



Discussion: Long-Term Growth in Advanced Economies

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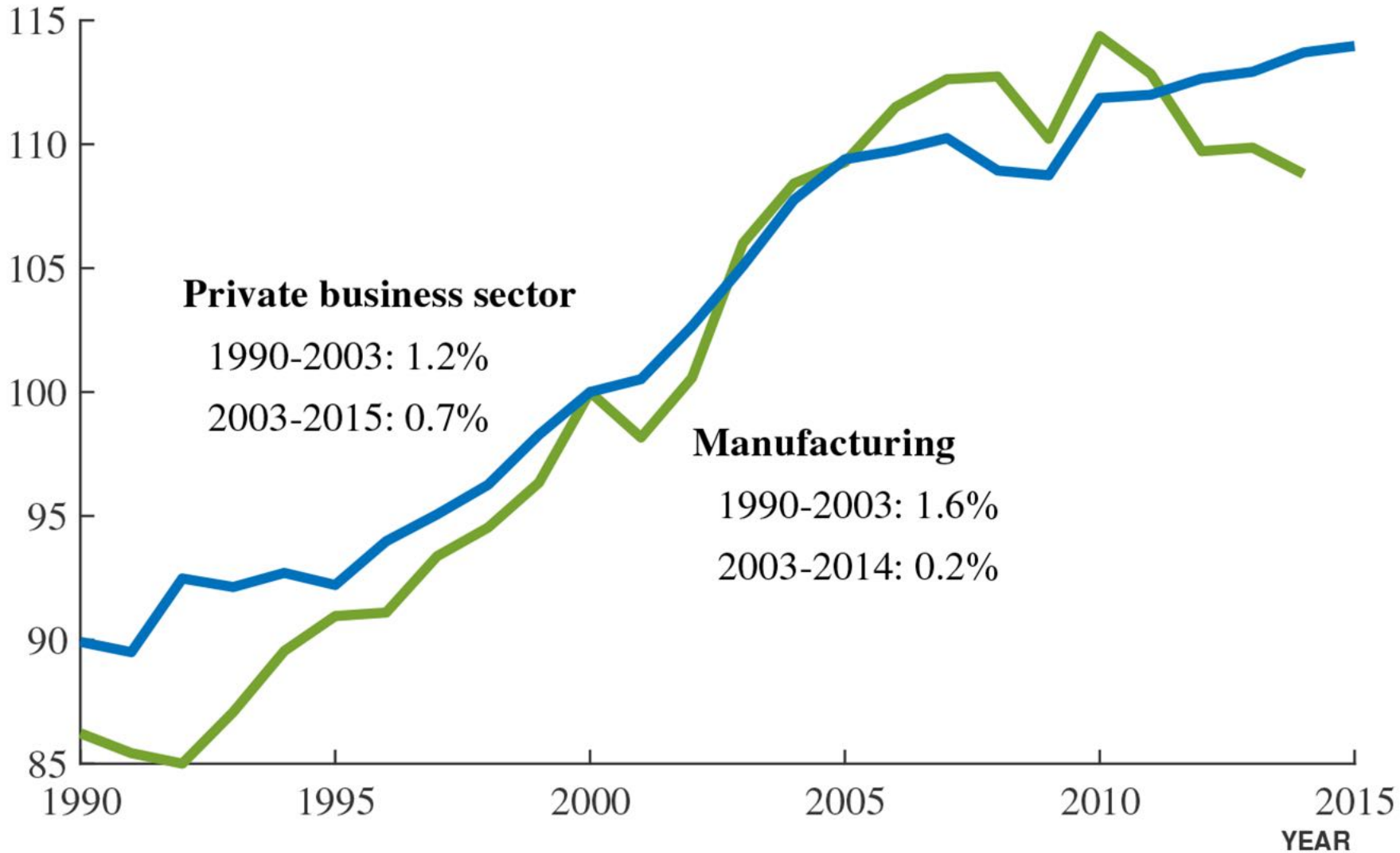
ECB Sintra Forum – June 28, 2017

Overview

- Basic facts
- Growth theory
- Evidence
- Prospects for the future

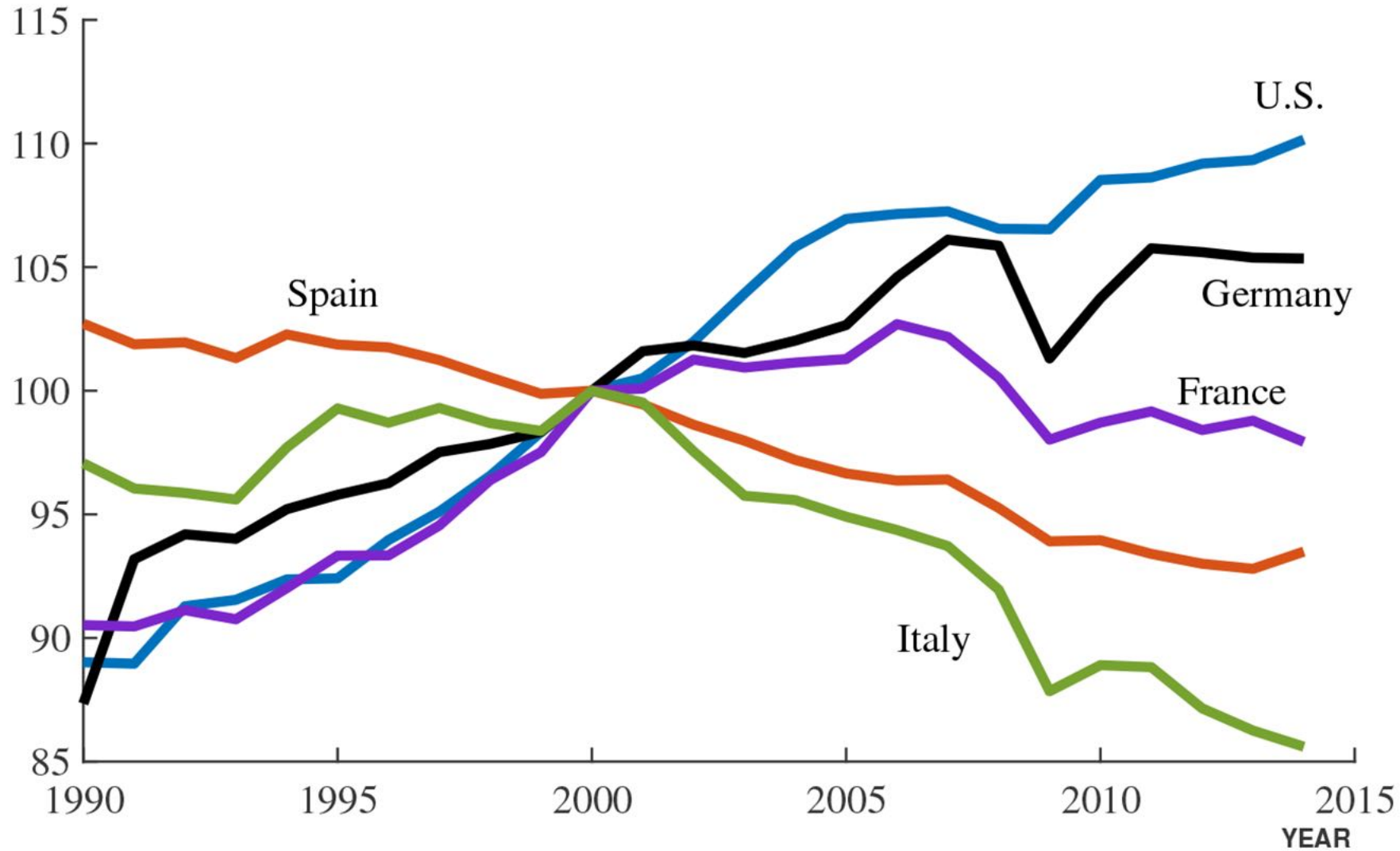
U.S. Total Factor Productivity

TOTAL FACTOR PRODUCTIVITY (2000=100)



TFP in Select Advanced Economies

TOTAL FACTOR PRODUCTIVITY (2000=100)



Growth Theory: Two Determinants of TFP

- Ideas

- Are ideas getting harder to find?
- Are we searching less intensely?

- Misallocation

- Italy/Spain: Has misallocation gotten worse?
- US/Germany: Has misallocation changed over time?



Evidence on Ideas

Are Ideas Getting Harder to Find?

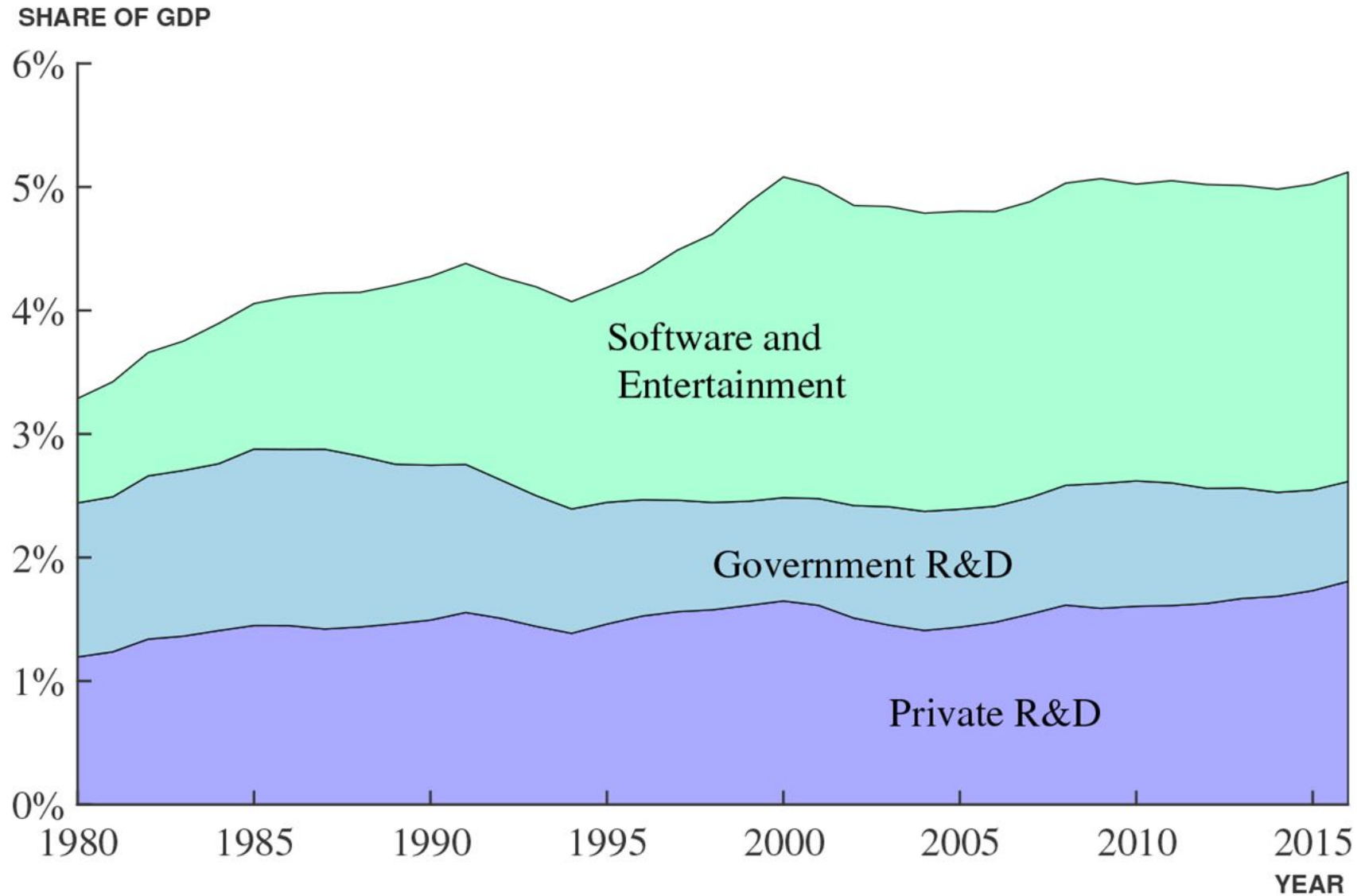
- Stylized fact:

Exponential growth is getting harder to achieve.

$$\begin{array}{ccccc} \text{Economic} & & & & \text{Number of} \\ \text{growth} & = & \text{Idea TFP} & \times & \text{researchers} \\ \text{e.g. 2\% or 5\%} & & \downarrow \text{(falling)} & & \uparrow \text{(rising)} \end{array}$$

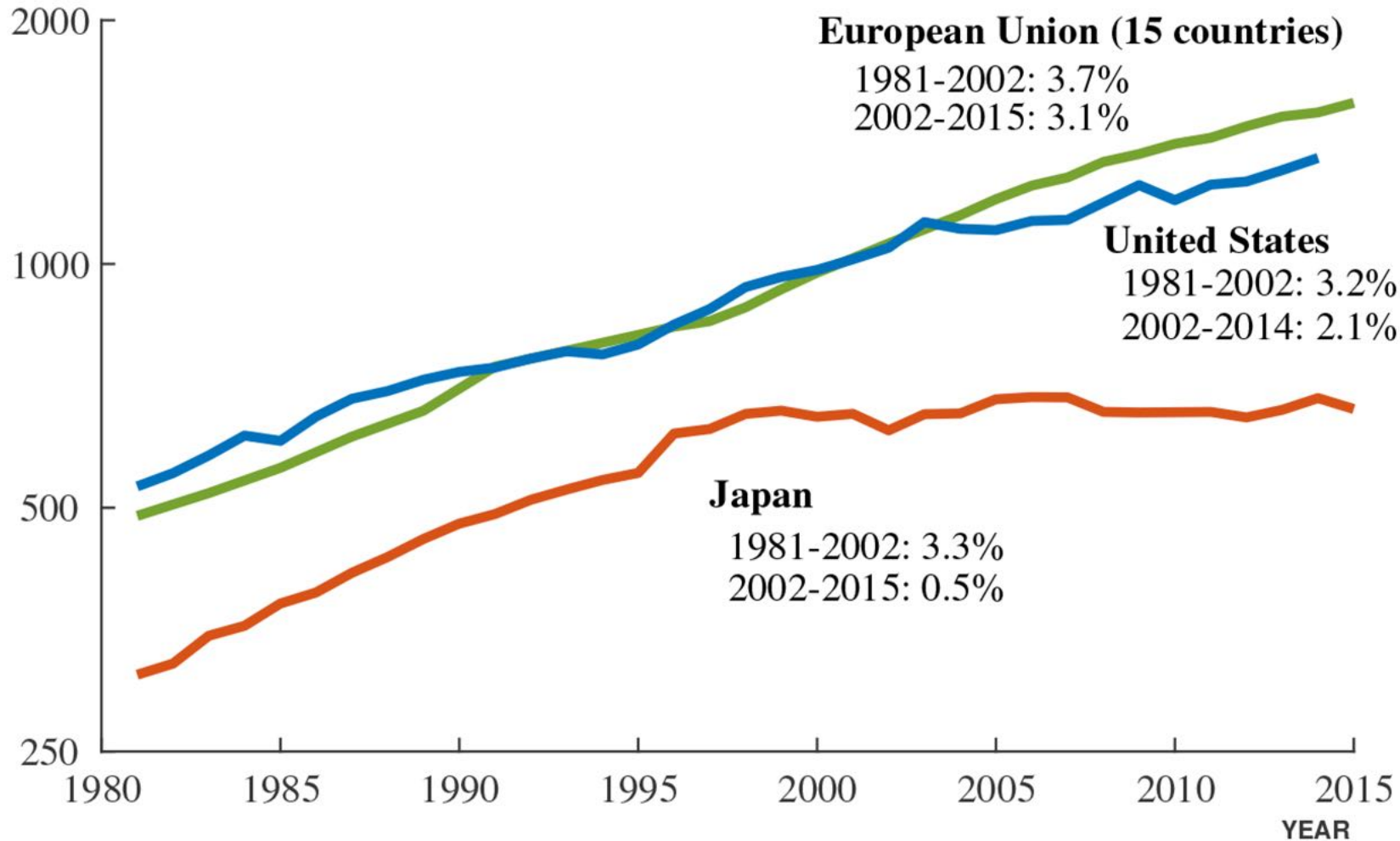
- Aggregate evidence: well-known (Jones 1995)
- Micro evidence: Bloom, Jones, Van Reenen, Webb (2017)
 - Moore's law, Agricultural productivity, Medical innovations, Firm-level data from Compustat
 - ~ 75 times harder to double chip density than in 1970
- But not much evidence that this has **changed** over time

U.S. Intellectual Property Investment



Research Employment in Select Economies

RESEARCH EMPLOYMENT (1000S, LOG SCALE)

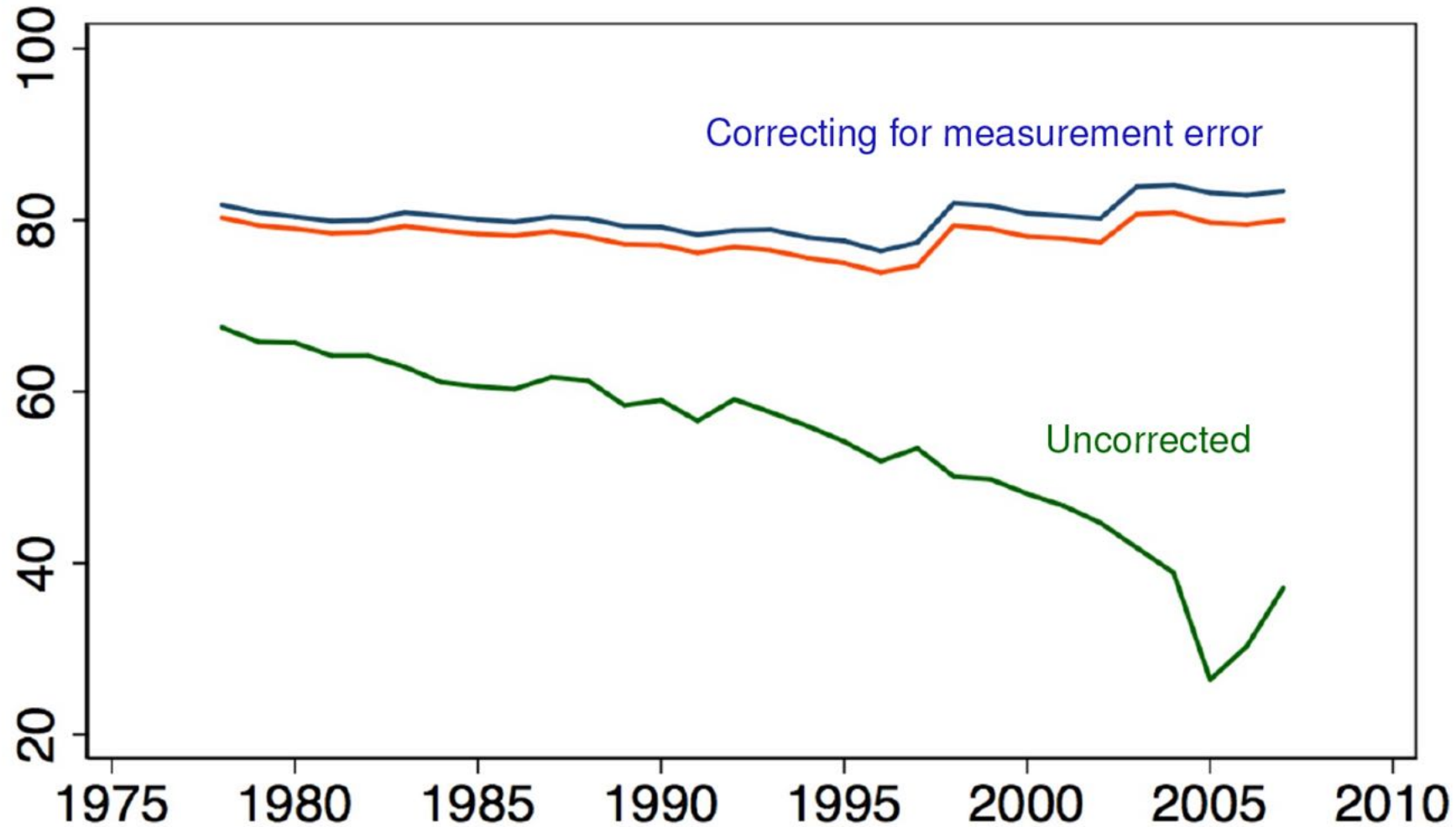




Evidence on Misallocation

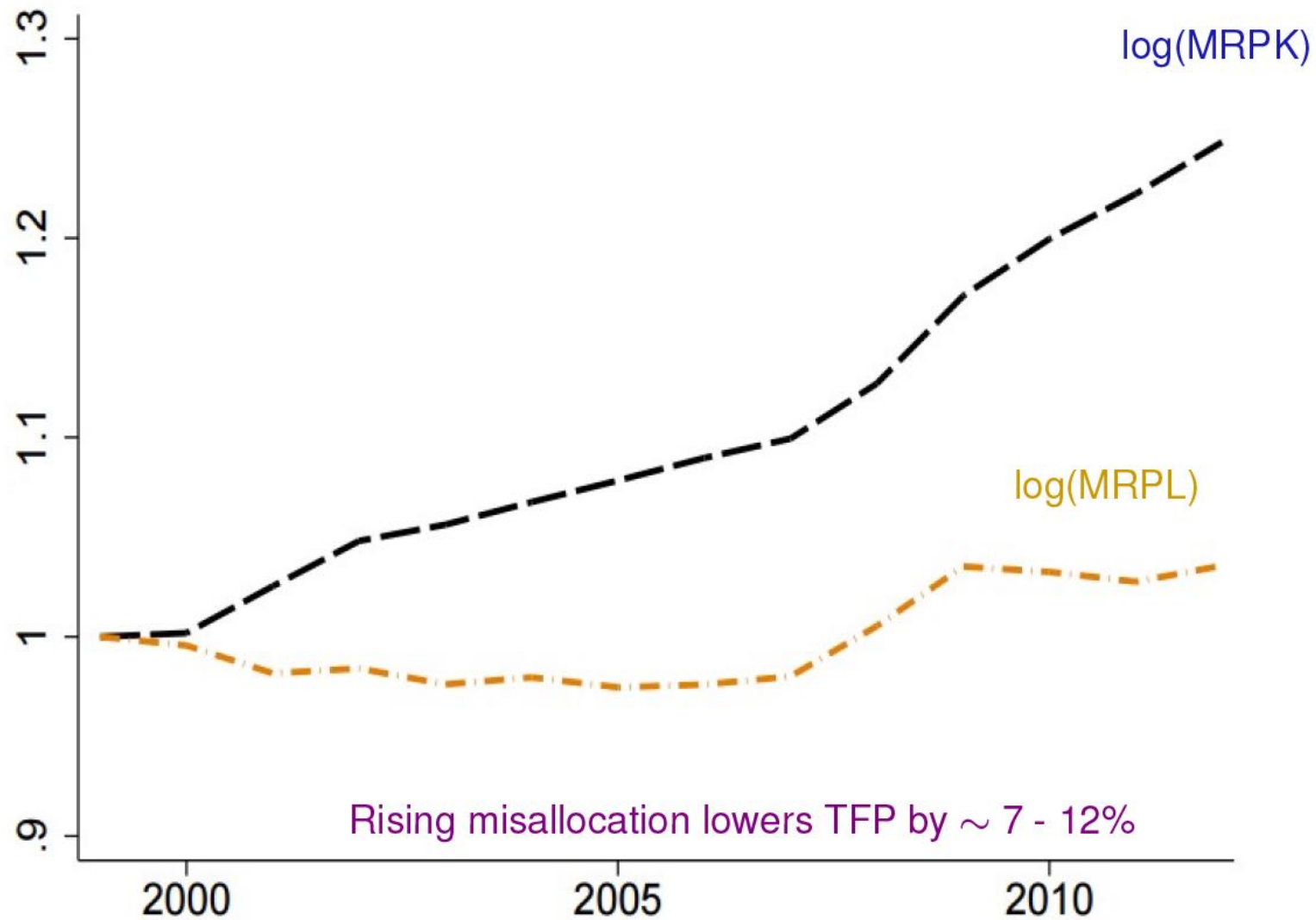
U.S. Allocative Efficiency (Bils, Klenow, and Ruane 2017)

Percent of Full Efficiency



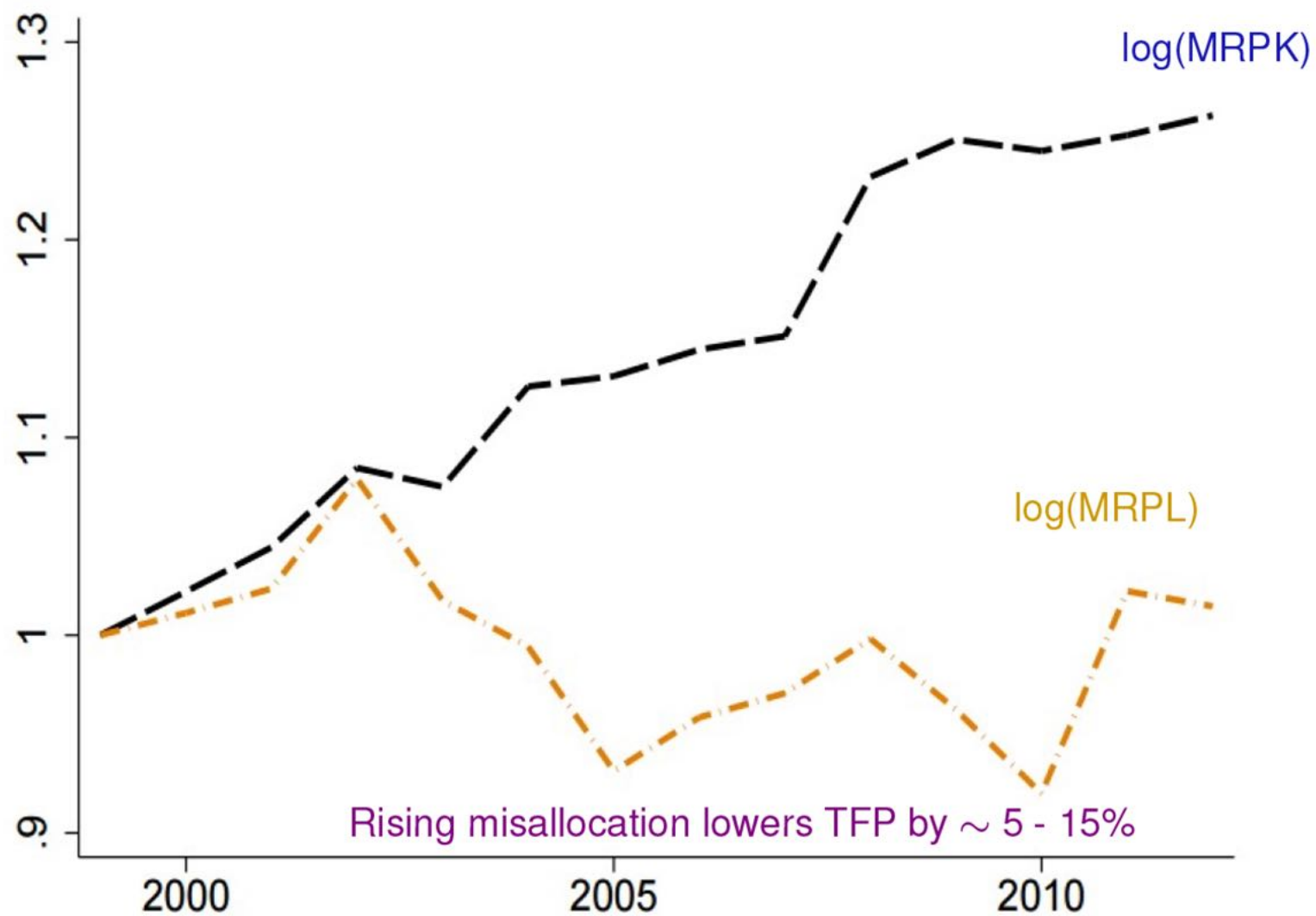
Misallocation in Spain (Gopinath et al 2017)

Standard deviation across firms



Misallocation in Italy (Gopinath et al 2017)

Standard deviation across firms



Additional Evidence on Misallocation in Europe

Borio, Kharroubi, Upper, Zampolli (2015) “Labour reallocation and productivity dynamics: financial causes, real consequences”

Calligaris, S. (2015), “Misallocation and Total Factor Productivity in Italy: Evidence from Firm-Level Data” *Labour*.

Cette, Fernald, and Mojon (2016) “The Pre-Great Recession Slowdown in Productivity” *European Economic Review*.

Dias, Marques, Richmond. “Misallocation and Productivity in the Lead Up to the Eurozone Crisis” *Journal of Macroeconomics*, forthcoming.

Garcia-Santana, Moral-Benito, Pijoan-Mas, and Ramos. “Growing Like Spain: 1995-2007” 2016.

Pelligrino and Zingales. “Diagnosing the Italian Disease” 2014.



Prospects for the future?

Comments/Questions on Ideas and Frontier Growth

- Has research input growth slowed? Why?
 - Causality?
 - Global inputs and technology diffusion
 - How to “add up” research across countries?
- China and India are each as large as the U.S./Europe/Japan
 - How many future Edisons and Einsteins?
 - How many (global) ideas will they contribute?
- Will automation increase growth rates in coming years?

Comments/Questions on Misallocation

- Many estimates for manufacturing only (e.g. BKR and GKKV)
 - omit misallocation from too much construction
- Is it really capital and not labor?
 - What economic forces underlie rising misallocation?
 - What about misallocation of intermediate inputs? (3x capital)
- Bils, Klenow, Ruane mismeasurement correction — what happens if it is applied elsewhere?
- Misallocation should be a long-run level effect, suggesting growth should resume
- What policies can reverse misallocation? Political economy?