



**EUROPEAN  
DEPARTMENT**

# **Is the Green Transition Inflationary?**

By M. Del Negro, J. Di Giovanni and K. Dogra

## **Discussion**

Gianluigi Ferrucci\*  
([gferrucci@imf.org](mailto:gferrucci@imf.org))

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\*Views and opinions are my own and should not be reported as stating an official position of the International Monetary Fund

# The paper in a nutshell

The paper studies how monetary policy should be conducted during the green transition

It uses a **closed-economy DSGE** framework with a green and a dirty sector to analyze if the transition is inflationary and how monetary policy should respond to the effects of climate policies on inflation

It finds that **carbon tax generates upward pressures on inflation if prices in the dirty sector are more flexible than prices in the rest of the economy**

But the **transition is not necessarily inflationary**: the central bank can keep inflation close to target if it accepts a cost in terms of widening output gap. The cost can be large if wages are sticky

Results are robust to **alternative model specifications** and do not depend on I-O interlinkages

# Strengths

It is a **topical paper** tackling a question that is very much in the minds of policymakers, financial market participants and practitioners

It is **built in steps**. It explains the basic intuition behind the results in a relatively simple framework and runs two further variants of the model with growing complexity to check the robustness of the findings, including a network economy realistically calibrated on US data

It has a strong **potential to effectively inform policymaking**

The emphasis on the importance of relative price stickiness in determining the tradeoffs faced by the central bank is an **original contribution**. The role of wage stickiness in affecting the size of the inflation-output tradeoff faced by monetary policy is another important contribution

There is high **potential for future research** using the same modelling framework by exploring angles that are currently not pursued

## What the paper does not do

**Closed economy model:** no trade or financial interactions with the rest of the world

**Focus on transition policies:** the model does not study the physical effects of climate change

**Production uses only labor, no capital in the model:** green investment and how transition policies can affect capital accumulation in the green and dirty sectors are not studied

**No financial sector:** impact of transition policies on the financial sector and the transmission of monetary policy is not studied

**No feedback between emissions and macro variables:** e.g., no impact of climate risks on  $r^*$ . But this is fine given the focus on the length of the monetary policy horizon, which is typically much shorter than the long horizon with which climate policies affect emissions

# Policy implication

Key implication of the model for policy-making: treat inflationary push from the green transition as an ordinary cost-push shock

Textbook recommendation for cost-push shock: if the shock is transitory and there is no evidence of second-round effects, monetary policy can focus on the medium term and “look through” the shock

But carbon pricing will instill a persistent trend in certain inflation components. Looking through the shock may imply a prolonged deviation of inflation from target and an unusually long “medium term” over which price stability will be restored. Any impact on credibility?

In practice, wages may not be fully flexible, expectations may be backward looking. Can the model say anything on the optimal course of monetary policy when there are frictions in the economy?

Under what conditions can the CB no longer “look through” the shock and must act against the inflation upswing caused by the transition?

# Is the green transition inflationary?

**The paper finds that the green transition does not need to imply higher inflation, but it can generate a tradeoff between price and output stabilization, which can be steep**

## **The tradeoff depends**

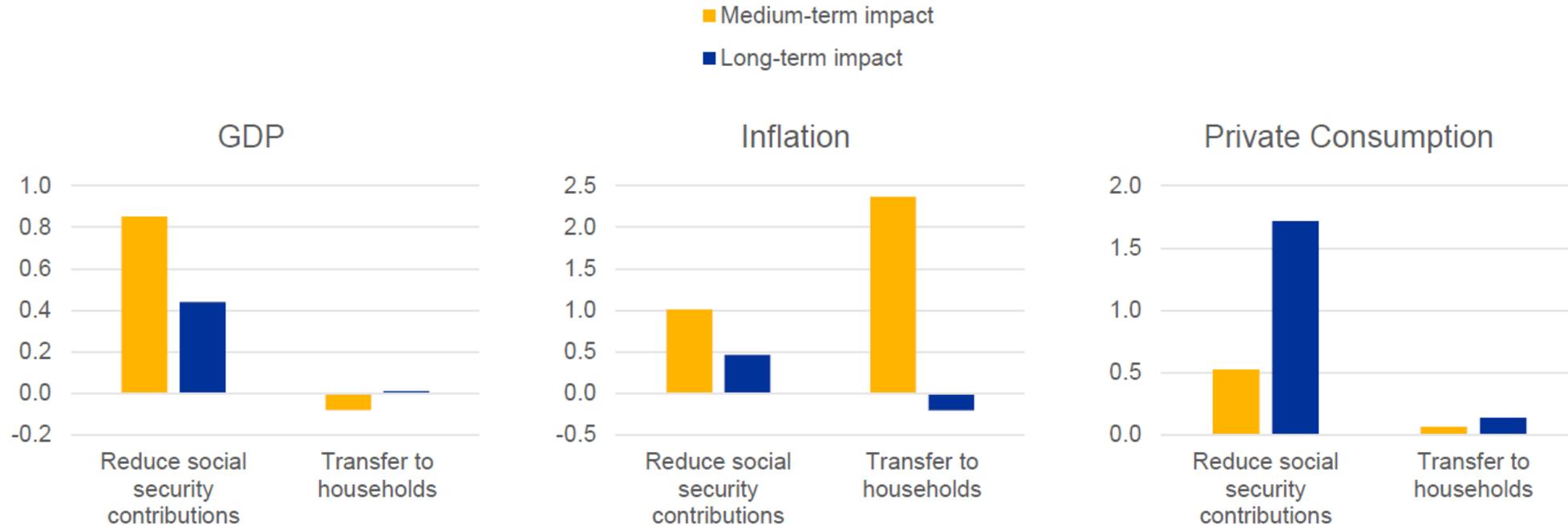
- Relative stickiness of prices in the dirty and clean sectors of the economy
- Type of climate policy adopted (carbon tax or green subsidy)
- “Sweet spot” (no tradeoff) when prices are fully flexible and when dirty and clean goods are equally sticky

**But the inflationary impact of the carbon tax presumably depends also on how the revenues collected from the tax are recycled back in the economy**

- Paper assumes neutral fiscal policy: tax revenues are handed out back to households
- How would the conclusion change if the tax was a sunk cost or if revenues were used to reduce another distortionary tax? It would be interesting to add a more thorough discussion on this

# Recycling of carbon tax revenues

**Impacts of the green transition on Spanish GDP, inflation and consumption**  
(percent deviation from baseline, EUR 30 per CO2 ton, with carbon border adjustment tax)



Source: Estrada and Santabarbara (2021), “Recycling carbon tax revenues in Spain. Environmental and Economic Assessment of Selected Green reforms”, Banco de Espana WP No 2119.

- Uses a general equilibrium model of the Spanish economy to calibrate the introduction of a EUR30 carbon tax
- Shows the macroeconomic outcome of the climate policy can differ substantially depending on how revenues from the carbon tax are recycled back in the economy

# Size of the carbon tax

## Green transition as an epochal transformation of our economies

- Model assumption: a carbon tax of 20 USD over 5 years (with AR process with parameter 0.4)
- This is not exceptionally high and yet it can pose steep tradeoff for the central bank!

## The IMF is advocating a global carbon tax floor of 70-80 USD/CO<sub>2</sub> ton

- US carbon tax is virtually zero!

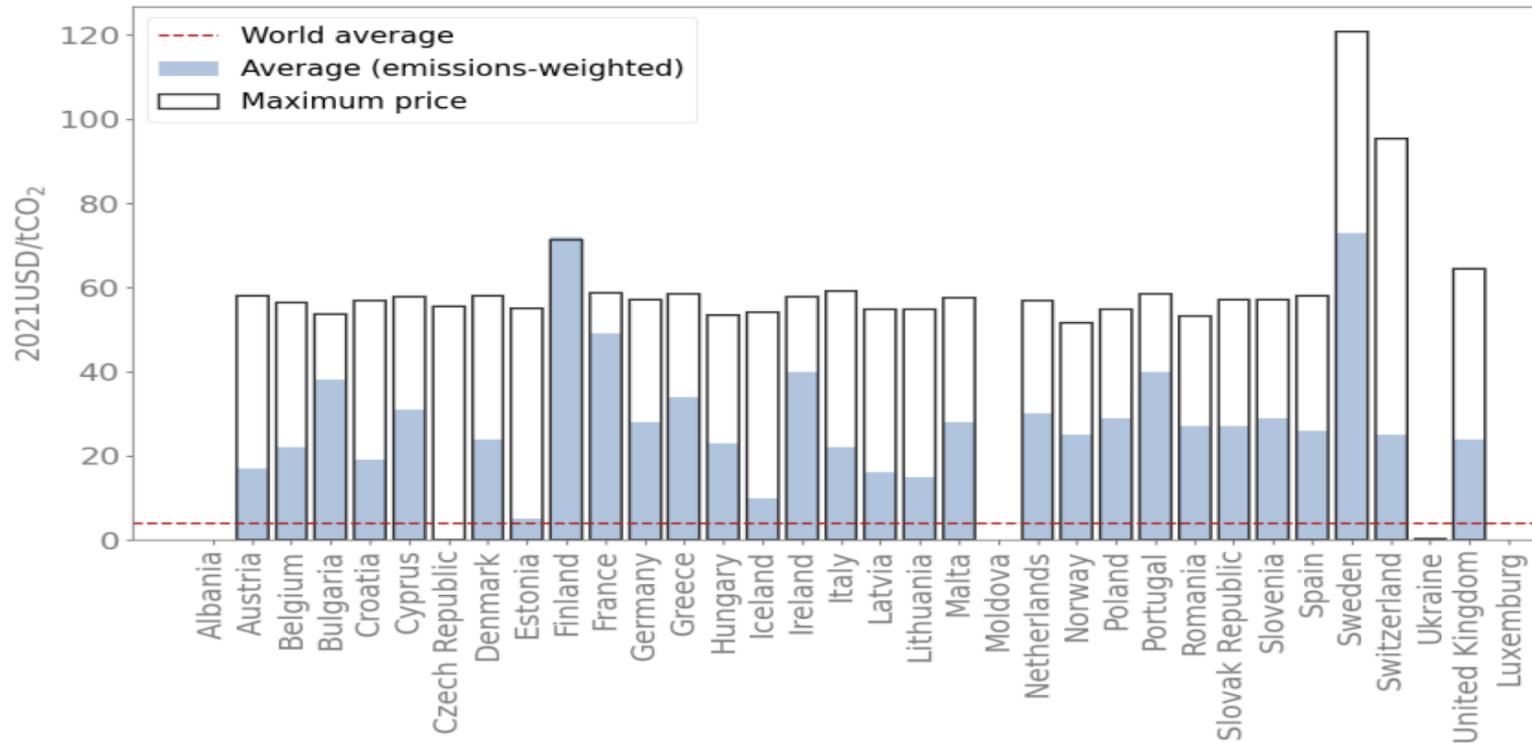
## The Climate Leadership Council proposed a Carbon tax of 40 USD/CO<sub>2</sub> in the US increasing every year at 5 percent above inflation

- “If implemented in 2021, this will cut U.S. CO<sub>2</sub> emissions in half by 2035 (as compared to 2005) and far exceed the U.S. Paris commitment.”

## Europe introduced its ETS in 2005, but coverage is limited, and emission prices are low

# Effective carbon tax in Europe

Maximum and average CO2 prices in Europe, 2021  
(2021 USD/tCO<sub>2</sub>)

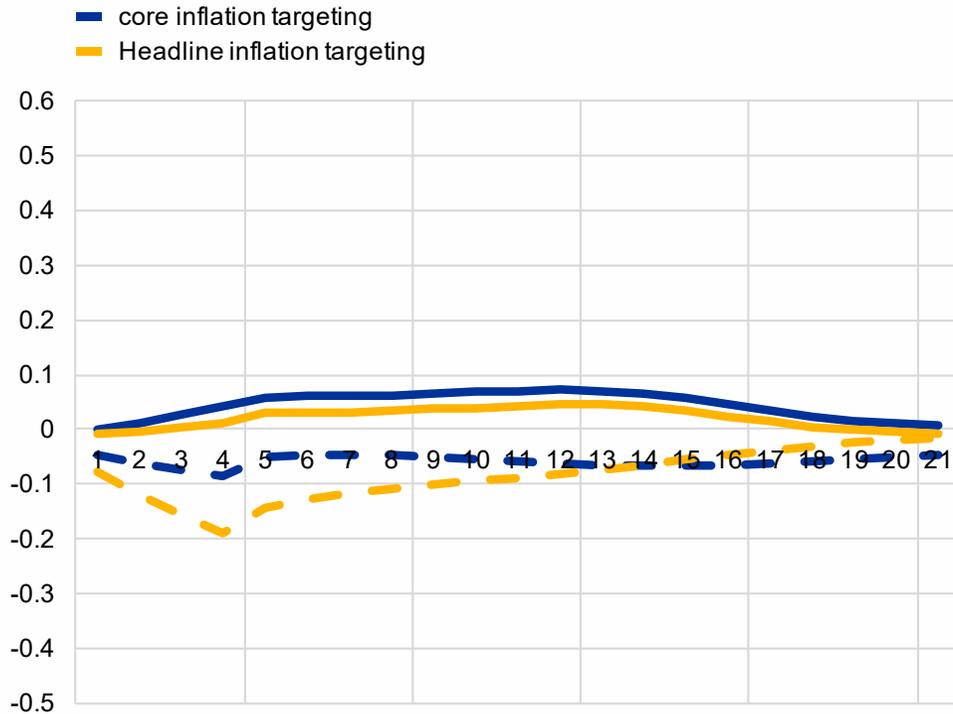


Source: IMF staff calculations based on Dolphin (2022).

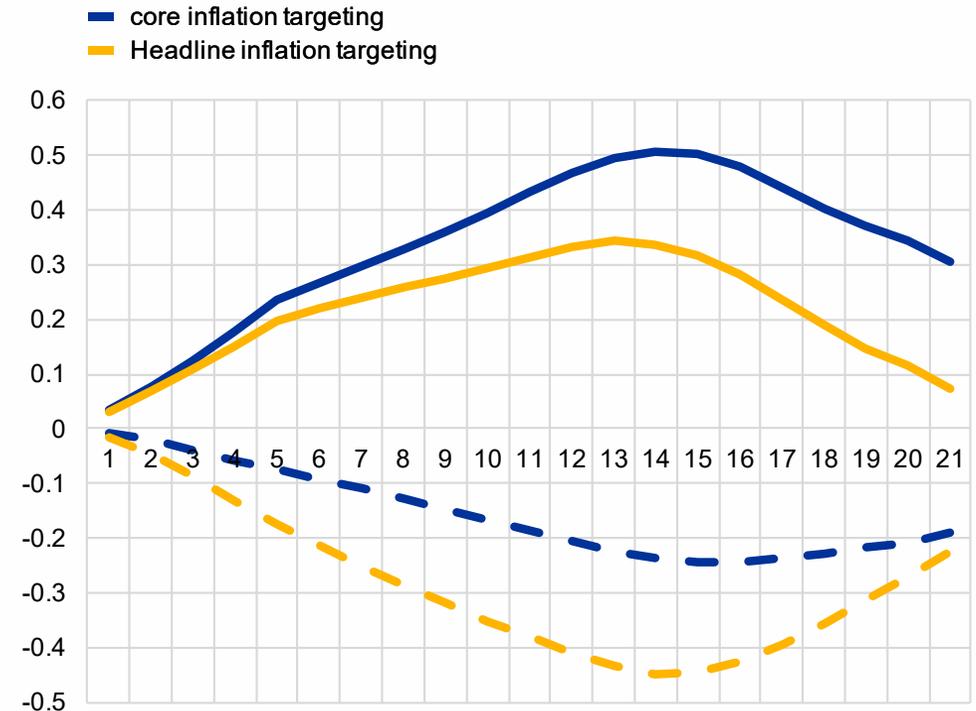
- The “headline” carbon price differs from the effective carbon price in most European countries
- Model assumption on carbon tax is relatively conservative, yet it causes a steep tradeoff to monetary policy
- Size of carbon tax is crucial for tradeoffs facing the central bank

# Risks under an orderly and delayed transition

## Orderly transition: impact on inflation and GDP growth (deviation from steady-state, annual rate in pp)



## Delayed transition: impact on inflation and GDP growth (deviation from steady-state, annual rate in pp)



Source: ECB simulations based on Adjemian and Darracq Pariès (2008).

Notes: Headline inflation shown with solid lines, GDP growth with dashed lines. Orderly transition assumes that the effective energy price rises by 3.5% annually starting in  $t$ . Delayed transition assumes that the effective energy price rises by 13.5% annually starting in  $t+5$ .

- Transitions risks are manageable in an orderly scenario but could be material in a delayed scenario
- For plausible assumptions regarding the carbon tax the trade-offs facing the central bank can be material
- With a steep carbon tax, are the main policy implications of the model still valid? Under what conditions?

# Carbon tax and cap & trade

Carbon pricing comes in the form of carbon tax and emissions trading systems (and combinations in between)

Carbon taxes provide more certainty about future prices but leaves the quantity of emissions more uncertain → Insert a trend in inflation

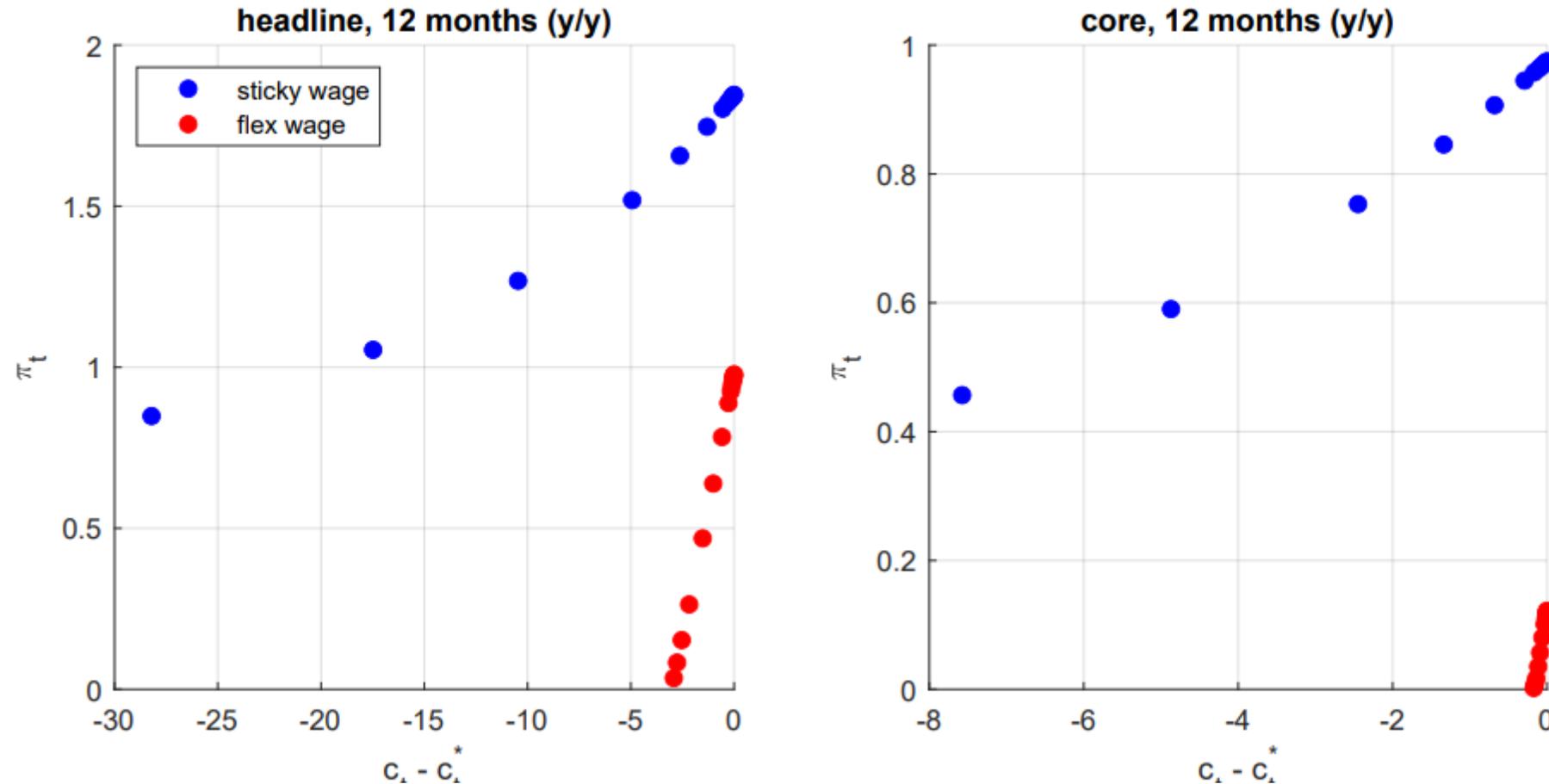
Emissions trading schemes provides more certainty about the quantity of emissions but imply higher price volatility → Insert a trend in inflation and volatility around that trend

The paper only considers the case of the carbon tax. Carbon tax seems more relevant for the US while the EU has already adopted the ETS.

Does the specific carbon pricing mechanism affect the way central banks conduct monetary policy during the transition? How? Perhaps an idea for a future extension of the paper

# Multisector model calibration: role of wage stickiness

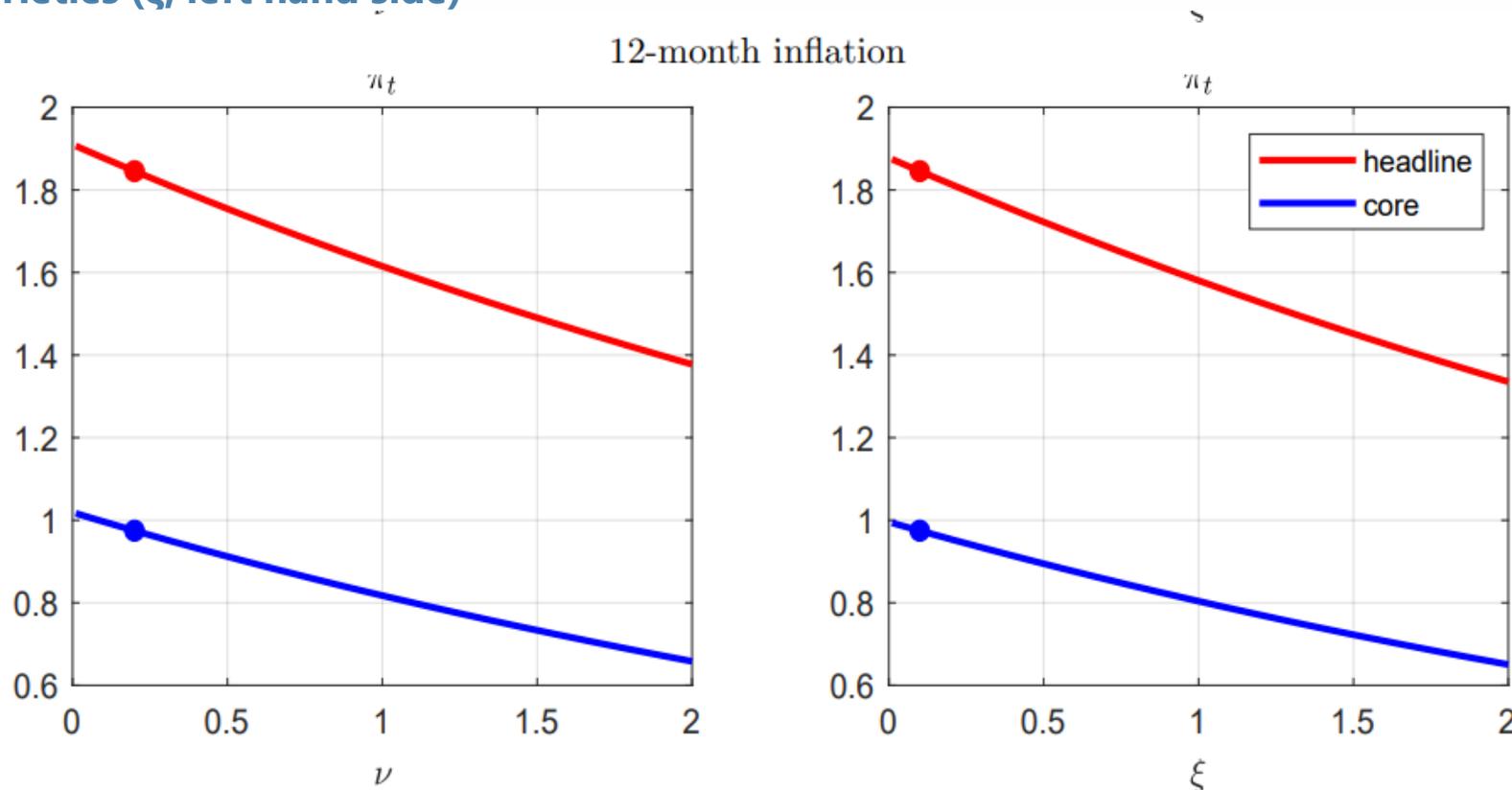
Figure 5. Inflation/output tradeoff at different horizons



- When wages are sticky monetary policy may be confronted with a steep output-inflation tradeoff
- But we are not necessarily doomed! Elasticities of substitution may come to the rescue

# Multisector model calibration

Elasticity of substitution between energy and non-energy inputs ( $\nu$ , right hand side) and intermediate input varieties ( $\xi$ , left hand side)



- The tradeoff could be eased as renewables become cheaper and are deployed on a larger scale (dots would move to the right in the charts)
- The tradeoff can also be eased the more prices become equally sticky in all sectors. But which policies could deliver this outcome?

# Minor points

## **The multi sector calibration for the US treats imports as “domestically produced” goods**

- Countries introducing carbon tax typically introduce CBAM to ensure level playing field between domestic and foreign producers and to avoid carbon leakage
- Treating imported goods as domestically produced is equivalent to assume that imports are subject to CBAM. Perhaps this could be mentioned in the draft

## **The introduction promises to study the carbon tax at different layers of the supply chain (upstream vs downstream), but this is then not pursued later in the paper**

## **Green subsidy treated as carbon tax with negative sign**

- Persuaded that subsidies are deflationary. Agree that a three-sector model with explicit substitution between dirty and clean consumption is required for a more fully fledged discussion

**Thank you!**