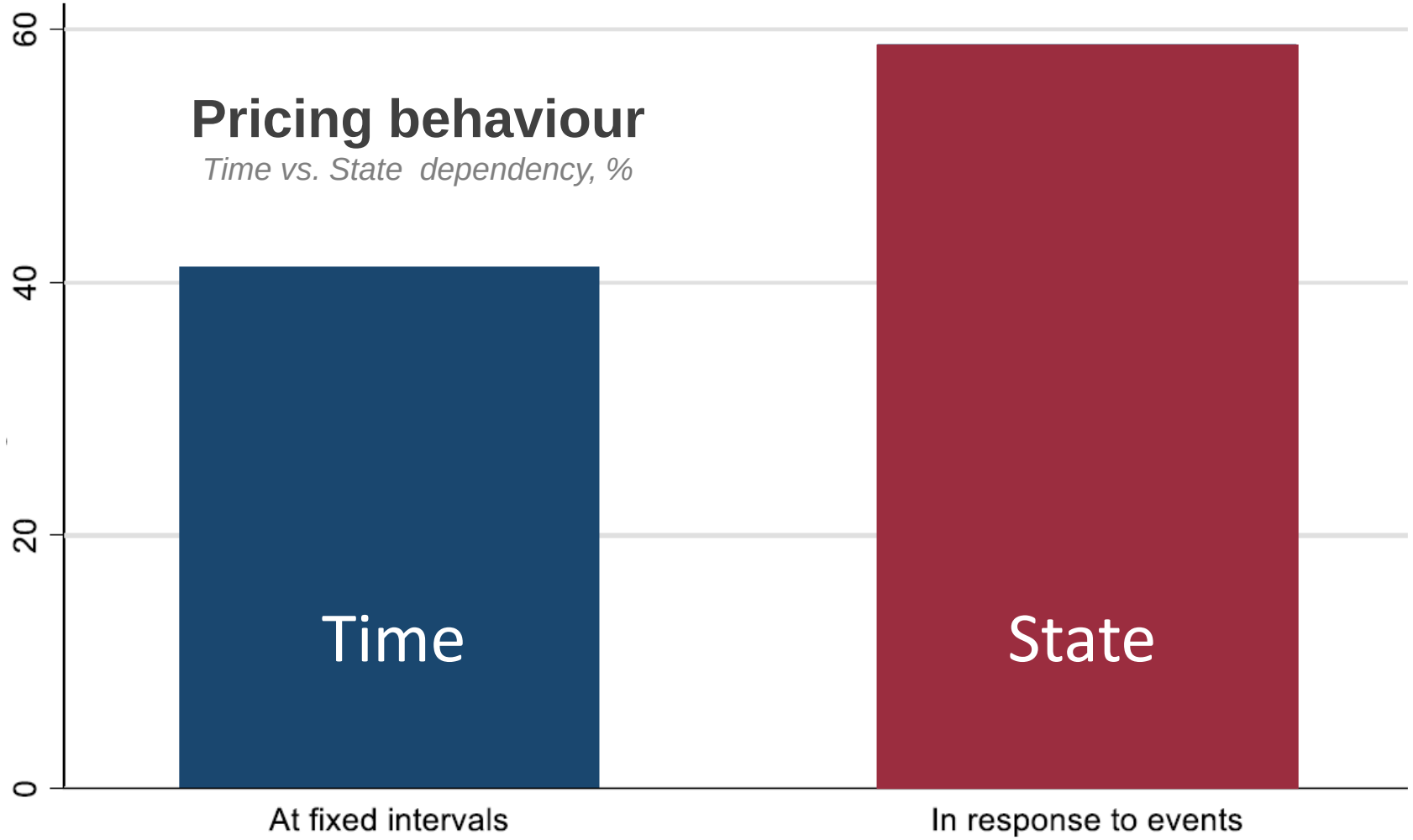
Bank of England

Inflation persistence and monetary policy

Slides

Huw Pill, Philip Schnattinger, Brad Speigner

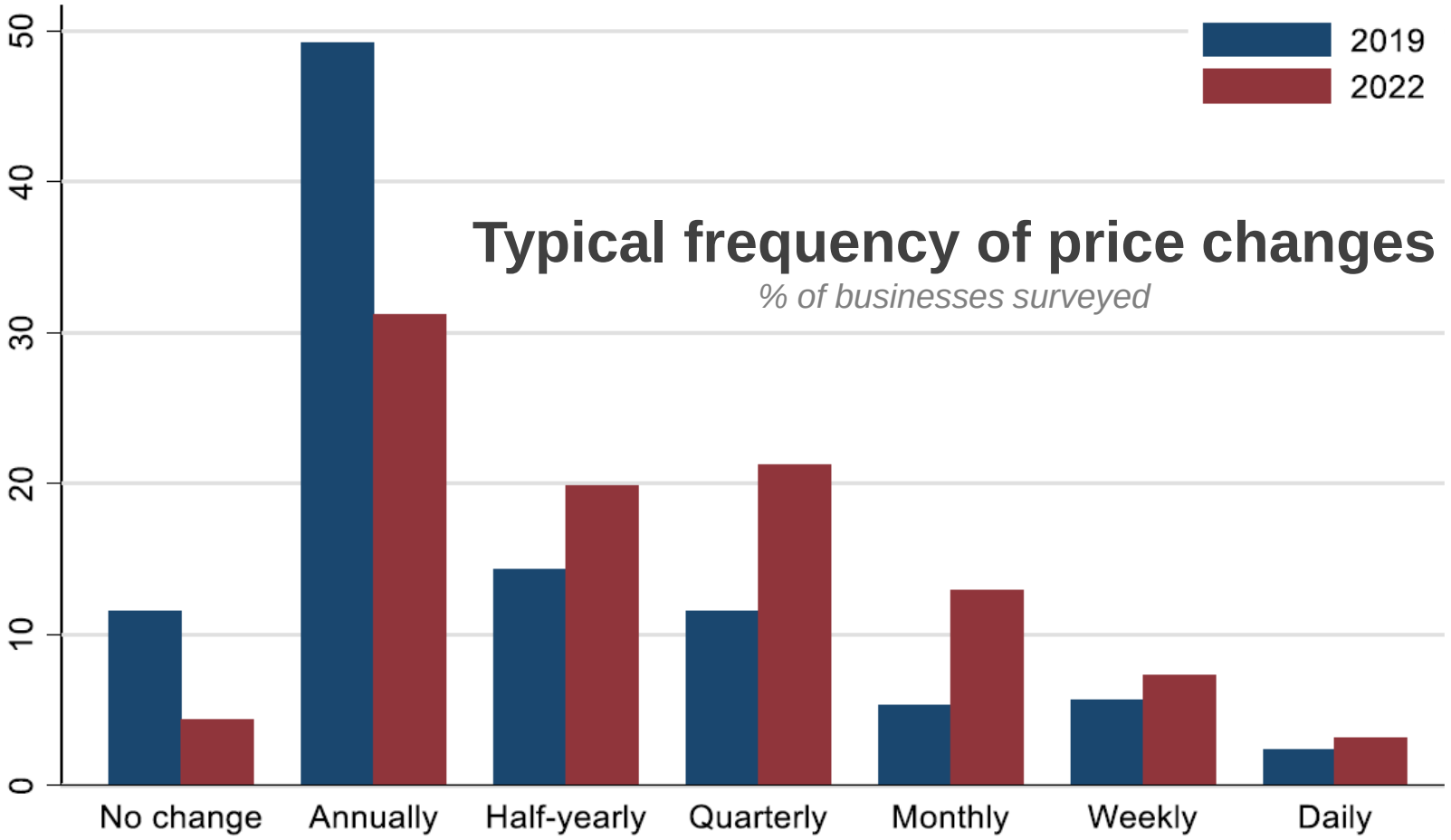
Firms pricing behaviour



Question wording – 'Which of the following best describes how your business usually sets prices?'; (i) 'Mostly change prices in response to specific events (e.g. changes in costs or demand)'; (ii) 'Mostly change prices at fixed intervals (e.g. once a year or once a quarter, etc.)'

Source: Bank of England Decision Maker Panel survey

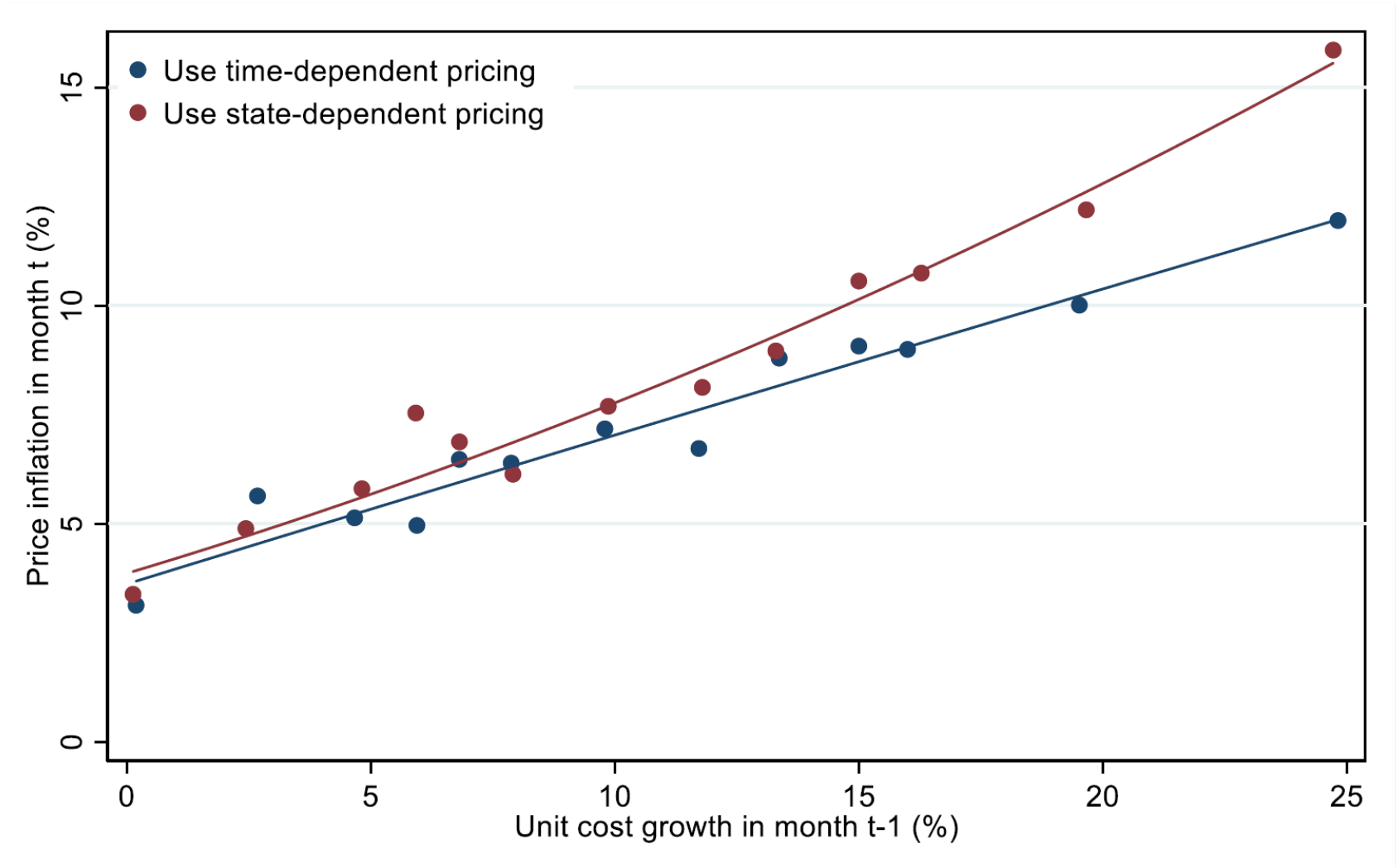
Firms pricing behaviour



Question wording – 'Approximately, how often did your prices change in each of the following years? Where possible, please consider the average across all products and services. If that is not possible, please answer for your main product/service.'

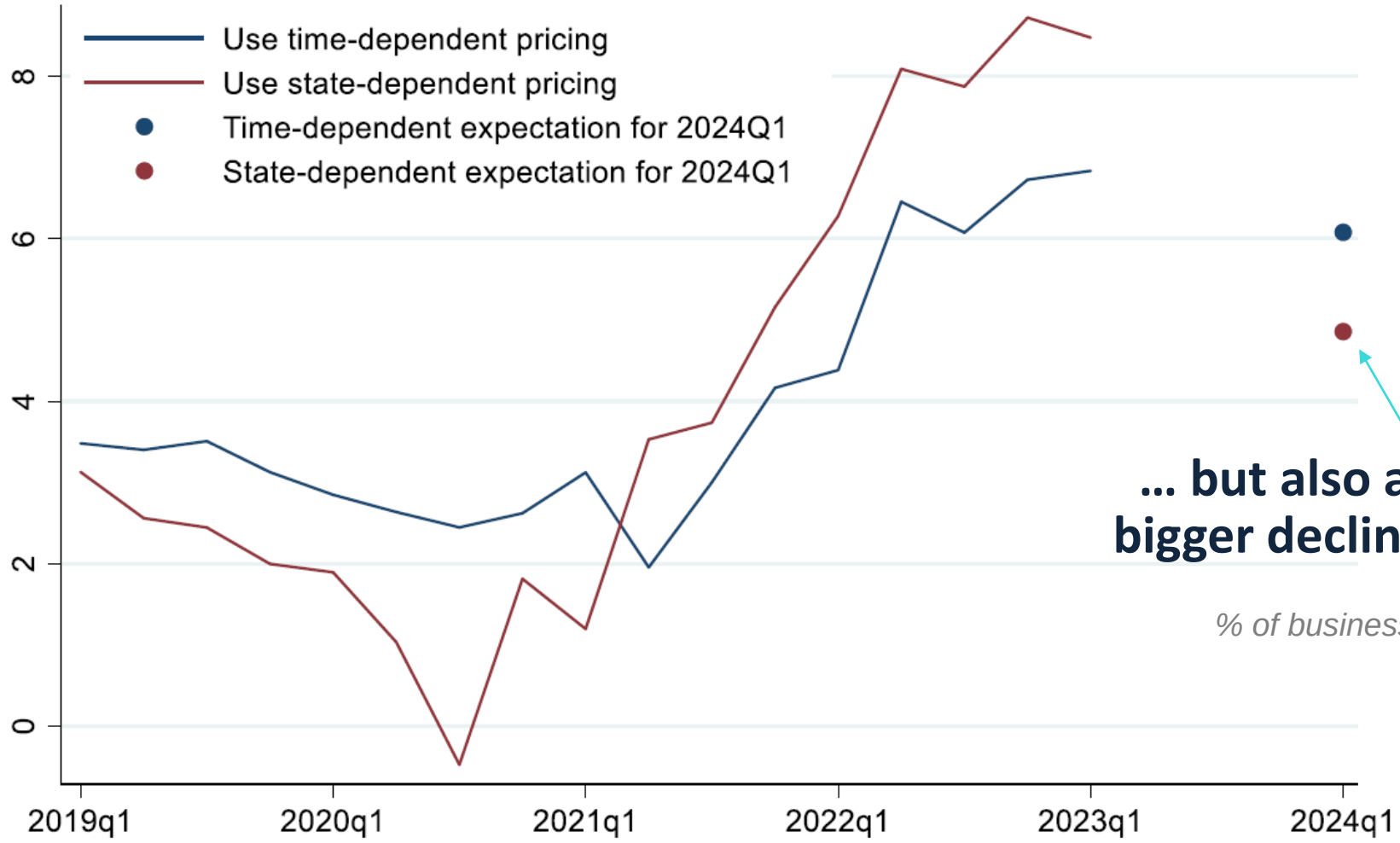
Source: Bank of England Decision Maker Panel survey

Firms pricing behaviour



Source: Bank of England Decision Maker Panel survey

State-dependent pricing firms report a bigger rise in inflation …



… but also anticipate a bigger decline in inflation

% of businesses surveyed

Source: Bank of England Decision Maker Panel survey

A negative Terms of Trade shock leaves less real income to distribute domestically …

Total Real Value Added

To Imports

$v^x_{\_1} = q^x\, p^x_1$

To domestic producers and suppliers of inputs into production, e.g. workers, intermediate good producers, retailers, …

$$v^s_1 = \frac{y^d}{\phi p_x + (1-\phi)p^d}$$

ToT shock

Total Real Value Added

To Imports

$p^x_2 \uparrow \Rightarrow v^x_2 \uparrow$

To domestic producers and suppliers of inputs into production, e.g. workers, intermediate good producers, retailers, …

$p^x_2 \uparrow \Rightarrow v^s_2 \downarrow$

- Negative ToT shock meant lower domestic real purchasing power
- Who bears the cost of this real income reduction ($v^s \downarrow$)?

Splitting the remaining surplus after a negative ToT shock

- **Baseline New Keynesian model:** Labour is the only input in the baseline NK model and the labour market is 'frictionless.' The split of the surplus depends on adjustment frictions, but in the long run the share of v^s accruing to workers v^i and firms v^f is stable. In equilibrium, marginal cost of work equal the marginal benefit for workers and firms (w wage, Z productivity) …

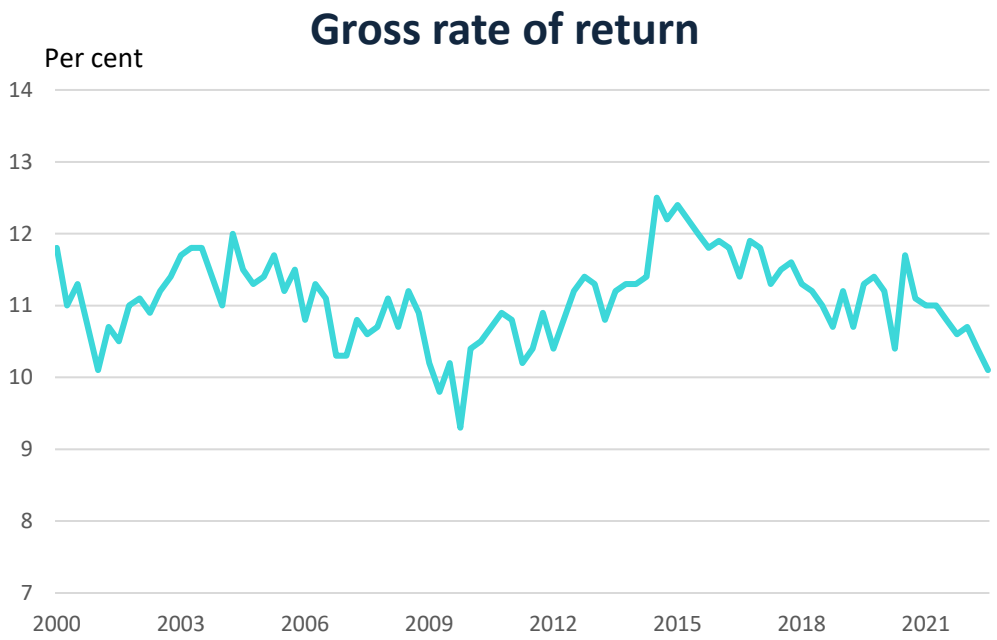
$$\frac{w_t}{P_t} = MRS_t \text{ and } MC_t = \frac{w_t/P_t}{Z_t}$$

- **Introducing labour market frictions:** Labour market frictions imply workers and firms need to be 'matched', giving rise to a surplus value from a job match split via a negotiated wage:

$$v^s = v^f(-w) + v^i(w)$$

- When the real income of the economy declines, for example through a ToT shock, $v^s \downarrow$. Under standard Nash bargaining v^f and v^i decline *equally*.

Profit and labour shares in the UK



Note: Rates of return of UK non continental shelf, private non-financial corporations
Source: ONS

Source: ONS

- The profit and labour share in value added have remained relatively stable. This could imply symmetric ‘push and shove’ between labour and capital.

What happens when parties refuse to accept that the real income implications of ToT shock?

- If both parties – whether these are workers and firms or intermediate and final goods producers – refuse to accept that their respective equilibrium surpluses v_t^f and v_t^i have declined and they target past surpluses $v_t^{f^*}$ and $v_t^{i^*}$ then …

$$v_t^{f^*} + v_t^{i^*} > v_t^s.$$

- In this situation, the input sellers target share, γ^*, is increasing in the differential between $v_t^{i^*}$ and v_t^i. A higher γ^* will lead to higher seller price proposals ι^* ...

$$\frac{\iota^*}{P} = \gamma^* v^s$$

- As long as $v_t^{f^*} + v_t^{i^*} > v_t^s$ inflation will persist.

Mechanics of targeting a real surplus that is too high – creation of 'push and shove' inflation

- We assume that total surplus v^s produced by a buyer and seller agent in the economy changes from $v_0^s > v_t^s$.
- We assume that in response to the decline in the total surplus the buying producers and the input sellers accept a decline in their real surplus only at rate ρ_v. Both agents j then target $\mathrm{v}_{\mathrm{j}}^*$:

$$\mathrm{v}_{\mathrm{t,j}}^* = \left(1 - \rho_{vj}\right)\mathrm{v}_{\mathrm{t-1j}}^* + \rho_{vj}\gamma_j\, v_t^s$$

  - Targets input prices ι_t^* and target output prices p_t^* are set according to the deviation of the target surplus from the equilibrium surplus, in the following way;

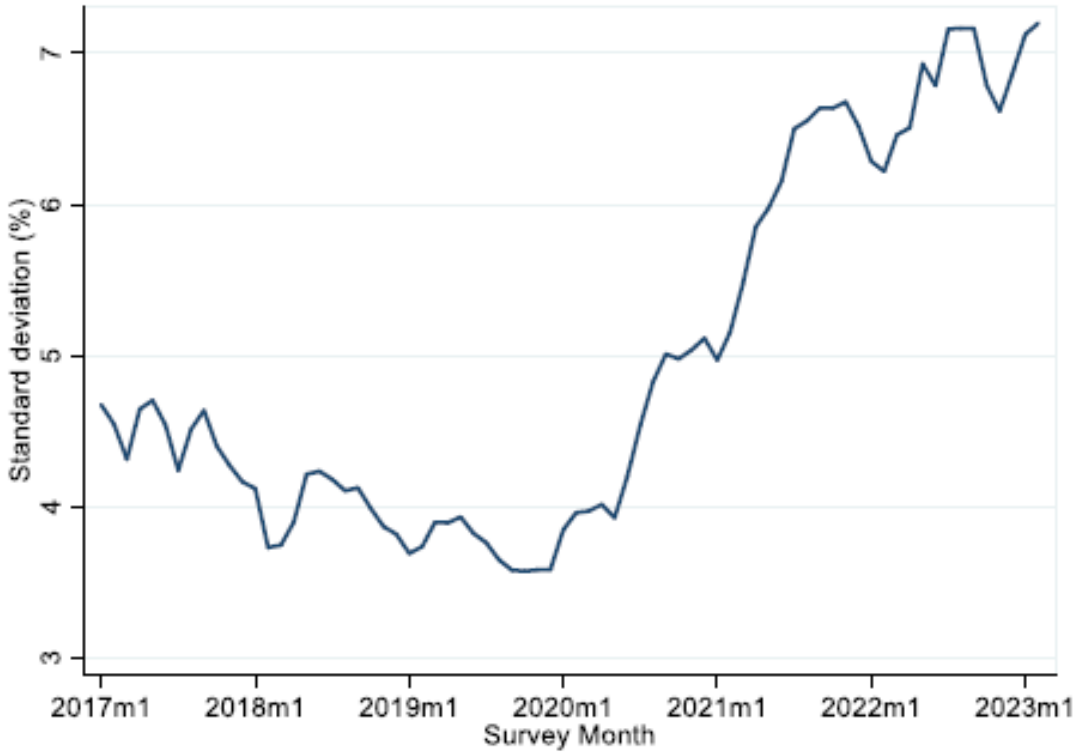
$$\iota_t^* = p_t(1 + (\mathrm{v}_{\mathrm{t},i}^* - \gamma_i v_t^s))$$

$$p_t^* = \iota_t(1 + (\mathrm{v}_{\mathrm{t},f}^* - \gamma_f v_t^s))$$

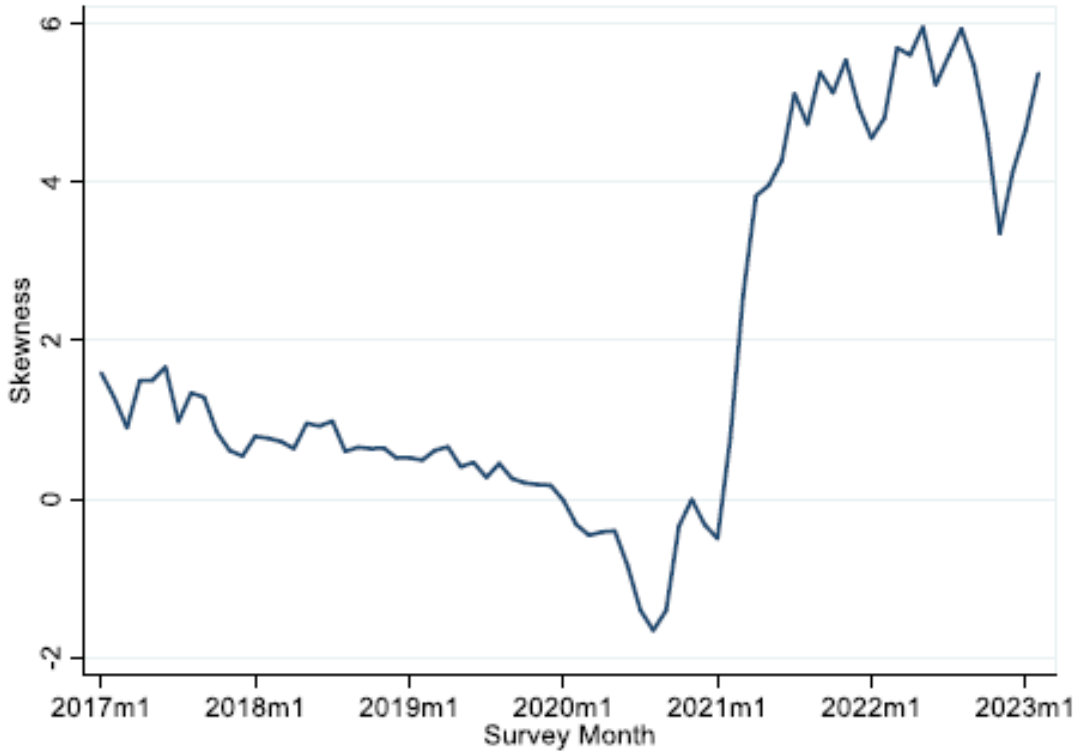
  - Intuitively, a higher target leads to higher (realised) input price demands ι_t^*. In turn, buying producers pass the realised higher input price level on to output prices protect their real surplus.

Price dispersion has risen showing pass-through, adjustments and price pushes are unequally distributed across firms

Standard deviation



Skewness



Source: Bank of England Decision Maker Panel survey

Wage dispersion across firms has also risen

Source: Bank of England Decision Maker Panel survey

Mechanics of targeting a real surplus that is too high

- The partial equilibrium model is closed by transmitting targeted prices with Calvo parameter λ_j to aggregate price levels ι_t and p_t

$$\iota_t = \lambda_\iota \iota^* + (1 - \lambda_\iota)\iota_{t-1}$$

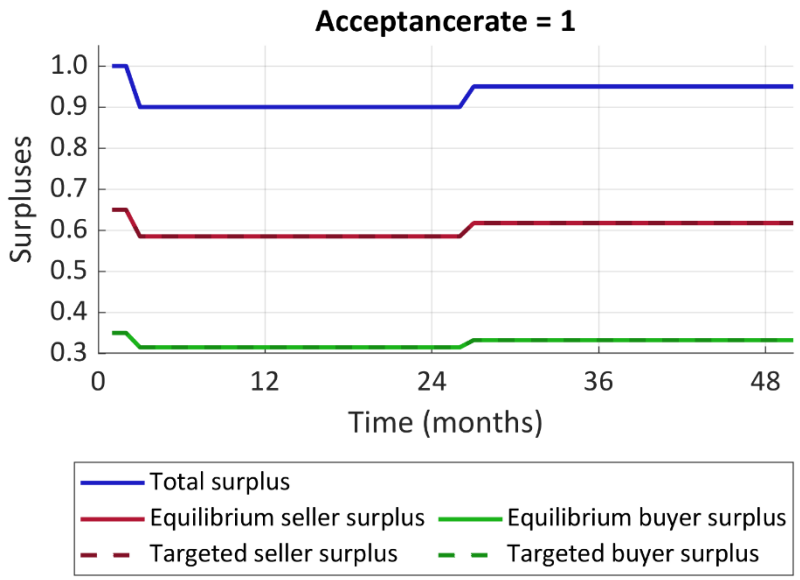
$$p_t = \lambda_p p^* + \left(1 - \lambda_p\right)p_{t-1}$$

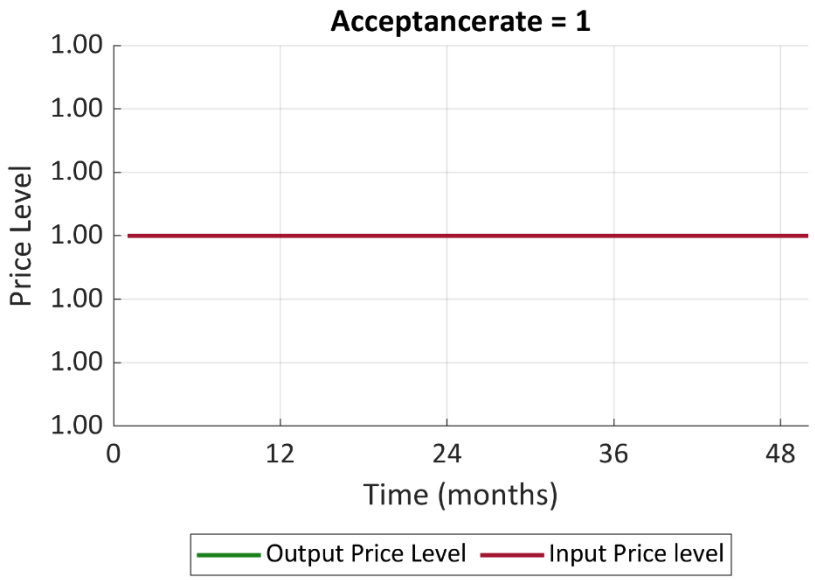
- Is a sluggish refusal to accept real surplus declines the same as price frictions?
  - While the implied dynamics are similar in the response of aggregate prices the micro foundations and policy implications are fundamentally different: Here sluggishness to accept $drives$ inflation.
  - This sluggishness is by its nature asymmetric and inflation expectations do not matter as drivers of inflation via this channel. Real income expectations do.

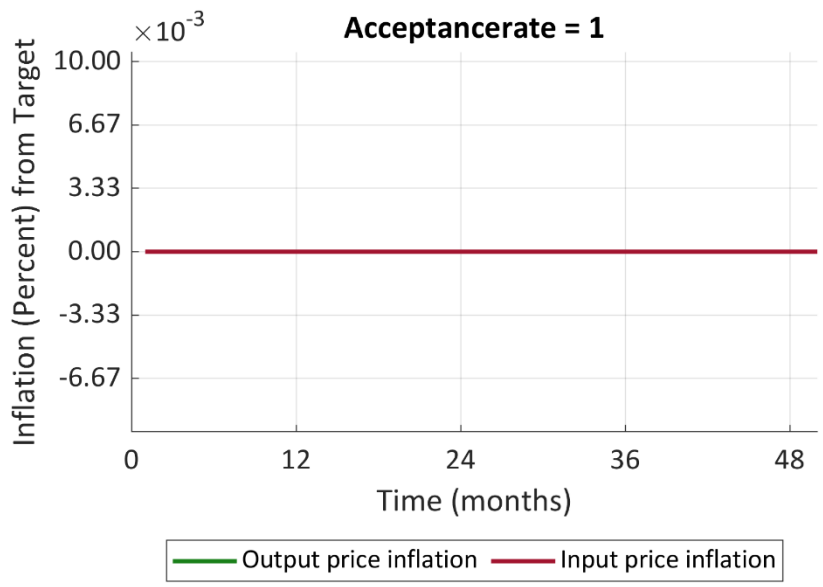
Illustrating the dynamics

- In the next slides we show …
  - A negative ToT shock at time 2
  - A positive ToT shock at time 26 making up 50% of the negative ToT at time 2
  - The fourth slide assumes that monetary policy can force a higher speed of acceptance. Intuitively this may be the result of interest rate increases reducing the bargaining power of input sellers, restricting their ability to raise the input price. And also cutting the demand for output produced, reducing the scope for output price increases.

Immediate surplus decline acceptance

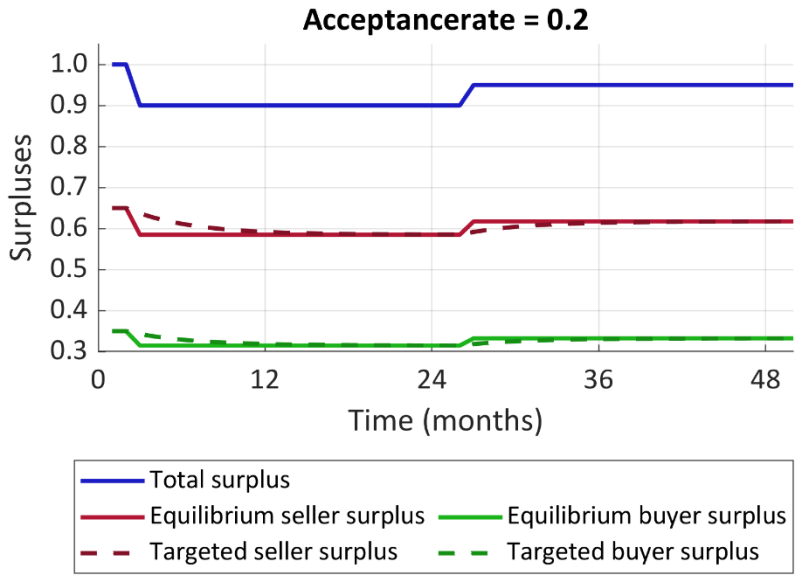


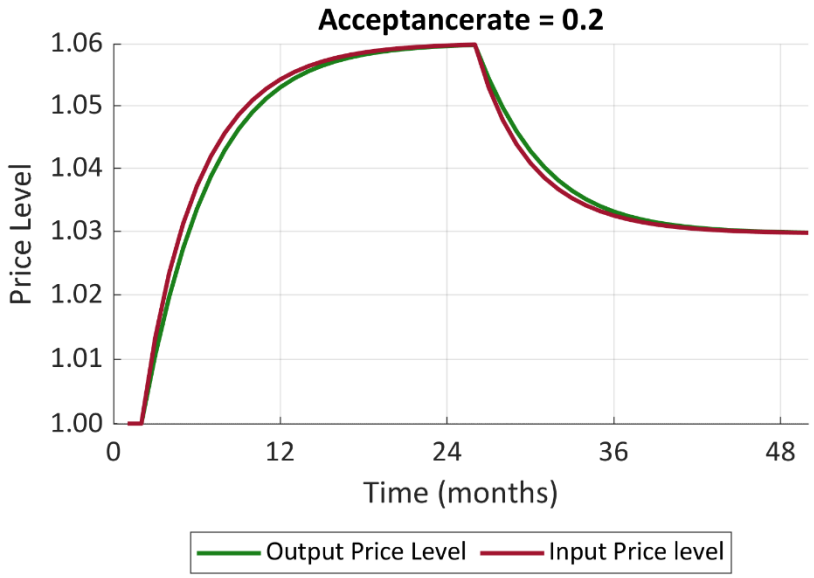


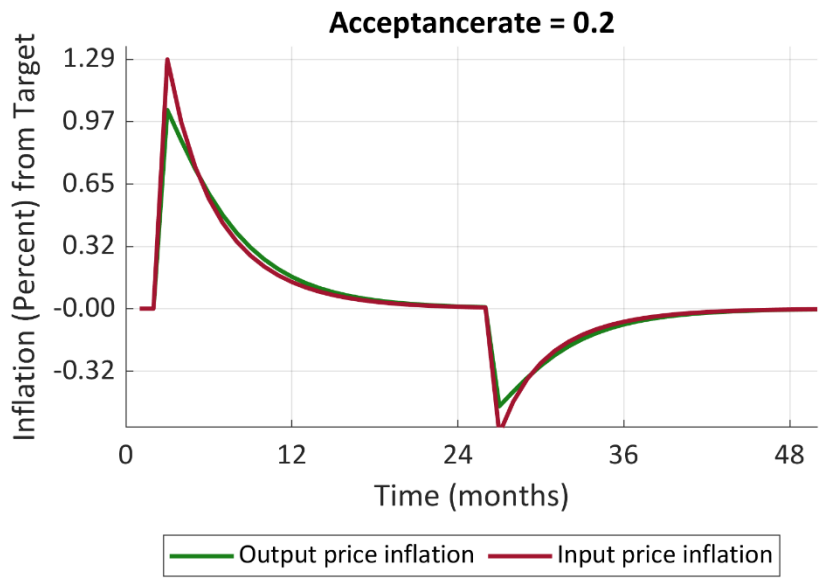


Immediate acceptance means no inflation caused by targeting too high real surpluses as the target surplus of both parties immediately adjusts

Sluggish (20%) surplus decline acceptance

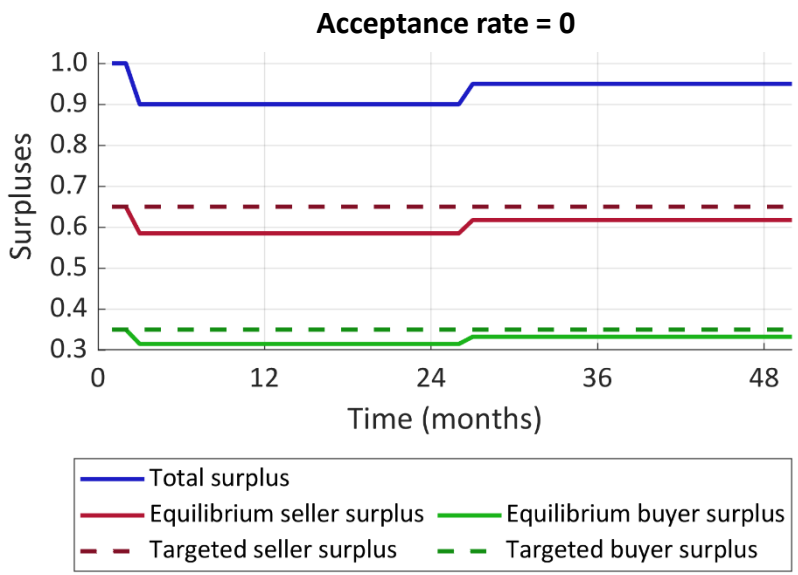


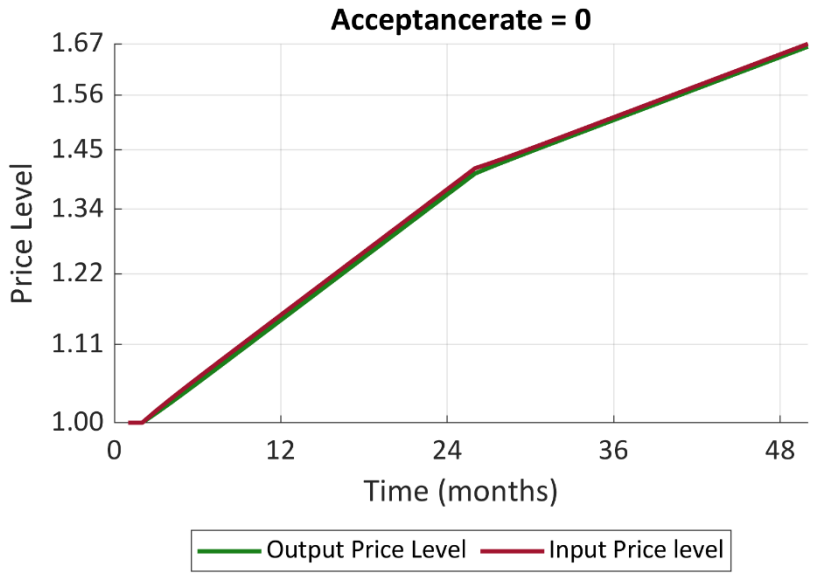


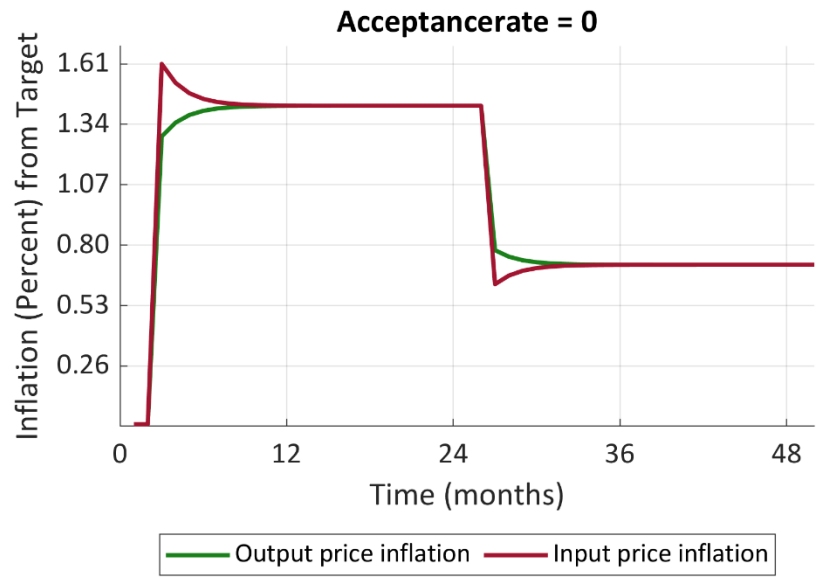


Sluggish acceptance leads to temporary inflation as targeted surpluses adjust to real surpluses. The positive terms of trade shock at time 26 has a negative effect on inflation provided real income increases are also sluggishly accepted.

Acceptance of the surplus declines never happens

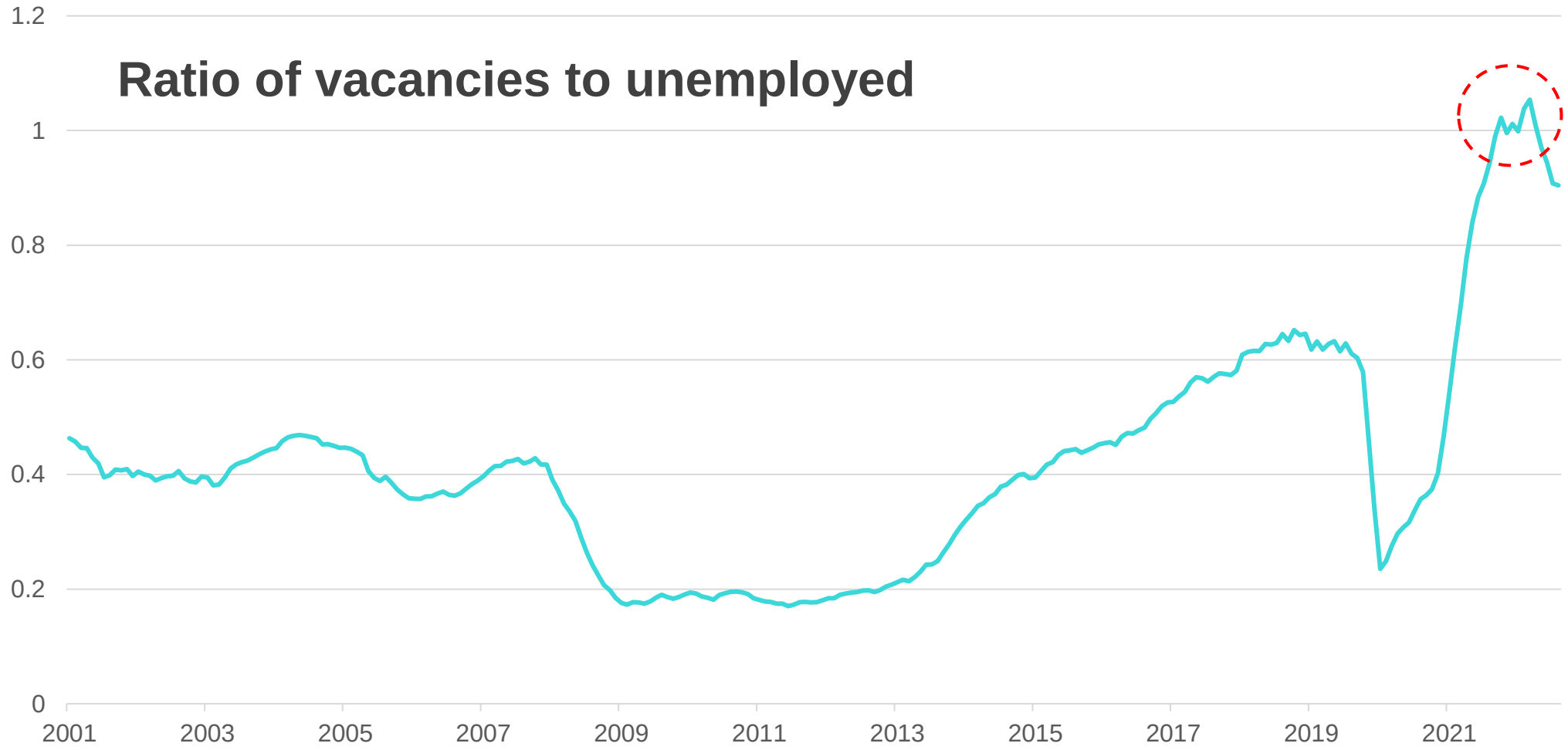






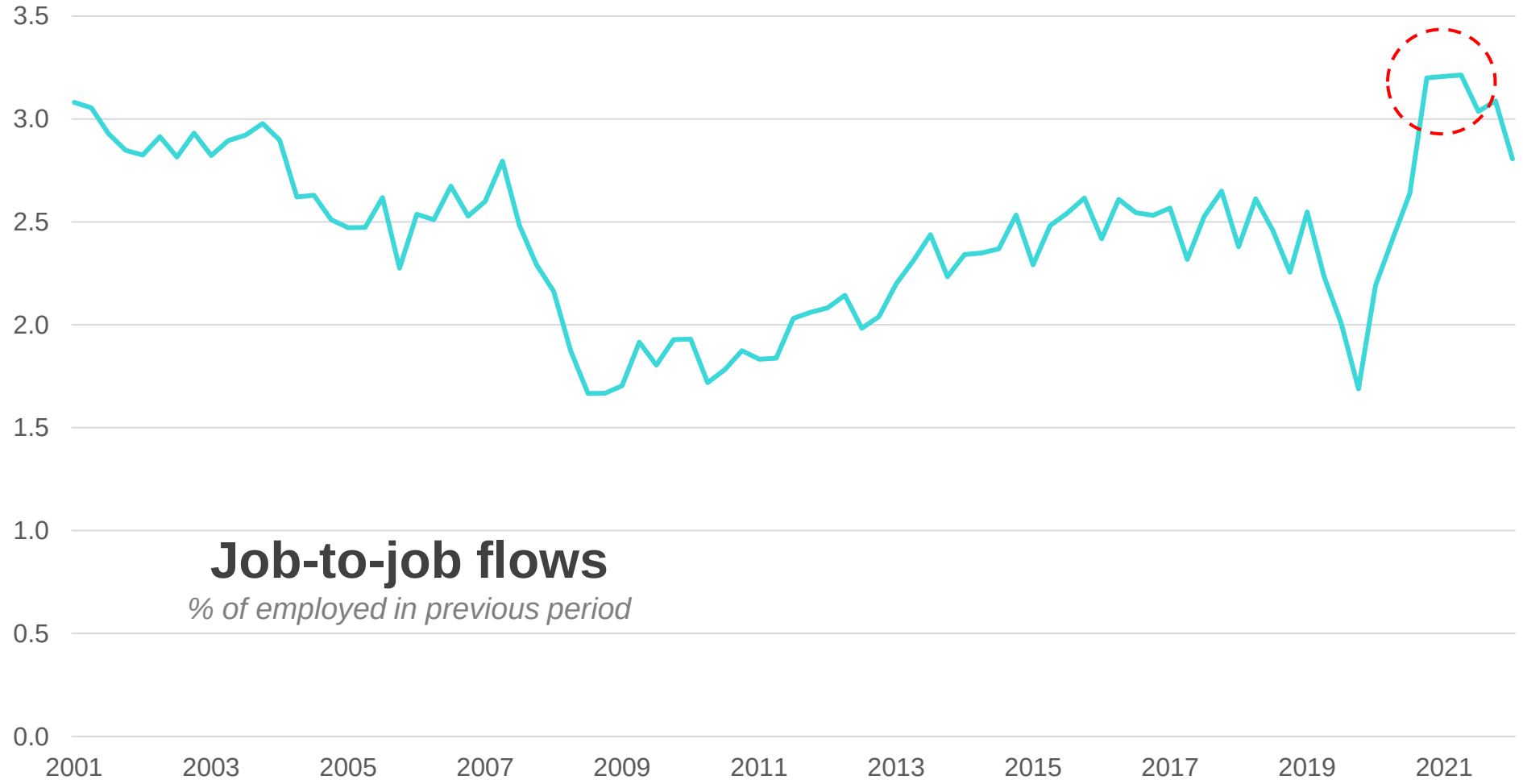
Refusal to accept decline in surplus means inflation increases persistently. The positive terms of trade shock at time 26 decreases inflation, but it is still positively increased compared to time 0.

Drivers of bargaining power – V/U ratio



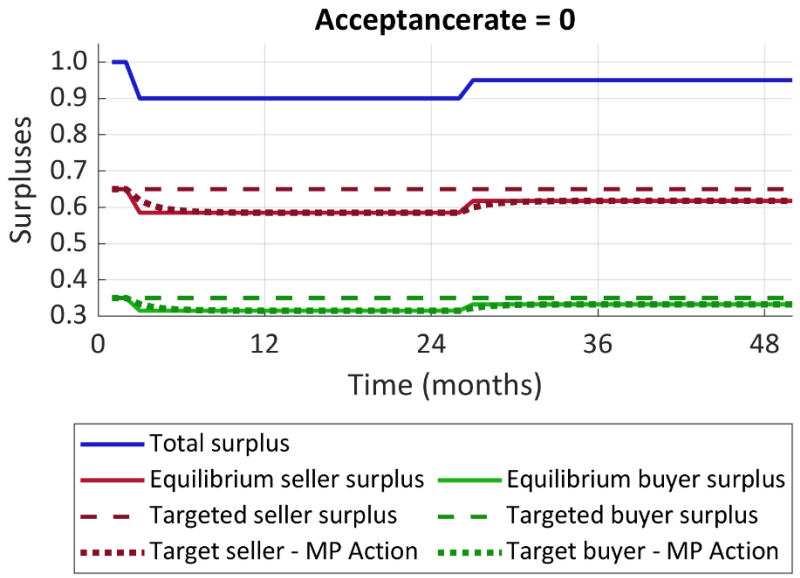
Source: ONS Labour Force Survey

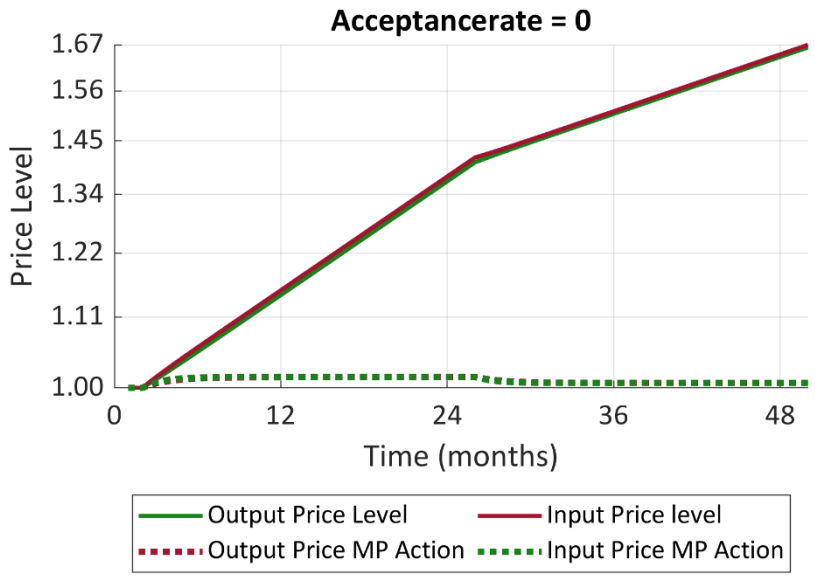
Drivers of bargaining power – Labour market churn

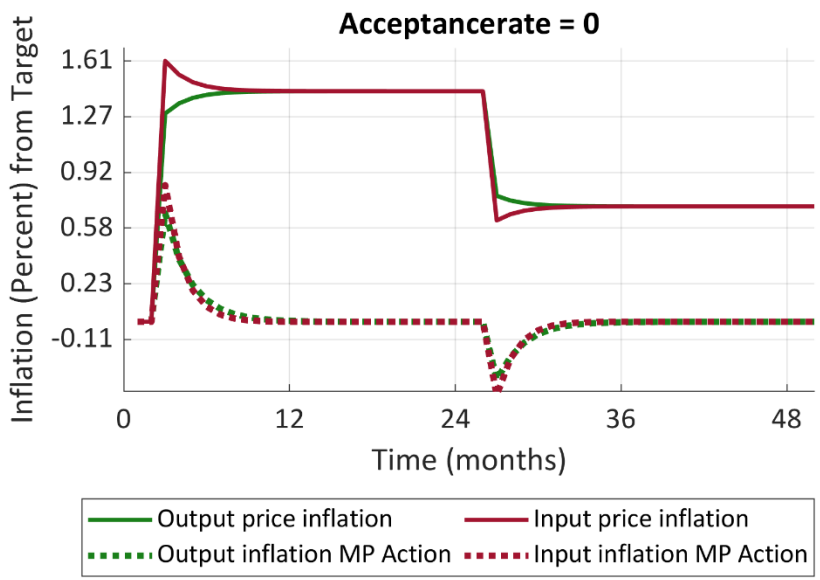


Source: ONS Labour Force Survey

Acceptance of the surplus decline is facilitated by monetary policy action







Monetary policy can facilitate a similar path to a sluggish acceptance of surplus decline. Compared to the refusal to accept, the dotted paths show that the increase in inflation will only be temporary elevated as the targeted surpluses are facilitated down.

Existing literature on the refusal to accept a real surplus decline

- The framework in Layard Nickell Jackman has real wage resistance which encapsulates this concept for workers.
  - In response to a real income shock the NAIRU rises.
  - To get workers to accept the decline in income the bargaining power of the worker is being reduced by higher unemployment leading to eventual acceptance in the reduction of their surplus.
  - Once sellers accept their decline in surplus, firms are no longer pushed to increase their prices and are encouraged to accept a surplus decline as average buyer bargaining power falls.
- Other resolution: Reversal of the ToT shock, increasing productivity, increasing labour supply.
- Refusal to accept a surplus decline may be further micro founded by real adjustment costs to income declines or minimum income requirements for input sellers and buyers to continue production.

References

- Pissarides, C.A. (2000). *Equilibrium unemployment theory*. MIT Press
- Layard, R., S.J. Nickell and R. Jackman (2005). *Unemployment: Macroeconomic performance and the labour market*. Oxford University Press
- Blanchard, O., and J. Galí (2007). “Real wage rigidities and the New Keynesian model,” *Journal of money, credit and banking* 39, pp. 35-65
- Broadbent, B. (2016). “The distributional implications of low structural interest rates and some remarks about monetary policy trade-offs,” speech to the Society of Business Economists Annual Conference
- Lorenzoni, G., and I. Werning (2023). *Wage price spirals*, MIT working paper