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Interest rate convergence across maturities: Evidence from bank data in an emerging market economy☆

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ABSTRACT

Against a background of financial liberalisation reforms, we assess the extent of market integration and competition in Colombian retail deposits and loans markets. We employ a dataset comprising bank-level interest rate data for different financial products across a range of banks. We utilise and further develop the Phillips and Sul convergence club approach by estimating the drivers of club formation. We find integration of the deposits market, but not loans where portfolio riskiness and loan maturity explain why there is not a fully integrated market. Also, the degree of loan market convergence responds asymmetrically to changes in monetary policy.

1. Introduction

Financial liberalisation reforms have been made by many emerging economies since the 1990s, where a key component has been the drive towards increased competition in retail banking. It is of interest to consider whether or not the new banking regimes that have emerged are characterised by integrated domestic markets for retail deposits and loans. Indeed, measuring the extent of integration or convergence across interest rates set by banks can provide valuable insights into how fragmented retail markets might still be despite significant changes in regulations. A further consideration is that the extent of convergence across maturities has implications for our understanding of the term structure of interest rates as based on expectations theory or liquidity preference considerations.

This paper investigates the extent of interest rate convergence in the retail banking sector of an emerging market economy, namely Colombia, which embarked upon a financial liberalisation process in the early 1990s. Prior to these reforms, Colombia, like many other developing countries, was characterised by "financial repression", a term used to describe an economy with a banking sector that is subjected to important restrictions in the form of high reserve requirements and liquidity ratios, interest rate ceilings, and subsidised credit to specific sectors of the economy, among others. Uribe and Vargas (2003) note that the reforms aimed at creating an independent central bank; redefining of the structure of the financial sector; relaxing the requirements for entry and exit

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of intermediaries; regulating mergers, acquisitions and liquidations; reducing reserve requirements; and liberalising interest rates although, despite the reforms, lending rate caps are still in place today through the operation of usury laws.[1]

Tests of the different aspects of convergence started with the works of Baumol (1986), Barro (1991) and Barro and Sala-i-Martin (1992) that typically focussed on output growth. During the last decade or so, there has been an increasing number of applications to financial markets. Indeed, authors such as Fung (2009) and Narayan, Mishra, and Narayan (2011) have investigated the notions of absolute and conditional convergence in the banking sectors and stock markets of several low, middle and high income countries, respectively. In turn, variations of time-series and cointegration-based methodologies have been employed by Arghyrou, Gregoriou, and Kontonikas (2009), Baharumshah, Soon, and Boršič (2013), Brada, Kutan, and Zhou (2005), Herwartz and Roestel (2011), Kim, Moshirian, and Wu (2005, 2006), Mylonidis and Kollias (2010) to analyse convergence of key financial variables in European and US markets, by Kaul and Mehrotra (2007) to study Toronto-listed Canadian stocks that are also traded in stock exchanges in the United States, and by Yu, Fung, and Tam (2010) to examine financial markets in Asia. More recently, the policy initiatives undertaken by the European Union (EU) to integrate national markets, through the introduction of the Single Market Programme, have also provided a fertile area of research to test the hypothesis of price convergence in retail banking. Some examples are provided in the analyses of convergence patterns among retail interest rates in the European banking sector by Rughoo and Sarantis (2012, 2014), banking efficiency scores by Matousek, Rughoo, Sarantis, and Assaf (2015), and sovereign bond yield spreads by Antonakakis, Christou, Cunado, and Gupta (2017). The distinctive aspect of this latter line of research is that it is based on the idea of convergence club formation put forward by Phillips and Sul (2007, 2009), according to which convergence may not hold for all individual series under consideration but for sub-groups of them.

This paper analyses convergence club formation in Colombian retail banking using the Phillips and Sul (2007, 2009) methodology. These authors put forward the notion of "relative" long-run equilibrium or convergence, according to which two series, let us say y_{it} and y_{jt}, are said to exhibit relative convergence when the ratio between them converges to unity as time passes, that is when $\lim_{t\to\infty}(\log y_{it}/\log y_{jt}) = 1$, and suggest testing the null hypothesis of relative convergence using a regression that involves log-t as a regressor. Here, an algorithm based on this log-t regression approach clusters interest rates with a common unobserved factor in their variance. In this respect, sigma-convergence as opposed to beta-convergence deals with the reduction in the variance of the distribution of retail interest rates over time. In addition to detecting panel convergence, if present, a key benefit attached to the Phillips and Sul clustering algorithm test is that it can also reveal whether club formation is present.

There do exist other time-varying approaches when it comes to convergence analysis. In our paper, we opt for the Phillips and Sul view of convergence which exploits all the information contained in the time-series dimension of the underlying data. Unlike methods based on unit root testing or cointegration, the Phillips and Sul (2007, 2009) approach does not necessitate any specific assumptions regarding the order of integration of the variables and allows for cases where the individual time series may be transitionally divergent. Indeed, the method by Phillips and Sul (2007, 2009) enables the detection of convergence where other methods such as stationarity tests fail insofar as stationary time series methods are unable to detect the asymptotic co-movement of two time series and therefore erroneously reject the convergence. Further to this, the concept of relative convergence advocated by Phillips and Sul (2007, 2009) is different from the concept of level convergence considered by Bernard and Durlauf (1995) and Evans and Karras (1996), which is defined as $\lim_{t\to\infty}(\log y_{it} - \log y_{jt}) = 0$. Chatterji and Dewhurst (1996) offer an alternative view of club convergence formation within the context of the cross-section regression model advocated by Baumol (1986).[2] However, Evans (1996) explains that tests of convergence based on regressions that relate the growth rate of a variable to its initial value (and possibly other characteristics) are only valid under strong conditions.

We provide three main distinctive features that add significant value to the existing literature. First, we are able to exploit a database of retail deposit and lending interest rates at bank-level over a period of more than 15 years. The information at our disposal permits us to analyse convergence club formation across different maturities in deposits and loans, which is a step forward in comparison to Rughoo and Sarantis (2012, 2014) where the analysis is carried out at country-level for EU economies. Second, we develop further the club convergence analyses by Antonakakis et al. (2017), Matousek et al. (2015), and Rughoo and Sarantis (2012, 2014), by looking at the factors driving convergence club membership. Third, the data span offers the possibility of implementing the Phillips and Sul algorithm in a recursive fashion, allowing us to gain insights into the potential effects of monetary policy on the number of (or membership of) convergence clubs resulting from monetary tightening or loosening.

Although it can be argued that Colombia is not representative of the rest of the emerging economies, Colombia nonetheless shares two key common features with this group of countries. First, there is a heavily concentrated banking sector and, against this background, access to bank-level data offers the opportunity to examine whether financial liberalisation has had similar effects on the deposits and loans sides of the market. Second, like in many other developing (and for that matter also developed) countries, in Colombia banks operate in the presence of interest rate caps in the form of usury laws. Apart from the fact that the effect of such caps has typically been overlooked by the existing literature, what makes the Colombian experience interesting is that the effects of the Global Financial Crisis (GFC) have not been regarded as serious as has been the case for other economies, mainly because of

[1] The Colombian Superintendency of Financial Institutions has two categories of interest rate caps: the usury rate for conventional (i.e. ordinary and consumption) loans and the usury rate for microcredit (i.e. loans to very small enterprises). Supervised institutions must report their rates by category on a weekly basis, and these data are used by the Superintendency to fix the level of the usury rates. In both cases, the usury rate is set as 1.5 times the corresponding average rate for the system as a whole.

[2] See, for example, Degl'Innocenti, Matousek, and Tzeremes (2018) for a recent application and further elaboration of this approach to the analysis of financial centres' competitiveness and economic convergence in European Union regions.