



THE LABOR PRODUCTIVITY PUZZLE

ELLEN R. MCGRATTAN AND EDWARD C. PRESCOTT

MARCH 2012

WORKING PAPER 694, www.minneapolisfed.org/research



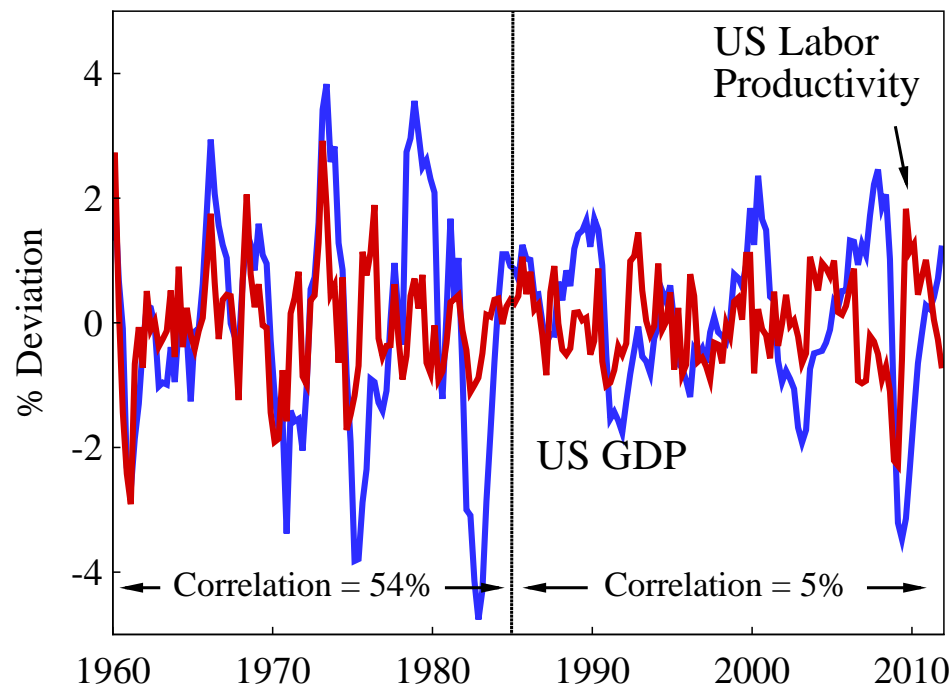
THE LABOR PRODUCTIVITY PUZZLE

- Pre-1985, correlation between GDP and GDP/hour high
- Post-1985, correlation has been near zero



THE LABOR PRODUCTIVITY PUZZLE

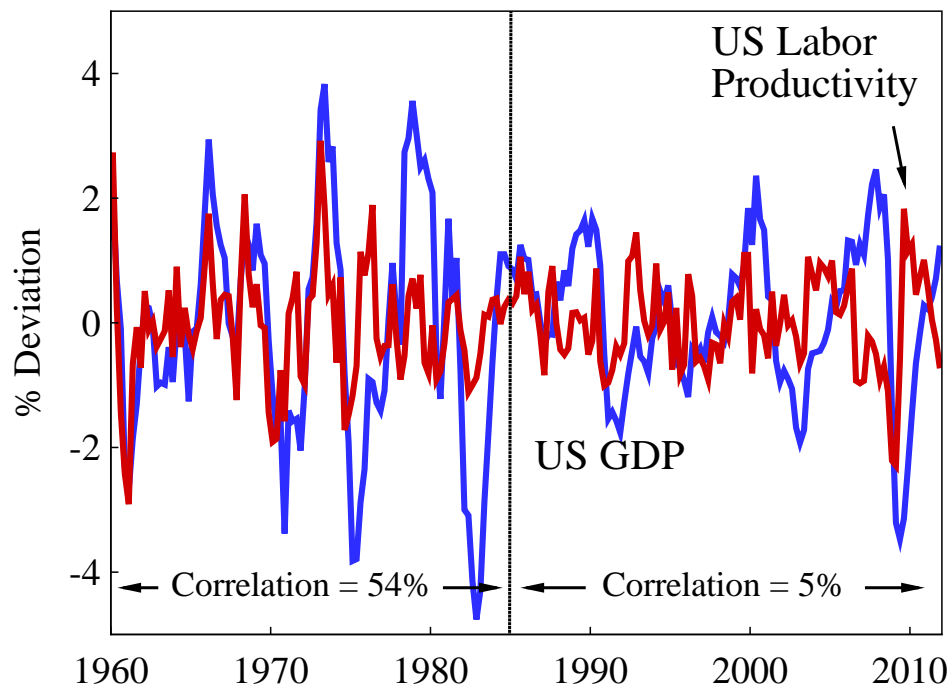
- Pre-1985, correlation between GDP and GDP/hour high
- Post-1985, correlation has been near zero





THE LABOR PRODUCTIVITY PUZZLE

- Pre-1985, correlation between GDP and GDP/hour high
- Post-1985, correlation has been near zero

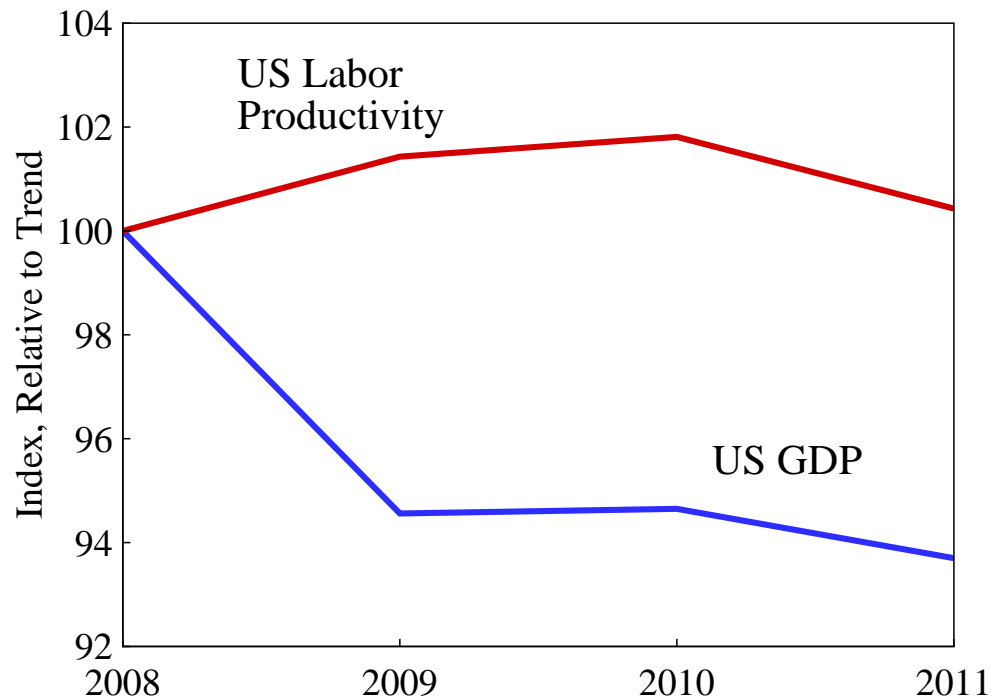


*Viewed as puzzle
for RBC theory*



RECENT RECESSION OF 2008–2009

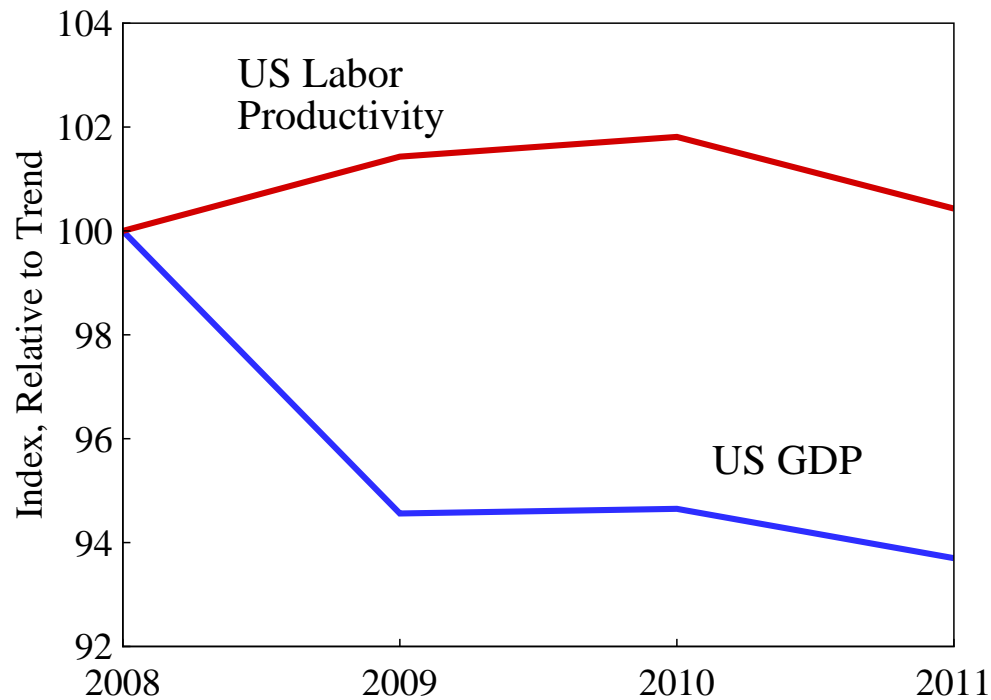
- GDP fell below trend in 2008, stayed low
- Productivity rose above trend, stayed high





RECENT RECESSION OF 2008–2009

- GDP fell below trend in 2008, stayed low
- Productivity rose above trend, stayed high



*Viewed as puzzle
for RBC theory*



PUZZLE FOR RBC THEORY

- If TFP shocks driving aggregate fluctuations
 - Productivity is low during recessions
 - Output is even lower
- Because both TFP and factor inputs fall



THIS PAPER

- Applies McGrattan and Prescott's RBC theory with
 - Intangible investment that is expensed
 - Nonneutral technology change w.r.t. its production
- Finds recent events not puzzling in light of theory



THE THEORY

- Originally developed to reconcile puzzling 1990's boom
 - Economic theories predicted a depressed economy
 - But US economy — especially hours — boomed
- Recent events are like 1990s period in reverse
 - Hours are depressed
 - Productivity is high



WHY NO PUZZLE?

- GDP excludes most intangible investment
 - Corporations expense R&D, advertising from profits
 - Business owners expense time building their businesses
- If intangible investment falls by more than GDP
 - True output falls by more than GDP
 - True productivity falls by more than GDP/hour

⇒ Observations not puzzling



RBC THEORY CIRCA 2012



MODEL

- Household/Business owners solve

$$\max E \sum_{t=0}^{\infty} \beta^t [\log c_t + \psi \log(1 - h_t)] N_t$$

subject to

$$c_t + x_{Tt} + q_t x_{It} = r_{Tt} k_{Tt} + r_{It} k_{It} + w_t h_t \\ - \text{taxes}_t + \text{transfers}_t + \text{nonbusiness}_t$$

$$k_{T,t+1} = (1 - \delta_T) k_{Tt} + x_{Tt}$$

$$k_{I,t+1} = (1 - \delta_I) k_{It} + x_{It}$$

where subscript T/I denotes tangible/intangible



TECHNOLOGY

- Production of final goods and services

$$y_b = A^1 F(k_T^1, k_I, h^1)$$

- Production of new intangible capital

$$x_I = A^2 G(k_T^2, k_I, h^2)$$

Total intangible stock used in two activities



TWO TYPES OF INTANGIBLE INVESTMENT

- Expensed: capital owners finance χ with reduced profits
- Sweat: worker owners finance $1 - \chi$ with reduced wages

Choice of χ has tax implications