

أهداف جسر التنمية

تهدف سلسلة جسر التنمية إلى التعريف بقضايا التنمية وأدوات تحليل جوانبها المختلفة إلى جمهور واسع من القراء بغرض توسيع دائرة معرفتهم وتوفير جسر بين نظريات التنمية وأدواتها المعقدة من ناحية ، ومغزاها ومدلولها العملي بالنسبة لصانعي القرار والمهتمين بهذه القضايا، من ناحية أخرى. وفي هذا الإطار تشكل سلسلة جسر التنمية إسهاماً من المعهد العربي للتخطيط بالكويت في توفير مراجع مبسطة وإثراء لمكتبة القراء المهتمين بأمور التنمية في العالم العربي.

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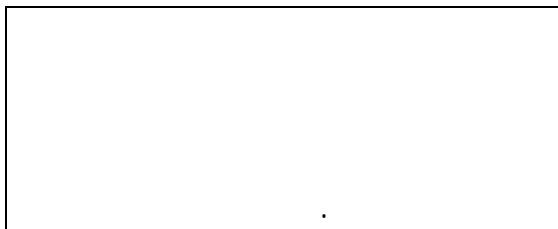
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(GDP

(CPI

Deflator)

(Base Period)

j	j	i	P_{ij}
j	j	i	q_{ij}
	s	$j = s, t$	$i = 1, 2, \dots, N$
			t

(Value Index)

V_{st}

(Price Index)

P_{st}

(Quantity Index)

Q_{st}

-1

$(i = 1, 2, \dots, N)$

$$V_{st} = \frac{\sum_{i=1}^N P_{it} q_{it}}{\sum_{i=1}^N P_{is} q_{is}}$$

V_{st}

:

1993	1990	1993	1990	
22	23	28	24	
21.64	15.89	63	70	
10.21	7.81	319	226	

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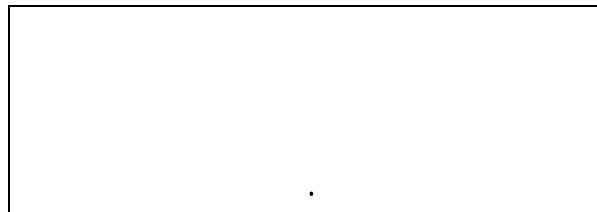
:

$$V_{1990,1993} = \frac{5236.31}{3429.36} = 1.527$$

1990

%53

.1993



:

-2

(Laspyres)

:

$$P_{st}^L = \frac{\sum_{i=1}^N P_{it} q_{is}}{\sum_{i=1}^N P_{is} q_{is}} = \sum_{i=1}^N \frac{P_{it}}{P_{is}} \times W_{is}$$

$$i \qquad W_{is} = \frac{P_{is}q_{is}}{\sum_{i=1}^N P_{is}q_{is}} \qquad L$$

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(Paasche)

:

$$P_{st}^P = \frac{\sum_{i=1}^N P_{it}q_{it}}{\sum_{i=1}^N P_{is}q_{it}} = \frac{1}{\sum_{i=1}^N \frac{P_{is}}{P_{it}} \times W_{it}}$$

i

W_{it}

.

⋮

$$P_{st}^F = \sqrt{P_{st}^L \times P_{st}^P}$$

.(Fisher Ideal Index)

⋮

$$P_{st}^T = \prod_{i=1}^N \left[\frac{P_{it}}{P_{is}} \right]^{\frac{W_{is} + W_{it}}{2}}$$

$$\ln P_{st}^T = \sum_{i=1}^N \left(\frac{W_{is} + W_{it}}{2} \right) [\ln P_{it} - \ln P_{is}]$$

1993

1990

⋮

(%)	$P_{1990,1993}$	
26.9	1.269	
26.6	1.266	
26.7	1.267	
26.7	1.267	

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.%26.7

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3

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⋮

⋮

$$V_{st} = P_{st} \times Q_{st}$$

$$Q_{it} = \frac{V_{st}}{P_{st}} = \frac{\sum_{i=1}^N P_{it} q_{it}}{\sum_{i=1}^N P_{is} q_{is}} \bigg/ P_{st}$$

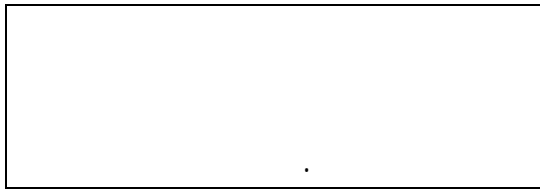
$$= \frac{\sum_{i=1}^N P_{it} q_{it} / P_{st}}{\sum_{i=1}^N P_{is} q_{is}}$$

$$= Q_{st}$$

(GDP)

(Self-Duality)

(Factor Reversal Test)



(Balk)

(Diewert)

1993

:1990

$Q_{1990,1993}$	$Q_{1990,1993}$	
1.204	1.206	
1.206	1.204	
1.205	1.205	
1.205	1.205	

1990

%21

.1993

-
-
-
-

:

4

:

:(Positivity)

:(Continuity)

:(Proportionality)

:(Dimentional Invariance)

-
-
-
-

(Regularity)

t

:(Time-Reversal Test)

$$\left(P_{st} = \frac{1}{P_{ts}} \right) s$$

-

1990 1987

.1987

:(Mean-Value Test)



:(Factor-Reversal Test)



$$V_{st} = P_{st} \times Q_{st}$$

:(Circularity Test "Transitivity") "



$$P_{st} = P_{sr} \times P_{rt}$$

$$\begin{matrix} r & t & s \\ t & s & \\ & & r \end{matrix}$$

:

5

(Translog)

(Quadratic)K



⋮

(TFP)

1

)

$t \quad s \quad ($

$$= \ln TFP_{st} = \ln \frac{\text{Output Index}_{st}}{\text{Input Index}_{st}}$$

⋮

$v \quad w \quad i \quad j$
 $\cdot \quad y \quad x$

⋮

⋮

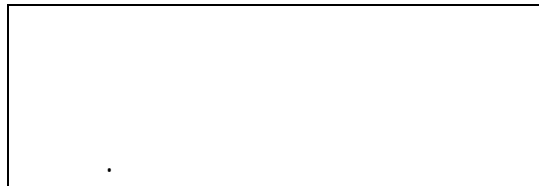
$$\begin{aligned}
 \text{LnTFP}_{st}^T &= \text{Ln} \frac{\text{Output Index}_{st}}{\text{Input Index}_{st}} = \text{LnOutput Index}_{st} - \text{LnInput Index}_{st} \\
 &= \frac{1}{2} \sum_{i=1}^N (w_{is} + w_{it}) [\text{Lny}_{it} - \text{Lny}_{is}] - \frac{1}{2} \sum_{j=1}^K (v_{js} + v_{jt}) [\text{Lnx}_{jt} - \text{Lnx}_{js}]
 \end{aligned}$$

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:

$$= \text{TFP}_{st}^F = \frac{\text{Output Index}_{st}^F}{\text{Input Index}_{st}^F}$$



:

2

(Transitivity)

(Internal Consistency)

.CCD

:

$$LnTFP_{st}^* = \left[\frac{1}{2} \sum_{i=1}^N (w_{it} + \bar{w}_i)(Lny_{it} - \overline{Lny}_i) - \frac{1}{2} \sum_{i=1}^N (w_{is} + \bar{w}_i)(Lny_{is} - \overline{Lny}_i) \right] - \left[\frac{1}{2} \sum_{j=1}^K (v_{jt} + \bar{v}_j)(Lnx_{jt} - \overline{Lnx}_j) - \frac{1}{2} \sum_{j=1}^K (v_{js} + \bar{v}_j)(Lnx_{js} - \overline{Lnx}_j) \right]$$

:

TFP_{st}^*

\bar{w}_i

\bar{v}_i

$$\overline{Lny}_i = \frac{1}{M} \sum_{k=1}^M Lny_{ik}$$

$$\overline{Lnx}_j = \frac{1}{M} \sum_{k=1}^M Lnx_{jk}$$

M

.CCD

:

$$TFP_{st}^* = \frac{\text{Transitive Output Index}_{st}}{\text{Transitive Input Index}_{st}}$$

.CCD

(Spatial Comparisons)

(Temporal Comparisons)

(Chain-Base Indices)

TFPIP

(Data File)

:

(Instruction File)

(Total Factor Productivity Index
(TFPIP Program

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<http://www.une.edu.au/Econometrics>

:

(Mathematical Programming)

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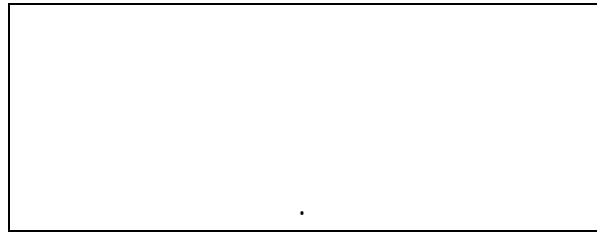
(1957)

(Allocative Efficiency)

(input-Oriented Measures)

(Output-

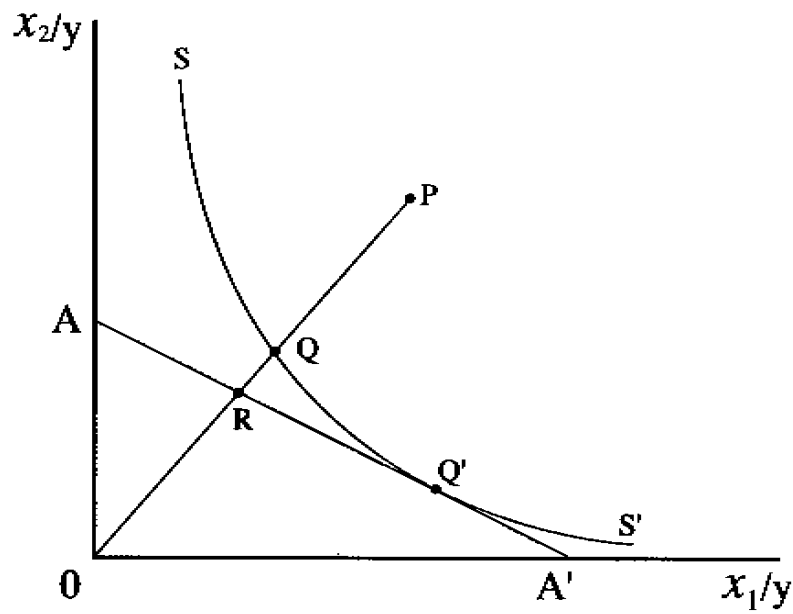
.Oriented Measures)



⋮

y

$x_2 \quad x_1$



Coelli et. al. (2000) :

AA'

y
 ss'

ss'

P

y

PQ

y

Q

·
: OP P

$$TE_i = \frac{OQ}{OP}$$

·
: OP
1 0-1
AA'

$$AE_i = \frac{OR}{OQ}$$

· Q Q' RQ y
:

$$EE_i = \frac{OR}{OP} = \frac{OQ}{OP} \times \frac{OR}{OQ} = TE_i \times AE_i$$

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: _____

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x₁ y₂ y₁
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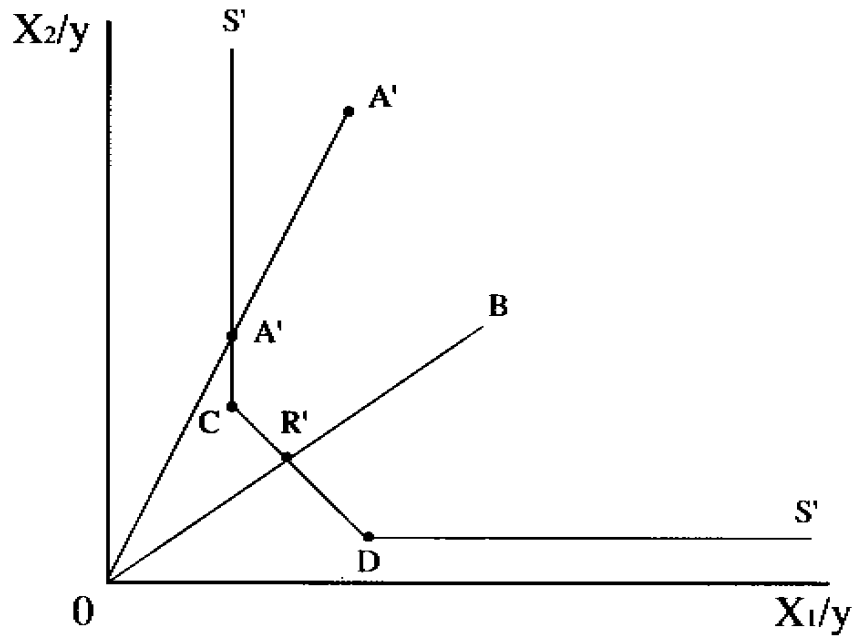
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(Data Envelopment Analysis “DEA”
(Non Parametric)

DEA . Model)

DEA
(VRS)

(CRS)



Coelli et. al. (2000) :

:

ss' -

$D \quad C$ -

$.ss'$ -

$B \quad A$ -

(\quad)

$\frac{OA'}{OA} \quad A \quad \frac{OB'}{OB} \quad B$

$D \quad C \quad B' (\quad)$

$.B \quad (Peers) \quad D \quad C$

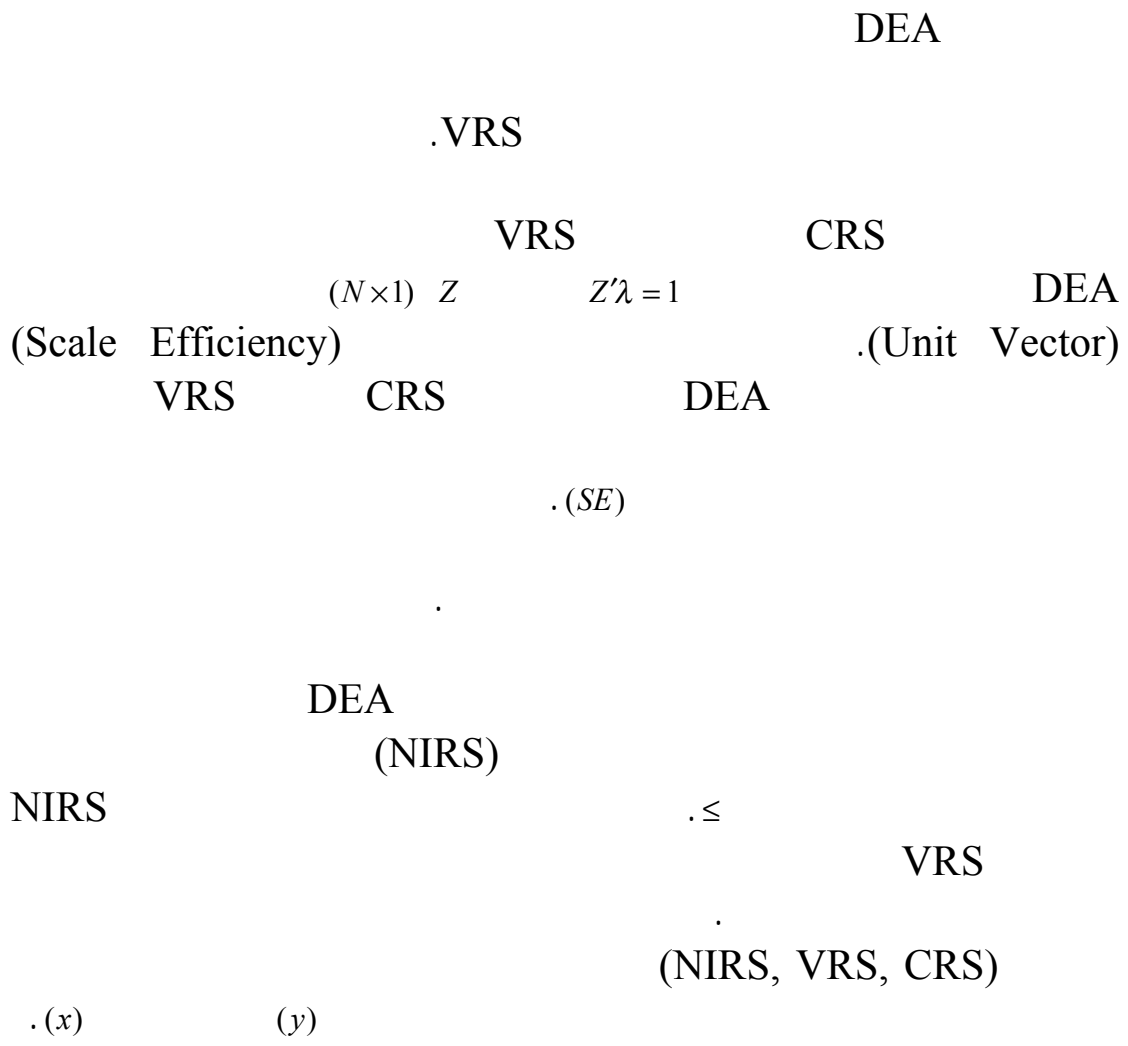
DEA

$.B' \quad B$ (Targets)

:(VRS)

CRS

CRS



$$P \quad TE_{NIRS} = TE_{VRS} = TE_{CRS}$$

$$. TE_{NIRS} \neq TE_{VRS}$$

Data)

.DEA

DEAP (Envelopment Analysis Program

[.http://www.une.edu.au/Econometrics](http://www.une.edu.au/Econometrics) :

DEAP

.DEA

TFPIP

.TFPIP

TFPIP

:

DEA

3

DEA

DEA

:

(VRS)

$$\begin{aligned}
& \text{Max}_{\phi, \lambda} \phi \\
& \text{st} \\
& -\phi y_i + Y\lambda \geq 0 \\
& x_i - X\lambda \geq 0 \\
& Z'\lambda = 1 \\
& \lambda \geq 0
\end{aligned}$$

$$\frac{1}{\phi} \quad \phi - 1 \quad 1 \leq \phi < \infty \quad i \quad (TE)$$

DEAP

: 4

(Cost

(Revenue Maximization)

Minimization)
(Profit Maximization)

: DEA

:DEA 5

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(

.(Two-Stage)

DEA

" (2001)

Balk, B. and R. Altsin (1996), "A New Transitive Productivity Index", *Journal of Productivity Analysis*, 8, 19-27.

Caves, D., L. Christensen, and W. Diewert (1982), "Multilateral Comparisons of Output, Input and Productivity Using Superlative Index Numbers", *Economic Journal*, 92, 73-86.

Coelli, T., P. Rao, and G. Battese (2000), "An Introduction to Efficiency and Productivity Analysis", Kluwer Academic Publishers, Norwell, USA.

Diewert, W. (1976), "Exact and Superlative Index Numbers", *Journal of Econometrics*, 4, 115-45.

Farrell, M. (1957), "The Measurement of Production Efficiency", *Journal of Royal Statistical Society, Series A*, 253-90.

Kenkel, J. (1989), "Introductory Statistics for Management and Economics", third edition, PWS-KENT Publishing Company, Boston, USA.

Limam, I. (2001), "Measuring Technical Efficiency of GCC Banks", Working Paper, API, Kuwait.

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.(International Yearbook of Industrial Statistics)
()

() 1991-1990

					1990		
0.51	4.05	1	45824	1474	120897	1990	
0.62	4.21	1.019	41355	1725	127688	1991	
0.38	1.8	1	19500	2087	42649	1990	
0.38	1.68	1.019	23752	2503	48277	1991	
0.16	1.81	1	1797	98	1552	1990	
0.01	0.95	1.019	1858	271	1807	1991	
0.4	1.45	1	67623	7819	145551	1990	
0.39	1.52	1.019	64133	9118	157988	1991	
1.13	1.82	1	9277	1367	30413	1990	
0.88	1.76	1.019	12989	1654	36365	1991	
0.33	3.08	1	4952	2249	17527	1990	
1.18	1.31	1.019	5263	2877	21951	1991	
0.5	2.23	1	19663	1605	44026	1990	
0.4	2.17	1.019	26811	1892	47121	1991	

author's calculations based on: :

International Yearbook of Industrial Statistics, UNIDO, 1996.

National Accounts Studies, ESCWA.

:

1990 1991 TFPIP

1991	1990	1991-1990	1991-1990	
1.0	1.0	1.129	1.129	
0.492	0.591	0.934	0.934	
0.204	0.299	0.578	0.601	
0.546	0.568	1.09	1.09	
0.648	0.814	0.896	0.896	
0.553	0.408	1.077	1.076	
0.493	0.659	0.832	0.832	

1990

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1991

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- 1991 1990
- %40
- 1991 1990
-
-
- .1991 1990
- ()
- .1991 () 1990
- %20
- .1991 %35 1990
-

1990

DEAP

(1990)

1.0	1.0		1.0	1.0	
0.669	0.918		0.982	0.729	
1.0	1.0		0.313	1.0	
1.0	1.0		0.694	1.0	
1.0	1.0		1.0	1.0	
0.398	0.398		1.0	1.0	
0.749	0.966		0.991	0.775	
0.831	0.897		0.854	0.929	

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%30

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%40

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1990

1991

.1.0

%7

.1990 %83
%17

.%10



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http://www.arab-api.org/develop_1.htm