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# THE ECONOMIC EFFECTS OF A SPANISH TRADE BOYCOTT AGAINST CATALAN PRODUCTS[1]

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## 1. Introduction

Even though this is an issue that, as far as we know, has never been object of systematic research, the possibility that the Catalan economy could eventually be the subject of a trade boycott organized by some sectors of Spanish society has appeared sometimes as a more or less defined threat upon the country's productive sectors. There have been several events that have spurred calls for this kind of boycotts lately (very often with limited general impact): political elections in Catalonia and the setting up of a new Regional Government, negotiations between the Spanish and the Catalan governments on the financing system of the latter, and specially the long process of political debates and negotiations that led to the approval of the new Statute of Autonomy for Catalonia during the period 2005-2010. In fact, one of the boycott episodes with greater impact in the media took place from 2005 on, after the approval of the project of a new Statute of Autonomy in the Catalan Parliament and its subsequent negotiation with the Spanish political parties in the Spanish Parliament. This process triggered what some observers called the "*cava* boycott" (*cava* is the name of a popular sparkling wine which is mainly produced in Catalonia). Although the call from the organizers was on the whole for a general boycott, the truth is that a great deal of the mass media attention was devoted to this particular product. To our knowledge, there are not any academic studies about the consequences of this boycott, either for the producers of *cava* or the Catalan economy as a whole.

Considering these precedents, the eventuality that some time in the future Catalan firms have to confront a new boycott organized by some sectors of the Spanish market should not be dismissed. Getting into the realm of political fiction, and purely to illustrate the point, let us just imagine what could happen if some day there was a call for a self-determination referendum in Catalonia. The economic relevance of this issue cannot be played down. After all, Spain remains the main buyer of Catalan exports, even though its importance as client has diminished a great deal in the last few years.[2] Is it possible to quantify, even if only

[2] The change is very remarkable if, for instance, one takes as a reference the geographical destination of the value added corresponding to Catalan exports. Between 1987 and 2005, the

approximately, the economic impact of a hypothetical Spanish boycott against Catalan products? This paper pretends to be a step forward in this direction and our aim is to try to answer this question rigorously.

The analysis herein is based on the fact that a boycott against Catalan products would affect a very specific dimension of economic activity, trade, and would entail a change in the pattern of commercial exchanges between Catalonia and Spain. In very broad terms there are two possible effects that a boycott against Catalan products could have on bilateral trade. First, it seems clear that Catalan firms could see severely reduced their capacity to export to Spain. Second, and symmetrically, a substitution process of imports from Spain could break out, as a consequence of a reactive boycott against Spanish products carried out by Catalan consumers. There are not any solid arguments to think that Catalan firms and consumers would not react identically once the conflict erupted and, therefore, the boycott would be symmetric. It is difficult to argue that people in Catalonia could have greater or smaller predisposition towards boycott or trade retaliation than Spanish firms and consumers. Hence, our premise is that, confronted with a political conflict that triggered a boycott, the social reactions would be very similar on both sides. Once we have enumerated the direct trade consequences of the boycott we are ready to follow on and examine the general effects these would have on economic activity in Catalonia.

Guinjoan and Cuadras Morató (2011) surveys the issue of trade boycotts against countries from a conceptual point of view, including also the exposition of some case studies. The book is largely focused on appraising the impact of a hypothetical Spanish trade boycott on Catalan firms and the whole economy. The current working paper presents in detail the computations that were carried out to quantify the effects of such boycott on the value added and employment generated in Catalonia.

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percentage sent to the Spanish market has been reduced by more than twenty percent points, going from 76% to 54% of the total (see Guinjoan and Cuadras Morató, 2011, chapter 2 and Oliver Alonso, 2007).

The rest of the paper is divided into three sections. The first section describes the data and methodology used in the exercise. The second section presents the main results, both at the aggregate level and for different industries. Finally the last section summarizes the paper.

## 2. Data and methodology

The objective of this section is to describe the exercise we carry out in the paper. First of all, the data sources and the general setup are outlined (subsection A). Second, we describe how we treat the effects of a trade boycott that causes a reduction of Catalan exports to the Spanish market (subsection B) and a process of partial substitution of Spanish imports in Catalonia (subsection C). Finally, we make some clarifications about the available statistical information for the Catalan case and the specific way our simulation exercise is carried out (subsection D).

### A. General setup

The Input-Output Table of Catalonia 2005 (TIOC 05), published in January 2010 by Idescat[3], is the main statistical source we use in our simulation exercise, the theoretical foundation of which is the input-output analysis.[4] Following Muñoz, Iráizoz and Rapún (2008), the input-output table can be defined, from an accounting point of view, as a systematic method to collect and present data consisting on grouping economic activities as industries and quantifying transactions between firms in some industries and firms in some others (the so-called *intermediate inputs*), the output devoted to final demand uses (household and government consumption, investment in capital goods made by firms, and exports), and the use each industry makes of *primary inputs* (labor and capital) in the production process. In other words, the input-output table presents detailed

[3] The latest input-output table for the Catalan economy corresponds to 2005. It is available at http://www.idescat.cat/cat/economia/tioc/

[4] A survey of applications of this kind of analysis can be found in Parellada and Álvarez (2003).

information on the uses of the total output of each industry and the origin of the inputs used by each industry in its production process.

The exercise we carry out in the current paper consists on comparing two situations for the Catalan economy in 2005:

- First, the "real" Catalan economy, as described in the TIOC 05 published by Idescat.[5]
- Second, a "simulated" Catalan economy which takes into account the economic effects on the trade exchanges between Catalonia and Spain caused by a boycott.

The outcome of this comparison can be taken as a first evaluation of the incidence of the boycott on some of the main economic aggregates, such as value added and employment, which are the variables toward which we pay attention. On the one hand, a reduction of Catalan exports to Spain would contribute to a reduction of total output, value added and employment of the Catalan economy. On the other hand, the potential substitution of imports coming from Spain would entail an increase of these same variables.

Formally the input output model is based on the relationship[6]

$$A*X + D = X \qquad (1)$$

where X is the total output vector, D is the final demand vector, and A is the technical coefficient matrix. From (1), total output can be expressed as a variable depending on final demand, which is considered exogenous, and the intersectorial productive relationships described in matrix A,

$$(1 - A)^{-1} D = X \qquad (2)$$

[5] All the results of the papers are based on the 65 industry version of the TIOC 05. Idescat also publishes a version with 14 industries.

[6] The interested reader can see Muñoz, Iráizoz and Rapún (2008) for further details on the input-output methodology.

Our simulation exercise basically consists on establishing some reasonable hypothesis about how the boycott may affect the final demand of the Catalan economy (due to export reduction to Spain and substitution of final goods imported from Spain) and also the technical coefficient matrix, due to substitution of intermediate goods imported from Spain. Thus, we would have

$$(1 - A')^{-1} D' = X' \qquad (3)$$

where D', A' and X' are, respectively, the new final demand vector (D') and the new technical coefficient matrix (A'), which incorporate the trade effects caused by the boycott, and the new total output vector (X').

From vector X' one can obtain the value added and employment corresponding to the Catalan economy under the new scenario and compare them with the situation described in the TIOC 05.

To compute value added for each industry, the coefficient $va_i$ is defined

$$va_i = \frac{VA_i}{X_i} \qquad (4)$$

where $VA_i$ is the value added and $X_i$ is the output for each industry (*i*)[7], both available in the TIOC 05. So, the new value added can be computed as

$$VA_i' = va_i X_i' \qquad (5)$$

where $X_i'$ is the *i* element of the output vector for the simulated economy (expression 3). To compute the new employment we proceed in a similar fashion. First, define the $n_i$ coefficient as

[7] $X_i$ is the element corresponding to the *i* row in vector X.

$$n_i = \frac{N_i}{VA_i} \qquad (6)$$

where $N_i$ is the value corresponding to Equivalent jobs (*Llocs de treball equivalents*) for each industry, also available at the TIOC 05. Once this is computed one can calculate the new values for Equivalent jobs, given the new valued added[8]

$$N_i' = n_i \, VA_i' \qquad (7)$$

B. The effects of the reduction of Catalan exports to Spain

Boycotts could limit the export potential of Catalan firms to the Spanish market. According to our methodology this would imply a reduction of the final demand of the Catalan economy equivalent to the value of the reduction of Catalan exports to Spain. Our analysis of the incidence of a boycott on exports is based on the following considerations and assumptions:

a) The export reduction effect would depend on their final use. We will assume that productive sectors selling to firms (who use these purchases as intermediate inputs or capital goods) are less likely to be affected by a boycott than productive sectors selling to final consumers, either households or governments.[9] In spite of the fact that data about the final use of the Catalan exports to Spain for each industry are not available, we can approximate it looking at the final uses of the total output for each industry in the Spanish economy, making the assumption that the use in Spain of the goods of a particular industry imported from Catalonia is identical to the use of the goods of the same industry produced in Spain. Thus, each industry *i* is characterized by the proportion of the non-exported total output (referred to Spanish data) which is destined to final consumption (households and

[8] The assumption of a linear relationship between value added and employment, characteristic of the input-output methodology, is rather contentious given the available empirical evidence (see Amarelo, 2009, which documents the relationship between economic growth and unemployment rates). As a consequence, the authors believe that the estimates of the boycott effects on employment are relatively less reliable.

[9] A detailed description of the motivation for this assumption can be found in Guinjoan and Cuadras Morató (2011).

governments) and, therefore, does not have a "corporate" use. This variable, designed by $R_i$, is defined as follows:

$$R_i = \frac{EX_i - EEXP_i - ECI_i - EFBC_i}{EX_i - EEXP_i} \quad (8)$$

where $EX_i$ is total uses of industry *i* (total supply at basic prices of industry *i*), $EEXP_i$ is total exports by industry *i*, $ECI_i$ is total intermediate inputs produced by industry *i* and $EFBC_i$ is the value of goods corresponding to gross capital formation produced by industry *i*. The necessary data to compute $R_i$ obviously correspond to the Spanish economy and are available at the Input Output Table of Spain 2005 (http://www.ine.es/daco/daco42/cne00/cneio2000.htm). Table A1 in the Annex presents the values for the variable $R_i$.

b) A parameter $b_E$ ($0 \leq b_E \leq 1$), which determines the percentage by which exports with "corporate" destination from any industry will be reduced in the event of a boycott, is defined. A second parameter, $b_C$ ($b_E \leq b_C \leq 1$), defines the percentage of export reduction for any industry when the final destination of exports is "non-corporate", that is, households and governments. The particular specification of these parameters has the following two implications:

1) $b_E$ and $b_C$ are identical for all industries. Therefore, the assumption is that the incidence of the boycott is identical across industries;

2) $b_E \leq b_C$, so it is assumed that sales of capital goods and intermediate inputs to firms suffer less from a boycott than sales of final consumption goods.

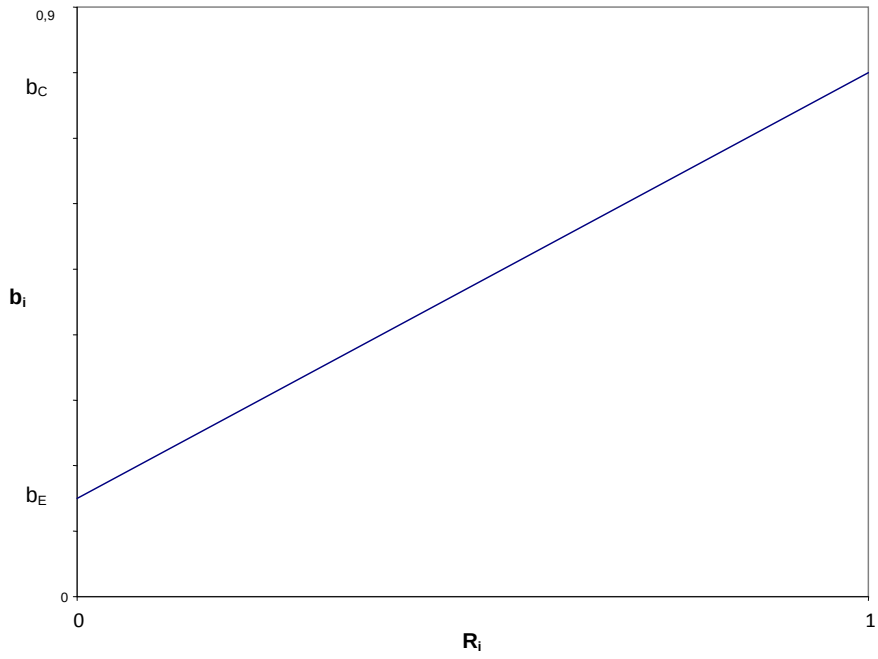
These two assumptions imply that the only difference concerning the incidence of the boycott across industries is due to the fact that each industry has a different destination mix ("corporate" and "non-corporate" customers) for its exports to Spain.

c) The degree of exports loss for industry *i*, $b_i$, will depend on $b_E$, $b_C$ and $R_i$ according the following expression:

$$b_i = R_i\, b_C + (1-R_i)\, b_E \qquad (9)$$

Clearly, $b_E \leq b_i \leq b_C \leq 1$ and $b_i$ is increasing with $R_i$. The main advantage of this formula is its simplicity: you only need to determine two parameters, $b_C$ and $b_E$, to get a positive correspondence between $R_i$, a variable obtained from the data, and $b_i$, the percentage by which Catalan exports to Spain will be reduced for each industry. Moreover, it is very easy to implement a sensitivity analysis that allows checking how the results of the exercise change as a function of different values for $b_C$ and $b_E$. The intuition behind this formulation can be grasped in a more precise way with the help of Figure 1:

**Figure 1. Determination of the variable $b_i$ as a function of $R_i$ ($b_E$=0,15; $b_C$=0,8)**




According to our hypotheses, the reduction of final demand caused by a decrease of exports to Spain for industry *i* would be equal to:

$$L_i = b_i EXP_i^E \qquad (10)$$

where $EXP_i^E$ is Catalan exports to the Spanish market by industry *i*, available at the TIOC 05. Table A1 in the Annex presents the values for $EXP_i^E$ and the variables $b_i$ and $L_i$ for the particular case in which $b_C = 0{,}4$ and $b_E = 0{,}2$.

C. <u>The effects of the process of import substitution</u>

The second effect we analyze is the possible substitution of imports coming from Spain, caused by either a symmetric boycott organized from Catalonia or even by some kind of trade ban set by the Spanish government (e.g. an embargo). This phenomenon has two different implications which must be considered separately.

1) First, there would be a process of substitution of imported intermediate inputs used in domestic (Catalan) production processes. This phenomenon would cause changes in the technical coefficients matrix, A, because now producing one unit of output in industry *i* in Catalonia would require a larger amount of intermediate inputs produced in Catalonia, to partly substitute for those that were previously imported from Spain. Our assumption is that this substitution process will depend on the parameter $b_E$ defined above and the percentage Catalan production represents of the total intermediate inputs in each case. The new technical coefficients are described as follows:

$$a'_{ij} = \frac{x_{ij} + b_E m_{ij}^E \dfrac{x_{ij}}{x_{ij} + m_{ij}^E + m_{ij}^R}}{X_j} \qquad (11)$$

where $x_{ij}$ is intermediate inputs bought by industry *j* from Catalan firms in industry *i*, $m_{ij}^E$ is imports from Spain of intermediate inputs of industry *i* made by firms in

industry *j*, $m_{ij}^R$ is imports from the rest of the world of intermediate inputs of industry *i* made by firms in industry *j*, and $X_j$ is total output of industry *j*.[10]

All the data needed to obtain the new technical coefficients are available at the TIOC 05. Proceeding in this way we can get the new matrix A' and the new Leontief inverse matrix $(1-A')^{-1}$.

2) Second, there will be a partial substitution of final goods produced in Catalonia for final goods imported from Spain. This will be the equivalent of an increase of the final demand of the Catalan economy. As described above, we consider that final goods corresponding to productive capital goods are less substitutable than those corresponding to final consumption. In fact, the same parameters $b_C$ and $b_E$ have been used to quantify the impact of import substitution on the final demand, $G_i$, as follows

$$G_i = b_E \frac{M_i^{E,FBC} Y_i^{FBC}}{FBCAT_i} + b_C \frac{(M_i^{E,DF} - M_i^{E,FBC})(Y_i^{DF} - EXPCAT_i - Y_i^{FBC})}{DF_i - EXPCAT_i - FBCAT_i} \quad (13)$$

where $DF_i = Y_i^{DF} + M_i^{E,DF} + M_i^{R,DF}$ makes explicit the composition of the final demand (the final demand for goods of industry *i* in Catalonia is equal to the final demand for goods produced domestically plus the imported goods from Spain and from the rest of the world) and $FBCAT_i = Y_i^{FBC} + M_i^{E,FBC} + M_i^{R,FBC}$ does the same for gross capital formation (the final demand of goods of industry *i* used for gross capital formation in Catalonia is equal to the final demand for those goods produced

[10] An alternative specification would be the following:

$$\alpha_{ij} = \frac{x_{ij} + b_E m_{ij}^E \frac{x_{ij}}{x_{ij} + m_{ij}^R}}{X_j} \quad (12)$$

Obviously $\alpha_{ij} \geq a_{ij}'$. Therefore, the chosen option for our exercise implies a lower level of import substitution and, consequently, would relatively overestimate the negative effects for trade of a boycott. Nevertheless, it is worth pointing out that the differences between the results with the two alternative specifications are of little significance.

domestically plus the imported goods from Spain and from the rest of the world) and $EXPCAT_i$ is exports of Catalan products of industry *i* to Spain and the rest of the world.[11] The data needed to perform these calculations are available at the TIOC 05.

The different elements of the new final demand vector, D', which includes all changes implied by the modifications in trade relationships, can be expressed as

$$D_i' = D_i - L_i + G_i \qquad (14)$$

Table A1 in the Annex presents the values for $D_i$ and the variables $G_i$ and $D_i'$ for the particular case in which $b_C = 0{,}4$ and $b_E = 0{,}2$.

Once here, we can compute the new output, $X' = (1 - A')^{-1} D'$ (expression 3) and from this, as explained in subsection 2.A, the changes in value added and employment (expressions 5 and 7). However, taking into account the kind of information available in the TIOC 05, it will be necessary to make a few clarifications about the specific way in which our exercise was carried out.

D. Clarifications about the available information in the TIOC 05 and the simulation exercise

The information published by Idescat on the TIOC 05 will prevent that the simulation exercise can be performed in exactly the way we have described in the previous subsections. This is because, for reasons which are analyzed in detail in Idescat (2007), the main table published for 2005 is not the Symmetric Table, as defined in the input-output section of the European System of Accounts (ESA 95).[12]

[11] An alternative specification of (13), similar to the one described in the previous note, could also be used. The consequences of our chosen option on the results of the exercise are identical to what was said previously.

[12] The Symmetric Table has the same number of rows and columns (corresponding to homogeneous industries or products). The sum of the elements of each row (which specify the use of the output of each industry) is identical to the sum of the elements of each column (which specify the origin of the inputs of each industry).

The main available information consists of a *Taula de Destinació Ampliada* or "Extended Use Table" (TDA). Even though the TDA is symmetric (it has the same number of rows and columns), the row distribution corresponds to the uses (intermediate and final demand) by *products* generated in the economy, while the column distribution corresponds to the origin of inputs (intermediate and primary) used by *industries* operating in the economy. This feature is especially relevant in the cases of products that are generated in industries with another product as their principal output. In these cases, the value of the output of product *i* (sum of the elements in the row *i*), which will be called $X_i^O$, is larger than the value of inputs used by industry *i* (sum of the elements in the column *i*), which will be called $X_i^I$.[13]

This is the main reason why we are forced to carry out our exercise according to the following procedure. First, we use the basic input-output model to compute the increase of total output for the different *products*, taking into account the changes in the final demand and the inter-industry relationships caused by the effect of the boycott on trade between Catalonia and Spain (expression 3). Once we have a new total output vector with the elements $X_i^{O\prime}$ (*products*), we proceed to compute the growth rate with respect to the original value $\left(X_i^{O'}/X_i^O\right)$ and calculate the new total output for each *industry*[14]

$$\left[X_i^{I'}=X_i^I*\left(X_i^{O'}/X_i^O\right)\right] \qquad (15)$$

This point is probably the most controversial aspect of our methodological procedure. This is because the growth rates we compute in the first place

[13] The clearest case of this in the TIOC 05 is row 56, which corresponds to the product "Research and Development Services", with total output equal to 1.622,4 millions of euros. This type of services is often produced by industries that also produce, as their main output, some other product. As a consequence, the total output reflected in column 56, which corresponds to the industry "Research and Development" is much smaller, 380,1 millions of euros.

[14] Obviously, it is not guaranteed that the new aggregate output defined as $X^{O'}=\sum_i X_i^{O'}$ is equal to the new aggregate output defined as $X^{I'}=\sum_i X_i^{I'}$. In fact, and following the example used previously in which $b_C = 0{,}4$ and $b_E = 0{,}2$, $X^{O\prime}$=330.797.448, while $X^{I\prime}$=330.634.792 (thousands of euros in both cases). Nevertheless, the difference between both figures, 162.655, is not very significant (it amounts to less that the 0,05% of the total output from our simulation, $X^{I'}$).

correspond to variations in *products* and later on these are applied to calculate the increases in total output of the different *industries*. The problem is that in the TDA this equivalence industry – product is not obvious, because there are industries that produce other products different from what constitutes their "main" product.[15] The new total output for each industry, $X_i^{I\prime}$, is what will be used to compute the new value added (expression 5) and employment (expression 7). Table A1 in the Annex presents the values for $X_i$, $VA_i$ and $N_i$ and $X_i$', $VA_i$' and $N_i$' (the last three for the particular case in which $b_C = 0{,}4$ and $b_E = 0{,}2$).[16]

## 3. Results

A. Aggregate results

Table 1 displays the results of the effects of a trade boycott on the total value added of the Catalan economy. The results are a function of different values of the parameters $b_C$ and $b_E$ (always for the case in which $b_C \geq b_E$). Table 2 presents the results referred to employment losses.

[15] Alternatively, a new output could have been computed $X^{O\prime}$ (*products*) and then, taking into account the ratio between value added and total production in each *industry*, calculate the new value added in each case. The results obtained under this other specification reflect a smaller (not very significantly) incidence of the boycott effects on value added and employment in the Catalan economy.

[16] The values $X_i'$ in Table 1 are referred to the concept of output we have called $X_i^{I'}$.

**Table 1. Difference between the real and the "simulated" Catalan economy. Total value added (in %)**

| Value Added | | Impact of boycott on sales to final consumers, $b_C$ | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *0* | *10* | *20* | *30* | *40* | *50* | *60* | *70* | *80* | *90* | *100* |
| Impact of boycott on sales to firms, $b_E$ | *0* | 0,0 | -0,4 | -0,9 | -1,3 | -1,7 | -2,2 | -2,6 | -3,0 | -3,5 | -3,9 | -4,3 |
| | *10* | | -1,6 | -2,0 | -2,4 | -2,9 | -3,3 | -3,8 | -4,2 | -4,6 | -5,1 | -5,5 |
| | *20* | | | -3,2 | -3,6 | -4,0 | -4,5 | -4,9 | -5,4 | -5,8 | -6,3 | -6,7 |
| | *30* | | | | -4,8 | -5,2 | -5,7 | -6,1 | -6,6 | -7,0 | -7,5 | -7,9 |
| | *40* | | | | | -6,4 | -6,9 | -7,3 | -7,8 | -8,2 | -8,7 | -9,1 |
| | *50* | | | | | | -8,1 | -8,5 | -9,0 | -9,4 | -9,9 | -10,3 |
| | *60* | | | | | | | -9,8 | -10,2 | -10,7 | -11,1 | -11,6 |
| | *70* | | | | | | | | -11,5 | -11,9 | -12,4 | -12,9 |
| | *80* | | | | | | | | | -13,2 | -13,7 | -14,2 |
| | *90* | | | | | | | | | | -15,0 | -15,5 |
| | *100* | | | | | | | | | | | -16,8 |

**Source**: See the text

**Table 2. Difference between the real and the "simulated" Catalan economy. Total employment (in %)**

| Employment | | Impact of boycott on sales to final consumers, $b_C$ | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *0* | *10* | *20* | *30* | *40* | *50* | *60* | *70* | *80* | *90* | *100* |
| Impact of boycott on sales to firms, $b_E$ | *0* | 0,0 | -0,4 | -0,9 | -1,3 | -1,8 | -2,2 | -2,7 | -3,1 | -3,6 | -4,0 | -4,4 |
| | *10* | | -1,5 | -2,0 | -2,4 | -2,9 | -3,3 | -3,8 | -4,2 | -4,7 | -5,1 | -5,5 |
| | *20* | | | -3,0 | -3,5 | -3,9 | -4,4 | -4,9 | -5,3 | -5,8 | -6,2 | -6,7 |
| | *30* | | | | -4,6 | -5,1 | -5,5 | -6,0 | -6,4 | -6,9 | -7,3 | -7,8 |
| | *40* | | | | | -6,2 | -6,6 | -7,1 | -7,6 | -8,0 | -8,5 | -8,9 |
| | *50* | | | | | | -7,8 | -8,3 | -8,7 | -9,2 | -9,7 | -10,1 |
| | *60* | | | | | | | -9,4 | -9,9 | -10,4 | -10,8 | -11,3 |
| | *70* | | | | | | | | -11,1 | -11,6 | -12,0 | -12,5 |
| | *80* | | | | | | | | | -12,8 | -13,2 | -13,7 |
| | *90* | | | | | | | | | | -14,5 | -15,0 |
| | *100* | | | | | | | | | | | -16,2 |

**Source**: See the text

B. An example: $b_E$=0,2 i $b_C$=0,4

This subsection presents the results of our exercise in greater detail. In order to do this, a particular case will be analyzed. Specifically, we will focus on the case in which the parameters related to the boycott have values $b_E$=0,2 and $b_C$=0,4.

Before proceeding, it will be useful to examine the position of the Catalan economy in 2005. Table 3 summarizes the main data on its external sector and Table 4 makes explicit the relationship among the concepts of output, value added, intermediate consumption (inputs produced in Catalonia and imported from Spain and the rest of the world) and final demand in the context of the input-output table. All the necessary statistical information to construct both tables is available in the TIOC 05. As we can observe in Table 4, the final demand of the Catalan

economy is equal to the sum of value added generated by Catalan firms and value added generated by foreign firms (from both Spain and the rest of the world), which goes under the label of imported intermediate inputs.

**Table 3. The external sector of the Catalan economy (2005). Thousands of € and % over Value Added**

| | Spain | Rest of the world | Total |
|---|---|---|---|
| Exports* | 62.654.389 *(38,57)* | 46.294.437 *(28,50)* | 108.948.826 *(67,07)* |
| Imports** | 43.058.258 *(26,51)* | 62.778.548 *(38,65)* | 105.836.806 *(65,16)* |
| *final goods* | 11.502.799 *(7,08)* | 19.841.855 *(12,22)* | 31.344.654 *(19,30)* |
| *intermediate inputs* | 31.555.459 *(19,43)* | 42.936.693 *(26,43)* | 74.492.152 *(45,86)* |
| Value Added: 162.430.393 | | | |

* Total exports do not include domestic consumption by no residents: 1.550.296 (Spain) + 8.675.671 (Rest of the world) = 10.225.967 (Total) (all the figure are in thousands of €)

** Total imports do not include external consumption by residents: 4.806.282 thousands of €

**Source**: TIOC 05

**Table 4. Output, value added, intermediate consumption, and final demand of the Catalan economy (2005). Thousands of €**

| | | |
|---|---|---|
| Value Added (1) = 162.430.393 | Output (2) | 348.075.070 |
| | - Interm. consumption (domestic) (3) | 108.362.342 |
| | - Interm. consumption (Spain) (4) | 31.555.459 |
| | - Interm. consumption (rest of the world) (5) | 42.936.693 |
| | - Net taxes on products (6) | 2.790.183 |
| Final demand = (1) + (4) + (5) + (6) = 239.712.727 | | |

**Source**: TIOC 05

In the particular case we are examining, the changes in the final demand of the Catalan economy are due to the decrease of the value of Catalan exports to the Spanish market (15.506.965 thousands of €) and the drop of Catalan imports of

final goods from the Spanish market (1.045.873 thousands of €). In net terms this is a total reduction equivalent to 14.461.092 thousands of €, which represent a 6,03% of the actual final demand for 2005 (the disaggregation of all these data by industries can be found in Table A1). The new final demand vector (also available at Table A1) and the new technical coefficient matrix is what we need for the computation of the new output vector (expressions 3 and 15), also presented in Table A1. From the new output the new value added vector can be retrieved (expression 5) and, taking into account the substitution process of imported intermediate inputs from Spain, also the intermediate consumption of locally produced and imported goods. The relationship among output, value added, and intermediate consumption for the economy after the effects of the boycott have been taken into account is displayed in Table 5.

**Table 5. Output, value added, intermediate consumption, and final demand of the "simulated" Catalan economy (2005). Thousands of €**

| | | |
|---|---|---|
| Value Added (1) = 155.858.112 | Output (2) | 330.634.792 |
| | - Interm. consumption (domestic) (3) | 105.545.812 |
| | - Interm. consumption (Spain) (4) | 23.670.974 |
| | - Interm. consumption (rest of the world) (5) | 42.803.883 |
| | - Net taxes on products (6) | 2.756.012 |
| Final demand* = (1) + (4) + (5) + (6) = 225.251.636 | | |

*The difference between final demand computed through the decrease of exports and final goods imports and the sum of concepts (1), (4), (5) and (6) is equal to 162.655 and is due to the procedure followed to compute the "new" output when a Symmetric Table is lacking (see note 13)

**Source**: See the text

Table 6 summarizes the effects of a boycott on the main macroeconomic magnitudes of the Catalan economy. First, the fall in economic activity due to the reduction of final demand implies a decrease of total value added. Second, the process of partial substitution of intermediate inputs imported from Spain will determine how this decrease of value added will be distributed according to its geographical origin (from Catalan, Spanish or rest of the world firms). The fall in final demand (which stands at almost 14.500 millions of €) causes a reduction in output and a decrease in value added generated by the Catalan productive system

of more than 6.500 millions of € and also a reduction of value added incorporated into the Catalan output, but generated abroad of around 8.000 millions of €, the biggest part of which are intermediate inputs imported from the Spanish market that, as we have already argued, are partly substituted with local output and imports from the rest of the world.

**Table 6. The effects of the boycott on output, value added, intermediate consumption, and final demand of the Catalan economy. Thousands of €**

| | | |
|---|---|---|
| Value Added (1) = -6.572.281 | Output (2) | -17.440.279 |
| | - Interm. consumption (domestic) (3) | -2.816.530 |
| | - Interm. consumption (Spain) (4) | -7.884.485 |
| | - Interm. consumption (rest of the world) (5) | -132.810 |
| | - Net taxes on products (6) | -34.171 |
| Final demand* = (1) + (4) + (5) + (6) = -14.461.092 | | |

*See the note in Table 5

**Source**: See the text

C. Results by industries

The main results disaggregated by industries are shown in Table A1. In order to facilitate a brief analysis of these results, Table A2 presents the reduction of value added and employment caused by the boycott, both in absolute terms and as a proportion of the pre-existing level in 2005.[17] Table A2 ranks all the industries from higher to lower relative fall of value added (and employment) due to the boycott.

The following aspects can be highlighted from the table:

[17] The hypothesis of linear relationship between value added and employment implies that, for each industry, the relative decrease of value added and employment will be identical. However, the fact that the employment content per unit of value added is different for each industry is what justifies that the total relative reduction is different from employment (3,95%) and value added (4,05%).

a) Even though some industries would suffer sizeable losses due to the boycott, only in one case these would greater than 20% of value added and employment (*Indústries làcties – "Dairy industries"*).

b) Many of the most affected industries are manufactures that maintain relatively important trade connections with the Spanish market.

c) Some of the industries which have the heaviest relative losses have such a small size that would not make into a list of the most affected sectors in absolute terms.

d) Even though almost all the industries in the Catalan economy would face valued added and employment losses in the event of a boycott, there are five that would enjoy a positive outcome. Of those, only the industry *Serveis auxiliars de la mediació financera* (*"Auxiliary services of financial intermediation"*) is quantitatively relevant and experiences an increase of 6,6 % with respect to the original situation.[18]

## 4. Final summary

After the series of events that took place from 2005 on, Catalan firms should not completely discard the hypothesis that, sometime in the future and mainly for political reasons, they could be the object of a trade boycott organized from some sectors of the Spanish society. This contingency has been analyzed in greater detail in Guinjoan and Cuadras Morató (2011). The current working paper describes the exercise that was carried out in order to quantify the impact of a boycott on the

[18] The remaining four industries enjoy small positive gains, lower than 0,55%, due to the boycott. These are industries with zero exports to Spain. The positive outcome can be explained by the fact that there is an increase of output which is due to the substitution of imports coming from Spain. At least three out the four industries are related to the tourism sector. This fact can be connected with how the tourism sector is treated in the input-output Catalan tables (see the notes in Table 3). The treatment of the tourism exports, which are included as domestic consumption by no residents and not as exports of the corresponding service industries, could lead to thinking that our exercise underestimates the actual effects of a boycott. We believe that this is most unlikely because the Catalan tourism trade balance with Spain has a sizeable deficit (see Llano Verduras and de la Mata López, 2009).

value added and employment of the Catalan economy, using the input-output analysis and the statistical data available at the TIOC 05.

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# Annex

## Table A1*

| | | R | b | $EXP^E$ | L | G | D | D' | X | VA | N | X' | VA' | N' |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INDUSTRY | | | | (thousands €) | (thousands €) | (thousands €) | (thousands €) | (thousands €) | (thousands €) | (thousands €) | (jobs) | (thousands €) | (thousands €) | (jobs) |
| Agricultura, ramaderia, caça i serveis relacionats | 1 | 19,15% | 23,83% | 307.486,00 | 73.272,58 | 58.032,78 | 1.198.401,30 | 1.183.161,50 | 3.551.942,49 | 1.690.522 | 65.938,30 | 3.561.450,57 | 1.638.924,28 | 63.925,74 |
| Silvicultura, explotació forestal i serveis relacionats | 2 | 11,04% | 22,21% | 9.127,90 | 2.027,06 | - | 48.466,20 | 46.439,14 | 154.729,03 | 128.790 | 3.868,50 | 136.418,67 | 124.289,03 | 3.733,30 |
| Pesca, aqüicultura i serveis relacionats | 3 | 74,91% | 34,98% | 55.448,70 | 19.397,54 | 12.444,60 | 171.308,70 | 164.355,76 | 220.570,00 | 127.731 | 3.619,40 | 213.587,28 | 123.400,05 | 3.496,69 |
| Extracció de productes energètics | 4 | 0,13% | 20,03% | 801,80 | 160,58 | 39,22 | 7.498,70 | 7.377,35 | 31.209,70 | 23.404 | 376,80 | 42.477,32 | 22.749,78 | 366,26 |
| Extracció d'altres minerals (excepte els productes energètics) | 5 | 0,93% | 20,19% | 85.264,60 | 17.211,20 | 608,46 | 165.599,70 | 148.996,95 | 568.644,80 | 238.799 | 2.724,90 | 534.774,37 | 228.847,10 | 2.611,34 |
| Indústries càrnies | 6 | 63,77% | 32,75% | 2.712.718,60 | 888.503,60 | 194.725,86 | 5.322.774,10 | 4.628.996,37 | 7.104.440,73 | 1.123.500 | 34.533,40 | 5.245.075,36 | 1.006.528,33 | 30.938,00 |
| Indústries d'altres productes alimentaris i tabac | 7 | 48,32% | 29,66% | 2.950.757,70 | 875.301,22 | 119.562,73 | 5.318.606,70 | 4.562.868,21 | 7.712.848,75 | 1.727.147 | 46.319,80 | 7.645.489,44 | 1.551.742,90 | 41.615,69 |
| Indústries làcties | 8 | 75,53% | 35,11% | 702.067,10 | 246.469,43 | 26.814,60 | 876.991,10 | 657.336,27 | 1.093.991,00 | 327.635 | 4.890,60 | 924.023,70 | 261.385,98 | 3.901,71 |
| Elaboració de begudes | 9 | 21,53% | 24,31% | 1.451.260,90 | 352.750,72 | 19.448,00 | 2.212.201,80 | 1.878.899,08 | 3.238.798,40 | 856.254 | 13.430,60 | 3.107.678,33 | 778.080,31 | 12.204,43 |
| Indústries tèxtils | 10 | 21,11% | 24,22% | 1.827.194,60 | 442.595,08 | 3.288,25 | 3.344.762,10 | 2.905.455,27 | 4.814.075,28 | 1.514.093 | 53.678,10 | 4.380.585,16 | 1.330.204,77 | 47.158,83 |
| Indústries de la confecció i de la pelleteria | 11 | 67,39% | 33,48% | 1.009.001,80 | 337.785,30 | 6.540,24 | 1.724.712,90 | 1.393.467,83 | 2.223.158,29 | 712.885 | 34.665,80 | 1.928.474,84 | 601.745,10 | 29.261,34 |
| Indústries del cuir i del calçat | 12 | 72,21% | 34,44% | 107.008,20 | 36.854,78 | 5.640,34 | 408.713,90 | 377.499,47 | 444.994,10 | 157.837 | 4.983,40 | 429.985,28 | 145.649,82 | 4.598,62 |
| Indústries de la fusta i del suro (excepte mobles); cistelleria i esparteria | 13 | 2,51% | 20,50% | 571.648,10 | 117.196,92 | 1.872,50 | 902.819,60 | 787.495,19 | 1.592.449,17 | 514.723 | 21.540,80 | 1.467.732,17 | 472.664,26 | 19.780,68 |
| Indústries del paper | 14 | 7,95% | 21,59% | 1.382.750,50 | 298.538,96 | 7.349,88 | 2.418.365,50 | 2.127.176,43 | 3.682.930,28 | 1.198.858 | 20.112,80 | 3.394.930,67 | 1.094.693,22 | 18.365,27 |
| Edició, arts gràfiques i reproducció de suports enregistrats | 15 | 16,43% | 23,29% | 1.901.013,60 | 442.674,80 | 38.230,59 | 2.917.440,20 | 2.512.995,99 | 5.088.046,34 | 2.106.210 | 48.489,00 | 4.827.120,34 | 1.906.049,72 | 43.880,92 |
| Refinació de petroli i tractament de combustibles nuclears | 16 | 24,02% | 24,80% | 1.085.080,70 | 269.140,91 | 89.448,45 | 1.850.144,10 | 1.670.451,64 | 2.963.950,01 | 493.208 | 955,10 | 2.797.538,81 | 459.884,51 | 890,57 |
| Indústries químiques | 17 | 27,85% | 25,57% | 7.245.730,00 | 1.852.775,83 | 67.935,81 | 14.561.530,20 | 12.776.690,18 | 16.799.593,22 | 5.430.645 | 74.008,60 | 16.507.337,57 | 4.828.196,94 | 65.798,47 |
| Fabricació de productes de cautxú i matèries plàstiques | 18 | 3,01% | 20,60% | 1.660.671,00 | 342.133,96 | 2.351,26 | 3.253.418,70 | 2.913.636,00 | 5.464.982,89 | 1.806.964 | 39.994,00 | 5.057.846,80 | 1.658.620,31 | 36.710,68 |
| Fabricació de vidre i productes de vidre | 19 | 4,57% | 20,91% | 335.009,10 | 70.064,87 | 123,62 | 534.997,30 | 465.056,05 | 791.197,02 | 349.918 | 7.668,60 | 744.368,12 | 317.468,38 | 6.957,45 |
| Fabricació de productes ceràmics, rajoles i productes de terra cuita per a la construcció | 20 | 4,65% | 20,93% | 250.698,40 | 52.473,16 | 976,72 | 474.756,70 | 423.260,26 | 710.475,60 | 364.218 | 7.207,30 | 824.611,08 | 343.038,60 | 6.788,19 |
| Fabricació de ciment, calç i guix | 21 | 0,42% | 20,08% | 345.305,70 | 69.350,71 | 305,57 | 407.302,80 | 338.257,65 | 795.724,52 | 388.427 | 2.217,50 | 720.479,37 | 349.601,20 | 1.995,85 |
| Fabricació d'elements de formigó, guix i ciment i productes minerals no metàl·lics; indústria de la pedra | 22 | 0,21% | 20,04% | 895.472,50 | 179.471,78 | 797,31 | 1.187.820,60 | 1.009.146,12 | 2.328.310,93 | 741.545 | 13.943,30 | 2.320.157,73 | 707.153,33 | 13.296,63 |
| Metal·lúrgia | 23 | 0,00% | 20,00% | 1.416.031,80 | 283.217,51 | 19,01 | 2.312.182,20 | 2.028.983,69 | 3.430.528,70 | 943.919 | 10.245,20 | 3.175.628,90 | 865.982,16 | 9.399,28 |
| Fabricació de productes metàl·lics (excepte maquinària i equips) | 24 | 1,82% | 20,36% | 3.246.246,80 | 661.083,52 | 40.610,56 | 5.168.967,70 | 4.548.494,73 | 8.631.566,74 | 3.334.306 | 93.958,50 | 8.178.840,33 | 3.074.382,03 | 86.634,03 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Indústries de la construcció de maquinària i equips mecànics | 25 | 7,75% | 21,55% | 2.388.456,60 | 514.702,89 | 17.089,06 | 5.450.663,70 | 4.953.049,88 | 7.180.589,03 | 2.722.037 | 60.642,50 | 6.394.061,13 | 2.514.080,54 | 56.009,58 |
| Fabricació de màquines d'oficina i equips informàtics | 26 | 9,93% | 21,99% | 44.437,60 | 9.770,01 | 6.315,22 | 148.519,60 | 145.064,82 | 169.050,10 | 35.294 | 1.070,30 | 133.168,39 | 34.573,91 | 1.048,45 |
| Fabricació de maquinària i materials elèctrics | 27 | 2,46% | 20,49% | 2.352.363,00 | 482.057,27 | 3.274,05 | 4.257.209,40 | 3.778.426,18 | 5.007.131,29 | 1.625.295 | 27.395,30 | 4.855.799,38 | 1.466.019,86 | 24.710,63 |
| Fabricació de materials electrònics; fabricació d'equips i aparells de ràdio, televisió i comunicacions | 28 | 19,02% | 23,80% | 565.740,40 | 134.664,26 | 754,03 | 1.999.893,80 | 1.865.983,57 | 2.079.957,00 | 422.862 | 9.721,60 | 2.054.600,99 | 394.998,17 | 9.081,01 |
| Fabricació d'equips i instruments medicoquirúrgics, de precisió, òptica i rellotgeria | 29 | 15,88% | 23,18% | 274.185,60 | 63.545,62 | 3.831,78 | 821.014,80 | 761.300,95 | 1.153.726,90 | 518.099 | 9.990,90 | 1.129.404,44 | 478.762,34 | 9.232,35 |
| Fabricació de vehicles de motor, remolcs i semiremolcs | 30 | 24,58% | 24,92% | 4.474.193,60 | 1.114.771,75 | 20.837,44 | 12.939.216,40 | 11.845.282,09 | 14.826.808,74 | 3.150.574 | 62.638,50 | 14.431.336,30 | 2.898.447,74 | 57.625,82 |
| Fabricació d'altres materials de transport | 31 | 10,48% | 22,10% | 497.668,10 | 109.967,45 | 6.373,24 | 1.299.182,80 | 1.195.588,59 | 1.378.680,00 | 381.308 | 7.594,40 | 1.290.765,47 | 352.764,58 | 7.025,91 |
| Fabricació de mobles; altres indústries manufactureres | 32 | 33,84% | 26,77% | 1.351.400,10 | 361.751,37 | 43.152,54 | 2.605.016,00 | 2.286.417,18 | 3.310.121,51 | 1.161.554 | 42.638,40 | 3.069.344,07 | 1.048.193,71 | 38.477,17 |
| Reciclatge | 33 | 0,00% | 20,00% | 196.695,60 | 39.339,12 | - | 196.695,60 | 157.356,48 | 1.306.662,26 | 155.563 | 1.391,60 | 1.198.842,66 | 139.776,77 | 1.250,38 |
| Producció i distribució d'energia elèctrica | 34 | 19,19% | 23,84% | 737.213,90 | 175.734,57 | 107.564,09 | 1.313.737,90 | 1.245.567,41 | 3.503.309,34 | 1.303.773 | 4.005,20 | 3.754.943,72 | 1.302.419,04 | 4.001,04 |
| Producció i distribució de gas, vapor i aigua calenta | 35 | 16,77% | 23,35% | 300.613,30 | 70.203,43 | - | 546.388,10 | 476.184,67 | 1.871.190,79 | 671.894 | 1.896,10 | 1.737.578,15 | 623.465,75 | 1.759,43 |
| Captació, potabilització i distribució d'aigua | 36 | 46,82% | 29,36% | - | - | - | 548.717,70 | 548.717,70 | 1.067.343,79 | 555.075 | 4.996,30 | 1.190.124,34 | 546.912,72 | 4.922,83 |
| Construcció | 37 | 1,59% | 20,32% | - | - | - | 23.021.729,80 | 23.021.729,80 | 37.981.820,11 | 16.514.981 | 338.976,00 | 38.194.978,98 | 16.452.124,55 | 337.685,85 |
| Venda, manteniment i reparació de vehicles de motor | 38 | 49,90% | 29,98% | 979.634,80 | 293.697,12 | - | 4.438.798,50 | 4.145.101,38 | 5.719.301,52 | 3.235.011 | 63.314,90 | 6.027.714,76 | 3.026.555,96 | 59.235,07 |
| Comerç a l'engròs i intermediaris (excepte vehicles de motor) | 39 | 34,96% | 26,99% | 5.423.648,10 | 1.463.951,82 | - | 14.940.765,60 | 13.476.813,78 | 23.626.351,20 | 12.022.048 | 208.017,20 | 19.485.313,34 | 11.053.956,91 | 191.266,34 |
| Comerç al detall (excepte vehicles de motor); reparacions | 40 | 85,03% | 37,01% | - | - | - | 8.423.866,10 | 8.423.866,10 | 9.327.941,40 | 6.026.839 | 274.057,40 | 9.517.381,95 | 6.021.070,04 | 273.795,06 |
| Hotels, càmpings i altres tipus d'allotjament | 41 | 69,14% | 33,83% | - | - | - | 2.280.346,30 | 2.280.346,30 | 2.592.962,28 | 1.667.691 | 39.543,20 | 3.274.999,47 | 1.676.669,80 | 39.756,10 |
| Restaurants, establiments de begudes, menjadors col·lectius i provisió de menjars preparats | 42 | 97,59% | 39,52% | - | - | - | 15.795.433,90 | 15.795.433,90 | 16.156.915,70 | 9.229.610 | 151.904,50 | 15.752.045,60 | 9.233.130,67 | 151.962,44 |
| Transport per ferrocarril | 43 | 72,01% | 34,40% | - | - | - | 207.090,80 | 207.090,80 | 367.811,40 | 244.268 | 3.373,80 | 408.617,85 | 239.644,10 | 3.309,94 |
| Altres tipus de transport terrestre | 44 | 19,44% | 23,89% | 1.576.382,80 | 376.553,94 | - | 4.062.915,00 | 3.686.361,06 | 7.875.740,77 | 3.257.298 | 93.920,40 | 7.510.194,66 | 3.074.238,86 | 88.642,11 |
| Transport marítim, de cabotatge i per vies interiors | 45 | 26,96% | 25,39% | 14.852,40 | 3.771,46 | 1.466,99 | 118.860,60 | 116.556,13 | 218.393,10 | 145.237 | 511,70 | 219.022,37 | 142.702,64 | 502,77 |
| Transport aeri i espacial | 46 | 46,29% | 29,26% | 770.921,10 | 225.560,43 | 7.164,62 | 1.465.093,70 | 1.246.697,89 | 1.662.386,89 | 635.112 | 7.058,60 | 1.533.233,74 | 552.482,53 | 6.140,27 |
| Activitats afins al transport | 47 | 4,13% | 20,83% | 1.931.530,70 | 402.259,56 | - | 3.170.590,90 | 2.768.331,34 | 7.404.426,55 | 3.062.016 | 34.075,90 | 6.707.748,54 | 2.788.309,61 | 31.029,93 |
| Activitats d'agències de viatges i operadors turístics | 48 | 72,18% | 34,44% | - | - | - | 1.468.705,00 | 1.468.705,00 | 1.704.826,00 | 371.831 | 8.234,90 | 1.747.431,73 | 372.649,86 | 8.253,03 |
| Correus i telecomunicacions | 49 | 29,75% | 25,95% | 210.192,90 | 54.545,83 | - | 2.478.809,10 | 2.424.263,27 | 6.498.906,50 | 3.814.539 | 28.454,80 | 6.485.091,43 | 3.699.243,84 | 27.594,75 |
| Mediació financera (excepte assegurances i plans de pensions) | 50 | 29,40% | 25,88% | 750.973,30 | 194.354,22 | 7.883,11 | 3.120.583,00 | 2.934.111,89 | 7.220.638,25 | 5.757.796 | 53.779,80 | 7.489.891,06 | 5.473.211,09 | 51.121,68 |
| Assegurances i plans de pensions (excepte Seguretat Social obligatòria) | 51 | 62,44% | 32,49% | 260.443,70 | 84.614,57 | 43.696,92 | 1.758.194,40 | 1.717.276,75 | 2.504.031,40 | 1.198.128 | 13.305,60 | 2.650.842,96 | 1.176.541,76 | 13.065,87 |
| Activitats auxiliars de la mediació financera | 52 | 31,47% | 26,29% | 127.700,30 | 33.577,07 | 72.629,38 | 682.159,20 | 721.211,51 | 1.627.935,91 | 498.248 | 9.757,80 | 1.052.178,20 | 530.975,53 | 10.398,73 |
| Activitats immobiliàries | 53 | 56,20% | 31,24% | - | - | - | 15.707.163,30 | 15.707.163,30 | 23.001.663,87 | 15.224.167 | 37.943,20 | 20.571.988,76 | 15.070.936,99 | 37.561,31 |
| Activitats de lloguer | 54 | 21,35% | 24,27% | 188.126,10 | 45.658,12 | - | 770.623,60 | 724.965,48 | 1.688.906,32 | 838.273 | 8.953,60 | 1.583.285,08 | 815.292,33 | 8.708,15 |
| Activitats informàtiques | 55 | 1,12% | 20,22% | 930.206,00 | 188.115,71 | - | 2.183.597,20 | 1.995.481,49 | 3.139.637,91 | 1.841.510 | 33.405,60 | 2.923.683,15 | 1.721.614,06 | 31.230,65 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recerca i desenvolupament | 56 | 32,59% | 26,52% | 152.812,90 | 40.522,25 | - | 870.113,90 | 829.591,65 | 1.622.473,91 | 175.921 | 3.820,60 | 360.320,83 | 166.781,95 | 3.622,12 |
| Altres activitats empresarials | 57 | 3,71% | 20,74% | 3.475.951,90 | 720.975,63 | - | 8.616.418,10 | 7.895.442,47 | 20.954.159,37 | 11.220.127 | 257.205,20 | 17.881.528,85 | 10.654.760,51 | 244.244,99 |
| Administració pública, defensa i Seguretat Social obligatòria | 58 | 100,00% | 40,00% | - | - | - | 7.922.968,00 | 7.922.968,00 | 7.922.968,00 | 5.574.101 | 128.528,50 | 8.499.899,60 | 5.574.101,20 | 128.528,50 |
| Educació | 59 | 95,00% | 39,00% | - | - | - | 6.338.696,60 | 6.338.696,60 | 7.024.758,20 | 5.897.093 | 139.381,00 | 7.621.108,73 | 5.878.089,69 | 138.931,85 |
| Activitats sanitàries i veterinàries, serveis socials | 60 | 91,65% | 38,33% | - | - | - | 10.720.356,90 | 10.720.356,90 | 11.886.892,72 | 7.875.862 | 184.358,20 | 11.856.976,29 | 7.868.791,75 | 184.192,69 |
| Activitats de sanejament públic | 61 | 49,90% | 29,98% | - | - | - | 896.097,40 | 896.097,40 | 1.480.184,35 | 642.619 | 12.492,90 | 1.418.235,09 | 630.119,99 | 12.249,91 |
| Activitats associatives | 62 | 79,29% | 35,86% | - | - | - | 359.453,70 | 359.453,70 | 532.555,29 | 233.167 | 7.086,40 | 557.596,38 | 229.690,11 | 6.980,74 |
| Activitats recreatives, culturals i esportives | 63 | 65,38% | 33,08% | 1.124.247,50 | 371.848,01 | 6.674,45 | 6.101.392,10 | 5.736.218,54 | 6.937.820,60 | 3.674.855 | 65.604,10 | 6.836.182,60 | 3.495.223,76 | 62.397,30 |
| Activitats diverses de serveis personals | 64 | 90,53% | 38,11% | - | - | - | 1.499.033,40 | 1.499.033,40 | 1.722.099,90 | 1.170.348 | 52.706,80 | 1.683.885,96 | 1.170.671,91 | 52.721,38 |
| Llars que ocupen personal domèstic | 65 | 100,00% | 40,00% | - | - | - | 1.376.833,10 | 1.376.833,10 | 1.376.833,10 | 1.376.833 | 151.430,90 | 1.376.833,10 | 1.376.833,10 | 151.430,90 |
| **TOTAL** | | | | **62.654.388,40** | **15.506.965,50** | **1.045.873,27** | **239.712.727,80** | **225.251.635,57** | **348.075.071,27** | **162.430.392,30** | **3.254.554,90** | **330.634.792,32** | **155.858.112,38** | **3.126.014,99** |

*The values of b, L, G, D', X', VA' and N' correspond to the particular case in which $b_c$=0,4 and $b_E$=0,2

**Source:** See the text

# Taula A2

| | | VA-VA' | N-N' | Reduction VA |
|---|---|---|---|---|
| INDUSTRY | | (thousands of €) | (jobs) | % |
| Indústries làcties | 8 | 66.248,62 | 988,89 | 20,22% |
| Indústries de la confecció i de la pelleteria | 11 | 111.140,00 | 5.404,46 | 15,59% |
| Transport aeri i espacial | 46 | 82.628,97 | 918,33 | 13,01% |
| Indústries tèxtils | 10 | 183.888,43 | 6.519,27 | 12,15% |
| Indústries químiques | 17 | 602.447,66 | 8.210,13 | 11,09% |
| Indústries càrnies | 6 | 116.971,87 | 3.595,40 | 10,41% |
| Indústries d'altres productes alimentaris i tabac | 7 | 175.404,40 | 4.704,11 | 10,16% |
| Reciclatge | 33 | 15.786,43 | 141,22 | 10,15% |
| Fabricació de ciment, calç i guix | 21 | 38.825,40 | 221,65 | 10,00% |
| Fabricació de maquinària i materials elèctrics | 27 | 159.274,94 | 2.684,67 | 9,80% |
| Fabricació de mobles; altres indústries manufactureres | 32 | 113.359,99 | 4.161,23 | 9,76% |
| Edició, arts gràfiques i reproducció de suports enregistrats | 15 | 200.160,58 | 4.608,08 | 9,50% |
| Fabricació de vidre i productes de vidre | 19 | 32.449,82 | 711,15 | 9,27% |
| Elaboració de begudes | 9 | 78.173,39 | 1.226,17 | 9,13% |
| Activitats afins al transport | 47 | 273.706,69 | 3.045,97 | 8,94% |
| Indústries del paper | 14 | 104.164,38 | 1.747,53 | 8,69% |
| Metal·lúrgia | 23 | 77.936,84 | 845,92 | 8,26% |
| Fabricació de productes de cautxú i matèries plàstiques | 18 | 148.343,49 | 3.283,32 | 8,21% |
| Indústries de la fusta i del suro (excepte mobles); cistelleria i esparteria | 13 | 42.058,44 | 1.760,12 | 8,17% |
| Comerç a l'engròs i intermediaris (excepte vehicles de motor) | 39 | 968.091,09 | 16.750,86 | 8,05% |
| Fabricació de vehicles de motor, remolcs i semiremolcs | 30 | 252.126,46 | 5.012,68 | 8,00% |
| Fabricació de productes metàl·lics (excepte maquinària i equips) | 24 | 259.923,67 | 7.324,47 | 7,80% |
| Indústries del cuir i del calçat | 12 | 12.186,88 | 384,78 | 7,72% |
| Indústries de la construcció de maquinària i equips mecànics | 25 | 207.956,26 | 4.632,92 | 7,64% |
| Fabricació d'equips i instruments medicoquirúrgics, de precisió, òptica i rellotgeria | 29 | 39.336,26 | 758,55 | 7,59% |
| Fabricació d'altres materials de transport | 31 | 28.543,22 | 568,49 | 7,49% |
| Producció i distribució de gas, vapor i aigua calenta | 35 | 48.428,55 | 136,67 | 7,21% |
| Refinació de petroli i tractament de combustibles nuclears | 16 | 33.323,09 | 64,53 | 6,76% |
| Fabricació de materials electrònics; fabricació d'equips i aparells de ràdio, televisió i comunicacions | 28 | 27.864,03 | 640,59 | 6,59% |
| Activitats informàtiques | 55 | 119.895,94 | 2.174,95 | 6,51% |
| Venda, manteniment i reparació de vehicles de motor | 38 | 208.454,64 | 4.079,83 | 6,44% |
| Fabricació de productes ceràmics, rajoles i productes de terra cuita per a la construcció | 20 | 21.179,30 | 419,11 | 5,82% |
| Altres tipus de transport terrestre | 44 | 183.058,74 | 5.278,29 | 5,62% |
| Recerca i desenvolupament | 56 | 9.138,95 | 198,48 | 5,19% |
| Altres activitats empresarials | 57 | 565.366,69 | 12.960,21 | 5,04% |
| Mediació financera (excepte assegurances i plans de pensions) | 50 | 284.584,91 | 2.658,12 | 4,94% |
| Activitats recreatives, culturals i esportives | 63 | 179.630,94 | 3.206,80 | 4,89% |
| Fabricació d'elements de formigó, guix i ciment i productes minerals no metàl·lics; indústria de la pedra | 22 | 34.391,97 | 646,67 | 4,64% |
| Extracció d'altres minerals (excepte els productes energètics) | 5 | 9.951,70 | 113,56 | 4,17% |
| Silvicultura, explotació forestal i serveis relacionats | 2 | 4.500,97 | 135,20 | 3,49% |
| Pesca, aqüicultura i serveis relacionats | 3 | 4.330,65 | 122,71 | 3,39% |
| Agricultura, ramaderia, caça i serveis relacionats | 1 | 51.598,02 | 2.012,56 | 3,05% |
| Correus i telecomunicacions | 49 | 115.294,86 | 860,05 | 3,02% |

| | | | | |
|---|---|---|---|---|
| Extracció de productes energètics | 4 | 654,62 | 10,54 | 2,80% |
| Activitats de lloguer | 54 | 22.980,27 | 245,45 | 2,74% |
| Fabricació de màquines d'oficina i equips informàtics | 26 | 720,39 | 21,85 | 2,04% |
| Activitats de sanejament públic | 61 | 12.499,11 | 242,99 | 1,95% |
| Transport per ferrocarril | 43 | 4.623,80 | 63,86 | 1,89% |
| Assegurances i plans de pensions (excepte Seguretat Social obligatòria) | 51 | 21.586,64 | 239,73 | 1,80% |
| Transport marítim, de cabotatge i per vies interiors | 45 | 2.534,46 | 8,93 | 1,75% |
| Activitats associatives | 62 | 3.476,69 | 105,66 | 1,49% |
| Captació, potabilització i distribució d'aigua | 36 | 8.161,78 | 73,47 | 1,47% |
| Activitats immobiliàries | 53 | 153.229,61 | 381,89 | 1,01% |
| Construcció | 37 | 62.856,55 | 1.290,15 | 0,38% |
| Educació | 59 | 19.003,11 | 449,15 | 0,32% |
| Producció i distribució d'energia elèctrica | 34 | 1.353,56 | 4,16 | 0,10% |
| Comerç al detall (excepte vehicles de motor); reparacions | 40 | 5.769,26 | 262,34 | 0,10% |
| Activitats sanitàries i veterinàries, serveis socials | 60 | 7.070,65 | 165,51 | 0,09% |
| Administració pública, defensa i Seguretat Social obligatòria | 58 | - | - | 0,00% |
| Llars que ocupen personal domèstic | 65 | - | - | 0,00% |
| Activitats diverses de serveis personals | 64 | - 323,81 | - 14,58 | -0,03% |
| Restaurants, establiments de begudes, menjadors col·lectius i provisió de menjars preparats | 42 | - 3.520,27 | - 57,94 | -0,04% |
| Activitats d'agències de viatges i operadors turístics | 48 | - 818,46 | - 18,13 | -0,22% |
| Hotels, càmpings i altres tipus d'allotjament | 41 | - 8.979,00 | - 212,90 | -0,54% |
| Activitats auxiliars de la mediació financera | 52 | - 32.727,13 | - 640,93 | -6,57% |
| **TOTAL** | | **6.572.279,92** | **128.539,91** | **4,05%** |

**Source**: Table A1