

Paris
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Les marchés du travail européen et américain dans la crise

European and American Labor Markets in the Crisis

Colloque international organisé par la DARES et le CEPREMAP ● International conference organized by DARES and CEPREMAP

The Spanish Productivity Puzzle in the Great Recession*

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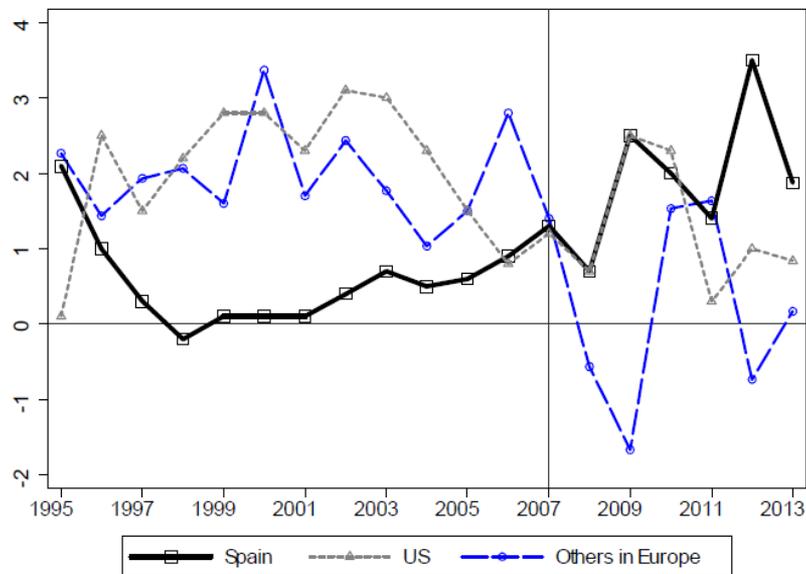
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* The opinions and analyses are the responsibility of the authors and do not necessarily coincide with those of the Bank of Spain or the Eurosystem.

Productivity Growth

The divergent experiences in US and Europe have increased the interest in understanding productivity growth.

Figure 1: Labor productivity (annual rates of growth, %)



Notes: Source OECD.
Labor productivity defined
as GDP per hour worked.

Productivity Growth: Spain

Two puzzles:

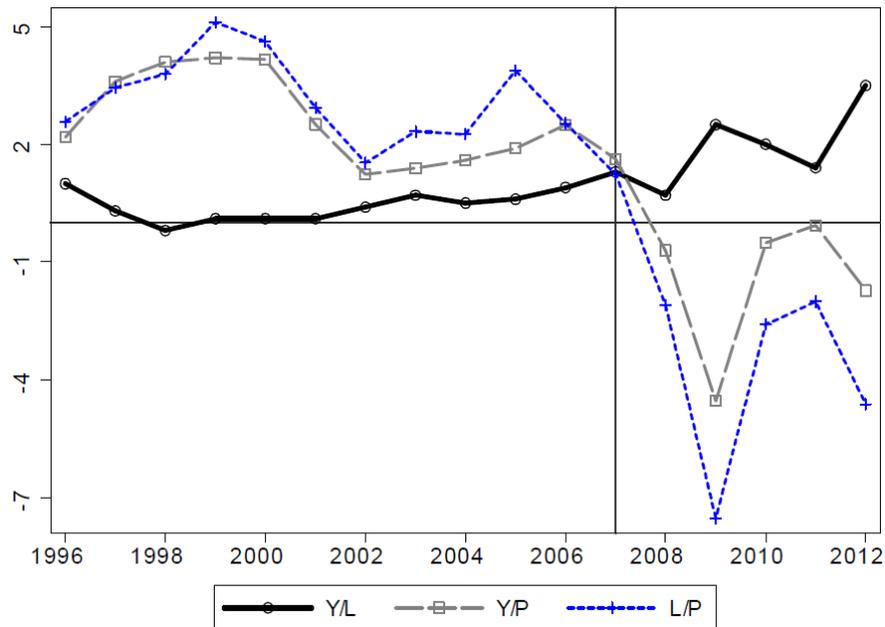
- The **slowdown** of the Spanish productivity growth between the mid-1990s and mid-2000s contrasts with the positive growth in the US and other European countries.
- While Spain had traditionally under-performed its European counterparts in terms of productivity, the trend is reversed after 2007.

Productivity growth is the only source of sustainable long-run economic growth (Romer 1987, Aghion and Howitt 1992) and a key tool for policy analysis.

Determining the temporary or permanent nature of factors underlying the **increase** in Spanish labor productivity constitutes a major determinant of **future competitiveness**.

Productivity Growth: Spain

Figure 2: Labor productivity, GDP per capita and total hours of worked over population in Spain
(annual rates of growth, %)



Notes: Source OECD.

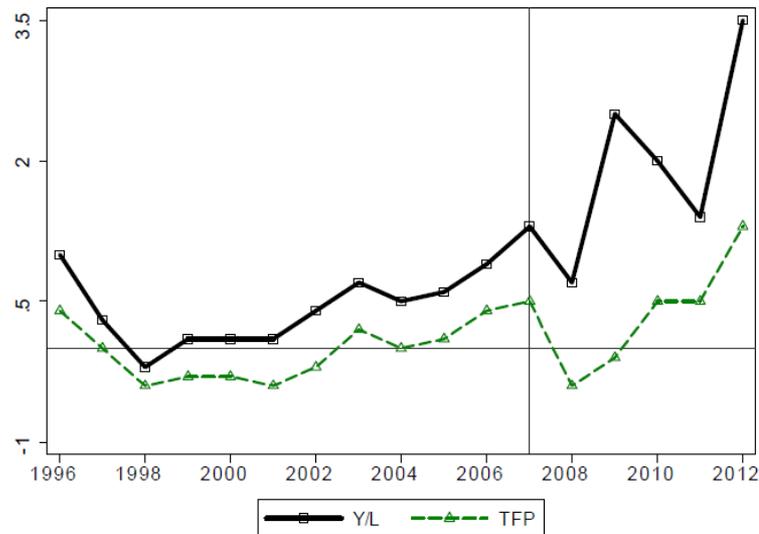
$$\frac{Y}{L} = \frac{Y/P}{L/P}$$

TFP Growth: Spain

If $Y = AK^\alpha L^{1-\alpha}$, then $\frac{Y}{L} = A \left(\frac{K}{L}\right)^\alpha$; where A is total factor productivity (TFP), and K capital.

TFP growth is the main determinant of productivity growth in the long run.

Figure 3: Labor productivity and Multifactor productivity in Spain (annual rates of growth, %)



Notes: Source OECD.

Productivity Growth: Spain in the Crisis

Very adverse conditions in the labor market:

- Since 2007, unemployment has increased reaching 25% in 2012 and 40% for young people.
- Evolution mainly explained by the massive destruction of jobs rather than by new entrants.
- Job destruction disproportionately affected temporary workers.

Hence recent improvement in Y/L may be due to:

- mechanical effect associated to sharp drops in employment,
- composition effects due to the massive destruction of less productive jobs, or
- genuine increase in the total factor productivity (TFP) of firms.

What we do

1. Using a longitudinal sample of Spanish manufacturing and services companies between 1995 and 2012, we estimate TFP at the firm level:
 - we compare the evolution at the micro and macro levels in order to establish whether the recent increase in the aggregate productivity results from parallel movements in the majority of firms or if it reflects composition effects.
2. By combining the information at the firm level on balance sheet items, collective agreements and imports-exports, we quantify the relative importance of several factors that may allow firms to adjust their level of TFP in the Great Recession:
 - changing the composition of the personnel or the working conditions, and
 - making use of the possibility of exporting or importing from abroad.

Measuring firm TFP

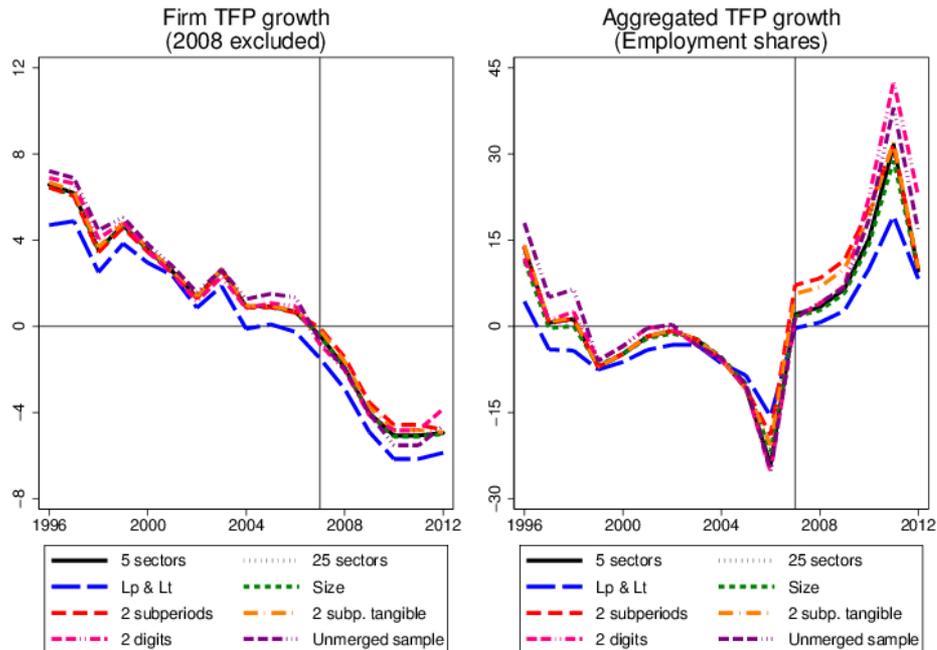
As is common in the literature, we consider a production function at the firm level and obtain our measure of firm TFP by plugging in the estimated technological parameters.

- To allow for differences across industries, we estimate a production function for each industry (results are robust to different classifications).
- We also consider other specifications: two subperiods 1995–2007 and 2009–2012 (due to the crisis, but also due to a major change in the National Accountancy System in 2008), different sizes, etc.

The main difficulty for estimation is the endogeneity due to the correlation between TFP and observed inputs (Griliches and Mairesse, 1995). To overcome this issue, we follow the control function approach (Olley and Pakes, 1996; Levinsohn and Petrin, 2003).

Estimated TFP

Figure 4: Firm *versus* Aggregated TFP growth (%)



Notes: Firm TFP=simple average across firms; Aggregated TFP=firms aggregated using employment weights.
5-years MA of annual growth rates.

Adjustment margins

Type of collective agreement: the vast majority of workers in Spain have their working conditions set under this system.

- Principle of statutory extension: any minimum condition established in a collective agreement at higher than firm level apply to every worker of the corresponding geographical and/or industry unit.
 - Principle of ultra-activity: any agreement remains valid after its expiry, if it has not been renewed.
- These principles make very difficult for a firm to adjust to adverse economic conditions.

Temporary jobs: adjustment in terms of employment.

Importer-Exporter: during a crisis period, exporting firms may circumvent the bad economic conditions of their own country.

Adjustment margins and TFP

Table 1: Fixed effects regressions of estimated TFP

Dependent var: ln TFP	[1] Coef.	SE	[2] Coef.	SE
Firm agreement	0.081***	(0.021)		
Municipality agreement			-0.235*	(0.141)
Province agreement			-0.085***	(0.021)
Regional agreement			-0.062***	(0.022)
National agreement			-0.078***	(0.021)
Share Temporary	-0.023***	(0.004)	-0.023***	(0.004)
Importer-exporter	0.062***	(0.002)	0.062***	(0.002)

Notes: 1,419,089 observations. Robust standard errors in parentheses. Indicators for year, region, size, age, sector and debt structure of the firm included. *** significant at 1%, ** 5%, and * 10%, respectively.

Adjustment margins and TFP

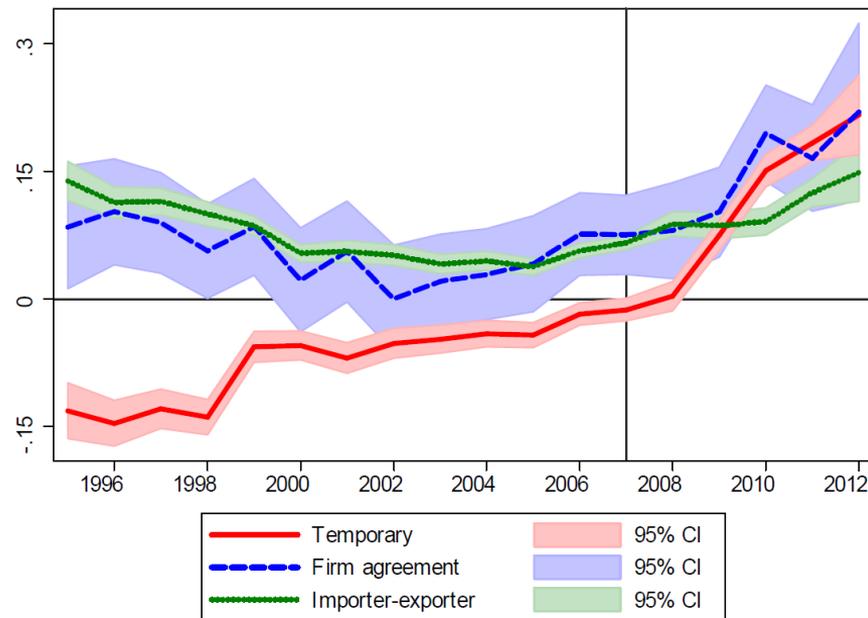
Table 2: Fixed effects regressions of estimated TFP

Dependent var: ln TFP	[1995-2007] Coef.	SE	[2009-2012] Coef.	SE
Firm agreement	0.065**	(0.022)	0.024	(0.033)
Share Temporary	-0.066***	(0.004)	0.090***	(0.011)
Importer-exporter	0.060***	(0.003)	0.065***	(0.008)
Observations	920,294			387,738

Notes: Robust standard errors in parentheses. Indicators for year, region, size, age, sector and debt structure of the firm included.
*** significant at 1%, ** 5%, and * 10%, respectively.

Adjustment margins and TFP

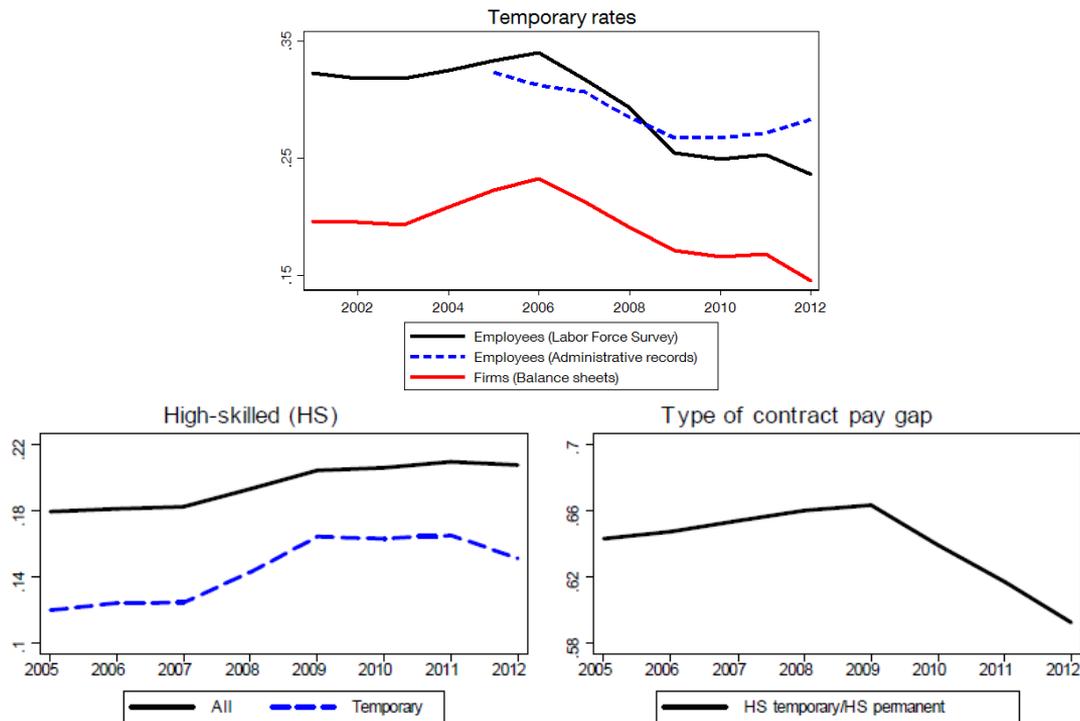
Figure 5: Time variation in adjustment margins



Notes: Estimates from FE regressions of TFP on adjustment margins, debt ratios, firm's size, age, sector, region, and interactions with time dummies.

Discussion

Figure 6: Changing composition of temporary workers



Source: Administrative records.

Take-away

- Two puzzles: while Spanish productivity under-performed that of the US and other European countries between mid-1990s and mid-2000s, the trend is reversed since 2007.
- Explanations for the slowdown: proliferation of temporary contracts and prevalence of low productive activities such as construction, sales, retail trade, hotels and catering (Mas and Quesada, 2006, Aguirragabiria and Alonso-Borrego 2009, Dolado et al. 2011.)
- Explanations for the increase during the Great Recession: massive job destruction but also increasing weight of firms displaying higher TFP (those who better adjust).

What's next? Take advantage of the existing labor market reforms in order to better identify the role of temporary workers.

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