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1 Introduction

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Fact one: within each industry some plants purchase imported inputs while others do not. - , ,

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Table 1: Number and Percentage of Importers: 1977-1989

SIC	Industry Name	#Plants	#Importers	%Importers	Share imported
3511	Basic Ind Chemicals	164	80	0.4878	0.1804
3522	Pharmaceuticals	232	179	0.7716	0.6216
3560	Plastics	747	291	0.3896	0.2788
3240	Leather Shoes	769	81	0.1053	0.0631
3420	Printing&Publishing	933	278	0.2980	0.3739
3220	Clothing	2613	121	0.0463	0.0410
	All six Industries	5458	1030	0.1887	0.2842

Notes: "Share imported" is defined as the value share of the imported material in the total value of material used.

Fact two: turnover in importing status. ,

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1978, 39 . , 9.86%
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	Import	Not Import
Import	0.8737	

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Table 4: Mean of Value Added Per Worker: Importers and Non-importers
(1,000 Colombia Peso, 1977)

SIC	Industry Name	Non-importers	Importers	All Firms
3511	Basic Ind Chemicals	333.47	442.22	380.29
3522	Pharmaceuticals	86.25	210.10	174.46
3560	Plastics	88.81	142.21	107.55
3240	Leather Shoes	84.41	113.07	86.65
3420	Printing&Publishing	77.87	126.03	89.57
3220	Clothing	91.67	99.61	91.87
	All six Industries	115.37	177.30	126.01

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3 The Model

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3.1 Timing Story

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$(!_{jt})$ (d_{jt}),
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$s_{jt} = f K_{jt}; !_{jt}; d_{jt};\ _t g$ j t:

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$$\ln Q_{jt} = {}_{l} \ln L_{jt} + {}_{m} \frac{}{1} \ln \left[M^{\frac{-1}{}} \right.$$

-1

- - $s_{jt} = f K_{jt}; !_{jt}; d_{jt}; \ _t g.$

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$d_{jt} = 1,$ j

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$d_{jt} = 0,$ t;

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$V^1(s_{jt})$ $V^0(s_{jt})$.

$$V^1(s_{jt}) = E_t V(s_{jt+1} \mid s_{it}; d_{jt+1} = 1)$$
$$V^0(s_{jt}) = E_t V(s_{jt+1} \mid s_{it}; d_{jt+1} = 0)$$

$!_{jt}$, -

($_t$). ,

, - :

$$V^1(s_{jt}) = \max_{I_{jt}} \iint V(s_{jt+1}; d_{jt+1} = 1) dF$$

l; m; k

$!_{jt-1}$

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: l; m; k; A; , ,

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4.1 Stage One: Production Parameters: $_l$; $_m$; $_k$; A; ; g; $^2_\varepsilon$

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l; m; k . A

$x = \ln X$ d_{jt} ,

(1) ( ) :

$$q_{jt} = {}_l l_{jt} + {}_m \frac{1}{\quad} \ln \left[M_{jdt}^{\frac{-1}{}} + (AM_{jft})^{\frac{-1}{}} d_{jt} \right] + {}_k k_{jt} + !_{jt} + {}_{jt} \qquad (1)$$

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. . $i_{jt} = i_t(!_{jt}; k_{jt}; d_{jt+1})$. (1996)

$!_{jt}$, $!_{jt} = !_t(i_{jt}; k_{jt}; d_{jt+1})$;

.[7]

$$q_{jt} = {}_l l_{jt} + \frac{m}{1} \ln \left[M_{jdt}^{\frac{-1}{}} + (AM_{jft})^{\frac{-1}{}} d_{jt} \right] + {}_k k_{jt} \qquad (11)$$
$$+ !_t(i_{jt}; k_{jt}; d_{jt+1}) + {}_{jt}$$
$$= {}_l l_{jt} + {}_m \frac{}{1} \ln \left[M_{jdt}^{\frac{-1}{}} + (AM_{jft})^{\frac{-1}{}} d_{jt} \right] + (i_{jt}; k_{jt}; d_{jt+1}) + {}_{jt}$$

$(i_{jt}; k_{jt}; d_{jt+1})$ -

. $\widehat{}_l$ $\widehat{}_m$, $\widehat{A}$;

$\widehat{}$; ( ) (11) -

. $l_{jt}; M_{jdt}; M_{jft}; i_{jt}; k_{jt}$ d_{jft}

$g(\,;\,)$ $\hat{}_{jt}; \hat{}_{jt-1}; k_{jt-1};\quad d_{jt-1}.$,
$g(\,;\,)$ $g(!_{jt-1}; d_{jt-1}) = g_0 + g_! !_{jt-1} + g_d d_{jt-1}.$
$g_!$, g_d
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g_d .

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$$\widehat{!_{jt}} = \hat{}_{jt} \quad \widehat{k} k_{jt} \tag{13}$$

4.2 Stage Two: Demand Elasticity and Pro…t Function

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$$C_{jt} = \frac{1+}{\quad}(\ _{l} + \ _{m}) R_{jt} + \ _{jt} \tag{1 }$$

$_{jt}$ . . . A D ,
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(1), $_{l}$ $_{m}$
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Construct the pro…t function.

, $r_k; r_w;$ r_d (3).

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D $\widetilde{r}_{jt} = \log(R_{jt}) \quad (r_w \widehat{!_{jt}} + r_k k_{jt} + r_d d_{jt})$:

:

$$\widetilde{r}_{jt} = \ \underset{t}{\blacksquare} e_{jt} \tag{1 }$$

e_{jt} . . -
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$$R_{jt} = \exp(\sum_{t} r_k k_{jt} + r_w !_{jt} + r_d d_{jt}):$$

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($_t$; w_{jt}; k_{jt}; d_{jt}) ;

$$_{jt} = \left[1 \quad \frac{1+}{} (_1 + _2)\right] \exp\left(\sum_{t} r_k k_{jt} + r_w !_{jt} + r_d d_{jt} \right) \qquad (16)$$

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4.3 Stage Three: Sunk/Fixed Cost Parameters

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$$L = \prod_{j=1:N} L_j = \prod_{j=1:N} \prod_{t=1:T} L_{jt} \tag{19}$$

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F^f F. ,

. . , $C^s_{jt} \sim \exp(cs)$ F.

$C^f_{jt} \sim \exp(cf)$[8]. $(cs; cf)$

$V^1(s_{jt})$ $V^0(s_{jt})$

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5 Estimation Results

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Industry	B.I.Chemicals	Pharmaceuticals	Plastics	L.Shoes	Print&Pub	Clothing
l	0.4260	0.3466	0.3034	0.4736	0.4956	0.5510
	(0.0024)	(0.0026)	(0.0013)	(0.0012)	(0.0006)	(0.0003)
m	0.3420	0.5774	0.6253	0.4015	0.4283	0.3666
	(0.0011)	(0.0019)	(0.0006)	(0.0006)	(0.0003)	(0.0001)
A	1.0006	0.9255	1.0903	1.0001	0.9317	0.9995
	(0.4611)	(0.0828)	(0.0233)	(0.5430)	(0.0359)	(0.1013)
	5.0069	9.6690	21.5337	2.7108	22.3194	9.2140
	(0.1287)	(0.0897)	(0.0577)	(0.3821)	(0.0479)	(0.5232)
age	0.0469	0.0361	0.0294	0.0077	-0.0415	0.0129
	(0.0031)	(0.0018)	(0.0010)	(0.0010)	(0.0003)	(0.0003)
ownership	49 02.65	3.492 2.0	93 TD[	ownener	22155(492 2.65	30 TD[
				261)]TJ	7.807 0 TD[	0.)-4713283)]TJ 7.80
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Table 6: Parameters in Productivity Evolution and Capital Share (NLLS)

Industry	Chemicals	Pharmaceuticals	Plastics	L.Shoes	Print&Pub	Clothing
Panel A: Basic Model						
α_k	0.1111	0.0992	0.0586	0.0917	0.1083	0.0580
	(0.0065)	(0.0027)	(0.0013)	(0.0023)	(0.0002)	(0.0005)
g_0	0.3954	0.1282	0.2527	0.4600	0.6003	0.3501
	(0.5068)	(0.4933)	(0.4217)	(1.0083)	(0.0302)	(0.2000)
g_ω	0.9032	0.9224	0.8421	0.7259	0.3906	0.7753
	(0.0324)	(0.1773)	(0.1754)	(0.2895)	(0.0153)	(0.0719)
g_d	0.0148	0.0092	0.0122	0.0213	0.0568	0.0050
	(0.0061)	(0.0067)	(0.0036)	(0.0141)	(0.0012)	(0.0047)
σ_ω	0.0762	0.0310	0.0329	0.0397	0.0682	0.0329
Panel B: Control for Export						
α_k	0.1247	0.0723	0.0537	0.0854	0.0911	0.0545
	(0.0096)	(0.0036)	(0.0014)	(0.0020)	(0.0002)	(0.0007)
g_0	0.5583	0.2743	0.3085	0.5481	0.6390	0.4593
	(0.9385)	(0.9876)	(0.5828)	(0.9686)	(0.0320)	(0.3650)
g_ω	0.8240	0.7719	0.7919	0.6954	0.3154	0.7202
	(0.1169)	(0.5460)	(0.2666)	(0.2548)	(0.0128)	(0.1111)
g_d	0.0150	0.0213	0.0115	0.0205	0.0277	0.0026
	(0.0072)	(0.0128)	(0.0035)	(0.0157)	(0.0012)	(0.0070)
g_e	0.0172	-0.0005	0.0066	0.0262	0.0036	0.0012
	(0.0085)	(0.0001)	(0.0040)	(0.0115)	(0.0000)	(0.0000)
σ_ω	0.0994	0.0621	0.0402	0.0588	0.1307	0.0472

Notes: Standard errors in parentheses.

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5.2 Demand and Revenue Function

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Table 7: Demand Elasticity and Constructed Revenue Function

Industry	B.I.Chemicals	Pharmaceuticals	Plastics	L.Shoes	Print&Pub	Clothing
Panel A: Revenue Function						
r_ω	0.7920	1.7661	2.0021	1.8300	1.6968	1.8764
r_k	0.1286	0.1382	0.1157	0.1785	0.1673	0.1113
r_d	0.0611	0.0526	0.1268	0.3402	0.0074	0.0630
r_0	12.9609	12.9649	12.1032	10.0024	11.7837	11.1879
Panel B: Implied Revenue Elasticity						
productivity	2.5328	2.2258	3.2128	3.6272	1.8669	3.4363
capital	0.1286	0.1382	0.1157	0.1785	0.1673	0.1113
importing	0.0630	0.0540	0.1352	0.4052	0.0074	0.0651
Panel C: Demand Elasticity						
η	-2.3554	-3.2365	-3.5475	-3.8308	-3.1350	-3.4588
	(0.0127)	(0.0064)	(0.0024)	(0.0033)	(0.0029)	(0.0022)

Notes: (1) the revenue parameters are constructed from parameters estimated in stage 1. Therefore I do not report the standard deviations for revenue parameters in this table. (2) The standard deviation for demand elascitity is reported in parentheses. (3) Revenue elasticity of productivity = (exp(0.01*productivity*r_ω)-1)*100. Productivity is the chosen industry mean. (4) Revenue elasticity of capital = $r_{k.}$ (5) The third row in Panel B represents the percentage gain of revenue when a plant imports. It is defined as = exp(rd)-1. Strictly speaking, it is not a concept of elasticity. (6) Standard deviations for demand elasticity are in parentheses.

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5.3 Fixed and Sunk Cost

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5.3.1 Distribution of the Sunk and Fixed Costs

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6 Robustness Check

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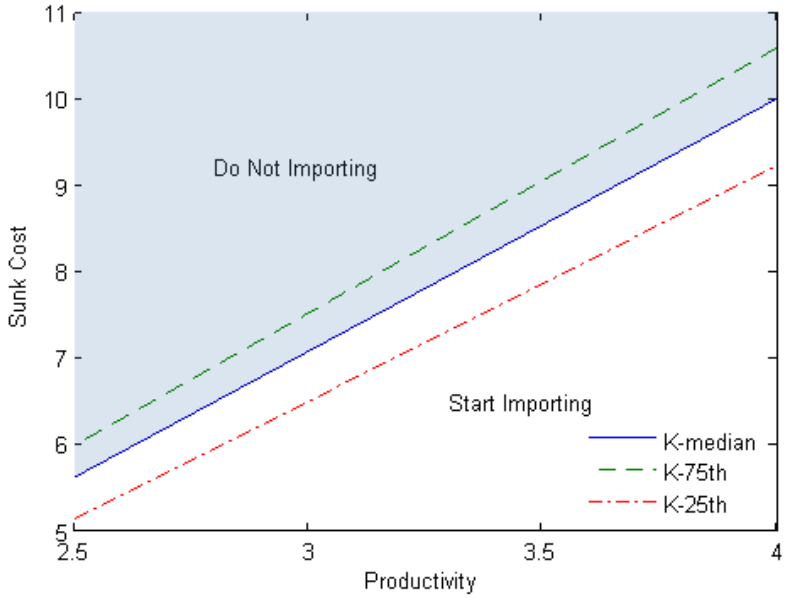
Do Not Importing
Start Importing
K-median
K-75th
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Sunk Cost
Productivity
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8 Gains from Importing Intermediate Inputs

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8.1 Gains from Importing

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\begin{aligned}
V(!_{jt}; K_{jt}) &= {}^{0}_{(s_{jt})} + \max_{i_{jt}} E_{!_{jt+1}} V(!_{jt+1}; K_{jt+1}) \qquad (\ ) \\
\text{s:t:}\ K_{jt+1} &= i_{jt} + (1 \quad {}_{k}) K_{jt-1} \\
!_{jt} &= E(!_{jt} \mid !_{jt-1}; d_{jt-1} = 0) + "_{jt}
\end{aligned}
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$$= V(s_{jt}) \quad V(!_{jt}; K_{jt}) \qquad (3)$$

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0:87% 22:28% .

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$V(s_{jt} \mid g_d = 0)$.[1]

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$$= V(s_{jt}) \quad V(s_{jt} \mid A = 1) \qquad (6)$$

[1] $V(\omega_{jt}, K_{jt})$

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Table 10: Dynamic and Static Effects from Importing (in millions of 1977 Pesos)

Industry Name	Dynamic Effect		Static Effect		Total E.
	Value	Pctg.	Value	Pctg.	
Basic Ind Chemicals	58.9987	96.37%	61.2299	3.63%	61.2206
Pharmaceuticals	102.8105	97.91%	2.1996	2.09%	105.0101
Plastics	51.6595	97.00%	1.5993	3.00%	53.2589
Leather Shoes	5.0599	86.66%	0.7789	13.34%	5.8388
Printing&Publishing	4.2915	99.26%	0.0322	0.74%	4.3237
Clothing	0.6800	86.07%	0.1101	13.93%	0.7900

Notes: "Pctg." refers to percentage, and defined as the share of gain from each effect in the total gain from importing.

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Table 11: Components of Static Effect (in millions of 1977 Pesos)

Industry Name	Static Effect (total)		Quality Effect		Variety Effect	
	Value	Pctg.	Value	Pctg.	Value	Pctg.
Basic Ind Chemicals	61.2299	3.63%	0.0093	0.02%	61.2205	3.61%
Pharmaceuticals	2.1996	2.09%	-3.2854	-3.13%	5.4849	5.22%
Plastics	1.5993	3.00%	0.7149	1.34%	0.8844	1.66%
Leather Shoes	0.7789	13.34%	0.0003	0.10%	0.7785	13.33%
Printing&Publishing	0.0322	0.74%	-0.6404	-14.81%	0.6726	15.56%
Clothing	0.1101	13.93%	-0.0008	-0.10%	0.1108	14.03%

Notes: "Pctg." refers to percentage, and is defined as the share of gain from each effect in the total gain from importing.

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9 Conclusion

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Appendix

Appendix 1: Algorithm to Evaluate $V^1(s_{jt})$ and $V^0(s_{jt})$

A 1 .

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1. ^{1} 2 ; . ,
$^1 = (\ _s;\ _f)$.

. D S S′ N ,
s 2 S′;

3. ^{1} s, V (s) (7);

V (s) ^{1} s:

3.1: $V_0(s)$; s 2 S′;

3. : C - $V^1(s_{jt})$ $V^0(s_{jt})$ -
(8), (9); F (w_{jt+1} j w_{jt};d_{jt})
, $_{jt}$;

3.3: $_{(s_{jt})}$; $V^1(s_{jt})$ $V^0(s_{jt})$ $V_0(s)$;

j $V_{i+1}(s)$ $V_i(s)$ j .
s. , -
.

. C^f_{jt} C^s_{jt}
, : $L_{jt}(\ ^1)$; $L_j(\ ^1)$; $L(\ ^1)$

. (
), $^* = \arg\max_{\in} L(\ )$ -
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Appendix 2: Self Selection to Import: A Numerical Example

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A $V(s_{jt}; d_{jt+1})$,

$$V(s_{jt}; d_{jt+1}) = a_0 + a_{w1}!_{jt} + a_{!2}^2!_{jt}^2 + a_{w3}!_{jt}^3 + a_{k1}k_{jt} + a_{k2}k_{jt}^2 + a_{k3}k_{jt}^3 + a_d d_{jt} + a_{!kdd'}!_{jt}k_{jt}d_{jt} + a_{d'}d_{jt+1} + a_{!kd'}!_{jt}k_{jt}d_{jt+1} + a_{!kdd'}!_{jt}k_{jt}d_{jt}d_{jt+1} \quad (8)$$

$$V = V^1(s_{jt}) \quad V^0(s_{jt}) = a_{d'} + a_{!kd'}!_{jt}k_{jt} + a_{!kdd'}!_{jt}k_{jt}d_{jt} \quad (9)$$

V $!_{jt}k_{jt}$ V (s j d′),
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(8) $V(s_{jt}; d_{jt+1})$,
A1.

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, , -

$$V = V^1(s_{jt}) \quad V^0(s_{jt}) = (\ 1{:}6707 + 0{:}1837!_{jt}k_{jt} \quad 0{:}0055!_{jt}k_{jt}d_{jt})\ \ 10^6$$

,
($!_{jt}k_{jt}d_{jt}$).
- - ,

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. ,

V ($!_{jt}$)

$$\frac{d\ V}{d\ (!_{jt})} = (0{:}1837 \quad 0{:}0055 k_{jt} d_{jt}) \quad 10^6 > 0$$

- .

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1, -

$$CS = \quad 1{:}6707 + 0{:}1837\,!_{jt} k_{jt}{:} \qquad (\qquad - \qquad)$$

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$$CF = \quad 1{:}6707 + 0{:}1782\,!_{jt} k_{jt}.$$

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Industry B.I.Chemicals Pharmaceutical

Appendix 3: Robustness Check

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Table A2: Robustness Check: Parameters of Static Inputs in Production Function (Non-Exporters)

Industry	B.I.Chemicals	Pharmaceuticals	Plastics	L.Shoes	Print&Pub	Clothing
α_l	0.3508	0.3414	0.2913	0.4973	0.4801	0.5635
	(0.0032)	(0.0030)	(0.0013)	(0.0011)	(0.0006)	(0.0002)
α_m	0.3846	0.5839	0.6235	0.3567	0.4374	0.3569
	(0.0014)	(0.0021)	(0.0006)	(0.0006)	(0.0003)	(0.0001)
A	0.9696	0.9706	0.9828	0.9964	0.9997	0.9994
	(0.4694)	(0.0911)	(0.0270)	(0.2164)	(0.0406)	(6.2074)
θ	4.4014	24.9377	18.5874	1.7724	35.7143	5.9312
	(0.0811)	(0.0856)	(0.0384)	(0.1674)	(0.0482)	(0.6933)
age	0.0606	0.0113	0.0330	-0.0002	-0.0267	0.0055
	(0.0032)	(0.0018)	(0.0010)	(0.0009)	(0.0003)	(0.0002)
ownership	0.1926	0.0487	0.0479	0.1081	0.1248	0.1340
	(0.0103)	(0.0098)	(0.0066)	(0.0587)	(0.0029)	(0.0092)

Notes: The standard errors in parentheses.

Table A3: Robustness Check: Parameters in Productivity Evolution and Capital Share for Non-Exporters

Industry	B.I.Chemicals	Pharmaceu.	Plastics	L.Shoes	Print&Pub	Clothing
α_k	0.1424	0.0662	0.0444	0.0933	0.0928	0.0540
	(0.0097)	(0.0031)	(0.0015)	(0.0016)	(0.0002)	(0.0006)
g_0	0.2452	0.2115	0.3137	0.7894	0.6763	0.3520
	(1.2080)	(0.7623)	(0.7764)	(1.1252)	(0.0451)	(0.2156)
g_ω	0.9355	0.8772	0.8075	0.6348	0.4224	0.7889
	(0.0857)	(0.2622)	(0.3062)	(0.2023)	(0.0192)	(0.0670)
g_d	0.0052	0.0097	0.0042	0.0262	0.0322	0.0042
	(0.0101)	(0.0099)	(0.0025)	(0.0152)	(0.0013)	(0.0080)
σ_ω	0.0052	0.0410	0.0225	0.0425	0.0664	0.0349

Notes: The standard errors in parentheses.

Industry	B.I.	Chemicals	harmaceutical	Plastics	L.Shoes	Print&Pub	Clothing
Revenue Function							
r_ω		0.8389	1.7225	3.2131	3.8280	1.1466	2.4272
r_k		0.1290	0.0454	0.1246	2.0700	0.0157	0.1908
r_d		0.1406	0.1236	0.1558	0.4012	0.1146	0.1274