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#### **Outline**

- Equation and Variable Counting
- Market Clearing
  - Commodities & Activities
  - Other Markets
  - Factor Market Clearing Options
    - Full Factor Mobility and Employment
      - '(new) classical' assumption
    - Factor Immobility
      - Short run market clearing
    - Activity Inspired Restrictions on Factor Markets
      - 'Realism'!!

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## SAMs & Macroeconomy - Counting

$$t_{jk} = t_{jk} (y; p, f, \lambda) \longrightarrow VARS = [y] + [p] + [f] + [\lambda]$$

$$p = p(y; p, f, \lambda)$$

$$y = n + x$$
EQNS =  $[y] + [p] - 1$ 

Degrees of Freedom = 
$$[f] + \lambda + 1$$

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## **Market Clearing**

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## **Market Clearing**

- Commodity markets
  - Commodity supply = commodity demand
  - Production equilibrium
- Other accounts
  - Government account
    - Internal 'balance'
  - Trade accounts
    - Trade (external) 'balance'
  - Savings-investment account
    - · 'Walras' law
- Factor markets
  - Factor supply = factor demand

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Commodity & Activity Market Clearing

* ### Commodity and activity market clearing

PRODEQUIL(a,c)..

QXAC(a,c) =E= IOQXACQXV(a,c)*QX(a);

QEQUIL(c)..

QQ(c) =E= QTTD(c)

+ SUM(a,QINTD(c,a))
+ SUM(h,QCD(c,h))
+ SUM(e,QED(c,e))
+ QGD(c)
+ SUM[in,QINVD(c,in)] + dstocconst(c)

;

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Oceano
```



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```
Other Market Clearing
  ### Institutional account (market) clearing
GOVEQUIL..
           KAPGOV = E = YG - EG ;
CAEQUIL.. CAPWOR =E= SUM[cm, PWM(cm) *QM(cm)]
                         + [SUM(f,YFWOR(f))/ER]
                         - SUM[ce, PWE(ce)*QE(ce)]
                         - SUM[h, howor(h)]
                         - SUM[e,entwor(e)]
                         - govwor
                         - SUM[f, factwor(f)];
  ##### Slack
WALRASEQ..
                   TOTSAV =E= INVEST + WALRAS
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```

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## **Factor Market Clearing**

$$\sum_{insv} FSI_{insw,f} = \sum_{a} FD_{f,a}$$

FMEQUIL(f)..
SUM(insw,FSI(insw,f)) =E= SUM(a, FD(f,a));

#### **Assumes:**

- 1. Full employment
- 2. Full factor mobility

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## Full Factor Mobility & Employment

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## Full Factor Mobility and Employment

#### In theory

factor payment = value of the marginal product of the factor

In stg\_t, the payment to a factor is:

$$WF(f)*WFDIST(f,a)*(1 + TF(f,a))$$

#### Where

```
WF(f) = economy-wide average price of factor f
WFDIST(f,a) = activity specific factor proportionality pay't
TX(f,a) = factor use tax by activity
```

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```
Full Factor Mobility and Employment

*# Basic Factor Market Closure

FSI_{inswf} = \overline{FSI}_{insw,f}

FSI.FX(insw,f) = FSIO(insw,f);

WFDIST_{f,a} = \overline{WFDIST_{f,a}}

WFDIST.FX(f,a) = WFDISTO(f,a);

Min WF_f = - infinity

Max WF_f = + infinity

WF.LO(f) = -inf;

Min FD_{f,a} = - infinity

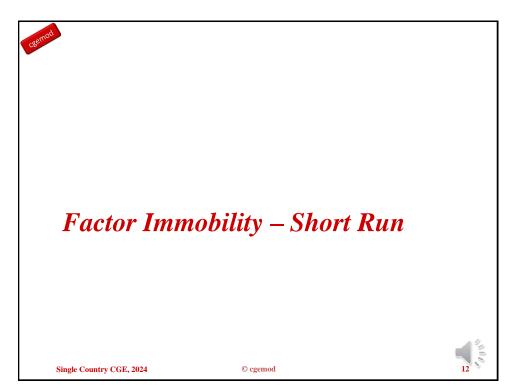
Min FD_{f,a} = - infinity

Max FD_{f,a} = + infinity

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Oceans
```

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### Factor Immobility - Short Run

Fix the factor demand by activity

$$FD_{fact,a} = FD_{fact,a}$$

$$FD.FX(k,a) = FDO(k,a)$$
;

Allow factor returns to vary by activity

$$WFDIST.LO_{fact,a} = -\inf$$

 $WFDIST.UP_{fact,a} = +\inf$ 

Adjustment through WFDIST

$$WF_{fact} = \overline{WF_{fact}}$$

$$WF.FX(k) = WFO(k)$$
;

Add code below Basic Closure to modify the constraints

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# Other Factor Market Clearing Options

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## **Activity Inspired Restrictions**

- Assume that the supply of capital is fixed in agriculture
  - Agricultural capital is different from capital in other sectors

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### **Activity Inspired Restrictions**

- Assume that the mining activity ("amins") cannot expand production in the 'solution period'
  - New mines typically takes a long time to establish
  - There may be an optimal extraction rate
  - Exports may be dominated by the output of the activity and it may be a small country
    - Diamonds in Botswana; Oil in Saudi Arabia
- Knowledge of what makes sense is important

## DO NOT USE TO PROVE YOUR PRIOR ASSUMPTIONS

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## **Activity Inspired Restrictions**

```
FD.FX(f, "amins") = FDO(f, "amins ");
WFDIST.LO(f, "amins ") = -inf;
WFDIST.UP(f, "amins ") = +inf;
```

# Is this enough?

CES at top level allows extra inputs through increased use of intermediates

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## STAGE\_t: Market Clearing

The End

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