

TFP, ICT and Absorptive Capacities: Micro-level evidence from Colombia

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Key takeaways from this presentation

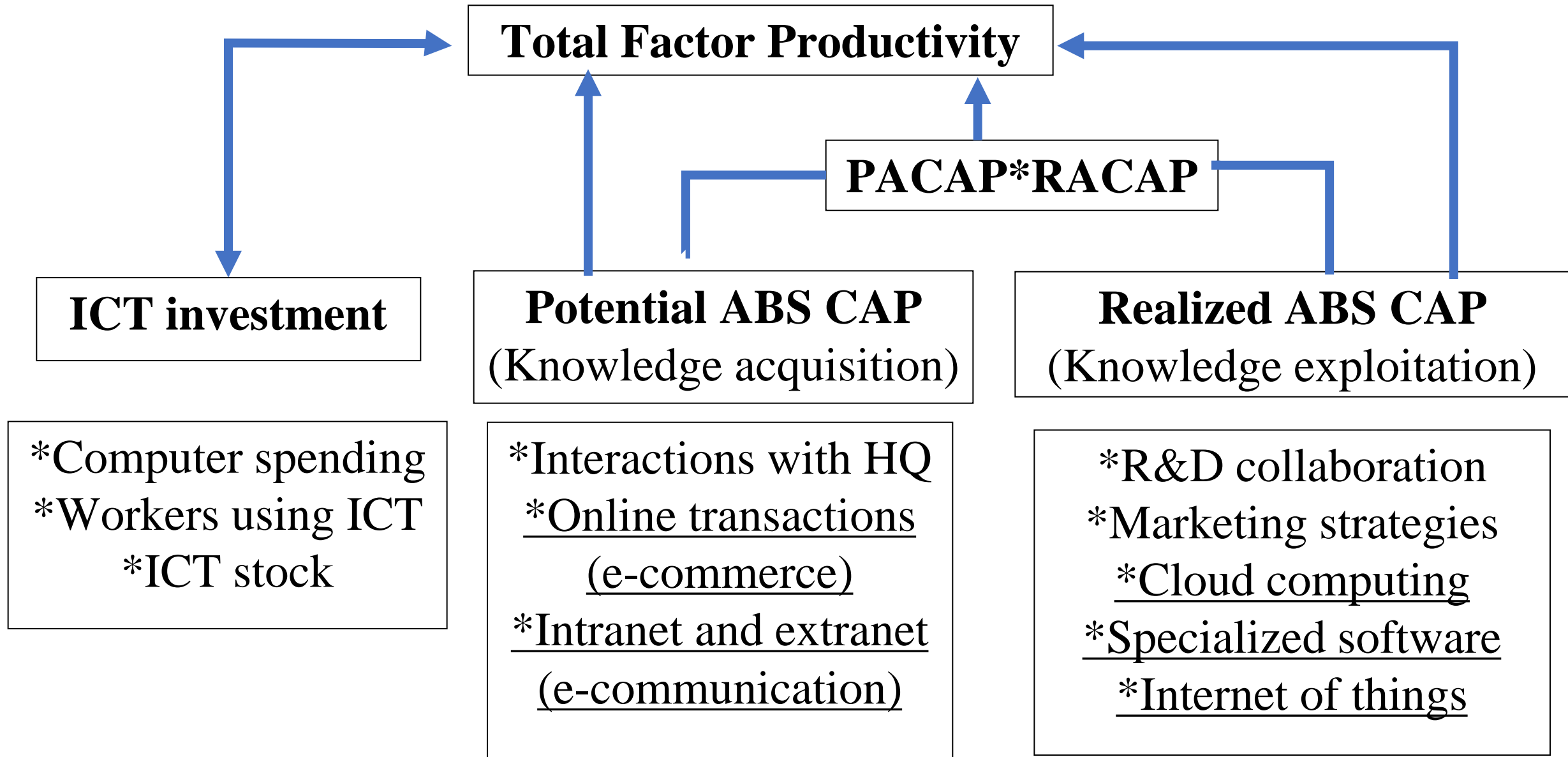
Micro-level productivity (TFP) is positively affected by

- ICT investment, E-commerce and e-communication
- R&D cooperation (paired with e-communication) and Marketing (combined with e-commerce)

Contribution from this work

- We consider 3 absorptive capacity effects on TFP:
1) Potential; 2) Realized; 3) the interaction between 1 and 2.
- Previous research has addressed only ONE:
The entire absorptive capacity TFP effect
- By studying 3 components, we understand why some firms extensively benefit from absorptive capacities while others do not.

Theoretical framework



Data and methodology

- **Sources of information on Colombian manufacturing: 2008-2018**

Industrial datasets (EAM) + ICT info (EAM-TIC) + Innovation surveys

- **IV econometric strategy**

$$Productivity_i = \beta_1 size + \beta_2 age + \beta_3 ICT_{inv} + \beta_4 IT_{PACAP} + \beta_5 R\&D_{coop} + \beta_6 MKT + \beta_7 (IT_{PACAP} * R\&D_{coop}) + \beta_8 (IT_{PACAP} * MKT) + \omega_0 \quad (1)$$

Indep. Var: ICT, Potential ACAP, Realized ACAP and their interaction.

Instruments (endogeneity ICT): workers using internet

Operationalization of variables

Name	Type of variable	Description
TFP**	<i>Nominal</i>	Olley & Pakes (1996), Levinhson and Petrin (2003)
ICT investment**	<i>Nominal</i>	Expenditures on informatics and communication equipment
ICT use (instrument)	<i>Nominal</i>	Percentage share of employees that utilize internet inside the firm
R&D cooperation	<i>Binary</i>	Whether the firm received monetary resources to cooperate on innovation related activities
Marketing	<i>Binary</i>	Whether the firm executed new commercialization techniques
E-communication	<i>Binary</i>	Whether the firms utilizes either intranet or extranet communication platforms
E-commerce	<i>Binary</i>	Whether the firm executes either type of online transaction (sales and procurement)

	TFP-OP	TFP-LP	LPROD
<i>ICT_inv</i>	0.415*** (0.03)	0.371*** (0.03)	0.399*** (0.03)
<i>Size</i>	0.003 (0.02)	-0.143*** (0.02)	-0.500*** (0.02)
<i>Age</i>	0.126*** (0.02)	0.066*** (0.02)	0.146*** (0.02)
<i>E_communication</i>	0.212*** (0.03)	0.122*** (0.02)	0.238*** (0.02)
<i>R&D_coop</i>	0.098 (0.16)	0.049 (0.15)	0.111 (0.14)
<i>R&D_coop*E_communi</i>	0.567** (0.17)	0.658*** (0.16)	0.558*** (0.14)
<i>MKT</i>	0.067 (0.04)	0.082 (0.08)	0.003 (0.08)
<i>MKT*E_commun.</i>	0.052 (0.05)	-0.024 (0.08)	0.130 (0.08)
R^2	0.328	0.189	0.275
Observations	25,643	25,643	32,458

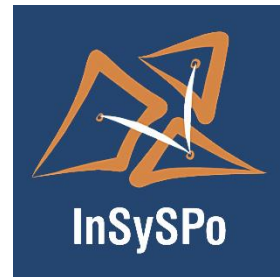
Conclusion and future research

- Emerging economies, like Colombia, might lack skills to fruitfully exploit realized AC.
- IT-enabled potential capabilities then represent an alternative to obtain (and strengthen) efficiency gains stemming from realized AC.
- Future research should study productivity effects stemming from IT-potential AC and IT-realized AC (IOT, cloud computing and so forth)
- We provided building blocks on this by stressing on the relevance of ICT and related potential capabilities.

Thanks for your attention!

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	TFP-OP	TFP-LP	LPROD
ICT_inv	0.354*** (0.03)	0.329*** (0.03)	0.332*** (0.03)
Size	0.036 (0.02)	-0.121*** (0.02)	-0.466*** (0.02)
Age	0.115*** (0.02)	0.059** (0.02)	0.134*** (0.02)
E_commerce	0.303*** (0.03)	0.194*** (0.03)	0.332*** (0.02)
R&D_coop	0.138 (0.16)	-0.024 (0.15)	0.137 (0.14)
R&D_coop*E_commerce	0.737*** (0.17)	0.740*** (0.16)	0.649*** (0.16)
MKT	-0.076 (0.07)	-0.101 (0.07)	-0.025 (0.06)
MKT*E_commerce	0.198** (0.07)	0.182** (0.07)	0.175** (0.07)
constant	-1.778*** (0.06)	-6.063*** (0.05)	4.795*** (0.05)
R^2	0.340	0.206	0.285
Observations	25,643	25,643	32,458

Results: e-communication (intranet and extranet)

- ICT and e-commun. (*Potential AC*) positively impacts productivity
- R&D coop and MKT (*Realized AC*) do not impact productivity
- R&D coop. only matters for TFP If combined with e-communication. (*interaction Potential and Realized*)
- Similar results for **e-commerce**.
- Outcome robust to different productivity measures and IT-Potential AC proxies.

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<i>Size</i>	0.003 (0.02)	-0.143*** (0.02)	-0.500*** (0.02)
<i>Age</i>	0.126*** (0.02)	0.066*** (0.02)	0.146*** (0.02)
<i>E_commun.</i>	0.212*** (0.03)	0.122*** (0.02)	0.238*** (0.02)
<i>R&D_coop</i>	0.098 (0.16)	0.049 (0.15)	0.111 (0.14)
<i>R&D_coop*E_comm</i>	0.567** (0.17)	0.658*** (0.16)	0.558*** (0.14)
<i>MKT</i>	0.067 (0.04)	0.082 (0.08)	0.003 (0.08)
<i>MKT*E_commun.</i>	0.052 (0.05)	-0.024 (0.08)	0.130 (0.08)
<i>constant</i>	-1.653*** (0.06)	-5.982*** (0.05)	4.925*** (0.05)
R ²	0.328	0.189	0.275
Observations	25,643	25,643	32,458
Sectoral dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes