Gendered effects of digital jobs matching platforms: experimental evidence from Mozambique

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Agenda

(1) Motivation

Motivation

Youth employment crisis in sub-Saharan Africa – at least one in five adults looking for (more) work.

But un(der)employment often coincides with unfilled vacancies.

Interest in how to reduce 'matching frictions':

- Vacancy information (Dammert et al., 2015)
- Transport subsidies (Franklin, 2018)
- Supported job search (Altmann et al., 2018; Belot et al., 2019)
- Wage information (Jones & Santos, 2022)
- Subsidized skills screening for firms (Abebe et al., 2021)
- Attracting and screening candidates on job portals (Fernando et al., 2023)

Our focus: **getting individuals to use digital jobs matching platforms**.

Existing literature

Mixed findings in US/Europe – 'puzzle of ineffective internet job search' (Kroft and Pope, 2014; Horton, 2017).

Recent evidence from India also not so encouraging:

- Chakravorty et al. (2021): nudged TVET graduates to use a government-run application → moderate uptake, but no positive effects on labour market outcomes

- Afridi et al. (2022): household visits offering free registration on a 'hyper-local' platform to find blue-collar workers → no significant overall treatment effect

- Kelley et al. (2023): registered randomly-chosen graduates on a jobs portal, which sent them SMS's on opportunities → temporary *increase* in voluntary unemployment

Our contributions

1 Consider a new context: low-income SSA where jobs dynamics somewhat different (v. challenging)

2 Compare platforms at opposite ends of the jobs spectrum: formal salaried jobs vs. informal tasks for the self-employed

3 Examine gender heterogeneity: interaction with gender barriers – men often first to move from self-employment into wage work (Bandiera et al., 2022); husbands benefit from wives' network treatment (Afridi et al., 2022)

4 Apply an alternative approach to dealing with non-compliance: principal scores

(2) Experiment

School-to-work youth tracer survey, Mozambique

We ran a longitudinal survey of TVET graduates (*Ensino Técnico Médio*) as they entered the labour market:

- All regions and types of schools (public/private) – Maputo City, Maputo Province, Tete, Nampula and Cabo Delgado
- Wide range of different courses, agriculture/industry/services
- Baseline face-to-face survey (N = 1639): October-Nov. 2019
- Follow-up telephone survey (4 waves): January-Nov. 2020
- Track multiple outcomes : e.g., employment status, job quality, earnings, search behaviour, life satisfaction

$\Rightarrow$ Focus primarily on combined employment outcome score (1st principal component of 9 sub-variables)

(More information: final survey report.)

A randomized nudge, sent by SMS

A simple encouragement (nudge) intervention.

Sent (tailored) SMS messages inviting participants to register on one of two local digital labour platforms:
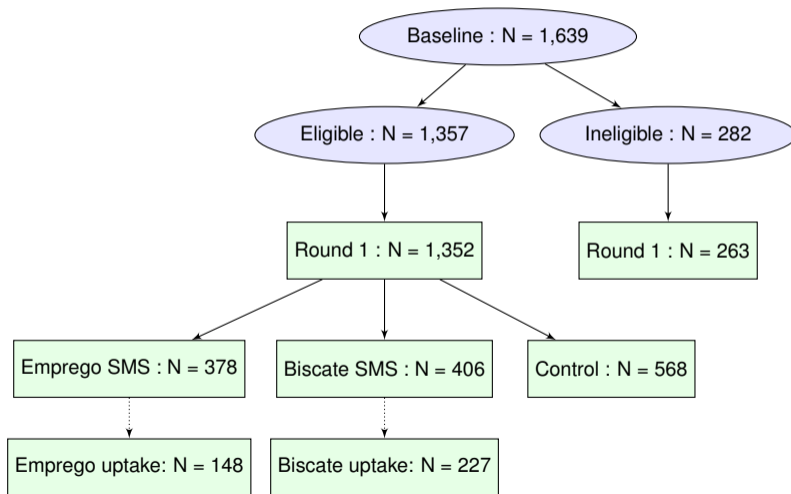
1. *Emprego*: employers post formal (professional) jobs
2. *Biscate*: clients contact workers for informal tasks

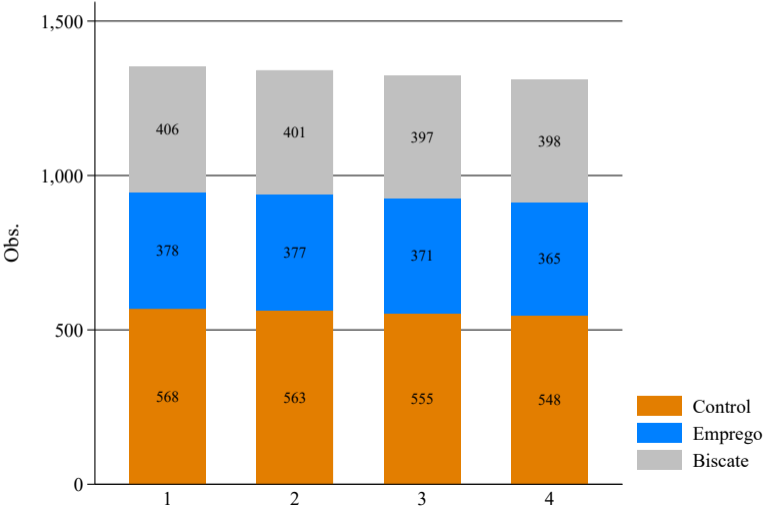... plus a control group (no SMS)

SMS invite example:

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Mensagem para finalistas do curso Geologia:
regista-te no Biscate para receberes oport-
-unidades de trabalho. Liga gratuito para *770#
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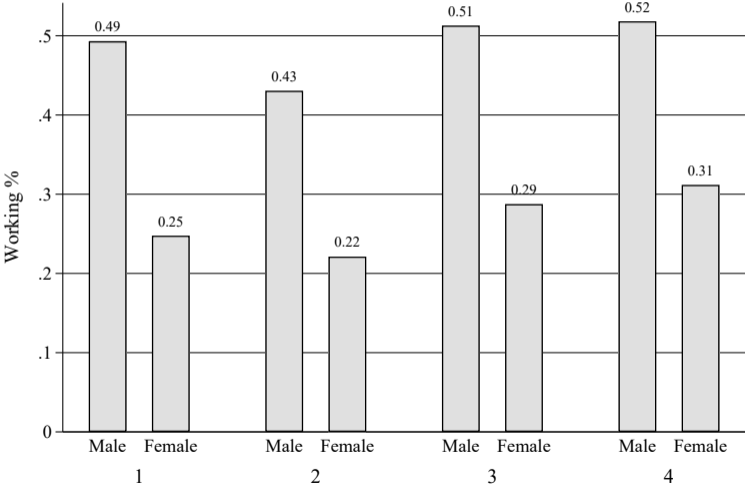
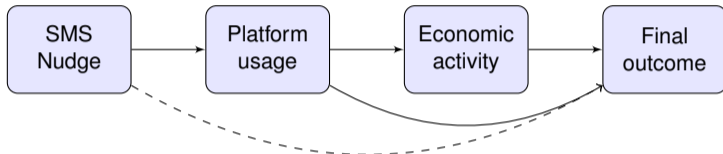# (3) Data & Methods

Sample structure

Low attrition across arms

Weak employment outcomes overall

Empirical strategy

Schematic:

Hypothesis 1 – nudges stimulate platform usage:

$$\text{Usage}_{it} = \alpha_j + \sum_p \beta_p \text{Nudge}_{it}^p + X_{it}'\theta + \lambda_t + \varepsilon_{it} \tag{1}$$

Hypothesis 2 – platforms improve outcomes (intent-to-treat):

$$y_{it} = \alpha + \sum_p \delta_p \text{Nudge}_{it}^p + X_{it}'\gamma + \mu_i + \lambda_t + \phi_{it} \tag{2}$$

ITT estimates are *often* conservative

ITT estimates capture the causal effect of the nudge, not the efficacy of the platforms *per se*

ITT decomposition without 'defiers':

$$\delta_{\text{ITT}} = \delta_c \underbrace{\Pr(\text{complier})}_{\text{Observed with error}} + \delta_a \underbrace{\Pr(\text{always-taker})}_{\text{Observed in controls}} + \delta_n \underbrace{\Pr(\text{never-taker})}_{\text{Observed in treated}}$$

Impact of platforms on marginal users $\Rightarrow$ '**complier-average treatment effect**' (CATE)

How to estimate CATE?
- Use randomized nudge as IV for platform uptake
  ... the standard approach, but can be inefficient and biased
- Alternative is to focus on compliance propensity

Beyond ITT estimates → principal scores

By randomization, we assume exchangeability:

$$Pr(\text{always-taker} \mid \text{treatment} = 0) = Pr(\text{always-taker} \mid \text{treatment} = 1)$$
$$Pr(\text{never-taker} \mid \text{treatment} = 1) = Pr(\text{never-taker} \mid \text{treatment} = 0)$$

Split sample approach: use control group to estimate 'always-taker' propensities & treated group(s) to estimate 'never-taker' propensities (c.f., Jo, 2009; Ding & Lu, 2017)

Apply estimates to **potential compliers** in opposite groups:

$$Pr(\text{complier} \mid \text{treatment} = 1) = \begin{cases} 1 - \hat{\pi}_a & \text{if uptake} = 1 \\ 1 - \pi_n = 0 & \text{if uptake} = 0 \end{cases}$$

$$Pr(\text{complier} \mid \text{treatment} = 0) = \begin{cases} 1 - \hat{\pi}_n & \text{if uptake} = 0 \\ 1 - \pi_a = 0 & \text{if uptake} = 1 \end{cases}$$

Use estimated complier probabilities to weigh ITT regression.

(4) Results

(1) Positive effect of the SMS nudge on usage

	Emprego	Biscate	Either
Emprego SMS	0.08***	0.06***	
	(0.01)	(0.01)	
Biscate SMS	-0.00	0.26***	
	(0.01)	(0.01)	
Any SMS			0.14***
			(0.01)
Female	-0.06***	-0.02**	-0.06***
	(0.01)	(0.01)	(0.01)
Manual course	-0.02*	0.01	0.00
	(0.01)	(0.01)	(0.01)
Speaks English	0.03***	0.01	0.03***
	(0.01)	(0.01)	(0.01)
Willing to work for self	0.01	0.00	0.03
	(0.06)	(0.05)	(0.06)
Willing to work for others	0.04	-0.01	0.03
	(0.05)	(0.05)	(0.06)
Obs	5,321	5,321	5,321
R^2 adj.	0.16	0.33	0.23

(2) But imperfect $\implies$ 'two-way non-compliance'

Emprego uptake
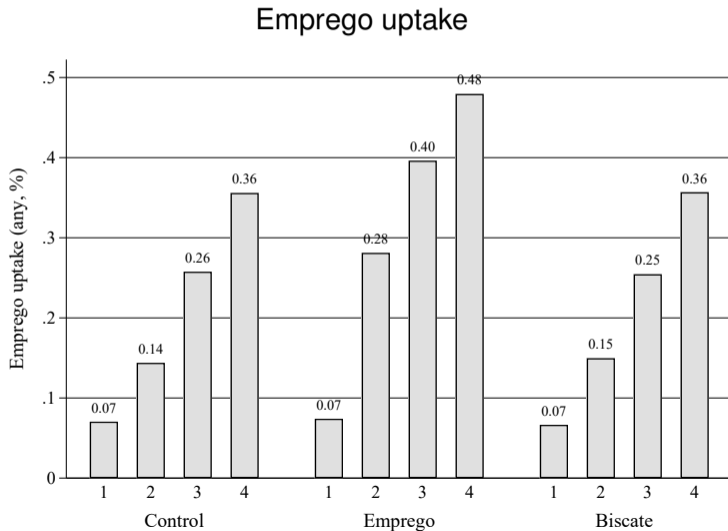
(2) But imperfect $\implies$ 'two-way non-compliance'

Biscate uptake
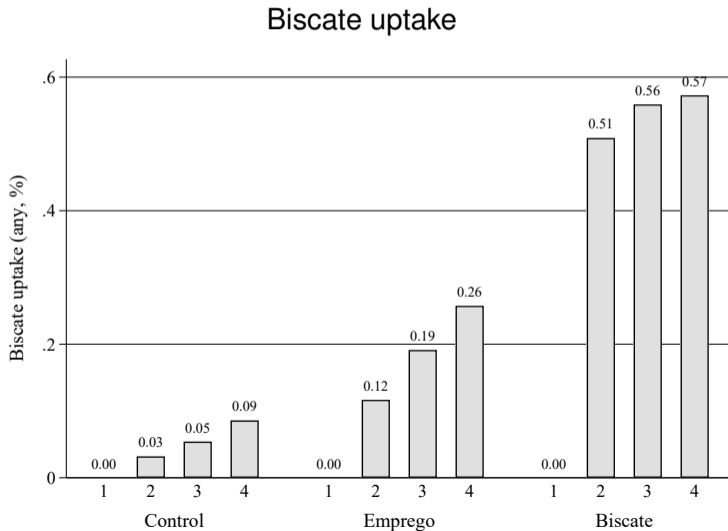
(3) Treatment effects generally close to zero

|	(a) Combined treatments			(b) Separate treatments		
Estimator →	ITT	IV	PI	ITT	IV	PI
Any platform	0.02	0.17	0.08			
	(0.05)	(0.36)	(0.06)			
Emprego				0.01	0.01	0.05
				(0.06)	(0.78)	(0.09)
Biscate				0.04	0.15	0.12*
				(0.06)	(0.24)	(0.07)
Diff.				-0.03	-0.14	-0.07
(prob.)				(0.66)	(0.86)	(0.45)
N	5,325	5,325	4,049	5,325	5,325	3,821
RMSE	0.76	0.65	0.74	0.76	0.65	0.75
Period fixed-effects	Y	Y	Y	Y	Y	Y
Time-varying controls	Y	Y	Y	Y	Y	Y
Individual fixed-effects	Y	Y	Y	Y	Y	Y

significance: * 10%, ** 5%, *** 1%

(3) Treatment effects generally close to zero

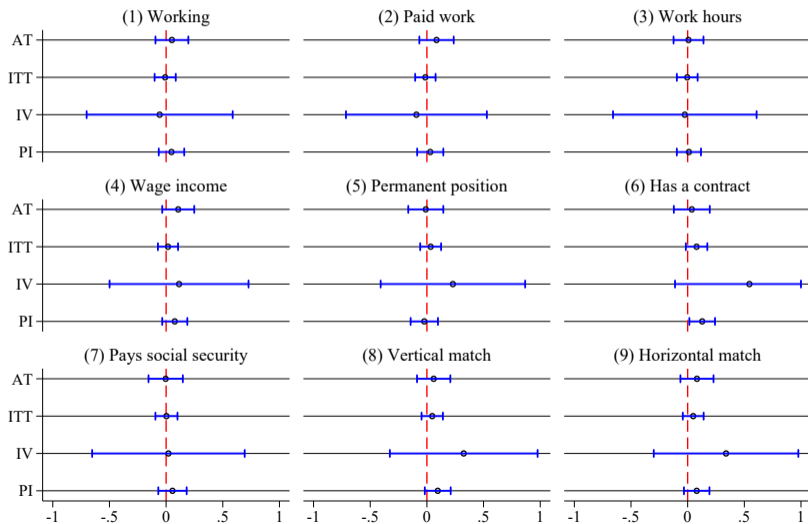Effect of any treatment on multi-outcome score
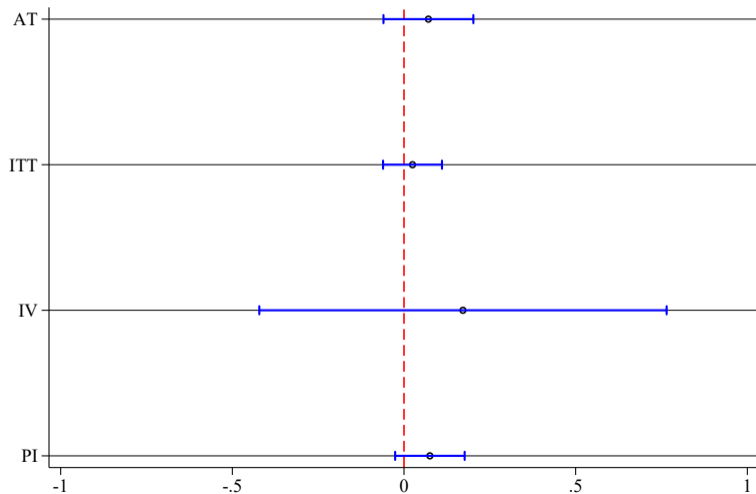
(4) *Hint* of a more positive effect of Biscate

Effect of specific treatments on multi-outcome score
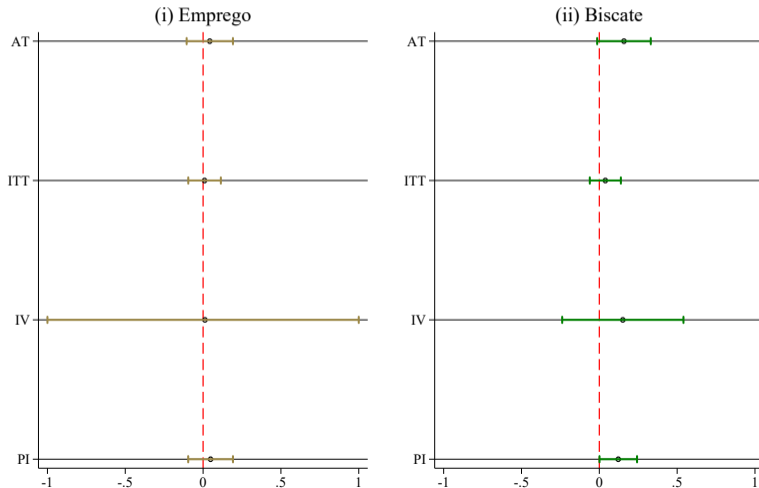
(5) Similar null effects across underlying outcomes

(6a) Important differences by gender ...

| | (I) Outcome score | | (II) Res. wage (log.) | | (III) Seeking work | |
Estimator →	ITT	PI	ITT	PI	ITT	PI
Any	0.06	0.15**	0.01	-0.00	0.04	0.09***
	(0.06)	(0.07)	(0.03)	(0.04)	(0.03)	(0.03)
Any × Female	-0.08	-0.20**	0.07**	0.07	-0.06**	-0.07*
	(0.07)	(0.09)	(0.03)	(0.04)	(0.03)	(0.04)
Any if female	-0.02	-0.04	0.08	0.07	-0.02	0.02
(prob.)	(0.73)	(0.59)	(0.01)	(0.08)	(0.44)	(0.63)
Obs	5,325	4,049	5,325	4,049	5,325	4,049
RMSE	0.76	0.74	0.35	0.35	0.38	0.37

significance: * 10%, ** 5%, *** 1%
Source: own estimates.

(6b) ... which interact with type of course

CATE-PI effects of specific treatments on multi-outcome score
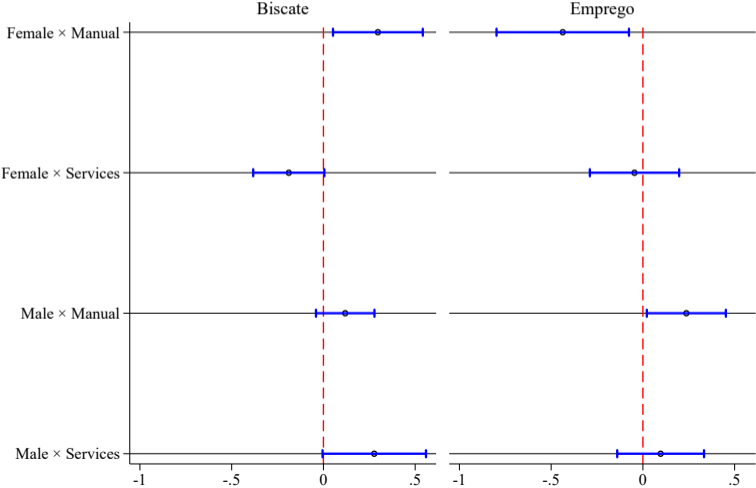
(5) Conclusion

Conclusion

1 Contributed new evidence on role of digital platforms, comparing platforms for formal jobs vs. informal tasks

2 ITT estimates are conservative $\rightarrow$ CATE-PI estimates useful

3 For the average TVET graduate, no evidence nudges to use digital platforms yield significantly better jobs outcomes $\implies$ slow jobs growth a key constraint

4 Complex gendered effects of *both* platforms:
   - Overall, men seem to benefit (marginally) more
   - Positive jobs benefits of *Biscate* for women with manual qualifications $\implies$ task-based digital platforms may help serve specific market niches with high search frictions
   - BUT negative effects of *Emprego* for same group also suggests platforms can reproduce gender barriers