, the role of the international environment, and the fact that efficiency is not always a determinant of size.

The link between market concentration and monopoly power is usually treated in probabilistic terms and in the theory this is not always potentially negative for the economy because of important differences between two aspects of conduct. Oligopolistic competition is the one associated with the possibility of monopoly power over pricing while monopolistic competition can be associated with potentially cost-raising conduct but which can confer benefits to consumers from diversified and differentiated products and better outreach and access. This is an aspect that is typically missed out or underplayed in applications. The Dorfmann-Steiner conditions explicitly recognizes the link between what may be called pricing in core business and optimizing behavior in other activities, which can be product differentiation or other activity. This is elaborated in the methodology.

3.2. Review of empirical literature

Adaptations and applications of economic models to the banking industry, have required taking into consideration the fact that generally banking is subject to high profile regulation and subject to heterogeneity (Hannan, 1991a). Bank profitability, however measured, has been much higher in Sub-Sahara Africa than other regions of the world for more than a decade (KPMG, 2012; Unctad, 2009). Recent empirical studies suggest that market power in the banking industry can facilitate the tolerance of higher risk and bank inefficiency, for example, as inherent in Sub-Saharan African countries (SSA) (Flamini *et al.*, 2009).

Studies for the region have indicated that apart from credit risk, higher returns on assets are associated with larger bank size, activity diversification and private ownership. Furthermore, macroeconomic policies that promote low inflation and stable output growth have boosted credit expansion (Flamini *et al.*, 2009) and affected profitability (Folawewo & Tennant, 2008; Francis, 2013; Gelos, 2009). On the other hand, variations in interest rate margins in 10 SSA countries reflected

operating inefficiencies (Al-Hashimi, 2007). In contrast to studies which find that macroeconomic risk has a significant effect on net interest margins (Al-Hashimi, 2007), limited effects were found by Chirwa & Mlachila (2004). The Greek experience (1985-2001), has been that the profitability of banks is shaped by bank-specific factors, as well as macroeconomic control variables which are not under the direct control of bank management, but the structure of the industry did not significantly affect profitability (Athanasoglou, Delis, & Staikouras, 2006). The study by Berger *et al* (2005) shows a positive relationship between foreign ownership and profitability while that for Uganda does not (Beck & Hesse, 2006). In Africa, high and sustained profitability could be an incentive for entry by foreigners who would be less deterred by the finance capital barrier.

The empirical literature suggests that risk management variables, associated with the new standards such as credit quality, core capital, non-interest bearing reserves and management quality, enhanced profitability in the USA (Angbazo, 1997) and in Greece (Athanasoglou *et al.*, 2006), while related regulation enhanced profitability in the EU and USA (Saunders & Schumacher, 2000). The persistence of high profitability of Sub-Saharan African banks has been attributed to risk associated with poor institutions for protecting creditor rights or risk associated with the economic environments including the political climate and the business cycle (including inflation) which among other problems raises the probability of loan defaults (Flamini *et al.*, 2009).

Beyond this higher risk- higher returns expectation, the market structure/market power explanation also has credibility in the sense of high barriers to entry accounting for high levels of concentration which facilitate and sustain high levels of profitability. Concentration can itself be facilitated by a combination of the barriers to entry from a perceived risky environment for bank operations. From their perspective, banks could argue that they need high profitability to remain safer or to re-invest, which can lead to and sustain more and better services (Bikker & Hu, 2002; Flamini *et al.*, 2009; Heggestad, 1977).

Table 1 presents a selective and stylised synopsis of the empirical literature on bank profitability in different regional and country contexts including environments likely to have stronger or weaker institutional bases against collusive behavior. The table is organized more around model configuration than on specific variables which is revisited under model specification. For convenience, we distinguish between Risk I - risk more closely related to bank operations - and solvency - the levels more closely associated with the quality

of bank management. Risk II is systemic risk related to industry-related policy, regulation and macroeconomic conditions. Noteworthy is that bank risks are related and they overlap. For example Risk I may be affected by elements of risk-reducing regulation such as statutory reserve requirements but which could also be discretionary and incorporated in bank-specific traits. In the table, Risk II can be disaggregated to accommodate differences in variables as used in the empirical studies.

TABLE 1: STYLISTED SELECTED EMPIRICAL STUDIES AND RESULTS ON DETERMINANTS OF BANK PROFITABILITY

First author	Year*	Region	Analysis	Dep var	Determinants of bank profitability			Foreign ownership	Notes
		App	Level		Risk I	Mkt power	Risk II		
Demir-guc-Kunt	1999	mixed	Bank	NIM/Return	n	y	y	y(LDCs)	Y(LDCs)
Gelos	2006	LA	Bank/country	NIM	y(inefficiency)	y(inefficiency)	y		RiskII**
Al-Haschimi	2007	SSA	NIM	NIM	y(inefficiency)	y(inefficiency)	n		High op costs
Anbazo	1997	USA	Bank	NIM	y		y		RiskI
Suanders	2000	EU & US		NIM			y		RiskII**
Athana-soglou	2006a	SE-Europe	Bank/country	Returns	y	y	n		
Athana-soglou	2006b	Greece	Bank	Returns	n	y	n		
Flamini	2009	SSA	Bank/country	Returns	y	y	y	Pvt(+)	Risk I & II**
Kanyoma	2006	Malawi	Bank/macro	Returns		y		(Pvtn(-))	
Chirwa	2004	Malawi	Bank/Macro	NIM		y	y		RiskII**

Notes: * = date of publication, Nim = Net interest margin, y = Yes, n = No, Risk I = Credit, Core capital, Non-interest bearing reserves, Management Risk II** = Macroeconomic volatility, Regulation including high reserve regulation Risk II*** = Inflation, Regulation = Reserve requirement, Central bank discount rate LDCs = Less Developed Countries

Some earlier studies have accommodated to varying degrees the industry regulatory and monetary policy regimes as well as macroeconomic environments represented by Risk II factors. These include Chirwa and Mlachila (2004) for Malawi; Saunders and Schumacher (2000) for the EU and USA; Gelos (2006) for Latin America; and Flamini *et al.* (2009) for Sub-Saharan Africa (see notes to Table 1 above). They mostly do not go far enough to account for some intervention environments that have not been uncommon in SSA.

The body of empirical results suggests that apart from the applications to the USA and EU/USA (excluding South-Eastern Europe and Greece), market power as measured by market share or size has been an important determinant of bank profitability along with Risk II factors. Outside these regions and in mixed cases market power definitely influences profitability. These results are what would be expected considering that market concentration would likely be lower in Europe and the USA compared to other regions. The interesting result is that in the less developed regions market power is interpreted as actually being motivated by inefficiency, only that the market power then allows the costs to be passed on to consumers (Al-Hashimi, 2007; Gelos, 2009). This appears to be the view recently expressed for Malawi banking (World Bank & IMF, 2008). On the other hand, in the South-Eastern European studies, profitability is actually positively associated with operational efficiency (Athanasoglou *et al.*, 2008; Athanasoglou *et al.*, 2006) which is consistent with Berger (1995). Flamini *et al.* (2009) interpret their result on the size variable for profitability of SSA banks in terms of the positive effect of economies of scale or market power hypothesis, but their result also does not discount non-linearity as a result of inefficiencies.

The results in Table 1 are not inconsistent with the emphasis that has been placed on bank risk and the importance of solvency as an operational consideration or as a regulated requirement (Allen & Saunders, 2004). In fact, the Flamini *et al.* (2009) analysis suggests that there is no reason to believe that higher bank profits would automatically be retained to bolster the capital base and reduce solvency risk, implying that capital adequacy needs to be regulated. The African experience suggests an environment that is evolving and susceptible to international pressure for changed institutions and governance. In a recent paper that uses a panel involving 330 banks in Africa over the period 2002 to 2007, Amidu & Wilson (2014) distinguish periods of increased competitiveness as being influenced by globalization and institutional quality.

4. Methodology

4.1. Research design

The research started as a collaborative effort between the Department of Economics, Chancellor College, University of Malawi, and the Reserve Bank of Malawi (RBM) (Malawi's central bank). It was based on secondary source information including high-frequency monthly panel data, specifically defined and requested from the RBM. Additional data and information were obtained from individual banks. The research was in two stages. The first stage involved preliminary data analysis on trends in the banking industry structure, conduct, pricing conduct and the institutional environment (much of the trends have been put as background material). The next stage involved estimation of an econometric model, the interpretation of which results is linked to the analyses from the first stage.

4.2. Model specification

Following Ho and Saunders (1981) Athanasoglou *et al.* (2005) and Flamini *et al.* (2009) we specify a bank-specific, industry-specific and macroeconomic model as:

$$\Pi_{it} = \alpha + \sum_{j=1}^j \beta_j X_{it}^j + \sum_{n=1}^n \beta_n X_{it}^n + \sum_{m=1}^m \beta_m X_{it}^m + v_{it} \quad (1)$$

Where:

Π_{it} = Alternatively the Lerner index or net interest margin (as defined below) and nominal spreads

X_{it}^j = Vector of bank-specific factors including risk, response capability and capacity

X_{it}^n = Vector of industry-specific factors such as monetary policy and regulation (bank rate, liquidity and capital adequacy), market structure and conduct including monopolistic competition

X_{it}^m = Vector of economy-wide or systemic (macroeconomic) factors such as the business cycle which in Malawi is reflected in the seasonality of agriculture output, the inflation rate and foreign exchange reserves. The Dynamic version that would have included $\gamma \Pi_{it-1}$ on the right-hand side to account for profit persistence (as compared to Flamini *et al.*, 2009) was discounted because of the use of high-frequency monthly observations.

4.2. Accounting for monopolistic competition, interventions and incentives in non-core business

The study specifically assumes that banks in Africa as elsewhere are involved in interest business as the core activity promoted by non-price decision variables such as product differentiation. They also engage in other non-core/non-interest business which in Malawi are significant sources of income. Dorfman and Steiner (1954) in what became known as the Dorfman-Steiner theorem or condition (DSC) established that profit maximising firms need to optimize in pricing and advertising by equating marginal cost of production and advertising respectively to marginal benefits. The resulting expression for the optimal advertising level can be rewritten with pricing as a core decision variable,

$$L = (P - MC)/P = (a/Pq) \cdot 1/Ea \cdot 1/Ed \quad (2)$$

where L is the Lerner index, P is price, MC is marginal cost, a is advertising budget, q quantities of core product(s), Ea and Ed are respectively elasticity of advertising and price elasticity of demand. The Lerner is inversely related to price elasticity of demand, Ed , and directly related to advertising and its elasticity. This can be extended to all other product differentiation activities in the vector \underline{x} in (3) below where the elasticity of demand for a core product related to an activity - such as outreach and product diversification - can influence monopoly power in the pricing of the core product(s).

$$L = (P - MC)/P = (\underline{x}, \underline{y})/E_d \quad (3)$$

A further extension is that the vector, \underline{y} represents opportunities in non-core areas such as foreign exchange transactions and Treasury Bills that contribute significantly to bank profitability in Malawi as discussed above. Deraniyagala and Kaluwa (2011) suggest that these have contributed to banks' lending conservatism towards the private sector. Another way to view this would be that the non-core activities in the vector \underline{y} can influence pricing attitudes or behavior directly and not necessarily through demand elasticity as the vector \underline{x} for example through reduced inclination for competitiveness in the core business. In related applications, along with other variables, non-interest bearing reserves were found to enhance profitability in the USA (Angbazo, 1997) and in Greece (Athanasoglou *et al.*, 2006). Beck and Hesse's (2006) study of the Ugandan banking industry uses an implied version of the augmented model suggested here and detailed in Table 2.

In this study two related variants of pricing conduct are used, the Lerner index, $L = (P-MC)/P = (P-AC)/P$ and Nominal Spreads, $P-AC$ with P = maximum lending rate and AC = ordinary savings deposit rate which for relevance and as argued earlier, are both non-concessional. Spreads allow for dichotomous and asymmetrical behavior from different sources of stimuli, collusion in lending rates and competitive savings deposits rates resulting from new entry and small banks. Lending rates can respond to stimuli from regulation including the bank rate, liquidity requirement and macroeconomic volatility as represented by inflation. The Lerner, is a profitability index that is related to optimization across activity in core and non-core activities as in expression (3) and this is used to augment the model given in expression (1). The two contain exactly the same elements but will respond differently to similar impulses.

4.4. Variable definitions and measurement

Table 2 presents the determinant factors and representative vector of variables that have been considered for the model in expression 1) and augmented by considerations in expression 3).

Market structure: concentration and/or dominance? The Hirschman-Herfindahl index of concentration **hhi** represents market structure and the likelihood of collusive pricing while bank size, share in deposits **depshare** represents the prospects of price-leadership/followership.

Market structure (non-price/monopolistic competition): This is represented by number of staff and branches **staff** and **branches** which have been assumed to be correlated with other orthodox but more difficult to measure product differentiation activities.

Efficiency: Some studies have suggested that the high profitability of African banks is associated with high levels of inefficiency and high operational costs. The general literature also suggests foreign ownership might influence efficiency. In Malawi two of the three largest banks are foreign-owned and one has been a contender for the dominance/price-leadership role. Two variables have been considered for efficiency and the possibility of easing pressure on margins, foreign ownership, **foreignown** and income/staff costs, **incstaffcost**.

Regulation and the macroeconomic environment: The bank rate, **br**, is used to capture the effects of its prominent use as a regulatory instrument against macroeconomic volatility represented by the inflation **inflation**.

Non-core business hypothesis in the Lerner: This is not prominent in the literature but for Malawi considerably boosts bank profitability and suspected of reducing the competitive pressure in lending rates. The non-core business variables include: orientation towards lending to government through Treasury

Bills measured relative to banks' total assets, *tbassets*; product diversification away from core-business, *prodmix*, and; the barring of independent foreign exchange bureaux activity between 2008 and 2012, *fxtrans*, measured as dummy (0 for "no bar" and 1 for "barred").

The independent and control variables are indicated in Table 2. Apart from concentration, the regulatory and macroeconomic variables (*br*, *fxtrans* and *inflation*) the rest are bank specific. Those in parentheses have a low profile in the literature. Except for monopolistic competition, the rest under "Detail I" corresponds to the literature. Notable exclusions are foreign exchange rate and the liquidity reserve ratio (lrr) because banks have used fixed margins on the rate and have carried liquidity in excess of the lrr.

TABLE 2: ESTIMATED MODEL AND VARIABLES

Factors			Variables		
Level	Detail I	Detail II	Description	Designation	Type
Bank-specific	Management	Efficiency	Income/staff cost	incstaffcost	Independent
	Standards	Ownership	Majority foreign	foreignown	Independent
			Government shares	govtshr	Control
	Credit risk	Lending	(Govt/total assets)	Tb/tassets	Independent*
	Liquidity risk	Equity	Capital adequacy	capadqcy	Control
	(Monopolistic competition)	Outreach	(non-price competition)	branches	
				staff	Independent*
Industry		Diversification	Non-interest/tot income	prodmix	Independent*
	Mkt power	Relative size	Share in deposits	depshare	Independent*
	Market structure	Concentration	Hirshman-Herfindahl index	hhi	Independent
	Reg/policy	(Interventions on forex)	(Forex trans ban)	fxtrans	Independent
		(Monetary policy)	(Bank rate)	br	Independent
Macro-economic	Business cycle*	Production	Inflation	inflation	Independent

**Denotes special relevance to this study*

Notes on explanatory variables: foreignown = majority foreign owned as a dummy 1, 0 otherwise; branches = number of branches; staff = number of employees; depshare = share in deposits; instaffcost = income/staff costs; tbtassets = Treasury Bills/total assets;; govtshr = government shareholding; capadqcy = equity/total liability; prodmix = product mix (non-interest income/total income); hhi = Hirschman-Herfindahl index of concentration; fxtrans = dummy 1, for proscription of non-bank linked foreign exchange dealers, 0 otherwise; br = bank rate.

Source: Computed by authors

The expectation is that all non-core business variables, which are bank specific, would confer an advantage to banks which would ease the pressure to compete i.e. a positive influence on monopoly power and spreads.

4.5. Data

The estimated model was based on a non-random sample of six of the 11 licensed banks, namely,: National Bank of Malawi, Standard Bank, First Merchant Bank, New Building Society Bank, NedBank, and IndeBank. This yielded 111 monthly observations for each bank for the period January 2005 to March 2014. This provided a total of $N = 666$ observations for the dependent and bank-specific variables. Data were from individual banks' financial statements and returns to the central bank which yielded information on a wider range of seemingly relevant bank-specific variables, but with the danger that most would be related and doing the same job (Athanasoglou *et al.*, 2006). One way to address this was to use variables derived from a number of other variables as long as the intended effects were correctly tracked and interpreted.

Data were requested and supplied by the central bank. Both the bank and period samples were determined by requested and supplied data but have important statistical characteristics. The sample banks represent the Malawi-specific banking industry characteristics which include the dominant and largest two banks, the next two (middle-sized) and two among the smallest. Between 2009 and 2013 the sample banks had average shares in total deposits ranging from 3% to 28%. This compares to less than 1% for each of the two smallest which are outside the sample and would not likely influence market outcomes. The rest of the excluded banks are among the smallest and latest entrants. Among the newest banks, five were licensed between 2000 and 2005 and two after, namely First Discount House (FDH) (2007) and International Commercial Bank (ICB) (2008). During the 2005-2014 sample period, some settling of the market structure is reflected by a reduction in the HHI index of concentration.

Apart from entry, the period is also characterized by reversals of some pre-May 2012 interventions in foreign exchange trading, a brief achievement of

single digit inflation rates necessitating a lowering of the bank rate, changing exchange rate regimes, and moving from a competitive foreign exchange market to one with regulated participation. The pre-January 2007 and post-May 2012 periods exhibited competitiveness in lending rates and spreads interceded by a period of virtual collusive price-leadership eased again by the pro-competition transparency requirements of the Basel II standards from 2012.

5. Results

5.1. Descriptive statistics

In Table 3, the descriptive statistics of variables used in regressions are reported but succeeding comments are only made on a few.

TABLE 3: DESCRIPTIVE STATISTICS

Variable	Mean	Std. Dev.	Min	Max
spreadn	22.39	4.60	15.50	41.00
lerner	0.79	0.09	0.55	0.91
dshare	0.15	0.14	0.02	0.50
incstaffcost	7.48	12.53	2.86	85.24
tbtassets	12.99	18.17	0.81	125.88
foreignown	0.33	0.47	0.00	1.00
govtshr	1.90	6.64	0.00	25.67
capadqcy	15.76	8.02	3.03	39.20
staff	485.74	288.62	79.00	966.00
prodmix	0.40	0.09	0.20	0.59
hhi	0.22	0.05	0.19	0.29
fxtrans	0.46	0.50	0.00	1.00
br	18.81	4.94	13.00	25.00
inflation	13.60	8.06	6.30	37.91

Source: Calculated by authors

As can be seen from the table, the mean of the HHI (0.22) is above 0.18 which is the rule-of-thumb upper bound for “moderately concentrated”. Size as proxied by staff, shows huge disparities with the smallest bank having only 79 employees compared to almost a thousand for the largest. Interest rate spreads have been very wide ranging from 15.50 to 41.00 percentage points with a mean

spread of 22.39 percentage points. Though not binding for the sample period as banks have tended to carry voluntary excess liquidity, the requirement has still been higher than the regional trends of close to single digit. Shocks in the later sample period have however made banks more vulnerable and sensitive to liquidity issues. A third of the banks had majority foreign ownership and this has to be linked to the issue of capital adequacy, which has wide variance and signals potential constraints faced by some banks. On the macroeconomic front, inflation, as a risk factor, averaged 13.6% and peaked at 37.91%, which has been high going by standards in the region.

5.2. Econometric estimation

From the perspective of econometric modeling, the implication of the rapid developments in the banking industry of Malawi is that there is no justification for assuming that a short sample period, of, say, less than 20 years, would reduce the problem of contemporaneous cross-sectional dependence (Baltagi, 2009). Shared industry experiences with regulation, standards and policy would lessen heteroskedasticity and enhance cross-sectional dependence. Bank-specific circumstances would enhance heteroskedasticity as well as autocorrelation. High-frequency data also pick up some in-firm traits and inclinations represented by bank-specific variables which interact with the changing environment as reviewed above. Some bank-specific variables such as firm-ownership have evolved from state-dominance to private-and-foreign ownership which interact (probably differently) with compliance with standards and almost certainly with monetary policy as a source of capital to finance operations.

Tests were conducted for group wise heteroskedasticity, cross-section dependence and for first-order serial autocorrelation in panel data using the Modified Wald, the Breusch-Pagan LM and the Wooldridge tests. All three problems were confirmed in the Spreads and this was assumed to apply as a worst case scenario in the Lerner model. The estimation required taking into account the three problems as well as preserving the integrity of the economic framework of the model by accounting for data properties of some important variables such as those that become time-invariant when defined as dummies or were observable annually rather than monthly. Such variables would be deleted by two-step methods involving first-differencing. In this study, the time invariant explanatory variables are the dummies for interventions in the foreign exchange transactions, *Fxtrans*, and the concentration index, *HHI*, which has been measured on an annual basis. In the Lerner model, the dependent variable *L*

is bounded ($0 \leq L \leq 1$) and requires non-linear estimation. In *Stata*, two versions of generalized least squares were used.

The Lerner model was estimated as a random effect censored Tobit while the feasible generalized least squares (FGLS) was used for the Spreads model (Baltagi, 2009; Greene, 2003). Estimation of the former uses quadrature, which is an iterative approximation whose accuracy depends partially on the number of integration points used (Naylor & Smith, 1982; Skrondal & Rabe-Hesketh, 2004). The model passed the tests, since the coefficients did not deviate with variations in integration points. The FGLS in *Stata* allows estimation in the presence of panel specific autocorrelation within panels and cross-sectional correlation and heteroskedasticity across panels.

TABLE 4: DETERMINANTS OF SPREADS AND THE LERNER INDEX (N = 666)

Determinants	Detail I	Detail II	Variable	Spreads	Lerner
Bank-specific	Market power	Size	depshare	10.16***	0.167***
				(2.929)	(0.0483)
	Management	Efficiency		-0.00408	0.000578***
				(0.0100)	(0.000148)
	Credit risk	Govt/pvt	tbtassets	-0.00484	0.000459***
				(0.00603)	(0.0000940)
	Standards	Ownership (stds)	foreigno	2.585***	0.0707*
				(0.963)	(0.0365)
			govtshr	0.0442	0.00139***
				(0.0319)	(0.000306)
Industry	Liquidity risk	(stds)	capadqcy	0.00530	0.00213***
				(0.0332)	(0.000382)
	Mono comp	Outreach	staff	0.00388**	-0.0000388*
				(0.00193)	(0.0000198)
			branches	-0.0610	0.00886***
				(0.124)	(0.00195)
		Diversification	prodmix	0.699	0.0949***
				(1.609)	(0.0185)
	Mkt structure	Concentration	hhi	-17.48***	-0.268***
				(5.077)	(0.0557)
	Reg/policy	Directives	fxtrans	0.0197	0.0302***
				(0.274)	(0.00545)

Macro-economy	M/policy	br	0.163*** (0.0377)	-0.0130*** (0.000862)
	External	reserves	0.00427 (0.00689)	-0.000160 (0.000194)
	Inflation	inflation	0.0618** (0.0273)	-0.000384 (0.000379)
		_cons	18.14*** (1.617)	0.905*** (0.0343)
		sigma_u		0.0410*** (0.0122)
		sigma_e		0.0321*** (0.000884)
		chi2	120.7***	2265.7***

Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Spreads uses panel-specific ARI autocorrelation structure. Lerner uses Panel Tobit

5.3. Discussion

As discussed in Sections 1 and 3 a major contention and contribution of this study has been to acknowledge and use the fact that Malawi banks approach the pricing of savings deposits and lending differently even though they belong to the same market. The spreads results are supposed to deal more directly with this view while the Lerner equation is more oriented towards banks' optimizing behavior across activities. A major difference between results in this and most earlier studies apart from Beck and Hesse (2006) is in that the dependent variables relate to core interest business rather than aggregate profitability, total revenue less total costs.

The results of both the Spreads and Lerner equations in Table 4 indicate that monopoly power is positively influenced by banks' market shares and negatively by market structure as represented by overall concentration. This is not inconsistent with the observed asymmetric conduct of (cooperative) price-leadership collusion in lending rates and (non-cooperative) competitiveness in deposits as depicted in Figures 1 and 2. In the Malawi case price-leadership had been facilitated by dominance by a duo as illustrated in Figure 2 and an institutional lapse which encouraged collusion. This establishes the link between the conflicting concentration and market share results through dominance and leadership. The pricing asymmetry accommodates smaller and new banks to

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jostle for market shares and enables them to achieve strong profitability results as in Figure 3.

Other results like the association of foreign ownership and staff efficiency with higher spreads are also linked to the size/dominance price-leadership phenomenon via the large bank-higher cost argument (Beck & Hesse, 2006; Al-Haschimi, 2007) which is said to apply to Malawi (World Bank & IMF, 2008). Flamini *et al.*, (2009) contend that high margins facilitate the tolerance of high risk and bank inefficiency.

Spreads respond to the bank rate as they should (in the Spreads equation) and through lending rates adjustments as the frontline decision variable. The inflation rate's role in spreads is muted by its key role in influencing bank rate adjustments, a result that has been seen before (Chirwa and Mlachila, 2004).

The dominant firm price-leadership collusion phenomenon and results have been a major driver of lack of competitiveness in Malawi's banking industry. It was facilitated by institutional mistakes in the regulation of banks' pricing conduct in core and non-cores business as well as high yields of Treasury Bills. These allowed pricing collusion and high profitability which blunted the need for competitive lending in the core business. Although this study takes a different focus and view of the institutional environment the general thrust of the results support the findings by Amidu and Wilson (2014) about the negative effect of weak institutions on bank competitiveness in Africa. As far as market conditions and other conduct are concerned, monopolistic competition, which again has been associated with concentration and dominance, has also been a factor in diminishing competitive pricing in core business and the likely channel is the high cost-high spreads as found by other studies (Beck & Hesse, 2006; Al-Haschimi, 2007; Flamini *et al.*, 2009).

6. Conclusion

The results of this country-based study suggest that the African banking industry can be subjected to institutional and economic environments that can invite collusive conduct and offer incentives for lack of competition in banks' core business. Major weaknesses of the present study stem primarily from what were its purported strengths, its focus. First, its focus on spreads based on core-business and coverage of a broader range of non-core business activity has probably improved relevance but reduced comparison with other studies. Secondly, its country focus and sensitivity to country dynamics has

meant that the sample period has quickly been overtaken by events such as two mergers and takeovers that occurred in 2015 and changed the configuration of dominance. Methodologically the biggest challenge has been from software and limitations of the tests on panel Tobit. Going forward a challenge is whether and how far the results obtained here are generalizable particularly in sub-Saharan Africa. Another methodological issue is that a decomposition analysis might explain how much of the explanatory variables can explain changes in Lerner and Spreads overtime.

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