

Labour market effects of digital matching platforms: experimental evidence from sub-Saharan Africa

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Agenda

- 1** Motivation
- 2** Design
- 3** Data & Methods
- 4** Results
- 5** Extensions
- 6** Conclusion

(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 policies to address 'matching frictions':

- Vacancy information (Dammert et al., 2015)
- Transport subsidies (Franklin, 2018)
- Subsidized skills screening (Abebe et al., 2021)
- Supported job search (Altmann et al., 2018; Belot et al., 2019)
- Wage information (Jones & Santos, 2022)

Existing literature

Limited evidence on contribution of digital jobs platforms to reducing market frictions, esp. in low income contexts.

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

Two recent studies in India:

- Kelley et al. (2022): register randomly-chosen graduates on a jobs portal and send them SMS’s on opportunities → temporary increase in voluntary unemployment.
- Chakravorty et al. (2021): nudge TVET graduates to use a government-run application → moderate uptake but no positive effects on labour market outcomes.

We **add new evidence from SSA** & **compare two different types of platforms**: conventional portal to find formal jobs vs. a portal to find informal workers.

(2) Design

Leverage a youth tracer survey

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, life satisfaction, earnings → synthetic overall score

More information: [final survey report](#).

Embed an experiment

Added a simple encouragement (nudge) intervention.

Sent SMS messages inviting *randomly-selected* participants to register on one of two local digital labour platforms:

- *Emprego*: employers post formal (professional) jobs
- *Biscate*: manual workers contacted by clients

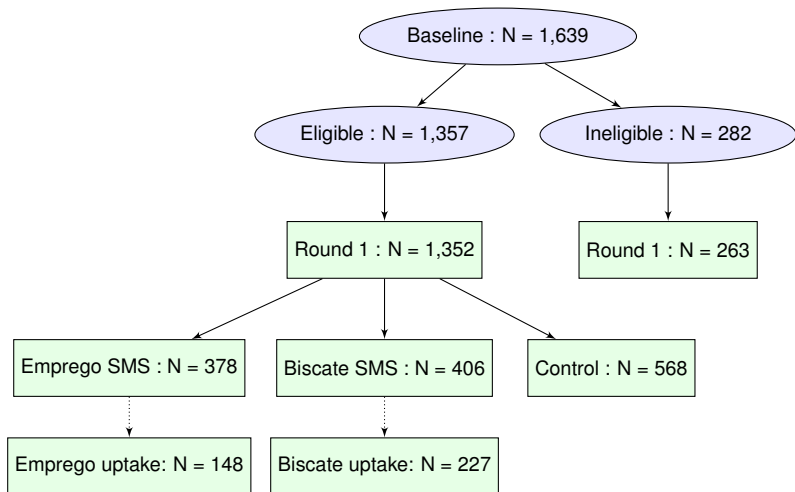
SMS invitation example:

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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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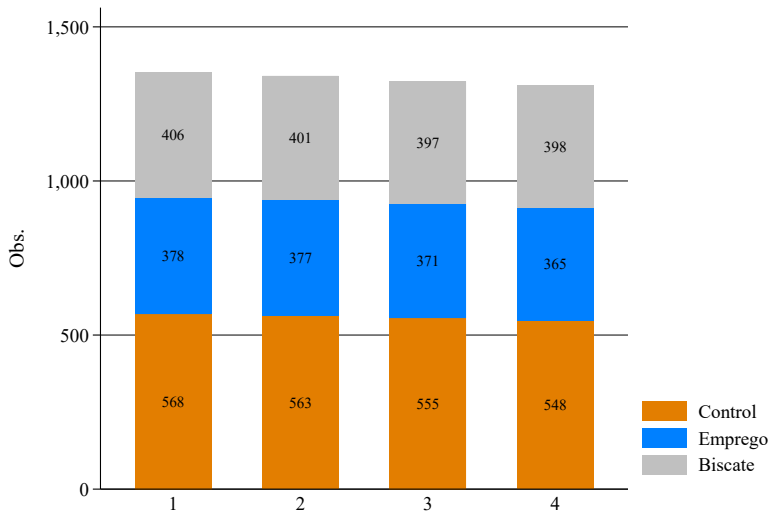
Main question: **does usage of digital platforms lead to better employment outcomes?**

(3) Data & Methods

Sample structure

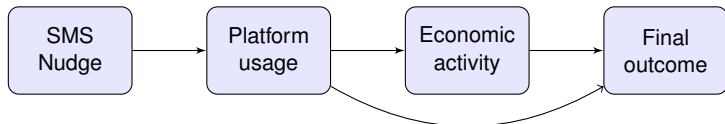


Sample structure



Analysis

Schematic:



Uptake regressions:

$$\text{Usage}_{it}^p = \alpha_j + \sum_p \beta_p \text{Nudge}_{it}^p + \mathbf{X}'_{it} \theta^p + \varepsilon_{it}^p \quad (1)$$

Outcome regression (intent-to-treat effect):

$$y_{it} = \alpha + \sum_p \delta_p \text{Nudge}_{it}^p + \mathbf{X}'_{it} \gamma + \phi_{it} \quad (2)$$

Complier average treatment effect (CATE): δ_p / β_p

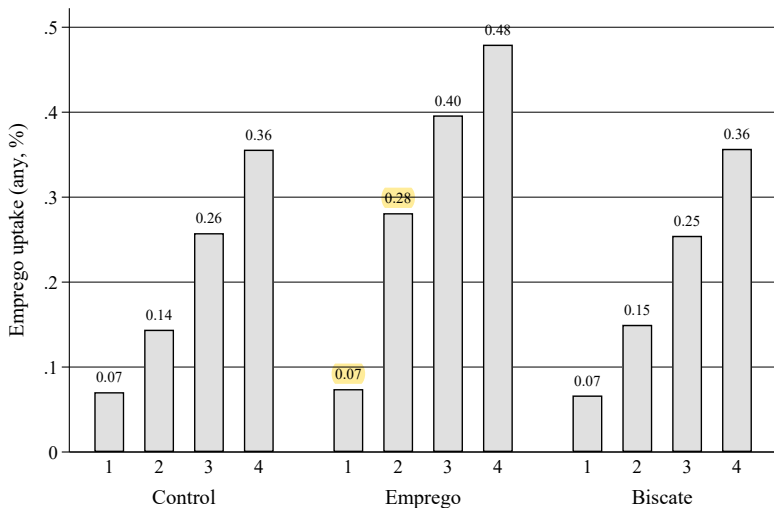
(4) Results

(1) Positive effect of the SMS nudge on usage

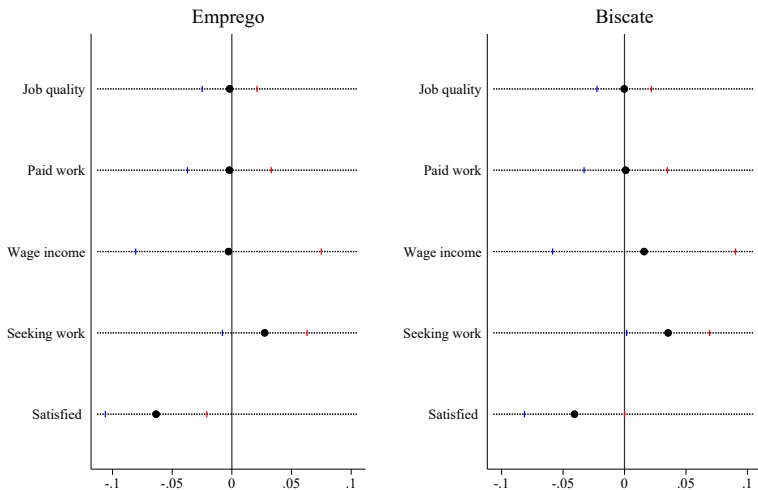
	(1) Emrego usage				(2) Biscate usage			
	Ext.	Self	Srch	Mean	Ext.	Self	Srch	Mean
Emrego SMS	0.09*** (0.02)	0.10*** (0.02)	0.03** (0.01)	0.08*** (0.02)	0.01 (0.01)	0.12*** (0.02)	0.02*** (0.01)	0.06*** (0.01)
Biscate SMS	-0.01 (0.01)	0.01 (0.02)	-0.01 (0.01)	-0.00 (0.01)	0.47*** (0.03)	0.27*** (0.02)	0.02*** (0.01)	0.26*** (0.01)
Manual course	-0.00 (0.01)	-0.00 (0.02)	-0.01 (0.01)	-0.00 (0.01)	0.04*** (0.01)	0.01 (0.02)	0.00 (0.00)	0.02** (0.01)
Female	-0.03*** (0.01)	-0.08*** (0.02)	-0.05*** (0.01)	-0.06*** (0.01)	-0.02* (0.01)	-0.04*** (0.01)	-0.00 (0.00)	-0.02*** (0.01)
Prev. experience	0.00 (0.01)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02* (0.01)	0.04*** (0.01)	0.00 (0.00)	0.02*** (0.01)
Obs	5,327	5,327	5,327	5,327	5,327	5,327	5,327	5,327
R ² adj.	0.06	0.13	0.02	0.13	0.39	0.17	0.02	0.32

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

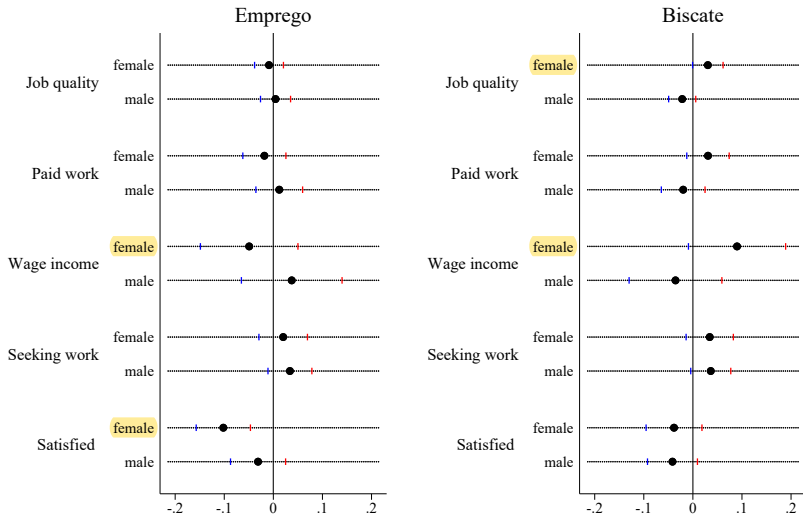
(2) But imperfect \implies 'two-way non-compliance'



(3) ITT effects generally not different from zero



(4a) Hint of differences by gender (ITT results) ...



(5) Extensions

Beyond ITT estimates

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

We are *also* interested in the impact of the platform on the marginal user – ‘complier-average treatment effect’

Standard approach is to use our randomized nudge as an IV for platform uptake, but this can be inefficient (large SEs)

Alternative is to focus on non-compliance propensities:

ITT decomposition (with no ‘defiers’):

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

Beyond ITT estimates → principal scores

By randomization, we assume exchangeability:

$$\Pr(\text{always-taker} \mid \text{treatment} = 0) = \Pr(\text{always-taker} \mid \text{treatment} = 1)$$

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

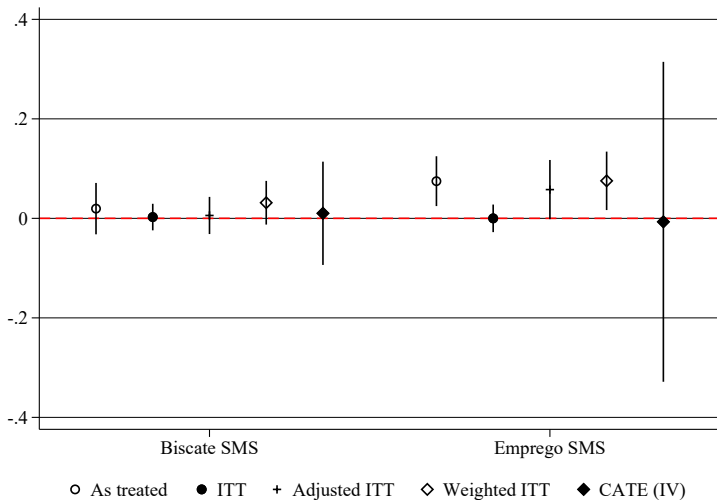
Split sample approach: use control group to estimate 'always-taker' propensities & 1 treated group(s) to estimate 'never-taker' propensities (c.f., Jo, 2009; Ding & Lu, 2017)

THEN apply these to **potential compliers** in opposite groups:

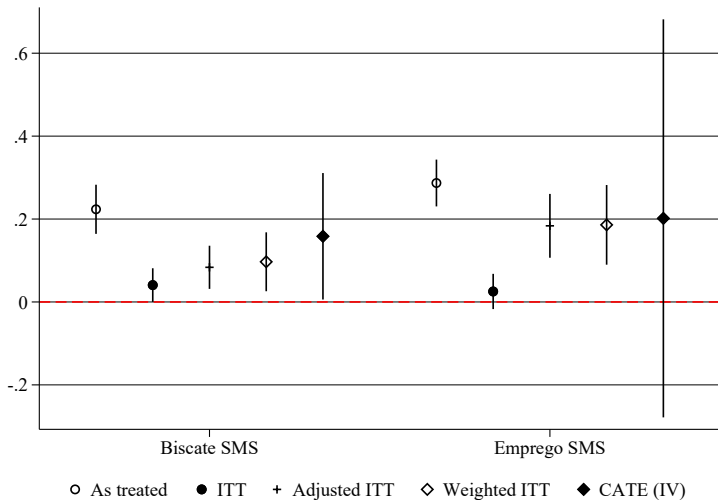
$$\Pr(\text{complier} \mid \text{treatment} = 1) = \begin{cases} 1 - \hat{\pi}_a & \text{if uptake} = 1 \\ 1 - \pi_n = 0 & \text{if uptake} = 0 \end{cases}$$

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

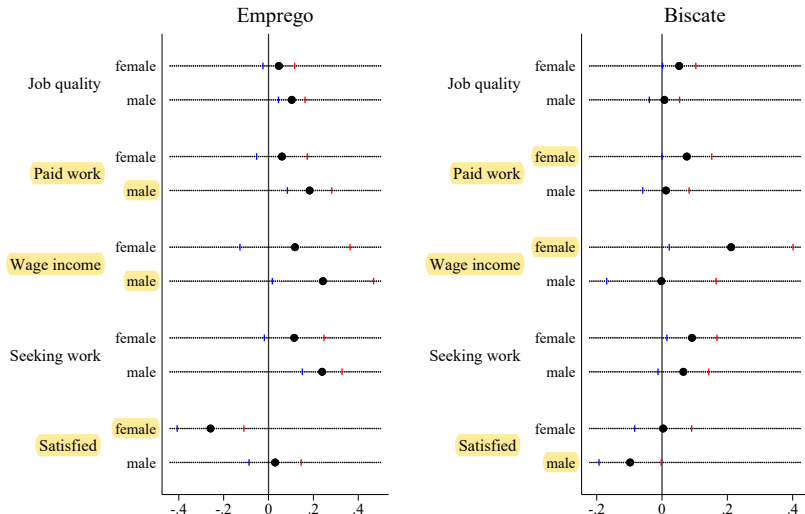
Comparison of estimators: Job quality score



Comparison of estimators: Seeking work



Weighted ITT results : larger gender differences



Validating demand on the Biscate platform

	(I) Contact rate		(II) Agreement rate		(III) Demand index	
	(a)	(c)	(a)	(c)	(a)	(c)
Female	-0.87 (0.86)	-2.86*** (0.75)	-0.41 (0.38)	-1.22*** (0.36)	2.45* (1.34)	0.44 (1.28)
Female × Age		0.98 (1.20)		-0.24 (0.53)		5.72** (2.36)
Female × Edu.		-5.02*** (1.72)		-0.92 (0.78)		-9.06*** (3.06)
Female × Manual		12.55*** (3.04)		4.95*** (1.19)		15.41*** (4.66)
Age	-0.03 (0.16)	-0.23 (0.24)	-0.12 (0.08)	-0.07 (0.11)	1.16*** (0.35)	-0.21 (0.47)
Education	-0.78** (0.35)	0.37 (0.40)	-0.23 (0.15)	0.02 (0.19)	-0.03 (0.58)	1.34 (0.83)
Experience	-0.70** (0.33)	0.01 (0.31)	-0.17 (0.16)	0.05 (0.16)	-0.29 (0.70)	1.14 (0.80)
Constant	7.09*** (0.55)	6.09*** (0.50)	2.74*** (0.25)	2.42*** (0.22)	9.14*** (0.93)	8.62*** (0.87)
Obs.	20,850	20,850	20,850	20,850	20,850	20,850
R ²	0.41	0.52	0.35	0.44	0.24	0.32

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

(6) Conclusion

Conclusion

- 1 Contribute experimental evidence on role of digital platforms to support youth employment, covering platforms for formal and informal jobs
- 2 For the average TVET graduate, no evidence nudges to use digital platforms yield significantly better jobs outcomes, BUT some evidence of higher search and lower satisfaction
- 3 But ITT estimates are conservative → prefer complier-adjusted/ -weighted estimates of platform efficacy
- 4 These show small positive effects of *Emprego* but important gendered effects of both platforms:
 - Jobs benefits of *Emprego* accrue to men ⇒ clearly reflects structural labour market advantage of men
 - Jobs benefits of *Biscate* accrue to women, esp. those with manual qualifications ⇒ task-based digital platforms may help serve specific market niches