Monetary Frameworks

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Central Banks and What They Do

A useful point of departure for discussion is to consider the *monetary framework:*

- *Institutional* Aspects of a Central Bank
- Monetary *Strategy*
- *Operational* Issues

Institutional Aspects

- Countries differ with respect to the *legal status* of their central banks

- For example: Is the central bank a *public* agency? (What is this supposed to mean?)

- Other dimensions: how are members appointed, accountability

- Key question: *Independence* (why is this so important?)

Monetary Strategy

Useful to distinguish between two related ideas:

1. Policy *Objectives*
2. Policy *Targets*
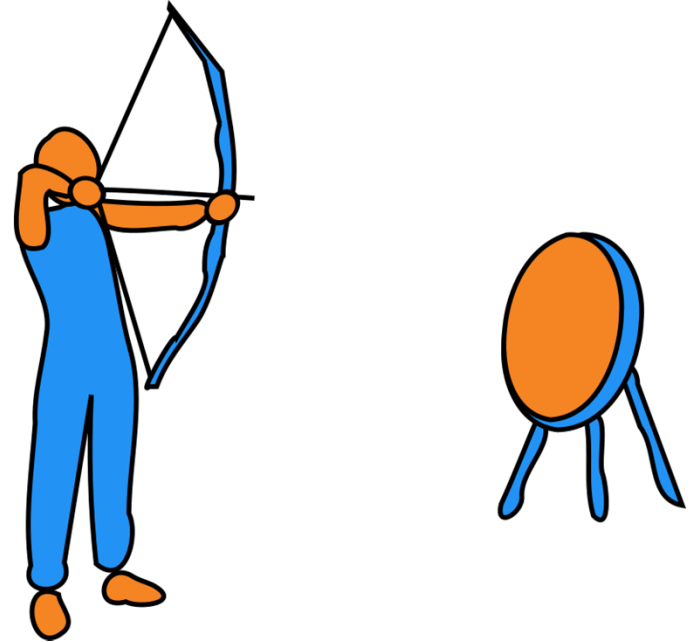
Central Bank Objectives

- Central Banks are often given a mandate in terms of the *ultimate* objectives of policy

- Often: price stability, employment, growth, financial stability

- Possible Questions: Where do they come from? If there are several objectives, are they consistent, or do they imply trade-offs?

- This being said, macroeconomists often take objectives as given.

Policy Targets

- Often (but not always) a central bank chooses to *target* or *stabilize* some particular variables, which are observable and measurable

- Sometimes called *intermediate* targets

- Leading examples: inflation or the price level; a monetary aggregate; or the exchange rate

Table 1. Primary Objectives of Monetary Policy

		Exchange rate anchor	Money aggregate targeting	Inflation targeting	Other
Single objective	Price stability	Burundi Morocco São Tomé and Príncipe	Congo Mozambique Sierra Leone Sri Lanka Sudan Ukraine Uzbekistan	Armenia Georgia Ghana Guatemala Kenya Moldova	Egypt
	XR	Cape Verde			
Dual objective	Price and XR	Liberia Tajikistan	Afghanistan Madagascar	Indonesia	Kyrgyz Republic
	Price and growth	Cambodia	Guinea	India Philippines	
	XR and other	Nicaragua			
	Price and other	Bolivia Guyana Honduras Timor Leste	Tanzania	Paraguay Romania Uganda	Vanuatu
3 or more objectives	Price, growth, XR	Ethiopia	Bangladesh		
	Price, growth, other	Vietnam	Malawi Myanmar Nigeria Yemen, Rep. of		Mongolia Papua New Guinea
	Price, XR, other				
	Price, other	Solomon Islands			Pakistan Zambia
	Price, growth, XR, other		Gambia Rwanda		

Source: IMF desk survey.

Note: "Other" refers to one or more of the following objectives: stability of the financial sector, promoting macro-economic development, maintaining external reserves, and supporting government policies. XR refers to exchange rate stability. The regime classification is based on responses by IMF country desks.

From: *Evolving Monetary Frameworks in Low Income and Other Developing Countries,* Staff Report, IMF, October 2015

Policy Implementation

Policy *implementation:* how does the central bank adjust the various available *instruments* to hit the policy targets?

➔What are the *policy instruments*?

➔What is the *decision making process* to adjust them?

Conventional Central Bank Tools

Traditionally, central banks have been seen as adjusting:

1. A monetary aggregate (example: base money)

2. An interest rate (often an overnight rate, such as the Fed Funds rate in the US)

3. An exchange rate

Unconventional Tools

With the global financial crisis, central banks in advanced economies have resorted to other tools:

- "Forward Guidance"
- Quantitative Easing (QE)
- Credit Easing

More Tools

In developing countries, central banks have also shown increased reliance on:

1. Reserve requirements
2. Foreign Exchange Intervention
3. Macroprudential and financial regulation
4. Capital Controls

The Decision Making Process

- This is related to the question of central bank independence

- Central banks differ in terms of their communication strategies (e.g. are central bank forecasts published?) as well as performance evaluation and incentives (e.g. what if targets are missed?)

- Key issue: degree of *transparency*

Summary, So Far

- Central banks across the world differ greatly in terms of objectives, targets, and policy implementation
- We hope to understand this diversity in terms of a hopefully convincing model (analytical framework)

Inflation Targeting: Leading Example

Inflation Targeting (IT)

- Circa 2007, inflation targeting (IT) had emerged as a leading example of "best practice" monetary framework

- Many developing countries were trying to move towards it

Consensus, A Decade Ago…

…the world achieved a working consensus on the core principles of monetary policy by the late 1990s…The consensus theory of monetary policy…implies that inflation targeting yields the best cyclical behavior of employment and output that monetary policy alone can deliver. (M. Goodfriend, "How the World Achieved Consensus on Monetary Policy", Jour. Econ. Perspectives 2007)

IT in Theory

Svensson in *New Palgrave Dictionary* : inflation targeting framework is defined by:

1. An announced numerical *inflation target*

2. An *explicit decision making framework* determining how policy instruments are adjusted in order to hit the target.

3. High degrees of accountability and transparency

IT and the New Keynesian Model

- "Explicit decision making framework": the New Keynesian model

- Indeed, the basic New Keynesian Model provided strong support for IT

The Basic NK Model: Building Blocks

Aggregate Supply:
The *New Keynesian Phillips Curve*

$$\pi_t = \beta E_t \pi_{t+1} + \gamma y_t$$

Aggregate Demand: The *Dynamic IS*

$$y_t = -\rho[i_t - E_t \pi_{t+1} - r_t^n] + E_t y_{t+1}$$

The Basic NK Model: Building Blocks

The model closes with an assumption about policy: an interest rate *rule (Taylor rule)*

$$i_t = r_t^n + \alpha \pi_t + \mu y_t$$

Optimal Policy

Suppose that the central bank is given the mandate of minimizing a loss function which depends only on inflation and output gap:

$$E \sum_{t=0}^{\infty} \beta^t L_t = E \sum_{t=0}^{\infty} \beta^t [\pi_t^2 + \varphi y_t^2]$$

The Optimality of Zero Inflation

Recall that the NK Phillips Curve is:

$$\pi_t = \beta E_t \pi_{t+1} + \gamma y_t$$

- Hence it is *feasible* for both inflation and the output gap to be *zero at all times*
- But this implies that the loss function is minimized!

Zero Inflation and Social Welfare

- The form of the assumed loss function can be seen as *ad hoc*

- But Woodford (2003) showed that, in models with explicit microfoundations, a quadratic approximation of the representative agent's welfare has that form.

Implementation

One way to implement the optimal policy of zero inflation is to adjust the coefficients of the policy rule:

$$i_t = r_t^n + \alpha\pi_t + \mu y_t$$

Then, *in equilibrium,* inflation and the output gap will be zero, so that the *nominal* interest rate will equal the *natural rate of interest:*

$$i_t = r_t^n$$

Summary: IT and the Basic NK Model

1. The Basic New Keynesian Model's Building Blocks are the NK Phillips Curve (AS) and the dynamic IS (AD)

2. Both can be derived from explicit microfoundations

3. Woodford (2003): the welfare of the representative agent can be approximated by a linear quadratic function of inflation and the output gap

Summary: IT and the Basic NK Model

4. It is feasible to attain zero inflation and a zero output gap (*divine coincidence*)

5. And in fact such outcome minimizes the loss function

6. So a central bank with the mandate to stabilize inflation and the output gap around targets (of zero) will maximize social welfare (the ultimate objective of policy)

Summary: IT and the Basic NK Model

7. The optimal outcome can be achieved if the central bank commits to a policy rule of the *Taylor* type

8. If so, the equilibrium nominal interest rate will equal the *natural real rate of interest*

Remarks

- The loss function L_t depends *only* on inflation and the output gap

- Hence the central bank *should not* be charged with other goals, such as financial stability or smoothing exchange rates

Remarks

- Control of the interest rate suffices to determine equilibrium inflation and output gap, and hence welfare.

- *No need* for the central bank to resort to other tools, such as *unconventional policies.*

Remarks

- Optimal policy only responds to information about current and future *target* variables.

- Responding to news in *non target* variables is justified only if the latter have marginal predictive power about target variables.

Collapse of Consensus: The Global Crisis and the Zero Bound
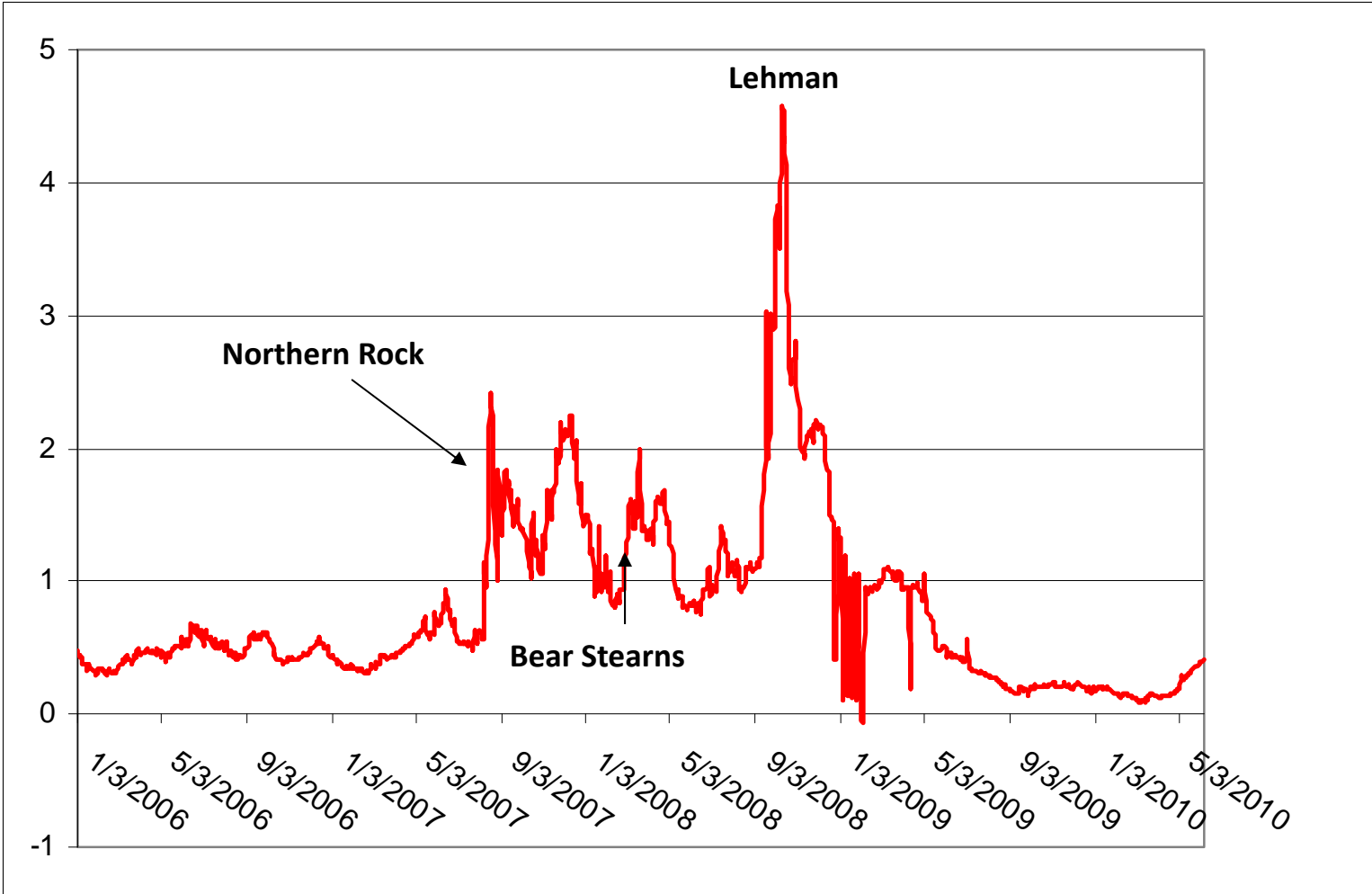
The Global Crisis and the Zero Bound

- To deal with the global crisis, many central banks in advanced countries reduced their interest rates

- But they found that *nominal* interest rates cannot be negative, i.e. they have a *zero lower bound*
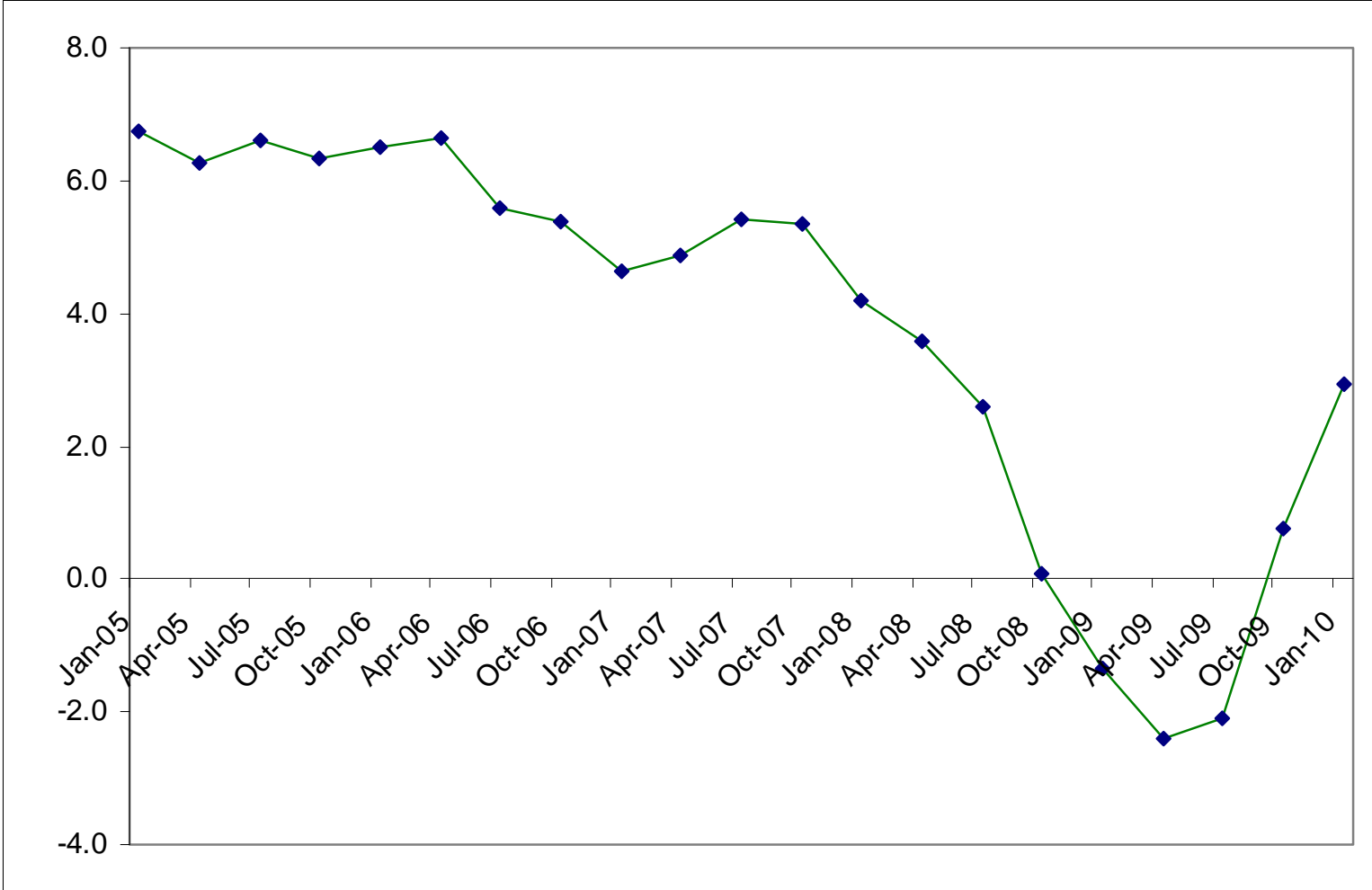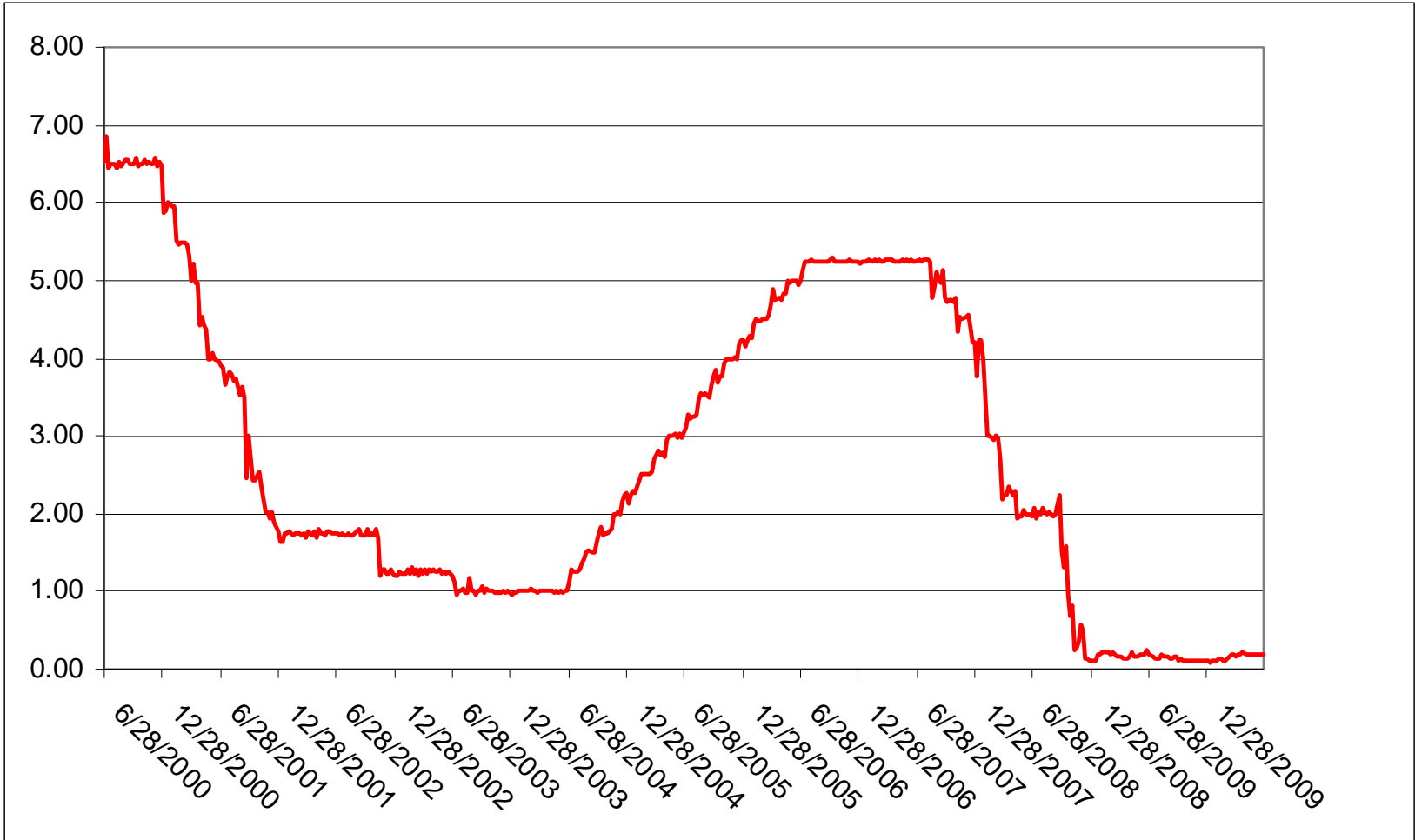
US: Annual GDP Growth (% with respect to one year ago)

TED Spread (LIBOR Versus T-Bill, percentage points)

US: Federal Funds Rate (Percentage Points)

The Zero Bound in the NK Model

- In the basic model, suppose that the central bank wants to implement zero inflation

- We have seen that this requires the policy rate to be equal to the natural rate of interest:

$$i_t = r_t^n$$

- But the natural rate is a real rate, and it can be *negative* !

Unconventional Tools

Seeking additional stimulus, advanced countries central bankers resorted to

- "Forward Guidance"
- Quantitative Easing (QE)
- Credit Easing

The IT Consensus and Developing Economies

- Arguably, developing countries never embraced the IT consensus fully

- Central banks deviated from IT wisdom significantly, even in countries that had adopted formal IT frameworks (Chang 2007, Céspedes, Chang, and Velasco 2014)

- Why?

Agenda

1. The NK Model in the Open Economy: Departures from basic IT wisdom

2. The Role of Financial Frictions, Balance Sheet Effects, Dollarization, and the Like

3. Conventional and Unconventional Policies in Emerging Economies

4. The Latin American Experience