Discussion of
“Endogenous TFP, Business Cycle Persistence and the Productivity Slowdown”
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What the authors do

- Consider a model where TFP does not fluctuate around an exponential trend but has an endogenous component which might be responsible for protracted declines in TFP

- Endogeneity of TFP due to procyclicality of R&D and adoption of technologies as in Comin and Gertler (2006)

- Estimate the model proposed by Anzoategui et al. (2016) on the Euro Area data for periods 1999Q1-2007Q4

- Provide a shock decomposition for 1999Q1-2017Q2

- Evaluate how the financial crisis (modeled via liquidity demand shock) affected the endogenous TFP and in turn other macroeconomic variables
Secular decline in labor productivity

Source: Schmöller and Spitzer (2018)
What’s responsible for the drop in productivity trend

• Hall (2014) documents a lasting fall in GDP trend due to lower employment, physical capital and TFP

• Secular stagnation hypothesis: savings glut / ZLB

• TANK with risk premium shock as in Kollmann et al. (2016)
  • Cozzi et al. (2017)

• Representative household with preference toward bonds as in Fisher (2015) and dual invention-adoption R&D sector as in Comin and Gertler (2006)
  • Anzötegui et al. (2016) → Schmöller and Spitzer (2018)
Key mechanism in the model

- Profits of intermediate goods producers are procyclical (standard in NK / monopolistic competition models)
- Newly adopted technology is sold at price $V$ equal to PDV of profits (free-entry condition)
- Value of unadopted technology $J$ depends on the expected future values of $V$ and $J$
- If the (real) skilled wages are relatively acyclical then technology invention and adoption are procyclical (and R&D expenditures are procyclical)
- Crucial assumption: labor markets for R&D (skilled) and production (unskilled) are separated
Big picture thoughts: R&D and growth

• Semi-endogenous growth
  • Decreasing returns to scale in R&D employment
  • Population growth rate determines long-run growth rate
  • Decline in TFP long-lasting but transitory (think Solow)

• Fully endogenous growth
  • Constant returns to scale in R&D employment
  • Employment share in R&D key for long-run growth rate
  • Decline in TFP permanent (think AK)

• See Cozzi (2017) for a hybrid model allowing for both regimes (think Jones and Manuelli (1990))
  • The lower the population growth is, the more important the fully endogenous “channel” becomes
  • Hard to discriminate between the two in the data
  • Crucial for designing growth-enhancing policies
Big picture thoughts: GPT and technology adoption

• In the data, technology adoption rate pertains to General Purpose Technologies
  • Synthetic fabrics, computerization, etc.

• GPT adoption rates became higher over time

• We don’t see it in faster TFP growth
  • Anzoategui et al. (2016): TFP trend in decline since 2000
  • Gordon (2015): Are GPT’s becoming less radical over time?

• In the model, an invented technology ends up used by a single intermediate goods producer
  • Concerns with mapping between data and model objects
  • Business R&D as a measure of “pure” R&D, adoption, or both?
  • Unclear on how to treat R&D activities performed by universities, govt. agencies, etc.
Technology adoption in the US over the last century

Source: https://hbr.org/2013/11/the-pace-of-technology-adoption-is-speeding-up
Technology adoption in the US over the last century

Source: https://marketrealist.com/2015/12/adoption-rates-dizzying-heights
Speed of diffusion: cycle vs long-term view

Source: Anzoategui et al. (2016)
Main remarks

• Schmöller and Spitzer (2018) re-estimate the model by Anzoategui et al. (2016) on EU data

• Several shortcomings relative to the “parent” paper
  • Shorter estimation period (start in 1999Q1 vs 1984Q1) – cannot reliably estimate the pre-2007 TFP trend
  • No external validation of the technology adoption margin
  • No comparison of spread between model and data
  • ZLB episode is not modeled explicitly (Kortela (2016) and Wu and Xia (2017) shadow interest rates used instead)

• Authors offer limited contribution beyond what Anzoategui et al. (2016) already did
Spreads on lending to non-financial corporations

Source: Gilchrist and Mojon (2018)
Quantitative importance of ZLB episodes

Source: Anzoategui et al. (2016)
Further remarks

• In the model, the relative price of investment \( p^k \) follows an exogenous AR(1) process in logs

• For the purpose of estimation both consumption and investment series are deflated by GDP deflator

• Value of \( \nu_s \) is not reported
  • Is it unimportant for the average growth rate?

• Liquidity demand shock (cf. variance decomposition) significantly more important than in Anzoategui et al. (2016) and Cozzi et al. (2017)
  • Explanation for this difference (US vs EA)?
  • How can we alleviate its effects via policy?

• Robustness checks for different calibrated values of parameters governing R&D processes
Decomposition of R&D investment growth rates

Can I get a graph like this?

Source: Cozzi et al. (2017)
Importance of business dynamics for TFP

- **Siemer (2014)** (US firm-level data)
  - Financial constraints during GFC lowered firm entry

- **Canton (2016)** (EU country-level data)
  - Increase in the firms birth rate increases TFP growth

- **Messer et al. (2016)** (US regional data)
  - Low firm entry rates reduce labor productivity growth

- **Schmitz (2016)** (Spanish firm-level data)
  - Smaller, more innovative firms hit harder by GFC

- **Bielecki (2017)** (US aggregate data)
  - Microfounded, estimated model of business dynamics with heterogeneous firms and endogenous TFP
Figure 2. Aggregated entry, exit and net entry rates (in % - 9 EU countries\textsuperscript{a} - 1997-2003\textsuperscript{b})

Source: Cincera and Galgau (2005)
Business dynamics in the EU

Source: Canton (2016)
Business dynamics in the US

Source: Decker et al. (2016)
R&D and business dynamics in the US

Establishments

Expansions

Contractions

Net entry

R&D expenditures

Hours worked

Source: Bielecki (2017)
Disappearing link between output gap and inflation

- **Semmler and Gross (2017)**
  - Phillips curve is steeper in booms than in recessions
- **Bullard (2018)**
  - Phillips curve in G7 became flat over time
  - Success of modern monetary policy?
Conclusions

• Very important and timely topic

• Paper competes with a rapidly growing literature

• Papers needs to differentiate itself from Anzoategui et al. (2016) and other papers in the field
  • Contribute further to the output gap-inflation puzzle
  • Engage with “missing firms” literature and explore business dynamics in the EU / EA
  • Provide policy discussion / implications
Thank you!
References


