Instituto de Crédito Oficial

Methodology report on the employment impact of ICO's Social Bond

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March 2018

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1. Introduction

The Instituto de Crédito Oficial (ICO) launched in 2015 the first Social Bond in Spain. The social bonds are framed within what is called in the international capital markets **"Sustainability Bonds"**. It is an issue modality whose funds are used to finance operations that generate a positive social or environmental impact.

Funds raised through the Social Bond serve to create or maintain employment in the most economically disadvantaged regions of Spain. ICO, through its second-floor facilities, is committed to financing SMEs that are located in **regions with a GDP per capita below the national average,** achieving value for the social impact of the activity**.**

The second-floor facilities are financing lines in which **ICO grants financing through the Credit Institutions,** and may have the purpose of **financing productive activities and / or liquidity.**

ICO has developed and implemented its own macroeconomic impact methodology based on the input-output analysis of the National Accounts, which is an standard methodology, broadly accepted and used for conducting these kind of analysis, **along with statistical and econometric techniques, to measure the impact of its activity on the Spanish economy.**

This methodology is based on a previous internal report on the recommended methodology for measuring the macroeconomic impact of ICO's activity, prepared by PriceWaterhouseCoopers (PwC)**, at the request of ICO, in December 2015.**

In addition, ICO's Research and Evaluation Department has introduced changes to the basic methodological framework **as a result of two fundamental factors. On the one hand, the models have been adapted** to the internal and external information available **for carrying out economic impact analyses. On the other,** improvements in specific processes have been introduced as a result of the practice observed principally during the process of measuring the macroeconomic impact of second-floor facilities, direct loans and venture capital.

Specifically, the ICO has developed an analysis for the quantification of the macroeconomic impact generated by its financing activity linked to the **Social Bond. The macroeconomic**

variable on which the impact is measured is employment in terms of full-time equivalent employment[1].

2. General methodology for measuring macro impact

The methodology and specific procedures developed allows measuring the impact of ICO's activity referred to Social Bond on Spanish economy, specifically on employment, differentiating according to the agent or agents generating the impact.

- Direct impact: This relates to the economic activity generated directly through companies receiving ICO financing.

- Indirect impact: This relates to the economic activity generated in the chain of suppliers of goods and services to companies receiving ICO financing.

- Induced impact: This relates to the economic activity generated by the employees of companies affected either directly or indirectly, owing to their consumption of goods and services as a result of increased income from work.

The procedure for measuring direct impacts has specific peculiarities that have to do with the financing product itself and the purpose of the loan (productive investments/liquidity). Thus, the analysis of the economic impact of second-floor facilities is based on two categories:

- Productive investments: This includes financing granted to companies making productive investments.
- Liquidity to finance working capital: This represents financing granted to companies to cover their liquidity needs.

Given that the impact generated under each of these two categories is of a very different nature and therefore also has a very different effect on the economy, an independent analysis is carried out for each of them.

On the other hand, for the estimation of indirect and induced impacts, a common methodology, the so-called input-output methodology, is used as we will see later.

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[1] Full-time equivalent employment is defined as total hours worked divided by the average annual number of hours worked in full-time jobs within the economic territory

3. Loans to productive investment

Financing granted by ICO under this category generates an impact on the economy in two ways: first, through the direct impact generated as a result of the potential increase in the production of the company receiving the financing, owing to an increase in its productive capacity; and, second, through the indirect and induced impact on the economy as a whole as a result of the investments being made.

Direct impact on employment

To quantify the impact in terms of employment, the following steps will be taken:

- Identifying the total volume of financing granted for productive investments. This amount must be broken down by the sectors of activity (CNAE) of the beneficiaries of the financing.

- Calculating the production/GFCF ratio: To estimate the increase in production resulting from the productive investment, it is necessary, first, to estimate the national average ratio between production and gross fixed capital formation (GFCF), which measures the relationship between total national investment in fixed assets and the volume of production for the whole of the country in a given year.

- Estimating the increase in production associated with productive investments granted by ICO: For this, it will be necessary to multiply the volume of financing granted for each sector of activity by the average production/GFCF ratio for the specific year to be estimated. This will yield the total increase in production generated directly by ICO in each sector of activity.

- Calculating the average employment coefficients of the companies receiving financing, which measure, for those companies, the average number of employees for each euro of production. This coefficient is calculated as the ratio between the number of full-time employees in the sector and the production for that sector.

- Applying the employment coefficients to the results for impact in terms of production. Once the employment coefficients have been calculated, the direct impact would be the

result of multiplying those coefficients by the direct impact on production estimated previously.

Indirect and induced impact on employment

The indirect and induced impact on employment is calculated following the general input-output methodology detailed in section 5.

4. Loans to liquidity/working capital

Transactions intended to finance liquidity to cover a company's current liabilities are identified in the same way as productive investments are identified.

It is assumed that the working capital financing needs covered by ICO principally relate to the payment of suppliers. In general, this financing does not generate new activity in the economy, as it is used to cover payment commitments which have already been made, but it does avoid a potential negative effect on the economy resulting from problems related to a lack of liquidity on the part of companies.

Accordingly, the approach taken is that the impact generated by ICO by means of this kind of financing will correspond to the effect of the financing on the recipients and on their suppliers.

In this regard, ICO financing allows companies which receive it to pay their suppliers, avoiding a decrease in production (direct impact).

The payment of suppliers allows the normal activity of ICO's client company and, consequently, that of its suppliers (knock-on effect) to be maintained and it avoids the latter having to bear the financing cost associated with not being paid at the agreed time.

Direct impact on employment

The direct impact on employment corresponds to the number of employees associated with the production preserved as a result of the liquidity loan. To quantify this impact, the following steps will be taken.

– <u>Estimating the turnover preserved by the ICO financing (preserved turnover).</u> For this, the volume of turnover preserved by the amount of the loan used for liquidity is approximated.

– Taking the <u>employment coefficients</u> in relation to production at sector level. <u>Applying the</u> employment <u>coefficients</u> to the results for impact in terms of production.

– The direct impact would be the result of multiplying those coefficients by the direct impact on production estimated previously.

Indirect and induced impact on employment

In this case, the indirect and induced impacts correspond to the knock-on effect avoided on account of the production preserved as a result of the loan being granted. For that, the following steps are required:

– Starting from the preserved turnover calculated previously.

– Distributing the total amount of production preserved by sector. For that, this amount will be distributed according to the intermediate consumption patterns of the branches of activity of the ICO client companies in relation to the other branches of activity of the economy.

– Based on amounts of each sector already calculated, indirect and induced impact in terms of employment, according to general methodology detailed in part 5.

5. Input-output methodology

The input-output methodology is a standard technique, widely used to estimate direct and induced impact on GDP and employment.

In general, the starting point for the development of input-output models is the symmetric input-output tables[2] (SIOT), which serve as a basis for calculating the multiplier matrices or Leontief inverse matrices. Both the SIOT and their associated multiplier matrices are usually published by the different national statistical institutes, as is the case with the Spanish National Statistics Institute (Instituto Nacional de Estadística: INE).

The input-output methodology is based on the Leontief production model, in which the production requirements of an economy are equivalent to the intermediate demand for goods and services on the part of the productive sectors, plus final demand, as summarised in the following expression:

$$X = AX + y$$

where X is a column vector representing the production needs of each sector of the economy, y is a column vector representing the final demand of each sector, and A is matrix known as a

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[2] The SIOT are a product-by-product or activity-by-activity matrix which describe, in detail, the national production processes and the product transactions of the national economy.

technical coefficient matrix, which indicates, by rows, for each particular sector, the percentage of its production which goes to each of the other sectors of the economy, and, by columns, also for each sector, the proportion of their production of goods and services which it requires of each of the other sectors of the economy. The above expression may also be seen in the following form:

$$\begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ \\ X_n \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} & a_{13} & \cdots & a_{1m} \\ a_{21} & a_{22} & a_{23} & \cdots & a_{2m} \\ a_{31} & a_{32} & a_{33} & \cdots & a_{3m} \\ \\ a_{n1} & a_{n2} & a_{n3} & \cdots & a_{nm} \end{bmatrix} \times \begin{bmatrix} X_1 \\ X_2 \\ X_3 \\ \\ X_n \end{bmatrix} + \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ \\ y_n \end{bmatrix}$$

where, for example, X_1 is the production needs of sector 1, y_1 is the final demand of the same sector, and a_{11}, a_{12}, a_{13}, ..., a1m are the percentages of the production of sector 1 which go to, respectively, sectors 1, 2, 3, ..., m, while a_{11}, a_{21}, a_{31}, ..., a_{n1} are the proportions of the production of sector 1 of the goods and services required, respectively, by sectors 1, 2, 3, ..., n.

Reordering the above expression, it is possible to calculate the production needs of an economy (X) based on the final demand (y). This is done as follows:

$$X = (I\text{-}A)^{-1} y$$

Where $(I\text{-}A)^{-1}$ is the Leontief inverse matrix or production multiplier matrix used to calculate impact. These matrices make it possible, for each euro invested or paid out in the different sectors (that is, for each euro of final demand), to determine the impact in terms of gross production (that is, production needs). This matrix is the starting point for estimating indirect and induced impact, both on GDP and on employment.

6. Input-output model development

Measurement of indirect impact on employment

To estimate the indirect impact on employment generated by ICO, the different phases and procedures required to calculate those impacts are detailed below:

– **Quantification of financing broken down by sectors affected,** according to SIOT.

- **We multiply the amounts paid out in each sector by the matrix of production multipliers, giving a vector with the indirect impact in terms of production.**

- **Calculation of employment coefficients by sector,** that is, the quotient of the number of employees and the production for each sector.

- **The indirect impact by sector will be the result of multiplying the indirect impact on production by sector**, by the employment coefficient for each sector.

- Subsequently, the total indirect impact is obtained by adding up the indirect impact on each sector affected.

Measurement of induced impact on employment

- Determining what proportion of the activity generated translates into an increase in wage income, for which it is necessary to calculate what proportion of the production generated, either directly or indirectly, relates to employee remuneration, using the wages and salaries ratio for production in each sector.

- Once the wage income generated in each sector as a whole has been calculated, the proportion of that income used for consumption and which therefore generates additional economic activity will be estimated, for which it will be necessary to estimate the value of the 'marginal propensity to consume[3]' (MPC) for the Spanish economy. The value of the MPC can be estimated by developing an econometric model which relates household disposable income and consumption.

- The total amount of this estimated increase in consumption would represent a proportion of the induced impact on production. In addition to this impact, it would be necessary to calculate the additional increase in activity which such consumption generates in the sectors in which it takes place (indirect impact of the induced impact). For that, the total amount of this consumption must be distributed among the different sectors of economic activity in which it occurs, applying to this figure the proportion for each sector in relation to total consumption by Spanish households taken from the SIOT ('Final consumption expenditure' column).

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[3] Increase in consumption by an individual as a result of an increase in their disposable income (income after payment of taxes)

- Once the amount for the increase in consumption has been obtained for each sector, those amounts will be multiplied by their corresponding sectoral production multiplier, yielding the induced impact on production as a whole.

- The final step would be to transform this impact on production into impact on employment, multiplying the impact on each sector by the employment/production ratio for each sector.

- Lastly, the total induced impact is obtained by aggregating the impact for each sector.