Recap Information

"Monetary Economics: Macro Aspects," Spring 2010
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May 31, 2010

The lecture slides associated with this part of the course, clearly provide the most comprehensive information about what I find of relevance. Nevertheless, this note lists the key concepts that you are supposed to know and be able to explain within each of the seven main subjects listed on the reading list.

Part I

Introduction and "Does monetary policy matter for output and prices?"

Key concepts you should know

- The long-run correlations between inflation, nominal interest rates and nominal money growth
- The (potential) long-run correlations between inflation, nominal money growth and output
- The (approximately) vertical long-run Phillips curve
- Short-run effects of money on output: Causality problems
- St. Louis regressions

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- The Lucas critique of simple regressions of money on output
  - Observational equivalence
  - Only unanticipated money may have effects on output; yet, St. Louis estimations may look as if systematic money matters
  - Dependence of estimated parameters on policy regime => shift in policy regime renders parameter estimates based on pre-policy shift data irrelevant
- VAR analyses and identification problems
- VAR analyses and problems with choosing the "right" monetary policy variable
- Consensus finding from VAR literature: Negative money shocks have negative and "hump-shaped" effects on output
- The "prize puzzle" and potential "solutions"
- Structural econometric models and their problems
- The narrative approach
- Examination of disinflations: Identification and credibility issues

Part II
Money's role in flexible-price general equilibrium models

Key concepts you should know

Money in the utility function

- Dynamic programming method of deriving optimal household behavior
- Interpretation of the first-order conditions for optimal behavior
- Elimination of the partial derivatives of the value function
- Steady-state properties of the simple MIU model
- Superneutrality or not?
- Real money holdings and the nominal interest rate
- The Fisher relationship
- The optimal rate of inflation

- The Friedman rule
- Welfare costs of inflation
- What can generate non-superneutrality in a MIU model?
- MIU model with endogenous labor; the consumption-leisure trade off
- Properties of utility function determining superneutrality or not
- Constant relative risk aversion utility function
- Distinction between effects of anticipated and unanticipated inflation
- Stochastic version of MIU model
- Requirement on money supply process to obtain non-supernetrality
- Role of money shocks for the real economy

Shopping-time models

- The relationship between shopping time, consumption and real money holdings
- The utility function as an indirect function of real money balances
- The consumption leisure trade-off and the impact of an increase in real money
- Optimal money demand and the optimal quantity of money in the dynamic shopping-time model

Cash-in-advance models

- The Cash-in-Advance constraint
- The Lagrange multiplier on the CIA constraint
- The optimal consumption choice with a binding CIA constraint
- The relationship between the nominal interest rate and the Lagrange multiplier on the CIA constraint
- Consumption and the nominal interest rate; the nominal interest rate as a "consumption tax"
- The long-run non-distortionary implications of the "consumption tax"
- Superneutrality in model with CIA constraint only on consumption goods, and utility only depending on consumption
- Causes of non-superneutrality: A consumption-leisure trade-off; cash and credit goods; CIA restrictions on investment on physical capital

- The optimal rate of inflation in cases of non-superneutrality
- The stochastic CIA model with endogenous labor supply
- The channel of monetary shocks through the consumption-leisure trade-off
- Qualitative effect of money shocks independent of value of constant rate of relative risk aversion
- Why only anticipated money matters?
- The stabilizing effect of a pro-cyclical monetary policy (against supply shocks)

Part III
Money's role with incomplete nominal adjustment

Key concepts you should know

Imperfect information as a source of non-neutrality of money

- Friedman's informal hypothesis
- The essentials of the Island model: Imperfect information
- Agents cannot distinguish whether money shocks are aggregate or local
  - If shocks are known to be aggregate they have no real effect
  - If shocks are known to be local, they have real effects
- The signal extraction problem
- The linear least-squares projection
- The role of the relative variances of local and aggregate shocks in agents' estimation of shock
- The real effects of aggregate shocks under imperfect information
- The role of unanticipated money
- The policy irrelevance hypothesis

One-period sticky wages and prices

- Simple one-period nominal wage contracts in MIU model

- The employment effects of higher-than-expected prices
- Real effects of unanticipated money
- Lack of persistence of money shocks with one-period wage rigidity

Staggered price setting

- Model of imperfect competition in intermediate goods market
- Prices as mark-up over marginal costs
- Imperfect competition in itself does not create non-neutrality of money
- Sticky, and staggered price setting
- The importance of current prices and expected future prices for each firms' pricing behavior
- Aggregate implications:
  - Current prices depend on past prices and expected future prices
  - A role for gradual adjustment of prices and thus persistent effects of money shocks
- Real rigidity versus nominal rigidity
  - High degree of real rigidity increases persistence

Part IV
Credibility problems in monetary policy

Key concepts you should know

Inflation and discretionary monetary policy

- The concept of time inconsistency of optimal policies in macroeconomic policy
- The concept of the suboptimality of time consistent, discretionary policies
- The concept of the optimality of time inconsistent, commitment-based policies
- The Barro Gordon 1983 model
  - Version with utility linear in output (no output stabilization motive)
  - Version with utility quadratic in output (an output stabilization motive)

- Real effects of unanticipated inflation
- The resulting inflation bias under discretion in version with utility linear in output
- The time inconsistency of commitment policy
- The resulting inflation bias under discretion in version with utility quadratic in output and output goal above the natural rate
- Optimal stabilization properties of discretion and commitment policies

Reputational solutions to credibility problems

- Reputation building when interaction is repeated
- The temptation to deviate versus the enforcement following a deviation
- The role of the discount factor for securing low inflation

Delegation and independent central banks

- The idea of setting up institutions shaping central banks' incentives so as to mitigate the inflation bias/credibility problems
- The "conservative" central banker
  - Trade-off: Lower inflation, but too unstable output
  - Some conservatism, however, always optimal
- Incentive contracts
  - The linear inflation contract
  - No trade-off: Eliminates inflation bias and delivers optimal stabilization
- Targeting rules
  - Flexible versus strict
  - Flexible inflation targeting and relationship with Rogoff-conservativeness
  - Flexible inflation targeting and relationship with linear contract

Part V
Operating Procedures, Interest Rates and Monetary Policy

Key concepts you should know

Choice of monetary policy instrument/operating procedures

- The Poole (1970) model
- The importance of relative variances of shocks
- The importance of the goals of policy for the determination of optimal instrument
- Money base as potential instrument: more "financial" instability causing it more likely that interest rate is optimal instrument
- A money base rule covering three "extreme" operating procedures
  - Optimal rule as an intermediate case
- The importance of forecasts of shocks
- The importance of operating procedure for identification of monetary policy

Intermediate targets

- Adjusting policy instrument towards variable providing good information about ultimate goal variables
- Example of unobservable shocks, but observable money supply, under strict inflation targeting
- Adjusting interest rate to attain intermediate target for money supply
  - Good if demand and supply shocks are important
  - Bad if money demand shocks are important
- Desirability of an intermediate target variable depends on relative variances of shocks

Price level (in)determinacy

- Using the nominal interest rate as instrument may render the price level indeterminate
- Circumvention of problem by having the price level or money supply re-enter the model
  - Feedback interest rate rule towards price level

  - Feedback interest rate rule towards money supply

The term structure of interest rates

- The link between short and long interest rates
- The expectations theory of the term structure
  - Long rates as average of expected current and future short rates
  - The role of credibility of future short interest rate setting
- The yield curve as an indicator for expectations about future monetary policy
- Empirical problems with the expectations hypothesis
  - The importance of actual policymaking for the empirical failure of the expectations hypothesis
- The relationship between long rates and inflation expectations

Impact of interest-rate rule parameters in simple model MIU style model

- Changes in policy rule parameters change impact of shocks
  - No "policy irrelevance"

Optimal interest-rate rule parameters in simpler model

- Instability of economy for fixed nominal interest rate
- Optimal policy rule must:
  - Secure stability
  - Minimize output and inflation fluctuations
- Trick of treating expected demand as policy instrument
- Solution of optimal expected demand by dynamic programming
- Finding explicit solution for expected demand by method of undetermined coefficients
- Properties of optimal interest rate rule
  - Higher inflation increases nominal interest rate by more => higher real interest rate => stability
  - More weight on output stabilization; less weight on inflation in policy rule
- Optimal to respond to output, even if inflation is all that matters

  - Arguments in policy rules tells nothing about the ultimate goals of policy
  - Size of response to variable says nothing about policy preferences (may as well reflect the economic structure)

International evidence for interest rate rules

- The Taylor rule looks very much like the optimal rule derived above
  - Coefficient on inflation higher than one
  - Positive coefficient on output gap
- Not to be seen as a mechanical rule
- Other countries' policy rules also look like Taylor-type rules (but may be "forward-looking")

Application: Inflation targeting

- Numerical specification of policy objectives concerning inflation
- Point targets, tolerance bands, inflation concepts, horizon, escape clauses
- Flexible versus strict inflation targeting
- Accountability
- Downplay monetary aggregates
- Inflation forecast as potential intermediate target
- Transparency
- A framework form appropriate "constrained discretion."

A dynamic model of inflation targeting

- Simple AS/AD model with control lags
- Example with strict inflation target
  - Nominal interest rate set so as to set two-year ahead inflation expectations equal to target (the horizon at which the nominal rate affects inflation)
  - Inflation expectations (=forecasts) as intermediate target variable
- Implied instrument setting as a Taylor rule
  - Form of interest rate rule shows that variables entering the rule says little to nothing about the goals of monetary policy

  - Output gap is in the rule as it helps predicting future inflation
  - As in simple model: If inflation forecast is above (below) the inflation target, raise (lower) the nominal interest rate

- Example with flexible inflation targeting
- Conventional "leaning against the wind" first-order condition (taking control lags into account)
- The higher emphasis on output stabilization, the longer it takes for inflation expectations to return to target

Part VI
Monetary policy conduct in "New Keynesian" settings

Key concepts you should know

A simple "New Keynesian" model of monetary policy analysis

- The intertemporal "IS-curve"
- The expectations-augmented "Phillips curve"
- The importance of forward-looking behavior
- For constant nominal interest rate, infinitely many non-explosive output and inflation paths (real indeterminacy)
- Purpose of monetary policy (nominal interest rate setting):
  - Minimize fluctuations in output gap and inflation
  - Secure a unique equilibrium for inflation and output gap

Optimal monetary policy under discretion

- The standard quadratic utility function in output gap and inflation
- The simple first-order condition for optimal policy
  - "Leaning against the wind" policy
- More nominal rigidity worsens the inflation-output gap trade off
- Characteristics of optimal policy outcomes

  - No effects of demand and technology shocks
  - The "cost-push" shock is spread out over output gap and inflation

- Characterization of associated interest rate setting

  - Formulated as function of expected future inflation, the nominal interest rate increases by more than an increase in inflation expectations => increases real interest rate => secures unique equilibrium
  - (Note that interest rate expression tells little about the preferences of the central bank.)

Optimal monetary policy under commitment

- Suboptimality of discretionary solution
- The case with positive target for output gap (inflation bias)
- The case with zero target for output gap (no inflation bias)
- Rogoff-conservatism as improvement over discretion

  - Signals future contractive behavior, which dampens current (forward-looking) inflation
  - Improves inflation-output gap trade-off and shock stabilization

- The stabilization bias of time-consistent monetary policy
- Fully optimal policy: The optimality of *inertial* policy

  - Inertia secures prolonged contractions following inflationary shocks
  - Affects expectations and improves inflation-output gap trade off

Part VII
Application: Monetary and fiscal policy in a low-inflation environment

Key concepts you should know

Benigno's AS/AD formulation of the New-Keynesian model

- The representative agents' utility functions and budget constraints
- The natural rate of output and its determinants
- The downward sloping AD curve
- The upward sloping AS curve
- Effects of fiscal expansions in a zero-interest rate trap (graphical)
- Effects of higher inflation expectations (graphical)