Short Run (Part 5):
AS-AD and Stabilization Policy

T. Kam

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Australian National University

Outline of Talk

Learning Objectives

- What is *systematic monetary policy*
- **AS-AD**: An *even more convenient representation* of IS-MP-PC with systematic monetary policy
  - With systematic monetary policy, we can combine the IS curve and the MP curve to get an aggregate demand (AD) curve.
  - Phillips Curve can be reinterpreted as an aggregate supply (AS) curve.
  - AD and AS curves represent an intuitive version of the short-run model that describes the evolution of the economy in a single graph.

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What we know, what next

Previously:

- understanding short run through model lens of IS-MP-PC
- In MP:
  - we said monetary policy effectively controlled R_t. (Why?)
  - but we did not describe what its *policy/decision rule is explicitly.*
- Then we added a description for a *simple monetary policy rule.*
  - That completes our full IS-MP-PC model with a *systematic monetary policy.*

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- **IS-MP + Monetary Policy Rule** can be represented in one as **AD curve**
- **Phillips Curve** represent (relabelled as) **AS curve**

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    - IS;
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Previously ... A "lean against the wind" policy rule

- We assumed central bank *simple policy rule* as:

$$\underbrace{R_t - \bar{r}}_{\text{Real interest rate gap}} = \underbrace{\bar{m}}_{\text{Sensitivity of policy to ...}} \times \underbrace{(\pi_t - \bar{\pi})}_{\text{current inflation gap from target}}$$

- Equivalently, in terms of a nominal interest rate policy instrument:

$$i_t = \bar{i} + (1 + \bar{m})(\pi_t - \bar{\pi})$$

where $\bar{i} = \bar{r} + \bar{\pi}$.

  - $\bar{m} > 0$
  - Interpretation?
  - Implication for policy behaviour?
  - Can my chimpanzee do this job?

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Overall model

- **IS curve**

$$\tilde{Y}_t = \bar{a} - \bar{b}(R_t - \bar{r})$$

- **MP curve**

$$R_t = i_t - \pi_{t-1}$$

- **Phillips Curve**

$$\Delta\pi_t = \bar{\nu}\tilde{Y}_t + \bar{o}$$

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Lyotards and leg-warmers

Checkpoint!

Make sure you know what these components represent/mean!

- IS,
- MP,
- PC, and
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The AS-AD Representation

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The AD construct

The AD-AS Representation

Rewriting IS-PC-MP + Simple Monetary Policy Rule

Two parts:

1. Rewrite IS-MP + Monetary Policy Rule as AD curve.
   - what it means
   - how to do it
2. Rewrite PC as the AS curve.
   - what it means
   - how to do it

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Deriving the AD Curve

- *What does the AD curve represent? What it means*:
  - Mechanically: Says short-run output is a function of the rate of inflation
  - Economics: the AD curve is the locus/set of points $(\tilde{Y}, \pi)$ such that
    - Goods/services markets equilibrium (IS holds);
    - Adaptive-expectation-Fisher equation applies (MP holds); and
    - they are consistent with a known[1] simple monetary policy rule.

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- How do we get this AD representation?
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  Let's do this using a few steps.

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Deriving the AD Curve

Step 0: think ...

Central bank's operational monetary policy rule:

$$R_t - \bar{r} = \bar{m}(\pi_t - \bar{\pi})$$

Note two key parameters governing policy behaviour:

- $\bar{m}$: what does this represent?
- $\bar{\pi}$: what is this?

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Step 1: plug ...

Substitute monetary policy rule:

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into IS curve ...

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Step 2: ... and play!

So our combined IS-MP-Monetary-Policy Rule is

$$\tilde{Y}_t = \bar{a} - \bar{b}\bar{m}(\pi_t - \bar{\pi})$$

Remarks:

- Parameters $\bar{a}, \bar{b}$ encode goods market equilibrium aspect of IS
- *New parameters* $\bar{m}, \bar{\pi}$: artefact of policy rule's influence on aggregate demand (IS) via MP relation.
- **This is** our *AD curve* representation!

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Deriving the AD Curve

Checkpoint!

The AD curve is a summary of:

1. Goods/services markets equilibrium (all about IS),
2. Linkage between short run real and nominal interest rate (MP), and
3. consistency of 1 and 2 with all agents in the model knowing the simple monetary-policy rule.

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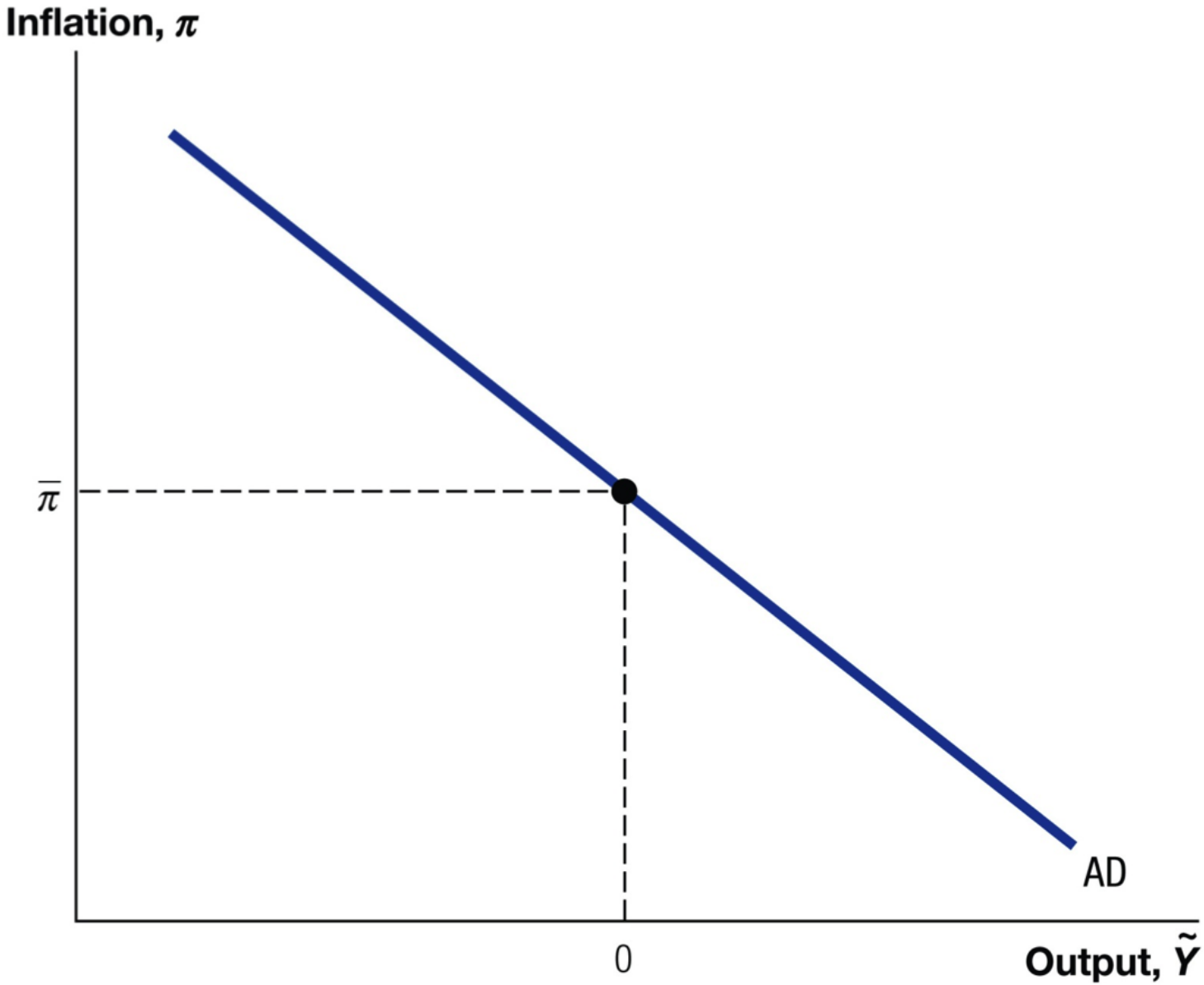
Exercise

Why do I keep saying "Linkage between short run real and nominal interest rate (MP)"?

Did I once use the MP relation: $R_t = i_t - \pi_{t-1}$, when working through Steps 0 to 2 above, at all?

If not why do I say the AD curve also incorporates the MP relation?



Graph of AD relation in $(\tilde{Y}, \pi)$ space. Note axes' labels!

The AD-AS Representation

The AD Curve

Some observations:

- AD is a downward sloping relation between π_t and $\tilde{Y}_t$. Why?
  - MP and Monetary Policy Rule
  - Investment Demand and IS

  Explain more?

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Implications:

- The AD curve gives us a convenient policy implication:
  - it is *as if* the central bank *chooses* short run output, through controlling short run inflation
- But as we know, from what goes underneath AD:
  - Mechanism:
    - if inflation is above (below) target,
    - then the central bank raises (lowers) the interest rate,
    - to lower (raise) output below potential.

The AD-AS Representation

The AD Curve

Implications:

- The AD curve gives us a convenient policy implication:
  - it is *as if* the central bank *chooses* short run output, through controlling short run inflation
- But as we know, from what goes underneath AD:
  - Mechanism:
    - if inflation is above (below) target,
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The AD Curve: Movements along

- A change in current inflation, π_t
  - A movement along the AD curve
- Changes in monetary-policy stance (toughness), $\bar{m} > 0$
  - Alter the slope of the AD curve
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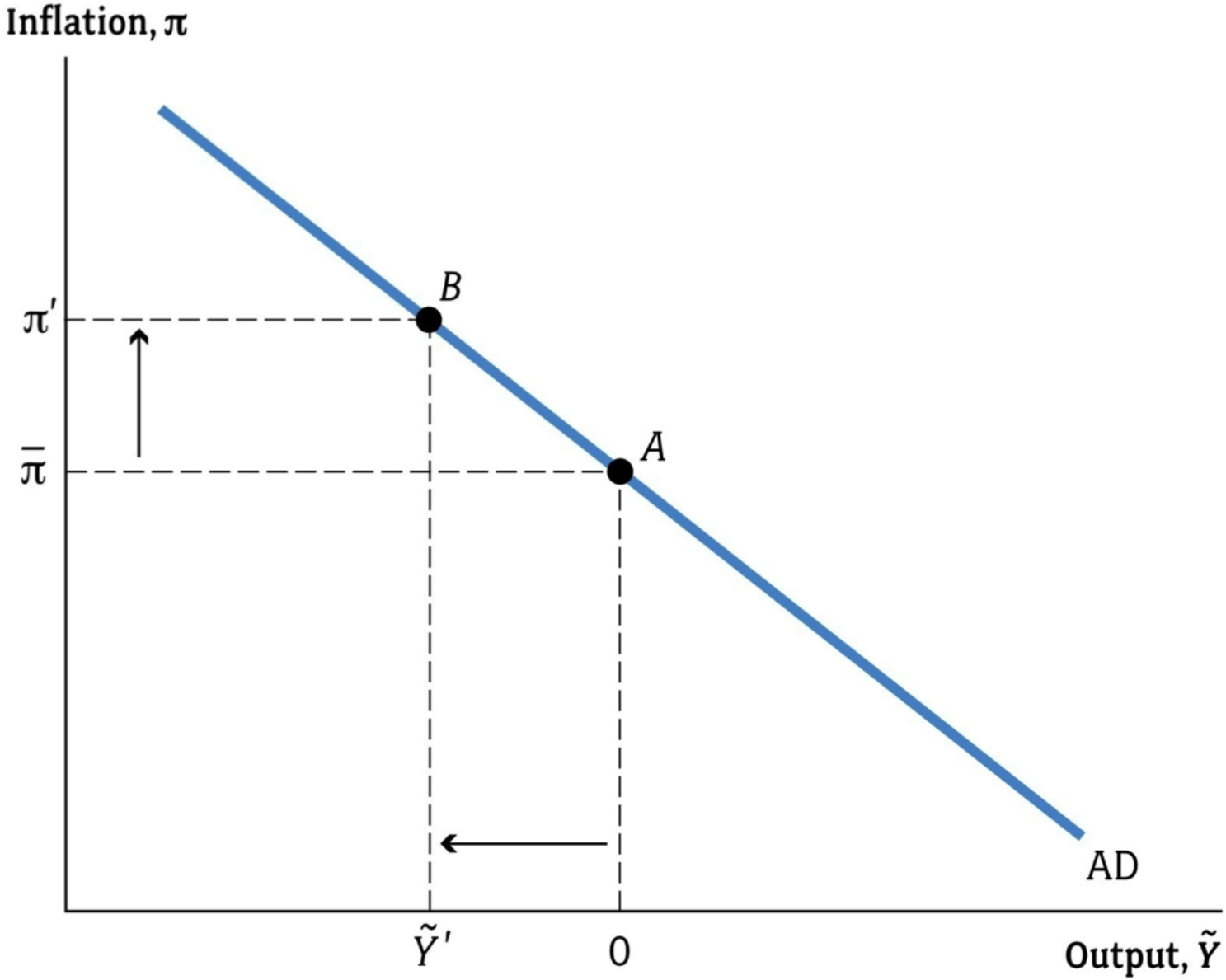
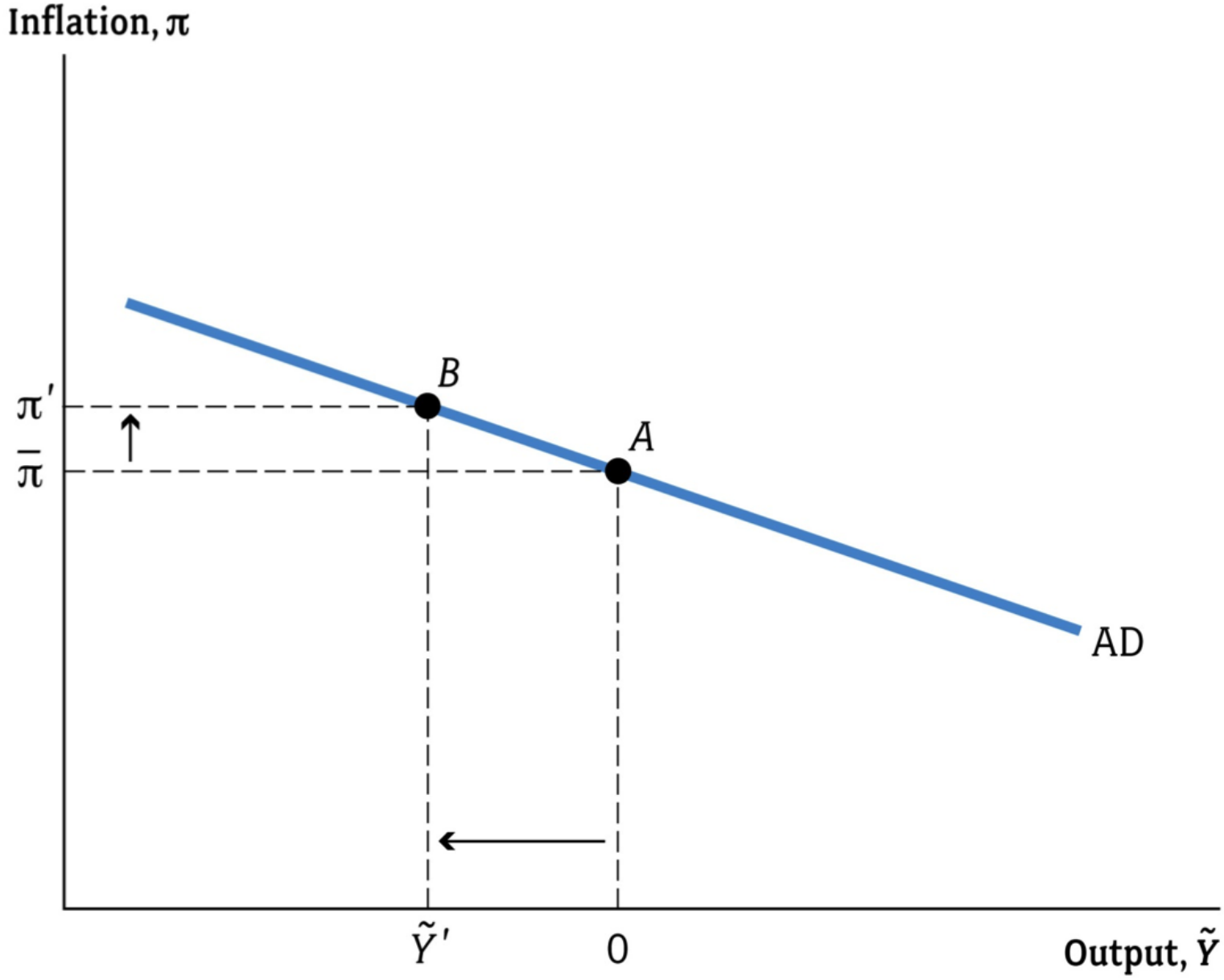


Movement along AD: Effect of inflation shock $\bar{o}$ on AD



Slope of AD is steeper if monetary policy is more aggressive. Graph show inverse AD.

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The AD Curve: Shifts

- AD curve shifts caused by:
  - Changes in the parameter $\bar{a}$.
    - Meaning?
    - How?
  - Changes in the policy target rate of inflation $\bar{\pi}$.
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Exercise

Show how a change in:

1. $\bar{a}$, or
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shifts the AD curve.

Explain your reasoning using the mechanism underlying the IS curve!

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The AS-AD Representation

The AS construct

The AD-AS Representation

The AS Curve

Remember our verbal microeconomic story behind the Phillips curve?

$$\pi_t = \pi_{t-1} + \bar{\nu}\tilde{Y}_t + \bar{o}$$

- Supply side decisions
- Firms respond to short run output demand fluctuations via their price-setting behaviour
- In aggregate, this translates to a (positive) relation between short run inflation change and output.

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Deriving the AS Curve

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- At each date t, lagged inflation π_{t-1} already predetermined or fixed.
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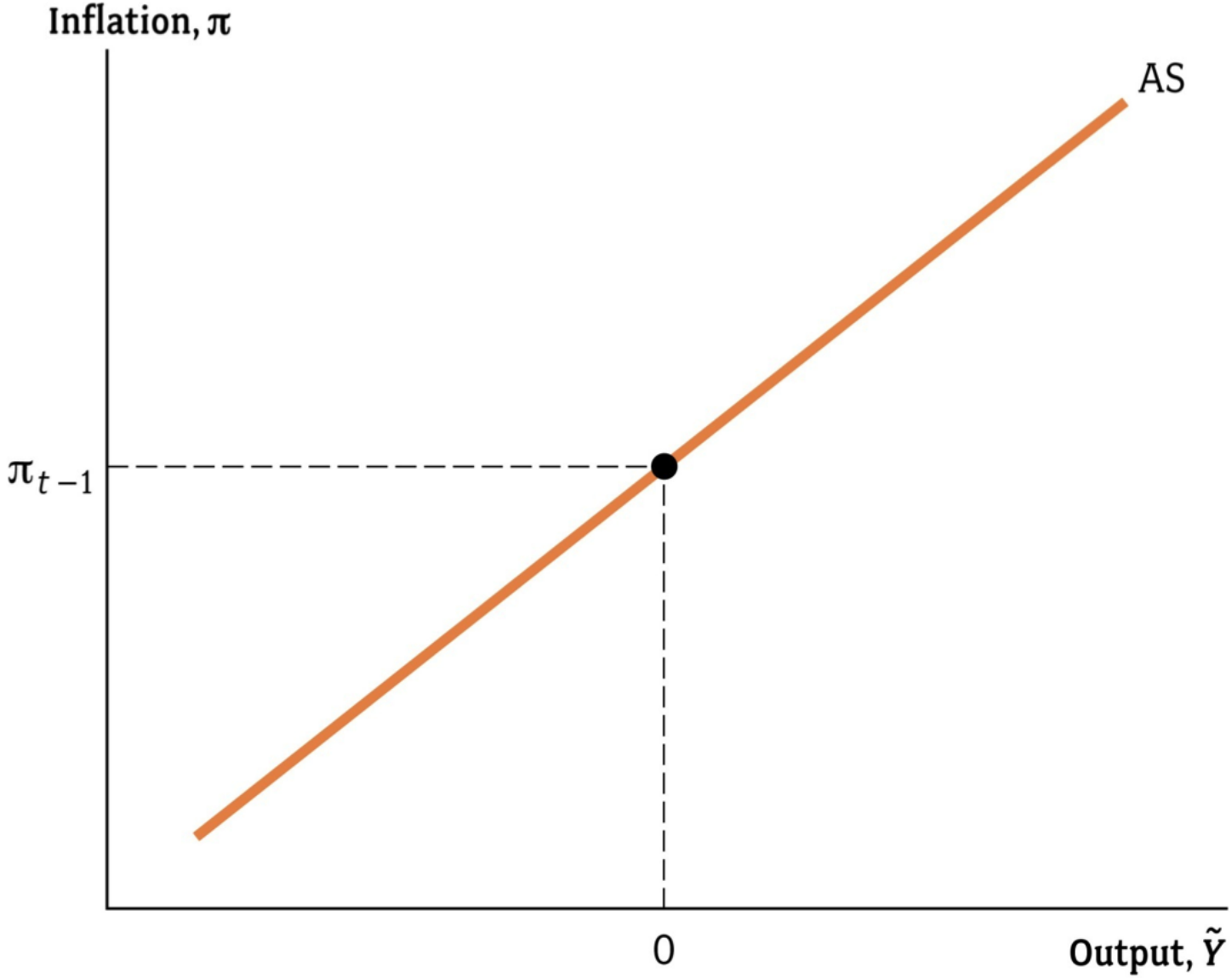

The AS representation. Note axes' labels!

Australian National University

The AD-AS Representation

The AS Curve: long run

Some observations:

- The point in the graph $(0, \pi_{t-1})$:
  - obtains when $\bar{o} = 0$ and when $\tilde{Y}_t = 0$. Why?
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Checkpoint!

- The vertical axis represents inflation.
- The horizontal axis represents short-run output.
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  - implication of price-setting behavior of firms embodied in the Phillips curve
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All together now!

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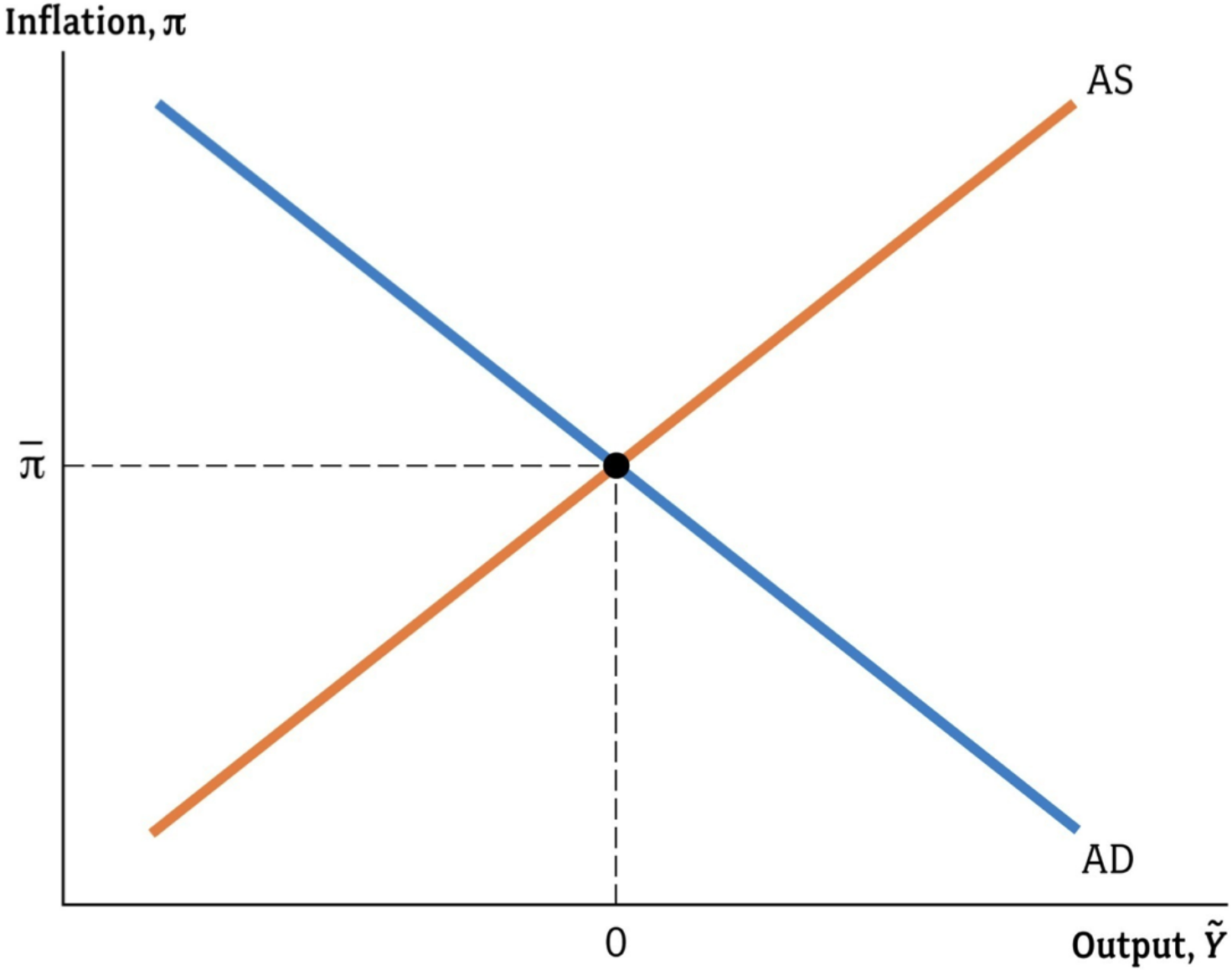
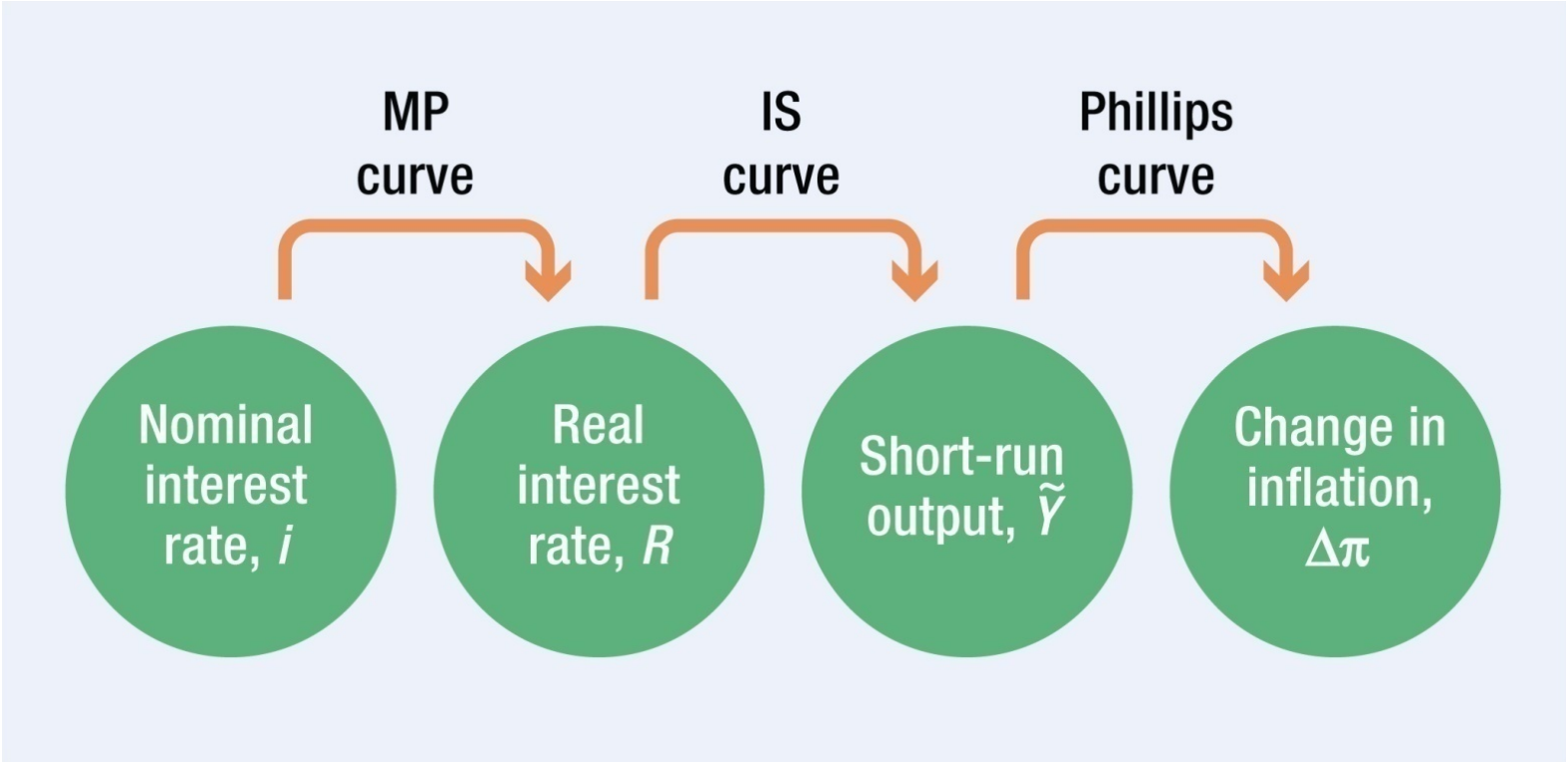


Graph of the AS-AD model.

Summary


MP curve
IS curve
Phillips curve
Nominal interest rate, i
Real interest rate, R
Short-run output, $\tilde{Y}$
Change in inflation, $\Delta\pi$

Summary

- IS-MP-PC
- What was missing was a model describing how monetary policy is determined.
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Pan troglodytes vs. Sophisticus Alere Fartacus

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Trivia

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