

The background of the slide is a vibrant yellow color, overlaid with a dense, repeating pattern of various international currency symbols. These symbols, including the dollar sign (\$), euro (€), yen (¥), and pound sterling (£), are rendered in a three-dimensional, embossed style that creates a textured, metallic appearance. The symbols are scattered across the entire background, with some appearing larger and more prominent than others.

# Policy Cooperation, Incomplete Markets and Risk Sharing

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# Policy Cooperation, Incomplete Markets and Risk Sharing

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- What are the objectives of monetary policymakers when they do not cooperate?
- How do these strategic objectives compare with cooperation?
- How are spillovers influenced under cooperative policymaking?



## Recent attention to policy (non-)cooperation

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- 2010: Guido Mantega, the Brazilian finance minister, “we are in the middle of a currency war”
- 2014: Raghuram Rajan, governor of the Central Bank of India, “I propose that large country central banks internalize more of the spillovers from their policies in their mandates”
- 2014: Stanley Fischer, Board of Governors of the Federal Reserve, “The state of the U.S. economy is significantly affected by the state of the world economy...Actions taken by the Federal Reserve influence economic conditions abroad... We cannot make sensible monetary policy choices without taking them into account.”



# Objectives of This Study

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- The academic monetary policy literature has not kept pace with policy developments
- In particular, the New Keynesian literature on non-cooperative policy is not well developed.
- At a basic level, except in some very special cases, the literature cannot answer the questions “What are the objectives of strategic policymakers?”
- And, “How does the targeting rule of strategic policymakers differ from that of cooperative policymakers?”

# Targeting rule

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- The New Keynesian literature on optimal monetary policy has been very successful. In part because in simple cases, the optimal policy can be expressed in terms of a “targeting rule”.
- Targeting rules quantify the tradeoffs of the objectives of policymakers (inflation, output gap)
- In contrast to an “instrument rule” that, for example, expresses how the interest rate or money supply should react to the state of the economy.
- Targeting rules are expressed in terms of tradeoffs between deviations of actual outcomes and desired outcomes: Output gap, deviation of inflation from the target, deviation of exchange rate from PPP, etc.

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# My plan for this presentation

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- My talk takes an unusual tack
- I will focus at first on the difficulties of the problem I have worked on.
- Focusing on those serves to highlight the issues that we need to confront when considering optimal policy in a global economy.
- The actual model I build is extremely simple – to simple to be used as a quantitative guide for policy. The purpose is to build intuition.

# Strategies

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- In a non-cooperative setting, each policymaker commits to a strategy
- The strategy maps out how the policymaker reacts in every possible outcome (“state”)
- I have modeled policymakers as choosing aggregate consumption
- Optimal policy tradeoffs may depend on the way strategy is expressed
- In equilibrium, strategy is optimal given other policymaker’s strategy
- Strategies are not the same as instruments (though they could be)
- Some strategies – such as choosing terms of trade – do not make for a sensible policy game.

# Complete Markets and Asset Prices

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- I focus on optimal policy when international asset markets are not complete
- I compare to optimal policy under “complete” asset markets
- Complete asset markets may seem like an arcane extreme. In essence, people can buy or sell insurance for any situation that could arise.
- But in simple models, complete markets are sometimes replicable with trade in just a few “normal” assets like stocks, bonds, or forwards.
- The key point is that optimal strategic policy attempts not only to influence terms of trade in a country’s favor, but also asset prices.

# Optimal Policy under Complete Markets

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- The complete markets case presents special difficulties for characterizing optimal strategic policy.
- Unlike the usual cases we deal with, the optimal policy for one “state” affects outcomes in all states, by affecting asset prices.
- That is, policymakers want to commit to a policy that makes their own residents wealthier.

- When markets are complete, we see:

$$MU_{HOME}^{\$} = MU_{FOREIGN}^{\$} \times WEIGHT(wealth)$$

- Strategic policy tries to influence the *WEIGHT*.

# Approximations

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- This is a purely mathematical point
- It is helpful to express optimal policy rules linearly. This always involves taking linear approximations.
- We typically approximate  $f(X)$  as a function such as “ $c + bx$ ”
- In this problem, we must approximate  $E(f(X))$ .
- I take a very low-tech approach. I write

$$E(f(X)) = \pi_1 f(X_1) + \pi_2 f(X_2) + \dots + \pi_N f(X_N)$$

Then I treat the probabilities (the  $\pi$ 's) as constants and approximate as a standard function. Much less hi-tech than fancy methods of Judd, etc.

# Intuitive expressions

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- In the end, the point of working with very simple models is to give us simple intuitive expressions that can convey to policymakers what tradeoffs they face in choosing an optimal policy.
- The optimal policy can be expressed in terms of some tradeoffs involving domestic and foreign consumption. But that is not a plausible characterization that I can tell policymakers.
- In the end, I'm afraid that I have not found the most intuitive way to express the tradeoffs (but maybe I have...)

# Features of the Model

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- Two-country, one-period model
- Each country produces a unique good (or goods) for export and domestic consumption.
- Output produce using only labor. Households get utility from consumption of Home and Foreign goods, and from leisure. Productivity shocks.
- Crucially, I assume home bias in consumption (otherwise model is too simple!)
- Could be thought of as either a competitive model with output tax as policy instrument, or sticky-price (PCP) model where policymaker can control some nominal level variable like nominal expenditures.

# Assumptions on Asset Markets

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- As I have already mentioned, I consider two cases:
  - **Complete asset markets,**
  - **And the opposite extreme, no asset markets (so trade is balanced).  
In a dynamic model, we would consider current account imbalances.**
- The complete asset markets case serves two purposes:
  - **As a benchmark for judging incomplete asset market distortion**
  - **Interesting in its own right because it demonstrates role of asset prices in optimal strategic policy.**

# Targeting Rules under Cooperation

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$$\hat{y}_j^W = 0 \qquad \sigma \hat{y}_j^R + \frac{(\sigma - 1)(\nu - 1)\nu(2 - \nu)}{2} m_j = 0$$

The first rule just says set the sum of the two countries' output gaps equal to zero.

The first term in second expression is the output gap in one country relative to another.

The second term is a deviation from optimal consumption risk sharing.

The optimal policy trades off output gaps and deviations from risk sharing: Policymaker may let one country have output fall below potential if it can enjoy higher consumption. For example, policy should be procyclical with supply shocks, but not fully accommodate.

# Targeting Rule under non-Cooperation

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$$\sigma \hat{y}_j - \frac{(\sigma - 1)(2 - \nu)}{2} \hat{s}_j + \frac{\sigma \nu (2 - \nu)}{2(\nu - 1)} \hat{\mu}_j - (\sigma - 1)(2 - \nu)(\sigma y_j - a_j - (\sigma E y - E a)) = 0$$

- It's complicated! There are four things that are traded off:
  - **The output gap**
  - **The terms of trade objective**
  - **A term that arises because of the with asset trade, policies try to manipulate asset prices, but do not when there is no asset trade.**
  - **A term involving smoothing the tradeoff between consumption and leisure**

# Some observations on policies

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- The terms of trade objective is not what you think.
- Policymakers want to close their output gap. Expansionary monetary policy helps, and that will lead to a depreciation.
- But the terms of trade objective dampens the terms of trade movement. The country exploits its monopoly power in trade, and reduces price fluctuations just like a monopolist would.
- Why is that observation important? The Fed often states its mandate is domestic employment.
  - **That makes it sound like they do not pay attention to the strategic terms of trade objective.**
  - **But if so, they let the terms of trade fluctuate even more than an optimally strategic policymaker. Mantega would not be happy!**

# Equilibrium

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- We can solve for equilibrium under complete and incomplete markets, under cooperation and non-cooperation.
- Under non-cooperation, we look at a Nash equilibrium.
- Irrespective of asset markets, non-cooperation is worse. Lower utility, lower consumption under non-cooperation.
- My aim is not to assess the gains from cooperation – a well-worn subject.
- However, I will make some observations about “spillovers” under cooperation versus strategic policy.

# Spillovers

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- As the paper discusses, the meaning of “spillover” is somewhat subtle
- There is a sense in which cooperation may mean allowing more spillovers, not less.
- One goal of cooperation is to share risk. Cooperation may mean allowing shocks to be shared across countries.
- One gets the sense that some policymakers don’t like negative spillovers from abroad. But they don’t mind positive spillovers. And they wouldn’t mind if some of their negative shocks were shared with the rest of the world.

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## Some observations on directions for study

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- Obviously, we need to look at more sophisticated, realistic models.
- Capital flows, per se, don't have a central place in most modern macro models, but are a concern of policymakers.
- “Cooperation” may in practice mean non-cooperative bargaining
- Understanding political influences may be important.

# Conclusions

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- Under cooperation, policymakers trade off output objectives with risk-sharing goals.
- A strategic policymaker wants to influence his own output gap, the terms of trade, asset prices if he can, but also has a smoothing motive.
- The terms of trade objective is separate from the output objective only in that policymaker wants to limit the terms of trade fluctuations.
- Cooperation may not mean “minimizing spillovers”
- Still a lot of work to be done in this area of research!