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Financial market participation, financial intermediation, and monetary policy

Edgar A. Ghossoub *

Department of Economics, One UTSA Circle, The University of Texas at San Antonio, San Antonio, TX 78249, United States

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ABSTRACT

It is not uncommon for the Friedman rule to be optimal in neoclassical models with money. Notably, previous studies also find that financial intermediation is not welfare improving when money is costless to hold. This paper departs from previous studies by highlighting the importance of participation costs in financial markets for the participation in financial intermediation and monetary policy. As in previous work, the Friedman rule is optimal. However, I demonstrate that the welfare gains from disinflation are much higher when savings are intermediated if direct participation costs in financial markets are significant. Consequently, financial intermediation can still be optimal at the Friedman rule.

1. Introduction

Standard neoclassical models with money often find that the Friedman rule is optimal.[1] However, monetary growth models with an endogenous role of financial intermediaries, demonstrate that banks do not improve welfare when money is costless to hold.[2] In a setting where agents are subject to idiosyncratic liquidity risk, the gains from intermediation depend strictly on the ability of intermediaries to provide risk sharing services and the cost of intermediation services. When money and other assets yield the same rate of return, agents can completely insure themselves against liquidity risk. Therefore, agents have no incentive to incur an additional cost to intermediate their savings.

Notably, previous work assumes that it is costless to participate directly in financial markets. However, as pointed out by Allen and Santomero (1998), costs of direct financial participation had significant implications for financial intermediation in the United States between 1980 and late 1990s. In particular, the authors point out that direct participation costs in financial markets have increased significantly over that time period.[3] Such costs may explain the decline in households' direct participation in capital markets and the increase in the reliance on mutual funds as a source of investment. Financial intermediaries such as mutual funds firms have low participation costs and thus provide an efficient channel for investors with high direct participation costs.

This paper highlights the importance of participation costs in financial markets for the participation in financial intermediation and monetary policy. In particular, I examine an economy where direct participation in financial markets is costly, money is essential, and financial intermediaries form endogenously. As in previous work, the Friedman rule is optimal. However, I demonstrate that the welfare gains from disinflation are much higher when savings are intermediated if direct participation costs in financial markets are significant. Consequently, financial intermediation can still be optimal at the Friedman rule.

This paper is organized as follows. In Section 2, I describe the model and study the behavior of agents. I offer concluding remarks in Section 3.

2. Environment

Consider a discrete-time economy with two geographically separated locations or islands. Each location is populated by an infinite sequence of two-period lived overlapping generations. Let $t = 1, 2, \ldots, \infty$, index time. At the beginning of each time period, a continuum of young individuals is born on each island with measure $N > 1$.

Each agent is endowed with x units of perishable goods during her young age and receives no endowments when old.

* Tel.: +1 210 458 6322.
E-mail address: Edgar.Ghossoub@UTSA.edu.

1 Previous work includes Ireland (1996) and Chari et al. (1996) among others.

2 See for example Bencivenga and Smith (2003) and Smith (2003).

3 While trading costs have declined, the opportunity cost of investors has increased significantly due to higher wages for example. Therefore, the total cost of direct participation in capital markets has increased significantly.

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Further, agents derive utility from consuming the economy's single consumption good, c when old. The preferences of a typical agent are expressed by $u(c) = \frac{c^{1-\theta}}{1-\theta}$, where $\theta \in (0, 1)$, is the coefficient of risk aversion.

While agents do not receive endowments in their old-age, they can save their young age income in financial markets. In particular, agents can invest in an irreversible and illiquid investment project (or technology) and hold cash reserves. For each unit of goods allocated to the technology in period t, agents receive $r > 1$ units of consumption in $t + 1$ and zero units if the investment is liquidated early. Assuming that the price level is common across locations, I refer to P_t as the number of units of currency per unit of goods at time t. In this manner, one unit of goods invested in cash in t generates $\frac{P_t}{P_{t+1}}$ units of goods in the subsequent period.

Following Townsend (1978), participation in financial markets is costly. In particular, each agent incurs a fixed cost, $T < x$, in units of goods from investing directly in the economy's assets. Since the cost is lump sum, agents wish they could pool their funds and invest all at once to lower trading costs.

Denote the per capita nominal monetary base and investment in the project, by $\tilde{m}_t$ and i_t respectively. At the initial date 0, the generation of old agents at each location is endowed with the aggregate money supply, M_0. Finally, define $m_t = \tilde{m}/P_t$ to be the real supply of money per person in period t.

Moreover, individuals in the economy are subject to relocation shocks. Each period, a fraction of young agents must move to the other island. These agents are called "movers". Limited communication and spatial separation make trade difficult between different locations. As in standard random relocation models, fiat money is the only asset that can be carried across islands.[4] Since money is the only asset that can cross locations, agents who learn that they will be relocated will liquidate all their asset holdings into currency.

In the absence of financial intermediation, agents self insure against liquidity risk by investing directly in financial markets. Due to idiosyncratic shocks, agents have an incentive to cooperate. Specifically, each agent j has the ability to cooperate with other members of its own generation to form a coalition. Agents that agree to form a coalition pay as a group, a one time fixed cost, $F\epsilon\ (x, Nx)$. Therefore, as in Townsend (1978), agents engage in a cooperative game. Each coalition or financial institution lasts for two periods and provides a number of financial services. First, if the number of depositors in the coalition is large enough (infinite), the bank can completely diversify idiosyncratic shocks. Thus, a financial intermediary provides liquidity services and prevents excessive cash holding. In this economy, N coalitions of this size can be supported.[5]

Additionally, due to increasing returns to scale to investment, financial intermediaries can reduce the costs of participating in financial markets by spreading the costs over a large number of depositors. The ability of banks to reduce trading costs depends on the number of banks in the banking sector. In particular, increasing returns to scale can only be realized if the number of coalitions formed, n does not exceed N. For example, suppose two coalitions of equal size are formed. The cost of investing in financial markets per person in each coalition is $\frac{T}{N/2} \gtrless T$. Thus, economies of scale are realized in this example if $N > n = 2$. In this manner, financial intermediaries play an important role in reducing participation costs in financial markets—a role generally ignored in previous work with liquidity risk such as Schreft and Smith (1997).

4 Currency is accepted in both locations because it is universally recognized and cannot be counterfeited.

5 This necessarily has to happen for the law of large numbers to hold. In this manner, there can be at most N infinite subsequences of unit mass each.

In addition to depositors, there is a central bank that follows a constant money growth rule. The aggregate nominal stock of cash in period t is expressed by $M_t = \sigma M_{t-1}$, where $\sigma > 0$ is the gross rate of money creation (or destruction when $\sigma < 1$). In real per capita terms:

$$m_t = \sigma \frac{P_{t-1}}{P_t} m_{t-1}. \tag{1}$$

The government uses seigniorage income to finance an endogenous sequence of spending. Denote real government spending per capita by g_t, with:

$$g_t = \frac{\sigma - 1}{\sigma} m_t.$$

Following Huybens and Smith (1999), government spending does not affect agents' portfolios in the economy.

2.1. Welfare under direct investment

Suppose agents participate directly in financial markets by incurring a participation cost, T. As agents do not value young age consumption, all income is saved in cash reserves and the long term project:

$$x = m_t^a + i_t^a + T \tag{2}$$

where m_t^a and i_t^a denote respectively the amount of cash balances and investment per person under financial autarky.

If an agent is forced to relocate, he will lose his investment in the long term project and thus his consumption in $t + 1$, c_{t+1}^m will stem from cash balances on hand:

$$c_{t+1}^m = m_t^a \frac{P_t}{P_{t+1}}. \tag{3}$$

Despite that money is dominated in rate of return, agents will end up holding excess cash reserves in the event they do not relocate. This happens because money is the only form of insurance in the absence of financial intermediation. Thus, if an agent does not relocate, his consumption, c_{t+1}^n comes from cash reserves and the return on the investment project:

$$c_{t+1}^n = m_t^a \frac{P_t}{P_{t+1}} + r i_t^a. \tag{4}$$

Agents make their portfolio choice to maximize their expected utility. The problem facing a typical agent under financial autarky is summarized by:

$$u^a = \underset{c_{t+1}^m, c_{t+1}^n, m_t^a, i_t^a}{Max} \frac{1}{1-\theta} \left(\pi \left(c_{t+1}^m\right)^{1-\theta} + (1-\pi) \left(c_{t+1}^n\right)^{1-\theta} \right) \tag{5}$$

subject to (2)–(4).

Define $I_t = r\frac{P_{t+1}}{P_t}$ to be the gross nominal return to the investment project between t and $t + 1$. The portfolio choice of a typical agent under direct investment is such that:

$$m_t^a = \gamma^a (I_t)(x - T) \tag{6}$$

where $\gamma^a (I_t) = \frac{m_t^a}{(x-T)} \in (0, 1]$ is the fraction of savings allocated towards money balances, with

$$\gamma^a (I_t) = \frac{1}{\left(1 - \frac{1}{I_t}\right) \left(1 + \left(\frac{1-\pi}{\pi}\right)^{\frac{1}{\theta}} (I_t - 1)^{\frac{1-\theta}{\theta}}\right)} \quad \text{if } I_t > \frac{1}{1-\pi}$$
$$\gamma^a (I_t) = 1 \quad \text{if } I_t \leq \frac{1}{1-\pi}. \tag{7}$$

While agents hold cash reserves to insure themselves against relocation shocks, they also value income. Therefore, agents hold