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I. What is the question?

What are the welfare implications of the following three monetary policies: the Taylor-type interest rate rules, the counter cyclical loan-to-value (LTV) ratio, and the direct credit market interventions?

II. Why should we care about this?

Since the financial crises in 1997 and 2008, many central banks have adopted more and more unconventional monetary policies such as the counter cyclical LTV ratio and the direct credit market interventions other than the Taylor-type interest rate rules. However, we may not be sure whether those unconventional policies are really beneficial to our economies, and this paper provides a general framework to help us make it clear.

III. What is the answer?

1. Both the counter cyclical LTV ratio and the direct credit market interventions are Pareto improving.
2. Aggressive direct credit market interventions enhance the social welfare and the entrepreneur's welfare the most.
3. The interest rate rule responding to output gap and inflation enhances the household's welfare the most.

IV. How did you get there?

The conclusion in III is attained through the following steps:

1. Construct a DSGE model.
2. Analyze the welfares without governmental interventions in different kinds of shocks.
3. Consider the monetary policies in the model and re-analyze the welfares.
4. Compare the results in 2 and 3 and conclude.

List of Important Notations

I. Household
   1. γ_{ch}: Habit in consumption
   2. γ_{h}: Habit in real estate
   3. A_{ht}: Housing demand shock
   4. A_{nt}: Labor supply shock
   5. j_h: Weighting on housing services
   6. j_n: Weighting on labor supply
   7. ρ_h: Autocorrelation of housing demand shock
   8. ρ_n: Autocorrelation of labor supply shock
   9. Ω_h: Adjustment cost of housing
   10. $\prod_t$: Profit paid to household

II. Financial Intermediaries
   1. B_t: Fund supplied to entrepreneurs
   2. N_t: Net worth of the financial intermediaries
   3. φ_t: leverage ratio of the intermediary
   4. $z_{t,t+1} = N_{t+1}/N_t$
   5. $x_{t,t+1} = B_{t+1}/B_t$
   6. ω: Proportional transfer to the entering bankers
   7. θ: Survival rate of the bankers

III. Entrepreneurs
   1. Y_t: Intermediate goods
   2. A_{zt}: Technology shock
   3. α: Capital share in the production function
   4. ξ: Housing share in the production function
   5. Ω_h: Adjustment cost of housing
   6. Ω_k: Adjustment cost of capital
   7. ρ_z: Autocorrelation of technology shock
   8. m: LTV ratio

IV. Government policies
   1. r_i: Interest rate smoothing parameter
   2. r_π: Inflation coefficient in the Taylor rule
   3. r_y: Markup coefficient in the Taylor rule
   4. φ_{ct}: Leverage ratio for total intermediated funds
   5. ρ_c: Feedback parameter of the credit spread

V. Prices
   1. w_t: Wage
   2. q_t: Housing price

3. μ_{bt}: Multiplier associated with the entrepreneur's borrowing constrain
4. μ_{kt}: Multiplier for the entrepreneur's capital accumulation equation
5. R_t^d: Real gross interest rate for depositors (households) from t to t+1
6. R_t: Real gross interest rate for lending funds to the entrepreneurs from t to t+1
7. i_t: net nominal interest rate
8. P_t^w: The price of intermediate goods

<u>實際應用之例：</u>

美國在 2008 年金融海嘯後，為了控制信貸市場不致於崩解，不僅提供了大量的流動性(direct market interventions)，也實施了 LTV，對於之後美國金融市場的安定發揮了極大的作用，算是對本篇論文的一個映證。

我國央行為了監管房市，除了傳統的貨幣政策以外，亦有透過 LTV 的方式對房市管控，避免公司炒作房地產。故該篇論文之結論亦可用以檢視我國央行監管房市所產生的福利效果。