

Taxes, Subsidies and Productivity Measurement in the Covid Era

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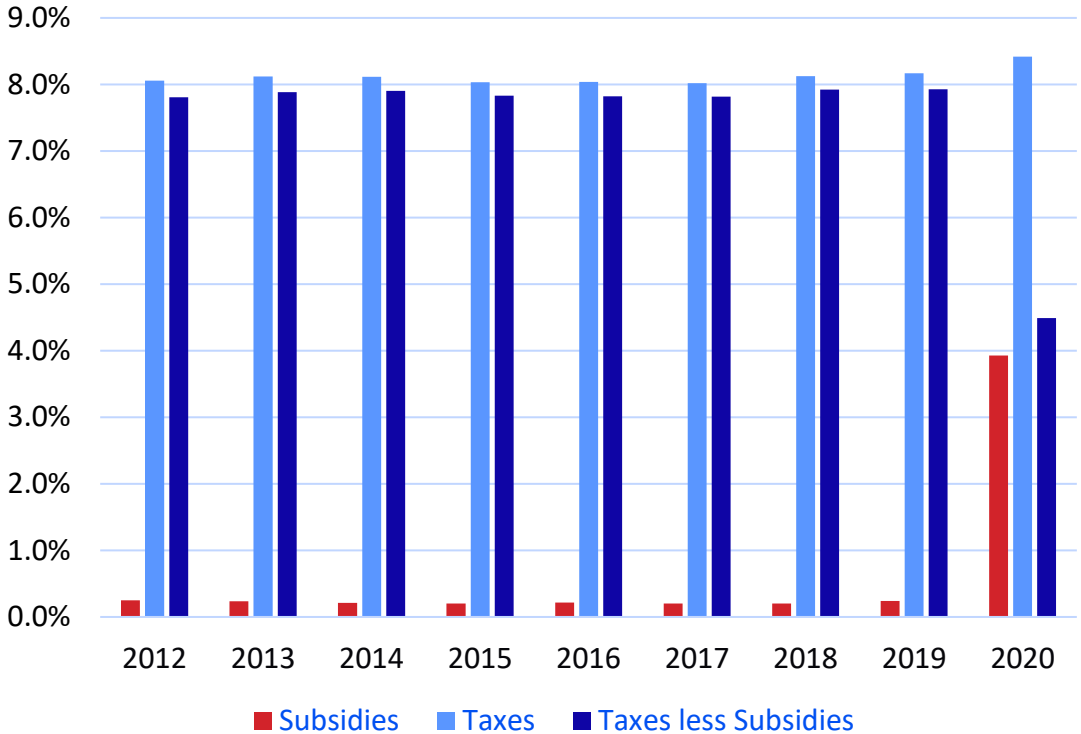
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COVID Subsidies

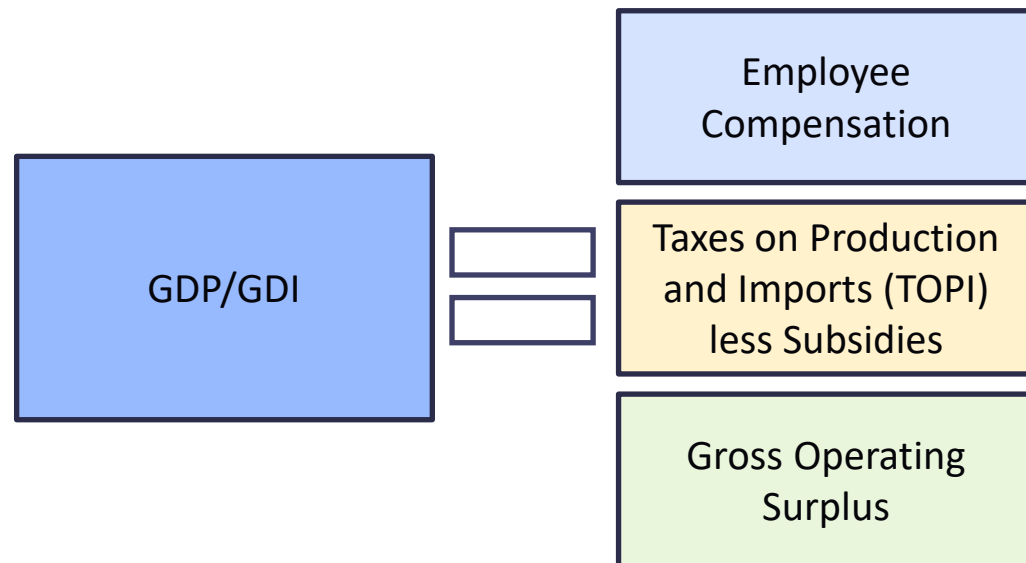
- The COVID-19 Pandemic resulted in \$668.6 billion in subsidies across all sectors of the economy
- This made us revisit our treatment of subsidies and its GDP component within our Total Factor Productivity measures

Private Business Taxes and Subsidies Shares of GDP



Subsidies and National Accounting

Distribution of GDP Components



- Intended to reflect the produced value of production
- Subsidies are non-produced value and need to be removed
- Removed from taxes on production and imports less subsidies and thus output

Subsidies and Productivity

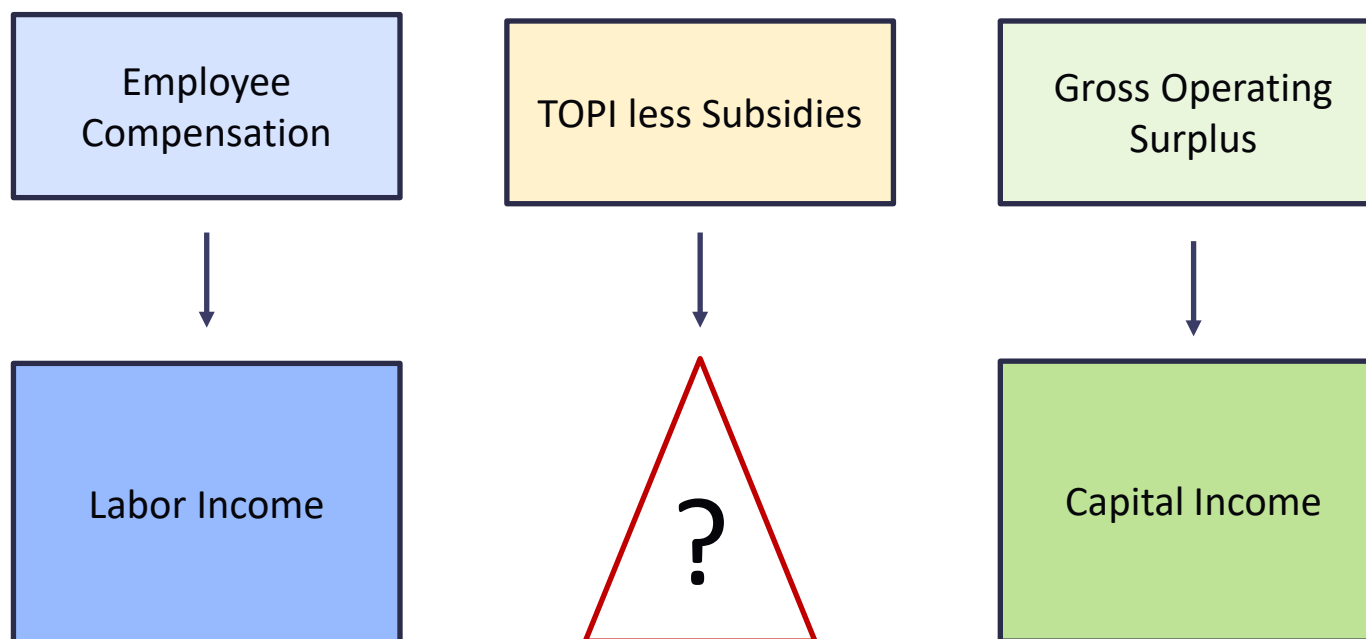
$$\text{TFP} = \frac{\textit{Output Growth}}{\textit{Combined Inputs Growth}}$$


The diagram illustrates the relationship between subsidies and productivity measurement. It features the equation $\text{TFP} = \frac{\textit{Output Growth}}{\textit{Combined Inputs Growth}}$. Two callouts, each in an oval and labeled "Subsidies removed", have arrows pointing to the "Output Growth" term in the numerator and the "Combined Inputs Growth" term in the denominator, respectively. This indicates that the effect of removing subsidies is to be accounted for in both the output and input growth components of the productivity calculation.

Conclusion: subsidies should not affect productivity measurement

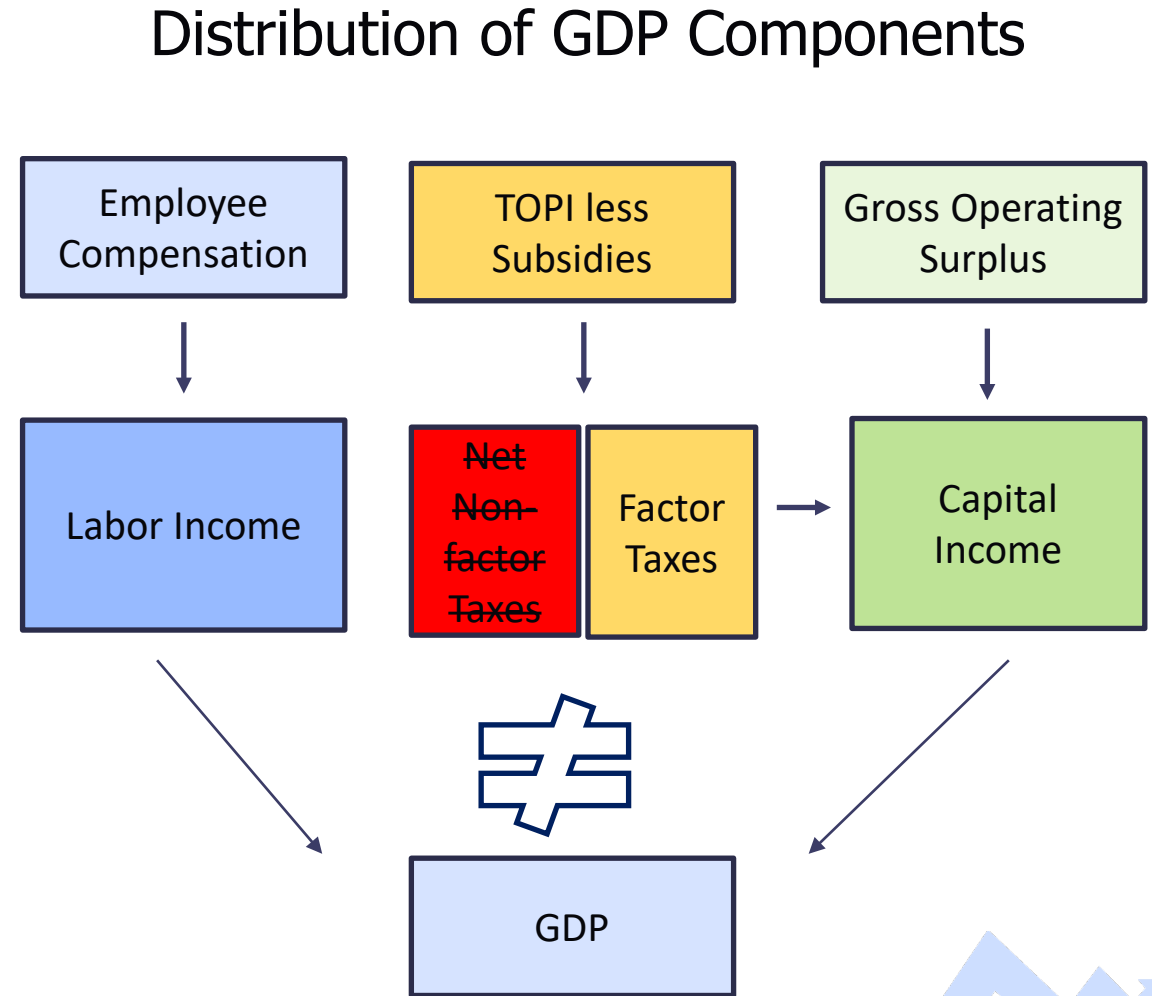
TOPI less Subsidies and Productivity: An Allocation Problem

Distribution of GDP Components

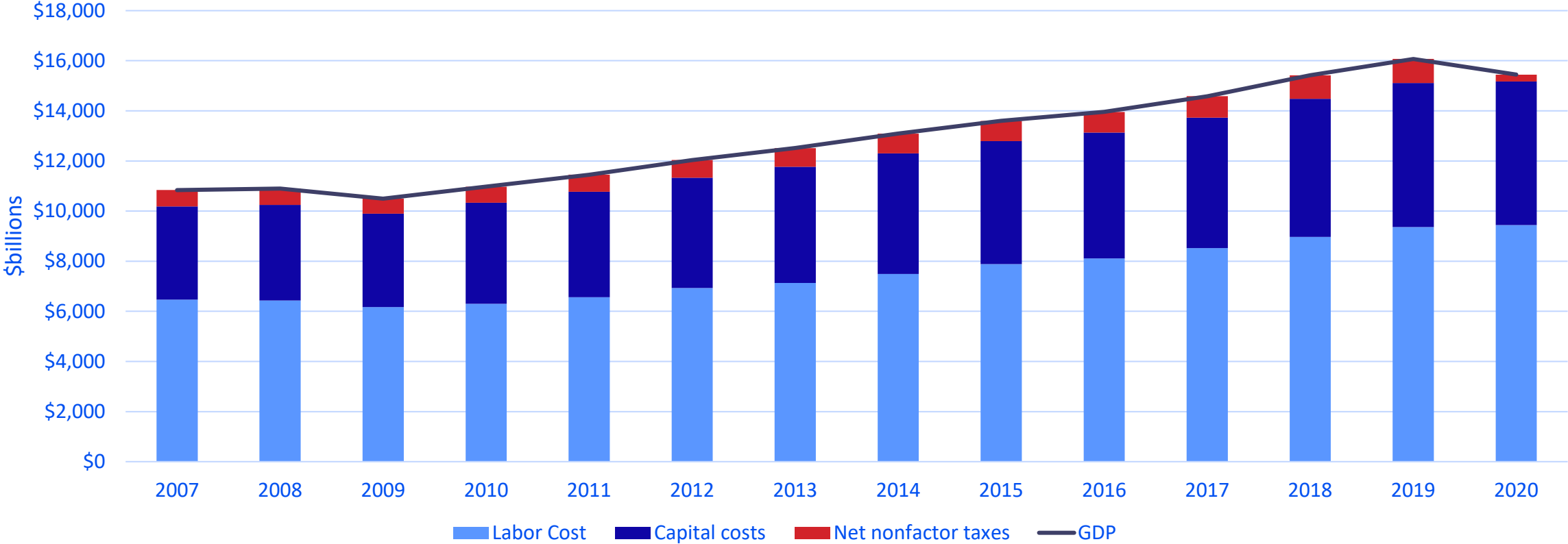


Net Nonfactor Taxes

- Factor taxes assigned to capital income
- Net nonfactor taxes (TOPI less subsidies – factor taxes) not assigned to a factor input
- TFP Discrepancy:
 - ▶ Output includes net nonfactor taxes
 - ▶ Input Costs exclude net nonfactor taxes because they cannot be assigned correctly



Private Business GDP Composition



Private Business and Industry Net Nonfactor Taxes

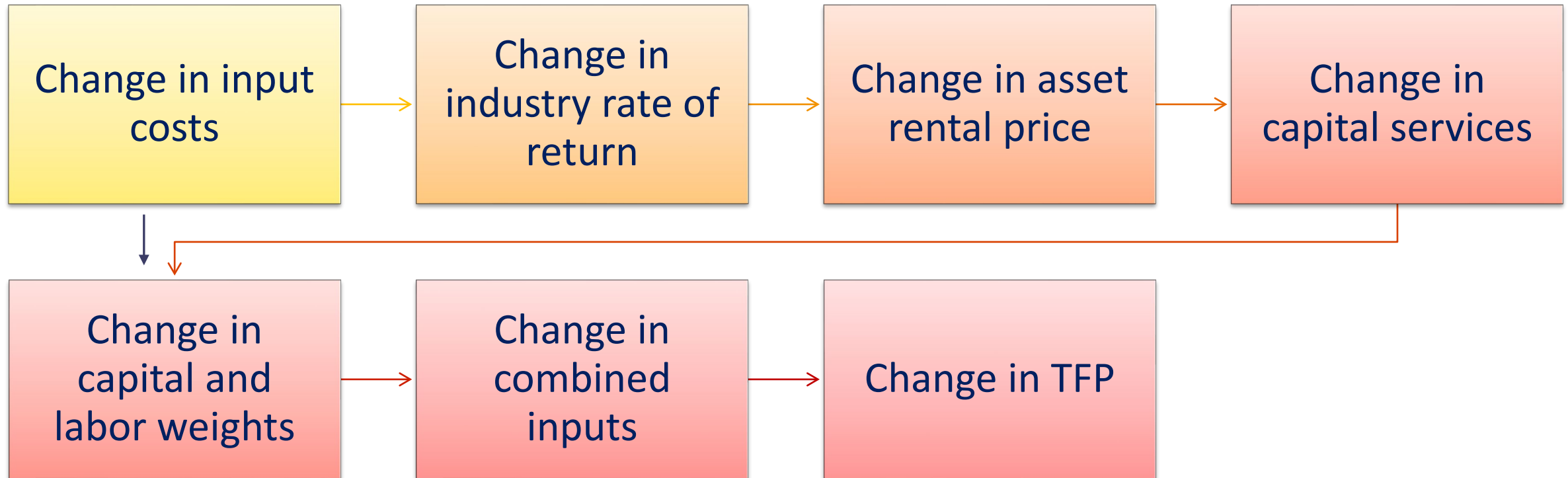
NAICS Code	Industry	Avg Net Nonfactor Taxes/GDP
11-81	Private Business	6.0%
42	Wholesale trade	21.1%
44, 45	Retail trade	19.8%
481	Air transportation	17.5%
721	Accommodation	14.6%
722	Food services and drinking places	12.2%
531	Real estate	11.6%
713	Amusements, gambling, and recreation industries	11.3%
22	Utilities	9.2%
311, 312	Food and beverage and tobacco products	8.6%
515, 517	Broadcasting and telecommunications	8.6%

Allocation of Net Nonfactor Taxes

MODEL	DISTRIBUTION OF NET NONFACTOR TAXES
CONTROL (CURRENT BLS METHODOLOGY)	Net nonfactor taxes removed from input costs
ALL CAPITAL	All of net nonfactor taxes value given to capital cost
SHARES	Net nonfactor taxes distributed to capital and labor cost based on industry input shares
50-50 SPLIT	Value of net nonfactor taxes evenly distributed to capital and labor costs



How Net Nonfactor Tax Can Affect Productivity Measures



Change in TFP and Related Measures by Treatment Method, Private Industry Sector

1987-2019	TFP Average annual growth	Capital Average annual growth	Combined Inputs Average annual growth	Capital Share Capital share of total input cost
Control	0.69	3.40	2.05	36%
All Capital	0.68	3.17	2.06	41%
Shares	0.71	3.33	2.03	36%
Even Split	0.71	3.27	2.02	37%

- For all models: Output growth = 2.75%, labor input = 1.33%
- From 1987-2019 net nonfactor charges grew 4.75%

Change in TFP and Related Measures by Treatment Method, NAICS 42 (Wholesale Trade)

1987-2019	TFP Average annual growth	Capital Average annual growth	Combined Inputs Average annual growth	Capital Share Average annual growth
Control	1.76	3.44	1.59	34%
All Capital	1.49	3.16	1.86	48%
Shares	1.80	3.31	1.56	34%
Even Split	1.72	3.26	1.63	37%

- For all models: Output growth = 3.38%, labor input = 0.71%
- From 1987-2019 net nonfactor charges grew 4.49%

Model Effects with Covid Subsidies

■ Net nonfactor taxes: 2019 = \$5.0b (0.7%), 2020 = \$-73.4b (-11.2%)

Ambulatory health care services	2019 TFP	2020 TFP	2019 Capital	2020 Capital	2019 Combined Inputs	2020 Combined Inputs	2019 Capital Share	2020 Capital Share
Control	2.09	-6.97	3.13	3.07	2.25	-0.75	17%	22%
All Capital	2.09	-6.81	3.11	3.22	2.25	-0.92	18%	13%
Shares	2.09	-6.98	3.12	3.09	2.24	-0.74	17%	22%
Even Split	2.09	-6.92	3.12	3.12	2.25	-0.81	17%	18%
Difference from Control								
All Capital	0.00	0.16	-0.02	0.15	0.00	-0.17	1%	-9%
Shares	0.00	0.00	0.00	0.02	0.00	0.00	0%	0%
Even Split	0.00	0.06	-0.01	0.05	0.00	-0.06	0%	-3%

Preferred Model

- We want a model that satisfies two goals:
 - ▶ GDP = Input Costs
 - ▶ Limits bias of productivity

All Capital	50-50 Split	Shares
Has the biggest effect	Second largest effect	Results in little change in TFP or capital
We believe most of capital taxes are included in the factor taxes assigned to capital	Arbitrary distribution	Preferred method

Next Steps



- Further investigation into net nonfactor taxes
- Incorporate feedback from our colleagues at this conference

Contact Information

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