Including unpaid work into economic modelling: computable general equilibrium models of the 24 hours
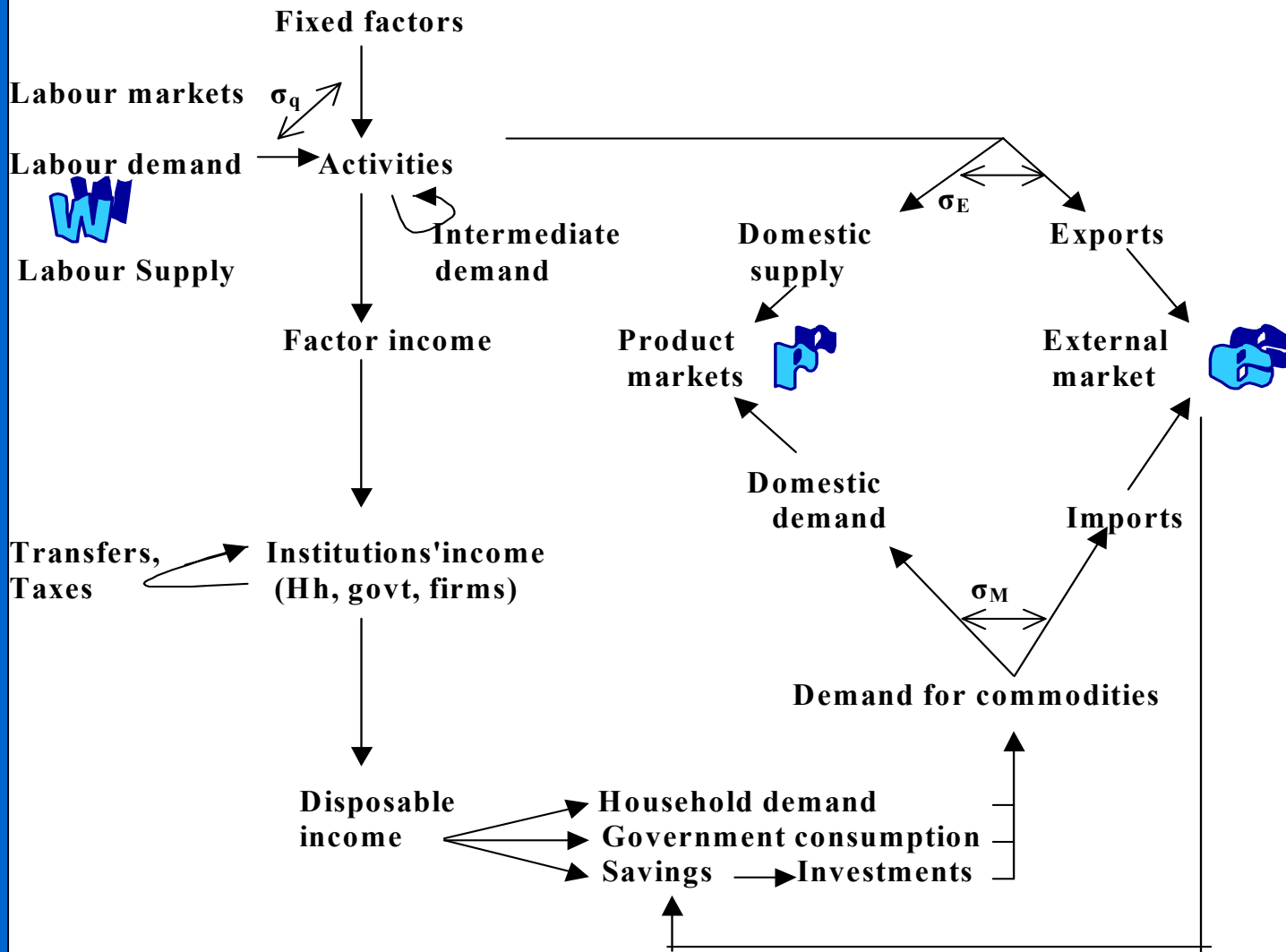
Marzia Fontana

Levy Economics Institute

- Computable general equilibrium (CGE) models emphasise interactions and feedback effects between sectors and actors

- They are often used to inform policy

- An effective tool for making time use data 'speak'

CGE FLOW CHART

Fixed factors

Labour markets σ_q

Labour demand → **Activities**

Labour Supply

Intermediate demand

Domestic supply

σ_E

Exports

Factor income

Product markets

External market

Domestic demand

Imports

Transfers, Taxes → **Institutions'income (Hh, govt, firms)**

σ_M

Demand for commodities

Disposable income

Household demand

Government consumption

Savings → **Investments**

Two parts

- Insights
- Suggestions for further work

The gendered CGE model

- Male and female labour
- Allocation of 24 hours each day
  - Market
  - Social reproduction
  - Leisure
- Social reproduction and leisure sectors
  - Qualitatively similar
  - Quantitatively different

- Stylised model of Bangladesh (1985):
  - Increase in female intensive manufactured exports

- Disaggregated models of Bangladesh (1994) and Zambia (1995):
  - Tariff liberalisation in manufacturing
  - Higher import price of food grains
  - Rise in foreign capital inflow
  - Export incentives in non-traditional agriculture
  - Changes in the price of copper

Results of a three-fold increase in female-intensive manufactured exports, for different values of gender rigidity
(absolute and percentage changes from base case levels)

	Base case	(Experiment T4) Central model specification		(Experiment E2) Lower price elasticity of demand f reproduction and f/m substitution elasticities	
	Base case	Absolute	%	Absolute	%
Female time use (billion hours)					
Leisure	13.8	-0.9	-6.4	-1.2	-8.9
Reproduction	103.6	-3.7	-3.6	-1.1	-1.1
Market, of which	51.8	4.6	8.9	2.4	4.5
Manufacturing	1.7	6.7	389.3	6.3	365.2
Total	169.2				
Wages (constant 1985 cents per hour)					
Female	2.7	0.1	3.0	0.4	15.8
Male	6.8	-0.3	-4.6	-0.5	-7.4
Female cash wage bill ($ million)	320	197	61.6	238	74.5

Effects of a three fold increase of female-intensive manufactured exports on output (percentage changes)

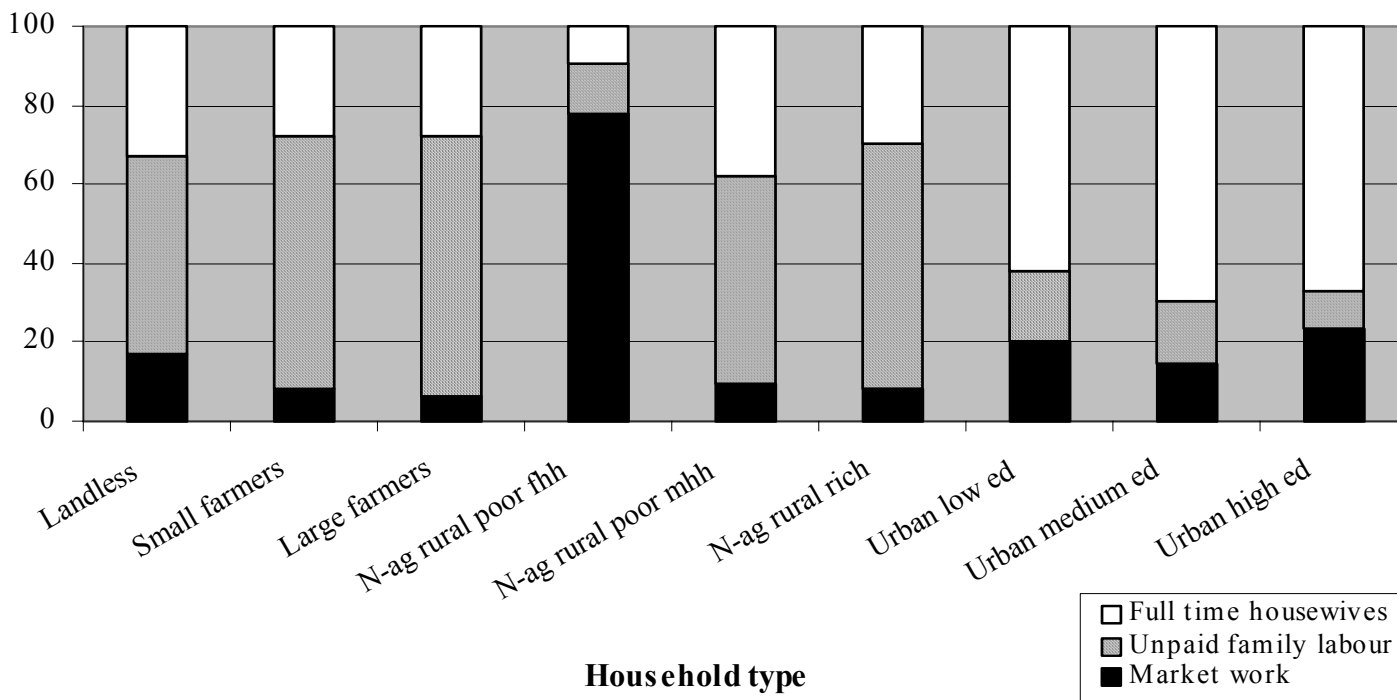|	Market	Social Reproduction	Leisure
Output	+ 2.9 ↑	- 2.8 ↓	- 8.7 ↓

Table 2.6. Results of experiment T4 (female-intensive manufactured exports) with different sectoral coverage
(absolute and percentage changes from base case levels)

		(T4) Central model specification		(S3) Exclusion of leisure and reproduction	
	Base case	Absolute	%	Absolute	%
Female time use (million hours)					
Leisure	13808	-885	-6.4	**?**	
Reproduction	103556	-3722	-3.6		
Market, of which	51777	4606	8.9	0	0.0
Agriculture	43147	-1943	-4.5	-4997	-11.6
Manufacturing	1726	6722	389.3	5850	338.8
Services	6903	-172	-2.5	-853	-12.3
Wages (constant 1985 cents per hour)					
Female	2.7	0.1	3.0	0.4	15.9
Male	6.8	-0.3	-4.6	-0.4	-5.6
F/M gap			7.6		21.5

Sectoral structure of Bangladesh,1994

	Net output (% of GDP)	Export intensity	Import penetration	Tariffs as % of imports	Female intensity(%)	F labour (% of tot)	M labour (% of tot)
Grains	9	-	2	13	17	2	10
Commercial crops	4	0	7	2	3	0	3
Livestock and horticulture	7	0	2	9	47	7	8
Fishing	3	10	-	-	29	0	0
Food processing	5	1	2	61	30	0	0
Garments	2	88	8	4	83	1	0
Other textiles	3	19	28	12	12	0	2
Other manufacturing	4	2	46	21	16	0	1
Infrastructure	12	-	-	-	5	0	1
Trade	17	-	-	-	5	1	9
Transport	15	-	-	-	1	0	4
Public services	12	-	-	-	20	0	2
Financial services	6	-	-	-	6	0	0
Domestic services	4	-	-	-	43	2	2
All market sectors	100	11	20	18	24	13	42
All social reproduction	37	-	-	-	76	53	16
All leisure	53	-	-	-	44	34	42
Total	189			-	49	100	100

Figure 3.2. Employment status of adult females by household

Legend:
- ☐ Full time housewives
- ▨ Unpaid family labour
- ■ Market work

Household type

Categories (x-axis): Landless, Small farmers, Large farmers, N-ag rural poor fhh, N-ag rural poor mhh, N-ag rural rich, Urban low ed, Urban medium ed, Urban high ed

Sectoral structure of Zambia,1995

	Net output (% of GDP)	Export intensity*	Import penetratio	Tariffs as of imports	Female intensity(%)	F labour (% of tot)	M labour (% of tot)
Maize	4	4	15	3	54	9	6
Commercial crops	1	16	17	0	41	1	1
Horticulture and groundnuts	6	3	3	21	60	13	5
Food and livestock	7	2	5	19	70	0	4
Fishing and forestry	5	-	0	16	7	6	4
Mining	17	93	23	20	7	0	1
Labour-intensive manufacturing	10	4	13	12	43	0	2
Capital-intensive manufacturing	3	9	65	14	4	3	3
Construction and utilities	6	10	0	20	3	0	1
Trade and transport	21	-	8	13	51	2	4
Public services	7	-	-	-	29	9	8
Market services	13	9	25	13	32	2	4
All market	100	17	20	13	49	45	42
All social reproduction	21	-	-	-	84	33	6
All leisure	68	-	-	-	27	22	52
Total	189	-	-	-	47	100	100

Suggestions for further work

- A detailed break down of the unpaid sector

- A more explicit link between care and the productivity of the labour force

- Intrahousehold resource allocation

Break down of the non-market sector

- Services included in household work do not have all the same characteristics:
  - Tedious tasks vs. emotional value
  - Substitutability/complementarity with market services
  - Different production technologies
  - Time inflexibility
- 'Leisure' is not all fun!
  - Free time vs. idle time

Link between care and the productivity of the labour force

- The investment aspect of care
- Effects of maternal care on children's nutritional status and school performance
- Children's time

Intrahousehold resource allocation

- A growing body of literature (Haddad *et al.*, 1997) shows that resources are rarely distributed equally within the household and that preferences are not likely to be the same among family members. It is not realistic to assume that the welfare of each individual in the household changes proportionately to that of the whole
  - Haddad and Reardon (1993) discrimination against girls in the Sahel
  - Haddad and Hoddinott (1994) differential impacts of women's income on child anthropometry outcomes
  - Udry (1996) inefficient allocation of resources between women's plots and men's plots in Burkina Faso

- Bargaining household models are likely to be more realistic than the unitary model

- Some surveys already collecting consumption/assets data by individual family member. Time use could shed even more light