Industries Without Smokestacks in Uganda and Rwanda

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Outline

1. Context and the Dataset
2. What defines an IWS in Uganda?
   - Top 20 firms in terms of output/worker
   - What distinguishes IWS firms?
3. Cross- Sectoral Output and Productivity Spillovers and Demand Spillovers from FDI in IWS

1.1: Context

- Exports have grown from 5 to 15% of GDP in RWA and 12 to 20% in UGA over last 20 years
- Services make up more than 40% of exports, according to WDI data
- How do these new/more successful service firms look like?

1.2: The Dataset

Table: The Datasets cover five different tax heads

Name	Description	# of unique TIN		frequency
		Uganda	Rwanda	
Pay as you earn	# of workers and wages	15,738		monthly
Value Added Tax	Sales and purchases	21,997		monthly
Value Added Tax	- at transaction level	12,148		monthly
Customs	Cross-border transactions	82,468		continuous

- Tax admin data from URA and RRA covering period 2010-15
- Data is self-reported, sparsely audited and covers only formal sector
- But: main interest is formal firms and exporters
  - Exploit VAT transaction details to map firm networks
  - Exploit Income tax returns to learn about employment structure
  - Link with Customs data as external sector window

2.1: IWS in Uganda - top 20 firms (output/worker)

Table: Ranking of top 20 industries by labor productivity, at ISIC level

	ISIC	Industry	# of Comp.	Wages	# of Workers	Average Output	% are exporters	% supply exporters	Export/ Output	Import/ Output
1	Marine aquaculture	Agriculture	3	9.34	103	5,310	0.67	0	0.45	0.04
2	Manufacture of cement{..}	Manufacturing	4	8.12	80	24,100	0.5	0.75	0.00	0.52
3	Manufacture of fertilizers	Manufacturing	1	11.19	12	1,650	1	1	0.00	1.09
4	Other telecommunications	Services	13	5.28	6	178	0	0	0.00	0.25
5	Wholesale of solid, liquid	Services	106	6.07	23	1,910	0.08	0.31	0.00	0.83
6	Post-harvest crop act	Agriculture	15	5.30	22	440	0.6	0.4	0.65	0.08
7	Activities of holding comp	Services	2	2.09	2	268	0	0	0.00	0
8	Marine fishing	Agriculture	15	6.44	24	1,530	0.27	0	0.36	0.02
9	Manufacture of malt liquor	Manufacturing	12	7.64	52	7,520	0.42	0.17	0.01	0.2
10	Wholesale on a fee	Services	67	6.11	29	791	0.09	0.19	0.00	0.04
11	Wholesale of waste	Services	54	5.38	12	287	0.13	0.35	0.01	0.56
12	Retail sale of beverages	Services	44	4.35	21	524	0.05	0.25	0.01	0.04
13	Medical and dental practice	Services	81	3.70	19	739	0.04	0.05	0.00	0.16
14	Retail sale of auto fuel	Services	158	4.66	22	939	0.05	0.21	0.00	0.37
15	Manufacture of tanks	Manufacturing	3	5.60	13	835	0.67	0.67	0.00	0.73
16	Retail sale of hardware	Services	531	2.43	5	105	0.07	0.17	0.00	0.19
17	Manufacture of pharma	Manufacturing	10	9.73	65	1,890	0.6	0.5	0.02	0.72
18	Passenger air transport	Services	21	10.16	19	1,310	0.33	0.24	0.00	0.15
19	Manufacture of vegetable	Manufacturing	25	7.21	60	3,890	0.32	0.24	0.06	0.7
20	Manufacture of refined petrol	Manufacturing	8	8.16	29	951	0.38	0.5	0.00	0.59

2.2: IWS in Uganda - What distinguishes IWS firms?

Rank	Industry	Output	# employees	% exporters	% supply exp	imp/outp
1	Marine aquaculture	*490	*7.4	67	0	0.04
6	Post harvest crop activity	*60	*1.6	60	40	0.08
8	Marine fishing	*140	*1.7	27	0	0.02
17	Manufacture of pharma	*111	*5.4	60	50	0.72

How do these IWS differ from the rest of their sectors?

- Economies of scale
- Connection to external sector
- Importance of inputs

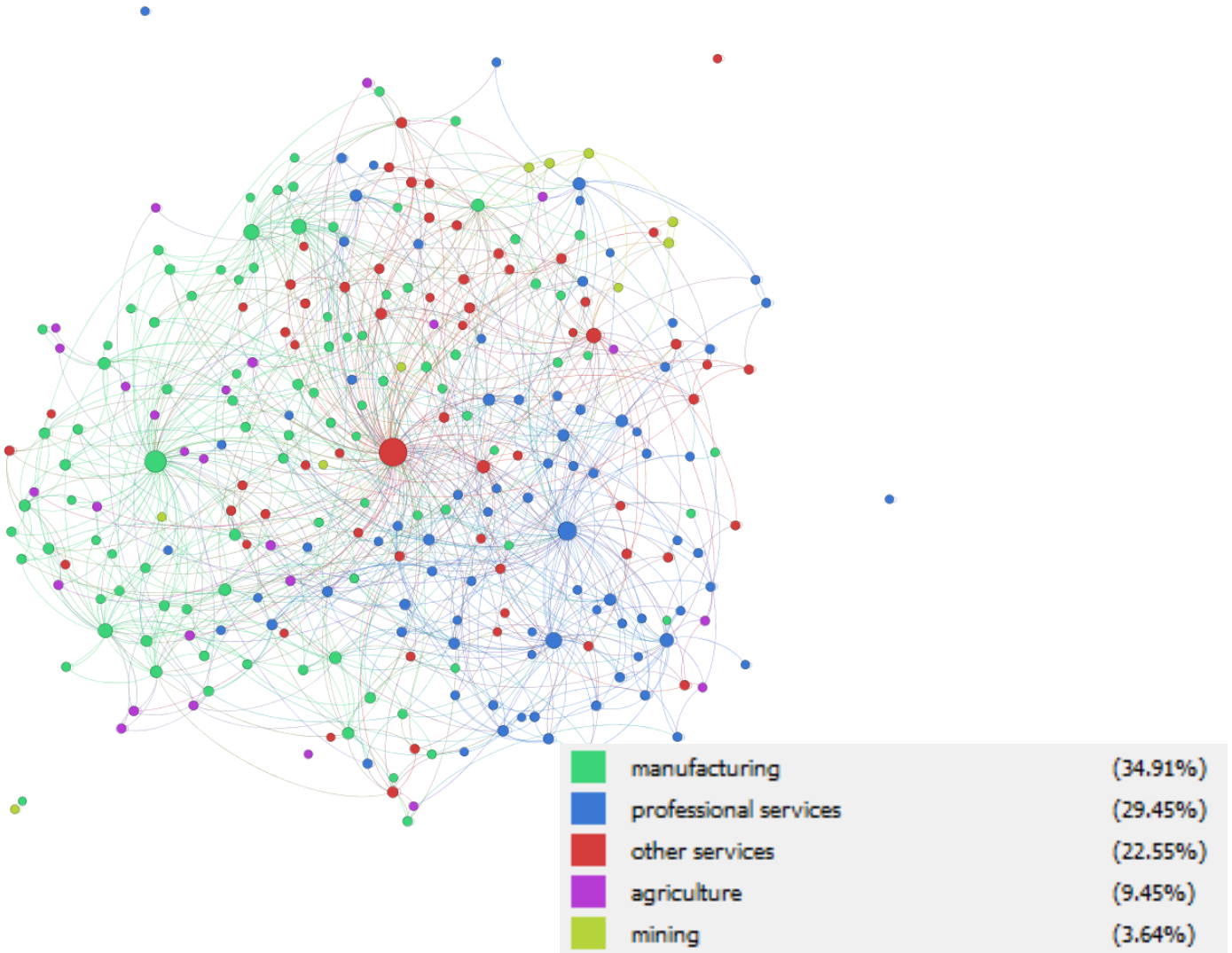
3. Output, Employment and Productivity spillovers

- Two case studies
  - Cross- sectoral productivity spillovers in Uganda
  - Demand spillovers from FDI in Rwanda

3.1: Two Question

- How central are IWS to the Ugandan economy?
- How does changes in productivity in IWS propagate through to other sectors of the economy?

3.1: Sector Input-Output



3.1: Which Sectors Most Pivotal?

- 4100 - Construction of buildings
- 2220 - Manufacture of plastics products
- 6810 - Real estate activities with own or leased property
- 6110 - Wired telecommunications activities
- 2599 - Manufacture of other fabricated metal products n.e.c.
- 5224 - Cargo handling
- 1702 - Manufacture of corrugated paper and paperboard and of containers of paper and paper board
- 2410 - Manufacture of basic iron and steel
- 6920 - Accounting, bookkeeping and auditing activities
- 5510 - Short term accommodation activities

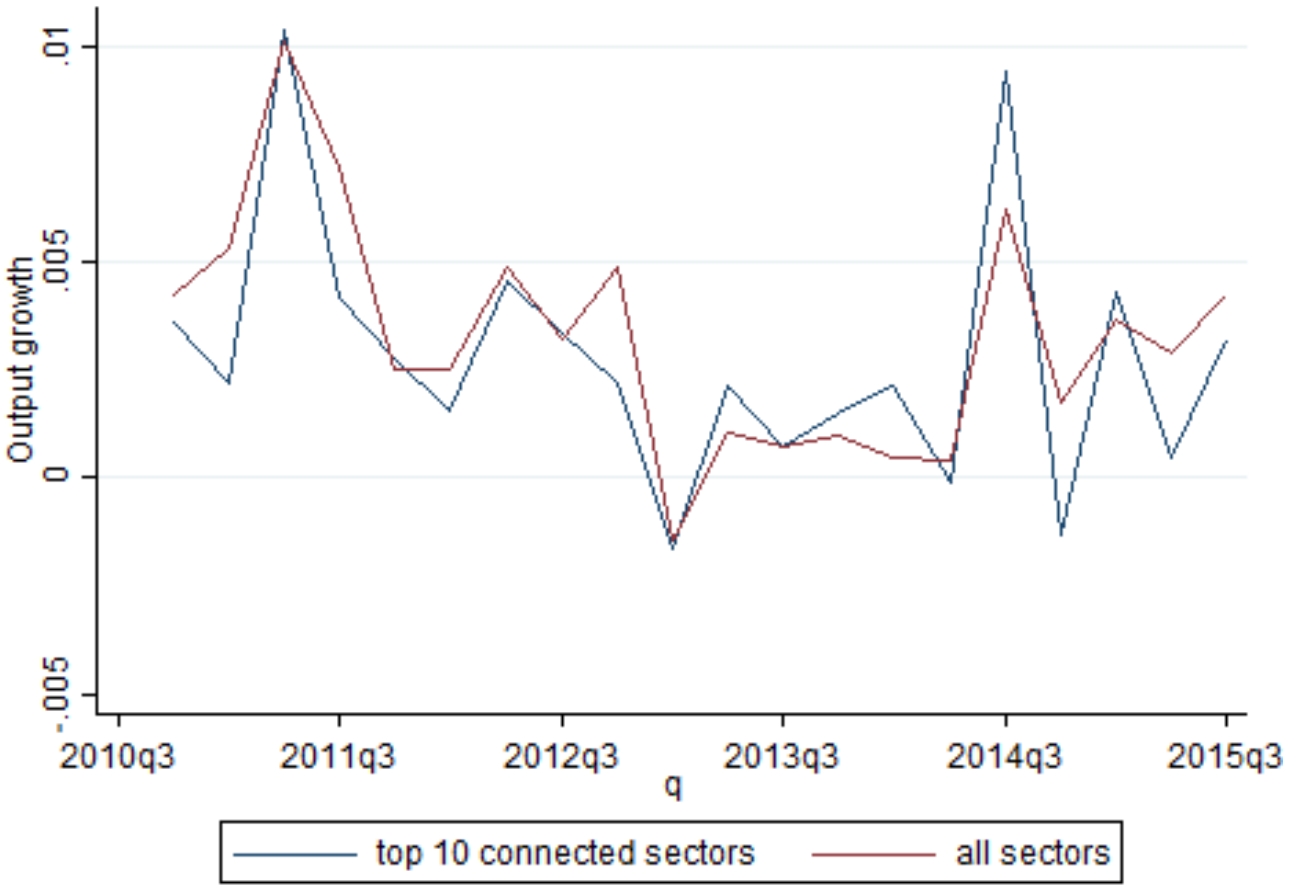
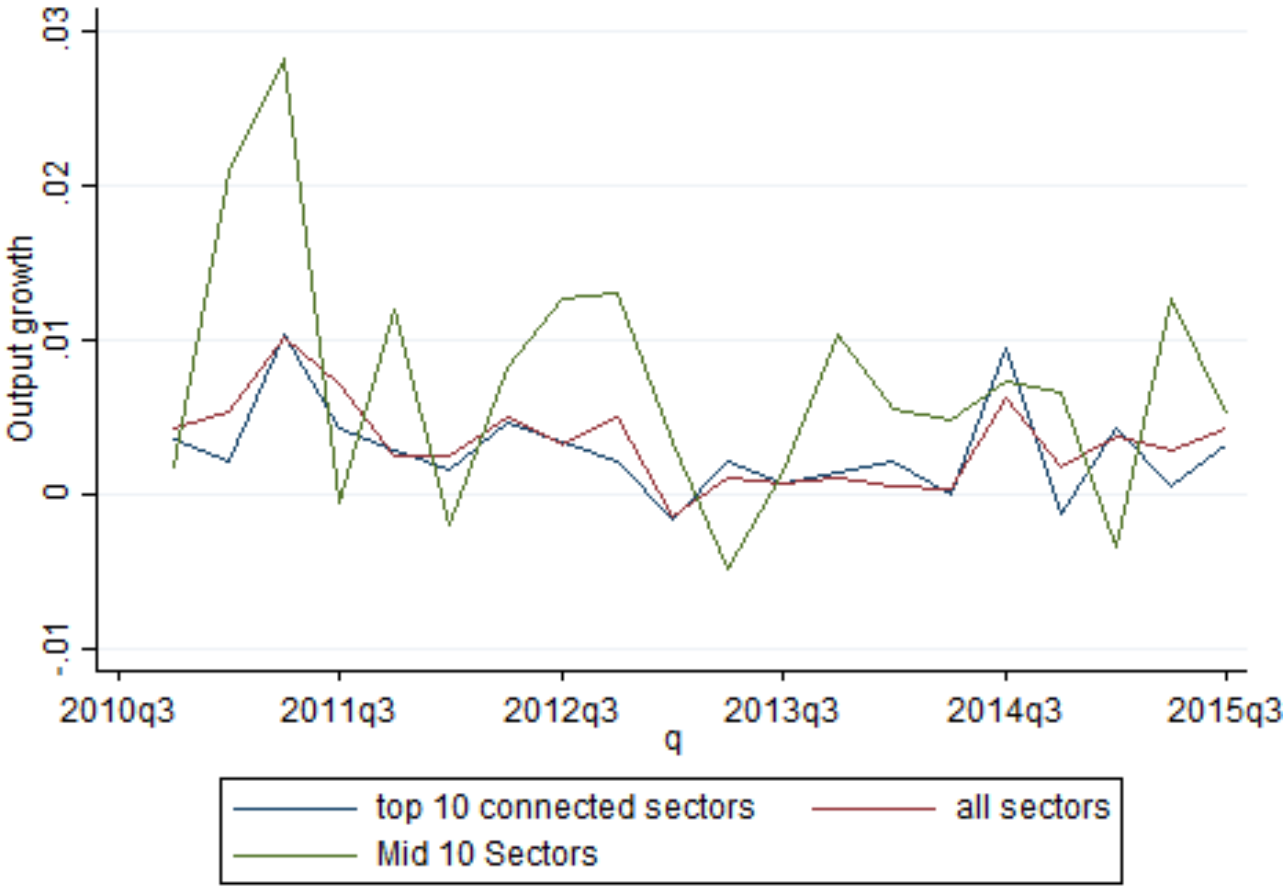


Figure: Output Growth top 10 and mid 10 most interconnected sectors and all sectors



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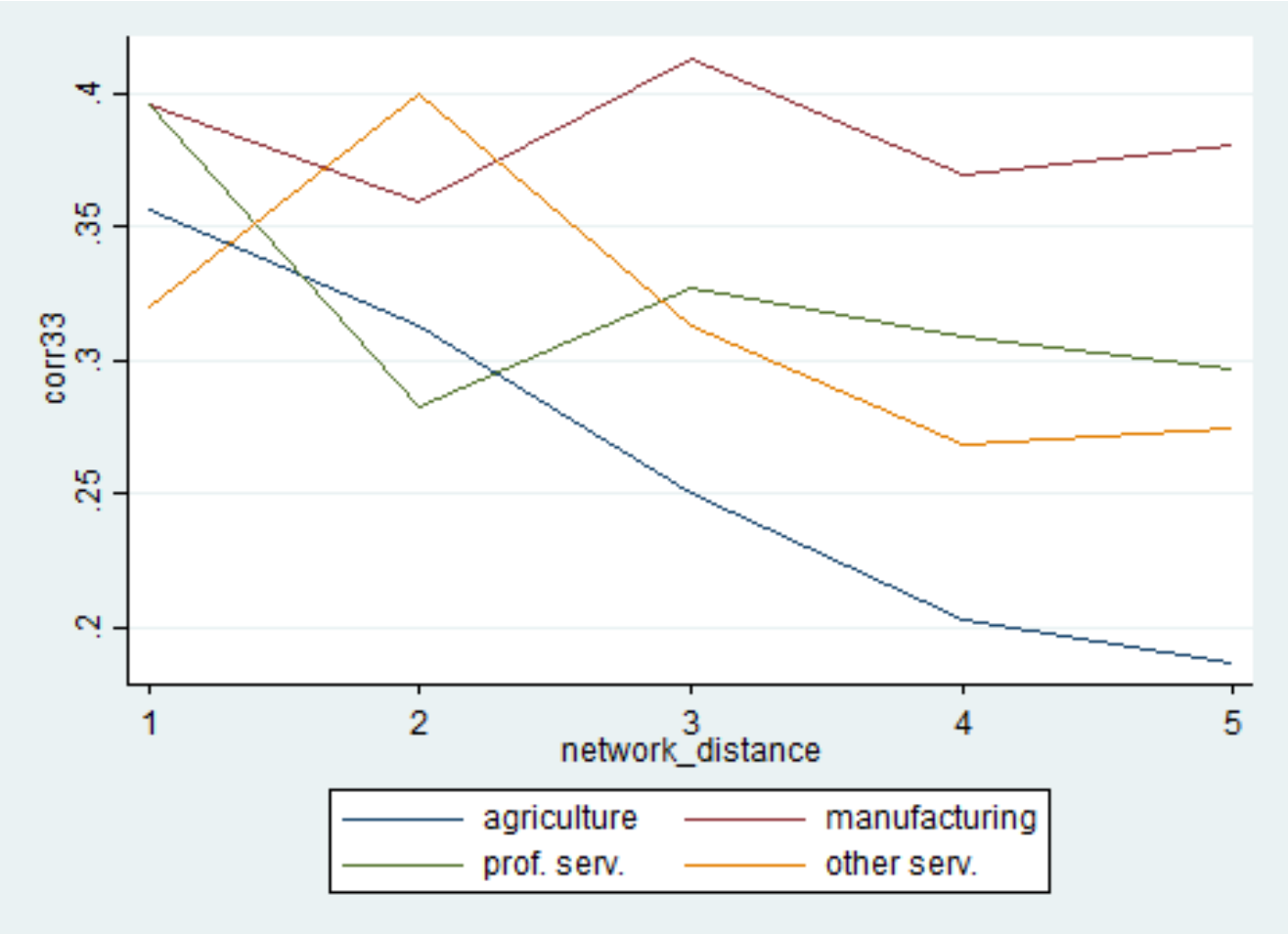

Figure: Productivity Correlation and Network Distance

Conclusions

1. Successful firms in East Africa rely on economies of scale and are crucially connected to the external sector through imports and exports.
2. Some sectors play a much stronger role in driving overall output and productivity growth than others, these sectors tend to be in services and manufacturing sectors.
3. FDI can pass through output and employment spillovers, but this effect is strongest in the manufacturing sector.

but, more work to consider...

1. Rwanda data - compare and contrast to Uganda
2. Delve more into some specific sectors...inspired by workshop

Appendices

3.2: Motivation

- FDI sought by governments due to the possibility for knowledge transfer to domestic firms
- Evidence on knowledge transfer mixed
  - Probably "good FDI" and "bad FDI"
  - Crowd in or crowd out domestic firms
- Can we observe backward spillovers in employment creation, sales growth and productivity?
- How do IWS compare to more extractive FDI?

3.2: Empirical strategy

- Run Fixed Effects regression
  $Y_{ijt} = \alpha + \beta_1 Backward_{ijt} + \beta_1 Forward_{ijt} + \delta X_{ijt} + a_i + a_j + a_t + u_{ijt}$
- $Y_{ijt} = \{Employees, Sales, Productivity\}$ for firm i, in sector j at time t
- $Backward_{ijt} = \sum FDIbuyers_{ijt} / \sum buyers_{ijt}$
- $Forward_{ijt} = \sum FDIsuppiers_{ijt} / \sum suppliers_{ijt}$
- Run with and without lags

3.2: Results

Table: Employment spillovers

	(1) all	(2) manufacturing	(3) agriculture	(4) mining	(5) services
Backward Linkage	0.00185**	0.00909***	0.00598**	0.00314	0.000437
	(2.18)	(3.94)	(2.65)	(0.35)	(0.66)
Forward Linkage	0.00116	0.000238	0.00465	0.0109	0.000449
	(0.93)	(0.04)	(0.80)	(0.50)	(0.35)
Constant	1.881***	1.840***	1.989***	1.845***	1.912***
	(120.68)	(86.19)	(22.05)	(18.92)	(78.56)
Time and firm fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	6244	3080	162	103	2899

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.2: Results

Table: Sales spillovers

	(1) all	(2) manufacturing	(3) agriculture	(4) mining	(5) services
Backward Linkage	0.00144	0.0248***	0.00115	0.0112	-0.00237
	(0.58)	(2.99)	(0.17)	(0.39)	(-1.00)
Forward Linkage	0.000766	-0.00331	-0.00822	-0.0450	0.000547
	(0.31)	(-0.83)	(-0.23)	(-0.62)	(0.20)
Constant	15.89***	15.65***	15.73***	16.19***	16.16***
	(641.95)	(466.19)	(69.65)	(64.16)	(437.19)
Time and firm fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	9480	4775	227	132	4346

t statistics in parentheses

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