

Expanded abstract

Impact Assessment of public policies: temporal analysis of reindustrialization program (REINDUS) in Spain

It is expected that this research will contribute to the economic literature on the importance of evaluating the impact of public policies in order to improve the allocation of financial resources as well as contribute to the productivity and efficiency of companies. For this, the REINDUS program has been taken as a reference, one of the most representative instruments of industrial policy in Spain, which grants, among others, soft loans to companies with the purpose of promoting industrial development through business improvement and efficiency of the productive sectors. The period analyzed includes calls between 2009 and 2014, based on 689 SMEs with required information. Therefore, the objective of this research is focused on advancing in the specification about the usefulness of soft loans, as an instrument of industrial policy, from the perspective of productivity and efficiency, in this way, it will be possible to contribute to the development of indicators and policies for monitoring and adapting the aid programs to companies, in order to optimize the allocation of these resources and generate the desired effects in the various public policies to support the development of the business fabric in Spain.

To study the improvement of productivity through the total change of the Total Factor Productivity (TFP), the Malmquist Index, initially introduced in the context of the consumer theory by Malmquist (1953), and the decompositions of Färe, Grosskopf et al. (1989, 1994) that assumed constant returns to scale using data envelopment analysis techniques, DEA (Orea and Zofio, 2017). Following this decomposition, we can calculate: (i) the productivity behavior (*malmquist*), (ii) the change in efficiency (*effch*), (iii) the technological change (*tech*). Färe, Grosskopf et al. (1994), provided the decomposition of efficiency into scale efficiency (*out / in-scalech*) and into pure efficiency change (*pure.out / in.effch*), finally, following Färe, Grifell-Tatjé et al. (1997), we can obtain the marginal rate of substitution (input-biased technical change *-ibtech-*) and the marginal rate of product transformation (output-biased technical change *-obtech-*) in presence of technological change and the magnitude of technical change *-matech-*.

To perform the necessary matching for the proposed analysis and because we are facing a quasi-experimental design, a combination of techniques is proposed, such as the analysis of Differences in Differences and the Matching by Nearby Neighbors using Mahalanobis Distance, to try to reduce the risk of bias in the estimation, since simple matching cannot account for unobservable characteristics (Pérez and Moral, 2015). To match the control and treatment groups, a model is used in which the criteria of financial capacity prevail, widely recognized by the literature on credit risk as determining factors when establishing the financing capacity of companies.

The analysis of the Total Factor Productivity (TFP) and its components in the study period, shows that the treated companies reduced their productivity on average, for example, the treated companies in the 2009 call shown a reduction in the TFP (*malmquist*) between 2012 and 2008 of 9%, while in the control companies the reduction was 7%. In the best case, call 2014, practically the same level of productivity was maintained among those treated (loss of 1% between 2013 and 2017). It was expected, therefore, that the investments made would have a positive effect on productivity, however, the results show the opposite, in fact, if technological change (*tech*) is observed, which implies a shift of the production frontier, presented a significant setback, it is striking, since it was the one that most contributed to the negative variation of the TFP in the analyzed period. The improvements came from positive changes in efficiency (*effch*), probably motivated by the reduction in wage costs after the crisis of 2007 and in line with the evolution of the labor market and the destruction of jobs in these years. Following the Färe decomposition, Grifell - Tatjé et al. (1997) we calculated the alternative directions of the bias of the inputs in the technological change. The STAF / FIAS input pair presented a bias towards the use fixed assets compared to savings in personnel expenses in the treated companies when technological change occurs, the same occurs with the treated companies in the FIAS / MATE relation, To the extent that this input is used, it generates savings in the production needed materials.

In general, the impact of the program did not show a positive effect within the treated companies compared to the control companies, in fact, there were setbacks in productivity (*malmquist*), mainly due to the technological setback (*tech-frontier shift*), which was largely offset by change in efficiency (*effch-catch up*). This technological decrease supposes a deviation from the policy objectives on the results obtained, therefore, emphasis will have to be placed on carrying out an exhaustive analysis of possible agency conflicts within the companies, on adjustment costs not contemplated in the policy, the amount of the loans and the execution of the projects proposed in such a way that the disbursements are subject to milestones that guarantee their execution.

It is proposed to design a monitoring strategy based on information technologies to facilitate and promote feedback on the objectives that allows managers to have up-to-date, quality, and robust information, recognizing that such responsibility also falls on the beneficiaries of the policy, since it is a public instrument on which companies must be accountable to society, making it a fundamental requirement to provide periodic information by the beneficiary to monitor the progress of the investments contemplated in the investment projects contributed in the time of application. Likewise, greater involvement is required from the managing entity in the realization of the business plans, mainly in the actions immediately after the disbursement, as carried out by private investment funds.

This work contributes to the economic literature a detailed analysis about the impact of the soft loans of the REINDUS program on the productivity and efficiency of the companies in the period 2009 to 2014, identifying the sources of the observed change on which the policy objectives can be adjusted to maximize its effectiveness, there is no previous work in this regard.

The main limitation of this work was presented in the information available for the realization of the paper. The aid Managing Administration (Dirección General de Industria y de la Pyme in 2017) refers to the Boletín Oficial del Estado where the results of the respective calls are published as the only source of information available to third parties, with the limitation that this implies. It was not until the results of the 2016 call that the rejected companies began to be published and in 2018 the scores obtained by the companies benefited exclusively, which indicates that there is a path to consolidate the institutionalization of the impact evaluation of public policies within of the Public Administration.

Keywords: Public economy, impact assessment, efficiency, productivity, Malmquist Index, technical change, technical efficiency change.