Impact of climate change/protection, digitalisation and (de)globalisation on r*

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European Central Bank

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SUERF/BAFFI/OeNB event “How to raise r*?”
## Overview

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Focus of this presentation

• r* is typically analysed as a function of factors of production (capital, labour, productivity), and preferences (risk aversion/savings).

• These, in turn, are affected by structural factors – those structural factors and their effects on r* are the focus of this presentation.

• The key focus is on climate change/protection, digitalisation, (de)globalisation.

• The presentation also covers demographics and distribution, and the effects of the COVID-19 pandemic.
Key messages

- Climate change/protection, digitalisation, (de)globalisation are **major structural factors impacting on r***.

- The **size/sign of the impact is uncertain**, interactions complex, so policy prescriptions have to be handled with care.

- Climate change/protection, digitalisation, (de)globalisation are **not the only major structural factors impacting on r***.

- Others include **demographics, distribution**. Moreover, and not least, episodes such as the COVID-19 pandemic may be impacting on r***.
# Overview

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Channels of impact

Safe assets
(+)= raising $r^*$
(-)= lowering $r^*$
(+/-)= ambiguous

Savings
(+)= raising $r^*$
(-)= lowering $r^*$
(+/-)= ambiguous

Excess Savings

Productivity
(+)= raising $r^*$
(-)= lowering $r^*$
(+/-)= ambiguous

Capital/Labour
(+)= raising $r^*$
(-)= lowering $r^*$
(+/-)= ambiguous

Potential Output

$r^*$
Channels of impact: climate change

**Safe assets**

(-) Increased demand if greater uncertainty/risk
(-) Especially if concerns about public finances

**Savings**

(-) Greater uncertainty and risks

**Excess Savings**

**r**

**Potential Output**

**Productivity**

(+) Investment in green technology
(-) Reallocation to mitigation and adaptation
(-) Deviation away from comfort temperature
(-) Increase entry barriers for new firms

**Capital/Labour**

(+) Investment in green technology
(-) De/Reconstruction due to extreme weather
(-) Higher morbidity/migration

**Safe assets**

(-) Increased demand if greater uncertainty/risk
(-) Especially if concerns about public finances

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**r**

**Potential Output**

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(+) Investment in green technology
(-) Reallocation to mitigation and adaptation
(-) Deviation away from comfort temperature
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**Capital/Labour**

(+) Investment in green technology
(-) De/Reconstruction due to extreme weather
(-) Higher morbidity/migration
Channels of impact: climate change (ctd.)

Green regulation might increase incentives for firms to invest in green technologies and thus increase innovation and productivity,

its impact may, however, be heterogeneous across firms, with small, less technological advanced, firms being at disadvantage.

The impact of the EU ETS on green patents


Notes: Diff-in-diff exercise looking at the evolution of green patents of firms affected by the EU ETS (solid line) relative to similar firms according to observable characteristics not covered by the EU ETS (dashed line)
Channels of impact: digitalisation

Safe assets
(-) Increased demand if greater uncertainty/risk
(-) Especially if related to cyber security/attacks

Productivity
(+/-) New types/digital assets (data, etc)
(+/-) Shift in demand for types of capital/labour

Savings
Excess Savings

Potential Output

Capital/Labour
(+/-) Shift in demand for types of capital/labour

(+/-) Product/process and asset innovations
(+/-) Enhanced supply efficiency/resilience
(+/-) More competition, flexibility, innovation

Productivity

Savings
Excess Savings

r*
Channels of impact: globalisation

Safe assets
(-) Increased demand if greater uncertainty/risk
(-) Especially if linked to politics/terrorism
(-) Official demand for safe assets

Savings
(-) channeling of savings from EMEs

Excess Savings

Productivity
(+) More competition / learning by exporting
(+) Greater variety and quality of inputs
(+) Better resource allocation

Capital/Labour
(+) Greater demand for (certain) capital/labour

Potential Output

Productivity
(+ More competition / learning by exporting
(+ Greater variety and quality of inputs
(+ Better resource allocation

Savings
(-) channeling of savings from EMEs
Firms that have exported/imported for at least 3 years show higher TFP growth rates than firms that just started exporting/importing;

The gains are particularly large for firms importing production inputs.

The impact of globalization on firm TFP growth
(annual TFP growth premia in p.p. of continuous exporters (left panel) and importers (right panel) relative to new exporters/importers)


Notes: The TFP premia is estimated controlling for country, sector and time fixed effects.
Channels of impact: demographics/distribution

**Safe assets**

(−) Increased demand if greater uncertainty/risk
(−) Especially if concerns about public finances

**Savings**

(+) Increase in ratio of dissavers to saver
(+) More equal income and wealth distribution

**Excess Savings**

**Potential Output**

**Productivity**

(+/−) Depending on institutions (pensions)

**Capital/Labour**

(+) Higher labour supply/labour force
# Overview

## Introduction

## Structural factors and r*

## COVID-19 (and structural factors) and r*

## Conclusions
Channels of impact: COVID-19 pandemic

Safe assets
(-) Increased demand if greater uncertainty/risk
(-) Especially if concerns about public finances

Savings
(-) Greater uncertainty and risks

Excess Savings

Potential Output

Productivity
(+) greater competition in online/digital world
(+) greater resilience of digital supply chains
(-) mismatches and reversals

Capital/Labour
(+) greater flexibility with teleworking
(+) greater intangibles return/investment
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r* might be supported by:

- **climate change/protection**, if they lead to investment and innovation and not to an increase in uncertainty or risks.

- **digitalisation**, in a technologically-optimistic scenario, in which productivity is enhanced, and COVID-19 leads to an acceleration of digitalisation, investment in intangibles, and resilience in supply.

- **globalisation/integration**, if they are conduits to greater competition and innovation, winner-takes-all dynamics limited, and COVID-19 does not lead to deglobalisation.

- **demographics**, if labour supply/labour force, and the ratio of dissavers to savers increase, and do so despite COVID-19.

- **distribution**, if it becomes more equal and savings of the affluent less excessive; and COVID-19 stimulates redistribution.
The factors contributing to $r^*$

Figure: Changes in the equilibrium real interest rate as a result of policy, demographic and technological shifts

- The challenge of raising $r^*$ is well illustrated by some of the estimates in the literature (eg Rachel and Summers, 2019)
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