Package 'clptheory'

April 4, 2023

Title Compute Price of Production and Labor Values

Version 0.1.0

Description Computes the uniform rate of profit, the vector of price of production and the vector of labor values; and also compute measures of deviation between relative prices of production and relative values. <https://scholarworks.umass.edu/econ_workingpaper/347/>. You provide the input-output data and 'clptheory' does the calculations for you.

License MIT + file LICENSE

Encoding UTF-8

RoxygenNote 7.2.3

Imports popdemo, stats, car, utils, dplyr, magrittr

Depends R (>= 2.10)

LazyData true

Suggests knitr, rmarkdown

URL https://github.com/dbasu-umass/clptheory/

NeedsCompilation no

Author Deepankar Basu [aut, cre, cph]

Maintainer Deepankar Basu <dbasu@umass.edu>

Repository CRAN

Date/Publication 2023-04-04 11:40:06 UTC

R topics documented:

`ausiot` *AUS IO Table*

Description

Input Output Tables for the Australian economy from the World Input Output Database.

Usage

```
ausiot
```

Format

Input Output table for Australia for 15 years, 2000-2014.

Source

doi:10.34894/PJ2M1C

Examples

```
ausiot[1:3,1:3]
```

aussea *Socio Economic Accounts*

Description

This is the socio economic accounts for the Australian economy extracted from the 2016 release of the World Input Output Database. It contains industry-level data on employment, capital stocks, gross output and value added at current and constant prices, in millions of local currency. The industry classification is consistent with the world input-output tables.

Usage

```
aussea
```

Format

A industry-level (53 industries) data set for Australia over 15 years, 2000-2014.

country Country code.

code Industry code.

description Description of the industry.

variable One of the following variables:

GO Gross output by industry at current basic prices (in millions of national currency).

II Intermediate inputs at current purchasers' prices (in millions of national currency).

VA Gross value added at current basic prices (in millions of national currency).

EMP Number of persons engaged (thousands).

EMPE Number of employees (thousands).

H_EMPE Total hours worked by employees (millions).

COMP Compensation of employees (in millions of national currency).

LAB Labour compensation (in millions of national currency).

CAP Capital compensation (in millions of national currency).

K Nominal capital stock (in millions of national currency).

GO_PI Price levels gross output, 2010=100.

II_PI Price levels of intermediate inputs, 2010=100.

VA_PI Price levels of gross value added, 2010=100.

GO_QI Gross output, volume indices, 2010=100.

II_QI Intermediate inputs, volume indices, 2010=100.

VA_QI Value added, volume indices, 2010=100.

NOMEXCH Nominal exchange rate between the national currency and the US dollar.

Source

doi:10.34894/PJ2M1C

Examples

```
summary(aussea$COMP)
```

`createdata` *Create data set for analysis.*

Description

This function creates the data objects (matrices, vectors and scalars) necessary to implement the SI and NI.

Usage

```
createdata(country, year, datasea, dataio)
```

Arguments

`country`	country code as a character (e.g. "USA").
`year`	year (eg. 2000).
`datasea`	the socio economic accounts (data frame).
`dataio`	the input-output (data frame).

Value

A list with the following elements:

`Ahat`	The input-output matrix
`l`	The direct labor input vector (complex labor)
`l_simple`	The direct labor input vector (simple labor)
`Q`	The gross output vector
`wavg`	The average or uniform nominal wage rate
`wagevector_all`	The vector of nominal wage rates
`vlp`	Value of labor power
`b`	The consumption or real wage bundle
`pshare`	Average profit share

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
createdata(country="USA",year=2010,datasea=usasea,dataio=usaiot)
```

`nregtestrel` *Nonregression-based Measures of Deviation.*

Description

This function computes various non-regression based measures of deviation between the vector of all possible relative labor values and the vector of all possible relative prices of production.

Usage

```
nregtestrel(x, y, w, w_avg, mev, Q)
```

Arguments

`x`	price vector (1 x n).
`y`	value vector (1 x n).
`w`	nominal wage rate vector (1 x n).
`w_avg`	average nominal wage rate (scalar)
`mev`	monetary expression of value using gross output (scalar)
`Q`	gross output vector (n x 1).

Value

A list with the following elements:

`rmse`	Root mean squared error
`mad`	Mean absolute distance
`mawd`	Mean absolute weighted distance
`cdm`	Classical distance measure
`angle`	Angle between the two vectors (in degrees)
`distangle`	Distance computed using the angle
`lrelpplv`	Length of the relative price of production (or labor value) vector

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Vector of nominal wage rates
w <- matrix(data=rep(wavg,3),nrow=1)
# Value of labor power
v <- 2/3
# Compute prices of production using NI
ni1 <- ppnewint1(A = A,l = l,w = wavg[1,1],v=v,Q = Q,l_simple = l)
# Nonregression-based measures of deviation
nregtestrel(x=ni1$ppabs,y=ni1$lvalues,w=w,w_avg=wavg[1,1],mev=ni1$mevg,Q=Q)
```

---

ppnewint1 *Circulating capital model 1 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a basic circulating capital model using the New Interpretation. The model has uniform wage rates across industries and does not take account of unproductive labor for labor value calculations.

Usage

```
ppnewint1(A, l, w, v, Q, l_simple)
```

Arguments

A	input-output matrix (n x n).
l	vector of complex labor input (1 x n).
w	uniform nominal wage rate (scalar).
v	value of labor power (scalar)
Q	gross output vector (n x 1).
l_simple	vector of simple labor input (1 x n).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Anonneg	Is A Nonnegative? (1=Y,0=N)
Airred	Is A Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
```

```
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Value of labor power
v <- 2/3
# Compute prices of production
ppnewint1(A = A,l = l,w = wavg[1,1],v=v,Q = Q,l_simple = l)
```

---

ppnewint2 *Circulating capital model 2 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a circulating capital model using the New Interpretation. The model allows differential wage rates across industries but does not take account of unproductive labor for labor value calculations.

Usage

```
ppnewint2(A, l, w, v, Q, l_simple)
```

Arguments

A	input-output matrix (n x n).
l	vector of complex labor input (1 x n).
w	vector of nominal wage rates (1 x n).
v	value of labor power (scalar)
Q	gross output vector (n x 1).
l_simple	vector of simple labor input (1 x n).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)

mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Anonneg	Is A Nonnegative? (1=Y,0=N)
Airred	Is A Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform wage rate
wavg <- m%*%b
# Vector of nominal wage rates
w <- matrix(data=c(wavg-0.5,wavg,wavg+0.5),nrow=1)
# Value of labor power
v <- 2/3
# Compute prices of production
```

```
ppnewint2(A = A,l = l,w = w[1,],v=v,Q = Q,l_simple = l)
```

---

ppnewint3 *Circulating capital model 3 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a circulating capital model using the New Interpretation. The model has uniform wage rates across industries and takes account of unproductive labor for labor value calculations.

Usage

```
ppnewint3(A, Ap, l, lp, w, v, Q, Qp, lp_simple)
```

Arguments

A	input-output matrix (n x n).
Ap	input-output matrix for the subset of productive industries (m x m).
l	vector of complex labor input (1 x n).
lp	vector of complex labor input for the subset of productive industries (1 x m).
w	uniform nominal wage rate (scalar).
v	value of labor power (scalar).
Q	gross output vector (n x 1).
Qp	gross output vector for the subset of productive industries (m x 1).
lp_simple	vector of simple labor input for the subset of productive industries (1 x m).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Anonneg	Is A Nonnegative? (1=Y,0=N)
Airred	Is A Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Value of labor power
v <- 3/5
# Compute prices of production
ppnewint3(A=A,Ap=A[1:2,1:2],l=l,lp=l[1,1:2],w=wavg[1,1],v=v,Q=Q,Qp=Q[1:2,1],lp_simple=l[1,1:2])
```

`ppnewint4` *Circulating capital model 4 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a circulating capital model using the New Interpretation. The model allows differential wage rates across industries and takes account of unproductive labor for labor value calculations.

Usage

```
ppnewint4(A, Ap, l, lp, w, wp, v, Q, Qp, lp_simple)
```

Arguments

A	input-output matrix (n x n).
Ap	input-output matrix for the subset of productive industries (m x m).
l	vector of complex labor input (1 x n).
lp	vector of complex labor input for the subset of productive industries (1 x m).
w	vector of nominal wage rates (1 x n).
wp	vector of nominal wage rates for the subset of productive industries (1 x m).
v	value of labor power (scalar).
Q	gross output vector (n x 1).
Qp	gross output vector for the subset of productive industries (m x 1).
lp_simple	vector of simple labor input for the subset of productive industries (1 x m).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Anonneg	Is A Nonnegative? (1=Y,0=N)
Airred	Is A Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform wage rate
wavg <- m%*%b
# Vector of nominal wage rates
w <- matrix(data=c(wavg-0.5,wavg,wavg+0.5),nrow=1)
# Value of labor power
v <- 3/5
# Compute prices of production
ppnewint4(A=A,Ap=A[1:2,1:2],l=l,lp=l[1,1:2],w=w[1,],wp=w[1,1:2],v=v,
Q=Q,Qp=Q[1:2,1],lp_simple=l[1,1:2])
```

`ppnewint5` *Capital stock model 1 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a basic capital stock model using the New Interpretation. The model has uniform wage rates across industries and does not take account of unproductive labor for labor value calculations.

Usage

```
ppnewint5(A, l, w, v, Q, D, K, t, l_simple)
```

Arguments

A	input-output matrix (n x n).
l	vector of complex labor input (1 x n).
w	uniform nominal wage rate (scalar).
v	value of labor power (scalar)
Q	gross output vector (n x 1).
D	depreciation matrix (n x n).
K	capital stock coefficient matrix (n x n).
t	turnover times matrix (n x n diagonal).
l_simple	vector of simple labor input (1 x n).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Nnonneg	Is N Nonnegative? (1=Y,0=N)
Nirred	Is N Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
```

```
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Value of labor power
v <- 2/3
# Depreciation matrix
D <- matrix(data = c(0,0,0,0.00568,0.0267,0.0028,0.00265,0.0147,0.00246),
nrow=3, ncol=3, byrow = TRUE
)
# Capital stock coefficient matrix
K <- matrix(
data = c(0,0,0,0.120,0.791,0.096,0.037,0.251,0.043),
nrow=3, ncol=3, byrow = TRUE
)
# Diagonal turnover matrix
t <- diag(c(0.317, 0.099, 0.187))
# Compute prices of production
ppnewint5(A = A,l = l,w = wavg[1,1],v=v,Q = Q,l_simple = l,D=D,K=K,t=t)
```

---

ppnewint6 *Capital stock model 2 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a capital stock model using the New Interpretation. The model allows differential wage rates across industries but does not take account of unproductive labor for labor value calculations.

Usage

```
ppnewint6(A, l, w, v, Q, D, K, t, l_simple)
```

Arguments

A	input-output matrix (n x n).
l	vector of complex labor input (1 x n).
w	vector of nominal wage rates (1 x n).
v	value of labor power (scalar)
Q	gross output vector (n x 1).
D	depreciation matrix (n x n).
K	capital stock coefficient matrix (n x n).
t	turnover times matrix (n x n diagonal).
l_simple	vector of simple labor input (1 x n).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Nnonneg	Is N Nonnegative? (1=Y,0=N)
Nirred	Is N Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
```

```
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Vector of nominal wage rates
w <- matrix(data=c(wavg-0.5,wavg,wavg+0.5),nrow=1)
# Value of labor power
v <- 2/3
# Depreciation matrix
D <- matrix(data = c(0,0,0,0.00568,0.0267,0.0028,0.00265,0.0147,0.00246),
nrow=3, ncol=3, byrow = TRUE
)
# Capital stock coefficient matrix
K <- matrix(
data = c(0,0,0,0.120,0.791,0.096,0.037,0.251,0.043),
nrow=3, ncol=3, byrow = TRUE
)
# Diagonal turnover matrix
t <- diag(c(0.317, 0.099, 0.187))
# Compute prices of production
ppnewint6(A=A,l=l,w=w[1,],v=v,Q=Q,l_simple=l,D=D,K=K,t=t)
```

---

ppnewint7 *Capital stock model 3 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a capital stock model using the New Interpretation. The model has uniform wage rates across industries and takes account of unproductive labor for labor value calculations.

Usage

```
ppnewint7(A, Ap, l, lp, w, v, Q, Qp, D, Dp, K, t, lp_simple)
```

Arguments

A	input-output matrix (n x n).
Ap	input-output matrix for the subset of productive industries (m x m).
l	vector of complex labor input (1 x n).
lp	vector of complex labor input for the subset of productive industries (1 x m).
w	uniform nominal wage rate (scalar).
v	value of labor power (scalar).
Q	gross output vector (n x 1).
Qp	gross output vector for the subset of productive industries (m x 1).
D	depreciation matrix (n x n).
Dp	depreciation matrix for the subset of productive industries (m x m).
K	capital stock coefficient matrix (n x n).
t	turnover times matrix (n x n diagonal).
lp_simple	vector of simple labor input for the subset of productive industries (1 x m).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Nnonneg	Is N Nonnegative? (1=Y,0=N)
Nirred	Is N Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Vector of nominal wage rates
w <- matrix(data=c(wavg-0.5,wavg,wavg+0.5),nrow=1)
# Value of labor power
v <- 3/5
# Depreciation matrix
D <- matrix(data = c(0,0,0,0.00568,0.0267,0.0028,0.00265,0.0147,0.00246),
nrow=3, ncol=3, byrow = TRUE
)
# Capital stock coefficient matrix
K <- matrix(
data = c(0,0,0,0.120,0.791,0.096,0.037,0.251,0.043),
nrow=3, ncol=3, byrow = TRUE
)
# Diagonal turnover matrix
t <- diag(c(0.317, 0.099, 0.187))
# Compute prices of production
ppnewint7(A=A,Ap=A[1:2,1:2],l=l,lp=l[1,1:2],w=wavg[1,1],v=v,
Q=Q,Qp=Q[1:2,1],lp_simple=l[1,1:2],D=D,Dp=D[1:2,1:2],K=K,t=t)
```

---

ppnewint8 *Capital stock model 4 using the New Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a capital stock model using the New Interpretation. The model allows differential wage rates across industries and takes account of unproductive labor for labor value calculations.

Usage

```
ppnewint8(A, Ap, l, lp, w, wp, v, Q, Qp, D, Dp, K, t, lp_simple)
```

Arguments

A	input-output matrix (n x n).
Ap	input-output matrix for the subset of productive industries (m x m).
l	vector of complex labor input (1 x n).
lp	vector of complex labor input for the subset of productive industries (1 x m).
w	vector of nominal wage rates (1 x n).
wp	vector of nominal wage rates for the subset of productive industries (1 x m).
v	value of labor power (scalar).
Q	gross output vector (n x 1).
Qp	gross output vector for the subset of productive industries (m x 1).
D	depreciation matrix (n x n).
Dp	depreciation matrix for the subset of productive industries (m x m).
K	capital stock coefficient matrix (n x n).
t	turnover times matrix (n x n diagonal).
lp_simple	vector of simple labor input for the subset of productive industries (1 x m).

Value

A list with the following elements:

meig	Maximum eigen value of A
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
mevn	Monetary expression of value using net output
mevg	Monetary expression of value using gross output
Nnonneg	Is N Nonnegative? (1=Y,0=N)
Nirred	Is N Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Vector of nominal wage rates
w <- matrix(data=c(wavg-0.5,wavg,wavg+0.5),nrow=1)
# Value of labor power
v <- 3/5
# Depreciation matrix
D <- matrix(data = c(0,0,0,0.00568,0.0267,0.0028,0.00265,0.0147,0.00246),
nrow=3, ncol=3, byrow = TRUE
)
# Capital stock coefficient matrix
K <- matrix(
data = c(0,0,0,0.120,0.791,0.096,0.037,0.251,0.043),
nrow=3, ncol=3, byrow = TRUE
)
# Diagonal turnover matrix
t <- diag(c(0.317, 0.099, 0.187))
# Compute prices of production
ppnewint8(A=A,Ap=A[1:2,1:2],l=l,lp=l[1,1:2],w=w[1,],wp=w[1,1:2],v=v,
```

```
Q=Q,Qp=Q[1:2,1],lp_simple=l[1,1:2],D=D,Dp=D[1:2,1:2],K=K,t=t)
```

---

ppstdint1 *Circulating capital model 1 using the Standard Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a basic circulating capital model using the Standard Interpretation. The model has uniform wage rates across industries and does not take into account unproductive labor for labor value calculations.

Usage

```
ppstdint1(A, l, b, Q, l_simple)
```

Arguments

A	input-output matrix (n x n).
l	vector of complex labor input (1 x n).
b	vector real wage bundle (n x 1).
Q	gross output vector (n x 1).
l_simple	vector of simple labor input (1 x n).

Value

A list with the following elements:

meig	Maximum eigen value of M
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
dprice	Direct price vector
mevg	Monetary expression of value using gross output
mnonneg	Is M Nonnegative? (1=Y,0=N)
mirred	Is M Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Compute prices of production
ppstdint1(A = A,l = l,b = b,Q = Q,l_simple = l)
```

`ppstdint2` *Circulating capital model 2 using the Standard Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a circulating capital model using the Standard Interpretation. The model has uniform wage rates across industries and takes into account unproductive labor for labor value calculations.

Usage

```
ppstdint2(A, Ap, l, b, Q, Qp, lp_simple)
```

Arguments

`A`	input-output matrix (n x n).
`Ap`	input-output matrix for the subset of productive industries (m x m).
`l`	vector of complex labor input (1 x n).
`b`	vector real wage bundle (n x 1).

Q	gross output vector (n x 1).
Qp	gross output vector for the subset of productive industries (m x 1).
lp_simple	vector of simple labor input for the subset of productive industries (1 x m).

Value

A list with the following elements:

meig	Maximum eigen value of M
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
dprice	Direct price vector
mevg	Monetary expression of value using gross output
mnonneg	Is M Nonnegative? (1=Y,0=N)
mirred	Is M Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
```

```
)
# Direct labor input vector (simple)
l_simple <- l
# Compute prices of production
ppstdint2(A=A,Ap=A[1:2,1:2],l=l,b=b,Q=Q,Qp=Q[1:2,1],lp_simple=l[1,1:2])
```

---

ppstdint3 *Capital stock model 1 using the Standard Interpretation.*

Description

This function computes the uniform rate of profit, prices of production and labor values for a basic capital stock model using the Standard Interpretation. The model has uniform wage rates across industries and does not take into account unproductive labor for labor value calculations.

Usage

```
ppstdint3(A, l, b, Q, D, K, t, l_simple)
```

Arguments

A	input-output matrix (n x n).
l	vector of complex labor input (1 x n).
b	vector real wage bundle (n x 1).
Q	gross output vector (n x 1).
D	depreciation matrix (n x n).
K	capital stock coefficient matrix (n X n).
t	turnover matrix (n x n diagonal matrix).
l_simple	vector of simple labor input (1 x n).

Value

A list with the following elements:

meig	Maximum eigen value of N
urop	Uniform rate of profit (as a fraction)
mrop	Maximum rate of profit (as a fraction)
ppabs	Price of production vector (absolute)
pprel	Price of production vector (relative)
lvalues	Labor values vector
dprice	Direct price vector
mevg	Monetary expression of value using gross output
nnonneg	Is N Nonnegative? (1=Y,0=N)
nirred	Is N Irreducible? (1=Y,0=N)

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# ------ Data
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Depreciation matrix
D <- matrix(data = c(0,0,0,0.00568,0.0267,0.0028,0.00265,0.0147,0.00246),
nrow=3, ncol=3, byrow = TRUE
)
# Capital stock coefficient matrix
K <- matrix(
data = c(0,0,0,0.120,0.791,0.096,0.037,0.251,0.043),
nrow=3, ncol=3, byrow = TRUE
)
# Diagonal turnover matrix
t <- diag(c(0.317, 0.099, 0.187))
# Compute prices of production
ppstdint3(A = A,l = l,b = b,Q = Q,l_simple = l,D=D,K=K,t=t)
```

`regtestrel` *Regression-based Measures of Deviation.*

Description

This function computes various regression based measures of deviation between the vector of all possible relative labor values and the vector of all possible relative prices of production. It runs a log-log and a level-level regression of relative prices on relative values and tests the joint null hypothesis that the intercept is 0 and the slope is 1.

Usage

```
regtestrel(x, y)
```

Arguments

x	price vector (1 x n).
y	value vector (1 x n).

Value

A list with the following elements:

a0lg	Intercept in the log-log regression
a1lg	Slope in the log-log regression
r2lg	R-squared in the log-log regression
fstatlg	F-stat of the null hypothesis that a0=0 and a1=1 in the log-log regression
pvallg	P-value of the null hypothesis that a0=0 and a1=1 in the log-log regression
nlg	Number of observations in the log-log regression
a0lv	Intercept in the level-level regression
a1lv	Slope in the level-level regression
r2lv	R-squared in the level-level regression
fstatlv	F-stat of the null hypothesis that a0=0 and a1=1 in the level-level regression
pvallv	P-value of the null hypothesis that a0=0 and a1=1 in the level-level regression
nlv	Number of observations in the level-level regression

References

Basu, Deepankar and Moraitis, Athanasios, "Alternative Approaches to Labor Values andPrices of Production: Theory and Evidence" (2023). Economics Department Working Paper Series. 347. URL: https://scholarworks.umass.edu/econ_workingpaper/347/

Examples

```
# Input-output matrix
A <- matrix(
data = c(0.265,0.968,0.00681,0.0121,0.391,0.0169,0.0408,0.808,0.165),
nrow=3, ncol=3, byrow = TRUE
```

```
)
# Direct labor input vector (complex)
l <- matrix(
data = c(0.193, 3.562, 0.616),
nrow=1
)
# Real wage bundle
b <- matrix(
data = c(0.0109, 0.0275, 0.296),
ncol=1
)
# Gross output vector
Q <- matrix(
data = c(26530, 18168, 73840),
ncol=1
)
# Direct labor input vector (simple)
l_simple <- l
# Market price vector
m <- matrix(data = c(4, 60, 7),nrow=1)
# Uniform nominal wage rate
wavg <- m%*%b
# Vector of nominal wage rates
w <- matrix(data=rep(wavg,3),nrow=1)
# Value of labor power
v <- 2/3
# Compute prices of production using NI
ni1 <- ppnewint1(A = A,l = l,w = wavg[1,1],v=v,Q = Q,l_simple = l)
# Regression-based measures of deviation
regtestrel(x=ni1$ppabs,y=ni1$lvalues)
```

`usaiot` *USA IO Table*

Description

Input Output Tables for the US economy from the World Input Output Database.

Usage

```
usaiot
```

Format

Input Output table for USA for 15 years, 2000-2014.

Source

doi:10.34894/PJ2M1C

Examples

```
usaiot[1:5,1:5]
```

---

usarwb *Real Wage Bundle, USA*

Description

Personal Consumption Expenditure from the Input Output Table for the USA. This data is used to construct the real wage bundle for computing the price of production vector.

Usage

```
usarwb
```

Format

Consumption expenditure on the output of 53 industries for USA for 15 years, 2000-2014.

Source

doi:10.34894/PJ2M1C

Examples

```
data(usarwb)
```

---

usasea *Socio Economic Accounts*

Description

This is the socio economic accounts for the USA extracted from the 2016 release of the World Input Output Database. It contains industry-level data on employment, capital stocks, gross output and value added at current and constant prices, in millions of local currency. The industry classification is consistent with the world input-output tables.

Usage

```
usasea
```

Format

A industry-level (53 industries) data set for USA over 15 years, 2000-2014.

country Country code.

code Industry code.

description Description of the industry.

variable One of the following variables:

GO Gross output by industry at current basic prices (in millions of national currency).

II Intermediate inputs at current purchasers' prices (in millions of national currency).

VA Gross value added at current basic prices (in millions of national currency).

EMP Number of persons engaged (thousands).

EMPE Number of employees (thousands).

H_EMPE Total hours worked by employees (millions).

COMP Compensation of employees (in millions of national currency).

LAB Labour compensation (in millions of national currency).

CAP Capital compensation (in millions of national currency).

K Nominal capital stock (in millions of national currency).

GO_PI Price levels gross output, 2010=100.

II_PI Price levels of intermediate inputs, 2010=100.

VA_PI Price levels of gross value added, 2010=100.

GO_QI Gross output, volume indices, 2010=100.

II_QI Intermediate inputs, volume indices, 2010=100.

VA_QI Value added, volume indices, 2010=100.

NOMEXCH Nominal exchange rate between the national currency and the US dollar.

Source

doi:10.34894/PJ2M1C

Examples

```
summary(usasea$COMP)
```

Index