

Counterfactual Evaluation of the Impact of European Structural and Investment Funds on Firm Performance in Portugal, 2007-2015

Executive Summary

Comissioned by:



Conducted by:



Funded by:



Portugal 2020 Operational Programs involved:



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The evaluation

1. The “Counterfactual Impact Evaluation of the European Structural and Investment Funds on Firm Performance” aimed at estimating the impact of SI QREN¹ – a set of enterprise support mechanisms funded by the EU Cohesion Policy in Portugal in 2007-2013 – on several dimensions of the performance of firms.
2. The evaluation study is part of the Portugal 2020 Global Evaluation Plan and was commissioned by the Agency for Development and Cohesion (ADC) to an international team coordinated by Ricardo Paes Mamede, professor at ISCTE-IUL and researcher at DINÂMIA'CET. The research work was carried out between October 2017 and November 2018.
3. During its different stages, the project was closely followed by a steering group composed of representatives of various stakeholders, including: ADC, the Managing Authorities of the Competitiveness and Internationalization Operational Program and of the Regional Operational Programs of mainland Portugal, the National Statistical Institute (INE), representatives the Economic and Social Council, the Office for Strategy and Studies of the Ministry of Economy (GEE), the Agency for Competitiveness and Innovation (IAPMEI), the National Innovation Agency (ANI), the Agency for Investment and Foreign Trade of Portugal (AICEP), and Turismo de Portugal (TP). The steering group was coordinated by ADC.
4. Different matching methods were used to identify adequate samples of treated and non-treated firms. The impacts of the policy were estimated as the difference between the average performance of treated firms and the control group, after correcting the remaining biases using de Abadie & Imbens (2002, 2011) procedure.
5. The volume and diversity of firm-level data used in this research is unprecedented both nationally and internationally, allowing for a very detailed characterization of firms and the analysis of firm performance in different domains.
6. We assessed the impact of SI QREN on 50 firm performance variables, organized in 11 dimensions: investment, growth, financial situation, human resources qualifications, innovation, internationalization, competitiveness, eco-efficiency, gender equality, quality of employment and income distribution within companies.
7. For this purpose, we used data from various institutional sources: the national Statistics Institute, the research office of the Ministry of Labour, the Operational Program Compete 2020, the National Institute of Intellectual Property, the Statistics Department of the Ministry of Science and Technology, IAPMEI (the national agency for SMEs and investment), the Portuguese Agency of Accreditation, and PME Investimentos (a public agency dedicated to financial engineering solutions for SMEs).

¹ SI QREN stands for *Sistemas de Incentivos do Quadro de Referência Estratégica Nacional*, which can be translated as Incentive Schemes of the National Strategic Reference Framework.

8. ADC, in liaison with INE, ensured the conditions for data processing to take place in a data safe centre specifically installed for this purpose, in full respect for statistical confidentiality.
9. The total cost of the evaluation was € 74,686 (plus VAT) and was financed by the Technical Assistance OP of Portugal 2020, with the support of the European Regional Development Fund.

Characterization of the companies supported by SI QREN

10. Treated firms systematically differ *ex ante* (i.e., before being supported) from untreated ones in several characteristics. In particular, SI QREN is biased towards: manufacturing industries and knowledge-based services, firms with 10 or more workers (and in particular with 50 or more persons employed), and more sophisticated and financially robust firms (regardless of industry, scale or location).
11. Those differences between treated and non-treated firms consistently reflect the regulatory framework of SI QREN, as well as the eligibility and selection criteria of each call for application. They also reflect the fact that firms have different propensities to apply for support.
12. The methods used in this study aim at correcting the selection bias of SI QREN through the identification of adequate control groups. The quality of the control groups used in the estimation of impacts – as measured by common statistical metrics – is sufficiently high to support the conclusions presented below. In any case, it is important to bear in mind that the use of different methods, or criteria for the acceptance of control groups, could result in potentially different results.

The overall impacts of the SI QREN

13. The results suggest that SI QREN fulfilled its stated policy goals, contributing to improve the performance of supported firms in areas such as: investment in fixed capital, human capital, innovation, internationalization, and competitiveness.
14. In particular, we estimate positive and statistically significant impacts of SI QREN on: GFCF; number of employees; GVA and turnover; number of skilled and highly educated workers; R&D expenditures and staff; use of patents, trademarks and other forms and industrial property; certification of management systems; exports, export intensity, and export diversification; productivity; net profits and market share.
15. The size of the impacts remains stable, or is reinforced, over time, depending on the output variables.
16. The above points lead to the main conclusion of this study: SI QREN played a generally positive role in the light of the goals explicitly identified in the main policy documents.

The cost-effectiveness and additionality of SI QREN

17. The cost-effectiveness of SI QREN can be interpreted as the amount of incentive needed to generate a unit impact in a given output variable. It is computed as the ratio of the average amount of support to the estimated average impacts.
18. According to our results, it takes 2.12 euros of public support for SI QREN to induce an additional increase of one euro of GFCF per treated firm after three years. For other relevant variables, the cost-effectiveness is: 1.79 euros for GVA, 1.17 euros for exports, 17.41 euros for R&D expenses, around 82 thousand euros per (additional) employee, and nearly 416 thousand euros per (additional) worker with a university degree.
19. One measure related to cost-effectiveness is the additionality effect, which indicates the size of the impact generated by one euro of support. We conclude that after three years, each euro will induce a cumulative additional GFCF value of 1.41 euros.

Sustainability of impacts over time

20. Generally, as mentioned above, the effects of SI QREN remain positive several years after the start of the subsidized projects. The size of the estimated impacts varies over the time horizon considered, with some specific results worth noting.
21. The positive impacts of SI QREN on investment (particularly fixed capital) are greater during the execution of the supported projects, decreasing in the subsequent period. These results suggest that part of the effect of public support consists in the anticipation of investment decisions by firms, which would tend to carry them out later if they had not benefited from public support.
22. Bearing in mind that QREN (NSRF in English) took place during a period marked by a severe national and international economic crisis, the above-mentioned developments appear to indicate that the support schemes under SI QREN allowed many treated companies to make investments that comparable non-treated firms have only been able to achieve when financing conditions began to improve (especially from 2014 onwards).
23. In any case, the impact of SI QREN on treated firms' investment remains for several years, albeit with decreasing intensity. Within the maximum time horizon that could be analysed (i.e., until the end of the sixth year after the start of the project), treated firms continue to register an amount of accumulated investment that is higher than that of similar companies that did not benefit from SI QREN.
24. For other business performance variables – namely, productivity, exports, number of employees, R&D expenditures, and the number of workers with higher education – the impact of SI QREN not only remains positive over the years, as it increases over time.

25. Regarding the use of industrial property and the certification of management systems, the impact of incentive schemes remains largely unchanged until the end of the sixth year after the start of the project.

The impact of SI QREN on non-explicit policy objectives

26. The research also addressed the impact of SI QREN on some dimensions which are not explicitly presented in the regulatory documents as central goals of the policy under analysis, but the assessment of which can provide important elements for reflection by the authorities. In particular, we estimated the impacts of SI QREN on the following dimensions: firms' financial situation; job quality; intra-firm distribution of income; gender equality; and eco-efficiency.
27. Concerning the SI QREN as a whole, no statistically significant impacts were found for financial situation variables. These results do not stem from the absence of effects, but rather from the large variability of the estimated impacts among the companies under analysis. In fact, as mentioned below, it is possible to identify positive impacts on some variables of the financial situation when the analysis focuses on specific incentive schemes and/or companies with specific characteristics.
28. As regards job quality and intra-firm distribution of income, the conclusions are ambivalent. On the one hand, the SI QREN had positive impacts on the growth of the number of workers with permanent contracts and on the increase of the average earnings of the workers. On the other hand, there is a more than proportional increase in the number of workers with temporary contracts, which translates into a higher incidence of this type of contract.
29. According to the results obtained, the increase in the average remuneration of the labour factor that results from the public incentives can be explained by two factors: the increase human resources' qualifications; and a transfer of part of the productivity gains to labour factor remuneration.
30. Positive and statistically significant impacts on variables related to gender equality were identified in only in a small number of analyses.
31. In some cases, a moderately positive impact on eco-efficiency has been identified, namely a reduction in the intensity of fuel use.

Analysis of impacts by incentive scheme and support intensity

32. In general, the above-mentioned results for all the SI QREN are valid for each of the three incentive schemes that have been analysed individually (SI Inovação, SI QPME and the Vouchers).

33. The estimated impacts of SI Inovação are higher than those of other incentive schemes in most indicators measured in absolute terms (e.g., monetary units or number of workers). This result is expected given the larger average size of the firms supported by this incentive system. However, the impact of SI Inovação is greater for many of the output variables even when they are measured in relative terms. This result reflects the higher average amount of incentive provided by SI Inovação, as well as the nature of the projects supported (clearly aimed at increasing productive capacities).
34. SI Inovação also stands out for its greater and more robust impact on productivity, as compared to other incentive schemes or SI QREN as a whole. This specificity of SI Inovação is probably related to the strong component of fixed capital investment of supported projects, which tends to be associated with higher increases in value added per worker.
35. SI QPME stands out for its impacts on export intensity, geographical diversification of exports and likelihood of registration of brands. This is consistent with the main purposes of this incentive scheme (i.e. internationalization and qualification of SMEs). It also stands out by the positive impact on some indicators of financial situation (financial autonomy and general liquidity) and on profitability ratios (assets and turnover).
36. The incentives granted under SI QPME appear to lead to significant improvements in the financial performance of firms, but also to innovation, qualification and internationalization, without requiring the same amounts of average incentive as the other incentive schemes (in particular, SI Inovação).
37. SI QPME is more cost-effective (i.e., it requires less amounts of incentive to achieve an equivalent impact) than SI Inovação and SI QREN as a whole in most of the variables under analysis. The cost-effectiveness of SI Inovação is more favourable only in the case of GFCF and exports variables.
38. The estimated impacts of the Vouchers are mostly non-statistically significant. In the few cases in which the effects are statistically significant, their size is smaller than in SI Inovação and SI QPME. This is an expected result, given the low amount of incentive (less than 25 thousand euros, on average). Nevertheless, it is worth mentioning that the Vouchers have positive and statistically significant impacts on the number of employees, the education and qualification of workers, the probability of trademark application and the certification of management systems – these results are coherent with the purposes of this simplified type of public support.
39. The impacts of SI QREN are more noteworthy for companies benefiting from intermediate support intensities (i.e., between 20% and 50%) – compared to higher incentive intensities – in the case of GFCF, GVA, exports, employed personal, workers with higher education and R&D expenditures. The differences recorded are to some extent determined by the pre-treatment values of these variables. In the case of exports, however, the impacts are substantially higher for the intermediate level of incentive intensity even when measured in relative terms.
40. Cost-effectiveness is lower for all variables analysed for firms benefiting from lower support intensities, which is partly explained by the larger average size of the companies involved.

Heterogeneity of impacts by firms' characteristics

41. The impacts of SI QREN are greater in the case of the manufacturing industry than in other industries in the case of GVA, exports and R&D expenses, reflecting higher starting values of those variables. When impacts are expressed in relative terms (i.e., divided by the pre-treatment values), the specificity of the manufacturing industry weakens. The impacts of the SI QREN on manufacturing firms (as compared to the whole set of firms under analysis) are slightly lower in different employment and qualification output variables. The inadequacy of the control groups did not allow this analysis to be extended to other industry groups.
42. Regarding the heterogeneity among firm size classes, the results suggest that the impacts of SI QREN on the variables measured in absolute values (investment, exports, R&D expenses, personnel employed, number of workers with higher education, etc.) increase with the average size of companies, as expected. However, when measured in relative variations, the impacts are smaller for higher size classes.
43. The analysis of the heterogeneity of impacts by region of location of companies suggests that the Norte region stands out against the Centro region, and mainland Portugal as a whole, for GVA, turnover, exports, geographical diversification of exports, and export intensity. The Centro region stands out for a greater positive impact of SI QREN on the probability of applying for patents and on the increase of the average monthly earnings of the workers. The inadequacy of control groups did not allow this analysis to be extended to other regions.
44. The analysis of the heterogeneity of impacts by export intensity indicates that the SI QREN not only promoted the general increase of exports of treated firms but contributed also to reinforce the export orientation of the companies with a lower presence in the international markets. The impacts seem to be more relevant in the case of companies with an intermediate level of export intensity (between 10% and 50% of exports, as a share of turnover).
45. The impacts of SI QREN on GFCF (and also on GVA) are lower in the case of companies that also benefited from subsidized credit lines, suggesting that SI QREN produced smaller impacts on companies that have an easier access to external finance. However, firms benefiting from both types of support (subsidies and credit lines) show statistically significant results (in contrast to firms that did not access lines of credit) on investment in intangible assets, R&D expenditure and on productivity. This suggests that SI QREN and credit lines complement each other in promoting more advanced factors of competitiveness and greater efficiency of companies.
46. Relative to the average of SI QREN, the amount of incentive needed to induce a unit of impact is greater, for most variables, in the case of manufacturing industries, micro and small enterprises. In general, cost-effectiveness is greater for companies with reduced or intermediate levels of productivity.
47. It is costlier for the State to induce an additional euro of exports in companies with reduced export intensity than in other firms. This suggests that the pursuit of the goal of increasing the volume of exports is more easily achieved by supporting firms with intermediate or higher levels of export intensity. However, it should be noted that the impact on the increase in

exports and the intensity of exports is positive and statistically significant also for companies for which exports account for a small part of their turnover.

48. The amount of public funds needed to induce the same levels of impacts is generally lower for companies that do not hold SME Leader status. For companies benefiting from credit lines it becomes more costly for public funds to induce an additional GFCF increase (but less expensive to induce an equivalent effect on exports and R&D expenditure). These results suggest that the additionality effect on fixed capital investment is greater for companies whose access to financing is not facilitated by other public policy instruments in addition to the SI QREN.
49. Cost-effectiveness is generally more favourable in the Norte than in the whole mainland Portugal, except for the induction of GFCF and the number of workers with higher education (where the cost-effectiveness values are above average and close to the ones of Centro region).
50. The cost-effectiveness analysis by sets of companies with specific characteristics, presented in the previous points, suggests that no group reveals a relative advantage for all outcome variables. This indicates that the SI QREN as a whole may have played a relevant role in pursuing different policy objectives for different types of firms.

Main policy recommendations

Note: The recommendations presented below are addressed to all the bodies involved in the design, implementation and evaluation of incentive schemes in Portugal, in particular the Ministries, the management authorities and their monitoring committees, the relevant public agencies, and the evaluation network of Portugal 2020.

1. Since the results are overall and systematically positive, the general orientations of the SI QREN incentive schemes (which do not depart substantially from those of Portugal 2020) should be maintained for the future.
2. In particular, reasonably high levels of selectivity regarding firms' human resources qualification, innovation and internationalization should be maintained. The evaluation shows that positive impacts of the policy on innovation and productivity presupposes minimum levels of human capital in treated firms, while the full range of impacts on the internationalization of companies is boosted by minimum levels of experience in external markets.
3. The diversity of incentive schemes should be maintained. In fact, the results suggest that the different policy instruments under SI QREN fulfil different objectives for different types of firms, being broadly aligned with the objectives for which they were conceived. For example, SI QREN boost exports in companies with low or medium levels of export intensity, but not in companies that export most of their production; however, the SI QREN produce significant impacts on the latter type of firms in the domains of innovation and productivity. Likewise, although the additionality effect in GFCF is more limited for companies that benefit both the SI QREN and

credit lines, the two types of policy instruments seem to complement each other in promoting productivity and investments in intangible assets. With respect to the diversity of instruments, it can be seen that SI Inovação produced more relevant results in variables such as GFCF and productivity, while the SI QPME had more significant impacts in the domains of internationalization and qualification of SMEs – again, in line with its stated goals.

4. The authorities should consider reducing the requirements on firms' level of financial robustness as eligibility criteria. Our results show that the impact of public support tends greater and more cost-effective when the beneficiary companies do not have access to credit lines. This seems to indicate that incentive schemes make a greater difference when supported companies are less likely to access funding by other means. It may be more adequate to allocate a greater share of resources to companies in this situation.
5. The authorities responsible for the incentive schemes may also wish to consider allowing the generosity of support to depend on the financial situation of firms, using the same indicators as those used by banking institutions to decide on the granting of credit for business investment purposes. By reducing incentive rates for companies with an easier access to bank credit (and other forms of financing), resources could be freed up to support promising business projects aligned with public policy priorities that face greater difficulties in financing through other sources.
6. The authorities should also pay greater attention to the level of support given to firms with very high levels of export intensity. The impact of support in this type of firms is generally smaller and its cost per unit of impact higher, suggesting that this firms tend to rely less on public support to pursue their strategies. The results suggest that the funds could be used more efficiently and effectively if they are targeted at companies that have an intermediate level of export intensity.
7. There should be a broad debate on the possible inclusion of criteria linked to the quality of jobs created, income distribution, gender equality and eco-efficiency in assessing the applications for support. Those policy goals are set out in different national documents (National Reform Plan, Portugal 2020, among others), and direct support measures as SI QREN may contribute to their fulfilment. This possibility should be considered against the risk of diverting incentive schemes from other key objectives.
8. Studies with similar purposes to those presented here should be developed over time, instead of being limited to specific and time-limited evaluations. Despite its limitations, this type of analysis can be put to the service of specific research questions, thus contributing to refine public policies in relevant detail, with potential results in their efficiency and effectiveness. It is therefore recommended that the authorities responsible consider different institutional alternatives that allow this type of work to continue over time. One solution to consider is funding fellowships for postgraduate students who wish to develop their dissertations in these areas.