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Impact Evaluation of Innovation Programs in the Chilean Services Sector *

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Abstract

This paper evaluates the impact of overall participation in innovation public programs on the performance of firms in the services industry. Using information from four innovation surveys carried out between 2005 and 2011, we find that that these programs have not been associated with improvements in innovation performance neither have contributed to alleviate financial constraints. Our findings hold across industries and firm size and also to the utilization of alternatives methodologies. However, there is some evidence of positive effects in some variables and for some industries in particular. Our results suggest a positive effect of participation on product innovation for firms in non-KIBS industries and that public programs have increased the intensity of innovation in the sample of all firms, but mostly for non-KIBS industries.

JEL codes:D22, L2, 03

Keywords: innovation, policy evaluation, services

1. Introduction

There is wide a consensus that innovation is important for productivity growth and that productivity explains a large part of cross-country differences in income per capita and economic growth. Moreover, there are several reasons why free markets do not allow achieving optimal levels of private innovation investment. For this reason, most countries around the world have implemented public programs and special incentives to increase private investment in innovation.[1] In the case of Chile, since the mid–1990s, successive governments have promoted business innovation policies oriented to improving long-run productivity. Although there is some evidence that fiscal incentives encourage firm-level investments in innovation, the impact of these public policy programs on firm performance in developing countries in general, and in Chile in particular, has not been fully evaluated (Hall and Maffioli; 2008; Lopez-Acevedo and Tan, 2010).

Most of the literature on this issue comes from the manufacturing industry due mainly to data availability. There are some previous papers evaluating the impact of public programs in Chile. Benavente and Crespi (2003) looked at the effects of PROFO (Group Development Projects) on firm performance, and Benavente et al. (2007) evaluated the FONTEC program.[2]More recently, Tan (2009) estimated the impact of different productive development programs offered by the Chilean Development Agency (CORFO)and found evidence that participation in these programs is associated with improvements in intermediate outcomes (training, adoption of new technology, and organizational practices). He also found statistically significant effects of these programs on sales, production, labor productivity, wages, and exports. More recently, the SMEs division of CORFO carried out a full impact evaluation of the different programs aimed at productivity upgrading by SMEs (CORFO, 2010). The findings suggest that programs that provide technical assistance (such as the Technical Assistance Fund-FAT) and even the PROFO program had no impact on firm performance. This was not the case with regard to cluster and supplier development programs, where the results were encouraging. A notable feature of this evaluation is that it makes use of tax registry information, which allows for the identification of almost all the beneficiaries and for access to a large group of potential control firms. However, this same virtue is also a problem, as the information contained in the tax register on firm characteristics is very limited, which makes it of little use in identifying a comparable group of control firms[3].

This scarcity of evidence is even more pronounced in the services sector. In this paper, we try to fill this gap in the literature by looking at the impact of innovation programs on firms' performance in this sector. We use several measures of innovation outputs and inputs and we look at the potential heterogeneous impact across industries and firm size.

Using information from four innovation surveys carried out between 2005 and 2011, we find that that these programs have not been associated with improvements in innovation performance neither have contributed to alleviate financial constraints. Our findings hold across industries and firm size and also to the utilization of alternatives methodologies.

This paper is structured as follows. The section discusses the information source for evaluation purposes. The third section presents the methodology. The fourth section provides the results. The fifth section concludes.

[1] Fiscal incentives come in two forms: direct subsidies and tax incentives. In the case of Chile, the bulk of the fiscal incentives system has been based on direct subsidies. Recently, Chile began exploring tax incentives.

[2] FONTEC operates five lines. Line 1 corresponds to projects aimed at developing new products and improving production process. The other four financing lines cover technological infrastructure, group technological transfer, technology transfers organizations, and pre-investment studies. For more details, see Benavente et al. (2007).

[3] There are other recent program evaluations for Chilean instruments, but they are not directly focused on innovation (Bonilla et al. 2011; Arráiz, et al., 2011).

2. Data Description

In this paper we use information provided by the National Survey of Innovation (EIT) carried out by the National Institute of Statistics. The survey is taken almost every three years since 1995. Since that year, seven innovation surveys have been conducted. Nevertheless, only in the last four surveys, the services sector was covered. Then, we use information for the surveys taken in 2005, 2007, 2009 and 2011. These surveys, with some variations, have maintained standardized questions according to the Oslo Manual, and thus can be used effectively for comparable estimations. The main structure of the survey is similar across the different versions. The questions are structured in the following main sections: (i) the types of innovations that the firm has carried out in the past two or three-years, (ii) the goals of those innovations, (iii) sources of the ideas of innovation, (iv) purchases of equipments, (v) obstacles to innovation, (vi) links with scientific and technological institutions, (vii) importance of innovation in firm business, (viii) cost and financing of innovation, (ix) expenditure in R&D, and (x) perspectives concerning future innovations.

The surveys include also some limited information on quantitative variables to be used in the analysis. We have information on employment, sales and exports for two-year before the survey is carried out. The services sector (and the survey in general) is subdivided according to one-digit industries corresponding to the ISIC rev.3 classification of economic activities. Then, we have firms classified according to nine industries, where we define KIBS as sectors K and I (R&D, transport, communication and real estate services).

Given that this Survey has not been planned to provide longitudinal information, the number of firms that have been surveyed in all years is very low. For this reason, we have used a firm identification number to link them across two adjacent surveys. For each innovation survey carried in t, we have quantitative information on firm characteristics in t-1 and t-2 and responses to innovation activities carried out in the last two years (three years in the first survey that we use). Linking to the survey carried in t+2, we have information on innovation activities carried out during the last two-years and quantitative information on the two-year previous period (t+1 and t).

We define two types of innovation - product and process innovation – using the responses to the following question[4]: during the last two years have you introduced:

- Technologically improved products?
- Technologically new products (to the firm)?
- … new into the domestic market?
- … new into the world markets?

For process innovation, we use the response to the following question: during the last two years have you introduced:

- Technological improvements in existing process?
- Technologically new process (to the firm)?
- … new into the domestic market?
- … new into the world markets?

Then, we define as product (process) innovation a dummy equal to 1 if the firm declares having introduced any of these product (process) innovations, 0 otherwise. Innovation is defined then as dummy variable equal to 1 if the firm declared having introduced either a product or process innovation, and zero otherwise.

[4] These questions have changed over time, but we have tried to take similar definitions across surveys. For impact evaluation we also use alternative definitions of product and process innovation separately and one measure of innovation intensity.

In Table 1, we summarize information on the total number of firms by industries and across surveys. We have more than 2,000 observations, mostly corresponding to the last two surveys (2009-2011). The data is evenly distributed across industries, with higher importance of transport and communications (17.03%) and real estate (16.98%)[5]. The lower incidence in terms of observations corresponds to hotels and restaurants (4.70%).

Table 1
Sample from Innovation Surveys
Number of Firms and Percentage

ISIC	Description	2005-2007	2007-2009	2009-2011	Total
E	Electricity, gas and wáter	113	86	75	274
		28.61	21.18	5.85	13.15
F	Construction	55	57	171	283
		13.92	14.04	13.33	13.58
G	Retail	36	6	239	281
		9.11	1.48	18.63	13.48
H	Hotels & Restaurantes	2	0	96	98
		0.51	0.00	7.48	4.70
I	Transport and Communications	43	75	237	355
		10.89	18.47	18.47	17.03
J	Financial intermediation	32	28	73	133
		8.10	6.90	5.69	6.38
K	Real Estate	62	69	222	353
		15.70	17.00	17.30	16.94
N	Health	34	48	109	191
		8.61	11.82	8.50	9.17
O	Other services	18	37	61	116
		4.56	9.11	4.75	5.57
Total		395	406	1,283	2,084
		100.00	100.00	100.00	100.00

Source: Authors' elaboration based on Innovation Surveys

[5] Real Estate is short name for services including real estate activities, renting of machinery and equipment without operator and of personal and household goods, computer and related activities, research and development, and other business activities.

3. Methodology

One of the first issues to be defined in impact evaluation is how and when to measure the effects of the program, that is, the outcomes of interest. In the spirit of the CDM model (Crépon,et al. 1998), a distinction can be made between innovation-input indicators and economic-performance indicators. Innovation-input indicators are those most directly affected by the intervention. For instance, for a fiscal incentives program, an innovation-input indicator is total investment in innovation by the beneficiary. While the relationship between the subsidy and the total investment seems in principle almost tautological, the literature suggests that public resources can produce crowding-out effects on private investment (David et al., 2000). In other words, to the extent that innovation policies are able to change the firm's marginal cost of capital and to the extent that investment decisions react to this change in the cost of capital, it might be possible to identify the extent to which innovation policies generate *input additionality*.

However, just assessing whether innovation efforts increase as a consequence of a subsidy is not enough for policy evaluation purposes. The whole portfolio of innovation projects held by the firm is normally affected. As a result, projects with different levels of productivity might be executed while others might be postponed. Thus, assessing the outputs of innovation investments is critical (*output additionality).* Innovation outputs are variables where the concrete realization of innovation activities is observed and their impacts on economic performance materialize. In the case of business innovation programs, important output variables to measure *output additionality* are, for example, productivity growth, employment, wages, and exports to just cite a few.

The standard approach in impact evaluation of innovation policies to date has been to focus on input additionality or, in other words, to look at effects on innovation investments, including R&D. This is done mainly because, due to data constraints, evaluators can follow beneficiaries over a short period of time after receiving the grant. However, if this period is too short, the only impact that can be truly measured is effort. In this paper we try to solve some of these problems in the literature. First, by linking firms across surveys, we can have information for a longer time period. Second, we look at the impact of public programs on innovation inputs, such as total investment in innovation, and innovation outcomes such as the probability of innovation and firm performance (sales and productivity).

In impact evaluation, the main definition of causality is based on the concept of *counterfactuals*. For instance, suppose a firm receives a subsidy for innovation investment, and suppose we observe the value of a given outcome of interest for that firm. Then, the public subsidy is said to have a causal effect if the outcome of the firm in absence of subsidy, but holding everything else equal, would have been different. In other words, the program or "treatment" has a causal effect if the observed outcome when the firm receives a subsidy is different from the counterfactual outcome, that is, the outcome that would have been observed if the firm had not received the subsidy. While this definition of causality is relatively simple and intuitive, it introduces a serious problem from an empirical point of view, because the counterfactual outcome, by definition, is never observed. In other words, if a firm receives a subsidy, it is impossible to know with certainty how this firm would have done it without it. This problem can be approached by setting a control group of firms that did not receive support from the program (or from any other program) selected in a way as to minimize all the observable differences between both groups.

To deal with this selection problem, we mix the propensity score matching with a differences-in-differences estimation[6]. In the first stage, we use propensity score matching (selection on observables) for selecting an appropriate control group. We use information from the first survey in this stage and we look at the impact of treatment with information of the next survey in the second stage. In the second stage, for those firms in the common support (with similar probability of using innovation programs), we apply a differences-in-differences approach. To look at the robustness of our results, we

[6] We use also an entropy balancing approach and the results, as we show in the next section, remain mostly unchanged.

also estimate an Ordinary Least Square (OLS) model in levels and an OLS model including the lagged dependent variable as covariate.

We evaluate the impact on several potential outcomes:

- Probability of introducing innovations (either product or process)
- Probability of introducing product innovation, separating between product innovation that is new to the firms and that it is new to the market.
- Probability of introducing process innovation, separating between process innovation that is new to the firms and that it is new to the market.
- A measure of innovation intensity measured as the total number of innovations (product, process, marketing and organizational) introduced by the firm over the total number of potential innovations included in the questionnaire.
- Sales (in logs)
- Productivity (log of sales per worker)[7]

And also on the following innovation inputs (or related to them):

- Investment on innovation (over total sales)
- The probability of investing on innovation defined as a dummy variable aimed to capture the impact of public programs on the decision of starting to invest in innovation
- The probability of declaring the financial constraints are one of the main obstacles to innovate. This variable is used to look at the potential effect of public programs on relaxing credit constraints.

Our variable of treatment is defined using the response to the following question: Do you have used the following public funds?

- FONTEC, FDI, FONDEF, FIA, INNOVA Bio-Bio.

Using this response, we define $D_{it} = 1$ if the firm declared having used any of these instruments, 0 otherwise[8].

These programs have in commons that all of them have been aimed to enhance innovation performance in Chilean firms. FONTEC (National Productivity and Technological Development Fund), managed by the Chilean National Development Agency (CORFO), provides financing for innovation projects carried out by private firms. FONTEC was established in 1991 and operates as a matching grant, subsidizing a percentage of the total costs of the private projects, the private co-funding has varied between 40 and 65 percent, and it has increased over time (Benavente, Crespi, and Maffioli, et.al. 2007). The subsidy never covers the full costs of the supported project, allowing for better alignment between the goals of the public agency and the firm, somehow controlling for the potential problem of moral hazard. In March 2005, FONTEC was formally ended and merged with another fund (known as the Innovation Development Fund—FDI), giving rise to a new organizational structure called INNOVA. The merger was motivated not only by the need to increase the operational efficiency of both funds and avoid duplication of effort, but also by the need to create an organization capable of implementing programs with a sector focus in addition to the standard "open window" system. The FDI had almost any significant difference with FONTEC, both have been instruments oriented to financing innovation project through matching grants from the Government.

Innova Bio-Bio has similar objectives to FONDEF/FDI and finances innovation projects in a specific region of the country. It was established in 2001 as a result of agreement among the regional government of Bío Bío, the Ministry of Economy and CORFO. It is oriented to promote the

[7] To measure productivity we use sales because we do not have information on value added. All of these nominal variables were deflated by services GDP deflator

[8] As it is clear from the available question in the survey, there is not specific timing of utilization and it corresponds to self-recall of participation. Unfortunately, we do not have administrative data for solving these problems.

innovation, the transfer of knowledge and the technological capacities of enterprises and businessmen in the region. This instrument funds project at the different phases of the innovative cycle: entrepreneurship, knowledge transfer and business innovation.

FONDEF (Science and Technology Development Fund), managed by CONICYT, provides funds pre-competitive R&D and technology projects organized jointly by universities, technology institutes, and the private sector. The government's subsidy also corresponds to a matching grant covering part of the total costs of the project (Tan, 2009). The objective of this program is to contribute to improving the competitiveness of the national economy through joint projects between research institutions and private companies to carry out applied research, precompetitive development, and technology transfer. In contrast to the other instruments, the financing is directed at universities and non-profit research and development institutions, as main beneficiaries, but private sector participation is required.

FIA (Agricultural Innovation Fund) is a sector-specific fund oriented to enhance innovation in the agricultural and forestry sectors. It co-funds three types of innovation-related activities: (i) innovation projects aimed to the introduction, development, validation and adoption of innovations (products, processes, services and management), (ii) innovation tours oriented to know innovative solutions in Chile or abroad to solve a clearly specific technological problem and to establish networks and links that contribute to implement innovative solutions, and (iii) innovation consulting aimed to bring to the country the needed knowledge to implement an innovative solution to problem and/or clearly identified businesses opportunity.

We could have identified the participation in each specific program and evaluated the individual (or complimentary) impact of them, but we have decided to group them because there is a low number of participating firms in individual programs. In fact, as we show in Table 2 the participation rate across surveys is only 4.1 percent.

Table 2
Participating Firms

Industry	%
Electricity, gas and wáter	4.0
Construction	2.1
Retail	3.6
Hotels & Restaurantes	2.0
Transport and Communications	1.7
Financial intermediation	2.3
Real Estate	9.6
Health	4.2
Other services	4.3
Total	*4.1*

Source: Authors' elaboration based on Innovation Surveys

There is an additional problem concerning the questions in the survey because public instruments have changed over time. In 2005 survey there are five public instruments, but only four in the 2009 survey.

For the propensity score, we estimate a pooled Logit model across surveys. We specify the model following closely Czarnitzki and Lopes-Bento (2012) given that they use a similar methodology to look at the impact of public R&D grants in Belgium. The following explanatory variables were included in the Logit model for the probability of using public instruments:

- "Pre-treatment" variables: size (measured as the log of the number of workers), age (number of years since firm foundation) and a dummy variable for firms that have declared positive innovation investment.
- Past productivity growth: defined as the growth of real sales per worker in the previous two year of the survey. This variable is aimed to control for previous trends in productivity that can induce firms to apply for public programs (or to affect the selection in the public agencies).
- We have also included a dummy variable for firms declaring that financial constraints are one of the main obstacles for innovating and a dummy variable identifying firms that have intellectual property rights. In the first case, we conjecture that firms with higher financial constraints would be more willing to participate in public programs for relaxing these constraints. For this second variable, the literature suggest that previous experience in successful R&D activities can increase public support because agencies often adopt a picking-the-winner strategy (Czarnitzki and Lopes-Bento; 2012).
- In all of these specifications, we also include dummy variables by industry and survey, and a dummy variable for firms located on the metropolitan region[9].

In the second stage, for those firms in the common support of the predicted participation probability[10], we estimate the following pooled regressions:

- Levels: $\log Y_{it+s} = \alpha + \beta D_{it} + \mu_{it+s}$
- Lag of dependent variable: $\log Y_{it+s} = \alpha + \beta D_{it} + \rho \log Y_{it} + \mu_{it+s}$
- Differences in differences $\log Y_{it+s} - \log Y_{it} = \alpha + \beta D_{it} + \mu_{it+s}$

The major challenge in impact evaluation is how to properly set the control group in a way that renders a credible counterfactual. In any quasi-experimental impact evaluation, the key issue is how to minimize the selection bias that emerges from both the observable and unobservable differences between the control group and the beneficiaries in a no-treatment state. Although the differences between the two groups cannot be tested during the period over which the treatment is being implemented, it can be tested during the baseline period just prior to the treatment. The empirical strategy followed in this paper uses propensity score matching techniques where the propensity score is estimated on the basis of firm characteristics just prior to the treatment (characteristics both in level and in growth rates). After estimating the propensity score for each firm, control firms that fall outside the common support for the treated firms are eliminated from the sample. This eliminates firms in the control group that are very different from treated firms.

Using propensity score matching techniques allows for the reduction of the selection bias generated by differences in the observable characteristics of the firms in the different groups. However, it does not control for the selection bias generated by unobservable characteristics. In order to control for these characteristics, some assumptions need to be made. This paper uses the standard assumption that unobservable firm characteristics can be approximated by a plant-level fixed effect. This makes it possible to remove unobserved differences between the beneficiary and the control group by using either a first-differences estimator under the assumption that these differences are constant over time

[9] We have also tried with other covariates suggested by the literature as productivity, exports, and other obstacles to innovation as high technical risk and easiness of imitation, but they turned out to be non-significant or their inclusion implied that the balancing property were not satisfied.

[10] The commons support is defined according to the minimum and maximum of both participating and control firms.

(Hall and Maffioli, 2008). For these reasons, the differences-in-differences estimator would be the most adequate to look at the impact of public programs. However, only for comparison, in our basic regressions we will also show the results of the other two estimations.

4. Econometric Results

Table 3 shows the results of the logit estimation for the propensity score. We find that larger firms (measured by the log of employment), those having intellectual property rights (patents), and firms with positive innovation investment are more likely to participate in these programs. In the case of the other variables, we find the expected signs but the effect is not significant. In fact, we find that higher productivity growth and higher financing obstacles for innovation increases the probability of participating. In the case of dummy variables, we do not find differences whether the firm is located in the metropolitan region, but we find a lower probability of participation in the 2009 survey and higher probability in only one sector (real state).

Table 3. **Estimation of the Propensity Score**
Pooled Logit Model

VARIABLES	Marginal Effects
Size	0.00305**
	(0.00145)
Age	0.000200
	(0.000137)
Patents	0.0122*
	(0.00727)
Prod.Growth	6.58e-05
	(0.00462)
Financing Obstacles	0.000964
	(0.00588)
Innovation Investment	0.0220***
	(0.00619)
Construction	-0.00893
	(0.0129)
Retail	0.0153
	(0.0118)
Hotel & Rest.	0.00869
	(0.0194)
Transport & Comm.	-0.0129
	(0.0125)
Financial	-0.0127
	(0.0163)
Real Estate	0.0283***
	(0.0104)
Health	-0.00130
	(0.0126)
Other	0.0105
	(0.0136)
Metropolitan región	0.00213
	(0.00666)
Survey 2007	-0.0105
	(0.00851)
Survey 2009	-0.0339***
	(0.00932)
Constant	-0.0892***
	(0.0148)
Observations	1,875

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Before turning to impact evaluation results, it is important then to analyze the quality of the matching procedure. For this purpose, for each variable included in the Logit model it was computed the average for the treated and control groups of the matched and unmatched samples and tested for differences in their respective means. This information is summarized in Table 4. For each variable, the first row displays the mean differences between the treatment and the control groups before matching and their statistical significance. Additionally, the second row shows the same information computed with the sub-sample of matched observations. It can be noticed in Table 4 that most of explanatory variables – especially size, age, property rights, innovation investment and survey year - there are significant differences in means between treated and control firms before matching that were successfully eliminated with the matching procedure. As a result, for all of the variables there are no differences in the average characteristics between treated and controls after the matching.

Table 4
Matching Quality

Variable		Mean			% Reduction	t-test	
		Treated	Control	% Bias	|Bias|	t	p>|t|
Size	Unmatched	4,49	3,92	30,20		2,57	0,01
	Matched	4,49	4,52	-1,60	94,80	-0,11	0,92
Age	Unmatched	23,22	17,38	26,80		2,94	0,00
	Matched	23,22	21,33	8,70	67,70	0,52	0,60
Patents	Unmatched	0,20	0,04	50,30		6,81	0,00
	Matched	0,20	0,13	19,50	61,20	1,05	0,30
Prod. Growth	Unmatched	-0,02	-0,04	4,60		0,37	0,71
	Matched	-0,02	-0,02	-0,60	87,40	-0,04	0,97
Financing obstacles	Unmatched	0,56	0,58	-3,40		-0,30	0,76
	Matched	0,56	0,59	-4,90	-44,90	-0,31	0,75
Innovation Inv.	Unmatched	0,76	0,38	82,00		6,91	0,00
	Matched	0,76	0,77	-2,70	96,80	-0,18	0,86
Construction	Unmatched	0,07	0,13	-20,30		-1,62	0,11
	Matched	0,07	0,09	-4,00	80,30	-0,29	0,77
Retail	Unmatched	0,12	0,14	-5,50		-0,47	0,64
	Matched	0,12	0,11	3,60	34,40	0,24	0,81
Hotel & Rest.	Unmatched	0,02	0,05	-14,60		-1,13	0,26
	Matched	0,02	0,04	-6,30	56,50	-0,45	0,65
Transport & Comm.	Unmatched	0,07	0,18	-32,90		-2,52	0,01
	Matched	0,07	0,05	7,40	77,60	0,65	0,52
Financial	Unmatched	0,04	0,06	-12,10		-0,97	0,33
	Matched	0,04	0,02	5,60	53,90	0,45	0,65
Real Estate	Unmatched	0,41	0,17	56,20		5,75	0,00
	Matched	0,41	0,41	0,00	100,00	0,00	1,00
Health	Unmatched	0,09	0,09	-3,10		-0,27	0,79
	Matched	0,09	0,09	0,00	100,00	0,00	1,00
Other	Unmatched	0,06	0,06	2,50		0,22	0,82
	Matched	0,06	0,06	0,00	100,00	0,00	1,00
Metropolitan región	Unmatched	0,43	0,34	17,50		1,58	0,11
	Matched	0,43	0,49	-12,50	28,20	-0,78	0,44
Survey 2007	Unmatched	0,32	0,20	26,50		2,54	0,01
	Matched	0,32	0,27	11,20	57,90	0,68	0,50
Survey 2009	Unmatched	0,33	0,70	-79,70		-7,16	0,00
	Matched	0,33	0,34	-2,60	96,70	-0,16	0,87

The results for impact evaluation on innovation outputs - probability of innovation (either product or process), new to the firm product innovation, new to the market product innovation, new to the firm process innovation, new to the market process innovation, innovation intensity, sales and productivity - are shown in Tables 5 through 12, respectively. The results in levels and including the lag of the dependent variable show a positive effect of participation in the probability of introducing innovations, with exception of process innovation, and in the innovation intensity. This positive impact, however, turns out to be negative in the case of diff-in-diff estimation.

Table 5
Estimates for the Impact Evaluation on Innovation
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.156***	0.115**	-0.0459
	(0.0557)	(0.0567)	(0.0742)
Lagged innovation		0.201***	
		(0.0254)	
Construction	0.0481	0.0488	0.0513
	(0.0457)	(0.0454)	(0.0593)
Retail	-0.00379	0.0265	0.147**
	(0.0452)	(0.0454)	(0.0584)
Hotel & Rest.	0.0237	0.0437	0.123
	(0.0586)	(0.0589)	(0.0783)
Trasport. & Comm.	0.0818*	0.0751*	0.0483
	(0.0467)	(0.0456)	(0.0579)
Financial	0.189***	0.164***	0.0651
	(0.0648)	(0.0634)	(0.0799)
Real state	0.0796*	0.0794*	0.0786
	(0.0433)	(0.0430)	(0.0551)
Health	0.140***	0.134***	0.110*
	(0.0501)	(0.0497)	(0.0637)
Other	-0.0637	-0.0482	0.0137
	(0.0526)	(0.0524)	(0.0715)
Survey 2007	-0.202***	-0.115***	0.228***
	(0.0422)	(0.0433)	(0.0499)
Survey 2009	-0.250***	-0.149***	0.252***
	(0.0386)	(0.0404)	(0.0445)
Constant	0.494***	0.324***	-0.353***
	(0.0447)	(0.0495)	(0.0531)
Observations	1,707	1,707	1,707
R-squared	0.056	0.092	0.029

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6
Estimates for the Impact Evaluation on New to the Firm Product Innovation
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.130***	0.122**	0.0552
	(0.0494)	(0.0500)	(0.0709)
Lagged innovation		0.111***	
		(0.0293)	
Construction	0.0973***	0.0845***	-0.0178
	(0.0285)	(0.0284)	(0.0402)
Retail	0.0861***	0.0757***	-0.00763
	(0.0289)	(0.0286)	(0.0390)
Hotel & Rest.	0.136***	0.124***	0.0338
	(0.0428)	(0.0430)	(0.0555)
Trasport. & Comm.	0.183***	0.167***	0.0414
	(0.0334)	(0.0328)	(0.0432)
Financial	0.121***	0.0999**	-0.0662
	(0.0455)	(0.0458)	(0.0664)
Real state	0.139***	0.119***	-0.0362
	(0.0285)	(0.0287)	(0.0408)
Health	0.103***	0.0923***	0.00432
	(0.0318)	(0.0319)	(0.0446)
Other	0.0247	0.0169	-0.0455
	(0.0294)	(0.0298)	(0.0508)
Survey 2007	-0.147***	-0.0960***	0.315***
	(0.0344)	(0.0365)	(0.0488)
Survey 2009	-0.145***	-0.0798**	0.440***
	(0.0333)	(0.0365)	(0.0450)
Constant	0.162***	0.101***	-0.391***
	(0.0310)	(0.0341)	(0.0479)
Observations	1,707	1,707	1,707
R-squared	0.049	0.060	0.093

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7

Estimates for the Impact Evaluation on New to the Market Product Innovation

Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.108**	0.101**	0.00322
	(0.0458)	(0.0457)	(0.0621)
Lagged innovation		0.0668***	
		(0.0246)	
Construction	0.0294	0.0276	0.00246
	(0.0228)	(0.0228)	(0.0332)
Retail	0.0488**	0.0492**	0.0547
	(0.0234)	(0.0234)	(0.0360)
Hotel & Rest.	0.00195	0.00115	-0.0101
	(0.0235)	(0.0234)	(0.0446)
Trasport. & Comm.	0.0626**	0.0551**	-0.0495
	(0.0259)	(0.0259)	(0.0375)
Financial	0.167***	0.159***	0.0514
	(0.0467)	(0.0466)	(0.0613)
Real state	0.0923***	0.0866***	0.00773
	(0.0252)	(0.0250)	(0.0339)
Health	0.0996***	0.0943***	0.0197
	(0.0300)	(0.0300)	(0.0406)
Other	0.0330	0.0297	-0.0175
	(0.0317)	(0.0316)	(0.0444)
Survey 2007	0.149***	0.155***	0.238***
	(0.0245)	(0.0243)	(0.0333)
Survey 2009	0.0480**	0.0431**	-0.0254
	(0.0187)	(0.0186)	(0.0310)
Constant	-0.0313*	-0.0345*	-0.0792***
	(0.0178)	(0.0177)	(0.0273)
Observations	1,707	1,707	1,707
R-squared	0.053	0.059	0.063

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8
Estimates for the Impact Evaluation on New to the Firm Process Innovation
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.0752	0.0628	0.0236
	(0.0517)	(0.0691)	(0.0875)
Lagged innovation		0.174***	
		(0.0496)	
Construction	-0.00298	0.105**	0.208***
	(0.0394)	(0.0528)	(0.0596)
Retail	-0.0561	0.0421	0.156***
	(0.0402)	(0.0490)	(0.0542)
Hotel & Rest.	-0.0301	0.0584	0.127*
	(0.0526)	(0.0594)	(0.0675)
Trasport. & Comm.	0.0555	0.150***	0.209***
	(0.0419)	(0.0562)	(0.0636)
Financial	0.0250	0.115	0.174**
	(0.0545)	(0.0727)	(0.0820)
Real state	0.0131	0.105**	0.194***
	(0.0385)	(0.0502)	(0.0576)
Health	0.0622	0.188***	0.288***
	(0.0435)	(0.0587)	(0.0657)
Other	-0.0637	0.00915	0.0635
	(0.0435)	(0.0620)	(0.0784)
Survey 2007	-0.371***		
	(0.0382)		
Survey 2009	-0.210***	-0.113**	0.414***
	(0.0388)	(0.0486)	(0.0443)
Constant	0.437***	0.240***	-0.406***
	(0.0422)	(0.0590)	(0.0546)
Observations	1,707	1,320	1,320
R-squared	0.074	0.063	0.117

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9
Estimates for the Impact Evaluation on New to the Market Process Innovation
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.0716*	0.0545	0.0131
	(0.0410)	(0.0385)	(0.0492)
Lagged innovation		0.0844***	
		(0.0233)	
Construction	0.0473*	0.0439*	0.0417
	(0.0283)	(0.0260)	(0.0497)
Retail	0.0224	0.00947	0.115***
	(0.0247)	(0.0220)	(0.0444)
Hotel & Rest.	0.00301	0.00194	0.0870
	(0.0262)	(0.0248)	(0.0539)
Transp. & Comm.	0.0344	0.0176	-0.0126
	(0.0287)	(0.0255)	(0.0538)
Financial	0.110**	0.0511	-0.0540
	(0.0454)	(0.0406)	(0.0683)
Real Estate	0.0179	0.0177	0.0658
	(0.0255)	(0.0231)	(0.0446)
Health	0.0594*	0.0448	0.0883*
	(0.0316)	(0.0288)	(0.0524)
Other	0.0167	0.0795**	0.139**
	(0.0364)	(0.0404)	(0.0580)
Survey 2007	0.165***		
	(0.0275)		
Survey 2009	-0.00614	-0.0223	-0.179***
	(0.0197)	(0.0198)	(0.0260)
Constant	0.0225	0.0287*	-0.0226
	(0.0211)	(0.0171)	(0.0314)
Observations	1,707	1,320	1,320
R-squared	0.076	0.034	0.034

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10
Estimates for the Impact Evaluation on Innovation Intensity
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.116***	0.0984***	0.0442
	(0.0365)	(0.0365)	(0.0446)
Lagged innov. int.		0.245***	
		(0.0286)	
Construction	0.0226	0.00954	-0.0308
	(0.0205)	(0.0202)	(0.0269)
Retail	0.0264	0.0247	0.0196
	(0.0225)	(0.0219)	(0.0274)
Hotel & Rest.	0.0264	0.0191	-0.00350
	(0.0260)	(0.0258)	(0.0361)
Transp. & Comm.	0.0805***	0.0538**	-0.0288
	(0.0247)	(0.0229)	(0.0280)
Financial	0.145***	0.102***	-0.0308
	(0.0378)	(0.0350)	(0.0394)
Real Estate	0.0449**	0.0312	-0.0111
	(0.0206)	(0.0200)	(0.0259)
Health	0.0766***	0.0574**	-0.00193
	(0.0243)	(0.0238)	(0.0308)
Other	0.00298	0.00392	0.00684
	(0.0261)	(0.0249)	(0.0326)
Survey 2007	-0.154***	-0.0684***	0.195***
	(0.0247)	(0.0261)	(0.0286)
Survey 2009	-0.198***	-0.0858***	0.259***
	(0.0222)	(0.0250)	(0.0247)
Constant	0.275***	0.141***	-0.271***
	(0.0240)	(0.0285)	(0.0286)
Observations	1,707	1,707	1,707
R-squared	0.106	0.163	0.079

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11
Estimates for the Impact Evaluation on Sales
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.0990	-0.0204	-0.0619
	(0.274)	(0.216)	(0.231)
Lagged sales		0.742***	
		(0.0257)	
Construction	-0.984***	-0.777***	-0.705***
	(0.230)	(0.209)	(0.228)
Retail	-1.169***	-0.747***	-0.601***
	(0.244)	(0.206)	(0.224)
Hotel & Rest.	-2.185***	-1.018***	-0.613**
	(0.268)	(0.232)	(0.244)
Transp. & Comm.	-0.794***	-0.609***	-0.545**
	(0.255)	(0.211)	(0.228)
Financial	0.123	-0.352	-0.517*
	(0.351)	(0.278)	(0.301)
Real Estate	-1.960***	-0.884***	-0.510**
	(0.219)	(0.202)	(0.213)
Health	-1.794***	-0.868***	-0.546***
	(0.237)	(0.201)	(0.211)
Other	-1.925***	-0.830***	-0.451*
	(0.296)	(0.254)	(0.260)
Survey 2007	0.545**	0.361**	0.297*
	(0.219)	(0.172)	(0.180)
Survey 2009	-0.0319	0.0478	0.0755
	(0.198)	(0.151)	(0.157)
Constant	16.03***	4.471***	0.461**
	(0.240)	(0.461)	(0.218)
Observations	1,699	1,699	1,699
R-squared	0.109	0.530	0.018

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12
Estimates for the Impact Evaluation on Productivity
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	-0.282	-0.164	0.0541
	(0.205)	(0.198)	(0.223)
Lagged productivity		0.351***	
		(0.0349)	
Construction	-2.019***	-1.320***	-0.0283
	(0.197)	(0.210)	(0.230)
Retail	-0.794***	-0.589***	-0.209
	(0.207)	(0.198)	(0.229)
Hotel & Rest.	-2.430***	-1.627***	-0.141
	(0.216)	(0.226)	(0.248)
Transp. & Comm.	-1.351***	-0.902***	-0.0711
	(0.213)	(0.210)	(0.232)
Financial	-0.865***	-0.592**	-0.0878
	(0.250)	(0.245)	(0.290)
Real Estate	-1.677***	-1.167***	-0.221
	(0.193)	(0.193)	(0.214)
Health	-2.351***	-1.638***	-0.318
	(0.191)	(0.199)	(0.217)
Other	-1.878***	-1.237***	-0.0508
	(0.247)	(0.247)	(0.268)
Survey 2007	0.250	0.216	0.153
	(0.169)	(0.165)	(0.188)
Survey 2009	-0.223	-0.237	-0.264
	(0.150)	(0.146)	(0.168)
Constant	12.00***	7.813***	0.0640
	(0.208)	(0.466)	(0.220)
Observations	1,671	1,671	1,671
R-squared	0.181	0.269	0.014

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the case of productivity and sales (Tables 11 and 12), most of parameters for participation are negative, but not significant. In general, these results suggest that participation in public programs have been not associated with improvements in innovation outcomes.

The same set of results for innovation inputs (innovation investment over sales and the probability of investing in innovation) and financial constraints are shown in Tables 13, 14, and 15. As in the previous results, our findings suggest that public programs have not increased innovation inputs neither helped to alleviate financial constraints. Moreover, the results for the innovation investment show that these programs could have reduced private investment (Table 13). In the case of the extensive margin - probability of investing in innovation (Table 14) – the effect is positive in the first two regressions, but negative and not significant in the diff-in-diff regressions. In Table 15, it can be appreciated that for the three specifications, the impact of participation in public programs on financial constraints positive and not significant, suggesting the utilization of these programs have not contributed to alleviate financial constrains for innovation.

Table 13
Estimates for the Impact Evaluation on Innovation Investment
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	-0.0230	-0.0327	-0.0487**
	(0.0201)	(0.0226)	(0.0242)
Lagged Inn. Inv.		0.375	
		(0.235)	
Construction	-0.0191	-0.0206	-0.0230
	(0.0150)	(0.0158)	(0.0169)
Retail	0.0791	0.0825	0.0881
	(0.0927)	(0.0923)	(0.0932)
Hotel & Rest.	-0.0564	-0.0646	-0.0784*
	(0.0420)	(0.0443)	(0.0420)
Transp. & Comm.	0.0123	0.00857	0.00243
	(0.0117)	(0.0131)	(0.0143)
Financial	-0.00935	-0.0101	-0.0113
	(0.00920)	(0.0104)	(0.0150)
Real Estate	0.0361	0.0302	0.0205
	(0.0261)	(0.0279)	(0.0274)
Health	0.215	0.210	0.201
	(0.148)	(0.144)	(0.147)
Other	0.00977	0.00709	0.00263
	(0.0128)	(0.0135)	(0.0155)
Survey 2007	-0.0200*	-0.0123	0.000561
	(0.0119)	(0.0112)	(0.0136)
Survey 2009	0.0827*	0.0870*	0.0941**
	(0.0470)	(0.0490)	(0.0473)
Constant	0.00264	-0.00850	-0.0270*
	(0.0114)	(0.0162)	(0.0138)
Observations	1,068	1,068	1,068
R-squared	0.016	0.018	0.015

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14
Estimates for the Impact Evaluation on Probability of Innovation Investment
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.0933*	0.0808	-0.138*
	(0.0502)	(0.0507)	(0.0755)
Lagged probability		0.0540***	
		(0.0201)	
Construction	0.0545	0.0492	-0.0429
	(0.0412)	(0.0409)	(0.0561)
Retail	0.0887**	0.0908**	0.127**
	(0.0397)	(0.0393)	(0.0545)
Hotel & Rest.	0.0885*	0.0891*	0.0997
	(0.0463)	(0.0461)	(0.0716)
Transp. & Comm.	0.0910**	0.0810*	-0.0939*
	(0.0418)	(0.0416)	(0.0565)
Financial	0.109*	0.0954	-0.135*
	(0.0593)	(0.0594)	(0.0811)
Real Estate	0.117***	0.113***	0.0300
	(0.0390)	(0.0386)	(0.0516)
Health	0.0820*	0.0752*	-0.0442
	(0.0448)	(0.0445)	(0.0625)
Other	0.0876*	0.0843*	0.0269
	(0.0465)	(0.0462)	(0.0691)
Survey 2007	-0.202***	-0.182***	0.164***
	(0.0422)	(0.0429)	(0.0498)
Survey 2009	0.304***	0.326***	0.718***
	(0.0367)	(0.0377)	(0.0448)
Constant	0.502***	0.464***	-0.200***
	(0.0439)	(0.0454)	(0.0508)
Observations	1,707	1,707	1,707
R-squared	0.255	0.259	0.241

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 15
Estimates for the Impact Evaluation on Financial Constraints
Common Support Sample

VARIABLES	(1) OLS-Levels	(2) OLS-Lagged	(3) OLS-First Difference
Treatment	0.0675	0.0721	0.0213
	(0.0543)	(0.0544)	(0.0813)
Lagged FC		-0.101***	
		(0.0243)	
Construction	-0.00987	-0.0117	0.00772
	(0.0473)	(0.0474)	(0.0672)
Retail	-0.0901*	-0.0865*	-0.125*
	(0.0476)	(0.0474)	(0.0706)
Hotel & Rest.	0.0120	0.00879	0.0440
	(0.0635)	(0.0627)	(0.0973)
Transp. & Comm.	-0.000694	0.00460	-0.0530
	(0.0473)	(0.0471)	(0.0691)
Financial	-0.113*	-0.105*	-0.190**
	(0.0603)	(0.0604)	(0.0865)
Real Estate	-0.0206	-0.00988	-0.126**
	(0.0438)	(0.0439)	(0.0624)
Health	0.0573	0.0623	0.00762
	(0.0500)	(0.0499)	(0.0732)
Other	0.0441	0.0443	0.0417
	(0.0586)	(0.0584)	(0.0875)
Survey 2007	0.169***	0.194***	-0.0809
	(0.0423)	(0.0431)	(0.0563)
Survey 2009	-0.0307	0.000117	-0.335***
	(0.0396)	(0.0410)	(0.0511)
Constant	0.528***	0.556***	0.249***
	(0.0450)	(0.0462)	(0.0562)
Observations	1,707	1,707	1,707
R-squared	0.042	0.051	0.046

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

We explore potential heterogeneities in impact across industries and firm size. To do that, we estimate the model dividing the sample between KIBS and non-KIBS industries, and large and small firms[11]. In the case of KIBS versus non-KIBS industries, we estimate separate regressions because it can be argued that the knowledge production function is different between these two types of industries. In KIBS there is more accumulation of intangible knowledge meanwhile while non-KIBS industries are more oriented to the adoption and assimilation of existing technologies. In this sense, it would be expected that public instruments – focuses in the accumulation of intangible knowledge– work better in KIBS that not non-KIBS.

We only present results for the diff-in-diff estimation and similar to previous estimations, industry and survey-year fixed effects are included in all the estimations. Similar to estimations for the whole sample, it seems that participation have not improved innovation performance. However, there are some differences across industries. The results for KIBS in Table 16 show that pubic programs would have reduced the probability of innovation and the probability of investing in innovation (column 10). In the case of the other variables, the impact is estimated to be non-significant. For non-KIBS, our findings suggest that participation would have increased the innovation intensity of the firms but it would have reduced innovation investment (columns 6 and 9 in Table 17).

[11] Small firms are defined as those with employment less or equal to 50 workers.

Table 16
Estimates for the Impact Evaluation on KIBS
Common Support Sample

VARIABLES	(1) Innovation	(2) Product	(3) New Product	(4) Process	(5) New Process	(6) Innovation Int.	(7) Sales	(8) Productivity	(9) Innov. Investment	(10) Pr.Innovation Inv.	(11) Financing Obstacles
Treatment	-0.194	-0.0400	-0.120	-0.0814	0.0209	-0.0598	0.0692	0.331	-0.0367	-0.268***	-0.00847
	(0.122)	(0.107)	(0.114)	(0.144)	(0.0713)	(0.0614)	(0.398)	(0.351)	(0.0296)	(0.103)	(0.131)
Financial	-0.0456	-0.0321	0.0363	-0.0335	-0.123*	-0.0290	0.00607	0.165	-0.0361	-0.175**	-0.0801
	(0.0750)	(0.0699)	(0.0645)	(0.0768)	(0.0656)	(0.0388)	(0.232)	(0.233)	(0.0256)	(0.0808)	(0.0826)
Survey 2007		0.142	0.228***			0.101*	0.566*	0.615*	-0.0447*	0.0761	0.0330
		(0.0978)	(0.0813)			(0.0545)	(0.338)	(0.339)	(0.0245)	(0.0982)	(0.107)
Survey 2007		0.358***	-0.0294	0.358***	-0.204***	0.190***	0.255	0.0663	0.0236	0.659***	-0.340***
		(0.0817)	(0.0719)	(0.0827)	(0.0504)	(0.0411)	(0.272)	(0.275)	(0.0484)	(0.0807)	(0.0902)
Constant	-0.0460	-0.328***	-0.0541	-0.156*	0.0633	-0.206***	-0.237	-0.502*	0.0385	-0.0997	0.106
	(0.0326)	(0.0792)	(0.0685)	(0.0805)	(0.0479)	(0.0387)	(0.258)	(0.265)	(0.0268)	(0.0776)	(0.0843)
Observations	416	416	416	321	321	416	416	404	266	416	416
R-squared	0.009	0.071	0.051	0.078	0.048	0.059	0.012	0.025	0.013	0.245	0.057

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 17
Estimates for the Impact Evaluation on non-KIBS
Common Support Sample

VARIABLES	(1) Innovation	(2) Product	(3) New Product	(4) Process	(5) New Process	(6) Innovation Int.	(7) Sales	(8) Productivity	(9) Innov. Investment	(10) Pr.Innovation Inv.	(11) Financing Obstacles
Treatment	-0.0439	0.135	0.0996	0.103	0.00606	0.126**	-0.169	-0.170	-0.0579*	-0.0353	0.0367
	(0.0845)	(0.0912)	(0.0626)	(0.107)	(0.0678)	(0.0594)	(0.273)	(0.290)	(0.0350)	(0.105)	(0.104)
Construction	0.0943	-0.0174	0.00373	0.203***	0.0384	-0.0333	-0.700***	-0.0223	-0.0286	-0.0441	0.000938
	(0.0593)	(0.0407)	(0.0335)	(0.0600)	(0.0505)	(0.0272)	(0.229)	(0.231)	(0.0209)	(0.0567)	(0.0681)
Retail	0.202***	-0.00269	0.0551	0.149***	0.112**	0.0168	-0.598***	-0.205	0.0801	0.126**	-0.141*
	(0.0566)	(0.0395)	(0.0370)	(0.0544)	(0.0460)	(0.0278)	(0.228)	(0.233)	(0.0951)	(0.0560)	(0.0725)
Hotel & Rest.	0.195**	0.0384	-0.00839	0.119*	0.0825	-0.00685	-0.607**	-0.132	-0.0919*	0.0985	0.0272
	(0.0760)	(0.0557)	(0.0455)	(0.0679)	(0.0556)	(0.0365)	(0.248)	(0.253)	(0.0542)	(0.0731)	(0.0992)
Tr.. & Comm.	0.0806	0.0402	-0.0485	0.205***	-0.0151	-0.0310	-0.540**	-0.0653	-0.000959	-0.0952*	-0.0560
	(0.0588)	(0.0430)	(0.0375)	(0.0636)	(0.0543)	(0.0280)	(0.230)	(0.233)	(0.0156)	(0.0567)	(0.0696)
Health	0.147**	0.00334	0.0196	0.283***	0.0855	-0.00512	-0.541**	-0.311	0.196	-0.0466	0.00211
	(0.0644)	(0.0445)	(0.0409)	(0.0661)	(0.0532)	(0.0310)	(0.213)	(0.218)	(0.143)	(0.0629)	(0.0737)
Other	0.0604	-0.0514	-0.0188	0.0562	0.135**	0.000814	-0.438*	-0.0309	-0.00158	0.0216	0.0394
	(0.0713)	(0.0511)	(0.0448)	(0.0790)	(0.0591)	(0.0328)	(0.261)	(0.269)	(0.0166)	(0.0694)	(0.0882)
Survey 2007		0.385***	0.247***			0.236***	0.184	-0.0451	0.0197	0.203***	-0.121*
		(0.0562)	(0.0330)			(0.0338)	(0.212)	(0.225)	(0.0153)	(0.0576)	(0.0662)
Survey 2009		0.478***	-0.0196	0.441***	-0.169***	0.292***	-0.00809	-0.419**	0.123*	0.747***	-0.333***
		(0.0537)	(0.0319)	(0.0523)	(0.0301)	(0.0307)	(0.192)	(0.207)	(0.0632)	(0.0539)	(0.0620)
Constant	-0.174***	-0.436***	-0.0886***	-0.427***	-0.0285	-0.303***	0.542**	0.215	-0.0425***	-0.230***	0.263***
	(0.0455)	(0.0543)	(0.0257)	(0.0570)	(0.0295)	(0.0323)	(0.228)	(0.235)	(0.0159)	(0.0551)	(0.0601)
Observations	1,291	1,291	1,291	999	999	1,291	1,283	1,267	802	1,291	1,291
R-squared	0.014	0.107	0.072	0.133	0.030	0.094	0.020	0.014	0.016	0.241	0.040

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results for the impact on evaluation small and large firms are shown in Tables 18 and 19, respectively. In the case of small firms, the evidence suggests a not significant effect of public programs on innovation outputs, innovation inputs, and financial constraints. For large firms, the results are similar, with the exception of the negative and significant impact of participation on the probability of investing on innovation (column10, Table 19).

In general, these results are not driven by the technique used to measure the impact and to build the counterfactual. We have estimated using alternative matching techniques, such as the nearest neighbor and kernel matching, and the results are similar. In fact, the absence of an overall positive impact of public programs is also found when an alternative methodology is used. In Tables 20 through 26, we present the results for all innovation related variables and KIBS and non-KIBS using the entropy balancing technique that does not require the selection of the common support region (Hainmuller, 2012). As in previous results, most of these regressions show a non significant or negative effect on innovation outputs and inputs. There are, however some exceptions. First, as it can be appreciated in Table 20, we find some positive effect of participation on product innovation for firms in non-KIBS industries. Second, the results using entropy balancing indicates that participation in public programs increase the intensity of innovation in the sample of all firms, but mostly for non-KIBS industries (Table 21).

Table 18

Estimates for the Impact Evaluation on Small Firms

Common Support Sample

VARIABLES	(1) Innovation	(2) Product	(3) New Product	(4) Process	(5) New Process	(6) Innovation Int.	(7) Sales	(8) Productivity	(9) Innov. Investment	(10) Pr.Innovation Inv.	(11) Financing Obstacles
Treatment	-0.0736	0.204	-0.0213	-0.0588	0.00661	0.100	0.171	0.244	-0.0685	-0.0202	-0.0567
	(0.110)	(0.124)	(0.0951)	(0.117)	(0.0663)	(0.0718)	(0.361)	(0.345)	(0.0422)	(0.128)	(0.135)
Construction	-0.0514	-0.122*	-0.0916	0.211**	-0.0614	-0.0654	-1.624***	-1.393***	-0.0355	-0.159	-0.0613
	(0.106)	(0.0694)	(0.0757)	(0.0867)	(0.0927)	(0.0539)	(0.453)	(0.482)	(0.0374)	(0.101)	(0.132)
Retail	0.182**	-0.0357	0.0229	0.160**	0.0988*	-0.0128	-1.394***	-0.831***	0.204	0.0810	-0.180*
	(0.0723)	(0.0492)	(0.0474)	(0.0714)	(0.0567)	(0.0359)	(0.292)	(0.308)	(0.162)	(0.0721)	(0.0960)
Hotel & Rest.	0.244***	-0.0412	0.0224	0.112	0.157**	0.0385	-1.280***	-0.592*	-0.0626	0.213**	0.142
	(0.0893)	(0.0555)	(0.0592)	(0.0875)	(0.0712)	(0.0431)	(0.288)	(0.339)	(0.0617)	(0.0917)	(0.149)
Tr. & Comm.	-0.0546	-0.0694	-0.212***	0.277***	-0.118	-0.0876**	-1.568***	-1.119***	-0.0139	-0.293***	-0.124
	(0.0864)	(0.0580)	(0.0556)	(0.0945)	(0.0836)	(0.0445)	(0.307)	(0.296)	(0.0214)	(0.0786)	(0.101)
Financial	-0.0182	-0.198***	0.0673	0.162	-0.151	-0.141***	-0.975**	-0.520	-0.0286	-0.210**	-0.0542
	(0.118)	(0.0735)	(0.0790)	(0.119)	(0.115)	(0.0517)	(0.382)	(0.396)	(0.0353)	(0.106)	(0.133)
Real Estate	0.108	-0.126**	0.0265	0.238***	0.0689	-0.00935	-1.459***	-1.001***	0.0140	0.0121	-0.208**
	(0.0714)	(0.0530)	(0.0437)	(0.0758)	(0.0551)	(0.0349)	(0.272)	(0.275)	(0.0282)	(0.0669)	(0.0862)
Health	0.0480	-0.121**	-0.0630	0.178**	0.0654	-0.0538	-1.405***	-1.084***	0.209	-0.0578	0.00454
	(0.0910)	(0.0563)	(0.0634)	(0.0819)	(0.0771)	(0.0417)	(0.272)	(0.297)	(0.198)	(0.0890)	(0.102)
Other	0.0418	-0.135*	-0.0849	0.0981	0.0745	-0.0738	-1.426***	-0.638*	0.00652	-0.0335	0.0315
	(0.0976)	(0.0694)	(0.0701)	(0.110)	(0.0710)	(0.0474)	(0.353)	(0.379)	(0.0198)	(0.0962)	(0.128)
Survey 2007		0.334***	0.249***			0.283***	0.757***	0.288	0.00368	0.298***	-0.210***
		(0.0680)	(0.0527)			(0.0449)	(0.245)	(0.274)	(0.0263)	(0.0740)	(0.0811)
Survey 2009		0.444***	-0.00796	0.440***	-0.174***	0.253***	0.281	-0.196	0.102	0.803***	-0.262***
		(0.0599)	(0.0503)	(0.0647)	(0.0426)	(0.0372)	(0.207)	(0.253)	(0.0694)	(0.0659)	(0.0744)
Constant	-0.186***	-0.353***	-0.0972**	-0.495***	-0.0108	-0.273***	1.054***	0.463	-0.0307	-0.238***	0.261***
	(0.0582)	(0.0635)	(0.0384)	(0.0694)	(0.0366)	(0.0430)	(0.238)	(0.285)	(0.0200)	(0.0655)	(0.0764)
Observations	785	785	785	627	627	785	779	757	432	785	785
R-squared	0.024	0.115	0.076	0.169	0.056	0.097	0.107	0.059	0.028	0.285	0.036

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 19

Estimates for the Impact Evaluation on Large Firms

Common Support Sample

VARIABLES	(1) Innovation	(2) Product	(3) New Product	(4) Process	(5) Process New	(6) Innovation Int.	(7) Sales	(8) Productivity	(9) Innov. Investment	(10) Pr.Innovation Inv.	(11) Financing Obstacles
Treatment	-0.142	-0.0448	0.0221	0.0934	0.0302	0.0168	-0.0842	-0.0413	-0.0332	-0.195**	0.0517
	(0.0967)	(0.0821)	(0.0835)	(0.125)	(0.0749)	(0.0560)	(0.296)	(0.286)	(0.0299)	(0.0935)	(0.0998)
Construction	0.111	0.0563	0.0155	0.133	0.0827	0.00790	0.392	0.760**	-0.0216	0.0316	0.0115
	(0.0836)	(0.0565)	(0.0450)	(0.0824)	(0.0718)	(0.0341)	(0.309)	(0.328)	(0.0162)	(0.0789)	(0.0886)
Retail	0.238***	0.0196	0.101*	0.173**	0.133*	0.102**	0.431	0.593*	-0.0548	0.185**	-0.133
	(0.0909)	(0.0612)	(0.0577)	(0.0839)	(0.0726)	(0.0419)	(0.329)	(0.348)	(0.0377)	(0.0839)	(0.109)
Hotel & Rest.	0.152	0.105	-0.0388	0.0889	0.0523	-0.00988	0.334	0.385	-0.0841	0.0602	-0.0257
	(0.115)	(0.0860)	(0.0648)	(0.0973)	(0.0812)	(0.0522)	(0.355)	(0.365)	(0.0511)	(0.103)	(0.129)
Tr.. & Comm.	0.145*	0.137**	0.0379	0.118	0.0566	0.0275	0.637**	0.821**	0.0106	0.0485	-0.0266
	(0.0849)	(0.0634)	(0.0527)	(0.0889)	(0.0776)	(0.0361)	(0.324)	(0.352)	(0.0176)	(0.0834)	(0.0955)
Financial	0.116	0.0421	0.0341	0.114	0.00142	0.0485	0.313	0.453	-0.00430	-0.0746	-0.275**
	(0.113)	(0.0985)	(0.0881)	(0.111)	(0.0924)	(0.0537)	(0.425)	(0.421)	(0.0138)	(0.118)	(0.115)
Real Estate	0.126	0.0761	-0.0202	0.142	0.0553	0.00626	0.730**	0.729**	0.0270	0.0522	-0.0690
	(0.0871)	(0.0637)	(0.0547)	(0.0886)	(0.0745)	(0.0381)	(0.311)	(0.334)	(0.0514)	(0.0824)	(0.0934)
Health	0.216**	0.126*	0.0785	0.359***	0.112	0.0663	0.561*	0.490	0.195	-0.0145	-0.0289
	(0.0934)	(0.0682)	(0.0551)	(0.0971)	(0.0759)	(0.0431)	(0.308)	(0.328)	(0.207)	(0.0909)	(0.107)
Other	0.0703	0.0542	0.0333	-0.000154	0.198**	0.0956**	0.743**	0.624	-0.00274	0.0941	0.0256
	(0.106)	(0.0750)	(0.0579)	(0.112)	(0.0922)	(0.0438)	(0.369)	(0.392)	(0.0220)	(0.102)	(0.118)
Survey 2007		0.315***	0.225***			0.144***	-0.0452	0.0129	0.00108	0.0730	-0.0211
		(0.0696)	(0.0425)			(0.0367)	(0.241)	(0.242)	(0.0143)	(0.0694)	(0.0777)
Survey 2009		0.455***	-0.0358	0.381***	-0.173***	0.273***	-0.0303	-0.273	0.0904	0.654***	-0.408***
		(0.0658)	(0.0382)	(0.0600)	(0.0333)	(0.0322)	(0.221)	(0.210)	(0.0642)	(0.0618)	(0.0709)
Constant	-0.149**	-0.460***	-0.0591	-0.288***	-0.0460	-0.300***	-0.461	-0.464	-0.0253	-0.194**	0.283***
	(0.0725)	(0.0725)	(0.0424)	(0.0831)	(0.0564)	(0.0363)	(0.351)	(0.337)	(0.0229)	(0.0829)	(0.0845)
Observations	922	922	922	693	693	922	920	914	636	922	922
R-squared	0.015	0.095	0.074	0.094	0.032	0.106	0.016	0.021	0.013	0.222	0.076

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 20

Estimates for the Impact Evaluation on Innovation Outputs 1

Entropy Balancing

	Innovation			New Firm Product Innovation			New Market Product Innovation		
VARIABLES	All	No KIBS	KIBS	All	No KIBS	KIBS	All	No KIBS	KIBS
Treatment	0.0357	0.115	-0.0524	0.109	0.165**	0.0506	0.0333	0.113*	-0.0649
	(0.0713)	(0.0811)	(0.117)	(0.0694)	(0.0831)	(0.105)	(0.0636)	(0.0612)	(0.113)
Construction	0.0689	0.0586		-0.0464	-0.0568		-0.0114	-0.0114	
	(0.134)	(0.138)		(0.132)	(0.135)		(0.0823)	(0.0924)	
Retail	0.237*	0.258**		0.230	0.268*		0.112	0.147	
	(0.124)	(0.121)		(0.142)	(0.145)		(0.108)	(0.0988)	
Hotel & Rest.	0.449*	0.473**		0.348	0.405*		-0.0218	0.0447	
	(0.242)	(0.235)		(0.212)	(0.207)		(0.114)	(0.116)	
Tr.. & Comm.	0.386**	0.370**		0.465***	0.441***		0.0374	0.0220	
	(0.171)	(0.160)		(0.148)	(0.139)		(0.140)	(0.129)	
Financial	0.458**		0.348*	0.122		0.0939	0.0524		0.142*
	(0.181)		(0.197)	(0.100)		(0.102)	(0.105)		(0.0857)
Real Estate	0.104			0.0194			-0.0935		
	(0.107)			(0.0952)			(0.0967)		
Health	0.185	0.184		0.0354	0.0334		0.0317	0.0308	
	(0.113)	(0.112)		(0.147)	(0.130)		(0.117)	(0.112)	
Other	0.238	0.211		0.166*	0.127		-0.0414	-0.0629	
	(0.177)	(0.190)		(0.0881)	(0.0869)		(0.0879)	(0.0987)	
Survey 2007	-0.00395	0.174	-0.199	0.139	0.416***	-0.174	0.274***	0.467***	0.0623
	(0.0906)	(0.111)	(0.139)	(0.0902)	(0.120)	(0.125)	(0.0806)	(0.0791)	(0.133)
Survey 2009	0.0835	0.129	0.0444	0.333***	0.379***	0.278**	-0.0273	-0.0276	-0.0185
	(0.0852)	(0.0980)	(0.138)	(0.0831)	(0.0950)	(0.133)	(0.0777)	(0.0784)	(0.135)
Constant	-0.396***	-0.504***	-0.171*	-0.465***	-0.596***	-0.296***	-0.0895	-0.196***	-0.0679
	(0.102)	(0.102)	(0.0892)	(0.0947)	(0.102)	(0.0928)	(0.0773)	(0.0636)	(0.0895)
Observations	1,875	1,424	451	1,875	1,424	451	1,875	1,424	451
R-squared	0.048	0.085	0.051	0.119	0.211	0.095	0.081	0.244	0.011

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 21

Estimates for the Impact Evaluation on Innovation Outputs 2

Entropy Balancing

	New Firm Process Innovation			New Market Process Innovation			Innovation Intensity		
VARIABLES	All	No KIBS	KIBS	All	No KIBS	KIBS	All	No KIBS	KIBS
Treatment	-0.0358	0.0476	-0.147	0.0693	0.0544	0.0849	0.0869**	0.153***	0.0195
	(0.0869)	(0.102)	(0.147)	(0.0481)	(0.0673)	(0.0708)	(0.0418)	(0.0485)	(0.0616)
Construction	0.492**	0.507**		0.0380	0.0407		-0.126*	-0.142*	
	(0.217)	(0.223)		(0.126)	(0.127)		(0.0712)	(0.0750)	
Retail	0.470***	0.490***		0.121	0.121		0.206**	0.227***	
	(0.152)	(0.154)		(0.109)	(0.113)		(0.0873)	(0.0775)	
Hotel & Rest.	0.485*	0.510*		0.207**	0.214*		0.148	0.165	
	(0.257)	(0.264)		(0.100)	(0.118)		(0.110)	(0.105)	
Tr.. & Comm.	0.373	0.389		0.0978	0.0968		0.258***	0.238***	
	(0.258)	(0.262)		(0.0775)	(0.0785)		(0.0902)	(0.0746)	
Financial	0.573**		0.244	0.108		-0.0213	0.0412		0.0422
	(0.290)		(0.274)	(0.0884)		(0.0674)	(0.0523)		(0.0413)
Real Estate	0.331**			0.130			-0.00894		
	(0.165)			(0.0801)			(0.0522)		
Health	0.397**	0.401**		0.101	0.101		-0.0376	-0.0395	
	(0.184)	(0.188)		(0.0731)	(0.0730)		(0.0827)	(0.0779)	
Other	0.426	0.438		0.408***	0.412***		0.195**	0.160*	
	(0.275)	(0.279)		(0.146)	(0.154)		(0.0814)	(0.0944)	
Survey 2007							0.122**	0.332***	-0.113
							(0.0590)	(0.0736)	(0.0772)
Survey 2009	0.329***	0.305***	0.380***	-0.289***	-0.301***	-0.280***	0.186***	0.254***	0.117
	(0.0938)	(0.118)	(0.146)	(0.0535)	(0.0810)	(0.0713)	(0.0466)	(0.0545)	(0.0744)
Constant	-0.486***	-0.529***	-0.125	-0.0844	-0.0724	0.0338	-0.319***	-0.436***	-0.194***
	(0.134)	(0.122)	(0.0898)	(0.0621)	(0.0591)	(0.0462)	(0.0509)	(0.0552)	(0.0510)
Observations	1,488	1,132	356	1,488	1,132	356	1,875	1,424	451
R-squared	0.144	0.199	0.100	0.164	0.184	0.137	0.154	0.300	0.078

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 22
Estimates for the Impact Evaluation on Sales
Entropy Balancing

	(1)	(2)	(3)
VARIABLES	All	No KIBS	KIBS
Treatment	-0.0159	-0.167	0.200
	(0.229)	(0.260)	(0.406)
Construction	0.251	0.220	
	(0.454)	(0.492)	
Retail	-0.173	-0.182	
	(0.593)	(0.627)	
Hotel & Rest.	0.321	0.254	
	(0.596)	(0.716)	
Tr.. & Comm.	0.448	0.430	
	(0.449)	(0.458)	
Financial	0.293		0.149
	(0.619)		(0.471)
Real Estate	0.130		
	(0.486)		
Health	0.281	0.278	
	(0.506)	(0.512)	
Other	0.351	0.311	
	(0.462)	(0.492)	
Survey 2007	0.189	0.329	-0.00226
	(0.278)	(0.266)	(0.510)
Survey 2009	-0.328	-0.189	-0.538
	(0.322)	(0.443)	(0.485)
Constant	-0.0497	-0.0471	0.105
	(0.374)	(0.297)	(0.315)
Observations	1,865	1,415	450
R-squared	0.023	0.036	0.018

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 23
Estimates for the Impact Evaluation on Productivity
Entropy Balancing

	(1)	(2)	(3)
VARIABLES	All	No KIBS	KIBS
Treatment	-0.00278	-0.280	0.329
	(0.221)	(0.271)	(0.364)
Construction	0.648	0.657	
	(0.458)	(0.484)	
Retail	-0.116	-0.101	
	(0.596)	(0.619)	
Hotel & Rest.	1.144*	1.206*	
	(0.620)	(0.726)	
Tr.. & Comm.	0.333	0.328	
	(0.480)	(0.482)	
Financial	0.623		0.298
	(0.614)		(0.469)
Real Estate	0.324		
	(0.468)		
Health	0.444	0.441	
	(0.485)	(0.486)	
Other	0.855	0.855	
	(0.551)	(0.570)	
Survey 2007	0.236	0.293	0.136
	(0.271)	(0.294)	(0.469)
Survey 2009	-0.563*	-0.619	-0.588
	(0.313)	(0.445)	(0.435)
Constant	-0.305	-0.172	-0.107
	(0.361)	(0.291)	(0.305)
Observations	1,833	1,397	436
R-squared	0.050	0.077	0.034

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 24
Estimates for the Impact Evaluation on Innovation Investment
Entropy Balancing

	(1)	(2)	(3)
VARIABLES	All	No KIBS	KIBS
Treatment	-0.0397*	-0.0472	-0.0223
	(0.0235)	(0.0338)	(0.0259)
Construction	-0.0473	-0.0566	
	(0.0642)	(0.0602)	
Retail	0.0516	0.0546	
	(0.0384)	(0.0379)	
Hotel & Rest.	-0.0428	-0.0623	
	(0.0470)	(0.0631)	
Tr.. & Comm.	0.0407	0.0347	
	(0.0281)	(0.0267)	
Financial	0.0175		
	(0.0288)		
Real Estate	0.0255		0.0138
	(0.0297)		(0.0231)
Health	0.0767	0.0763	
	(0.0600)	(0.0585)	
Other	0.0336	0.0191	
	(0.0824)	(0.0883)	
Survey 2007	-0.0176	0.0422	-0.0892***
	(0.0232)	(0.0330)	(0.0283)
Survey 2009	0.0461	0.0944	-0.0164
	(0.0415)	(0.0669)	(0.0372)
Constant	-0.00810	-0.0331	0.0359
	(0.0287)	(0.0278)	(0.0248)
Observations	1,115	842	273
R-squared	0.011	0.014	0.055

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 25

Estimates for the Impact Evaluation on Probability of Innovation Investment

Entropy Balancing

	(1)	(2)	(3)
VARIABLES	All	No KIBS	KIBS
Treatment	0.0424	0.131	-0.0662
	(0.0698)	(0.0985)	(0.0868)
Construction	0.0884	0.0879	
	(0.172)	(0.175)	
Retail	0.242*	0.285**	
	(0.127)	(0.123)	
Hotel & Rest.	0.267	0.347	
	(0.210)	(0.218)	
Tr.. & Comm.	0.409*	0.390**	
	(0.209)	(0.198)	
Financial	0.336***		0.239**
	(0.124)		(0.112)
Real Estate	0.0924		
	(0.0981)		
Health	0.139	0.138	
	(0.153)	(0.143)	
Other	0.335**	0.308*	
	(0.161)	(0.170)	
Survey 2007	-0.0168	0.223*	-0.280***
	(0.0860)	(0.120)	(0.0989)
Survey 2009	0.525***	0.527***	0.531***
	(0.0853)	(0.130)	(0.106)
Constant	-0.402***	-0.529***	-0.171**
	(0.0998)	(0.110)	(0.0713)
Observations	1,875	1,424	451
R-squared	0.189	0.177	0.287

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 26
Estimates for the Impact Evaluation on Financial Constraints
Entropy Balancing

VARIABLES	(1) All	(2) No KIBS	(3) KIBS
Treatment	0.0345	0.0505	0.0110
	(0.0797)	(0.102)	(0.128)
Construction	-0.0493	-0.0446	
	(0.152)	(0.152)	
Retail	-0.237	-0.223	
	(0.167)	(0.169)	
Hotel & Rest.	0.188	0.222	
	(0.245)	(0.258)	
Tr.. & Comm.	0.116	0.113	
	(0.139)	(0.139)	
Financial	-0.108		0.0299
	(0.243)		(0.249)
Real Estate	-0.138		
	(0.111)		
Health	-0.0159	-0.0158	
	(0.147)	(0.147)	
Other	0.275	0.274	
	(0.168)	(0.171)	
Survey 2007	0.00604	0.0559	-0.0482
	(0.0916)	(0.103)	(0.155)
Survey 2009	-0.147	-0.168	-0.123
	(0.106)	(0.150)	(0.152)
Constant	0.138	0.117	0.0219
	(0.0998)	(0.104)	(0.106)
Observations	1,875	1,424	451
R-squared	0.047	0.071	0.005

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusions

Using information coming from four innovation surveys carried out between 2005 and 2011, this paper evaluates the impact of overall participation in innovation public programs on the performance of firms in the services industry. To do that, we use propensity score matching techniques and a differences-in-differences approach.

The Logit model for the participation indicates that there is evidence that larger firms, those having intellectual property rights and firms that invest on innovation are more likely to participate in these programs. This would suggest that there is some bias towards "better" firms receiving public funds for innovation projects.

In general, our results show that participation in these programs have not been associated with overall improvements in innovation performance neither have contributed to alleviate financial constraints. Our main findings hold across KIBS and non-KIBS industries and across large and small firms. They seem to be also robust to the utilization of alternatives methodologies. However, there is some evidence of positive effects in some variables and for some industries in particular. Our results suggest a positive effect of participation on product innovation for firms in non-KIBS industries and that public programs have increased the intensity of innovation in the sample of all firms, but mostly for non-KIBS industries.

In general these results show scarce support for the idea that participation in pubic programs can have a significant effect on innovation outputs and inputs in the services industry. This can be reflect that these programs are poorly designed and implemented for improving innovation performance in services, but also that further research need to be undertaken for a better evaluation of these programs. The available information suffers from serious shortcomings that impede to be too strong in the policy implications of this evidence. First, the variables of participation in public programs are self-reported which introduces a bias to the estimates due to measurement error with regard to the treatment variable. In this regard, administrative records from public agencies would be more appropriate to identify beneficiaries of public programs. Second, even we have information for two consecutive surveys, the evaluation period can be too short to give a clear idea about the impact of these programs. Unfortunately, most of innovation surveys are not designed as a panel. For this reason, the number of firms that are surveyed in each round is very small for being used to estimate panel data models that would allow testing for lagged effects of these programs.

Our results have two main implications for public policy oriented to improve competitiveness in the industry sector. First, as we show in this paper, there is a very low percentage of firms that have used public instruments in Chile and the impact of these instruments is barely significant. This can be consequence that instruments are not focused on these industries and follow the standard logic of support for firms producing goods. In such a case, public policy should analyze whether new instruments need to be designed to alleviate specific obstacles to innovation in the services industry. Second, developing countries should advance in to improve the availability of information to evaluate public instruments. The current versions of innovation surveys have several shortcomings that limit their usefulness for undertaking this type of evaluations.

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