Erasmus University Rotterdam

School of Economics

Master Thesis Economics & Business Economics

In Defense of the New

A study into the effect of start-up support policy in South Holland on the firm stock in primary and secondary treated sectors in the period 2000-2017.

30-04-2023

Student Name:	Thomas van Eijl	Supervisor:	F. Van Oort
Student ID:	511092	Second Assessor:	[Name]

Abstract

To establish the role start-ups and scale-ups play in the creation of a stable economic ecosystem, this research investigates the effect of establishing a startup support programme (SSP) in municipalities in South Holland (Netherlands) between 2000 and 2017. We implement a bias-corrected synthetic control methodology to assess the impact of 9 SSPs founded within the time period and conclude that only 22% of SSPs was able to significantly affect the treated sectors. We also find evidence for economies of scale having an impact on the treatment effect for secondary treated sectors. Overall, findings indicate that SSP establishment has a positive impact on the primary treated firm stock in a municipality.

Keywords

Start-ups, Scale-ups, Policy, Economic Ecosystem, Firm Dynamics, Bias-corrected Synthetic Control Methodology, municipal policy, public sector strategy, ecosystems research, urban economics.

[This page has intentionally been left blank]

"It ought to be remembered that there is nothing more difficult to take in hand, more perilous to conduct or more uncertain in its success than to take the lead in the introduction of a new order of things. Because the innovator has for enemies all those who have done well under the old conditions, but only lukewarm defenders in those who may do well under the new."

Niccolo Machiavelli – The Prince*

"The world is often unkind to new talent, new creations. The new needs friends."

– Ratatouille**

** Machiavelli, N., Parks, T., & Bickford-Smith, C. (2015). The Prince. Van Haren Publishing.*

*** Bird, B., Pinkava, J., Capobianco, J. (2007) Ratatouille. Walt Disney Pictures & Pixar Animation Studios, p. 114.*

[This page has intentionally been left blank]

Acknowledgements

There are many people I would like to thank, people without whom writing this thesis would not have been possible. Firstly, I would like to thank Dr. Frank van Oort for his insights during the thesis process and the stern feedback he has given me (especially on time management, among other things). His comments on methodology and the aid in obtaining the LISA-dataset were instrumental over the course of writing this thesis. I would also like to thank Dr. Jeroen van Haaren for his aid in the creation of the LISA-dataset, without which this analysis would not have been possible.

Secondly, I want to thank Dr. Menno Huijs from the Municipality of Rotterdam, who through discussions has provided me with a valuable insights into the creation and operationalisation of SSPs in a municipal context. I thank him especially for providing the spark of inspiration that this thesis was based upon and the consistent support he, as well as his colleagues from the municipality of Rotterdam, have given me.

In a more personal sphere, I want to thank my friends for standing by me and supporting me by discussing their views and opinions on the content and methodology of this thesis, even though they themselves were also incredibly busy with their own theses during this time. The quality of the final product before the reader is in part based on their sharp critique.

I want to thank my family for their incredible support during this, at times, incredibly stressful period. In particular, I want to thank my father for his unrelenting support and his critical eye, as well as his creative insights by engaging with the materials before the reader. Finally, I want to thank my brother especially for being a such supportive roommate and for being unflinching in the face of yet another overly technical monologue on synthetic controls, variable tables and the general woes of writing a thesis.

I’m humbled by the faith so many people have placed in me and the product of my work and I can only hope the thesis that now lies before the reader at least matches their expectations.

Thomas van Eijl

[This page has intentionally been left blank]

Table of Contents

Section 1

Introduction

In today's society, built around constant change and iterative improvement, there are only a few things at once as perilous and crucial as introducing a (radical) new innovation. Whenever ease of competition in a market increases, this will drastically increase the amount of R&D spending and as a consequence, drive up the rate of innovation (Dasgupta & Stiglitz, 1980). Speed is essential (Nagaoka, 2007), requiring high levels of internal investment whilst at the same time risking a longer time-to-market when processes are sped up *too much* (Cohen et al., 1996; Lendrem & Lendrem, 2014). Even if management processes are suitable to generating innovation, it is reasoned that only 20% of innovations is viable for going-to-market. As such, the risk of uncertainty for new innovations is high for incumbents. While some of this risk can be negated through the use of R&D alliances (Zhang & Yin, 2012), thus spreading the innovation through multiple network-linked agents instead of one principal agent, failing to successfully innovate can seriously set back the participating firms investing time and resources.

By their nature as challengers to incumbent firms for market positions, most if not all start-ups seek to exploit a specific innovation or innovative niche (Skala, 2018). In their role as innovators, start-ups can take on much of the risk of new innovation, without incurring the negative consequences regarding their market position, vested assets and set control structures borne by incumbent firms (Freeman & Engel, 2007). Start-ups consequently play an important role in the wider innovation ecosystem (Ojaghi et al., 2019).

Because of the important role start-ups can fill by providing the renewing innovations necessary for a healthy economic ecosystem, influencing the amount and the type of start-ups in a given ecosystem should be considered a prime target for public policy. If public policy can be successful in influencing the direction of innovation and economic development through start-up policy, it is important to understand the scope under which the influence is most efficient and effective.

We examine start-up support policy in South Holland, the Netherlands because of its economic importance to the Netherlands and, through the proximity of such cities as the Hague and Rotterdam, their importance in an international context. For the benefit of this study, we formulate the following primary question:

How has established start-up support policy between 2001 and 2017 by municipal governments in South Holland contributed to the development of the firm stock in these municipalities and to what degree have these SSPs been conducive to the greater economic ecosystem?

In this regard, we restrict 'start-up support policy' to the funding and other support given to accelerators and incubators operating as an organisation independent of public institutions within the geographical area of South Holland. We define an 'economic ecosystem' as the interlinked network of public and private institutions exchanging investments, resources, knowledge and human capital under a cohesive institutionally, legislative and geographically bounded umbrella.

Subsection 1.1 - Academic and Strategic Relevance

There are numerous case studies on incubators and accelerators, focusing either on highly specialised technologies such as the space industry (Abi-Fadel & Peeters, 2019), studies on success drivers (Alpenidze et al., 2019; Butz & Mrożewski, 2021), the role they play within the wider ecosystem (Bliemel et al., 2016) or within a comparative study between European and American (US) accelerators (Lohithaksha et al., 2014). Regarding case studies, most of the available literature focuses on developing countries (Konyuhov et al., 2020; Petkovski et al., 2019; Wahyuni & Noviaristanti, 2022). The current study provides new avenues for academic research into start-up support policy by conducting a case study covering a highly industrialised, highly urbanised area (South Holland, the Netherlands).

Knowing whether the academic notions surrounding successful start-up support policy hold true will have tremendous strategic relevance for start-ups, incumbents and public institutions. A case-study such as the one in the present analysis can help create clear sets of boundary restrictions for public support policies, targeting precisely those characteristics that will provide an optimal societal outcome. At the same time, insights into the workings of real-life start-up support policies in a vibrant economic ecosystem (Rotterdam/South-Holland) will help new start-ups and incumbents decide how to approach their innovation strategy for optimal returns and impact. Finally, assessing the success rate of the current start-up policy framework in the region will allow policymakers and public institutions to fine-tune the current policies and enhance their effectiveness. In doing so, not only are the existing and future policy frameworks enhanced, but it will allow public and private actors to take the next step on the road to realising a smart, safe and sustainable society.

Subsection 1.2 - Research Structure and Reference

The remainder of this analysis is broken down into several sections. Section 2 will define a basic framework of concepts for use in the remainder of the analysis and places the concepts in their institutional environment for a case study of the Netherlands (South Holland). Section 3 will expand on the basic framework by providing an overview of relevant literature, further developing the case study parameters and creating a set of testable hypotheses. Section 4 discusses the methodology and data used in the analysis, with Section 5 providing an overview of the key results and rigidity tests. Section 6 will provide a conclusion based on the academic analysis, whilst Section 7 will assess the strategic implications within the case study environment. A discussion of methods, data and considerations, as well as proposals for future avenues of (strategic) research is provided in Section 8. Section 9 is reserved for references used in this analysis.

Subsection 1.3 - Executive Summary of Results

Looking at 50 municipalities within South Holland in the period between 2000 and 2017, we identify 9 different SSPs that try to increase the firm stock through incubation or acceleration. We find significant results for only 2 out of 9 SSPs (22%) w.r.t. their primary treated sectors, indicating that the introduction of an SSP into a local economic ecosystem is not guaranteed to effectuate a desired change.

In addition, we find that where SSPs *are* able to effectuate statistically significant change, the effect is not consistent between primary and secondary sectors. The firm stock in primary sectors increases as a result of SSP introduction, but with secondary sectors, the size of the host municipality plays an important role, with only large municipalities having a positive effect on the firm stock.

Our broad overview of literature opens new avenues for quantitative analysis with regards to Startup Support Programmes (SSPs) and the propositions provided in the discussion section sketch a roadmap for the next research steps in this area.

Section 2

Definitions & Theoretical Background

In this section, we identify the core concepts for this analysis and provide definitions from the relevant available academic literature. Firstly, we look at *Start-Up Programs* to define the purview of these programs and to provide a (limited) typology. Secondly, we will elaborate the definition of *Start-Up Support Policy* as found in the introduction as the object of interest for this study.

Subsection 2.1 – Start-up Programs

Independent start-up programmes can be broadly split into two categories, accelerators and incubators, although accelerators lack a formal and universal distinction in the academic literature, mostly because of the relatively recent creation of the concept in 2005 with the Y Combinator incubator (Bliemel et al., 2016; Miller & Bound, 2011). Both are seen as integral to the development of regional economies, specifically through R&D and new knowledge generation (Canovas-Saiz et al., 2021; Leitão et al., 2022) although there are distinct differences in finance, networking capabilities, selection criteria and structure between both models (Torun, 2016).

Most accelerators take the form of *'cohort based, fixed term boot camps'* (Hochberg, 2016), made up out of start-ups in need of mentorship, investment or other support in order to help fuel the growth of the company. The fixed term of accelerator programs is targeted at entrepreneurs with an existing start-up, rather than seeking to help create new start-ups (Pauwels et al., 2016). This fixed term, usually between three (Cohen, 2013) and six months, is one of the main differences with the incubator model, which may remain involved for several years (Cohen & Hochberg, 2014). Selection is predominantly based on value proposition and business case validation in the screening stage and focuses more on sustainable advantages in the selection stage (Yin & Luo, 2018). Because of the lack of a formal definition, there is a proliferation of different types of accelerators cited in the literature, with the most common outcomes cited being funding (51.85%), validation of ideas (39.51%), product development (37.04%), networking (33.33%) and knowledge transfers (32.10%) among over 98 academic sources (Crișan et al., 2021). Three macro-categories are identified in the literature on accelerators: ecosystem-builders, deal-flow makers between investors and investments, and welfare simulators for economic development (García et al., 2019), which highlights the potential use of accelerators in a policy context (Yang et al., 2018).

Incubators distinguish themselves from accelerators by focussing on the first team formation and up to the first funding rounds of the start-up innovation lifecycle (Abi-Fadel & Peeters, 2019). Generally, due to longer periods of (active) involvement, incubated start-ups have higher survival rates than non-incubated start-ups (OECD & EC, 2019). Incubation typically follows a four-phase process, first selecting the kinds of innovations they want to substantiate and support, and then determining the payment for the services of the incubator before any actual involvement. During the involvement phase, incubator managers typically provide hands-on assistance, (intangible) knowledge, as noted by Ali et al. (2022), resources in the form of investments or, as noted by Galbraith et al. (2021) and Hausberg & Korreck (2018), a physical location. Finally, the incubator exits the start-up based on a set of criteria determined during the structuring phase and based upon milestones the start-up has achieved.

Within the segment of for-profit (corporate) incubators, the literature distinguishes several subtypes: fast-profit incubators, market incubators, leveraging incubators and in-sourcing incubators. Of these four subtypes only the in-sourcing incubators focuses on the external market, through the attraction of promising technologies and start-ups. The other three subtypes serve to further commercialise non-core aspects of a corporate innovation portfolio (Becker & Gassmann, 2006). Most incubators focus on a localised geographical area and usually target specific niches, providing facilities for associated start-ups for extended periods of time (Dempwolf et al., 2014). Beyond corporate profit, other goals have been cited for incubators, such as education (Nicholls-Nixon & Valliere, 2019), art (Murphy, 2018), social impact (Sansone et al., 2020) and ecosystem building (Sanyal & Wamique Hisam, 2018), with governments and academic institutions as a predominant sponsor at 21% and 20% of incubators respectively (Stagars, 2014).

Subsection 2.2 – Start-up Support Policy

Although it is generally accepted in the literature that (innovation-oriented) start-ups need public policy support (Pustovrh et al., 2019), it is unclear what type of support is the most effective (Giraudo et al., 2019; Kumar, 2017; Patanakul & Pinto, 2014). The primary way in which public institutions support start-up ecosystems is by dealing with entry barriers and other forms of market failure within an ecosystem to smooth the way for new entrants (Boadway & Tremblay, 2003). This direct support can be levied by providing start-up grants, levied loans, subsidies or other programs targeted at making self-employment more attractive (Caliendo & Künn, 2011; Hottenrott & Richstein, 2020), although the distinction should be made whether these policies are aimed at reducing unemployment or increasing innovation in a given ecosystem (Román et al., 2013). Another viable means of direct support is the public-private partnership, especially in start-ups with a focus on transitional technologies (Doblinger et al., 2019), or by fostering a system of diverse knowledge spillovers between semi-public institutions (Colombelli, 2016). Public institutions can also indirectly support start-up growth by ensuring quality policy frameworks and environmental factors conducive to new firm creation (Harhoff, 1999; Henrekson & Davidsson, 2007), such as sufficiently fast broadband internet speeds (Deller et al., 2021) or policies aimed at increasing the accessibility of capital (Giraudo et al., 2019).

As a measure of direct (funding, knowledge) and indirect (decreasing barriers to entry) government support, accelerators form a key part of the start-up ecosystem, acting as effective support-, education- and funding organisations (Canovas-Saiz et al., 2021; Vekic & Borocki, 2017). Although accelerators can be founded without government support, public institutions (government, universities) have been cited as one of the major founding sponsor categories for new US accelerators (S. Cohen et al., 2019). The success of accelerators does not only depend on the support that the individual institution receives, but also on the environment in which the accelerator operates. Without, for instance easy access to (venture) capital or a strong knowledge sharing economy, the effectiveness of accelerators will diminish (Harris & Wonglimpiyarat, 2019; Lohithaksha et al., 2014). As such, an accelerator can be seen as a service enhancing the mix of extant environmental factors rather than a factor on its own (Battistella et al., 2017; Bliemel et al., 2018).

Subsection 2.3 – Definitions and Delineations

Based on the above, for the purposes of this analysis we define *start-up programs* (SUP) as accelerator or incubator programs aimed at fostering growth in the economic ecosystem of the municipality. We define *support policy* as policy measures enacted by public (governmental) institutions to found and fund an SUP.

The above definitions excludes policies aimed at broad economic improvement, but not channelled through an accelerator or incubator, as well as wholly private, in-company accelerators or incubators.

Section 3

Literature Review & Hypotheses

In this section, we analyse the available literature on start-ups and start-up support policies to come to a set of hypotheses used in the remainder of this analysis. Firstly, we look at which factors contribute to the success and persistence of start-ups, then we look at the role of SUPs and SSP's as a driver of economic growth. Thirdly, we investigate the role of SUs and SSP's as a driver of knowledge, innovation and entrepreneurship, before assessing the qualities of a successful and beneficial SSP. Finally, we derive a set of testable hypotheses for the remainder of this study.

As the methodology presented in Section 4 has to date not been operationalised on a municipal scale and as such presents a wholly new avenue of analysis into incubation and acceleration programmes, this literature review aims to provide a holistic overview of the scientific knowledge on the subject to date. This, to be able to create a jumping-off point for further research on the subject as a whole.

Subsection 3.1 – Success and persistence of Start-Ups

Before assessing the internal aspects of start-up success, the existence of local/regional values supportive of entrepreneurship is an important factor to consider (Andersson, 2013; Westlund & Olsson, 2011). One of the key ways in which culture seems to drive entrepreneurial success is the acceptance of higher margins of risk among supporting institutions, such as banks and insurers (Baughn & Neupert, 2003), the absence of which should form the basis for government intervention (Davari & Farokhmanesh, 2017; Richter et al., 2018). This cultural aspect of entrepreneurship has been found to correlate with higher economic growth for regions in Europe (Beugelsdijk & Noorderhaven, 2004). These regional characteristics, and consequently the start-up rate, tend to be persistent and are shaped by the path-dependence of the local political milieu (Andersson & Koster, 2010). The cultural dimension also highlights the need for specialised design in start-up support policies, as cultural factors weigh heavily in success or adoption of such policies (Caliendo & Künn, 2011). At the same time, start-up activity and the associated employment and growth effects are susceptible to exogenous shocks such as the COVID-19 pandemic, which significantly decrease start-up rates, start-up growth and survival rates of young firms (Benedetti-Fasil et al., 2022).

Other external factors, such as the speed of internet in rural areas, are found to positively influence the start-up rate. These external factors differ between subsectors, as dependencies on external environments become more or less pronounced (Deller et al., 2021; Akehira et al., 2022). Other external factors that positively influence start-up success include economic growth (Galindo & Méndez, 2014), available local knowledge and spillover effects (Aharonson et al., 2007; Colombelli, 2016), historical (local) industry structure (Harhoff, 1999),

Although predicting start-up success based solely on internal aspects is very difficult without specialised tools and processes (Dellermann et al., 2017), in general, it is found that a combination of firm characteristics positively contribute to the success and performance of (corporate) start-up entrepreneurship (Luo et al., 2005). The transitionary context in which these elements are most conducive to success, in this case China, might be equally applied to a more western, targeted transition such as the energy transition due to the full-spectrum nature of transitory changes (legislative, economic, social). With regards to human capital makeup, it is suggested by Kaiser and Müller (2015) that start-up teams benefit more from homogenously skilled teams than long-run heterogeneity, suggesting that benefits arising from heterogenous skillsets only come available in later stages. This effect is also found among university-originated start-ups (Ko & An, 2019). This ‘completeness’ of the founding team is strongly indicative of success and survival rates (Roure & Keeley, 1990).

Besides initial or general success, Gartner et al. (1999) note that gathering knowledge about operations and the inhabited market early on in a start-up’s lifecycle is a key determinant of the firms long-term survival. Other sources indicate that initial resources play only a limited role in the long-term survival of a start-up firm and that the formation of so-called ‘business networks’ may be more important in connecting favourable environmental influences with the business (Korunka et al., 2010). It should be noted that foreign capital flows to start-ups seem to follow the ‘business networks’ idea, with young, promising and well-connected start-ups receiving relatively more foreign capital than older start-up firms (Pisoni & Onetti, 2018). In contrast, initial business successes are found to be important in establishing long-term persistence, especially economically volatile areas like software development (Mejia & Gopal, 2018).

With regards to funding, start-ups benefit more from investment funds targeted specifically at new and innovative firms than from generalist funds, although these funds tend to manage less individual firms and there is no appreciable difference between the performance of these and generalist funds (Cumming, 2007). The main advantage of targeted funds seems to be a higher willingness to take on risk. Cooper et al. (1994) also highlight that initial financial capital is among the core drivers of both start-up survival and growth. It is important to note that this access to finance is not just the product of individual firm characteristics and linked risk of the enterprise, but can also be mediated by public policy (Giraudo et al., 2019; Hottenrott & Richstein, 2020).

Success measures in employee retention in new start-ups does not substantially differ from older incumbents. Initial differences in employment are caught up within 5 years, unless these differences are the result of external economic effects, such as recessions lasting over 3 years, in which case the start-ups have around 10% less employees (Horrell & Litan, 2010). Large exogenous shocks, such as the COVID-19 pandemic, similarly create a skill-flight response towards established incumbent firms (Bernstein et al., 2020). The findings highlight that the use of employment growth figures as a measure of success between start-ups and incumbents might be insufficient.

Subsection 3.2 – Start-ups as economic growth driver

There are feedback effects at work between the start-up rate and economic growth, where new start-ups increase the growth rate (Gries & Naudé, 2009) through attracting investment, creating jobs and increasing (local) welfare (Susilo, 2020), whilst an increasing economic growth prompts more start-up growth (Galindo & Méndez, 2014). This effect on economic growth is heterogenous between developing and developed countries, where the latter group profits from a rising start-up rate but the former group is negatively affected, possibly because of differences in the type of start-up (Stel et al., 2005). A partial black-box effect therefore seems to exist surrounding the relationship between start-up rates and economic growth, as it is possible to establish a correlation on a macro level, but increasingly difficult to specify the precise mechanism by which this growth is effectuated (Carree & Thurik, 2010). Furthermore, growth is not homogenous for start-ups, but is heterogeneously spread across different start-up sectors, with most notably technology-based start-ups adding to international economic growth (Wu & Atkinson, 2017). These positive employment effects can at least be partially explained by exogenous economic shocks in the local ecosystem, creating difficulty in the determination of a cause-effect relationship (Carlino & Drautzburg, 2020).

The economic growth effectuated by start-ups can further differ between high- and low-density areas, where low-density areas receive more benefits from innovation through a new start-up (Westlund & Olsson, 2011). This is not surprising, as low-density areas have a less saturated market than high-density areas, which in turn allows for a higher marginal effect of start-up rates on economic growth (Pettersson et al., 2011). This effect also applies to employment and income growth rates in non-metropolitan (low-density) areas (Rupasingha &

Goetz, 2011). Furthermore, urbanisation effects tend to cluster likeminded individuals with an entrepreneurial attitude closer together, as also Beugelsdijk & Noorderhaven (2004) concluded that more entrepreneurial attitude is positively correlated with economic growth in a large cross-sectional study in Europe.

New start-up ventures exhibit a higher degree of innovation than their incumbent counterparts (Hölttä-Otto et al., 2013), which helps to effectuate higher economic growth not only in the start-up, but also in the local region of the start-up and through partnerships with incumbent firms (Jackson et al., 2018). This capacity for innovation also translates into a role as a facilitator of spillovers to their immediate networks, which indirectly support economic growth (Audretsch, 2007; Audretsch & Keilbach, 2008).

Economic growth is not only effectuated through commercialisation of these innovations, but also by fostering employment growth in a given locality through the creation of new jobs and redeployment of existing but disappearing employment opportunities through hands-on training and experience (Ayandibu & Houghton, 2017; Kumar, 2017) and the destruction of jobs without sufficient remaining economic potential (Kane, 2010). Supporting self-employment is especially effective under austere fiscal policy regimes, because of the flexibility of self-employment as opposed to salaried employment (Tsvetkova et al., 2018). Redeployment of employment assets is mostly confined to newly entering firms, rather than into established incumbents (Dent et al., 2016). These jobs are also more valuable, as small but successful start-up firms pay a wage premium to functionally identical employees when compared to incumbent firms (Burton et al., 2017). This difference in wages paid would, if extrapolated across an economic ecosystem, in theory increase the average wages in a local area. The positive effect of start-ups on employment growth is not homogenous, as there is distinct differences within the group labelled ‘start-up’ (Román et al., 2013). Entrepreneurs who use a start-up as a last resort or are dependent on external funding to remain in business indefinitely don’t generate the same effects as chance-driven entrepreneurs.

The economic value of an accelerator is predominantly added through the fostering of a healthy financing environment. The presence of an accelerator program for a given sector positively impacts local seed- and early stage VC fund formation not only within but also outside the sector served by the accelerator (Bone et al., 2019; Fehder & Hochberg, 2014; 2019). Spillovers are not just constrained to VC-funding, but can also take place in the form of co-location clustering and improving the nascent productivity advantages of an economic cluster (Madaleno et al., 2018). These spillover effects illustrate that accelerators have a broader implicit economic scope than their focus areas, as they occur not just on an individual firm level (Selig et al., 2018), but also contribute to a stronger economic ecosystem (Bliemel et al., 2018). Beyond direct economic effects, accelerators can also support public social policies through providing employment opportunities to disadvantaged groups (Salamoun & Azad, 2017) or serve as learning opportunity for students (Savoie et al., 2018).

Regarding internal effects of acceleration, start-ups and scale-ups participating in accelerator or incubator programs often cite their participation as a significant or vital contributor to their (economic) success, measured in survival, employee growth or funds raised (Bone et al., 2019). This suggested impact on survival rates is also supported in empirical literature, specifically for technology-based non-exporting start-ups and services start-ups with a small founding team (Del Sarto et al., 2020). The choice between acceleration and non-acceleration is not just based on economic considerations, however, as Wahyuni & Noviaristanti (2022) suggest that personal and cultural characteristics are also indicative of accelerator participation propensity (Wahyuni & Noviaristanti, 2022)**.**

Subsection 3.3 – Drivers of knowledge, innovation and entrepreneurship

Start-ups: Innovation & Knowledge

There is a bilateral nature to knowledge available in a geographic area and the growth of start-ups, wherein the knowledge stock supports the creation of new firms and new firms innovate and add to the available knowledge stock (Colombelli, 2016). Specifically, the breadth and type of knowledge and nascent opportunities in the economic ecosystem serve as predictors of new firm creation and consequently, new knowledge generation in a spillover effect from incumbent innovation (Audretsch, 2007; Audretsch et al., 2015). Particularly new venture start-ups are able to fully incorporate this knowledge, leading to a higher degree of innovativeness than among incumbent firms (Hölttä-Otto et al., 2013). The institutions or firms facilitating the spillovers do not necessarily benefit from the spillovers, with most of the benefits being realised by the receiving start-up firm (Audretsch & Stephan, 1999).

The specific type of knowledge generated is important in determining its effectiveness, with a higher emphasis placed on technological domains. It is equally important to determine which knowledge is conducive to firm growth (economic knowledge) and which knowledge has little to no realisable economic gain (Audretsch & Keilbach, 2004; 2008). As such, market-ready innovation is not a direct function of firm R&D investment, but rather of the interplay between market demand and R&D. This conforms to literature on African start-ups , which suggests that a shorter time-to-start-up is associated with a higher degree of innovation (Asongu &

Tchamyou, 2016), aligning with the fail-fast theory of lean startups (Ries, 2011). Innovations are brought to market quickly, with only economically viable knowledge being ultimately beneficial. .

Should innovations or start-ups fail, it is found that their knowledge, rendered through patents, is rapidly re-sold to other firms in the sector, especially in highly innovative sectors (Serrano & Ziedonis, 2019). This seems to indicate that even highly specialised knowledge of failing firms is retained in start-up networks. The apparent fluidity of patent assets is also established by Goel & Saunoris (2017), who find that the number of registered patents is indicative of new start-up creation after a lag-period.

The particular type of knowledge and innovation generated by start-up firms is found to be geographically bound, with inter-regional spillovers remaining limited or negligible role in growth (Barboza & Capocchi, 2020). This form of clustering is highly localised, with some literature suggesting spillover boundaries of as little as 500 meters (Aharonsen, Baum & Feldman, 2007).

Although there is a lot of research on innovation and open innovation among start-ups, the role and effectiveness of local and regional governments in fostering this innovation is relatively under researched. Academic literature proposes a general positive relationship between incubation/acceleration and innovation (Patanakul & Pinto, 2014; Spender et al., 2017) as well as overall performance. Participation in accelerator networks for open innovation enhances innovation performance and mediates for a lack of innovation-oriented skills at start-up (Battistella et al., 2017). Accelerators play a key role in the commercialisation of innovations, increasing the likelihood of the release of a minimum viable product or a first sale (Mejia & Gopal, 2018). As such, the role of the accelerator with regards to innovation seems akin to that of a facilitator, rather than an innovator (M. Bliemel et al., 2018; Tripathi & Oivo, 2020), helping validate innovations, providing tools, support and learning opportunities and helping increase market access (Crișan et al., 2019). In cases of corporate accelerators, it is important for management to provide clear goals (regarding proposition, place, people and process) for the accelerator to safeguard success (Kohler, 2016). The SSPshould ideally be positioned as an intermediary between government, universities and industry to foster and commercialise innovations (Harris & Wonglimpiyarat, 2019). This is also supported by the different types of SSPcreating/fostering different types of knowledge in the start-up, which ranges from entrepreneurial knowledge to market knowledge (Becker & Gassmann, 2006). Specifically, facilitating SSPmeasures such as offering office or lab space, funding and mentoring from professionals all increased the amount of R&D funding (Bone et al., 2019; Stayton & Mangematin, 2018). Innovation-focussed investments are more prevalent among incubator-type SSPs than accelerator-type SSPs, although this does not translate to higher patenting rates. (Mungila Hillemane, 2020). Joining several different programs, each with a different focus (for instance incubator vis á vis accelerator), can further be beneficial, lending credence to the theory that more support is advantageous (Woolley & MacGregor, 2021).

With regards to the effects of SSPs on entrepreneurship and the amount of available funding, Fehder & Hochberg (2019) find that there is an increase in VC and seed-stage deals in a local region after the founding of an accelerator, indicating that accelerators also have broad-spectrum positive effects on an economic ecosystem beyond benefits internalised by start-ups, which might help closing the pioneer gap for new start-ups (Lall et al., 2013). Entrepreneurial success also increases after acceleration, especially if entrepreneurship education is involved in the acceleration process (Gonzalez-Uribe & Leatherbee, 2017). Even if acceleration does not lead to a viable start-up, entrepreneurial knowledge gathered from an accelerator is retained by participants, increasing the local knowledge stock (Lange & Johnston, 2020). This link with entrepreneurship development is an important focal area for accelerators, especially in an environment mediated by government regulation (Li et al., 2020; Sanyal & Wamique Hisam, 2018).

Finally, it should be noted there are distinct differences between organisations focused on increasing innovation and start-up support organisations with a focus on promoting company growth, specifically regarding the types of success metrics used in the evaluation of these programs (Dempwolf et al., 2013). Any analysis of the effectiveness of these programs necessarily focuses on its core goals and metrics, rather than (solely) macro-economic variables.

Subsection 3.4 – Successful Start-up programmes

Firstly, it is important to note that public institutions can influence start-up establishment and success through, among others, legislative, institutional, economic and social policies (Petkovska et al., 2019; Pustovrh et al., 2019). However, as these policies work through intermediate platforms rather than directly, they may influence or decrease the eventual outcome (Román et al., 2013), especially since influencing these environmental factors with the intent to increase start-up rates is hard for public policy to achieve (Henrekson & Davidsson, 2007).

A first key way in which public policy supports start-ups is through the public-private partnership. The stability awarded by such a joint venture drastically increases the level of innovation, especially among start-ups in highly innovative sectors such as cleantech. The levels of available foreign capital also increase, awarding as much as 155% more available financing per licensing deal (Doblinger et al., 2019). This emphasis on connectedness among successful start-ups also translates into a larger founder network, which has been found to correlate positively with foreign capital raised among start-ups (Banerji & Reimer, 2019) although not necessarily with survival rates (Cooper et al., 1994). However, effective public policy targeted at increasing start-up rates cannot be focused on singular public-private partnerships or be aimed at a single external dimension due to the contradicting direction of environmental effects, increasing start-up rates both through positive and negative economic effects (Boadway & Tremblay, 2003).

SSPs allow for a broader-based approach to increasing start-up rates. Notably, start-up support policy effectiveness is not just a product of size, but also of the breadth and type of services offered (Kupp et al., 2017; Vekic & Borocki, 2017). Incubator participation does not lead to a significant short-term increase in employment, whereas accelerators realise effects on a much shorter timescale (Lukeš et al., 2019). A blend of different institutions and different levels of support are therefore integral to the health and continued growth of start-up ecosystems. Specifically, venture capital (VC) availability is seen as an important broad-spectrum support measure, which increases start-up formation even outside the segments targeted for funding by the VC-fund (Samila & Sorenson, 2011).This broader focus might also offer non-economic support, such as psychosocial support, to new entrepreneurs, who may find the stress of starting a new start-up daunting (Waters et al., 2003).

Cohen et al. (2019) published a comprehensive study on common design elements of accelerator-type SSPs, noting among other things the high degree of correlation between the type of founder and the types of sponsors to an accelerator, which might risk the focus of the accelerator becoming too narrow. Experience with starting new ventures in the management of an SSP is also directly related to participant success (Wise & Valliere, 2014). Ensuring the design dimensions, such as selection criteria's (Radojevich-Kelley & Hoffman, 2012), of the SSP are clear before starting the program is important in ensuring quality and consistency of the outputs (Kohler, 2016). Although investment-oriented SSPs outperform impact-oriented SSPs, possibly as a result of their specific organisational makeup, SSPs in general are an effective way to limit the risks of imperfect information that arise when public actors provide lump-sum investments in employment and start-ups, by introducing an intermediary as a means of 'researching' the applicants (Melcangi & Turen, 2021).

Newell et al. (2021) conclude a set of broadly applicable success factors for general accelerators, such as support networks, the alignment of accelerator policy with public policy and developing a series of success indicators. This again underlines the importance of the institutional conditions when evaluating the performance of start-up support policies. Particularly, the availability and access to capital, an established network of partners and knowledge stock are found to be success factors for incubator-type SSPs (Alpenidze et al., 2019). The accessible capital need not be local, as capital from supranational organisations like the EU is also a viable source of funding (Serwatka, 2018), which may close the gap between settled SSPs and up-and-coming SSPs in economically developing countries.

As illustrated above, the practical design considerations of an SSP are not uniform and are found to differ between US-based SSPs and EU-based SSPs, where US-based SSPs are generally larger (Cánovas-Saiz et al., 2020) more likely to be designed for rapid marketability testing as opposed to offering support services (Abi-Fadel & Peeters, 2019). Closing the performance gap between European and US-based SSPs is predominantly a factor of improving knowledge of the external dimension, such as decreasing transaction costs for downstream deals, exit timelines, SSP brand and image, network and access to resources (Chengappa & Geibel, 2014). Additionally, differences emerge when SSP goals begin to vary, such as between impact and economic returns, especially during selection procedures for entry into the SSP (Butz & Mrożewski, 2021).

The effectiveness of an SSP, then, is at least partially based on the level of 'fit' between the SSP and the economic ecosystem it serves (Bliemel et al., 2016), especially with regards to the acceptance of entrepreneurship in the local ecosystem and the level of ecosystem-side support (Fernández et al., 2019). This interplay between SSP and ecosystem is characterised as 'co-evolution', rather than monodirectional influence, as also seen with regards to cocreation of knowledge assets (Battistella et al., 2017). Additionally, it is important to ensure that momentum is retained (Singh, 2020), output parameters are set and consequently met, to minimise the risk of ineffectual SSPs (Lukosiute et al., 2019).

Subsection 3.5 - Summary of Literature Findings & Hypotheses

The following is a summary of conclusions that can be drawn from the findings in the previous subsection, aimed at answering the central question of this analysis.

Firstly it is noted in the literature that there are different effects of the establishment of an SSP in large and smaller municipalities, as well as differences between niche-focussed and general-focussed SSPs. In this context, a niche-focus allows for a more consistent support approach to new business, which can lead to higher success rates and thus impact. With regards to size, larger urban environments benefit from a stronger economic ecosystem, more readily available knowledge, access to spillovers and a higher availability of capital and partners, which once again will lead to higher success rates for SSPs in these environments.

Secondly, there is a learning effect of the presence of an SSP, which increases its effectiveness as it operates over time. Because each SSP is a product of its local economic environment, the requirements for successfully contributing to these environments will necessarily be heterogeneous between different economic ecosystems and within the same ecosystem over time as needs shift in accordance with (exogenous) market demands. Although the effect of SSPs is geographically bounded, the learning effects (in the form of best practices) might be transferred between municipalities.

Thirdly, although a local ecosystem necessarily adjusts to exogenous market demands, literature suggests the impact of an SSP is itself not influenced by these changes. This follows from the reasoning that an SSP provides services directly to the local ecosystem, as opposed to the market that ecosystem serves. As such, an SSP would act more closely to a multiplier than to an active market participant.

Fourthly, measuring the success of an SSP requires analysing a relatively non-volatile dependent variable like firm entry, as variables such as employment figures are too susceptible to (exogenous) shocks to provide accurate treatment data.

The findings discussed above provide a non-limitative insight into the available scientific literature and serve to frame the findings in light of the object of our analysis. Based on these findings, the following hypotheses can be formed:

> *H1a: The treatment effect of SSPs in large urban municipalities is higher than the treatment effect of SSPs in smaller municipalities for primary sectors.*

H1b: The treatment effect of SSPs in smaller municipalities is higher than the treatment effect of SSPs in large urban municipalities for secondary sectors.

H2a: The prevalence of several SSPs in a municipality does not create a crowding-out effect for primary sectors.

H2b: The prevalence of several SSPs in a municipality creates a crowding-out effect for secondary sectors.

H3: Niche-focussed SSPs are more successful than general-focus SSPs in increasing the firm stock in their treated region.

In addition to the hypotheses presented above, we expect to find that SSP effectiveness is economically insulated from exogenous shocks. To assess the validity of this expectations, we test the following hypothesis in addition to those presented above:

H4: The 2008 financial crisis has not has an appreciable effect on the efficacy of SSPs for large or smaller municipalities.

Finally, although we assume the treatment of an SSP to be geographically bounded, there is a basis to expect an announcement effect that spills over to other municipalities.

H5: There is an announcement effect of SSP establishment in other, non-treated municipalities, to the firm stock in treated municipalities prior to treatment.

Taken together, the hypotheses formed from the literature review will establish whether SSPs have a statistically appreciable effect on firm stocks, whether there is a difference in treatment effects brought on by scale advantages, whether treatment effects evidence crowding-out effects and to what extent an SSP is an isolated, geographically bounded actor.

As a means of reference, we reiterate our central question: *How has established start-up support policy between 2001 and 2017 by municipal governments in South Holland contributed to the development of the firm stock in these municipalities and to what degree have these SSPs been conducive to the greater economic ecosystem?*

Section 4

Methods & Data

In this section, we provide an overview of the data used, as well as providing an overview of the synthetic control method operationalised in this analysis. Firstly we will introduce the synthetic control framework and assess it's applicability in section 4.1. Secondly, we will look at the methodology in more detail in section 4.2 before providing a framework for robustness testing and bias control in section 4.3. Finally, an overview of the data used in this analysis can be found in section 4.4.

Subsection 4.1 – The Synthetic Control Methodology

The synthetic control framework was first introduced by Abadie and Gardeazabal (2003) and has been further developed by Abadie et al. (2010; 2015). It is particularly useful to determine the impact of a given treatment on a single treated unit when using panel data (Ben-Michael et al., 2021). Generalised, the methodology works by creating a simulated (synthetic) control group as a match to a treated group, based on characteristics of a large pool of donor groups. This circumvents the problem of finding a sufficiently reliable counterfactual/control group, which can be encountered when using the difference-in-difference method for statistical inference (Abadie et al. 2010). The control group is created by taking a weighed average of specific, observable characteristics for a set of units comparable to the treatment unit. By taking weighed averages, the synthetic control method also allows for treatment effects changing over time, which provides a further edge of the method over other common methodologies. A further specification of the model, in the form of the bias-corrected synthetic control, also considers the differences in predictor variables between the treated and (synthetic) control group (Abadie & L'Hour, 2021). The resultant model can be used outside contexts where the synthetic control group has a perfect fit on pre-treatment outcomes (Ben-Michael et al., 2021).

To first assess the validity of implementing a synthetic control methodology in this analysis, we test the assumptions of Abadie (2021) regarding the contextual requirements of the method.

Firstly, the *size of the effect and volatility of the outcome*. The effect of small treatments are harder to estimate than large those of large treatments. This holds true especially for highly volatile outcome variables, which can obscure even large treatment effects. Hence, a substantial intervention aimed at a low-volatility outcome would be ideal. Economic literature suggests that entrepreneurship rates in high-income countries (such as the Netherlands) are not explicitly highly volatile (Amorós et al., 2009), which would align with the contextual requirement. Furthermore, the addition of an SSP in an area where there was no measure to support entrepreneurship can be considered a sufficiently large intervention.

Secondly, to create a synthetic control variable, it is important that there are *comparison groups available* for the creation of the control group. Our sample consists of longitudinal panel data across 50 different municipalities in the Netherlands (South Holland), each containing data on 605 unique economic sectors based on SBI08 three-digit coding. As the number of municipalities is already more than twice as large as the 24 countries used by Abadie et al. (2015), it is assumed there is sufficient data available to create a synthetic control group. Further, the introduction of an SSP into the treated municipality was not mirrored in other municipalities and those that *did* introduce an SSP focused on different sectors. Since all municipalities are geographically clustered into a single province within a single country, it is assumed that no large idiosyncratic shocks occurred to specific units within the group. As such, it is assumed no bias is introduced to the resultant analysis.

Third, there should be *no anticipation* of the intervention by the targeted segments. One of the primary means by which literature suggests economic actors can predict public policies is through the use of political capital (Murtinu, 2021). Although this type of anticipation may apply to a certain number of firms *within* a single business segment, it is unlikely to be scaled to an entire business segment. Furthermore, whilst policies on a national level can be anticipated due to long lead-times in policy preparation, the smaller nature of municipal interventions will dampen the anticipation effects. To ensure the contextual requirement is sufficiently controlled for, we align our analysis with Abadie (2021) and backdate the intervention with 1 year to circumvent possible (minimal) anticipation effects.

Fourthly, there should be *no interference/spillovers* between treated units and units used to construct the control. Given the small geographical context of this analysis (South Holland, the Netherlands), this contextual requirement can be cause for concern surrounding the applicability of the synthetic control methodology. In this light, literature suggests that spillover effects are highly localised (Madaleno et al., 2018; Qian et al., 2011) and quickly deteriorate with distance. This, combined with the fact that many of the incubators in the analysis operate with *local* development as a focus and as such only cater to those firms located within their host municipality, brings us to assume that the effects of spillovers is negligible for the purposes of applicability of the synthetic control method.

Fifthly, the analysis requires the data to conform to the *convex hull condition*, which stipulates that there should be no units with observed characteristics that are extremely low or extremely high when compared to other units in the analysis.

Finally, there should be *sufficient pre- and post-intervention periods available* to study successfully anticipate effects and create a non-biased synthetic control estimator. Tables 1 and 2 show the pre- and post- intervention periods for each of the SSP's studied within the time period under study (2000-2017 for non-Rotterdam and SSPs operating within Rotterdam within that same period. For the purposes of this analysis, the contextual requirement of sufficient periods pre- and post-intervention is deemed sufficient to allow for statistical inference using a synthetic control methodology.

TABLE 1: Pre- and post-intervention periods for selected SSP's (Not-Rotterdam)

SSP Name	**Treatment Year**	**Pre-treatment**	**Post-treatment**
ESA Business Incubation Centre	2011	11	6
Crosspring	2006	6	11
World Startup Factory*	2014 (2005)	14 (5)	3 (14)
Yes! Delft	2006	6	12
Biopartner Center Leiden	2007	7	10

Note: The selection of Startup Support Programmes / Policies above has been curated from a list of 14 such programmes. In this context, a gap of at least 2 years before 2017 was deemed sufficient post-treatment periods, especially when taking into account a 1 year treatment lead time. A pre-intervention period of 5 years was also deemed sufficient to conform to the contextual requirement. Whilst individually these may not immediately conform to the requirements set by Abadie (2021), it is assumed that the combined findings of each SC analysis are sufficiently diverse to estimate an overall effect.
* The Municipality of The Hague instituted a policy of increased innovation support, signalled by the founding of the HiiL Justice Accelerator in 2005. Graphical analysis shows clear evidence of a treatment effect starting in 2005. As a result, the 'treatment year' for WSF is backdated to 2005. Adjusted years are given in parentheses.

TABLE 2: Pre- and post-intervention periods for selected SSP's (Rotterdam)

SSP Name	Treatment Year	Pre-treatment	Post-treatment
Erasmus Centre for Entrepreneurship	2013	13	4
PortXL	2015	15	2
Erasmus MC Incubator	2011	11	6
Bluecity	2013	13	4

Note: The above SSP's treat Rotterdam, which is too large to be compared to the ordinary municipalities of South-Holland. Hence, the SCM for these SSP's is based on data from EUROSTAT.

Taken together the contextual requirements set forth in Abadie (2021) are deemed sufficiently fulfilled to make the context under study suitable for an estimation using the Synthetic Control Methodology (SCM).

Subsection 4.2 – The Bias-adjusted SCM model

In this section, we will present the model framework that is used to find the results presented in section 5. The model works in two distinct steps that allow for a bias-corrected synthetic control approach: firstly, we estimate a synthetic control group, which is then bias-corrected to obtain balanced treatment effect estimations. The model follows the frameworks proposed by Abadie et al. (2010) and Abadie (2021), as cited previously and makes use of the notation and methodology presented in these works. Statistical estimation is carried out using the stata package *allsynth* by Wiltshire (2022).

The outcome variable this analysis will be denoted as (Y_t) and will denote the total number of firms in the first series of analyses and total number of persons employed in the second series of analyses. The outcome variable is measured during year *t* denoting pre-intervention periods for $t=1,\dots,T_0$ and $t=T_0+1,\dots,T$ for post-intervention periods for $I + J$ municipalities where municipalities $i = 1,\dots, I$ implemented an SSP during the observed period and all municipalities $j = 1,\dots, J$ did not implement an SSP during this period.

We will use $Y_{j,t}^N$ to denote the potential outcome of untreated municipality *j* in year *t*. We will use $Y_{j,t}^I$ to denote the potential outcome of municipality if it were treated during year *t*. To derive the treatment effect for country *i* after intervention at time *t*, we can then solve equation (1).

$$\tau_{i,t} = Y_{i,t}^{I} - Y_{i,t}^{N} \quad (1)$$

However, since we only observe the outcome $Y_{i,t}^{I} = Y_{i,t}$ for those $t > T_0$, the counterfactual $Y_{i,t}^{N}$ is required to estimate the treatment effect. The SCM allows us to construct a synthetic control group using a combination of weighed observations derived from a specified set of untreated donor pool municipalities. This counterfactual is created through equation (2).

$$\hat{Y}_{i,t}^{N} = \sum_{j=I+1}^{I+J} w_j^* Y_{j,t} \forall\, t \quad (2)$$

Based on the idea that the SCM mimics pre-intervention outcomes of $Y_{i,t}$, it presents a plausible estimate of $Y_{i,t}^{I}$ over the interval $t > T_0$. This estimate is weighed according to w for each municipality j during the creation of the control group. If we take w_j^* to mean the optimal weight for a given municipality j, to be distributed $w_j^* = [0,1] \;\forall\, j$, then $\sum_{j=I+1}^{I+J} w_j^* = 1$. If then $W^* = (w_{I+1}^*, \dots, w_{I+J}^*)'$ denotes a vector of all country weights, we can derive the value of W^* as a constant by minimising equation (3) over the pre-intervention period.

$$\left(\sum_{k=1}^{K} v_k \left(X_{i,k} - \sum_{j=I+1}^{I+J} w_j X_{j,k}\right)^2\right)^{\frac{1}{2}} \quad (3)$$

The optimal weights in the model depend on a set of predictor variables (X_k), which show characteristics of countries i and j that are observable, and the weight assigned to them (v_k) relative to the other predictors, where $v_k = [0,1] \;\forall\, k$ and $\sum_{k=I1}^{K} v_k = 1$. The observations for X_k exist on a matrix along the dimensions $T_0 \times 1$ and contain all the predictor values for countries i and j for all periods $t \leq T_0$. Further, $V_j = (v_j, \dots, v_k)$ is a vector that contains predictor weights for municipality j, which is constant over time.

Following Abadie (2021), the SC group is then created for any given selection of V according to $W^*(V) = (w_{I+1}^*(V), \dots, w_{I+J}^*(V))'$. Estimating V follows Abadie (2010; 2021) and Abadie & Gardeazabal (2003) by choosing a V that minimizes the mean squared prediction error over the pre-intervention period (Abadie, 2021, p. 236). As such, we minimise equation (4) over the pre-intervention period, where the minimisation co-depends on equation (3) and forms a bilevel optimisation problem.[1]

[1] For a more comprehensive overview of this type of process, I refer to Dube and Zipperer (2015), Malo et al. (2020) and Ferman and Pinto (2021).

$$\sum_{t=1}^{T_0}\left(Y_{i,t} - \sum_{j=I+1}^{I+J} w_j^*(V)Y_{j,t}\right)^2 \tag{4}$$

Based on equation (3) and (4), we can then estimate equation (1), using $\hat{Y}_{i,t}^N$. We derive the estimated treatment effect ($\hat{\tau}$) from equation (5) at time $t > T_0$.

$$\hat{\tau}_{i,t} = Y_{i,t}^I - \hat{Y}_{i,t}^N = Y_{i,t} - \sum_{j=I+1}^{I+J} w_j^* \, Y_{j,t} \tag{5}$$

A main caveat with equation (5) is the fact that it does not account for (potential) differences in predictor values between treated municipalities and their synthetic equivalents (Abadie, 2021). To counteract this caveat, previously mentioned authors implement a regression-based correction (Abadie & L'Hour, 2023; Ben-Michaels et al., 2021). By implementing a ridge regression ($\hat{\mu}_{0,t}$), we can bias-correct the resultant synthetic control by *"regressing the untreated outcomes $Y_{I+1,t}, \ldots, Y_{I+J,t}$, on the values of predictors for the untreated units, i.e. $V_{I+1}, \ldots, V_{I+J}$."* (Abadie, 2021, p. 419). The bias correction takes the form of equation (6).

$$\varphi_t = \left(\hat{\mu}_{0,t}(V_i) - \sum_{j=I+1}^{I+J} w_j^* \, \hat{\mu}_{0,t}(V_j)\right) \tag{6}$$

The finalised, bias-corrected treatment effect ($\tilde{\hat{\tau}}$) for treated municipality *i* in periods where $t > T_0$ is calculated according to equation (7).

$$\begin{aligned} \tilde{\hat{\tau}} &= \hat{\tau}_{i,t} - \varphi_t \\ &= \left(Y_{i,t} - \sum_{j=I+1}^{I+J} w_j^* Y_{j,t}\right) - \left(\hat{\mu}_{0,t}(V_i) - \sum_{j=I+1}^{I+J} w_j^* \, \hat{\mu}_{0,t}(V_j)\right) \\ &= \left(Y_{i,t} - \hat{\mu}_{0,t}(V_i)\right) - \sum_{j=I+1}^{I+J} w_j^* \left(Y_{j,t} - \hat{\mu}_{0,t}(V_j)\right) \end{aligned} \tag{7}$$

Using this equation will allow us to estimate a synthetic control model with bias-corrected observations, applicable to the current case.

Subsection 4.3 – Robustness and Control

To test the veracity of the results gathered from the bias-corrected SCM analysis, we implement rigidity tests through three avenues: 1) by performing an in-time placebo test and 2) by performing an in-space placebo test. We opted to forego a restriction of the donor pool, as the municipalities in the sample weren't differently influenced by exogenous shocks due to their close geographical proximity. A pseudo-restriction of the donor pool by way of aggregating at a higher level of agglomeration to allow the creation of an SC to Rotterdam is outlined in subsection 4.4.

Subsection 4.3.1 – In-time placebo test

As argued in the contextual requirements in section 4.1, the data in the analysis was backdated by 1 year to avoid anticipation effects. However, it can be argued that the introduction of incubators in a given municipality in a given year will have created a form of anticipation effect in other municipalities. As such, I backdate every intervention to the year of founding for the first SSP in this study (the ESA incubator, founded in 2003).

The results for the in-time placebo test are presented in Appendix V.

Subsection 4.3.2 – In-space placebo test

As a separate means of control, we implement the formal in-space placebo test mentioned by Abadie et al. (2010; 2015) and Wiltshire (2022) and referred to as a ‘widely adopted approach in synthetic control literature’ (Wiltshire, 2022, p. 6). The in-space placebo test assigns a fictional treatment to the donor pool municipalities to derive a ‘treatment effect on the untreated’, which is then compared to the original SCM results based on their p-value.

To carry out the placebo test, we iteratively assign treatment to all donor municipalities *j* for each treated unit *i*. The specific municipality *i* and the remaining *j* municipalities are then used to calculate the synthetic control group to *j*, following the process described in section 4.2.

Following the approach proposed by Abadie et al. (2010), we need to carry out four calculations in order to derive the p-values required for the in-space placebo test. Firstly, we use equation (8) to derive the pre-intervention mean squared prediction error (ξ_a) and use equation (9) to derive the post-intervention mean squared prediction error (ξ_p).

$$\xi_a = \left(\frac{1}{T_0}\sum_{t=1}^{T_0}\left(Y_{i,t}^{I} - Y_{i,t} - \sum_{j=I+1}^{I+J} w_j^* Y_{j,t}\right)^2\right)^{\frac{1}{2}} \quad (8)$$

$$\xi_p = \left(\frac{1}{(T-T_0)}\sum_{t+1}^{T_0}\left(Y_{i,t}^{I} - Y_{i,t} - \sum_{j=I+1}^{I+J} w_j^* Y_{j,t}\right)^2\right)^{\frac{1}{2}} \quad (9)$$

By then taking the ratio of the post- and pre-intervention root mean squared prediction error, we an compare the magnitude of the treatment effect relative to the fit of the SC, expressed by ξ_r according to equation (10).

$$\xi_r = \frac{\xi_p}{\xi_a} \quad (10)$$

The resulting ratios S (where $S = 1, \dots, s$ and $i \in S$) are compared to the donor pool municipalities. A result is considered robust when its ratio is substantially larger for the treated than for the donor municipalities. The p-value for the post-/pre-intervention ratio for the donor countries being equal to that of the treated country is obtained through ranking the ratios by order of magnitude and dividing rank by the total number of municipalities. The approach was formalised by Wiltshire (2022) in equation (11)

$$p_i = \frac{\sum_{s=1}^{S} \mathbb{1}[\xi_{r,s} \geq \xi_i]}{S} \quad (11)$$

The results of this in-place placebo test are presented in Appendix VI.

Subsection 4.4 – Data

Following Abadie (2021), the data operationalised by the SCM must conform to the following three requirements: 1) Aggregate data on predictors & outcomes must be available, 2) there must be sufficient pre-intervention data and 3) there must be sufficient post-intervention data. We believe that the data used in this analysis conforms to the requirements set out above (as also outlined in section 4.1), as the Netherlands Statistics Agency (CBS) has aggregated a large amount of municipal-level and sectoral data over the period under study (2000-2017). The requirement for sufficient availability of post- and pre-intervention data is fulfilled by a shifting intervention period between the different SSP interventions, allowing general inferences to be made whilst lowering sensitivity to bias induced by exogenic shock.

The main variable of interest (Y) is the total number of active businesses for a given sector. Although the LISA-dataset does contain data on employment, these data are too volatile for analysis using an SCM, following the contextual and data requirements outlined in previous subsections. The data has been aggregated to the sector level from the LISA dataset, which contains individualised microdata on individual firms as well as the sector in which these firms are active. The LISA-data was collected for the province of South-Holland in the Netherlands and contains data for over 50 different municipalities over a period of 17 years (2000-2017). After curtailing the dataset to account for municipalities that merged, were dissolved or were re-arranged into a different province during the period under study, the dataset comprises 50 municipalities, shown in Appendix I.

The remaining variables used in the creation of the SCM predictor variables are summarised in Table 3 and were obtained from different datasets provided by CBS-Statline. The variables used to create the predictors were selected on the basis of availability at a municipal level and their relationship to firm entry or exit. Table 3 also shows the rationale for the inclusion of the variables in the dataset, along with related academic sources if applicable, in addition to the sources already provided in Section 3.

TABLE 3: Variables implemented in the Synthetic Control Models

Variable Name	Unit of Measurement	Rationale for inclusion
Total Inhabitants	# on 1/1	Larger municipalities are expected to have more people willing to start a business.
Average inhabitants	Mean of population on 1/1 and 31/12	Provides a more dynamic view than total inhabitants, which are only registered once per year.
Urbanisation	# of homes per KM^2	Higher degrees of urbanization increase the likelihood of spillover effects and may attract more firms.
Homesupply	# of homes within municipal borders	Housing shortages prevent resettling of entrepreneurs to treated regions and make the municipality less attractive to firms.
Immigration – Inmoving	Total # registered in year	Proxies the 'desirability' of a municipality.
Immigration – Outmoving	Total # registered in year	Proxies the 'undesirability' of a municipality.
Students – BOL	Total # registered in year	Students form a primary sources of start-up firms, supported by knowledge institutions. (Ko & An, 2019)
Students – BBL	Total # registered in year	-
Students – HE	Total # registered in year	-
Students – SE	Total # registered in year	-
Students – MBO	Total # registered in year	-
Diplomas – Bachelor	Total # awarded in year	Knowledge required to foster startups is generated by graduating and entering the workforce. (Audretsch et al., 2015; Audretsch & Keilbach, 2008; Audretsch & Lehmann, 2005; Audretsch & Stephan, 1999)
Diplomas – Master/ PHD	Total # awarded in year	Highly specialized knowledge is required for cutting-edge innovation and R&D in technological sectors.
Total Road Length	All roads (km)	Environmental / infrastructure factors are a key attribute to firm attraction. (Korunka et al., 2010)
Total Road Length (Municipal)	Roads under care of municipality (km)	Proxies local municipal spending on infrastructure and development, likely mirroring other forms of infrastructure spending (such as digital).
Nearest Highway On-ramp	Km	Measures reachability and attractiveness for non-locals to commute / start-up.
Nearest Trainstation	Km	Measures reachability and attractiveness for non-locals to commute / start-up.
Private Household Income	Per €1000	Higher household income is linked to higher likelihood to start a business (Rodriguez et al., 2009; Roper & Scott, 2009).
Social Security Recipients - Total	# registered with UWV	Some SSPs are implemented as startup-programs for the unemployed, higher rates of unemployment are

		then expected to correlate to some degree with startup rates (Caliendo & Künn, 2011).
Social Security Recipients - Unemployment	# registered with UWV	Breakdown of SSR-Total
Social Security Recipients - Benefits	# registered with UWV	Breakdown of SSR-Total
Number of Personal-use Automobiles	# registered within municipality	Proxies likelihood of inhabitants to commute and the ownership of capital assets between municipalities.
Number of Company-use Automobiles	# registered within municipality	Proxies the general economic success of established businesses and serves as a predictor of non-service firms.

Note: Citations are provided where necessary. The rationale for the inclusion of a given measure in the analysis is provided in the third column. All other variables without citation are included based on extrapolation from the literature review in section 3.

Because of the size difference between Rotterdam and the rest of the municipalities in South Holland, no accurate SCM could be run based on this data. To investigate the effect of the introduction of the Rotterdam based SSP's, we agglomerate the municipalities in the dataset to larger urban clusters. The grouping was conducted optically, based on geographical proximity to a sufficiencly large population cluster.

We focus on 9 different SSPs that were founded in South Holland in the period 2000-2017. Appendix I shows which sectors were treated by the SSP. To estimate the indirect effect of the SSP on non-targeted (service) sectors, such as financial services, consultancy and legal advice, we also compile a (non-limitative) list of such sectors for each SSP. These secondary sectors are shown in column 3. The targeted sectors for each SSP were compiled from the SBI-codes of companies in the business portfolio of each individual SSP and gathered from the ORBIS online database, which contains up-to-date information on company microdata from the Dutch Chamber of Commerce (KVK) business registry and other official sources.

Section 5
Results & Rigidity Testing

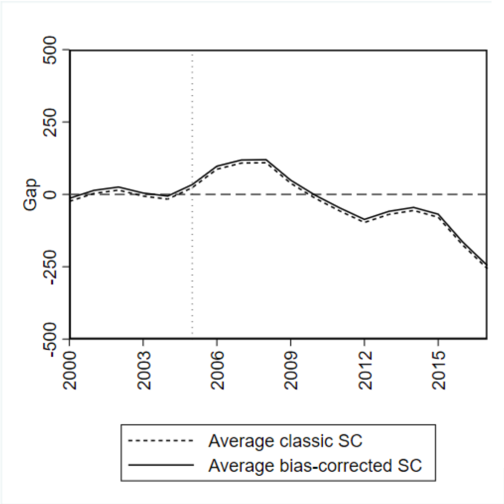
Subsection 5.1 – Results

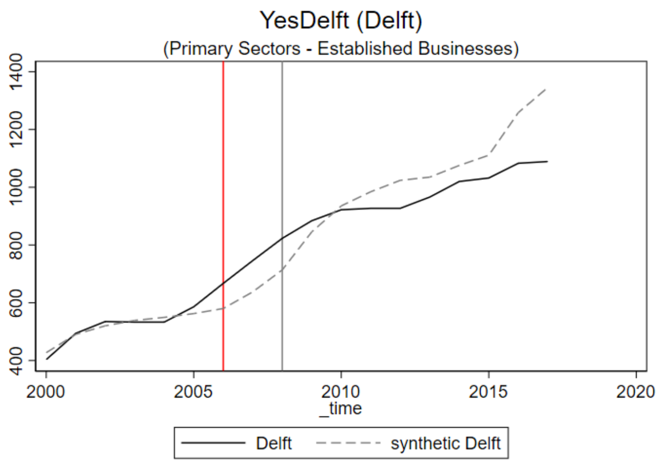
In this section, we provide the results of the analysis outlined under the methodology. For the benefit of the reader, most of the underlying numerical data has been moved to the relevant appendices. The weights assigned to the donor pool municipalities can be found in Appendix II, the factor weights assigned to the variables in the SCM can be found in Appendix III and the treatment effects, rendered in both standard and bias-controlled forms, can be found in Appendix IV. The results of the in-time and in-place placebo mentioned under Sections 4.3.1 and 4.3.2 respectively can be found in Appendices V and VI.

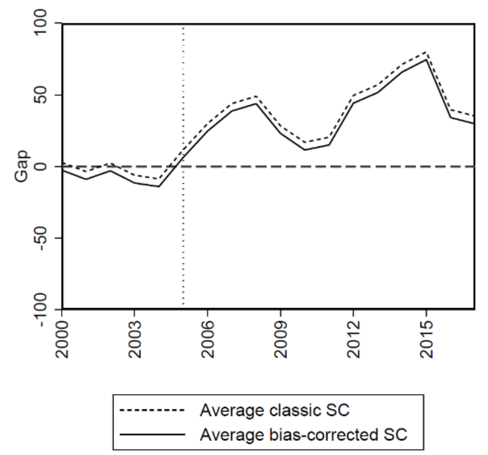
As a result, the findings in this chapter will only provide the graphical outcomes of the Synthetic Control Method implemented in this analysis. The final treatment effect should be read as the number of firms active in the treated sectors in a given year. A the cumulative effect per year indicates that the cumulative number of firms X have been started different from the synthetic control trend. For negative values, this means that according to the SCM, there would have been *more* firms in the treated sectors in the *absence* of treatment. As before, treatment consists of the founding of an SSP in the municipality in a given year.

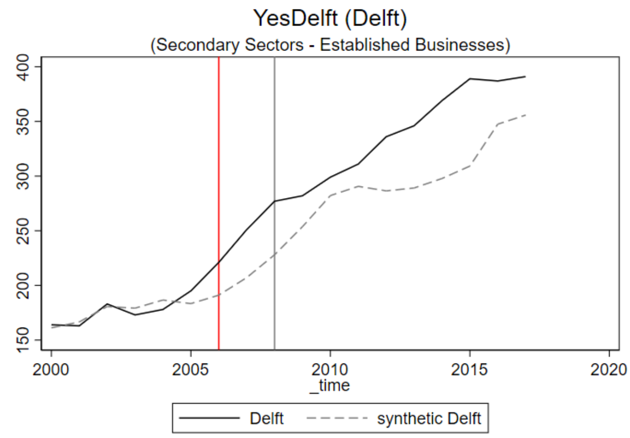
The graphs below this section show the treated group outcome compared to the synthetic control group outcome on the right, with a graph of the 'gap' between these two lines on the left. For each of the treated municipalities, an analysis was conducted on their primary treated sectors, as well as on their secondary (supporting) sectors. This second group is made up of firms offering financial services, legal advice, (business) consultancy services and other such supporting sectors. To increase readability of the treatment graphs, two horizontal lines were added to each. The red line in each of the graphs indicates the treatment year, whereas the grey lines indicate the start of the 2008-2009 financial crisis. The crisis is represented graphically because although we do not explicitly test for the start of the crisis, several graphs show some effect of the crisis on new firm entry (most notably for the ESA-BIC and Crosspring SSPs).

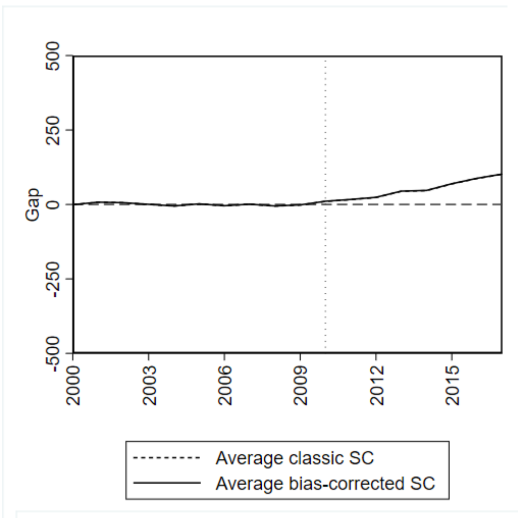
In the left graphs showing the gap between SC and treated, the dashed line indicates a zero-gap, which is useful in the assessment of a stable pre-intervention trend for the SC line, as is assumed for an SCM analysis. The faint horizontal line in each of these graphs indicates the treatment year.

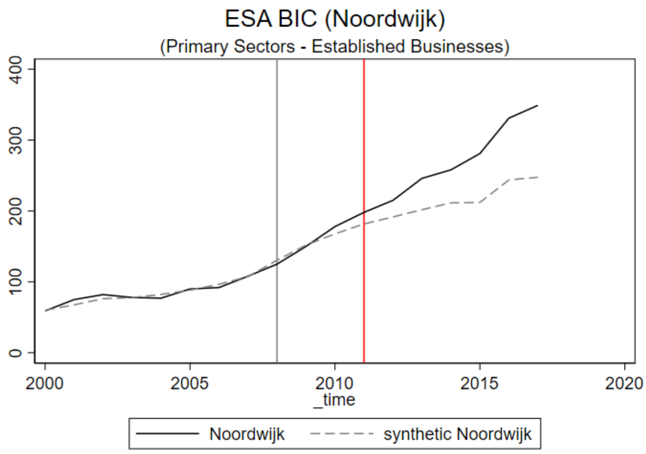

Gap
Average classic SC
Average bias-corrected SC

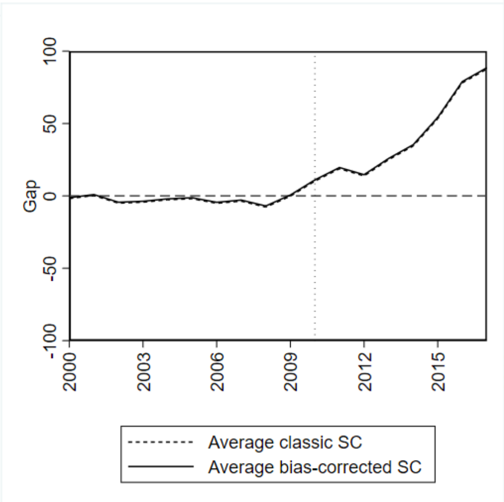

YesDelft (Delft)
(Primary Sectors - Established Businesses)
_time
Delft
synthetic Delft

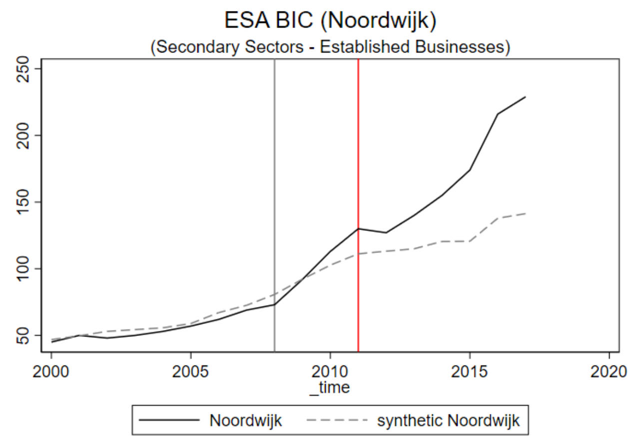

Gap
Average classic SC
Average bias-corrected SC

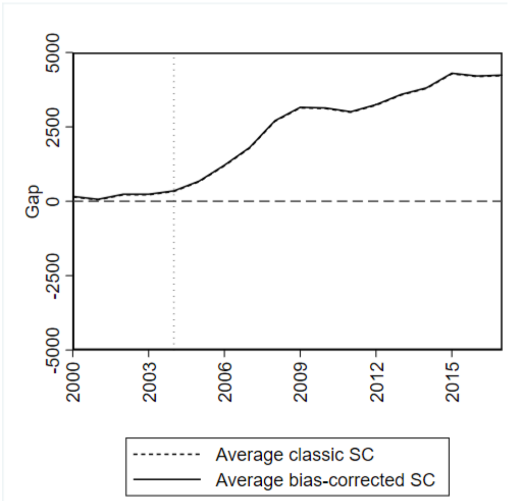

YesDelft (Delft)
(Secondary Sectors - Established Businesses)
_time
Delft
synthetic Delft

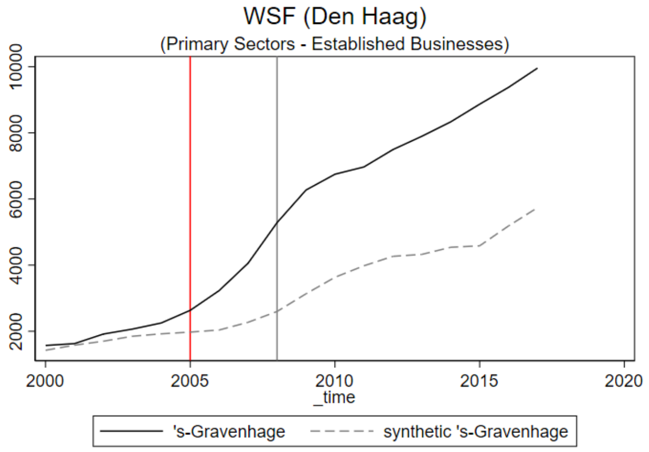

Gap
Average classic SC
Average bias-corrected SC

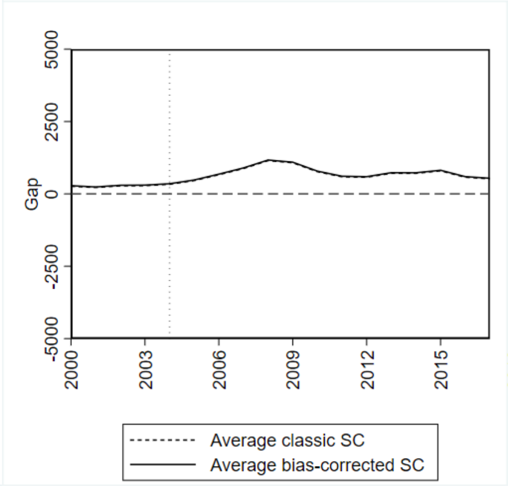

ESA BIC (Noordwijk)
(Primary Sectors - Established Businesses)
_time
Noordwijk
synthetic Noordwijk

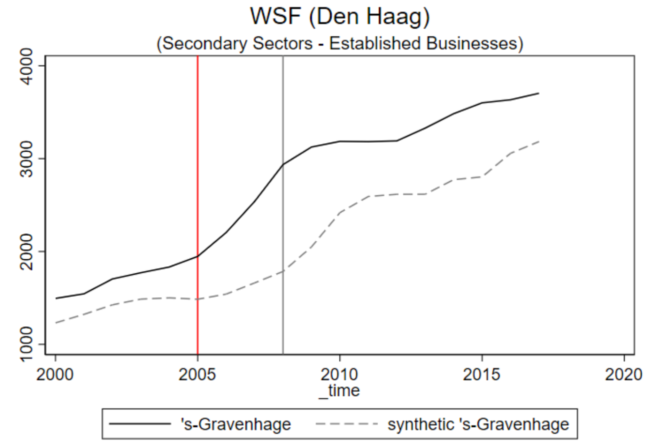

Gap
Average classic SC
Average bias-corrected SC

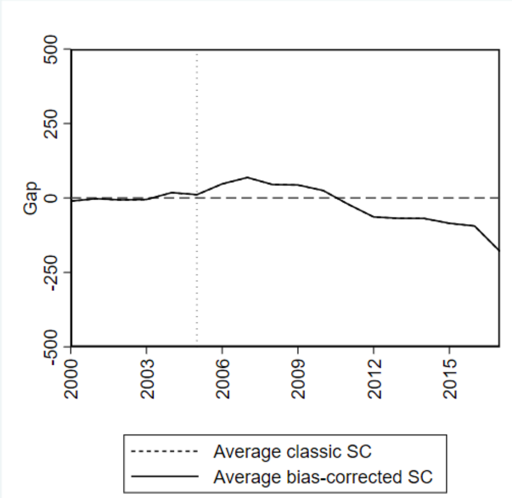

ESA BIC (Noordwijk)
(Secondary Sectors - Established Businesses)
_time
Noordwijk
synthetic Noordwijk

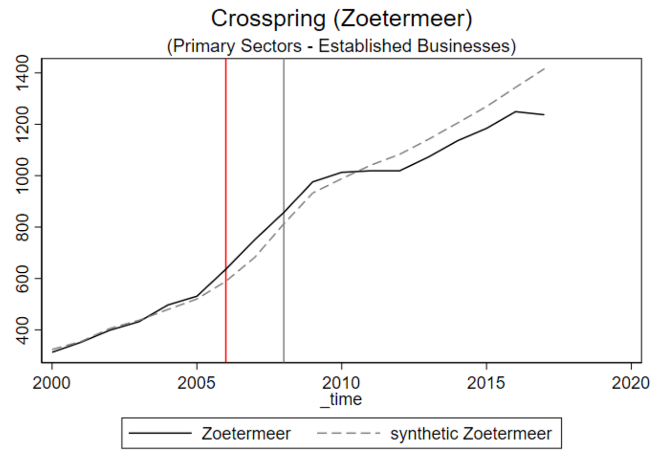

Gap
Average classic SC
Average bias-corrected SC

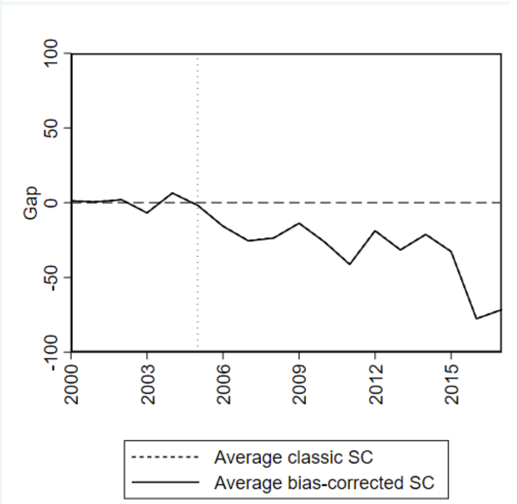

WSF (Den Haag)
(Primary Sectors - Established Businesses)
_time
's-Gravenhage
synthetic 's-Gravenhage

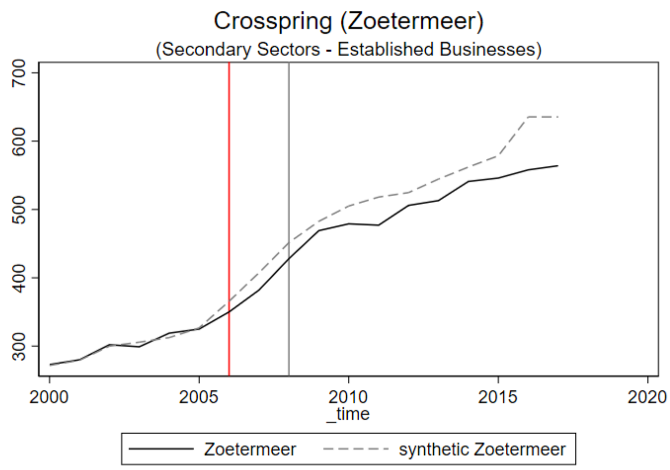

Gap
Average classic SC
Average bias-corrected SC

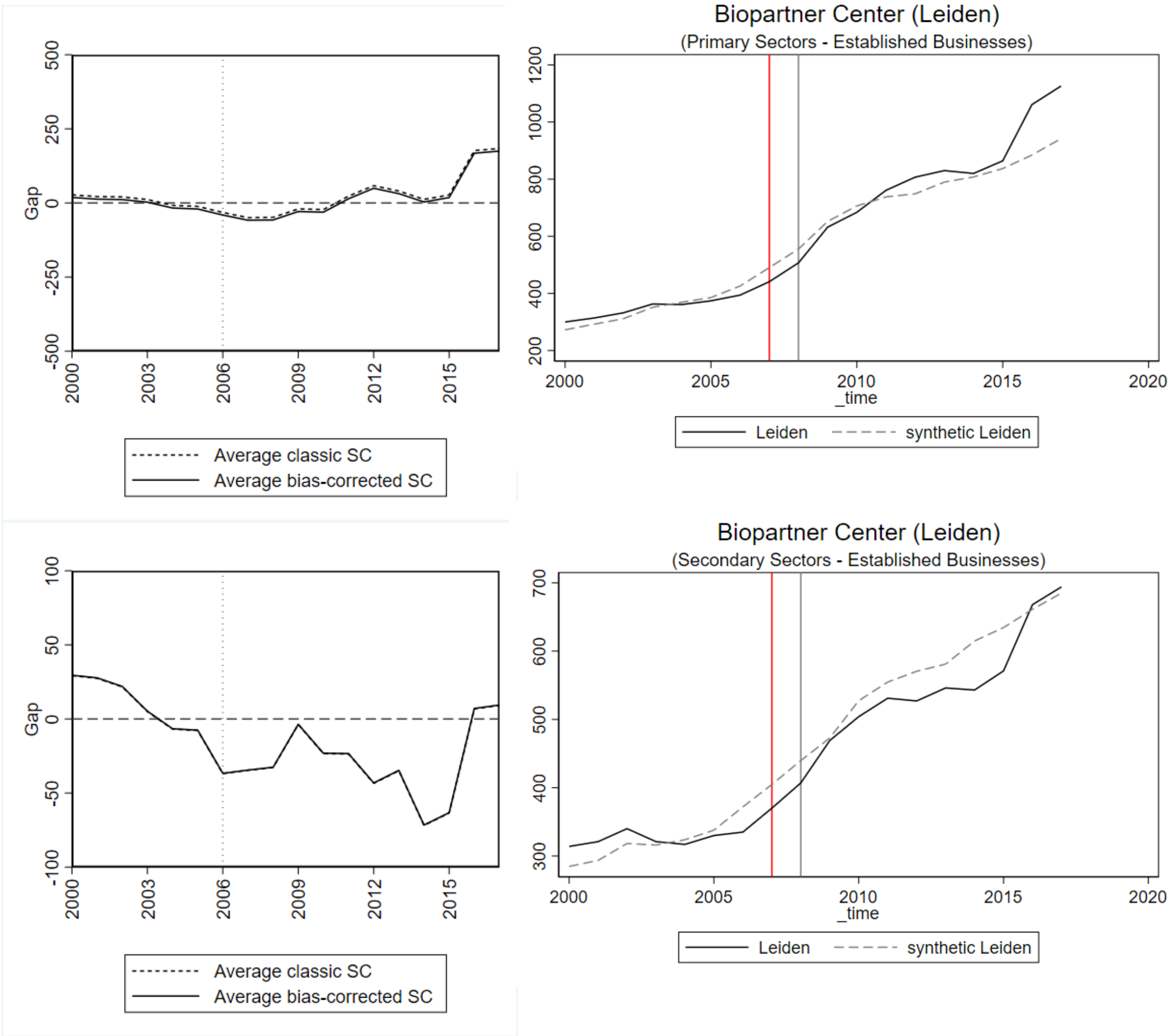

WSF (Den Haag)
(Secondary Sectors - Established Businesses)
_time
's-Gravenhage
synthetic 's-Gravenhage


Gap
Average classic SC
Average bias-corrected SC


Crosspring (Zoetermeer)
(Primary Sectors - Established Businesses)
_time
Zoetermeer
synthetic Zoetermeer


Gap
Average classic SC
Average bias-corrected SC


Crosspring (Zoetermeer)
(Secondary Sectors - Established Businesses)
_time
Zoetermeer
synthetic Zoetermeer



Subsection 5.1.1 – Results (Smaller Municipalities)

From the graphs presented above, we conclude that there is no consistent positive or negative effect between of the introduction of an SSP at this municipality level. For some, there is a net positive effect of SSP introduction (ESA BIC, BCL and WSF), whilst for some, there seems to be a net negative effect of SSP introduction (YesDelft! and Crosspring).

The following effect is interpreted: SSPs introduced in larger municipalities (The Hague) or municipalities with a distinct innovative portfolio ('aerospace' in the case of Noordwijk and 'biotech' in case of Leiden) seem to be more successful than those introduced as a more general means of boosting firm founding (as for Crosspring) or with a more generalist innovative niche ('high tech' in Delft). This interpretation is consistent with earlier findings from the literature, stating that a higher degree of specialisation (or 'fit' with a local ecosystem) will increase SSP effectiveness (Battistella et al., 2017; Bliemel et al., 2016; Fernández et al., 2019). However, further study would be needed to test the assumptions outlined above in this specific geographic context.

Table 5 provides an overview of cumulative treatment effects (CTE) for the non-Rotterdam municipalities, in both their original and bias-corrected forms. From this table it can be seen that the CTE of most non-Rotterdam SSPs is relatively similar, in a bandwidth of 500 and -500.

The exception is WSF, which has a CTE of close to 40.000 firms in the primary treated sector. One explanation of this size difference is the size of the treated municipality (the Hague) or the focus area of the SSP (international business across the innovative landscape). Alternatively, in line with literature, the scope of services offered by WSF can create a stronger basis for success (Kupp et al., 2017; Vekic & Borocki, 2017). Most likely, it is a combination of factors of municipality size and incubator design that created a CTE close to 40.000 firms. It should be noted that the high degree of volatility for the Secondary Sectors treated by BCL inhibits sound inference, as the pre-treatment trend of the SC is not stable.

TABLE 5: Cumulative Treatment Effects – Non Rotterdam SSPs

NAME	TREATMENT YEAR	ORIGINAL CTE	BIAS-CORRECTED CTE	RMSPE
YesDelft! (Primary)	2006	-460	-333	16.67
YesDelft! (Secondary)	2006	520	456	6.77
ESA BIC (Primary)	2011	388	392	4.98
ESA BIC (Secondary)	2011	311	317	4.87
WSF (Primary)	2005	38854	39108	211.66
WSF (Secondary)	2005	9478	9719	277.76
Crosspring (Primary)	2006	-354	-351	10.21
Crosspring (Secondary)	2006	-398	-400	4.011
BCL (Primary)	2007	381	284	20.71
BCL (Secondary)	2007	-316	-313	22.51

Note: The CTE indicates the number of firms that would have been founded in excess of the treated trend since the treatment year in the municipality that the SSP was founded in. Negative effects indicate that there would have been more firms in the treated municipality if the SSP was not founded. The cumulative effects are based on the SC and BCSC gaps, which are provided in Appendix IV.

Subsection 5.1.2 – Results (Rotterdam)

From the graphs presented below, which follow the same stylistic guides as earlier, we can see that some of the created SC trends do not conform to the treatment group trend pre-treatment. Regarding the BlueCity Secondary sectors, the difference in the pre-treatment trend between the SC and the treated outcome is too large to assume the conditions for stable pre-treatment difference are met. As such, no inference should be conducted based on these outcomes.

Table 6 provides an overview of the CTE for all SSPs founded in Rotterdam within the period under study. When compared to the Non-Rotterdam SSPs in Table 5, the disparity in effect sizes becomes clear (and consequently the need to separate the two categories) becomes evident. The bandwidth of CTE in Rotterdam stretches roughly from 4.000 to 11.000 firms in primary treated sectors and roughly from -18.000 to 8.000 in secondary treated sectors. [2]

The larger effect sizes found for Rotterdam-based SSPs seems to conform to the difference seen in the non-Rotterdam cohort between The Hague and the other treated municipalities.

Special note should be made of the substantially lower outcomes for the secondary sectors of PortXL. The lack of growth in the secondary (supportive) sectors could indicate that the economic ecosystem in Rotterdam has already reached a saturation point / equilibrium for these sectors and that additional growth in this area could be detrimental. When covering the secondary sectors to the sectors treated by PortXL, these would most likely be involved in maritime or transport-related service industries, which are already prevalent in the municipality. More general service providers might not directly be attracted by the type of firms supported by PortXL, which would explain the lack of growth in the secondary segment when compared to the secondary segments for other SSPs.

With regards to the blue line in the PortXL – Secondary graph, the graphical analysis shows a clear treatment effect after 2003. This treatment year would be consistent with the founding of SSPs in other parts of South Holland, most notably the HiiL Justice accelerator in The Hague in 2005 (2004 when we take into account a 1 year lead time). The distinct treatment effect could be an indicator that much of the Secondary sectors, which are largely

[2] This changes to a bandwidth of [249:7798] when we do not take into account the severe negative CTE of PortXL to secondary sectors. Not taking into account PortXL Secondary Sectors would shift the expected CTE of an SSP in Rotterdam from a net unknown to an expected net positive effect.

TABLE 6: Cumulative Treatment Effects – Rotterdam SSPs

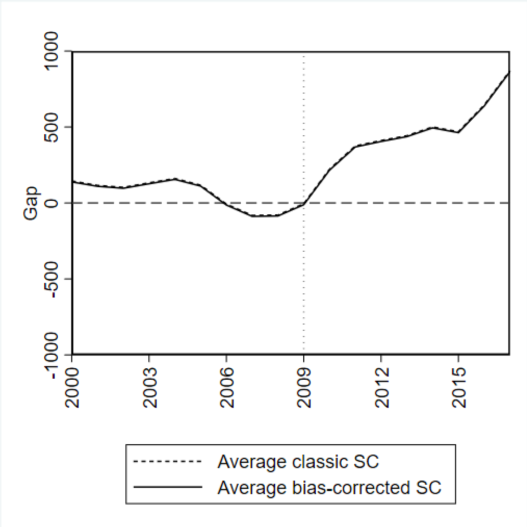
NAME	TREATMENT YEAR	ORIGINAL CTE	BIAS-CORRECTED CTE	RMSPE
EMCI (Primary)	2011	3935	3885	107.26
EMCI (Secondary)	2011	249	246	3.21
PortXL (Primary)	2011	8080	7990	657.63
PortXL (Secondary)	2011	-17760	-17928	1143.18
ECE (Primary)	2011	8743	8675	241.51
ECE (Secondary)	2011	2856	2779	1349.57
BlueCity (Primary)	2011	10645	10567	3059.92
BlueCity (Secondary)	2011	7798	7703	1414.14
Combined CTE	-	*31.403 // -6857*	*-31.117 // -7200*	-

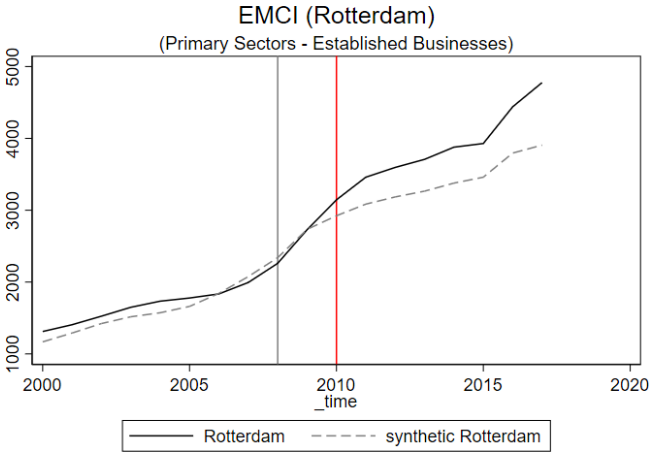
Note: The CTE indicates the number of firms that would have been founded in excess of the treated trend since the treatment year in the municipality that the SSP was founded in. Negative effects indicate that there would have been more firms in the treated municipality if the SSP was not founded. The cumulative effects are based on the SC and BCSC gaps, which are provided in Appendix IV. As outlined previously, due to all SSPs in Table 6 being introduced into the same municipality (Rotterdam), we have taken the treatment year of 2010, which is a one year lead-time on the founding of the earliest SSPs (BlueCity and EMCI) to eliminate cross-contamination between the SSP CTEs. The values in the 'combined CTE' row denote the summed CTE for the Primary // Secondary sectors using the OCTE or BCCTE.

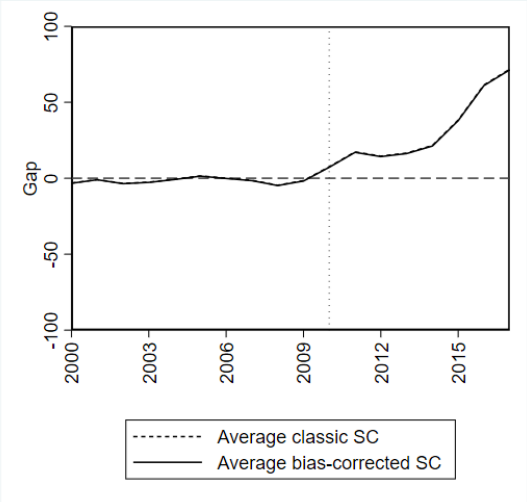
business services, moved to The Hague in anticipation of the founding of the HiiL Justice Accelerator. This could also explain the distinct negative effect of PortXL among secondary sectors: if the SSP is not able to attract sufficient attention to warrant firm entry in the secondary sectors, these secondary sector firm are liable to move to different municipalities.

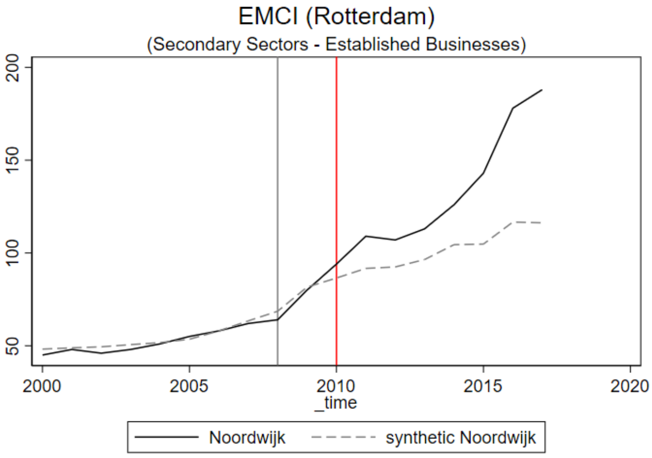
Overall, the conclusion presented under section 5.1.1 that specialised niches (EMCI / BlueCity) perform better than generalised niches (ECE) seems to hold. There is a clear post-treatment effect for the specialised SSPs, whereas the more general SSP more clearly shows an effect in secondary, indirectly treated sectors.

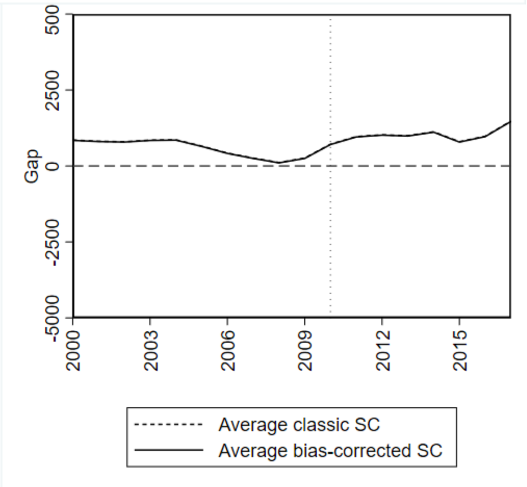
An important note is the fact that the RMSPE is very high for several SSPs. An SSP of these magnitudes can indicate a poor model fit. The remainder of this analysis will take the RMSPE into account when assessing potential effects of SSP introduction.

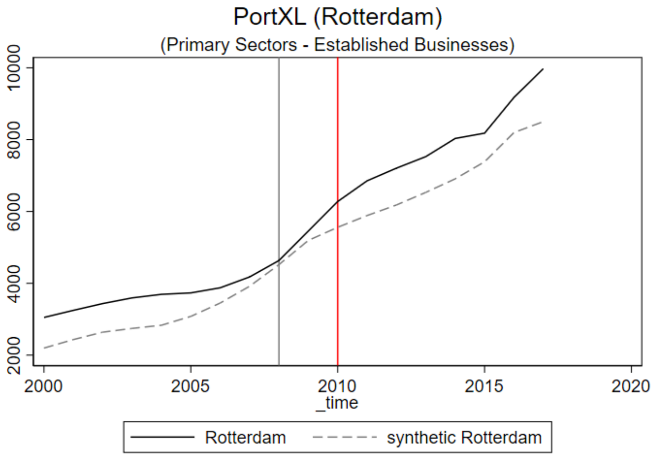

Gap
1000
500
0
-500
-1000
2000
2003
2006
2009
2012
2015
Average classic SC
Average bias-corrected SC

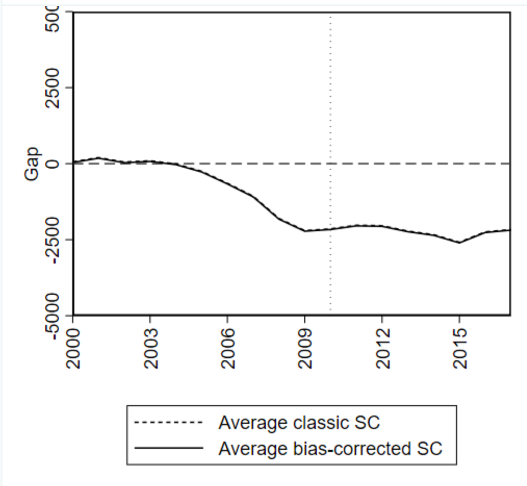

EMCI (Rotterdam)
(Primary Sectors - Established Businesses)
5000
4000
3000
2000
1000
2000
2005
2010
_time
2015
2020
Rotterdam
synthetic Rotterdam

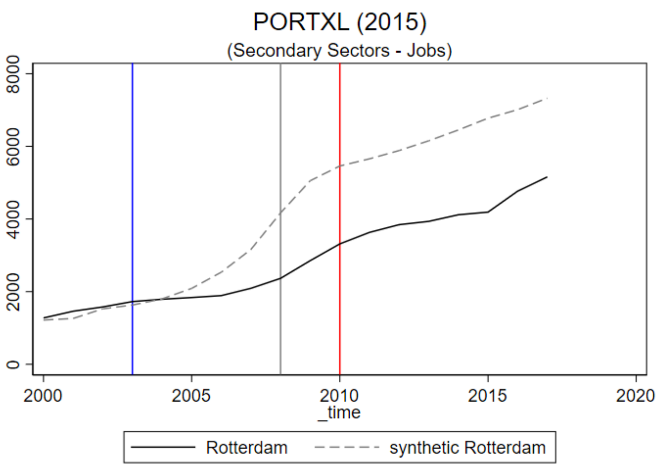

Gap
100
50
0
-50
-100
2000
2003
2006
2009
2012
2015
Average classic SC
Average bias-corrected SC

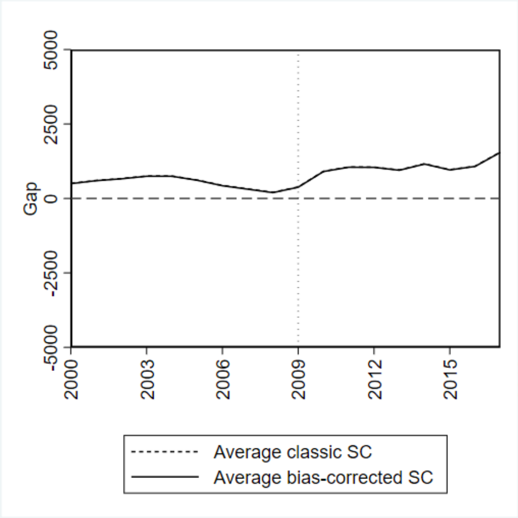

EMCI (Rotterdam)
(Secondary Sectors - Established Businesses)
200
150
100
50
2000
2005
2010
_time
2015
2020
Noordwijk
synthetic Noordwijk

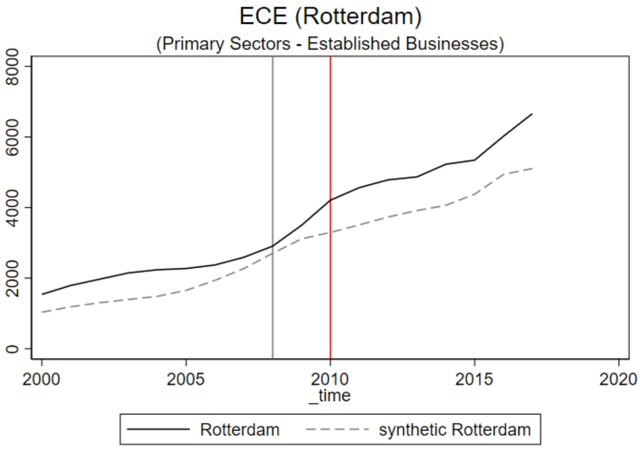

Gap
500
2500
0
-2500
-5000
2000
2003
2006
2009
2012
2015
Average classic SC
Average bias-corrected SC

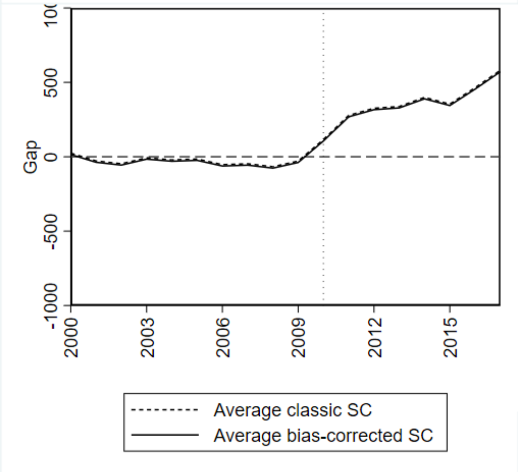

PortXL (Rotterdam)
(Primary Sectors - Established Businesses)
10000
8000
6000
4000
2000
2000
2005
2010
_time
2015
2020
Rotterdam
synthetic Rotterdam

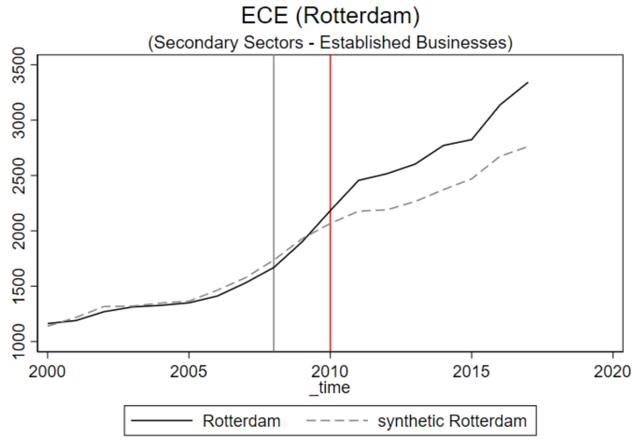

Gap
2500
0
-2500
-5000
2000
2003
2006
2009
2012
2015
Average classic SC
Average bias-corrected SC

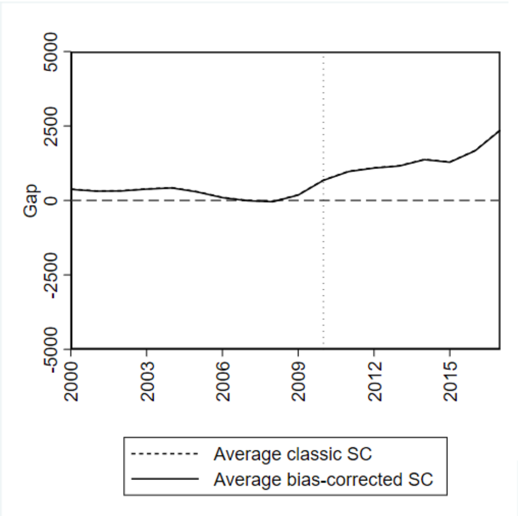

PORTXL (2015)
(Secondary Sectors - Jobs)
8000
6000
4000
2000
0
2000
2005
2010
_time
2015
2020
Rotterdam
synthetic Rotterdam

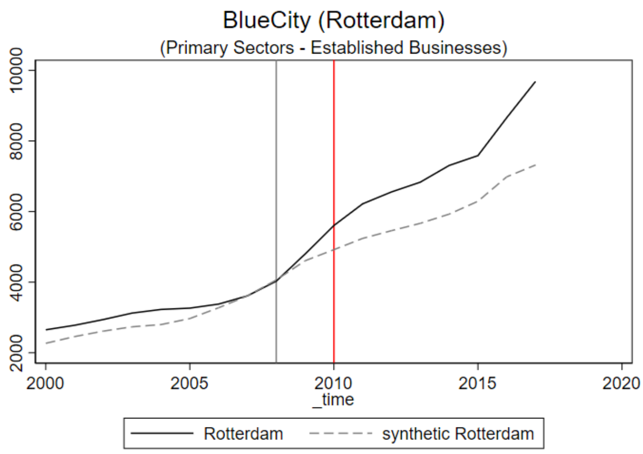

Gap
Average classic SC
Average bias-corrected SC

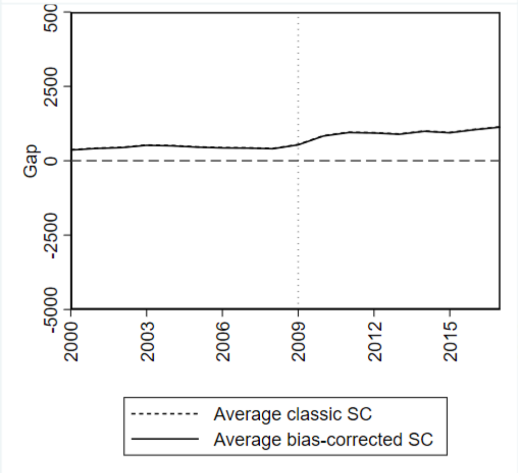

ECE (Rotterdam)
(Primary Sectors - Established Businesses)
_time
Rotterdam
synthetic Rotterdam

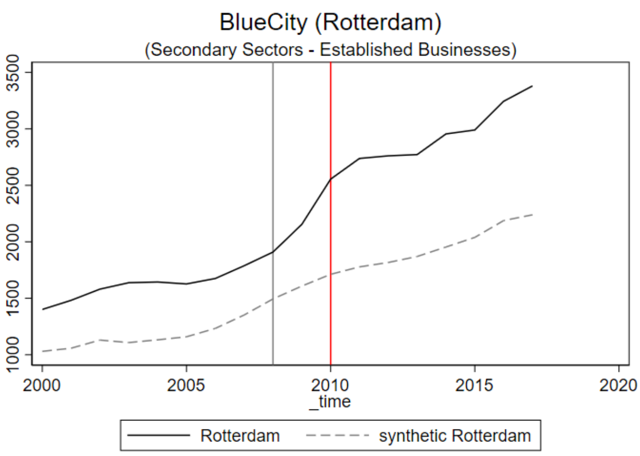

Gap
Average classic SC
Average bias-corrected SC


ECE (Rotterdam)
(Secondary Sectors - Established Businesses)
_time
Rotterdam
synthetic Rotterdam


Gap
Average classic SC
Average bias-corrected SC


BlueCity (Rotterdam)
(Primary Sectors - Established Businesses)
_time
Rotterdam
synthetic Rotterdam


Gap
Average classic SC
Average bias-corrected SC


BlueCity (Rotterdam)
(Secondary Sectors - Established Businesses)
_time
Rotterdam
synthetic Rotterdam

Subsection 5.2 – Critical Assessment of Rigidity Tests

To attempt a falsification of the above-mentioned results, we follow the rigidity test methodology proposed in subsection 4.3. The results of both the in-time and in-place rigidity tests are presented in appendices V and VI respectively.

Table 7 shows the result of the In-Time Placebo test. Based on these findings, we can conclude that the majority of the results of the in-time placebo support the specification of the original models. In the case of the primary sector trends for PortXL and Crosspring and both BCL trends, the falsifications highlight the tendency of the effects to average back out to neutral over time. Only the secondary sectors for BCL shift from a neutral to a clear negative treatment effect. This neutral impact over time seems to be supported by the original models, which show a much lower treatment effect outcome over time for older SSPs. A more expansive would be required to test the assumption that SSPs only temporarily disbalance the equilibrium growth rate of firms in a municipality, after which the growth rate adjusts back to equilibrium levels over time.

TABLE 7: In-Time Placebo outcomes

SSP Name	Sectors	In-Time Placebo outcome	Outcome Change Specification
BCL	*Primary*	Falsified	Positive to Neutral
BCL	*Secondary*	Falsified	Neutral to Negative
Crosspring	*Primary*	Falsified	Negative to Neutral
Crosspring	*Secondary*	Supported	-
YesDelft!	*Primary*	Unclear	Trend gap too wide to assess effect
YesDelft!	*Secondary*	Supported	-
ESA BIC	*Primary*	Supported	-
ESA BIC	*Secondary*	Supported	-
WSF	*Primary*	Supported	-
WSF	*Secondary*	Supported	-
PortXL	*Primary*	Falsified	Positive to Neutral
PortXL	*Secondary*	Supported	-
ECE	*Primary*	Supported	-
ECE	*Secondary*	Supported	-
EMCI	*Primary*	Unclear	Trend gap too wide to assess effect
EMCI	*Secondary*	Supported	-
BlueCity	*Primary*	Supported	-
BlueCity	*Secondary*	Supported	-

Note: The basis for these assessments is presented in Appendix V. The model specification follows the methodology outlined in section 4.3 and more broadly, the specifications presented in section 4.1 and 4.2. A 'trend gap too wide to assess' indicates that the pre-treatment gap between the SC and treated trendlines is too wide to fulfil the pre-treatment consistency required for sound analysis. As such, it is neither possible to support nor to falsify the original model based on these in-time placebo graphs.

Table 8 shows the result of the in-space placebo test, which we use to test whether a given outcome is statistically different from assigning the treatment randomly to one of the donor pool municipalities. . From the in-place placebo test it follows that the majority of the models presented in subsection 5.1 are falsified by the in-place placebo specification of the SC models. If we overlap the findings from both the in-time and in-place placebo, we see that both methods of falsification support statistical inference based on the findings of the primary sectors for WSF and EMCI and the secondary sectors for Crosspring and ECE.

TABLE 8: In-Place Placebo outcomes

	Primary Sectors		Secondary Sectors	
SSP	**P-Value**	**Outcome**	**P-Value**	**Outcome**
BCL	*0.64*	*Falsified*	*0.88*	*Falsified*
Crosspring	*0.36*	*Falsified*	*0.06**	*Accepted*
YesDelft	*0.40*	*Falsified*	*0.84*	*Falsified*
ESA BIC	*0.14*	*Falsified*	*0.22*	*Falsified*
WSF	*0.10**	*Accepted*	*0.80*	*Falsified*
BlueCity	*0.09*	*Falsified*	*0.29*	*Falsified*
EMCI	*0.06**	*Accepted*	*0.29*	*Falsified*
ECE	*0.61*	*Falsified*	*0.03***	*Accepted*
PortXL	*0.41*	*Falsified*	*0.96*	*Falsified*

Note: table 8 presents the p-values following from the in-space placebo test. Columns 2 and 4 present the p-values for the primary and secondary treated sectors respectively, whilst columns 3 and 5 present the interpretation of that P-value for the associated SC model. The first column presents the SSP that served as the treatment. All values are calculated in accordance with the methodology of subsection 4.3.2 and rounded down to two decimal points. Significant results are indicated by a * for the 0.1, ** for the 0.05 and *** for the 0.01 levels of significance.

This is especially valuable as it provides an interpretable result for both a secondary and a primary sector outcome for both Rotterdam and the smaller Municipalities.

Although the remaining results are insignificant, we can still draw the conclusion that the introduction of an SSP does not seem to be statistically effective in changing the number of firms active in their treated region to a different degree than other municipalities.[3] This can be seen as consistent with the literature provided earlier, tying the success or failure of an SSP to local cultural factors as much as the framework of the individual SSP (Andersson & Koster, 2010; Caliendo & Künn, 2011).

Looking at the significant result, the 2x2 outcome matrix of Table 9 can be created based on the observed trends. It is important to note that the heterogeneity observed in the treatment effects of the original model and the characteristics of individual municipalities would stand in the way of obtaining a generalised conclusion on the effect of SSP establishment on the number of active firms. However, for the South-Holland context, which has a limited geographical scope, it is not unreasonable to list a series of general observations that seem applicable to this specific context.

TABLE 9: Effect of treatment on firm stock by sector and municipal group

	Primary Sector	**Secondary Sectors**
Non-Rotterdam	Increase*	Decrease*
Rotterdam	Increase*	Increase**

*Note: The above findings combine the found CTE for the SSPs from Table 5 and 6 with a significant In-Space placebo outcome from Table 8 and support from the In-Time placebo outcome of Table 7. The treatment effect is noted as either an increase in the firm stock over time after treatment or a decrease in the firm stock in this same period. P-values are noted as *=P≤0.1, **=P≤0.05, ***=P≤0.01.*

The establishment of an SSP increased the firm stock for primary and secondary treated sectors in a large urban environment (Rotterdam), while only increasing the stock for primary sectors in smaller municipalities. This 'size effect' has been noted before and is consistent with available literature (Pettersson et al., 2011; Rupasingha & Goetz, 2011; Westlund & Olsson, 2011).

The decrease in secondary sectors in non-Rotterdam (smaller) municipalities can be partially explained by clustering of these (support) sectors in larger urban areas. Business services, financial firms and other such secondary activity requires a large and stable basis of client firms, which is not necessarily found in smaller municipalities. This seems consistent

[3] Although the trends are mostly robust to an in-time shift of the treatment, the effect is not statistically different from a 'random' assignment to any of the other municipalities. This indicates that whilst the *trendlines* may be correctly estimated (relatively stable to time-shifts), the probability of obtaining a *similar or larger effect* from any other municipality is high. When we take the aim of an SSP to be supporting the unique ecosystem of their host municipality, it should stand to reason that the effect should be similarly unique and as such, statistically different from the randomly allocated treatment to other municipalities.

with the *increase* found for secondary sectors in Rotterdam, which indicates that there is sufficient additional demand for these secondary services to warrant growth in these sectors.

The increase in primary sectors for both the Rotterdam an non-Rotterdam municipalities is consistent with the aim of an SSP and the available literature. The size difference between the two CTE's can be partially attributed to the earlier start date of the WSF and the limited size of the treated sector group for EMCI.

Subsection 5.3 – Hypothesis Testing

To turn to the primary research question, we now test the hypotheses formulated under subsection 3.5. It should be noted that the limited number of robust results might bias the findings and makes further inference based on the findings error-prone due to a lack of comparison units. As such, the answers and implications arising from the hypotheses below should be regarded carefully.

> *H1a: The treatment effect of SSPs in large urban municipalities is higher than the treatment effect of SSPs in smaller municipalities for primary sectors.*

When taking the mean of the CTE for both the WSF and EMCI primary sectors, we find a mean annual treatment effect MATE of between 3238 (SC) and 3259 (BCSC) firms for WSF between 656 (SC) and 648 (BCSC) for EMCI. On face value, this would indicate that the treatment effect for SSPs in large urban municipalities is higher than the treatment effect for smaller municipalities. If we adjust the MATE based on the size of the treated sector group[4], we find a MATE between 1050 (SC) and 1037 (BCSC) for EMCI. As the MATE is also smaller after we adjust for population size, the first hypothesis is accepted.

> *H1b: The treatment effect of SSPs in large urban municipalities is higher than the treatment effect of SSPs in smaller municipalities for secondary sectors.*

When taking the CTE for both Crosspring and ECE, we find a CTE of between -343 (SC) and -400 (BCSC) for Crosspring and a CTE of between 2856 (SC) and 2779 (BCSC). Due to the negative treatment effect for Crosspring, the treatment effect will always be smaller than for ECE, which means the second hypothesis is accepted.

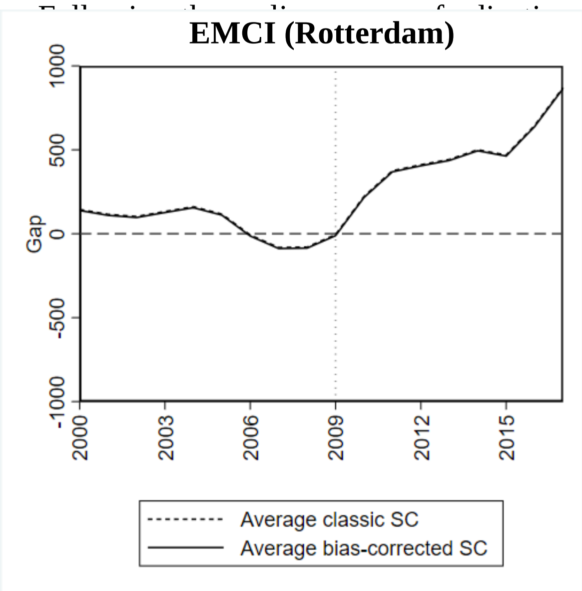
[4] The mean number of firms in the WSF treated group is 488. The mean number of firms in the EMCI treated group is 303. This returns an adjustment factor of 1.6, assuming that the treatment scales linearly with the size of the treated group.

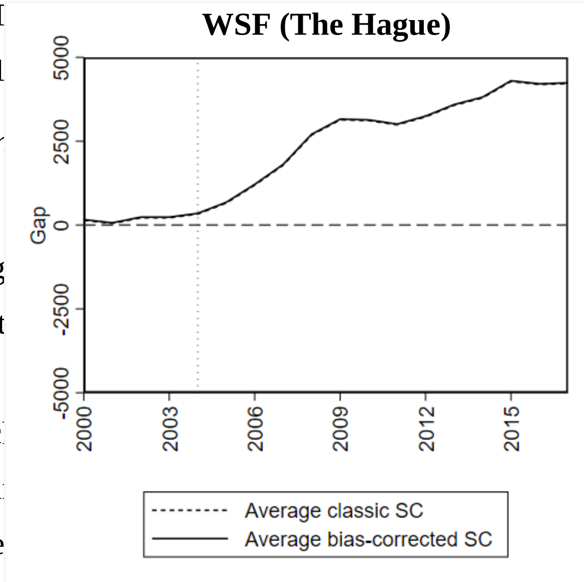
H3: Niche-focussed SSPs are more successful than general-focus SSPs in increasing the firm stock in their treated region.

In the above comparison, we take EMCI and Crosspring as niche-focussed SSPs because of their narrow band of treated sectors, whereas WSF and ECE are taken as general-focus SSPs.

the MAT
a and H1
not has ar

the gap g
n the next
effect of
firm stoc
cline in fi
might be e

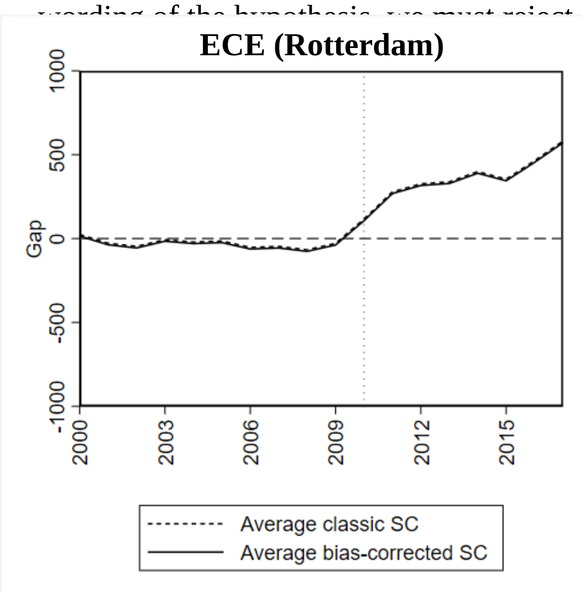


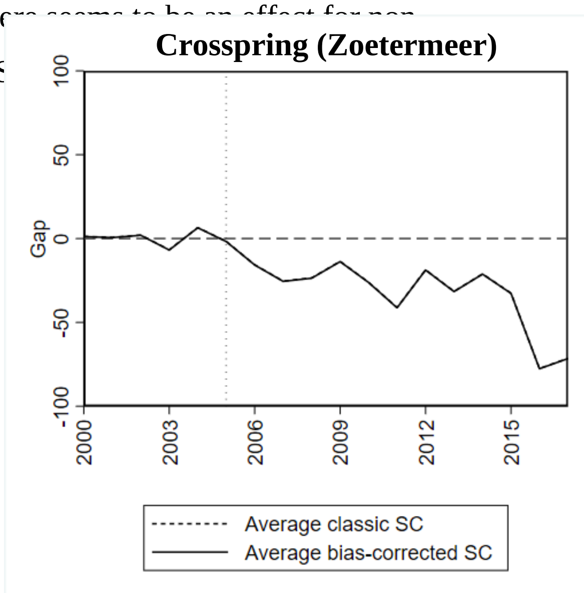


post-crisis for Rotterdam-based SSPs and pre-crisis for non-Rotterdam SSPs. Based on the

H4, as there seems to be an effect for non-

with an S





H5: There is an announcement effect of SSP establishment in other, non-treated municipalities, to the firm stock in treated municipalities prior to treatment.

Based on the in-time placebo test, we find no evidence to suggest an announcement effect from SSP establishment in a different municipality prior to the treatment in a given municipality. As such, this hypothesis is rejected.

H2a: The prevalence of several SSPs in a municipality does not create a crowding-out effect for primary sectors.

H2b: The prevalence of several SSPs in a municipality creates a crowding-out effect for secondary sectors.

Due to the limited significance of results in this analysis, a cross-comparison between municipalities with several SSPs and with only a single SSP for a given sector set, as well as the heterogeneity of treated sectors between the SSPs, we are unable to formally reject or accept hypotheses H2a and H2b.

Taking into account the non-significant findings, there does not seem to be a crowding out effect among primary sectors treated, which might be explained by the fact that the specific focus each SSP has will likely not overlap. If there *is* an overlap, it is expected that this will cause either or both of the SSPs to realign their focus to serve distinct areas.

This cannot be said for secondary sectors, which are only indirectly treated. As mentioned previously, the severe negative impact of PortXL on secondary sectors could be explained by crowding-out or saturation of the local economic ecosystem. When there are too many firms active in a given sector for a given ecosystem, the market share of each firm becomes too small to sustain revenues, which in turn will cause a decline in the number of firms. This decline can also be caused by over-specialisation as a result of SSP outcomes. If an economic ecosystem is becomes too specialised for general service providers because of innovation propelled by an SSP, the result is consolidation of service providers into niche firms. One such example may be found in the maritime insurance or legal markets, which are highly specialised and require specific knowledge assets to be carried out.

Based on these (not statistically significant) findings, it would be possible to provisionally reject H2a and accept H2b. To conclusively reject or accept either hypothesis, more research is required.

Section 6

Policy Review & Strategic Implications

The significant results in section 5 present the core implications of this analysis. To evaluate their impact on public policy and firm strategy, it is important to note the aim and object of a typical SSP within an economic ecosystem.

The typical SSP is founded to make sure the rate of innovation within an economic ecosystem is maintained and, if possible, increased, by providing a testbed and 'safe environment' for start-up companies to form their business and grow their innovative capacities. This environment is often supported by knowledge institutions and mentors from public and private actors, which help the individual participant firms. However, the goal of an SSP is not to ensure the survival of the participant firms, but rather the growth of what is deemed an economically advantageous niche in a given geographical area (in this case a municipality). As such, the success of an SSP hinges on the ability of the programme to increase the *firm stock* within their territory and to support continued growth beyond what would have been possible in the absence of the SSP.

As was shown in section 5, this analysis proposes that an SSP is a successful means of increasing the (innovative) firm stock in treated sectors in excess of the normal trend for a given municipality. On the surface, this would mean that SSPs are a successful tool in the policymakers toolbox. However, the lack of significant results in a majority of studied SSPs should caution policymakers in assuming an SSP will consistently perform well. Only 22% of SSPs in this analysis provided a statistically significant benefit to their chosen sectors. This indicates that an SSP is only effective under particular circumstances. As such ensuring that these conditions are met before an SSP is founded should become a cornerstone of policy design in this area going forward.

Due to the rise of ecosystems theory in economics, we now understand the importance of secondary or adjacent sectors in securing the economic health of a region. In this case, support from service sectors, which encompass nearly 7.4% of total employment in the Netherlands and are the largest sector by employment (CBS, 2021), is indispensable in ensuring the long-term survival of the firms that rely on the SSP to grow and innovate. For secondary sectors, we see a clear scale effect between large and small municipalities. This means that on the long term, policymakers in smaller municipalities wishing to grow their unique ecosystem must rely on larger, neighbouring municipalities. It is expected that this trend will necessitate increased cross-municipal cooperation, which might eventually lead to rising levels of agglomeration. It is important that policymakers do not neglect this cooperative aspect to SSP foundation.

On the side of the firm, the findings outlined above suggest the importance of selectivity when deciding on participation with an SSP. Firms that are expected to rely on support of secondary sectors after a successful SSP participation track will need to create cooperations with secondary sector firms in different cities at best, or will face relocation at worst. Incurring high costs for relocation and the possible loss of local spillover assets and cooperations should be weighed against the expected benefit of participation in an SSP. As with the founding of an SSP on the policy side, participating in an SSP as a firm is not always beneficial. Pre-participation research by the firm is therefore advised, in light of the above.

Section 7

Discussion & Future Research

This research has sought to study the effect of SSP foundation on the primary and secondary firm stock at a municipal level. The results and their appropriate rigidity testing is presented in section 5. To our knowledge, this is one of the first times the Synthetic Control Method has been implemented at the municipal level within the SCM literature, which has as expected caused several points of discussion arising from the methodology, the data underlying the analysis and the assessment of the results. Furthermore, as this research serves only as a first look into the efficacy of SSPs from an SCM model base, there are extensive possibilities for further research on this topic.

Subsection 7.1 – Discussion & Shortcomings

Of the shortcomings of this research, the primary one arises from the geographical scope. South Holland was chosen as the area of interest for this study, which constrains the number of municipalities available for the SC models. Expanding the scope to encompass the Netherlands or even the European Union at the municipal level is expected to yield more robust results if sufficient data can be gathered. This is especially true for Rotterdam, which is larger than the other municipalities in the sample. To counter this, we have agglomerated municipalities in the sample to approach Rotterdam's size, but it is expected that there remains some bias as a result of this transformation.

The chosen type of data, which is sectoral and at the municipal level, provides a level of aggregation which allows for detailed analysis. However, the availability of data of this type is severely limited and hard to find in the right specification if found. As such, the selection of variables in the analysis is as much based on relationships found in the literature as it is based on availability. This might cause bias arising from omitted factors, which could drastically alter the outcomes of the SCM, although we cannot provide an example of such a variable. Furthermore, the level of aggregation does not allow an assessment of the number of firms by size category, which limits the possibilities for analysis. A more detailed breakdown by size class would be ideal to assess the impact of SSPs in a more granular fashion.

With regards to methodological shortcomings, the availability of data for pre-treatment periods was very limited for some SSPs. This *may* cause a bias as a result of too short a lead-time in the SCM. Similarly, in some cases the limited availability of post-treatment data will bias the findings down, as some treatments will not yet be visible in the data. Future analyses should increase the time-period over which the analysis is conducted if possible, although the availability of data for these periods is uncertain.

We have assumed that treatment is geographically bounded and that there are no spillovers of treatment between municipalities. Whilst this is based on the literature provided, there is an argument to assume spillovers for secondary sectors, especially in small geographical areas such as South Holland. This may cause problems with the methodology and include an overestimation bias in the result, as firms 'treated' by an SSP in municipality A are counted in the treatment effect for an SSP in municipality B. Conversely, this may also cause an under-estimation for the effect in municipality A, which does not count firms outside their geographical boundary, but which are treated by its SSP. A future analysis might implement 'fuzzy border' catchment areas in a GIS framework to ensure a more accurate depiction of treatment areas.

A further shortcoming of this analysis pertains to labelling. Since this is the first such analysis to look at incubators and accelerators through an SC methodology, we have grouped all forms of incubator and accelerator into a single term (SSP). The individual characteristics of the programmes might heterogeneously influence the treatment effect, which currently isn't explicitly studied. A future study should differentiate between the different types of SSP, as well as differentiate the internal aspects that set an SSP apart from others (such as ties to financial institutions or knowledge hubs) that might increase their effectiveness.

A final shortcoming of this research, which is brought about by data availability, is found in the type of primary sectors treated and the region. The South Holland SSPs predominantly focus on (technological) innovation in their SSPs, which might bias the results when compared to non-technological incubation and acceleration. Furthermore, the characteristics of South Holland as one of the provinces with substantial economic means in the Netherlands should be taken into account, as a study of less economically productive regions or cities from such regions might yield different results.

Subsection 7.2 – Future Research

This research represents a first attempt at an assessment of SSP efficacy at the municipal level. In addition to research taking into account the shortcomings highlighted under 7.1 the literature review provides several angles of future research:

To review the impact of SSP establishment on *innovation* rather than the firm stock, it is suggested that using patent filings or citations in a given area might be an adequate proxy. This data can be aggregated to municipal-sectoral level and studied in a similar framework as the one operationalised in this analysis, which would provide an insight in the *impact* of SSP's, rather than just the output of SSP's and is more in line with the aim and object of this type of policy.

As mentioned before, incorporating a larger number of (internationally distanced) municipalities is expected to increase the usefulness of the analysis by providing more differently assessable SSPs. As a primary expansion to the current context, analysing the Antwerp and Hamburg region would be especially interesting, seeing the competition between these regions and the Rotterdam-Rijnmond region for maritime business. This scale can be increased to encompass the whole of Europe or beyond, if sufficient data is available.

Increasing the number of variables in the SCM, to also encompass cultural characteristics at a regional level, is proposed as a means of incorporating the non-quantitative side of start-up strategy. In an international setting, the Hofstede cultural dimensions might be an interesting baseline. Within this expanded context, a further breakdown of firms into individual elements of an ecosystem might allow for a more granular breakdown of effects among 'secondary sector' firms.

Regarding the post-analysis inference, a larger number of significant results would provide an interesting basis for assessing the *internal* aspects that are conducive to success among SSPs. By looking at aspects such as partnerships with financial service providers or knowledge institutions, the scope of findings would dramatically increase and the first steps towards a policy playbook for SSP implementation might be made.

Finally, the addition of individual, firm-level data, such as the level of R&D expenditure or revenues might allow the assessment of SSP foundation of individual firm strength. In this light, it is interesting to ask the question to what degree active incumbents are affected by an increase in available R&D knowledge through an SSP.

Overall, proposals for future avenues of research within the context of this analysis focus mainly on the expansion of the time-scope, the source data used and the aspect of SSP foundation studied. The quantitative analysis of the effect of SSPs in an ecosystem setting is promising and forms a logical next step in furthering the knowledge of economic ecosystems not just at a municipal, but also at a regional or national level.

Section 8
Conclusions

The economic ecosystem requires constant renewal and improvement to remain healthy. New firms enter and exit the ecosystems' many different subsectors and areas fluidly, reacting to market demands and the latest developments. Nowhere is this more visible then within the socio-economic transitions, such as the Energy Transion and the Digital Transformation. To stall in the attainment of these transition goals is to fall behind in an internationally competitive market, yet the technologies and innovations required to reach these goals are incredibly cost- and knowledge intensive. One of the main questions of modern economic policy is how to steer this renewal such that desired outcomes can be reached and specific target innovations can be realized.

As one of the first analyses to implement the Synthetic Control Method on municipal level SSPs, we have studied the impact of startup support policies (SSPs), proxied through incubator and accelerator foundation, on the firm stock within a municipal space. Looking at 50 municipalities within South Holland in the period between 2000 and 2017, we identify 9 different SSPs that try to increase the firm stock through incubation or acceleration.

We find significant results for only 2 out of 9 SSPs (22%) w.r.t. their primary treated sectors, indicating that the introduction of an SSP into a local economic ecosystem is not guaranteed to effectuate a desired change. In addition, we find that where SSPs *are* able to effectuate statistically significant change, the effect is not consistent between primary and secondary sectors. The firm stock in primary sectors increases as a result of SSP introduction, but with secondary sectors, the size of the host municipality plays an important role, with only large municipalities having a positive effect on the firm stock.

The results of this analysis can help policymakers in understanding the effect of SSPs on their local ecosystems and tests the assumption that SSPs are always beneficial. Additionally, it provides individual firms with the option to critically reflect on the desirability of participating in one SSP over the other. As a scientific exercise, this research takes a first step towards a quantitative, cross-municipal analysis of ecosystem-supporting policies such as accelerators and incubators by providing a broad overview of the current literature on the subject and implementing a (relatively) novel methodology to the municipal context.

In today's society of constant improvement, development and renewal, it pays to ask the question how to reach the goals of our combined future and to wonder: Who stands in defense of the new?

Section 9

Bibliography

Abadie, A. (2021). Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. *Journal of Economic Literature*, *59*(2), 391–425. https://doi.org/10.1257/jel.20191450

Abadie, A., Diamond, A., & Hainmueller, J. (2010). Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program. *Journal of the American Statistical Association*, *105*(490), 493–505. https://doi.org/10.1198/jasa.2009.ap08746

Abadie, A., Diamond, A., & Hainmueller, J. (2015). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, *59*(2), 495–510. https://doi.org/10.1111/ajps.12116

Abadie, A., & Gardeazabal, J. (2003). The Economic Costs of Conflict: A Case Study of the Basque Country. *The American Economic Review*, *93*(1), 113–132. https://doi.org/10.1257/000282803321455188

Abadie, A., & L'Hour, J. (2021). A Penalized Synthetic Control Estimator for Disaggregated Data. *Journal of the American Statistical Association*, *116*(536), 1817–1834. https://doi.org/10.1080/01621459.2021.1971535

Abi-Fadel, M., & Peeters, W. A. (2019). The Role of Incubators in the European New Space Economy. *New Space*, *7*(4), 201–207. https://doi.org/10.1089/space.2019.0035

Aharonson, B. S., Baum, J. a. C., & Feldman, M. P. (2007). Desperately seeking spillovers? Increasing returns, industrial organization and the location of new entrants in geographic and technological space. *Industrial and Corporate Change*, *16*(1), 89–130. https://doi.org/10.1093/icc/dtl034

Akehira, S. P., Alcantara, E., & Razmjoo, A. L. J. (2022). Competition and Innovation: The Rise of Startups and Its Effects Towards the Philippines Economy. *Journal of Economics, Finance and Accounting Studies*, *4*(1), 383–411. https://doi.org/10.32996/jefas.2022.4.1.24

Ali, A., Irfan, S., & Salman, Y. (2022). A Scientometric Analysis of University Business Incubators and Accelerators Based on 20 Year of Research. *Journal of Management and Research*, *9*(1). https://doi.org/10.29145/jmr/91/03

Alpenidze, O., Pauceanu, R. M., & Sanyal, S. (2019). Key Success Factors for Business Incubators in Europe: An Empirical Study. *Academy of Entrepreneurship Journal*, *25*(1), 1. https://www.abacademies.org/articles/Key-success-factors-for-business-incubators-in-europe-an-empirical-1528-2686-25-1-211.pdf

Amorós, J. E., Cristi, O., & Minniti, M. (2009). DRIVING FORCES BEHIND ENTREPRENEURSHIP: DIFFERENCES ON ENTREPRENEURSHIP RATE LEVEL AND ITS VOLATILITY ACROSS COUNTRIES. *Frontiers of Entrepreneurship Research*, *29*(16), 2. http://negocios.udd.cl/files/2010/10/DRIVING-FORCES-BEHIND-ENTREPRENEURSHIP.pdf

Andersson, M. (2013). Start-up rates, entrepreneurship culture and the business cycle: Swedish patterns from national and regional data. *Innovation and Entrepreneurship in the Global Economy*, 162–183. https://doi.org/10.4337/9781783477326.00015

Andersson, M., & Koster, S. (2010). Sources of persistence in regional start-up rates--evidence from Sweden. *Journal of Economic Geography*, *11*(1), 179–201. https://doi.org/10.1093/jeg/lbp069

Asongu, S. A., & Tchamyou, V. S. (2016). The impact of entrepreneurship on knowledge economy in Africa. *Journal of Entrepreneurship in Emerging Economies*, *8*(1), 101–131. https://doi.org/10.1108/jeee-08-2015-0045

Audretsch, D. B. (2007). Entrepreneurship capital and economic growth. *Oxford Review of Economic Policy*, *23*(1), 63–78. https://doi.org/10.1093/oxrep/grm001

Audretsch, D. B., & Keilbach, M. (2004). Entrepreneurship and regional growth: an evolutionary interpretation. *Journal of Evolutionary Economics*, *14*(5), 605–616. https://doi.org/10.1007/s00191-004-0228-6

Audretsch, D. B., & Keilbach, M. (2008). Resolving the knowledge paradox: Knowledge-spillover entrepreneurship and economic growth. *Research Policy*, *37*(10), 1697–1705. https://doi.org/10.1016/j.respol.2008.08.008

Audretsch, D. B., Keilbach, M., & Lehmann, E. (2015). The Knowledge Spillover Theory of Entrepreneurship and Technological Diffusion. *University Entrepreneurship and Technology Transfer*, 69–91. https://doi.org/10.1016/s1048-4736(05)16003-2

Audretsch, D. B., & Lehmann, E. E. (2005). Does the Knowledge Spillover Theory of Entrepreneurship hold for regions? *Research Policy*, *34*(8), 1191–1202. https://doi.org/10.1016/j.respol.2005.03.012

Audretsch, D. B., & Stephan, P. E. (1999). Knowledge spillovers in biotechnology: sources and incentives. *Journal of Evolutionary Economics*, *9*(1), 97–107. https://doi.org/10.1007/s001910050076

Ayandibu, A. O., & Houghton, J. (2017). The role of Small and Medium Scale Enterprise in local economic development (LED). *Journal of Business and Retail Management Research*, *11*(2). https://jbrmr.com/cdn/article_file/i-26_c-262.pdf

Banerji, D., & Reimer, T. (2019). Startup founders and their LinkedIn connections: Are well-connected entrepreneurs more successful? *Computers in Human Behavior*, *90*, 46–52. https://doi.org/10.1016/j.chb.2018.08.033

Barboza, G., & Capocchi, A. (2020). Innovative startups in Italy. Managerial challenges of knowledge spillovers effects on employment generation. *Journal of Knowledge Management*, *24*(10), 2573–2596. https://doi.org/10.1108/jkm-08-2019-0436

Battistella, C., De Toni, A. F., & Pessot, E. (2017). Open accelerators for start-ups success: a case study. *European Journal of Innovation Management*, *20*(1), 80–111. https://doi.org/10.1108/ejim-10-2015-0113

Baughn, C. C., & Neupert, K. (2003). Culture and national conditions facilitating entrepreneurial start-ups. *Journal of International Entrepreneurship*, *1*(3), 313–330. https://doi.org/10.1023/a:1024166923988

Becker, B., & Gassmann, O. (2006). Gaining leverage effects from knowledge modes within corporate incubators. *R and D Management*, *36*(1), 1–16. https://doi.org/10.1111/j.1467-9310.2005.00411.x

Benedetti-Fasil, C., Sedláček, P., & Sterk, V. (2022). Startups and employment following the COVID-19 pandemic: a calculator. *Economic Policy*, *37*(111), 507–533. https://doi.org/10.1093/epolic/eiac028

Ben-Michael, E., Feller, A., & Rothstein, J. (2021). The Augmented Synthetic Control Method. *Journal of the American Statistical Association*. https://doi.org/10.3386/w28885

Bernstein, S., Townsend, R., & Xu, T. (2020). Flight to Safety: How Economic Downturns Affect Talent Flows to Startups. *NBER Working Paper Series*. https://doi.org/10.3386/w27907

Beugelsdijk, S., & Noorderhaven, N. (2004). Entrepreneurial attitude and economic growth: A cross-section of 54 regions. *The Annals of Regional Science*, *38*(2), 199–218. https://doi.org/10.1007/s00168-004-0192-y

Bikker, J. A., & Van Der Linde, D. (2016). Scale economies in local public administration. *Local Government Studies*, *42*(3), 441–463. https://doi.org/10.1080/03003930.2016.1146139

Bliemel, M., Flores, R., De Klerk, S., & Miles, M. P. (2018). Accelerators as start-up infrastructure for entrepreneurial clusters. *Entrepreneurship & Regional Development*, *31*(1–2), 133–149. https://doi.org/10.1080/08985626.2018.1537152

Bliemel, M. J., Flores, R. G., De Klerk, S., Miles, M. P. P., Costa, B., & Monteiro, P. (2016). The Role and Performance of Accelerators in the Australian Startup Ecosystem. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2826317

Blom-Hansen, J., Houlberg, K., Serritzlew, S., & Treisman, D. (2016). Jurisdiction Size and Local Government Policy Expenditure: Assessing the Effect of Municipal Amalgamation. *American Political Science Review*, *110*(4), 812–831. https://doi.org/10.1017/s0003055416000320

Boadway, R., & Tremblay, J. F. (2003). Public Economics and Startup Entrepreneurs. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.385781

Bone, J., Gonzalez-Uribe, J., Haley, C., & Lahr, H. (2019). The impact of business accelerators and incubators in the UK. *BEIS Research Papers*, 2019/009. https://www.gov.uk/government/publications/the-impact-of-business-accelerators-and-incubators-in-the-uk

Burton, M. D., Dahl, M. S., & Sorenson, O. (2017). Do Start-ups Pay Less? *ILR Review*, *71*(5), 1179–1200. https://doi.org/10.1177/0019793917747240

Butz, H., & Mrożewski, M. J. (2021). The Selection Process and Criteria of Impact Accelerators. An Exploratory Study. *Sustainability*, *13*(12), 6617. https://doi.org/10.3390/su13126617

Caliendo, M., & Künn, S. (2011). Start-up subsidies for the unemployed: Long-term evidence and effect heterogeneity. *Journal of Public Economics*, *95*(3–4), 311–331. https://doi.org/10.1016/j.jpubeco.2010.11.003

Canovas-Saiz, L., March-Chordà, I., & Yagüe-Perales, R. M. (2021). A quantitative-based model to assess seed accelerators' performance. *Entrepreneurship &Amp; Regional Development*, *33*(3–4), 332–352. https://doi.org/10.1080/08985626.2021.1872941

Carlino, G., & Drautzburg, T. (2020). The role of startups for local labor markets. *Journal of Applied Econometrics*, *35*(6), 751–775. https://doi.org/10.1002/jae.2783

Carree, M. A., & Thurik, A. R. (2010). The Impact of Entrepreneurship on Economic Growth. *Handbook of Entrepreneurship Research*, 557–594. https://doi.org/10.1007/978-1-4419-1191-9_20

Centraal Bureau voor de Statistiek. (2021). *Werkgelegenheidsstructuur*. Centraal Bureau Voor De Statistiek. https://www.cbs.nl/nl-nl/visualisaties/dashboard-arbeidsmarkt/banen-werkgelegenheid/toelichtingen/werkgelegenheidsstructuur#:~:text=De%20zakelijke%20dienstverlening%20(inclusief%20uitzendkrachten,4%20miljoen%20banen%20in%202021.

Chengappa, L., & Geibel, R. (2014). What European Incubators Can Learn From Their American Counterparts： An Analysis of the Critical Success Factors for a Startup Incubator. *Tourism Hospitality Management*, *2*(1), 40–47. https://www.semanticscholar.org/paper/What-European-Incubators-Can-Learn-From-Their-An-of-Chengappa-Geibel/1d6a644558f2451ef32735774b02431b82a94196

Cohen, M. A., Eliasberg, J., & Ho, T. H. (1996). New Product Development: The Performance and Time-to-Market Tradeoff. *Management Science*, *42*(2), 173–186. https://doi.org/10.1287/mnsc.42.2.173

Cohen, S. (2013). What Do Accelerators Do? Insights from Incubators and Angels. *Innovations: Technology, Governance, Globalization*, *8*(3–4), 19–25. https://doi.org/10.1162/inov_a_00184

Cohen, S., Fehder, D. C., Hochberg, Y. V., & Murray, F. (2019). The design of startup accelerators. *Research Policy*, *48*(7), 1781–1797. https://doi.org/10.1016/j.respol.2019.04.003

Cohen, S., & Hochberg, Y. V. (2014). Accelerating Startups: The Seed Accelerator Phenomenon. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2418000

Colombelli, A. (2016). The impact of local knowledge bases on the creation of innovative start-ups in Italy. *Small Business Economics*, *47*(2), 383–396. https://doi.org/10.1007/s11187-016-9722-0

Cooper, A. C., Gimeno-Gascon, F., & Woo, C. Y. (1994). Initial human and financial capital as predictors of new venture performance. *Journal of Business Venturing*, *9*(5), 371–395. https://doi.org/10.1016/0883-9026(94)90013-2

Crișan, E. L., Salanță, I. I., Beleiu, I. N., Bordean, O. N., & Bunduchi, R. (2019). A systematic literature review on accelerators. *The Journal of Technology Transfer*, *46*(1), 62–89. https://doi.org/10.1007/s10961-019-09754-9

Cumming, D. (2007). Government policy towards entrepreneurial finance: Innovation investment funds. *Journal of Business Venturing*, *22*(2), 193–235. https://doi.org/10.1016/j.jbusvent.2005.12.002

Dasgupta, P., & Stiglitz, J. (1980). Uncertainty, Industrial Structure, and the Speed of R&D. *The Bell Journal of Economics*, *11*(1), 1. https://doi.org/10.2307/3003398

Davari, A., & Farokhmanesh, T. (2017). Impact of entrepreneurship policies on opportunity to startup. *Management Science Letters*, 431–438. https://doi.org/10.5267/j.msl.2017.6.003

De Andrade Lima, R. C., & Da Mota Silveira Neto, R. (2018). Secession of municipalities and economies of scale: Evidence from Brazil. *Journal of Regional Science*, *58*(1), 159–180. https://doi.org/10.1111/jors.12348

Del Sarto, N., Isabelle, D. A., & Di Minin, A. (2020). The role of accelerators in firm survival: An fsQCA analysis of Italian startups. *Technovation*, *90–91*, 102102. https://doi.org/10.1016/j.technovation.2019.102102

Deller, S., Whitacre, B., & Conroy, T. (2021). Rural broadband speeds and business startup rates. *American Journal of Agricultural Economics*, *104*(3), 999–1025. https://doi.org/10.1111/ajae.12259

Dellermann, D., Lipusch, N., Ebel, P., Popp, K. M., & Leimeister, J. M. (2017). Finding the Unicorn: Predicting Early Stage Startup Success Through a Hybrid Intelligence Method. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3159123

Dempwolf, C., Auer, J., & D'Ippolito, M. (2013). Innovation accelerators: Defining characteristics among startup assistance organizations. *Small Business Administration*, *10*. https://www.academia.edu/download/63818493/rs425-Innovation-Accelerators-Report-FINAL20200703-84782-1qyfnur.pdf

Dempwolf, C., Auer, J., & D'Ippolito, M. (2014). Innovation Accelerators: Defining Characteristics Among Startup Assistance Organizations. *Small Business Administration*. https://doi.org/10.13140/RG.2.2.36244.09602

Dent, R. C., Karahan, F., Pugsley, B., & Şahin, A. (2016). The Role of Startups in Structural Transformation. *American Economic Review*, *106*(5), 219–223. https://doi.org/10.1257/aer.p20161053

Doblinger, C., Surana, K., & Anadon, L. D. (2019). Governments as partners: The role of alliances in U.S. cleantech startup innovation. *Research Policy*, *48*(6), 1458–1475. https://doi.org/10.1016/j.respol.2019.02.006

Dollery, B., Byrnes, J., & Crase, L. (2008). Australian Local Government Amalgamation: A Conceptual Analysis of Population Size and Scale Economies in Municipal Service Provision. *The Australasian Journal of Regional Studies*, *14*(2), 167. http://www.anzrsai.org/assets/Uploads/PublicationChapter/262-Dolleryetal2.pdf

Dollery, B., & Fleming, E. (2006). A Conceptual Note on Scale Economies, Size Economies and Scope Economies in Australian Local Government. *Urban Policy and Research*, *24*(2), 271–282. https://doi.org/10.1080/08111140600704111

Dube, A., & Zipperer, B. (2015). Pooling Multiple Case Studies Using Synthetic Controls: An Application to Minimum Wage Policies. *Social Science Research Network*. https://doi.org/10.2139/ssrn.2589786

Fehder, D. C., & Hochberg, Y. V. (2014). Accelerators and the Regional Supply of Venture Capital Investment. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2518668

Fehder, D. C., & Hochberg, Y. V. (2019). Spillover effects of startup accelerator programs: evidence from venture-backed startup activity. *(Self Published)*. http://yael-hochberg.com/assets/portfolio/FH.pdf

Ferman, B., & De Xavier Pinto, C. C. (2021). Synthetic controls with imperfect pretreatment fit. *Quantitative Economics*, *12*(4), 1197–1221. https://doi.org/10.3982/qe1596

Fernández, M. T. F., Santos, J. L., & Jiménez, F. J. B. (2019). Performance of business incubators and accelerators according to the regional entrepreneurship ecosystem in Spain. *Investigaciones Regionales - Journal of Regional Research*, *43*, 41–56. https://dialnet.unirioja.es/servlet/articulo?codigo=7058522

Freeman, J., & Engel, J. S. (2007). Models of Innovation: Startups and Mature Corporations. *California Management Review*, *50*(1), 94–119. https://doi.org/10.2307/41166418

Galbraith, B., McAdam, R., & Cross, S. E. (2021). The Evolution of the Incubator: Past, Present, and Future. *IEEE Transactions on Engineering Management*, *68*(1), 265–271. https://doi.org/10.1109/tem.2019.2905297

Galindo, M. N., & Méndez, M. T. (2014). Entrepreneurship, economic growth, and innovation: Are feedback effects at work? *Journal of Business Research*, *67*(5), 825–829. https://doi.org/10.1016/j.jbusres.2013.11.052

García, M. G., Castillo, A. C., & Nicholls, J. F. G. (2019). Speeding up ventures - a bibliometric analysis of start-up accelerators. *International Journal of Intellectual Property Management*, *9*(3/4), 230. https://doi.org/10.1504/ijipm.2019.103027

Gartner, W., Starr, J., & Bhat, S. (1999). Predicting new venture survival. *Journal of Business Venturing*, *14*(2), 215–232. https://doi.org/10.1016/s0883-9026(97)00063-3

Giraudo, E., Giudici, G., & Grilli, L. (2019). Entrepreneurship policy and the financing of young innovative companies: Evidence from the Italian Startup Act. *Research Policy*, *48*(9), 103801. https://doi.org/10.1016/j.respol.2019.05.010

Goel, R. K., & Saunoris, J. W. (2017). DYNAMICS OF KNOWLEDGE SPILLOVERS FROM PATENTS TO ENTREPRENEURSHIP: EVIDENCE ACROSS ENTREPRENEURSHIP TYPES. *Contemporary Economic Policy*, *35*(4), 700–715. https://doi.org/10.1111/coep.12224

Gonzalez-Uribe, J., & Leatherbee, M. (2017). The Effects of Business Accelerators on Venture Performance: Evidence from Start-Up Chile. *The Review of Financial Studies*, *31*(4), 1566–1603. https://doi.org/10.1093/rfs/hhx103

Gries, T., & Naudé, W. (2009). Entrepreneurship and regional economic growth: towards a general theory of start-ups. *Innovation: The European Journal of Social Science Research*, *22*(3), 309–328. https://doi.org/10.1080/13511610903354877

Harhoff, D. (1999). Firm Formation And Regional Spillovers - Evidence From Germany. *Economics of Innovation and New Technology*, *8*(1–2), 27–55. https://doi.org/10.1080/10438599900000003

Harris, W. L., & Wonglimpiyarat, J. (2019). Start-Up Accelerators and Crowdfunding to Drive Innovation Development. *The Journal of Private Equity*, *23*(1), 124–136. https://doi.org/10.3905/jpe.2019.1.091

Hausberg, J. P., & Korreck, S. (2018). Business incubators and accelerators: a co-citation analysis-based, systematic literature review. *The Journal of Technology Transfer*, *45*(1), 151–176. https://doi.org/10.1007/s10961-018-9651-y

Henrekson, M., & Davidsson, P. (2007). Determinants of the Prevalence of Start-Ups and High-Growth Firms. *Social Science Research Network*. https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID998263_code48420.pdf?abstractid=998263&mirid=5

Hochberg, Y. V. (2016). Accelerating Entrepreneurs and Ecosystems: The Seed Accelerator Model. *Innovation Policy and the Economy*, *16*, 25–51. https://doi.org/10.1086/684985

Hölttä-Otto, K., Otto, K., & Luo, J. (2013). Innovation differences between new venture startups and incumbent firms. *DS 75-3: Proceedings of the 19th International Conference on Engineering Design (ICED13) Design for Harmonies, Vol. 3: Design Organisation and Management, Seoul, Korea 19-22.08.2013*, 277–286.

Horrell, M., & Litan, R. E. (2010). After Inception: How Enduring is Job Creation by Startups? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1657121

Hottenrott, H., & Richstein, R. (2020). Start-up subsidies: Does the policy instrument matter? *Research Policy*, *49*(1), 103888. https://doi.org/10.1016/j.respol.2019.103888

Jackson, P., Richter, N., & Schildhauer, T. (2018). How Established Firms Can Profit from Working with Startups. *Entrepreneurial Innovation and Leadership*, 87–97. https://doi.org/10.1007/978-3-319-71737-1_8

Kaiser, U., & Müller, B. (2015). Skill heterogeneity in startups and its development over time. *Small Business Economics*, *45*(4), 787–804. https://doi.org/10.1007/s11187-015-9667-8

Kane, T. J. (2010). The Importance of Startups in Job Creation and Job Destruction. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1646934

Ko, C., & An, J. (2019). Success Factors of Student Startups in Korea: From Employment Measures to Market Success. *Asian Journal of Innovation and Policy*, *8*(1), 97–121. https://doi.org/10.7545/ajip.2019.8.1.097

Kohler, T. (2016). Corporate accelerators: Building bridges between corporations and startups. *Business Horizons*, *59*(3), 347–357. https://doi.org/10.1016/j.bushor.2016.01.008

Konyuhov, V. Y., Gladkih, A. M., & Zott, R. S. (2020). Accelerator as an effective replacement of a business incubator in the Irkutsk region. *Journal of Physics: Conference Series*, *1582*(1), 012045. https://doi.org/10.1088/1742-6596/1582/1/012045

Korunka, C., Kessler, A., Frank, H., & Lueger, M. (2010). Personal characteristics, resources, and environment as predictors of business survival. *Journal of Occupational and Organizational Psychology*, *83*(4), 1025–1051. https://doi.org/10.1348/096317909x485135

Kumar, R. (2017). *Targeted SME Financing and Employment Effects: What do we know and what can we do differently?* World Bank Group. https://openknowledge.worldbank.org/handle/10986/27477?locale-attribute=en

Kupp, M., Marval, M., & Borchers, P. (2017). Corporate accelerators: fostering innovation while bringing together startups and large firms. *Journal of Business Strategy*, *38*(6), 47–53. https://doi.org/10.1108/jbs-12-2016-0145

Lall, S., Bowles, L., & Baird, R. (2013). Bridging the "Pioneer Gap": The Role of Accelerators in Launching High-Impact Enterprises. *Innovations: Technology, Governance, Globalization*, *8*(3–4), 105–137. https://doi.org/10.1162/inov_a_00191

Lange, G. S., & Johnston, W. J. (2020). The value of business accelerators and incubators – an entrepreneur's perspective. *Journal of Business &Amp; Industrial Marketing*, *35*(10), 1563–1572. https://doi.org/10.1108/jbim-01-2019-0024

Leitão, J., Pereira, D., & Gonçalves, N. (2022). Business Incubators, Accelerators, and Performance of Technology-Based Ventures: A Systematic Literature Review. *Journal of Open Innovation: Technology, Market, and Complexity*, *8*(1), 46. https://doi.org/10.3390/joitmc8010046

Lendrem, D. W., & Lendrem, B. C. (2014). The development speed paradox: can increasing development speed reduce R&D productivity? *Drug Discovery Today*, *19*(3), 209–214. https://doi.org/10.1016/j.drudis.2013.09.002

Li, C., Ahmed, N., Qalati, S. A., Khan, A., & Naz, S. (2020). Role of Business Incubators as a Tool for Entrepreneurship Development: The Mediating and Moderating Role of Business Start-Up and Government Regulations. *Sustainability*, *12*(5), 1822. https://doi.org/10.3390/su12051822

Lohithaksha, L., Chengappa, C., Richard, R., & Geibel, G. (2014). What European Incubators Can Learn From Their American Counterparts： An Analysis of the Critical Success Factors for a Startup Incubator. *Journal of Tourism and Hospitality Management*, *2*(1), 2328–2169.

Lukeš, M., Longo, M. C., & Zouhar, J. (2019). Do business incubators really enhance entrepreneurial growth? Evidence from a large sample of innovative Italian start-ups. *Technovation, 82–83,* 25–34. https://doi.org/10.1016/j.technovation.2018.07.008

Lukosiute, K., Jensen, S., & Tanev, S. (2019). Is Joining a Business Incubator or Accelerator Always a Good Thing? *Technology Innovation Management Review*, *7*(10), 5–15. https://doi.org/10.22215/timreview/1251

Luo, X., Zhou, L., & Liu, S. S. (2005). Entrepreneurial firms in the context of China's transition economy: an integrative framework and empirical examination. *Journal of Business Research, 58*(3), 277–284. https://doi.org/10.1016/s0148-2963(03)00159-0

Madaleno, M., Nathan, M., Overman, H. G., & Waights, S. (2018). Incubators, Accelerators and Regional Economic Development. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3261715

Malo, P., Eskelinen, J., Zhuo, X., & Kuosmanen, T. (2020). Computing Synthetic controls using bilevel optimisation. *Munich Personal RePEC Archive*, (Working paper no. 104085). https://mpra.ub.uni-muenchen.de/104085/1/MPRA_paper_104085.pdf

Matějová, L., Nemec, J., Křápek, M., & Klimovský, D. (2017). Economies of Scale on the Municipal Level: Fact or Fiction in the Czech Republic? *Nispacee Journal of Public Administration and Policy, 10*(1), 39–59. https://doi.org/10.1515/nispa-2017-0002

Mejia, J., & Gopal, A. (2018). The Long-term Effects of a Short-term Helping Hand: Software Startups in Accelerators. *International Conference on Information Systems*. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1366&context=icis2018

Melcangi, D., & Turen, J. (2021). Subsidizing startups under imperfect information. *Federal Reserve Bank of New York Staff Report, 995*. http://hdl.handle.net/10419/262045

Miller, P., & Bound, K. (2011). The Startup Factories - The Rise of Accelerator Programmes to support new technology ventures. *NESTA*. http://www.eban.org/wpcontent/uploads/2014/09/14.-StartupFactories-The-Rise-of-Accelerator-Programmes.pdf

Mungila Hillemane, B. S. (2020). Technology business incubators in India: what determines their R&D contributions to the national economy? *International Journal of Innovation Science*, *12*(4), 385–408. https://doi.org/10.1108/ijis-03-2020-0020

Murphy, O. (2018). Coworking Spaces, Accelerators and Incubators: Emerging Forms of Museum Practice in an Increasingly Digital World. *Museum International*, *70*(1–2), 62–75. https://doi.org/10.1111/muse.12193

Murtinu, S. (2021). The government whispering to entrepreneurs: Public venture capital, policy shifts, and firm productivity. *Strategic Entrepreneurship Journal*, *15*(2), 279–308. https://doi.org/10.1002/sej.1374

Nagaoka, S. (2007). Assessing the R&D Management of a Firm in Terms of Speed and Science Linkage: Evidence from the US Patents. *Journal of Economics &Amp; Management Strategy*, *16*(1). https://doi.org/10.1111/j.1530-9134.2007.00135.x

Newell, R., Newman, L., & Mendly-Zambo, Z. (2021). The Role of Incubators and Accelerators in the Fourth Agricultural Revolution: A Case Study of Canada. *Agriculture*, *11*(11), 1066. https://doi.org/10.3390/agriculture11111066

Nicholls-Nixon, C. L., & Valliere, D. (2019). A Framework for Exploring Heterogeneity in University Business Incubators. *Entrepreneurship Research Journal*, *0*(0). https://doi.org/10.1515/erj-2018-0190

OECD & EC. (2019). Policy brief on incubators and accelerators that support inclusive entrepreneurship. *OECD SME and Entrepreneurship Papers*. https://doi.org/10.1787/d7d81c23-en

Ojaghi, H., Mohammadi, M., & Yazdani, H. R. (2019). A synthesized framework for the formation of startups' innovation ecosystem. *Journal of Science and Technology Policy Management*, *10*(5), 1063–1097. https://doi.org/10.1108/jstpm-07-2018-0071

Patanakul, P., & Pinto, J. K. (2014). Examining the roles of government policy on innovation. *The Journal of High Technology Management Research*, *25*(2), 97–107. https://doi.org/10.1016/j.hitech.2014.07.003

Pauwels, C., Clarysse, B., Wright, M., & Van Hove, J. (2016). Understanding a new generation incubation model: The accelerator. *Technovation*, *50–51*, 13–24. https://doi.org/10.1016/j.technovation.2015.09.003

Petkovska, M. T., Daniloska, N., Boshkolova, D., Petkovski, V., & Majstoroska, J. (2019). Government institutional support for fostering SMEs innovation in Western Balkan countries. *Economic Development Journal of the Institute of Economics*. http://hdl.handle.net/20.500.12188/8352

Petkovski, V., Boskovska, Daniloska, & Mirchevska, T. P. (2019). Government institutional support for fostering SMEs innovation in Western Balkan countries. *Economic Development*, *3*, 9–19. https://www.researchgate.net/publication/349379895_Government_institutional_support_for_fostering_SMEs_innovation_in_Western_Balkan_countries

Pettersson, L., Widell, L. M., & Sjölander, P. (2011). Do startups in the agricultural sector generate employment in the rest of the economy? : An arellano-bond dynamic panel study. *Social Capital and Development Trends in Rural Areas*, 255–273.

Pisoni, A., & Onetti, A. (2018). When startups exit: comparing strategies in Europe and the USA. *Journal of Business Strategy*, *39*(3), 26–33. https://doi.org/10.1108/jbs-02-2017-0022

Pustovrh, A., Jaklič, M., Bole, D., & Zupan, B. (2019). How to Create a Successful Regional Startup Ecosystem: A Policy-making Analysis. *Lex Localis*, *17*(3), 747–768. https://doi.org/10.4335/17.3.747-768(2019

Qian, H., Haynes, K. E., & Riggle, J. D. (2011). Incubation Push or Business Pull? Investigating the Geography of U.S. Business Incubators. *Economic Development Quarterly*, *25*(1), 79–90. https://doi.org/10.1177/0891242410383275

Radojevich-Kelley, N., & Hoffman, D. L. (2012). Analysis of Accelerator Companies: An Exploratory Case Study of Their Programs, Processes, and Early Results. *Small Business Institute Journal*, *8*(2), 54–70. https://www.sbij.org/index.php/SBIJ/article/download/136/93

Richter, N., Jackson, P., & Schildhauer, T. (2018). Entrepreneurial Behaviour and Startups: The Case of Germany and the USA. *Entrepreneurial Innovation and Leadership*, 1–14. https://doi.org/10.1007/978-3-319-71737-1_1

Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses* (1st Edition). Currency.

Rodriguez, P. L., Tuggle, C. K., & Hackett, S. F. (2009). An Exploratory Study of How Potential "Family and Household Capital" Impacts New Venture Start-Up Rates. *Family Business Review*, *22*(3), 259–272. https://doi.org/10.1177/0894486509335342

Román, C., Congregado, E., & Millán, J. M. (2013). Start-up incentives: Entrepreneurship policy or active labour market programme? *Journal of Business Venturing*, *28*(1), 151–175. https://doi.org/10.1016/j.jbusvent.2012.01.004

Roper, S., & Scott, J. B. (2009). Perceived Financial Barriers and the Start-up Decision. *International Small Business Journal*, *27*(2), 149–171. https://doi.org/10.1177/0266242608100488

Roure, J. B., & Keeley, R. H. (1990). Predictors of success in new technology based ventures. *Journal of Business Venturing*, *5*(4), 201–220. https://doi.org/10.1016/0883-9026(90)90017-n

Rupasingha, A., & Goetz, S. J. (2011). Self-employment and local economic performance: Evidence from US counties*. *Papers in Regional Science*, no-no. https://doi.org/10.1111/j.1435-5957.2011.00396.x

Salamoun, R., & Azad, B. (2017). Role of Innovation Incubators and Accelerators in Alleviating the Refugee Crisis. *Americas Conference on Information Systems*. http://dblp.uni-trier.de/db/conf/amcis/amcis2017.html#SalamounA17

Samila, S., & Sorenson, O. (2011). Venture Capital, Entrepreneurship, and Economic Growth. *Review of Economics and Statistics*, *93*(1), 338–349. https://doi.org/10.1162/rest_a_00066

Sansone, G., Andreotti, P., Colombelli, A., & Landoni, P. (2020). Are social incubators different from other incubators? Evidence from Italy. *Technological Forecasting and Social Change*, *158*, 120132. https://doi.org/10.1016/j.techfore.2020.120132

Sanyal, S., & Wamique Hisam, M. W. H. (2018). The Role of Business Incubators in Creating an Entrepreneurial Ecosystem: A Study of the Sultanate of Oman. *Indian Journal of Commerce &Amp; Management Studies*, *IX*(3), 09. https://doi.org/10.18843/ijcms/v9i3/02

Savoie, M. L., Bendickson, J. S., & Edwards, C. J. (2018). Embedding MBA Students in Local Incubators and Accelerators. *Entrepreneurship Education and Pedagogy*, *1*(3), 243–257. https://doi.org/10.1177/2515127418779974

Selig, C. J., Gasser, T., & Baltes, G. H. (2018). How Corporate Accelerators Foster Organizational Transformation: An Internal Perspective. *2018 IEEE International*

Conference on Engineering, Technology and Innovation (ICE/ITMC). https://doi.org/10.1109/ice.2018.8436287

Serrano, C. J., & Ziedonis, R. (2019). How Redeployable are Patent Assets? Evidence from Failed Startups. *Academy of Management Proceedings*, *2019*(1), 15631. https://doi.org/10.5465/ambpp.2019.260

Serwatka, A. (2018). Accelerators for Startups in Europe. *Copernican Journal of Finance &Amp; Accounting*, *7*(1), 67. https://doi.org/10.12775/cjfa.2018.005

Singh, V. K. (2020). Policy and Regulatory Changes for a Successful Startup Revolution: Experiences from the Startup Action Plan in India. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3635930

Skala, A. (2018). The Startup as a Result of Innovative Entrepreneurship. *Digital Startups in Transition Economies*, 1–40. https://doi.org/10.1007/978-3-030-01500-8_1

Soukopová, J., Nemec, J., Matějová, L., & Struk, M. (2014). Municipality Size and Local Public Services: Do Economies of Scale Exist ? *Nispacee Journal of Public Administration and Policy*, *7*(2), 151–171. https://doi.org/10.2478/nispa-2014-0007

Spender, J. C., Corvello, V., Grimaldi, M., & Rippa, P. (2017). Startups and open innovation: a review of the literature. *European Journal of Innovation Management*, *20*(1), 4–30. https://doi.org/10.1108/ejim-12-2015-0131

Stagars, M. (2014). Incubators and Accelerators. In *University Startups and Spin-offs* (pp. 131–136). Apress. https://link.springer.com/chapter/10.1007/978-1-4842-0623-2_13

Stayton, J., & Mangematin, V. (2018). Seed accelerators and the speed of new venture creation. *The Journal of Technology Transfer*, *44*(4), 1163–1187. https://doi.org/10.1007/s10961-017-9646-0

Stel, A. V., Carree, M., & Thurik, R. (2005). The Effect of Entrepreneurial Activity on National Economic Growth. *Small Business Economics*, *24*(3), 311–321. https://doi.org/10.1007/s11187-005-1996-6

Susilo, D. (2020). Scalable start-up entrepreneurship and local economic development in emerging economies. *Applied Economics Journal*, *27*(2). https://www.researchgate.net/publication/344311413_Scalable_Start-up_Entrepreneurship_and_Local_Economic_Development_in_Emerging_Economies

Torun, M. (2016). Business Accelerators and Their Differences from Incubators. *Multincubadora*. https://www.researchgate.net/publication/311810125_Business_Accelerators_and_Their_Differences_from_Incubators

Tripathi, N., & Oivo, M. (2020). The Roles of Incubators, Accelerators, Co-working Spaces, Mentors, and Events in the Startup Development Process. *Fundamentals of Software Startups*, 147–159. https://doi.org/10.1007/978-3-030-35983-6_9

Tsvetkova, A., Partridge, M., & Betz, M. (2018). Self-employment effects on regional growth: a bigger bang for a buck? *Small Business Economics*, *52*(1), 27–45. https://doi.org/10.1007/s11187-018-9988-5

Van Der Panne, G., Van Beers, C., & Kleinknecht, A. (2003). Success and Failure of Innovation: A Literature Review. *International Journal of Innovation Management*, *07*(03), 309–338. https://doi.org/10.1142/s1363919603000830

Vekic, A., & Borocki, J. (2017). The role of institutions in supporting startup companies. In *XVII International Scientific Conference on Industrial Systems* (17th ed.). University of Novi Sad. https://www.iim.ftn.uns.ac.rs/is17/papers/89.pdf

Wahyuni, A. I., & Noviaristanti, S. (2022). Startup Characteristics and The Role of Business Incubators in Indonesia. *Indonesian Journal of Business and Entrepreneurship*. https://doi.org/10.17358/ijbe.8.2.251

Waters, L., McCabe, M., Kiellerup, D., & Kiellerup, S. (2003). The Role of Formal Mentoring on Business Success and Self-esteem in participants of a new business start-up program. *Journal of Business and Psychology*, *17*(1). https://link.springer.com/article/10.1023/A:1016252301072#citeas

Westlund, H., & Olsson, A. (2011). Economic Entrepreneurship, Startups and Their Effects on Local Development: The Case of Sweden. In *Congress of the European Regional Science Association: "New Challenges for European Regions and Urban Areas in a Globalised World* (51st ed.). European Regional Science Association. http://hdl.handle.net/10419/119982

Wiltshire, J. C. (2022). *allsynth: (Stacked) Synthetic Control Bias-Correction Utilities for Stata — Justin C. Wiltshire*. Justin C. Wiltshire Personal Website. https://justinwiltshire.com/allsynth-stacked-synthetic-control-biascorrection-utilities-for-stata

Wise, S., & Valliere, D. (2014). The Impact on Management Experience on the Performance of Start-Ups within Accelerators. *The Journal of Private Equity*, *18*(1), 9–19. https://doi.org/10.3905/jpe.2014.18.1.009

Woolley, J. L., & MacGregor, N. (2021). The Influence of Incubator and Accelerator Participation on Nanotechnology Venture Success. *Entrepreneurship Theory and Practice*, *46*(6), 1717–1755. https://doi.org/10.1177/10422587211024510

Wu, J. J., & Atkinson, R. D. (2017). How technology-based start-ups support US economic growth. *Information Technology & Innovation Foundation*.

https://itif.org/publications/2017/11/28/how-technology-based-start-ups-support-us-economic-growth/

Yang, S., Kher, R., & Lyons, T. S. (2018). Where Do Accelerators Fit in the Venture Creation Pipeline? Different Values Brought by Different Types of Accelerators. *Entrepreneurship Research Journal*, *8*(4). https://doi.org/10.1515/erj-2017-0140

Yin, B., & Luo, J. (2018). How Do Accelerators Select Startups? Shifting Decision Criteria Across Stages. *IEEE Transactions on Engineering Management*, *65*(4), 574–589. https://doi.org/10.1109/tem.2018.2791501

Zhang, M., & Yin, X. (2012). The Effect of R&D Alliances on the Speed of Innovation: Evidence from Chinese SMEs. *Physics Procedia*, *25*, 1155–1161. https://doi.org/10.1016/j.phpro.2012.03.213

APPENDIX I – SBI Codes

TABLE 4: Sectors treated by studied SSPs

SSP Name	Primary Sectors	Secondary Sectors
BCL	6420, 7211, 8690, 7112, 7022, 2014, 3250, 4638, 6202, 4646	6209, 6430, 6491, 6492, 6619, 6910, 6920, 7010, 7020, 7219, 7220, 7810, 7820, 7830, 8211, 8219, 8291, 8299
Crosspring	6201, 6202, 4531, 4677, 5812, 6619, 6611, 5819, 6430, 8622, 6312, 7022	6491, 6492, 6910, 6920, 7010, 7211, 7219, 7220, 7810, 7820, 7830, 8211, 8219, 8291, 8299
YesDelft	7211, 7219, 7220, 7112, 7120, 6312, 6311, 6201, 6202, 2899, 2891, 2892, 2896, 2811, 2814, 2813, 2814, 2825, 2829, 2830, 2651, 2660, 2670, 2680, 2630, 2720	6209, 6430, 6491, 6492, 6619, 6910, 6920, 7010, 7020, 7810, 7820, 7830, 8211, 8219, 8291, 8299
ESA BIC	7211, 7219, 6201, 6202, 7022, 2651, 161, 2751, 6311, 4646, 6130, 4110	6202, 6209, 6430, 6491, 6492, 6619, 6910, 6920, 7010, 7020, 7211, 7219, 7220, 7810, 7820, 7830, 8211, 8219, 8291, 8299
WSF	4120, 4110, 6312, 6209, 7219, 6201, 4616, 7022, 6399, 9499, 8299	6202, 6430, 6491, 6492, 6619, 6910, 6920, 7010, 7020, 7211, 7219, 7220, 7810, 7820, 7830, 8211, 8219, 8291
BlueCity	7211, 2014, 6420, 6202, 5610, 7022, 6420, 7111, 7112, 7410, 4329, 6420, 7022, 7410, 4672, 1089, 1310, 5610, 4791, 3299, 4643, 7219, 9499, 7112, 5621, 1105, 3832, 0113, 7740	6209, 6430, 6491, 6492, 6619, 6910, 6920, 7010, 7020, 7220, 7810, 7820, 7830, 8211, 8219, 8291, 8299
EMCI	6420, 7211, 8690, 7112, 7022, 2014, 3250, 4638, 6202, 4646	6209, 6430, 6491, 6492, 6619, 6910, 6920, 7010, 7020, 7219, 7220, 7810, 7820, 7830, 8211, 8219, 8291, 8299
ECE	1820, 7022, 6201, 7740, 6312, 6420, 4791, 7211, 7820, 5912, 5911	6202, 6209, 6430, 6491, 6492, 6619, 6910, 6920, 7010, 7020, 7219, 7220, 7810, 7830, 8211, 8219, 8291, 8299
PortXL	6311, 7211, 7120, 6201, 7219, 7112, 2811, 4312, 2651, 7219, 7490, 2015, 3600, 3512, 7219, 3315, 7112, 3511, 5224, 2811, 7490, 3011, 7022, 2899, 7112, 2651, 7740, 3500, 5829, 6201, 7022, 3299, 7120, 7112, 2899, 6202, 7112, 4669, 2899, 8559, 5229, 5221, 5224, 3320, 6420, 4321, 6202, 2899, 4791	7211, 7219, 6201, 6202, 7022, 2651, 161, 2751, 6311, 4646, 6130, 4110

Note: Table 4 provides an overview of the exact SBI codes used in the current research. The SBI-codes follow the SBI08 // NACE coding system: the first two digits indicate the main sector, with the third and fourth digit providing a further specification. All primary sectors were derived from the portfolio (current and past) of the SSPs as displayed on the web address associated with the SSP. Secondary sectors were compiled from a source-list based on their applicability, with individual sectors being removed from the 'secondary' group if they were also incorporated in the primary treatment group.

APPENDIX II – Control Group Weights

TABLE A2.1: Weights assigned to countries in the control group (Non-Rotterdam SSPs)

	PRIMARY SECTORS					SECONDARY SECTORS				
Municipality	**ESA BIC**	**Crosspri ng**	**WSF**	**BCL**	**YesDelft**	**ESA BIC**	**Crosspri ng**	**WSF**	**BCL**	**YesDelft**
Alblasserdam	0	0	0	0	0	0	0.06	0	0.13	0
Alphen aan den Rijn	0	0.11	0	0	0	0	0.53	0	0	0
Barendrecht	0.01	0	0	0	0	0	0	0	0	0
Brielle	0	0	0	0	0	0.22	0	0	0	0
Capelle aan den IJssel	0	0.30	0.13	0.74	0	0.06	0	0	0	0
Dordrecht	0	0	0	0	0	0	0	0	0.77	0.01
Gorinchem	0	0	0	0	0	0	0	0	0	0
Gouda	0	0	0	0	0	0	0	0	0	0
's-Gravenhage	0	0.08	0	0.19	0	0	0	0	0	0
Hardinxveld-Giessendam	0.01	0.14	0	0.07	0	0	0.08	0	0	0
Hellevoetsluis	0.12	0	0	0	0	0.19	0	0	0	0
Hendrik-Ido-Ambacht	0	0	0	0	0	0	0.02	0	0	0
Hillegom	0.01	0	0	0	0	0.01	0	0	0	0
Katwijk	0	0	0	0	0	0	0	0	0	0
Krimpen aan den IJssel	0	0	0	0	0	0	0	0	0	0
Leiden	0	0	0	0	0.57	0	0	0	0	0.23
Leiderdorp	0	0	0	0	0	0	0	0	0	0
Lisse	0	0	0	0	0	0	0	0	0	0
Maassluis	0.39	0	0	0	0	0	0	0	0	0
Nieuwkoop	0	0	0	0	0	0	0	0	0.01	0
Noordwijk	0.01	0	0	0	0	0.01	0	0	0	0
Oegstgeest	0	0	0	0	0	0.04	0	0	0	0
Papendrecht	0	0	0	0	0	0	0	0	0	0
Ridderkerk	0	0	0	0	0	0	0	0	0	0

Note: Table 2.1.1 shows the weights assigned to each municipality in the synthetic control group for non-Rotterdam SSPs. All municipalities in the analysis are shown at the left-hand side of the table, ordered according to their governmental municipality code (not printed here). The columns show the weights assigned to the municipalities for the SSP under analysis. The columns are separated into the primary (treated) sectors and the secondary (indirectly treated) sectors for ease of reference. All value weights are obtained in accordance with section 4.2 and rounded to two decimal points. Due to rounding, the combined weight of all used municipalities might not sum to one. The findings presented in section 5 were derived using more specific weights than those shown here as a result of rounding.

TABLE A2.1 [Cont'd]: Weights assigned to countries in the control group (Non-Rotterdam SSPs)

	PRIMARY SECTORS					SECONDARY SECTORS				
Municipality	ESA BIC	Crosspring	WSF	BCL	YesDelft	ESA BIC	Crosspring	WSF	BCL	YesDelft
Rotterdam	0	0	0.87	0	0.26	0	0	0.85	0.09	0
Rijswijk	0	0	0	0	0	0	0.01	0	0	0
Schiedam	0	0	0	0	0	0	0	0	0	0.44
Sliedrecht	0	0	0	0	0	0	0.15	0	0	0
Albrandswaard	0.08	0	0	0	0	0	0	0	0	0
Westvoorne	0.16	0	0	0	0	0.02	0	0	0	0
Vlaardingen	0	0	0	0	0	0	0	0	0	0
Voorschoten	0	0	0	0	0	0.36	0	0	0	0.21
Waddinxveen	0	0	0	0	0	0	0	0	0	0
Wassenaar	0.04	0	0	0	0	0	0	0	0	0
Zoetermeer	0	0	0	0	0	0	0	0.15	0	0
Zoeterwoude	0.05	0	0	0	0	0	0	0	0	0
Zwijndrecht	0	0	0	0	0	0	0	0	0	0
Teylingen	0.12	0	0	0	0	0	0	0	0	0
Lansingerland	0	0	0	0	0	0	0	0	0	0
Westland	0	0	0	0	0.17	0	0	0	0	0.11
Midden-Delfland	0.00	0	0	0	0	0.04	0	0	0	0
Kaag en Braassem	0	0	0	0	0	0	0	0	0	0
Zuidplas	0	0	0	0	0	0	0	0	0	0
Bodegraven-Reeuwijk	0	0	0	0	0	0	0	0	0	0
Leidschendam-Voorburg	0	0	0	0	0	0	0	0	0	0
Goeree-Overflakkee	0.01	0.05	0	0	0	0.00	0	0	0	0
Pijnacker-Nootdorp	0	0.32	0	0	0	0	0	0	0	0
Nissewaard	0.01	0	0	0	0	0.04	0.15	0	0	0
Krimpenerwaard	0	0	0	0	0	0	0	0	0	0

Note: Table A2.1 shows the weights assigned to each municipality in the synthetic control group for the Non-Rotterdam SSPs. All municipalities in the analysis are shown at the left-hand side of the table, ordered according to their governmental municipality code (not printed here). The columns show the weights assigned to the municipalities for the SSP under analysis. The columns are separated into the primary (treated) sectors and the secondary (indirectly treated) sectors for ease of reference. All value weights are obtained in accordance with section 4.2 and rounded to two decimal points. Due to rounding, the combined weight of all used municipalities might not sum to one. The findings presented in section 5 were derived using more specific weights than those shown here as a result of rounding.

TABLE A2.2: Weights assigned to countries in the control group (Rotterdam SSPs)

	Primary Sectors				Secondary Sectors			
Municipalities	PortXL	ECE	EMCI	BlueCity	PortXL	ECE	EMCI	BlueCity
Regio Drechtsteden	0.17	0	0.27	0	0.08	0.19	0	0
Agglomeratie Den Haag	0.83	1.00	0.73	1.00	0.92	0.81	0	1.00
Noord Zuid-Holland	0	0	0	0	0	0	0	0
Capelle aan den IJssel	0	0	0	0	0	0	0	0
Gorinchem	0	0	0	0	0	0	0	0
Hellevoetsluis	0	0	0	0	0	0	0.06	0
Hillegom	0	0	0	0	0	0	0	0
Krimpen aan den IJssel	0	0	0	0	0	0	0	0
Leiderdorp	0	0	0	0	0	0	0	0
Lisse	0	0	0	0	0	0	0.01	0
Noordwijk	0	0	0	0	0	0	0	0
Oegstgeest	0	0	0	0	0	0	0.00	0
Rijswijk	0	0	0	0	0	0	0	0
Schiedam	0	0	0	0	0	0	0	0
Albrandswaard	0	0	0	0	0	0	0	0
Westvoorne	0	0	0	0	0	0	0	0

Note: Table A2.2 shows the weights assigned to each municipality in the synthetic control group for the Rotterdam SSPs. All municipalities in the analysis are shown at the left-hand side of the table, ordered according to their governmental municipality code (not printed here). The columns show the weights assigned to the municipalities for the SSP under analysis. The columns are separated into the primary (treated) sectors and the secondary (indirectly treated) sectors for ease of reference. All value weights are obtained in accordance with section 4.2 and rounded to two decimal points. Due to rounding, the combined weight of all used municipalities might not sum to one. The findings presented in section 5 were derived using more specific weights than those shown here.

TABLE A2.2 [Cont'd]: Weights assigned to countries in the control group (Rotterdam SSPs)

	Primary Sectors				**Secondary Sectors**			
Municipalities	PortXL	ECE	EMCI	BlueCity	PortXL	ECE	EMCI	BlueCity
Vlaardingen	0	0	0	0	0	0	0.08	0
Voorschoten	0	0	0	0	0	0	0	0
Zoeterwoude	0	0	0	0	0	0	0.54	0
Teylingen	0	0	0	0	0	0	0	0
Lansingerland	0	0	0	0	0	0	0.13	0
Westland	0	0	0	0	0	0	0	0
Midden-Delfland	0	0	0	0	0	0	0.11	0
Kaag en Braassem	0	0	0	0	0	0	0	0
Zuidplas	0	0	0	0	0	0	0	0
Leidschendam-Voorburg	0	0	0	0	0	0	0	0
Goeree-Overflakkee	0	0	0	0	0	0	0	0
Pijnacker-Nootdorp	0	0	0	0	0	0	0.04	0
Nissewaard	0	0	0	0	0	0	0.02	0
Krimpenerwaard	0	0	0	0	0	0	0	0

Note: Table A2.2 shows the weights assigned to each municipality in the synthetic control group for the Rotterdam SSPs. All municipalities in the analysis are shown at the left-hand side of the table, ordered according to their governmental municipality code (not printed here). The columns show the weights assigned to the municipalities for the SSP under analysis. The columns are separated into the primary (treated) sectors and the secondary (indirectly treated) sectors for ease of reference. All value weights are obtained in accordance with section 4.2 and rounded to two decimal points. Due to rounding, the combined weight of all used municipalities might not sum to one. The findings presented in section 5 were derived using more specific weights than those shown here.

APPENDIX III – Variable Factor Weights

TABLE A3.1: Factor weights assigned to each variable in the Synthetic Control Models

Synthetic Control	Total Inhabitants	Urbanisation	Homesupply 1 Jan	Inhabitants Inmoving	Inhabitants Outmoving	Average Inhabitants	BOL Students	BBL Students	Higher Education Students	Scientific Education Students	MBO Students	Students HIGH
ESA Primary	0.4873382	0.0000067	0.0007875	0.0001848	0.0006859	0.4985018	0.0016020	0.0000102	0.0009512	0.0018074	0.0003120	-
ESA Secondary	0.5045928	0.0000032	0.0001753	0.0001462	0.0002821	0.4885707	0.0017472	0.0000205	0.0002253	0.0006284	0.0007412	-
Crosspring Primary	0.4957310	0.0000025	0.0004903	0.0002505	0.0010925	0.5011281	0.0000910	0.0000833	0.0002339	0.0001900	0.0001798	-
Crosspring Secondary	0.4271892	0.0001282	0.0016216	0.0002189	0.0016433	0.3395406	0.0476139	0.0005421	0.0137943	0.0006883	0.0403736	-
WSF Primary	0.4982663	0.0000034	0.0001658	0.0002832	0.0012658	0.4970563	0.0003944	0.0000473	0.0004351	0.0000602	0.0001006	-
WSF Secondary	0.4824914	0.0000682	0.0042618	0.0007244	0.0003021	0.4564662	0.0140322	0.0001752	0.0042061	0.0039660	0.0125900	-
YD Primary	-	0.0000096	-	0.0034050	0.0263328	-	0.0055445	0.0399095	0.2053113	0.2693168	0.0049185	-
YD Secondary	-	0.0001040	-	0.0044382	0.0071291	-	0.3337887	0.0385838	0.0156976	0.0075972	0.1201739	-
BCL Primary	0.4580423	0.0000412	0.0058194	0.0002707	0.0028327	0.5179696	0.0000949	0.0000784	0.0026322	0.0048269	0.0000805	-
BCL Secondary	0.4933211	0.0000221	0.0008886	0.0001195	0.0003063	0.4623469	0.0093713	0.0001530	0.0018619	0.0004570	0.0064141	-
PortXL Primary	-	-	-	0.0373921	0.0103093	-	-	0.0172489	-	0.2366269	-	0.5730902
PortXL Secondary	0.5243482	0.0000021	0.0010975	0.0001716	0.0001664	0.4692243	0.0000911	0.0001246	0.0008259	0.0010740	0.0000926	-
ECE Primary	0.4610106	-	0.0049801	0.0001038	0.0003459	0.5218554	-	0.0003147	0.0067164	-	-	0.0000989
ECE Secondary	0.5201943	0.0000003	0.0011695	0.0001085	0.0000961	0.4663255	0.0003354	0.0000960	0.0022538	0.0029396	0.0001068	-
BlueCity Primary	0.4892521	0.0000009	0.0001086	0.0002069	0.0006241	0.5081350	0.0000085	0.0000017	0.0001598	0.0003911	0.0001632	0.4895687
BlueCity Secondary	0.5197511	0.0000008	0.0007578	0.0001829	0.0001474	0.4747479	0.0000558	0.0000639	0.0006954	0.0011074	0.0000585	0.5211026
EMCI Primary	-	-	-	0.0373921	0.0103093	-	-	0.0172489	-	0.2366269	-	0.5730902
EMCI Secondary	0.5243482	0.0000021	0.0010975	0.0001716	0.0001664	0.4692243	0.0000911	0.0001246	0.0008259	0.0010740	0.0000926	0.5260592

Notes: Table A3.1 shows the weights assigned to each of the variables serving as predictors in the SCM. The treatments, i.e. SSPs are presented in the leftmost column, whilst the individual variables are displayed as column headers. The values are obtained in accordance with the methodology described in section 4.2. A dash indicates variables that were omitted to increase the model fit to the data. All variables are rounded to eight decimal places to account for small decimal values. Due to rounding, summation of all factor weights may be different from one. The results presented in section 5 are obtained using more precise factor weights than those presented above.

TABLE A3.1 [Cont'd]: Factor weights assigned to each variable in the Synthetic Control Models

Synthetic Control	Bachelor Diplomas	Master/PHD Diplomas	Total roadlength	Total Municipal Roadlength	Nearest Highway ramp	Nearest Trainstation	Private Household Income	Social Security - Total	Social Security - Unemployment	Social Security - Benefits	Number of Personal Automobiles
ESA Primary	0.0038452	0.0023615	0.0006232	0.0008370	0.0000000	0.0000022	0.0000003	0.0000024	0.0000071	0.0000149	0.0000991
ESA Secondary	0.0012799	0.0008887	0.0001040	0.0001910	0.0000001	0.0000009	0.0000001	0.0000007	0.0000083	0.0000181	0.0003254
Crosspring Primary	0.0001384	0.0002081	0.0000215	0.0000091	0.0000000	0.0000007	0.0000000	0.0000002	0.0000014	0.0000036	0.0001311
Crosspring Secondary	0.1093097	0.0013324	0.0015907	0.0027327	0.0000004	0.0000065	0.0000010	0.0002191	0.0002267	0.0008901	0.0088213
WSF Primary	0.0008771	0.0001154	0.0003499	0.0005175	0.0000001	0.0000017	0.0000000	0.0000031	0.0000061	0.0000111	0.0000345
WSF Secondary	0.0067054	0.0047359	0.0004783	0.0020397	0.0000002	0.0000008	0.0000030	0.0001035	0.0000416	0.0002701	0.0054772
YD Primary	0.2187706	0.2262536	-	-	0.0000232	0.0001349	0.0000227	0.0000230	-	0.0000240	-
YD Secondary	0.4412299	0.0296425	-	-	0.0001606	0.0000416	0.0001162	0.0009899	-	0.0003068	-
BCL Primary	0.0006733	0.0048753	0.0001167	0.0000088	0.0000002	0.0000027	0.0000004	0.0000132	0.0000190	0.0000818	0.0013510
BCL Secondary	0.0202361	0.0009718	0.0006127	0.0009820	0.0000002	0.0000027	0.0000003	0.0000267	0.0000325	0.0001110	0.0015041
PortXL Primary	0.0669898	0.0361348	0.0042843	-	-	0.0014246	-	-	0.0020716	0.0009072	0.0052699
PortXL Secondary	0.0006114	0.0010990	0.0003226	0.0004829	0.0000007	0.0000001	0.0000006	0.0000710	0.0000017	0.0001019	0.0000012
ECE Primary	-	-	0.0036246	0.0001410	0.0000065	0.0000001	-	0.0000044	0.0000665	0.0002289	0.0004828
ECE Secondary	0.0016549	0.0028515	0.0005614	0.0007344	0.0000007	0.0000001	0.0000017	0.0001675	0.0000034	0.0002276	0.0000633
BlueCity Primary	0.0002071	0.0003603	0.0001449	0.0001491	0.0000009	0.0000001	0.0000045	0.0000244	0.0000036	0.0000173	0.0000221
BlueCity Secondary	0.0005929	0.0010979	0.0002147	0.0002968	0.0000006	0.0000000	0.0000002	0.0000522	0.0000005	0.0001106	0.0000031
EMCI Primary	0.0669898	0.0361348	0.0042843	-	-	0.0014246	-	-	0.0020716	0.0009072	0.0052699
EMCI Secondary	0.0006114	0.0010990	0.0003226	0.0004829	0.0000007	0.0000001	0.0000006	0.0000710	0.0000017	0.0001019	0.0000012

Note: Table A3.1 shows the weights assigned to each of the variables serving as predictors in the SCM. The treatments, i.e. SSPs are presented in the leftmost column, whilst the individual variables are displayed as column headers. The values are obtained in accordance with the methodology described in section 4.2. A dash indicates variables that were omitted to increase the model fit to the data. All variables are rounded to eight decimal places to account for small decimal values. Due to rounding, summation of all factor weights may be different from one. The results presented in section 5 are obtained using more precise factor weights than those presented above

APPENDIX IV – Treatment Effects

TABLE A4: Predictor variable means for SSPs

	ESA BIC (Noordwijk)				Crosspring (Zoetermeer)				WSF (The Hague)			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
Year	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**
2000	59	60	45	47	313	324	273	272	1569	1424	1495	1232
2001	75	68	50	50	352	355	280	279	1625	1578	1544	1323
2002	82	76	48	53	399	406	302	300	1915	1698	1704	1425
2003	78	78	50	54	432	437	299	306	2065	1848	1771	1487
2004	77	82	53	56	497	479	319	312	2250	1921	1833	1501
2005	90	88	57	59	531	520	325	327	2632	1974	1947	1486
2006	92	97	62	67	636	589	350	366	3229	2037	2204	1541
2007	108	107	69	73	751	683	382	407	4058	2271	2539	1662
2008	125	130	73	81	857	812	428	451	5285	2598	2936	1785
2009	150	152	92	92	976	933	469	483	6270	3132	3125	2049
2010	178	168	113	103	1013	988	479	505	6748	3631	3186	2419
2011	198	182	130	111	1019	1041	477	518	6968	3979	3183	2593
2012	215	192	127	113	1019	1083	506	525	7492	4265	3191	2616
2013	246	202	140	115	1073	1142	513	544	7895	4323	3329	2617
2014	258	211	155	120	1136	1205	541	562	8332	4539	3484	2774
2015	281	212	174	121	1184	1269	546	579	8866	4583	3601	2804
2016	331	244	216	138	1249	1343	558	636	9377	5186	3634	3058
2017	349	248	229	141	1237	1416	564	635	9958	5738	3704	3184

Note: Table A4 shows the means for all predictor variables for the treatment SSP presented in the top row, specified to primary and secondary sectors. The leftmost row indicates the treatment year. 'Treatment' columns show the treatment (real) outcome, whilst the 'Synthetic' column shows the predicted / generated value calculated following the BCSC methodology presented in section 4.2. The black horizondal line indicates the treatment year.

TABLE A4 [Cont'd]: Predictor variable means for SSPs

	YesDelft! (Delft)				BCL (Leiden)				PortXL (Rotterdam)			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
Year	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**	**Treated**	**Synthetic**
2000	403	427	164	161	300	272	314	285	3049	2196	1276	1218
2001	494	491	163	167	314	292	321	294	3247	2434	1461	1261
2002	535	520	183	181	332	311	340	318	3436	2639	1579	1527
2003	533	539	173	179	363	351	321	316	3594	2744	1727	1632
2004	533	549	178	187	361	369	317	324	3693	2832	1791	1800
2005	586	563	195	183	374	385	330	338	3733	3079	1838	2089
2006	667	580	221	191	394	426	335	372	3875	3451	1891	2536
2007	746	638	251	207	441	490	370	405	4177	3917	2092	3162
2008	823	714	277	228	507	556	407	440	4634	4520	2366	4169
2009	884	845	282	254	632	652	469	473	5453	5194	2853	5054
2010	922	935	299	282	684	706	504	527	6277	5560	3315	5460
2011	927	984	311	291	761	738	531	555	6853	5886	3632	5657
2012	927	1024	336	286	807	749	527	570	7206	6180	3844	5885
2013	966	1035	346	289	830	790	546	581	7528	6532	3935	6153
2014	1020	1076	369	298	820	808	543	615	8032	6909	4117	6452
2015	1032	1111	389	309	864	837	571	634	8180	7382	4190	6775
2016	1083	1258	387	348	1061	884	668	661	9175	8197	4767	7011
2017	1089	1345	391	356	1126	942	694	685	9977	8502	5159	7326

Note: Table A4 shows the means for all predictor variables for the treatment SSP presented in the top row, specified to primary and secondary sectors. The leftmost row indicates the treatment year. 'Treatment' columns show the treatment (real) outcome, whilst the 'Synthetic' column shows the predicted / generated value calculated following the BCSC methodology presented in section 4.2. The black horizondal line indicates the treatment year.

TABLE A4 [Cont'd]: Predictor variable means for SSPs

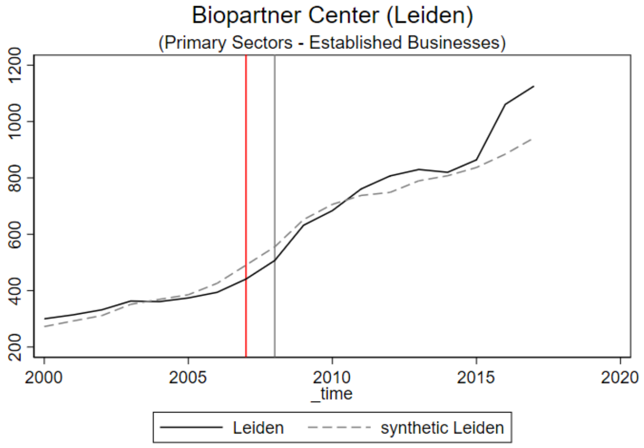
	ECE (Rotterdam)				BlueCity (Rotterdam)				EMCI (Rotterdam)			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
Year	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic	Treated	Synthetic
2000	1540	1036	1163	1139	2650	2268	1401	1030	1312	1168	45	48
2001	1793	1189	1190	1218	2779	2458	1482	1058	1406	1290	48	49
2002	1970	1303	1270	1317	2941	2613	1581	1130	1525	1422	46	49
2003	2148	1395	1313	1320	3124	2735	1638	1108	1649	1517	48	51
2004	2237	1484	1327	1348	3227	2798	1644	1132	1734	1573	51	52
2005	2273	1654	1350	1365	3264	2968	1627	1159	1778	1661	55	53
2006	2373	1937	1411	1464	3379	3275	1675	1233	1835	1843	58	58
2007	2591	2271	1530	1577	3612	3612	1788	1352	1994	2076	62	63
2008	2908	2704	1669	1736	4028	4062	1909	1494	2261	2340	64	69
2009	3498	3113	1900	1929	4796	4606	2154	1608	2728	2733	80	82
2010	4208	3296	2183	2067	5605	4920	2555	1712	3145	2923	94	87
2011	4564	3508	2456	2178	6220	5240	2738	1778	3460	3085	109	92
2012	4785	3733	2516	2190	6556	5459	2761	1817	3596	3185	107	92
2013	4869	3914	2603	2265	6833	5667	2772	1870	3708	3265	113	96
2014	5227	4064	2771	2372	7306	5927	2955	1954	3878	3378	126	104
2015	5343	4377	2824	2470	7585	6292	2990	2039	3929	3460	143	105
2016	6023	4940	3137	2673	8660	6984	3244	2188	4440	3796	178	117
2017	6661	5105	3343	2762	9688	7319	3380	2239	4777	3906	188	116

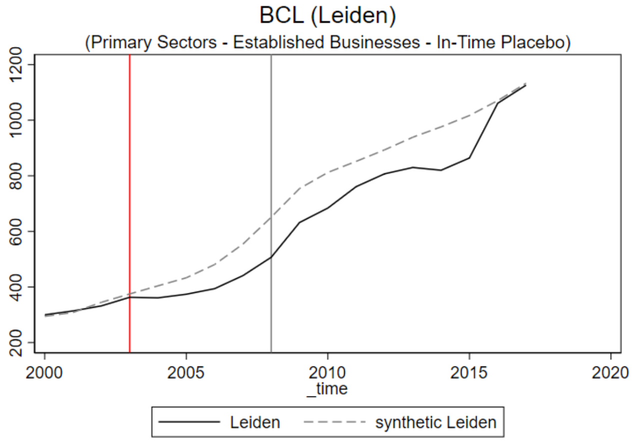
Note: Table A4 shows the means for all predictor variables for the treatment SSP presented in the top row, specified to primary and secondary sectors. The leftmost row indicates the treatment year. 'Treatment' columns show the treatment (real) outcome, whilst the 'Synthetic' column shows the predicted / generated value calculated following the BCSC methodology presented in section 4.2. The black horizondal line indicates the treatment year.

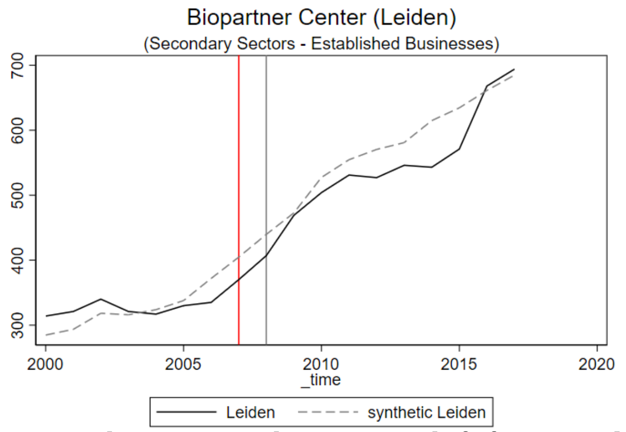
APPENDIX V – In-Time Placebo Test

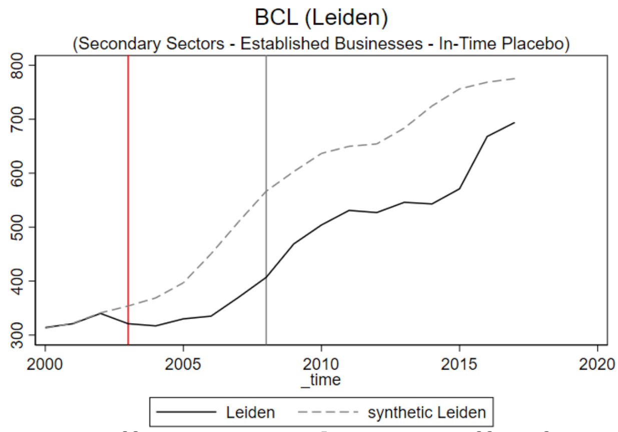
For the benefit of the reader, the panels below will show the in-time placebo test side-by-side with the original SC graph. The left panels present the original graphs, whereas the right panels present the in-time shifted placebo tests. The in-time placebo was run with 2003 as a treatment year, which is 2 years before the first SSP was started to eliminate anticipation effect beyond the 1 year lead time operationalised in the remainder of this analysis. The methodology of deriving the in-time placebo follows the methodology presented in section 4.3.1. The red line in the graphs indicates the treatment year, whereas the light grey vertical line indicates the start of the 2008 economic crisis as a means of reference. The dashed line represents the synthetic control trend, with the solid line representing the trendline for the treated municipality.

The X-axis of each graph indicates the time (in years), whilst the Y-axis indicates the number of firms active in a given year in the sectors under study.

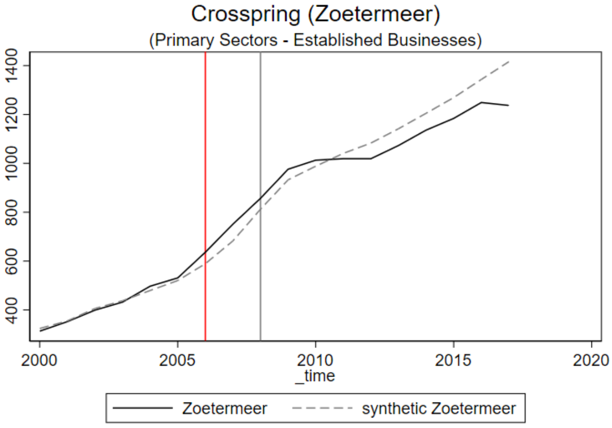


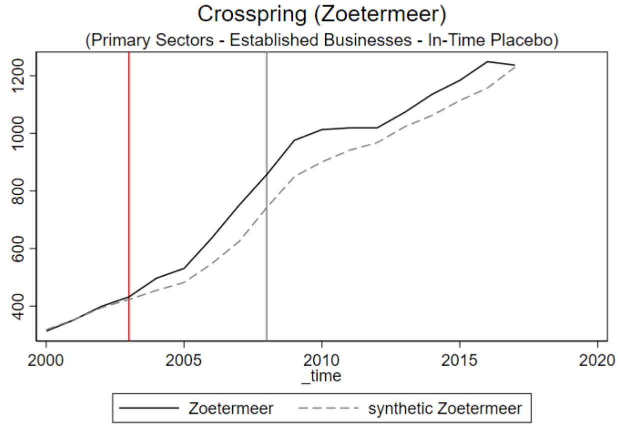


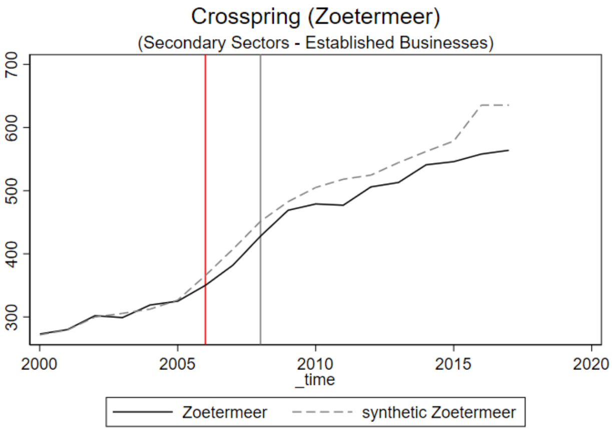


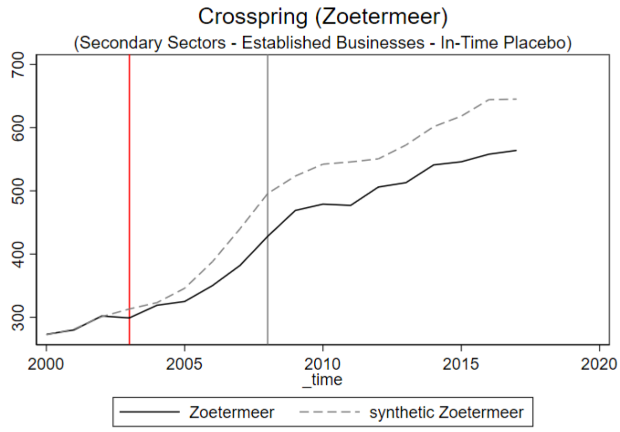


The BCL graphs seem to shift from a mildly positive effect to a neutral/negative effect for primary sectors. The effect for the secondary sectors shifts from a neutral to a distinctly negative effect when a longer lead-time is implemented. Both graphs are falsified based on the in-time placebo.



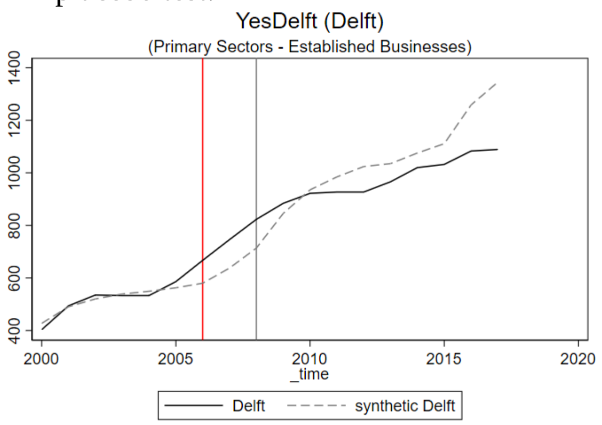


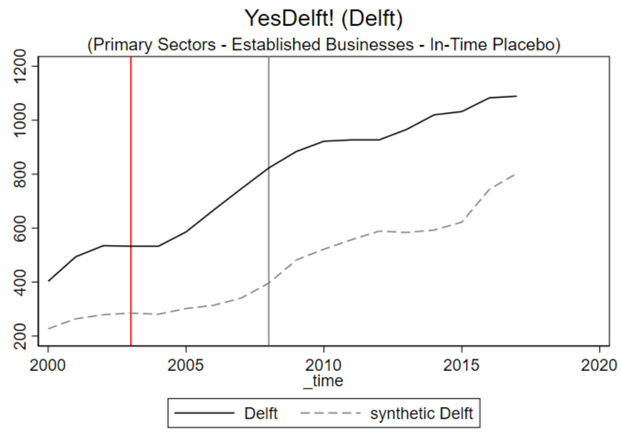


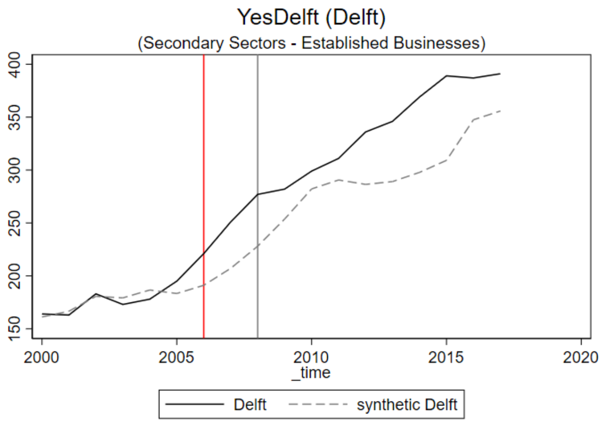


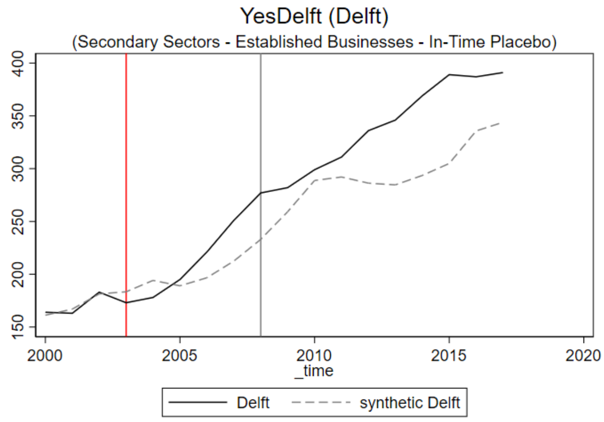
The graphs for Crosspring's primary sectors remains relatively unchanged, although its effect trends towards a more neutral outcome, rather than a negative one. The secondary sector follows a similar trend in both model specifications, supporting the original model trend.

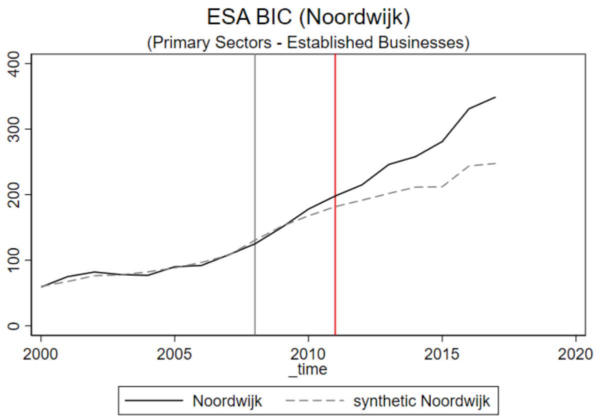
The primary sector graph for YesDelft! diverges from the pre-treatment trend in the too much in-time placebo to be able to draw conclusions or falsify the earlier findings. The secondary sector in-time trend remains relatively unchanged and is as such supported by the placebo test.

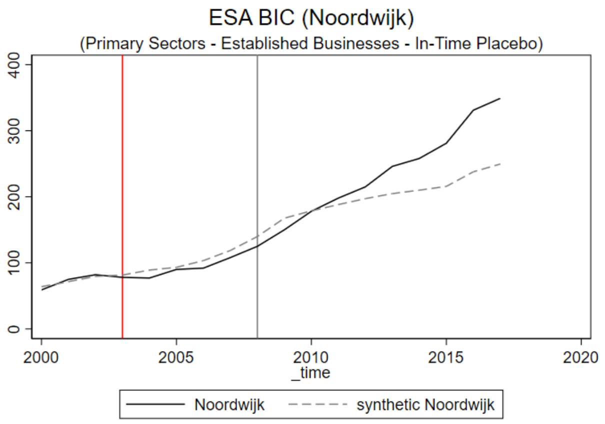


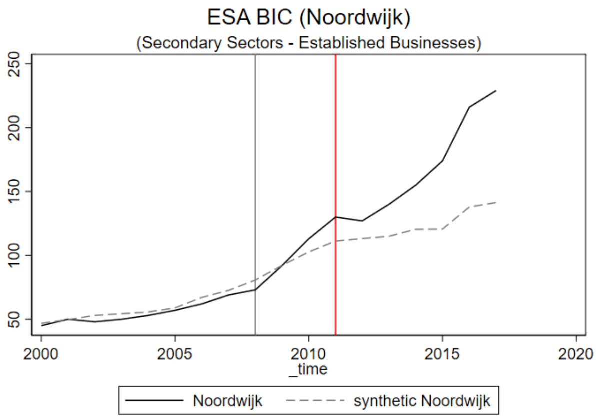


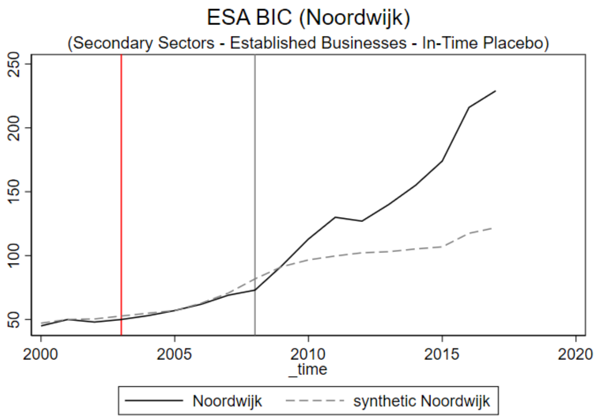






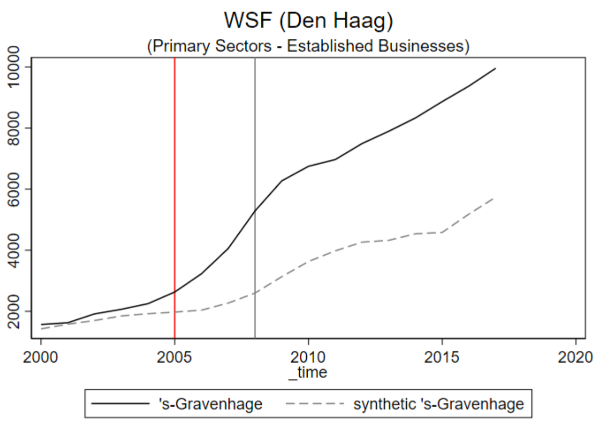


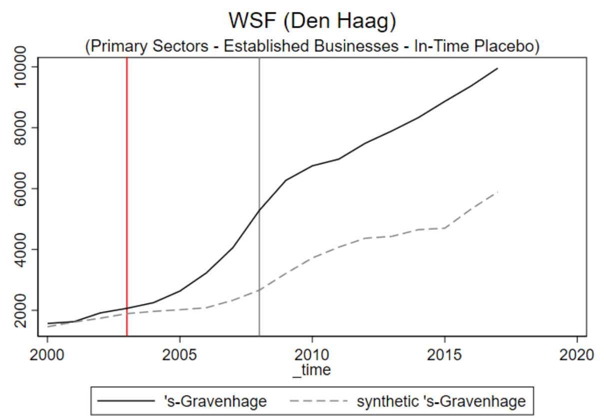


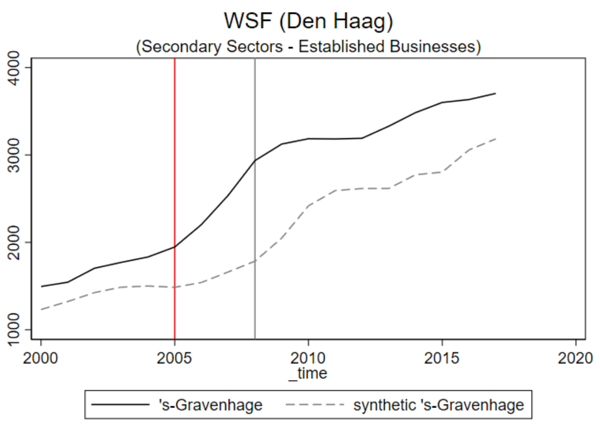


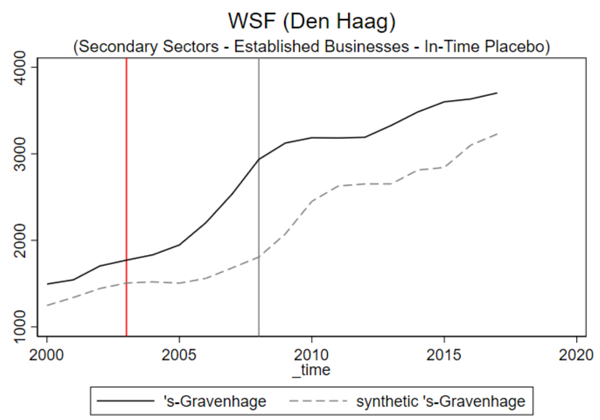
The trends for the ESA BIC SSP remain consistent between the original and in-time placebo versions of the model. Although the gap widens between the model specifications for the secondary sector, the found effects are supported by the placebo test.

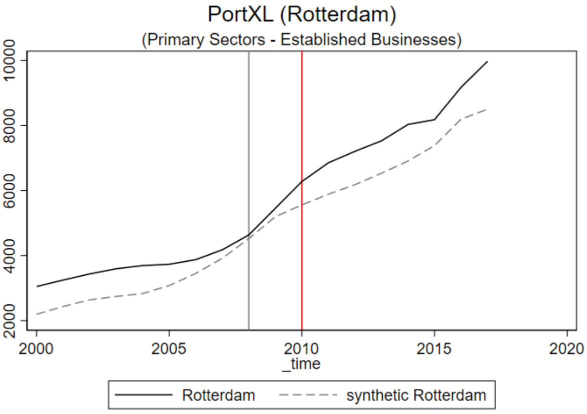
The in-time and original graphs for WSF for both sectors remain relatively equal, which is unsurprising considering the treatment year for the original WSF graphs was 2005. The effect found is therefore supported by the placebo test.

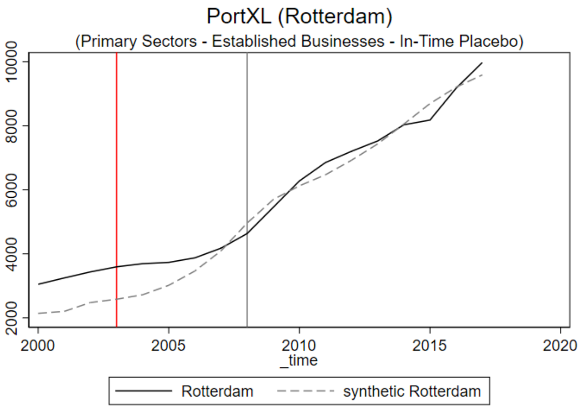


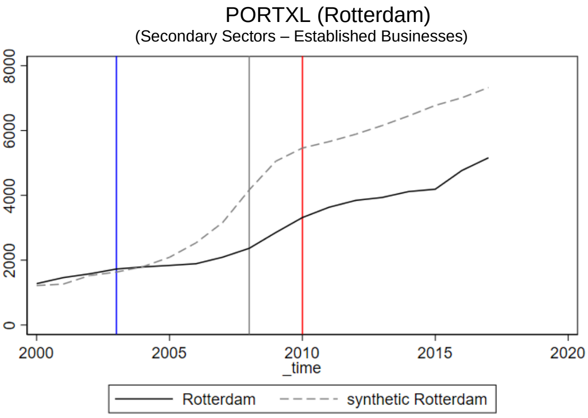


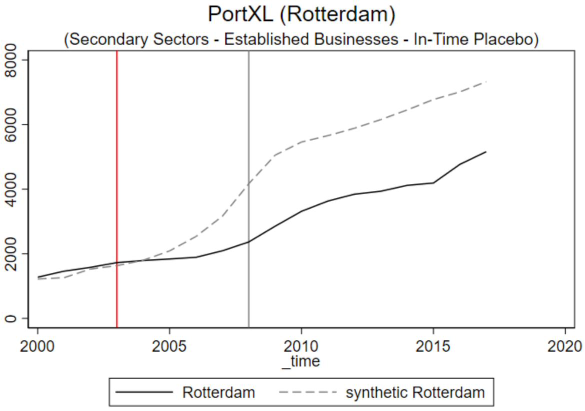






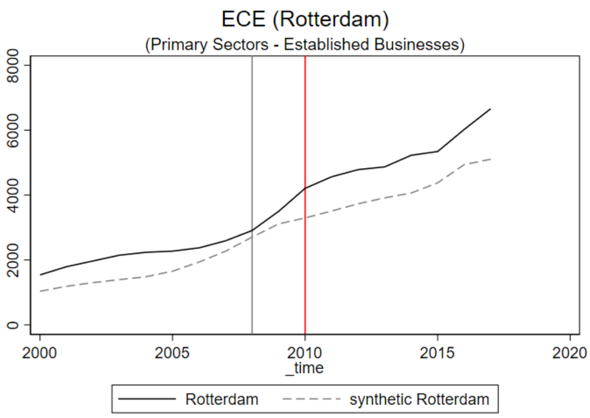


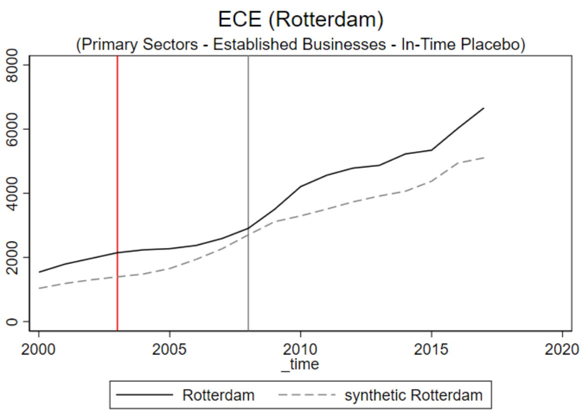


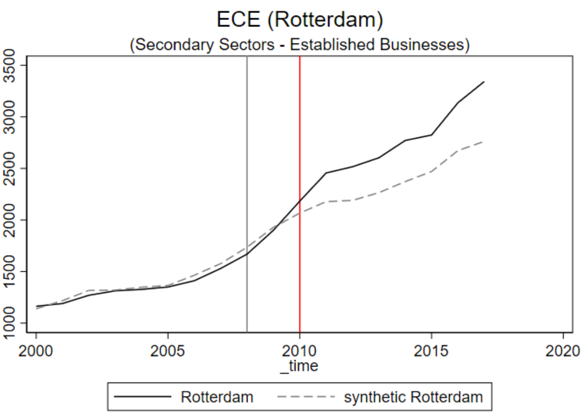


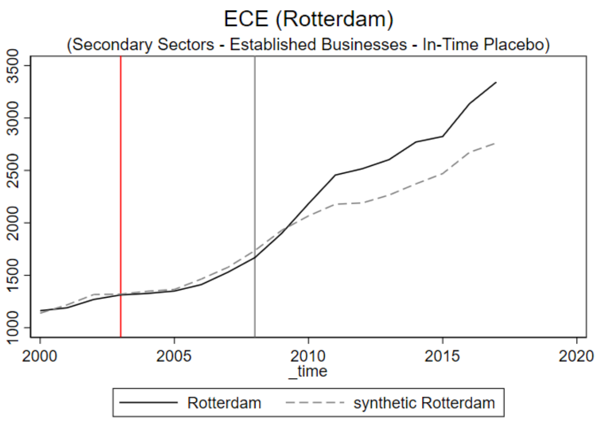
The primary sector for PortXL does not retain its positive trend and instead becomes neutral. The secondary sector remains relatively unchanged. As such, the primary sector trend is falsified by the in-time regression, whereas the secondary sector trend is supported by the placebo.

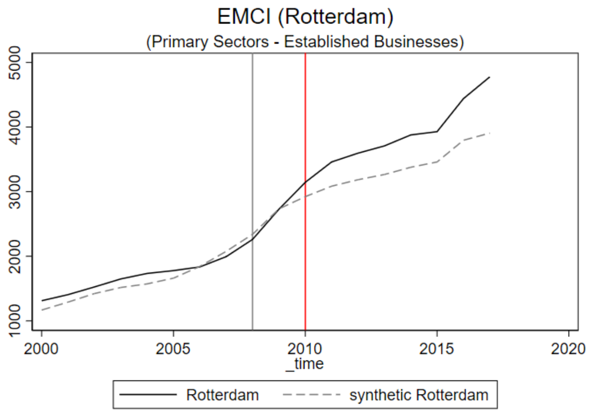
The trendlines for both the primary and secondary sector for the ECE SSP remain consistent in the in-time placebo specification of the model. As such, the observed trends are supported by the placebo.

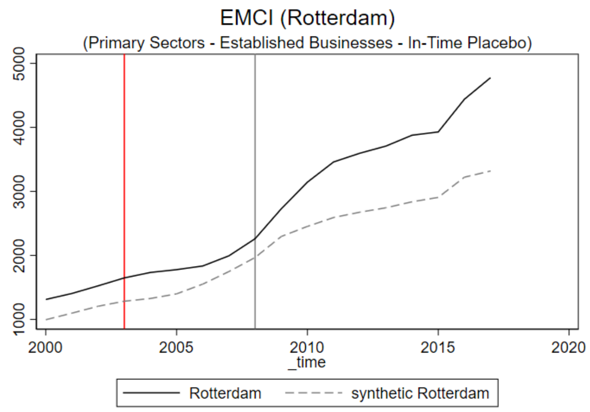


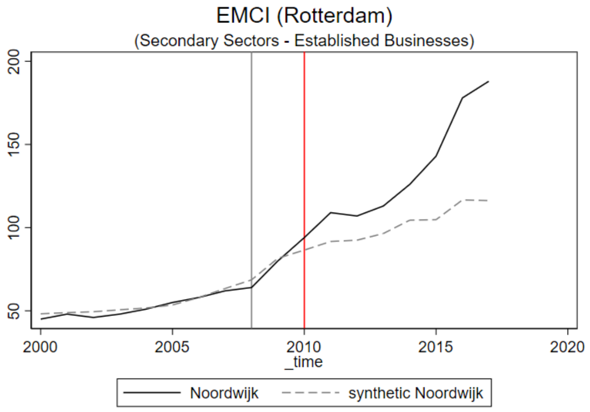


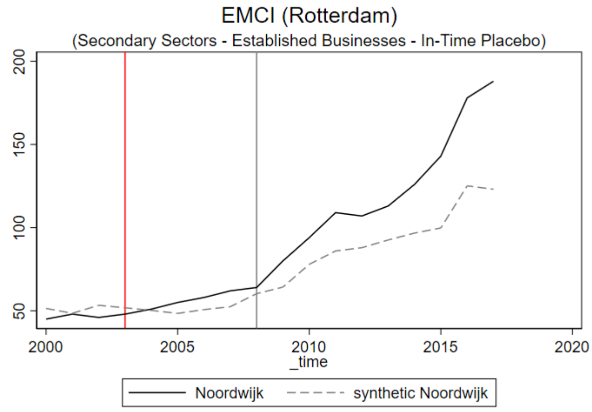






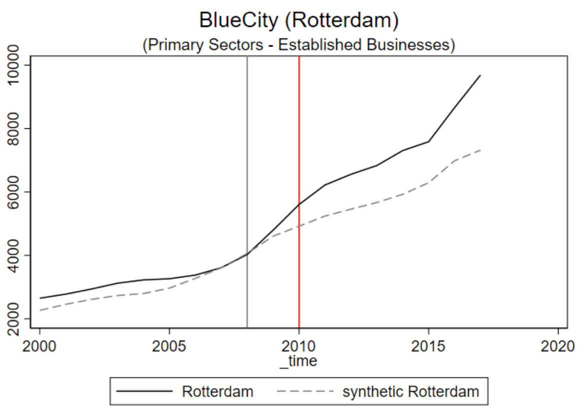


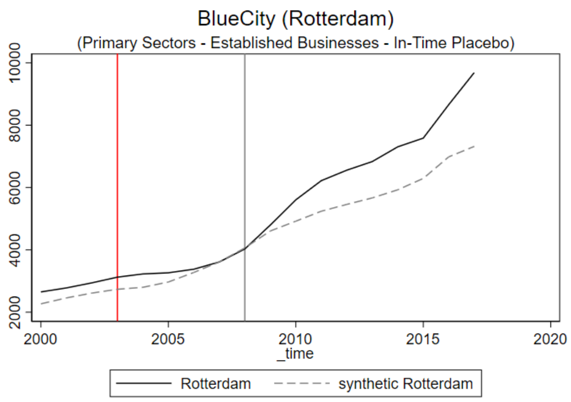


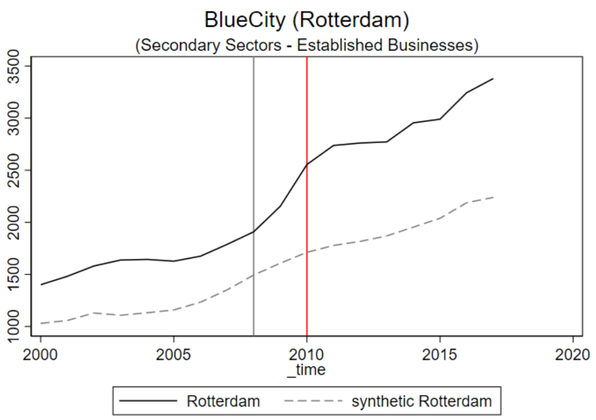


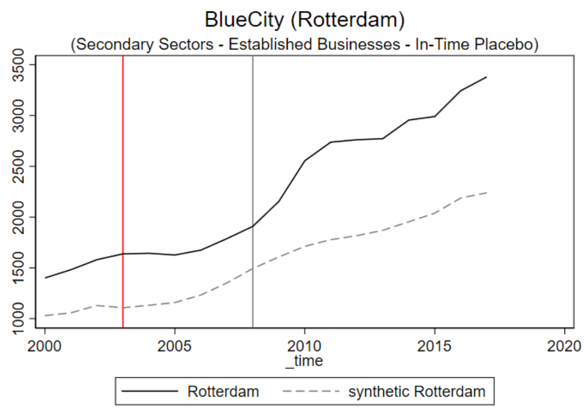
The primary sector trend for the EMCI SSP widens in the pre-treatment years, which inhibits a sound assessment and as such falsifies the model. The secondary sector trend retains a positive outcome, which supports earlier findings.

The trends for the BlueCity SSP retain their sign and magnitude based on graphical analysis. As such, the observed trends are supported by the in-time placebo specification of the SCM model.



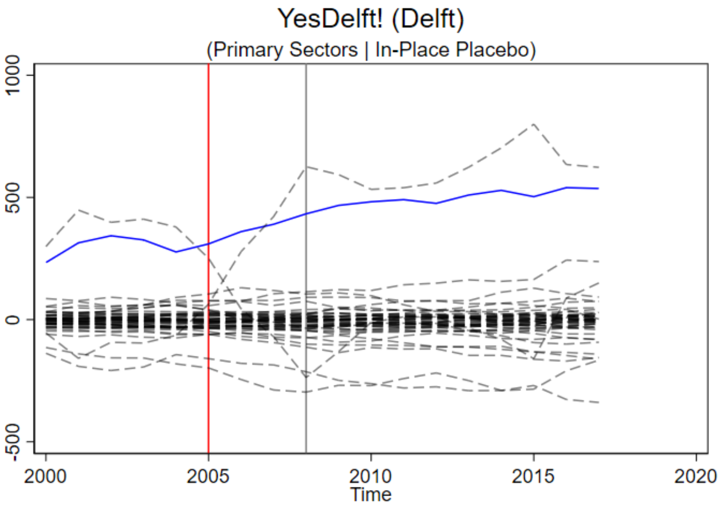




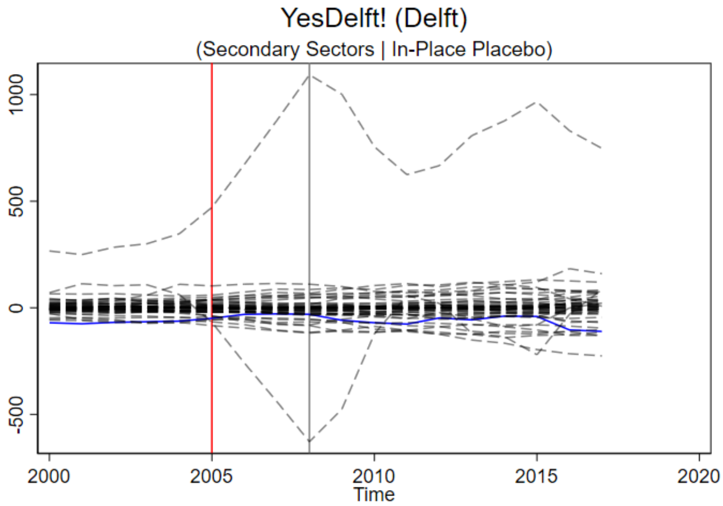


APPENDIX VI – In-space Placebo Test

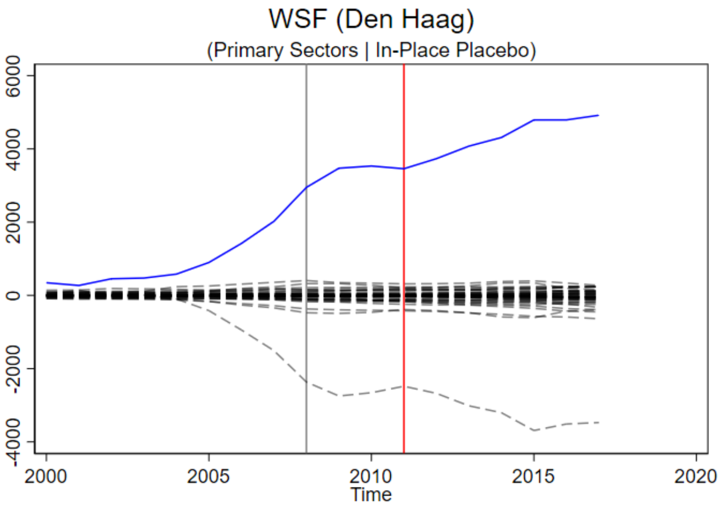
For the benefit of the reader, this appendix shows the outcomes of the in-space placebo test, carried out in accordance with the methodology outlined in subsection 4.3.2. The graphs show the treatment gap for each municipality in the dataset if treatment is assigned to them in the treatment year using grey dashed lines. The original treated municipality is distinguished by the blue line. The red horizontal line in the graphs indicates the treatment year, whereas the light grey vertical line indicates the start of the 2008 economic crisis as a means of reference. The dashed line represents the synthetic control trend, with the solid line representing the trendline for the treated municipality. After treatment is assigned to each of the municipalities, the probability of the original treatment line being similar to that of a randomly assigned municipality is obtained, represented as a P-value. Significant results are indicated by an *, ** or *** for the 0.1, 0.05 and 0.01 significance values.



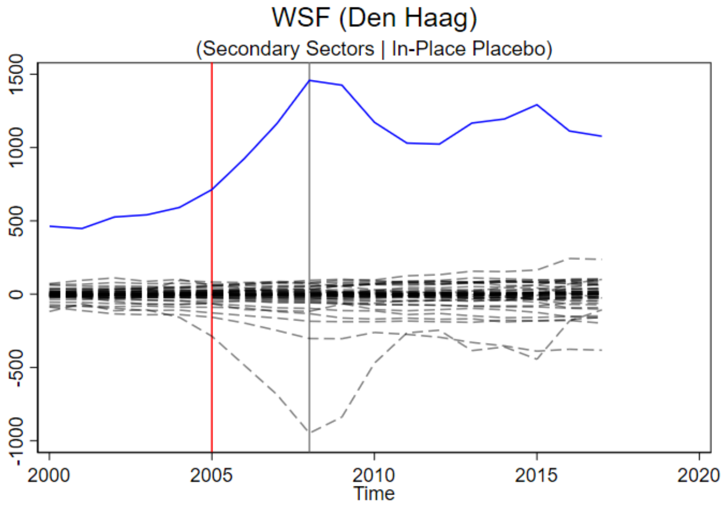
PVAL = 0.4



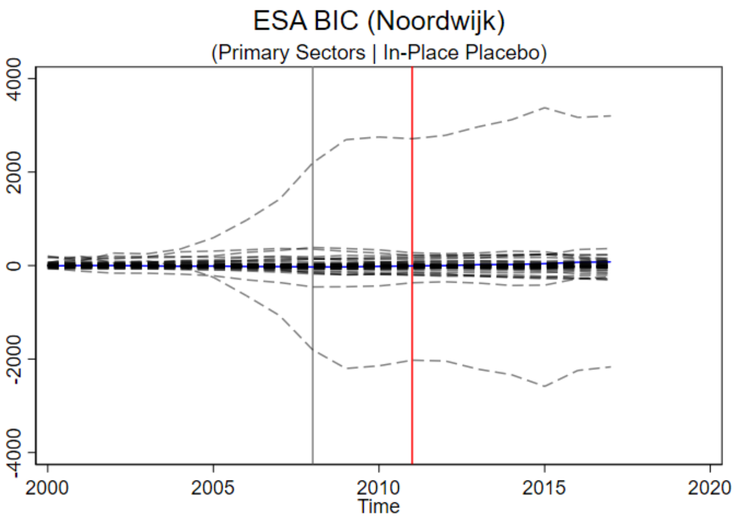
PVAL = 0.84



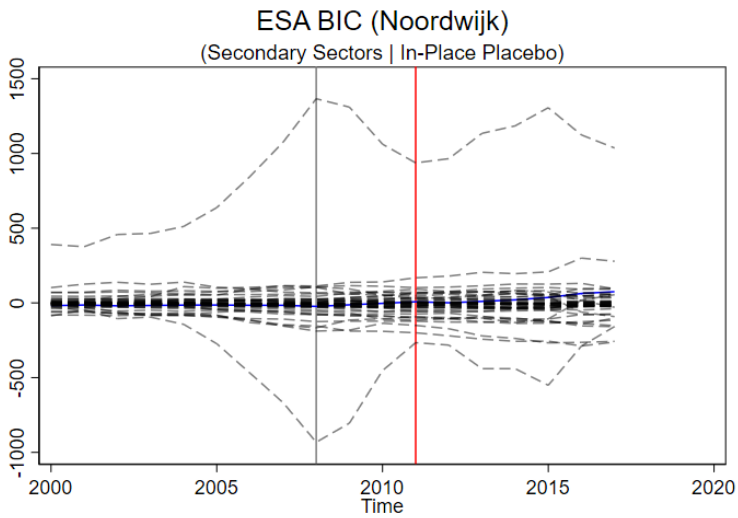
*PVAL = 0.10**



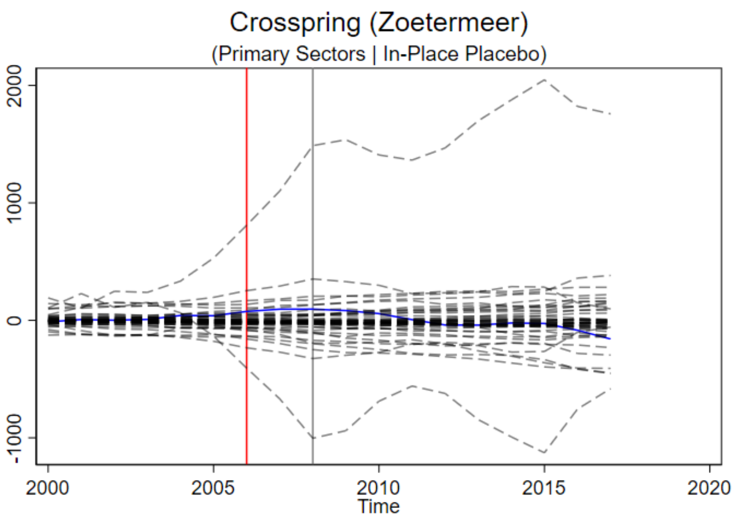
PVAL = 0.8



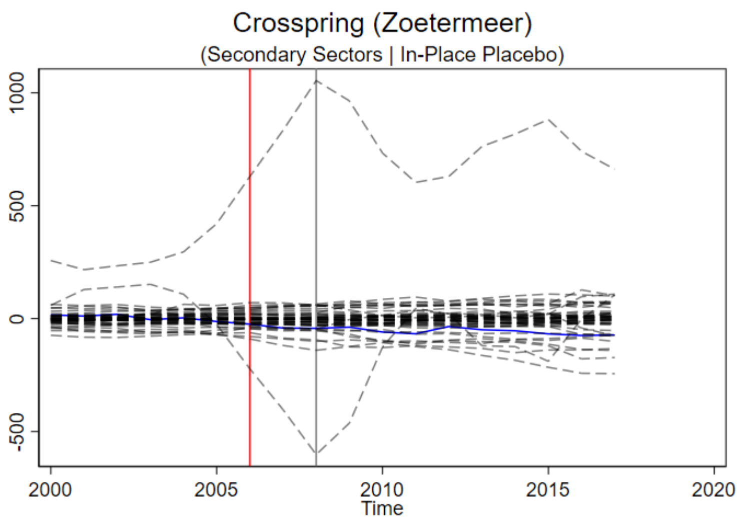
PVAL = 0.14



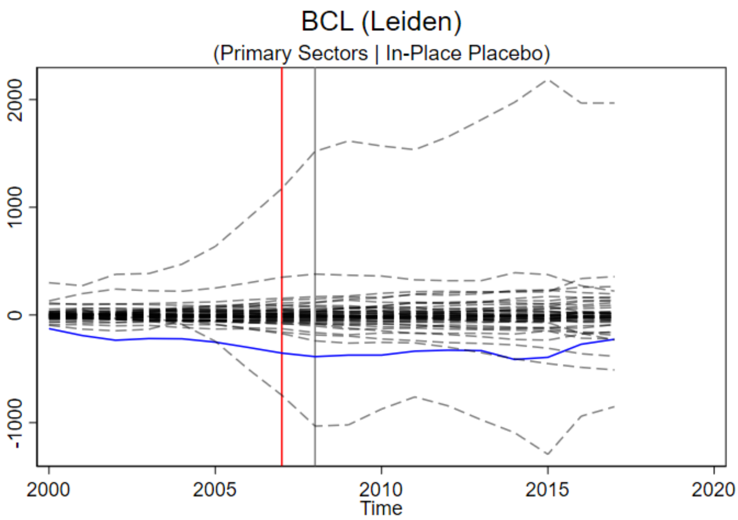
PVAL = 0.22



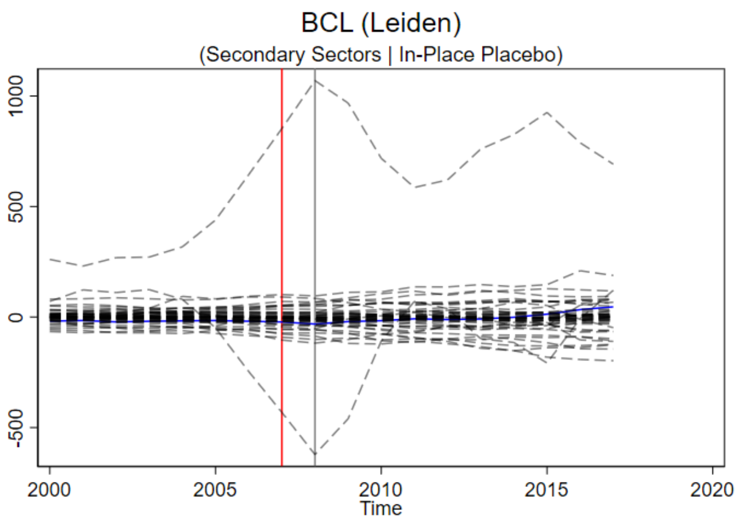
PVAL = 0.36



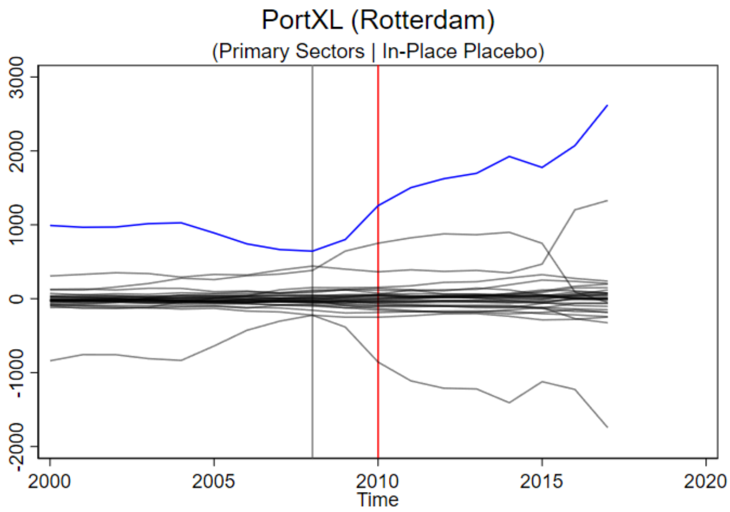
*PVAL = 0.06**



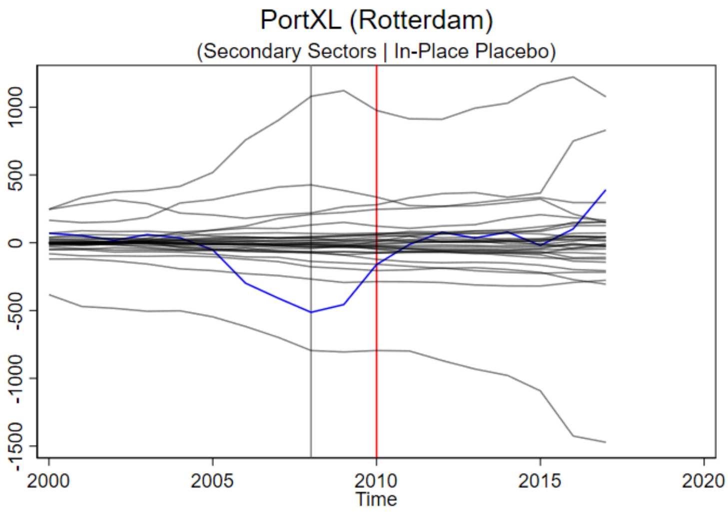
PVAL = 0.64



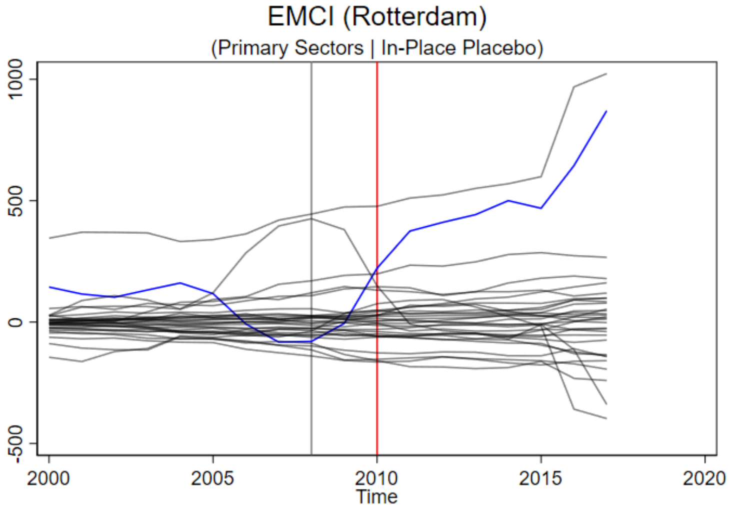
PVAL = 0.88



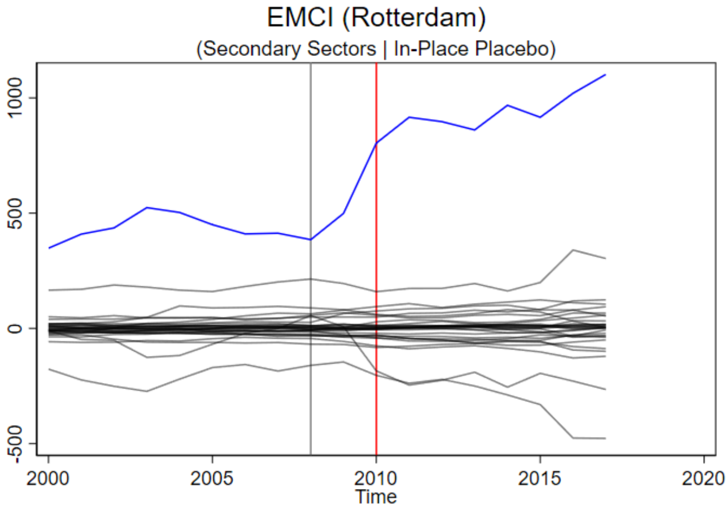
PVAL = 0.41



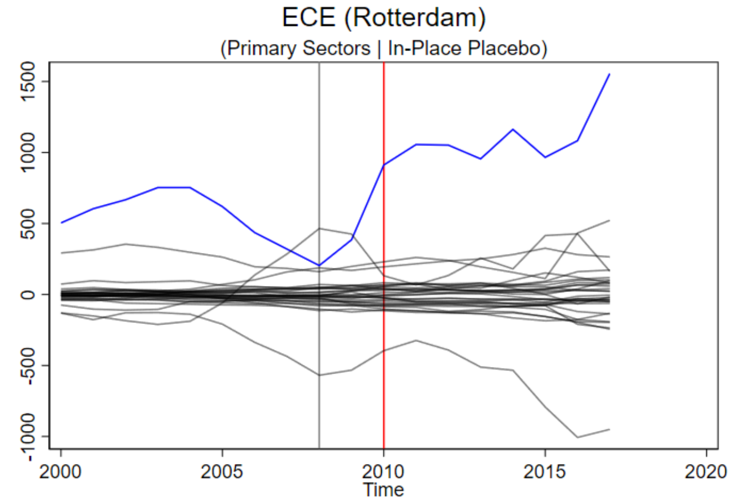
PVAL = 0.96



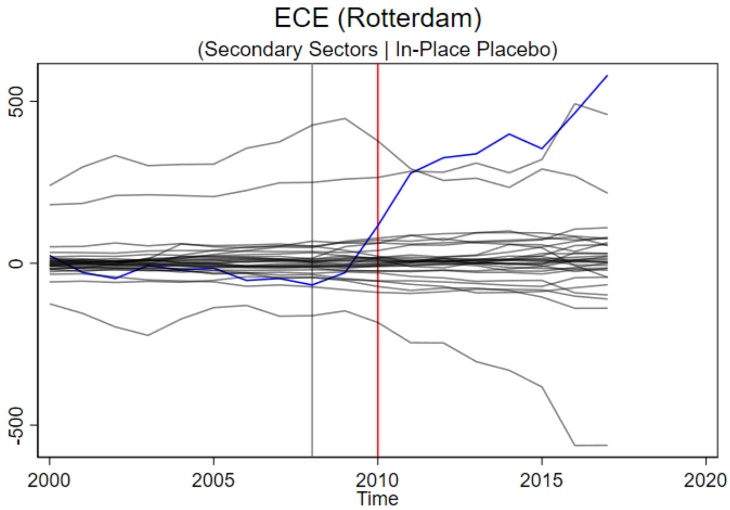
*PVAL = 0.06**



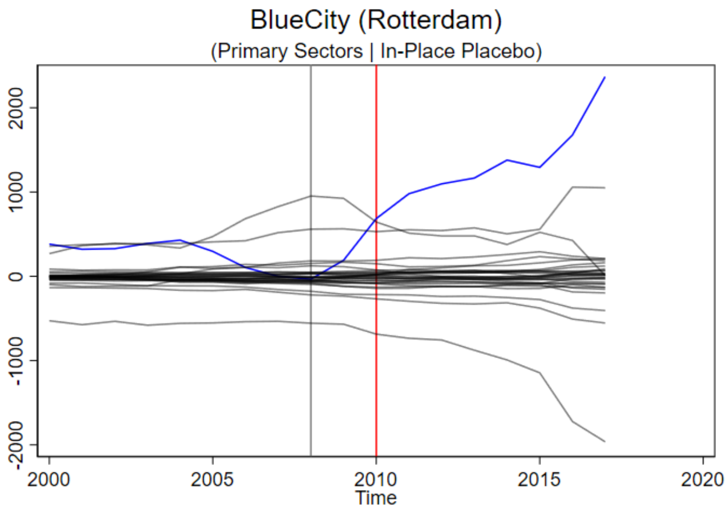
PVAL = 0.29



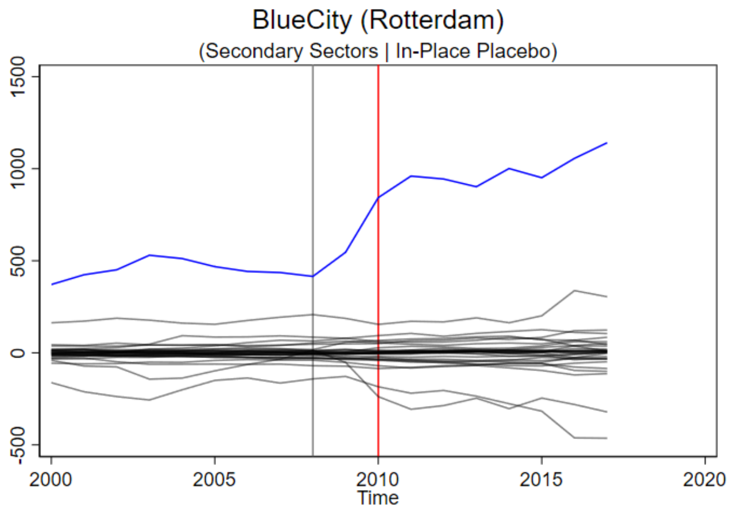
PVAL = 0.61



*PVAL = 0.03***



*PVAL = 0.09**



PVAL = 0.29

APPENDIX VII – Classic and Bias-Corrected Control Gaps

TABLE A7: Classic and Bias-corrected control gaps

	ESA BIC (Noordwijk)				Crosspring (Zoetermeer)				WSF (The Hague)			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
Year	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC
2000	-1	-1	-2	-1	-11	-11	1	1	145	163	263	281
2001	7	8	0	1	-3	-2	1	1	47	66	221	239
2002	6	6	-5	-4	-7	-6	2	2	217	236	279	297
2003	0	0	-4	-4	-5	-5	-7	-7	217	236	284	302
2004	-5	-5	-3	-2	18	18	7	6	329	348	332	350
2005	2	2	-2	-1	11	11	-2	-2	658	677	461	479
2006	-5	-4	-5	-4	47	47	-16	-16	1192	1211	663	681
2007	1	1	-4	-3	68	69	-25	-26	1787	1807	877	896
2008	-5	-5	-8	-7	45	45	-23	-24	2687	2707	1151	1169
2009	-2	-1	0	1	43	44	-14	-14	3138	3157	1076	1094
2010	10	11	10	11	25	25	-26	-26	3117	3136	767	786
2011	16	17	19	20	-22	-22	-41	-41	2989	3009	590	609
2012	23	24	14	15	-64	-64	-19	-19	3227	3247	575	594
2013	44	45	25	26	-69	-68	-31	-32	3572	3591	712	731
2014	47	47	35	35	-69	-69	-21	-21	3793	3813	710	729
2015	69	70	53	54	-85	-85	-33	-33	4283	4303	797	816
2016	87	88	78	79	-94	-94	-78	-78	4191	4210	576	595
2017	101	102	88	89	-179	-179	-71	-72	4220	4240	520	539

Note: Table A7 shows the difference between the SC and BCSC treatment SSPs presented in the top row, specified to primary and secondary sectors. The leftmost row indicates the treatment year. 'SC' columns show the treatment (original) gap, whilst the 'BCSC' column shows the bias-corrected SC gap calculated following the BCSC methodology presented in section 4.2. The black horizondal line indicates the treatment year.

TABLE A7 [Cont'd]: Classic and Bias-corrected control gaps

	YesDelft! (Delft)				BCL (Leiden)				PortXL (Rotterdam)			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
Year	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC
2000	-24	-14	3	-3	28	19	29	30	853	843	58	36
2001	3	14	-4	-9	22	13	27	28	813	803	200	178
2002	15	25	2	-3	21	12	22	22	797	786	52	30
2003	-6	5	-6	-12	12	3	5	5	850	840	95	73
2004	-16	-6	-9	-14	-8	-17	-7	-7	861	851	-9	-31
2005	23	34	12	6	-11	-20	-8	-8	654	644	-251	-273
2006	87	97	30	25	-32	-41	-37	-37	424	413	-645	-667
2007	108	119	44	39	-49	-58	-35	-34	260	249	-1070	-1091
2008	109	120	49	44	-49	-57	-33	-33	114	103	-1803	-1824
2009	39	49	28	23	-20	-29	-4	-4	259	248	-2201	-2222
2010	-13	-3	17	11	-22	-31	-23	-23	717	706	-2145	-2166
2011	-57	-47	20	15	23	14	-24	-23	967	955	-2025	-2046
2012	-97	-86	50	44	58	50	-43	-43	1026	1014	-2041	-2062
2013	-69	-58	57	52	40	31	-35	-35	996	985	-2218	-2239
2014	-56	-45	71	66	12	3	-72	-72	1123	1112	-2335	-2356
2015	-79	-68	80	75	27	18	-63	-63	798	786	-2585	-2606
2016	-175	-165	39	34	177	168	7	7	978	966	-2244	-2265
2017	-256	-246	35	30	184	175	9	9	1475	1464	-2167	-2188

Note: Table A7 shows the difference between the SC and BCSC treatment SSPs presented in the top row, specified to primary and secondary sectors. The leftmost row indicates the treatment year. 'SC' columns show the treatment (original) gap, whilst the 'BCSC column shows the bias-corrected SC gap calculated following the BCSC methodology presented in section 4.2. The black horizondal line indicates the treatment year.

TABLE A7 [Cont'd]: Classic and Bias-corrected control gaps

	ECE (Rotterdam)				BlueCity (Rotterdam)				EMCI (Rotterdam)			
	Primary		Secondary		Primary		Secondary		Primary		Secondary	
Year	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC	SC	BC SC
2000	504	496	24	15	382	373	371	359	144	139	-3	-3
2001	604	596	-28	-37	321	312	424	413	116	110	-1	-1
2002	667	659	-47	-56	328	319	451	440	103	97	-3	-4
2003	753	745	-7	-16	389	380	530	518	132	126	-3	-3
2004	753	745	-21	-30	429	419	512	500	161	155	-1	-1
2005	619	611	-15	-24	296	286	468	456	117	111	2	1
2006	436	428	-53	-62	104	95	442	430	-8	-14	0	0
2007	320	312	-47	-56	0	-10	436	424	-82	-88	-1	-2
2008	204	195	-67	-76	-34	-44	415	403	-79	-86	-5	-5
2009	385	376	-29	-38	190	180	546	534	-5	-11	-2	-2
2010	912	903	116	106	685	675	843	831	222	216	7	7
2011	1056	1047	278	268	980	970	960	948	375	369	17	17
2012	1052	1043	326	316	1097	1087	944	932	411	405	15	14
2013	955	946	338	328	1166	1156	902	890	443	436	17	16
2014	1163	1154	399	389	1379	1369	1001	989	500	494	22	21
2015	966	957	354	344	1293	1283	951	939	469	463	38	38
2016	1083	1074	464	454	1676	1666	1056	1044	644	638	61	61
2017	1556	1547	581	571	2369	2359	1141	1129	871	865	72	71

Note: Table A7 shows the difference between the SC and BCSC treatment SSPs presented in the top row, specified to primary and secondary sectors. The leftmost row indicates the treatment year. 'SC' columns show the treatment (original) gap, whilst the 'BCSC column shows the bias-corrected SC gap calculated following the BCSC methodology presented in section 4.2. The black horizondal line indicates the treatment year.