The Effect of Place-based Policy on Entrepreneurship: Evidence from China's Cross-Border E-Commerce Comprehensive Pilot Zone

Abstract: This study investigates the impact of a place-based policy on entrepreneurship, using the rollout of the Cross-Border E-Commerce Comprehensive Pilot Zone (CBEC-CPZ) as a quasi-natural experiment. The program significantly increased business creation within designated zones, with a 34.2% rise in new enterprises compared to regions without such zones, primarily driven by the entry of private firms. These results are robust to multiple checks, including anticipation tests, endogeneity adjustments, placebo timings, varying park sizes, alternative control groups, and spillover assessments. Heterogeneity analyses highlight improved resource allocation efficiency and the role of local strengths, particularly trade openness, as key drivers of the policy effect. The findings demonstrate that the CBEC-CPZ program effectively fosters private entrepreneurial activity and enables small firms to integrate into international markets.

Keywords: Institutional innovation; Entrepreneurship; Cross-Border E-Commerce Comprehensive Pilot Zone

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The authors declare no financial relationships or other potential conflicts of interest.

1. Introduction

The growing internationalisation of privately owned firms, many of which are small or micro-enterprises, poses challenges to traditional theories of why firms engage in internationalisation. According to these explanations (e.g. the OLI paradigm and the resource-based view), firms require strong firm-specific advantages to overcome the costs of operating abroad, including the liability of foreignness. SMEs, however, face liabilities of newness and smallness, lacking the firm-specific resources (financial, tangible, and intangible) needed to compete in foreign markets. Yet in China, thousands of such firms have entered the global economy. Investigating how these firms succeed without the heavyweight assets envisaged by traditional theory provides insights into whether new, digitally enabled institutional frameworks can compensate for firm-specific advantages, thereby enriching our understanding of what it takes to internationalise.

Since its accession to the WTO, China has seen remarkable export growth, a key driver of its economic development. Yet, with the rise of challenging global trade conditions (Boylan et al., 2021; Naradda Gamage et al., 2020) and the fading of traditional advantages like the demographic dividend (Bai & Lei, 2020; S. Ma et al., 2021), new paths are needed. Cross-Border E-Commerce (CBEC) has emerged as a promising model, blending e-commerce with international trade. It holds the potential to not only reshape China's foreign trade but also support a deeper economic transformation. However, institutional challenges like institutional distance and institutional voids may still hinder the CBEC development (Agarwal & Wu, 2018; Gomez-Herrera et al., 2014; Liu et al., 2021; S. Ma et al., 2018).

To address these challenges, the Chinese government has introduced the China Cross-Border E-Commerce Comprehensive Pilot Zone (CBEC-CPZ) program, which designates specific urban areas to adopt specialized management models and provide policy incentives for CBEC trade. China now accounts for roughly half of global e-commerce transactions, and early studies link CBEC-CPZ program to higher export volumes (M. Ma et al., 2025). What remains unclear, however, is whether these trade gains translate into entrepreneurial dynamism. There is limited empirical evidence on their ability to trigger start-up activity, especially at CPZ level. Addressing this gap is essential for understanding the broader developmental payoff of digitally enabled trade policies.

In this paper, we empirically investigate the relationship between CBEC-CPZ program, which is explicitly framed by Chinese government as a 'highland' for new trading rules, and entrepreneurial development in China. Drawing on insights from an influential body of studies in economic institution (Acemoglu et al., 2005; Acemoglu & Robinson, 2013; North, 1990), we conjecture that CBEC-CPZ program has a significant impact on incentives and constraints that SMEs face when they move into

global markets. Specifically, these zones implement reforms such as streamlined customs procedures, tax incentives, and digital trade infrastructure, which are explicitly designed to mitigate institutional barriers (e.g., bureaucratic delays, opaque regulations) that hinder CBEC development. By reducing these barriers, the policy cultivates a more efficient and entrepreneurship-friendly business environment. We expect a significant increase in market vitality, particularly through heightened entrepreneurial activity within these zones.

To identify the impact on entrepreneurship, we use quasi-experimental variation in the rollout of the CBEC-CPZ program across zones and over time. In our analyses, treatment is defined by the zone-specific launch time of the CBEC-CPZ program. Once a city has been chosen as the pilot city, it remains. Our identification strategy assumes that the zone-specific launch date is independent of the evolution of entrepreneurship, as the rollout of the CBEC-CPZ program is primarily determined by national regulations set by the central government (Wang & Yang, 2021). To guarantee that the control group and treatment group share the same evolution of baseline outcomes, we exclude never-treated cities from the estimation to avoid violation of this assumption (Sun & Abraham, 2021). We then can estimate treatment effects in an event study framework, using the quarter level administrative data on business creation in regions before and after the introduction of CBEC-CPZ program. In our preferred specification, we use the estimator proposed in Sun and Abraham (2021), which allow us to obtain dynamic and aggregate treatment effect under staggered rollout.

We find that business creation within the CBEC zones increased significantly by 29.8% relative to a counterfactual, estimated from regions without CBEC zones. Our results are quantitatively robust to different specifications, including (i) using alternative heterogeneity-robust estimator that allow for the weaker assumption that parallel trends hold conditional on covariates, (ii) redoing the estimation using placebo launch dates shifted by 2 quarters to the past from the actual city-specific launch dates, (iii) addressing potential unobservables related to treatment timing, (iv) adjusting the sample of control group to consider the spillover effects or contamination in the control group, (v) adjusting the size of the treatment group based on different radii of the CBEC parks. The advantages provided by the CBEC zones may have attracted some relevant firms to relocate into the CBEC parks. To ensure the observed business creation is not due to relocation spillovers, we redo the estimation by using an SDM-based spatial DID method with a spatial adjacency matrix. This suggest that the observed impact of the policy does not arise from the relocation of existing firms into the park from outside areas, but instead from stimulating new entrepreneurial ventures within the park itself. But we find no evidence supporting that program enhance business longevity within the CBEC zones.

Our study makes several contributions. First, we respond to recent calls to integrate insights from

place-based policy research by examining how institutional innovations embedded in specific local contexts can shape SMEs' internationalization trajectories. In doing so, we move beyond firm-centric explanations and highlight the role of policy-enabled institutional frameworks in improving resources allocation efficiency and harnessing local strengths. Second, we extend the discussion of digital-era globalization, showing how platform infrastructures and supportive policy environments can substitute for traditional firm-specific advantages. Finally, our findings contribute to the broader literature on international business and institutional economics by demonstrating that the interplay between local policy design and digital technologies can provide new pathways for private enterprises to participate in global markets.

The rest of this article is structured as follows. Section 2 presents the introduction of the CBEC-CPZ program. Section 3 presents hypotheses relating to the CBEC-CPZ and business creation. Section 4 presents the quarterly panel data of business creation, the rollout of CBEC pilot program, covariates, and heterogeneity variables. Section 5 presents the preferred estimation specification, alternative specification, and spatial specification used in our analysis. Section 6 reports the estimation results for the dynamic treatment effects, aggregate treatment effect, robustness checks, and spillover effects. Section 7 reports heterogeneity analysis. Section 8 discusses practical implications and limitations and concludes.

2. Policy background

CBEC, with its seamless integration of online marketing, digital transactions, and contactless payments, offers several key advantages over traditional trade. It diminishes the barriers of geographic distance, lowers transaction costs, and opens the door to wider market access. Technology-driven platforms empower global commerce by effortlessly connecting distant buyers and sellers. Lendle et al. (2012) found that the impact of distance on online cross-border trade is 65% lower than in traditional trade due to technological innovations that reduce information costs and build trust through online feedback and secure payment systems. This helps businesses bypass physical distance and infrastructure limitations, reducing the need for warehousing and physical presence in foreign markets (Ding et al., 2017). As a result, businesses can enter new markets faster and reach global customers more easily, particularly those in niche markets that may not have been accessible via traditional trade (Gomez-Herrera et al., 2014).

However, institutional distance, which refers to differences in regulatory, cultural, and normative frameworks between home and host countries, and institutional voids, which are characterized by the absence or underdevelopment of institutions that support market activity (Khanna & Palepu, 1997;

Puffer et al., 2010), still hinder the CBEC development (Agarwal & Wu, 2018). Specifically, in the early stages of China's CBEC development, institutional distance raises compliance costs and creates legal uncertainties, making it difficult for businesses to resolve disputes or meet foreign regulatory requirements (Gomez-Herrera et al., 2014; S. Ma et al., 2018). Institutional voids also emerged, including inefficient customs clearance, complex regulatory supervision, challenges in tax rebate settlements, payment risks, a shortage of necessary resources in the industry, and a lack of scientific management guidelines (Liu et al., 2021).

To address these challenges, the Chinese government has implemented a set of policies since 2012 to support the development of CBEC. The State Council has issued several guiding documents, and various ministries have adjusted tax policies to encourage greater enterprise participation (see, Ma et al.(2021), for a review). A significant reform is the establishment of the CBEC-CPZ, which designates specific urban areas to adopt specialized management models and provide policy incentives for CBEC trade across the Chinese mainland.

China's CBEC-CPZ, established since 2014, represent institutional experiments to optimize e-commerce environment. The first zone was launched in Hangzhou in March 2015. By April 2020, the programme had expanded to five batches totalling 105 cities across 30 provinces, municipalities, and autonomous regions (see Fig. 1). The CBEC-CPZ encompasses a wide range of policy pilot initiatives, including government facilitation reforms in customs and inspection, logistics system optimization, and improvements to the financial service system.

[Figure 1]

It was initially proposed to establish six systems within the CBEC-CPZ, namely an information-sharing system, a financial services system, an intelligent logistics system, an e-commerce credit system, a statistical monitoring system, and a risk prevention and control system. Additionally, two platforms were to be created, including the online 'single window' platform and the offline 'comprehensive park' platform.

The goals of these 'six systems and two platforms' are to develop a government management model characterized by 'information exchange, mutual recognition of supervision, and mutual assistance in law enforcement.' This model facilitates integrated customs clearance and other trade conveniences through data exchange among customs, national inspection, taxation, foreign exchange management, and other departments. Furthermore, by enabling data exchange among e-commerce, logistics, banks, and other institutions, it aims to enhance financial and logistics services, thereby reducing the financing challenges, currency exchange difficulties, and logistics costs faced by e-commerce businesses.

The CBEC-CPZ offers several preferential policies to registered e-commerce companies within these parks. These benefits include VAT reductions and exemptions, permission for businesses and individuals to open personal foreign exchange settlement accounts, and the ability to process foreign exchange transactions at banks directly based on contracts or waybills—exempt from the annual personal foreign exchange limit of US$50,000. Furthermore, the transaction cap for individual goods trade is being gradually raised. Customs policies have also become more supportive of CBEC since 2018, with the General Administration of Customs planning to introduce the 'Cross-border E-commerce Standard Framework' to simplify declarations, enable centralized taxation, facilitate batch transfers, and streamline return and exchange processes, along with offering tax guarantee services. The economic institutional innovations embodied in the CBEC policies are designed to address the institutional challenges the CBEC faces. The improved regulatory environment provided by the CBEC-CPZ program should create a more inclusive atmosphere for business creation and growth.

3. Hypotheses

3.1 CBEC-CPZ program increases entrepreneurship

Institutional theory emphasizes that economic institutions establish the norms, rules, constraints, and incentives that serve as governance mechanisms to regulate exchanges and interactions among individuals (Chowdhury et al., 2019; North, 1990). By providing stability and reducing barriers to entry, inclusive institutions play a critical role in fostering entrepreneurship (North, 1990; Webb et al., 2020). The CBEC-CPZ program serves as an economic institutional innovation designed to address the institutional barriers that have historically hindered CBEC development in China. However, early CBEC development faced high compliance costs, legal uncertainties, and inefficient customs processes, which created obstacles for new businesses (Gomez-Herrera et al., 2014; S. Ma et al., 2018). By streamlining customs, simplifying tax processes, improving regulatory transparency, and reducing logistics costs, the CBEC zones address these institutional voids, creating a more inclusive environment that lowers costs and reduces risks for entrepreneurs. This aligns with the institution theory that inclusive institutions encourage innovation and business creation by providing equitable access to resources and opportunities (Robinson & Acemoglu, 2012). Thus, we hypothesize that the CBEC policy significantly promotes entrepreneurial activity within these zones.

Hypothesis 1: The introduction of CBEC-CPZ program increases entrepreneurship.

3.2 Mechanism

3.2.1 Improving resources allocation efficiency

The role of the market in resource allocation has long been recognized as fundamental to fostering entrepreneurship and economic dynamism. Market-led institutions, by enabling the free flow of resources, create environments where individuals are empowered to innovate and pursue entrepreneurial ventures (North, 1990; Robinson & Acemoglu, 2012). Markets, when allowed to operate with minimal restrictions, facilitate efficient resource allocation by directing labour, capital, and knowledge to the most productive uses. This efficiency is particularly crucial in sectors like CBEC, where rapid responsiveness to market demand and flexibility in operations are essential for success.

Empowering the market in resource allocation not only enhances productivity but also lowers entry barriers for new firms. By allowing resources to gravitate toward areas of highest demand, a market-driven system reduces the friction entrepreneurs face when accessing essential resources, thus making business creation and expansion more feasible (Clemens & Cook, 1999; Whitley, 1999). This principle underpins the CBEC-CPZ policy, which actively seeks to elevate the market's role in resource allocation within the CBEC sector.

The CBEC-CPZ policy prioritizes enhancing government services to improve the business environment and support the sustainable development of CBEC. The policy seeks to address institutional barriers that have historically impeded resource allocation efficiency in China, such as high compliance costs, cumbersome customs processes, and regulatory bottlenecks. It explicitly calls for governments to 'actively provide services, strongly support the construction and development of pilot zones, strengthen organizational leadership, improve mechanisms, clarify responsibilities, and ensure accountability.' This underscores the policy's objective of fostering a service-oriented government by streamlining regulatory processes, optimizing public services, and promoting institutional innovation. The CBEC-CPZ policy could enhance market mechanisms by removing these regulatory barriers and establishing a streamlined framework that enables resources to be allocated according to market principles, which allows the market to guide resources, including labour, land, technology, and capital, toward entrepreneurial activities that are most likely to generate value.

Moreover, by bolstering the market's influence in resource distribution, the CBEC-CPZ policy aligns with Acemoglu and Robinson's (2012) notion of inclusive institutions, which ensure that access to resources is not limited to a narrow elite but is broadly accessible, enabling a diverse array of participants to engage in business creation. This market-oriented approach is complemented by strategic

public support, where public resources, such as infrastructure and regulatory frameworks, are allocated to create a stable foundation without undermining the market's efficiency in resource allocation.

In sum, the CBEC-CPZ program realizes its intended function by placing the market at the centre of resource allocation, thus creating an economic institutional environment where entrepreneurship can thrive, particularly in regions where resource allocation efficiency is lower. By balancing market-driven allocation with targeted public support, the policy mitigates previous institutional voids and enables the efficient deployment of resources, validating its role as a catalyst for business creation and economic vitality in the CBEC zone area.

Hypothesis 2: The effect of the introduction of the CBEC-CPZ in spurring entrepreneurship is more pronounced in groups with lower resource allocation efficiency.

3.2.2 Harnessing local strengths

The CBEC-CPZ policy emphasizes a tailored approach, encouraging local governments to leverage their unique regional strengths and industry advantages. This 'localized strategy' enables regions to adapt the policy according to their specific characteristics, aligning CBEC initiatives with local resources, expertise, and industrial priorities. By focusing on these localized advantages, regions can maximize the policy's benefits, enhancing its effectiveness in fostering entrepreneurial activities across diverse areas (Amsden, 2001; Rodrik, 2008).

Furthermore, existing literature suggests that regions with higher trade openness are better positioned to leverage economic policy opportunities. Higher trade openness is typically associated with well-established infrastructure, international trade networks, and regulatory expertise, which collectively reduce barriers to cross-border trade and allow for quicker adaptation to policy changes (Dollar & Kraay, 2004; Girma et al., 2004). These factors could facilitate smoother integration into global markets, enabling CBEC ventures in such regions to gain a competitive edge and capitalize more effectively on the policy.

Finally, the support provided by local governments in regions with high trade openness further amplifies the policy's impact on entrepreneurship. Such governments often demonstrate strong proficiency in international trade regulations and actively provide resources to help businesses navigate compliance, establish cross-border connections, and utilize existing trade infrastructure (Demirgüç-Kunt & Maksimovic, 2002; Krugman, 1991). Consequently, the effect of the CBEC-CPZ policy on entrepreneurship is significantly more pronounced in regions with higher trade openness, as these areas

are inherently better equipped to harness the opportunities created by the policy. Thus, we put out our fourth hypothesis.

Hypothesis 3: The effect of the CBEC-CPZ program in spurring entrepreneurial quantity could be more pronounced in groups with higher trade openness.

4. Data

4.1 Business registry data

The business registry data used in this study spans the period from 2013 to 2020 and is sourced from the National Enterprise Credit Information Publicity System, an administrative dataset that provides comprehensive records on business registration dates, registered addresses, legal statuses, and industry classifications. To enhance the geographic precision of the analysis, latitude, and longitude coordinates for registered business addresses were obtained from Amap, a leading mapping service provider in China.

Trends in business creation within and outside CBEC pilot zones

The analysis of business creation trends within and outside CBEC pilot zones from 2013 to 2020 reveals significant disparities across industries and ownership types (see Table A2 and Table A3). Industries such as wholesale and retail trade, leasing and business services, and information technology are disproportionately represented within CBEC pilot zones, reflecting the policy's focus on fostering trade facilitation and service industries. In contrast, other sectors such as agriculture and manufacturing exhibit lower representation in these zones, underscoring structural differences in economic priorities under the policy.

Ownership patterns further highlight the distinct characteristics of businesses within and outside CBEC pilot zones. Private enterprises and foreign-invested businesses dominate within CBEC pilot zones, with private enterprises accounting for 61 per cent of total businesses, compared to 44 per cent outside these zones. Conversely, individual industrial and commercial households (IICH) are more prevalent outside CBEC pilot zones, comprising 55 per cent of total businesses, compared to only 38 per cent within. These findings suggest that CBEC pilot zones are fostering a more formalised and globally integrated business environment, while IICH models remain predominant outside these zones.

4.2 CBEC pilot zones

Official data on industrial parks within CBEC pilot zones has not been publicly released. To address this gap, we manually collected the data from local government websites and news reports. Due to incomplete public disclosure, we supplemented the dataset by scraping point-of-interest (POI) data from Amap for comprehensive parks (POI code: 120100) with titles that include the keywords 'cross-border' and 'bonded area.' This process enabled us to obtain latitude and longitude coordinates for all identified parks, resulting in a total of 1,124 CBEC parks. According to the central government's official website[1], China reportedly has 'over 1,000 CBEC parks,' a figure that closely aligns with our tally.

Boundary information and park size estimation

Boundary information for most CBEC parks was unavailable on Amap. Only about one-fifth of the parks had accessible boundary data, which revealed that the median area of a CBEC park was approximately 80,000 square meters, with sizes ranging from 4,000 square meters to over 200,000 square meters. Given this distribution, we standardised the size of all CBEC parks to 80,000 square meters. A business was considered to be located within a CBEC park if its registered address fell within a circular area of 80,000 square meters cantered on the park's coordinates. Using this method, we obtained the number of new businesses created each quarter within and outside CBEC parks for all pilot cities.

To ensure the robustness of our findings, we conduct sensitivity analyses using alternative park sizes ranging from 40,000 to 120,000 square meters in increments of 10,000 square meters. This approach allows us to verify whether our results remained consistent across different park size assumptions.

Treatment and control groups

Each city is divided into two units: CBEC pilot zones and CBEC non-pilot zones. Initially, we anticipated obtaining data for 105 treatment groups and 105 control groups. However, due to data availability constraints, the final dataset included 93 treatment groups and 93 control groups.

Trends in business creation

[1] Information is available at website: https://www.gov.cn/lianbo/bumen/202406/content_6955410.htm

Figure 2 illustrates the trends in log-transformed business creation within and outside CBEC pilot zones from 2010 to 2020. Prior to 2015, both groups exhibited relatively parallel growth patterns. However, following the introduction of the CBEC pilot program in 2015 (marked by the vertical line in Figure 2), business creation within the pilot zones accelerated, narrowing the gap with areas outside the zones. This suggests that the CBEC pilot program may have stimulated entrepreneurial activity within the designated zones.

[Figure 2]

4.3 Control variables

Our specification controls for several covariates, which include GDP per capita (measured in RMB), the ratio of fiscal expenditure on science, technology, and education to GDP, and the ratios of the tertiary and secondary industries output, the ratio of trade to GDP, the ratio of e-commerce transactions to GDP, fiscal transparency, and financial inclusion index.

Specifically, GDP per capita is expressed in RMB. The ratio of science, technology, and education expenditure is calculated as the proportion of fiscal expenditure in these areas relative to GDP. The tertiary industry output ratio represents the share of tertiary industry output to GDP, while the secondary industry output ratio represents the share of secondary industry output to GDP. The first four covariates are all sourced from the National Bureau of Statistics of China (NBSC).

The ratio of trade to GDP is a measure of how much a country or region relies on international trade, including export and import value, relative to the size of its economy. The ratio of e-commerce transactions to GDP represents the share of total e-commerce transactions (both sales and purchases) relative to the local GDP. A higher ratio suggests a stronger relative presence of e-commerce activity compared to the region's overall economic output. Data sources for those two variables are China Stock Market & Accounting Research Database (CSMAR).

Fiscal transparency index is from *Research Report on Fiscal Transparency of Municipal Governments in China*[2], which provides insight into government fiscal activities, such as budget preparation, spending, and reporting. It helps ensure accountability in public resource management, reduces fiscal risks, and strengthens trust in financial governance (Alt & Lassen, 2006; Hameed, 2005). Regions with higher fiscal transparency are often better equipped to manage public funds effectively, fostering sound fiscal policymaking and improved economic outcomes (Wehner & De Renzio, 2013). Financial inclusion index is obtained from the *Peking University Digital Financial Inclusion Index*

[2] The report is available at the website: https://ggglxy.scu.edu.cn/info/1093/5147.htm

(2011–2020)[3], which represents both the level of digital financial inclusion development and the regional balance of its distribution.

4.4 Heterogeneity variables

Following Hsieh and Klenow (2009), we measure resource misallocation by the standard deviation of corporate total factor productivity (TFP) across firms in each city. Specifically, we use data from publicly listed companies and calculate TFP via both the Olley–Pakes (OP) and Levinsohn–Petrin (LP) methods before computing the standard deviation. We adopt OP and LP because they address common issues, such as simultaneity bias between inputs and productivity, and the selection biases arising from firms entering or exiting the market, that can distort traditional production function estimates. This leads to more reliable TFP measures and therefore a more accurate assessment of resource misallocation. OP uses investment as the proxy for a firm's unobserved productivity. The idea is that more productive firms tend to invest more. LP replaces investment with an intermediate input (e.g., materials or energy) as the proxy. This approach addresses the issue that some firms might have zero investment in certain periods, making OP estimation problematic in those cases.

Trade openness is closely tied to local strengths within the context of CBEC. Following Chiang (2009) and Hoen & Oosterhaven (2006), this study employs the Location Quotient (LQ) as a standard metric to evaluate trade openness. The LQ captures the relative concentration of trade activities within a region compared to the national average, effectively identifying areas with comparative advantages in global trade. By emphasizing the structural role of trade in a region's economy, this measure aligns with the theoretical concept of trade openness, reflecting a region's ability to engage with and benefit from international markets. As a result, the LQ serves as a reliable and validated proxy for examining regional disparities in trade-related activities and their influence on policy outcomes. Due to data limitations at the city level, province-level data is used to estimate each city's trade openness.

$$LQ_{pt} = \frac{(exports_{pt} + imports_{pt})/GDP_{pt}}{(exports_{nt} + imports_{nt})/GDP_{nt}} \quad (1)$$

Where p denotes province and n denotes country. $exports$ represents the total export value. $imports$ represents the total import value. GDP is the Gross Domestic Product. $LQ_{pt} > 1$ indicates that the region has a comparative concentration advantage in trade activities, reflecting higher trade openness. $LQ_{pt} < 1$ suggests that the region is less specialized in trade activities, indicating lower trade

[3] The index is available at the website: https://en.idf.pku.edu.cn/

openness relative to the national context.

Table 1 reports the descriptive statistics of the three final grouping variables: capital distortion (OP-based), capital distortion (LP-based), and local institutional strength. Each variable is constructed as a binary indicator equal to one if the city's value in the year prior to the program's implementation is above the country-specific median, and zero otherwise. This procedure ensures that the grouping is not affected by the policy itself and captures pre-policy differences in resource allocation efficiency and institutional strength for analysing heterogeneous treatment effects.

5. Empirical strategy

5.1 The dynamic specification

We are interested in identifying the effect of the CBEC-CPZ program on the number of business creations in a multi-period difference-in-differences (DiD) framework. A canonical approach has been to estimate with ordinary least squares (OLS) accounting for time and unit fixed effects, commonly referred to as the two-way fixed-effects (TWFE) estimator.

For the dynamic TWFE model for event studies, Sun and Abraham (2021) shows that the population regression coefficient is 'contaminated' by information from other leads and lags even if parallel trend in baseline outcome[4] and no anticipatory behaviour prior to treatment[5] both hold. A sufficient condition to avoid such contamination is the treatment effect is homogeneous across cohorts for each event time[6] (Sun & Abraham, 2021) since their relevant weights would sum to zero. In practice, many studies suggest either binning or trimming the distant relative periods to create 'balanced' panels. However, both approaches are subject to contamination concerns. To mitigate contamination in a trimming specification, it is crucial to limit the exclusion to only the relative time indicators preceding the treatment, provided the assumptions that the parallel trend in baseline outcome and no anticipatory behaviour prior to treatment hold (Sun & Abraham, 2021).

5.1.1 Sun and Abraham (2021) Estimator

The method provided by Sun and Abraham (2021) (SA method) addressing the bias is to estimate

[4] $E\left[Y_{i,t}^{\infty} - Y_{i,s}^{\infty} | E_i = e\right]$ is the same for any unit i's treatment time $e \in supp(E_i)$ and for all s, t and is equal to $E\left[Y_{i,t}^{\infty} - Y_{i,s}^{\infty}\right]$.

[5] There is a set of pre-treatment periods such that $E\left[Y_{i,e+l}^{e} - Y_{i,e+l}^{\infty} | E_i = e\right] = 0$ for all possible leads.

[6] For each relative period l, the $CATT_{e,l}$ doesn't depend on the cohort and is equal to $CATT_l$.

the cohort-specific average treatment effect on the treated (CATT) using clean comparisons and then assign transparent relevant weight (usually proportional to sample size) to calculate dynamic treatment effects or aggregate treatment effect.

$$Y_{it} = \mu_i + \delta_x X + \lambda_t + \sum_{e \neq \infty} \sum_{l \neq -1}^{27} \delta_{el}\left(\mathbf{1}\{E_i = e\} \cdot D_{it}^{l}\right) + \epsilon_{it} \quad (2)$$

Where Y_{it} represents an outcome of interest for unit i in time t. μ_i indicates city fixed effects. μ_i refers to the fixed effects for city-zone combinations, where each city is split into two units: CBEC pilot zones and non-pilot zones. λ_t indicates year-quarter fixed effects. E_i represents the year-quarter when the CBEC policy was implemented in a specific unit i. The term $1\{E_i = e\}$ = 1 represents the specific unit i first receives the CBEC treatment at time e, and D_{it}^{l} indicates that the specific unit i is at the relative time l. δ_{el} represents the $CATT_{e,l}$ for each cohort e and relative period l. For unit i that were never treated, $E_i = \infty$, and $D_{it}^{l} = 0$ for all l and all t. X is a vector of city characteristics, including GDP per capita, ratio of sci/tech/edu expenditure, ratio of tertiary industry outputs, and ratio of secondary industry outputs.

The first step is to estimate regression (2) on all observations using never-treated cohorts $C = \{\infty\}$. If parallel trend in baseline outcome and no anticipatory behaviour prior to treatment both hold, the estimator $\hat{\delta}_{el}$ is an unbiased and consistent estimator for $CATT_{e,l}$. For the second step, we estimate the weights $Pr\{E_i = e | E_i \in [-l, T-l]\}$ by sample shares of each cohort in the relevant period(s) $l \in b$. For the third step, to form the 'interaction-weighted' (IW) estimator, we take a weighted average of estimates for $CATT_{e,l}$ from step 1 with weight estimates from step 2 and get the dynamic treatment effect and the aggregate treatment effect of the CBEC policy, as specified as equation (3).

$$\hat{v}_b = \frac{1}{|b|} \sum_{l \in b} \sum_{e} \hat{\delta}_{el} \widehat{Pr}\left\{E_{ij} = e \middle| E_{ij} \in [-l, T-l]\right\} \quad (3)$$

If bin b is a singleton, then its size $|b| = 1$.

5.1.2 Callaway and Sant'Anna (2021) Estimator

Callaway and Sant'Anna (2021) proposes another Heterogeneity-Robust Estimator to address the bias of the TWFE estimator. The building block of Callaway and Sant'Anna (CS) method is the average treatment effect for units who are members of a treatment group e at a particular time t ($ATT(e,t)$), denoted by Equation (4), where $G_e = 1$ if a group was first treated in period e. The method also assumes that once the treatment starts, it remains, showing as $G_e = 1$, $D_t = 1$ for all $t \geq e$. The details of $ATT(e,t)$ vary depending on whether the parallel trends assumption is conditional or unconditional.

$$ATT(e,t) = E[Y_t(e) - Y_t(0)|G_e = 1] \quad (4)$$

$$E[Y_t(0) - Y_{t-1}(0)|X, G_e = 1] = E[Y_t(e) - Y_{t-1}(0)|X, C = 1] \quad (5)$$

$$ATT_{con}^{nev}(e,t) = E[Y_t - Y_{e-1}|X, G_e = 1] - E[Y_t - Y_{e-1}|X, C = 1] \quad (6)$$

$$\theta_{es}(l) = \sum_{e \in G} 1\{e + l \leq \mathrm{T}\} P(G = e|G + l \leq \mathrm{T}) ATT_{con}^{nev}(e, e + l) \quad (7)$$

$$\theta_{es}^{o} = \frac{1}{T-1} \sum_{l=0}^{T-2} \theta_{es}(l) \quad (8)$$

There is a known $\delta \geq 0$. For each $e \in G$ and $t \in \{2, \cdots, \mathrm{T}\}$ such that $t \geq e - \delta$. Equation (5) is the conditional parallel trends assumption based on the never-treated groups, where $C = 1$ for groups not been treated. Equation (6) is the ATT for never-treated groups under the conditional parallel trend's assumption. $\theta_{es}(l)$ represented in equation (7) is the average effect of participating in the treatment l time periods after the treatment were adopted across all groups that are ever observed to have participated in the treatment for exactly l time periods. θ_{es}^{o} represented in equation (8) is the overall treatment effect estimator by averaging $\theta_{es}(l)$ across event times l.

Both CS and SA can estimate aggregate treatment effect (DiD model) and dynamic treatment effect (event study model). The difference between CS and SA method lies in the way of dealing with covariates if all the assumptions hold. The control variables in this study are a set of indicators capturing socioeconomic development. For time-varying covariates, Callaway and Sant'Anna (2021) use the value from the period immediately before the treatment as a time-invariant variable, then multiplies it by time dummies. The SA method handles time-varying covariates in the same way as traditional regression. The CS method uses a varying base period. In the implementation of the CS method, we add 'long2' to make sure the choose of the default base period is consistent with SA method. The SA method uses a universal base period, meaning all differences are measured relative to a specific period, typically the one just before treatment begins.

5.2 Spatial DID model

The potential outcomes framework for the observed outcome[7] encodes the stable unit treatment value assumption (SUTVA) that unit i's outcomes do not depend on the treatment status of unit $j \neq i$, which rules out spillover effects (Roth et al., 2023). But spillover effect may occur when the effect of treatment extends over the treatment boundaries. In this case, the SUTVA assumption would be violated.

[7] $Y_{it} = D_i Y_{it}(1) + (1 - D_i) Y_{it}(0)$

Therefore, this study used a spatial DID model to further check the spatial spillover effect of CBEC policy on the business creation.

Spatial models, such as the spatial autoregressive (SAR) model, spatial error model (SEM), and spatial Durbin model (SDM), offer different approaches to capturing spatial relationships. Among these, the SDM is particularly effective in capturing the spatial spillover effects of both the explanatory and the dependent variables (Chen et al., 2023; Li & Li, 2020). Thus, our study uses the SDM to account for the spatial spillover effects of CBEC policy. The spatial DID model based on the SDM used in this study is as follows:

$$Y_{it} = \rho \sum_{j=1}^{N} w_{ij} Y_{jt} + \beta_1 D_{it} + \sum_{k=2}^{M} \beta_k X_{it}^k + \phi_1 \sum_{j=1}^{N} w_{ij} D_{jt} + \sum_{k=2}^{M} \phi_k \sum_{j=1}^{N} w_{ij} X_{jt}^k + \mu_i + \lambda_t + \epsilon_{ijt} \quad (9)$$

Where spatial units are indexed by $i, j = 1, \dots, N$. The spatial weight for the $\{i, j\}$th unit-pair is denoted by w_{ij}, which is calculated through the following equation (10). The spatial autoregressive coefficient, denoted by ρ, captures the spatial correlation between business creation in unit i and its neighbouring unites. β_k stands for the local effect of the control variable, and ϕ_k the spatial spillover effect of the control variable. β_1 is the local effect of the CBEC policy, ϕ_1 denotes the spatial spillover effect of the CBEC policy.

$$W_{ij} = \begin{cases} 1, unit\ i\ \ is\ adjacent\ to\ unit\ j \\ 0, unit\ i\ is\ not\ adjacent\ to\ unit\ j \end{cases} \quad (10)$$

6. Main results

Fig. 3 presents the results from the SA estimators based on equations (2) and (3). These results illustrate the pre-trends, dynamic treatment effects, and aggregate treatment effects over the first 20 quarters following the implementation of the CBEC policy.

A critical identifying assumption of our empirical strategy is the parallel trend assumption, which posits that, in the absence of the CBEC policy, business creation in treatment and control cities would have followed a common trend. While this assumption cannot be directly tested, its plausibility is enhanced if pre-treatment trends in business creation are similar across treated and control units. The estimated pre-trend coefficients are statistically insignificant and close to zero, indicating the absence

of anticipation effects or pre-existing differential trends between treatment and control groups prior to the policy's introduction. This finding lends credibility to our identification strategy and supports the causal interpretation of the estimated treatment effects.

The results also suggest a consistent upward trend in business creation following the introduction of the CBEC policy. On average, business creation increased by 34.2 percentage points. This estimate represents the average treatment effect across the first 20 post-treatment quarters.

To contextualise the magnitude of this effect, consider one case of the CBEC-CPZ in Hangzhou city, which reported an average of 17.8 business creations per quarter during the pre-treatment period. A 34.2 percentage points increase translates to an additional 6.1 business creations per quarter. This substantial rise underscores the policy's potential to stimulate entrepreneurial activity within CBEC zones.

The estimated quarterly treatment effects exhibit an increasing trend over the first 7 quarters following the policy implementation, after which they fluctuate around a stable level. However, these effects only become statistically significant after the first five quarters, likely due to the construction and preparation period required for establishing CBEC zones and their corresponding facilities. The average treatment effect across all post-treatment periods is 45.5 per cent (see column (1) of Table A4). However, this effect should be interpreted with caution. Notably, Hangzhou is the only city with observations in the last four quarters, as it was the earliest batch to receive the treatment. Consequently, the precision of quarterly estimates for later quarters is lower compared to earlier quarters, as highlight in Cloud et al. (2023).

7. Robustness checks

This section provides a detailed robustness analysis of the CBEC-CPZ policy's impact on business creation using multiple approaches to address potential concerns such as anticipation effects, endogeneity concerns, placebo tests, CBEC park sizes, control group composition, and spillover effects.

7.1 Addressing concerns relating to no anticipation assumption.

Anticipation effects are more likely to occur among State-owned and Collective Businesses (SCBs), as these firms typically have privileged access to information and resources. In other cases, treatment anticipation is less likely to be an issue. For example, although it is possible that Hangzhou was selected

as the first pilot city due to its own strengths, other cities such as Shanghai, with its strong tradition of external openness, and Yiwu, with its advanced e-commerce sector, also possess significant advantages. Furthermore, the specific siting of CBEC park within Hangzhou is difficult to predict. Given these uncertainties, we believe that treatment anticipation is unlikely to be a concern.

We excluded SCBs from the sample to assess whether their inclusion might bias the estimated results, as these firms typically operate under more favourable institutional conditions. These businesses often enjoy privileged access to government resources and are more likely to anticipate policy changes, adjusting their strategies accordingly before official implementation. Given this, we conducted a robustness check by removing these businesses from the sample to better isolate the true impact of the introduction of CBEC pilot policy on business creation.

The results of this analysis are shown in columns (1) and (2) of Fig. A1. In column (1), the yellow line represents estimates from the sub-sample excluding SCBs, while the black line replicates the baseline results from the main estimation sample for comparison. The estimated pre-trend coefficients are insignificant and hover near zero. The close alignment of the two lines suggests that the dynamic treatment effects are largely consistent. A comparison of the aggregate effect on business creation—displayed in column (2) of Fig. 3 for the full sample and in column (2) of Fig. A1 excluding SCBs—reveals only a minor difference of 0.1%. This indicates that the inclusion of SCBs leads to a slightly lower estimate of the policy's impact on business creation, likely due to their distinct advantages and relative insensitivity to institutional reforms. The negligible 0.1% difference confirms the robustness of our results and further highlights that the policy's entrepreneurial stimulus operates through private firms, empowering disadvantaged market participants to engage more actively in the market.

7.2 Addressing CEBC rollout endogeneity concerns.

A threat to the identification of causal effects would be if the city- specific time characteristics were correlated with changing trends in business creation and the timings of launches. We interact city own characteristics with year dummies as additional controls in our specification. In this way, not only can city-specific time trends be controlled for, but also time-specific effects for each city, such as regional or national factors (like a recession or a new policy shock), where the impact of these events may vary between cities, can also be accounted for.

Same as above, the black line in column (1) of Fig.A2 replicates the baseline results from the main estimation sample for comparison. The yellow line represents results estimated from equations (2) and

(3) after the inclusion of city-specific time fixed effects. The estimated pre-trend coefficients are insignificant and close to zero as shown in Fig.A2. The close alignment of the two lines suggests that the dynamic treatment effects and the aggregate effect are largely consistent, which shows that our main results are qualitatively robust to the inclusion of a city-specific time fixed effects in our model.

7.3 Placebo tests on launch dates

Second, we re-estimate the results from column (2) of Fig. 3, applying placebo launch dates, shifted by 1 and 2 quarters to the past from the actual launch dates. If results were driven by non-parallel trends not fully captured by the fixed effects, these placebo tests could also indicate significant estimates. These results are shown in the Fig. A3. This figure presents the estimated aggregated treatment effects on business creation relative to shifts in rollout time, with the actual rollout time set as the reference point (0). The only significant effect is observed at the actual rollout time, with a 34.2% increase in business creation compared to control group. The effects at other time shifts are not significant. We view this as reaffirming evidence that the observed treatment effects at the actual rollout time are robust and not driven by non-parallel trends or unobservable factors.

7.4 Using varying CBEC park sizes.

There is no officially released list of CBEC parks. If the radius is too large, untreated samples may be included in the treatment group. In this case, the coefficient may be underestimated. If the radius for calculating the CBEC parks is too small, treated samples may be included in the control group. In this section, we use different radii to observe how the estimates change.

The results are presented in Fig. A4. This figure illustrates the estimated aggregate results on business creation across varying CBEC park sizes. The relationship between park size and business creation follows an inverted U-shape, where the estimated effects increase with park size, peaking at 34.2% for parks around 80,000 square meters, before declining for larger parks. Thus, we argue that our setting of a radius of 80,000 square meters is reasonable.

7.5 Using the alternative estimator.

The yellow line in column (1) of Fig. A5 report the CS estimates from equations (4) to (7), showing the dynamic treatment effect up to the 20th quarter after the treatment, with almost identical pre-trends and post-trends to those estimated by the SA method, shown by the black line in column (1) of Fig. A5. Although the yellow line is slightly above the black line at certain points, the two remain close overall, indicating the dynamic results are consistent between two estimation methods. The estimated pre-trend coefficients are insignificant and close to zero.

The SA method demonstrates slightly lower aggregate effects on business creation, with an estimated increase of 34.3% compared to 38.3% (as shown in column (2) of Fig. A2) for the CS method across the first 20 quarters. This slight underestimation may be due to the control variables absorbing part of the treatment effect; however, the impact on our results is minimal. Given the additional assumptions imposed by the CS method, such as random sampling, which requires that the CBEC zones are randomly selected and independent of each other, we believe the SA estimator provides a more accurate estimate, even though limited treatment anticipation would be the reason to favour the CS estimator.

7.6 Increasing the size of the control group by including never treated cities.

According to the remark from Callaway and Sant'Anna (2021), the use of 'never-treated' units as part of the comparison group may not be considered appropriate due to their significantly different behaviour compared to the 'eventually treated' units. In such cases, all 'never-treated' units can be excluded from the analysis. In our study, to ensure that the treatment and control groups are broadly comparable across key characteristics such as demographic composition, economic activity, infrastructure development, and institutional context, we limited the sample to pilot cities, with the control group consisting of areas outside the CBEC parks within these cities and the treatment group being the areas inside the parks.

But potential issues related to the control group still exist. This approach may be affected by potential spillover effects of the policy on areas outside the designated zones but still within the same pilot cities. To address the concern relating to potential spillover effects, we adjusted the control group by incorporating never-treated cities in two ways. First, we expanded the control group by adding non-pilot cities to observe how the coefficients change. Second, we modified the sample by replacing the original control group with the newly added non-pilot cities, ensuring that the original control groups were excluded. This approach helps mitigate potential spillover effects, even if they are present.

The relevant results are presented in columns (1)-(4) of Fig. A6. In columns (1) and (2), the yellow line reports the SA estimators from equations (2) and (3), showing the pre-trends and dynamic treatment effects, as well as the aggregate treatment effects for the first 20 quarters. This uses the control group with non-pilot cities added to observe how the coefficients change. In columns (3) and (4), the yellow line again reports the SA estimators from equations (2) and (3), but here the control group is replaced with the newly added non-pilot cities, excluding the original control group. The black line replicates the baseline results from the main estimation sample for comparison.

The aggregate treatment effects in column (2) and column (4) of Fig. A6 show limited differences compared to the results in column (2) of Fig.3, with a variation of less than 2.7%. This affirming evidence show that potential spillover effects (for a detail discussion of potential spillover effects concerns, see Section 5.2.7) could not a concern in our identification.

7.7 Spillover effects

The preceding analysis provides empirical evidence that the implementation of the CBEC policy, which introduced a series of economic institutional innovation measures, promotes business creation. However, it is possible that the policy induced the relocation of already established businesses from other regions into the CBEC parks, implying that the policy may not have directly fostered new entrepreneurial activity but rather resulted in a siphoning effect. Therefore, it is necessary to further explore whether the policy generated spillover effects on surrounding areas.

To investigate this, we do the estimation by employing an SDM-based spatial DID method using a spatial adjacency matrix. The results, presented in Table 2, show that CBEC policy has a significant effect on business creation, but has no spatial spillover effect. This suggest that the observed effect of the policy is not driven by relocating existing firms into the park from outside areas, but rather by fostering new entrepreneurial ventures within the park itself.

8. Heterogeneity analysis

Column (1) and (2) of Table 3 provides results of the CBEC policy's impact on business creation across different groups of resource allocation efficiency level, which show that regions with higher resource distortions exhibit a significant increase in entrepreneurial activities, while those with lower distortions show no significant effect. This aligns with the policy's emphasis on optimizing resource allocation and suggests that its success on stimulating entrepreneurial activities lies in improving

resource efficiency.

Finally, for local strengths, the policy's effect is substantially more pronounced in regions with higher trade openness, showing a significant 50.379% increase in entrepreneurial activities (see column (3) of Table 3), whereas regions with lower trade openness show no significant results. This underscores the importance of global trade integration in enabling regions to capitalize on the opportunities created by the CBEC-CPZ program.

9. Conclusion

This paper constructs, for the first time, a city-pilot zone-quarter panel dataset describing entrepreneurial dynamism in China, based on administrative new-firm-registration data from 2013 to 2020. Using the rollout of the CBEC Comprehensive Pilot Zone as a quasi-experiment and employing a staggered difference-in-differences (DID) design, we first provide the quantitative assessment of how these pilot-zone institutional innovations affect regional entrepreneurship.

To do so, we use unit-by-time variations in experiencing the rollout of CBEC pilot program as a quasi-natural experiment. Our results suggest that this CBEC-CPZ program has significantly increased business creation within the designated zones, as evidenced by a 34.2% rise in new enterprises compared to control groups. The finding that areas where experience CBEC-CPZ program change the quantity of entrepreneurial activity is consistent with the theory that exogenous institutional reforms changing the environment where entrepreneurial decisions are taken and implemented (Chowdhury et al., 2019; Douhan & Henrekson, 2010). This finding is robust to a series of checks, including addressing anticipation issues, tackling endogeneity concerns, conducting placebo tests on launch dates, considering varying park sizes, using alternative control groups, and testing for spillover effects.

Our first heterogeneity analysis suggests that improved resource allocation efficiency may be a critical pathway linking the CBEC-CPZ program to increased entrepreneurial activity, which is consistent with Kaiser (1990), emphasizing the role of efficient resource allocation in fostering innovation and business creation. Additionally, this aligns with studies highlighting the importance of institutional innovations in enhancing resource allocation efficiency (Robinson & Acemoglu, 2012) and their subsequent positive impacts on entrepreneurial growth. These results highlight the importance of fostering efficient resource distribution in driving the entrepreneurial response to institutional reforms.

Our second heterogeneity analysis highlights the CBEC-CPZ program's essential focus on harnessing local strengths. This policy encourages regions to adapt the program to their specific

characteristics, leveraging unique local resources and industry advantages to maximize its impact. The results show that the policy's effect on business creation is significantly more pronounced in regions with higher trade openness, as these regions not only possess stronger infrastructure and established trade networks but also have greater experience and a clearer understanding of their challenges and reform needs (Dollar & Kraay, 2004; Girma et al., 2004). This enables them to integrate and capitalize on the program's opportunities more effectively. These findings highlight the importance of aligning policy goals with regional strengths as a pathway to fostering entrepreneurship and optimizing reform outcomes.

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Table

Table 1 Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Outcome variables					
Number of new firms	5,696	10929.940	17628.070	0	193,226
Entrepreneurship quality (mean)	5,280	10.731	6.787	0	23.678
Entrepreneurship quality (median)	5,280	10.767	6.826	0	23.676
Control variables					
Ratio of sci/tech/edu expenditure	5,696	0.031	0.013	0.014	0.171
GDP per capita	5,696	79,154.480	35,444.120	15,238	203,489
Ratio of secondary industry outputs	5,696	44.926	8.866	15.050	72.230
Ratio of tertiary industry outputs	5,696	48.193	10.351	19.840	83.870
Ratio of trade	5,696	0.380	0.294	0.008	1.517
Fiscal transparency	5,696	51.516	20.992	7	92.150
Financial inclusion index	5,696	265.020	69.405	118.01	431.93
Ratio of e-commerce transactions	5,696	0.206	0.143	0.018	1.139
Heterogeneity variables					
Capital distortion (OP)	4,672	0.493	0.500	0	1
Capital distortion (LP)	4,672	0.493	0.500	0	1
Local strength	5,696	0.674	0.469	0	1

Table 2 Spatial spillover test results

	(1)	(2)
Estimator	SDM-Based DID	
%-increase in business creation	8.214***	8.227***
	(2.501)	(2.500)
%-increase in business creation (W)	3.119	2.951
	(3.727)	(3.726)
Unit fixed effects	Yes	Yes
Time fixed effects	Yes	Yes
Covariates	Yes	Yes
Observations	5696	5696

Notes: ** p<0.05, *** p<0.01. Standard errors clustered at city level are presented at parentheses. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

Table 3 Treatment effects of CBEC-CPZ program are heterogeneous across different groups

	(1)	(2)	(3)
Heterogeneity variable	Capital Distortion		Trade openness
	OP	LP	
%-increase in business creation for the lower group	32.070	58.300	9.167
	(26.757)	(30.892)	(13.392)
%-increase in business creation for the higher group	53.921***	40.960***	50.379***
	(8.633)	(8.310)	(11.740)
Unit fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Covariates	Yes	Yes	Yes
Observations for the lower group	2560	2560	1664
Observations for the higher group	2432	2432	4032

Notes: ** p<0.05, *** p<0.01. Standard errors clustered at city level are presented at parentheses. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$

Figure 1 The spatial distribution and rollout year of CBEC pilot cities

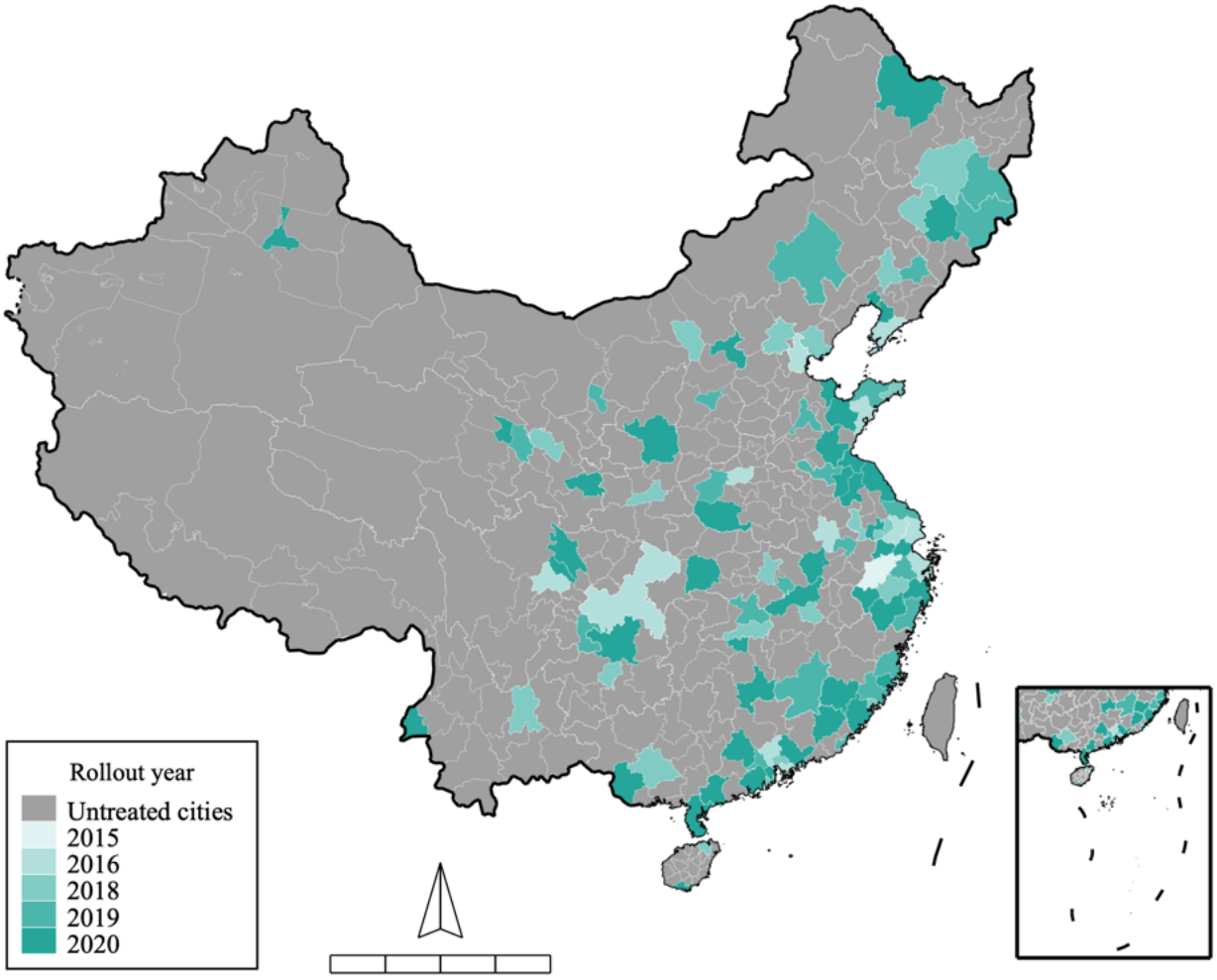
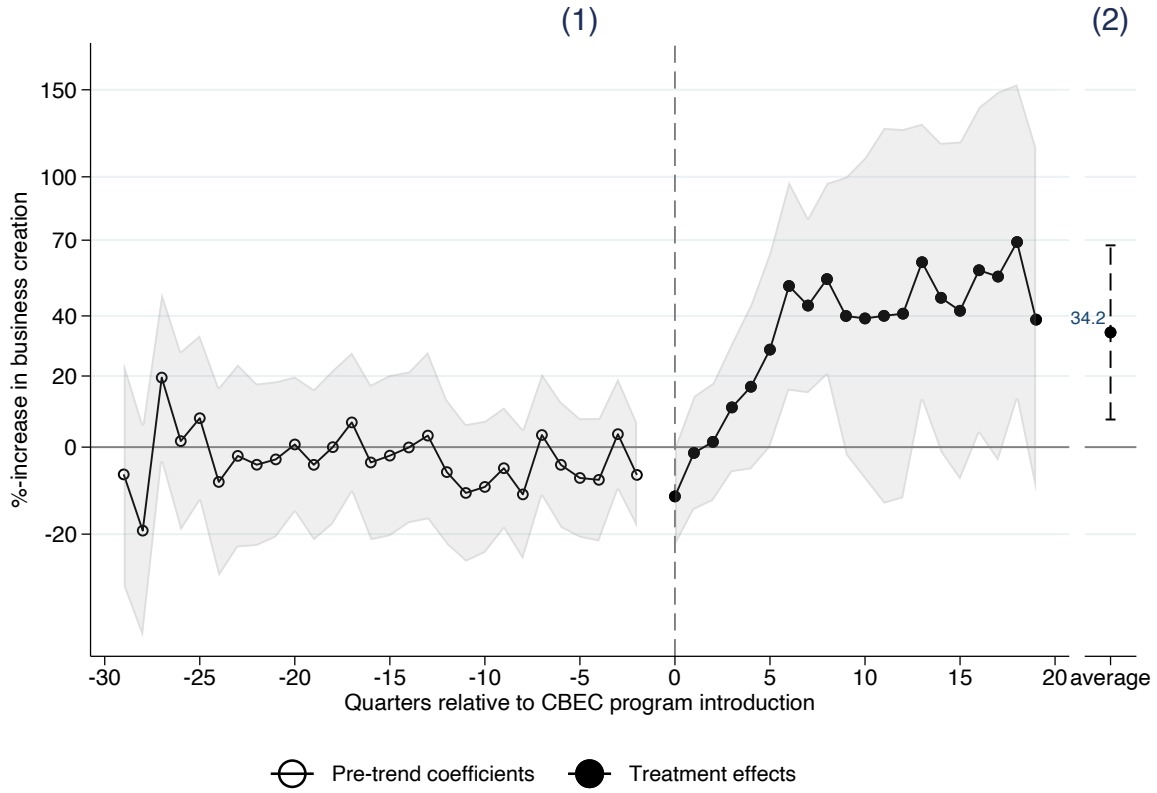


Figure 2 Yearly trend of number of business creation (log) by zone



Note: To clearly compare the trends, the number of business creation (log) outside the zone has been adjusted by subtracting a constant value of 6.7.

Figure 3 Estimated treatment effects on business creation



Notes: Standard errors clustered at the city level are presented in parentheses. The number of observations in each sample is 5,696. Unit fixed effects, time fixed effects, and covariates are controlled for in the specification (2). Column (1) of this figure shows pre-trends and quarterly dynamic treatment effects relative to treatment introduction. In the line plot, filled dots indicate treatment effect estimates for the first 20 quarters relative to the introduction of CBEC policy. Circles indicate estimates for pre-treatment quarters. Effects after quarter 19 are not presented in the above figure. Quarter-level estimates for long-term effects (after quarter 19) are estimated on small subsamples (only Hangzhou city has observations as it is the earliest batch to be treated). So, estimates for later quarters cannot be estimated with comparable precision as for earlier quarters. Column (2) of this figure shows aggregate treatment effects for the first 20 quarters after the treatment. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

Appendix Table

Table A1 Rollout Time of CBEC Pilot Zones across Cities

Time	Number of cities with pilot zones	Cities where pilot zones locate
Mar 2015	1	Hangzhou
Jan 2016	12	Ningbo, Tianjin, Shanghai, Chongqing, Hefei, Zhengzhou, Guangzhou, Chengdu, Dalian, Qingdao, Shenzhen, Suzhou
Jul 2018	22	Beijing, Hohhot, Shenyang, Changchun, Harbin, Nanjing, Nanchang, Wuhan, Changsha, Nanning, Haikou, Guiyang, Kunming, Xi'an, Lanzhou, Xiamen, Tangshan, Wuxi, Weihai, Zhuhai, Dongguan, Yiwu
Dec 2019	24	Shijiazhuang, Taiyuan, Chifeng, Fushun, Hunchun, Suifenhe, Xuzhou, Nantong, Wenzhou, Shaoxing, Wuhu, Fuzhou, Quanzhou, Ganzhou, Jinan, Yantai, Luoyang, Huangshi, Yueyang, Shantou, Foshan, Luzhou, Haidong, Yinchuan
Apr 2020	46	Xiongan New Area, Datong, Manzhouli, Yingkou, Panjin, Jilin, Heihe, Changzhou, Lianyungang, Huai'an, Yancheng, Suqian, Huzhou, Jiaxing, Quzhou, Taizhou, Lishui, Anqing, Zhangzhou, Putian, Longyan, Jiujiang, Dongying, Weifang, Linyi, Nanyang, Yichang, Xiangtan, Chenzhou, Meizhou, Huizhou, Zhongshan, Jiangmen, Zhanjiang, Maoming, Zhaoqing, Chongzuo, Sanya, Deyang, Mianyang, Zunyi, Dehong Dai and Jingpo Autonomous Prefecture, Yan'an, Tianshui, Xining, Urumqi

Table A2 Number and ratio of new businesses by industry within and outside CBEC-CPZ (2013–2020)

Industry	Zone	No. Business creation (unit)	Ratio (%)
Transportation, Storage, and Postal Services	0	2,570,031	3.942
	1	2,173	3.881
Accommodation and Catering Services	0	6,091,065	9.342
	1	4,714	8.419
Information Transmission, Software, and Information Technology Services	0	3,054,739	4.685
	1	3,280	5.858
Agriculture, Forestry, Animal Husbandry, and Fishery	0	2,954,113	4.531
	1	382	0.682
Manufacturing	0	1,0001,666	15.339
	1	7,492	13.381
Health and Social Work	0	425,984	0.653
	1	352	0.629
Residential Services, Repairs, and Other Services	0	4,902,538	7.519
	1	3,992	7.130
Construction	0	3,080,623	4.725
	1	2,663	4.756
Real Estate	0	1,067,982	1.638
	1	1,348	2.408
Wholesale and Retail Trade	0	19,095,481	29.286
	1	17,847	31.875
Education	0	580,553	0.890
	1	536	0.957
Culture, Sports, and Entertainment	0	1,973,415	3.027
	1	1,776	3.172
Water Conservancy, Environment, and Public Facilities Management	0	484,997	0.744
	1	317	0.566
Production and Supply of Electricity, Heat, Gas, and Water	0	289,937	0.445
	1	238	0.425
Scientific Research and Technical Services	0	3,275,198	5.023
	1	3,310	5.912
Leasing and Business Services	0	4,591,310	7.041
	1	4,910	8.769

Mining	0	174,509	0.268
	1	76	0.136
Financial Industry	0	590,187	0.905
	1	584	1.043

Note: $Zone = 0$ denotes areas outside the CBEC pilot zones, while $Zone = 1$ indicates areas within the CBEC pilot zones.

Table A3 Number and ratio of new businesses by ownership within and outside CBEC-CPZ (2013–2020)

Ownership	Zone	No. Business creation (unit)	Ratio (%)
Individual Industrial and Commercial Households	0	35,652,410	54.701
	1	31,258	37.628
Joint Venture Enterprises	0	594,968	0.913
	1	114	0.137
State-Owned Enterprises	0	43,870	0.067
	1	52	0.063
Foreign-Invested Enterprises	0	284,458	0.436
	1	924	1.112
Unknown type	0	43,963	0.067
	1	26	0.031
Private Enterprises	0	28,545,843	43.797
	1	50,695	61.026
Collective Ownership Enterprises	0	11,740	0.018
	1	2	0.002

Note: $Zone = 0$ denotes areas outside the CBEC-CPZ, while $Zone = 1$ indicates areas within the CBEC comprehensive pilot zones.

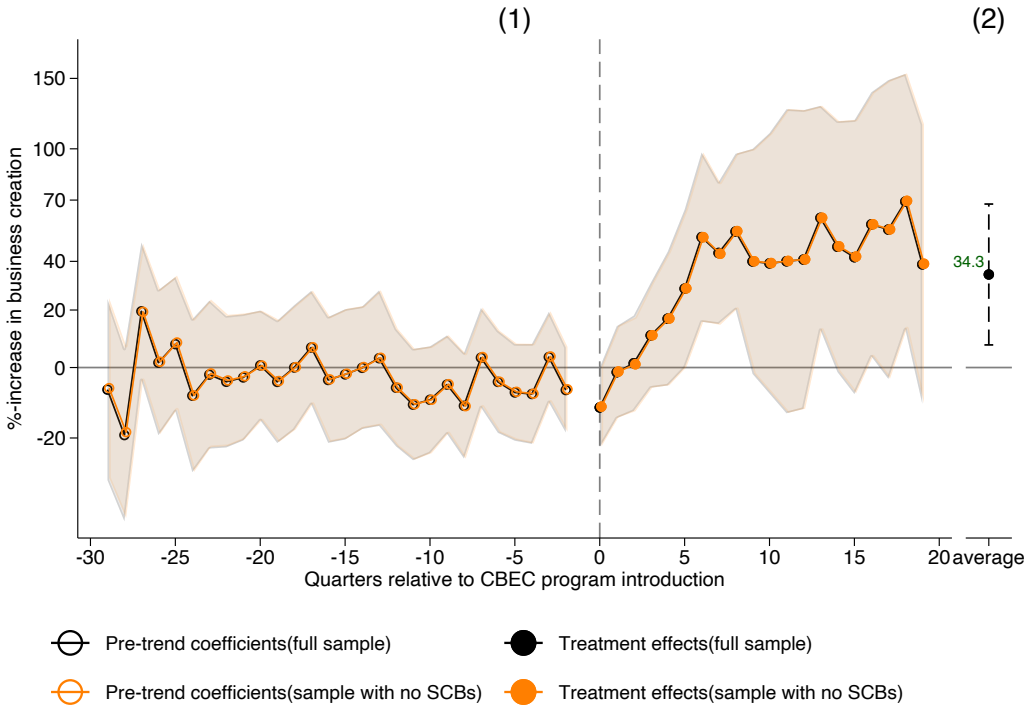
Table A4 Estimated aggregate treatment effects on the No. business creation

	(1)	(2)	(4)	(5)
Estimator	SA	CS	SA	SA
Control group	Main sample		Alt. sample 1	Alt. sample 2
%-increase in business creation during 24 quarters	45.455***	49.063***	41.425***	40.088***
	(10.230)	(10.583)	(9.944)	(10.010)
Unit fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Covariates	Yes	Yes	Yes	Yes
Observations	5696	5696	10898	8763

Notes: ** p<0.05, *** p<0.01. Robust standard errors in parentheses allow for clustering of the model error at the city level. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

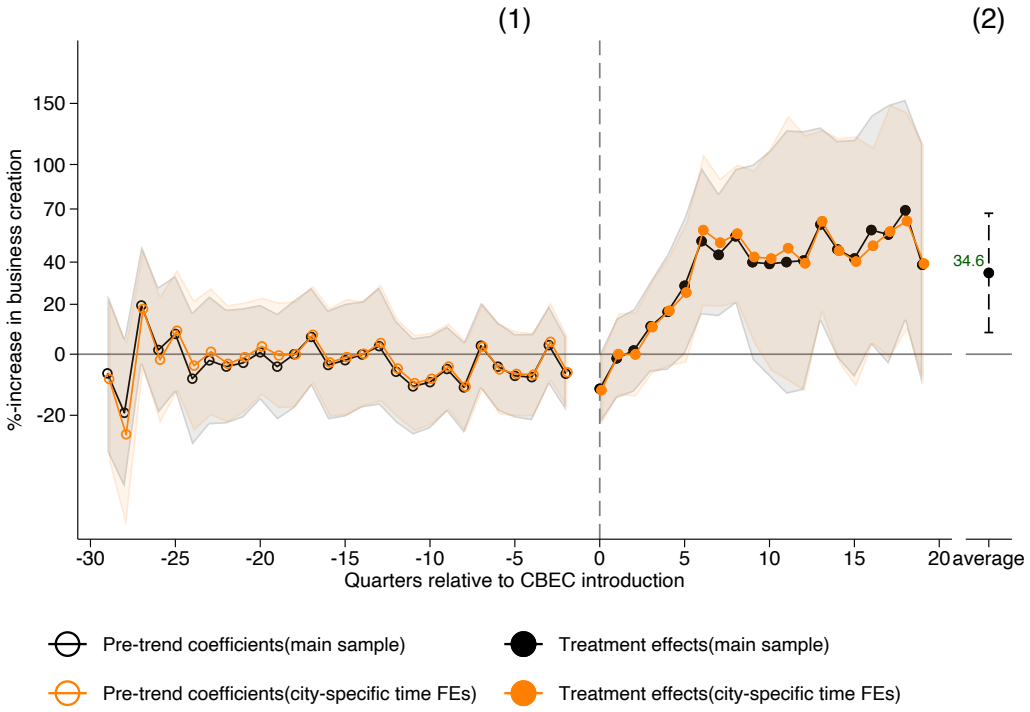
Appendix Figure

Figure A1 Estimated treatment effects on business creation excluding SCBs



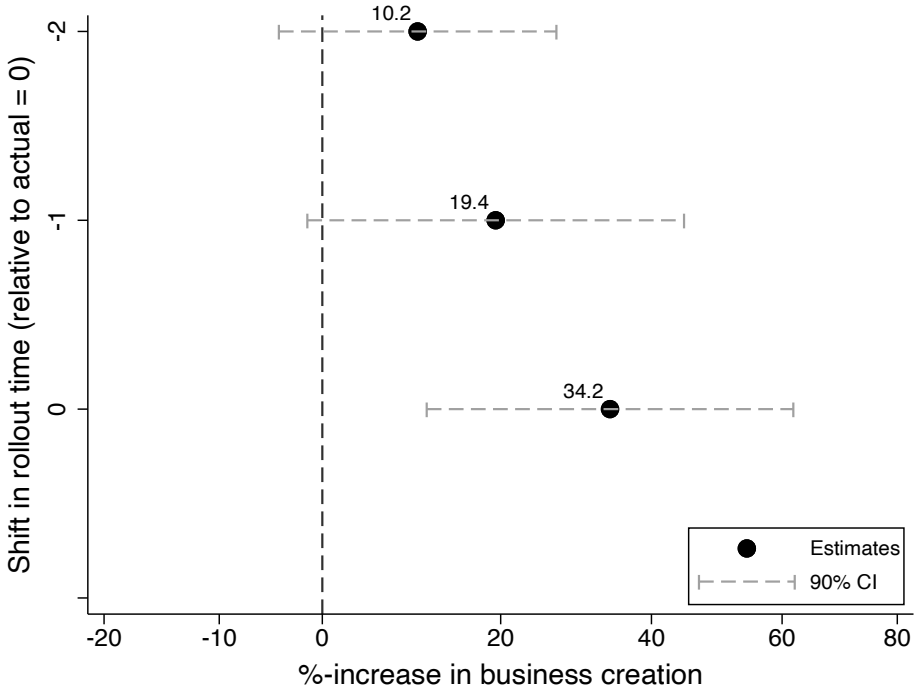
Notes: Standard errors clustered at the city level are presented in parentheses. The number of observations in each sample is 5,696. Unit fixed effects, time fixed effects, and covariates are controlled for the estimation specification. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

Figure A2 Estimated aggregate treatment effects after addressing endogeneity concerns



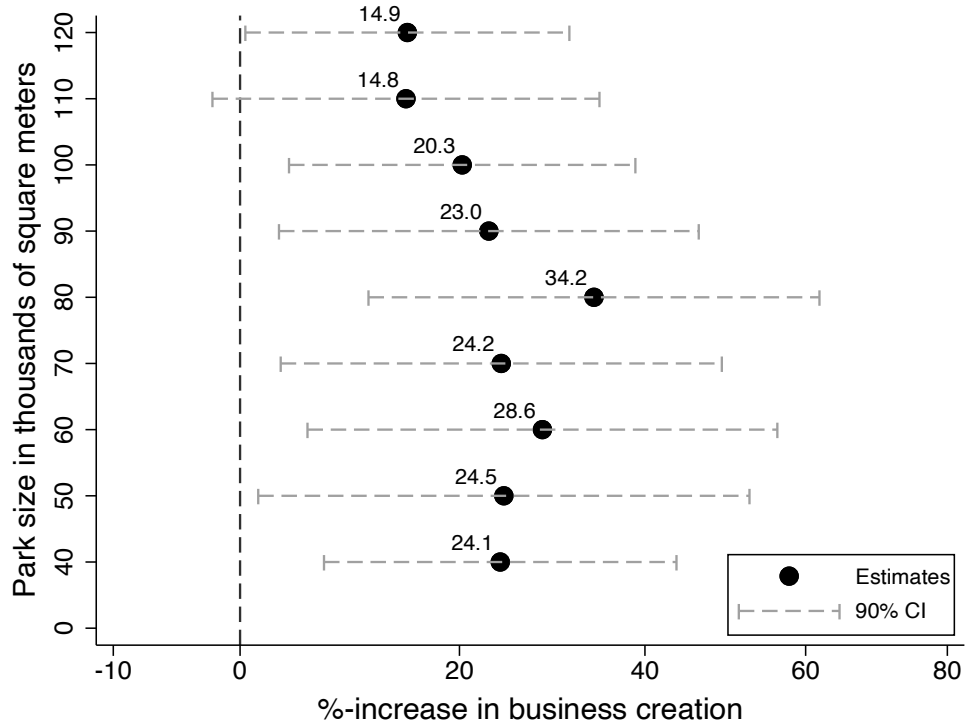
Notes: Standard errors clustered at the city level are presented in parentheses. The number of observations in each sample is 5,696. Unit fixed effects, time fixed effects, covariates, and city-specific time fixed effects are controlled for the estimation specification. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

Figure A3 Aggregate effects using varying rollout time



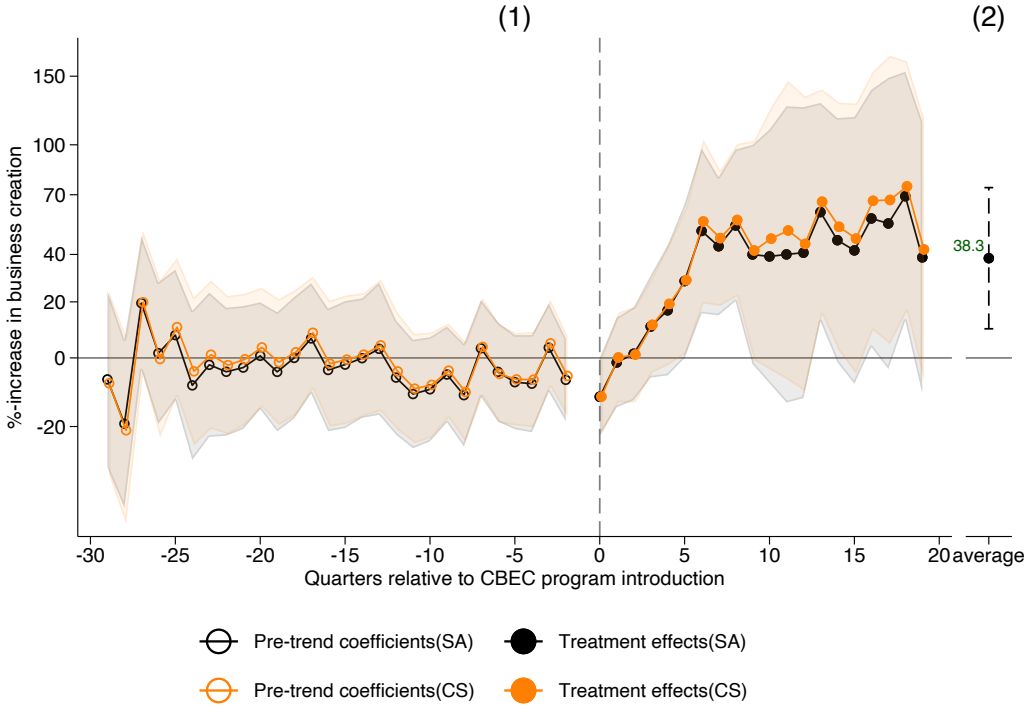
Notes: Standard errors clustered at the city level are presented in parentheses. The number of observations in each sample is 5,696. Unit fixed effects, time fixed effects, and covariates are controlled for the estimation specification. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

Figure A4 Aggregate effects using varying CBEC park sizes



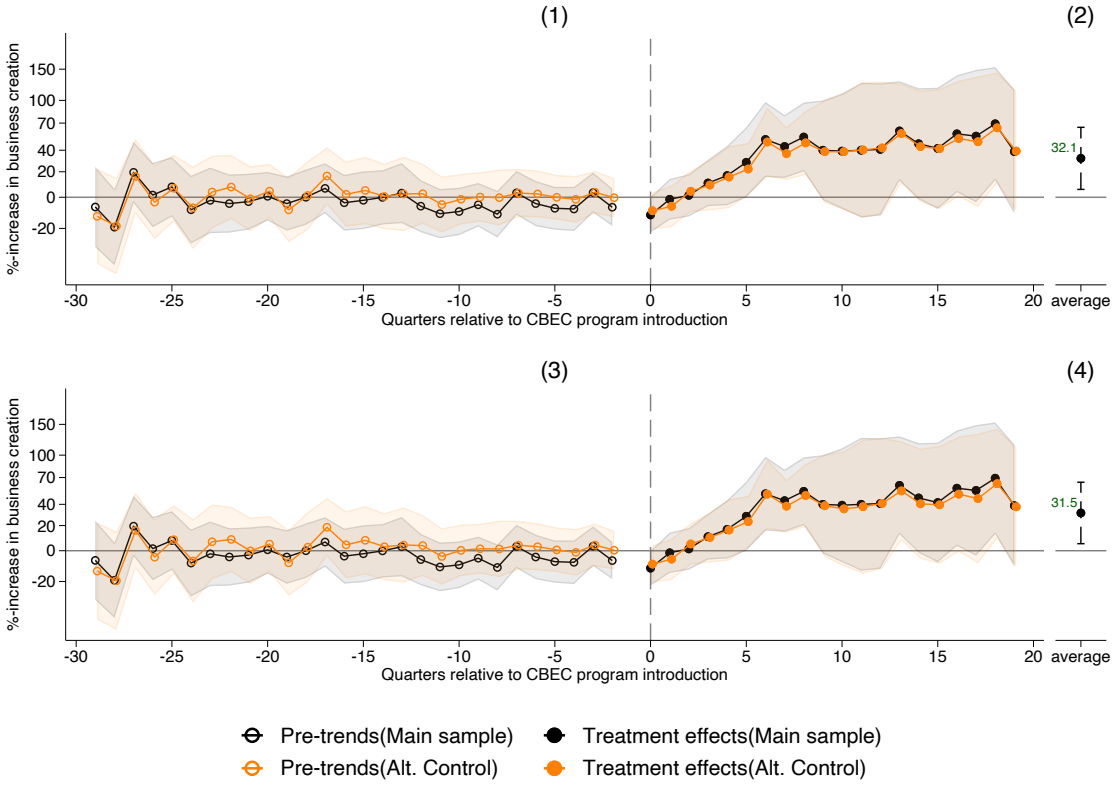
Notes: Standard errors clustered at the city level are presented in parentheses. The number of observations in each sample is 5,696. Unit fixed effects, time fixed effects, and covariates are controlled for the estimation specification. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

Figure A5 Estimated treatment effects on business creation using the alternative estimator



Notes: Standard errors clustered at the city level are presented in parentheses. The number of observations in each sample is 5,696. Unit fixed effects, time fixed effects, and covariates are controlled for the estimation specification. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.

Figure A6 Estimated treatment effects using alternative control group



Notes: Standard errors clustered at the city level are presented in parentheses. The number of observations in each sample is 5,696. Unit fixed effects, time fixed effects, and covariates are controlled for the estimation specification. Raw estimates are transformed to semi-elasticities: $100 \cdot (\exp(\theta_{es}^{o}) - 1)\%$.