Surgical care in Ethiopia:
Task-shifting, public finance, or both?

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Outline

The question

The model

The results

The question

Surgical care in rural Ethiopia is limited

83% of Ethiopia is rural

Fewer than 40 surgeons in the country[1,2]

16.5% of women deliver in a facility every year[3]

- 83% in Addis Ababa
- As few as 3% in rural Ethiopia

[1]Berhan Y (2008). Medical doctors profile in Ethiopia: production, attrition, and retention. *Ethiop Med J* 46(S1):1-77
[2]Surgical society of Ethiopia (www.sseth.org)
[3]Central Statistical Agency [Ethiopia] and ICF International (2012). Ethiopia Demographic and Health Survey, 2011.

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Barriers to care are legion

Obstetric surgical care

Most patients list "care not needed" or "care not customary"

- 10% list cost/transportation
- 6-25% list lack of provider

Non-obstetric surgical care

Few list "care not needed" or "care not customary"

- 20-25% list cost/transportation
- 15-30% list lack of provider/quality
- 50-65% list both

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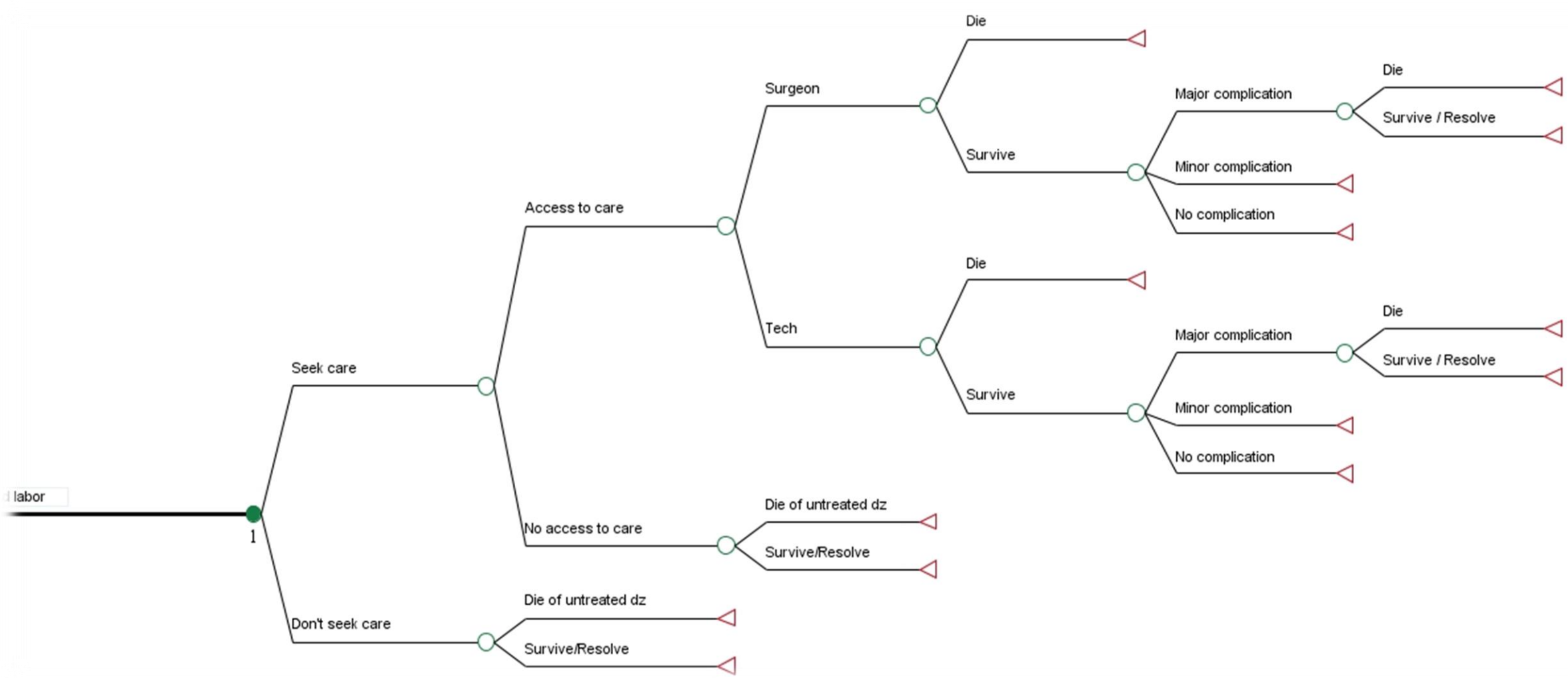
[1]Central Statistical Agency [Ethiopia] and ICF International (2012). Ethiopia Demographic and Health Survey, 2011.

Addressing the barriers

Cost	Provider	Both
Free-at-the-point-of-care ◦ "Universal public finance"	Task-shifting	Task-shifting + UPF


labor
1
Seek care
Don't seek care
Access to care
No access to care
Surgeon
Tech
Die
Survive
Major complication
Minor complication
No complication
Die
Survive / Resolve
Die
Survive
Major complication
Minor complication
No complication
Die
Survive / Resolve
Die of untreated dz
Survive/Resolve
Die of untreated dz
Survive/Resolve

THE MODEL

Life- and limb-threatening conditions

Obstetric surgical care

Caesarian section

Abortion/D&C

Ectopic pregnancy

Obstructed labor

Uterine rupture

Uterine sepsis

Hysterectomy

Non-obstetric surgical care

Appendectomy

Trauma

- Abdominal trauma
- Thoracic trauma
- Amputation
- Uncomplicated fracture

Model inputs

SOURCES

Ethiopia 2011 DHS survey

WHO Global health observatory

Literature search

- Ethiopia
- Sub-Saharan Africa
- Other developing nations/regions
- Developed nations
- Assumption

	Procedure cost	Periop mortality	Mortality, untreated	Major complication rate	Minor complication rate	Prevalence
Obstructed Labor	$102.183	0.00282	0.3	0.1094	0.0742	Obstetric conditions: 0.020354
Uterine Sepsis	$102.183	0.022	0.3	0.154	0.22	
Uterine rupture	$102.183	0.214	0.3	0.14	0.27	
Hysterectomy	$102.183	0.02	0.3	0.14	0.27	
Ectopic Pregnancy	$102.183	0.03	0.75*	0.046	0.046	
D&C	$102.183	0.022	0.3	0.154	0.22	
C-section	$102.183	0.00282	0.3	0.1094	0.0742	
Appendectomy	$122.265	0.012	0.7	0.0354	0.14	Appendicitis: 0.0003
Abdominal Trauma	$159.809	0.133	0.923	0.5	0.242	Traumatic conditions: 0.06285
Long-bone fracture	$143.018	0*	0.06	0.2	0.0667	
Thoracic trauma	$159.809	0.16	1.00*	0.105	0.263	
Need for amputation	$143.018	0.29	0.75	0.086	0.248	

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Model structure

Other assumptions

Direct, non-medical costs included[1]

- Varied by where care was rendered
- Friction costs excluded

Patients who would have received care from a surgeon in the status quo still received care from a surgeon under task-shifting

- No spillover

10% increase in demand for obstetric services under UPF

- Sensitivity analysis: increased demand to meet utilization in Addis Ababa

Poverty creation

- Absolute threshold used

[1]Kifle YA and Nigatu TH (2010). Cost-effectiveness analysis of clinical specialist outreach as compared to referral system in Ethiopia: an economic evaluation. *Cost Eff Res Alloc* 8:13

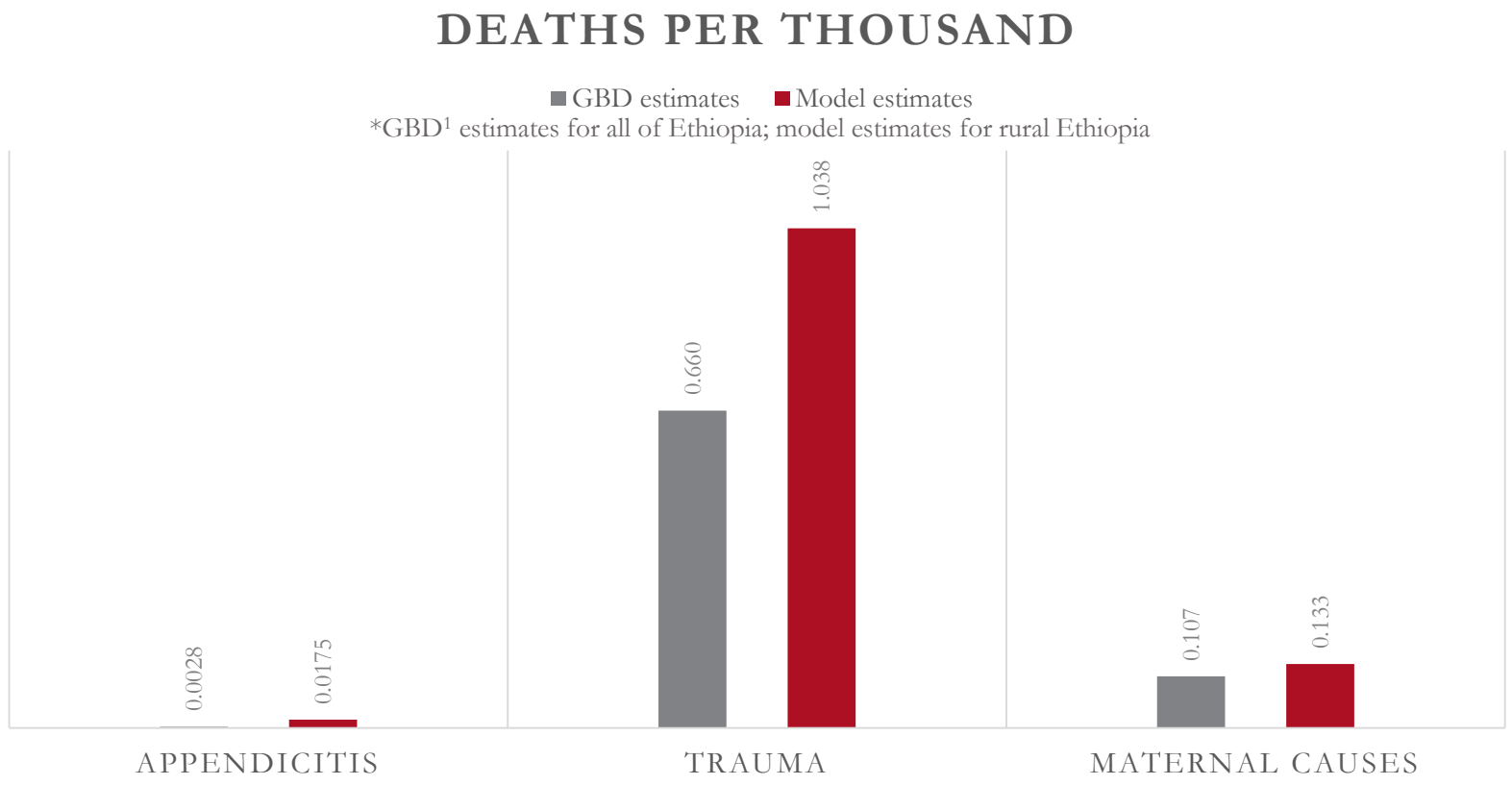
Other assumptions

Surgical care by a technician was more morbid and less expensive

- 1.125 times the morbidity/mortality[1]
- 0.7 times the cost[2]

[1]Gessessew A, *et al* (2011). Task shifting and sharing in Tigray, Ethiopia to achieve comprehensive emergency obstetric care. *Int J Obs Gyn* 113:28-31
[2]Vlassof M, *et al* (2008). Economic impact of unsafe abortion-related morbidity and mortality: evidence and estimation challenges. *IDS Research Report* 59, University of Sussex, Brighton, UK

Model calibration



Maternal Mortality Ratio

WB:[2]	350
Model:	374

Maternal Deaths

Unicef:[3]	9000
Model:	9255

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[1]WHO Global Burden of Disease, 2004 [2]World Bank data, http://data.worldbank.org/indicator/SH.STA.MMRT (Accessed 10 June 2013)
[3]WHO, Unicef, UNFPA, World Bank (2012). Trends in Maternal Mortality: 1990 – 2012

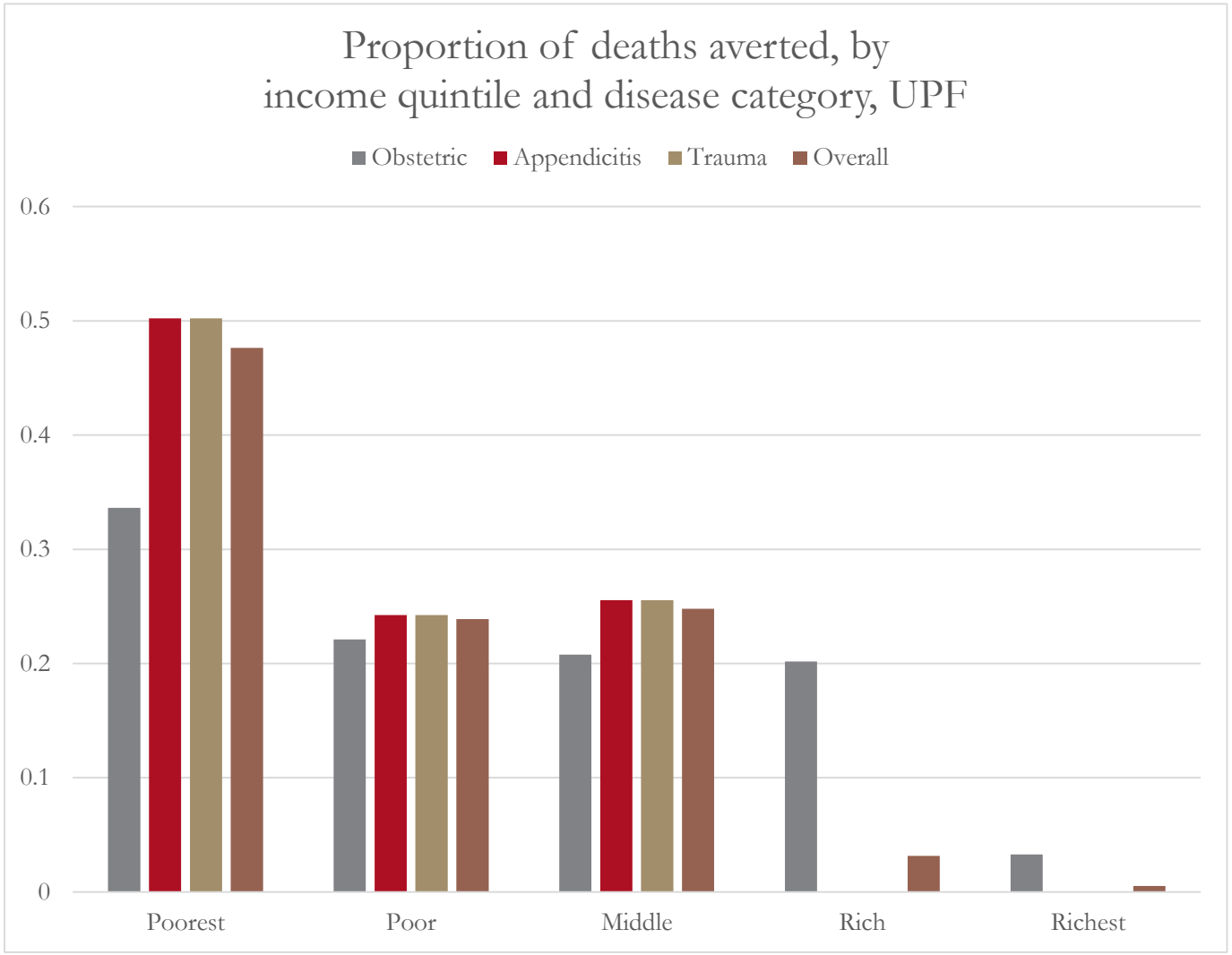
The results

Dashboard

			Wealth quintile				
			Poorest	Poor	Middle	Rich	Richest
Deaths averted	UPF	Obstetric	241.02517	158.36533	148.9041	144.5493	23.6096
		Appendicitis	54.76601	26.42032	27.84618	0	0
		Trauma	1876.74907	905.38483	954.24687	0	0
		Total	2172.54024	1090.17049	1130.99715	144.5493	23.6096
	Task shifting	Obstetric	165.4677	307.54867	188.91785	275.6472	66.7587
		Appendicitis	79.38407	46.34201	51.71177	0	0
		Trauma	2660.2974	1553.00077	1732.95061	0	0
		Total	2905.14917	1906.89145	1973.58023	275.6472	66.7587
	Both	Obstetric	404.206	465.0507	336.6251	419.529613	92.02391
		Appendicitis	497.2945	219.3674	240.7397	0.09587956	0
		Trauma	16579.4527	7344.5123	8070.3689	32.82272363	0
		Total	17480.9532	8028.9304	8647.7338	452.4482162	92.02391
Cases of poverty averted	UPF	Obstetric	0	-646	-798	-419	0
		Appendicitis	0	-110	-81	1083	0
		Trauma	0	-11,666	-16,976	231,582	9633
		Total	0	-12,422	-17,855	232,246	9633
	Task shifting	Obstetric	0	-1240	-1020	-61	0
		Appendicitis	0	-119	-150	-7	0
		Trauma	0	-21,357	-31,603	0	-153
		Total	0	-22,716	-32,773	-68	-153
	Both	Obstetric	0	-1912	-1320	544	-146
		Appendicitis	0	-541	-702	979	0
		Trauma	0	-100,965	-147,117	210,207	9633
		Total	0	-103,418	-149,139	211,730	9487
System cost	UPF	Obstetric	$90,520	$60,114	$56,323	$64,173	$36,404
		Appendicitis	$11,2901	$78,634	$72,537	$86,724	$26,713
		Trauma	$32,919,344	$22,927,684	$21,150,143	$25,286,590	$7,789,062
		Total	$33,122,766	$23,066,432	$21,279,003	$25,437,487	$7,852,180
	Task shifting	Obstetric	$25,263	$46,955	$28,843	$42,085	$10,192
		Appendicitis	$6,510	$3,800	$4,241	$0	$0
		Trauma	$1,904,912	$1,112,030	$1,240,883	$0	$0
		Total	$1,936,685	$1,162,785	$1,273,967	$42,085	$10,192
	Both	Obstetric	$97,386	$119,401	$83,586	$118,777	$74,588
		Appendicitis	$201,551	$100,611	$97,629	$88,937	$26,714
		Trauma	$47,433,318	$29,365,230	$28,496,849	$25,926,730	$7,789,062
		Total	$47,732,255	$29,585,242	$28,678,063	$26,134,444	$7,890,364

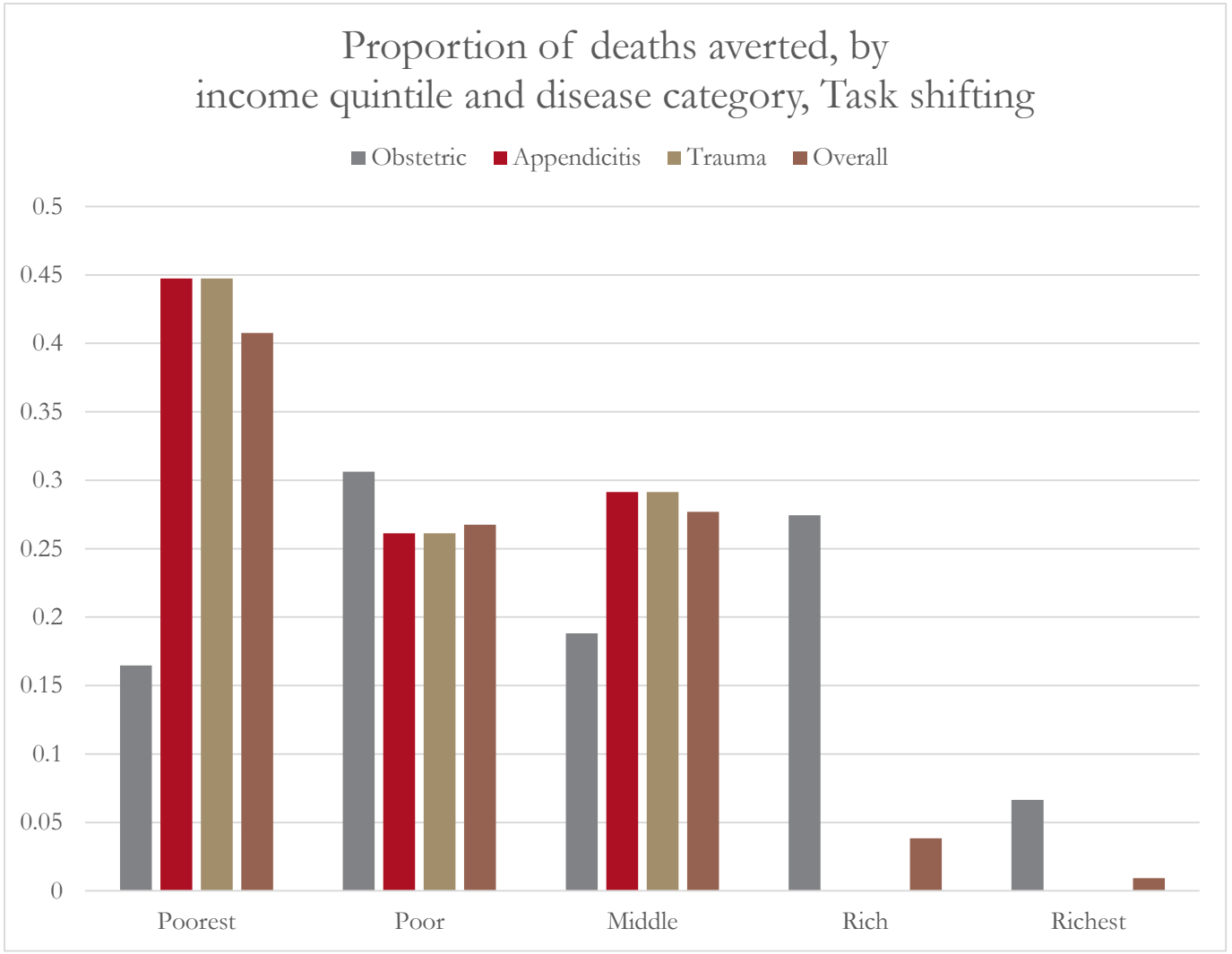
Deaths averted: UPF

By income quintile and disease category



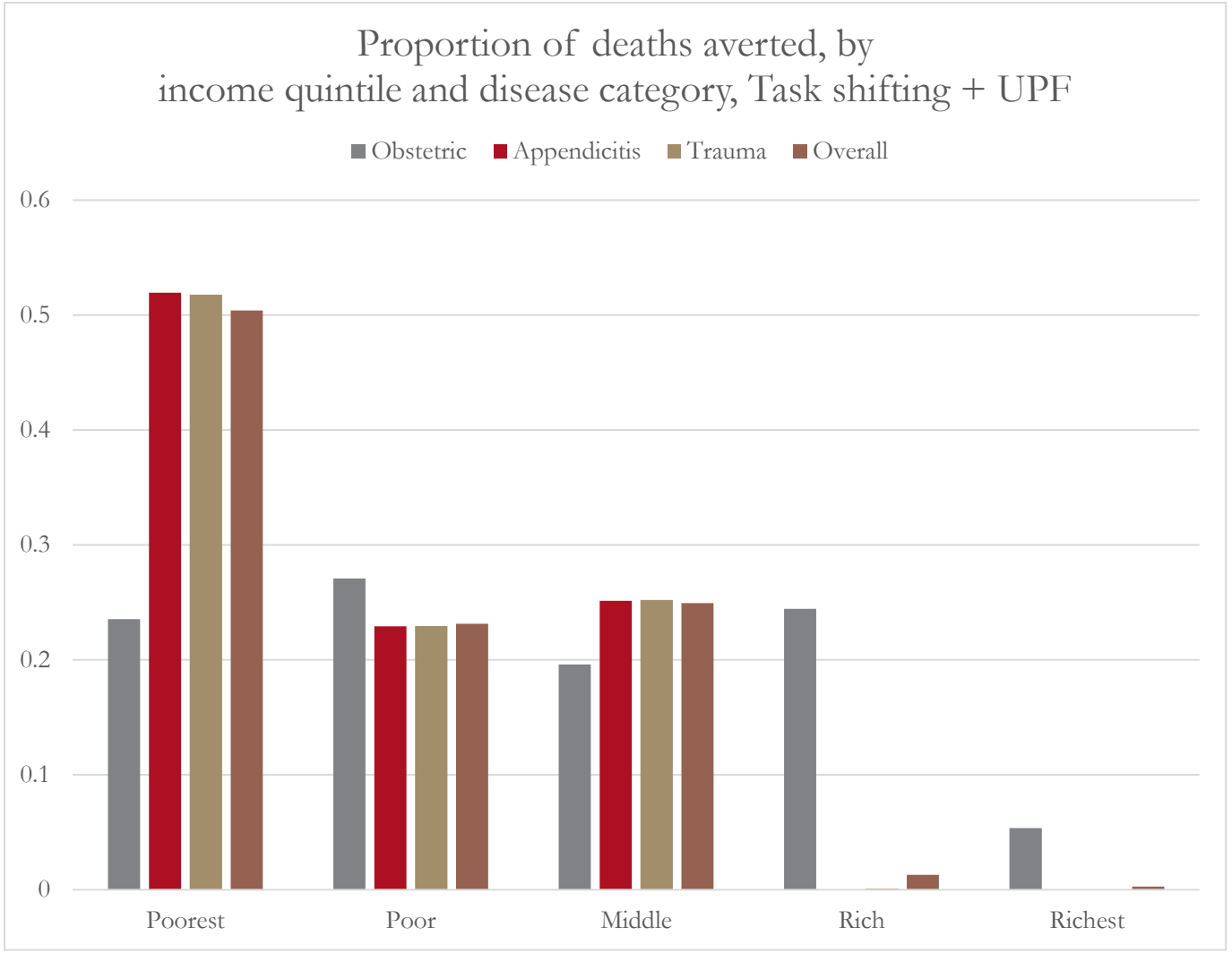
Deaths averted: Task shifting

By income quintile and disease category



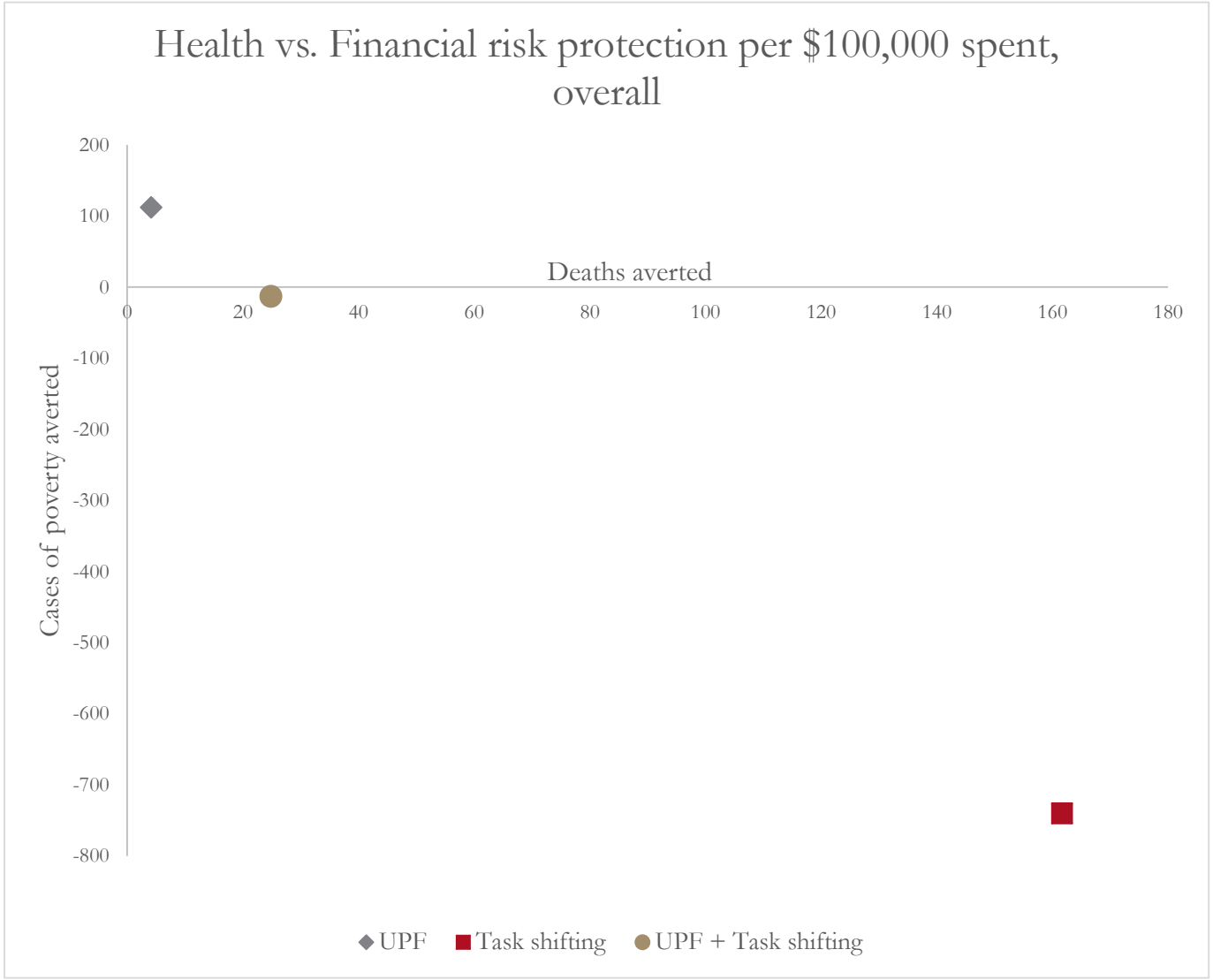
Deaths averted: Task shifting + UPF

By income quintile and disease category



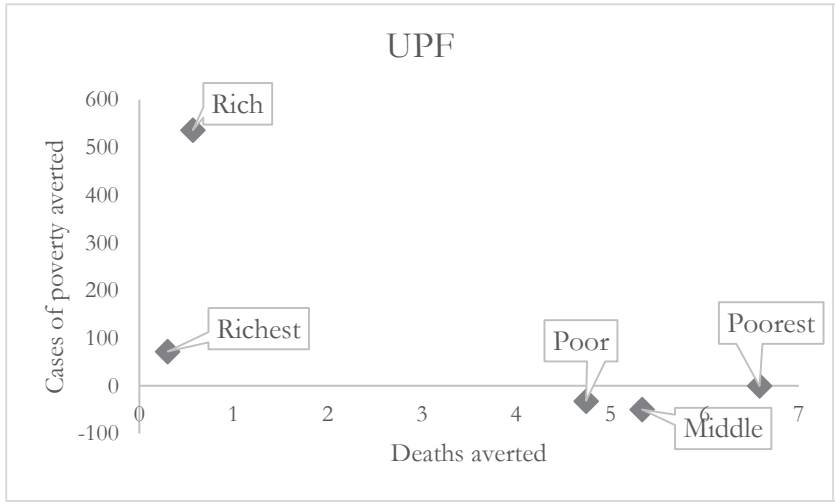
Health versus FRP

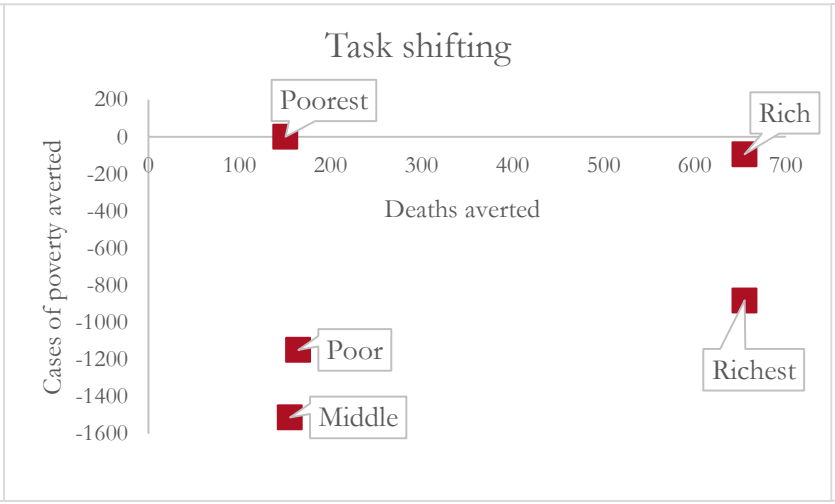
Per $100,000 spent

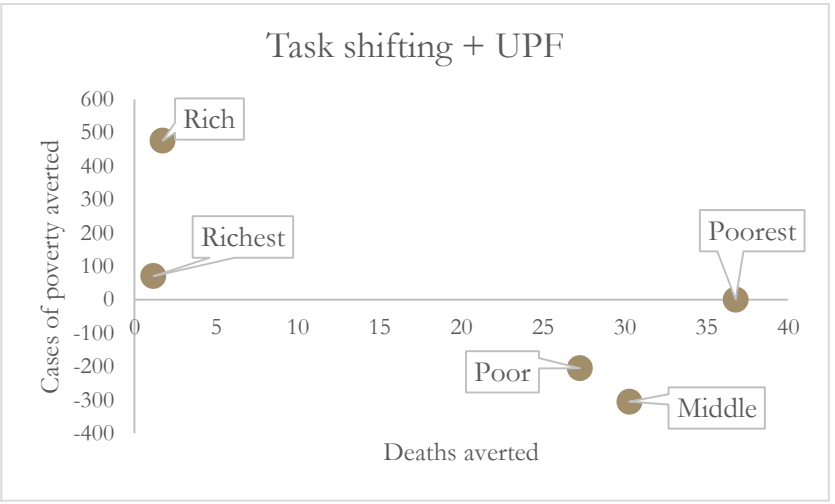


Health versus FRP

Cases of poverty averted







The rich get richer
The poor get healthier

The rich get healthier (and poorer)
The poor get poorer (and healthier)

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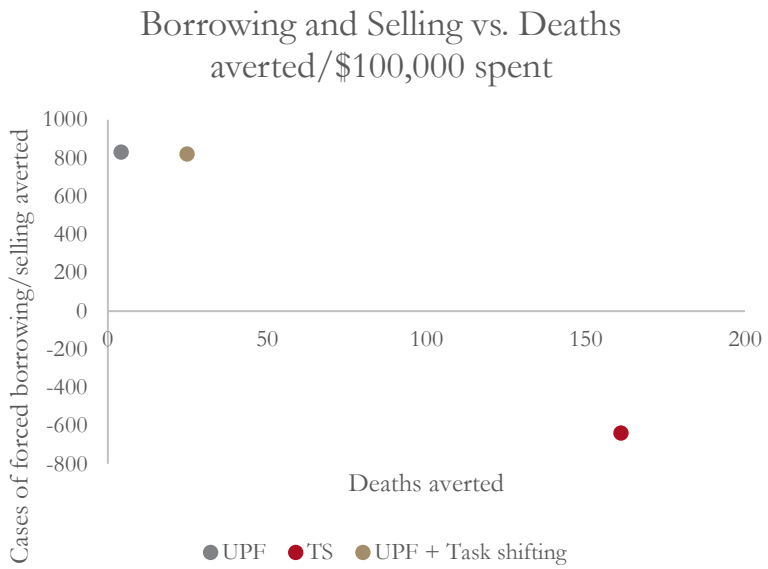
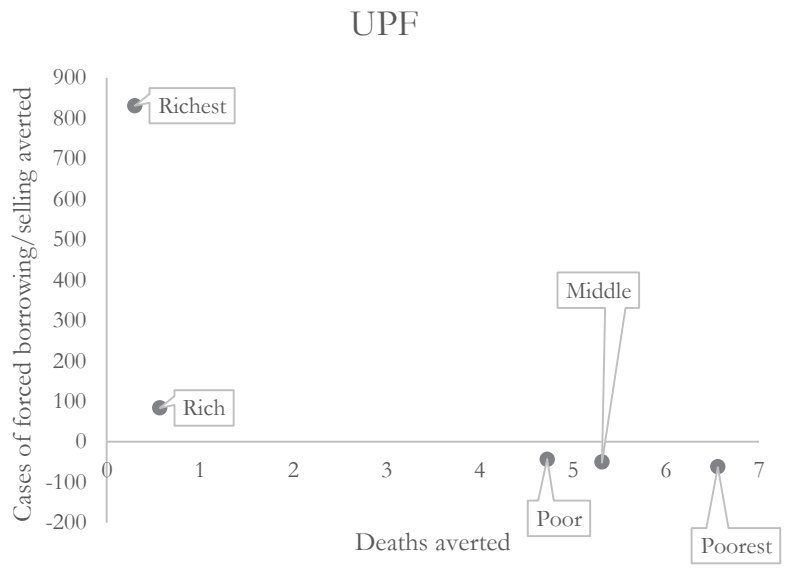
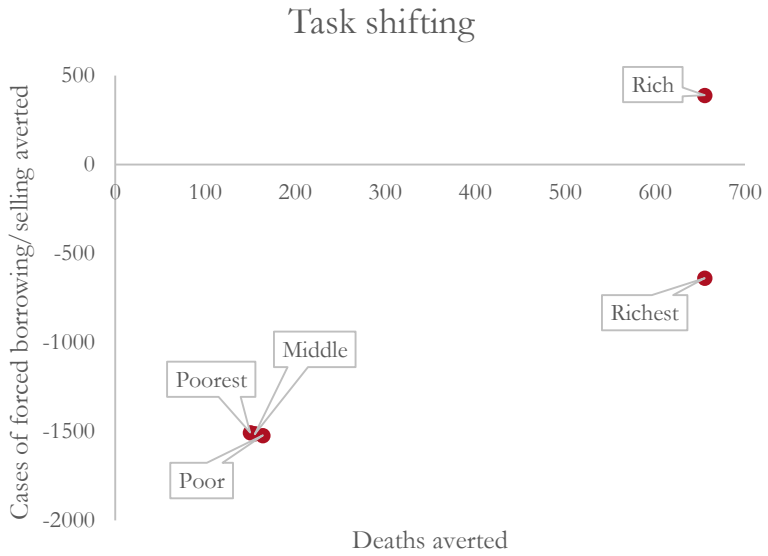
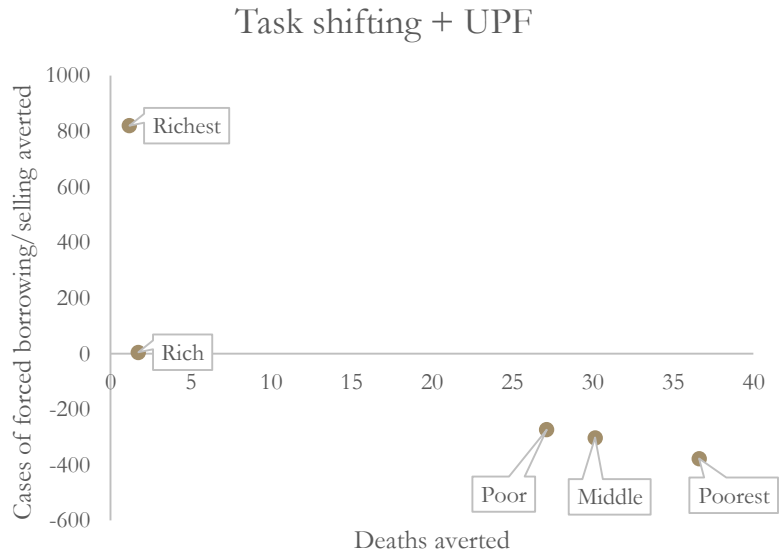
Health versus FRP

Cases of forced borrowing and selling averted









Conclusions

Conclusions

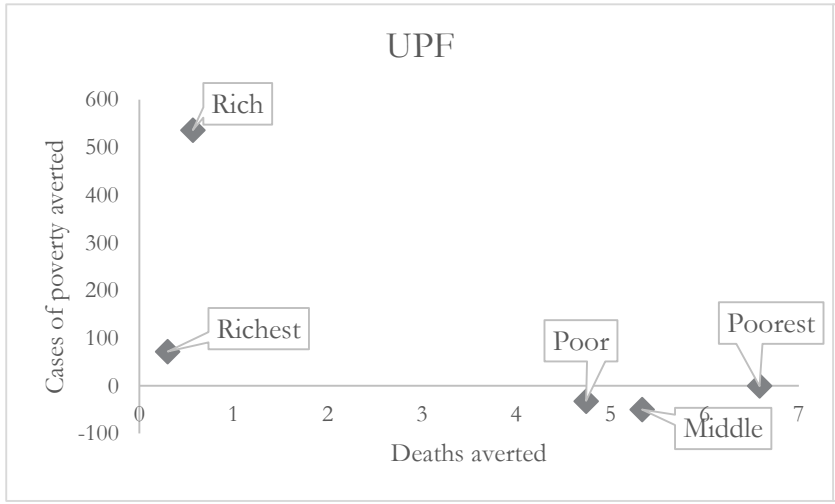
Health improvement and financial risk protection are in tension

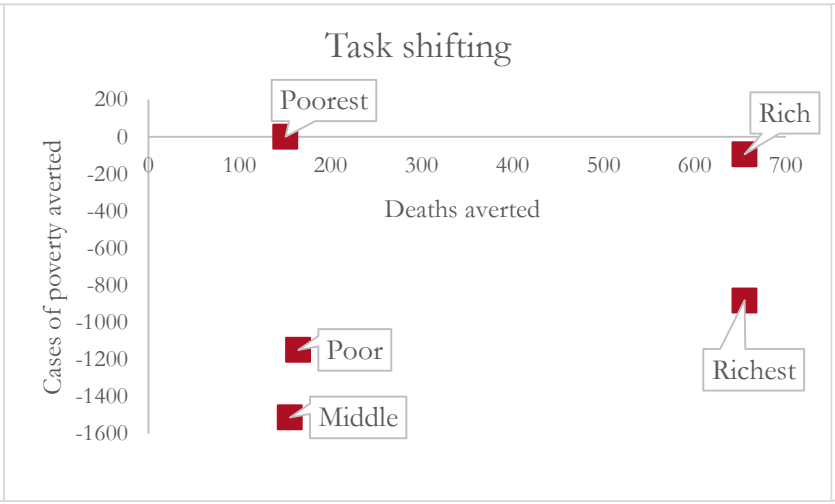
- UPF improves FRP with small effect on deaths
- Task shifting *creates* cases of poverty, but averts significantly more deaths

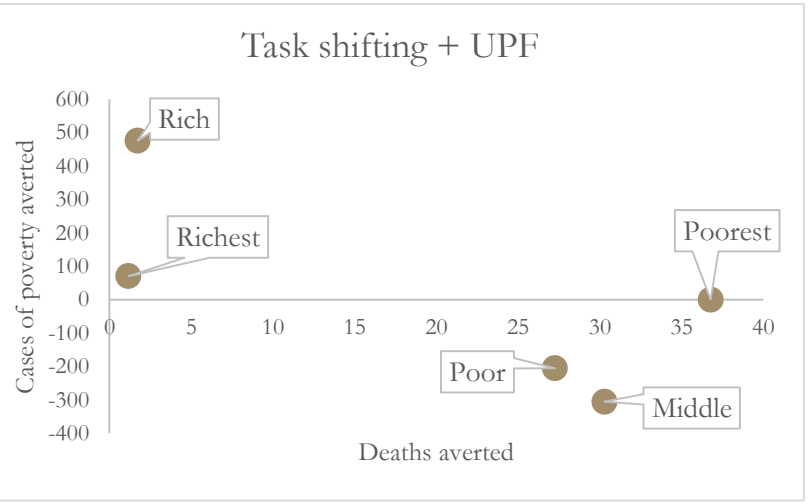
The distribution of benefits among rural Ethiopia depends on the intervention

- UPF improves the health of the poorest and the financial state of the richest
- Task shifting improves the health of the richest, and creates more poverty in the poorest

Questions?







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