

Productivity, Entrepreneurship, and Innovation

Competitiveness Policy Evaluation Lab - ComPEL



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Senior Economist

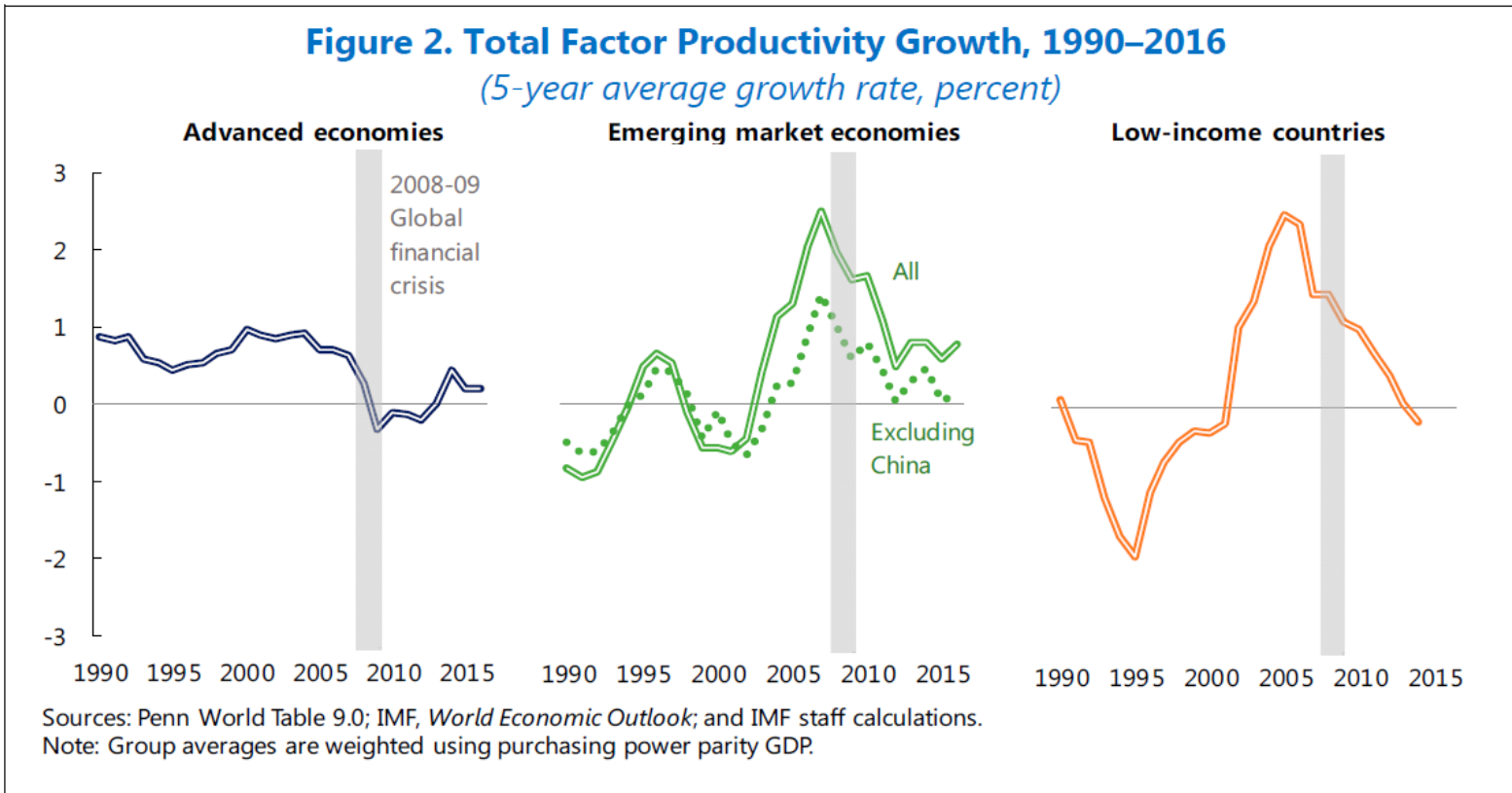
18 September 2018

Outline



1. Current trends
2. Key findings from IE
3. Examples of IE designs
4. IE in ComPEL

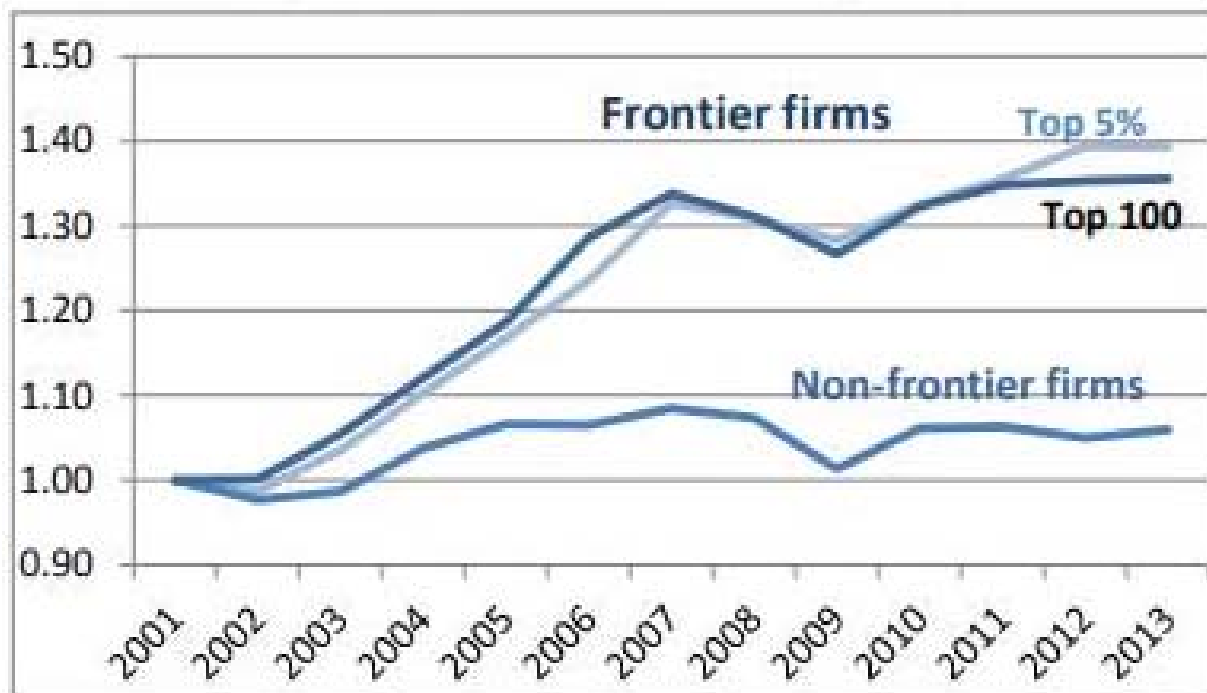
TFP has slowed significantly globally



- It explains half of the variation in per capita income across countries
- It slowed with larger dispersion among developing countries (Li & Rama, 2013)
- Productivity gaps within countries are large: in the US, most efficient firms (top 10%) produce twice as much output with the same inputs as least efficient firms (bottom 10%). In China and India, the same ratio is 5:1.

Firms are not catching up

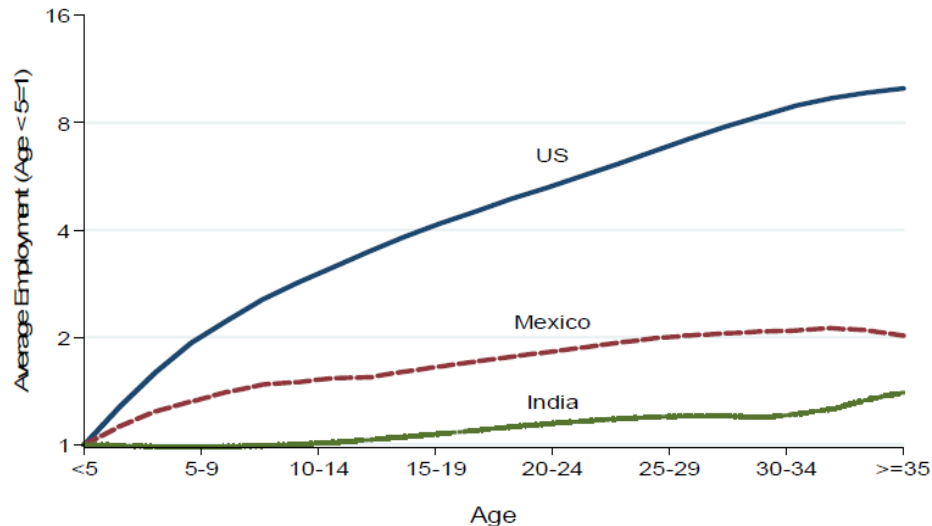
Frontier and Non-frontier Aggregate Productivity Growth in OECD Countries



Source: Albrizio and Nicoletti. Background paper for OECD Global Forum on Productivity. *Boosting Productivity: A Framework for Analysis and a Checklist for Policy*. Figure 5. Includes Manufacturing and business services, excluding the financial sector. Frontier is defined as the 100 most productive or the top 5% most productive firms within each industry.

Most firms are not growing

Average Employment



Source: Hsieh and Klenow (2014). *The Life Cycle of Plants in India and Mexico*, *The Quarterly Journal of Economics*

- In the US, a small fraction of high-performing, rapidly-growing firms accounts for the majority of output and job creation
- Firm dynamics in developing countries tend to be muted and the majority of resources are trapped in firms that are sub-scale, low-efficiency, and exhibit slow if any growth in employment and productivity (Bartelsman et al 2009; Haltiwanger et al 2013)

But yet SMEs employ most workers and create most jobs

Developing countries

OECD



99% of formal firms

99%



75% of stock of employment

65%

58% of jobs creation



45% median GDP contribution

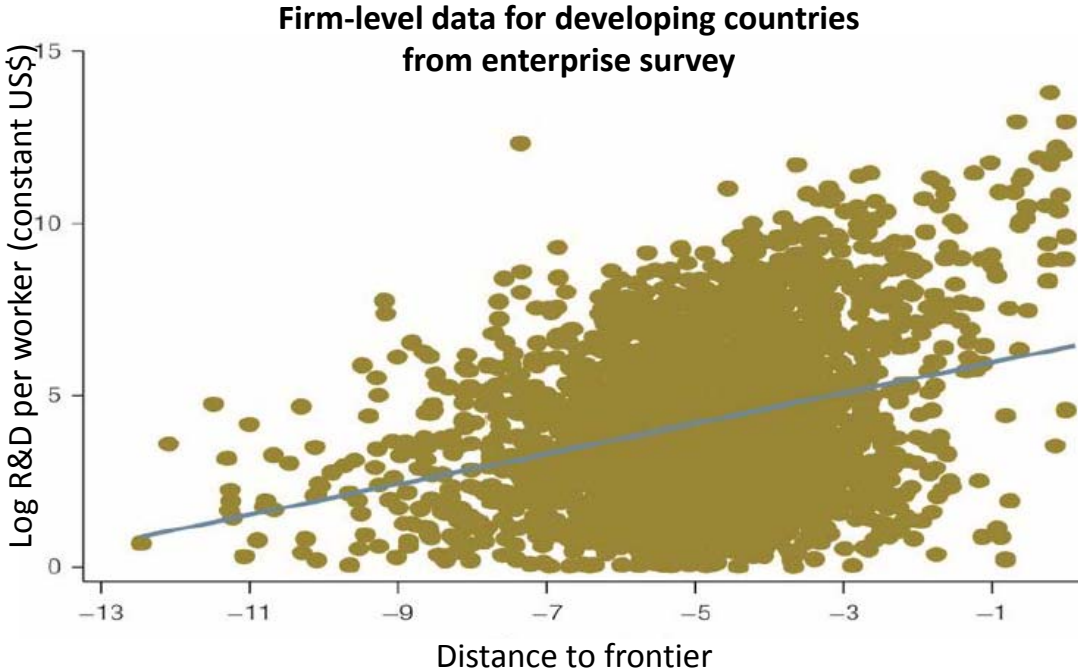
60%

Firms do not invest enough in innovation

	Dist. to Frontier	Rate of Return to R&D
▶ USA	-.18	57%
▶ UK	-.53	77%
▶ Italy	-.73	88%
Korea	-1.33	?
Poland/Hungary	-2.28	?
Indonesia/Albania	-3.74	?
Moldova/Tajikistan	~-5.0	???

} 200-300?

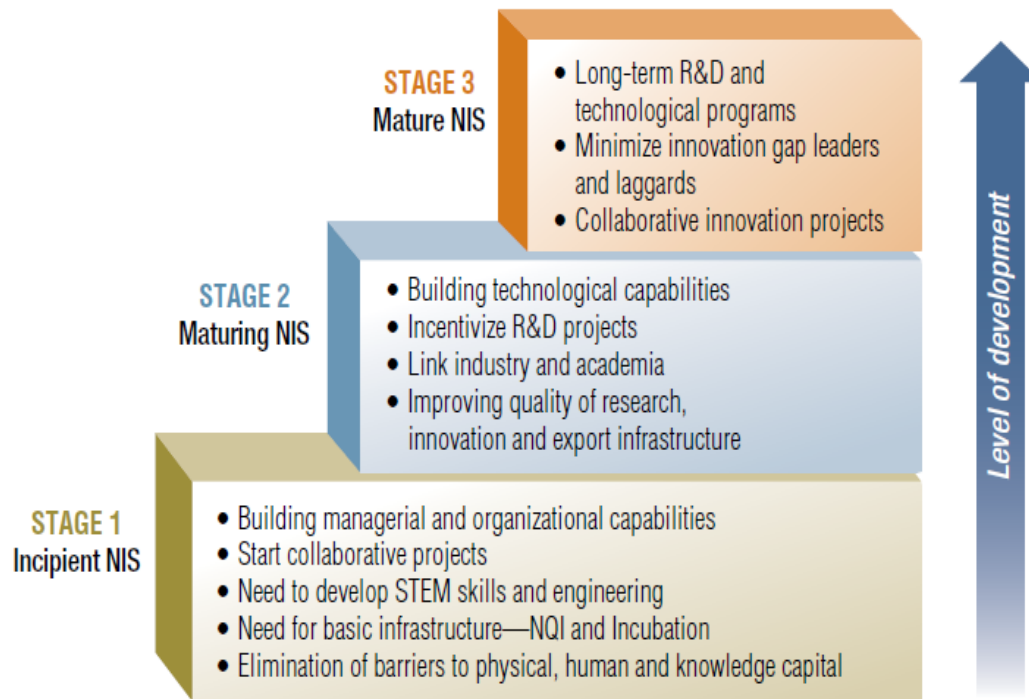
Griffith, Redding, Van Reenen (2004)



Source: Cirera and Maloney, 2017. The Innovation Paradox

Supporting firm capabilities for innovation

FIGURE 7.2 The Capabilities Escalator: Innovation Policy Needs



- Sequence policy mix to build appropriate firm capabilities
- Not deterministic- a project of decades
- Allocate resources to stage where country is weakest

Note: NIS = National Innovation System; NQI = national quality infrastructure; R&D = research and development; STEM = science, technology, engineering, and mathematics.

Why should we support firms?

- Due to the existence of market failures or missing markets firms cannot overcome key constraints on their own

Constraints	Market failures/missing markets
Lack of managerial and organizational skills	<ul style="list-style-type: none">• not knowing the value of training or how poor the firm is run• not being able to insure against losing investments in intangible assets
Lack of access to finance	<ul style="list-style-type: none">• missing markets for non-traditional lending
Lack of local demand	<ul style="list-style-type: none">• prohibitive search costs and contract frictions obstruct buyer-seller relationships
High regulatory compliance costs	<ul style="list-style-type: none">• firms don't know how to comply, government officials can extract rents



2. Key findings from IE

Emerging IE research on firm support

Constraints

Interventions

Lack of managerial and organizational skills

Training/Mentoring
Labor incentives
Learn skills from demand
Learn to innovate

Lack of access to finance

Application support
Grants/Vouchers
Guarantees/Collateral
Crowdfunding/Fintech

Lack of local demand

Finding buyers
Securing orders
Marketing/Export support
Gov procurement
Networks/Alliances

High regulatory compliance cost

Information
Monitoring/enforcement
Feedback channels

- ✓ *What is the impact of interventions on outcomes of interest?*
- ✓ *Are there differential impacts for key groups (women, SMEs, etc.)*

Intermediate Outcomes

- Change practices
- Improve workers' skills
- Adopt technology
- Invest in innovation
- Learn from buyers and competitors (knowledge)
- Secure contracts/sales
- Access new markets

Longer-term Outcomes

- Improve performance (sales, profits)
- Grow (employees)
- Improve productivity
- Improve product (quality, variety)

Lack of managerial and organizational skills

- **Not strong evidence of benefits of traditional training on employment or productivity, soft-skills seems to matter...but evidence is still incipient**
 - Simplified rule-of-thumb training significantly improved firms' financial practices, objective reporting quality, and revenues in the Dominican Rep. (Drexler et al 2014)
 - Not significant effects on firm performance (McKenzie and Woodruff 2014)
 - **Personal initiative** training worked better than traditional training and improves firm performance in Togo, sales: ~18%, monthly profit ~31%, total profits: ~ 29% (Campos et al. 2017) and in Mexico weekly profits increase profit ~11% (Iacovone, 2018 Mimeo)
- **Managerial practices are clearly linked to productivity, profitability, firm growth, and survival and these are improved through consulting**
 - These differ greatly between firms and across countries (WDR, Bloom et al 2011; McKenzie and Woodruff 2015)
 - Directly affect the firm by improving strategic and operational decisions, and affect productivity by helping use factors of production more efficiently (Bruhn et al 2010)
 - Are also important in the context of large firms (Bloom et al, 2013)
 - India, Mexico - Management can be **improved through consulting** (Bloom et al, 2013, Bruhn et al 2017) with impacts that can last for more than 8 years (Bloom et al, 2018)

Lack of access to finance

Returns to capital are high

- Mexico - Cash and in-kind grants increases profits, and more so for firms that were more financially constrained. The estimated return to capital was 20–33 % a month, 3-5 times higher than market interest rates (McKenzie and Woodruff, 2008)
- Yemen - Matching grants led to increased investment, including in marketing (Assaf et al. 2015)
- Nigeria - Winning a grant through a business plan competition leads to greater firm entry, more survival, and higher profits, sales, and employment (McKenzie, 2017)

But SMEs find it difficult to get it...which interventions worked?

Assessing credit worthiness with soft information helps

- Peru - Using psychometric assessment tools increased SME loan use for those without credit history, without deteriorating repayment behavior (Arraiz et al. 2017)
- Colombia - using soft information for credit scores is also beneficial for Banks, improving efficiency and decentralized decision-making in loan production (Paravisini, Schoar, 2015)

Leveraging on collaterals

- Kenya - Allowing borrowers to collateralize loans with the asset purchased under the loan increased borrowing dramatically, from 2.4% to 44.3%, with 100% recovery rate (William et al 2015)

Lack of local demand

There is a lack of local demand in developing countries (poorer populations) and the cost of reaching markets is disproportionately larger for them (Atkin and Donaldson 2015)

Emerging evidence points at benefits of connecting firms to markets (to a larger demand), but how?

- **Securing first orders matters productivity and technology adoption:**
 - Tech adoption increases when given orders requiring a new technology (Hardy and McCasland 2016)
 - Linking small producers with an intermediary to provide them with the opportunity to export increased profits by 16-26% (Atkin et al 2016). Their evidence supports quality and productivity improvements through learning by exporting.
- **Connecting business with procurement opportunities matter for business growth**
 - Winning procurement contracts increases firm growth, with 93% of new hires coming from unemployment or informal sector (Ferraz et al 2016)
 - Accelerating payments to government contractors was found to increase firm payroll due to increases in employment (Barrot and Nanda 2016)



3. Examples of IE designs

Mexico - Consulting services for SMEs

Miriam Bruhn (World Bank Group)
Dean Karlan (Yale University)
Antoinette Schoar (MIT)



- Puebla implemented a business development program to provide subsidized consulting services from a selected list of local consulting firms
- Program goal: to help enterprises reach the next size category thus contribute to job creation and economic growth of the

Evaluation design

Interventions

Consulting SMEs - one-year long consulting program, 4 hours per week. US\$12,000 per SME on average.

Consultants:

- (1) diagnose the problems that prevented the enterprises from growing
- (2) suggest solutions that would help to solve these problems
- (3) assist SMEs in implementing the solutions

Design

- Program advertised for formal firms, 432 interested
- 150 randomly selected to get consulting subsidy of 70 to 90% of cost
- 282 did not receive the consulting subsidy
- Survey + admin data on wages and employment

Results

- Positive effects on productivity, and return-on-assets and “entrepreneurial spirit”
- Persistent increase in the number of employees (over 50%) and total wage bill (over 70%) even five years after the program
- Large heterogeneity in the specific managerial practices that improved, but most prominent areas are marketing and formal accounting

BUT...

- Difficult to scale-up due to lack of consultants and funds, and take up (only 80 took it, 70 declined)
- Consulting works, but not clear whether subsidies are needed

Peru - Psychometrics and Access to Credit

Irani Arráiz (IDB)

Miriam Bruhn (World Bank Group)

Rodolfo Stucchi (IDB)

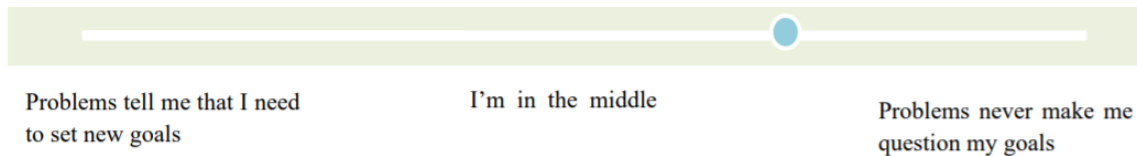


- SME lack info on their financials and operations making it difficult for banks to assess their risk
- Cannot access credit without a credit score, but cannot have a credit score without a loan
- In Latin America, Credit Bureaus cover only 39% of adults

Evaluation design

Intervention: Loan applicants filled the questionnaire and got score from Entrepreneurial Finance Lab

Example 2. Move the slider to which statement best represent you

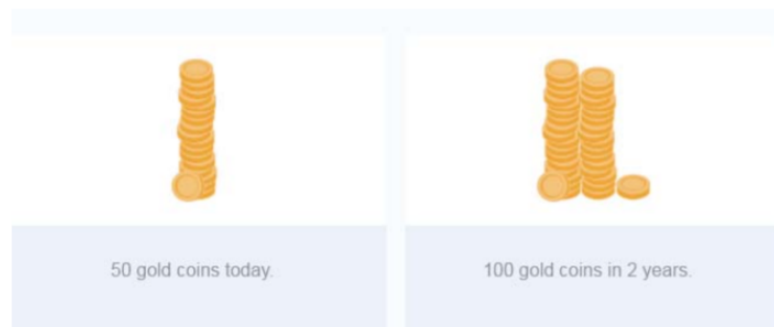


Problems tell me that I need to set new goals

I'm in the middle

Problems never make me question my goals

Example 3. If a family member offered you the choice between these 2 options, what would you select?



50 gold coins today.

100 gold coins in 2 years.

Design

- All applicants that got an EFL score higher than a threshold, set by the Bank, got offered a loan.
- Regression discontinuity design that compares loan applicants who scored just above and just below the EFL score threshold.
 - Loans with other institutions
 - Traditional credit score in Equifax

Results

Does a loan offer increase the use of credit?

- 80% of applicants above got a loan, vs 45% below

“Those above the threshold are more likely to have a loan from any financial institution suggesting the EFL tool increased use of credit for SME owners without a credit history”

Does lending to a new client increase Bank's risk?

- No significant differences in loan repayment behavior (Equifax credit scores) across applicants above and below the threshold

Nigeria YouWIN!

David McKenzie (World Bank Group)



- 99.6% of firms in Nigeria have 10 or fewer workers
- Policy-makers interested in identifying firms with potential and assess what type of policies foster their growth

Evaluation design

Intervention (a filter process, not just grant)

- President launched program on national TV and advertised through media
- 24,000 applications for new or expanding business - 6,000 selected and invited
- 4,873 business attended 4-day training and most submitted BP
- BP were scored - top 2,400 chosen, eligible for up to US\$64,000 grant (34 million total)

Top 2,400 Business Plans

475 national and regional winners (non experimental)	
729 other winners (treatment)	1112 control
84 dropped	

Three rounds of data collection

Results

- The Program created 7,000 jobs

NEW FIRMS	EXISTING FIRMS
<ul style="list-style-type: none">• 37 pp increase in start-up rate• 23 pp increase in likelihood of having 10+ workers• 23% increase in profits	<ul style="list-style-type: none">• 20 pp increase in survival over control• 21 pp increase in likelihood of having 10+ workers• 25% increase in profits

- Main effect seems to be enabling firms to buy more capital and hire more workers, instead of changing their business practices, mentoring or networking

Mexico Entrepreneurship

David Atkin (MIT)

Leonardo Iacovone (World Bank)

Alejandra Mendoza (World Bank)

Eric Verhoogen (Columbia University)

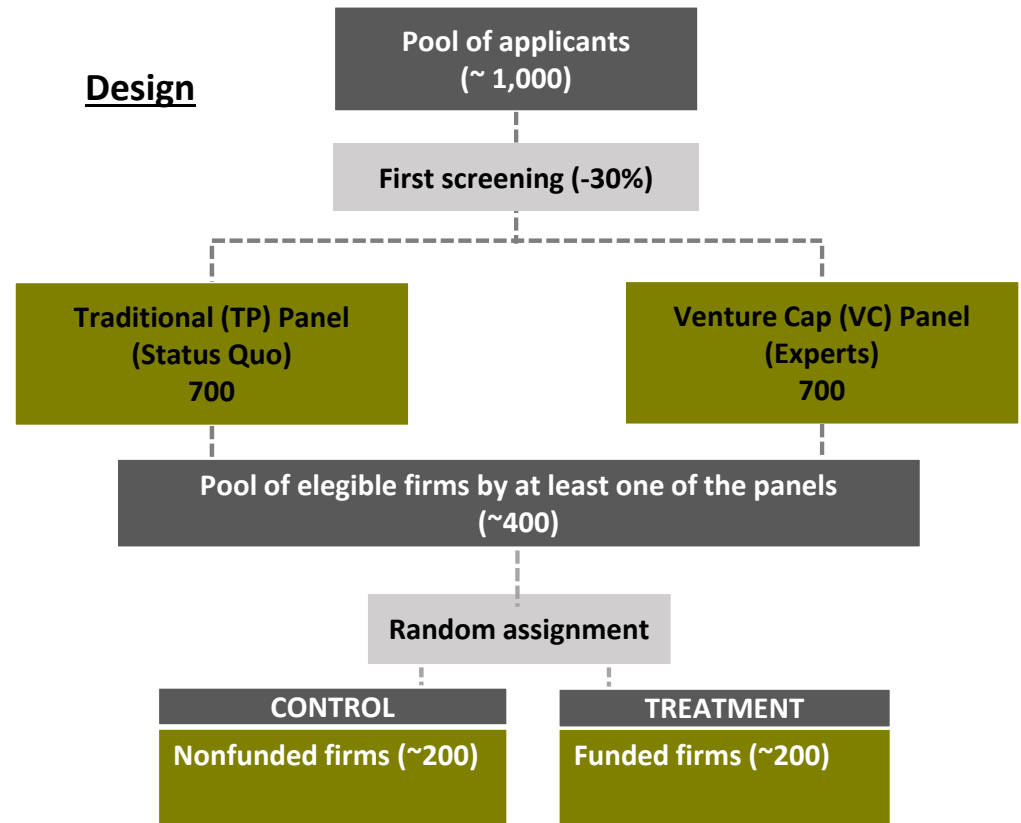


- Low levels of VC investments compared to other emerging economies:
 - China and India 0.20% of GDP
 - Brazil and Uruguay about 0.07%
 - Mexico 0.01%
- The High Impact Entrepreneurship Program (HIEP), run by the Mexican Ministry of the Economy, supports **innovative SMEs** to improve their development and increase their capabilities to succeed.
- It focuses on a type of SME that has not been broadly explored in empirical analysis: innovative small companies with high growth potential.

Evaluation design

Interventions

- Traditional panel that operates with information asymmetries (no links to applicants, no industry knowledge)
- Expert panel that operates without information asymmetries
- Large grants (150K per firm) to high-quality firms



Egypt - Exporting and firm performance

David Atkin (MIT)

Amit K. Khandelwal (Columbia University)

Adam Osman (University of Illinois)



- Most firms owner-operated
- Production reaches the market via intermediaries
- Intermediaries predominantly sell rugs in local market and Cairo/Alexandria
- Only 12% of firms had produced rugs for export markets

Evaluation design

Interventions

Secure orders - Partner intermediary ATA to do marketing of rugs in Western markets via fairs and manage orders with local one

Train intermediaries on marketing and replies

Training producers on quality and designs

Design

- Provided a random set of rug producers with the opportunity to fill orders
- Of 219 producers identified, 74 were in treatment group
- Treatment induces firms to export by reducing important trade friction— matching frictions between producers and overseas buyers

Results

What is the impact of offering a link to the exports market on quality and productivity?

Treatment firms:

- exhibit 16-26% higher profits, depending on measurement method
- have higher productivity and quality after controlling for rug specifications
- can produce higher quality rugs of same specifications, with same inputs, in less time

Peru Building Safety Inspections

*Manuel Barron (Univ. Pacifico)
Guadalupe Bedoya (World Bank Group)
Paul Gertler (UCLA-Berkeley)
Ana Goicoechea (World Bank Group)*



- In 2014, only 6% of new businesses were inspected
- In 2017, 60% of businesses inspected did not pass the inspections
- Lack of standardization in the application of regulation
- No incentives to maintain safety standards (no supervision threat)
- Municipalities have mandate for supervision but no resources

Evaluation design

Interventions

Information system – electronic inspections, inspection database, and performance reports.

Standardization – verifications, discussion of discrepancies, and rewards

Intense supervision – pose a credible compliance incentive by informing firms about the regulation and the odds of getting a supervision visit.

Design

Phase 1, randomize visits:
1500 visits with standardization
1500 without

Phase 2, randomize supervision:
800 firms with high odds
800 firms with medium odds
800 with low/current odds (comparison group)

Outcomes

Quality
Efficiency
Corruption

Compliance
Safety
Firm performance
(costs and losses)



6. IE in ComPEL

Our IEs

- Improve the quality of programs by
 - Generating evidence on ‘how to achieve impact’ – public good
 - Building capacity to demand/use evidence to make decisions
- They compare **causal** effects
- Are selected strategically – not advocating for IE only
- They require partnerships (we cover partially)

Our thematic clusters of linked studies

	Targeting firms with high growth potential	Connecting firms to markets	Building Productive Skills	Improving regulatory efficiency for firms
Experiment with:	Strategies to target potential gazelles, like screening, competitions or ordeals, and judges evaluations	Ways to improve buyer-seller relationships, like supplier programs, grants, mentoring, matching or market platforms	Strategies to build managerial skills, like training, soft skills, mentoring, consulting	Ways to improve service delivery, monitoring and enforcement of regulations that directly affect firms
Ongoing:	Brazil, Georgia, Kenya, Mexico , and Nigeria	Argentina, Colombia, Ethiopia, Tunisia, Zambia	Ethiopia, Mexico, Pakistan	Kenya, Peru
Completed:	Balkans, Nigeria*		Togo*, Jordan*	Balkans, Benin, Georgia, Malawi, Tajikistan

** Related, but initiated outside ComPEL's process*

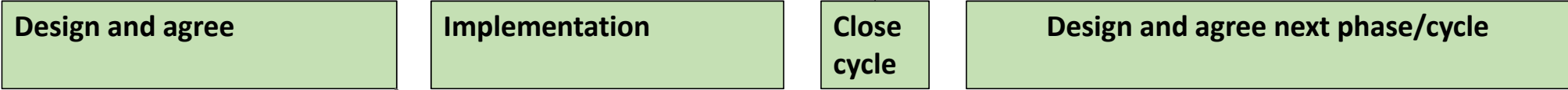
- ✓ Rigorous IE is not cheap but strategically selecting key interventions and rolling them out in various countries is very powerful
- ✓ When IE is not feasible, consider alternative ways to evaluate programs (beyond anecdotes)...and always pursue rigorous monitoring and evaluation

Read more: <http://www.worldbank.org/en/programs/competitiveness-policy-impact-evaluation-lab>

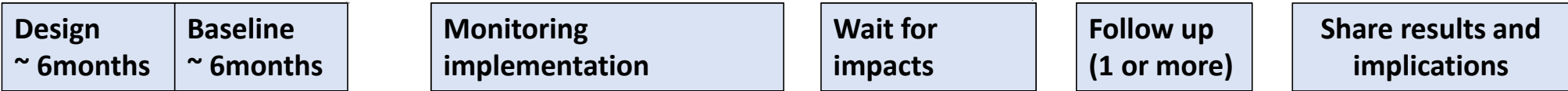
FAQs: How long does it take?

Program/Project

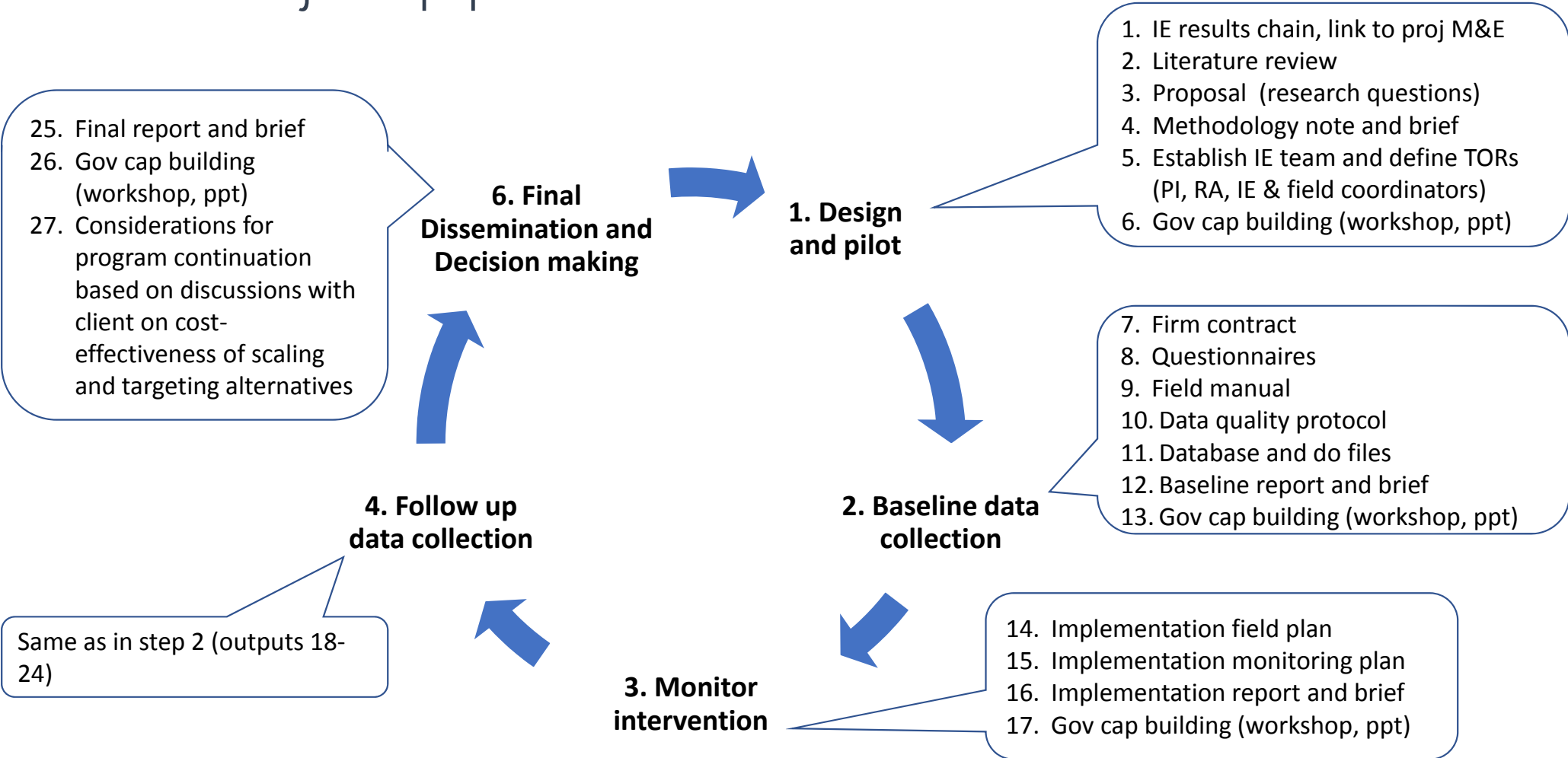
And still won't have that final report here!



Experiments



All the wait for just 1 paper?



How are findings used?

Example from Nigeria, training and grants to develop/implement business plans

Government

- ✓ Design - adopted selection tool
- ✓ Baseline – held an all-female round after learning about low proportion of female applicants and winners
- ✓ Midline – adjusted allocation criteria by eliminating preference for existing firms, given that impacts were higher on new firms
- ✓ End line – showcased program potential and leveraged funding for similar programs

World Bank

- ✓ Designed a new program in the country to provide fast-tracking grants through business plans
- ✓ Allocated funding to designing and implement other competitions in the region

Other FAQ?

- How to build a control group or sampling frame?
- Why would any government accept to randomize instead of serving everyone equally?
- ...

To conclude

Experiments improve effectiveness of programs by

- Using evidence to fine-tune design, implementation, and sustainability of programs
- Continuously providing governments with data and monitoring tools that allow course correction
- Building capacity for evidence-based policymaking

Gracias!

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ComPEL's Experiments

<http://www.worldbank.org/en/programs/competitiveness-policy-impact-evaluation-lab>

