Tackling Youth Unemployment:
Evidence from a Labor Market Experiment in Uganda

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January 2018, AEA
Motivation

- youth unemployment and underemployment are key policy challenges in the developing world
- East Africa: majority of popn aged below 25, youth represent 60% of the unemployed
- factors driving youth unemployment [Freeman 1979, Becker 1994, Pissarides 1994]:
  - pre labor market: young workers lack skills/info
  - barriers to labor market entry

- this paper: labor market field experiment to study these issues
This Paper: Two-Sided Market RCT Design

- workers: young entrants into the labor market
- firms: SMEs in eight sectors [manufacturing, services]
- two sided experimental design: T and C workers; T and C firms
- the RCT measures causal impacts on workers and firms of experimentally varying:
  - vocationally training workers before they enter the labor market [VT]
  - incentivising firms to hire and train workers on-the-job [FT]
  - matching
- sheds light on $L^S$, $L^D$ and matching elements of the labor market
- context: Uganda
  - skewed age distn, youth unemployment key policy issue
Research Questions 1: Treatment Effects on Workers

- how do the impacts on workers of VT and FT differ?
  - contrasting supply- and demand-side policies

- outcomes: verified skills, employment, wages, productivity, earnings
Research Questions 2: Mechanisms

• tracked workers for four years since baseline

• what are the steady *state impacts* of VT/FT on workers?

• structurally estimate a job ladder model of worker search

• **key outcomes**: job offer arrival rates (UJ, JJ), unemployment rates, earnings

• feed into IRR calculations
Research Questions 3: Firm-Side Responses

- two sided experimental design: T and C workers; T and C firms

- firm side experiment allows us to measure:
  - whether returns to VT/FT reflect matching to differential firms
  - within-firm employment displacement
  - profit impacts and rent-sharing
Context: Workers

- oversubscription design used for intervention
- targeted to poorest/disadvantaged youth
  - not the kinds of individual that can self-finance VT or FT
  - many job training programs target youth [Card et al. 2011, Attanasio et al. 2012]
- panel data: 1714 workers tracked from baseline and three follow-ups
- [Table 1: C-group Worker Characteristics and Labor Market Outcomes]
Table 1: Baseline Balance on Worker Labor Market Outcomes

Means, robust standard errors from OLS regressions in parentheses
P-value on t-test of equality of means with control group in brackets
P-value on F-tests in braces

<table>
<thead>
<tr>
<th>Number of workers</th>
<th>Currently working</th>
<th>Has worked in the last month</th>
<th>Has done any wage employment in the last month</th>
<th>Any self employment in the last month</th>
<th>Has done any casual work in the last month</th>
<th>Total earnings in the last month [USD]</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Workers</td>
<td>1714</td>
<td>.360</td>
<td>.383</td>
<td>.130</td>
<td>.046</td>
<td>.257</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.045)</td>
<td>(.044)</td>
<td>(.023)</td>
<td>(.013)</td>
<td>(.508)</td>
</tr>
</tbody>
</table>
Context: Firms

- urban labor markets throughout Uganda
- matched to nationally representative sample of 1500 SMEs
  - $L \in [1, 15], \bar{L} = 3$, operating in eight sectors:
    - welding, motor mechanics, construction,..., hairdressing
- wage subsidy covering firm’s screening/learning costs
  - employer learning [Farber and Gibbons 1996, Altonji and Pierret 2001]
  - apprenticeships as screening technologies [Autor 2001, Hardy and McCasland 2015]
- [Table 2: Vocational Training]
- [Table 3: On-the-Job Training]
<table>
<thead>
<tr>
<th>Sector</th>
<th>% workers skilled in sector</th>
<th>Coefficient and SE from worker wage regressions [USD]</th>
<th>Coefficient and SE from worker log(wage) regressions [USD]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coefficient</td>
<td>SE</td>
</tr>
<tr>
<td>All Sectors</td>
<td>31.0%</td>
<td>26.2***</td>
<td>(3.15)</td>
</tr>
<tr>
<td><strong>Manufacturing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Welding</strong></td>
<td>24.9%</td>
<td>34.5***</td>
<td>(6.40)</td>
</tr>
<tr>
<td><strong>Motor-mechanics</strong></td>
<td>23.5%</td>
<td>16.1*</td>
<td>(9.41)</td>
</tr>
<tr>
<td><strong>Electrical wiring</strong></td>
<td>41.9%</td>
<td>27.3***</td>
<td>(7.60)</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>28.8%</td>
<td>11.5</td>
<td>(9.39)</td>
</tr>
<tr>
<td><strong>Plumbing</strong></td>
<td>49.1%</td>
<td>60.9***</td>
<td>(19.0)</td>
</tr>
<tr>
<td><strong>Services</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hairdressing</strong></td>
<td>29.2%</td>
<td>22.9***</td>
<td>(5.97)</td>
</tr>
<tr>
<td><strong>Tailoring</strong></td>
<td>41.6%</td>
<td>15.9</td>
<td>(9.76)</td>
</tr>
<tr>
<td><strong>Catering</strong></td>
<td>40.2%</td>
<td>26.8**</td>
<td>(11.6)</td>
</tr>
</tbody>
</table>
Table 3: Characteristics of Apprenticeships

**A. Availability**
- Worker received on-the-job training at the current firm: 0.498
- Duration of on-the-job training [months]: 10

**B. Payments**
*In the first month of training, the worker:*
- Was paid: 0.198
- Was unpaid: 0.515
- Was paying the firm owner: 0.288

| Earnings (conditional on > 0) [US$] (median) | 39.2 (40.1) |
| Amount worker was paying to owner (conditional on > 0) [US$] (median) | 51.9 (33.3) |

**C. Trainers**
*Who was mainly involved in training the worker:*
- Firm owner only: 0.457
- Other employees only: 0.091
- Firm owner as well as other employees: 0.452
Figure 1: Experimental Design

A. Worker Side Design

1714 Workers

- Training
  - T3: Vocationally Trained (390 workers)
  - T4: Vocationally Trained + Matched (307 workers)
- No training
  - T5: Untrained, Matched (283 workers)
  - T2: Firm-trained (wage subsidy + matched) (283 workers)
  - T1: Control (451 workers)
Firm Training [T2]

- firm paid 120K UGX/month = $50 (for 6 months) to hire an untrained worker
- inflexible wage subsidy with designated split: $12.5 to owner, $38 to worker
- two anchors for this split:
  - for those reporting to be an apprentice with a wage, mean wage is $39
  - wages of all unskilled workers
    - subsidy rate for unskilled workers (subsidy/average wage): 63% [de Mel et al. 2010, SR=50%]
Certification and Skills Composition

- certification:
  - VT workers can signal their skills to employers
  - value of certification [Pallais 2014, MacLeod et al. 2016, Bassi and Nansamba 2017]
  - SM evidence: UJ and JJ transitions

- incentives for firms to train workers depends on labor market imperfections [Acemoglu and Pischke 1998, 1999]

- VT workers more likely to be poached than FT → tilts to balance towards latter having relatively more firm specific skills
  - RF evidence: skills, wages, productivity, firm profits
  - SM evidence: UJ and JJ transitions
Estimation

- observe worker $i$ in treatment group $d$ in strata $s$ in survey wave $t = 0, 1, 2, 3$
- estimate the following ANCOVA specification in survey waves $t = 1, 2, 3$:
  \[
  y_{ist} = \sum_j \beta_j T_i + \gamma y_{i0} + \delta x_{i0} + \lambda_s + \vartheta_t + u_{ist}
  \]
- worker $i$’s assigned treatment $T_i$ ($j$ treatments)
- $\lambda_s, \vartheta_t$: strata and survey wave fixed effects
- randomization at worker level ($i$): robust standard errors
Skills: Task Composition, Sector- and Firm-specific Skills

- firm-sponsored training
- conducted sectoral-specific skills test on workers (incl. $C'$), administered at second and third follow-up
- try to measure firm-specific skills (third follow up)
- sectoral task lists by training type (O*NET)

- [Table 4: Skills]
- [Figure 3: Tasks]
- [Table 5: Employment (Extensive and Total Margins)]
- [Figure 4: Productivity Bounds]
Table 4: Skills

OLS regression coefficients, IPW estimates, robust standard errors in parentheses

<table>
<thead>
<tr>
<th>Firm-Provided Training</th>
<th>Received OTJ-T at First Employer</th>
<th>Position in First Job is &quot;Trainee&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Firm Trained</td>
<td>.144*** (.052)</td>
<td>.215*** (.041)</td>
</tr>
<tr>
<td>Vocationally Trained</td>
<td>-.029 (.042)</td>
<td>-.019 (.025)</td>
</tr>
</tbody>
</table>

Mean (SD) Outcome in Control Group

|                        | .404 | .092 |

Control for Baseline Value

|                      | No   | No   |

P-values on tests of equality:

| Firm Trained = Vocationally Trained | [.000] | [.000] |

N. of observations

<p>|                | 792   | 794   |</p>
<table>
<thead>
<tr>
<th>1. MOTOR-MECHANICS</th>
</tr>
</thead>
</table>
| **1.** multiple-choice  
What are you advised to do when servicing the engine by changing oil?  
A. Top up lubricating oil  
B. Replace oil filter  
C. Over hand engine  
D. Over hand cylinder head  
Correct Answer: B |
| **2.** multiple-choice  
What immediate remedy can you give to a vehicle with a problem of excessive tyre wear in the center more than other parts?  
A. Increase tyre pressure  
B. Reduce tyre pressure  
C. Inflate pressure  
D. Remove the vehicle tire  
Correct Answer: B |
| **3.** multiple-choice  
If a customer reports to you that his/her vehicle charging system works at lower rate, how can you help him?  
A. Replacing the charging system  
B. Adjusting the alternator tension  
C. Replacing alternator housing  
D. Renewing wire insulator  
Correct Answer: B |
| **4.** multiple-choice  
Which of the following set of systems or component call for mechanical adjustment during general vehicle service?  
A. Tyres, cooling system, master cylinder  
B. Break shoes, alternator, and valve clearance  
C. Distributor, radiator, propeller shaft  
D. Tank, crank shaft, turbo charger  
Correct Answer: B |
| **5.** multiple-choice  
What solution would you give a customer with a vehicle engine producing blue smoke?  
A. Top up lubricant  
B. Time the engine  
C. Replace piston rings  
D. Remove carbon deposits  
Correct Answer: C |
| **6.** matching  
What should you do to stop the following vehicle troubles?  
A. Battery over charging  
B. Engine over heating  
C. Lubricant leakage  
D. Smoke in exhaust  
E. Engine fails to start  
Correct Answer: 1B, 2A, 3C, 4D, 5E |
| **7.** order  
When changing engine oil, in which order should you perform the following steps?  
A. Drain oil through drain plug  
B. Remove oil filter cup  
C. Run engine to check leaks  
D. Fill new oil through filler cup to level  
E. Remove oil filter  
F. Warm up the engine  
Correct Answer: B, E, A, D, F, C |
### Table 4: Skills

**OLS regression coefficients, IPW estimates, robust standard errors in parentheses**

<table>
<thead>
<tr>
<th>Sector-Specific Skills Test</th>
<th>Firm-Specific Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Report Some Skills</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
</tr>
<tr>
<td>Firm Trained</td>
<td>.110*** (.032)</td>
</tr>
<tr>
<td>Vocationally Trained</td>
<td>.269*** (.023)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean (SD) Outcome in Control Group</th>
<th>Control for Baseline Value</th>
<th>P-values on tests of equality: Firm Trained = Vocationally Trained</th>
<th>N. of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>.596 (30.1 (22.9))</td>
<td>No</td>
<td>[.000] [.001] [.000]</td>
<td>1,818</td>
</tr>
</tbody>
</table>

P-values on tests of equality:
- Firm Trained = Vocationally Trained: [.000] [.001] [.000] [.025]
- N. of observations: 1,818 1,818 1,302 650
Figure 3: Tasks Performed by Vocationally Trained and Firm Trained Workers

Panel A: Manufacturing

- Dig a foundation
- Fit a sink
- Fit a sink on a slab
- Fitting a bath tub
- Connecting water pipes
- Making metallic roofs
- Plaking plate stands
- Spraying
- Fetching water
- Repairing wornout tyres
- Making a double bed
- Making designs on doors
- Making restaurant chairs
- Making a door 3’5
- Making a single door

ALL TASKS
Table 5: Employment and Earnings
OLS regression coefficients, IPW estimates, robust standard errors in parentheses

<table>
<thead>
<tr>
<th></th>
<th>Has done any work in the last month</th>
<th>Number of months worked in the last year</th>
<th>Hourly wage rate [USD]</th>
<th>Total earnings in the last month [USD]</th>
<th>Total earnings in the last month [USD]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td><strong>Firm Trained</strong></td>
<td>.063**</td>
<td>.518**</td>
<td>.028**</td>
<td>5.80**</td>
<td>12.4**</td>
</tr>
<tr>
<td></td>
<td>(.025)</td>
<td>(.259)</td>
<td>(.012)</td>
<td>(2.53)</td>
<td>(5.34)</td>
</tr>
<tr>
<td><strong>Vocationally Trained</strong></td>
<td>.090***</td>
<td>.879***</td>
<td>.031***</td>
<td>9.75***</td>
<td>64.8***</td>
</tr>
<tr>
<td></td>
<td>(.020)</td>
<td>(.207)</td>
<td>(.009)</td>
<td>(2.01)</td>
<td>(22.9)</td>
</tr>
<tr>
<td><strong>Mean Outcome in Control Group</strong></td>
<td>.438</td>
<td>4.52</td>
<td>.074</td>
<td>28.7</td>
<td>28.7</td>
</tr>
<tr>
<td><strong>Control for Baseline Value</strong></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>P-values on tests of equality:</strong></td>
<td>[.255]</td>
<td>[.134]</td>
<td>[.799]</td>
<td>[.111]</td>
<td>[.016]</td>
</tr>
<tr>
<td>Firm Trained = Vocationally Trained</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N. of observations</strong></td>
<td>3,256</td>
<td>3,256</td>
<td>3,099</td>
<td>3,111</td>
<td>2,264</td>
</tr>
</tbody>
</table>
Underlying Market Failure

- with such high returns from training, why do workers not self-invest in their HK?

- credit constraints likely bind in this sample
  - total cost: $470 per trainee split as VTI ($400) + out-of-pocket costs ($70)

- credit constraints also prevent workers paying for FT

- credit constraints on firms prevent them paying up front hiring/screening costs of employing youth

- worker beliefs:
  - imperfect information about returns to skills in low-income labor markets
    [Jensen 2009, Kaufmann 2014]

- [Table A6: Worker Beliefs]
Table A6: Worker Expectations
Means, standard deviations in parenthesis
All amounts in 2012 USD

<table>
<thead>
<tr>
<th></th>
<th>Expected probability of finding a job in the next 12 months</th>
<th>Average expected monthly earnings (triangular distribution)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With current Skill Set</td>
<td>If received VT</td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>All Workers (Baseline Interview)</td>
<td>.567 (.288)</td>
<td>.867 (.144)</td>
</tr>
<tr>
<td>N. of observations</td>
<td>1,611</td>
<td>1,589</td>
</tr>
</tbody>
</table>

Notes: Notes: ***denotes significance at the 1% level, ** at the 5% level, * at the 10% level. The data used is from the baseline and first three follow-up worker surveys. Columns 1 to 4 report the mean and standard deviation (in parentheses) of the average expected probability of finding a job and the average monthly earnings (assuming a triangular distribution of expected earnings) with the current skill set (columns 1 and 3), or if the worker were to receive vocational training (columns 2 and 4). This is based on all workers interviewed at baseline (across all treatments). All monetary variables are deflated and expressed in terms of August 2012 prices, using the monthly consumer price index published by the Uganda Bureau of Statistics. Deflated monetary amounts are then converted into August 2012 USD. The top 1% values of each variable are excluded from the analysis.
Value Functions

- value function for an unemployed worker is:

\[
V^n(t) = -\varphi(c) + \beta \left[ \lambda_0(c, t) \max \{ \int V(w, t) dF(w|t), V^n(t) \} \\
+ (1 - \lambda_0(c, t)) V^n(t) \right]
\]

- value function for an employed worker with wage \( w \) is:

\[
V(w, t) = w - \varphi(c) + \beta \left[ \delta V^n(t) + \lambda_1(c, t) \max \{ \int V(w, t) dF(w|t), V(w, t) \} \\
+ (1 - \delta - \lambda_1(c, t)) V(w, t) \right]
\]
Treatments and Job Search

- training can affect worker behavior through two mechanisms:
  - the probabilities of receiving a job offer: \((\lambda_0(c, t), \lambda_1(c, t))\)
  - the distribution of offered wages \((F(w|t))\)

- through these mechanisms training impacts endogenous choices:
  - search effort \((c)\)
  - whether to accept or reject wage offers (reservation wage)

- [Table 6: Worker Beliefs and Search]
Table 6: Worker Beliefs and Job Search

OLS regression coefficients, IPW estimates, robust standard errors in parentheses

<table>
<thead>
<tr>
<th>Job Offer Probability</th>
<th>Offered Wages</th>
<th>Search Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected probability of finding a job in the next 6 months (0 to 10 scale)</td>
<td>Average expected monthly earnings (triangular distribution) [USD]</td>
<td>Has actively looked for a job in the last year</td>
</tr>
<tr>
<td>(1)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Firm Trained</th>
<th>Vocationally Trained</th>
<th>Mean Outcome in Control Group</th>
<th>Control for Baseline Value</th>
<th>P-values on tests of equality:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.593*** (.137)</td>
<td>1.87*** (.108)</td>
<td>2.81 72.6</td>
<td>Yes Yes No</td>
<td>Firm Trained = Vocationally Trained [.000] [.000] [.000]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N. of observations 3,136 1,905 3,255</td>
</tr>
</tbody>
</table>
Estimation

- follow two-step procedure in Bontemps et al. [2000]
  - $\lambda_0, \lambda_1, \delta$ are estimated, asymptotic se’s calculated

- [Table 7, Panel A: Job Destruction and Job Offer Rates]

- [Table 7, Panel A: $u, \kappa_1$]

- [Table 7, Panel B: $F(.)$ and $G(.)$ Estimates]
Table 7: Estimates of the Job Ladder Search Model
Two-step estimation procedure in Bontemps, Robin and van den Berg [2000]

Panel A: Parameter Estimates

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control (1)</th>
<th>Firm Trained (2)</th>
<th>Vocationally Trained (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job destruction rate (monthly): δ</td>
<td>.0272</td>
<td>.0259</td>
<td>.0239</td>
</tr>
<tr>
<td></td>
<td>(.0030)</td>
<td>(.0037)</td>
<td>(.0021)</td>
</tr>
<tr>
<td>Arrival rate of job offers if UNEMPLOYED (monthly): λ₀</td>
<td>.0189</td>
<td>.0191</td>
<td>.0237</td>
</tr>
<tr>
<td></td>
<td>(.0019)</td>
<td>(.0024)</td>
<td>(.0019)</td>
</tr>
<tr>
<td>Arrival rate of job offers if EMPLOYED (monthly): λ₁</td>
<td>.0388</td>
<td>.0376</td>
<td>.0428</td>
</tr>
<tr>
<td></td>
<td>(.0096)</td>
<td>(.0117)</td>
<td>(.0080)</td>
</tr>
<tr>
<td>Interfirm competition for workers: K₁</td>
<td>1.426</td>
<td>1.452</td>
<td>1.791</td>
</tr>
<tr>
<td>Unemployment Rate: u</td>
<td>.5892</td>
<td>.5755</td>
<td>.5024</td>
</tr>
<tr>
<td>% Impact:</td>
<td>2.3%</td>
<td>14.7%</td>
<td></td>
</tr>
</tbody>
</table>
Table 7: Estimates of the Job Ladder Search Model

Two-step estimation procedure in Bontemps, Robin and van den Berg [2000]

Panel B: Function and Income Estimates

<table>
<thead>
<tr>
<th></th>
<th>Steady State: November 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Data from Second and Third Follow-up)</td>
</tr>
<tr>
<td>Average (sd) monthly OFFERED wage [USD]</td>
<td>$F(.)$</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Average (sd) monthly ACCEPTED wage [USD]</td>
<td>$G(.)$</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment Effect Impact on Annual Income [USD]</td>
<td>% Impact:</td>
</tr>
</tbody>
</table>
IRR

- IRR challenge versus capital/cash transfers in low-income settings [Blattman and Ralston 2015]
- VT cost: $470 per trainee split as VTI ($400) + out-of-pocket costs ($70)
- FT cost: $50.3 \times 6 \text{ months} = $302 \text{ per trainee}
- SS earnings impact 3 times larger for vocational training: $107 versus $37
- opportunity costs: foregone earnings while being trained

- [Table 10: IRR]
- [Figure 7: McKenzie 2017 Meta-analysis]
Table 10: Internal Rate of Return

<table>
<thead>
<tr>
<th>Panel</th>
<th>Description</th>
<th>Firm Trained</th>
<th>Vocationally Trained</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>Social discount rate = 5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remaining expected productive life of beneficiaries</td>
<td>38 years</td>
<td>38 years</td>
</tr>
<tr>
<td>Panel A. External parameters</td>
<td>Total cost per individual at year 0 [USD]:</td>
<td>368</td>
<td>510</td>
</tr>
<tr>
<td></td>
<td>(i) Training costs (for 6 months)</td>
<td>302</td>
<td>470</td>
</tr>
<tr>
<td></td>
<td>(ii) Program overheads costs</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(iii) Foregone earnings (for 6 months) - average at baseline</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Panel B. Estimated total earnings benefits</td>
<td>2 Benefits/cost ratio</td>
<td>1.69</td>
<td>3.56</td>
</tr>
<tr>
<td></td>
<td>Social discount rate = 10%</td>
<td>0.98</td>
<td>2.06</td>
</tr>
<tr>
<td></td>
<td>3 Internal Rate of Return (IRR)</td>
<td>0.098</td>
<td>0.211</td>
</tr>
<tr>
<td>Panel C. Sensitivity</td>
<td>Sensitivity to different expected remaining productive life of beneficiaries</td>
<td>0.001</td>
<td>0.166</td>
</tr>
<tr>
<td></td>
<td>Remaining expected productive life = 10 years</td>
<td>(for 6 months) - average at baseline</td>
<td></td>
</tr>
<tr>
<td>Panel D. Programme Costs for IRR to equate social discount rate</td>
<td>5 Total cost per individual at year 0 [USD]</td>
<td>624</td>
<td>1814</td>
</tr>
</tbody>
</table>
Figure 7: Comparison of Treatment Impacts to Meta-analysis by McKenzie [2017]

Panel A: Employment impacts

- **Red**: Job search assistance/matching
- **Green**: Wage subsidies
- **Blue**: Vocational training

Panel B: Earnings impacts

- **Red**: Job search assistance/matching
- **Green**: Wage subsidies
- **Blue**: Vocational training
External Validity

- we have documented large impacts of training relative to studies in middle- and high-income countries: why?
- our effect sizes are large relative to literature
- ranking of treatments similar to earlier studies ($VT > match$)
  - sectoral focus: reduced mismatch
  - worker selection into evaluation sample, low attrition
  - treatment intensity
  - VTI quality (interacting with imperfect information of workers)
Motivation

- Youth unemployment and underemployment are key policy challenges in the developing world.

- Factors driving youth unemployment:
  - Pre labor market: young workers lack skills/info
  - Barriers to labor market entry

- This paper: labor market field experiment to study these issues
  - Both workers and firms constrained
  - Returns to VT dominate FT
  - Role of VTI sector and certification