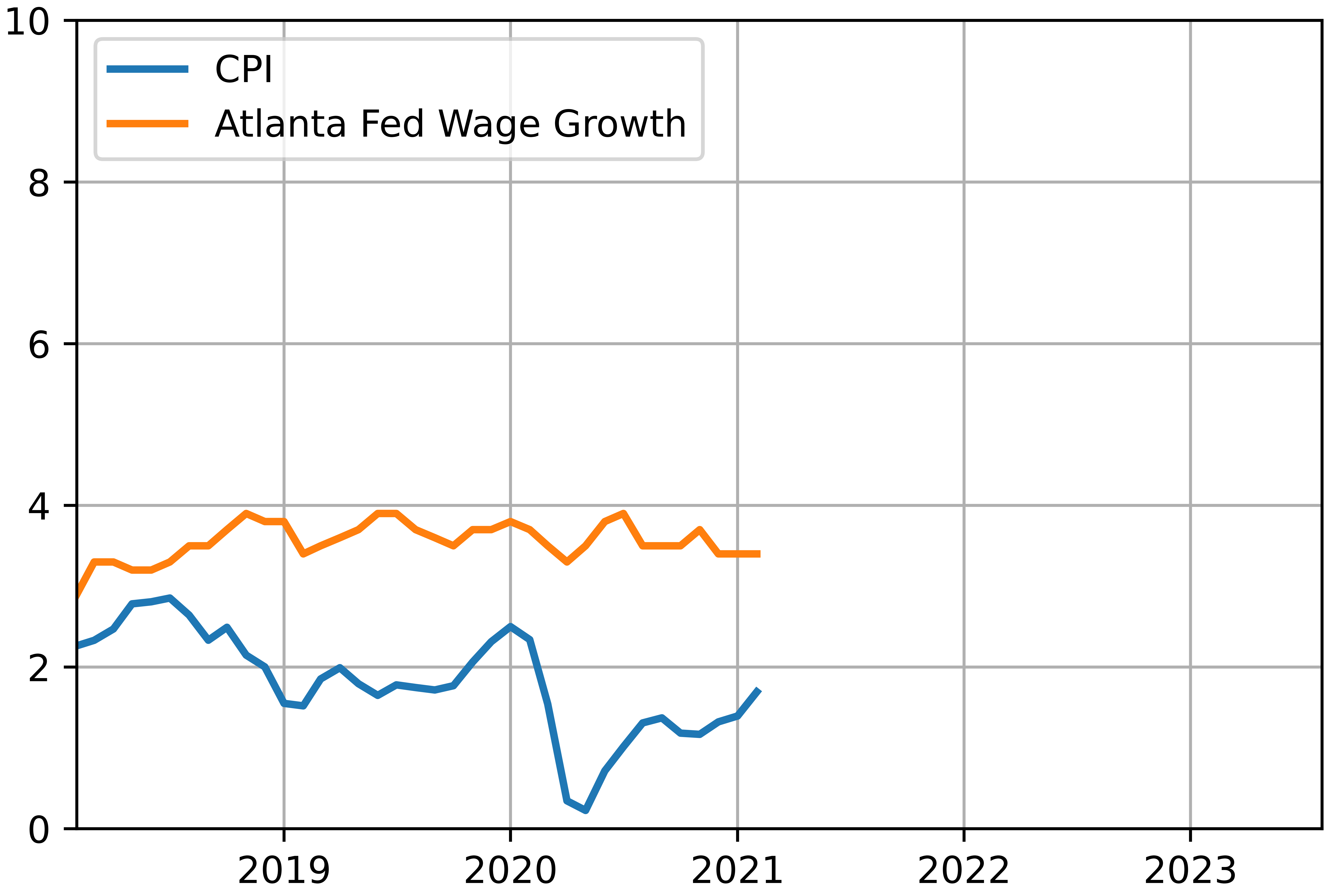
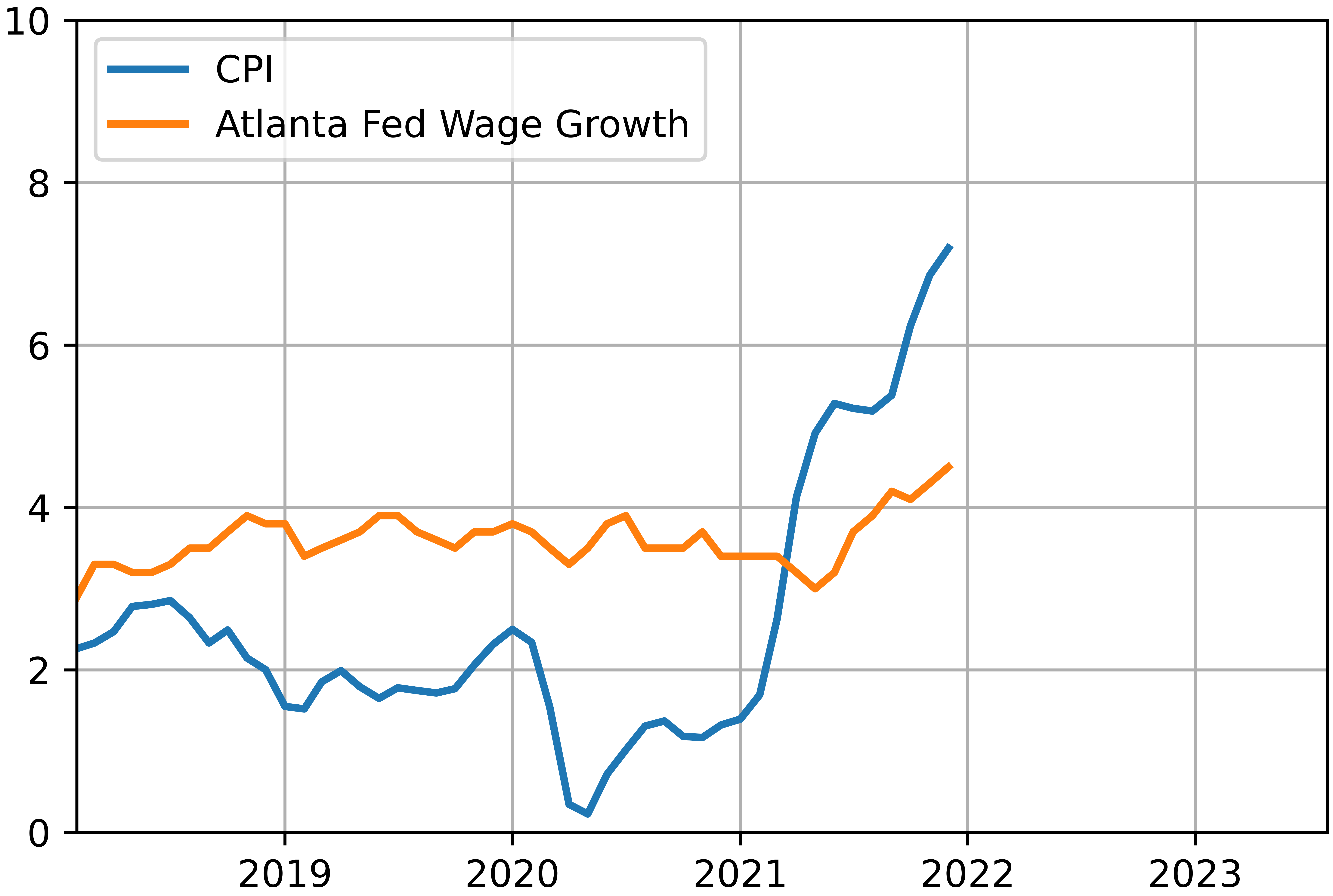
Wage-Price Spirals

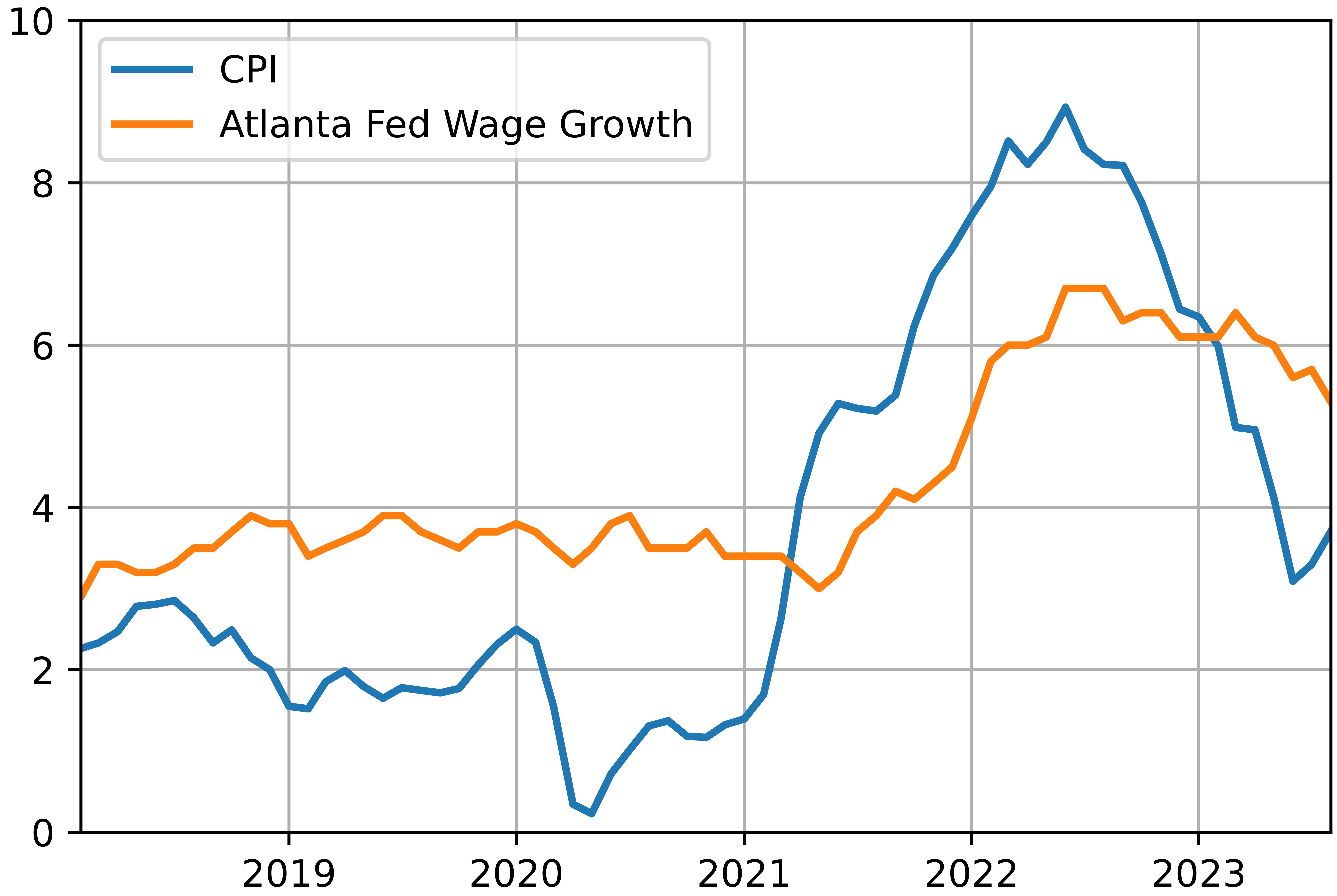
BPEA September 2023

Guido Lorenzoni and Ivan Werning


CPI
Atlanta Fed Wage Growth
0
2
4
6
8
10
2019
2020
2021
2022
2023



CPI
Atlanta Fed Wage Growth
0
2
4
6
8
10
2019
2020
2021
2022
2023


CPI
Atlanta Fed Wage Growth
10
8
6
4
2
0
2019
2020
2021
2022
2023

What we do

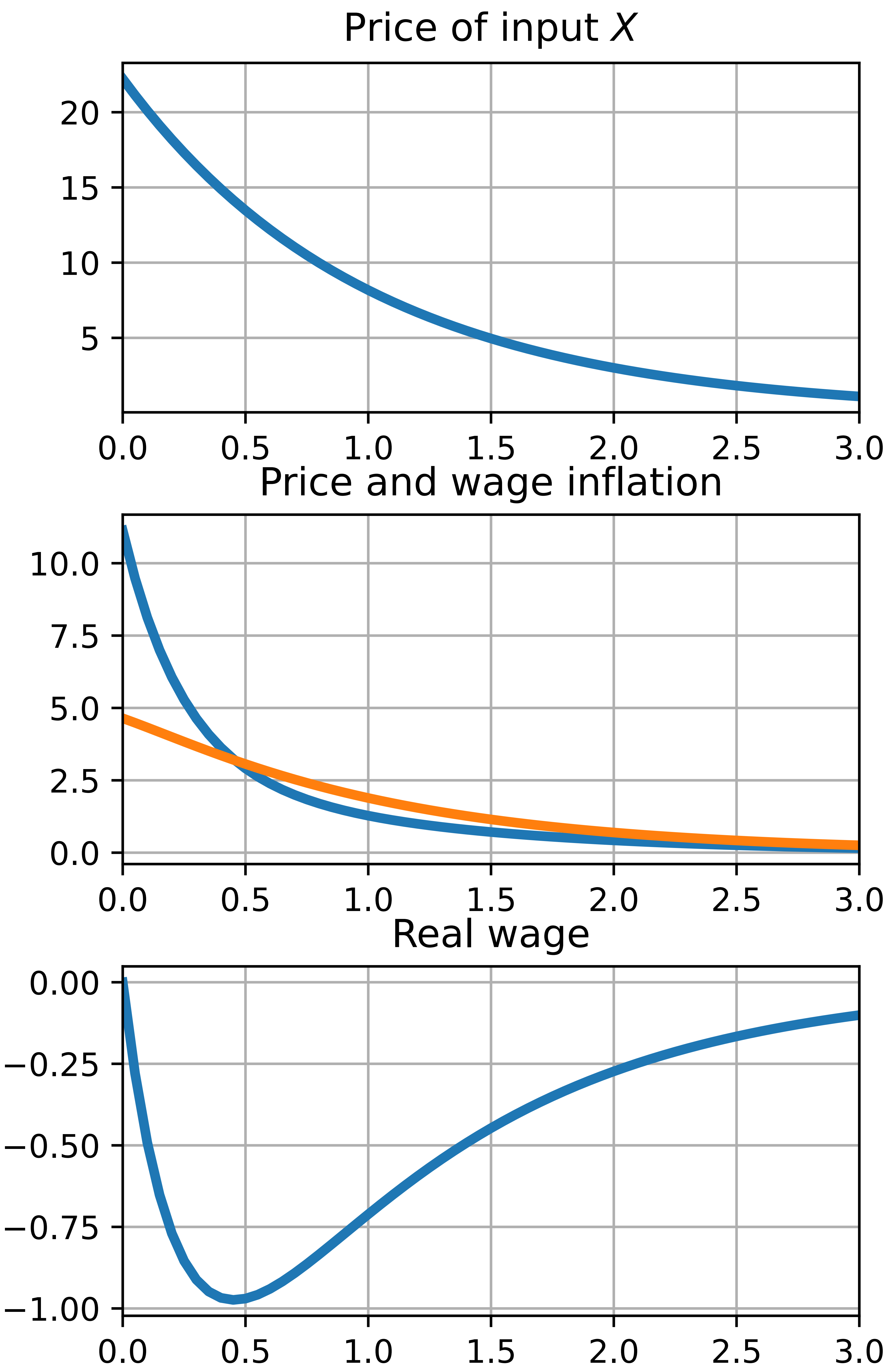
- **Applied contribution**:
  - Simple model gives inflation episode in 3 phases, similar to the one we're going through
  - Supply constraints and limited substitutability play crucial role
- **Conceptual/theory contribution**:
  - What is a wage-price spiral?
  - Mutually reinforcing dynamics of price and wage inflation
  - Spiral = conflict = different aspirations of firms and workers for w/p

Model ingredients

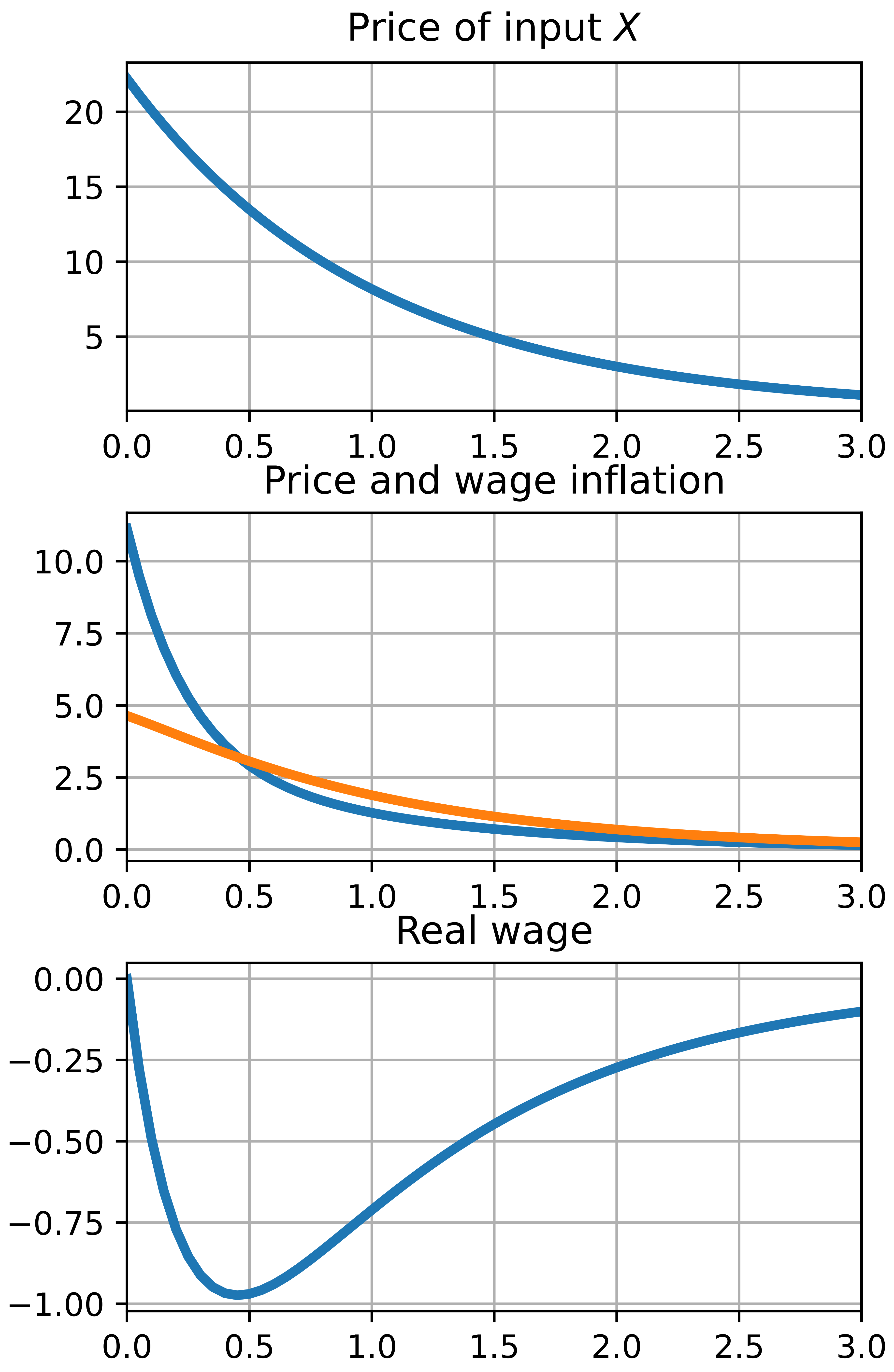
- Price setting and wage setting
- Input in inelastic supply X
- Limited substitution between X and labor

- Workers and firms aspirations depend on state of labor market and cost of inputs
- Cost of input endogenous

- Simple NK structure: aspirations map to output gap
- Level of the real wage is a state variable



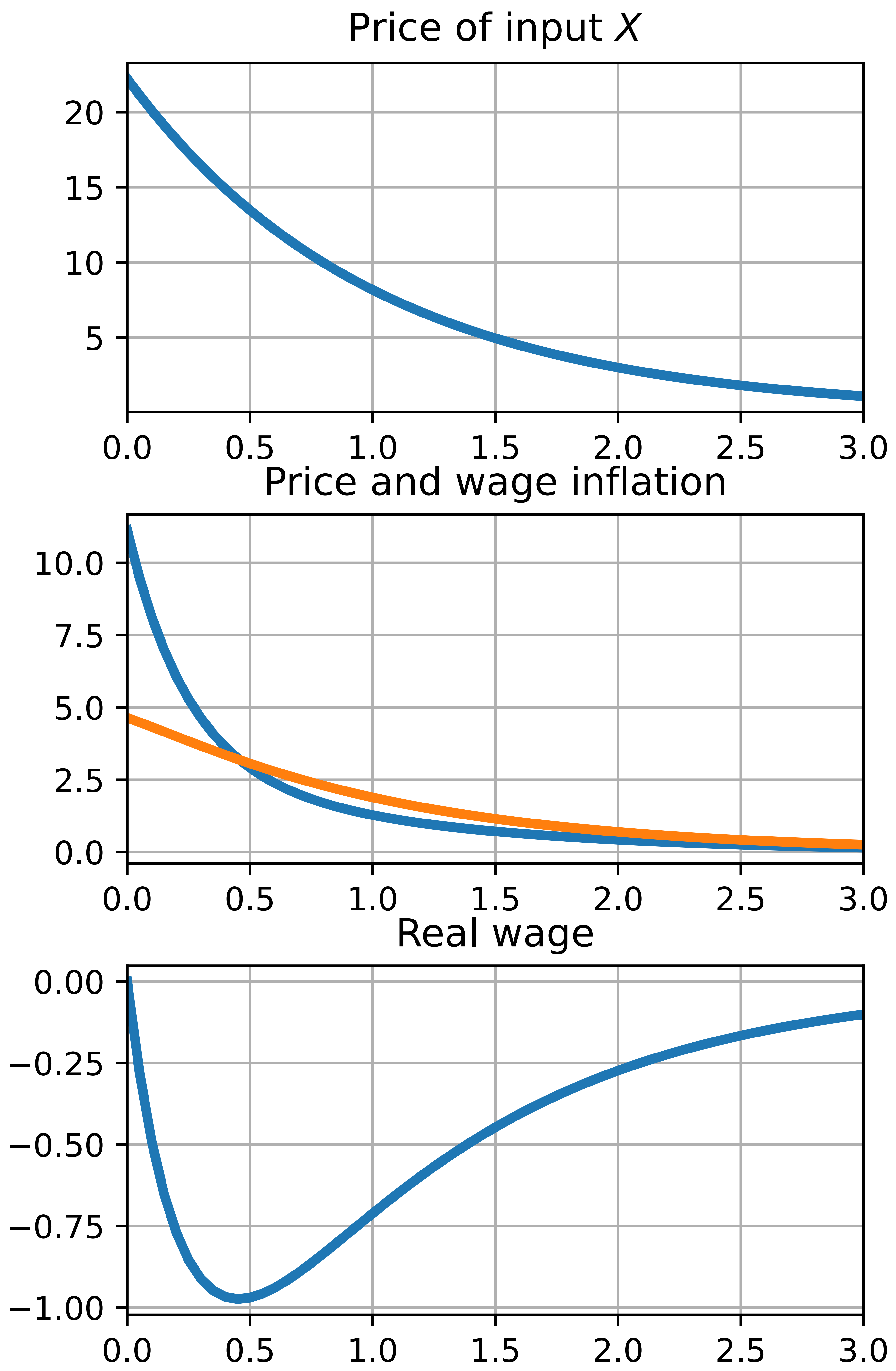
Price of input X
20
15
10
5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Price and wage inflation
10.0
7.5
5.0
2.5
0.0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Real wage
0.00
−0.25
−0.50
−0.75
−1.00
0.0
0.5
1.0
1.5
2.0
2.5
3.0



A "supply-constrained" demand shock

Three phases:

- Very fast response of X price, non-core inflation
- Pass-through into general price inflation
- Response of wages, initially less than prices, but more persistent



A "supply-constrained" demand shock

Three phases:

- Very fast response of *X* price, non-core inflation
- Pass-through into general price inflation
- Response of wages, initially less than prices, but more persistent

Supply shock show similar pattern

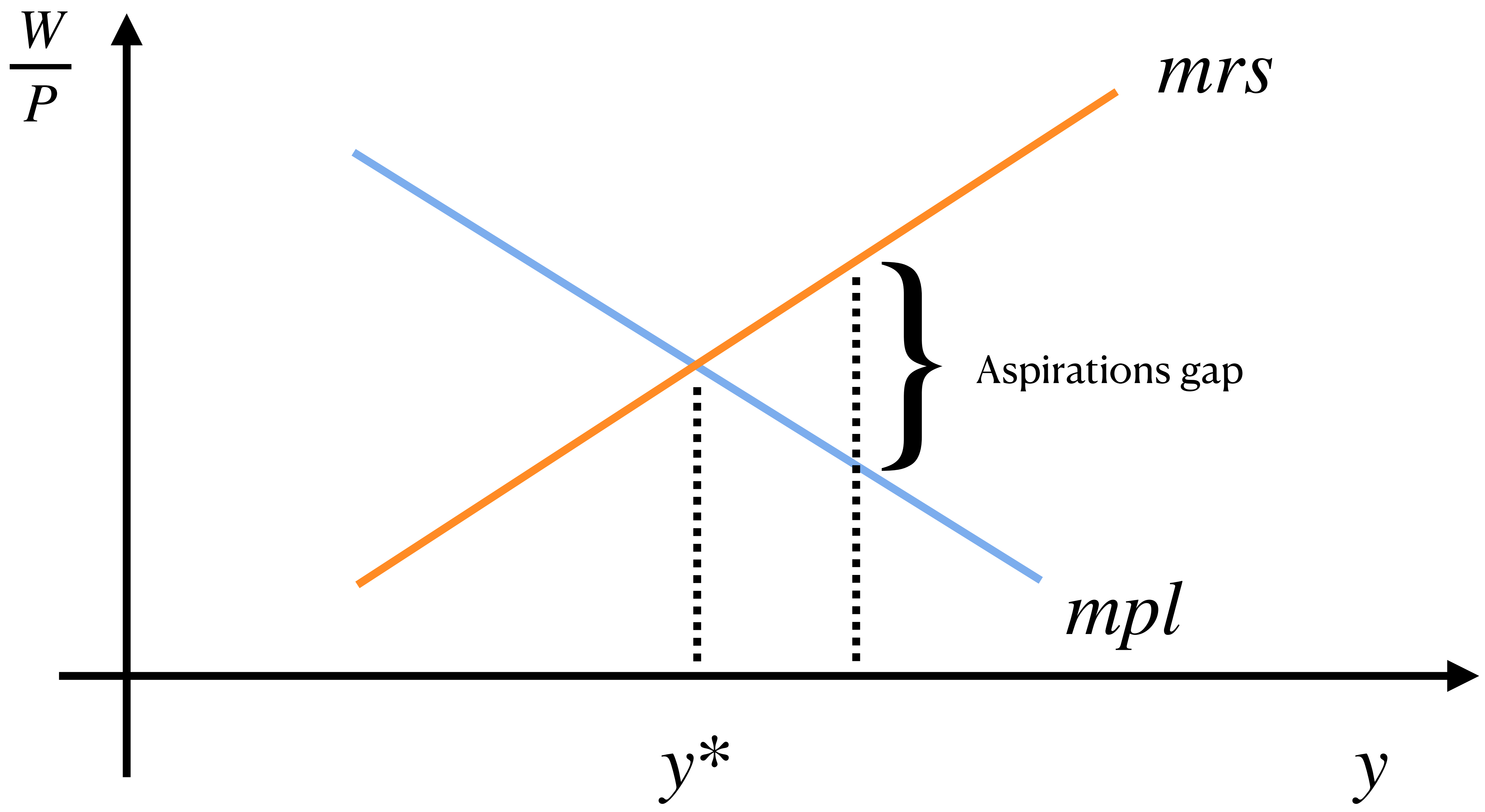
Profits go up, if *X* interpreted as capacity

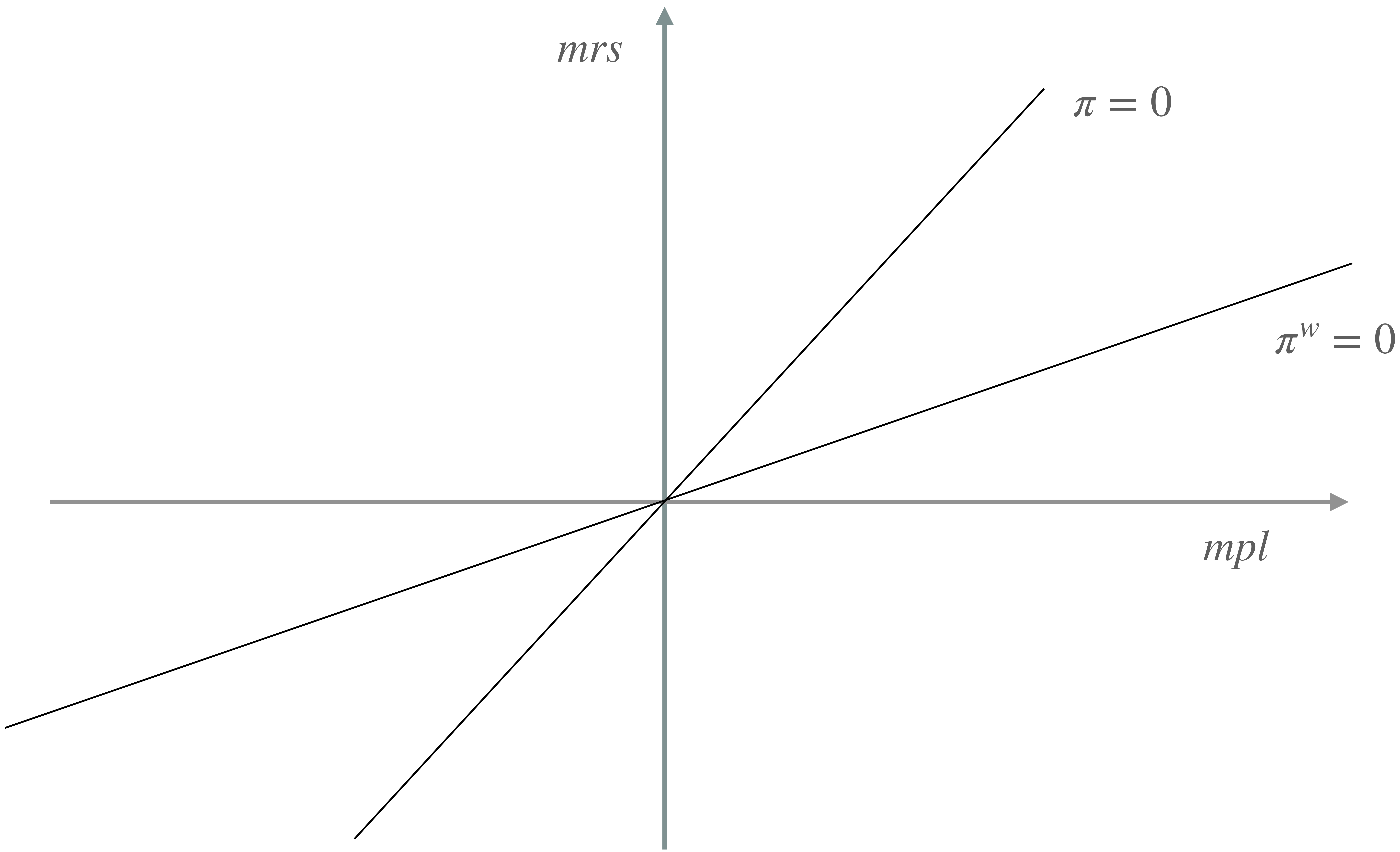
Ball, Leigh, Mishra (2022): high pass-through from non-core to core inflation

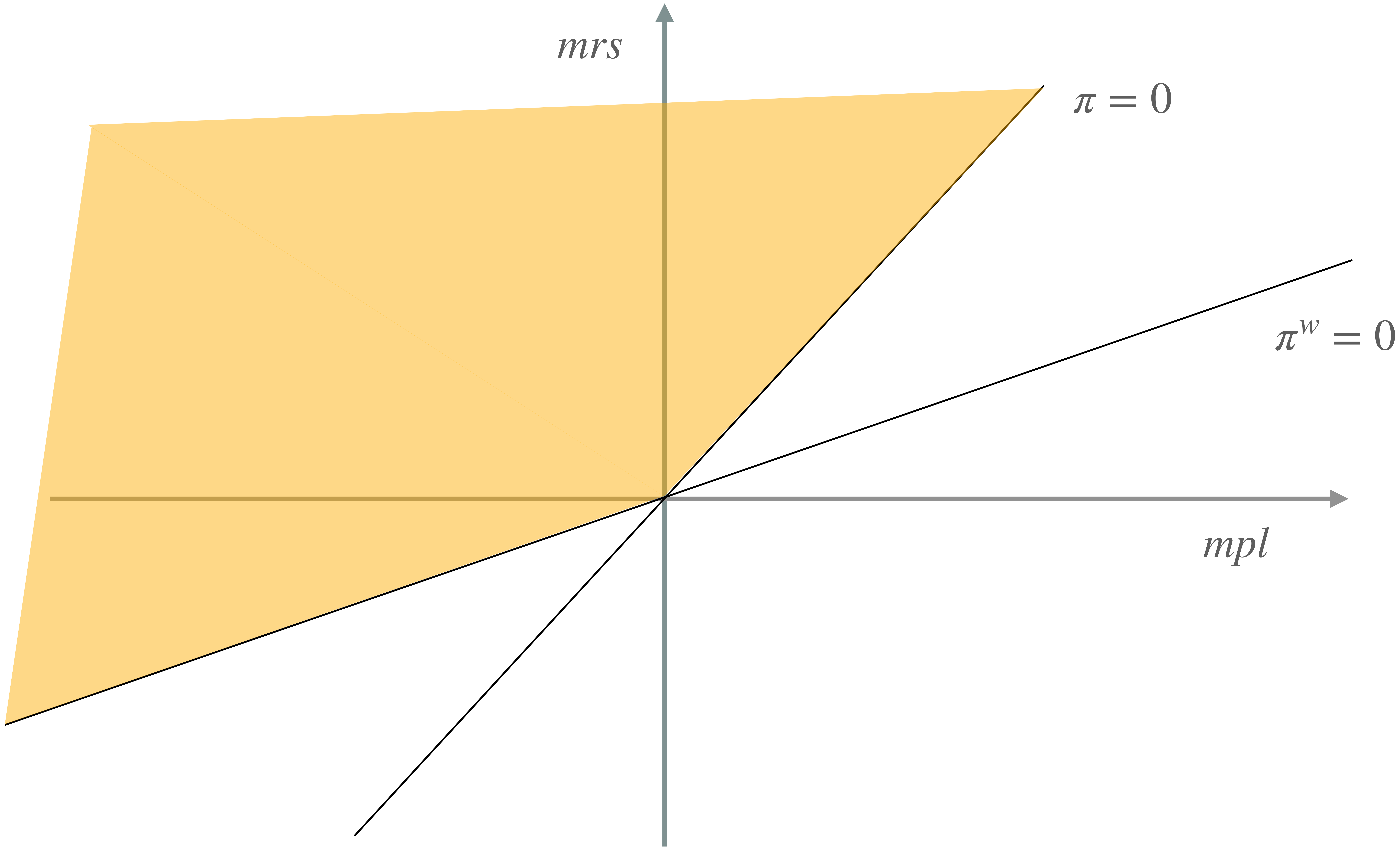
Bernanke, Blanchard (2023): energy and shortages

Why?

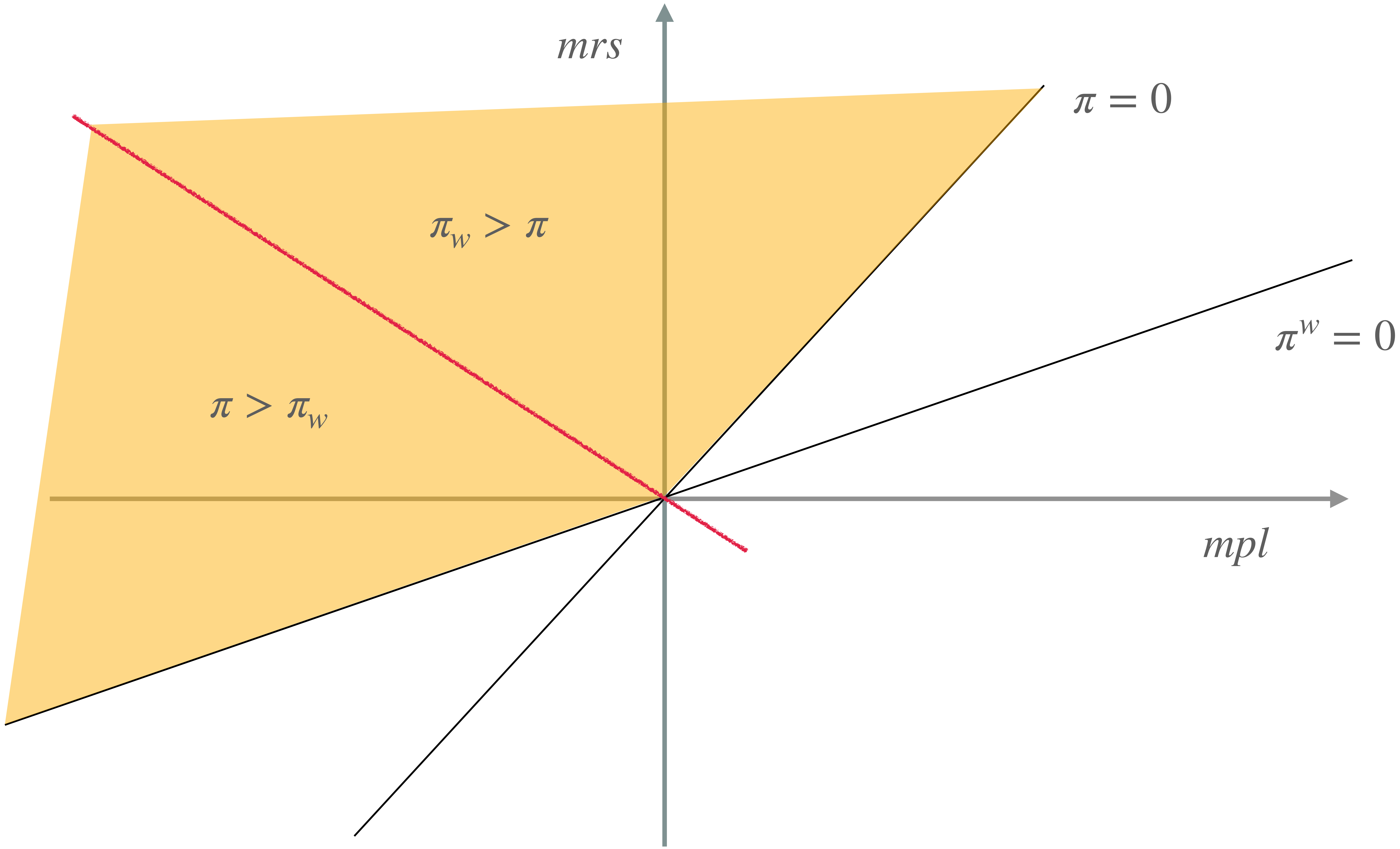
- Output gap creates distance between **aspirations** of workers and firms



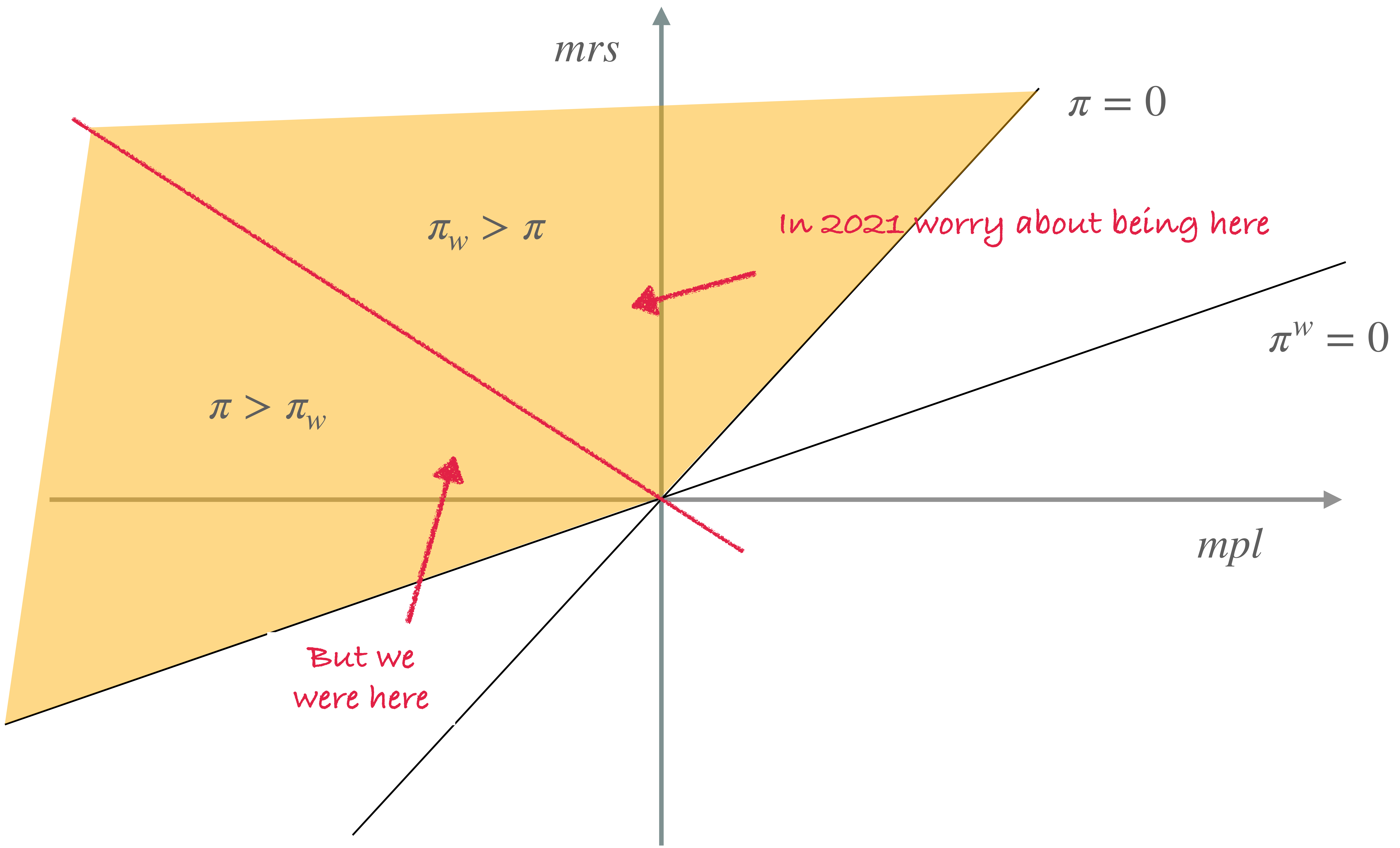

mrs
$\pi = 0$
$\pi^w = 0$
mpl



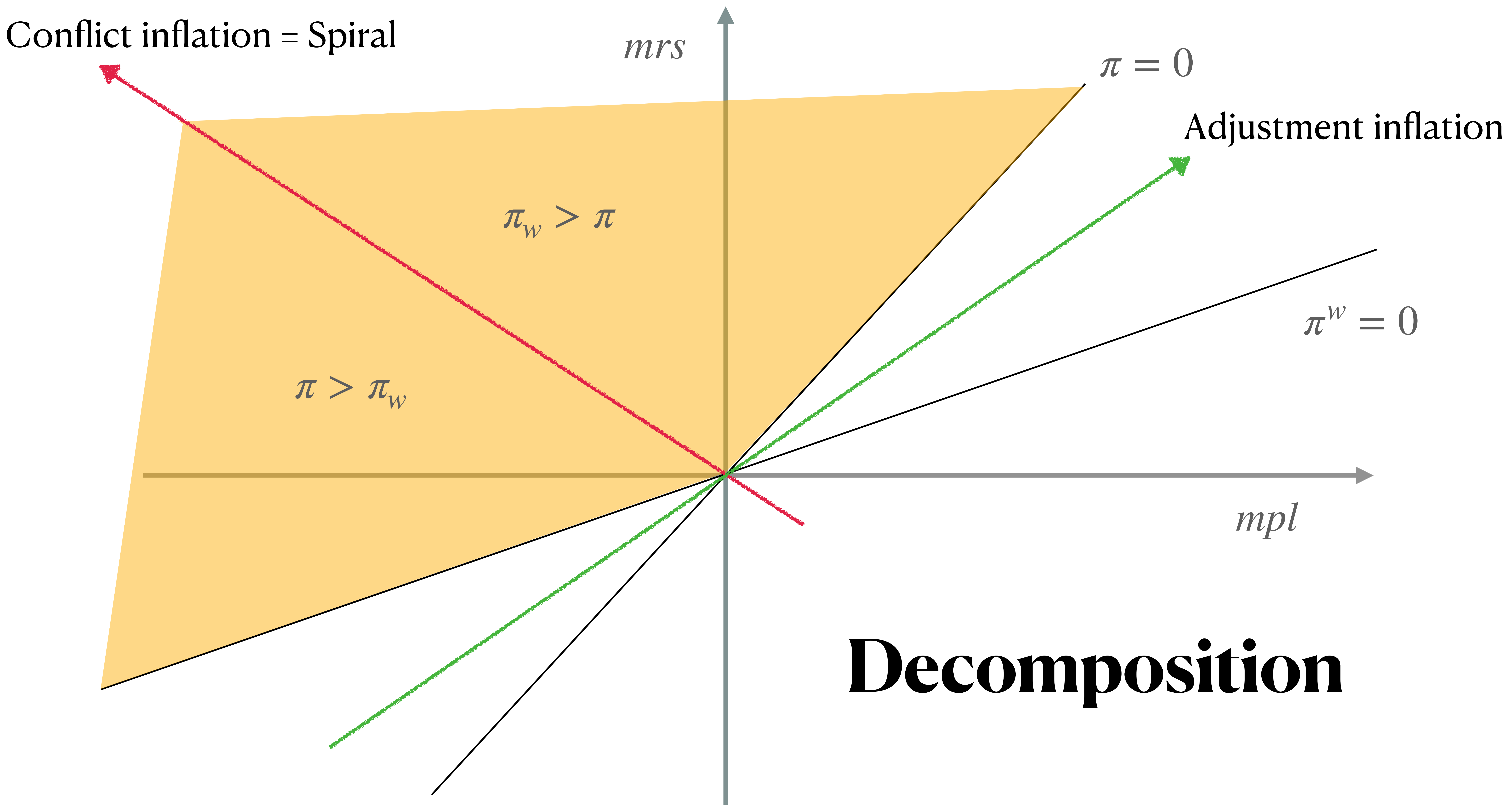
mrs
$\pi = 0$
$\pi^w = 0$
mpl



mrs
$\pi = 0$
$\pi_w > \pi$
$\pi^w = 0$
$\pi > \pi_w$
mpl



mrs
$\pi = 0$
$\pi_w > \pi$
In 2021 worry about being here
$\pi^w = 0$
$\pi > \pi_w$
mpl
But we
were here

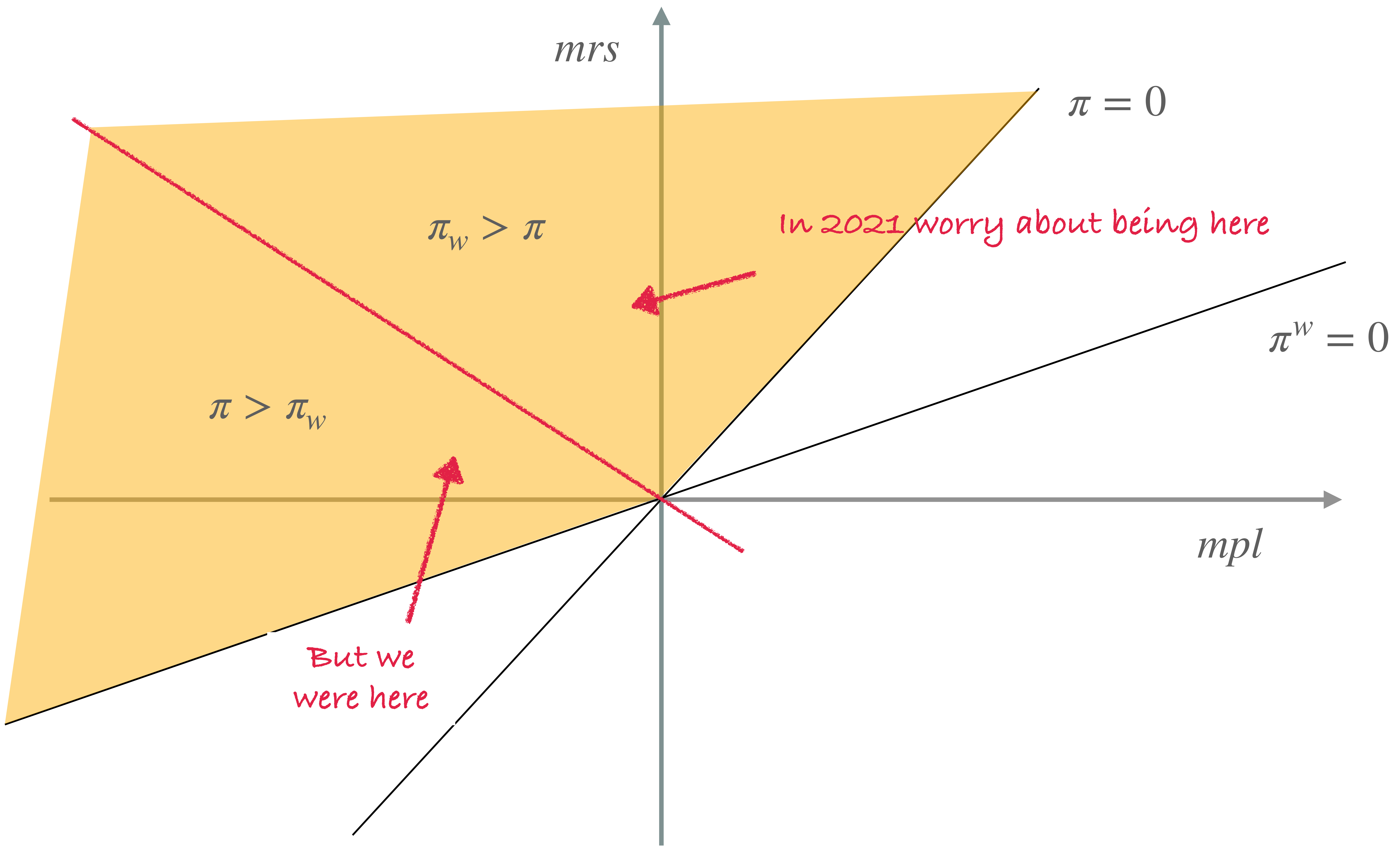

Conflict inflation = Spiral
mrs
$\pi = 0$
Adjustment inflation
$\pi_w > \pi$
$\pi^w = 0$
$\pi > \pi_w$
mpl
Decomposition

Conflict and spirals

- **Conflict, disagreement, disappointment** central to inflation experience
- Tension between aspirations and realizations of relative prices
- They are there in our models! We try to bring them out and expand
- How to measure it?

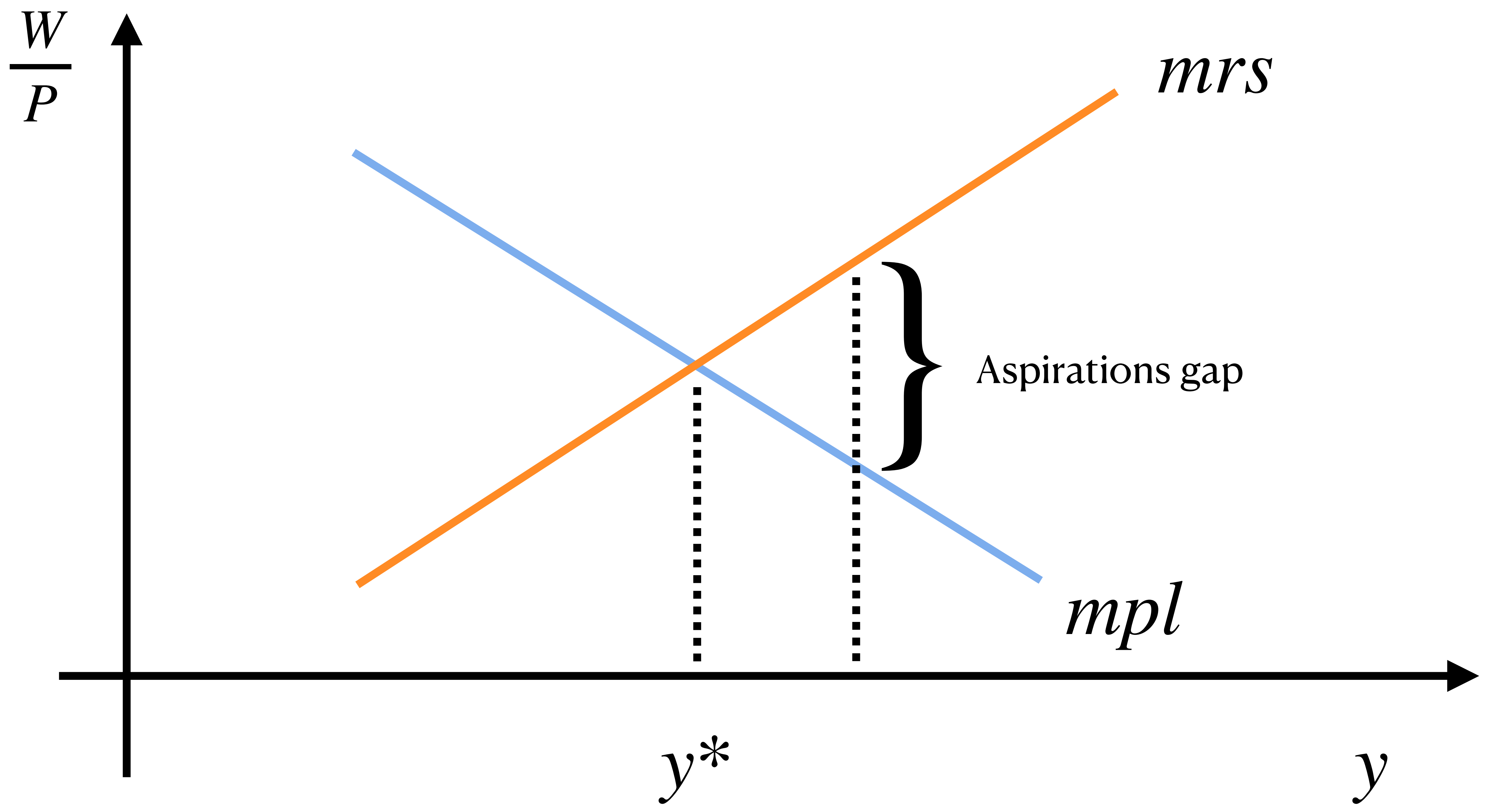
$$\text{conflict inflation} = \frac{\Lambda_w}{\Lambda_w + \Lambda_p}\pi + \frac{\Lambda_p}{\Lambda_w + \Lambda_p}\pi^w$$

- In NK framework closely related to “divine coincidence inflation” of Rubbo (2023)



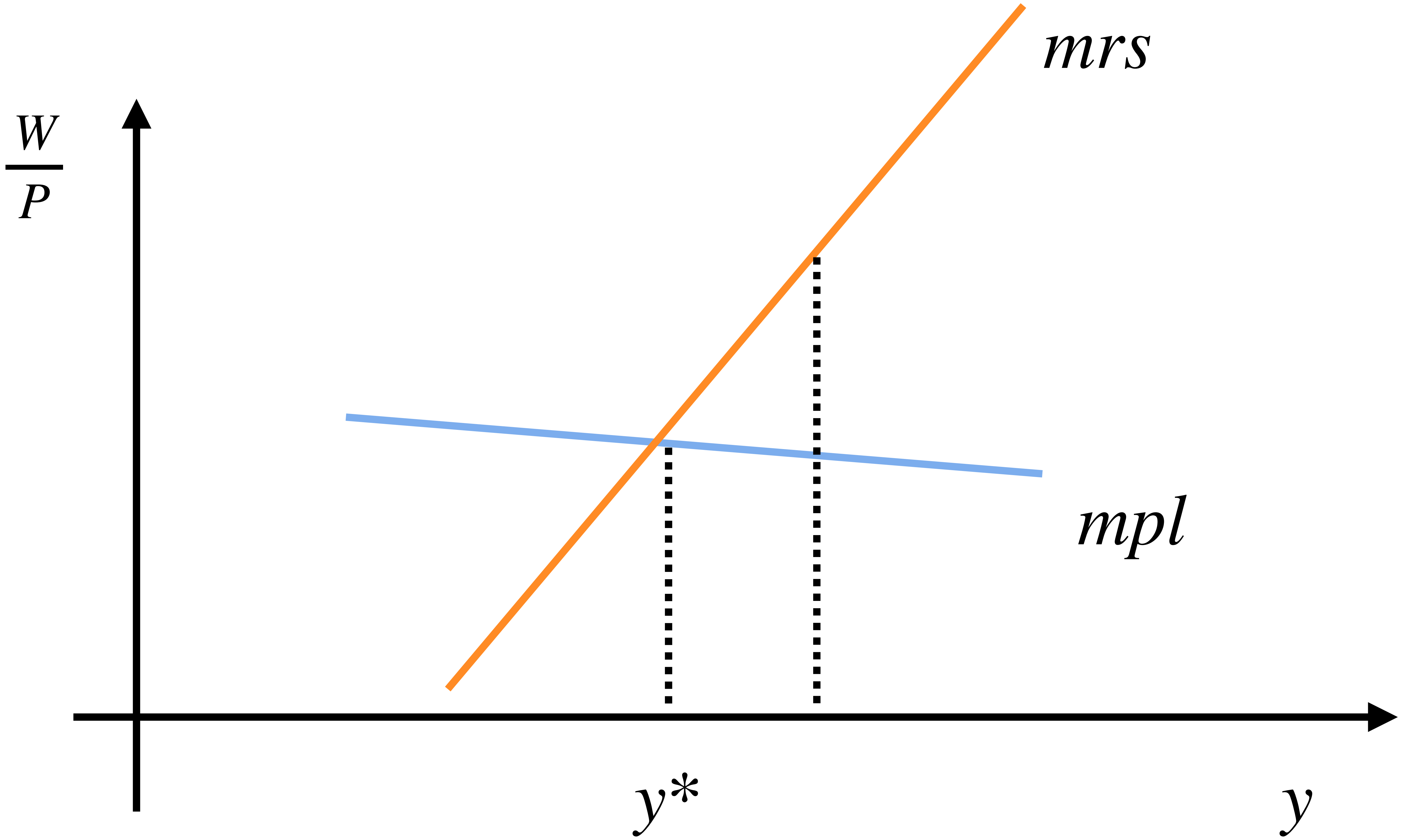
mrs
$\pi = 0$
$\pi_w > \pi$
In 2021 worry about being here
$\pi^w = 0$
$\pi > \pi_w$
mpl
But we
were here

Why? (Reprise)



Why? (Reprise)

- Depends on slopes of these curves

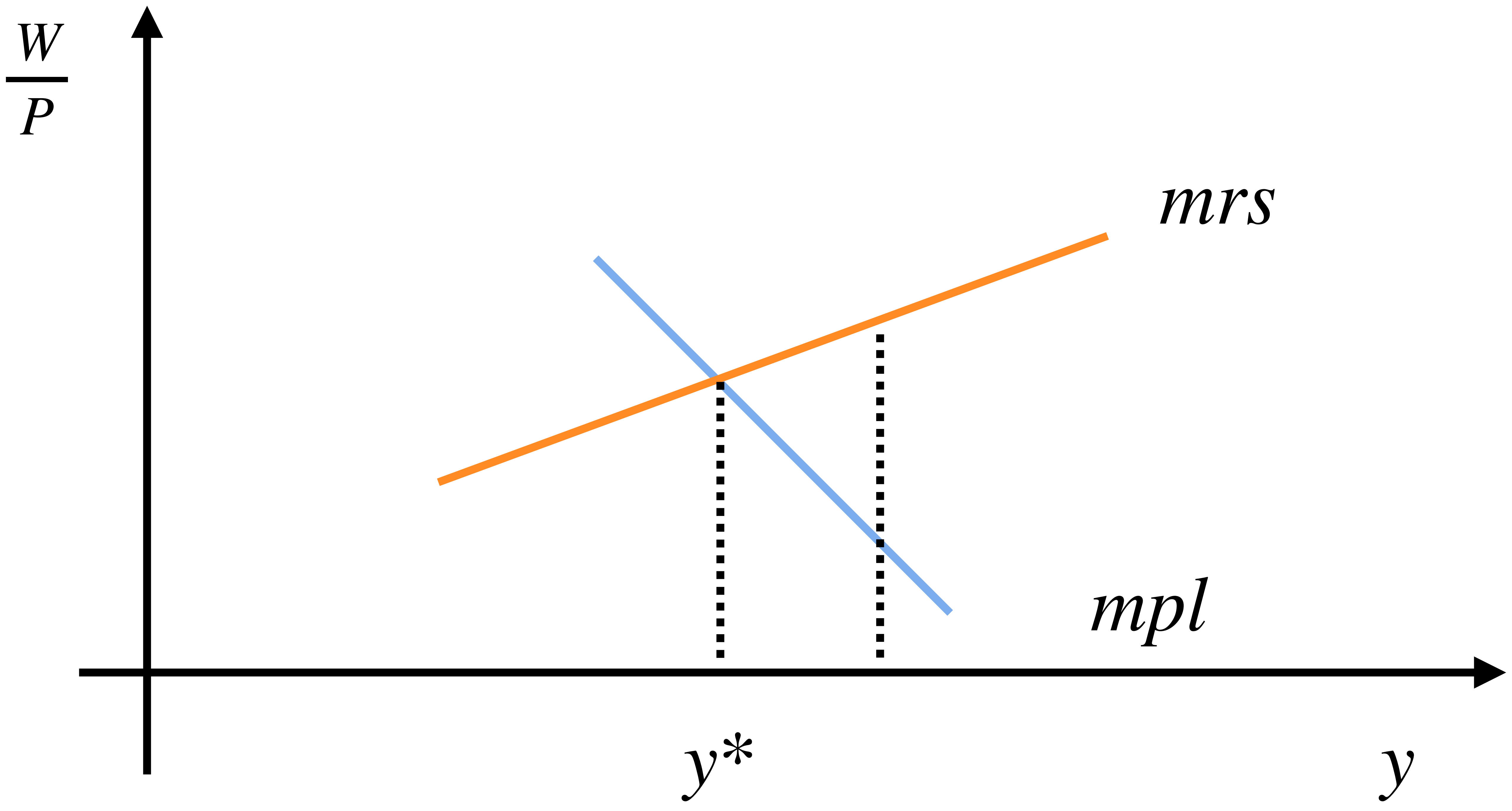


Here labor scarcity dominates:

$\pi_w > \pi$

Why? (Reprise)

- Depends on slopes of these curves

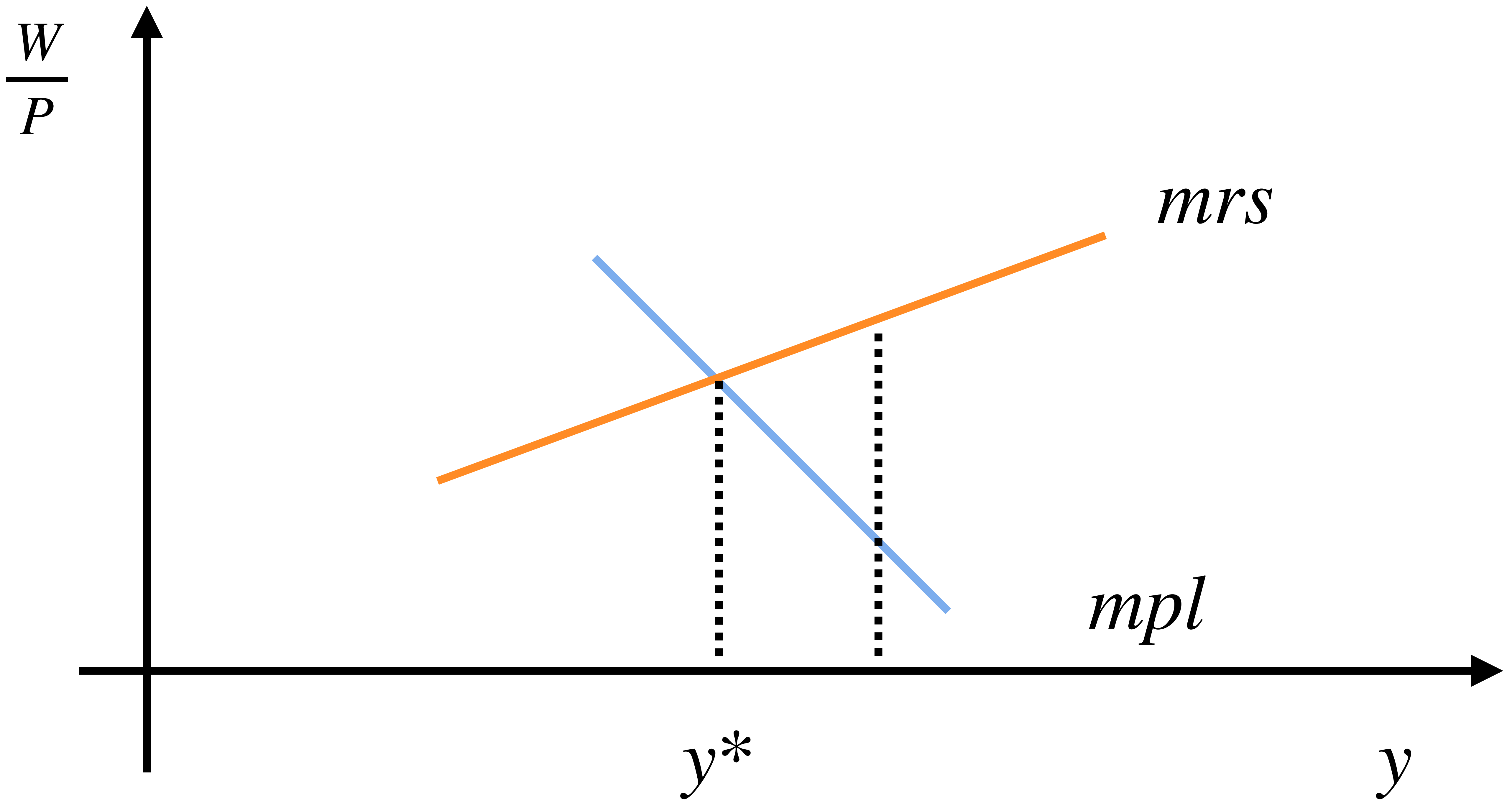


Here non-labor inputs scarcity dominates:

$\pi > \pi_w$

Why? (Reprise)

- Depends on slopes of these curves

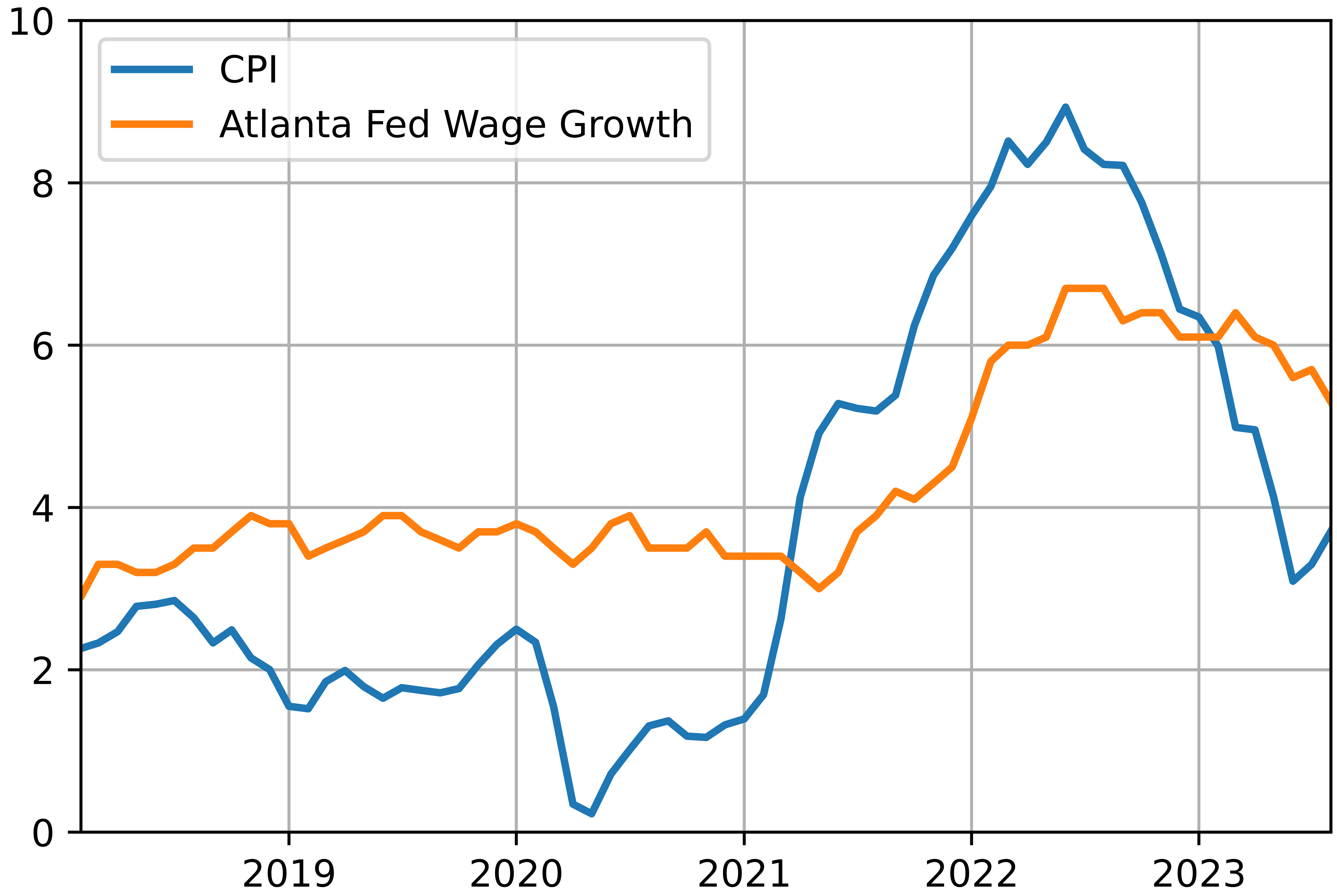


$$\frac{\Lambda_p}{\Lambda_w}\frac{s_X}{\epsilon} > \sigma s_L + \eta$$

Prices less sticky than wages

Steep *mpl*: low elasticity of substitution with labor

Flat *mrs*: Weak response of real wage demands to hot labor market



CPI
Atlanta Fed Wage Growth
10
8
6
4
2
0
2019
2020
2021
2022
2023

Why does inflation fall?

- Why does price inflation fall while W/P rises?
  - Price of other input falls…
    … supply constraints easing…
    … related: profit margin is high, room for real wages to recover
  - Wage increases partly already priced in (forward looking behavior)
- Conflict perspective: inflation usually causes relative prices to move; once relative prices are at a new level, are people happy with them? If not, is there a relative price at which they will eventually be happy?
- Caveats…
  - Is excess demand going away fast enough?
  - Adaptive non-rational expectations?