Learning from the Informal Apprenticeship System in West Africa

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Skills Training in Context

High-Public Resource Delivery Models

- TVET **integrated** into **secondary and tertiary education systems**
  - → Potential for **dual systems**
  - → Well-suited to contexts in which the **majority of students** progress from primary to secondary school

Low-Public Resource Delivery Models

- **Apprenticeship** / informal on-the-job training models
  - → **Widespread informal institution** in many parts of Africa
  - → Secondary school participation ~ **30% in many parts of Africa**
  - → Potential to run **testing/certification** through public sector

Skills Training in Context

72% of non-agricultural employment in Africa is in the informal sector (ILO, 2020)

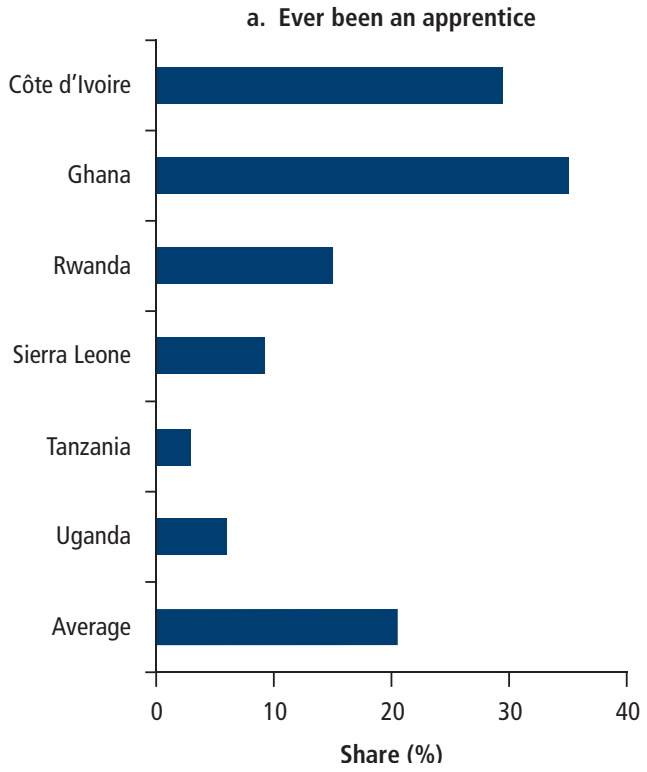
- Apprenticeships mostly take place in **informal sector firms**
- Understanding firms matters

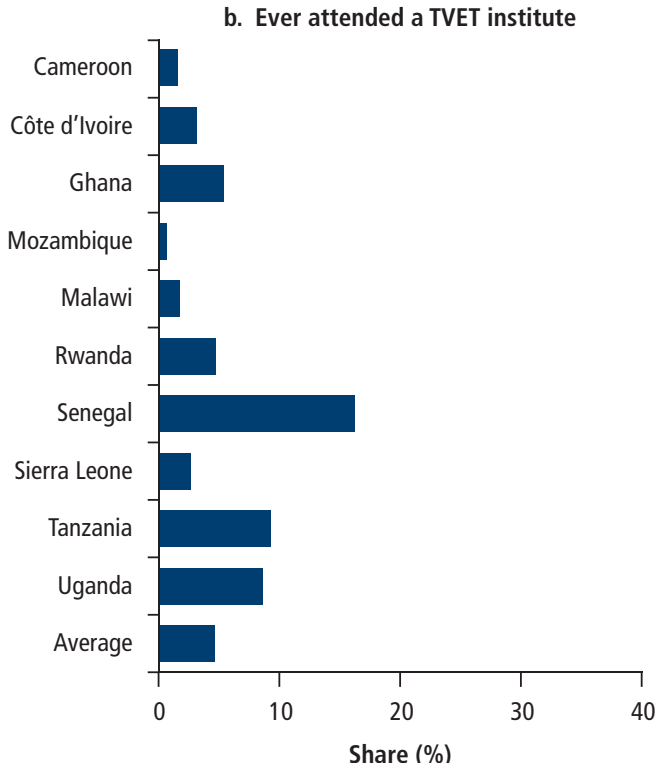
"Low-Demand" economies

- 26% of employment is wage employment (WB, 2023)
- Prepare for **self-employment**

Prevalence of Apprenticeship Training

- Most common source of skills training for many countries in Africa and South Asia (ILO, 2011)
- Comparable survey data is rare, but in countries with harmonized data
  - 20% of people aged 24-35 had participated in an apprenticeship
  - 4% of people aged 24-35 had participated in a vocational training

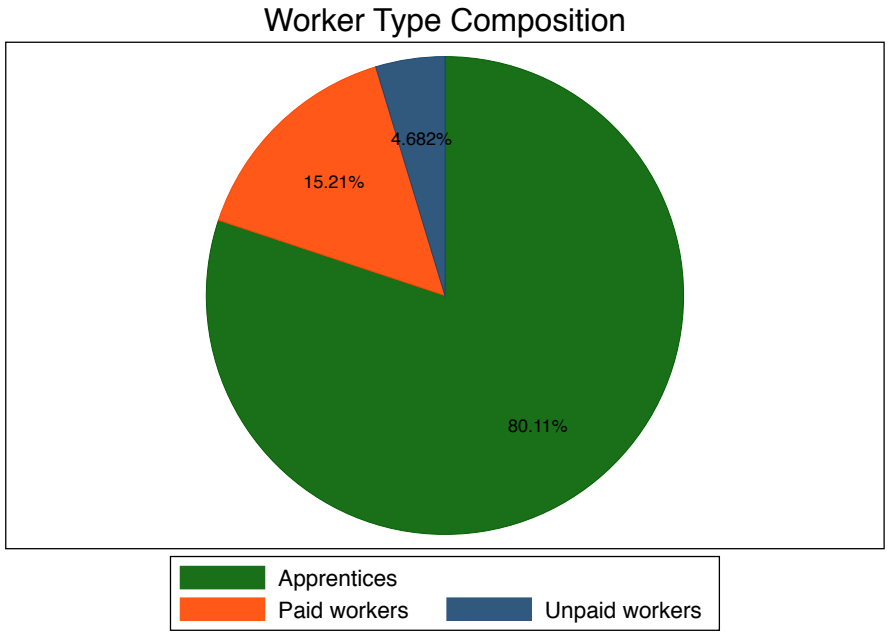


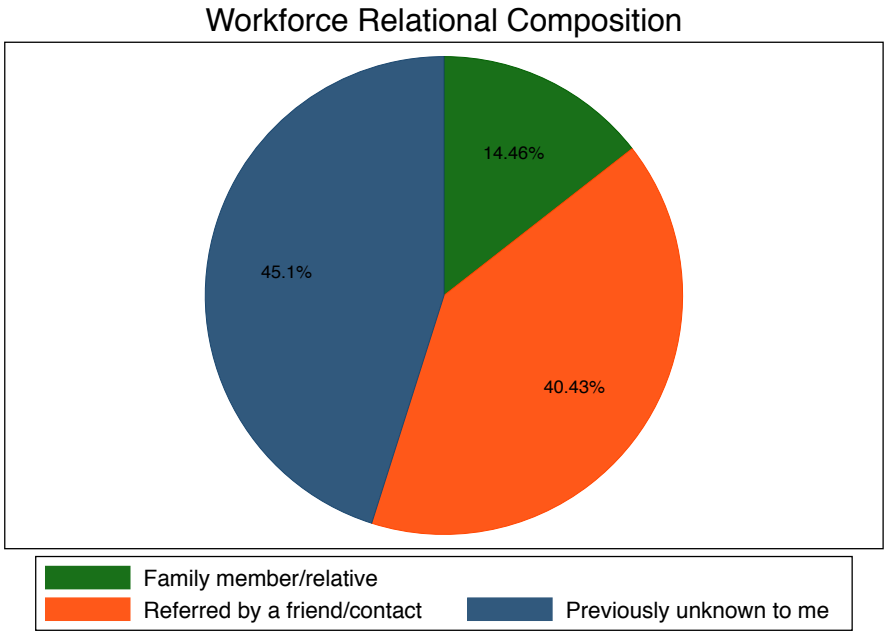


Source: Filmer and Fox, 2014

Prevalence of Apprenticeship Training

- Apprentices are the vast majority of workers in small manufacturing and services firms in Africa
- In Ghana, they make up 80% of the workforce in these types of firms, and are often hired without prior social connection





Source: Hardy and McCasland, 2023

(Informal Rules of) Traditional Apprenticeship Institution in Ghana

- Payment of a **(non-refundable) fee to begin** the apprenticeship (equivalent to about 6 months of apprenticeship wages once apprenticeship begins)
- "Chop Money" **wages paid** during apprenticeship (these start at about 25% of formal sector minimum wage)
- Wages rise over the period of the apprenticeship (up to about the formal sector minimum wage) and are **correlated with firm revenues** (high revenue months = higher wages)
- Typically a 2-3 year term

(Informal Rules of) Traditional Apprenticeship Institution in Ghana

- Apprenticeship "completion" is a somewhat fluid concept
- Discretion of the firm owner and apprentice to declare completion, sometimes marked by:
  - A traditional **ceremony**
  - A **fee/in-kind gift** from the apprentice to the firm owner
  - A **"testimonial" certificate** from the firm owner
  - Passing **an exam** hosted by either a local informal **trade association** or a **government entity**, both of which provide **certification of skills**
- Only about 10% of apprentices continue working in the training firm after completion of the apprenticeship
- Others move into self-employment, search for other wage employment, or leave the trade

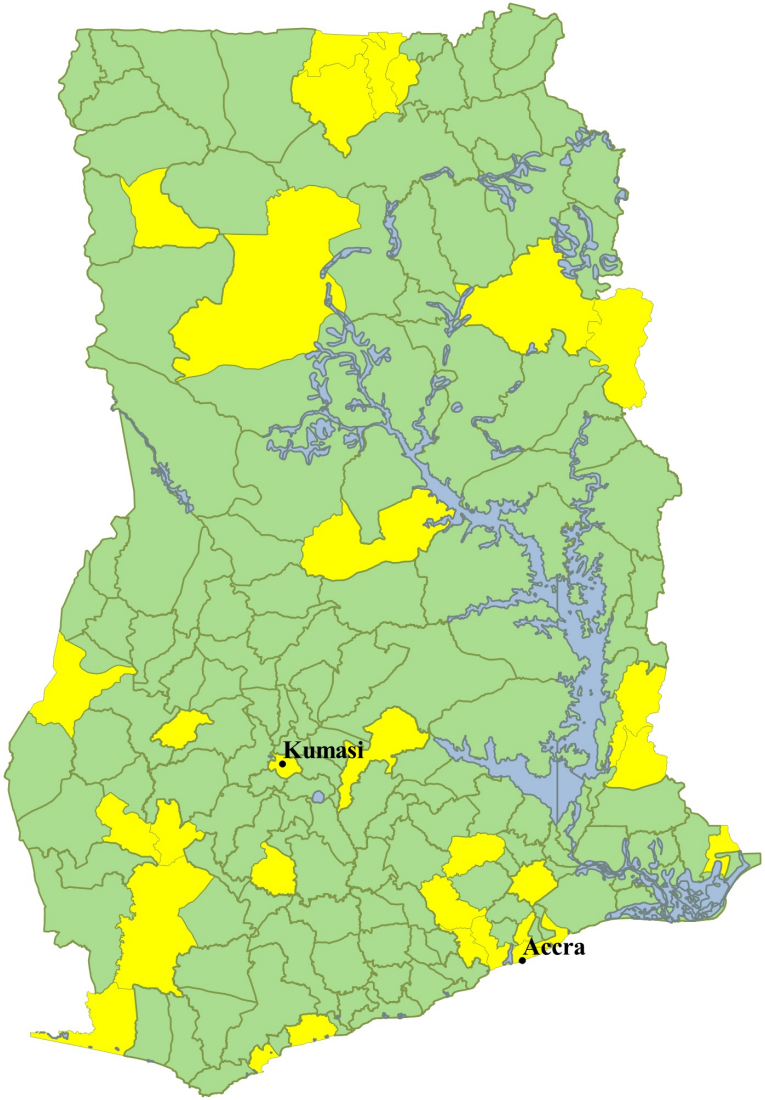
Research Agenda

- **Question 1:** How do **firms benefit** from access to apprentices?
- **Question 2:** What can we learn about the informal apprenticeship institutional **system**?
- **Question 3:** Can **outcomes-based incentive schemes** improve the quality of training in informal apprenticeships?
- **Question 4:** Which **types of firms** provide higher quality training?
- **Question 5:** Overall, how to informal apprenticeships impact **labor market outcomes** for trainees?

Impact Evaluations for Learning

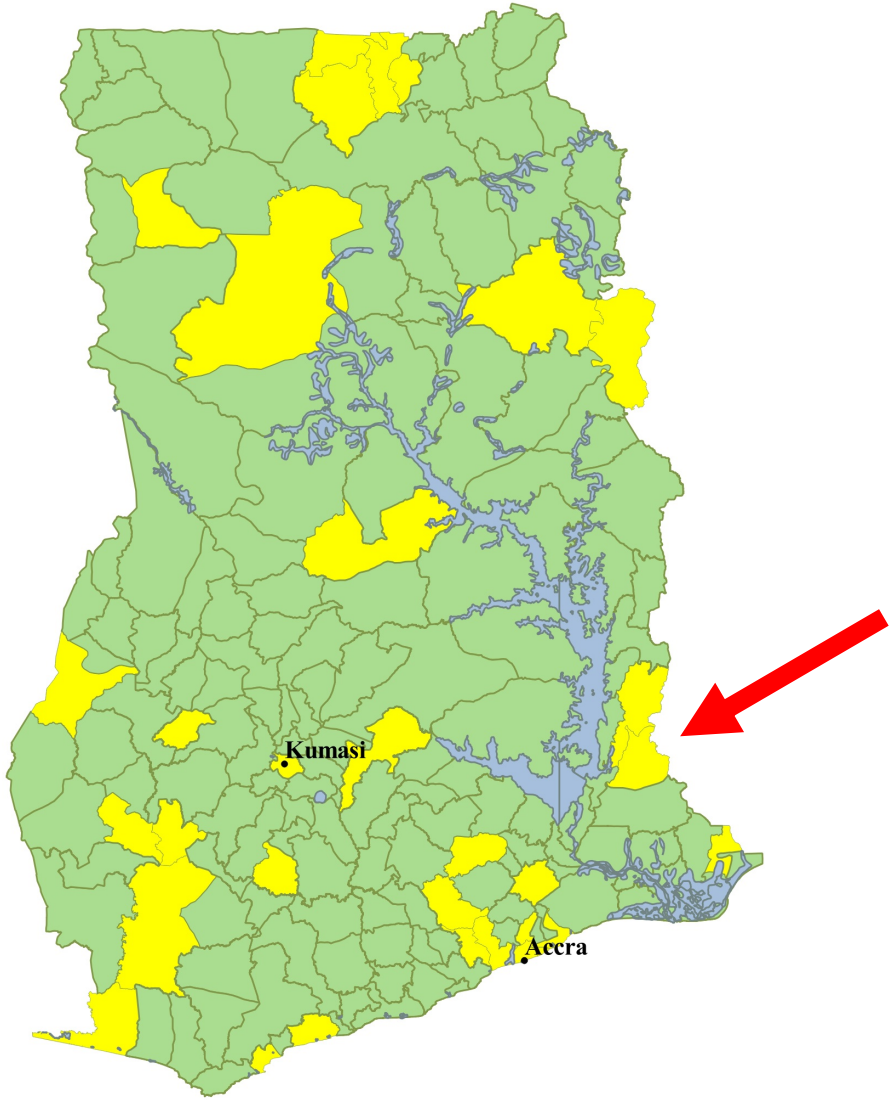
- **Firm-level Study:** (Conditional on trainee preferences over firms) **randomly assigned apprentices to firms** and replaced the traditional entrance fee with a non-monetary government process to apply for program
- **Power Crisis Study:** Controlling for firm and day level fixed effects, how to **firms with apprentices cope** with power crisis relative to firms without?
- **Incentives Study:** RCT on **performance-based incentive** scheme in a sample of firms-apprentices
- **Match Study:** (Conditional on trainee preferences over firms), **randomize the training firm** in a sample of apprentices
- **Labor Market Study:** Medium- and long-term data from RCT on any **access** to apprenticeship training for youth

Ghana Sample



- Firm-level, Incentives, Match, and Labor Market Studies conducted in 32 districts around Ghana

Ghana Sample



- Firm-level, Incentives, Match, and Labor Market Studies conducted in 32 districts around Ghana
- Power crisis study conducted in Hohoe district

Firm-Level Study

Garment-makers, hairdressers, welders, carpenters, masons

	Take Up	
	(1) Program Apprentices	(2) Total Workforce
Treatment Apprentices	0.47***	0.58***
	(0.04)	(0.13)
Observations	1315	1315
Mean of Dep Variable T=0	0.06	3.18

- About half of apprentices assigned to firms attended the apprenticeship
- Each assigned apprentice increased the total workforce in the firm by about half a person
  - → Firms did not substitute away from other employment by firing existing workers or delaying the hiring of other workers

Source: Hardy and McCasland, 2023

Firm-Level Study

	(1) Profits (GHC)	(2) IHS Profits	(3) Revenues (GHC)	(4) IHS Revenues	(5) Program Apprentice Wages (GHC)
Panel A					
	Primary Specification				
Treatment Apprentices	40.54***	0.11***	50.92	0.09**	11.82***
	(12.00)	(0.04)	(30.06)	(0.04)	(2.41)
Panel B					
	With Additional Baseline Controls				
Treatment Apprentices	41.27***	0.12***	53.80*	0.08**	11.82***
	(12.06)	(0.04)	(31.43)	(0.03)	(2.34)
Observations	1257	1257	1257	1257	1257
Mean of Dep Variable T=0	401.08	6.12	736.24	6.68	1.13

- Firms earn about 10% more profits for each assigned apprentice (about 20% more profits for each apprentice who comes to work for them)

Source: Hardy and McCasland, 2023

Research Agenda

- **Question 1:** How do **firms benefit** from access to apprentices?
    - Apprentices **supply needed labor** for firms (Hardy and McCasland, 2023)

Firm-Level Study

Question 2: What can we learn about the informal apprenticeship institutional **system**?

- 88% of firm owners say they train apprentices because they **"want to help vulnerable young people"**

So why do firms charge a fee?

- 85% of firm owners say they normally charge a fee to start an apprenticeship because it will ensure that the apprentice is **serious about the apprenticeship**

Firm-Level Study

Why are firms willing to waive the fee for the government program?

- Can be explained by a simple **signaling model**

- **Suppose:**
  - Serious apprentices are more productive
  - Firms with more productive apprentices have higher revenues
  - Wages are correlated with revenues
  - Serious apprentices can expect higher wages

→ **Only serious apprentices should be willing to pay**
  - The monetary entrance fee
  - The time costs to apply to government program

Research Agenda

Question 2: What can we learn about the informal apprenticeship institutional **system**?

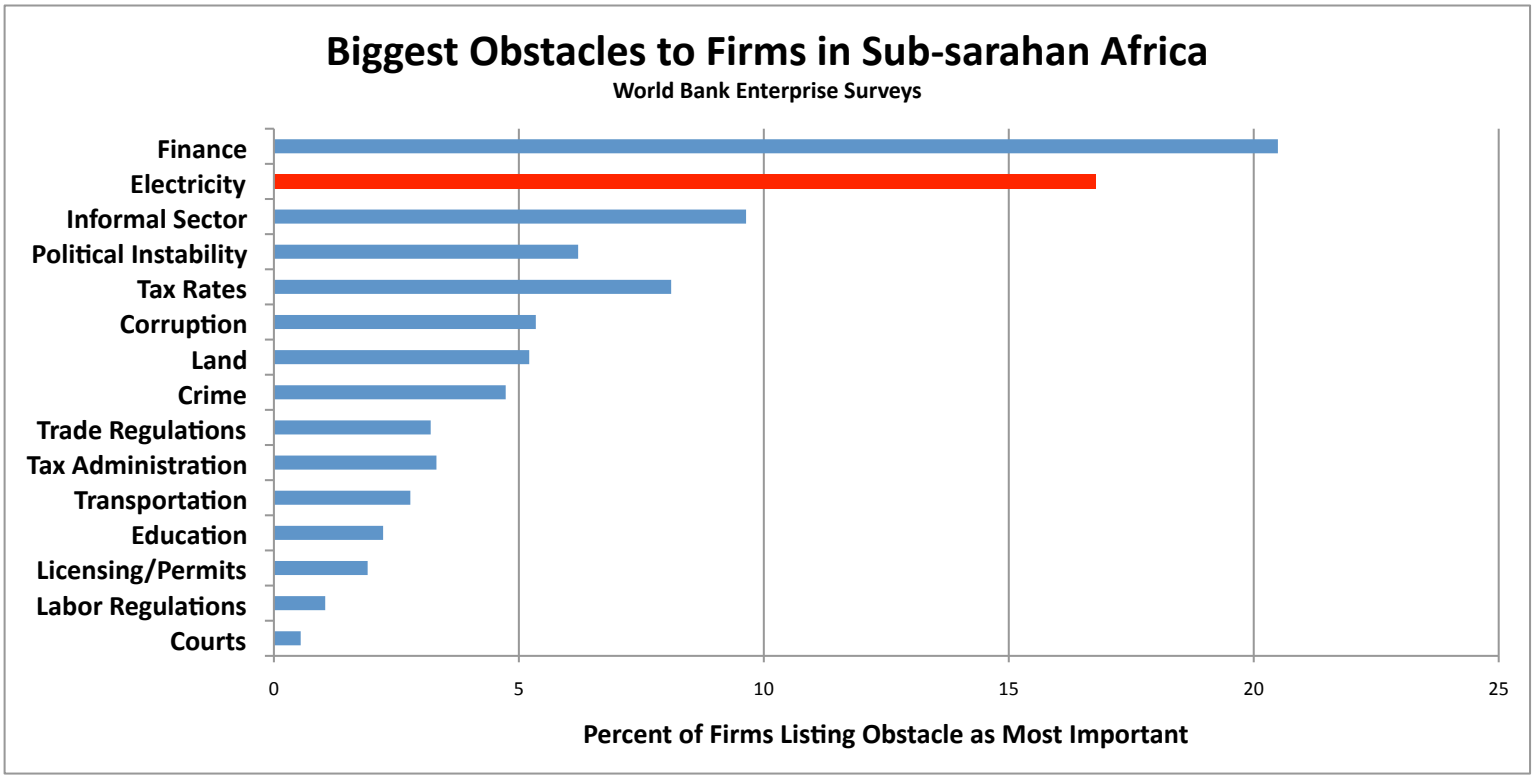
- 88% of firm owners say they train apprentices because they **"want to help vulnerable young people"**

So why do firms charge a fee?

- 85% of firm owners say they normally charge a fee to start an apprenticeship because it will ensure that the apprentice is **serious about the apprenticeship**

Important equity implication: The poorest youth, even those who are serious, will not be able to enter apprenticeship under the traditional institution

Power Crisis Study



Power Crisis Study

Garment-makers

→ Both labor and capital intensive production options available

Power Crisis Study

Table 2. Effect of Blackouts on Weekly Sales, Profits, and Expenses

	Revenues (GHC) (1)	Profits (GHC) (2)
Panel A. One-person firms		
Number of blackout days reported (out of 5)	−4.40***	−4.15***
	(1.24)	(1.27)
Outcome variable average	44.74	31.42
Observations	1,265	1,265
Panel B. Firms with workers		
Number of blackout days reported (out of 5)	0.76	2.07
	(2.33)	(2.09)
Outcome variable average	77.75	48.71
Observations	1,097	1,097

- Firms without apprentices suffer 10% loss in revenues each blackout day
- Firms with apprentices see no change in revenues with blackouts

Source: Hardy and McCasland, 2021

Power Crisis Study

Table 5. Effect of Blackouts on Worker Labor and Wages

	Any worker present (1)	Total worker days (2)	Total worker hours (3)
Firms with workers, only			
Number of blackout days reported (out of 5)	0.03***	0.32***	3.13***
	(0.01)	(0.10)	(0.96)
Outcome variable average	0.84	8.32	77.51
Observations	1,097	1,097	1,097

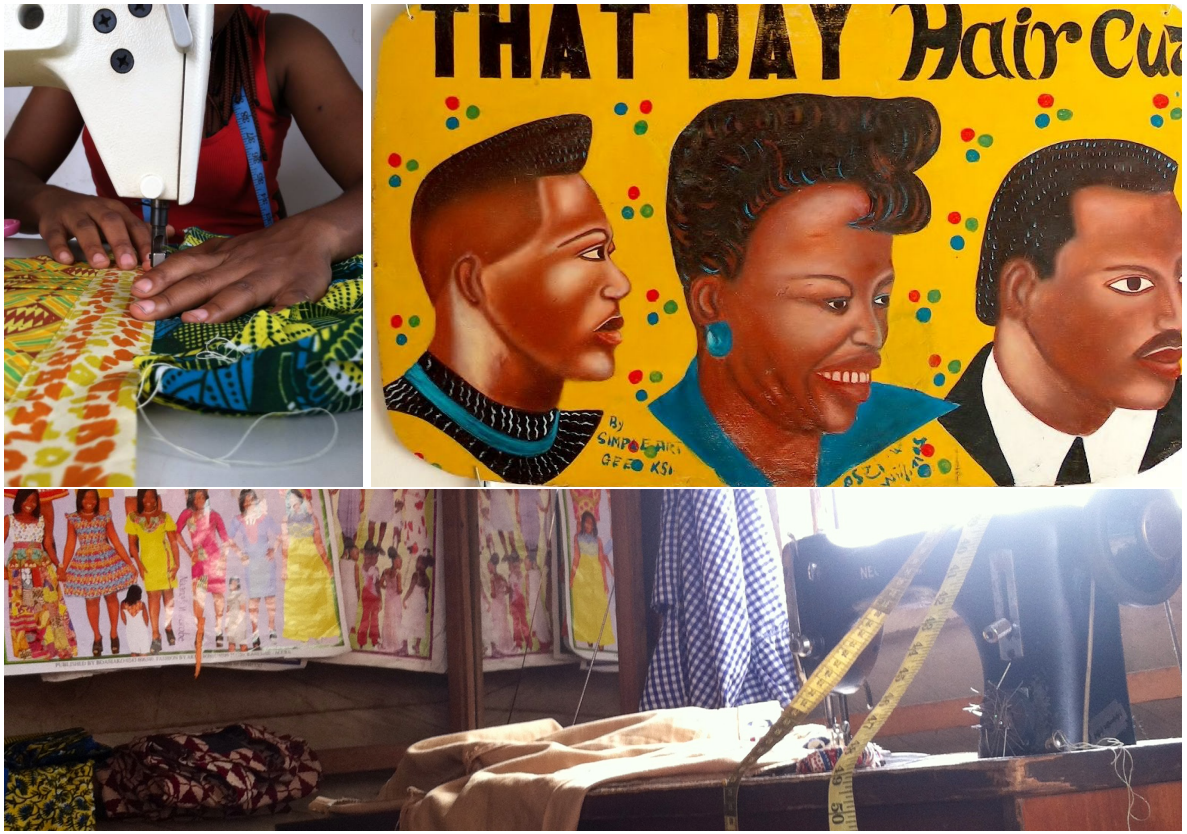
- Firms with apprentices increase apprentice time worked, shifting to more labor-intensive production

Source: Hardy and McCasland, 2021

Research Agenda

- **Question 1:** How do **firms benefit** from access to apprentices?
  - Apprentices **supply needed labor** for firms (Hardy and McCasland, 2023)
  - Apprentices help firms switch to **labor-intensive production** when capital-intensive production is not possible (e.g. when power is out) (Hardy and McCasland, 2021)

Incentives Study



- Sample is 94% female

- Hairdressers and garment-makers
- **Formal TVET agency developed skills competency tests** for these trades
- We also collect data on skills and labor market outcomes 2 years later

Incentives Study

- **We randomize performance-based financial incentives:**
  - **Control** – Firms owners receive **flat cash value** conditional only on worker participation in a trade-specific skills aptitude test
  - **Treatment** – Firm owners receive **performance-based cash value** linked to worker test performance

Incentives Study

- **Control** – Flat fee = 100 Ghana Cedis (about 40% of one month's profits or 3.3% of annual profits or 3 months wages paid to an apprentice)
- **Treatment** – Same expected payout value, intended to incentivize training inputs across the apprentice skill distribution

Group (Decile)	Payment to MCP (Ghana Cedis)
1	200
2	140
3	130
4	120
5	105
6	90
7	80
8	70
9	35
10	25

Note: MCP = master craftsperson

Incentives Study

	Assessment			
	Took incentivized test (0/1) (1)	Practical component (z-score) (2)	Theoretical component (z-score) (3)	Earned certificate (0/1) (4)
Panel A: Full sample				
Treatment	-0.01	0.13*	-0.08	0.05
	(0.04)	(0.07)	(0.07)	(0.04)
Observations	763	488	488	488
Mean of Dep Variable T=0 Incentivized Test Sample	0.65	0.00	0.00	0.80
Panel B: Women only				
Treatment	-0.01	0.18**	-0.05	0.07*
	(0.04)	(0.08)	(0.07)	(0.04)
Observations	717	457	457	457
Mean of Dep Variable T=0 Incentivized Test Sample	0.64	0.00	0.00	0.81

- Performance incentive **improves performance** on the government skills test by 0.13 or 0.18 standard deviations

Source: Brown, Hardy, Mbiti, McCasland, and Salcher, 2024

Incentives Study

	Endline survey			
	Craft skills quiz (z-score)	Craft skills quiz (z-score)	Sales skills (z-score)	Sales skills (z-score)
	(5)	(6)	(7)	(8)
Panel A: Full sample				
Treatment	0.15**	0.14	0.12**	0.10
	(0.07)	(0.09)	(0.06)	(0.07)
Observations	743	466	748	468
Mean of Dep Variable T=0	0.00	0.05	0.00	-0.11
Incentivized Test Sample		Yes		Yes
Panel B: Women only				
Treatment	0.15**	0.13	0.13**	0.12
	(0.07)	(0.09)	(0.06)	(0.08)
Observations	703	439	706	439
Mean of Dep Variable T=0	0.00	0.06	0.00	-0.09
Incentivized Test Sample		Yes		Yes

- **Two years later:** Performance incentive improves performance in craft skills by 0.15 standard deviations and in sales skills by 0.12 standard deviations

Source: Brown, Hardy, Mbiti, McCasland, and Salcher, 2024

Incentives Study

	Unconditional		
	Total earnings (GhC) (1)	Self-employment profits (GhC) (2)	Wage employment earnings (GhC) (3)
Panel A: Full sample			
Treatment	10.43*	8.41*	3.41
	(5.56)	(4.70)	(3.40)
Observations	2992	2992	2992
Mean of Dep Variable T=0	44.34	24.18	12.98
Panel B: Women only			
Treatment	12.89**	8.93*	3.02
	(5.46)	(4.75)	(3.57)
Observations	2824	2824	2824
Mean of Dep Variable T=0	41.52	22.99	13.10

- **Two years later:** Performance incentive **improves total earnings** by 24%, driven by **higher self-employment profits**

Source: Brown, Hardy, Mbiti, McCasland, and Salcher, 2024

Incentives Study

- How did the performance-based incentive change:
  - **Training inputs during training?**
  - **Self-employment outcomes for youth?**

Incentives Study

	Firm level pedagogy
	Any formal syllabus (0/1) (5)
Panel A: Full sample	
Treatment	0.10*
	(0.06)
Observations	341
Mean of Dep Variable T=0	0.41
Panel B: Women only	
Treatment	0.10*
	(0.06)
Observations	325
Mean of Dep Variable T=0	0.41

- Performance incentive **increased use of a formal syllabus by 25%**

Source: Brown, Hardy, Mbiti, McCasland, and Salcher, 2024

Incentives Study

	Apprentice completion			
	Completed	Paid exit/ceremony	Completed and exited	Completed and retained
	(1)	(2)	(3)	(4)
Panel A: Full sample				
Treatment	0.07**	0.10***	0.08**	-0.01
	(0.04)	(0.03)	(0.04)	(0.01)
Observations	748	748	748	748
Mean of Dep Variable T=0	0.31	0.15	0.28	0.03
Panel B: Women only				
Treatment	0.07*	0.11***	0.08**	-0.00
	(0.04)	(0.03)	(0.04)	(0.01)
Observations	706	706	706	706
Mean of Dep Variable T=0	0.32	0.16	0.30	0.02

- Performance incentives **increase completion by 23%**
- Performance incentives **increase exit from firm by 28%**

Source: Brown, Hardy, Mbiti, McCasland, and Salcher, 2024

Research Agenda

- **Question 3:** Can **outcomes-based incentive schemes** improve the quality of training in informal apprenticeships?
  - Yes! Outcomes-based incentives are a cost-effective way to improve skills acquisition and labor market outcomes in this **pilot study**
  - **Scale questions:**
    - What would it look like over multiple cohorts?
    - What would it look like at scale?
    - Maybe firm owners would not behave the same as the pilot?

Match Study

- **Question 4:** Which **types of firms** provide higher quality training?

- **Match Study:** (Conditional on trainee preferences over firms), **randomize the training firm** in a sample of apprentices

    - Firm owner math score (MCP = master craftsperson)
    - Firm profits
    - Number of prior apprentices (training experience)
    - Firm wagebill

→ Placed with 1st or 2nd highest firm within district and trade? (about 10 firms per district and trade)

Garment-makers, hairdressers, welders, carpenters, masons

Match Study

	(1) **Math Score** (z-score)	(2) **Profits** (GHC)	(3) **Apprentices Trained** (#)	(4) **Wage Bill** (GHC)
	Total Earnings (GHC)			
Matched with 1st/2nd MCP	-13.101	62.738**	65.106***	45.553*
	(21.411)	(25.270)	(22.080)	(26.680)
Adjusted p-value	0.541	0.013	0.003	0.089

- Apprentices training at firms with **higher profits, higher wagebill, and more training experience** earn more about 1 year after training ends, as compared to apprentices that train with other firms
- We find no effect of firm owner math skills

Source: Hardy, Mbiti, McCasland, and Salcher, 2019

Garment-makers, hairdressers, welders, carpenters, masons

Labor Market Study

- **Question 5:** Overall, how to informal apprenticeships impact **labor market outcomes** for trainees?

  → RCT on access to apprenticeship training for youth

- **Medium-Term** → 3 years is a long training duration, what happens about 1 year after training?

	(1) **Total** (GHC)	(2) **Wage empl.** (GHC)
Treatment	-11.54**	-15.35***
	(5.73)	(4.84)
Adjusted p-value	0.044	0.007
Mean Control	89.19	42.17
Observations	3,270	3,270

- Training reduces earnings from wage employment, as apprenticeship graduates transition to self-employment

Source: Hardy, Mbiti, McCasland, and Salcher, 2019

Labor Market Study

- **Question 5:** Overall, how to informal apprenticeships impact **labor market outcomes** for trainees?

  → RCT on access to apprenticeship training for youth

- **Longer-Term (6 years after training)** → Analysis in progress!

Labor Market Study

- **Longer-Term (6 years after training)**

Some Challenges:

- Men in the treatment group are about **equally likely to drop out** as they are to complete an apprenticeship
- Men in the treatment group are about **25% less likely to migrate for work**, potentially reducing access good work opportunities

Some Opportunities:

- Treated women are about **25% more likely to work in self-employment** (with no change in wage employment)
- Treated women earn about **13% more in self-employment profits** (with no change in wage employment earnings)

Thank you!!!

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