Inflation and the Theory of the Phillips Curve

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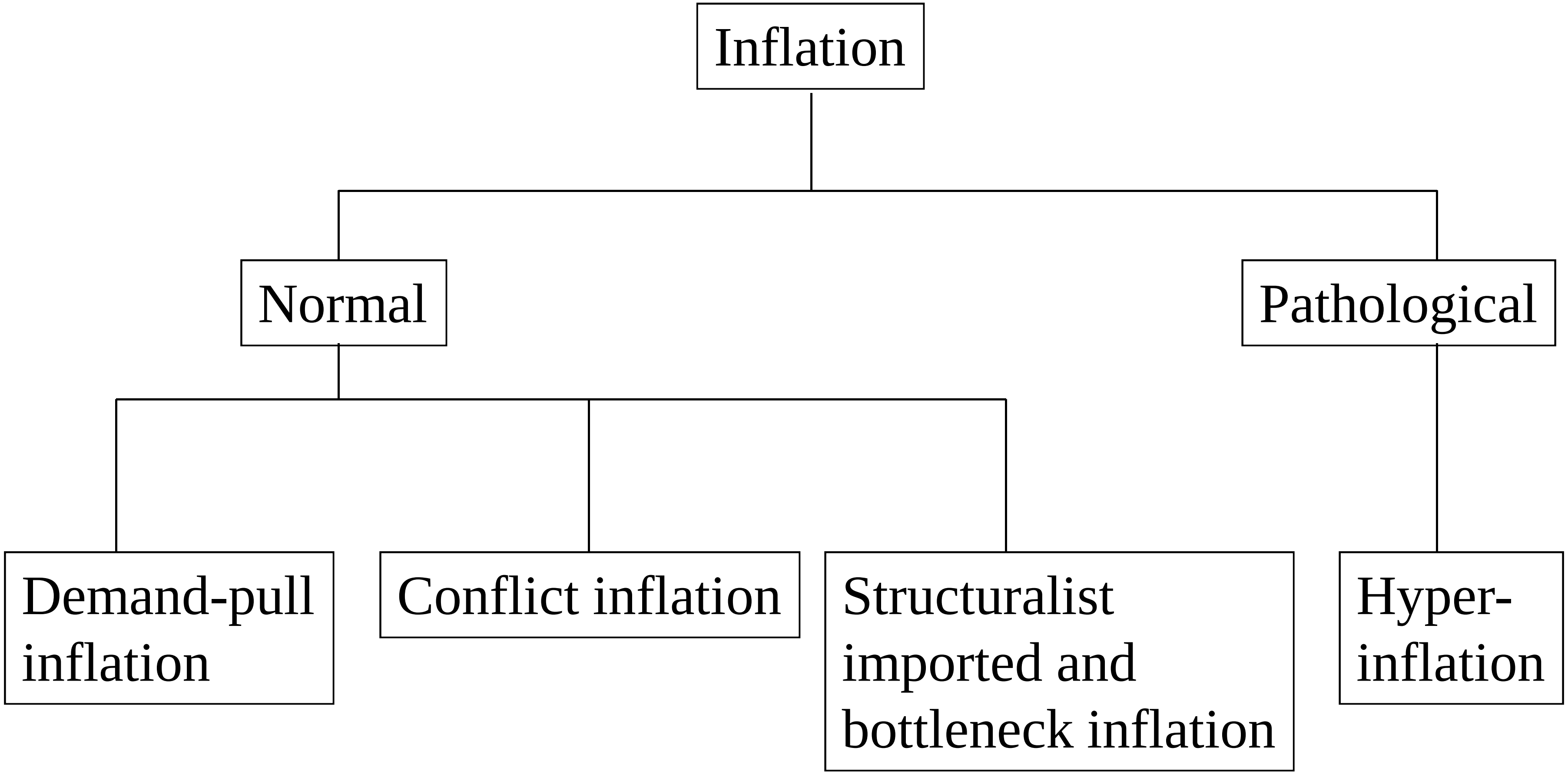
Figure 1. Taxonomy of different types of inflation.



Formation of inflation expectations
vs.
incorporation of inflation expectations

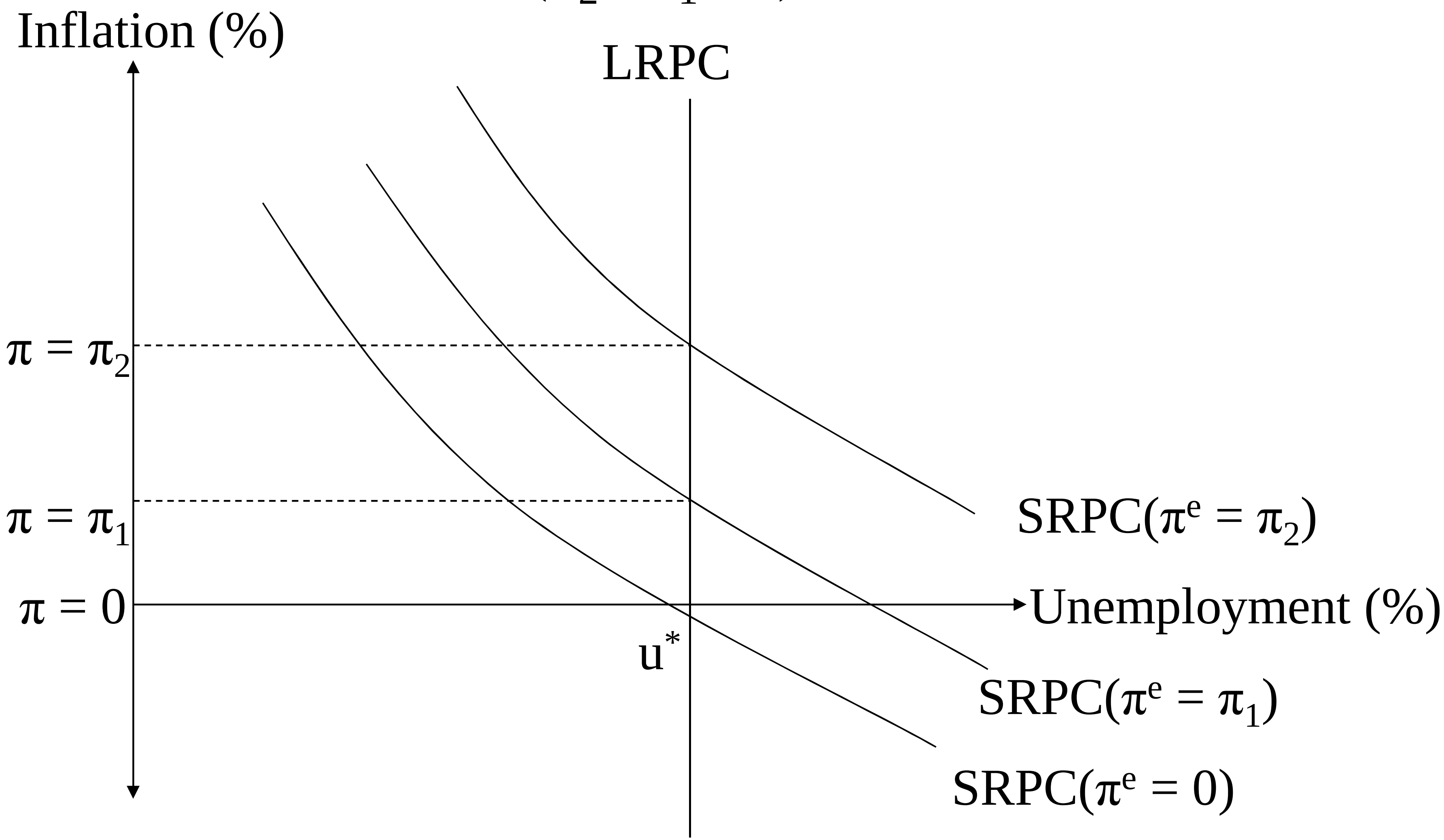
Lipsey PC

- (1.1) $w = f(u - u^*)$ $f(0) = 0, f' < 0, f'' < 0$
- w = nominal wage inflation;
- u = actual unemployment rate;
- u^*= rate of unemployment (frictional and structural) associated with full employment.
- (1.2) $\omega = f(u - u^*)$ $f(0) = 0, f' < 0, f'' < 0$
- ω = real wage inflation.
- (1.3) $\omega = w - \pi$
- π = rate of price inflation
- (1.4) $w = f(u - u^*) + \pi$

Friedman – Phelps PC

- Introduce inflation expectations
- (2.1) $w = f(u - u^*) + \pi^e$
- π^e = expected inflation.
- (2.2) $\pi = w$
- (2.3) $\pi = f(u - u^*) + \pi^e$
- Implications:
- A) No LR trade-off
- B) Vertical LRPC that crossed by family of SRPCs.
- C) Can keep $u < u^*$ if accelerate inflation.

Figure 2. The Friedman – Phelps Phillips Curve
($\pi_2 > \pi_1 > 0$).



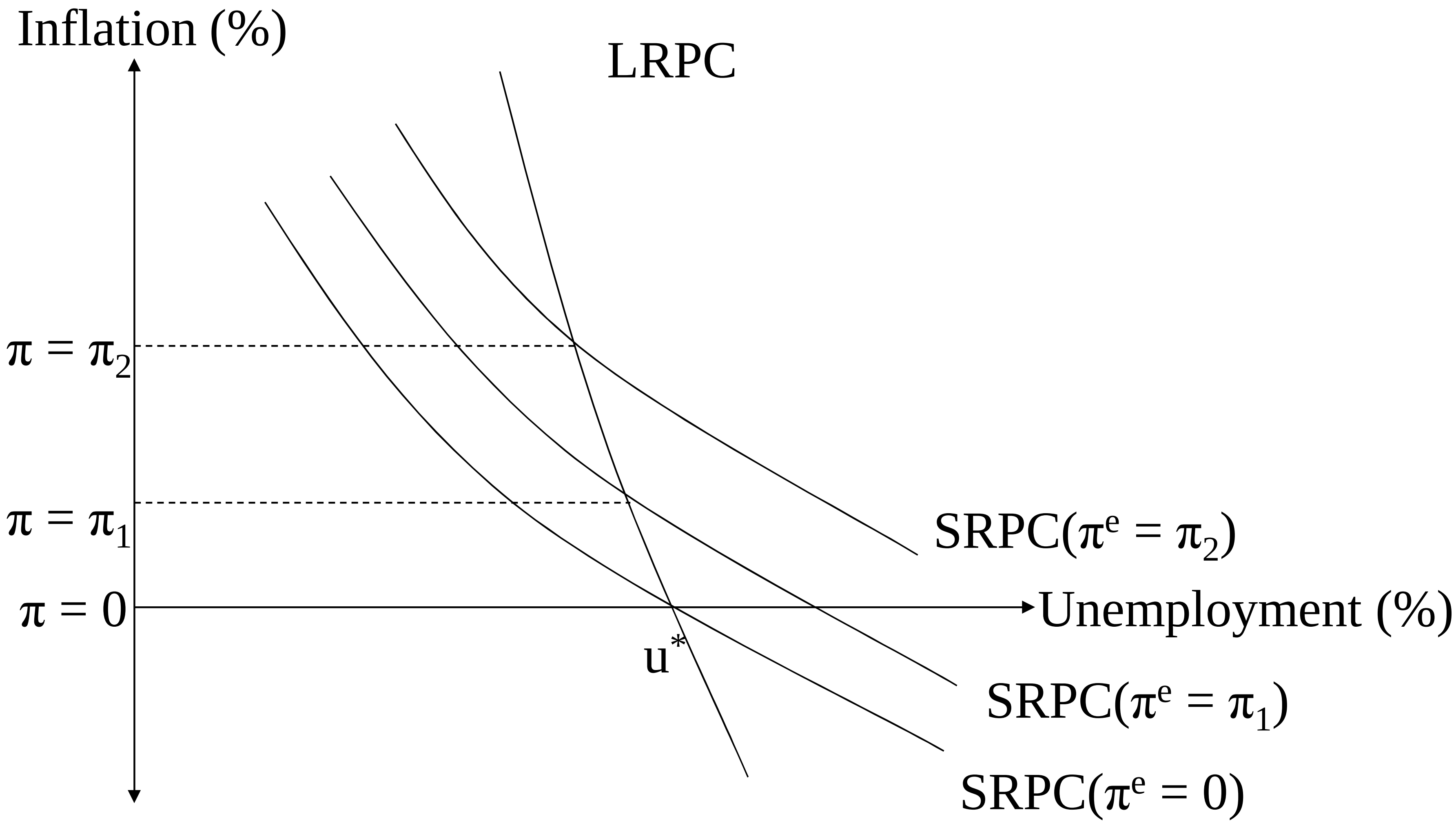
Lucas PC

- Replaced AE with RE.
- Implications:
- (1) LRPC vertical but no family of SRPCs
- (2) Cannot keep $u < u^*$ by accelerating inflation.
- Friedman-Phelps-Lucas transformed macro:
- (1) End of Keynesian discourse about full-emp.
- (2) Shifted research attention to implications of expectations for policy.
- (3) Changed welfare interpretation of lowering unemp → "fooling" workers vs original Keynesian interpretation of reducing involuntary unemployment.

Tobin PC

- (3.1) $w = f(u - u^{*}) + \lambda\pi^{e}$ $0 < \lambda < 1$, $f' < 0$, $f'' < 0$
- (3.2) $\pi = w$
- (3.3) $\pi = f(u - u^{*}) + \lambda\pi^{e}$
- LR equilibrium condition ($\pi^{e} = \pi$):
- (3.4) $\pi = f(u - u^{*})/[1 - \lambda]$
- Slope = $d\pi/du = f'/[1 - \lambda] < 0$ if $\lambda < 1$.
- <u>Implications</u>
- (1) Family of negative sloped SRPCs & LRPC.
- (2) If have RE → just have single LRPC.
- (3) If have RE → LRPC still negatively sloped → shows critical factor = incorporation of inflation expectations , NOT formation of expectations.

Figure 3. The Tobin neo-Keynesian Phillips Curve ($\pi_2 > \pi_1 > 0$).



Multi-Sector PC

- Two challenges to developing PC
- (1) Why does inflation help improve economic outcomes & welfare?
- (2) Why is coeff of inflation expectations < 1?

Figure 4. The problem of demand shocks in a multi-sector economy (sectors A, B)

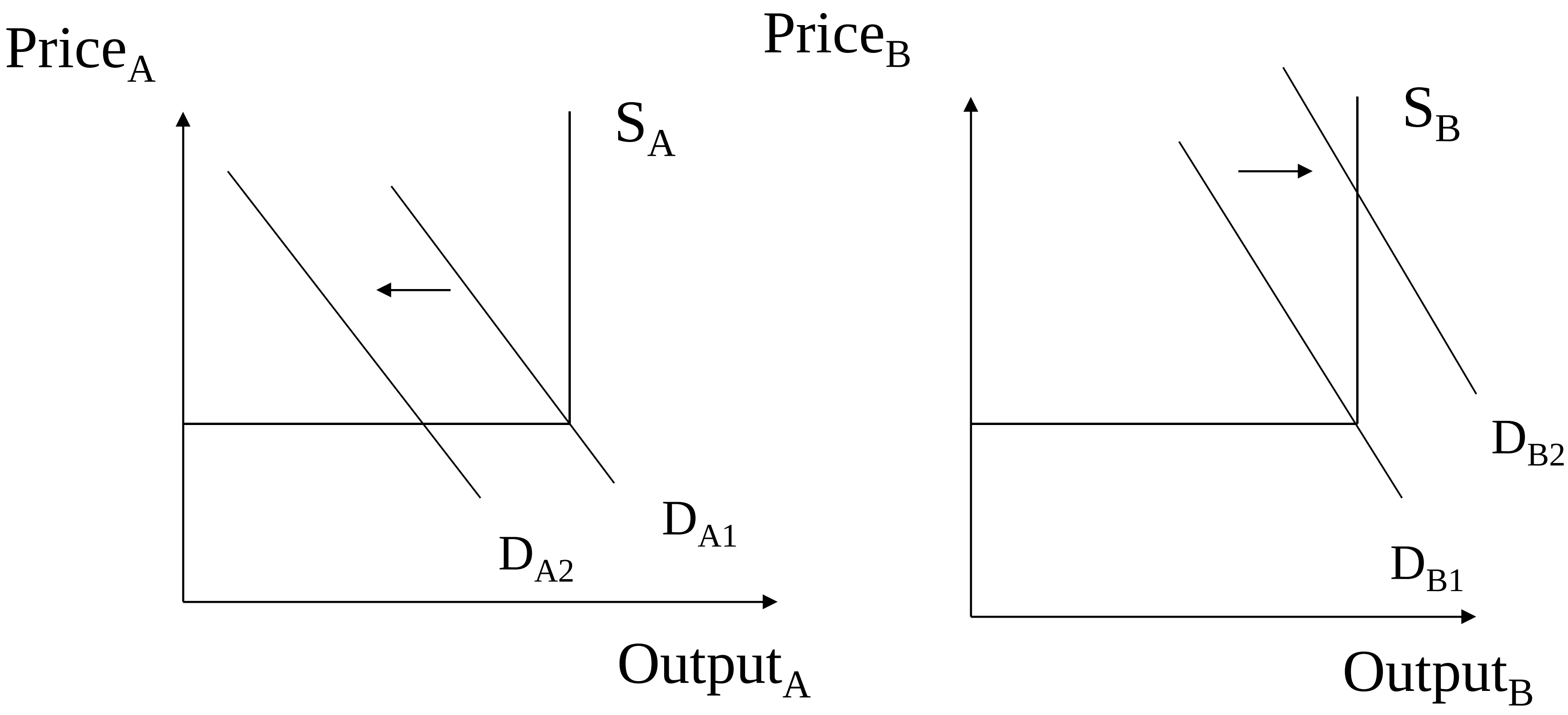
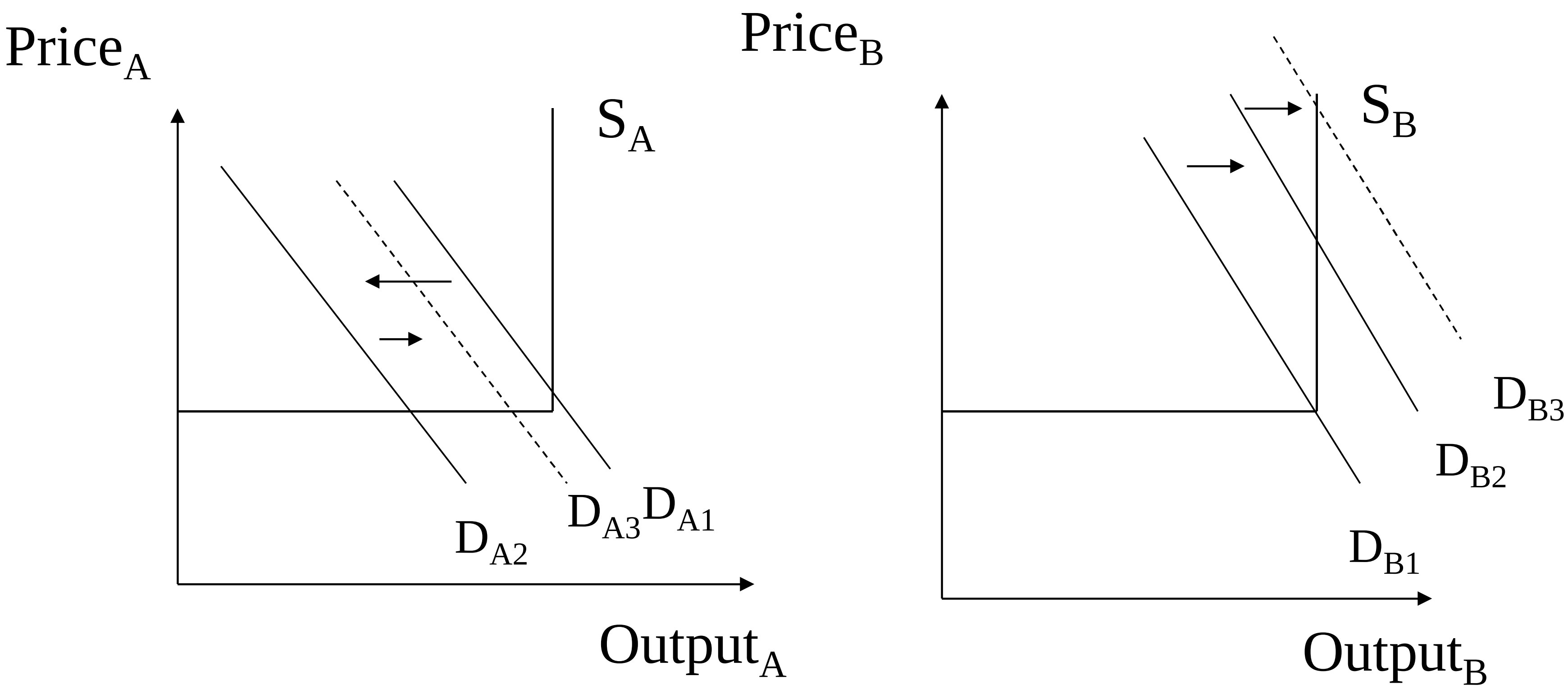


Figure 5. The effect of steady aggregate nominal demand growth multi-sector economy (sectors A, B)



Multi-Sector PC - 2

- $f(u_i - u^*) + \lambda\pi^e \qquad u_i > u^*, \; 0 \leq \lambda \leq 1,$
- (4.1) $w_i =$
- $f(u_i - u^*) + \pi^e \qquad u_i < u^*$
- where $i = 1, \ldots, N$.
- (4.2) $\pi^e = \pi$
- (4.3) $\pi_i = w_i$
- (4.4) $w = \Sigma w_i / N$
- (4.5) $\pi = \Sigma \pi_i / N$
- (4.6) $u = \Sigma u_i / N$
- (4.7) $s = s(u) \qquad 0 < s < 1, \; s' > 0$

Multi-Sector PC - 3

- (4.8) $w = F(u - u^*) + [1 - s(u) + s(u)\lambda]\pi^e \quad F_u < 0$
- (4.9) $\pi = F(u - u^*)/s(u)[1 - \lambda]$

- $d\pi/du = \{[1 - \lambda]F' + F(u - u^*)s_u\}/[1 - \lambda]s(u)^2 < 0$

- (4.10) $\Lambda = 1 - s(u) + s(u)\lambda \leq 1 \qquad \Lambda_u < 0$

Backward bending PC &
near rational expectations

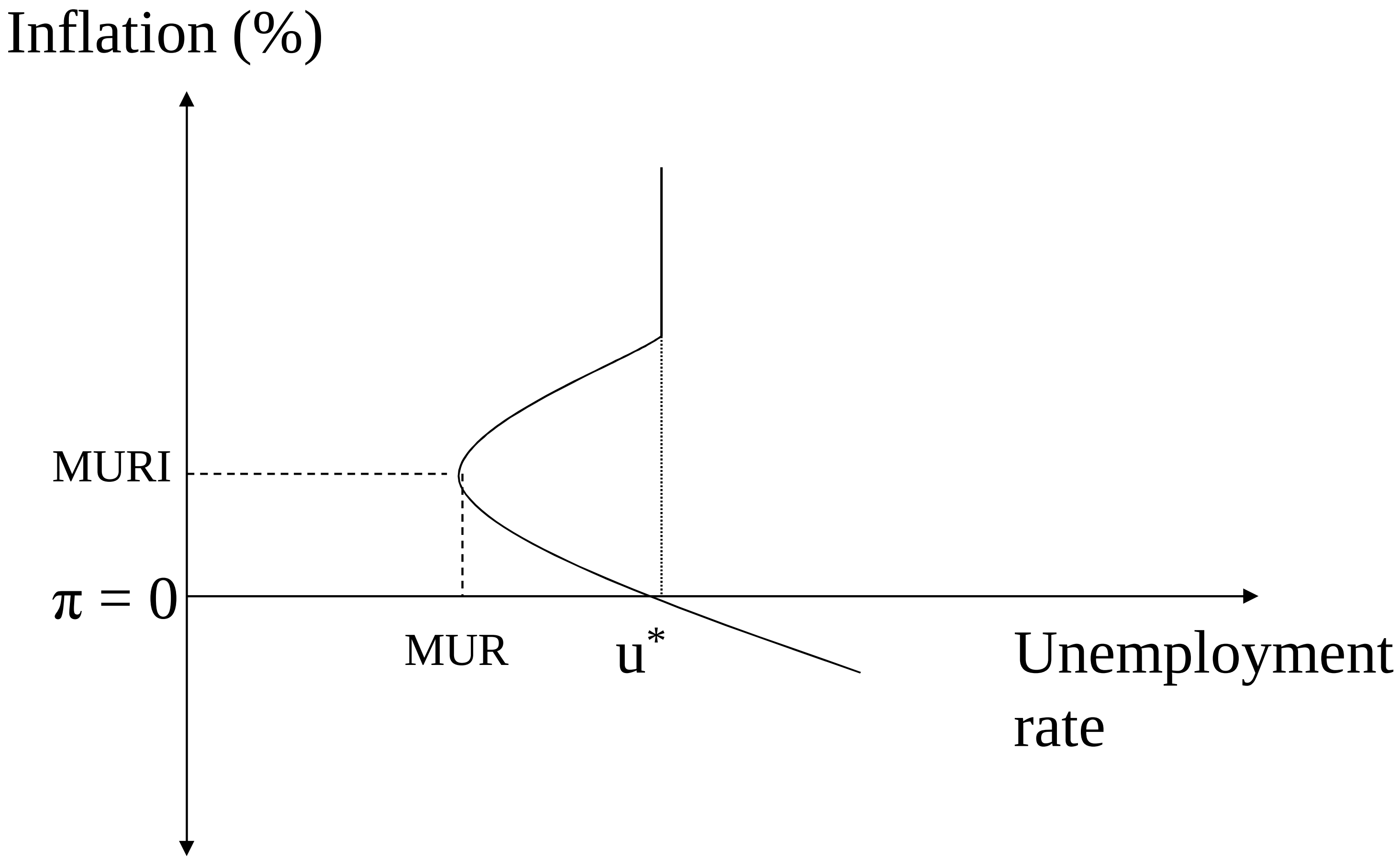
Backward bending PC & Near Rational Expectations - 1

- $f(u - u^{*}) + \pi^{e}_{R}$ $i = R$
- (5.1) $w_i =$
- $f(u - u^{*}) + \pi^{e}_{NR}$ $i = NR$
- (5.2) $\pi^{e}_{R} = \pi$
- $= p(\pi) \leq \pi$ $\pi < \pi^{C}$ $p' > 0$
- (5.3) π^{e}_{NR}
- $= \pi$ $\pi \geq \pi^{C}$
- (5.4) $\pi_i = w_i$
- (5.5) $w = sw_{NR} + [1 - s]w_R$
- (5.6) $\pi = s\pi_{NR} + [1 - s]\pi_R$
- (5.7) $s = s(\pi)$ $0 \leq s \leq 1, s' < 0$

Backward bending PC & Near Rational Expectations - 2

- (5.8) $\pi^e = s(\pi)\pi^e_{NR} + [1 - s(\pi)]\pi^e_R$
- (5.9) $\pi = F(u - u^*) + s(\pi)\pi^e_{NR} + [1 - s(\pi)]\pi^e_R$
- High inflation regime ($\pi \geq \pi^C$) = all rational
- (5.10.a) $\pi = F(u - u^*) + \pi^e$
- (5.10.b) $\pi^e = \pi$
- Lower inflation regime ($\pi<\pi^C$)= some non-rational
- (5.11) $\pi = F(u - u^*) + s(\pi)p(\pi) + [1 - s(\pi)]\pi$
- $d\pi/du = F'/[\, s(\pi) + \pi s' - s'p(\pi) - p's(\pi)] \ {}^{>}_{<}\ 0$

Figure 6. The backward bending Phillips curve.

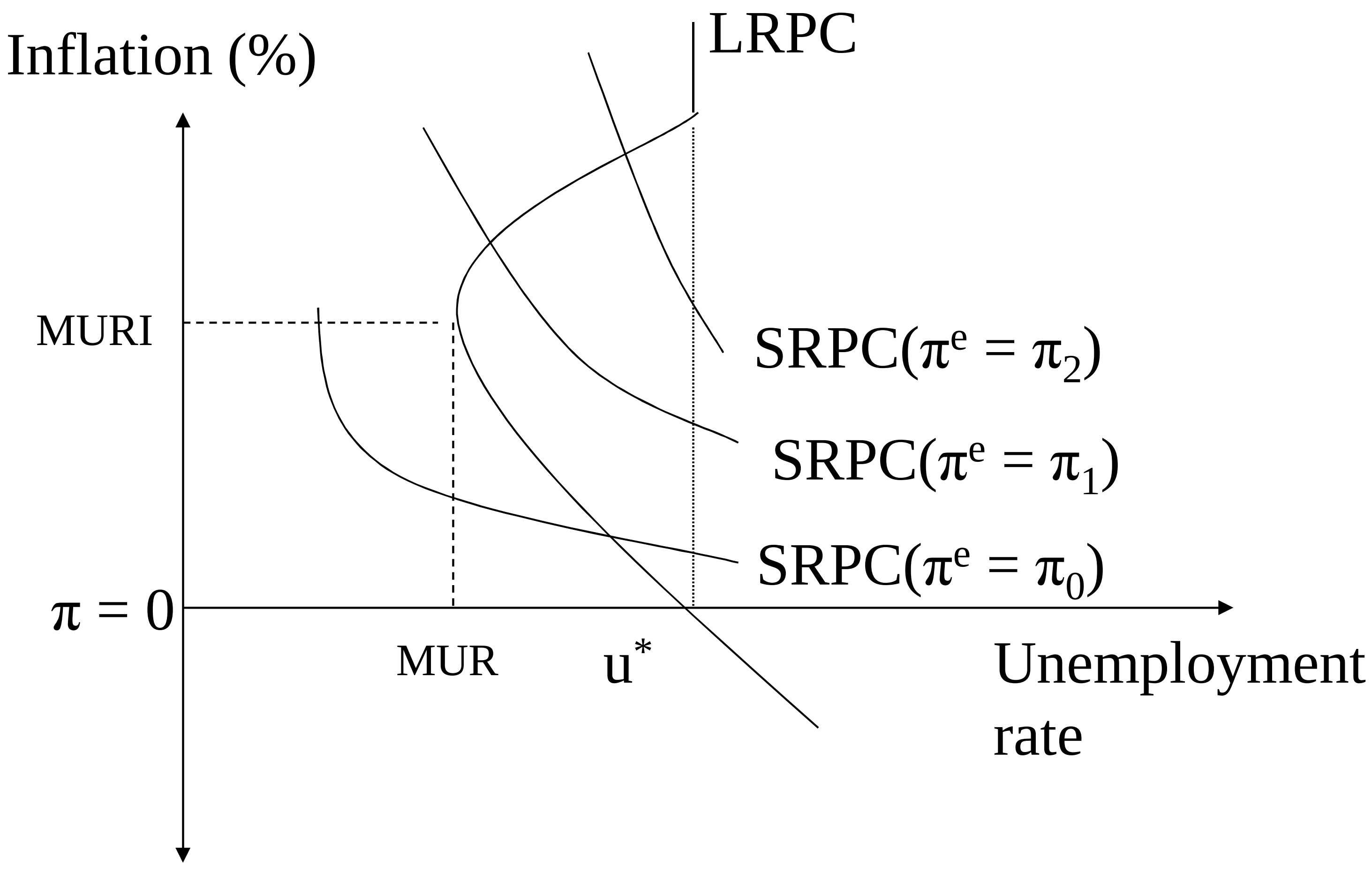


Backward bending PC in a multi-sector economy with incomplete incorporation of expectations

Backward bending PC, multi-sector economy with incomplete incorporation of expectations - 1

- $\lambda(\pi^e) < 1 \qquad \pi^e < \pi^C, \lambda' > 0$
- (6.1) $\lambda =$
- $1 \qquad \pi^e \geq \pi^C$
- High inflation regime: $\pi^e \geq \pi^C$
- (6.2) $\pi = F(u - u^*) + \pi^e \qquad F_u < 0, \pi^e \geq \pi^C$
- (6.3) $\pi^e = \pi$
- Lower inflation regime: $\pi^e < \pi^C$
- (6.4) $\pi = F(u - u^*) + [1 - s(u)]\pi^e + s(u)\lambda(\pi^e)\pi^e$
- (6.5) $\pi^e = \pi$
- $d\pi/du = \{F' + s'\pi[\lambda(\pi) - 1]\}/s(u)\{[1 - \lambda(\pi)] - \pi\lambda'\} \gtrless 0$

Figure 47 The backward bending Phillips curve (LRPC) with adaptive expectations ($\pi_2 > \pi_1 > \pi_0$).



Near rational expectations

vs.

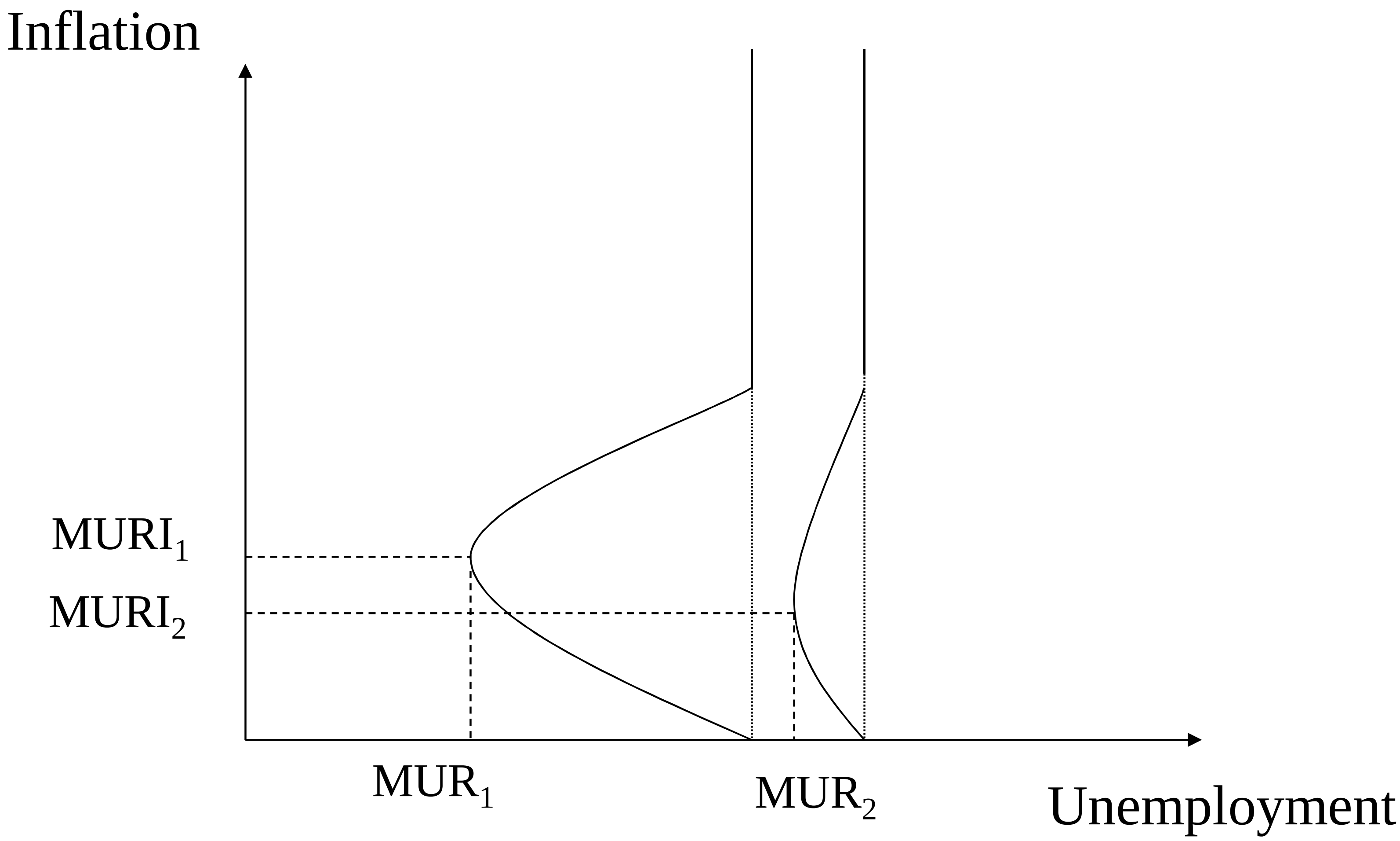
Incomplete incorporation of expectations

Worker militancy, conflict and the Phillips curve

Worker militancy, conflict and the Phillips curve

- $f(u_i - u^*) + \lambda\pi^e \qquad u_i > u^*, \ 0 \leq \lambda \leq 1,$
- (7.1) $w_i =$
- $f(u_i - u^*) + \pi^e \qquad u_i < u^*$
- (7.2) $\pi = \pi^e$
- (7.3) $u^* = u(\psi) \qquad u_\psi > 0$
- $\lambda(\pi^e, \psi) < 1 \qquad \pi^e < \pi^C, \lambda_{\pi e} > 0, \lambda_\psi > 0$
- (7.4) $\lambda =$
- $1 \qquad \pi^e \geq \pi^C$
- where ψ = labor militancy variable.
- $= F(u - u^*(\psi)) + [1 - s(u) + s(u)\lambda(\pi^e, \psi)]\pi^e \quad \pi^e < \pi^C$
- (7.5) w
- $= F(u - u^*(\psi)) + \pi^e \qquad \pi^e \geq \pi^C$
- (7.6) $\pi = F(u - u^*(\psi))/s(u)[1 - \lambda(\pi^e, \psi)] \qquad \pi^e < \pi^C$

Figure 8. Increased worker militancy shifts the backward bending Phillips curve to the right and lowers the MURI.



Conclusions