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Oligopolistic competition in the banking market and economic growth

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ABSTRACT

We investigate how banks' degree of imperfect competition affects economic growth. This study explores an imperfect competition model in banking in an overlapping generations model with endogenous growth. We demonstrate the following results. First, an increase in the deposit interest rate increases the steady growth rate of the economy. Second, as competition among banks intensifies, the economic growth rate increases. Third, it is ambiguous as to whether a higher lending interest rate caused by an increase in productivity results in a higher economic growth rate. In our numerical exercises, we exemplify the possibility that an increase in the lending interest rate increases the growth rate.

1. Introduction

This study explores a model of imperfect competition in the banking sector in an overlapping generations model with endogenous growth. We investigate how banks' degree of imperfect competition affects economic growth when banks engage in oligopolistic competition in financial markets. In particular, by introducing the oligopolistic lending market among banks in the two-period overlapping generations model with endogenous growth, we clarify the relationship between the growth rate of the economy and the degree of bank competitiveness. Under imperfect competition, oligopolistic banks can exert market power and lower the deposit interest rate. The difference between the lending interest rate and the deposit interest rate is a source of positive profits. As banks earn positive profits, bank stocks gain positive value. Thus, we consider the situation in which there are two financial assets—bank deposits and bank stocks—and incorporate into the model the arbitrage on the rate of return between both assets.

A considerable number of papers address the imperfect competition of banks in a static setting. Monti (1972) and Klein (1971) developed the well-known Monti-Klein model, which considers a monopolistic bank confronted with the elastic demand for loans and the elastic supply of deposits. The Monti-Klein model has been extended to the oligopolistic version by many authors, such as De Palma and Gary-Bobo (2000).[1] However, few existing studies address imperfect competition in a macro-dynamic setting. As one such exceptional article, Amable et al. (2002) investigated the determination of the optimal number of banks in an overlapping generations (OLG) model with endogenous growth. They specify the extent to which deposit insurance may reduce instability. Amable and Chatelain (2001) examined whether financial infrastructures can foster economic development, and their concern was closely related to ours. However, their formalization depended on the Salop (1979) circular model and differs from our setting in which we deal with the Monti-Klein model.

Amable and Chatelain (2001) and Amable et al. (2002) apply the Salop model to industrial organization of the banking sector, and their specification of households' saving behavior was a simple linear or log-linear utility function. Thus, the level of savings is immune to a change in the deposit interest rate. The market power of the banking sector results from the distance from households or the degree of the preservation of depositors' property rights. In contrast, in our model, given the constant intertemporal elasticity of substitution (CIES) utility function, banks confront an upward-sloping supply of deposits. Banks' market power creates a wedge between the deposit interest rate and lending interest rate, and it depends on the elasticity of saving and intensity of the competition. In our model, the wedge depends on the intertemporal elasticity of substitution. We first show that the elasticity of saving, which is determined by the intertemporal elasticity of substitution, should be sufficiently high for the banking sector to gain positive profits from oligopolistic behavior. Then, we examine the consequences of imperfect competition in the banking sector generated

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[1] For a detailed survey on the Monti-Klein model, see Freixas and Rochet (2002).

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from households' preference for saving. Indeed, several papers confirmed the conclusion of the Monti-Klein model. Edwards (1964) suggested that the different interest rate levels on each loan reflect different elasticities of demand. Recently, Uchida and Tsutsui (2005) failed to reject the hypothesis of oligopolistic competition of city banks in Japan. On the relationship between banking market conditions and bank pricing decisions, there has been much empirical literature. Some of the studies focused on the impact of market structure on the lending (credit) market, and others investigated the impact on the deposit market. Regarding the latter, Berger and Hannan (1989) and Prager and Hannan (1998) revealed that as the competition becomes intense, the deposit interest rate increases. Based on their empirical findings, a motivation of our study is to theoretically derive the positive relationship between competition and the deposit interest rate and to demonstrate the macroeconomic consequences.

Starting with the pioneering works of Lucas (1988) and Romer (1986), the relationship between the industrial organization and economic growth has been analyzed. Bencivenga and Smith (1991) were the first to investigate the relationship between the organization of the financial system and economic growth. They provided conditions under which competitive intermediaries can enhance economic growth. Guzman (2000) analyzed a two-country model in which one has a competitive banking system and the other has a monopolistic banking system. He showed that the existence of a monopolistic banking system deters both capital accumulation and economic growth through credit rationing. Deidda and Fattouh (2005) examined an endogenous growth model with both a final goods sector and a banking sector. They found that banking concentration has two opposite effects on growth: promoting economies of specialization and duplicating banks' investments in fixed capital. Thus, stronger competition in the banking sector may or may not increase economic growth.

From an empirical point of view, a few existing studies tackled this issue by estimating the relationship between competition in the financial sector and economic growth. Among other findings, Claessens and Laeven (2005) empirically demonstrated the positive relationship between them by estimating whether stronger competition in countries' banking systems allows financially dependent industries to grow faster. Beck et al. (2004) revealed that bank concentration increases obstacles to obtaining financing but only in developing countries. This result suggests that the competitive environment in the banking sector enhances economic growth in developing countries.

Another motivation of our study originated from the pioneering work of Galor and Zeira (1993), which assumed financial market imperfection and examined the situation in which a gap exists between the interest rate on deposits and loans. They showed that this gap and the non-convexity of technology are the sources of long-run wealth inequality. However, in their setting, the gap between the interest rate on deposits and loans was exogenously given. Thus, our study explores a model in which the gap between two interest rates is endogenously determined in an oligopolistic bank market and investigates the effect of the size of the gap on economic growth.

We demonstrate the following results. First, an increase in the deposit interest rate increases the steady growth rate of the economy. Second, as the competition among banks intensifies, the economic growth rate increases both when the number of banks is exogenously given and when it is endogenously determined in a free-entry market. Third, whether a higher lending interest rate results in higher economic growth rate is ambiguous. By numerical simulation, we exemplify the possibility that an increase in the lending interest rate increases the growth rate. We also numerically investigate the effect of other structural parameters, such as the number of firms, total factor productivity (TFP), and intertemporal elasticity of substitution on the growth rate.

The remainder of this paper is organized as follows. Section 2 describes the model. Section 3 presents the main result. In Section 4, we conduct several numerical analyses on comparative statics with respect to certain structural parameters, such as the productivity and intertemporal elasticity of substitution. Section 5 presents the concluding remarks.

2. The model

We consider a one-sector OLG model with endogenous growth in a closed economy. In the model, time is discrete, starts at $t = 1$, and never ends. In the economy, perfectly competitive firms produce the final goods and identical banks engage in oligopolistic competition on deposits from individuals and lending to firms. Banks are indexed by $l = \{1, \ldots, N\}$, where N is the total number of banks.

2.1. Individuals

In each period, the economy is populated by young individuals who supply one unit of their labor inelastically and earn wages to either consume or save. The economy is also populated by old individuals who retire and consume the savings that they accumulated during their young period, plus the accrued interest. All individuals are identical and live for two periods. We call the individuals who are young in period t as generation t. L_t^s denotes the number of individuals born in period t. The population grows at the gross population growth rate of $n \equiv L_{t+1}^s/L_t^s - 1(\geq 0)$, which is exogenously given and constant over time.

Generation t chooses consumption levels in their young period t and in their old period $t+1$, (c_t, d_{t+1}) to maximize their utility subject to the budget constraints in their respective young and old periods. We denote the savings and wage of generation t by s_t and w_t. Regarding interest rates, r_{t+1}^e denotes the expected net deposit interest rate that generation t, which made deposits in a bank in period t, receives in period $t+1$, and R_{t+1}^e denotes the expected net lending interest rate that a bank that financed firms in period t receives in period $t+1$. The superscript e stands for expected value.[2]

We denote the deposit into bank l by generation t as $a_{l,t}$. The total amount of deposits into all banks that generation t holds is $a_t \equiv \sum_{l=1}^N a_{l,t}$. For brevity, we normalize the number of stock shares of bank l that generation t holds as unity. Thus, each generation always owns one share of stock of a bank. We denote the stock value of bank l in period t by $v_{l,t}$. Because each generation owns a share in a bank, the total expenditure that generation t made to purchase the shares of all banks is denoted by $v_t \equiv \sum_{l=1}^N v_{l,t}$. We denote the dividend per share of bank l that generation $t-1$ receives in period t as $D_{l,t}$. The total amount of stock dividend received by generation $t-1$ is denoted by $D_t \equiv \sum_{l=1}^N D_{l,t}$. The savings when generation t is young, s_t, is allocated to both bank deposits and the purchase of bank stocks, that is, $s_t = a_t + v_t = \sum_{l=1}^N a_{l,t} + \sum_{l=1}^N v_{l,t}$. Because $v_{l,t+1} + D_{l,t+1}$ stands for the total earnings per share that generation t acquires in period $t+1$, which is the sum of capital and income gains, the stock value of bank l in period $t+1$ corresponds to $(v_{l,t+1} + D_{l,t+1})L_t^s$.

All individuals are price takers. We assume that individuals have an intertemporal utility function with a CIES, as follows:

$$u = u(c_t, d_{t+1}) = \frac{c_t^{1-\sigma} - 1}{1-\sigma} + \beta\frac{d_{t+1}^{1-\sigma} - 1}{1-\sigma}. \tag{1}$$

σ denotes the reciprocal of the intertemporal elasticity of substitution. β denotes the discount factor, and $0 < \beta < 1$ is assumed.

The budget constraints of generation t in young age and old age are, respectively, as follows:

$$c_t + s_t = c_t + a_t + v_t = w_t, \tag{2}$$

$$d_{t+1} = (1 + r_{t+1}^e)a_t + v_{t+1}^e + D_{t+1}^e, \tag{3}$$

where w_t is the wage rate obtained in period t.

[2] Note the difference in notion between net and gross. The gross expected deposit and lending interest rates are $1 + r_{t+1}^e$ and $1 + R_{t+1}^e$, respectively.