Economics and Business Letters
10(3), 208-216, 2021

Role of quoted spreads in financial services

Guillermo Peña*

Department of Economic Analysis, University of Zaragoza, Spain

Received: 15 December 2020
Revised: 16 February 2021
Accepted: 17 February 2021

Abstract

Banking has driven the development of the world for centuries. An interesting issue to analyze is the optimal spread on financial products reflecting the value added that does not generate economic distortions for consumers in intertemporal decisions. Based on a gravity equation for these services, this paper examines the optimality of a modified Quoted Spread, the recently-proposed mobile-ratio, by assessing whether the pure interest expressed as a gravity equation between interests does not change after applying this spread. Results show that the mobile-ratio is the specification of the spread with no distortions on investment decisions, where a Granger test to a panel of countries confirms that predictability between both variables cannot be accepted. The proposal can be useful for policy-makers, regarding fiscal and monetary policy. First, because this ratio plays a key role for the VAT on financial services, and second, because this can be a task for improving current banking regulations and guidelines, reducing uncertainty and smoothing the business cycle.

Keywords: banking studies; marginal productivity; value added; financial gravity model; asset pricing
JEL Classification Codes: G20, E43, E52

1. Introduction

López-Laborda and Peña (2018) develop in their paper a method for taxing the value added of financial services on Value Added Tax (VAT) by levying explicit fees and the implicit margin. The method applies to each transaction a "mobile-ratio", i.e. the difference between interest payments and receipts and divided by the sum of both to reflect the margin per transaction unit, which is an adaptation of the well-known Quoted Spread, divided by two. This spread represents the value added per transaction without explicit fees, which is taxed by the tax rate of VAT and could be considered an approximation of the marginal productivity of financial services, where its employment as input on real output is observed to be constant (Odedokun, 1998). The use of endogenous monetary spreads is common in the literature (Cesa-Bianchi et al., 2019), but this paper contrasts the existence of an optimal specification.

* Corresponding author. E-mail: gpena@unizar.es.

Citation: Peña, G. (2021) Role of quoted spreads in financial services, *Economics and Business Letters,* 10(3), 208-216.

DOI: 10.17811/ebl.10.3.2021. 208-216

ISSN: 2254-4380

Optimization is a recurrent topic in finance (Reppen et al., 2020), and a non-distorting or "optimal" policy or behavior is usually neutral in economics, especially if it does not alter the investment, determined by the intertemporal discount factor, which is closely related to pure interest—the interest on capital excluding fees for risk. The Treasury bill rate is close to this implicit interest, and also to the nominal interest rate set by the Central Bank. Thus, if pure interests were to remain unchanged after an economic behavior—in this case applying implicit bank fees per unit of financial product—the policy could be considered optimal—thought this depends in part on the degree of uncertainty underlying interest rate decisions by the Central Bank (as well as responses by retail banking), since it is sometimes the case that policy is set on the anticipation of evolutions that are not yet represented in data (a situation typical for example of Greenspan's tenure at the Fed, and one that invokes problems of lack of reliance on frequency distributions, as well as structural breaks etc.). The main purpose of this paper is to check whether the so-called mobile-ratio is the optimal spread to apply to financial services, that is, it does not alter intertemporal decisions. Policy measures derived from the proposal can improve the competence in the sector, without falling into over-regulation. This policy could help to reduce the asymmetric information between lenders and borrowers, which can produce uncertainty shocks. This misinformation can act as a financial accelerator mechanism with an important role in business and macroeconomic cycles (Strobel et al., 2018). So, the application of the proposal by policy-makers could help smoothing out uncertainties and lowering the business and financial cycle volatilities. This lower uncertainty could also improve, in a micro-level, the people's perceptions of their own financial well-being by improving present and future time perspectives and financial satisfaction, even for developing countries (Mahdzan et al., 2020). Additionally, this paper is useful for the VAT on financial operations, which aims to tax the value added in a non-distortionary way.

Section 2 explains the preliminary aspects of the gravity model for financial services. Subsequently, Section 3 sets out the optimal bank spread for financial services by solving what specification of the relationship of interests is neutral to pure interest, i.e. evaluating the gravity equation specified with and without applying fee-spreads by obtaining the specification of the spread that satisfies that the pure interest is kept constant. The results show that the mobile-ratio developed by Lopez-Laborda and Peña (2018), could be considered the optimal fee-spread for financial services. In Section 4 some empirical exercises check the validity of the expectations. Finally, Section 5 discusses the results and provides conclusions.

2. The Financial Gravity model

Recent financial crises as the Global Financial Crisis (GFC) of 2007-2009 and the posterior Great Recession has taught macroeconomists that banks are a vital part in the economy, and then, they have also to play an important role in macroeconomic models (Werner, 2016). Current literature has tried to include new insights on commercial banking models into existing macroeconomic models as the standard New Keynesian DSGE models (Jakab and Kumhof, 2019), improving the previous predictability.

Commercial banks as providers of financial services can be considered as any other business (Peña, 2019), view that is followed in this paper, where it is proposed a denominated "Financial Gravity" (FG) model based on previous works. In this paper, financial institutions are not mere barter institutions as Intermediary Loanable Fund (ILF) models can show (Kumhof and Zoltan, 2015), but they can be considered sometimes as traders who earn a fee by their job. This job can lead to positive profits, as we will see (Peña, 2020a), but it does not need from real resources (Peña, 2019 and Jakab and Kumhof, 2019), it is only the provision of a service that provides the satisfaction of some consumers' needs (safety, liquid availability, better information, etc.).

Additionally, financial institutions in a FG model are neither only mere monetary institutions as in Financing through Money Creation (FMC) models (Kumhof and Zoltan, 2015), in spite of having common points as we will see later. For instance, first, both models consider quantitative issues (McLeay, Radia and Thomas, 2014a). Second, both theories also consider the possibility of generation of loans from nothing (Lopez-Laborda and Peña, 2018), with the creation of new monetary purchasing power through loans (*creatio ex nihilo*). Third, the proposed models allow banks to have non-zero profits as in Jakab and Kumhof (2019). Finally, both insights also consider Central Banks provide as many reserves and cash as commercial banks demand at the reference interest rates (Kumhof and Zoltan, 2015), in most cases without real limits and without restriction of reserves. This is considered in the next section. Nonetheless, the main difference with the FMC approach is that this and the other previous model do not raise financial institutions to the level of a monetary businesses as well as any other "real" or non-financial businesses, whilst Peña (2019) considers financial services in the same way as the rest of products and services, with the difference that banks only create value added in the form of money, not in physical or real way, and this can be done from non-real resources. So, the FG model combines both previous ILF and FMC models making some additional contributions.

The four main points in common with ex-nihilo fund theories are developed next. First, the quantities issue is considered by adapting the proposal of Lopez-Laborda and Peña (2018) shown in the 15th footnote of that paper in which capital amounts are equal. Considering that the interest payments *IP* are equal to the product of the deposit interest rate i_d and the deposit *D*, the interest receipts *IR* are the product of the loan interest rate i_l and the loan capital *L*, and finally, the pure interest ε is the product of the pure interest rate ε_o and the bond capital, B, with $D \neq L$, we have:

$$\begin{aligned} \rho \cdot i_d \cdot D &= \varepsilon_0 \cdot B - i_d \cdot D \\ \rho \cdot i_l \cdot L &= i_l \cdot L - \varepsilon_0 \cdot B \end{aligned} \tag{1}$$

From this can easily be derived the two equations from the last authors, which also hold by considering different capital amounts.

$$\varepsilon_0 \cdot B = \frac{2 \cdot i_l \cdot L \cdot i_d \cdot D}{i_l \cdot L + i_d \cdot D} \Rightarrow \varepsilon = \frac{2 \cdot IR \cdot IP}{IR + IP} \tag{2}$$

The mobile-ratio is formulated as a modification of a well-known Quoted Spread divided by two (Peña, 2020b) and can be considered the marginal productivity of financial services:

$$\rho = \frac{i_l \cdot L - i_d \cdot D}{i_l \cdot L + i_d \cdot D} = \frac{IR - IP}{IR + IP} \tag{3}$$

The creation of new money out of nothing through loans (Werner, 2014a, b) is also considered in the proposed approach. In fact, according to (1), there is triple equality that allows banks to create a simultaneous double account matching the loan with its counterpart the deposit for a single customer (McLeay, Radia and Thomas, 2014b) if the money is deposited in the same bank where the loan is issued (left after the mobile-ratio), the spread for a loan issued at a bank where the money is not deposited (with a leave of cash, equity or corporate bond counterpart, for instance, center), or the spread for only a deposit (with, for example, an entry of cash, right):

$$\rho = \frac{IR - IP}{IR + IP} = \frac{IR - \varepsilon}{IR} = \frac{\varepsilon - IP}{IP} \tag{4}$$

The case of the center is illustrated in Lopez-Laborda and Peña (2018) as a case in which a non-financial business provides credit operations as example of financial services that "involve a sole provider and a single customer of the financial service" (p. 168), as the FMC consider (Werner, 2014a).

The third common point is that profits can be non-zero, as in Jakab and Kumhof, (2019), allowing the usual oligopolistic behavior of most banks. The reason is that the definition of value added of financial services, *IR-IP*, used in this paper and provided by López-Laborda (2018, eq. 1) considers the financial accounts, concretely the profits and losses statement, of banks, which permits using accountant identities for every casuistic in banking. So, the value added obtained by the "indirect method" and used in VAT, *IR-IP*, can also be obtained by the direct method, mainly as the sum of non-zero profits and wages and salaries (Peña, 2020a).

Finally, the case in which commercial banks obtain as many reserves and cash as they demand at target interest rates provided by Central Banks without restriction of reserves is considered in the next section.

3. The optimum financial marginal productivity neutral to pure interest

An "optimal" specification of pure interest, $\varepsilon*$, is considered to be related to the Central Bank's reference rate, and will be associated with short-term Treasury bill rates according to Poddar and English (1997) an "implicit" gravity equation for pure interest, $\bar{\varepsilon}$.

Given the previous differentiation between pure interest formulations, the optimal pure interest $\varepsilon*$ would be:

$$\varepsilon *= \frac{2 \cdot IR' \cdot IP'}{IR' + IP'} \tag{5}$$

which is related to fee-free interest receipts, IR', which could, in turn, be associated with the loan facility interest rate, and also to fee-free interest payments, IP', which could be considered close to the deposit facility rate.

Implicit pure interest $\bar{\varepsilon}$ follows the gravity equation that relates fee-free interest payments and receipts to bank fees, as set out in (6):

$$\bar{\varepsilon} = \frac{2 \cdot (1-\rho)IR' \cdot (1+\rho)IP'}{(1-\rho)IR' + (1+\rho)IP'} = \frac{2 \cdot IR \cdot IP}{IR + IP} \tag{6}$$

where banks apply to the fee-free interest receipts received by the Central Bank an additional fee through a spread to the customers denoted by ρ that is the same proportion that the one applied to the customers on the amount of fee-free interest payments/receipts given to/by the Central Bank, reducing/increasing the interest payments/receipts that the customers have to afford/receive.

The gravity equation leading to these "gross" amounts of interest (including bank fees) has to be equal to the optimal pure interest to clear the optimal marginal productivity of financial services ($\rho*$):

$$\varepsilon *= \bar{\varepsilon} \Leftrightarrow \frac{2 \cdot IR' \cdot IP'}{IR' + IP'} = \frac{2 \cdot (1-\rho*)IR' \cdot (1+\rho*)IP'}{(1-\rho*)IR' + (1+\rho*)IP'} \tag{7}$$

This could be simplified to:

$$(1-\rho*)(1+\rho*) = \frac{(1-\rho*)IR' + (1+\rho*)IP'}{IR' + IP'} \tag{8}$$

Rearranging and leaving the factors with $\rho*$, and replacing $\frac{IR'}{IR'+IP'}$ by $r*$ and $\frac{IP'}{IR'+IP'}$ by $R*$ and reordering results in:

$$\rho*\left(\rho* - (r* - R*)\right) = 0 \tag{9}$$

After that, solving $\rho*$ leads to the modified Quoted Spread (the mobile-ratio) found as the optimum, but as a function of the fee-free interests determined by the Central Bank (net interests) rather than gross interests determined by the financial institutions:

$$\rho *= r * -R *= \frac{IR' - IP'}{IR' + IP'} = \rho \quad (10)$$

So the marginal productivity of a financial institution and of the Central Bank, expressed as ρ', have to be the same in order to be optimal. Knowing the equivalences derived from (6), $IR' = IR/(1 - \rho *)$ and $IP' = IP/(1 + \rho *)$, the optimal mobile-ratio could be expressed as:

$$\rho *= \frac{IR/(1-\rho *) - IP/(1+\rho *)}{IR/(1-\rho *) + IP/(1+\rho *)} \quad (11)$$

Rearranging and leaving the factors of $\rho*$ on the same side of the expression, it leads to:

$$2\rho * IP + \rho *^2 \, (IR + IP) = IR - IP \Rightarrow \rho *= \left(-2IP + \sqrt{4IR^2}\right)/2(IR + IP) \quad (12)$$

Finally, choosing the positive root due to the economic interpretation of a positive optimal marginal productivity and the meaninglessness of a negative one, it leads to the optimum financial marginal productivity neutral to pure interest:

$$\rho *= \frac{IR - IP}{IR + IP} \quad (13)$$

where the optimal fee-spread or marginal productivity of financial products $\rho*$ is exactly the proposal made by Lopez-Laborda and Peña (2018) for the mobile-ratio, now expressed in terms of the gross interests after fees, as them. This means that if a financial institution applies a marginal productivity of financial services equal to the mobile-ratio, it would be the same as the Central Bank marginal productivity and this could be optimum in the long-term. Despite current controversy according to the non-stationarity of reaching a non-zero datum (Nasir and Morgan, 2020), positive non-zero constants as a policy target that could reduce uncertainty (Peña, 2020c).

4. Empirical evidence

According to the previous theoretical contributions, the pure interest has to be neutral to the marginal productivity of financial services in order to be optimal. For empirical comparisons, the two variables have to be expressed in the same units, therefore, as the mobile-ratio is a proportion of interests, the pure interest has also to be expressed as proportion of interests. So, the variable δ will be the pure interest by the gravity model divided by total interests.

Data is obtained from the lending and deposit interest rates of the World Bank database, using 67 countries for 1997 to 2019 in order to achieve a balanced panel. Descriptive statistics are included in Table 1, while Table 2 shows the results of the Granger test in p-values.

Table 2 shows the p-values for the 67 countries (first column) of considering that δ infers $\rho*$ (second column), the opposite predictability (third column), and when there is any univocal inference, 1, or not, 0, (fourth column) or only for the first causality (fifth column). The average of the data is in bold in the last row. The methodological strategy consists of analyzing whether the modified Quoted Spread $\rho*$ does not univocally Granger-causes the pure interest expressed as δ. The null hypothesis is absence of Granger-causality, which is accepted by the empirical results in average, confirming the neutrality of the spread. Indeed, the target interference is only found in a 3% of the countries of the full sample. These theoretical and empirical results are coherent with Peña (2019), who considers that the intertemporal interest rate do not shift with financial intermediation.

As the pure interest is the efficient interest, the modified Quoted Spread would be efficient if it follows pure interest as a proportion of total interest behavior. This can be checked in a descriptive and a statistical manner. First, it is easy to see in Table 1 that both variables have a similar mean. Second, their correlation is obtained extremely high (-96.62%), so both variables can be considered as independent proxies from each other or from another variable.

Table 1. Descriptive statistics.

Variable	*Obs*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
δ	1541	0.395	0.096	0.007	0.500
$\rho*$	1541	0.414	0.197	-0.097	0.993

Table 2. Empirical results.

Y Granger-causes (GC) X?:	*1) Rho GC Delta?*	*2) Delta GC Rho?*	*Univoque GC?:1 yes, 0 no*	*2)? 1 yes, 0 no*
Algeria	0	0.001	0	0
Angola	0.767	0.161	0	0
Antigua and Barbuda	0.253	0.318	0	0
Armenia	0.844	0.462	0	0
Aruba	0.121	0.121	0	0
Australia	0.221	0.074	1	0
Bahamas, The	0.218	0.197	0	0
Bangladesh	0.821	0.358	0	0
Belarus	0.535	0.623	0	0
Belize	0.176	0.127	0	0
Bhutan	0.038	0.034	0	0
Bolivia	0.901	0.858	0	0
Botswana	0.015	0.024	0	0
Brazil	0.817	0.81	0	0
China	0.002	0.001	0	0
Colombia	0.445	0.66	0	0
Costa Rica	0.102	0.135	0	0
Czech Republic	0.406	0.1	1	0
Dominica	0.019	0.031	0	0
Egypt, Arab Rep.	0.484	0.642	0	0
Eswatini	0.664	0.331	0	0
Grenada	0.362	0.343	0	0
Guatemala	0.352	0.478	0	0
Guyana	0.525	0.695	0	0
Honduras	0.04	0.019	0	0
Hungary	0	0.005	0	0
Indonesia	0.115	0.427	0	0
Israel	0.206	0.267	0	0
Jordan	0	0	0	0
Korea, Rep.	0.282	0.271	0	0
Kuwait	0.915	0.934	0	0
Kyrgyz Republic	0.012	0.072	0	0
Lesotho	0.507	0.468	0	0
Macao SAR, China	0.015	0.088	0	0
Madagascar	0.184	0.024	1	0
Malaysia	0.131	0.29	0	0
Maldives	0.966	0.875	0	0
Mauritius	0.093	0.56	1	1
Mexico	0.076	0.164	1	1
Moldova	0	0.001	0	0
Mozambique	0.894	0.979	0	0
Myanmar	0.278	0.156	0	0
Namibia	0.794	0.868	0	0

Table 2 (cont'd). Empirical results.

Y Granger-causes (GC) X?:	*1) Rho GC Delta?*	*2) Delta GC Rho?*	*Univoque GC?:1 yes, 0 no*	*2)? 1 yes, 0 no*
Nicaragua	0.807	0.44	0	0
Nigeria	0.008	0.032	0	0
North Macedonia	0.804	0.537	0	0
Papua New Guinea	0.259	0.32	0	0
Philippines	0.742	0.73	0	0
Romania	0.118	0.072	1	0
Russian Federation	0.519	0.514	0	0
Rwanda	0.066	0.097	0	0
Seychelles	0.115	0.063	1	0
Sierra Leone	0.094	0.057	0	0
Singapore	0	0	0	0
South Africa	0.929	0.951	0	0
St. Kitts and Nevis	0.558	0.443	0	0
St. Lucia	0.009	0.008	0	0
St. Vincent and the Grenadines	0.827	0.88	0	0
Suriname	0.789	0.947	0	0
Tanzania	0.805	0.94	0	0
Tonga	0.208	0.321	0	0
Trinidad and Tobago	0	0.002	0	0
Ukraine	0.306	0.165	0	0
Uruguay	0.01	0.016	0	0
Vanuatu	0.078	0.076	0	0
Vietnam	0.059	0.043	0	0
Zambia	0.023	0.015	0	0
Average	**0.339**	**0.324**	**0.104**	**0.03**

5. Concluding remarks

This paper confirms that the modified Quoted Spread proposed by Lopez-Laborda and Peña (2018) for financial services and called mobile-ratio is the optimal spread to obtain the value added on these products. The formulation of implicit pure interest that they propose is used, expressed as a gravity equation of interest payments and receipts or flows, being close to the short-term Treasury bill rate (Poddar and English, 1997).

Conclusions are drawn. First, the similarities and differences of a proposed Financial Gravity (FG) model are analyzed compared to previous models. Second, this paper mathematically proves, by analyzing the spread on interests that makes no change on the pure interest, that the mobile-ratio proposed by Lopez-Laborda and Peña (2018) to calculate the financial margin per transaction may be operationally optimal under given conditions. This spread may be applied on financial services by financial institutions and Central Banks to keep consumers' intertemporal decisions unchanged by maintaining pure interest constant. Finally, these theoretical expectations are empirically confirmed.

Acknowledgements

I would like to thank the Editors and the anonymous reviewer because their suggestions have improved the paper.

References

Cesa-Bianchi, A., Kumhof, M., Sokol, A., & Thwaites, G. (2019). Towards a new monetary theory of exchange rate determination, Bank of England Working Paper, No. 817, August 2019.

Feenstra, R. C. (2015) Advanced international trade: theory and evidence, *Princeton University Press.*

Isard, W. (1954) Location theory and trade theory: short-run analysis, *The Quarterly Journal of Economics*, 305–320.

Jakab, Z., & Kumhof, M. (2019) “Banks are not intermediaries of loanable funds—facts, theory and evidence”, Bank of England Working Paper, No. 761, June 2019.

Kimura, H., and Todo, Y. (2010) Is foreign aid a vanguard of foreign direct investment? A gravity-equation approach, *World Development*, 38(4), 482–497

Kumhof, M. and Zoltan, J. (2015) ‘Banks are not intermediaries of loanable funds — and why this matters’, Bank of England Working Paper, No. 529, May 2015.

López-Laborda, J., and Peña, G. (2018) A New Method for Applying VAT to Financial Services, *National Tax Journal*, 71(1), 155–182.

Mahdzan, N.S., Zainudin, R., Abd Sukor, M.E., Zainir, F. and Wan Ahmad, W.M. (2020), "An exploratory study of financial well-being among Malaysian households", Journal of Asian Business and Economic Studies, Vol. 27 No. 3, pp. 285-302. https://doi.org/10.1108/JABES-12-2019-0120.

McLeay, M., Radia, A., and Thomas, R. (2014a) ‘Money in the modern economy: an introduction’, Bank of England Quarterly Bulletin Q1: 4-13

McLeay, M., Radia, A., and Thomas, R. (2014b) ‘Money creation in the modern economy’, Bank of England Quarterly Bulletin Q1: 14-25.

Nasir, M. A., & Morgan, J. (2020). Paradox of Stationarity? A policy target dilemma for policymakers. *The Quarterly Review of Economics and Finance* 10.1016/j.qref.2020.05.007.

Odedokun, M. O. (1998) Financial intermediation and economic growth in developing countries, *Journal of Economic Studies*, 25(3), 203-224.

Peña, Guillermo (2019) Efficient treatment of banking services under VAT, *Economics and Business Letters,* 8(2), 115-121 (http://zbw.eu/econis-archiv/bitstream/11159/4096/1/1689161833.pdf).

Peña, G. (2020a). VAT experience as an influence on banking crises. *National Accounting Review*, 2(1), 53-65 (https://www.aimspress.com/fileOther/PDF/NAR/NAR-02-01-003.pdf).

Peña, G. (2020b) A new trading algorithm with financial applications. *Quantitative Finance and Economics*, 4(4), 596-607 (http://www.aimspress.com/fileOther/PDF/QFE/QFE-04-04-027.pdf).

Peña, G. (2020c). Monetary Policy after the Great Moderation. Journal of Central Banking Theory and Practice, 9(3), 5-26 (https://content.sciendo.com/view/journals/jcbtp/9/3/article-p5.xml).

Poddar, Satya, and Morley English, (1997) Taxation of Financial Services under a Value-Added Tax: Applying the Cash-Flow Approach, *National Tax Journal* 50 (1), 89–111 (https://www.jstor.org/stable/41789244#metadata_info_tab_contents).

Reppen, A. M., Rochet, J. C., & Soner, H. M. (2020) Optimal dividend policies with random profitability, *Mathematical Finance*, 30(1), 228-259 (https://onlinelibrary.wiley.com/doi/pdf/10.1111/mafi.12223).

Strobel, J., Salyer, K.D. and Lee, G.S. (2018), "Uncertainty, agency costs and investment behavior in the Euro area and in the USA", Journal of Asian Business and Economic Studies, Vol. 25 No. 1, pp. 122-143. https://doi.org/10.1108/JABES-04-2018-0007.

Werner, R. (2014a) ‘How do banks create money, and why can other firms not do the same? An explanation for the coexistence of lending and deposit taking’, International Review of Financial Analysis 36: 71-77.
Werner, R. (2014b) ‘Can banks individually create money out of nothing? The theories and the empirical evidence’, International Review of Financial Analysis 36: 1-19.
Werner, R. (2016) ‘A lost century in economics: Three theories of banking and the conclusive evidence’, International Review of Financial Analysis 46: 361-379.