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## Liquidity risk and financial competition: Implications for asset prices and monetary policy <sup>☆</sup>

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### ABSTRACT

This paper studies the implications of banking competition for capital markets and monetary policy. In particular, I develop a two-sector monetary growth model in which a group of agents is exposed to liquidity shocks and money is essential. Banks insure depositors against such risk and invest in the economy's assets. In this setting, I compare an economy with a perfectly competitive banking sector to an economy with a fully concentrated financial sector. Unlike previous work, banks can have market power in both deposits and capital markets. Compared to a perfectly competitive financial sector, I demonstrate that a monopolistic banking system can have substantial adverse consequences on capital formation, assets prices, and the degree of risk sharing. Furthermore, multiple steady-states can emerge and the economy becomes subject to poverty traps. More importantly, market power in financial markets may overturn the Tobin effect present under a perfectly competitive financial sector. This necessarily happens in economies with high degrees of liquidity risk and low levels of capital formation.

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### 1. Introduction

The financial sector in general and the banking sector in particular around the globe have been subject to a large wave of consolidations in the past three decades.<sup>1</sup> Recent events in financial markets have only served to speed up this process in the United States and Europe.<sup>2</sup> As the number of financial institutions declines, the degree of competition may be altered, which raises concerns of policy makers. Specifically, this trend in financial markets raises two primary questions: how does the market structure of the banking system affect capital markets and the amount of insurance provided by the banking sector? More importantly, do the effects of monetary policy depend on the industrial organization of the banking sector? The second question is of significant importance because the effects of monetary policy hinge on the way the

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<sup>1</sup> FDIC statistics point out that the number of commercial banks has declined by 50% between 1990 and 2009 in the United States. [Berger et al. \(1999\)](#) provide an overview of consolidations in the financial sector for the United States and Europe between 1984 and 1997. Recent work by [Amel et al. \(2004\)](#) points out to a similar trend in most industrial countries.

<sup>2</sup> For instance, FDIC data indicate that 168 banks failed between 2008 and 2009 in the United States. In addition, there were around 400 mergers over that same period.

banking sector reacts to price changes.<sup>3</sup> If banks are price setters in financial markets, they might behave differently relative to a competitive banking sector.

The objective of this manuscript is to develop a framework that can shed some light on these issues. In particular, I examine a two-period overlapping generations economy that has two production sectors: a capital goods sector and a consumer goods sector. The economy is inhabited by three types of agents: capital producers, depositors, and bankers. Following [Townsend \(1987\)](#), agents are born on one of two geographically separated locations or islands. Private information and limited communication prevent credit from flowing across islands. Money overcomes these trade frictions and it is the only asset that can cross locations. Furthermore, there is a government that adopts a constant money growth rule and rebates its seigniorage income to young depositors in the form of lump-sum transfers.

After trade takes place, a fraction of young depositors is randomly chosen to relocate to the other location. Because money is the only asset that can cross locations, agents must liquidate all their belongings into currency.<sup>4</sup> As in [Schreft and Smith \(1997\)](#), financial intermediaries or bankers completely diversify idiosyncratic shocks. Therefore, all savings are intermediated.<sup>5</sup> In addition to holding cash reserves, banks purchase capital goods, which they rent to consumer goods firms in the subsequent period.

In order to examine the implications of banking structure, I compare two economies. In one economy, the banking sector is perfectly competitive, while in the other, the financial system is fully concentrated.<sup>6</sup> Although few, if any, banks operate in either pure monopoly or perfectly competitive environments, comparing these two extreme cases sheds some light on how the degree of competition affects capital markets and interacts with monetary policy.<sup>7,8</sup>

To begin, I assume that banks enter competitively in deposits and capital markets. Thus, they make their portfolio choice to maximize the expected utility of their depositors. Under a technical condition, a steady-state exists and is unique. Additionally, a higher rate of money creation promotes capital formation. Intuitively, inflation raises depositors' savings through higher transfers, which expands banks' ability to invest in asset markets. The higher demand for new equipment raises their price and lowers their yield.

I proceed by studying the behavior of an economy in which the banking sector is fully concentrated. In contrast to previous work such as [Williamson \(1986\)](#), the bank has market power in both deposit and capital markets. In this manner, the banker extracts all surplus from deposit markets. Further, the bank is a monopsonist in the market for new equipment and a monopolist in the rental market for capital.

Because the bank has market power in financial markets, it has an incentive to restrict investment activity to lower asset prices and raise the return from capital. Therefore, an imperfectly competitive financial sector can have significant adverse consequences on capital markets. Additionally, market power in the market for deposits can lead to a low level of insurance against liquidity risk relative to a competitive banking sector. As I demonstrate in the text, this necessarily happens when the level of total factor productivity is below some threshold level.

Moreover, market power in banking is a source of multiplicity of equilibria. In particular, there can be either a unique steady-state or two steady-states. Specifically, multiple steady-states arise when agents' degree of exposure to liquidity risk is significant. Because market power can lead to multiplicity of equilibria, the economy is subject to poverty traps. That is, the economy could end up with a significantly low level of investment and inefficiently low asset prices.

In contrast to the economy with a perfectly competitive banking sector, the effects of monetary policy depend on the degree of liquidity risk in the economy and the extent of economic development. When the banking sector is concentrated, inflation affects the economy through two primary channels. First, a higher rate of money creation raises deposits through higher transfers. This enables the bank to expand its portfolio and to increase capital investment.

Furthermore, inflation affects the amount of insurance the bank is willing to provide. In particular, a higher rate of money growth reduces the return to relocated agents. Because the banker extracts all the surplus from deposit markets, a higher inflation rate encourages him to hold a more liquid portfolio. Therefore, inflation hampers capital formation through this channel.

When the need for liquidity is not too significant, the steady-state is unique and the impact of inflation through government rebates dominates. Consequently, a higher rate of money creation raises investment activity as under a perfectly banking system. The higher amount of capital formation raises the price of capital and reduces its rental rate. Therefore, inflation adversely affects the return to capital.

<sup>3</sup> Concentration in the financial sector can also have important consequences on financial and economic stability. This issue has been extensively examined in the literature. [Allen and Gale \(2004\)](#) and [Boyd and De Nicoló \(2005\)](#) provide a nice overview of the literature.

<sup>4</sup> Random relocation shocks are analogous to liquidity preference shocks in [Diamond and Dybvig \(1983\)](#).

<sup>5</sup> This necessarily happens because banking services are costless to access.

<sup>6</sup> I follow [Boyd et al. \(2004\)](#) by comparing two economies. The first economy has  $N > 1$  bankers that engage in price competition in deposits and capital markets. The second economy has one banker that has market power in financial markets.

<sup>7</sup> In a sample of 74 countries, [Beck et al. \(2004\)](#) report that banking concentration ranges from 18% in the U.S. to 100% in Belize.

<sup>8</sup> As I discuss in [Section 5](#), a more general examination of banking concentration can be studied by allowing banks to engage in a Cournot Nash multi-product competition as in recent work by [Corbae and D'Erasmus \(2011\)](#). In their study, Corbae and D'Erasmus investigate the implications of banking industry dynamics for borrowers' default frequencies. Specifically, they calibrate a model with endogenous bank entry to match U.S. data, and demonstrate that borrowers are more likely to default on their loans in a more concentrated banking system. As in [Boyd and De Nicoló \(2005\)](#), banks are Cournot–Nash competitors in credit markets in their model. However, banks are Price–Nash competitors in deposit markets. Notably, their work does not emphasize the implications of banking structure for asset prices and monetary policy.

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