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CLIMBING THE COLLABORATIVE RESEARCH AND INNOVATION POLICY SUPPORT LADDER

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REPORT PREPARED BY

Kevin Mulligan

Queen's University Belfast

Helena Lenihan

University of Limerick

Mauricio Perez-Alaniz

University of Limerick



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Authors

The core members of the research team for this project were as follows:

- » Dr Kevin Mulligan - Queen's University Belfast
- » Professor Helena Lenihan - University of Limerick
- » Dr Mauricio Perez-Alaniz - University of Limerick

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Contact

You are also welcome to email us if you have any questions about this report or the work of the IRC generally: info@ircaucus.ac.uk

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EXECUTIVE SUMMARY

Background

Small and Medium-Sized Enterprises (SMEs) are a crucial engine of Research and Innovation (R&I) within the economy, but typically face significant financial and knowledge constraints. Engaging in collaborative projects with academics in Higher Education Institutions (HEIs) is a key way in which SMEs can overcome these constraints, and access cutting-edge knowledge to develop R&I capabilities. Governments in many countries provide SMEs with R&I policy supports to engage in these collaborations. However, taking the first step into academic-industry collaboration is not straightforward for SMEs. Such collaborations carry unique risks for smaller, resource constrained firms who have limited previous R&I experience, especially at the early stages. Therefore, SMEs often refrain from this type of collaboration, even when there is significant potential for R&I returns. This highlights that the provision of government-funded collaboration opportunities may not be enough on its own. Rather, achieving desired policy outcomes may require a tailored policy support environment, which enables SMEs to develop R&I collaboration capabilities on a step-by-step basis.

The current report offers novel insights into what an effective policy support environment may look like, by proposing what we term the ‘collaborative R&I policy support ladder’. This comprises a tailored approach to support the development of SMEs’ R&I capabilities, by combining different collaborative R&I policy supports over time. The crucial ‘first rung’ on the ladder involves low-cost, easy to implement policy instruments, that encourage relationship building between firms and HEIs. Our ladder approach suggests that such policy instruments should not be viewed as an end in themselves. Rather, they may be used to build SMEs’ capacity to take on larger and more complex R&I projects in the future, with a greater potential for realising commercial value. It is at this key point where the ‘second rung’ on the R&I collaborative support ladder becomes vital. This comprises policy support instruments to encourage more meaningful R&I collaborations between firms and HEIs. In this context, our report first examines the extent to which SMEs approach R&I funding in this step-by-step way. Following this, we evaluate whether climbing the collaborative R&I policy support ladder results in improved R&D and business performance for SMEs.

Our report suggests that this ladder-based conceptualisation of effective R&I policy implementation has been neglected in previous research. Indeed, although the fact that firms receive multiple policy supports over time is often acknowledged as important, the policy system in many countries has tended to view individual R&I policy support programmes on a stand-alone basis. Therefore, adopting the ladder-based approach provides an opportunity to inform targeted policy support.

We achieve this by analysing the interplay between two collaborative R&I policy instruments available to firms in the Republic of Ireland:

- Innovation Vouchers.
- Innovation Partnerships.

Innovation Vouchers are small-scale funding supports (usually circa €5,000) which focus on helping SMEs to build early-stage collaborative relationships with academics and HEIs on defined innovation projects. Due to the low administrative burden for applications, Innovation Vouchers provide an accessible entry point for SMEs into the R&I policy support system in general, and academic-industry collaboration in particular. Moreover, Innovation Vouchers are also relatively low cost for funding agencies to implement. They therefore represent an important, low-stakes access point for SMEs at the beginning of their innovation journey, which we conceptualise as the ‘first rung’ on the ladder. Innovation Partnerships, in turn, represent the ‘second rung’, providing larger-scale R&I support (circa €80,000) for more complex and ambitious academic-industry collaborations.

Considering the above, this report focuses on the following two issues:

- (1) Whether receiving an Innovation Voucher increases SMEs’ likelihood of securing follow-on support for more ambitious collaborative R&I projects.
- (2) The extent to which climbing the collaborative R&I policy support ladder improves firm-level R&I activity and associated business performance.

Findings

We address these issues by constructing a novel panel dataset which tracks SMEs based in Ireland between 2006 and 2022. The dataset captures detailed information on SMEs’ use of public R&I supports, as well as their Research and Development (R&D) investment behaviour and business performance. Our final sample captures 30,287 observations from 4,477 unique firms, providing a robust sample for analysis.

Our analysis suggests four main findings:

- (1) Receiving an Innovation Voucher significantly increases the likelihood of SMEs’ securing subsequent larger-scale funding to support more ambitious collaborative R&I projects.
- (2) The transition from receiving an initial Innovation Voucher to subsequent larger-scale collaborative R&I support enables SMEs to substantially increase R&D spending and R&D employment over the following five years.

- (3) While these SMEs are building their new R&D capacity, they simultaneously improve several measures of firm performance, such as increased sales, employment, and Gross Value Added. However, firm performance improvements are less consistent than R&D impacts, suggesting it takes time for SMEs to fully bed in and exploit their newly developed R&I capabilities.
- (4) When received as stand-alone supports, Innovation Vouchers are relatively ineffective at driving SME R&D and business performance. However, this should not be interpreted as evidence that the scheme overall is ineffective. Innovation Vouchers play a key role in the wider innovation ecosystem by helping SMEs take their first step on the ladder. Removing or limiting them would block a key pathway to innovation.

Overall, these findings provide strong empirical support for the concept of a collaborative R&I policy support ladder. They support the idea that targeted, sequential funding can enable SMEs to build innovation capabilities step-by-step, through a more managed process.

Actionable insights for policy

Our results indicate that R&I policy outcomes may be improved by placing a greater emphasis on creating and managing deliberate support pathways. Such pathways could usefully be designed to encourage SME progression from small-scale collaborative schemes into larger collaborative R&I programmes. This is the underpinning logic of our proposed collaborative R&I support ladder. From a policy perspective, we identify three areas that can facilitate the development and implementation of this ladder-based approach:

- (1) Innovation Vouchers appear to play an important role at the 'lower end' of the R&I ecosystem. They help SMEs with relatively limited pre-existing R&I capabilities take their first step into academic collaboration. After an initial Innovation Voucher, many SMEs seek out further, larger-scale collaborative R&I projects. This behavioural change is non-trivial, and demonstrates the power of Innovation Vouchers to catalyse an R&I-driven growth strategy. From a policy perspective, therefore, maintaining and supporting the effective use of Innovation Vouchers appears crucial.
- (2) R&I funding agencies may improve policy outcomes by making a more deliberate effort to support SMEs in progressing from Innovation Vouchers into larger-scale collaborative R&I programmes. This pathway appears to enable SMEs to build key R&I capabilities steadily over time, locking in the benefits of newly-developed collaborative relationships with academic partners. Achieving this may require the design of such pathways from the outset, paying attention to SMEs' specific needs at the early stages.

- (3) Depending on country and regional context, the ladder-based approach may be enhanced by having a dedicated collaborative R&I policy instrument designed to follow-on from the initial Innovation Voucher, as is the case in Ireland. Alternatively, where a variety of related larger-scale collaborative supports already exist, a more managed approach to encourage SME Innovation Voucher recipients to utilise these supports may be preferable. Either way, our results suggest that it is crucial for SMEs and funding agencies alike to view Innovation Vouchers as the first rung on the ladder, not an end in themselves.

The above suggestions for policy centre on how to effectively build a strong pipeline of innovative SMEs at various stages of development. The evidence in this report emphasises that a ladder-based approach can successfully build SMEs' R&I capabilities. This presents an opportunity for policy to harness this approach to achieve superior policy outcomes, especially for SMEs at the beginning of their innovation journey.

1. Introduction

Government financial support for collaborative research and innovation (R&I) projects between Small and Medium-sized Enterprises (SMEs) and Higher Education Institutions (HEIs), plays an important role in many economies (Cunningham & Link 2021; Roper et al. 2024). Cultivating a pipeline of innovative SMEs at various growth stages is essential for resilient R&I systems (OECD 2023). However, SMEs face significant knowledge and financial obstacles to start and sustain their pathway to innovation (Busom et al. 2014; Perez-Alaniz et al. 2025). Government-supported R&I collaborations can provide an entry ticket for SMEs to access cutting-edge knowledge and infrastructure embedded in HEIs (Kleine et al. 2022). Despite this, engaging in collaborative R&I with HEIs can be difficult for SMEs, due to resource constraints and key differences in priorities and institutional logics between business and academia (Hewitt-Dundas et al. 2019). Government R&I policy has attempted to bridge this gap through a variety of approaches designed to enable firms to take advantage of HEI collaborations.

Within this context, this report evaluates of how SMEs engage with different types of collaborative R&I policy support over time. The report shows that the specific transition from initial small-scale collaborative R&I support to larger-scale collaborative R&I in a later period has a significant impact on SMEs' Research and Development (R&D) investment and business performance outcomes.

This Section provides the theoretical background and policy context for the report. It first outlines the overall objective of the report, before going on to detail the data used in the analysis. The Section concludes by summarising key results and resulting actionable insights for policy.

1.1 The collaborative R&I policy support ladder

There are many different types of collaborative financial supports for firm-level R&I, which vary in size and, consequently, the type and scale of projects they can support. However, policy documents across many countries highlight that these different funding support types should not be viewed as stand-alone programmes which exist in isolation (European Commission 2017). Instead, such supports are often understood as being sequential, helping firms to develop at each stage of the innovation process over time (DBIS 2015; SQW 2019). While small-scale collaborative R&I supports tend to focus on small R&I projects, the expectation is that they can build up SMEs' innovation capacity. This, in turn, prepares SMEs for future larger R&I projects and R&I funding applications. We term this process the 'collaborative R&I policy support ladder', which SMEs climb as they grow along their pathway to innovation.

In many economies, Innovation Vouchers represent the ‘first rung’ on the ladder for SMEs. Innovation Voucher programmes are common across many countries and regions (e.g. the UK, Austria, Finland, Spain). They tend to focus on solving specific technical or scientific problems SMEs face in product development. Although policy design varies somewhat from place-to-place, they typically provide firms with a €5,000-€10,000 ‘voucher’ which they can use to facilitate knowledge exchange with a researcher or research team based at a HEI. For most SMEs, this type of support represents their earliest engagement with the public R&I support system (Kleine et al. 2022). Applying for an Innovation Voucher also represents a key signal of intent for many SMEs. This signals that they have an innovative idea, wish to develop it further, are open to external collaboration, but that they lack certain essential resources to set the idea in motion (Chapman & Hewitt-Dundas 2018). Indeed, Chapman and Treanor (2026) have recently examined a specific case which tallies with our ladder concept: grant-backed university spinouts, who use this initial experience with government funding to secure subsequent grant support.

Despite its acknowledged importance in many economies, how SMEs deal with the key ‘second rung on the ladder’, from small-scale to larger-scale collaborative R&I funding support, has been ignored in previous research. To fill this identified knowledge gap, this report addresses the following research questions:

RQ1: Does receiving an Innovation Voucher increase the probability of SMEs progressing to larger-scale collaborative R&I support?

RQ2: What is the impact of receiving small-scale collaborative R&I support, followed by larger-scale collaborative R&I support, on SMEs’ R&D and business performance outcomes?

1.2 Data and policy context

To address these research questions, we build a comprehensive and novel dataset which tracks the R&I and business performance activity of SMEs based in the Republic of Ireland from 2006-2022. As detailed below, Ireland represents a uniquely appropriate setting in which to examine our research questions, due to specific features of its policy context, as well as the high quality of available firm level data. The dataset captures SMEs that receive initial small-scale support through an Innovation Voucher, and then go on to receive additional larger-scale collaborative R&I funding for more advanced collaborative projects.

Innovation Vouchers have been extensively studied in previous research, with much evidence focusing on the UK. Several studies find that Innovation Vouchers tend to accelerate or broaden planned R&I projects (Bakhshi et al. 2015; Kleine et al. 2022; Sala et al. 2016). This catalytic effect is particularly important for SMEs as they build

their R&I capacity, with studies showing that direct short-term innovation outcomes associated with Innovation Vouchers are consistently positive (Kleine et al. 2022; Xu & Guo 2023). Chapman and Hewitt-Dundas (2018) show that the use of Innovation Vouchers increases engagement with external knowledge providers, and drives improved innovation-related behaviours, such as a shift in managerial attitudes toward collaboration and risk-taking. This result is compounded by evidence showing that Innovation Vouchers induce SMEs to engage with universities and creative or technical service providers, catalysing new or deeper ties (Rajalo & Vadi 2021). However, some studies show that certain positive effects tend to fade within one-to-two years, with limited evidence of persistent productivity or sales growth (Bakhshi et al. 2015; Kleine et al. 2022). Moreover, recent research in the context of China has also shown that Innovation Vouchers can be wholly ineffective when they are not targeted at substantive innovation projects (Dai & Guo 2026). Notwithstanding this, and importantly for the current report, Caloffi et al. (2022) show that the positive effects of Innovation Vouchers are stronger when they are combined with advisory services that help firms identify and exploit external knowledge (Caloffi et al. 2022). This report seeks to build on and extend this previous research, by examining the role Innovation Vouchers play as a ‘first rung on the ladder’, as SMEs build their R&I capacity over time.

Turning to the ‘second rung on the ladder’, our study focuses on a specific larger-scale collaborative R&I support scheme targeted at SMEs in Ireland, known as the ‘Innovation Partnership programme’. This programme provides R&I grants which cover 40-80 per cent of eligible academic-industry project costs, up to €200,000. As such, they represent a meaningful step-change from Innovation Vouchers in terms of R&I project scale and nature of the academic collaboration. However, similar to an Innovation Voucher, the funding support from an Innovation Partnership is paid directly to the HEI on verified collaborative project expenses. This means that participating in an Innovation Partnership represents a significant commitment of financial and knowledge resources for SMEs.

Past studies suggest that larger-scale collaborative R&D funding can generate meaningful firm-level benefits, particularly for firms with limited internal R&D capacity. Scandura (2016) finds that participation in publicly-funded academic-industry projects increased firms’ R&D expenditure and R&D employment. Similarly, Hottenrott and Lopes-Bento (2014) show that subsidised academic-industry collaborations stimulated additional R&D investment and innovation among SMEs. In a highly detailed study in the UK context, Vanino et al. (2019) demonstrate positive effects on turnover and employment growth from collaborative R&I grants. Previous to this, Roper and Hewitt-Dundas (2013) highlighted how publicly funded university-based research centres strengthened firms’ external innovation linkages and open innovation practices. Building on these findings, Mulligan et al. (2022) show that engagement with publicly

funded research centres reshapes firms' R&D strategies, increasing R&D intensity in general, and encouraging more of the so-called 'R' in R&D over the longer term.

Importantly for this report, in the Irish context, several policy documents highlight that Innovation Vouchers and Innovation Partnerships are viewed as functioning most effectively when SMEs utilise them in a sequence. A comprehensive review of R&I policy supports for firms in Ireland (Forfás 2014) highlighted that both Innovation Vouchers and Innovation Partnerships are viewed as “complementary supports” (p. 13), with the latter representing “the next step up [the] R&D ladder” (p. 28) in terms of funding support. The report continues that this type of sequential funding support is intended to “create a pathway for smaller companies to gain experience in working with external partners ... [which] could start with ... Innovation Vouchers” (Forfás 2014, p. 267). This understanding is supported by several more recent policy documents and reports on Ireland (e.g. DETE, 2025; DFHERIS, 2022; DPEIPSRD, 2020; OECD, 2019). As such, the transition from Innovation Vouchers to Innovation Partnerships in Ireland represents the ideal context to examine our research questions.

To examine this issue, we construct a highly detailed panel dataset by merging several key sources of information: Administrative data which captures all firms who received R&I supports in Ireland; and a government survey which, among other factors, captures firms' R&D and business performance outcomes. Our sample covers 4,477 unique firms from 2006-2022, comprising 30,287 firm-year observations. A total of 223 firms received only an Innovation Voucher (with 1,531 observations), 160 received only the larger-scale Innovation Partnership support (with 1,704 observations), and 124 firms received an IV, followed by an Innovation Partnership (with 1,348 observations). On this basis, the sequential transition from Innovation Voucher to Innovation Partnership is an empirically significant factor in our data, as well as being an important phenomenon from both academic and policy perspectives.

1.3 Results summary

In the empirical analysis, this report categorises SMEs based on the different types of collaborative R&I policy support they receive over time:

- » No collaborative R&I support.
- » Innovation Voucher only.
- » Innovation Partnership only.
- » Innovation Voucher followed by Innovation Partnership.

As in other country contexts, there is a wide variety of R&D and innovation policy supports available to firms in Ireland. In our analysis, we take steps to ensure that our results are based solely on the above categories, and are not contaminated by impacts from other R&I policy supports.

Results from our analysis show the following:

- » Innovation Vouchers increase SMEs' probability of receiving a larger scale collaborative R&I support within the next five years, by approximately 5 percentage points, on average. This effect is especially pronounced in the year immediately after SMEs receive the initial Innovation Voucher, and remains important up to at least 5 years after the receipt of this support.
- » From our results, we infer that the above effect reflects the wide variance in the type of SMEs who receive Innovation Vouchers. Some SMEs appear to use Innovation Vouchers as part of a deliberate R&I and business growth strategy, while others appear to be experimenting with how the system works.
- » In terms of firm-level impacts, we do not find that Innovation Vouchers by themselves result in SME R&D and firm performance improvements.
- » However, SMEs that transition from receiving an initial Innovation Voucher to a subsequent Innovation Partnership, achieve consistent and large increases in R&D spending and R&D employment.
- » Importantly, the Innovation Voucher-Innovation Partnership transition produces follow-on impact for sales, employment and GVA. While these firm performance effects are less consistent than the R&D impacts, they reflect the fact that SMEs appear to be utilising their improved R&I capabilities to drive commercial success.
- » The firm-level effects of climbing the ladder are larger and more consistent than for SMEs that receive only Innovation Vouchers, or that go directly to receiving larger-scale R&I collaborative support (i.e. no initial Innovation Voucher).

Overall, these results strongly support our proposal of a collaborative R&I policy support ladder. As such, the analysis offers several potential implications for policy.

2. Data

The analysis draws on data from the Annual Business Survey of Economic Impact (ABSEI). This is an annual survey collected annually by the Irish Department of Enterprise, Tourism and Employment (DETE). The sample frame of the survey comprises all firms who engage with Ireland's enterprise development agencies. These are Enterprise Ireland, who focus on domestically-owned firms, and Industrial Development Agency (IDA) Ireland, who are responsible for foreign-owned firms. ABSEI provides detailed firm-level information on business characteristics such as sector, employment, turnover, and R&D. Several previous studies have highlighted the

high quality of this dataset and its suitability for R&I policy evaluation (see e.g. Ipinnaiye et al. 2025; Lenihan et al. 2026; Perez-Alaniz et al. 2026).

To enhance the survey data, we merge ABSEI with administrative data from Enterprise Ireland and IDA Ireland. This enables us to identify firms in the ABSEI survey that received specific types of public R&I support. For completeness, the final dataset also incorporates additional administrative data sources capturing whether firms claimed R&D tax credit claims, and/or received other types of R&D grant (e.g. direct, large-scale grants not involving collaboration).

The resulting merged database tracks firms from 2006 to 2022, capturing 30,287 observations from 4,477 unique firms. As we discuss in Section 3.2, however, our analysis requires firms to feature in the dataset at least 3 times, for the periods before, during, and after receiving any support. From our sample, the average number of times firms are observed is 5 over the sample period, with approximately 50 percent of firms being observed at least 7 times.

2.1. Policy support variables

As noted in Section 1, this report focuses on two collaborative R&I supports for firms:

- Innovation Vouchers.
- Innovation Partnerships.

In Ireland, the Innovation Voucher programme was introduced by Enterprise Ireland in 2007. It was designed as an entry-level innovation support to strengthen knowledge transfer between SMEs and publicly-funded research organisations (Forfás 2014). The scheme was designed to encourage firms with limited R&I experience to engage with HEIs on specific innovation projects. Under the original programme design, vouchers worth €5,000 were allocated on a semi-competitive basis (i.e. most firms who applied and met the entry criteria were approved). Innovation Vouchers typically have a maximum 12-month duration, but most projects tend to run on shorter timescales. Subsequent reforms expanded both the scale and flexibility of the programme, introducing co-funded vouchers to support larger projects up to €10,000, and access to multiple Innovation Vouchers over time (DETE 2021).

Turning to the Innovation Partnership programme, this scheme was launched in 2010 (Forfás 2014). It is designed to support firms undertaking more complex and R&D-intensive innovation activities, relative to what may be described as ‘entry-level’ activities supported by Innovation Vouchers. While Innovation Vouchers are intended to facilitate short-term problem solving and initial engagement with knowledge providers, Innovation Partnerships target more advanced R&D collaborations that require structured research partnerships between firms and HEIs (Forfás 2014; DETE 2021). The Innovation Partnership programme provides significantly greater financial

support than the Innovation Voucher scheme, typically covering up to 80 per cent of eligible project costs up to a maximum of €200,000, with firms contributing the remaining 20 per cent share. In some cases, firms can apply for additional funding on top of the 80 per cent, for specialised equipment or research infrastructure (DETE 2021). This higher level of co-funding reflects the more ambitious scope and longer duration of Innovation Partnership projects, typically extending over 12 to 18 months. However, this duration can be longer depending on project needs, which usually focus on joint development of novel technologies, prototypes, or process innovations. Based on the data used in our analysis, the average Innovation Partnership award is approximately €80,700.

Having described the two collaborative R&I policy supports this report examines, we now turn to our key focus:

- » Whether SMEs that receive an initial Innovation Voucher are more likely to progress to receive subsequent, larger-scale collaborative R&I support (relative to SMEs that receive no initial Innovation Voucher).
- » Whether SMEs that transition from receiving an initial Innovation Voucher in one period, to participating in an Innovation Partnership in a subsequent period, have superior R&D and business performance outcomes.

As detailed by Tchorzewska et al. (2025) and Lenihan et al. (2025), when examining firms that receive multiple different R&I supports over time, it is somewhat artificial to focus on year-to-year transitions (i.e. to only examine the transition from year t to $t+1$, and ignore all subsequent and previous years). Rather, a more realistic approach is to construct a ‘time window’ after the firm has received the initial policy support. This required a rich data environment, where the R&I policy supports firms receive can be measured with accuracy over a long time period. The Oslo Manual suggests an ideal time window of 3-5 years (OECD/Eurostat 2018).

Table 1 shows firms in our merged dataset that receive an initial Innovation Voucher, followed by an Innovation Partnership in the 1-5 years after the initial support, as well as firms that received only an Innovation Voucher or Innovation Partnership over the same time window.

Table 1: Sample of firms receiving collaborative R&I policy support

Category	Unique firms (full sample)	% total	Unique firms (sample used in the analysis)	% total
Only Innovation Voucher	319	48.41	223	48.69
Only Innovation Partnership	217	32.93	160	34.93
Innovation Voucher followed by an Innovation Partnership	123	18.66	75	16.38
Total	659	100	458	100

Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Total merged sample presents the number of firms in each collaborative R&I support category that remain in our sample after merging the administrative R&I policy support data, and the firm-level data from the ABSEI survey. Sample used in the analysis presents the number of firms that are used in our Stage 2 analysis. The difference in the number of firms between the total merged column and sample used in the analysis column arises due to: 1) Firms not responding to key questions in the ABSEI survey, and thus we do not have accurate outcome measures; 2) Firms only feature in our dataset from the treatment years onwards, and thus that we do not have data to match them with suitable control firms; and 3) Firms received other R&D policy instruments, such as R&D grants and R&D tax credits, immediately before receiving collaborative R&I support instruments, and are thus not included to avoid hidden treatment bias.

2.2. Firm-level outcome variables and control variables

The analysis employs the following firm-level outcome variables:

- Total R&D investment
- R&D intensity (defined as R&D per employee)
- R&D Employment
- Total Sales
- Total Employment
- Gross Value Added (GVA)

Following common practice (for a recent example, see e.g. Fitjar 2025), the analysis defines these above variables in natural logarithm format. This is done because firm-level R&D and performance data are typically highly skewed, meaning a small number of firms tend to report exceptionally large values, which can distort analysis. The log transformation reduces the influence of these extreme observations. Furthermore, using natural logarithms facilitates the interpretation of estimated coefficients in percentage terms. This allows policy impacts to be understood as percentage changes, which is useful when making suggestions for policy.

The inclusion of these outcome variables represents an effort to capture a useful spectrum of policy outcomes which are targeted by the R&I policy interventions under investigation. Nevertheless, it is important to note that we are constrained by the information captured in our dataset. In an ideal world, especially in terms of Innovation

Vouchers, we would prefer to also include more ‘low stakes’ or intermediate outcome variables, such as SME engagement in new, non-funded academic collaborations and other collaboration behaviours, as well as incremental innovation, which often does not necessitate formal R&D. As detailed in Section 1, several previous studies have examined outcome variables such as these in relation to Innovation Vouchers, mostly finding positive impacts. The main purpose of this report is examining the collaborative R&I policy support ladder. Building up some level of internal R&D capacity is essential for SMEs to effectively participate in the larger-scale collaborative R&I programme under examination in this report (Forfás 2014). Moreover, the expectation is that, if effective, both Innovation Vouchers and Innovation Partnerships should, given a sufficient time lag, help firms to improve their overall business performance (DETE 2021). Therefore, while acknowledging some limitations, the outcome measures used in this report are appropriate.

R&D expenditure is an appropriate firm-level outcome variable because it is one of the most immediate and reliable measures of change in innovation behaviour induced by public R&I funding (Ipinnaiye et al. 2025). Changes in R&D spending provide a direct measure of the extent to which firms allocate additional resources to innovation following policy support. In this regard, it is important to note that the collaborative R&I funding supports considered in this report do not provide direct funding to the SMEs. Rather, the funding support goes directly to the academic collaboration partners in their institutions. This is important as it enables us to identify a pure form of ‘private’ R&D expenditure induced by public R&I support. This is in contrast to other types of direct, non-collaborative R&I grant, where firms receive direct financing to spend on R&D. In this latter case, it can be challenging for evaluations to disentangle the additional private R&D spending induced by government R&D support, from the public funding provided through a direct grant. Building on SMEs’ total R&D expenditure, we also include R&D ‘intensity’, obtained by dividing SMEs’ total R&D expenditure by their total number of employees. Including R&D intensity alongside total R&D spending distinguishes increases in the absolute scale of SME R&D from changes in R&D activity relative to firm size. This provides a more nuanced assessment of how relatively small innovation supports affect firms, showing whether they expand R&D capacity or intensify existing R&D activity. Finally in terms of R&D, we also focus on the extent to which firms hire additional R&D employees. R&D investments can vary substantially year-on-year, especially for SMEs who have yet to establish formal R&D processes. In contrast, R&D employment signals that SMEs are making long term commitments to R&I activities, by hiring (or redeploying) dedicated R&D staff (Scandura 2016).

Turning to firm performance, sales and employment are key indicators of whether collaborative R&I support translates into tangible business growth beyond R&D activity alone. Increases in sales capture the commercialisation and market success of innovations. Employment growth reflects firm expansion and the creation of economic

value. Together, these outcomes assess whether Innovation Vouchers and larger-scale collaborative R&I support generates meaningful economic impacts for SMEs through HEI collaboration. Finally, GVA captures the economic value generated by SMEs through production activities. It reflects broader business performance beyond R&I inputs alone. GVA assesses whether upstream R&D investments translate into improved economic outcomes, such as higher productivity and value creation. Consequently, GVA is a useful outcome variable for evaluating whether collaborative R&I support helps firms to both create value through R&D investments, as well as capture this value through commercialisation.

In addition to these firm-level outcome variables, the report includes a battery of control variables to ensure the analysis accounts for all important factors. Table 2 describes the control variables used in our analysis. As the table shows, we control for firms' R&D activity and business performance behaviour in the 5 years before they received any public R&I support. In addition to this, we control for factors such as firms' regional location, age, sector, and whether they are domestically- or foreign-owned. Table 3 presents the summary statistics for firms in each of our key R&I support categories.

Table 2. Variables used in the analyses

Variable Name	Description
Only Stage 1	
Innovation Voucher (IV) Previous 5	Binary variable. Equals 1 if firms received an IV during the 5 years previous to receiving larger-scale collaborative R&I funding.
Dynamic variables	Set of 5 binary variables. These variables provide more detail into the above, by looking at how many years before obtaining larger-scale collaborative R&I funding, firms received the IV. They go from 1 (t-1) to 5 (t-5).
Year	Dummy Factor Variables representing each year.
Only Stage 2	
IV Only	Binary Variable. Equals 1 if firms received an IV in T0, and no further R&I support in the subsequent 5 years.
Innovation Partnership (IP) Only	Binary Variable. Equals 1 if firms received an IP in T0, and no further R&I support in the subsequent 5 years.
IV to IP	Binary Variable. Equals 1 if firms received an IV in T0, and an IP within the following 5 years.
Stage 1 and Stage 2	
Mean R&D expenditure (Average t-1 to t-3)	Average of total R&D expenditure over 3 years pre-public R&I support (Ln).
Mean R&D Intensity (Average t-1 to t-3)	Average of R&D per employee over 3 years pre-public R&I support (Ln).
Mean GVA (t-1 to t-3)	Average of GVA over 3 years pre-public R&I support (Ln).
Decline	Binary variable. Equals 1 if firms had declining turnover in the 2 years pre-public R&I support.
Age	Binary variable. Equals 1 if firm is older than 6 years at the time of observation.
Owner	Binary variable. Equals 1 if firms are over 50% domestic-owned.
Region	Categorical variable capturing 7 regions: Dublin, Mid-East, Mid-West, Midlands, South-East, South-West, West.
Sector (aggregated Nace)	Categorical variable capturing 6 aggregated Nace Sectors: (1) Business, Financial & Other Services; (2) Energy, Water, Waste & Construction; (3) Food, Drink & Primary Production; (4) Information & Communication Services; (5) Modern Manufacturing; and (6) Traditional Manufacturing.
Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. The variables in Only Stage 1, are variables that are only used in our panel probit model analysis of Stage 1. The variables in Only Stage 2 are key independent variables of interest that we use in Stage 2 of our analysis to identify the different subgroups in our sample. Finally, the variables listed in Stage 1 and Stage 2 are used for the probit analysis, the matching process, and in the final estimation as control variables. For variables where we take the average value over three years, in cases where all 3 years not available, we use either 2 or 1. Ln refers to the Natural Logarithm.	

Table 3. Descriptive statistics

	Full Sample (1)		IV Only (2)		IP Only (3)		IV to IP (4)		Untreated (5)	
Variable	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Total R&D (Ln)	4.183	2.749	2.861	2.387	4.875	2.253	4.798	2.076	3.731	2.741
Mean R&D past 3 years (Ln)	4.089	2.576	2.755	2.219	4.801	2.108	4.683	1.921	3.653	2.507
Mean R&D intensity (Ln)	1.319	0.961	1.173	1.104	1.647	1.035	1.806	0.967	1.13	0.861
Total Sales (Ln)	7.537	3.295	6.552	2.91	7.747	2.9	6.739	2.686	7.479	3.534
Employees (Ln)	1.181	1.118	0.651	0.723	1.357	0.949	1.306	0.906	0.966	1.019
Gross Value Added (Ln)	6.561	3.461	5.58	3.036	6.89	2.801	6.091	2.763	6.36	3.755
Decline in turnover (1/0)	0.377	0.485	0.3	0.458	0.29	0.454	0.254	0.436	0.429	0.495
Age (7+ years)	0.695	0.461	0.664	0.472	0.788	0.409	0.716	0.451	0.635	0.481
Foreign owned	0.211	0.408	0.028	0.164	0.052	0.222	-	-	0.284	0.451
Domestic owned	0.789	0.408	0.972	0.164	0.948	0.222	1	0	0.716	0.451
Region: Border	0.08	0.271	0.086	0.281	0.087	0.282	0.099	0.299	0.096	0.295
Region: Dublin	0.368	0.482	0.32	0.467	0.263	0.441	0.219	0.414	0.347	0.476
Region: Mid-East	0.11	0.313	0.105	0.307	0.093	0.291	0.079	0.269	0.116	0.32
Region: Mid-West	0.092	0.288	0.069	0.253	0.082	0.275	0.069	0.254	0.092	0.289
Region: Midlands	0.044	0.206	0.068	0.252	0.086	0.28	0.058	0.234	0.044	0.205
Region: South-East	0.067	0.25	0.146	0.353	0.079	0.269	0.082	0.275	0.056	0.23
Region: South-West	0.143	0.35	0.122	0.327	0.22	0.415	0.275	0.447	0.138	0.344
Region: West	0.096	0.295	0.082	0.275	0.09	0.286	0.12	0.325	0.11	0.313
Busin., Fin., & Other Services	0.139	0.346	0.164	0.37	0.126	0.332	0.144	0.351	0.147	0.354
Energy/Water/Waste/Const.	0.031	0.174	0.057	0.231	0.034	0.182	0.032	0.176	0.032	0.177
Food, Drink, Primary Prod.	0.122	0.328	0.14	0.347	0.129	0.335	0.045	0.207	0.139	0.346
ICT	0.29	0.454	0.242	0.429	0.201	0.401	0.224	0.418	0.252	0.434
Modern Manufacturing	0.167	0.373	0.126	0.332	0.247	0.431	0.28	0.45	0.155	0.362
Traditional Manufacturing	0.249	0.433	0.272	0.445	0.262	0.44	0.275	0.447	0.275	0.447
Observations	30,287		1,552		1,716		1,233		12,121	
Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. The difference between the number of observations in the total sample, and the sum of the observations for the four groups presented in this table is because the full sample also includes firms that received other R&D funding instruments, most notably R&D grants and R&D tax credits, or that receive combinations of collaborative and non-collaborative instruments. These firms are not assigned to the subsamples, as they are not used in the Stage 2 analysis.										

Perhaps the most salient fact when comparing summary statistics from Tables 3 comes from focusing on relative levels of R&D between the different collaborative R&I support categories. It is noteworthy that average R&D for SMEs that receive an Innovation Voucher only is substantially lower than for SMEs that received an Innovation Partnership alone, make the Innovation Voucher-Innovation Partnership transition, or that do not receive any R&I support. Such SMEs also tend to have a lower performance in terms of sales. This suggests that SMEs in the 'Innovation Voucher only' category are firms that may be underperforming, in comparative terms, and thus wish to experiment with the public R&I support system. Overall, these summary statistics highlight the need for careful methodological treatment, to ensure our analysis provides meaningful results based on a fair comparison of like-with-like.

3. Methodology

To address the two research questions outlined in Section 1, we adopt two distinct methodological procedures. We first examine whether SMEs that receive an initial Innovation Voucher are more likely to receive subsequent larger-scale R&I collaborative support. Following this, we evaluate the impact that receiving such a sequence of R&I collaborative supports has on SMEs' R&D and business performance.

3.1. Climbing the R&I policy support ladder

To address our first research question, we implement a panel data, random effects probit model, as presented in Equation (1):

$$Pr(Collab_Support_{it}) = \alpha + \beta_1 IV_{it-x} + \beta_x X'_{it-x} + \varepsilon_{it} \quad (1)$$

Where $Collab_Support_{it}$ is a dummy variable, and Pr refers to the probability of firm i being awarded larger-scale R&I collaborative support in period t (i.e. 2006-2022). IV_{it-x} is a dummy variable capturing whether SMEs received an Innovation Voucher before being awarded larger-scale collaborative R&I funding. We use two versions of this model. In the first version, IV_{it-x} is equal to 1 if firms received at least one IV in the 5 years, before being awarded larger-scale support for R&I collaborations. In the second version, we include 5 dummy variables, one each for each of the five years comprising this period. X' is a vector of covariates for firm i that are assumed to influence this probability. The terms α and ε refer to the intercept and error terms, respectively. Finally, β_1 is our main coefficient of interest. A positive and significant effect would suggest that Innovation Vouchers improve SMEs' probabilities of being awarded subsequent larger-scale support for R&I collaborations with HEIs.

3.2. Impact analysis

We next turn to our second research question, which focuses on the impact of transitioning from an Innovation Voucher to Innovation Partnership on firm-level outcomes. We achieve this

by combining a distance matching (i.e. Mahalanobis matching) and Staggered Difference-in-Differences (SDiD) framework.

Evaluating the firm-level impacts of any R&I support instrument requires comparing how firms performed following the receipt of an R&I policy instrument, against the hypothetical counterfactual of how such firms would have performed in the absence of the support. As the same firm cannot be observed in both states (i.e. ‘treated’ and ‘untreated’) at the same time, the counterfactual is estimated. This is achieved using untreated firms (i.e. those that do not receive R&I support), but that are statistically identical to the treated firms.

In constructing our counterfactual, we begin by estimating a probit model, to obtain the probability of SMEs obtaining any of the three types of treatment considered here (i.e. Innovation Voucher only, Innovation Partnership only, and the Innovation Voucher-Innovation Partnership transition). This is carried out by using the observable variables presented in Table 2.¹ The above estimation yields the probability of being in any of the three treatment categories noted above. We thus match treated and untreated SMEs based on these probabilities, based on their Mahalanobis distance.

Formally, for treated firm i and control firm j , the Mahalanobis distance is defined as:

$$D_{ij} = \sqrt{(X_i - X_j)'S^{-1}(X_i - X_j)} \quad (2)$$

where X is a vector of pre-treatment covariates, as included in Table 2, and S is the sample covariance matrix of these covariates. Each treated firm is matched to the control firm that minimises the distance D_{ij} , within its exact-matching strata (i.e. firms of the same sector, region, and ownership structure). This ensures a fair comparison of like-with-like when comparing treated with control firms. Finally, the matching process is performed without replacement (i.e. one untreated firm can only be the control firm for one specific treated firm), to ensure that we keep a similar number of firms in the treatment and the control groups.

Once the above groups of treated and control firms are established, we use a DiD estimator to compare changes in outcomes for treated firms with changes observed among comparable untreated firms. A key feature of this estimation approach is that, in addition to accounting for observable characteristics (i.e. by including the control variables in Table 2), it also controls for

¹ It is important to note that 14 firms in the IV to IP treatment group, also received R&D grants and/or R&D tax credits. We decided to keep these firms to maximise the number of observations. As a result of this, we added two additional variables to this estimation, comprising dummy variables measuring whether firms also received R&D grants, or claimed R&D tax credits. While the number of firms receiving these additional treatments is small, these variables ensure that such firms are matched with suitable control firms that also received such instruments. This is important so as to ensure that our results remain unaffected by other potential R&I policy instruments, available to firms in Ireland.

time-invariant differences between firms and common macroeconomic shocks. This is because, as noted below, it focuses on the difference between: 1) the difference in the outcome variable of treated firms between the periods before and after treatment; and 2) the differences in the same periods for the matched control firms. Combining our matching approach with DiD mitigates potential difference between treated and untreated firms (both observable and unobservable), thus increasing the reliability of our estimated results.

Importantly, the firms in our analysis can receive the treatment at different points in time. This is because government R&I support can be received in any year (or multiple years) during the observation period. Moreover, given our methodological approach, once firms receive an R&I support instrument, they are considered as treated for the remainder of the outcome period. This is a typical example of a so-called ‘staggered’ treatment design. In this context, recent methodological contributions caution of potential situation whereby treated firms are matched to control firms that have been treated in previous periods (Callaway & Sant’Anna 2021; de Chaisemartin & D’Haultfœuille 2023; Borusyak et al. 2024). This type of matching would produce bad comparisons, and potential bias the results of the analysis. Several approaches have thus been proposed to explicitly account for variation in treatment timing and construct treatment effects by comparing firms that receive support in a given period with firms that are never treated. Amongst several approaches, the approach proposed by Callaway and Sant’Anna (2021) is especially useful for the purpose of this study. This is because it exploits the longitudinal structure of firm-level panel data and allows treatment effects to be estimated before, during, and after programme participation in a pragmatic way that makes use of all sample data.

Following Callaway and Sant’Anna (2021), the primary parameter of interest is the group-time Average Treatment Effect on the Treated (ATT), denoted as $ATT(g, t)$ in Equation (3):

$$ATT(g, t) = E[Y_{t(g)} - Y_{t(0)} | G = g] \quad (3)$$

In Equation (3), $Y_{t(g)}$ represents the potential outcome at time (t) for firms that first receive government R&D support in period (g), and $Y_{t(0)}$ represents the counterfactual outcome that would have been observed for those same firms had they never received support. The term $(G=g)$ identifies the cohort of firms that first enter treatment in period (g), while E denotes the expected value (average) across firms in that cohort. Consequently, $ATT(g, t)$ measures the average causal effect of government R&D support for firms first treated in period (g), evaluated at time (t).

Identification of $ATT(g, t)$ is based on a Difference-in-Differences comparison between treated firms and an appropriate control group, as represented in Equation (4):

$$ATT(g, t) = E[Y_t - Y_{\{g-1\}} | G = g] - E[Y_t - Y_{\{g-1\}} | C = 1] \quad (4)$$

The first term captures the average change in outcomes for firms treated in period (g), measured relative to the last pre-treatment period ($g-1$). The second term measures the corresponding outcome change among control firms, where ($C=1$) denotes firms that were never treated. Under the conditional parallel trends assumption, enforced through the Double Robust Inverse Probability Weighting procedure and observed control variables, the difference between these two changes identifies the causal treatment effect.

To obtain an overall estimate of programme impact, the cohort-specific treatment effects are aggregated across treatment groups and post-treatment periods, as depicted in Equation (5):

$$\theta^o = \sum_g \sum_{t \geq g} w(g, t) \cdot ATT(g, t) \quad (5)$$

In Equation (5), θ^o is the overall average treatment effect, and $w(g, t)$ represents the weight assigned to each group-time treatment effect. The weights typically reflect the relative importance or size of each treatment cohort and period. This aggregation produces a single summary measure of the average impact of government R&I support while preserving the flexibility of the staggered adoption framework to accommodate heterogeneous treatment timing and treatment effects. In addition, the staggered structure enables the estimation of dynamic treatment effects, providing evidence on whether the impacts of government support emerge immediately, accumulate over time, or persist after programme completion. These features make this approach ideal for evaluating the impact of government R&I support on firm-level outcomes using panel data.

A central requirement of any DiD approach, including the one used in this study, is the parallel trend assumption. This requires that, in the absence of treatment, treated and comparison firms would have experienced similar trends in outcomes over time. Rather than relying solely on unconditional comparisons, this study enforces the parallel trends assumption conditional on a rich set of control variables that are used to model treatment assignment (i.e. see Table 2).

4. Results and discussion

This Section presents the results from our analysis. Our results below are organised in two stages:

Our first set of results examines whether firms that receive an initial Innovation Voucher have a greater probability of going on to receive subsequent larger-scale collaborative R&I support. This analysis is essential in demonstrating whether our conceptualised ‘ladder’ exists. This is important because, while Section 1 highlighted that policymakers intend SMEs to utilise Innovation Vouchers and Innovation Partnerships in a sequential way, in practice SMEs are free to choose which supports they use based on their perception of need and opportunity.

Our second set of results focuses on the impact of climbing the ladder, examining the key, early transition from first to second rung. Our main focus here is on SMEs that transition from

an initial Innovation Voucher to larger-scale collaborative R&I support in the form of an Innovation Partnership.

4.1. Innovation Vouchers as a first rung on the ladder

Table 4 presents the results of the extent to which receiving an Innovation Voucher increases the probability of SMEs obtaining subsequent, larger-scale collaborative support for R&I. Table 4 measures this in two ways:

- (1) For SMEs that participate in an Innovation Partnership at any point over the sample, we examine whether they received an Innovation Voucher in the 5 years prior to this. This first analysis focuses on SMEs average probability in the 5 year pre-Innovation Partnership period.
- (2) For the same SMEs, we examine each specific year over this 5 year pre-Innovation Partnership period. This will move beyond average trends, and show how SMEs tend to approach the ladder.

Results from these analyses are shown in Table 4. Column 1 in Table 4 indicates that Innovation Vouchers have a positive and significant effect on SMEs’ probability of being awarded subsequent, larger-scale R&I collaborative funding. The overall effect size is highly statistically significant, and of approximately 5 percentage points in magnitude. From Column 2, we observe that the effect is greatest immediately after the receipt of the Innovation Voucher (at approximately 6.5 percentage points). Effect sizes tend to decrease slightly over time, although they remain highly statistically significant in all years.

Table 4: Probability of SMEs climbing the collaborative R&I policy support ladder

Variables	Innovation Partnership dy/dx	Innovation Partnership dy/dx
	(1)	(2)
IV_Yes (last 5 Years)	0.047***	
	(0.003)	
IV_year -1		0.064***
		(0.004)
IV_year -2		0.040***
		(0.007)
IV_year -3		0.036***
		(0.008)
IV_year -4		0.032***
		(0.008)
IV_year -5		0.024**
		(0.011)
Received R&D Grants and/or R&D Tax Credits	0.054***	0.054***
	(0.003)	(0.003)
R&D expenditure (Mean previous 3 years)	0.004***	0.005***
	(0.001)	(0.001)
R&D intensity (Mean previous 3 years)	0.001	0.001
	(0.001)	(0.001)
Number of Employees (Logs, Mean previous 3 years)	0.001	0.002
	(0.002)	(0.003)
Gross Value Added (Logs, Mean previous 3 years)	0.001	0.001
	(0.001)	(0.001)
Decline (1= Yes if Firms shows a decline in sales in previous two years)	-0.003**	-0.002**
	(0.000)	(0.001)
Older than 6 years (1 = Yes)	0.001	0.001
	(0.003)	(0.003)
Domestic (1 = Yes)	0.050***	0.043***
	(0.008)	(0.008)
Region (NUTS2) Control	Yes	Yes
Sector (NACE Rev. 2) Control	Yes	Yes
Year Control	Yes	Yes
Observations	30,287	30,287
Unique firms	4,477	4,477
Log Likelihood	-2554.4466	-1459.6502
Rho	0.572	0.234
Likelihood Ratio test	1100.29	79.44
Prob >= Chibar2	0.000	0.000
Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard Errors in Parenthesis. *** p < 0.01, ** p < 0.05, * p < 0.1. Results are marginal effects. Constant is estimated in main model but not reported here. The acronym 'IV' stands for Innovation Voucher. The coefficient for the variable IV_Yes (last 5 Years) in Column 1 presents the probability of receiving an Innovation Partnership on average in the 5 years after an initial Innovation Voucher. The Coefficients IV_year -1 to IV_year -5 present the results when we consider each of the 5 years before the year in which firms obtained the Innovation Partnership.		

The above findings suggest that Innovation Vouchers play a significant role as a first rung of the collaborative R&I policy support ladder. Such effects may appear small when considered on their own, but are meaningful when considered in relative terms. To put these effects into perspective, our data suggests that the average firm has less than 3 percent probability of securing larger-scale R&I collaborative funding in general. In this context, a 5 percentage points increase means that Innovation Vouchers almost triple this probability (i.e. from 3 to 8 percent).

Building on this, the next sub-section takes a step further to examine the impact of climbing the ladder on SMEs R&D expenditure and firm performance improvements.

4.2. Impact of climbing the collaborative R&I policy support ladder

Results relating to our second research question are presented in Table 5. Table 5 is organised around three so-called ‘treatment categories’:

- SMEs that receive an Innovation Voucher only.
- SMEs that receive an Innovation Partnership only.
- SMEs that transition from an Innovation Voucher as their first support to an Innovation Partnership in the next 5 years.

Results from each of these treatment categories are relative to statistically identical SMEs who received no government R&I policy support.

As noted in Section 3.2, our empirical approach rests on the assumption that, in the absence of treatment, both treated and control firms would have followed similar trends. To examine this, in Table 5 the coefficients ‘Pre_avg’ correspond the average of the dependent variable of interest, during the 5 year pre-treatment period, in comparison to the control firms. A positive and significant coefficient for this variable would indicate that, on average, treated firms were already outperforming the control firms before receiving treatment. By contrast, a negative and significant coefficient would indicate the opposite. Both of these outcomes would violate our parallel trend assumption, and bias our treatment-effect estimates.

As Table 5 shows, however, the parallel trends assumption is satisfied in all but a small number of marginal cases. Moreover, as presented in Figure 1, any differences which do occur are minor, and, crucially, do not occur in the years immediately before the treatment. Instead, they mainly take place 4 or 5 years before the treatment period. The exception to this rule is for the variables Total Sales, for which we do observe significant differences in the year immediately before treatment. This means that any results for this variable must be interpreted with some caution. Tables 1A-1F in the Appendix provide considerable additional detail by examining the significance of any pre-treatment trends year-by-year. This additional detail supports the overall results shown in Table 5.

We now focus on the main stage two results, which are presented as the weighted average impact of the three treatment categories for the period t_0 to t_5 , totalling 6 years. Figure 1

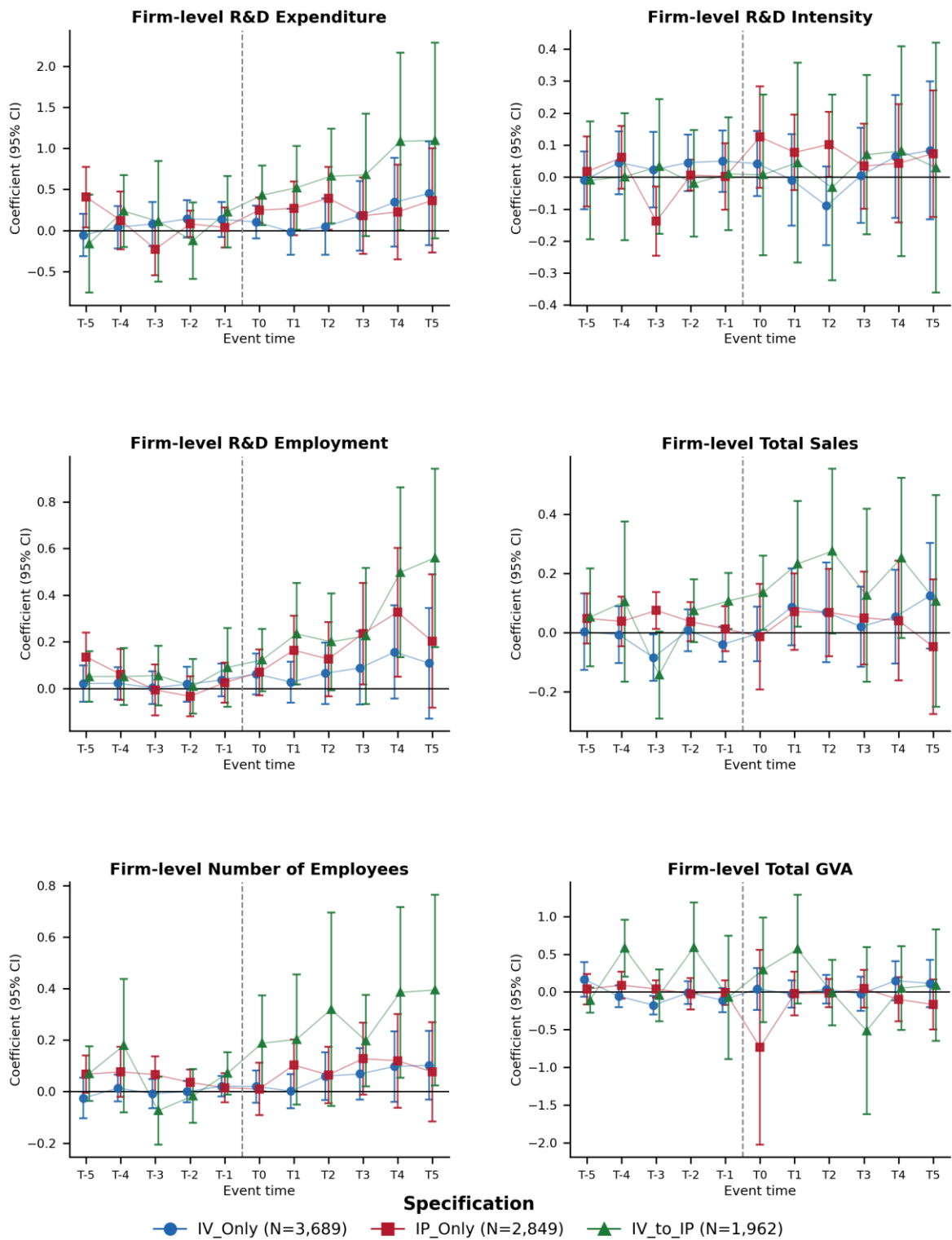
presents the dynamic event study coefficients, for each of the years comprising this period. We focus first on firms that receive only one Innovation Voucher. As Table 5 shows, we do not find that Innovation Vouchers alone result in increased R&D or firm-level performance effects in SMEs. Figure 1 also shows that the coefficients remain close to zero across most of the years comprising the outcome period. These results are perhaps unsurprising, given that Innovation Vouchers mainly focus on specific and small-scale collaborations with academics in HEIs. As noted in Section 1, Innovation Vouchers by themselves may well impact short-term innovation outcomes such as incremental product innovation and managerial attitudes, which are not captured in our analysis.

Table 5. Impact of collaborative R&I policy support on firm-level outcomes

	IV_Only	IP_Only	IV_to_IP
Firm-level R&D Expenditure			
<i>Pre_avg</i>	0.067 (0.064)	0.083 (0.068)	0.057 (0.116)
<i>Post_avg</i>	0.185 (0.165)	0.279+ (0.170)	0.745** (0.284)
Firm-level R&D Intensity			
<i>Pre_avg</i>	0.031 (0.026)	-0.010 (0.021)	0.003 (0.039)
<i>Post_avg</i>	0.016 (0.057)	0.076 (0.050)	0.033 (0.122)
Firm-level R&D Employment			
<i>Pre_avg</i>	0.020 (0.018)	0.036 (0.025)	0.051 (0.034)
<i>Post_avg</i>	0.084 (0.059)	0.187* (0.076)	0.307** (0.109)
Firm-level Total Sales			
<i>Pre_avg</i>	-0.024 (0.021)	0.042* (0.018)	0.039 (0.041)
<i>Post_avg</i>	0.059 (0.052)	0.028 (0.064)	0.188+ (0.111)
Firm-level Number of Employees			
<i>Pre_avg</i>	0.001 (0.014)	0.052** (0.017)	0.046 (0.037)
<i>Post_avg</i>	0.058 (0.038)	0.084 (0.055)	0.282* (0.129)
Firm-level Total GVA			
<i>Pre_avg</i>	-0.038 (0.036)	0.027 (0.034)	0.187+ (0.092)
<i>Post_avg</i>	0.047 (0.098)	-0.166 (0.144)	0.079 (0.257)
Number of Observations	3,689	2,849	1,962
Unique treated firms	223	160	75

Note: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Coefficients are average treatment effect on the treated firms, and are obtained using the doubly robust DID estimators proposed by Callaway and Sant'Anna (2021). The coefficients *Pre_avg* are the weighted average of the 5 years prior the treated firms are treated. *Post_avg* are the weighted average of the impacts of the treatment, during the treatment year, and the following 5 years following the treatment.

Figure 1. Event plots for Stage 2 results (dynamics effects by year)



Notes • Dashed line marks the treatment boundary (between T-1 and T0). • Error bars show 95% confidence intervals.

Moving on to larger-scale support for collaborative R&I, our results suggest that when received alone, such instruments can result in improved levels of R&D investments in SMEs. More specifically, as presented in Table 5, such instruments result in improved R&D Expenditure (0.279 log points, $p < 0.1$), and firms hiring additional R&D employees (0.187 log points, $p < 0.05$). These effects are economically important with regard to their magnitude, as they are equivalent to an increase of approximately 32 and 18 percent, respectively. Figure 1 also shows that the estimated treatment effects become positive following programme participation, and increase over time. This pattern is consistent with the collaborative nature of Innovation Partnerships, where research activities and associated expenditure typically build over time. Despite this, however, our findings do not suggest that larger-scale support for collaborative R&I by itself translates into improved firm-performance.

We now turn to our main treatment category of interest, SMEs that receive an Innovation Voucher followed by larger-scale R&I collaborative support. SMEs in this category experienced the largest increases in R&D expenditure during the period t_0 to t_5 , at 0.745 log points, on average ($p < 0.01$). This is a large effect, and equivalent to an increase of approximately 110 percent, relative to the control group. This suggests that, from a relatively low base, SMEs who make the Innovation Voucher-Innovation Partnership transition can double their R&D capacity in the subsequent 5 years. From Figure 1, we observe that such effects tend to increase over time, suggesting that SMEs develop new R&D capacity steadily as they build the new Innovation Partnership-supported collaboration. These results are confirmed in the detailed year-by-year analysis presented in Appendix Tables 1A-1C (see Column 3, coefficients 'Tp1' to Tp5'). As discussed in Section 2.2, it is possible that SMEs in the Innovation Voucher-Innovation Partnership are in a process of building up their R&D capacity before they receive their initial Innovation Voucher. Results presented here suggest that these SMEs utilise the collaborative R&I supports to enhance this process.

Moreover, while we do not observe any positive significant effects for R&D intensity, we do find that Innovation Voucher-Innovation Partnership transition drives SMEs to increase R&D employment by approximately 0.30 log points ($p < 0.01$). This is equivalent to an increase of circa 32 percent. Given that R&D employment tends to be a more lasting indicator than R&D spending (which can vary substantially year-on-year, especially for SMEs), this result is a strong indicator of increased R&D capacity. Furthermore, Table 1C in the Appendix shows that the impact of the Innovation Voucher-Innovation Partnership transition on SMEs R&D employment is much larger and more consistent across the years, relative to impact estimation of SMEs that receive an Innovation Partnership alone. This is important, because it highlights the potential benefits of following the step-by-step, ladder-based approach.

We now turn our attention to firm-performance effects associated with the Innovation Voucher-Innovation Partnership transition. Our results here present a somewhat less consistent story, than those for firm-level R&D related activities. However, overall, they suggest that receiving an Innovation Voucher followed by an Innovation Partnership can help SMEs improve their business performance. Table 5 shows that the Innovation Voucher-Innovation Partnership

transition increases SMEs total sales by approximately 0.2 log points ($p < 0.1$), which is equivalent to a 23 percent increase. This finding is confirmed and expanded on in Appendix Table 1E, which shows that the Innovation Voucher-Innovation Partnership transition drives increased sales in years 1, 2, 4 and 5 post treatment. As such, this appears to be a consistent and well-established business performance improvement stemming directly from SMEs climbing the ladder. As discussed above, it is important to note that in this case we observe a small but significant pre-trend in the year immediately before the treatment. In this context, it may be likely that our treatment-effect represents an overestimation.

Table 5 also shows that SMEs making the Innovation Voucher-Innovation Partnership transition tend to have comparatively more employees, than firms in the control group (0.282 logs, $P < 0.05$). Moreover, such effects are consistent across 4 of the 5 years post-treatment. Finally, we do not observe that the above transition affects the GVA levels of SMEs.

5. Conclusion and actionable insights for Research and Innovation policy

This report provides evidence that SMEs benefit most when Innovation Vouchers are used as a gateway into a broader programme of collaborative R&I activity, rather than as a stand-alone intervention. We find the Innovation Vouchers improve SMEs' probabilities to secure larger-scale collaborative funding for R&I. Importantly, our results demonstrate that SMEs which progress from an initial Innovation Voucher to larger-scale collaborative support, achieve substantial improvements in R&D expenditure, R&D employment, and several firm-performance indicators. In contrast, SMEs that receive an Innovation Voucher alone experience little measurable improvement in these outcomes. These findings suggest several potentially important implications for the design and implementation of R&I policy.

A key insight emerging from this study is the importance of supporting SMEs at what might be termed the 'lower end' of the innovation ecosystem on a step-by-step basis. These SMEs are not established innovators, but rather firms towards the beginning of their innovation journeys. Within this context, Innovation Vouchers appear to perform an important enabling function. They provide a low-cost and relatively low-risk mechanism through which SMEs can access expertise, knowledge and infrastructure embedded within the higher education system.

Importantly, our results suggest that Innovation Vouchers, when received as stand-alone supports, are relatively ineffective at driving SME R&D and business performance improvements. However, this limited impact should not be interpreted as evidence that the scheme is ineffective or should be discontinued. Such a conclusion would overlook the role that Innovation Vouchers play within the wider innovation ecosystem. Our results suggest that many SMEs use Innovation Vouchers as a form of exploration or experimentation. For some SMEs, the experience appears to provide sufficient information to conclude that academic collaboration is not the most appropriate route for their innovation needs. While this may not generate measurable R&D or firm performance impacts, it nonetheless represents a valuable

learning outcome. In effect, Innovation Vouchers seem to provide one cohort of SMEs with an opportunity to ‘fail fast’ in a low-stakes environment. Given the relatively modest financial value of the scheme and its low administrative burden, this appears to be a reasonable outcome from a policy perspective.

At the same time, our findings clearly demonstrate that a separate cohort of Innovation Voucher recipients use the scheme differently. These SMEs appear to view the Innovation Voucher as the first stage of a broader innovation and growth strategy. This aligns closely with our proposed ladder-based approach. For these SMEs, the initial Innovation Voucher-supported collaboration appears to serve as a platform for building relationships, developing trust, understanding collaborative working practices, and identifying future R&I opportunities. The substantial increases observed in R&D expenditure and R&D employment among firms that transition from Innovation Vouchers to Innovation Partnerships indicate that meaningful capability building is taking place. The evidence therefore suggests that Innovation Vouchers work particularly well when they act as the first rung on a collaborative R&I support ladder.

These findings highlight an important distinction between transactional and relational approaches to academic-industry collaboration. Innovation Vouchers appear to be less effective when SMEs treat them as a mechanism for purchasing a discrete piece of contract research from an academic partner. In such cases, the collaboration appears to end once the immediate problem has (or has not) been solved. Although not directly tested in our analysis, our results suggest that better outcomes emerge when both parties engage in a more meaningful collaboration, built around shared R&I objectives and longer-term engagement. The largest impacts are observed where Innovation Vouchers evolve into broader collaborative relationships that continue beyond the initial project. From a policy perspective, this reinforces the need to encourage SMEs and academic partners to view Innovation Vouchers as the beginning of a collaborative journey rather than the end point.

An important insight for R&I policy, therefore, centres on the need to strengthen progression mechanisms between different stages of collaborative R&I support. Funding agencies have a potentially important role to play in this regard. Rather than viewing Innovation Voucher applications as isolated funding requests, agencies could place greater emphasis on understanding SMEs’ broader innovation ambitions at the point of application. For example, application and assessment processes could seek to identify whether the proposed project forms part of a wider R&I growth strategy, whether the firm has already taken steps to build innovation capabilities, and whether there is potential for future collaborative activity. The objective for funding agencies would not be to restrict access to Innovation Vouchers on the basis that some may not produce impact. Instead, funding agencies could harness the opportunity to identify SMEs that may benefit from additional guidance and support as they progress through the innovation policy support system.

This suggests a stronger role for what may be termed innovation pathway management. SMEs that demonstrate motivation to innovate, but possess limited knowledge of collaborative R&I

capabilities, may benefit from targeted advisory support alongside other R&I funding. Such support could help SMEs understand how to maximise the value of academic collaboration. This could centre on developing the organisational capabilities required to engage in larger collaborative R&I programmes. For some SMEs, this guidance may discourage applications where expectations are unrealistic. For example, many of the SMEs who used Innovation Vouchers on a 'one and done' basis in our analysis may fall into this category. For others, such early-stage guidance may accelerate the behavioural and organisational changes that appear necessary to fully exploit the benefits of collaborative R&I support. The evidence from this report suggests that these behavioural changes are an important part of the mechanism through which Innovation Vouchers ultimately generate impact over the longer term.

More broadly, our findings support a shift in how collaborative R&I policy is conceptualised and evaluated. Our results suggest that many R&I policy supports should not be assessed solely on the basis of individual programme performance. Instead, greater attention should be given to how different interventions interact over time, as funding recipients develop and their needs change. The strongest impacts identified in this report arise not from a single intervention, but from the combination and sequencing of interventions. This suggests that policy effectiveness depends on both the quality of individual schemes, as well as on how successfully firms can move between them.

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APPENDIX

Table A1. Year-by-year analysis of Stage 2 results for firm-level R&D Expenditure

	IV_Only	IP_Only	IV_to_IP
Average effects (5 years post treatment)			
<i>Pre_avg</i>	0.067 (0.064)	0.083 (0.068)	0.057 (0.116)
<i>Post_avg</i>	0.185 (0.165)	0.279+ (0.170)	0.745** (0.284)
Pre-treatment trends (year-by-year)			
<i>Tm5</i>	-0.056 (0.131)	0.405* (0.188)	-0.162 (0.304)
<i>Tm4</i>	0.039 (0.131)	0.122 (0.179)	0.236 (0.224)
<i>Tm3</i>	0.078 (0.136)	-0.228 (0.163)	0.110 (0.374)
<i>Tm2</i>	0.140 (0.116)	0.080 (0.081)	-0.124 (0.237)
<i>Tm1</i>	0.134 (0.108)	0.037 (0.125)	0.227 (0.222)
Post-treatment effects (year-by-year)			
<i>Tp0</i>	0.103 (0.101)	0.247** (0.080)	0.428* (0.185)
<i>Tp1</i>	-0.017 (0.142)	0.268 (0.167)	0.520* (0.260)
<i>Tp2</i>	0.047 (0.176)	0.393* (0.195)	0.661* (0.294)
<i>Tp3</i>	0.178 (0.217)	0.179 (0.237)	0.678+ (0.381)
<i>Tp4</i>	0.344 (0.275)	0.225 (0.295)	1.086* (0.552)
<i>Tp5</i>	0.452 (0.323)	0.366 (0.325)	1.095+ (0.607)
Number of Observations	3,689	2,849	1,962
Unique treated firms	223	160	75
Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard errors in parentheses. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. The acronyms used here are defined as follows: IV Only: SMEs that only receive an Innovation Voucher; IP Only: SMEs that only receive an Innovation Partnership; IV-to-IP: SMEs that transition from receiving an Innovation Voucher to and Innovation Partnership in the next 5 years; Pre_avg: Average of the dependent variable during the 5 year pre-treatment period; Post_avg: Average of the impacts of the treatment, during the treatment year and the following 5 years post-treatment; Tm 1-5: Dependent variable in each of the 5 years pre-treatment; Tp 0-5: Impact of the treatment in the treatment year (i.e. Tp0) and each of the following 5 years post-treatment.			

Table A2: Year-by-year analysis of Stage 2 results for firm-level R&D Intensity

	IV_Only	IP_Only	IV_to_IP
Average effects (5 years post treatment)			
<i>Pre_avg</i>	0.031 (0.026)	-0.010 (0.021)	0.003 (0.039)
<i>Post_avg</i>	0.016 (0.057)	0.076 (0.050)	0.033 (0.122)
Pre-treatment trends (year-by-year)			
<i>Tm5</i>	-0.010 (0.046)	0.017 (0.056)	-0.010 (0.094)
<i>Tm4</i>	0.045 (0.050)	0.061 (0.050)	0.001 (0.101)
<i>Tm3</i>	0.023 (0.060)	-0.138+ (0.055)	0.033 (0.107)
<i>Tm2</i>	0.045 (0.045)	0.006 (0.025)	-0.020 (0.085)
<i>Tm1</i>	0.050 (0.049)	0.002 (0.053)	0.010 (0.090)
Post-treatment effects (year-by-year)			
<i>Tp0</i>	0.042 (0.052)	0.125 (0.081)	0.007 (0.128)
<i>Tp1</i>	-0.009 (0.073)	0.077 (0.060)	0.045 (0.159)
<i>Tp2</i>	-0.090 (0.063)	0.102* (0.052)	-0.033 (0.148)
<i>Tp3</i>	0.005 (0.076)	0.034 (0.068)	0.070 (0.127)
<i>Tp4</i>	0.064 (0.098)	0.043 (0.094)	0.081 (0.167)
<i>Tp5</i>	0.083 (0.110)	0.073 (0.101)	0.029 (0.199)
Number of Observations	3,689	2,849	1,962
Unique treated firms	223	160	75

Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard errors in parentheses. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. The acronyms used here are defined as follows: IV Only: SMEs that only receive an Innovation Voucher; IP Only: SMEs that only receive an Innovation Partnership; IV-to-IP: SMEs that transition from receiving an Innovation Voucher to and Innovation Partnership in the next 5 years; *Pre_avg*: Average of the dependent variable during the 5 year pre-treatment period; *Post_avg*: Average of the impacts of the treatment, during the treatment year and the following 5 years post-treatment; *Tm* 1-5: Dependent variable in each of the 5 years pre-treatment; *Tp* 0-5: Impact of the treatment in the treatment year (i.e. *Tp0*) and each of the following 5 years post-treatment.

Table A3: Year-by-year analysis of Stage 2 results for firm-level R&D Employment

	IV_Only	IP_Only	IV_to_IP
Average effects (5 years post treatment)			
<i>Pre_avg</i>	0.020 (0.018)	0.036 (0.025)	0.051 (0.034)
<i>Post_avg</i>	0.084 (0.059)	0.187* (0.076)	0.307** (0.109)
Pre-treatment trends (year-by-year)			
<i>Tm5</i>	0.021 (0.040)	0.135* (0.053)	0.051 (0.055)
<i>Tm4</i>	0.022 (0.035)	0.060 (0.056)	0.051 (0.062)
<i>Tm3</i>	0.003 (0.036)	-0.006 (0.056)	0.055 (0.065)
<i>Tm2</i>	0.018 (0.038)	-0.034 (0.044)	0.009 (0.060)
<i>Tm1</i>	0.036 (0.036)	0.025 (0.044)	0.090 (0.086)
Post-treatment effects (year-by-year)			
<i>Tp0</i>	0.062 (0.045)	0.069 (0.050)	0.122+ (0.068)
<i>Tp1</i>	0.027 (0.045)	0.164* (0.075)	0.234* (0.111)
<i>Tp2</i>	0.065 (0.067)	0.126 (0.081)	0.200+ (0.106)
<i>Tp3</i>	0.088 (0.080)	0.235* (0.111)	0.225 (0.149)
<i>Tp4</i>	0.156 (0.102)	0.327* (0.141)	0.498** (0.186)
<i>Tp5</i>	0.108 (0.121)	0.203 (0.146)	0.560** (0.195)
Number of Observations	3,689	2,849	1,962
Unique treated firms	223	160	75
Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard errors in parentheses. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. The acronyms used here are defined as follows: IV Only: SMEs that only receive an Innovation Voucher; IP Only: SMEs that only receive an Innovation Partnership; IV-to-IP: SMEs that transition from receiving an Innovation Voucher to and Innovation Partnership in the next 5 years; Pre_avg: Average of the dependent variable during the 5 year pre-treatment period; Post_avg: Average of the impacts of the treatment, during the treatment year and the following 5 years post-treatment; Tm 1-5: Dependent variable in each of the 5 years pre-treatment; Tp 0-5: Impact of the treatment in the treatment year (i.e. Tp0) and each of the following 5 years post-treatment.			

Table A4: Year-by-year analysis of Stage 2 results for firm-level sales

	IV_Only	IP_Only	IV_to_IP
Average effects (5 years post treatment)			
<i>Pre_avg</i>	-0.024 (0.021)	0.042* (0.018)	0.039 (0.041)
<i>Post_avg</i>	0.059 (0.052)	0.028 (0.064)	0.188+ (0.111)
Pre-treatment trends (year-by-year)			
<i>Tm5</i>	0.003 (0.066)	0.048 (0.043)	0.052 (0.084)
<i>Tm4</i>	-0.007 (0.049)	0.038 (0.043)	0.105 (0.138)
<i>Tm3</i>	-0.084* (0.040)	0.075* (0.032)	-0.143+ (0.075)
<i>Tm2</i>	0.008 (0.036)	0.037 (0.034)	0.074 (0.054)
<i>Tm1</i>	-0.039 (0.030)	0.013 (0.039)	0.107* (0.048)
Post-treatment effects (year-by-year)			
<i>Tp0</i>	-0.004 (0.047)	-0.014 (0.091)	0.135* (0.064)
<i>Tp1</i>	0.087 (0.066)	0.071 (0.066)	0.232* (0.108)
<i>Tp2</i>	0.069 (0.086)	0.068 (0.075)	0.275+ (0.142)
<i>Tp3</i>	0.020 (0.069)	0.050 (0.080)	0.126 (0.149)
<i>Tp4</i>	0.054 (0.081)	0.041 (0.103)	0.252+ (0.138)
<i>Tp5</i>	0.125 (0.091)	-0.047 (0.116)	0.107 (0.182)
Number of Observations	3,689	2,849	1,962
Unique treated firms	223	160	75

Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The acronyms used here are defined as follows: IV Only: SMEs that only receive an Innovation Voucher; IP Only: SMEs that only receive an Innovation Partnership; IV-to-IP: SMEs that transition from receiving an Innovation Voucher to and Innovation Partnership in the next 5 years; *Pre_avg*: Average of the dependent variable during the 5 year pre-treatment period; *Post_avg*: Average of the impacts of the treatment, during the treatment year and the following 5 years post-treatment; *Tm* 1-5: Dependent variable in each of the 5 years pre-treatment; *Tp* 0-5: Impact of the treatment in the treatment year (i.e. *Tp0*) and each of the following 5 years post-treatment.

Table A5: Year-by-year analysis of Stage 2 results for firm-level employment

	IV_Only	IP_Only	IV_to_IP
Average effects (5 years post treatment)			
<i>Pre_avg</i>	0.001 (0.014)	0.052** (0.017)	0.046 (0.037)
<i>Post_avg</i>	0.058 (0.038)	0.084 (0.055)	0.282* (0.129)
Pre-treatment trends (year-by-year)			
<i>Tm5</i>	-0.025 (0.040)	0.068+ (0.037)	0.070 (0.054)
<i>Tm4</i>	0.014 (0.027)	0.077 (0.050)	0.179 (0.132)
<i>Tm3</i>	-0.008 (0.029)	0.066+ (0.036)	-0.074 (0.067)
<i>Tm2</i>	-0.000 (0.021)	0.036 (0.025)	-0.017 (0.053)
<i>Tm1</i>	0.021 (0.020)	0.015 (0.029)	0.071+ (0.042)
Post-treatment effects (year-by-year)			
<i>Tp0</i>	0.020 (0.032)	0.010 (0.052)	0.188* (0.095)
<i>Tp1</i>	0.002 (0.034)	0.103* (0.051)	0.203 (0.129)
<i>Tp2</i>	0.060 (0.047)	0.065 (0.056)	0.320+ (0.192)
<i>Tp3</i>	0.069 (0.051)	0.128+ (0.071)	0.198* (0.091)
<i>Tp4</i>	0.098 (0.070)	0.120 (0.093)	0.386* (0.169)
<i>Tp5</i>	0.102 (0.068)	0.077 (0.098)	0.395* (0.189)
Number of Observations	3,689	2,849	1,962
Unique treated firms	223	160	75
Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard errors in parentheses. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. The acronyms used here are defined as follows: IV Only: SMEs that only receive an Innovation Voucher; IP Only: SMEs that only receive an Innovation Partnership; IV-to-IP: SMEs that transition from receiving an Innovation Voucher to and Innovation Partnership in the next 5 years; Pre_avg: Average of the dependent variable during the 5 year pre-treatment period; Post_avg: Average of the impacts of the treatment, during the treatment year and the following 5 years post-treatment; Tm 1-5: Dependent variable in each of the 5 years pre-treatment; Tp 0-5: Impact of the treatment in the treatment year (i.e. Tp0) and each of the following 5 years post-treatment.			

Table A6: Year-by-year analysis of Stage 2 results for firm-level Gross Value Added

	IV_Only	IP_Only	IV_to_IP
Average effects (5 years post treatment)			
<i>Pre_avg</i>	-0.038 (0.036)	0.027 (0.034)	0.187+ (0.092)
<i>Post_avg</i>	0.047 (0.098)	-0.166 (0.144)	0.079 (0.257)
Pre-treatment trends (year-by-year)			
<i>Tm5</i>	0.166 (0.117)	0.038 (0.103)	-0.109 (0.086)
<i>Tm4</i>	-0.058 (0.073)	0.089 (0.090)	0.579** (0.191)
<i>Tm3</i>	-0.176** (0.064)	0.039 (0.058)	-0.047 (0.176)
<i>Tm2</i>	-0.012 (0.077)	-0.025 (0.106)	0.586+ (0.304)
<i>Tm1</i>	-0.109 (0.082)	-0.008 (0.083)	-0.072 (0.416)
Post-treatment effects (year-by-year)			
<i>Tp0</i>	0.040 (0.141)	-0.733 (0.657)	0.291 (0.353)
<i>Tp1</i>	-0.029 (0.093)	-0.022 (0.148)	0.567 (0.368)
<i>Tp2</i>	0.035 (0.097)	-0.017 (0.096)	-0.009 (0.221)
<i>Tp3</i>	-0.025 (0.115)	0.044 (0.128)	-0.514 (0.564)
<i>Tp4</i>	0.149 (0.132)	-0.098 (0.150)	0.051 (0.284)
<i>Tp5</i>	0.112 (0.160)	-0.168 (0.169)	0.090 (0.378)
Number of Observations	3,689	2,849	1,962
Unique treated firms	223	160	75
Notes: Results are based on analysis of strictly controlled Research Microdata Files provided by the Central Statistics Office (CSO). The CSO does not take any responsibility for the views expressed or the outputs generated from this research. Standard errors in parentheses. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. The acronyms used here are defined as follows: IV Only: SMEs that only receive an Innovation Voucher; IP Only: SMEs that only receive an Innovation Partnership; IV-to-IP: SMEs that transition from receiving an Innovation Voucher to and Innovation Partnership in the next 5 years; Pre_avg: Average of the dependent variable during the 5 year pre-treatment period; Post_avg: Average of the impacts of the treatment, during the treatment year and the following 5 years post-treatment; Tm 1-5: Dependent variable in each of the 5 years pre-treatment; Tp 0-5: Impact of the treatment in the treatment year (i.e. Tp0) and each of the following 5 years post-treatment.			



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