

Seeking opportunities to enable positive tipping points in coal mining regions



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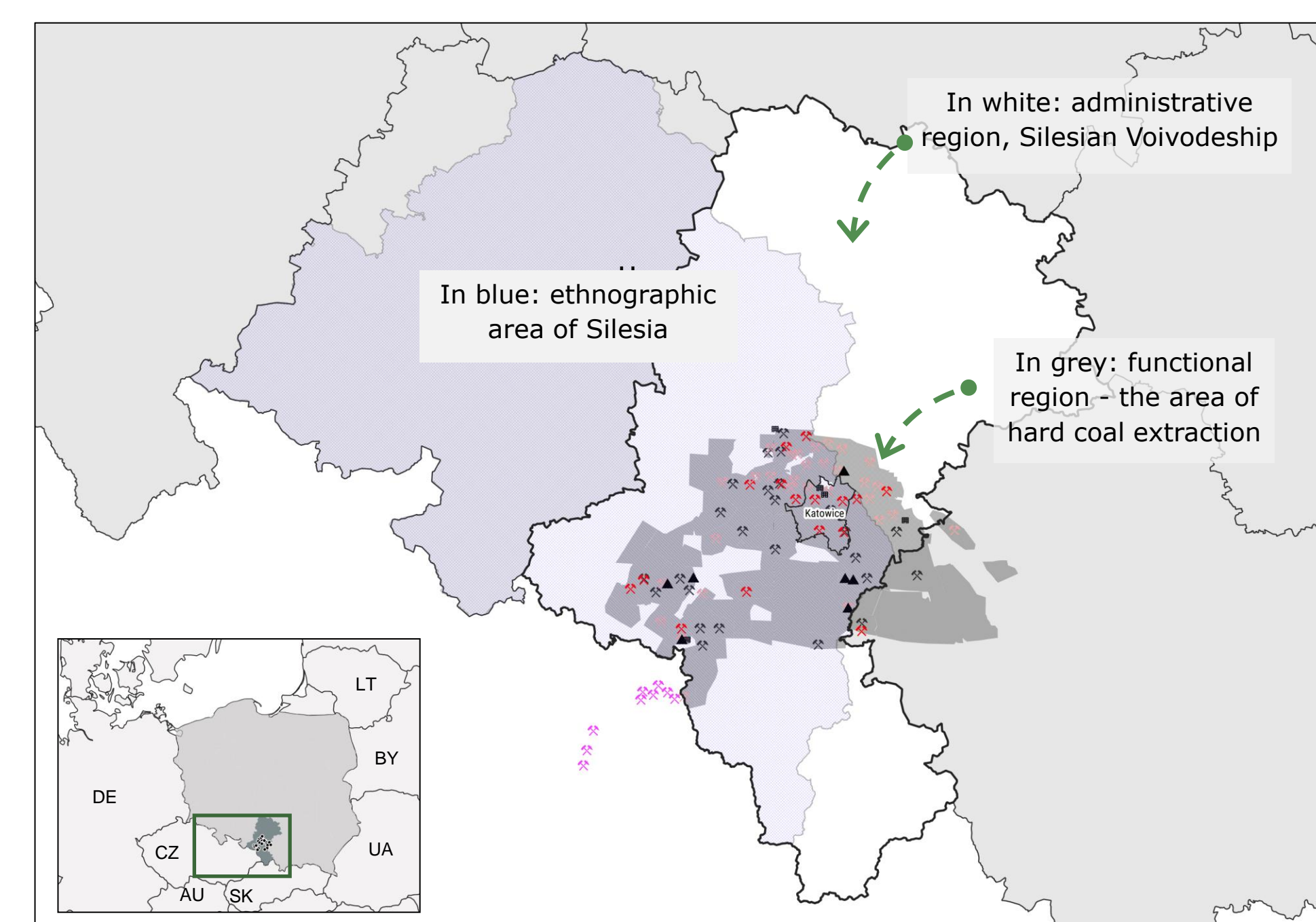
The focus

To which extent the economic, political and cultural changes, as well as other mega-trends, may alter the socio-economic consequences of decarbonization and enable relevant tipping points, contributing to the narration shifts?

In this case study, we:

- explain the context and dominant narrations of the coal mining transformation in **Upper Silesia**.
- examine socio-economic trends since the beginning of the coal transformation in the 1990s, the current and future situation (up to 2050)
- address the relationships between structural change in the regional economy and the transition narratives.

Study area: Upper Silesia



Legend: in black – active coal mines; in red/purple – closed.
Source: own elaboration

Two competing narratives

Narrative	Industrial Silesia	Green Silesia
postulate	extend the lifetime of coal through technologies (IGCC, CCS, coal to SNG)	to diversify the economic base into more modern and service-oriented activities
coal phase-out	2049 or even later	2030s / early 2040s
rationale	accumulated technical know-how, energy security, economic patriotism	health and living condition improvements, green technologies deployment
main actors	unions, mining-related institutions, industry research institutes	regional authority, business institutions, research institutes, NGOs,
regional vision	the industrial heart of Poland	European hub of modern services and industries



Mining is a declining industry in the regional labour market

- Since 1990: mining employment has declined by 300,000 people, more than 40 mines have been closed
- 2020: 74,500 miners (3% of the working age)
- Economic structure is more diversified thanks to the various regional investments
- Labour market outlook for the future transition is much better than in the 1990s and early 2000s.

Coal has been losing political status but is still crucial for the energy mix

- Discussion abt coal is dominated by negative sentiment
- Institutional shifts are important **tipping events**: empowering regions (2007), Ministry of Climate (2019)
- Energy Policy until 2040 included **mine closure schedule** until 2049, firstly used **coal phase-out**
- Since RU's aggression on UA, coal strengthened its position in energy sector but lost as a household fuel

Coal miners require a safe and secured coal exit

- more than 40% of currently employed miners will have retired by 2030
- surplus of miners will be accompanied by shortages of workers in other industries
- unemployment will not be an issue: the issue will be to guarantee stable and well-paid jobs, keep the dignity and security of the coal miners, and avoid anti-climate populist attitudes

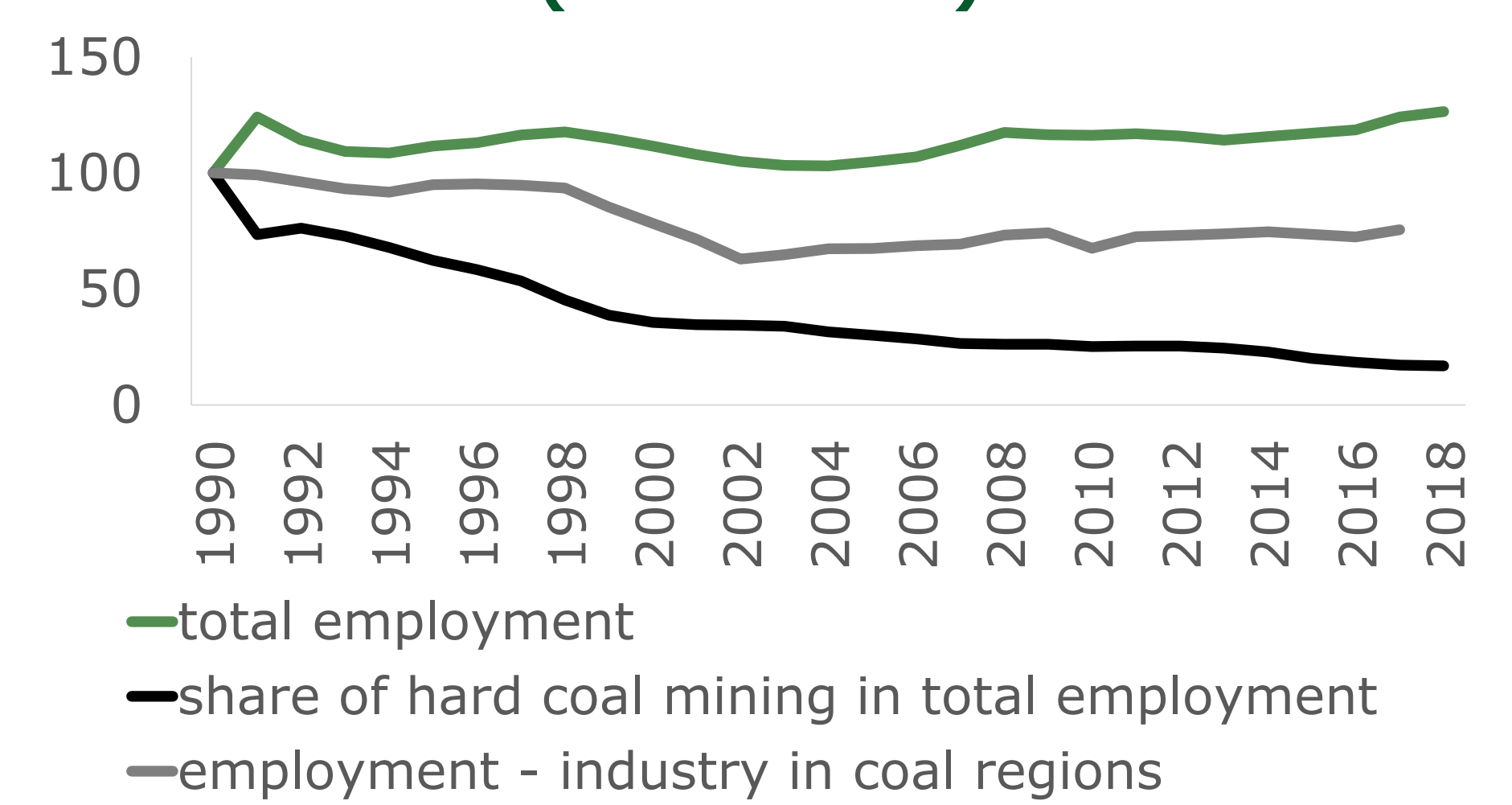
Carbon tax: a good way to speed decarbonisation?

- rather a solution to mitigate climate tipping points than a trigger for stimulating change
- introduction of a carbon tax will lead to a reduction of GHG emissions by 30-60%, as well as a decrease in GDP from 1.8%-3.2% by 2032.
- will affect mostly energy-intensive and advanced industries still strongly embedded in Silesia.

Preliminary remarks

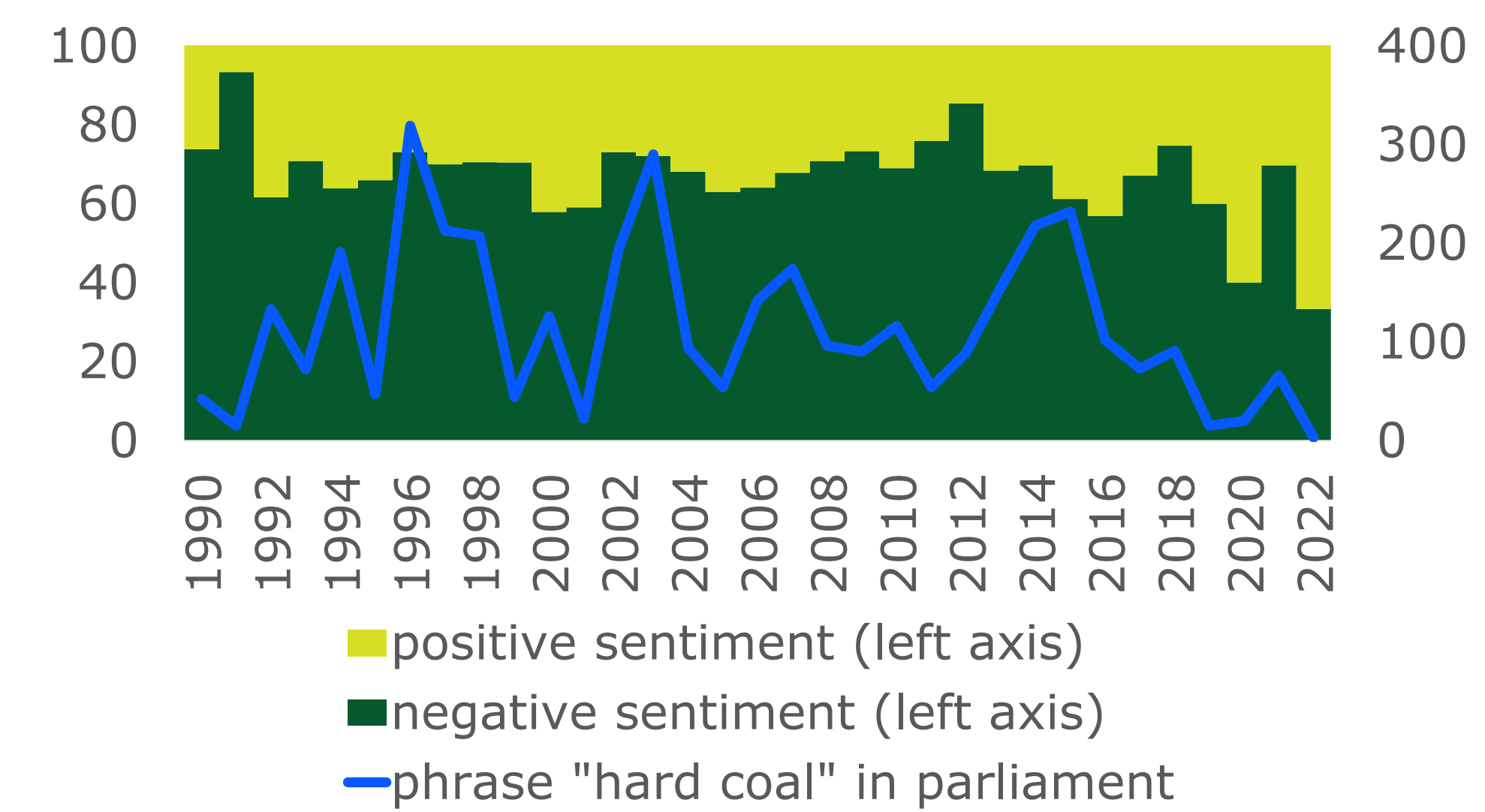
- **coal exit** (tipping point) in the case of the regional labour market should be easier to manage compared to other countries, even including related industries.
- a tough challenge for the region is to replace coal in the energy mix, as the **energy transition** will transform the regional political economy [5] and diminish the imaginary of Silesia as an industrial heartland.
- to avoid tensions, an incremental pathway without any radical solutions such as carbon tax was offered – but to what extent such a pathway is **just**?

Dynamics of employment (1990-2020)



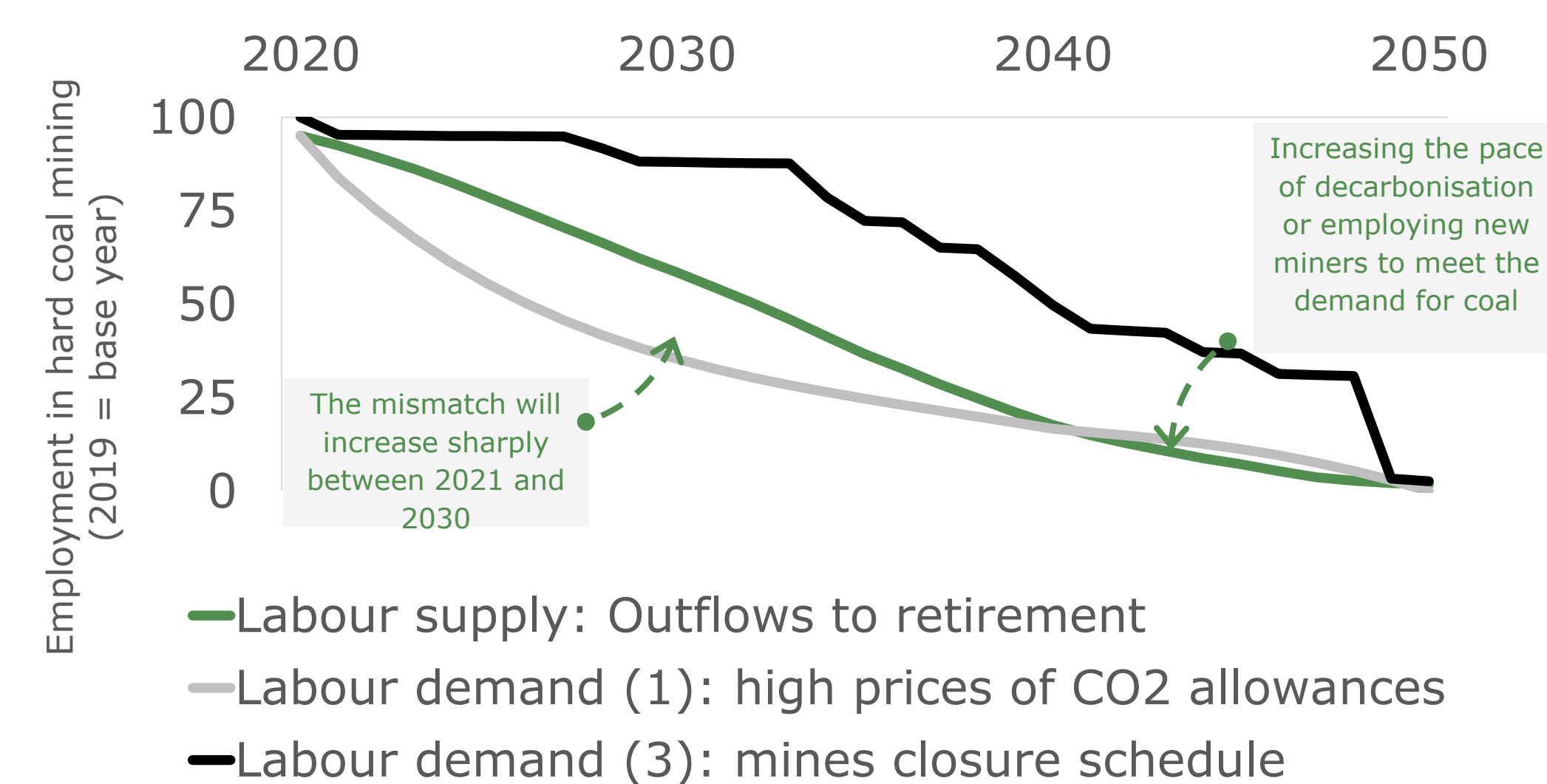
Source: [4]

Political discourse about coal



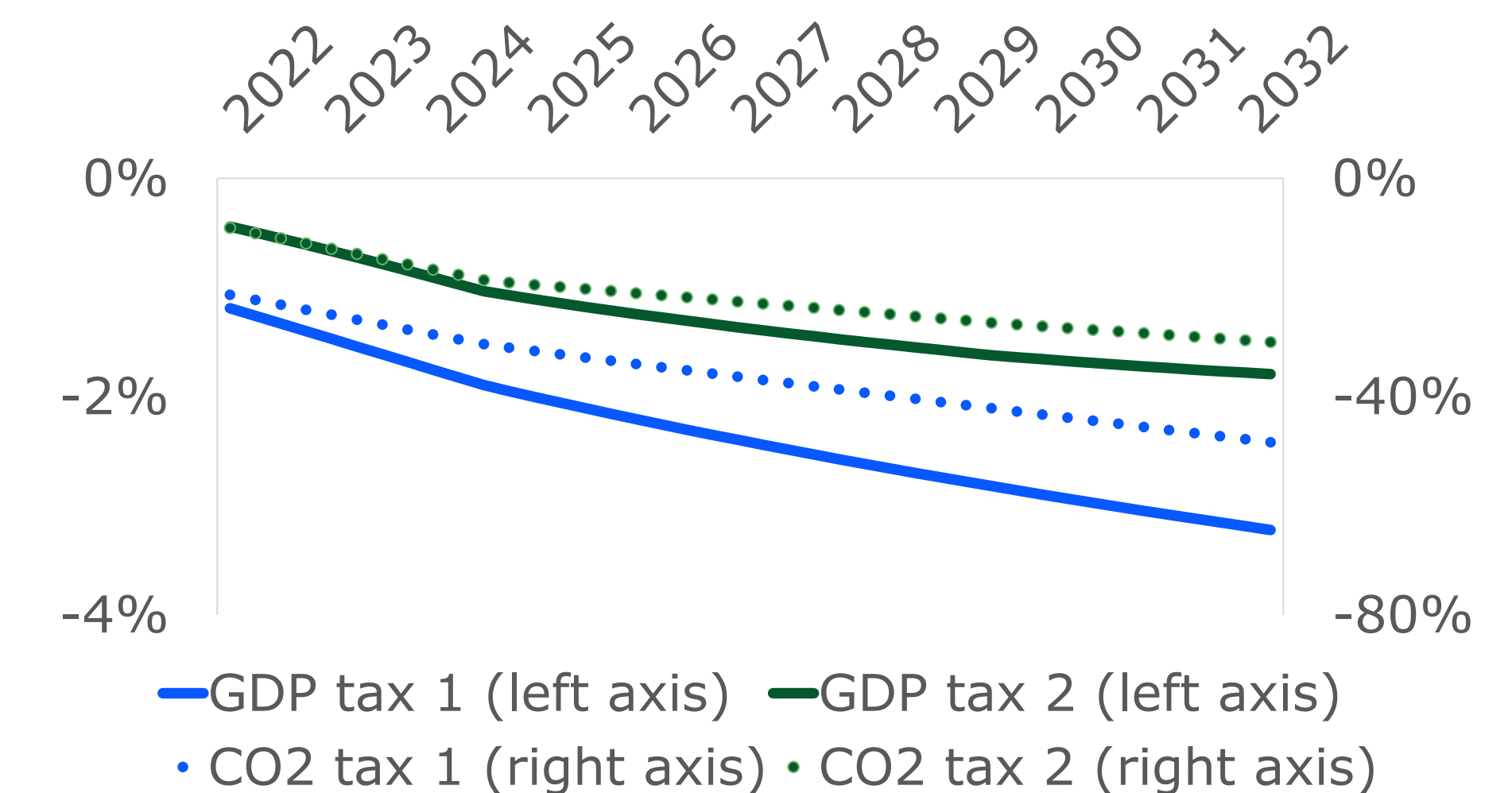
Source: own elaboration based on Polish Parliamentary Corpus

Labour supply and demand in hard coal mining



Source: [4]

GDP and CO₂ emissions (% deviation from no carbon tax scenario)



Source: own calculations based on MEMO model and outputs from MESSAGE-GLOBIOM (Tax 1) and REMIND-MAGPIE (Tax 2) IAMs

Questions instead conclusions

- *What kind of interventions will be the most beneficial to gain a positive tipping point?*
- *How to convince people to carbon taxation? (How to make environmental taxes effective, distributionally progressive and understandable?)*
- *How best to communicate to trigger action on positive tipping points in coal regions?*

References

1. Antosiewicz, M., & Kowal, P. (2016). Memo III—a large-scale multi-sector DSGE model, IBS Research Report 02/2016.
2. Milkoreit, M., Hodob, J., Baggio, J., Benessaiah, K., Calderón-Contreras, R., Donges, J. F., Mathias, J.-D., Rocha, J. C., Schoon, M., & Werners, S. E. (2018). Defining tipping points for social-ecological systems scholarship—An interdisciplinary literature review. Environmental Research Letters 13(3), 033005.
3. Tábara, J. D., Lieu, J., Zaman, R., Ismail, C., & Takama, T. (2022). On the discovery and enactment of positive socio-ecological tipping points: Insights from energy systems interventions in Bangladesh and Indonesia. Sustainability Science 17(2), 565-571.
4. Sokołowski, J., Frankowski, J., Mazurkiewicz, J., Lewandowski, P. (2022). Hard coal phase-out and the labour market transition pathways: The case of Poland. Environmental Innovation and Societal Transitions 43, 80-98.
5. Jakob, M., Steckel, J., (2022). The Political Economy of Coal. Obstacles to Clean Energy Transitions, Routledge.

Research Methods

- A. Statistical analysis (including mining employment data)
- B. Interviews and dedicated workshops with stakeholders
- C. Sentiment analysis
- D. DSGE modelling [1]

CONCEPTUAL FRAMEWORK

Tipping point – a critical threshold crossed when a small quantitative change results in fundamental, non-linear qualitative changes in the configuration and dynamics of a given system [2]

SETP system of reference [3]

- **scope**: coal administrative region, 1990–2050
- **perspective**: **etic**, applied perspective, close to the Green Silesia vision but with a stronger focus on the labour market and the situation of employees

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