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Corporate liquidity, investment and financial constraints: Implications from a multi-period model

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Abstract

In single period models, financially constrained firms invest more in response to increases in their net worth or interest rate cuts. We examine whether or not these results necessarily hold in a multi-period setting. We present a multi-period version of the Holmstrom and Tirole moral hazard model and show that the *probability* of investment (or the hurdle rate for investment) in the first period of a two-period model is non-monotonic in the level of liquid balances [Holmstrom, B., Tirole, J., 1997. Financial intermediation, loanable funds, and the real sector. Quart. J. Econ. 112 (3), 663–691. August; Holmstrom, B., Tirole, J., 1998. Private and public supply of liquidity. J. Polit. Economy 106 (1), 1–40. February; Holmstrom, B., Tirole, J., 2000. Liquidity and risk management. J. Money, Credit, Banking 32 (3), 295–319. August]. When a risk-free interest rate is introduced in the model, we show that a lower interest rate (or a downward shift or the yield curve) can lead to *less* current investment due to the interaction of future financial constraints and discounting of cash flows. Our results have implications for the effect of monetary policy on investment by financially constrained firms. They also address several recent empirical debates, such as the relationship between liquidity and the cash-flow sensitivity of investment, and whether or not accumulation of cash balances by Japanese firms can be consistent with the existence of financial constraints affecting investment.

JEL classification: E0; E3; E5; G3; G32

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1. Introduction

Why does more balance-sheet liquidity sometimes fail to stimulate investment by financially constrained firms? Why does investment not respond at times to lower interest rates? A large literature has developed based on the idea that an increase in liquidity or net worth has a positive impact on the investment levels of financially constrained firms. In this paper, we argue that in a multi-period context where firms have the option of allocating their liquidity *intertemporally*, such a presumption is not valid in general. If firms have more liquid balances and these liquid balances can be carried into future periods, then firms are less likely to be financially constrained in the future as well. Since the risk of not being able to take projects in the future—should they pass up on projects today—is lower, firms may become more conservative in their project choice *today* as their liquidity position improves. In other words, investment may *decline* today (equivalently, the hurdle rate for projects increase) as firms' liquid balances increase.

Such a perverse relationship between liquidity and investment has important policy implications. For example, the result suggests that the ability of monetary policy to stimulate firm investment and hence aggregate demand through the balance sheet channel may be may be much more limited in scope than previously thought.[2] In recessions, firms tend to accumulate cash balances as investment opportunities become less attractive. Our results show that since they are also likely to be more conservative in terms of current investment when they have larger cash balances, there is an additional channel through which investment may be affected in a downturn.

When interest rates change, we show that the interaction of financial constraints and the expected cost of borrowing in the present and the future can also have perverse effects on firms' incentives to invest. In particular, if there is a parallel downward shift in the yield curve (i.e., an equal decrease in both the first and second-period interest rates), investment in the first period decreases. The lower *current* borrowing rate increases the attractiveness of current projects and encourages current investment. However, the lower expected *future* borrowing cost also makes future projects more attractive than before. If the projects are risky, financial constraints play a role in determining the choice between current and future projects. Since failure of the current projects would imply that financially constrained firms are unable to undertake the now more attractive future projects, lower future borrowing costs tend to favor postponement of current projects. Therefore, for a positive impact on investment to occur, the yield curve has to become more positively sloped as well. This result is consistent with Estrella and Mishkin's (1998) well known result that an inverted yield curve is a precursor of recessions. It is also worthwhile to think of this result in the context of recent Japanese monetary policy. Japan has responded to deflationary conditions by setting short-term money market interest rates to zero while simultaneously engaging in quantitative easing in which the central bank has sharply increased the base money supply through orthodox and unorthodox means. One implication and potential goal of

[2] The balance sheet channel refers to the impact of monetary policy on firms' balance sheets, such as their liquid balances or net worth. For example, lower interest rates will reduce firms' short term interest expenses, thereby improving their net income. This is supposed to have a positive impact on the investment levels of financially constrained firms. See Fazzari et al. (1988), Bernanke and Gertler (1989, 1995), Gertler (1992), and Bernanke et al. (1996, 1998), for expositions of how financial market imperfections affect the impact of monetary policy on firms' investment decisions and real sector activity.