Optimal Monetary and Macroprudential Policy: Gains and Pitfalls in a Model of Financial Intermediation

Michael T. Kiley           Jae W. Sim

March 28, 2014
THEORETICAL FRAMEWORK

• Financial intermediation sector in a standard New Keynesian model.

• Banks intermediate funds from households (with debt and equity) to firms (to fund capital).

• The financial structure of banks is determined by the following assumptions:

  1. Tax deductability of interest payments.  
     Debt is preferred to equity (pecking order).
  2. Costly default on debt.  
     This limits leverage because of increasing cost of debt.
  3. Raising external equity (negative dividends) is costly.  
     This induces precautionary behavior in the choice of debt.
MAIN FINDINGS

1. When the economy is hit by financial shocks, the optimal interest rate policy brings large welfare gains.

2. Augmenting a simple Taylor rule with a reaction to credit does not improve welfare much.

3. With an optimal tax on debt (macro-prudential), an optimal interest rate policy brings much smaller welfare gains.
WELFARE CALCULATION
Simple vs. Optimal Policy

Figure 5: Welfare Under A Simple Rule for the Nominal Interest Rate
Note: Upper panel: New-Keynesian calibration. Lower panel: Financial-intermediation calibration. The translucent surface at zero represents welfare under the optimal (Ramsey) rule for the nominal interest rate. The surface below this benchmark reports welfare (as a percent of steady-state consumption) under the nominal interest rate rule which responds to inflation and the change in output.

expressed in units of consumption, relative to the optimal policy for alternative combinations of the monetary policy rule coefficient on inflation (the x-axis) and on output growth (the y-axis); importantly, the response to credit in the monetary policy rule is set to zero in these parameterization of the simple rule. For example, a value of -0.5 would indicate that the associated parameterization of the policy rule delivers a level of welfare that is lower than that of the optimal policy by 1/2 percent of steady-state consumption.

Three results are apparent. First, the welfare surfaces for combinations of the coefficients on inflation and output growth are very flat. Second, under the New-Keynesian calibration, the simple rule achieves essentially the same level of welfare as the optimal policy (a result that is fairly standard for rules in the change in the nominal interest rate that respond to inflation and output growth, e.g. Chung, Herbst, and Kiley (2014)).

across calibrations.
WHY ARE THE WELFARE NUMBERS SO BIG?
Figure 8: Impulse Response Following a Positive Innovation To the Cost of Capital

Note: Yellow diamonds – efficient response; green circles – simple monetary policy with coefficients of 0.5 on inflation and change in output; red squares – simple monetary policy with the same coefficients on inflation and change in output and 0.05 on response to credit (relative to output).

mediaries is modified into

\[ m_t + \tau m_t (1 - m_t) \]

\[ Q_t S_t + N_t - D_t + \varphi \min \{ 0, D_t \} \]  

(26)

When an intermediary invests in the risky asset, the accounting marginal cost of investment is given by its capital ratio \( m_t \). However, the economic marginal cost of such investment is \( E \epsilon_t [\lambda_t] m_t \), which can deviate from the accounting cost \( m_t \) because the expected shadow value of one dollar is not always equal to one dollar, particularly when a financial intermediary faces a difficulty in raising external funds. \( E \epsilon_t [\lambda_t] \) summarizes the liquidity condition of a given intermediary. Inefficient fluctuations in liquidity conditions can then distort the efficient balance of the marginal costs and benefits of investment projects. For instance, during good times, the shadow value of internal funds may be unusually low, prompting over-investment, which then lead to a further improvement in the liquidity condition due to rising asset prices. During bad times, the same mechanism applies, but in the opposite direction.
KEY TO UNDERSTAND THE WELFARE CALCULATIONS

- The welfare numbers are calculated by comparing Steady States.

- My conjecture is that in the steady state with the optimal policy there is a higher stock of capital.

- If my conjecture is correct, the welfare calculations are not very informative.
MODEL WITHOUT FINANCIAL FRICTIONS

Marginal return of capital

Marginal cost of capital
MODEL WITH FINANCIAL FRICTIONS AND NONSTOCHASTIC COST OF FINANCING

Marginal cost of capital

Marginal return of capital

Tax benefit

Capital, K
MODEL WITH FINANCIAL FRICTIONS AND
STOCHASTIC COST OF FINANCING

Investment

Marginal cost of capital

Marginal return of capital

Tax benefit

Investment
MODEL WITH FINANCIAL FRICTIONS AND STOCHASTIC COST OF FINANCING

Marginal cost of capital

Marginal return of capital

Capital, K

Tax benefit
WHAT DOES THE OPTIMAL POLICY DO?
MODEL WITH FINANCIAL FRICTIONS AND STOCHASTIC COST OF FINANCING
MODEL WITH FINANCIAL FRICTIONS AND STOCHASTIC COST OF FINANCING

Tax benefit

Capital, $K$

Marginal cost of capital

Marginal Return of capital
CAPITAL STOCK IN STEADY STATE
(STYLIZED CONDITION)

\[ \alpha K^{\alpha - 1} = \frac{1}{\beta} (1 - \tau)(1 + p) \]

Marginal product of capital = Marginal cost of capital

- \( \tau \) = Tax benefit of debt.
- \( p \) = Expected premium in the financing cost.
Sequence of output with and without optimal policy

With optimal policy

With simple policy

Time
Sequence of output with and without optimal policy

With optimal policy

With simple policy

Time
CENTRALITY OF THE INTERMEDIATION SECTOR

- Recent contributions have proposed new models with a more prominent role for financial intermediaries.

- In many cases, the new models simply relabel ‘firms’ as ‘banks’:
  - In previous models firms were facing financial frictions while the financial intermediation sector was frictionless.
  - In the new models firms are frictionless or fully dependent on banks but financial intermediaries face financial frictions.

- The current paper is part of these contributions:
  - Banks are similar to firms in the costly-state verification model.
  - However, banks pay negative dividends at a cost and this introduces precautionary investment.
QUESTIONS

1. What is the advantage of focusing on banks rather than firms?

2. If the collapse in economic activity derives from the lack of financing from banks, how can we reconcile the fact that nonfinancial corporations hold large stocks of liquid assets?

3. The counter argument is that problems in financial intermediation affect households, not firms.
MORE SPECIFIC COMMENTS

• There is no formal description of the Ramsey problem and its analytical properties.

• There is no information about the transitional dynamics in the implementation of the Ramsey policy.

• It would be informative to understand show the dynamics of \( Q \) (price of capital).
CONCLUSION

• Interesting paper.

• Clever modeling of the intermediation sector that keeps tractability.

• If my conjecture is correct, it would be very interesting to explore the impact of cyclical policies on the long-term level of the macro-economy (in addition to the business cycle implications).