



Local Multipliers

STRENGTHEN: Global Knowledge Sharing Workshop



Local Multipliers

What?

- ▶ LM are sectoral employment multipliers
- ▶ Method complementary to IO/SAM
- ▶ Moretti (2010) AER Papers and Proceedings

Why?

- ▶ Limitations of IO/SAM
 - ▶ Productivity growth for Et multipliers
 - ▶ IO Data scarcity in Sub-Saharan Africa
 - ▶ Difficulty to assess employment quality

→ Costly disaggregation of IO/SAM Tables wrt to households groups / production units / regions

Defining LM?

Local Multipliers based on population census data

- ▶ Population census tells you:
 - ▶ where you live
 - ▶ if you work
 - ▶ in which industry
 - ▶ with which employment status
- ▶ Census data sample covers:
 - ▶ 10% of the population
 - ▶ The entire country

→ A picture of sectoral employment at municipality level

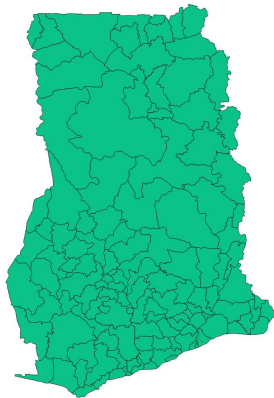
Local Multipliers are sectoral employment multipliers

- ▶ Creating 1 job in sector X in municipality Z generates Y jobs in the (local) economy

Why using LM?

- ▶ Population census collected in Sub-Saharan African countries
- ▶ Wealth of data
- ▶ Picture of local employment dynamics and specialisation
- ▶ Time dynamic (2 census)
- ▶ Multipliers can be positive, zero or negative
- ▶ Intuitive hierarchy: Manufacturing > Service > Agriculture
- ▶ Small territorial boundary that fits the size of Gvt intervention
- ▶ Work directly on employment
- ▶ Multipliers wrt skills and employment status
- ▶ Easy implementation (reduced form equation)
- ▶ Hypothesis testing
- ▶ Benin, Cote d'Ivoire, Ghana, Malawi, Mali, Mozambique, Rwanda, South Africa, Tanzania, Uganda, Zambia

Ghana: 2000-2010



(a) Administrative entity

Six steps

- ▶ Identify a country with 2 census containing an employment module
- ▶ Make consistent the administrative entities over time
- ▶ Aggregate individual -- > local (sub)sectoral employment statistics
- ▶ Take the difference over time
- ▶ Run a reduced form regression regression
- ▶ Robustness check (IV)

Table of existing local multipliers

	USA Moretti (2010)	USA Dijk (2016)	Sweden MT (2013)
Manufacturing on service	1.59***	1.02***	0.48*
Manufacturing skilled on service	2.52*	1.87	2.97***
Manufacturing unskilled on service	1.04	0.5	-0.15

- ▶ In USA, 1 job in manufacturing creates 1 job in service
- ▶ The multiplier increases with skills
- ▶ No evidence of agglomeration effect

LM: manufacturing on service

For 1 job created in the manufacturing sector, 3 to 7 jobs are created in the service sector

	$N_{m,t}^{NT} - N_{m,t-1}^{NT}$							
	BJ	GH	MW	ML	MZ	RW	TZ	ZM
ΔN_m^T	3.24** (1.28)	5.45*** (1.34)	3.91*** (1.08)	6.95*** (0.63)	3.05 (2.42)	7.23*** (0.78)	5.50*** (0.12)	5.86*** (0.83)
N	77	109	183	257	143	100	113	150
R^2	0.57	0.57	0.32	0.85	0.13	0.60	0.92	0.71

LM: service on manufacturing

Jobs creation in the service sector does not lead to job creation in the manufacturing sector

	$N_{m,t}^T - N_{m,t-1}^T$							
	BJ	GH	MW	ML	MZ	RW	TZ	ZM
ΔN_m^{NT}	0.18*** (0.03)	0.11*** (0.01)	0.08** (0.03)	0.12*** (0.01)	0.04** (0.02)	0.08*** (0.01)	0.17*** (0.01)	0.12*** (0.02)
N	77	109	183	257	143	100	113	150
R^2	0.57	0.57	0.32	0.85	0.13	0.60	0.92	0.71

Comparing IO and LM in Rwanda

- ▶ Manufacturing > service > agriculture $\simeq 0$

	Local multipliers			IO multipliers		
	m_a	m_m	m_s	m_a	m_m	m_s
Agriculture		0.17	-0.05		0.003	0.006
Manufacturing	0.006		7.2***	6.63		1.04
Service	-0.58	0.08***		0.35	0.04	

- ▶ LM of manufacturing on service is larger than IOM
- ▶ IOM of manufacturing on agriculture over-estimates the impact

Local multipliers for disaggregated sectors - Rwanda

Manufacturing > service > agriculture

Service creates jobs in other service sectors

	Service	Manufacturing	Agriculture
Metalic, mineral	20.98***	2.32***	−10.43***
Wood, paper	31.75***	4.29***	−11.43***
Food, beverage	10.39***	1.08***	−2.63***
Construction	3.41***	0.38***	−0.60***
Transport	4.15***	0.58***	−0.64***
Hotel, restaurant	9.92***	0.97***	−1.15***
Crops	−3.5***	−0.65***	0.71***

Local multipliers increases with skills and employment status - Rwanda

In Rwanda: 1 manufacturing job creates 7 service jobs

- ▶ 1 high skilled manufacturing jobs creates 12 service jobs
- ▶ 1 employees manufacturing jobs creates 9 service jobs

IV and robustness check

IV: Bartik shift share instrument

- ▶ Reverse causality
- ▶ Endogeneity

Robustness check

- ▶ Control variables: city size, distance to the main port, neighbouring country, sea dummy
- ▶ Rural vs urban, excluding largest city
- ▶ Linear vs. nonlinear estimations

Conclusion: Pros of LM

- ▶ Good complement to IO
- ▶ Alternative to CGE
- ▶ Simple reduced form equation
- ▶ Censuses are widely available
- ▶ Sectoral employment multipliers
 - ▶ Aggregated and disaggregated sectors
 - ▶ Employment status
 - ▶ Skills
 - ▶ Gender
 - ▶ Age
 - ▶ Migration
- ▶ Nonlinearities associated with structural transformation

Challenges? related to Local Multipliers

- ▶ Minimum requirement: 2 census with an employment module
- ▶ Make sense of territorial reforms
- ▶ Sectoral disaggregation limited by geographic disaggregation
- ▶ Identification of different transmission channels
- ▶ Experimental stage:
 - ▶ Construction of IV
 - ▶ Linear vs nonlinear estimation

Regression

- ▶ Estimation of a reduced form equation

- ▶ $\Delta N_m^{NT} = \alpha + \beta \Delta N_m^T + \epsilon_m$

- ▶ α : constant
 - ▶ ΔN_m^T : change in manufacturing employment in municipality m
 - ▶ ΔN_m^{NT} : change in service employment in municipality m
 - ▶ ϵ_m : error term clustered at municipality level

◀ previous slide