STAGE_t: Factor Demand & Supply

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Outline

- Endogenous factor supplies
- Production boundary
  - SNA production boundary
  - General production boundary
    - Leisure and social reproduction
  - Labour force and the production boundary
- Factor Demand and Supply
  - Factor Demand
  - Factor Supply
  - Factor ownership by institution
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      - Government vv public enterprises
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  - Calibration
- Endogenous Factors supplies
  - Why variables in stg_t?

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Production Boundaries

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SNA Production Boundary

Inside the SNA Boundary
Activities that produce goods and services for sale on markets for which prices can be uniquely defined, whether or not they are actually sold. (HPHC is inside the production boundary) (SNA, 2008, 1.41.and 1.42 and 6.27).

Outside the SNA Boundary
"activities undertaken by households that produce services for their own use ……" (SNA, 2008, 1.40, 6.26 and 6.27).

Reason
"household services are not produced for the market, there are typically no suitable market prices that can be used to value such services." (see SNA, 2008, 6.28 to 6.31)

Consequence
The inputs (labour) used to produce 'services for their own use' are excluded from the accounts.

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General Production Boundary

Inside the General Boundary

Activities that produce goods and services for sale on markets for which prices can be uniquely defined, whether or not they are actually sold. (SNA, 2008, 1.41, 1.42 and 6.27).

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"activities undertaken by households that produce services for their own use ……" (SNA, 2008, 1.40, 6.26 and 6.27).

Reasons

1. Labour is used to **produce** leisure and social reproduction services
2. Defines the total supply of labour by households to productive activities

Consequence

If labour services are moved between 'market' and 'non-market' activities, there are opportunity costs

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Labour and the Production Boundary

Population of the country

three categories; employed, unemployed and not in the labour force.

Economically active population

"…. individuals willing to supply labour to undertake an activity included in the SNA production boundary" (SNA, 2008, 19.5).

Labour Force

"those who are actively prepared to make their labour available during any particular reference period for producing goods and services that are included within the production boundary of the SNA. The labour force is further divided into those who are employed and those who are unemployed." (SNA, 2008, 19.17).

Unemployed

those who are neither "an employee or self-employed but available for work and actively seeking work." (SNA, 2008, 19.29)

Moreover, "[T]he concept of unemployed persons is not required in the national accounts because the unemployed do not contribute to production but their numbers are necessary to make the conceptual transition from the employed population to the economically active population." (SNA, 2008, 19.29).

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Labour and the Production Boundary

Consequences

1. "[I]f the production boundary was extended to include the production of personal and domestic services by members of households for their own final consumption, all persons engaged in such activities would become self-employed, making unemployment virtually **impossible** by definition." (SNA, 1.42)
2. "[T]his illustrates the need to confine the production boundary in the SNA and other related statistical systems to market activities or fairly close substitutes for market activities" (1.42).

Model Issues

1. Labour-Leisure trade off
2. Social reproduction
3. Unemployment benefits

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Factor Demand and Supply

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Factor Demand

Harberger 'convention': no factor quantity data

$$VFD_{f,a} = SAM_{f,a} \qquad VFS_f = \sum_a VFD_{f,a} \Rightarrow VFD_{f,a} \equiv FD_{f,a} \qquad \forall f,a$$

$$WFA_{f,a} = \frac{SAM_{f,a}}{SAM_{f,a}} = \frac{\left(WFA_{f,a} * VFD_{f,a}\right)}{VFD_{f,a}} = \frac{\left(WF_f * wfdist_{f,a} * VFD_{f,a}\right)}{VFD_{f,a}} = 1 \qquad \forall f,a$$

$$WF_f.wfdist_{f,a} = 1 \qquad \forall f,a$$

Harberger convention: factors are homogenous with no activity specific technology attributes.

Hence, the units of the value quantities can be defined as factor:activity specific efficiency units.

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Factor Demand

Physical Factor quantities: Satellite account

$$FD_{f,a} = FACTUSE_{f,a} \qquad FS_f = \sum_a FD_{f,a}$$

$$WFA_{f,a} = \frac{SAM_{f,a}}{FACTUSE_{f,a}} = \frac{\left(WFA_{f,a}.FD_{f,a}\right)}{FACTUSE_{f,a}} = WF_f.wfdist_{f,a}$$

$$WF_f.wfdist_{f,a} = PVA_a.QVA_a.\left[\sum_f \delta_{f,a}.FD_{f,a}^{-\rho_a}\right]^{-1}.\delta_{f,a}.FD_{f,a}^{-\rho_a-1}$$

***wfdist*$_{f,a}$**

1. **differences in the observed productivities of the factors in different activities**
2. **all differences in rates or return are activity specific**

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Factor Supply

'Conventional' presumption

$$FS_f = \sum_a FD_{f,a} \qquad fsi_{ins,f} = insvash_{ins,f} * FS_f$$

IMplicit factor supply by institutions

Endogenous factor supplies presumption

$$FS_f = \sum_{ins} FSI_{ins,f} \qquad FSISH_{ins,f} = \frac{FSI_{ins,f}}{\sum_{ins} FSI_{ins,f}}$$

EXplicit factor supply by institutions

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Factor Ownership

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YFEQ(f)..          YF(f) =E= SUM(a,WF(f)*WFDIST(f,a)*FD(f,a))
                           + (factwor(f)*ER) ;

YFDISPEQ(f).. YFDISP(f) =E= (YF(f) * (1-deprec(f)))*(1-TYF(f)) ;

YFINSEQ(f)..   YFINS(f) =E= YFDISP(f) ;

FSISHEQ(insw,f)$SUM(inswp,fsia(inswp,f)) ..
     FSISH(insw,f) =E= FSI(insw,f)/SUM(inswp,FSI(inswp,f)) ;

INSVAEQ(insw,f).. INSVA(insw,f) =E= FSISH(insw,f) * YFINS(f) ;

* ## Household Income

YHEQ(h)..          YH(h) =E= SUM(f,INSVA(h,f))
                           + ….. ;
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Any changes in FSI cause changes in INSVA

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Calibrating Factor Supply by Institution

- Factor quantity data
  - Factor use by activity (FACTUSE)
  - Factor ownership by institution (FACTINS)
    - Households
    - Enterprises – private and public
    - Rest of the World
- Factor transactions data
  - FACTUSE – (transaction) value quantities
  - FACTINS – modified transaction values
- Reconciliation
  - Requires consistency between FACTUSE & FACTINS
    - Coded to remove very small inconsistencies

Calibrating FACTUSE & FACTINS

- Step 1: SAM(f,a)
- Step 2: FEXP(f) = SUM[a,SAM(f,a)]
  - Total value of domestic expenditure on factors
- Step 3: SAM(insw,f)
  - excludes depreciation and factor income taxes
- Step 4: SUM[insw,SAM(insw,f)]
  - factor expenditures less depreciation and income taxes
- Step 5: FINSsh(insw,f) = (SAM(insw,f)/ SUM[insw,SAM(insw,f)]
  - shares of factor expenditures
- Step 6: FACTINS = FINSsh(insw,f) * FEXP(f)

Critical Assumptions:

1. **Rate of return is independent of ownership**
2. **Rate of depreciation is independent of ownership**

Missing data: FACTUSEINS(f,a,insw)

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Endogenous Factor Supplies

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Why Factor Supply by Institution?

- FSI defined by choice of production boundary
  - Labour force or All labour
- Endogenous changes in FSI
  - Comparative statics
    - Household migration
    - Changes in leisure
    - Changes in social reproduction
    - Changes in unemployment
    - Factor mobility functions
  - Dynamics
    - Changes in household composition
    - Changes in factor ownership
    - Changes in factor quality

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The End