

## Entry Regulation and Intersectoral Reallocation

**Antonio Ciccone**    **and**    **Elias Papaioannou**  
*UPF-ICREA*                      *Dartmouth College*

November 2007

Introduction

### Does entry regulation slow down growth?

- Is entry regulation a reason why some countries end up growing more slowly than others?
- Look at a channel: Entry regulation (red tape) slows down aggregate productivity by harming inter-sectoral factor allocation to globally expanding industries (due to technological progress or global demand shifts)

## Theoretical Literature on Entry Costs

**Previous Literature:** Entry costs → level of economic efficiency

- **Technology adoption** (e.g. Parente and Prescott, JPE 1994)
- **Industry reshuffling** (e.g. Hopenhayn, ECTA 92)
- **Product variety** (e.g. Dixit and Stiglitz, AER 78)
- **Employment** (e.g. Blanchard and Giavazzi, QJE 2002).
- **Unemployment** (e.g. Pissarides, 2001)

**Our focus:** Entry delays → growth of employment-output-productivity

## Related (Empirical) Literature on Entry Regulation

- **Measurement of costs and delays due to entry barriers and red tape**  
De Soto (1989); Djankov, La Porta, Lopez-de-Silanes, and Shleifer (*QJE* 2002);  
World Bank (Doing Business around the World); OECD (Regulation Database)
- **Entry regulation (Red Tape) and entry/growth**  
Fisman and Sarria-Allende (NBER 2004); Klapper, Laeven and Rajan (*JFE* 2006); Perotti and Volpin (CEPR 2006); Nicoletti and Scarpetta (2001, 2002, 2006); Alesina, *et al.* (*JEEA*, 2005); Bertrand and Kramraz (*QJE* 2002); Bruhn (2007); Aghion, Burgess, Redding and Zilibotti (NBER 2006); Yakovlev and Zhuravskaya (2007).

## Does entry regulation slow down growth?

### 1. Theoretical model

Red tape (administrative entry delays; product market regulation)

- Entry in globally expanding sectors (introduction of new varieties)
- Industry employment reallocation
- Industry growth

### 2. Empirical analysis

Red tape (administrative entry delays; product market regulation)

- Industry value added growth
- Employment reallocation
- Entry – growth in establishments (Red Tape and Delayed Entry; *JEEA* 2007)

## Presentation Overview

1. Theoretical model
2. Data
3. Industry measure of global frictionless factor reallocation
4. Main Empirical Results
5. Further Evidence and Sensitivity Checks
6. Summary

## Main Model Elements

- Many open economies (free trade)
- Many industries differentiated at the country of origin
- Within each country-industry, an endogenous number of varieties.
- Love for variety preferences and increasing returns in production.

- Economies are continuously subjected to industry shifts
- Model studies industry adjustment to such (demand or supply driven) shocks
- Comparison between **FRictionLESS** and **DELAyed ENTRY CASE**

- Growth in expanding industries is slower when there are barriers to the entry of new firms (introduction of new varieties/products)
- Entry barriers slow down aggregate growth

## Entry Regulation and Growth in a Multi-sector World Equilibrium Model with Prompt Entry [**Frictionless Case**]

ANTICIPATED and unanticipated  
INDUSTRY-LEVEL SHIFTS in  
PRODUCTIVITY and PREFERENCES



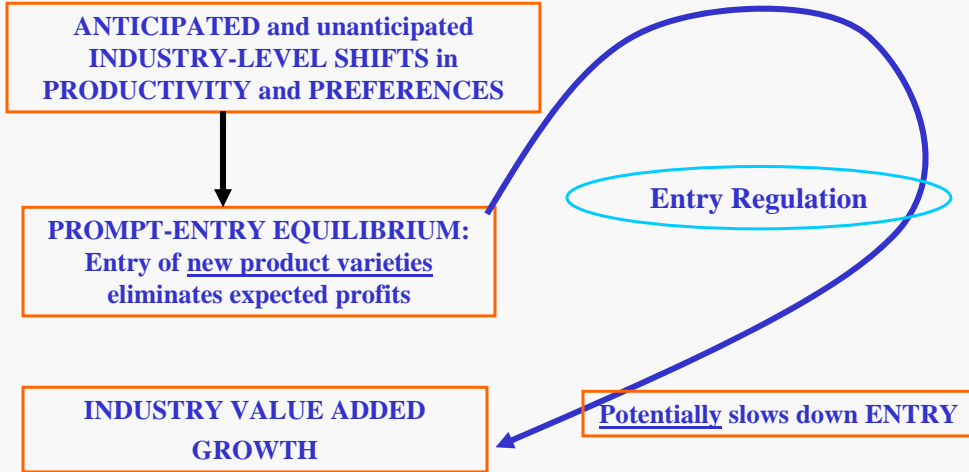
PROMPT-ENTRY EQUILIBRIUM  
Entry of new product varieties  
eliminates expected profits



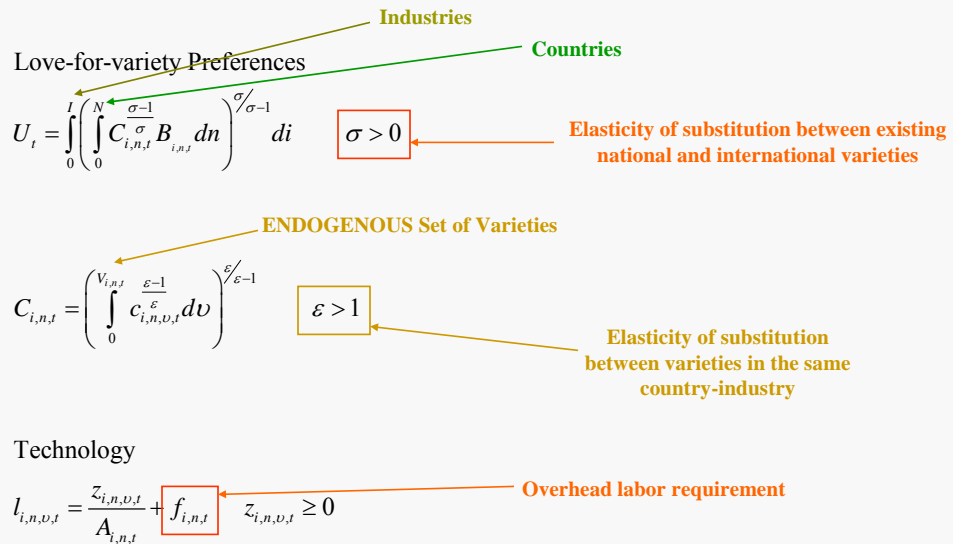
INDUSTRY VALUE ADDED  
GROWTH

**Equilibrium with  
Prompt Entry/  
Frictionless Equilibrium**

## Entry Regulation and Growth in a Multi-sector World Equilibrium Model with Frictions



## Set-Up: Multi-Industry World Equilibrium Model



## Profit Maximization of Monopolistically Competitive Firms (firms decide on employment before the realization of shocks)

Firm-Profit Maximization [MR=MC]

$$\frac{E_{t-1} [A_{i,n,t} p_{i,n,t}]}{\text{price-markup}} = w_{n,t}$$

Inverse Demand in Symmetric Equilibrium

$$p_{i,n,t} = B_{i,n,t} \left( \frac{Y_{i,n,t}}{P_{i,t}^{1-\sigma}} \right)^{\frac{1}{\sigma}} V_{i,n,t}^{\frac{1-\varepsilon-\sigma}{\sigma \varepsilon - 1}} z_{i,n,t}^{\frac{1}{\sigma}}$$

## Inverse Demand Elasticities

... with respect to quantity of existing varieties:

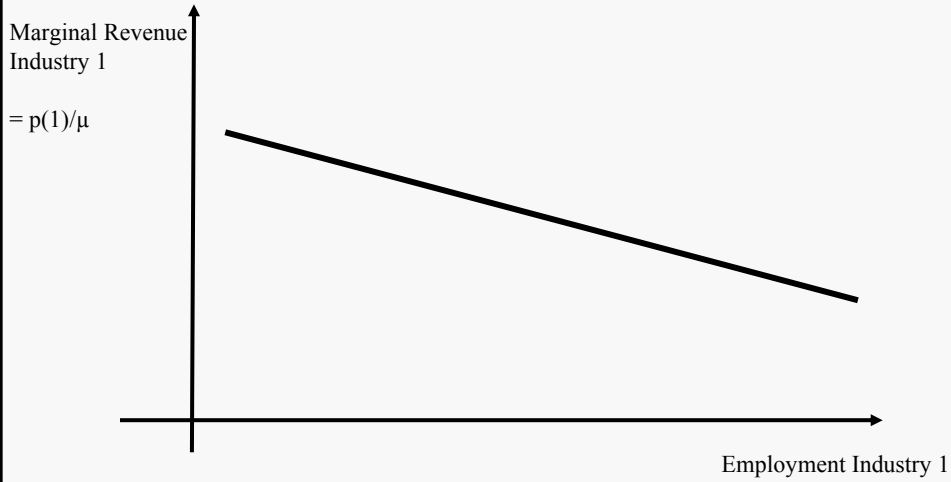
$\frac{1}{\sigma}$  where  $\sigma$  is the elasticity of substitution among existing domestic and international varieties  
(between 3 and 7 according to empirical work)

... with respect to quantity of new varieties ( $\varepsilon > \sigma$ ):

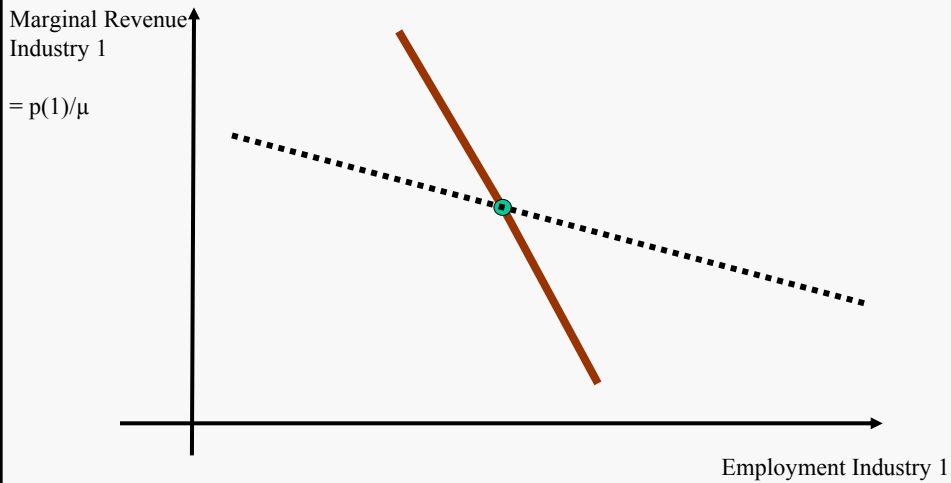
$$\frac{1}{\sigma} \frac{\varepsilon - \sigma}{\varepsilon - 1} < \frac{1}{\sigma} \quad \text{if } \sigma > 1$$

**Prices are less responsive when production increases at the extensive rather than the intensive margin.**

### Inverse Demand Elasticities and Returns with Entry [Frictionless case]



### Inverse Demand Elasticities and Returns with No Entry (with frictions; varieties fixed)



## Benchmark: Equilibrium with Prompt Entry

Equilibrium Measure of Varieties Positive

$$V_{i,n,t}^* = \theta_L E_{t-1} \left( \frac{(A_{i,n,t}^\sigma B_{i,n,t}^{\sigma-1}) Y_t}{P_{i,t}^{1-\sigma} w_{n,t}^\sigma} \right)^{\frac{\varepsilon-1}{\varepsilon-\sigma}}$$

• **ANTICIPATED technology and demand shifts**

&

• **World income**

• **International competition**

• **Domestic factor price**

Equilibrium Employment Allocation

$$L_{i,n,t}^* = l_{i,n,t}^* V_{i,n,t}^* = \theta_L E_{t-1} \left( \frac{(A_{i,n,t}^\sigma B_{i,n,t}^{\sigma-1}) Y_t}{P_{i,t}^{1-\sigma} w_{n,t}^\sigma} \right)^{\frac{\varepsilon-1}{\varepsilon-\sigma}}$$

All adjustment at extensive margin

## Example (industry and aggregate equilibrium)

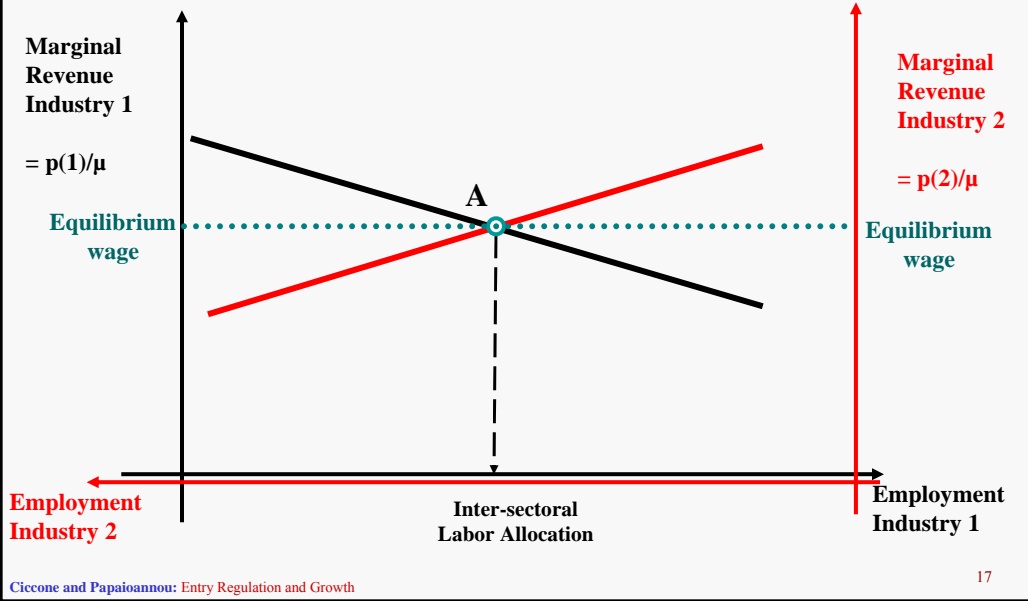
### Assume (for simplicity)

- Just two industries
- Only (positive) demand shocks
- No intersectoral productivity differences
- Labor only input of production

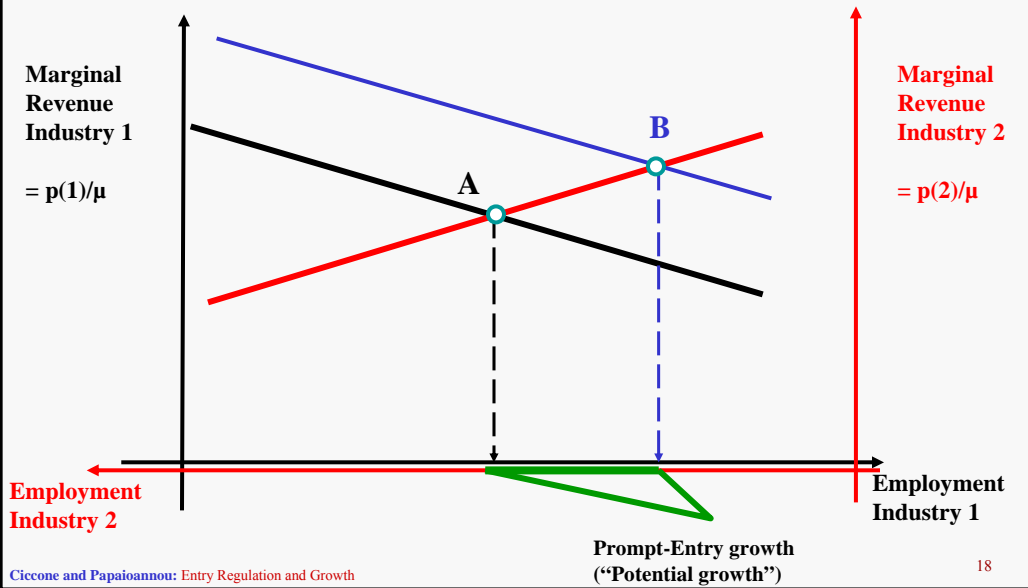
### Equilibrium Response

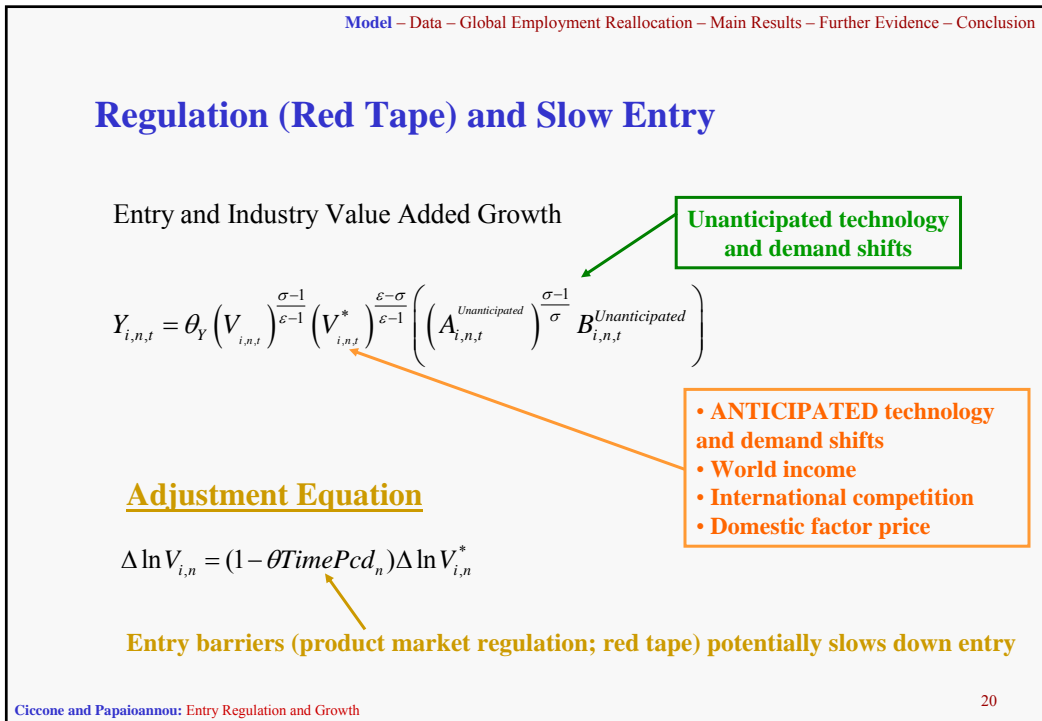
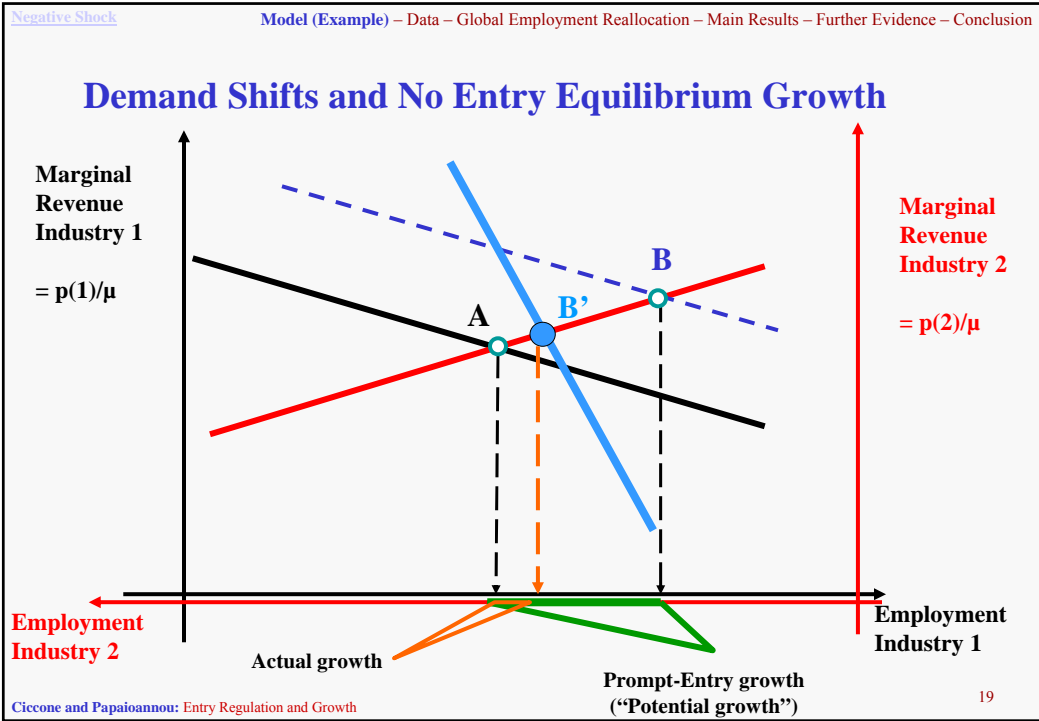
1. Frictionless case (no barriers to entry)
2. Frictions (barriers) to entry

### Initial inter-sectoral employment allocation

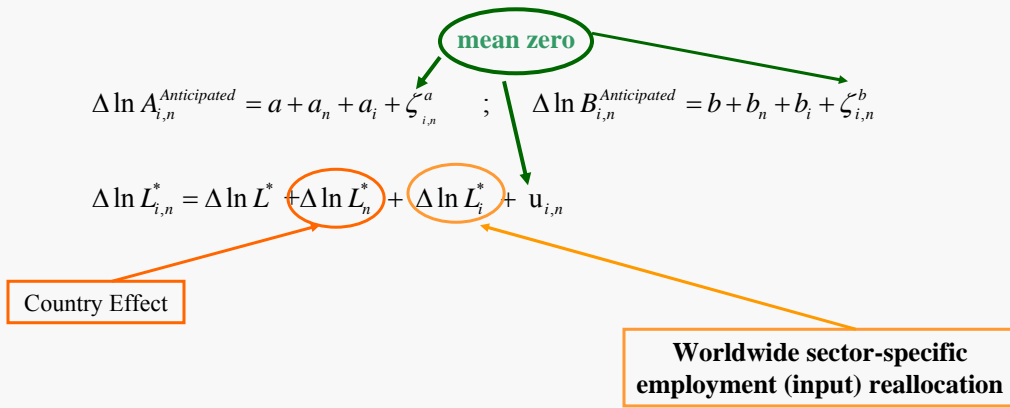


### Demand Shifts and Prompt Entry Equilibrium Growth

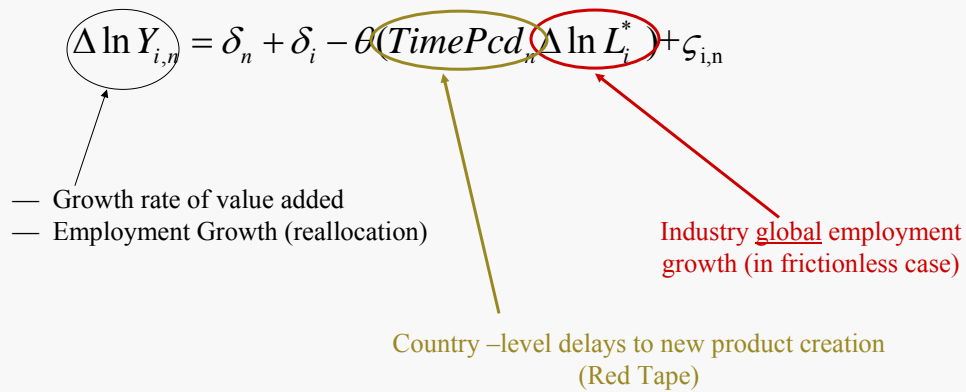




## Worldwide Industry Allocation Shifts



## Model Estimating Equation



## Data

### 1. Country-Industry Level (from UNIDO)

- Log change in value added and employment (in the eighties; eighties and nineties).
- 55-45 countries; 27-28 manufacturing industries (more than 1,000 obs.)

### 2. Country-Level

- Entry regulation indicators from Djankov, La Porta, Lopez-de-Silanes and Shleifer (*QJE* 2002); focus on *TIME* to start business (model emphasis is on delays)
- Other measures of regulation (Frazer Institute start-up measure; OECD economy wide product market regulation index; OECD service regulation index)
- Other controls (income, labor regulation, etc.)

### 3. Industry-level

- Global employment reallocation in a frictionless economy (preferred measure)
- US Employment growth (for comparability)
- Other industry measures (external finance dependence, capital intensity, etc).

## Global frictionless employment reallocation

1. **“Standard” approach:** use data from a country with low levels of entry regulation, where employment growth is unlikely to reflect frictions in product (or labor or capital) markets. (Rajan and Zingales, 1998).
  - ➔ This approach however introduces measurement error that does not necessarily takes the “classical form.” Thus the bias can be either upwards (if it reflects idiosyncratic factors common to countries that are “similar” to the benchmark country) or downwards (if the error is white noise).
2. **“New” approach:** estimate global employment reallocation in a frictionless economy using data on all countries and accounting for the fact that in countries with high barriers to entry employment reallocation might not reflect industry shocks. (Ciccone and Papaioannou, 2006)

## “Standard approach” - Biased Estimates

$$\Delta \ln Y_{i,n} = \delta_n + \delta_i - \theta(\text{TimePcd}_i(\Delta \ln L_{i,US})) + \zeta_{i,n}$$

$$\Delta \ln L_{i,US} = \Delta \ln L_i^{\text{World}} + \Delta \ln L_{i,US}^{\text{Idiosyncratic}} + \Delta \ln L_i^{\text{PMR}}$$

### Why is least squares biased?

- US employment growth mismeasures global factor (employment) reallocation  
→ attenuation
- US idiosyncratic factors may be correlated with idiosyncratic factors of similar to the benchmark countries with low barriers to entrepreneurship (but not countries with high barriers)  
→ Overestimate the effect of entry regulation

## New Approach to Measurement Error

Estimate  $\Delta \ln L_i^{\text{Worldwide}}$  with the following two-step method:

- (1) regress  $\Delta \ln L_{i,n}$  on industry constants, country effects, and  $PMR_n$  (slope  $\Lambda_i$ )

$$\Delta \ln L_{i,n} = \Theta_i + \Theta_n + \Lambda_i PMR_n$$

- (2) Obtain predicted values of employment growth in the lowest value of PMR.

$$\Delta \ln L_i^{\text{World,EST}} = \Theta_i^{\text{EST}} + \Theta_n^{\text{EST}} + \Lambda_i^{\text{EST}} PMR_{\min}$$

## Global measure of employment reallocation

**Countries with lowest values of entry regulation (PMR):** Canada and Australia (2 days); United Kingdom (3), United States (4), New Zealand (3).

Note (1): Makes no difference which of these countries-values we use in our prediction equation

Note (2): Makes no difference if we are to include or drop the benchmark country (or even all of the countries with low levels of entry regulation).

Note (3): Since we will also use other measures of entry regulation, this will also change the country with the lowest value of PMR.

## Least Squares Estimates – Value added

$$\Delta \ln Y_{i,n} = \delta_n + \delta_i - \theta(\text{TimePcd}_n \Delta \ln L_i^*) + \varepsilon_{i,n}$$

	Value Added Growth (in the 80's)				
	(1)	(2)	(3)	(4)	(5)
Entry Delay X Employment Reallocation [TimePcd X EMPGR]	-0.1974 (4.57)	-0.2190 (4.28)	-0.1694 (3.78)	-0.1749 (4.18)	-0.2100 (4.90)
Employment Regulation X Employment Reallocation [LMR X EMPGR]		0.2848 (0.81)			
Legal Inefficiency X Employment Reallocation [LAWINEFF X EMPGR]			-0.0971 (1.14)		
Financial Development X Employment Reallocation [FD X EMPGR]				0.0033 (1.55)	
Income X Employment Reallocation [Y X EMPGR]					-0.0759 (1.59)
Observations	1338	1324	1338	1310	1283
Countries	52	51	52	51	50
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes

## Least Squares Estimates – Employment

	Employment Growth in the 80's				
	(1)	(2)	(3)	(4)	(5)
Entry Delay X Employment Reallocation [TimePcd X EMPGR]	-0.2316 (6.66)	-0.2512 (6.33)	-0.1954 (5.33)	-0.2094 (6.06)	-0.2459 (7.21)
Employment Regulation X Employment Reallocation [LMR X EMPGR]		0.3714 (1.41)			
Legal Inefficiency X Employment Reallocation [LAWINEFF X EMPGR]			-0.1232 (2.10)		
Financial Development X Employment Reallocation [FD X EMPGR]				0.0040 (2.68)	
Income X Employment Reallocation [Y X EMPGR]					-0.0348 (1.04)
Observations	1456	1414	1456	1377	1375
Countries	56	54	56	53	53
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes

Ciccone and Papaioannou: Entry Regulation and Growth

29

## Least Squares Estimates – Controlling for finance

	Value Added Growth (80's)			Employment Growth (80's)		
	(1)	(2)	(3)	(4)	(5)	(6)
Entry Delay X Employment Reallocation [TimePcd X EMPGR]	-0.1829 (4.32)	-0.1786 (4.18)	-0.1760 (4.23)	-0.2240 (6.61)	-0.2316 (6.88)	-0.2095 (6.06)
Finance X External Finance Dependence [FD X EXTFIN]	0.0002 (1.56)			0.0002 (2.16)		
Finance X Capital Growth [FD X CAPGR]		0.0060 (2.95)	0.0058 (2.38)		0.0024 (1.67)	0.0008 (0.51)
Finance X Employment Reallocation [FD X EMPGR]			0.0005 (0.18)			0.0036 (2.12)
adjusted R-squared	0.376	0.379	0.379	0.383	0.382	0.384
Countries	1310	1310	1310	1377	1377	1377
Observations	51	51	51	53	53	53
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

Ciccone and Papaioannou: Entry Regulation and Growth

30

## Least Squares Estimates – Controlling for finance and initial conditions

	Value Added Growth (80's)			Employment Growth (80's)		
	(1)	(2)	(3)	(4)	(5)	(6)
Entry Delay X Employment Reallocation [TimePcd X EMPGR]	-0.2337 (5.20)	-0.2366 (5.24)	-0.2234 (5.07)	-0.2550 (7.31)	-0.2692 (7.70)	-0.2400 (6.77)
Finance X External Finance Dependence [FD X EXTFIN]	0.0004 (2.98)			0.0004 (3.93)		
Finance X Capital Growth [FD X CAPGR]		0.0073 (3.61)	0.0062 (2.58)		0.0033 (2.25)	0.0011 (0.67)
FinanceX Employment Reallocation [FD X EMPGR]			0.0026 (1.04)			0.0050 (2.98)
$\ln(VAs,c) / \ln(EMPs,c)$	-0.0132 (5.27)	-0.0127 (5.11)	-0.0130 (5.17)	-0.0114 (5.82)	-0.0105 (5.38)	-0.0109 (5.60)
Observations	1310	1310	1310	1377	1377	1377
Countries	51	51	51	53	53	53
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

Ciccone and Papaioannou: Entry Regulation and Growth

31

Correlogram

## LS Estimates – Valued added growth across decades

Entry_Delay Interacted	1970s	1980s	1990s	1970s	1980s	1990s
1970s [EMPGR7079] global employment reallocation in 70's	<b>-0.1383</b> (1.76)			<b>-0.2112</b> (1.70)	0.0080 (0.06)	0.1398 (0.32)
1980s [EMPGR8089] global employment reallocation in 80's		<b>-0.1974</b> (4.57)		0.0954 (1.38)	<b>-0.1786</b> (2.85)	0.2005 (2.07)
1990s [EMPGR9099] global employment reallocation in 90's			<b>-0.1991</b> (2.53)	-0.0106 (0.25)	-0.0405 (1.04)	<b>-0.2991</b> (2.69)
adjusted R-squared	0.368	0.396	0.329	0.367	0.396	0.322
Observations	1408	1338	1036	1408	1338	1036
Countries	54	52	43	54	52	43
Industries	28	28	28	28	28	28
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

Ciccone and Papaioannou: Entry Regulation and Growth

32

## LS Estimates – Employment growth across decades

Entry_Delay Interacted	Employment Growth across decades					
	1970s	1980s	1990s	1970s	1980s	1990s
1970s [EMPGR7079] global employment reallocation in 70's	<b>-0.2169</b> (3.85)			<b>-0.2343</b> (2.83)	0.0818 (1.09)	0.1126 (0.11)
1980s [EMPGR8089] global employment reallocation in 80's		<b>-0.2316</b> (6.66)		0.0210 (0.43)	<b>-0.2600</b> (5.72)	0.0626 (0.83)
1990s [EMPGR9099] global employment reallocation in 90's			<b>-0.2402</b> (3.94)	-0.0012 (0.04)	-0.0157 (0.50)	<b>-0.2875</b> (3.13)
adjusted R-squared	0.4176	0.3627	0.3713	0.4168	0.3622	0.3718
Observations	1494	1456	1080	1494	1456	1080
Countries	57	56	44	57	56	44
Industries	28	28	28	28	28	28
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## Further Evidence & Sensitivity Checks

1. Alternative measures of entry regulation (and “benchmark” countries)
2. Using US data to proxy global inter-industry employment reallocation
3. Other

## LS Estimates – Frazer Institute Measure (1995) (global measure of employment reallocation)

Predicted at lowest value of the index (Singapore)

Frazer Institute Start-Up Regulation measure interacted with global employment reallocation in each decade	Value Added Growth			Employment Growth		
	1970s (1)	1980s (2)	1990s (3)	1970s (4)	1980s (5)	1990s (6)
Start-Up Regulation X Employment Reallocation [ <i>Start-Up X EMPGR</i> ]	-0.1264 (3.14)	-0.1386 (4.08)	-0.0965 (1.39)	-0.1233 (3.51)	-0.1585 (5.71)	-0.0965 (1.61)
adjusted R-squared	0.354	0.448	0.385	0.460	0.439	0.366
Observations	1096	1113	810	1128	1175	870
Countries	41	42	33	42	44	35
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## LS Estimates – OECD PMR index (1998) (global measure of employment reallocation)

Predicted at lowest value of the index (UK)

OECD Product Market Regulation measure interacted with global employment reallocation in each decade	Value Added Growth			Employment Growth		
	1970s (1)	1980s (2)	1990s (3)	1970s (4)	1980s (5)	1990s (6)
OECD PMR Index X Employment Reallocation [ <i>PMR98 X EMPGR</i> ]	-0.2471 (2.28)	-0.4173 (3.71)	-0.3748 (2.65)	-0.3538 (3.84)	-0.4491 (6.07)	-0.4655 (4.04)
adjusted R-squared	0.554	0.433	0.406	0.556	0.395	0.402
Observations	708	692	523	706	692	556
Countries	26	26	21	26	26	22
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## LS Estimates – OECD Service PMR index (global measure of employment reallocation)

Predicted at lowest value of the index (US)

OECD service regulation measure interacted with global employment reallocation in each decade	Value Added Growth across decades					
	1970s	1980s	1990s	1970s	1980s	1990s
	(1)	(2)	(3)	(4)	(5)	(6)
<i>PMR70s X EMPGR7079</i>	<b>-0.2734</b> (2.14)			<b>-0.5111</b> (2.64)	0.0551 (0.24)	0.3304 (1.08)
<i>PMR80 X EMPGR8089</i>		<b>-0.1689</b> (2.52)		0.1688 (1.87)	<b>-0.1563</b> (1.50)	0.3815 (2.32)
<i>PMR90 X EMPGR9099</i>			<b>-0.2580</b> (1.35)	-0.0112 (0.27)	-0.0528 (1.21)	<b>-0.5094</b> (2.29)
adjusted R-squared	0.426	0.280	0.407	0.4279	0.2792	0.4296
Observations	557	542	400	557	542	400
Countries	20	20	16	20	20	16
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## LS Estimates – OECD Service PMR index (global measure of employment reallocation)

Predicted at lowest value of the index (US)

OECD service regulation measure interacted with global employment reallocation in each decade	Employment Growth across decades					
	1970s	1980s	1990s	1970s	1980s	1990s
	(1)	(2)	(3)	(4)	(5)	(6)
<i>PMR70s X EMPGR7079</i>	<b>-0.1333</b> (1.31)			<b>-0.2020</b> (1.40)	0.2111 (1.63)	0.2406 (1.28)
<i>PMR80 X EMPGR8089</i>		<b>-0.2257</b> (4.52)		0.0305 (0.46)	<b>-0.2720</b> (4.52)	0.2227 (1.99)
<i>PMR90 X EMPGR9099</i>			<b>-0.2443</b> (1.80)	0.0259 (0.96)	-0.0284 (0.71)	<b>-0.3957</b> (2.27)
adjusted R-squared	0.477	0.328	0.446	0.4762	0.3285	0.4606
Observations	553	544	433	553	544	433
Countries	20	20	17	20	20	17
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## LS: Using US data to proxy global employment reallocation

	Value Added (in the 80's)			Employment (in the 80's)		
	(1)	(2)	(3)	(4)	(5)	(6)
Administrative Entry Delay X Employment Reallocation	-0.2363 (4.43)	-0.1936 (4.11)	-0.1932 (4.32)	-0.2165 (5.40)	-0.1715 (4.53)	-0.1896 (5.49)
Employment Regulation X Employment Reallocation	0.3894 (1.17)			0.4640 (1.73)		
Legal Inefficiency X Employment Reallocation		-0.0647 (0.82)			-0.0825 (1.42)	
Financial Development X Employment Reallocation			0.0048 (2.16)			0.0039 (2.60)
Initial Conditions	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R-squared	0.433	0.423	0.403	0.386	0.378	0.397
Observations	1282	1310	1282	1386	1428	1349
Countries	50	51	50	53	55	52
Country and Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

Ciccone and Papaioannou: Entry Regulation and Growth

39

## LS: Using US data to proxy global employment reallocation; Controlling for finance and initial conditions

	Value Added (in the 80's)			Employment (in the 80's)		
	(1)	(2)	(3)	(4)	(5)	(6)
TimePcd X Factor Reallocation [TIME X EMPGR]	-0.2132 (4.60)	-0.2016 (4.38)	-0.1936 (4.23)	-0.1970 (5.53)	-0.1952 (5.61)	-0.1981 (5.67)
Finance X External Finance Dependence [FD X EXTFIN]		0.0004 (2.89)			0.0004 (4.17)	
Finance X Investment Opportunities [FD X CAPGR]			0.0076 (3.28)			0.0034 (2.07)
Initial Conditions	Yes	Yes	Yes	Yes	Yes	Yes
adjusted R-squared	0.423	0.405	0.407	0.378	0.402	0.396
Observations	1310	1282	1282	1428	1349	1349
Countries	51	50	50	55	52	52
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

Ciccone and Papaioannou: Entry Regulation and Growth

40

## LS: Using US data to proxy global employment reallocation. Models across decades

Administrative Entry Delay Interacted with US Employment reallocation in each decade	Value Added Growth			Employment Growth		
	1970s (1)	1980s (2)	1990s (3)	1970s (4)	1980s (5)	1990s (6)
1970s [EMPGR7079]	0.1709 (2.62)			0.0570 (1.19)		
		<b>opposite sign</b>				
1980s [EMPGR7079]		-0.1395 (3.07)			-0.1206 (3.15)	
1990s [EMPGR9099]			-0.0450 (0.72)			-0.1785 (4.07)
		<b>insignificance</b>				
adjusted R-squared	0.362	0.394	0.310	0.4121	0.3521	0.3583
Observations	1380	1310	960	1466	1428	1001
Countries	53	51	42	56	55	43
Industries	28	28	26	28	28	26
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## Conclusion

### Why should entry regulation matter conceptually?

- Because industry expansion is usually stronger when new varieties demanded by consumers can enter markets

### Does entry regulation matter for growth empirically?

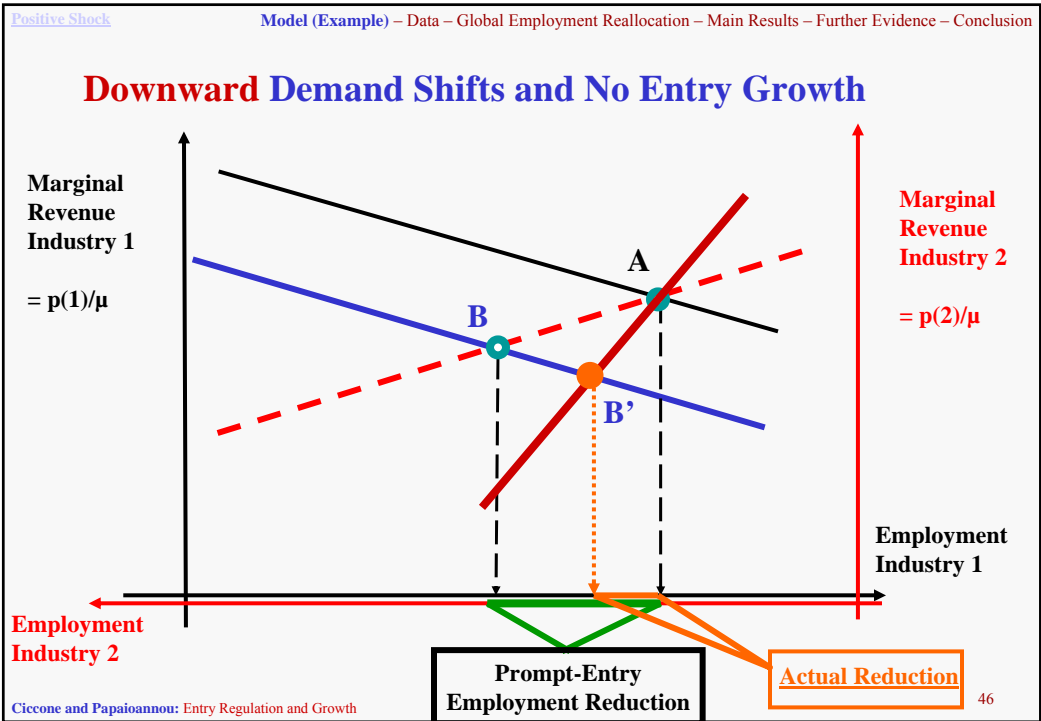
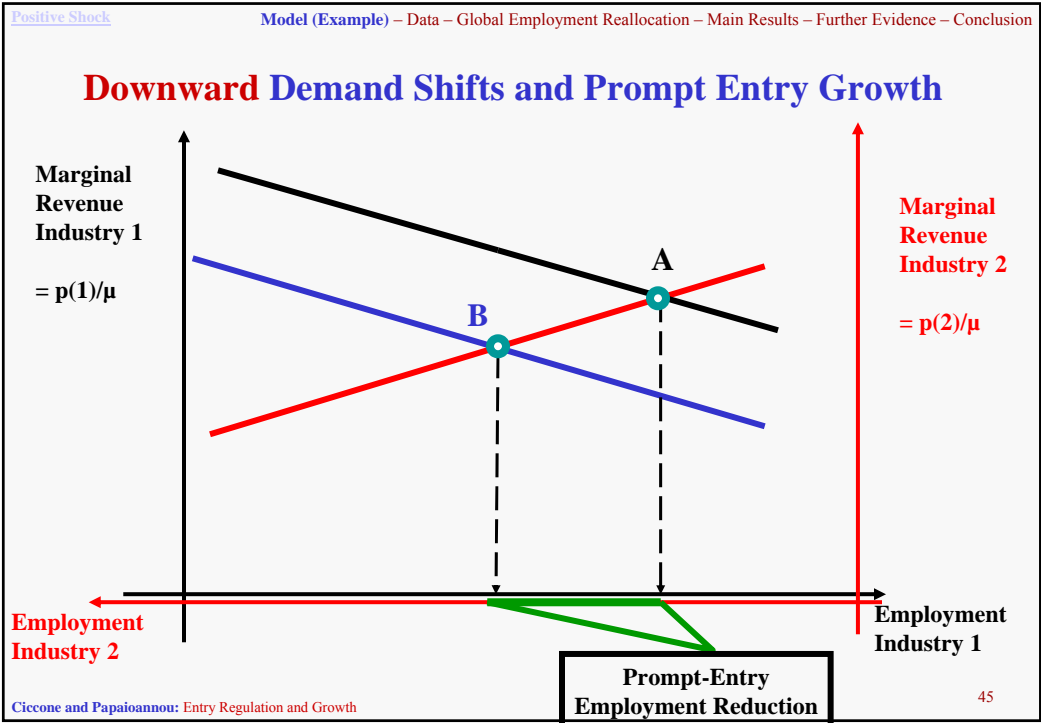
- Yes; countries where new businesses can be started up more quickly see faster growth in globally expanding industries

## Conclusion (cont.)

1. **Multi-industry world equilibrium model of entry regulation, introduction of new varieties, and growth**
  - Entry regulation (red tape) affects growth when industry demand is more price elastic when varieties adjust
  
2. **Value added and employment growth (and entry) is slower in expanding industries in countries with greater bureaucratic/administrative delays to start-up a new business**
  - Account for measurement error when proxying (latent) industry characteristics with data from a benchmark country.
  - Strong results even when controlling for income or focusing on high-income countries.

## Appendix Tables and Figures

1. Theoretical Example: Negative shocks (2 industries)
2. Correlation matrix of industry global employment reallocation across decades
3. Various models controlling for initial log value added and initial log employment
  - i. Frazer Institute Start-up index (in 1995)
  - ii. OECD Product Market Regulation index (in 1998)
  - iii. OECD Service Product Market Regulation index (in each decade); Value added across decades
  - iv. OECD Service Product Market Regulation index (in each decade); Employment across decades
  - v. IV models using legal origin as an “instrument” of the benchmark entry regulation measure
4. IV models (with and without controlling for initial conditions), using legal origin to extract the historically predetermined component of entry regulation



## Correlogram of industry global reallocation across decades

- estimated using the time measure from Djankov et al. (2002)  
- estimated using the OECD product market regulation index

	Djankov <i>et al.</i> (2002) measure			OECD PMR index		
	1970s (Intime)	1980s (Intime)	1990s (Intime)	1970s (OECD)	1980s (OECD)	1990s (OECD)
1970s (Intime)	1					
1980s (Intime)	0.6312*	1				
1990s (Intime)	0.4945*	0.3072	1			
1970s (OECD)	0.8041*	0.7139*	0.2856	1		
1980s (OECD)	0.5505*	0.8563*	0.3658	0.6815*	1	
1990s (OECD)	0.3935*	0.2246	0.8958*	0.2466	0.3099	1

## LS Estimates – Frazer Institute Measure (1995)

### controlling for initial conditions

### (global measure of employment reallocation)

Predicted at lowest value of the index (Singapore)

	Value Added Growth			Employment Growth		
	1970s (1)	1980s (2)	1990s (3)	1970s (4)	1980s (5)	1990s (6)
Start-Up Regulation X Employment Reallocation [ <i>Start-Up X EMPGR</i> ]	-0.1583 (4.40)	-0.1683 (5.02)	-0.1323 (3.69)	-0.1371 (4.25)	-0.1723 (6.31)	-0.1258 (2.13)
$\ln(Vas,c)/\ln(EMPs,c)$	-0.0272 (7.56)	-0.0140 (6.43)	-0.0129 (1.88)	-0.0202 (7.44)	-0.0098 (5.12)	-0.0134 (5.57)
adjusted R-squared	0.483	0.481	0.405	0.523	0.463	0.395
Observations	1096	1113	810	1128	1175	870
Countries	41	42	33	42	44	35
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## LS Estimates – OECD PMR index (1998) controlling for initial conditions (global measure of employment reallocation)

Predicted at lowest value of the index (UK)

	Value Added Growth			Employment Growth		
	1970s (1)	1980s (2)	1990s (3)	1970s (4)	1980s (5)	1990s (6)
OECD PMR Index X Employment Reallocation [PMR98 X EMPGR ]	-0.3740 (3.92)	-0.5201 (4.63)	-0.5533 (3.62)	-0.4284 (5.26)	-0.5111 (2.89)	-0.6039 (5.28)
$\ln(Vas,c)/\ln(EMPs,c)$	-0.0213 (7.34)	-0.0123 (4.15)	-0.0195 (3.90)	-0.0155 (5.80)	-0.0085 (6.56)	-0.0176 (5.10)
adjusted R-squared	0.625	0.459	0.442	0.607	0.415	0.441
Observations	708	692	523	706	692	556
Countries	26	26	21	26	26	22
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## LS Estimates – OECD Service PMR index (global measure of employment reallocation)

Predicted at lowest value of the index (US)

Entry Delay Interacted	Value Added Growth across decades					
	1970s	1980s	1990s	1970s	1980s	1990s
<i>PMR70s X EMPGR7079</i>	<b>-0.4073</b> (3.18)			<b>-0.5782</b> (2.98)	0.0284 (0.12)	0.1868 (0.65)
<i>PMR80 X EMPGR8089</i>		<b>-0.1792</b> (2.65)		0.1243 (1.46)	<b>-0.1579</b> (1.53)	0.3643 (2.25)
<i>PMR90 X EMPGR9099</i>			<b>-0.3016</b> (1.58)	-0.0112 (0.37)	-0.0556 (1.30)	<b>-0.5102</b> (2.27)
$\ln(Vas,c)/\ln(EMPs,c)$	-0.0208 (5.35)	-0.0032 (0.87)	-0.0148 (2.25)	-0.0206 (5.33)	-0.0034 (0.88)	-0.0128 (1.96)
adjusted R-squared	0.507	0.280	0.430	0.507	0.279	0.446
Observations	557	542	400	557	542	400
Countries	20	20	16	20	20	16
Industry and Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## LS Estimates – OECD Service PMR index (global measure of employment reallocation)

Predicted at lowest value of the index (US)

Entry_Delay Interacted	Employment Growth across decades					
	1970s	1980s	1990s	1970s	1980s	1990s
<i>PMR70s X EMPGR7079</i>	<b>-0.0182</b> (5.34)			<b>-0.3156</b> (2.36)	0.2230 (1.70)	0.1884 (1.02)
<i>PMR80 X EMPGR8089</i>		<b>-0.2220</b> (4.48)		0.0108 (0.19)	<b>-0.2717</b> (4.50)	0.2023 (1.82)
<i>PMR90 X EMPGR9099</i>			<b>-0.2717</b> (2.00)	0.0262 (1.02)	-0.0272 (0.67)	<b>-0.3982</b> (2.30)
<i>ln(Vas,c)/ln(EMPs,c)</i>	-0.2758 (2.90)	0.0012 (0.47)	-0.0088 (2.53)	-0.0181 (5.36)	0.0015 (0.56)	-0.0072 (2.12)
adjusted R-squared	0.557	0.327	0.457	0.5548	0.3278	0.4682
Observations	553	544	433	553	544	433
Countries	20	20	16	20	20	16
Industry and Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

## IV Estimates – Legal Origin (global measure of employment reallocation)

	Value Added Growth			Employment Growth		
	1970s	1980s	1990s	1970s	1980s	1990s
	(1)	(2)	(3)	(4)	(5)	(6)
Entry Delay X Employment Reallocation [TimePcd X EMPGR]	-0.3288 (1.80)	-0.2421 (2.33)	-0.2684 (2.11)	-0.5488 (3.64)	-0.2141 (2.85)	-0.3358 (3.56)
Observations	1408	1338	1036	1494	1456	1080
Countries	54	52	43	57	56	44
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes

**IV Estimates – Legal Origin,  
controlling for initial conditions  
(global measure of employment reallocation)**

	Value Added Growth			Employment Growth		
	1970s (1)	1980s (2)	1990s (3)	1970s (4)	1980s (5)	1990s (6)
Entry Delay X Employment Reallocation [ <i>TimePcd X EMPGR</i> ]	-0.4057 (2.39)	-0.3523 (3.26)	-0.3068 (2.34)	-0.5924 (4.25)	-0.2812 (3.56)	-0.3515 (3.75)
<i>ln(Vas,c)/ln(EMPs,c)</i>	-0.0276 (10.09)	-0.0128 (5.20)	-0.0132 (4.36)	-0.0232 (11.35)	-0.0106 (5.58)	-0.0136 (5.62)
Observations	1408	1338	1036	1494	1456	1080
Countries	54	52	43	57	56	44
Industry Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes