From Firm Producti ity Dynamics to ggregate Efficiency

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Di claim r

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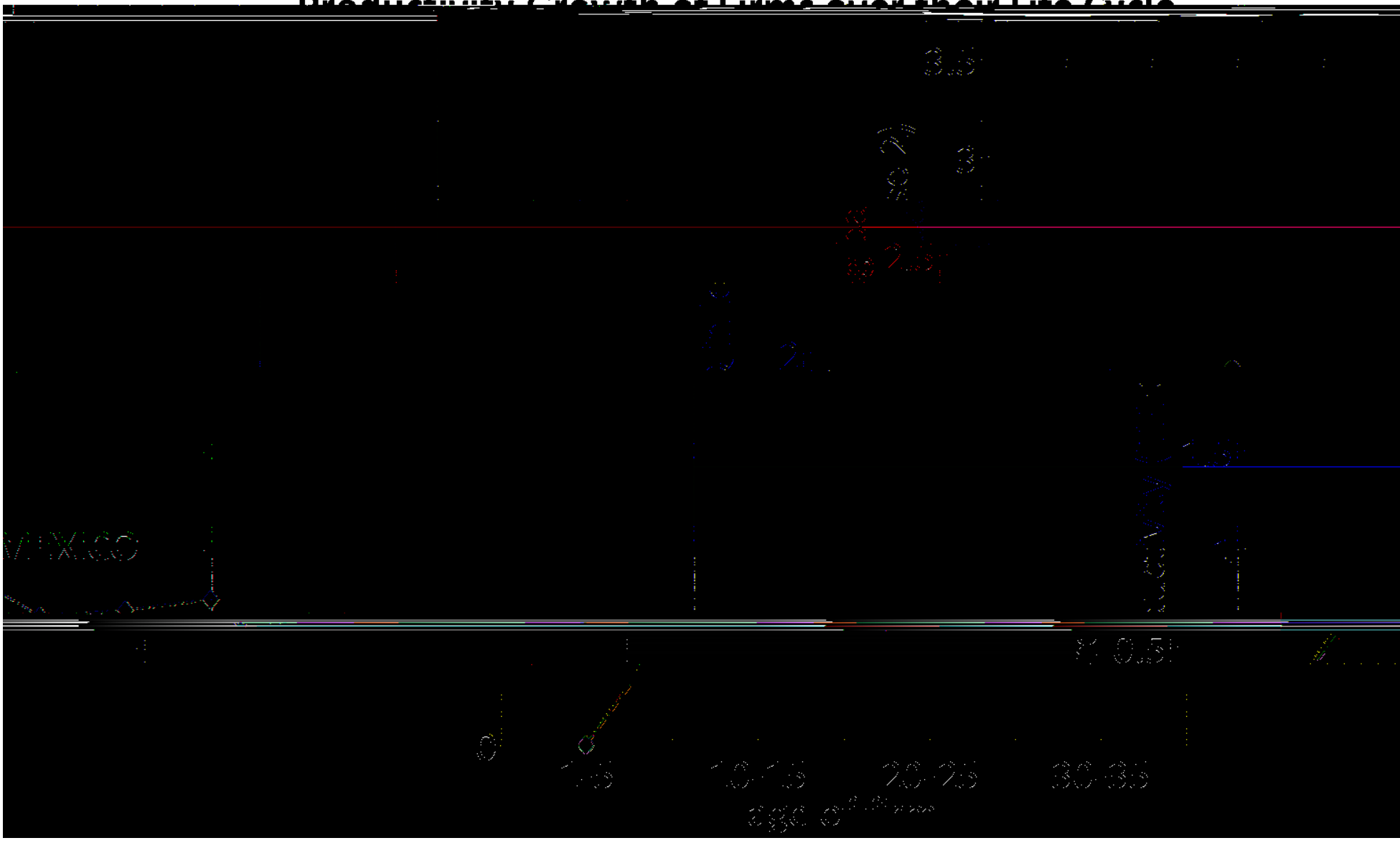

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Part of these TFP di erences have been attributed to:

Larger dispersion of marginal product of capital and labor across firms in developing economies, ***misallocation***.

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What models (and frictions) can explain these observations?

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What frictions can generate misallocation?

Financial constraints: firms without sufficient collateral are not able to produce with optimal level of capital, then mg. product of capital is not equalized across firms.

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then financial constraints reduce the growth of productivity at the firm level, reducing aggregate TFP.

Introduction

To analyze this mechanism we can extend previous models w/endogenous firm productivity accumulation:

- firms make investments to improve productivity every period (Pakes & McGuire, 1994; Klette & Kortum, 2004), firm productivity evolves stochastically,

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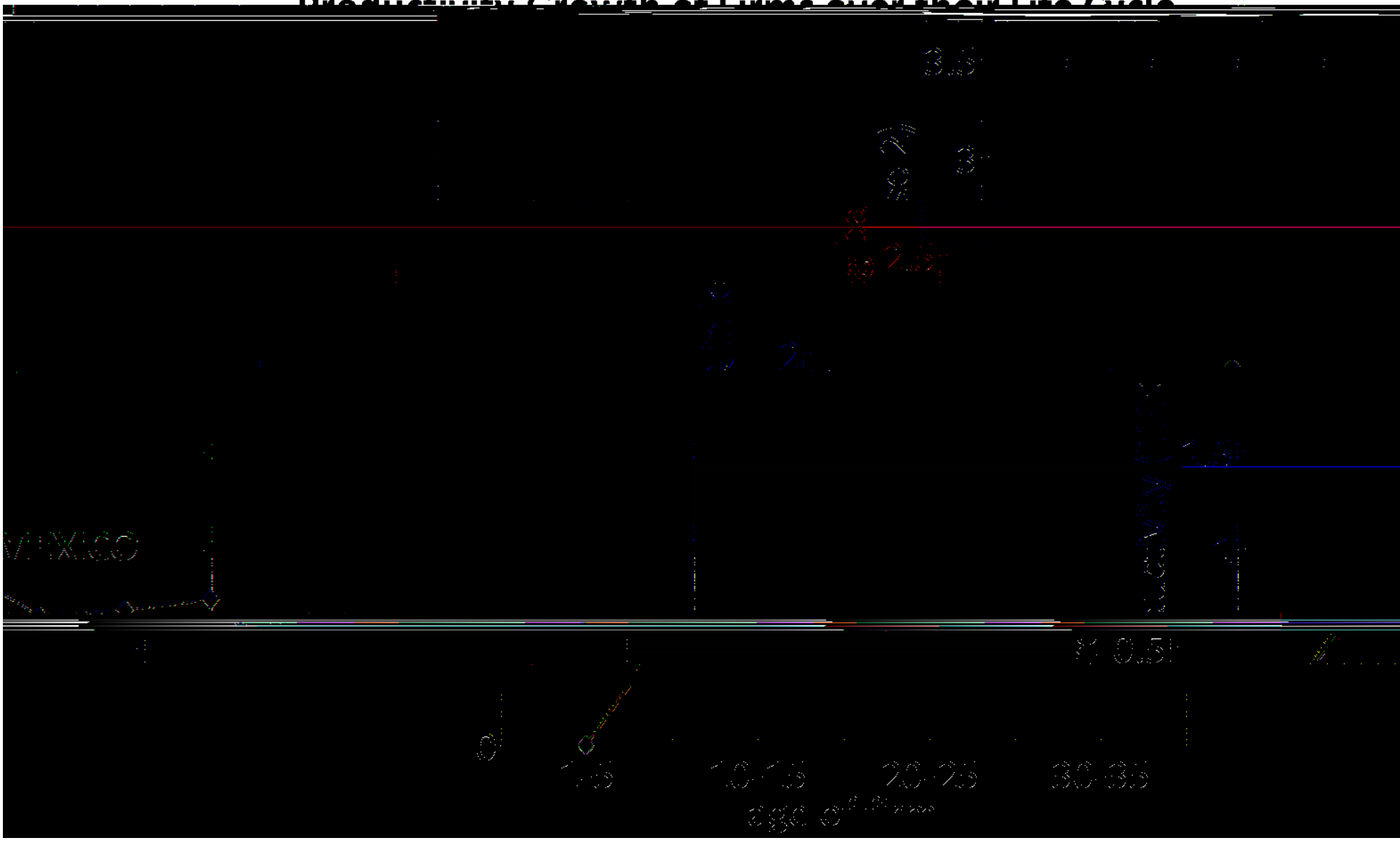


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Quantitativ Mod l: Economic Forc at Wor

In the model the following mechanisms come into play:

- financial constraints lower the incentives of entrepreneurs to invest in productivity (entrepreneur will not be able to produce at optimal level and reap benefits of higher productivity),
- lower wages lead to lower ability individuals entering the economy (a standard result since Lucas, 1978).

Quantitativ Mod l: Outlin

Main elements of the model:

- occupational choice: entrepreneur or worker,
- financial constraints,
- investment in knowledge capital (stochastic),
- small open economy,
- (extended model with productivity shocks, informal sector in paper).

Builds upon Lucas (1978), Hopenhayn (1992), Pakes & McGuire (1994), Klette & Kortum (2004), Buera, Kaboski & Shin (2011).

Production T chnology

Entrepreneur w/ability j (fixed) has access to the technology:

$$q = (j\,n)^{1\ \ n} f(k,l)^{n}$$

where:

q is production of final good,

$f(k,l) = k^{a} l^{1\ \ a}$, n 2 $(0,1)$ decreasing returns-to-scale,

j is permanent ability of the entrepreneur, distribution $h(j)$,

knowledge a ital n, accumulated through investment in innovation good x.

Innovation T chnology

Every period knowledge capital n can **increase**:

$$P(n^{0} = n(1 + \mathrm{D}) \, j \, n, x) = (1 \quad g) \frac{(1 \quad I) \, a(x/n)}{1 + a(x/n)} + g$$

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Probability of a **decrease** (*bad ho k*) in knowledge capital:

$$P(n^0 = n/(1 + \mathrm{D}) \, j \, n, x) = \frac{(1 \quad g) \, l}{1 + a(x/n)}$$

With remaining probability, remains **unchanged**.

Wor r

$s = f j, n_w, bg$, problem of worker is a savings $b^0 \quad 0$ decision:

$$v_w(s) = \max_{f b^0 \quad 0g} u(c) + b(1 \quad m) \sum_{f z^0 g} Q(z^0) v(s^0)$$

$$s.t. \quad c + b^0 = w + (1 + r) b$$

Entr pr n ur

$s = f j, n, bg$, entrepreneurs choose $b^0 \quad 0$ and $x \quad 0$ to max:

$$v_e(s) = u(c) + b(1 \quad m) \sum_{f n^0 g} P(n^0 j n, x) \max f v_w(s^0), v_e(s^0) g$$

subject to budget constraint:

$$c + b^0 = p(s) \quad x + (1 + r) b$$

Entr pr n ur

$s = f j, n, bg$, entrepreneurs choose b^0 0 and x 0 to max:

$$v_e(s) = u(c) + b(1 \quad m) \sum_{fn^0g} P(n^0 j n, x) \max f v_w(0 \text{ d}$$

Financial Enforc m nt Con traint

In the case of no-default the entrepreneur receives **ND**:

$$\max_{f\,l\,g} \; q \quad w\,l \quad (r+d)\,k \quad x + (1+r)\,b$$

while in the case of default the entrepreneur would receive **D**:

$$\max_{f\,l\,g} \; (1 \quad y)\,(q \quad w\,l + (1 \quad d)\,k) \quad x$$

capital level is **enforcea le** if it satisfies **ND** **D**, implying a bound $\overline{k}(s)$ on capital rental (a reduced form of capturing di erences in property rights/creditor protection).

Predetermined Parameters.

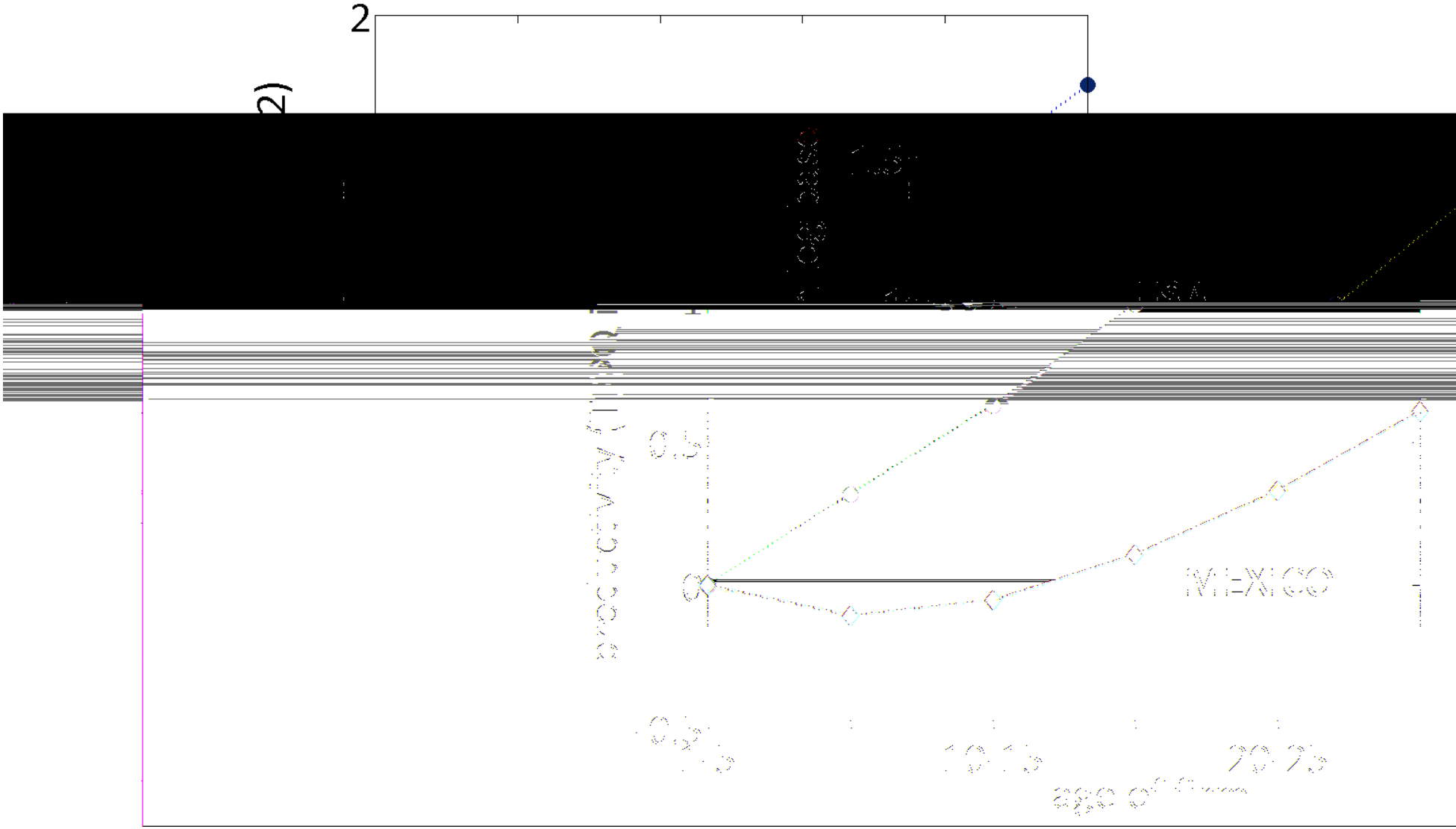
parameter	value	description
$b\,(1 \quad m)$	0.92	e ective discount factor
s	1.50	risk aversion
r	0.04	interest rate (small open economy)
n	0.85	span-of-control
a	1/3	income share of capital
d	0.08	capital depreciation rate
a	3.00	innovation technology
l	0.70	innovation technology

Cali rated Parameters - US Moments.		
parameter	symbol	value
exogenous exit rate	m	0.05
firm entry probability	J	0.04
Pareto dist.	q	4.34
innovation technology	g	0.24
initial knowledge capital	$n_w/\underline{n}$	1.91
size innovation steps	D	0.38
target statistics	data	model
death rate large firms	0.05	0.05
total firm entry/exit rate	0.10	0.11
std. deviation growth rates	0.25	0.25
relative size firms [20-25]/[1-5] years	2.48	2.46
employment at firms w/50+ workers	0.69	0.60
knowledge capital investment/total output	4.40	3.83

Quantitativ Ex rci

We lower y to target the ratio of private credit/output in an emerging economy of 20%.

Productivity Growth of Firms over their Life Cycle



Main Results.		
statistics	US	EE
weighted firm productivity	1.00	0.80
TFP	1.00	0.92
aggregate output	1.00	0.66
firm productivity [20-25]/[1-5] years	2.61	1.26

Final Comm nt

We have explored a new channel through which financial constraints have an impact on aggregate TFP: they distort the incentives to invest in productivity at the firm level.

Extended model with informal sector (low productivity and low growth firms w/no access to credit) and forthcoming: quantitative relevance of size dependent distortions vs. financial constraints.

Buera, Kaboski and Shin (2015): more research is needed in endogenous entrepreneurial productivity!