

# How to close the productivity gap between the EU and the US

*by Röger, Varga & in 't Veld (ECFIN)*

Comments *by*  
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\* this presentation is personal to the author and does not necessarily reflect the views of the European Commission

# The strengths of the paper

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- The paper calibrates a semi-endogeneous GE growth model a la Römer/Jones
- To explain the EU-US gap in productivity levels and R&D intensity
  - also jobs & skill premium
- The paper's main findings:
  - For the R&D intensity gap: product-market-competition (mark-ups) and entry barriers in the intermediary goods sector are most important
  - For labour productivity (levels): product-market-competition in the final goods sector are most important
  - A neglected result: the importance of reducing the risk premia (financial constraints) for both R&D intensity and labour productivity

# The model set-up

- The model is a variant of Rømer model (variety model)
  - Cf alternative AK and Schumpeterian endogenous growth models
  - Jones variant of Rømer, avoiding scale effects;
  - Skill decomposition (low, medium, high)
- The submodel for innovation/R&D
  - R&D sector: with an exogenous own and foreign stock of knowledge, new knowledge added by employing more skilled labour
    - Spillovers from foreign stock of knowledge
    - Results (patents) are bought by non-liquidity constrained households (medium and high-skilled)
    - MAKE: R&D expenditures (wage bill for skilled workers)
  - Intermediary sector (manufacturing): buys patents from the households, pay a fixed entry costs and sell new processes (monop.comp) to final goods sector
    - No MAKE,
    - only adoption of existing technologies: Disembodied BUY
    - Expenditures for acquiring patents from households
      - Technically not in BERD according to OECD Frascati manual
  - Final sector (services): buy the processes from the intermediary goods sector to produce and sell final products (services)
    - No MAKE, no Disembodied BUY
    - Only adopt process innovations from intermediary sector through Embodied BUY
      - Technically not in BERD according to OECD Frascati manual

# The model set-up

- The submodel for R&D is more about the use/diffusion of innovations:
  - Effects of R&D more important than R&D gap:
    - on TFP/labour productivity (growth)
- The submodel for R&D is not very realistic

- Final goods sectors = services; Intermediary goods sectors = manufacturing

Versus

- Manufacturing final goods producers
- Intermediary service providers, some of which provide innovations for manufacturing (software companies, financial services, engineering..)

- process innovations, horizontal differentiation (variety), split between MAKE, DEMBbuy, EMBbuy, innovations only produced in specialized R&D sector, diffusion through patent trading, households holding patents...

Versus

# Some empirics...

- 11% of Belgian EPO patents are applied for by individual person (79% firms, 10% HEI/PROs)
- Only 11% of EPO patents are licensed (PATVAL)
- Firms which are innovation-active, do own R&D (64%) 59% buy equipment, 19% buy licenses (Flemish CISIV).
- Only 9% of innovation-active companies apply for a patent (EU-CISIV)
- 71% of Flemish Cies in “Immaterial Services” sector are innovation-active, 55% have permanent R&D activities
- 45% of Flemish Cies in “Material Services” sector are innovation-active, 36% have occasional R&D activities;
- 40% of innovations are aimed at improving quality of products/services (EU-CISIV)
- 17% of innovations are aimed at reducing labour costs, 7% reducing material/energy (EU-CISIV)
- 73% of Flemish innovation-active firms are product-innovators, 67% process-innovations



An unrealistic  
innovation/R&D model set-  
up



Does it matter for the results?

# Effects of product-market competition/mark-ups

- The Schumpeterian growth models à la Aghion et al have made clear that the link between competition and innovation is complex
  - Countervailing forces playing differently depending on the technology gap
    - Competition is more likely to be stimulating innovation closer to frontier (neck-and-neck) competition

*Does this model allow for non-linearities in the role of competition/mark-ups?*

- Model results on competition are driven by model assumptions
  - Final product market competition (services) has effect on productivity levels, but no or little effect on R&D gap
  - Intermediary product market competition (manufacturing) has effect on R&D gap but little on productivity levels
    - By model assumption:
      - final R&D sector not R&D active, nor DEMB buying of technology ; intermediary sector buys DEMB;
      - Entry process in intermediary goods sector, not in final goods sector

*Sensitive policy implications on importance of further integration of services sector in EU on innovation, growth and jobs*

# Financial constraints

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- Calibration results indicate importance of FC for R&D gap, productivity gap
- Survey evidence confirm importance of FC for innovation, esp for young, small innovators

BUT in this model

- FC not in medium/high-skilled households which buy/sell licenses;

*How does FC affect R&D, productivity?*

*What drives the strong effects?*



# Sectoral specialisation

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- A major issue in the literature on explaining the US-EU R&D deficit is the sectoral mix
  - EU's specialisation in medium tech sectors
- This model has no sectoral decomposition, and can therefore not contribute to this discussion
- Nevertheless, size of the R&D sector, intermediary sector, final sector should matter, but not in reported calibration
  - EU's different specialisation in (High-Tech) services

# Policy Instruments for innovation/R&D

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- The model considers tax credits & allowances for households; for firms; similar rates for capital investments and license purchases
- What about the more common R&D subsidies?
- What about patent costs? Patent effectiveness?
  - In EU significantly higher (up to 4 times) than in US (see van Pottelsberghe)

# Globalisation scenario

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- Despite international spillovers in stock of knowledge; trade of finished goods (services)
- Closed economy model for technology
  - Market for researchers/high skills is national (but see Freeman)
  - Market for disembodied technology buy is national; no Technology Balance of Payment
  - Market for embodied technology buy is national

# Miscellaneous

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- Can model be used to calibrate differences between Member States ?
  - See openness/internal market assumptions of the model
- Why is there a big part of the employment gap left unexplained?

# To summarize

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- This discussant loves the results
  - Importance of product market competition and financial constraints to explain US-EU R&D and productivity gap
- But this discussant does not love the model
- Can you reassure her that the results will be robust to alternative specifications that match closer the reality of R&D/innovation?