

Hawks, Doves, Bubbles, and Inflation Targets

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Any opinions expressed here are mine and do not necessarily reflect those of others on the Federal Open Market Committee.

Inflation targeting

INFLATION TARGETING AND THE DUAL MANDATE

- The FOMC adopted an explicit, numerical inflation target at the January 2012 meeting.
- Some discussion has suggested that “inflation targeting” is inconsistent with the Fed’s dual mandate.
- The purpose of this talk is to argue that inflation targeting is perfectly consistent with the Fed’s dual mandate.
- Indeed, as we shall see, inflation targeting is consistent with hawks, doves, and even bubbles.

INFLATION TARGETING

- At the January 2012 meeting, the Federal Open Market Committee (FOMC) named an explicit, numerical inflation target of 2 percent.
- The Fed joins many central banks around the world in adopting an inflation target.
- It has been Chairman Bernanke's goal since joining the Fed.
- Congratulations to the Chairman on this important accomplishment.

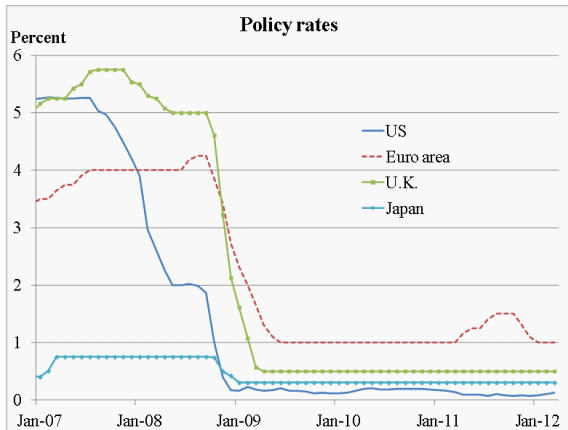
THE DUAL MANDATE

- The dual mandate is actually a triple mandate:
 - The Fed should conduct monetary policy to “... promote effectively the goals of maximum employment, stable prices, and moderate long-run interest rates.”
- Most focus on two goals: “maximum employment” and “stable prices.”

THE FED AND THE ECB

- The ECB, by contrast, has a single mandate.
- The goal is to promote “stable prices.”
- In practice, monetary policy is viewed in the same way in Europe as it is in the U.S., despite the differing mandates.
- This talk may shed some light on why this occurs.

DO CENTRAL BANKS BEHAVE DIFFERENTLY?



THIS TALK

- Use a simple “toy” model.
- Use a simple policy rule.
- The model plus the policy rule jointly determines an equilibrium.
- The coefficients in the policy rule will affect the nature of the equilibrium.
- Key point: The choice of the inflation target is separate from the choice of the coefficients in the policy rule.

Consistency with the dual mandate

A TOY MODEL

- Households maximize an index of material well-being by making decisions on how much to consume and save, and how much time to devote to market work.
 - The solution to their problem gives one equation.
- Firms hire workers and produce output for sale to households.
 - The solution to the firms' pricing problem gives a second equation.
- The monetary authority controls a short-term nominal interest rate.
 - We will use a Taylor-type policy rule to describe the decision on interest rates.

THE CONTROVERSIAL STICKY PRICE ASSUMPTION

- Models of this general form have been popularized by Michael Woodford (2003, *Interest and Prices*, Princeton University Press).
- A key assumption is that prices are “sticky” in a certain sense.
- If prices are perfectly flexible, the model is like the “real business cycle” model described by Edward Prescott (1986, FRB Minneapolis *Quarterly Review*).
- There would be no role for the central bank in that model.
- The sticky price assumption is controversial: See, for instance, Mark Bils and Peter Klenow (2004, *Journal of Political Economy*).
- However, I will not challenge the sticky price assumption here.

SOME EQUATIONS

- The three equation system is

$$z_t = E_t z_{t+1} - \theta (r_t - E_t \pi_{t+1}) + \epsilon_t \quad (1)$$

$$\pi_t = \kappa z_t + \beta E_t \pi_{t+1} \quad (2)$$

$$r_t = \varphi_\pi \pi_t + \varphi_z z_t \quad (3)$$

- Here z_t is the output gap, π_t is the deviation of inflation from target, and r_t is the deviation of the nominal interest rate from its long-run value.
- So, the steady state occurs where z_t , π_t , and r_t are all equal to zero.
- The ϵ_t term is a stochastic shock that keeps knocking the economy away from steady state.

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- The model is forward-looking because the actors in the model are forward-looking.
- The parameters θ , κ , and β come from the structure of the model.
 - In calibrated versions, $\kappa \approx 0.024$ and $\beta \approx 0.99$; thus inflation today is mostly expected inflation.
- The “Taylor-type” policy rule has parameters φ_π and φ_z .

WHAT IS THE OUTPUT GAP?

- The output gap in the model is not the output gap of common parlance.
- Instead, z_t is the difference between the amount of output that would be produced if prices were flexible versus the amount of output actually produced when prices are sticky.
- The flexible price level of output would fluctuate dramatically in response to shocks in the economy.
- The size of the output gap measured this way is likely to be smaller than conventional measures once prices have a chance to adjust.

WHERE IS THE INFLATION TARGET?

- The inflation target is not explicitly specified in this system.
- This is because it is inside the π_t term, which is the deviation of observed inflation from an inflation target.
- The central bank controls the inflation rate in the medium and long term.
- The inflation target is simply the embodiment of this fact.
- In effect, researchers “pencil in” the long-run rate of inflation they think the central bank desires.

NAMING AN INFLATION TARGET

- Historically, central banks did not say explicitly what rate of inflation they were trying to achieve in the medium to long run.
- After the global inflation debacle of the 1970s, this practice was called into question.
- Since the central bank controls the inflation rate, there seems to be little to be gained from “hiding” the inflation target.
- Financial markets will “pencil in” their own perception of the inflation target anyway, but with some uncertainty about the true value.
- That just adds unnecessary uncertainty to the macroeconomic system.

IS AN INFLATION TARGET HAWKISH OR DOVISH?

- Naming an explicit numerical inflation target is neither hawkish nor dovish.
- It is simply a recognition that the central bank controls the medium- to long-run rate of inflation, and that in order to minimize uncertainty the central bank may as well say what it is trying to achieve.
- The subject of which actual value of long-run inflation is best for society is the subject of an entire literature.
- The literature generally supports low rates of inflation.
- As a practical matter, many central banks have adopted 2 percent.

THE DUAL MANDATE AND THE STEADY STATE

- In the steady state, the central bank achieves its inflation target.
- The other equations, representing the private sector, then churn out the steady state values of the other variables.
- Chief among these are the steady state level of consumption and the steady state level of labor supply.
- The steady state level of labor supply could be interpreted as the “maximum employment” of the dual mandate.
 - It is the amount of time households desire to work given wages and all other variables in the economy.
- The shock ϵ_t keeps knocking the economy off of this level of employment (either above or below).

THE BEST POLICY ACHIEVES THE DUAL MANDATE

- In the three equation system above, the central bank can move the nominal interest rate to offset incoming shocks exactly.
- The other variables never leave their steady state values.
- Inflation remains at the target rate of inflation.
- Employment remains at the maximum level.
- The dual mandate is achieved exactly at every point in time.
- Real-world policy cannot fully offset incoming shocks, but this toy model provides a conceptual benchmark.

WHAT ABOUT A SINGLE MANDATE?

- In a single price stability mandate system, the essential story would not change.
- The central bank still controls inflation over the medium to long run.
- It still makes sense to explicitly name the inflation target as opposed to “hiding” it.
- And, achieving the single mandate is still consistent with the maximum level of employment of households.
- The single mandate may be a clearer way to describe the essential story, but it would not change the story.

Hawks and doves

THE RHETORIC ON THE DUAL MANDATE

- If inflation targeting is consistent with the dual mandate, why all the discussion?
- Answer: There are more aspects to policy than just the inflation target.
- In particular, there are the policy parameters φ_{π} and φ_z in the Taylor-type policy rule.
- These parameters describe how aggressively the central bank reacts to inflation (φ_{π}) and to the output gap (φ_z) when setting the nominal interest rate in the Taylor-type rule.

MORE RHETORIC

- Relatively large values of φ_π might be viewed as “hawkish”, while relatively large values of φ_z might be viewed as “dovish.”
- But whatever values are chosen for these parameters, the system operates within the context of an inflation target.
- In other words, the nature of the policy rule is separate from the issue of naming an inflation target.

THE TWO PARTS OF THE TAYLOR-TYPE RULE

- I think most of the discussion about the dual mandate is really a discussion about how much emphasis should be put on each of the two parts of the Taylor-type policy rule.
- If shocks can be offset completely each period, then the policymaker should choose values to accomplish that.
- But that can only be done in the toy model.
- In reality, both inflation and output are going to deviate from their steady state values.
- So, how should these values be set?

WHAT DO THE HOUSEHOLDS WANT?

- One advantage of starting the analysis with households is that policy can be chosen to maximize the well-being of the households.
- This is superior to allowing policymakers to impose their own judgements on the macroeconomy.
- The idea is to choose φ_π and φ_z to maximize household utility when the system is simulated over a long period of time.
- There is a large literature on this topic which provides ample fodder for both hawks and doves.
- In general, the answer will depend on additional assumptions made in the underlying model

Beyond interest rate adjustment

OTHER CONSIDERATIONS

- There are many important monetary policy considerations other than the nature of interest rate adjustment.
- Some of these can be discussed even with just the toy model.
- Others involve missing elements from the model.

BUBBLES

- There has been a lot of discussion concerning the possibility that current Fed policy may lead to “bubbles” in the economy.
- I interpret bubbles to mean that there are multiple equilibria, that is, situations where two or more sets of prices and expectations can clear markets.
- In that situation, the model cannot tell us which equilibrium will be achieved.
- Some equilibria can be very volatile.
- Interestingly, the toy model has a clear condition for such a situation to exist.

THE TAYLOR PRINCIPLE

- The condition for multiple equilibria in the toy model is that the policymaker violates the “Taylor principle.”
- The Taylor principle is, in its simplest form, that nominal interest rates should be adjusted more than one-for-one with deviations of inflation from target.
- The principle is violated when φ_{π} and φ_z are “too small.”
- In effect, the policymaker must be sufficiently aggressive in responding to shocks, otherwise the economy will have multiple equilibria, some of which may be very unpleasant.

THE WORST POLICY

- In the toy model, one of the worst policies is to set both φ_π and φ_z to zero.
- This guarantees that the Taylor principle is violated, and that multiple equilibria exist.
- This is also known as the “interest rate peg” policy, because interest rates never change.
- Actual policy rates in the U.S. have been near zero since December 2008 and are projected to remain there until late 2014.
- This could be viewed as an approximation to the “interest rate peg” policy, and thus conducive to multiple equilibria.

UNEMPLOYMENT

- The toy model is missing important variables.
- One of these is unemployment.
- Existing models of unemployment in macroeconomics have a search-theoretic nature.
- Leading authors: Peter Diamond, Dale Mortensen, Christopher Pissarides.
- It is difficult, but possible, to merge the search-theoretic models with macroeconomics.
- See, for instance, Mark Gertler, Luca Sala, and Antonella Trigari, *Journal of Money, Credit, and Banking*.

UNCONVENTIONAL POLICY

- Another issue is that most monetary policy is not currently about interest rate adjustment.
- Instead, so-called “unconventional” policy such as quantitative easing has come to the fore.
- For an assessment of the effectiveness of quantitative easing programs, see the Federal Reserve Bank of St. Louis conference, “Quantitative Easing,” June 30, 2011.

MISSING FACTORS

- Other factors have been especially important during the last five years, in ways that were unanticipated before 2007.
- One critically important area is housing and real estate more generally.
- Another critically important area is financial market stability.
 - Runs on non-bank financial institutions were very important during the recent crisis.
- Without these elements in the models in a well-understood way, we cannot be completely sure that any particular monetary policy is the appropriate one.

GLOBALIZATION

- I would be remiss if I did not mention globalization and international monetary policy arrangements as another missing aspect of this model.
- For some discussion of this issue, see Bullard and Singh (2008, *Journal of Monetary Economics*).

ROBUST POLICY

- These considerations suggest that policy should be conducted in a way that is robust to possible errors of omission or commission in the baseline model.
- There is a “robust control” literature that adopts techniques from engineering to the forward-looking systems of macroeconomics.
- The findings there have been interesting but are not sufficient at this time to address the many issues in macroeconomic models.

Conclusion

CONCLUSION

- The FOMC recently set an explicit numerical inflation target.
- I have argued that such a target is consistent with the Fed's dual mandate.
- Much of the discussion about the dual mandate is, in my view, really about the nature of the Fed's reaction function to economic events.
- However, that issue is separate from setting an inflation target.
- I have stressed that heavy focus on the nature of the Fed's interest rate reaction function in the current environment is questionable.
- There are many issues at least as important, and resolution of any of those issues could change the argument for a particular reaction function.

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Federal Reserve Economic Data (FRED)
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