From lettuce to cars (part II): the complexity of exports influences the quality of employment

- What a country or region produces is an indication of its productive capacities and is intimately linked to the characteristics of the labour market.
- In this article, we show that workers employed in more complex sectors are less likely to have a temporary contract.
- This is particularly relevant for workers with a lower level of education, suggesting that these individuals benefit the most from a shift in productive specialisation towards more complex goods.

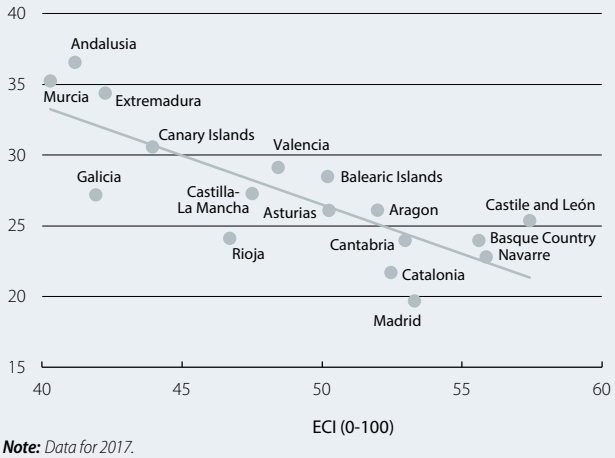
In a previous article,[1] we showed that there are major differences between the goods exported by Spain's various autonomous community regions. These differences can be measured using an export complexity index (ECI) at the regional level: an indicator that measures the degree of sophistication of the products exported by each Autonomous Community (AC) and provides an indication of that AC's productive capacity.[2] In this article, we go a step further by analysing how the complexity of the products that are exported is intimately linked with the characteristics of the labour market and, in particular, with the quality of the jobs generated by each region.

Relationship between the complexity of exports and the quality of employment

Several studies show that there is a close relationship between the incidence of temporary employment[3] and workers' productivity, since both employees and employers have fewer incentives to invest in specific human capital when the employment relationship is short-lived.[4] As a result, the production of more complex goods destined for the export markets is often associated with tasks that require more company or job-specific knowledge. We would therefore expect to see an inverse correlation between the complexity of the goods produced and temporary labour: the greater the complexity, the lower the incidence of temporary employment. This is precisely what the first chart

Relationship between the complexity of exports (ECI) and temporary employment

Temporary employment rate (%)



Note: *Data for 2017.*
Source: *C. Canals and J. Montoriol (2018).*

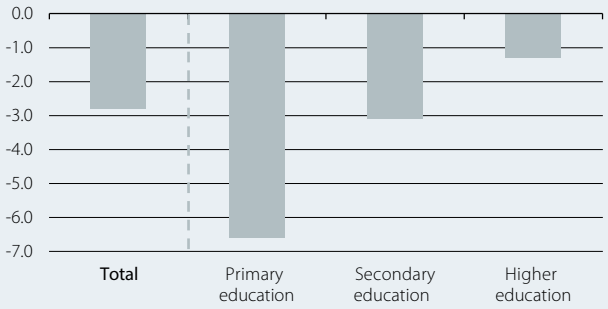
illustrates at the AC level. As we can see, the temporary employment rate is below the Spanish average in Castile and Leon, Navarre and the Basque Country, the three ACs that top the export complexity list. At the other end of the scale, Murcia, Andalusia and Extremadura have a high rate of temporary employment and low export complexity.

This simple relationship, though clearly illustrative, oversees the fact that having a temporary contract (as opposed to a permanent one) also largely depends on workers' specific characteristics, such as their level of education and age. Therefore, there may be other factors influencing the relationship we see in the chart between these two elements. To overcome this problem, we use a regression model at the individual level with information on workers provided by the labour force survey (LFS).[5] The second chart (first bar) shows the results of the model on the probability of having a temporary contract. Besides taking into account each worker's specific characteristics, each

1. See the Focus «From lettuce to cars: an analysis of the complexity of Spanish exports», available at www.caixabankresearch.com.
2. This index is developed based on the complexity index at the product level (PCI), developed by the MIT's Atlas of Economic Complexity, and the value of exports of each product from the various ACs (using data obtained from Datacomex). For a formal definition, see the Focus referenced in the first note.
3. The temporary employment rate refers to the percentage of workers with temporary contracts relative to the total number of workers.
4. See R. Sánchez and L. Toharia (2000). «Temporary workers and productivity: the case of Spain». Applied Economics, 32(5), 583-591; A. Cabrales, J.J. Dolado and R. Mora (2013). «Dual Labour Markets and (Lack of) On-The-Job Training: Evidence for Spain using PIAAC data». National report of the Programme for the International Assessment of Adult Competencies, 2, 9-38; and S. De la Rica, J.J. Dolado and V. Llorens (2008). «Ceilings or floors? Gender wage gaps by education in Spain». Journal of Population Economics, 21(3), 751 776.
5. All the results presented are based on C. Canals and J. Montoriol (2018). «La complejidad de las exportaciones y la calidad del empleo». Papeles de Economía Española, (158), 116.

Impact of greater export complexity on the incidence of temporary employment, according to the worker's education level

Probability of having a temporary contract (pps)



Note: *We use a probit model in which the dependent variable takes a value of 1 if the worker has a temporary contract and 0 if it is permanent. The first bar (Total) represents the impact that an increase of one standard deviation in the export complexity index (ECI), which measures the complexity of the products exported by each sector and autonomous community, has on the probability of having a temporary contract. The bars for Primary, Secondary and Higher education represent the impact of an increase of one standard deviation in the ECI according to the worker's level of education. Control variables are included, relating to the socio-demographic characteristics of the worker, as well as autonomous community fixed effects. The data includes workers in the primary and secondary sectors. Data for 2017.*
Source: *CaixaBank Research, based on data from C. Canals and J. Montoriol (2018).*

worker is also assigned the ECI for the AC where they live and the sector they work in.[6] The results leave no room for doubt: the complexity of the goods produced has a significant impact on the probability of having a temporary employment contract. For instance, the probability of having a temporary contract in Madrid is 2.8 pps lower than it is in Extremadura, due to differences in the complexity of the products produced in each of these ACs.[7,8]

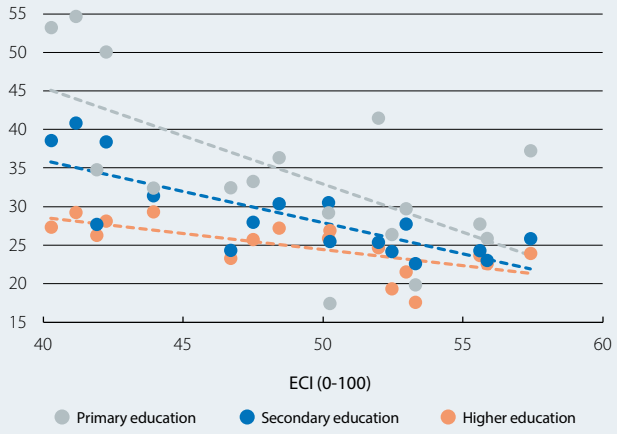
Education matters

As mentioned earlier, a product's complexity index reflects its degree of sophistication, meaning that it provides an indication of the level of technology needed to produce it. *A priori*, if human capital and technological capital complement one another, we would expect more complex production processes to require a higher level of human capital. Thus, companies that produce complex goods should incentivise long-term employment relations. In addition, they should also offer permanent contracts to workers with a lower educational level, in order not only to give them more incentives to work hard, but also to endow them with professional experience, continuous training and other elements that are key to boosting human capital.

In order to corroborate this hypothesis, we extended the regression analysis to assess the interaction between export complexity and workers' level of education. Before presenting the main results, however, it is worth illustrating the relationship at the AC level between the ECI and the rate of temporary employment according to the worker's level of education.[9] The third chart shows that ACs with a higher ECI tend to have a lower rate of temporary employment, although this inverse correlation is weaker for workers with a higher level of education. In other words, workers with a lower education level are those who benefit the most from working in sectors that produce more complex goods, since they have a lower incidence of temporary employment. Similarly, the results of the regression (second chart, bars 2, 3 and 4) corroborate the hypothesis that, for individuals with primary education or below, an increase in the complexity of exports – like that observed between the ACs of Extremadura and Madrid – reduces the probability of having a temporary contract by 6.6 pps. For those with a secondary education, the reduction is of 3.1 pps, while for those with higher education there is only a 1.3-pp reduction (furthermore, in the latter case, the coefficient is not far off 0 in some cases).

Relationship between export complexity (ECI) and the incidence of temporary employment according to the worker's education level

Temporary employment rate (%)



Note: *Each point on the chart represents an autonomous community. Data for 2017.*
Source: *C. Canals and J. Montoriol, (2018).*

6. The ECI by AC and sector is calculated in the same way as the ECI by AC, using the exports of different products as a measure to produce a weighted index. The main analysis considers workers in the primary and secondary sectors, since these are the sectors for which the ECI is available. For further details, see Canals and Montoriol (2018) referenced above.
7. The difference between the ECI of Extremadura and that of Madrid corresponds to approximately one standard deviation of the ECI.
8. The results also hold up when using other alternative variables to approximate the quality of employment, such as involuntary part-time work or workers who would like to work more hours.
9. Education levels, according to the CNED for 2014, are grouped into: primary (1, 2 and 10), secondary (21-41) and higher (51-81).

Spillovers into the wider economy

The analysis presented thus far only includes workers in goods-producing sectors. The reason for this is that, by design, the export complexity index can only be computed for goods and is not defined for services. Nevertheless, 76% of the Spanish workforce work in the services sector, so in order to complete the analysis, we examined whether there is a spillover effect from the primary and secondary productive sectors (i.e. natural resources such as agriculture and industry) into the tertiary sector (services). In particular, the hypothesis put forward is whether specialisation in the production of complex goods in a particular AC has a positive impact on the quality of employment in the services sector in the region. There are several channels through which this relationship could operate (for instance, greater competition between companies to attract workers could encourage hiring on permanent contracts), although analysing them in detail is beyond the scope of this article.

The results presented in the fourth chart appear to support this hypothesis. That is, there is a strong inverse correlation between temporary employment and complexity, not only in the primary and secondary sectors but also in the services sector. Specifically, an increase in the ECI[10] like the one outlined above results in a 3.5-pp reduction in the probability of having a temporary contract in the services sector (somewhat less than the 5.4-pp reduction seen in the primary and secondary sectors).[11] In other words, the empirical evidence suggests that there is a positive spillover between the complexity of the goods produced and the quality of employment in services.

In conclusion: productive specialisation influences the quality of employment

The existence of notable differences in the productive specialisation of the various ACs has major implications for the labour market at the regional level. Those ACs specialising in the production and export of more complex goods have lower rates of temporary employment, especially among workers with a lower education level who tend to endure a more precarious employment situation. Therefore, not only is the volume of exports important, but what is exported also matters. What a country or region produces is a display of its productive capacities, and this is intimately linked to employment conditions and to labour productivity. In this regard, encouraging the production of more complex products can help to reduce the high rate of temporary employment in the Spanish economy and, at the same time, boost productivity growth in the long term.

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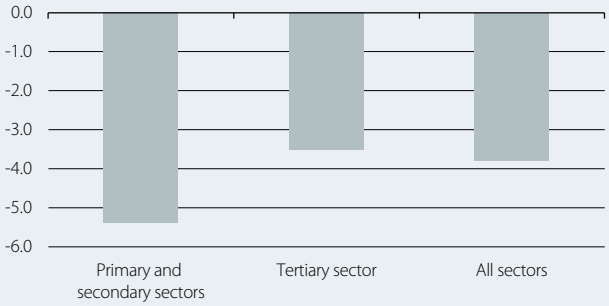
Spillovers: impact of greater export complexity on the probability of having a temporary contract by sector

(p. p.)



Note: *We use a probit model in which the dependent variable takes a value of 1 if the worker has a temporary contract and 0 if it is permanent. The bars represent the impact of an increase of one standard deviation in the export complexity index (ECI), which measures the complexity of products exported in each sector and autonomous community. Control variables are included relating to the socio-demographic characteristics of the worker. Autonomous Community fixed effects are not included. Data for 2017.*
Source: *CaixaBank Research, based on data from C. Canals and J. Montoriol (2018).*

10. Note that ECI is defined at the AC level (without taking the sector into account), since it cannot be calculated for services.
11. Note that the main difference between the current estimates for the primary and secondary sectors and the previous estimates is that, before, the ECI was defined at the sector and AC level, whereas this is not the case in the current estimates.