



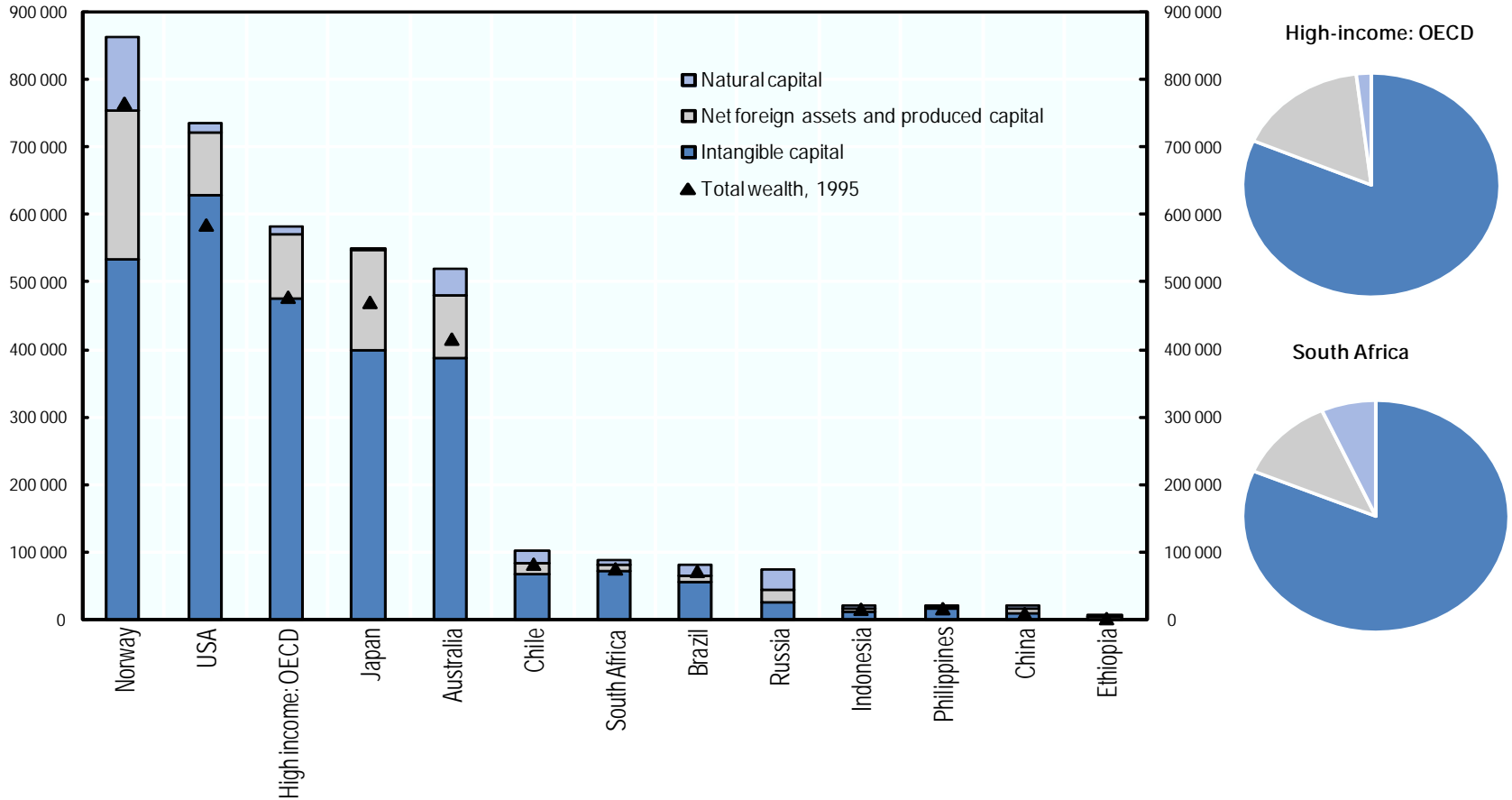
Green Productivity

OECD Green Growth and Sustainable Development Forum
23 November 2012, Paris
Nicola Brandt (OECD)



Sometimes need to go beyond GDP

Total wealth per capita, 2005
USD 2005



Source: World Bank.



Extended Productivity Framework

- Traditional MFP growth:

$$\widehat{MFP} = \hat{Y} - \hat{Z}$$

Include the environment:

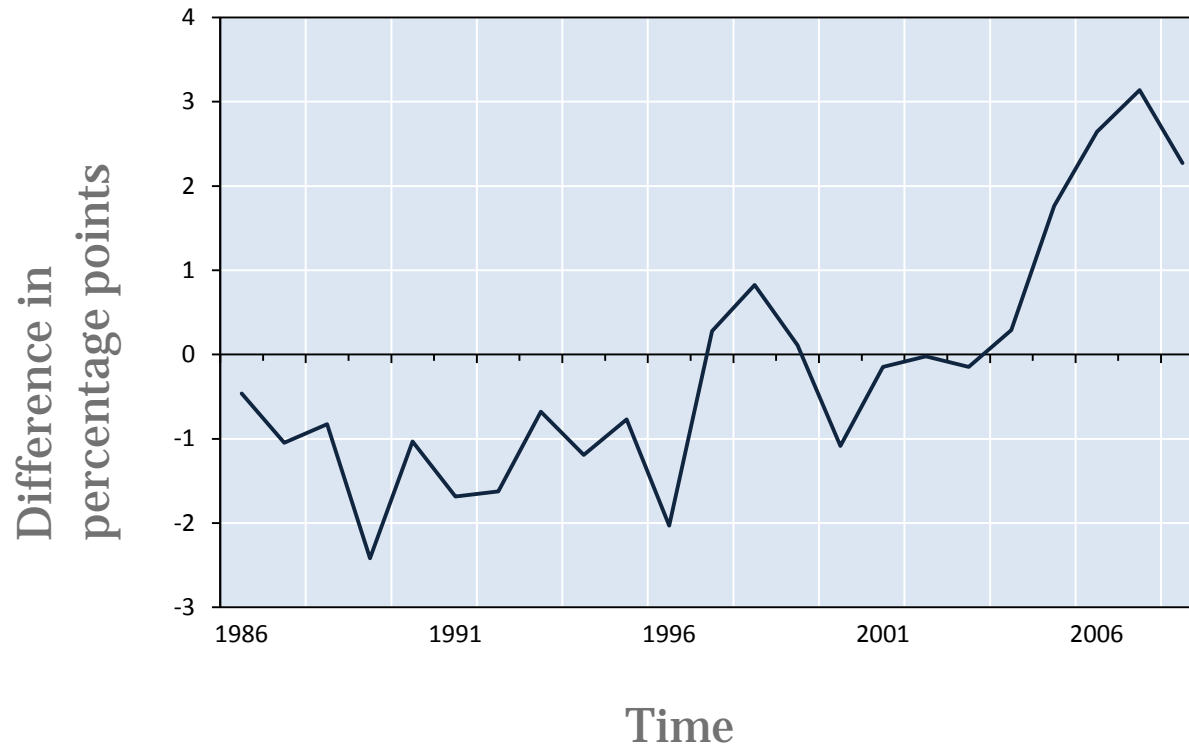
- Good and bad outputs: $Q = s_Y Y + s_R R$
- Natural capital as an additional input factor: $F(K, L, S, t)$

$$\widehat{GMFP} = \widehat{MFP} + s_S (\hat{Z} - \hat{S}) - s_R (\hat{Y} - \hat{R})$$



MFP may underestimate productivity growth in resource booms...

- Norway – Difference of adjusted and traditional MFP growth





...but not necessarily, other inputs grow also fast in resource booms

- Including natural assets, 1985 - 2008

Country	Average traditional MFP growth per year in %	Average MFP growth with natural resources per year in %	Difference in percentage points	Total rent over GDP
AUS	0.92	0.88	-0.04	3.81
CAN	0.38	0.45	0.07	4.34
CHL	0.54	0.73	0.19	7.03
DNK	0.75	0.71	-0.03	1.82
NOR	1.18	1.02	-0.17	17.02
RUS	2.21	2.49	0.28	13.58
ZAF	1.62	1.70	0.07	2.75



Some inputs were devoted to improving the environment – with success

- Including natural assets and bad output, 1990 – 2008

Country	Average traditional MFP growth in %	Average MFP growth (natural capital) in %	Average MFP growth adjusted in %	Difference traditional and fully adjusted MFP
CAN	0.61	0.64	0.69	0.08
CHL	0.80	0.89	1.08	0.28
GBR	1.36	1.42	1.47	0.11
NLD	0.91	0.94	0.98	0.06
NOR	1.17	1.28	1.29	0.12
RUS	2.21	2.49	2.92	0.71
USA	1.12	1.15	1.20	0.08
ZAF	1.62	1.70	1.84	0.21



Further Steps

- Refinement of shadow prices:
 - Environmental regulation differs across countries, country-specific shadow prices are needed
- Including more resource-rich countries
- Study environmental regulation