

The Spanish Productivity Puzzle: Immigration and Other Factors

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Prepared for the LSE-CIEES Workshop on “The Spanish Economy after the
Crisis: Towards a New Growth Model”, Madrid, 24-26 June 2009

REPORTAJE: Primer plano

Es la hora del cambio, vale, ¿pero cómo?

El futuro productivo de España debe apoyarse en la innovación, la educación y la calidad

J. P. VELÁZQUEZ-GAZTELU 17/05/2009

Vota

Resultado ★★★★★ 1 votos



Saldremos de ésta. Más tarde o más temprano, la economía española dejará atrás la recesión y retomará la senda del crecimiento, aunque tardará -si es que lo consigue alguna vez- en volver a los ritmos del 3%, 4% o 5% registrados a finales de los noventa y principios de la presente década, cuando nuestro país superó con creces la media europea y alcanzó un nivel de vida desconocido en su historia. Sea como sea, los economistas coinciden en que es imprescindible que de las cenizas de esta crisis nazca en España un nuevo modelo de crecimiento menos dependiente de la construcción, más competitivo y cimentado en la innovación, la calidad y la buena formación de sus trabajadores. En palabras de Antonio Torrero Mañas, catedrático de la Universidad de Alcalá de Henares, "la crisis financiera internacional ha sido el detonante que ha precipitado el ajuste de la economía española, que hubiera sido inevitable en cualquier caso".

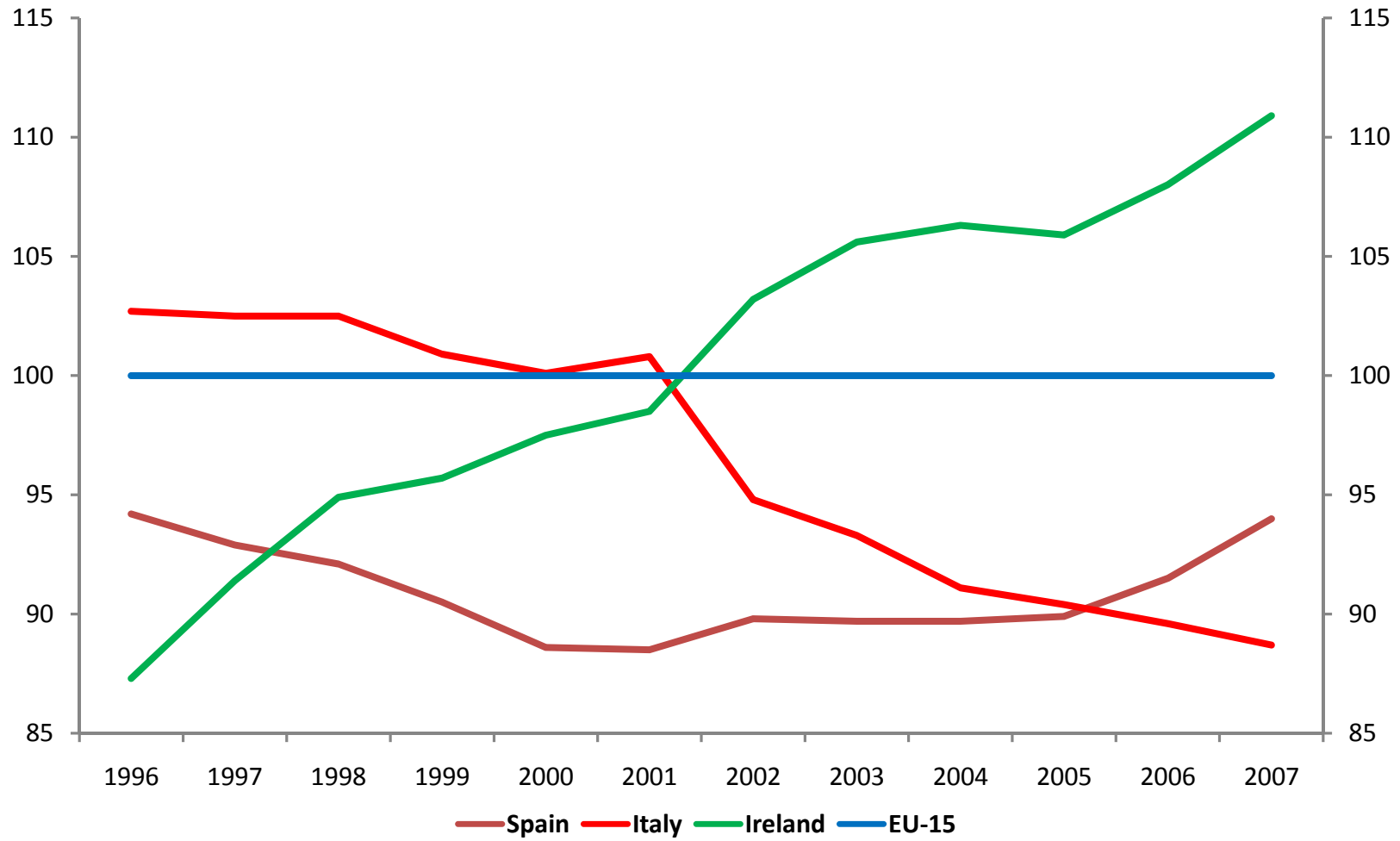


Panorámica de la planta solar fotovoltaica situada en la localidad navarra de Cintruénigo.-

What is the productivity puzzle?

- The puzzle is not in the level: Spain has been for a long time a relatively low-productivity country in the context of the European Union-15 (i.e. little catch-up)
- Spain is neither
 - a “Celtic Tiger”
 - a declining Mediterranean economy

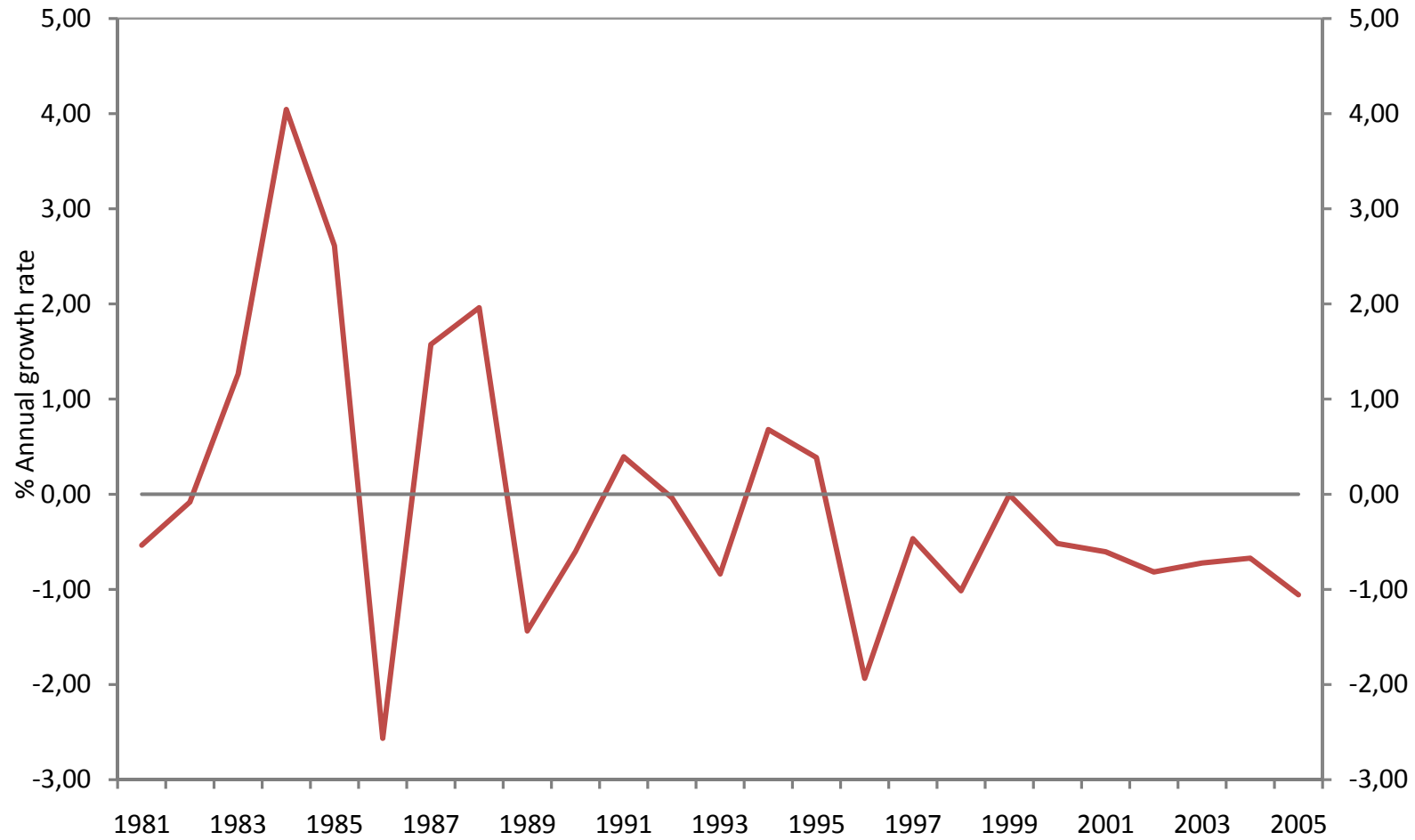
**Figure 1. Labor productivity
GDP per hour in PPP (EU-15=100)**



What is the productivity puzzle?

- The puzzle is in productivity growth: a significant slowdown which has led to *negative* Total Factor Productivity growth
 - In the face of:
 - A new wave of technological progress
(Information and Communication Technologies, ICT)
 - A sustained increase in the educational achievement of the population
- Look for shocks

Figure 2. Total Factor Productivity in Spain (Market economy)
(Source: EU KLEMS database)



Outline

1. Some facts
2. Non-explanations
3. Potential explanations
 - I. Composition effects
 - II. Technological slowdown
4. Policy areas

1. Some facts

Table 1. Value Added, labor input and labor productivity. Total economy (ann., %)				
	Gross Value Added	Total persons engaged	Total hours worked	GVA per hour worked
1970-1995				
United States	2.8	1.7	1.5	1.3
European Union - 10	2.4	0.4	-0.2	2.6
Spain	2.9	0.3	0.0	2.9
Italy	2.7	0.4	0.4	2.3
1995-2005				
United States	3.3	1.1	0.8	2.4
European Union - 10	2.0	1.2	0.8	1.3
Spain	3.4	3.5	3.1	0.3
Italy	1.2	1.1	0.8	0.3

Source: EU KLEMS Growth and Productivity Accounts, March 2008 Release.

Note: The European Union-10 (EU-10) consists of Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Spain, and the United Kingdom.

Table 2. Value added growth and contribs. Market economy (annual, %)

	V. Added	Labor	Hours	Quality	Capital	ICT	NICT	TFP
	(1)= 2+5 +8	(2)=3+4	(3)	(4)	(5)=6 +7	(6)	(7)	(8)
1 980-1 995								
US	3.0	1.2	1.0	0.2	1.1	0.5	0.6	0.7
EU-10	2.1	0.0	-0.3	0.3	1.1	0.4	0.7	1.0
Spain	2.4	0.3	0.0	0.3	1.4	0.5	1.0	0.6
Italy	1.9	0.3	0.2	0.1	0.8	0.3	0.6	0.8
1 995-2005								
US	3.7	0.7	0.4	0.3	1.3	0.8	0.6	1.7
EU-10	2.2	0.6	0.4	0.2	1.2	0.6	0.6	0.4
Spain	3.6	2.5	2.1	0.4	1.9	0.5	1.4	-0.8
Italy	1.2	0.8	0.7	0.2	1.0	0.3	0.8	-0.7

Source: EU KLEMS Growth and Productivity Accounts, March 2008 Release.

Features

- Productivity slowdown follows EU pattern, but stronger
- In the midst of a long and strong expansion
- Increase in labor quality
- Low share of investment in ICT

2. Non-explanations

Some forms of measurement error

- Inputs:
 - National Accounts/EU KLEMS (produced by IVIE) methods are common to all countries
 - Capital utilization (Jimeno-Sánchez Mangas, 2006)
 - Embodied technological progress (idem)
 - Gross output v. Value added (Escribá-Murgui, 2009)
- Elasticities:
 - Imperfect competition (Bassanetti-Torrini-Zollino, 2008)
 - Firm specific deflators (Jimeno-Sánchez Mangas, 2006)

2. Potential explanations

I. Composition effects

A) Industry composition:

Construction:

- Why? Population growth, low interest rates, easy finance (Arce-Campa-Gavilán, 2008), cheap labor
- Dismal productivity record: -2.6% p.a. in 1996-2005 (23% cumulated)
- But it represents 9% of value added, so TFP growth for the rest of the economy \approx -0.6% p.a.

Negative TFP growth in ICT sectors!

So: industry composition cannot be the whole story

Figure 3. Total Factor Productivity level in Spain: Total economy and Construction (1995=100. Source: EUKLEMS)

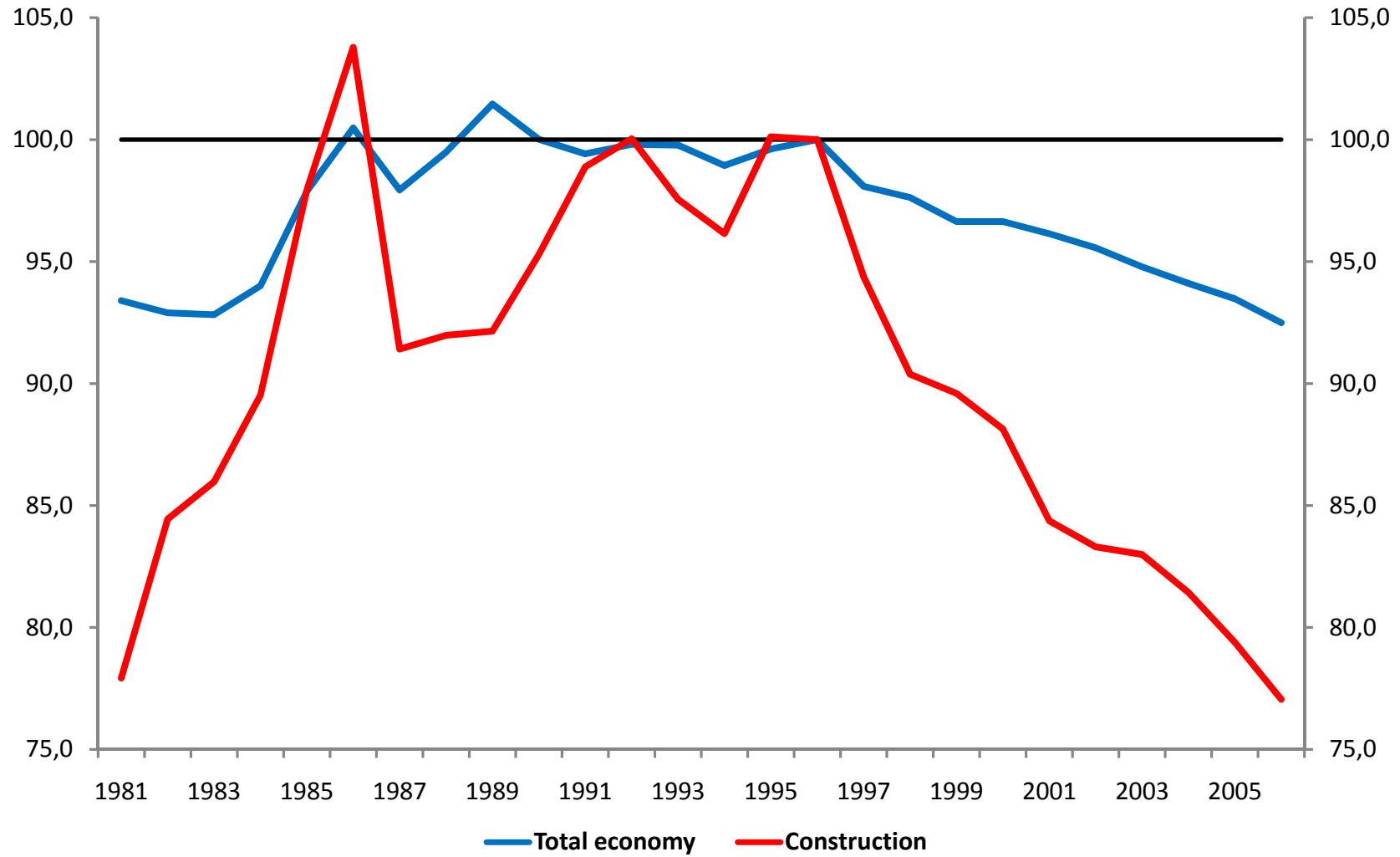


Table 3. Contributions to Value added growth. 1995-2005 (annual, %)

	Value added	Labor	Capital	TFP
European Union - 10				
.Electrical mach., post & comm.	5.5	-0.4	1.7	4.1
.Manufacturing, excluding electric.	0.8	-0.4	0.6	0.7
.Other goods producing industries	1.1	0.0	0.7	0.4
.Distribution services	2.3	0.6	1.1	0.6
.Finance and business services	3.6	2.2	2.2	-0.8
.Personal and social services	1.7	1.5	1.0	-0.8
Spain				
.Electrical mach., post & comm.	4.5	1.6	4.3	-1.4
.Manufacturing, excluding electric.	2.2	1.6	1.2	-0.6
.Other goods producing industries	4.0	3.1	1.6	-0.7
.Distribution services	3.6	2.3	2.4	-1.2
.Finance and business services	5.3	3.0	1.6	0.7
.Personal and social services	3.1	2.9	2.0	-2.1

Source: EU KLEMS Growth and Productivity Accounts, March 2008 Release.

B) Worker composition:

Less experienced workers: fall in unemployment rate from 23% in 1995 to 8.3% in 2007

Two issues:

- a) Educational upgrade
- b) Immigration wave

a) Educational upgrade

Significant increase of attainment

Table 4. Educational attainment of adult population
(25-64 years old)

	Spain			France	US
	1987	1995	2005	2004	2004
Below upper secondary	83	71	52	32	13
Upper secondary	9	17	28	41	48
Tertiary	8	12	20	27	39

Source: France and US, OECD, *Education at a Glance 2008* ;
Spain, INE, Labor Force Survey

But there are very worrying signs in graduation rates

Table 5. Graduation rates and attainment (2006)

Educational attainment	Spain	EU-19	Finland
Upper secondary education (25-34 y.o.'s)	64	78	90
Tertiary education (35-44 year-olds)	31	25	41
Upper secondary education graduation rates (typical age of graduation):			
All	72	86	95
Males	64	82	91
Females	84	90	100
Trends in graduation rates (Upper secondary education):			
1995	62	78	91
2000	60	77	91
2006	72	86	95

Source: OECD, *Education at a Glance 2008*

And the quality of education is lower than average

Table 6. PISA Test Scores

	2003			2006		
	Maths	Sciences	Reading	Maths	Sciences	Reading
Finland	539	545	521	539	545	521
France	508	511	476	508	511	476
Spain	476	489	461	480	488	461

Source: OECD.

And there seems to be insufficient training

Table 7. Training prevalence and supply

1. Individuals in labor force following any type of training (%):				
	All types	Formal	Non-formal	Informal
Spain	24.5	4.7	10.3	16.0
European	42.0	4.5	16.5	32.5

2. Firms providing training for their employees (%):				
Firm size:	10-19	20-49	50-249	> 250
Spain	39.0	49.0	68.0	89.0
European	49.0	66.0	80.0	92.0

Source: EU.

b) The immigration wave

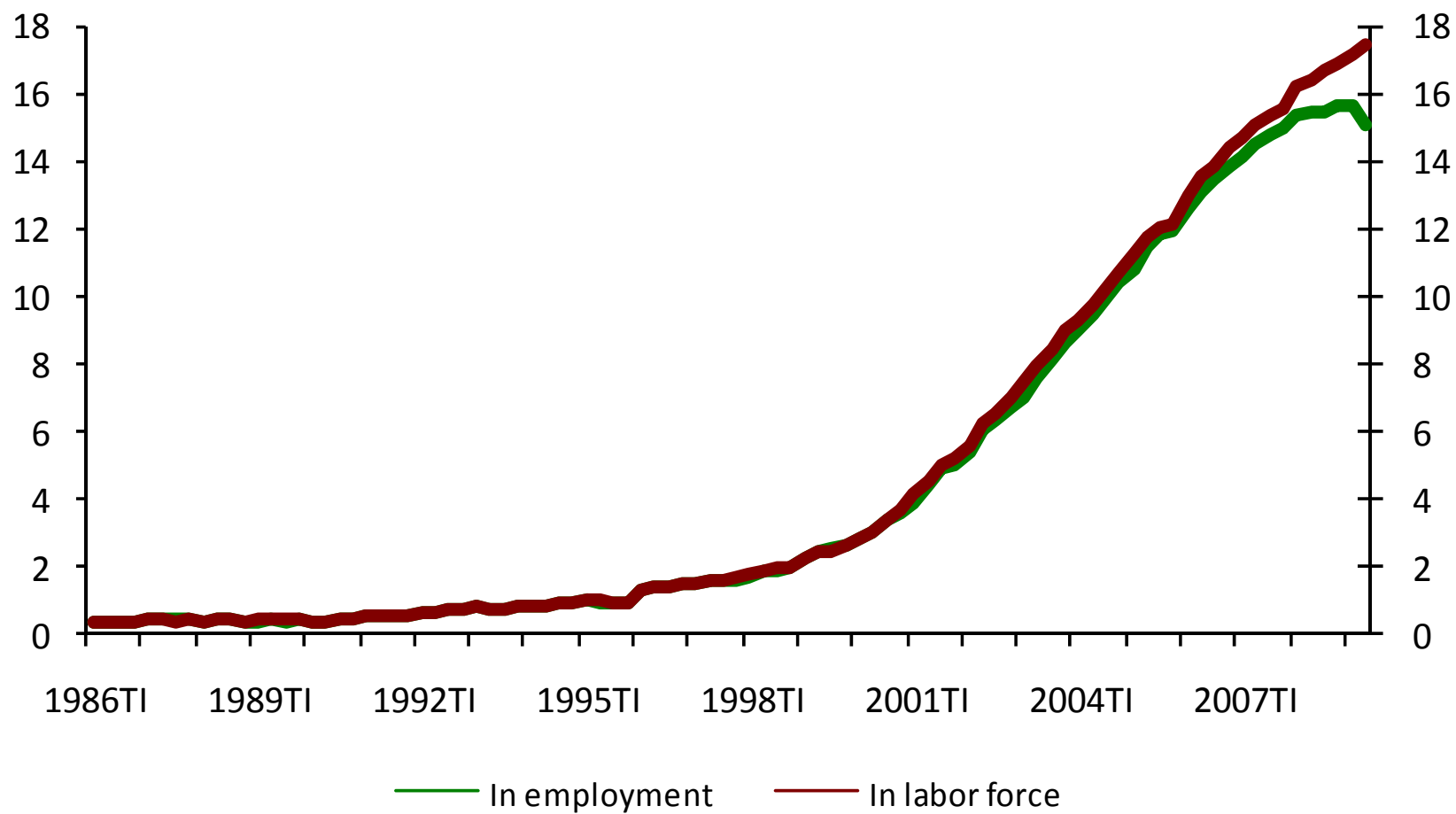
Table 8. Immigrant share

	Labor force	Employment
1995	1.0	1.0
2000	3.3	3.2
2005	11.8	11.5
2009:1	16.6	15.5

Table 9. Immigrants by nationality

	European Union	Rest of Europe	South America	Rest of the world	Total
2000:1	38.6	5.9	23.8	31.7	100.0
2005:1	16.5	18.0	44.4	21.1	100.0

Figure 4. Immigrant share in employment and labor force



Skills are similar, but occupations differ

Table 10. Breakdown of population by education (%)

	Total	Spanish	Foreign	European Union	Rest of Europe	South America	Rest of world
2000:1							
Primary or less	44.0	44.3	44.2	32.5	19.3	15.7	19.6
Secondary	38.5	38.3	38.3	43.6	49.4	47.5	55.9
Tertiary	17.6	17.4	17.4	23.9	31.3	36.8	24.5
2005:1							
Primary or less	35.5	36.5	36.4	26.0	11.3	17.0	21.4
Secondary	43.0	42.3	42.4	50.8	42.7	57.8	59.6
Tertiary	21.4	21.2	21.3	23.2	45.9	25.2	19.1
Overeducated		17.7	38.9	n.a.	51.8	40.8	19.9

(Fernandez-Ortega, 2008: 20-45 y.o., 1996-2006. Ed. > Mean + 1 s.d. in occ.)

Unsurprisingly, returns to skill have fallen

Both to upper secondary and to tertiary education

Table 11. Relative earnings by educational attainment

	Spain		France		United States	
	1997	2004	1997	2004	1997	2004
Below upper secondary	76	85	84	85	70	65
Upper secondary	100	100	100	100	100	100
Tertiary	149	132	149	147	168	172

Note: Earnings before income tax for 25-to-64 year-olds.

Source: OECD, *Education at a Glance 2008*

And they are lower for migrants

Table 12. Log returns to education in Spain

	1995	2002
Natives		
Secondary vs. Primary	0.16	0.14
Tertiary vs. Secondary	0.42	0.35
Immigrants		
Secondary vs. Primary	n.a.	0.05
Tertiary vs. Secondary	n.a.	0.30

Source: Regressions on Wage Structure Survey

Links between natives and immigrants

- Demand for unskilled labor has gone up, which is consistent with the decrease in returns to skill
- Little evidence of negative effect of immigration on natives' wages or employment rates (Carrasco-Jimeno-Ortega, 2008)
- Immigrants are not substitutes with low-skill natives, and they have favored a shift of natives towards more skilled jobs and an increase in female labor supply (De la Rica-Amuedo, 2009)

Sources of decline in returns to skill

- United States (1980s):
 - Increase in supply of skill
 - Increase in returns to skill
 - Δ in demand for skill (e.g. Juhn-Murphy-Pierce, 1993)
 - Spain:
 - Increase in supply of skill
 - Decline in returns to skill
 - a) Insufficient increase in demand for skill
 - b) Decrease in quality of skill supply
- Both seem to be at work in Spain**

Composition effects in productivity

Gauging individual productivity through **industry-specific** regressions on wages controlling for **age, gender, nationality, and education**

Source: Wage Structure Survey, 1995 and 2002
Excludes agriculture, non-market economy and firms with less than 10 workers

Shift-share analysis

Table 13. Annual percentage change in hourly real wages
(1995-2002)

Raw data average	-1.8
Composition effects (1995 employment shares):	
- All (Age, gender, nationality, education, industry)	-1.6
- Age, education, industry (i.e. ignore gender, nationality)	-1.5
- Age, gender, nationality, industry (i.e. ignore education)	-8.0

Note: Figures are differences vis-à-vis raw average

Source: computations on Wage Structure Survey

Results:

- Gender and nationality composition changes have small effects (but nationality includes an imputation)
- Educational composition changes have large effects (probably too large)

→ Why did productivity not surge as a result of the educational upgrade?

Caveat: the link between wages and productivity is not 1-to-1 (see below)

Cfr. Lacuesta-Puente-Cuadrado (2006): controlling for occupation and unobserved heterogeneity on WSS implies that labor quality is flat from 1997 to 2006

3. Potential explanations

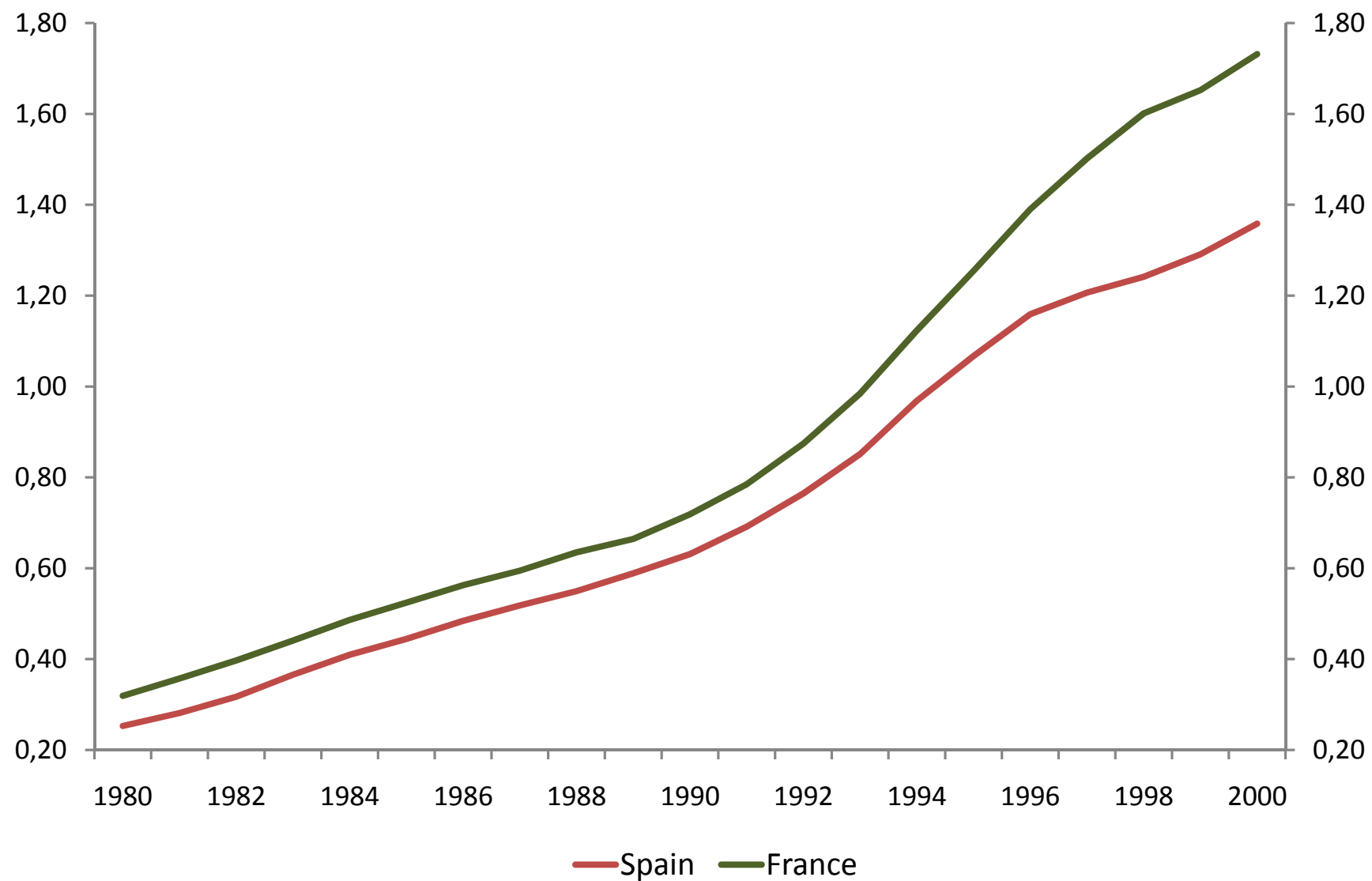
II. Technological slowdown

Table 14. Change in ICT capital services per hour worked

	1986-1990	1991-1995	1996-2000	2001-2005
<i>Growth rate</i>				
Spain	11.9	7.3	11.1	4.9
France	10.4	6.5	11.8	6.7
US	11.9	10.2	17.2	10.1
<i>Change in growth rate</i>				
Spain		-4.7	3.8	-6.1
France		-3.9	5.3	-5.1
US		-1.6	7.0	-7.1

Source: EU KLEMS Growth and Productivity Accounts, March 2008 Release

Figure 5. ICT capital per hour worked: France and Spain



Factors affecting investment in technology

1. Labor market institutions

(i) Labor contracts

Dual labor market (Bentolila-Dolado-Jimeno, 2008):

- High firing costs for permanent contracts (45 days pyos) → →
- Low firing costs for temporary contracts (0/8 days pyos)

→ Bias towards low-skill labor

→ High churning (2008):

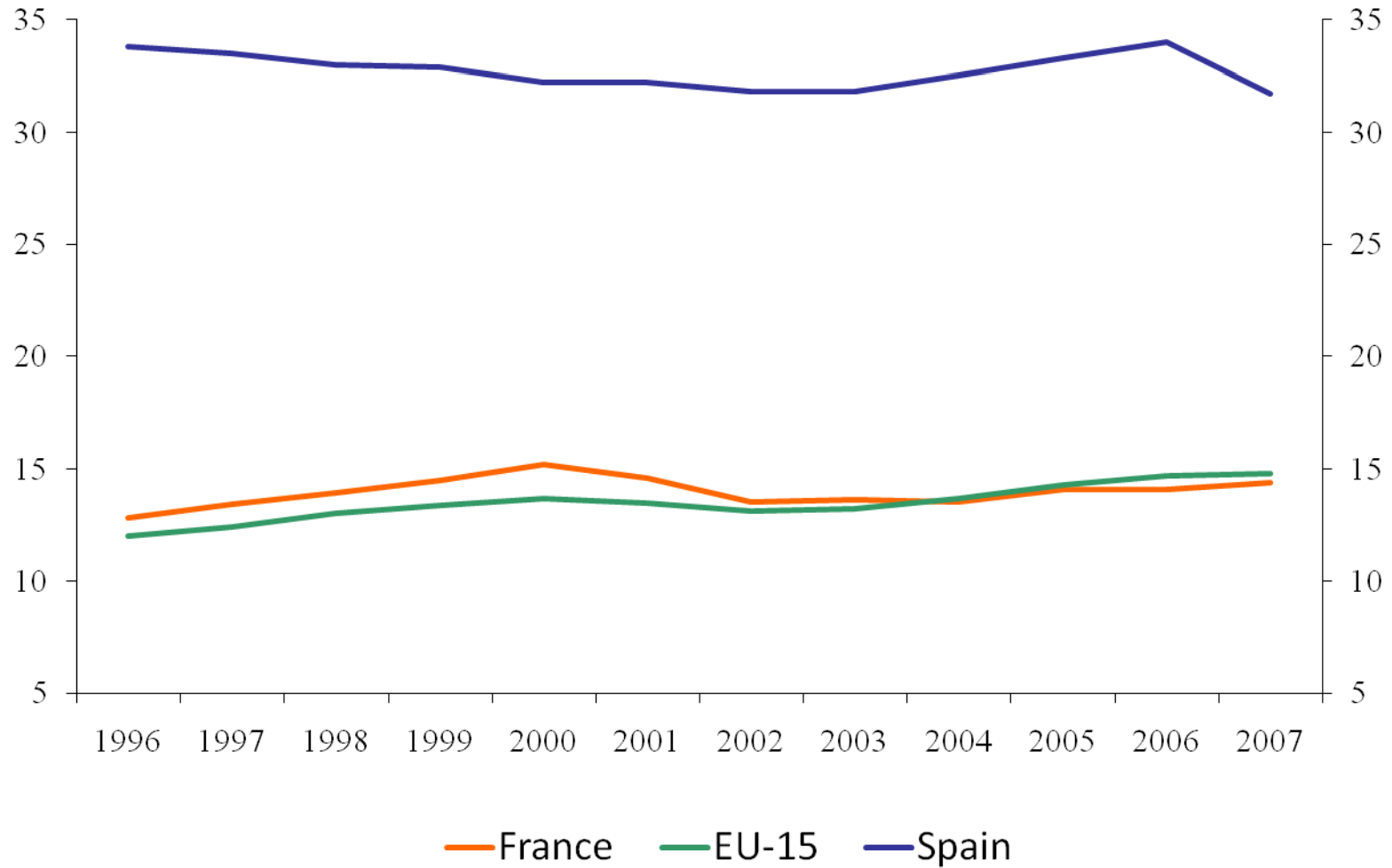
- 16.6 million contracts = 0.76 contracts per employed person
- Very short contracts: 2.7 m. < 7 days and 5 m. <30 days
- Low conversion rate to permanent: 5.1%; < 8% s. 1994

Table 15. Employment protection

Index. 180 countries. Source: *Doing Business 2008*, World Bank

Indicator	Spain	OECD
Difficulty of hiring	78	26
Rigidity of hours	60	42
Difficulty of firing	30	26
Rigidity of employment	58	31
Firing costs (weeks of salary, seniority = 10 years)	56	26

Figure 6. Temporary employment rate in Europe, 1996-2007
as a percentage of employees



International evidence

Many theoretical papers (Hopenhayn-Rogerson, 1993, Mortensen-Pissarides, 1994)

Empirical evidence is recent. Bassanini-Nunziata-Venn (2008):

- Panel regressions, 11 OECD countries, 1982-2003
- Employment protection legislation (firing costs for permanent employees) reduces TFP growth
- Temporary contracts do not offset that negative effect

Evidence for Spain

Dolado-Stucchi (2009): Link between temp. contracts and TFP

- Mechanisms:
 1. Low conversion rates \rightarrow \downarrow Effort \rightarrow \downarrow TFP
 2. High temporary rate \rightarrow \downarrow Training \rightarrow \downarrow TFP
- Panel of Spanish manufacturing firms (ESEE, 1991-2005)
- Results (long run effects):
 - Temporary rate: \uparrow 1 p.p. \rightarrow \downarrow TFP: 0.27-0.40 p.p.
 - Conversion rate: \uparrow 1 p.p. \rightarrow \uparrow TFP 0.20-0.32 p.p.
 - Simulation (2001-2005): \downarrow TFP growth = -0.74 p.p.Effect of temp. and conversion rates: -0.46 p.p. (60%)

(ii) Collective bargaining

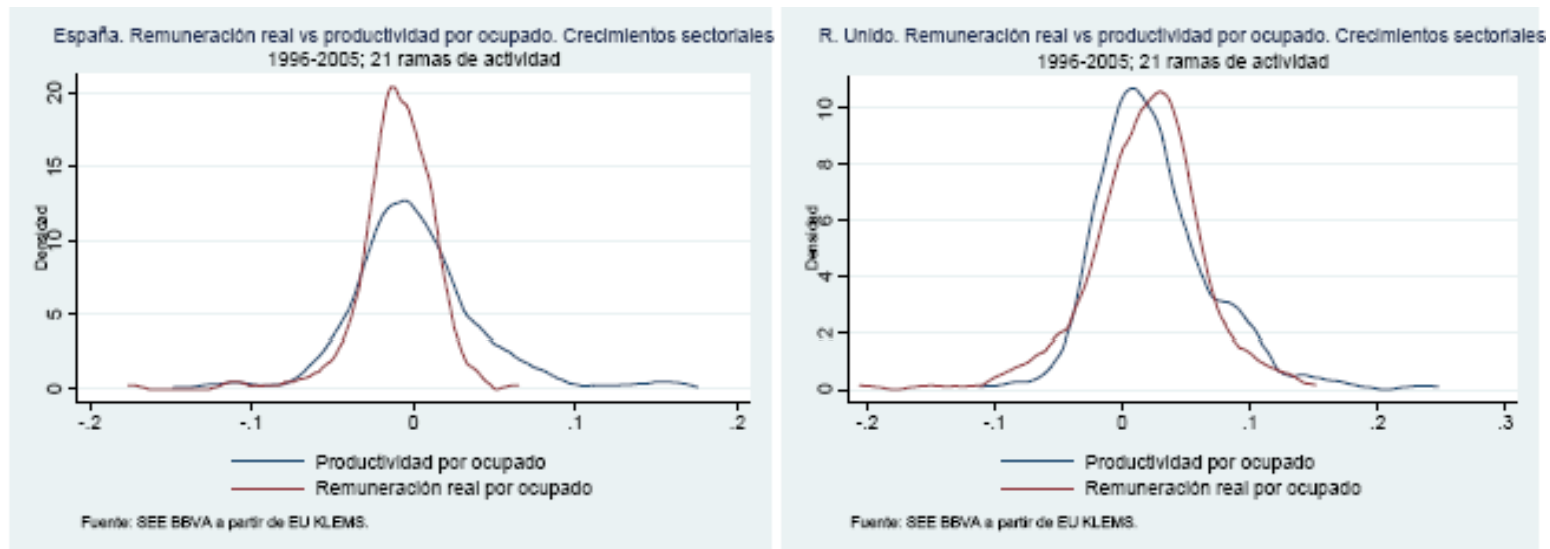
Inefficient: industry/province (Bentolila-Jimeno, 2002)

Effects:

- Distorts labor allocation across firms and industries:
 - Real wage rigidity (response to unemployment)
 - ΔW coll. bargains signed in 5/09: **3.1%** [$\Delta N = -6.9\%$ s. 2007:3]
 - ΔW CB in Construction in 5/09: **3.57%** [$\Delta N = -27.2\%$ s. 2007:3]

[In a context of deflation of 0.9 p.p. over past year]
 - Weak link to productivity (graphs)
- Inhibits reorganization inside firms: industry-level provisions

Wage distribution v. Productivity distribution: Spain United Kingdom (1996-2005)



Source: A. de la Fuente and R. Doménech (2009), “Convergence and Aging: Challenges and Proposals”, mimeo.

Evidence for Spain

Bover-Bentolila-Arellano (2002) (S. Security. data, 1980-87):
Union activity reduces wage dispersion across skill groups,
firm-level bargaining raises it – but only around 10% of
employees have a firm-level bargain

Sánchez Mangas (2008) (Manufacturing, ESEE, 1990-2002):

- Labor productivity at firms that use ICTs more intensively is 6% higher than in the rest
- If they also undertake organizational changes, productivity is 21% higher
- Only 20% of firms undertake those changes

Factors affecting investment in technology

2. Immigration

Effect of immigration (Rybczynski): Little change in equilibrium factor prices, changes in production structure

Evidence:

- US: Hanson-Slaughter (2002), Lewis (2003). Israel: Gandal-Hanson-Slaughter (2005)
- Spain: González-Ortega (2008):
 - Immigration does not alter regional output mix much. Absorption via higher intensity of unskilled labor use
 - Industries: Retail, Hotels and restaurants, Construction and Domestic services

Our approach

Acemoglu (1998), Beaudry-Green (2005): Capital-skill complementarity, skill-intensity of technology is endogenously determ. by relative supply of skilled labor

Hypothesis: By reducing the skilled-unskilled ratio, the immigration wave reduced firms' incentives to adopt new technologies (Lewis, 2005; Doms-Lewis, 2006; Beaudry-Doms-Lewis, 2008)

Note: Kangasniemi-Mas-Robinson-Serrano (2008), using EU KLEMS data for the UK and Spain, find a small, sometimes non-significant negative effect of immigrant employment share on labor productivity levels

Our (very) preliminary results

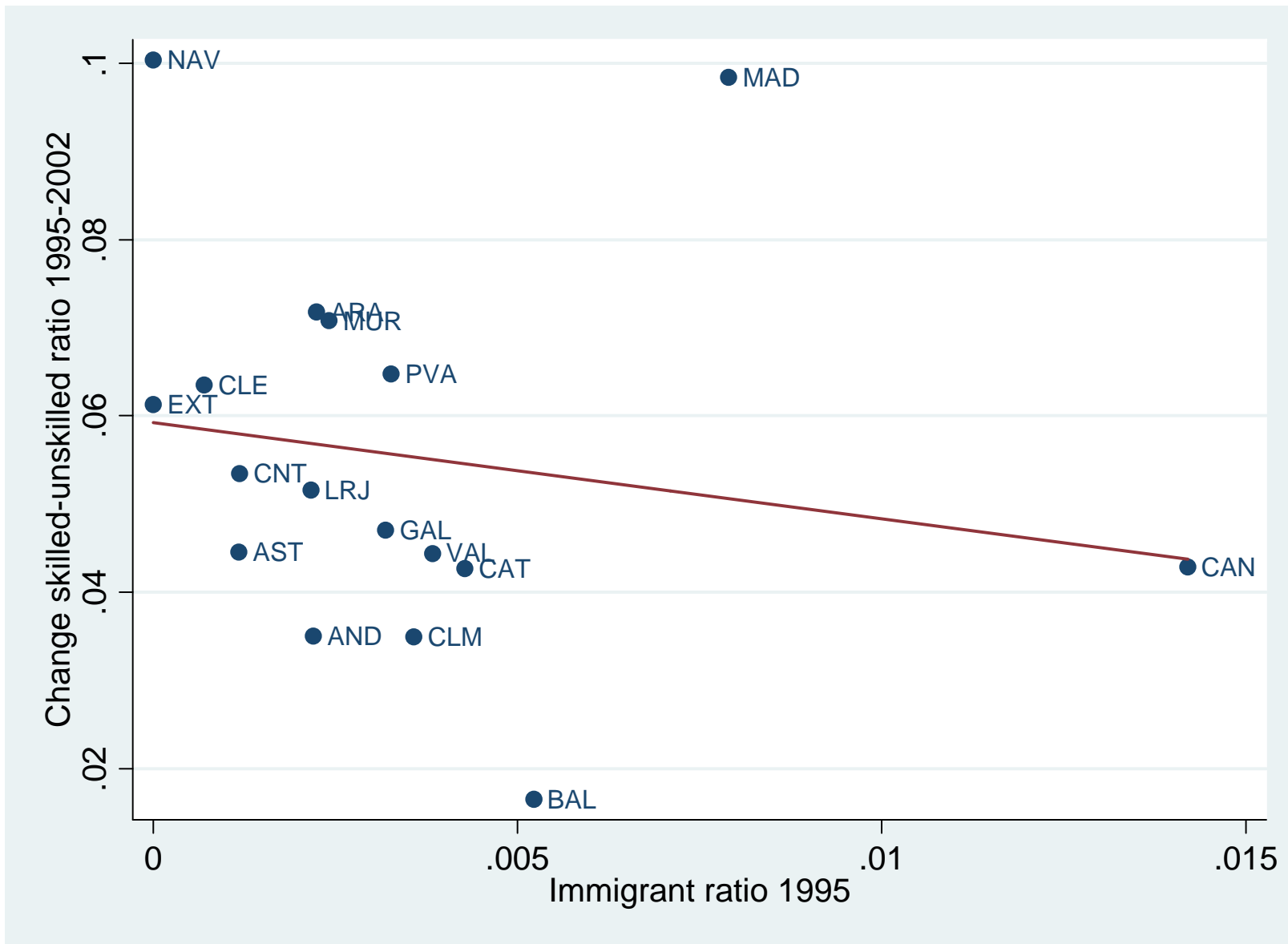
Data: BDMORES (Ministry of Finance, Bustos *et al.*, 2008)

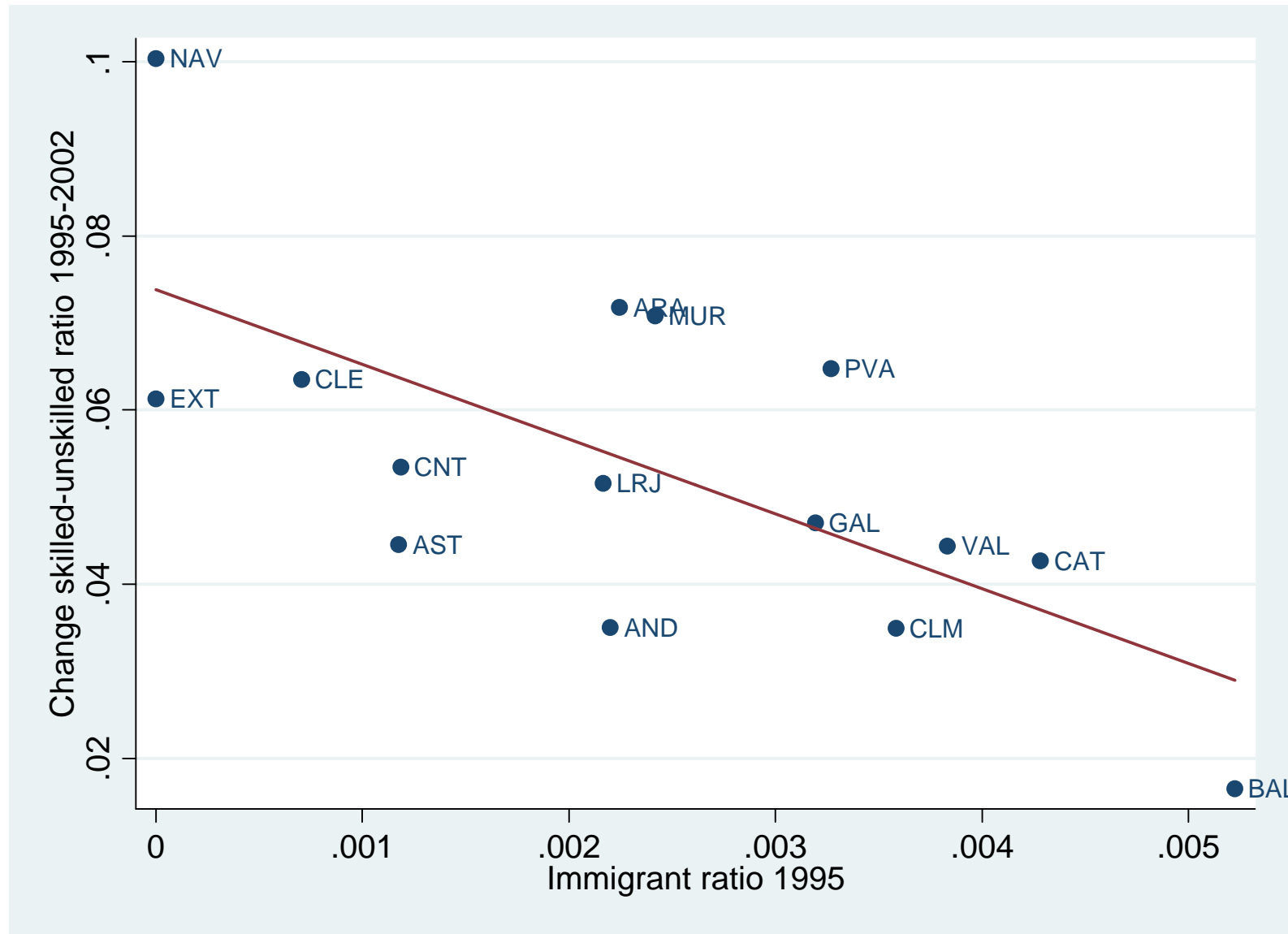
- Breakdown by industry and region, employment levels according to national accounts (not LFS)
- Exclude Agriculture, Other Market Services, and Nonmarket Services to match wage data

Approach:

- \uparrow Immigrant ratio, \uparrow Temporary employment ratio \rightarrow
 \downarrow Skilled-unskilled ratio (SUR) $\rightarrow \downarrow \Delta$ Technological capital
 $\rightarrow \downarrow \Delta$ TFP

[SUR=Workers w. tertiary ed./(with secondary ed. or less),
Corrected for age-gender composition]





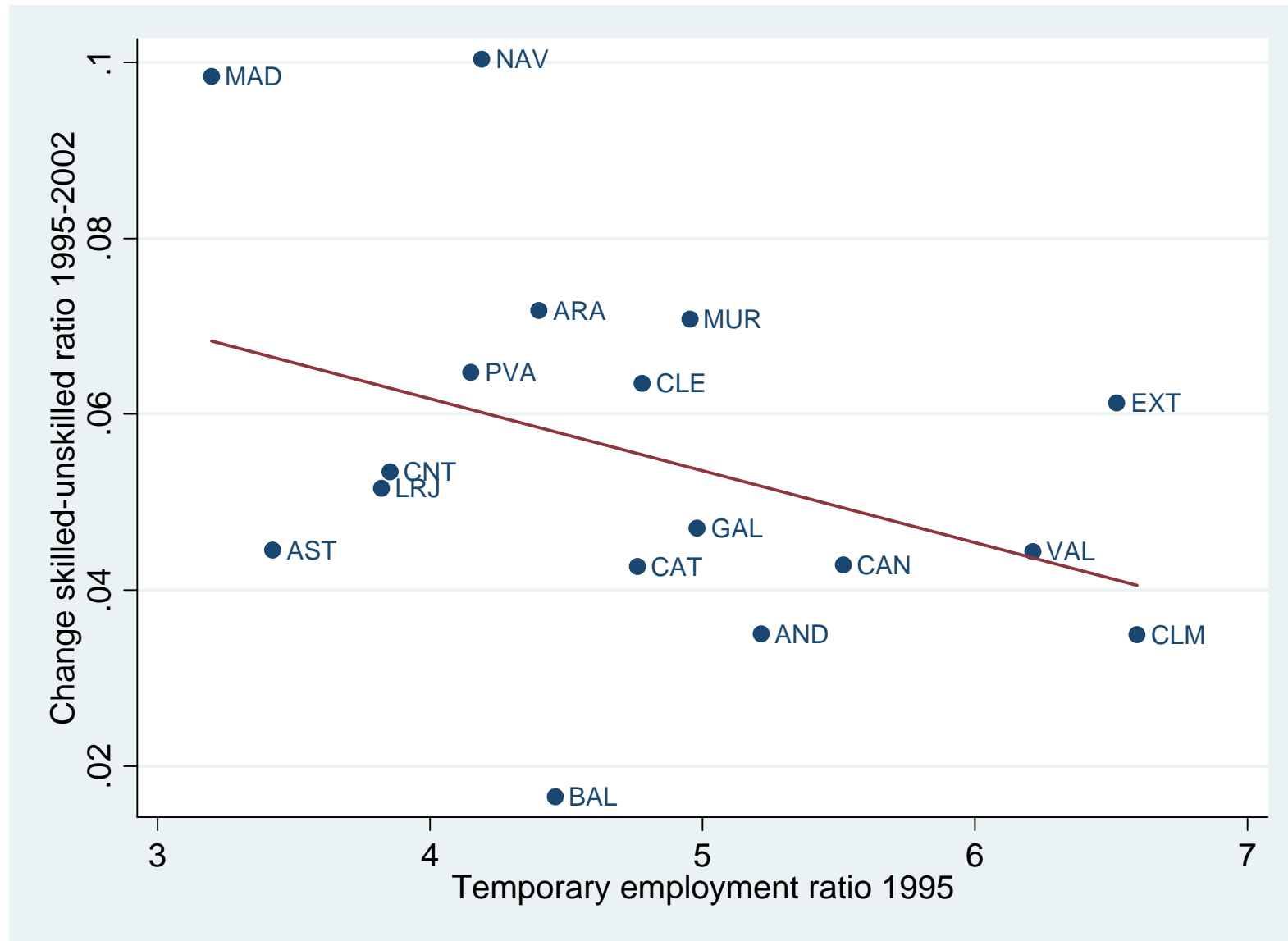


Table 16. Empirical results for TFP and Technological Capital

1. Productivity Growth and Change in Technological Capital:

$$\Delta \text{Log TFP (t)} = 0.08 \Delta \text{Log Technological Capital (t)}$$

(4.1)

2. Change in Technological Capital:

First stage

$$\text{Log Skilled-Unskilled Ratio (t)} = 0.51 \text{ Log Skilled-Unskilled Ratio (t-5)}$$

(38.2)

$$- 5.46 \text{ Immigrant Ratio (t-5)}$$

(2.5)

$$- 0.86 \text{ Temporary Employment Ratio (t-5)}$$

(11.0)

Second stage

$$\Delta \text{Log Technological Capital (t)} = 0.01 \text{ Log Skilled-Unskilled Ratio (t)*}$$

(2.8)

Note: 3211 obs. (16 industries, 17 regions, 1992-2003). Technological capital corrected for industry composition. All regressions are employment-weighted and include regional and time dummies. Standard errors are clustered for industry-region pairs.

Accounting for the TFP slowdown

- Qualitatively, neither hypothesis is rejected
- A counterfactual simulation maintaining the immigrant and temporary employment rates at their 1988 values shows:
 - Changes in these two variables account for a reduction of the skilled-unskilled ratio of 0.01 over the period 1999-2003 [reference: 0.14 in 1998]
 - But, given the estimated coefficients in the equations and the evolutions, this explains a small share of the change in TFP over that period

Mechanism

- Beaudry-Doms-Lewis (2008) mechanism is that a reduction in the skilled-unskilled ratio would raise the relative price of skilled labor and thus reduce incentives to accumulate technological capital
- Preliminary evidence: We find favorable evidence for this mechanism for temporary employment in 1995 but not for 2002, and in neither year for immigration → it does not seem to be working through wages

Factors affecting investment in technology:

3. Product market regulations

Nicoletti-Scarpetta (2003): PMR reduce productivity growth

Table 17. Indicators of regulation
(Ranking out of 27 OECD countries)

Ease of doing business	23
Starting a business	27
Employing workers	25
Registering property	15
Getting credit	17
Protecting investors	18
Paying taxes	20
Trading across borders	23
Enforcing contracts	22
Closing a business	16

Source: *Doing Business 2008*, World Bank

Conclusions

- Spanish firms have slowed down their accumulation of technological capital
- They have not managed / found it profitable to exploit more the complementarity between new technologies and skilled labor

Explanatory factors (educated guesses)

- **Immigration:** Inflow of unskilled labor has made technological capital relatively less profitable
- **Education:** Increase in skill supply lower than raw data suggest
- **Regulations:** Barriers to exploiting the technological capital-skill complementarity (labor and product market)

... But the puzzle remains

4. Policy areas

I. Education and Innovation

1. Education (primary, secondary):
 - A national exam, e.g. at the end of compulsory secondary, and disseminate information on results by school (like Madrid)
 - Redistribute funds from tertiary to primary and/or secondary
 - Give more autonomy to schools (UK example: Clark, 2004)
 - Tracking and bridges?
2. Education (tertiary), Innovation: Mon. 24/6/2009

4. Policy areas

II. Labor market regulations

What I did not manage to do →

1. “A Proposal to Restart the Spanish Labor Market”

Group of 100 reputed academic economists

www.crisis09.es/propuesta

- End duality through a single labor contract with severance pay that increases with seniority
- Decentralization of collective bargaining

2. Detailed proposals on collective bargaining in Bentolila-Jimeno (2002): representation, issues for bargaining at each level, indexation, “ultraactivity”, breakaway clauses, etc.



**“Everything reminds
Milton Friedman of the
money supply.
Everything reminds me
of sex, but I try to keep
it out of my papers.”**

- Robert Solow

4. Policy areas

III. Product market regulation

Three policy recommendations

1. Increase competition
2. Increase competition
3. Increase competition

Thank you!