



ESTIMATION OF OUTPUT GAPS AND POTENTIAL OUTPUT AGAINST THE BACKDROP OF THE COVID-19 PANDEMIC – OECD APPROACH

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Outline

1. Recap of OECD method
2. Adjustments for COVID
3. Conceptual / practical issues that I hope we can discuss

1. Recap of OECD method



Production function with filtered components

$$\underbrace{GDPVTR}_Y = \underbrace{(EFFLABS * POPS1574 * LFPRS1574 * CLFS * (1 - NAIRU))}_A^\alpha \underbrace{(KPTV)}_K^{1-\alpha}$$

- *POPS1574*: Trend working age population
- *LFPRS1574*: Trend labour force participation rate
- *NAIRU*: Trend unemployment rate
- *EFFLABS*: Trend labour efficiency
- *KTPV*: Productive capital stock (excludes housing)
- *CLFS*: Adjustment factor for difference between NA and LFS employment definitions
- $\alpha = 0.67$ (standard labour income share)



Supply components

- Trend working age population (*POPS1574*)
 - We take official historical population estimates and splice projections from
 - Eurostat for European countries
 - United Nations for other countries
 - Then we HP filter it
- Trend labour force participation rate (*LFPRS1574*)
 - We cyclically adjust *LFPR1574*, including projection, using previous EO estimate of unemployment gap (*UNR – NAIRU*)
 - Then we HP filter it
- Trend unemployment rate (*NAIRU*)
 - Estimated using Kalman filter and anchored inflation expectations approach ([Rusticelli, Turner and Cavalleri \(2015\) ECO WKP #1231](#))
 - Now experimenting without NAIRU

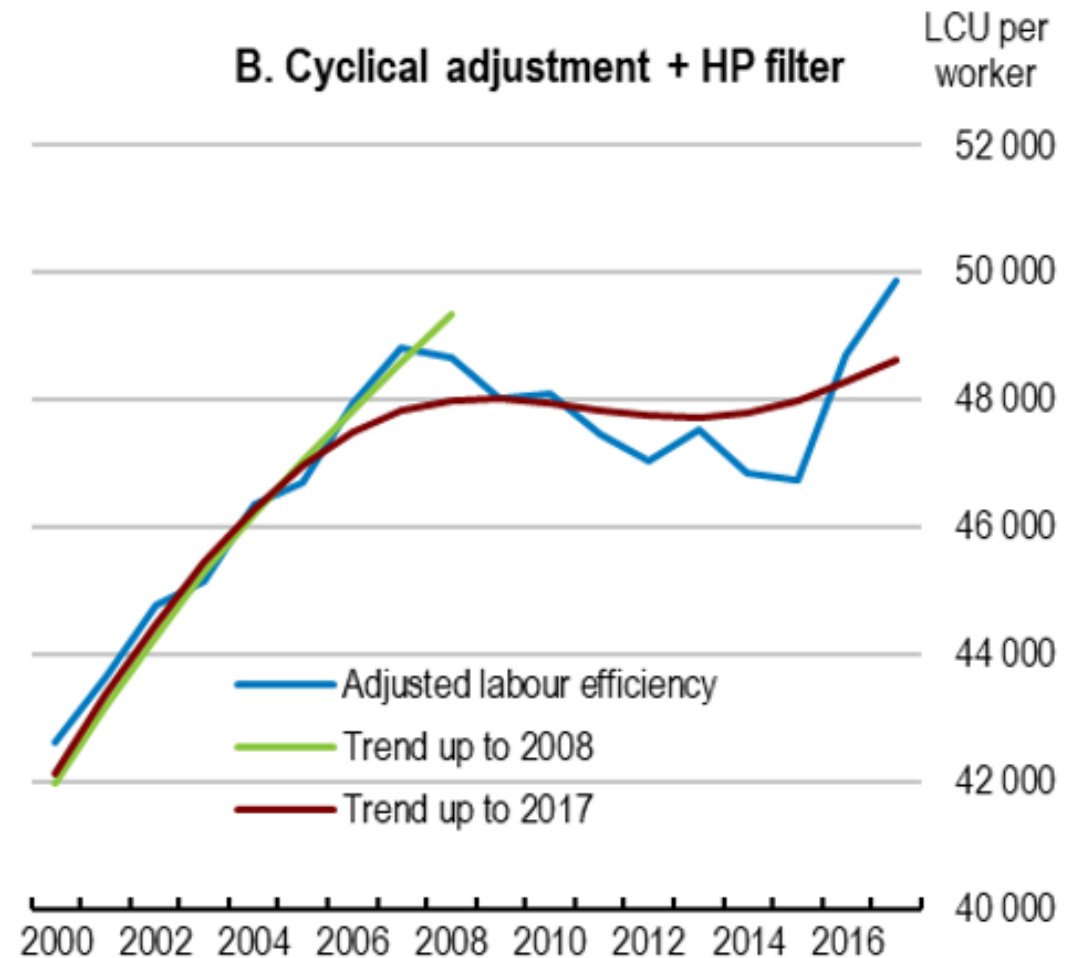
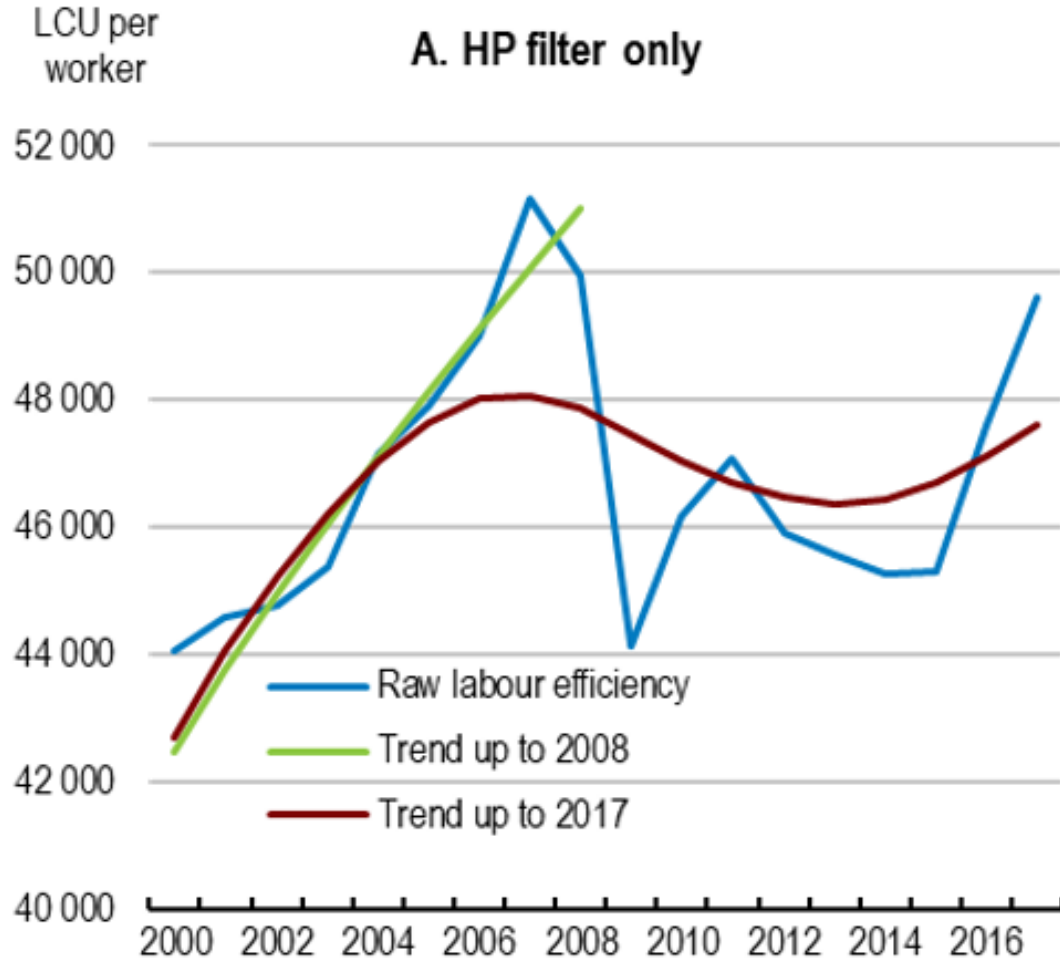


Supply components (cont'd)

- Trend labour efficiency (*EFFLABS*)
 - Raw labour efficiency is computed as residual.
 - Then we cyclically adjust it using different indicators (capacity utilisation, investment ratio, CA balance, commodity prices)
 - E.g. CAPU fell by 20 percentage points in 2020Q2 in France
 - Then we HP filter it
 - Projection over 2-year horizon based on continuation of recent trend
- Productive capital stock (*KTPV*)
 - Historical estimates from OECD Statistics Directorate for ~20 countries
 - Perpetual inventory method (PIM) for the rest
 - Endogenous to investment projection in Forecast Entry system



Pre-filter cyclical adjustment example: trend labour efficiency in Finland around GFC



2. Adjustments for COVID



Impact of COVID on potential output: what we did

- Capital stock
 - Direct impact from desks' investment projection via stock-flow equation
 - Assumed no impact on scrapping rate
 - Relative to fall 2019 investment counterfactual, impacts on potential level by end-2021 are small
 - JPN: 0%, USA: -0.1%, Euro area: -0.2% to -0.4%, GBR: -0.3%
- Trend labour force participation
 - Filter would pick up revised (lower) projection but otherwise no explicit adjustment
- Trend labour efficiency growth
 - Ad-hoc downward adjustments roughly commensurate with output decline, but kept profile smooth
- NAIRU
 - Projected increase based on ΔUNR



NAIRU adjustment

The first equation, estimated individually for each country, relates the change in the long-term unemployment rate (LT_UNR_t), defined as unemployment of more than one year duration, to the change in the aggregate unemployment rate (UNR_t) at the annual frequency:

$$\Delta LT_UNR_t = \alpha + \theta_1 \Delta LT_UNR_{t-1} + \theta_2 \Delta UNR_t + \theta_3 \Delta UNR_{t-1} + \varepsilon_t \quad [\text{A2-1}]$$

The second equation pools all countries together and seeks to relate the change in the NAIRU to the change in the long-term unemployment rate, also at the annual frequency:

$$\Delta NAIRU_{i,t} = \alpha_i + \gamma_t + \beta_1 \Delta NAIRU_{i,t-1} + \beta_2 \Delta LT_UNR_{i,t} + \sum_k \beta_k (X_{i,t}^k - \bar{X}_{i,t}^k) \Delta LT_UNR_{i,t} + \varepsilon_{i,t} \quad [\text{A2-2}]$$

where α_i are country fixed effects, γ_t are time fixed effects, $X_{i,t}^k$ are structural labour market indicators and $\bar{X}_{i,t}^k$ are the sample means of these indicators.



NAIRU adjustment

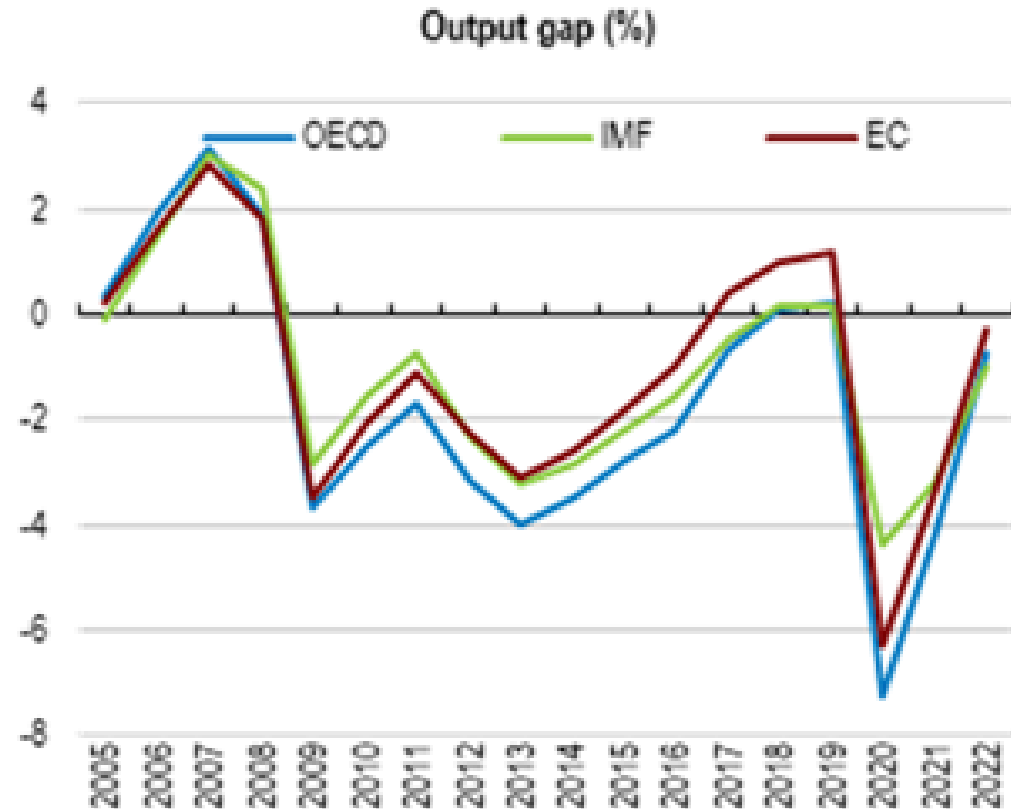
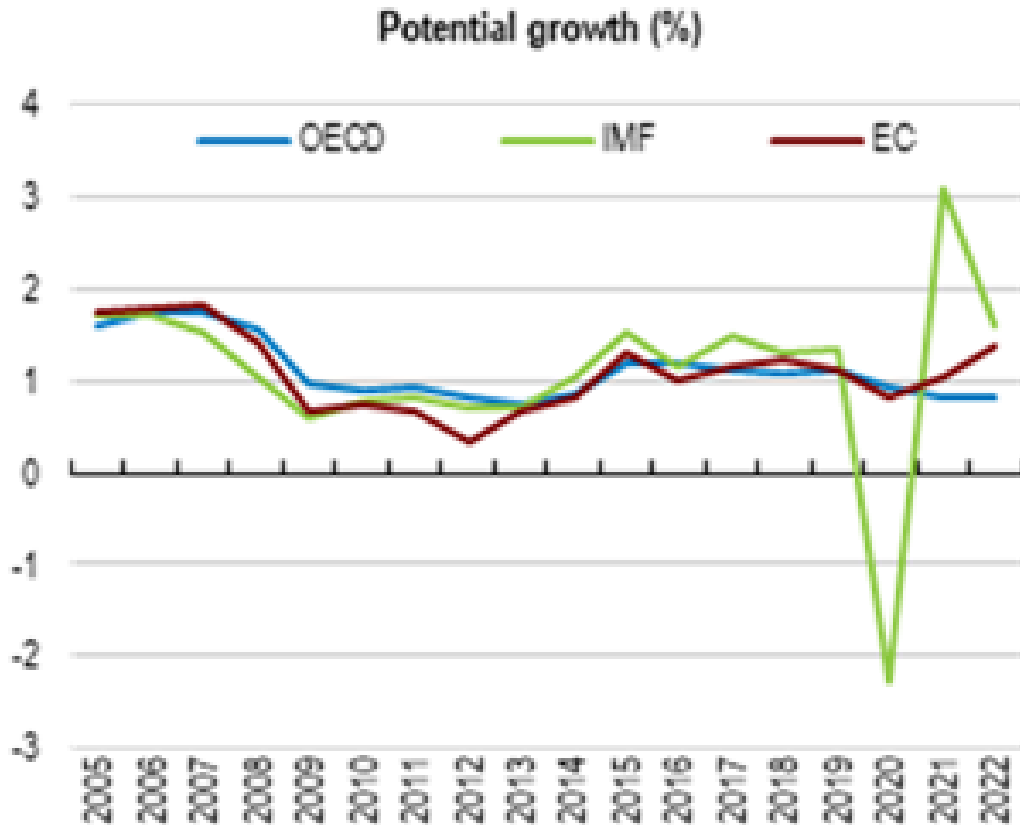
- Results in line with intuition
 - Estimated equations predict larger increase in NAIRU for countries with less flexible labour markets (higher EPL)
- However,
 - Projected increases are small, between 0 and 0.2 points
 - Many reasons to believe historical elasticities not a good guide to current situation
 - Measurement issues around UNR
 - Support schemes for businesses and workers
 - UNR has already declined close to pre-COVID level in many places

3. Conceptual / practical issues



Impact of COVID on potential: short run

- COVID (public health shock) fits badly within traditional AD/AS framework
- Closures / lockdowns can be conceptualised in different ways





Impact of COVID on potential: longer run

- Nature of shock very different from ‘traditional’ recession.
- No severe global pandemic in recent history to use in empirical work.
- Labour market withdrawals and evidence of labour shortages
 - Few people left on support schemes. US evidence suggests not a main factor behind current shortages.
 - People still living on accumulated savings? Temporary.
 - Fear of virus? Again, temporary.
- Supply chain disruptions
 - Pure efficiency loss. But should re-adjust over time.
 - Could be some negative impact on efficiency from reshoring, trade-off for greater resiliency



Impact of COVID on potential: longer run

- Change in output mix
 - Temporary component: Hospitality/travel will recover.
 - Requires retraining and job re-matching. Slow process. But unemployment is frictional, not structural
 - Perhaps some gains in efficiency from more remote working
- Investment has generally held up well. Labour shortages might spur investment in labour-saving tech.
- Strong output growth projections also suggest little supply side scarring
 - E.g. In Spring 2021 euro area potential was about 1.3% lower by end-2021 than in fall 2019 projection. This now looks too pessimistic in view of the recent Interim Outlook projection.
 - Another possibility is that our output growth projections are too strong



The impact of COVID-19 on human capital

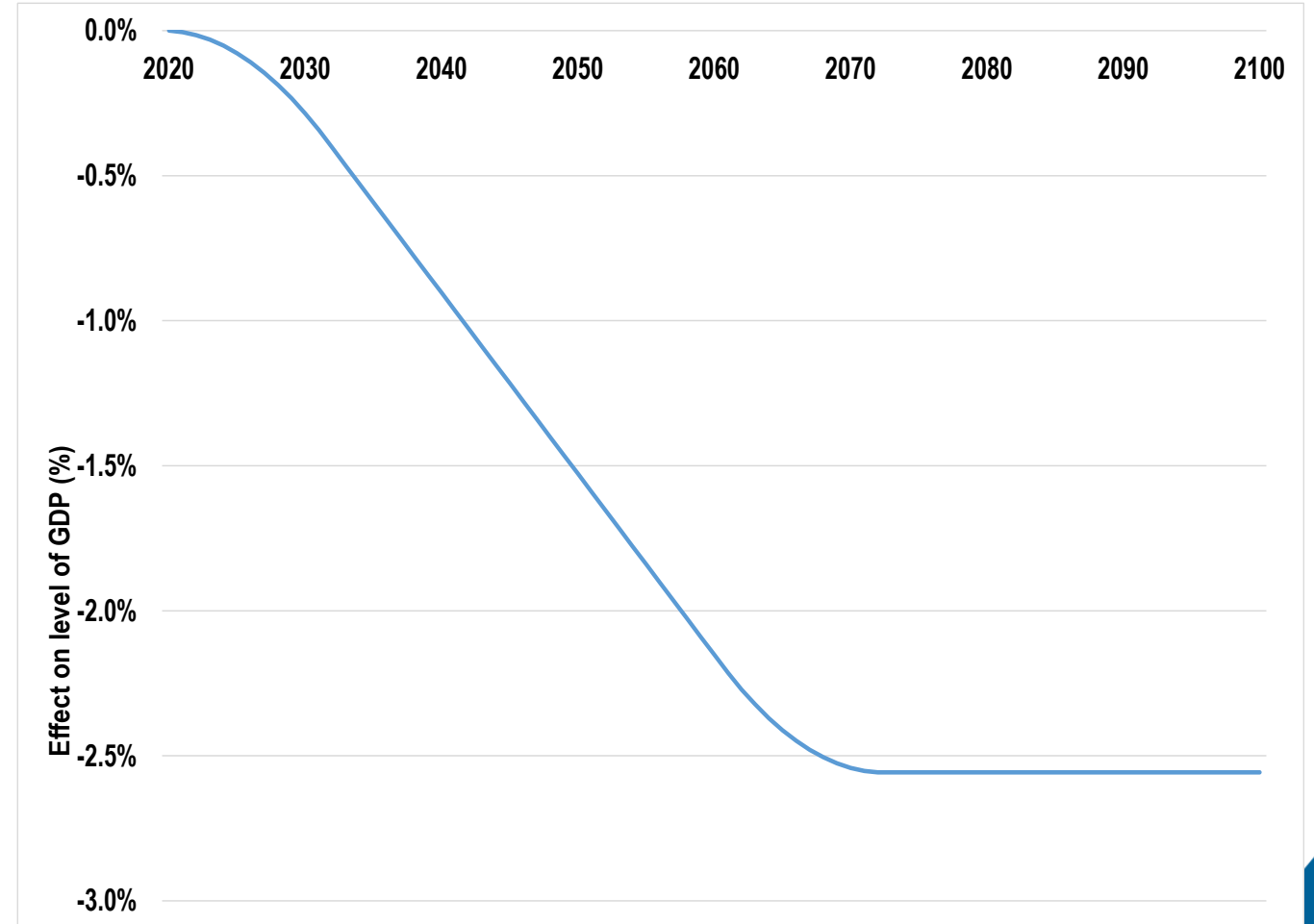
- If production function had human capital quantity and quality
 - School closure -> reduces learning-adjusted years schooling
 - Sometimes dramatic present value losses.... but long lags involved
- **World Bank** (Azevedo et al., 2020).
- Average earning losses from micro evidence on returns to schooling:
 - For Europe per year \$500 - \$2400 per student (all figures 2017 \$PPP)
 - For Europe lifetime per student \$10k - \$44k
 - Possible global loss of \$10 trillion in lifetime earnings
- Also effect on inequality, dropouts, numbers below minimum proficiency level
- Own back-of-the envelope calculations using WB estimates in most severe scenario -> peak 0.7% GDP loss for France but only by 2032 (once all affected cohorts reach labour force).



The impact of COVID-19 on human capital

➤ Hanushek & Woessmann (2020)

- GDP 2% higher per standard deviation in educational achievement of labour force. Based on simple historical relationship between **growth & composite measure of skills**
- In central scenario, “*Losses might yield 1.5 % lower annual GDP for remainder of century*”

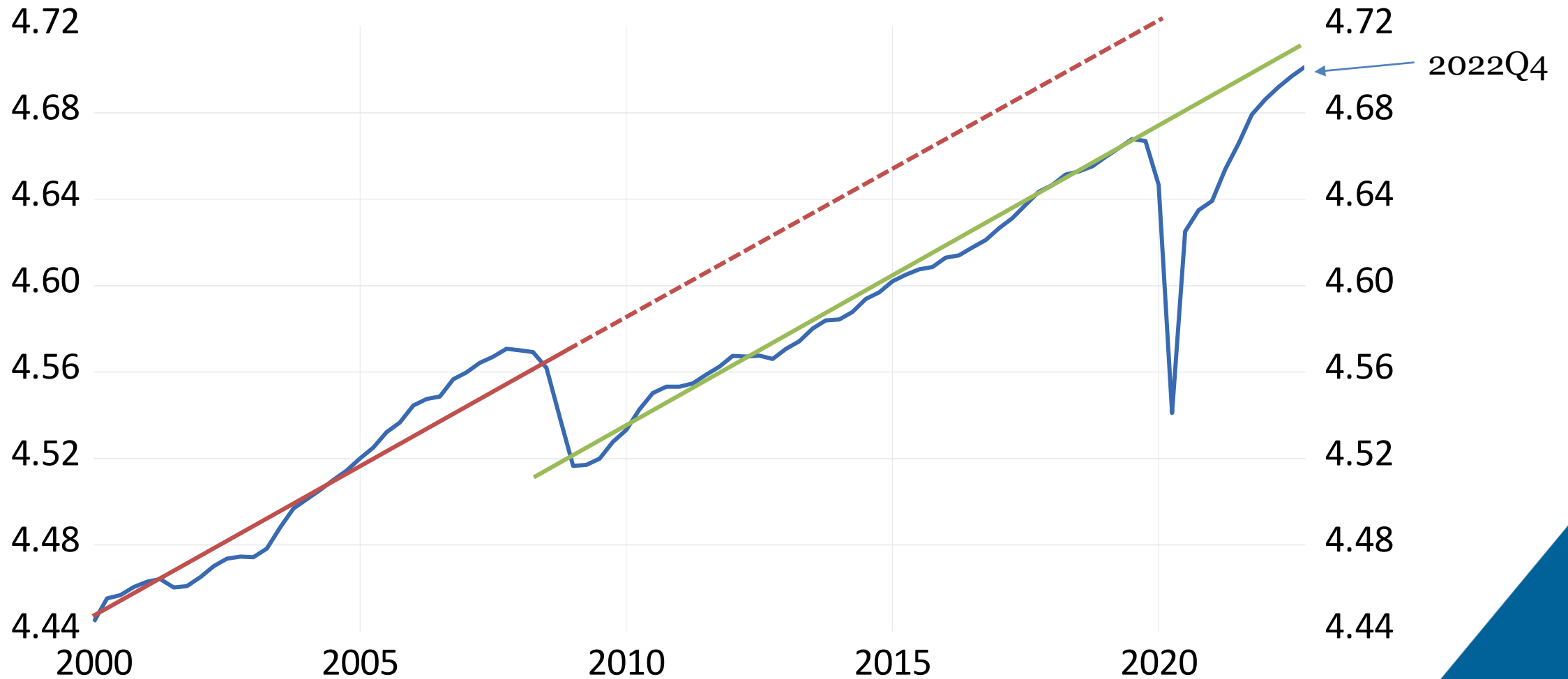


... but implies even longer lags



Comparison with GFC shock: multiple equilibria?

Log output per capita - G20 advanced





Main takeaways

- Estimating very short-run impact not very useful policy or otherwise
- Long-run impact highly uncertain but probably fairly small
- Recent 2021/22 forecasts imply small permanent impact, unless we envision positive output gaps in 2022/23
- Medium to long-run impact may reflect mostly education losses, but this will take some time to feed through



References

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