

# Osnove privrednog rasta

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# Fenomen privrednog rasta

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- Dinamika BDP-a u stalnim cijenama
- Teorija rasta: kako je moguće ostvariti održivi privredni rast tokom dugog vremenskog perioda
- Faktori proizvodnje:
  - Rad
  - Fizički kapital (oprema)
  - Zemlja i ostali proizvodni faktori
- Rast produktivnosti rada i kapitala – tehnički progres (akumulacija znanja i usavršavanje tehnika)

## Gross domestic product, annual real growth rates (based on Eurostat data)

GEO/TIME	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	average
Belgium	1.10%	1.71%	1.04%	3.57%	2.32%	2.55%	3.68%	0.45%	-2.02%	2.86%	1.69%	0.74%	0.46%	1.58%	2.03%	1.48%	1.90%	1.49%	1.40%	1.58%
Bulgaria	3.82%	5.95%	5.15%	6.44%	7.15%	6.80%	6.56%	6.09%	-3.42%	0.57%	2.35%	0.36%	0.32%	1.89%	3.99%	3.81%	3.51%	3.08%	3.37%	3.57%
Czechia	3.04%	1.57%	3.58%	4.81%	6.60%	6.77%	5.57%	2.69%	-4.66%	2.43%	1.76%	-0.78%	-0.05%	2.26%	5.39%	2.54%	5.17%	3.18%	2.34%	2.85%
Denmark	0.82%	0.47%	0.39%	2.67%	2.34%	3.91%	0.91%	-0.51%	-4.91%	1.87%	1.34%	0.23%	0.93%	1.62%	2.34%	3.25%	2.82%	2.18%	2.85%	1.34%
Germany (until 1990 fo	1.69%	-0.20%	-0.71%	1.18%	0.73%	3.81%	2.98%	0.96%	-5.70%	4.18%	3.92%	0.43%	0.43%	2.22%	1.49%	2.23%	2.60%	1.27%	0.56%	1.27%
Estonia	5.98%	6.80%	7.57%	6.77%	9.49%	9.72%	7.57%	-5.09%	-14.43%	2.69%	7.44%	3.12%	1.35%	2.99%	1.84%	3.19%	5.50%	4.36%	5.00%	3.78%
Ireland	5.31%	5.90%	3.00%	6.78%	5.74%	4.99%	5.32%	-4.44%	-5.07%	1.77%	0.60%	0.13%	1.23%	8.64%	25.18%	1.99%	9.13%	8.52%	5.57%	4.75%
Greece	4.13%	3.92%	5.79%	5.06%	0.60%	5.65%	3.27%	-0.34%	-4.30%	-5.48%	-9.13%	-7.30%	-3.24%	0.74%	-0.44%	-0.19%	1.51%	1.93%	1.87%	0.21%
Spain	3.93%	2.73%	2.98%	3.12%	3.65%	4.10%	3.60%	0.89%	-3.76%	0.16%	-0.81%	-2.96%	-1.44%	1.38%	3.84%	3.03%	2.97%	2.43%	1.95%	1.67%
France	1.98%	1.14%	0.82%	2.83%	1.66%	2.45%	2.42%	0.25%	-2.87%	1.95%	2.19%	0.31%	0.58%	0.96%	1.11%	1.10%	2.29%	1.79%	1.51%	1.29%
Croatia	3.35%	5.12%	5.64%	4.16%	4.31%	5.00%	5.27%	1.76%	-7.36%	-1.50%	-0.31%	-2.24%	-0.55%	-0.10%	2.44%	3.48%	3.14%	2.69%	2.94%	1.96%
Italy	1.95%	0.25%	0.14%	1.42%	0.82%	1.79%	1.49%	-0.96%	-5.28%	1.71%	0.71%	-2.98%	-1.84%	0.00%	0.78%	1.29%	1.67%	0.94%	0.34%	0.22%
Cyprus	3.95%	3.72%	2.62%	5.03%	4.85%	4.71%	5.10%	3.65%	-2.02%	2.01%	0.40%	-3.45%	-6.55%	-1.83%	3.22%	6.44%	5.15%	5.24%	3.07%	2.39%
Latvia	6.32%	7.08%	8.43%	8.50%	10.72%	11.99%	10.03%	-3.33%	-14.26%	-4.41%	6.47%	4.25%	2.31%	1.07%	4.01%	2.37%	3.25%	4.02%	2.05%	3.73%
Lithuania	6.53%	6.75%	10.57%	6.57%	7.73%	7.41%	11.11%	2.81%	-14.84%	1.65%	6.04%	3.84%	3.55%	3.54%	2.02%	2.52%	4.28%	3.94%	4.34%	4.22%
Luxembourg	2.53%	3.82%	1.63%	3.61%	3.17%	5.18%	8.35%	-1.28%	-4.36%	4.86%	2.54%	-0.35%	3.65%	4.30%	4.31%	4.57%	1.80%	3.11%	2.30%	2.83%
Hungary	4.07%	4.74%	4.08%	4.82%	4.24%	4.03%	0.24%	1.06%	-6.70%	1.12%	1.94%	-1.38%	1.86%	4.23%	3.82%	2.14%	4.32%	5.41%	4.58%	2.56%
Malta	-1.18%	2.57%	4.07%	0.14%	3.38%	2.51%	4.78%	3.83%	-1.13%	5.55%	0.47%	4.12%	5.47%	7.63%	9.61%	3.89%	8.01%	5.18%	4.92%	3.88%
Netherlands	2.33%	0.22%	0.16%	1.98%	2.05%	3.46%	3.77%	2.17%	-3.67%	1.34%	1.55%	-1.03%	-0.13%	1.42%	1.96%	2.19%	2.91%	2.36%	1.68%	1.41%
Austria	1.27%	1.65%	0.94%	2.74%	2.24%	3.45%	3.73%	1.46%	-3.76%	1.84%	2.92%	0.68%	0.03%	0.66%	1.01%	1.99%	2.40%	2.58%	1.42%	1.54%
Poland	1.26%	2.04%	3.50%	4.98%	3.51%	6.13%	7.06%	4.20%	2.83%	3.74%	4.76%	1.32%	1.13%	3.38%	4.24%	3.14%	4.83%	5.35%	4.54%	3.79%
Portugal	1.94%	0.77%	-0.93%	1.79%	0.78%	1.63%	2.51%	0.32%	-3.12%	1.74%	-1.70%	-4.06%	-0.92%	0.79%	1.79%	2.02%	3.51%	2.85%	2.24%	0.73%
Romania	5.22%	5.70%	2.34%	10.43%	4.67%	8.03%	7.23%	9.31%	-5.52%	-3.90%	2.01%	2.08%	3.51%	3.41%	3.87%	4.80%	7.11%	4.44%	4.08%	4.15%
Slovenia	3.22%	3.51%	2.96%	4.36%	3.80%	5.75%	6.98%	3.51%	-7.55%	1.34%	0.86%	-2.64%	-1.03%	2.77%	2.21%	3.19%	4.79%	4.38%	3.18%	2.40%
Slovakia	3.25%	4.51%	5.50%	5.28%	6.62%	8.49%	10.83%	5.57%	-5.46%	5.87%	2.85%	1.90%	0.67%	2.64%	4.81%	2.13%	3.04%	3.77%	2.32%	3.93%
Finland	2.61%	1.71%	2.00%	3.99%	2.78%	4.03%	5.30%	0.78%	-8.07%	3.19%	2.55%	-1.40%	-0.90%	-0.37%	0.54%	2.81%	3.27%	1.52%	1.15%	1.45%
Sweden	1.45%	2.20%	2.31%	4.34%	2.86%	4.66%	3.44%	-0.45%	-4.34%	5.95%	3.20%	-0.59%	1.19%	2.66%	4.49%	2.07%	2.57%	1.95%	1.26%	2.17%
United Kingdom	2.97%	2.32%	3.29%	2.37%	3.18%	2.79%	2.43%	-0.28%	-4.25%	1.95%	1.54%	1.48%	2.14%	2.61%	2.36%	1.92%	1.89%	-0.54%	-2.50%	1.46%
Iceland	3.90%	0.68%	2.27%	8.04%	6.33%	5.25%	9.37%	1.99%	-6.78%	-3.44%	1.88%	1.30%	4.13%	2.08%	4.75%	6.63%	4.52%	3.86%	1.94%	3.09%
Norway	2.07%	1.45%	0.91%	3.97%	2.63%	2.40%	2.99%	0.48%	-1.73%	0.70%	0.98%	2.70%	1.03%	1.97%	1.97%	1.07%	2.32%	1.29%	-4.37%	1.31%
Switzerland	1.31%	0.16%	0.04%	2.78%	3.12%	3.99%	4.11%	2.15%	-2.22%	3.00%	1.69%	1.01%	1.85%	2.45%	1.33%	1.72%	1.80%	2.75%	0.93%	1.79%
Montenegro							6.81%	7.23%	-5.79%	2.73%	3.23%	-2.72%	3.55%	1.78%	3.39%	2.95%	4.72%	5.08%	4.06%	2.85%
North Macedonia	-3.07%	1.49%	2.22%	4.67%	4.73%	5.14%	6.47%	5.47%	-0.36%	3.36%	2.34%	-0.46%	2.92%	3.63%	3.86%	2.85%	1.08%	2.72%		2.73%
Albania	8.29%	4.54%	5.53%	5.51%	5.53%	5.90%	5.98%	7.50%	3.35%	3.71%	2.55%	1.42%	1.00%	1.77%	2.22%	3.32%	3.80%	4.07%	2.24%	4.12%
Serbia	6.88%	6.38%	4.39%	9.03%	5.53%	5.11%	6.44%	5.66%	-2.73%	0.73%	2.04%	-0.68%	2.89%	-1.59%	1.81%	3.34%	2.10%	4.50%	4.25%	3.48%
Bosnia and Herzegovina						5.42%	5.86%	5.43%	-3.00%	0.87%	0.96%	-0.82%	2.35%	1.15%	3.09%	3.15%	3.16%	3.72%	2.58%	2.42%
Kosovo (under United Nations Security Council Resolution 1244/99)									3.60%	3.31%	4.38%	2.81%	3.44%	1.22%	4.09%	4.07%	4.23%	3.82%	4.94%	3.63%

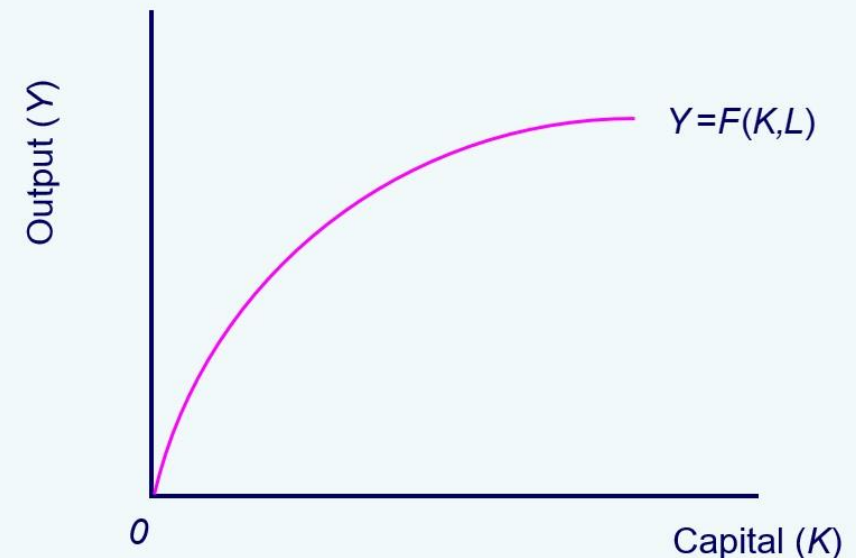
# Proizvodna funkcija

- Da li proizvodimo više zato jer koristimo veću količinu proizvodnih inputa ili su inputi postali produktivniji? Ili je riječ o kombinaciji?
- Proizvodna funkcija:
  - K - fond (stok) kapitala (fabrike, oprema, zemlja, putna infrastruktura, telekomunikaciona infrastruktura, itd)
  - L - ukupni broj radnih časova ( $L=Nh$ , N-broj radnika, h-broj radnih časova po radniku)

$$Y = f(K, L)$$

- Output će rasti sa rastom K i L

## Production Function (Extensive Form)



# Kob-Daglasova proizvodna funkcija

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$$Y = K^\alpha L^{1-\alpha}$$

- $\alpha$  – elastičnost outputa u odnosu na kapital: rast kapitala za 1% izazvaće rast outputa za vrijednost  $\alpha$
- konstantni prinosi na obim proizvodnje
- Marginalna produktivnost kapitala je opadajuća funkcija po K, rastuća po L

$$\frac{\partial Y}{\partial K} = \alpha K^{\alpha-1} L^{1-\alpha} = \alpha \left(\frac{L}{K}\right)^{1-\alpha}$$

- Marginalna produktivnost rada je rastuća funkcija po K, opadajuća po L

$$\frac{\partial Y}{\partial L} = (1 - \alpha) \left(\frac{K}{L}\right)^\alpha$$

- $\frac{Y}{L}$  - Output po radnom času (produktivnost rada)

$$\frac{Y}{L} = y = \frac{K^\alpha L^{1-\alpha}}{L} = K^\alpha L^{-\alpha} = \left(\frac{K}{L}\right)^\alpha = k^\alpha$$

# Marginalna (granična produktivnost)

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- Kako će output reagovati na malu promjenu jednog inputa dok se ostali inputi ne mijenjaju?

$$\frac{\Delta Y}{\Delta K}$$

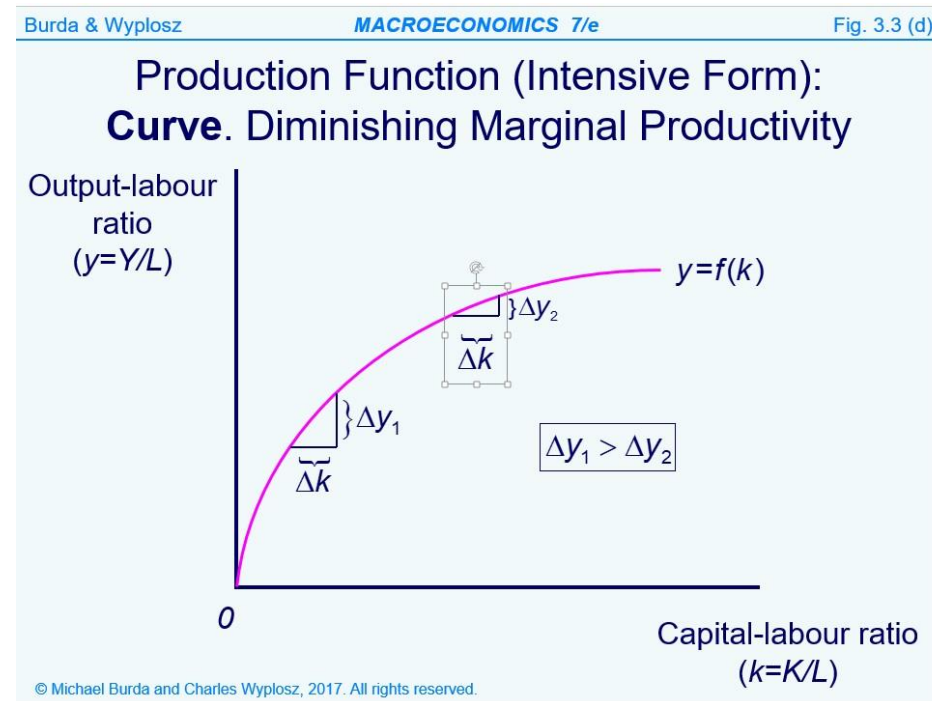
- Opadajuća marginalna produktivnost – konstantno dodavanje jedinice inputa neće imati isti efekat na output neograničeno. Ukoliko se vrijednost ostalih inputa ne promijeni, rast outputa će se vremenom smanjivati

# Pretpostavke o prinosima

- Konstantni prinosi: output se mijenja srazmjerno promjeni inputa
- Rastući prinosi: output se mijenja brže od promjene inputa
- Opadajući prinosi: output se mijenja sporije od promjene inputa
- Uz pretpostavku konstantnih prinosa, proizvodnu funkciju možemo da prikažemo kao:

$$y = f(k)$$

- $y$  – output po radnom času (prosječna produktivnost rada)
- $k$  – kapital po radnom času (kapitalna intenzivnost)



# Ocijenjena proizvodna funkcija – 30 evropskih zemalja

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Agregatna proizvodnja je funkcija stoka kapitala, zaposlenih i TFP:

$$LY_t = c + \alpha LK_t + \beta LL_{o,t} + \gamma LLL_{t,t} + \delta LR_t + \varepsilon_t$$

Sektor industrije:

$$LY_{t,i} = c + \alpha LK_t + \beta LL_{oi,t} + \gamma LLL_{ti,t} + \delta LR_t + \varepsilon_t,$$

Tehnološki intenzivne (pametne) usluge:

$$LY_{t,k} = c + \alpha LK_{k,t} + \beta LL_{k,t} + \delta LR_t + \varepsilon_t,$$

Ostale usluge:

$$LY_{to,i} = c + \alpha LK_{to} + \beta LL_{oo,t} + \gamma LLL_{to,t} + \delta LR_t + \varepsilon_t,$$



### Panel Least Square (fixed effects), Equation (7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Capital stock growth	0.053991	0.028653	1.884308	0.0603
Non-tertiary employment growth	0.467598	0.046124	10.13789	0.0000
Tertiary educated employment growth	0.142189	0.025867	5.496934	0.0000
Investment in R&D growth	0.035949	0.012949	2.776247	0.0058
C	0.016596	0.001663	9.978145	0.0000
R-squared: 0.679020				

Source: Authors' calculation.

### Simple OLS Estimation, Equation (8)

Variable	Estimate	Std. Error	t-value	Pr(> t )
Capital stock growth	0.318493	0.072350	4.4021	1.390e-05 ***
Non-tertiary employment in industry growth	0.581377	0.071598	8.1199	6.339e-15 ***
Tertiary educated employment in industry growth	0.142095	0.053091	2.6764	0.007759 **
Investment in R&D growth	0.068251	0.032215	2.1186	0.034765 *
C	0.018136	0.004358	4.1616	3.899e-05 ***
R-Squared: 0.23126				

Note: Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1.

Source: Authors' calculation.

### Panel Least Square (fixed effects), Equation (9)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Capital stock growth in knowledge-intensive services	0.085728	0.036602	2.342195	0.0198
Total employment growth	0.544899	0.070688	7.708494	0.0000
Investment in R&D growth	0.129365	0.030245	4.277212	0.0000
C	0.015683	0.003327	4.713821	0.0000
R-squared: 0.348024				

Source: Authors' calculation.

### Simple OLS Estimation, Equation (10)

Variable	Coefficient	Std. Error	t-value	Pr(> t )
Capital stock growth in other services	0.0663748	0.0231399	2.8684	0.004407 **
Non-tertiary employment in other services growth	0.6409087	0.0653128	9.8129	<2.2e-16 ***
Tertiary educated employment in other services growth	0.1478331	0.0323546	4.5692	7.071e-06 ***
Investment in R&D growth	0.0744726	0.0179690	4.1445	4.395e-05 ***
Intercept)	0.0069368	0.0021471	3.2309	0.001366 **
R-Squared: 0.32025				

Note: Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1.

Source: Authors' calculation.

# Akumulacija kapitala i privredni rast

- Da li je akumulacija kapitala beskonačan proces?
- Da li rast štednje neizostavno vodi bržem rastu? Ako je štednja po definiciji odložena potrošnja, što to ustvari znači?
- Izvori finansiranja investicija

$$I = S + (T - G) + (Z - X)$$

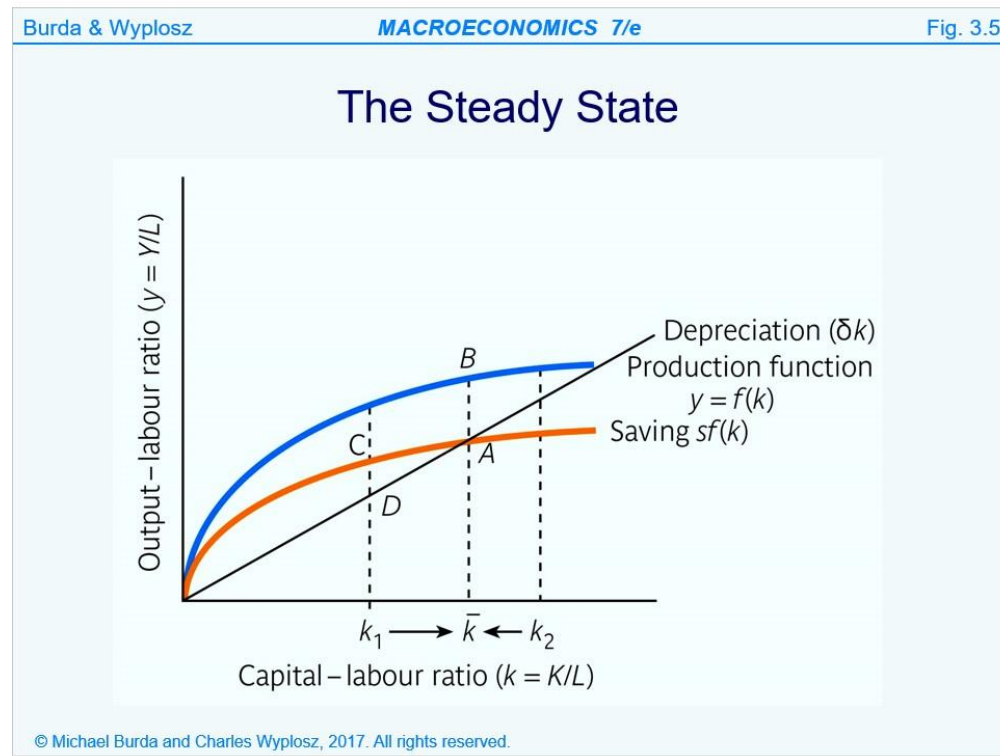
- $S$  – domaća štednja,  $(T - G)$  – budžetski saldo,  $(Z - X)$  – saldo tekućeg računa BP
- Ako je  $(T - G) = 0$ , i  $(Z - X) = 0$ , onda je

$$I = S$$

- Rast kapitala u potpunosti se finansira iz domaće štednje

$$I = sY$$

$$\frac{I}{L} = s \left( \frac{Y}{L} \right) = sy = sf(k)$$



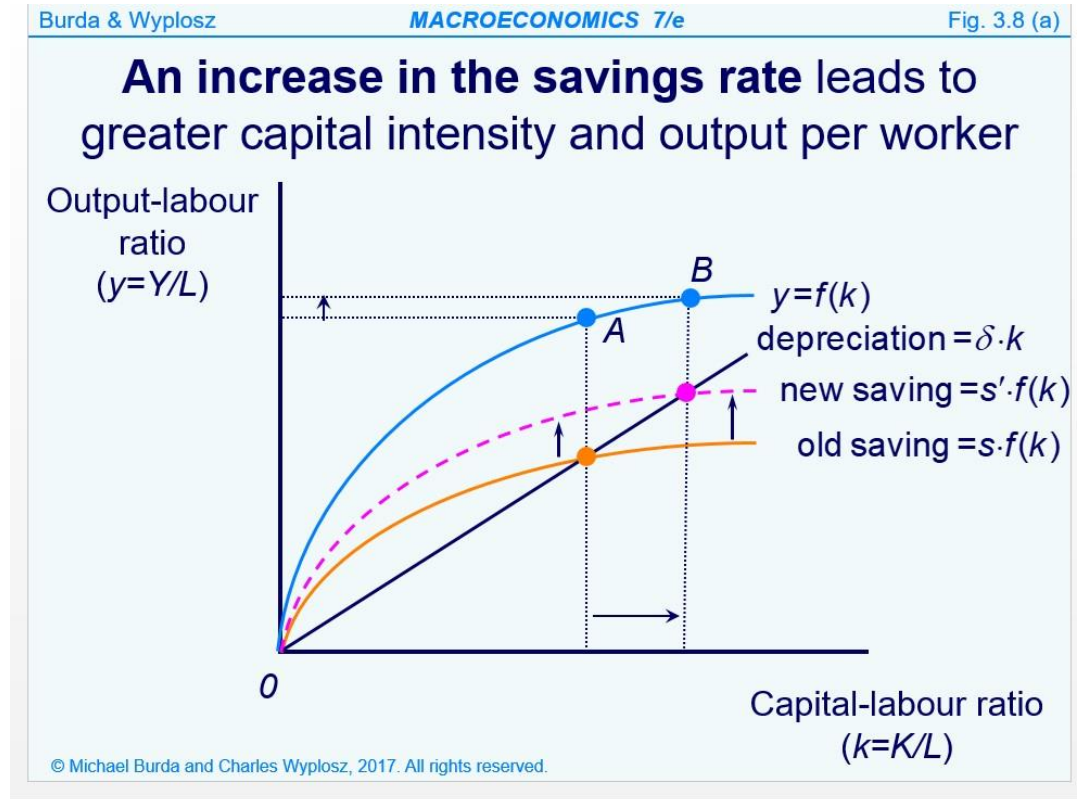
# Akumulacija kapitala

- Promjena stoka kapitala posledica je novih investicija i amortizacije

$$\Delta K = sY - \delta K$$

$$\Delta k = sy - \delta k$$

- Neto akumulacija kapitala po jedinici rada pozitivno zavisi od stope štednje a negativno od stope amortizacije
- Kapitalna intenzivnost ( $k$ ) povećava output ali i amortizaciju



# Zlatno pravilo

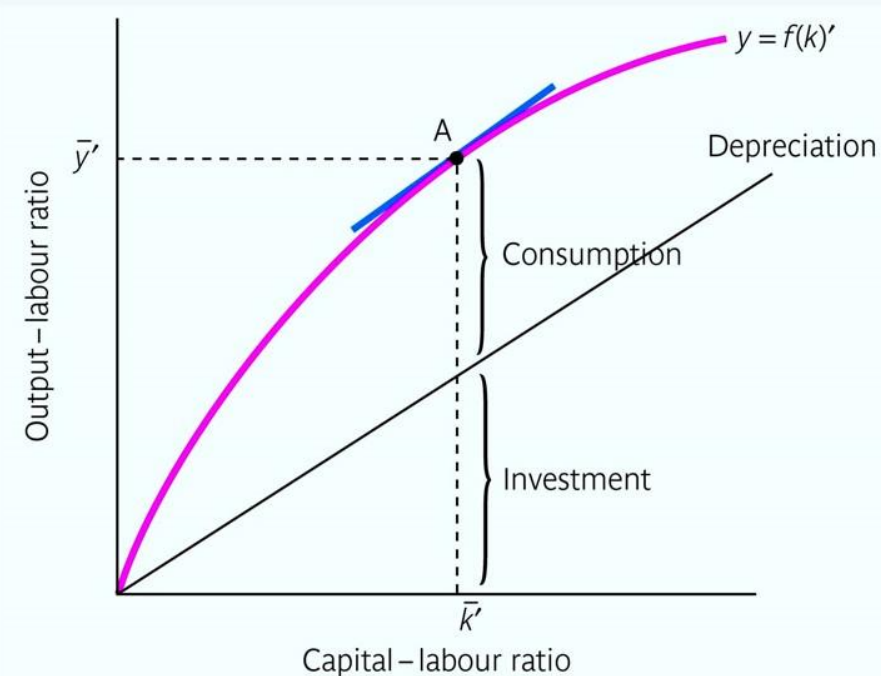
- U situaciji kada nemamo rast stanovništva ni tehnički progres, privreda maksimizira potrošnju u tački u kojoj marginalni dobitak od dodatne jedinice BDP koja je otišla u štednju i investicije bude jednak stopi amortizacije

$$MPK = \delta$$

- Uvođenje rasta stanovništva mijenja zlatno pravilo, kao i tehničkog progressa
- Marginalna produktivnost kapitala jednaka je sumi stope amortizacije, rasta tehničkog progressa i rasta stanovništva

$$MPK = \delta + a + n$$

## The Golden Rule



# Rast stanovništva i privredni rast

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- Rast radne snage je izvor privrednog rasta
- Uticaj demografskih faktora (rast broja stanovnika)

$$\Delta k = sy - (\delta - n)k$$

- Proces širenja kapitala – kada K/L treba da poraste, investicije treba da obezbijede ne samo prirast kapitala koji ce nadoknaditi amortizaciju, vec i onaj dio koji ce pratiti rast broja radnih sati (povecanje broja radnika)
- BDP per capita moze da raste jedino onda kad BDP raste brže od rasta broja stanovnika

# Tehnički progres i privredni rast

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- Ukupna faktorska produktivnost (TFP)
- Rast znanja i napredak tehnologije vode rastu produktivnosti
- Proširena verzija proizvodne funkcije

$$Y = f(A, K, L)$$

- A (tehnologija) nije proizvodni faktor
- Ako pretpostavimo da djeluje direktno na rad:

$$Y = f(K, AL)$$

$$\Delta k = sf(k) - (\delta + a - n)k$$

# Ukupna faktorska produktivnost

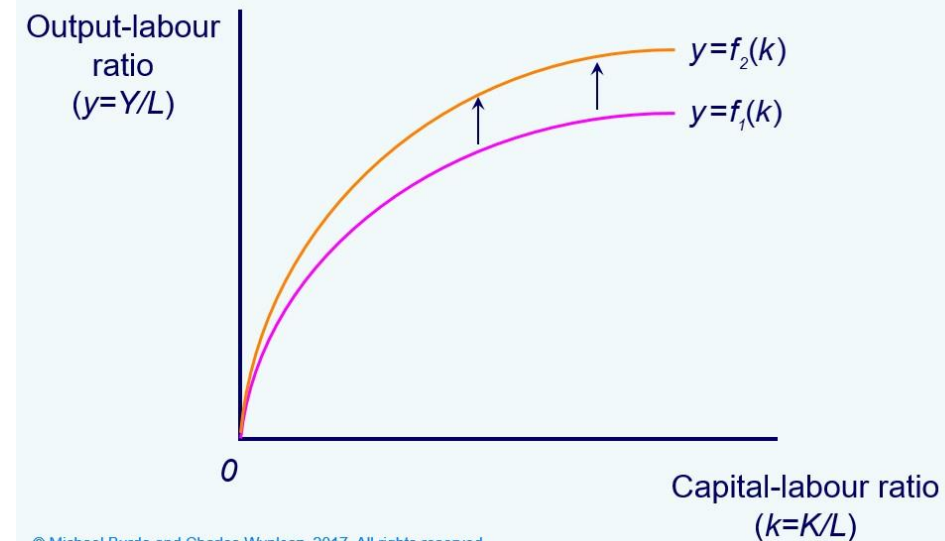
- Ukupna faktorska produktivnost (TFP) je dio outputa koji nije objašnjen količinom inputa korištenih u proizvodnji, a obično se mjeri Solowovim rezidualom (Solow, 1957).
- Nivo TFP je određen efikasnošću korišćenja inputa u procesu proizvodnje (Comin, 2010).
- Ukupna faktorska produktivnost je važna determinanta ekonomskih fluktuacija, ekonomskog rasta i razlika u dohotku po stanovniku među zemljama, što je potvrđeno mnogim empirijskim studijama. Baier, Dwyer i Tamura (2006), koristeći uzorak od 145 zemalja i podatke za više od sto godina za 23 zemlje u uzorku, primjenjujući metodologiju računovodstva ekonomskog rasta, pokazali su da ukupna faktorska produktivnost objašnjava 14% prosječnog rasta proizvodnje po radniku. Pod ukupnom faktorskom produktivnošću, oni podrazumijevaju: „promjene u tehnologiji, institucionalne promjene, i druge faktore“.
- Barro (1998) ističe da je tehnološki napredak u stvari ključan za dugoročni rast po glavi stanovnika koji je američka ekonomija nastojala održati već dva vijeka. Nelson (2000) je naglasio da: „Ranih 1950-ih, empirijski rad je jasno pokazao da „rast ukupne faktorske produktivnosti” predstavlja lavovski udio izmjerenog povećanja proizvodnje po radniku. Tehnološki napredak je predložen kao glavna sila koja stoji iza rasta TFP-a.“

Burda & Wyplosz

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Fig. 3.3 (d)

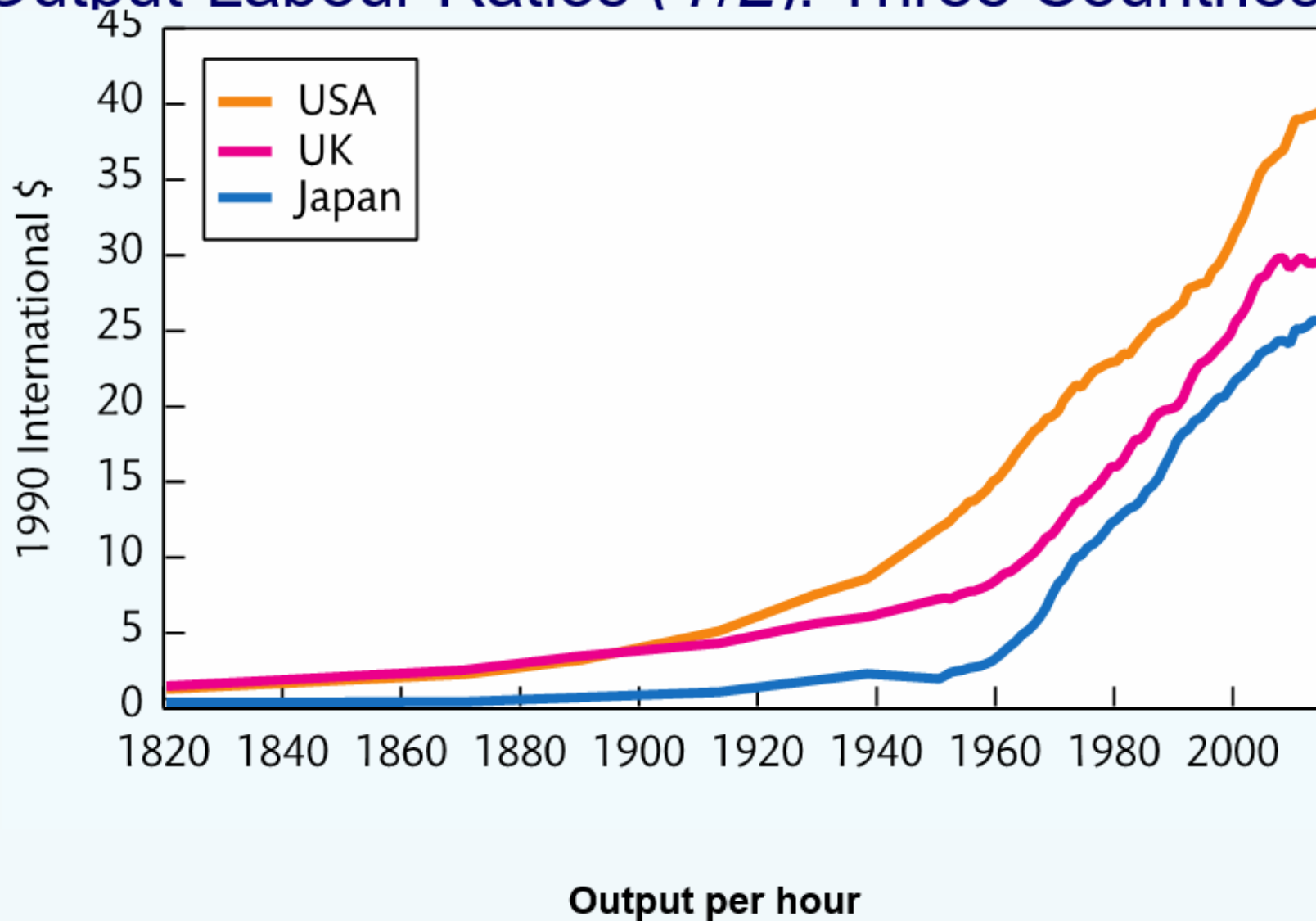
## Production Function (Intensive Form): Shift. Changes in Productivity



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## Output-Labour Ratios ( $Y/L$ ): Three Countries



# Metodologija

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- Procjena ukupne faktorske produktivnosti je važna zbog njenog doprinosa dugoročnom rastu dohotka po glavi stanovnika.
- Ekonometrijski i aritmetički pristup (koncept računovodstva rasta)
- Sa računske metodološke tačke gledišta, od rada Abramovitz-a (1956) i Solow-a (1957), pristup računovodstva rasta je primijenjen u značajnom broju studija.
- „Pristup računovodstva rasta pruža kompletan sistem dosijea, u smislu da sve pojave koje utiču na ekonomski rast moraju to učiniti kroz količine ulaznih faktora, relativne intenzitete faktora ili ukupni rast faktorske produktivnosti, bilo pojedinačno ili u kombinaciji. Drugo, rezultati računovodstvene vježbe mogu ukazati na područja u kojima će parametarske studije vjerovatno biti plodonosne”. (Norsworthy, 2005.)

# Računovodstvo privrednog rasta

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- Rezidual Soloua

$$\frac{\Delta A}{A} = \frac{\Delta Y}{Y} - \left[ (1 - S_l) \frac{\Delta K}{K} + S_l \frac{\Delta L}{L} \right]$$

- $S_l$  - udio rada,  $(1-S_l)$  – udio kapitala

[Makro vježbe](#)

# TFP u zemljama Balkana

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- Primjenjujući navedenu metodologiju, procijenili smo TFP za ukupnu ekonomiju i pojedinačne sektore u periodu 2000-2017. godina.
- Analizirane su sledeće ekonomije: Albanija, Bosna i Hercegovina, Bugarska, Sjeverna Makedonija, Crna Gora, Srbija i Rumunija
- Varijacije između stopa rasta proizvodnje, TFP-a i doprinosa kapitala i rada su uočene ne samo među zemljama, već i među sektorima u svakoj zemlji i vremenskom okviru. Od 2000. do 2017. godine, najveći rast TFP-a u ukupnoj privredi zabilježen je u Rumuniji, koja je druga vodeća zemlja po stopi rasta proizvodnje u uzorku, sa prosječnom stopom rasta proizvodnje od 4,13%. Najveća prosječna stopa rasta proizvodnje zabilježena je u Albaniji, iako je prosječni rast TFP bio niži u poređenju sa Bosnom i Hercegovinom, Srbijom i Rumunijom. Ovo je uglavnom zbog većeg iskorišćenja kapitala i rasta zaposlenosti. Prosečan rast TFP-a takođe je bio visok u Srbiji (2,08), sa rastom proizvodnje od 3,02. U Crnoj Gori i Makedoniji, zemljama iz uzorka sa najnižim prosječnim godišnjim rastom BDP-a, prosječna stopa rasta TFP-a bila je negativna, dok su rast kapitala i rast iskorištenosti kapitala bili relativno visoki.

## Dekompozicija rasta proizvodnje, ukupna ekonomija i sektorski pristup, (2000-2017)

		2000-2017			
		Total	Agriculture	Industry (incl. construction)	Services
Albania	GDP/Value Added	4.23	3.15	5.09	-1.62
	Employment	0.40	-1.20	1.06	2.93
	Capital	1.68	1.07	2.00	0.77
	Utilization	0.85	0.85	0.85	0.85
	TFP	1.31	2.44	1.18	-6.17
Bosnia and Herzegovina	GDP/Value Added	3.30	0.85	4.74	3.35
	Employment	-0.15	-1.52	0.58	0.29
	Capital	1.17	0.32	1.57	1.30
	Utilization	-0.04	-0.04	-0.04	-0.04
	TFP	2.32	2.10	2.64	1.81
Bulgaria	GDP/Value Added	3.64	-0.29	3.69	3.62
	Employment	0.25	-2.36	-0.14	0.94
	Capital	1.68	0.21	1.67	1.79
	Utilization	1.22	1.22	1.22	1.22
	TFP	0.49	0.65	0.94	-0.33
North Macedonia	GDP/Value Added	2.68	0.31	4.28	2.74
	Employment	1.09	0.05	0.63	1.97
	Capital	1.17	0.32	1.33	1.45
	Utilization	0.65	0.65	0.65	0.65
	TFP	-0.24	-0.71	1.66	-1.33
Montenegro	GDP/Value Added	2.96	2.24	8.49	-0.30
	Employment	0.90	0.04	-0.02	1.44
	Capital	1.66	0.94	2.12	1.02
	Utilization	1.20	1.20	1.20	1.20
	TFP	-0.79	0.07	5.19	-3.96
Serbia	GDP/Value Added	3.02	1.03	1.70	2.84
	Employment	-0.29	-1.76	-0.80	0.91
	Capital	1.76	0.91	1.30	2.04
	Utilization	-0.53	-0.53	-0.53	-0.53
	TFP	2.08	2.41	1.73	0.43
Romania	GDP/Value Added	4.13	3.97	4.37	4.46
	Employment	-1.00	-3.43	-0.52	0.97
	Capital	1.97	1.29	2.16	2.60
	Utilization	0.47	0.47	0.47	0.47
	TFP	2.69	5.64	2.26	0.41

PREZENTIRANI REZULTATI ISTRAŽIVANJA OBJAVLJENI SU U: BAČOVIĆ, MAJA. (2021). TOTAL FACTOR PRODUCTIVITY GROWTH IN UPPER MIDDLE-INCOME BALKAN COUNTRIES FROM 2000-2017, TOTAL ECONOMY AND SECTORAL APPROACH: GROWTH ACCOUNTING METHOD, ARGUMENTA OECONOMICA. 1 (46), STR. 79-97.

# TFP u zemljama Balkana (2)

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Ako uporedimo prosječne stope rasta TFP-a za ukupnu ekonomiju i na nivou sektora, vidimo da je rast TFP-a u industriji u najvećoj korelaciji sa ukupnim rastom TFP-a. Rast TFP-a u industriji bio je pozitivan u svim zemljama

U poljoprivredi, rast TFP-a bio je veći od ukupnog u Albaniji, Bugarskoj, Crnoj Gori, Srbiji i Rumuniji i bio je najvažniji faktor za rast dodane vrijednosti u poljoprivredi.

Rast TFP-a bio je najniži u sektoru usluga, čak negativan u četiri zemlje iz uzorka (Albanija, Bugarska, Sjeverna Makedonija i Crna Gora).

# TFP u ekonomijama bivše SFRJ

**Table 3.** GDP growth and its determinants and unemployment rate, 1952–1987 and 1997–2019.

	Bosnia and Herzegovina	Montenegro	Croatia	Macedonia	Slovenia	Serbia
<b>GDP growth (%)</b>						
1952–1987	5.0	5.4	5.3	5.8	5.7	5.6
1997–2019	3.3 <sup>1</sup>	1.4	3.2	2.9	3.0	2.8
<b>Capital stock growth (%)</b>						
1952–1987	7.4	11.0	6.8	8.0	6.4	6.9
1997–2019 <sup>2</sup>	1.9	2.7	2.7	4.3	2.5	4.8
<b>Employment growth (%)</b>						
1952–1987	4.0	5.0	3.5	5.0	3.4	4.2
1997–2019	1.2	0.4	0.8	2.0	0.8	–0.4
<b>TFP growth (%)</b>						
1952–1987 <sup>3</sup>	0.1	–1.2	0.8	–0.1	1.5	0.6
1997–2019 <sup>4</sup>	0.7	0.0	1.7	0.1	1.6	1.5
<b>Unemployment rate (%)</b>						
1952–1987	8.78	9.94	5.43	15.79	2.05	10.46
1997–2019	25.23	18.88	12.56	31.08	6.83	16.42
<b>Labor productivity (constant 1972 prices)</b>						
1952–1987	45,988	46,491	54,228	41,182	60,025	51,598
1997–2019	50,511	59,971	96,649	41,693	135,311	39,042
<b>Fixed assets per person (const. 1972 prices, 000)<sup>5</sup></b>						
1952–1987 <sup>6</sup>	17.8	24.0	27.3	14.8	43.9	17.8
1997–2019 <sup>7</sup>	6.1	18.0	38.8	11.0	71.4	10.7

<sup>1</sup>Data from 2000–2019

<sup>2</sup>Data for Bosnia and Herzegovina are from 2007–2019, for Montenegro from 2000 to 2019

<sup>3</sup>Kukic (2020) also estimated TFP growth for the same sample from 1952 to 1986. Although different assumptions he applies resulted in slightly different annual rates, variation among republic (countries) is comparable with results in this research

<sup>4</sup>Data for Bosnia and Herzegovina are from 2007 to 2019, for Montenegro from 2000 to 2019

<sup>5</sup>Similar values (average for 1953, 1963 and 1973) were estimated by Vinski (1959), 17,21

<sup>6</sup>1972 dinars

<sup>7</sup>2010 US\$

Source: Author's calculations

# TFP u Evropi (sektorski pristup)

Table 2. Output growth decomposition in Europe, 2000-2019

	Gross value added growth	Fixed Asset growth	Employment growth	TFP growth		
	mean	mean	0.33%	mean		
All NACE activities	2.27%	1.99%	0.66%	0.72%	0.48%	1.12%
Agriculture, forestry and fishing	0.75%	2.44%	0.81%	-2.10%	-1.41%	1.34%
Industry (except construction)	1.93%	2.21%	0.73%	-0.81%	-0.54%	1.73%
Construction	1.03%	1.29%	0.42%	0.63%	0.42%	0.18%
Wholesale and retail trade, transport, accommodation and food service activities	2.30%	2.34%	0.77%	1.00%	0.67%	0.87%
Financial and insurance activities	2.21%	0.66%	0.22%	0.53%	0.36%	1.63%
Information and communication	4.99%	3.57%	1.18%	2.56%	1.71%	2.09%
Real estate activities	2.06%	1.20%	0.40%	2.43%	1.63%	0.03%
Professional, scientific and technical activities; administrative and support service activities	3.82%	3.77%	1.24%	3.50%	2.35%	0.22%
Public administration, defence, education, human health and social work activities	1.20%	1.03%	0.34%	1.22%	0.82%	0.04%
Arts, entertainment and recreation; other service activities	1.63%	1.71%	0.56%	1.61%	1.08%	-0.02%
Observations	399	399	399	399	399	399

Source: author's computation



# Objašnjenje dugoročnog privrednog rasta

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- Hipoteza o konvergenciji – što je zemlja dalje od svog stabilnog stanja, to će brže rasti
  - U Solovljevom modelu, u stabilnom stanju prosperitet je određen stopom štednje i stanjem tehnologije
  - Zemlje sa istim ili sličnim stopama štednje i uporedivim tehnologijama trebalo bi da na dugi rok ostvaruju isti dohodak per capita

$$\frac{\Delta Y_t}{Y_t} - \alpha = \beta \frac{\bar{Y}_t - Y_t}{\bar{Y}_t}$$

- $\frac{\Delta Y_t}{Y_t}$  - stopa rasta u periodu  $t$
- $\alpha$  – stopa rasta u stabilnom stanju
- $\beta$  – brzina konvergencije
- $\bar{Y}_t$  - dohodak u stabilnom stanju

# Objašnjenje dugoročnog privrednog rasta

---

- Uslovna konvergencija i nedostajući inputi
- Zemlje sa različitim proizvodnim funkcijama konvergiraju ka različitim tačkama stabilnog stanja
- Uzroci razlike u proizvodnim funkcijama:
  - Ljudski kapital
  - Infrastruktura
  - Društvena infrastruktura (svojinska prava, ljudska prava, politicka stabilnost)
- Mogućnost endogenog rasta
  - znanje

# Politika privrednog rasta

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- Obrazovanje i istraživanje
- Intelektualna svojina, patenti i politika konkurencije
- Otvorenost razmjene i konkurencija
- Politika, demokratija, jednakost i stabilnost

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