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Why are post-crisis Spanish exports so dynamic?

- Spain's export performance has improved sharply since 2009-in other words, its exports of goods and services have been more robust than expected relative to the development of the foreign demand.

- This strong performance is due to several factors including the sharp improvement in cost competitiveness, partly made possible by the wage moderation but also by the strong recovery in productivity that accompanied the massive post-crisis job losses (by comparison, exchange rate movements had a negligible effect over the period).

- However, the cost competitiveness gains only partly explain Spain's strong post-crisis export performance: (i) Spanish exports were already dynamic before the crisis, despite a sharply deteriorating cost competitiveness; (ii) cost-competitiveness gains are only partly reflected in prices because firms chose to restore their margins; (iii) Spain's hourly labour costs were already lower than those of its main partners before the crisis; (iv) foreign demand remains the main determinant of exports, while competitiveness factors play a minor role.

- Spanish firms also seem to have responded to weak domestic demand by turning to foreign markets. The number of exporting firms has risen sharply since the crisis. The share of Spanish exports directed towards the euro area has declined substantially, whereas the share of exports directed towards high growth potential markets has risen. However, this development is partly due to the lack of dynamism of the euro area as compared to other export markets.

- In the longer term, however, cost-competitiveness gains should be reduced because of a slower productivity growth and a slow recovery in wages.

- Moreover, it is an open question whether the improvement in export performance will last, given the lack of a significant change in specialisation and despite the government's proactive policy. While Spanish firms are gaining market share in dynamic regions, there is, however, no major sector diversification. Spain's production base is also still characterised by a relatively low percentage of exporting firms-a situation that could curtail the internationalisation of the economy.

Export performance (goods and services, 2008=100)

Source: OECD, DG Trésor calculations.
Export performance = country's exports/world demand for country's products.
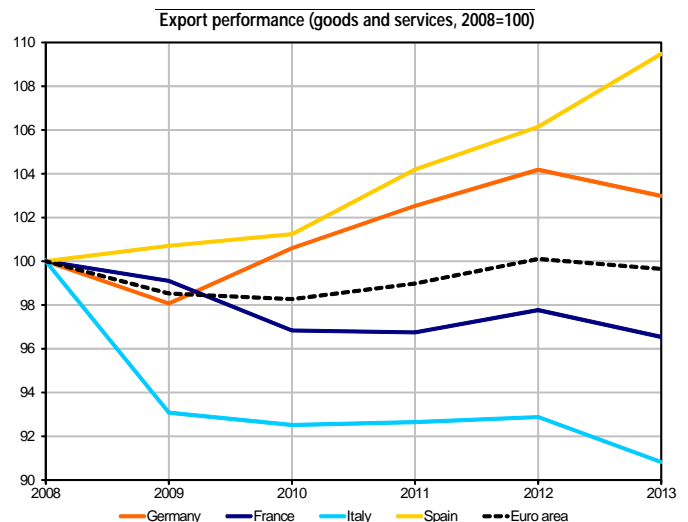
1. Spain's cost competitiveness has improved sharply, in line with strong productivity gains and a wage-moderation policy

1.1 Massive job losses have resulted in a sharp increase in productivity gains since 2008

The Spanish economy destroyed 3.8 million jobs between Q1-2008 and Q3-2013, driving the unemployment rate to a peak of 26.2% of the labour force in Q1-2013.

This reflects the fact that, between 2008 and 2011, as a result of the recent economic downturn, Spanish firms chose to cut their workforce and to increase hours worked per worker. This response contrasts with the one broadly adopted in the rest of the euro area, particularly in Germany.

While the adjustment initially focused on fixed-term contracts, job losses were concentrated on open-ended contracts from 2011 on. By sector (chart 1), **most losses occurred in the construction industry** (which has lost 1.6 million payroll employment, or nearly 70% of its workforce, since early 2008), but also in market services (which lost over one million salaried positions between Q2-2008 and Q1-2013), and, to a lesser extent, in the manufacturing sector (790,000 job losses between Q2-2008 and end-2013). However, job creation has resumed in market services since Q2-2013, adding a total of 232,000, including 177,000 in Q2-2014.

Chart 1: Spain - quarterly change in market-sector paid employment - by sector
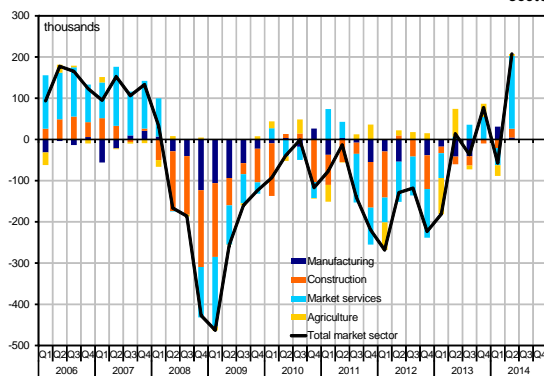
Source: Eurostat, DG Trésor calculations.

In other words, employment "over-adjusted" to the economic shock - between Q1-2008 and Q2-2013, GDP fell by 7.4% while total employment fell by 17.0%. This increased productivity gains. The average annual growth of hourly labour productivity in the total economy increased from 0.6% over the period 2001-2008 to 2.5% over the period 2009-2013 (chart 2)[1].

Chart 2: : Spain - hourly labour productivity (total economy)
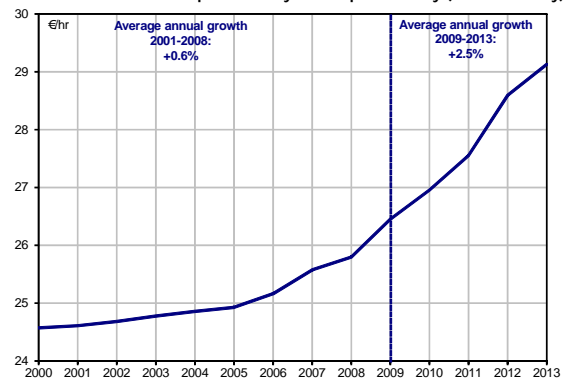
Source: OECD, DG Trésor calculations.

1.2 Productivity gains were accompanied by wage moderation

The downturn in wages began in 2010[2] (chart 3), breaking with a tradition of substantial wage rises generally indexed to inflation (box 1).

Chart 3: Spain - average wage per capita and labour productivity (total economy)
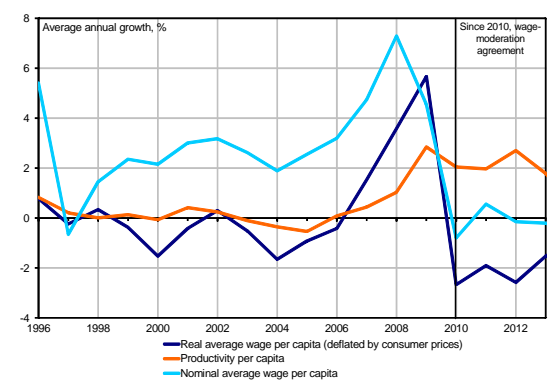
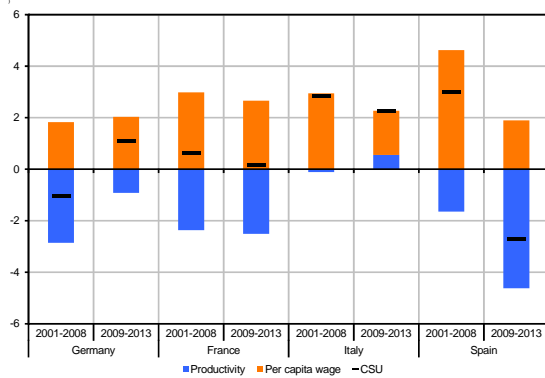*Source: Eurostat, DG Trésor calculations.*

1.3 The result: major gains in cost competitiveness

Unit labour costs (ULCs) rose at an extremely vigorous pace between 2000 and 2008, in step with robust wage growth and slack productivity. **Since 2009, however, they have declined sharply owing to strong productivity gains and wage moderation** (chart 4).

As a result, Spain has achieved substantial gains in cost competitiveness since the crisis. By comparison, the impact of exchange-rate movements over the total period has been mild (chart 5).

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(1) The decline in absenteeism may also have had a positive effect on productivity gains. An ADECCO study based on data from the Spanish National Statistical Institute found that absenteeism decreased by 0.5 point to 4.5% in 2012. Absenteeism is measured by the ratio of hours not worked to the number of working hours.

(2) Strong wage growth in 2008-2009 was partly due to a composition effect, as most job losses concerned low-skilled positions.

Chart 4: Average annual growth in unit labour costs and factor contributions (manufacturing sector)

Source: Eurostat; DG Trésor calculations.

Chart 5: Contribution to change in cost competitiveness (2009-2012)
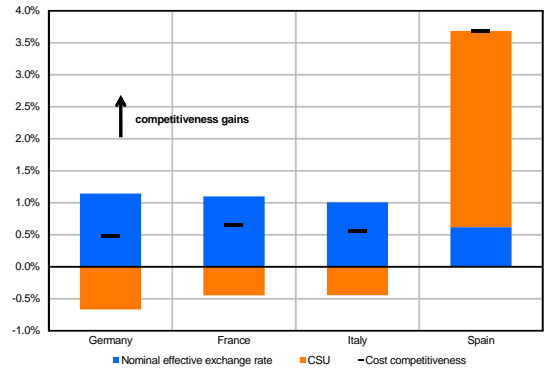
Source: Eurostat; DG Trésor calculations.

Box 1: **Labour-market reforms since 2012 have sustained competitiveness**

The 2012 reform promoted wage moderation. In addition to cuts in public-sector wages, Spain also achieved wage moderation in the private sector through bargaining with trade unions, and government reforms. In 2010, Spain began to unlink wages from inflation. In most cases, this involved a shift to an indexation on firm's performance or GDP growth. These changes were ratified by an inter-union agreement signed by management and labour representatives in 2012. The agreement set modest annual adjustment targets for 2012-2014[a] and amended the wage protection clause, which now takes into account price movements in the euro area. The 2012 labour-market reform promoted compliance with these targets by putting pressure on the social partners to sign new collective agreements.

In addition to wage moderation, the labour-market reform encouraged a widespread adoption of tools designed to make labour more flexible. The 2012 reform modified the application of collective agreements by facilitating their suspension, creating incentives for their revision, and giving priority to company-level agreements. It thus allowed employers to optimise the adjustment of labour force in relation to production constraints. An OECD study[b] finds that this greater flexibility (adjustment in working hours and wages) explains at least one-third of the ULC decrease observed between Q4-2011 and mid-2013[c]. Labour management flexibility has since been strengthened. Part-time work has been facilitated by broadening the applicability of long-term contracts to this type of hiring for businesses with fewer than 50 employees (*contrato apoyo a emprendedores*). Moreover, the decree-law of 20 December 2013 raised the limit of compulsory hours that employers can require of their part-time employees[d]. When demand picks up, this measure provides an incentive to use workers who are already trained and more productive rather than external labour.

a. The target increases are 0.5% in 2012, 0.6% in 2013, and 0.6-1.5% in 2014.
b. "The 2012 labour market reform in Spain: a preliminary assessment", OECD, December 2013.
c. The OECD estimates that the greater flexibility introduced by the reform has lowered unit costs by 1.2-1.9%.
d. Part-time workers under open-ended contracts can work voluntary overtime (i.e., hours that their employer cannot impose on them) up to 15% (or 30% under a collective agreement) of the working hours stipulated in their contract and without advance notice. In summer 2014, the Spanish government also adopted measures to increase social protection of part-time workers, making this type of employment more attractive to the labour force as well.

1.4 These competitiveness gains may have impacted exports indirectly by encouraging multinational firms to locate in Spain

Competitiveness gains may have impacted location decisions by multinational firms, which could, in turn, have a positive effect on exports. The most striking example is the automotive industry, with the decision by many car manufacturers to expand operations in Spain. Citröen, for instance, has chosen the Villaverde facility to produce its new C4-Cactus model. The decision entails a €100-million investment and the creation of 200 jobs.

Nissan has invested €130 million in its Barcelona plant, of which a large portion served to produce a new model-the Nissan Pulsar-released in autumn 2014. Michelin plans to invest €25 million in its Valladolid facility in 2014-2015, in addition to the €30 million already invested in its Burgos plant in 2014. More generally, the June 2014 business climate indicator for Spain (prepared by ICEX-Invest in Spain in partnership with IESE Business School) shows a brighter outlook for investment by foreign firms. Nearly 90% of the 200 foreign firms surveyed plan to maintain or increase their investments in Spain.

2. Cost-competitiveness gains do not, however, seem to be the sole reason for Spain's good export performance

2.1 The "Spanish paradox": before the crisis, exports were dynamic even as competitiveness was eroding

Spanish exports were relatively buoyant even before the crisis, a fact obscured in the balance of payments by the import surge. While Spain's export performance did worsen between 2000 and 2008, the decline was far milder than in France and Italy-despite the fact that unit labour costs were rising more steeply in Spain than in these two countries (chart 4 above), undermining Spanish competitiveness.

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The European Commission report on macroeconomic imbalances[3] underscores this "**Spanish paradox**" and offers an explanation: price-cost competitiveness does influence export behaviour but, in the case of Spain, the effect is weak. Crespo Rodríguez et al. (2012)[4] show, for example, that world trade fluctuations explain an average of around 80% of export performance (87.7% for Spain), whereas cost competitiveness explains only 5% or so (1.6% for Spain). Our export model is consistent with this finding. Despite the existence of a long-term link between exports and price competitiveness, the later's contribution to variations in exports is very weak (see below). **The main determinant is foreign demand.**

Correa-López and Doménech (2012)[5] note that, since Spain joined the Economic and Monetary Union, its share of world exports of goods and services has been fairly resilient, losing 8.9% between 1999 and 2011 compared with 20-40% for the main industrialised countries. According to the authors, there is a link between changes in cost competitiveness and in market share, but the connection is weak and not significant. **Non-price factors, they argue, played a greater role than relative prices during the period.**

Besides geographic and sectoral positioning-which also helps to explain export performance-other microeconomic factors account for the relative resilience of Spanish exports, particularly the fact that **the characteristics of exporting firms differ significantly from the national average: they are bigger and more productive.** Company size is indeed the factor most commonly emphasised in the recent economic literature to explain the degree of internationalisation of the economy (box 2). The Fundación SEPI survey on Spanish manufacturers' strategies finds a positive correlation between the propensity to export and business size[6]; moreover, large firms are far more productive than small businesses[7]. The weakness of Spain's productivity relative to its competitors-France, Germany, Italy, United Kingdom, United States-thus seems due to the larger share of small and medium-sized enterprises (SMEs) in the Spanish economy; the productivity of the large Spanish firms is equivalent to that of their North American counterparts[8].

This evidence suggests that the loss of competitiveness by Spanish exporters before the crisis was not as severe as the overall competitiveness indicators imply.

Box 2: **The structure of Spain's entrepreneurial fabric helps to explain the Spanish paradox**

Recent economic literature tends to show that overall export performance is determined at microeconomic level, as a function of the percentage of exporting firms (extensive margin) and the share of exports in exporting firms' total sales (intensive margin). Data from the Bank of Spain (2011) highlight two characteristics of the Spanish production system. The first is the relatively small percentage of exporting firms: between 2001 and 2011, 12% of firms exported goods and 9% exported non-tourism services. This pattern reflects the high fragmentation of the production system: the total number of firms is high relative to the economy's size, and there are too many small or very small enterprises that are incapable of exporting. The second characteristic is the heavy concentration of exports in a small number of exporting firms: 1% of top exporters account for 67% of total export volume; the top 10% account for a massive 93% of the total. These data indicate a "selection effect" of foreign trade. Only the firms whose productivity exceeds a given threshold can absorb the fixed costs of penetrating new international markets and surviving competitive pressure. Empirical studies show a great intra-industry heterogeneity in the measurement of productivity. In other words, the minimum productivity needed to operate in international markets lies well above average productivity.

2.2 Similarly, since the crisis, cost-competitiveness gains have certainly helped to improve export performance, but they are not the main factor

Since 2009, Spain's export performance has improved sharply (chart on front page), with an acceleration in 2013. In France and Italy, export performance remained broadly stable during the period; in Germany, it improved until 2012 but-by contrast with Spain-weakened slightly in 2013. However, cost-competitiveness gains seem to have made only a modest contribution to boosting Spanish export performance.

The explanation lies in the fact that **only a small proportion of the gains in cost competitiveness were passed on to prices, as firms preferred to rebuild profit margins**. Faced with a deteriorating financial position and heavy debt in the wake of the 2008-2009 crisis, Spanish firms gave priority to restoring their margins. They therefore passed on only a small share of cost competitiveness to prices-unlike before the crisis, when they had generally been willing to trim their margins instead (chart 6).

Margin rebuilding has helped Spanish businesses to increase their financing capability. By early 2013[9], despite adverse external borrowing conditions, Spanish firms had started investing again and paying off their debts.

Moreover, in level terms, cost-competitiveness gains have not significantly altered Spain's position vis-à-vis its partners, for its hourly labour costs were already lower before the crisis[10].

On balance, price competitiveness appears to have had a limited impact on post-crisis changes in Spanish exports of goods and services. That is what our model of Spanish exports of goods and services suggests (box 3 and chart 7), a finding consistent with the literature on the subject.

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(3)   "Macroeconomic Imbalances - Spain 2014", Occasional Papers 176, March 2014, European Commission.
(4)   Crespo Rodríguez, A. et al. (2012), "Competitiveness indicators: the importance of an efficient allocation of resources", Bank of Spain.
(5)   Correa Lopez, M. and Doménech, R. (2012), "The internationalisation of Spanish firms", BBVA.
(6)   Over 90% of firms with more than 500 employees export, versus under 30% of firms with fewer than 20 employees.
(7)   Data from 2005 published by OECD in 2008 suggest that the productivity of Spanish firms with more than 250 employees is 65% above average.
(8)   Correa Lopez and Doménech, *op. cit.*
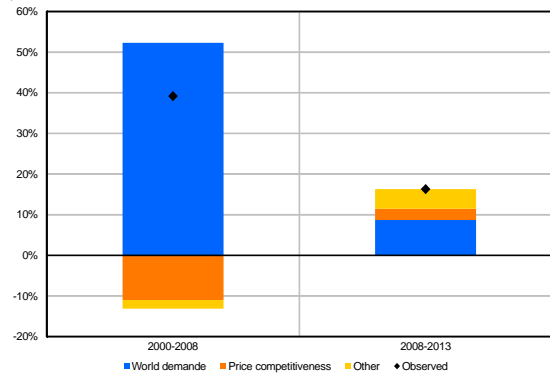(9)   Excluding the construction sector.
(10) Ciornohuz, C. and Darmet-Cucchiarini, M. (2014), "How do French unit labour costs compare to those of its euro area partners?", *Trésor-Economics* no. 134.

Chart 6: Spain - cost competitiveness and price competitiveness
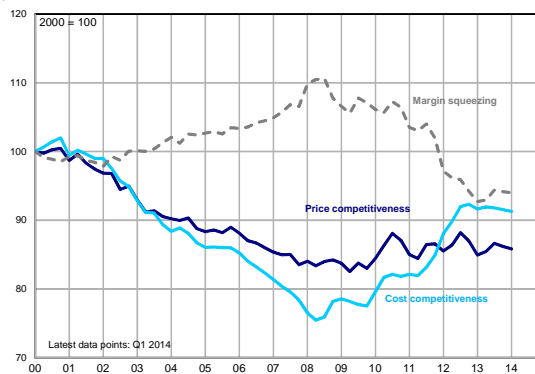
Source: OECD, DG Trésor.

Chart 7: Spain - contributions to changes in exports

Source: Eurostat, DG Trésor estimate.

Box 3: Modeling Spanish exports of goods and services

The DG Trésor model for real exports of goods and services is an error-correction model based on two standard explanatory variables: world demand (here: for Spanish exports) and price competitiveness. In the long run, exports are determined by world demand and price competitiveness, the latter defined as the ratio of foreign export prices (in euros) to prices of Spanish exports of goods and services. We calculate competitiveness for 24 countries, using a double weighting system that reflects competition experienced in third markets. We imposed a long-term unit elasticity of exports relative to world demand (static homogeneity condition)[a].

Equation estimated using ordinary least squares for the period Q1-1995-Q4-2011:

$$lnX \equiv 0,31 + 0,83\Delta lnDM + 0,11\Delta lnCompet - 0,15[lnX - lnDM - 0,75lnCompet] - 1$$

$$(1.30) \qquad (7.87) \qquad (2.38) \qquad (-2.38)$$

SER=1.75%   DW=2.08 R^2_{adj} =56.9%

Student *T* values are in parentheses.

Notations:

- *X*: real exports of goods and services
- *DM*: world demand for Spanish exports
- *Compet*: price competitiveness.

a. *Cf.* Bardaji J., de Loubens A. and Partouche H., (2010), « La maquette de prévision Opale 2010 », *DG Trésor working paper*, December.

3. Improved export performance may be due more to a change in firms' behaviour

3.1 To make up for weaker domestic demand, firms appear to have turned to international markets

Spanish businesses seem to have responded to the fall in domestic demand by focusing actively on external markets, as indicated by the 55% rise in the number of exporting firms between 2007 and 2013 (chart 8). The increase in the number of regular exporters[11] has been more modest and-understandably-it has occurred later. Their number rose 10.5% between 2011 and 2013, suggesting an increase in the number of first-time exporters.

It should be noted that regular exporters, although relatively few in number, account for 92.1% of total nominal exports.

A more detailed breakdown shows that the rise in the number of regular exporters was particularly steep in two categories: firms with very modest nominal exports (under €5,000 a year, up 22% between 2010 and 2013), and firms with very high nominal exports (over €5 million a year, up 14% between 2010 and 2013).

A small number of large firms appear to have been responsible for the majority of exports, driving up the total. Firms exporting over €250 million a year accounted for only 0.24% of regular exporters in 2013 (up 31% from 2010) but their share of total nominal exports came to nearly 40% (up from 34% in 2010).

Chart 8: Spain - number of exporting firms
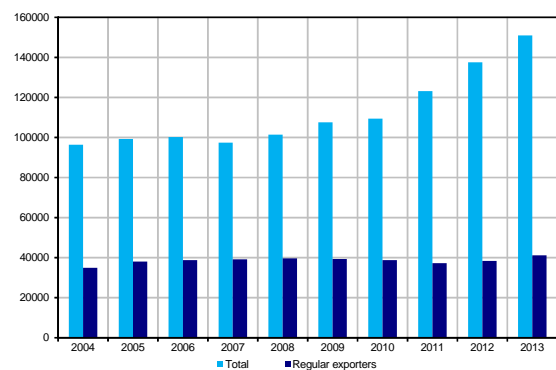
Source: Ministerio de Economía y Competitividad, ICEX: "Perfil de la empresa exportadora española".

Spanish exports thus depend essentially on a small number of large firms that are turning to external markets and becoming more international every year. This pattern could persist in the years ahead, at least to a certain degree, owing to the high fixed costs of entering new markets. Eventually, however, export momentum could be dampened by the structure of Spain's production system, which is too fragmented and is slow to coalesce around large, high-exporting firms[12] (box 2).

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(11) Firms having exported for at least four consecutive years.

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3.2 Exporters are capturing market share in more dynamic regions

Spain, which boasts a number of very large international firms, has seen the share of its exports to the euro area decline significantly, while that of its exports to markets with high potential has grown. Between 2007 and 2013, the share of exports to the euro area fell from 57% to 49%, while the shares of exports to Asia and Africa rose from 6.1% to 9.1% and from 4.3% to 7.1% respectively. These trends are largely due, however, to the weakness of the euro area by comparison with other export markets. The euro area remains, by far, Spain's largest export market.

Since 2010, Spain has also been capturing market share in faster-growing regions: Asia-Pacific; Africa and Near and Middle East (NME); and South & Central America & Caribbean (chart 9). Spain has profited from the growth momentum of emerging economies, particularly Asia. Between 2010 and 2012, the largest gain in market share was in Asia despite a weaker presence there than in Africa-NME (Spain's share of manufacturing exports to the two regions stood at 0.5% versus 2.4% respectively in 2012).

Chart 9: Spain - market share by geographic area (manufacturing sector)
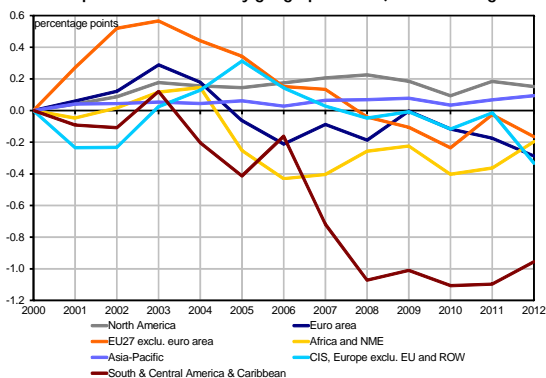
Source: CHELEM database, DG Trésor calculations.

3.3 Spain's sectoral positioning can partly explain its good export performance but not the post-crisis trends

In 2013, excluding energy and raw materials, Spain's main exports consisted of machinery and transport equipment (32%: chart 10), chemical products (13%), and other manufactured products (25%). **Although Spain is not significantly positioned in high-technology sectors** compared with France and Germany, **its profile does give it a special place in the international market**, for it occupies segments characterised by restricted supply.

Hausmann et al. (2011)[13] show, for instance, that Spain exports complex products, i.e., sophisticated goods whose manufacturing requires organisations that incorporate a large quantity of skilled labour. Using the same methodology, Correa-López and Doménech (2012)[14] estimate that Spain's position measured by complexity and connectivity indicators[15] ranks above the world average (at twice the level for complexity and 10% above for connectivity). The more complex a product, the fewer the countries able to produce and hence export it. **This positioning gives Spain relative protection from competition by the newly industrialised countries**, which may partly explain its good export performance.

Chart 10: Sectoral composition of Spanish exports
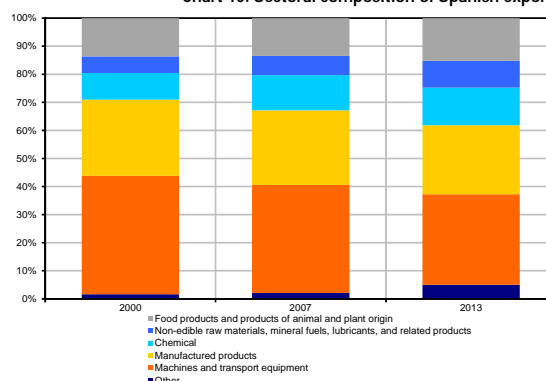
Source: Datacomex, DG Trésor calculations.

At sector level, although post-crisis changes in export structure have been minimal, we note a slight substitution of products with higher value added for products with low value added. For example, the share of machines and transport equipment has decreased from 42.2% to 32.2%, while that of chemical products has risen from 9.4% to 13.4%. Spain appears to have shifted to fine chemicals, whose share of the manufacturing sector has grown steadily from 0.2% in 2000 to 5.2% in 2012; by contrast, the share of heavy chemicals has stagnated, edging up from 4.8% in 2000 to 5.7% in 2012.

Nevertheless, Spain remains chiefly positioned in traditional sectors (ceramics, cement, agricultural foodstuffs), which suggests that it has not actually moved up the quality scale.

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(12) Several government reforms, still not fully implemented, may provide solutions to these problems. The enactment of the law on the guarantee of domestic market unity, adopted in 2013, and the adoption of the law on liberalisation of regulated professions and services could stimulate the Spanish economy. On 28 February 2014, the government also introduced a bill to foster business financing, which would notably widen the range of financing sources. This would offer new ways of funding business growth, particularly for small and medium-sized enterprises.

(13) Hausmann, R., Hidalgo, C.A., Bustos, S., Coscia, M., Chung, S., Jímenez, J., Simoes, A., and Yildirim, M.A. (2011), The Atlas of Economic Complexity: Mapping Paths to Prosperity, Cambridge, Mass.

(14) *Op. cit.*

(15) A sector's complexity index decreases as the number of countries capable of exporting goods produced by the sector increases. Connectivity measures a sector's technological proximity to all goods produced worldwide. The greater its connectivity, the more the sector is able to extend its exports of goods and services to other sectors. A high complexity and connectivity index reflects a strong international advantage in terms of production diversification.

4. Whether the recent export acceleration will persist is uncertain, given the absence of significant change in production specialisation and the likely erosion of competitiveness gains

4.1 Some factors point to continued export dynamism

Spanish exports are likely to remain buoyant: (i) as fixed costs for new market entry are high, first-time exporting firms should continue to export; (ii) market-share gains in high-growth regions are an encouraging sign; (iii) world demand should prove more robust; and (iv) internationalisation is one of the pillars of government strategy[16].

Furthermore, the many reforms in progress-particularly in the labour market-aim to achieve a long-term improvement in productivity and hence in competitiveness:

- **The 2012 labour market reform should reduce market segmentation.** Labour market duality can adversely affect the level of human capital by reducing lifelong training and limiting the accumulation of firm-specific skills. It may therefore erode productivity. Since the crisis, however, the share of fixed-term contracts in total Spanish employment has decreased, although it remains larger than in the main euro-area countries. As a result, **a decrease in the percentage of fixed-term contracts-particularly for low-productivity positions-may have a positive composition effect on productivity,** which could be long-lasting if reforms produce results, steering the labour market toward more stable jobs.

- The labour-market reform should also promote a b**etter organisation of the production system**, including greater labour flexibility (box 1).

- **Measures to foster competition** in the Spanish market should also sustain business competitiveness. The law on the guarantee of domestic market unity, adopted in 2013, liberalised the retail trade and facilitated business creation. To strengthen competition, the law also merged all the existing industry-specific competition agencies into a single institution. In late December 2013, the government introduced a bill on the deindexation of the economy to eliminate inertia between regulated prices and changes in the consumer price index (CPI)[17]. The bill also calls for the publication of a "competitiveness guarantee index"[18] to serve as a benchmark for the private sector.

4.2 Other factors, instead, point to a slowdown

The lack of a significant sectoral repositioning does not suggest true structural change is under way.

Export growth will also depend-to a modest extent-on the future trend in cost competitiveness. Unfortunately, the gains in cost competitiveness observed in recent years may not be fully preserved. In the medium term, they are likely to lose momentum because of the productivity slowdown and the recovery in wages. Admittedly, the recovery will be sluggish because of the expected persistence of high unemployment, which will weaken employee bargaining power.

Productivity growth is now projected to slow after its very sharp correction, partly due to the explosion of the real-estate bubble. Moreover, **in the longer run, its trend remains uncertain but should involve moderate gains**, for the following reasons:

- **loss of skills due to high unemployment, particularly long-term unemployment:** the share of long-term unemployment in total unemployment surged to over 50% at end-2013. A sharp rise in long-term unemployment can curb the continued rise in productivity gains owing to human capital losses. Continuing education and retraining of the unemployed are therefore crucial to curtailing the hysteresis effects generated by the rise of long-term unemployment in Spain.

- **lack of repositioning towards the economy's most productive sectors:** the slump in the construction industry was compensated by the service sector, which displays comparable productivity. Meanwhile, the share of manufacturing-a sector with high productivity gains-has been declining slightly in terms of value added and hours worked. Thus the economy's post-crisis structural change does not seem to have generated productivity gains. This analysis is confirmed by a breakdown of inter- and intra-sector productivity growth (box 4 and table 1). The post-crisis growth rate on a constant-structure basis is strongly positive, whereas the structural-change effect is slightly negative.

Table 1: Breakdown of annual growth in hourly labour productivity by component (annual average growth rate, %)

	Growth rate on a constant-structure basis	Structural change	Cross effect	Total
2001-2008	0.8	−0.1	−0.1	0.6
2009-2013	2.9	−0.3	−0.1	2.5

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(16) In late February 2014, Spain's Council of Ministers adopted a 2014-2015 strategic plan to promote internationalisation. Provisions include facilitating market access for companies that want to export, on the basis of the Bali agreement (reduction in transaction costs and modernisation of customs procedures). The plan also covers financial aspects, with the creation of a €50-million credit line (*FIEM-facilidades UE*) that will enable Spanish firms to obtain financing conditions similar to those of the rest of the EU.

(17) Instead of the overall CPI, the benchmark will consist of the changes in prices of the specific components of the cost of each service.

(18) This index is equal to euro-area inflation minus one-quarter of losses in Spanish competitiveness since 1999, measured by the gap between inflation movements in Spain and the euro area.

- probable influence of rise in undeclared work on strong productivity growth: the magnitude of this phenomenon in Spain was highlighted in a broader study on the grey economy prepared by a Spanish academic[19], who noted the significant impact of high unemployment and the number of "autonomous" workers on the size of Spain's informal economy. This scenario is corroborated by the low level of tax revenues since 2011 and an international comparison: Spanish construction workers are more productive than German ones, and the gap has been widening since the crisis.

Box 4: Breakdown of inter- and intra-sector productivity growth

We have broken down productivity growth in order to isolate the effects of changes in employment structure and assess the impact of a sectoral reallocation of employment on productivity. The first component is the "growth rate on a constant-structure basis", which enables us to assess the productivity gains that are due exclusively to intra-sectoral changes in productivity. The second component is the impact of a change in the sectoral structure of employment: even in the absence of productivity gains in each sector of the economy, total productivity can rise if the share of the most productive sectors in total employment rises at the expense of the share of the least productive sectors. The third component is a cross effect, consisting of the product of the first two components.

Ignoring additivity problems involving volumes calculated at chain-linked prices, productivity can be written as follows:

$$\pi_t = \frac{VA_t}{H_t} = \frac{\sum_i VA_t^i}{\sum_i H_t^i} = \sum_i \frac{VA_t^i}{H_t^i} \times \frac{H_t^i}{\sum_i H_t^i}$$

$$\frac{\pi_{t+1} - \pi_t}{\pi_t} = \frac{1}{\pi_t} \left[\underbrace{\sum_i \left(\frac{VA_{t+1}^i}{H_{t+1}^i} - \frac{VA_t^i}{H_t^i} \right) \times \frac{H_t^i}{\sum_i H_t^i}}_{\text{on a constant-structure basis}} + \underbrace{\sum_i \frac{VA_t^i}{H_t^i} \times \left(\frac{H_{t+1}^i}{\sum_i H_{t+1}^i} - \frac{H_t^i}{\sum_i H_t^i} \right)}_{\text{structural-change effect}} + \underbrace{\sum_i \left(\frac{VA_{t+1}^i}{H_{t+1}^i} - \frac{VA_t^i}{H_t^i} \right) \times \left(\frac{H_{t+1}^i}{\sum_i H_{t+1}^i} - \frac{H_t^i}{\sum_i H_t^i} \right)}_{\text{cross effet}} \right]$$

with: $\pi_t \left(\pi_t^i = \frac{VA_t^i}{H_t^i} \right)$: hourly productivity (of sector i) in t, VA_t (real) value added in t and H_t : hours worked in t

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The post-crisis improvement in Spanish export performance remains to be confirmed. It has been promoted by a redeployment of Spanish firms, no doubt chiefly driven by the weakness of domestic demand since the crisis. However, it remains vulnerable in the absence of a significant shift in specialisation and despite the government's proactive stance.

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(19) "La economía sumergida pasa factura. El avance del fraude en España durante la crisis," study supervised by Prof. Jordi Sardà of the University of Rovira i Virgili for GESTHA (Spain's national union of tax inspectors), January 2014.

http://www.tresor.economie.gouv.fr/tresor-economics

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