行政院國家科學委員會專題研究計畫　成果報告

流動性貼水，銀行放款，與資產定價

計畫類別：個別型計畫
計畫編號：NSC93-2415-H-002-011-
執行期間：93 年 08 月 01 日至 94 年 07 月 31 日
執行單位：國立臺灣大學經濟學系暨研究所

計畫主持人：陳南光

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摘要

本計畫的目的是要同時從企業對流動性的需求與銀行流動性供給的角度，解釋在均衡之下有可能產生相當高的流動性貼水。當未來的投資機會不確定時，企業主受限於所持有的可作爲擔保品的資產，面臨來自銀行的流動性限制。同時，銀行也受限於自身的放款能力，可能無法適時提供足夠的流動性。於是，企業主必須事前選擇投資在流動性高的資產上，以備不時之需。我們發現，即使在風險中立下，流動性貼水仍可存在。流動性貼水與企業主所可能受到信用限制的機率以及所受到信用限制的程度成正相關。我們預期在合理的參數之下，可以得到相當高的流動性貼水。而金融中介可適度降低流動性貼水。

關鍵詞

流動性貼水，資產定價，銀行放款

Abstract

The objective of this project is to study how liquidity premia can arise in equilibrium due to both corporate demand for liquidity and the supply of bank loans. Entrepreneurs with uncertain investment opportunities thus face potential liquidity constraints from banks due to their limited collateralizeable asset holdings; the willingness and ability of a bank to lend is also constrained by its own capital position. It shows that liquidity premium can exist even if agents are risk neutral. The premium is positively related to the probability that agents have access to production technologies that are susceptible to credit constraints and the extent that they be credit constrained. Since financial intermediaries can reduce the credit constraints faced by agents, they can reduce the liquidity premium. Furthermore, an increase in the amount of funds available in the intermediary sector can reduce the premium.

Key words

Liquidity premium, asset pricing, bank lending

計畫緣由與目的

Recent works on capital market imperfections show that because of frictions in the capital market (See, for example, Bernanke and Gertler (1989), Kiyotaki and Moore (1997, 2001)), entrepreneurs can be credit constrained, i.e., they may not be able to raise sufficient external funds to finance to optimal level of investments. As a result,

the level of investment that they can undertake depends on their liquefiable net worth positions. Hence, the liquidity of assets matters - liquidity refers to the ability that an asset can be sold in short notice without incurring much loss. Liquidity matters because it affects the ability of agent to seize investment opportunities when they arise. However, few existing works on capital market imperfections have addressed issues related to asset liquidities. The objective of this paper is to study how liquidity can affect the market value of an asset in the presence of capital market imperfections.

This paper adopts an environment where risk neutral agents have access fund now that can be saved for the future. They can choose from two different types of assets, one is perfectly liquid and the other one is illiquid. Furthermore, they face the possibility of having access to production opportunities in the future and they can choose the level of production. If there is no friction in the capital market, then the agents will always be able to raise sufficient funds to finance the first best level of production when the opportunities arise. That is, they will never be credit constrained and hence their net worth positions will not affect their abilities to seize the production opportunities when they arise. As a result, the production decision in the future and the current portfolio choice will be independent. Furthermore, the price of the illiquid asset will simply be the present value of the benefits that it generates directly for its holders, or what standard finance textbooks would refer to as its fundamental value.

To study the effects of capital market imperfections on asset pricing, this paper adopts the moral hazard problem considered in Holmstrom and Tirole (1997). Due to the moral hazard problem, agents cannot raise sufficient external funds to finance the first best production level when they have access to production opportunities in the future. That is, they can be credit constrained and the production level that they can achieve will depend on the amount of internal funds they have when the production opportunities arise. The internal funds they have in the future in turn depend on their initial wealth and their current portfolio choice. Hence, when agents make their current portfolio choice, they take into consideration the liquidity risk that they may face in the future. Therefore, in contrast to the frictionless environment, the current portfolio choice and the future production decision are not independent. In particular, in order to hedge against the potential liquidity risk, agents will prefer to hold liquid assets. Thus, the value of the illiquid asset depends not only on the benefits that it generates directly for its holder but also on how it affects the ability of the agents to seize

the production opportunities when they arise. In particular, since the illiquid asset can reduce the amount of liquefiable net worth of the agents and hence leads to a loss in terms of the output that the agent can potentially achieves in the future, its price can fall below its value in a frictionless environment. Hence, the price of the asset may not be equal to what standard finance textbooks refer to as its fundamental value. The discount in price translates to premium in terms of returns. That is, liquidity premium can exist even though agents are risk neutral. Furthermore, the premium will depend on the probability and the extent that the agents be credit constrained in the future - in a frictionless environment, these factors would not have any effects on asset pricing. Hence, by considering asset pricing in an environment with capital market imperfections, this paper identifies new source of factors that can potentially affect asset prices.

It has been widely accepted that an important function of financial intermediaries is to screen and monitor the borrowers. Furthermore, because of their screening and monitoring activities, they can reduce the extent to which firms are credit constrained. On the other hand, this paper shows that the liquidity of assets matters because it affects the ability of agents to hedge against liquidity risk. Thus, if the presence of financial intermediaries can reduce the liquidity risk faced by individual agents, it will also affect the price of illiquid assets. Hence, this paper adopts a version of the model in Holmstrom and Tirole (1997) and studies the role of financial intermediaries in asset pricing. Relative to an environment without financial intermediaries, this paper shows that the presence of financial intermediaries can reduce the need of individual agents to hedge against liquidity risk and hence reduce the liquidity premium. Nevertheless, since the amount of funds available in the intermediary sector can affect the liquidity risk of agents, it will also affect the price of the illiquid asset. In particular, if there is a drop in the amount of funds available in the intermediary sector, agent will have to rely more on their own to hedge against liquidity risk and hence liquidity premium increase. Thus, the presence of financial intermediaries will add another source of factors that can potentially affect asset prices, namely the amount of funds available in the intermediary sector.

結果與討論

The issue of how the possibility of being credit constrained in the future could affect the current portfolio choice of agents and hence the pricing of assets has also been studied by Holmstrom and Tirole (2001). However, the environment and the notion of liquidity vary in the two papers. In Holmstrom and Tirole (2001), net worth positions of agents are

realized in the future and agents can sign state contingent contracts to hedge against the fluctuations in their net worth positions. Thus, the liquidity of an asset is its ability to hedge against the fluctuations in the net worth positions of entrepreneurs in the future. On the other hand, this paper defines liquidity as the ability that an asset be sold in short notice without incurring much loss. Furthermore, this paper studies how agents make their portfolio choices given their initial endowments.

In Proposition 1 we show that in the presence of moral hazard, the price of the illiquid asset does not depend solely on the non-pecuniary benefits that it generates directly for its holder – it will also depend on other factors which standard finance textbook would not consider as factors that affect the "fundamental value" of the asset. In particular, the price of the asset is at a discount relative to its "full" value in the benchmark case without moral hazard. The discount in price translates to premium in terms of returns. Thus, the above proposition shows that liquidity premium can exist even though all agents are risk neutral. Furthermore, the higher the probability that agents have access to the production technology (that are susceptible to moral hazard and hence credit constraint), the more likely that they be credit constrained at *t=1* and hence the liquidity premium will be higher (i.e., the price of the illiquid asset will be lower at *t=0*). Second, the higher the liquidation value of the illiquid asset and the higher the agent's initial wealth at *t=0*, the less serious they will be credit constrained at *t=1*. As a result, the liquidity premium will be lower (or the price of the illiquid asset will be higher at *t=0*). Hence, proposition 1 shows that in an environment with capital market imperfections, factors that affect the probability and the extent that agents be credit constrained in the future will affect the price of illiquid assets even though these factors may not affect the benefits generated directly by the asset.

Furthermore, the role of financial intermediaries arises in the model because they can monitor the entrepreneurs. As a result, relative to the environment without intermediaries, as shown in Proposition 2, entrepreneurs will be able to raise more external funds and hence they will be less constrained. Therefore, the cost associated with holding the illiquid asset will be lower and hence reduce the discount in its price. Furthermore, the amount of funds available in the intermediary sector can affect the liquidity premium. In particular, an increase in the funds available in the intermediary sector can increase the amount of (monitored) external funds available to the entrepreneurs and hence reduce the liquidity risk faced by agents ex ante. Therefore, liquidity premium will be lower.

計畫成果自評

The objective of this paper is to study the

implications of capital market imperfections on asset prices. In particular, it studies how liquidity is valued in an environment with capital market imperfections. Liquidity is defined as the ability that an asset can be sold in short notice without incurring much loss. Capital market imperfections arise from moral hazard. The main results of the paper are as follows. First, liquidity premium exists because agents anticipate the possibility of being credit constrained in the future. Second, the premium depends positively on the probability and the extent that agents be credit constrained in the future. Third, the presence of financial intermediaries which monitor the borrowers can reduce the credit constraints faced by agents. Therefore, it can reduce the need of agents to hedge against liquidity risk on their own and hence reduce the liquidity premium. Furthermore, the amount of funds available in the intermediary sector will affect the liquidity premium. These results are in sharp contrast to the ones in a frictionless environment. Without any capital market imperfections, the liquidity of assets will not matter when agents are risk neutral. Hence, the liquidity of an asset will not affect its value and the presence of financial intermediaries will have no effect on liquidity premium.

To sum up, this paper shows that liquidity premium can arise even with risk neutrality and identifies new source of factors that can potentially affect prices of illiquid assets. These factors might be particularly important in understanding valuations of illiquid assets like properties.

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