Investment Promotion for Development Zones in China: Underlying Rationale and Policy Options

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Abstract: *Development zones (DZs) have emerged as a significant policy initiative for promoting regional coordination and facilitating resources allocation. They serve as an organizational framework for fostering industrial agglomeration and driving high-quality development. DZs attract and accommodate resource factors, firms, and projects, thereby functioning as a central catalyst for economic growth. This study utilizes data collected at the "DZ, City and Countrycountry" levels through manual compilation, textual analysis, and innovation measurement. It aims to empirically examine the theoretical rationale and practical preferences for promoting business and investment in China's DZs. This study considers several factors such as industry attribute, firm attribute, agglomeration theory, and industrial chain layout. Based on our research findings, DZs exhibit distinct preferences. First, industry attribute: DZs align with both national and regional strategic planning and adhere to the industrial endowments of the respective areas. Second, firm attribute: DZs prioritize attracting firms that are productive and innovative, and have an international presence, rather than those that primarily contribute to taxes and job creation. Third, DZs are guided by the agglomeration theory, which suggests that they prefer firms that generate strong agglomeration externalities. Lastly, DZs also consider the industrial chain layout, aiming to attract firms that not only align with their existing industrial strengths but also extend to the upstream and downstream supply chain links. These conclusions are substantiated by the performance of robustness test. The success of DZs in China can be attributed to the five key principles: Adherence to national and regional strategic planning, prioritizing the actual industrial foundation, incorporating the theory of agglomeration externalities, strengthening corporate competitiveness, and expanding industrial chains.*

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1. Introduction

Development zones (DZs) are a significant instrument in the pursuit of the socialist path with Chinese characteristics, as well as a crucial undertaking for Chinese modernization; they play a significant role in facilitating industrial spatial agglomeration and resource allocation (Shi et al.,

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2022). They achieve this by promoting the concentration of resource factors through the provision of governmental incentives, including tax credits, fiscal allowances, land grants, and property protection (Wang, 2013). According to Bao and Tang (2016), the establishment of DZs in China has played a significant role in stimulating regional economic growth. These zones have functioned as a catalyst, facilitator, and structural framework for China's economic growth miracle. Additionally, it has been observed that DZs in China have served as the focal points for prominent levels of investment, manufacturing, and economic activity, exhibiting a significant degree of density and vibrancy (Zhang et al., 2020). In 2019, the Ministry of Science and Technology and the Ministry of Commerce reported that the combined output value of China's national-level high-tech zones and economic and technological DZs reached 23.04 trillion yuan. This figure surpassed the combined output value of Guangdong and Jiangsu, considered the most prosperous provinces in China. The academic community has devoted considerable attention to the success of China's DZs. Numerous studies have been conducted to analyze the implications, advantages, and challenges associated with these zones (Zheng et al., 2008). These studies have found that DZs have yielded significant policy outcomes in terms of enhancing productivity (Kong and Chai, 2021), fostering technological innovation (Wu et al., 2021), mitigating air pollution (Zhang et al., 2021), addressing financial constraints and local liabilities (Bian et al., 2021), and improving the quality of exports (Yang and Xie, 2021).

The policy objective of "forging a new development paradigm and promoting high-quality development" has been identified in the Report presented at the 20th CPC National Congress. The achievement of this policy objective requires the execution of regional initiatives aimed at establishing a regional economic structure and land management characterized by mutually beneficial advantages and superior development. Our primary aim in this study consists in identifying the factors that contribute to the remarkable achievement of DZs as China's foremost instrument for implementing regional development programs and fostering regional economic growth. Previous research has predominantly concentrated on the corporate viewpoint, ascribing the achievement of such success to factors such as "policy rent" and "agglomeration rent" (Chen et al., 2016; Wang and Zhang, 2016). DZs are commonly recognized as a platform for fostering growth. Positioned at the forefront of economic progress, openness, and reform initiatives, DZs are required to adhere to performance benchmarks and evaluation objectives. From our opinion, the adoption of investment promotion as a framework is a pertinent approach to comprehending the achievements of China's DZs. This assertion is supported by the following arguments. The establishment of DZs serves as a progressive institutional framework and a novel regional development environment that facilitates the concentration and distribution of factors and resources through investment promotion. It is important to note that any discrepancies, contradictions, or ambiguities in the organizational structure, narratives, or intergovernmental relations of DZs can significantly impact investment promotion activities and outcomes. DZs are not only required to adhere to national and regional development strategies, but they are also influenced by the actions and policies of local governments. The aforementioned details can be hypothesized or replicated through investment promotion endeavors. Furthermore, the investment promotion activities conducted by DZs serve as a reflection of China's overall national governance, economic progress, and regional competitiveness. The investigation of investment promotion provides a fresh perspective on China's wider economic dynamics. Unfortunately, the academic community has not given enough attention to investment promotion as a significant strategy for development and the crucial priority of DZs as a policy instrument. Although there is considerable interest in DZs, existing research has primarily focused on their business process and organizational structure (Lyu et al., 2017), as well as the governance modes and network of relationships (Zhu, 2016). Academic researchers have seldom utilized conventional economic and econometric analytical approaches to examine the mechanisms through which DZs facilitate investment and the underlying reasons for this phenomenon.

This paper aims to analyze the development goals and functions of China's DZs by employing the

textual analysis method, which involves identifying the operational and management mechanisms and characteristics of these zones. Additionally, it seeks to uncover the principles and rationale underlying investment promotion activities conducted by China's DZs. In this study we use our manually gathered data at the "DZ, City and Country" levels to conduct a theoretical evaluation of investment promotion preferences. This evaluation is based on an innovative measurement of the externalities of industrial agglomeration in DZs. The objective is to elucidate the factors that have contributed to the success of China's DZs in terms of investment promotion. This paper aims to address three key inquiries. Firstly, it will explore the underlying rationale behind the investment promotion preferences exhibited by China's DZs, considering factors such as development goals and functional orientations. Secondly, it will examine the specific preferences of investment promotion adopted by China's DZs, considering aspects such as industry attributes, enterprise attributes, agglomeration theory, and industrial chain. Lastly, it will analyze the driving forces that contribute to the success of China's DZs, focusing on the perspective of investment promotion. In this analysis, we explore several key questions related to DZs; specifically the significance of factors such as the "guidance of industrial planning", "actual industrial endowment", "agglomeration externalities", "industrial chain layout", and "corporate competitive advantage". By considering the competition between DZs, we provide explanations for the outcomes observed in relation to these questions. Research on the fundamental reasoning and specific preferences underlying the investment promotion activities of China's DZs will contribute to revealing the mechanisms and motivations behind these zones' investment promotion efforts. This research aims to elucidate the factors that have facilitated the success of China's DZs in terms of investment promotion. Also, our research outcomes may contribute novel perspectives on national governance, economic development, and regional rivalry, specifically focusing on the perspective of investment promotion.

The remainder of this paper is structured as follows: Section 2 reviews the literature; section 3 presents the observed facts of investment promotion by China's DZs; section 4 specifies model, variables, and data; section 5 presents the empirical results; and the final section offers conclusions and policy recommendations.

2. Literature Review

DZs have garnered significant attention from academics as a crucial component of place-based policies and strategic initiatives aimed at fostering regional economic development. The topic of this study is related to the following branches of research literature in the context of DZs as a typical place-based policy.

The first branch of research has examined the implementation outcomes of conventional place-based policies, such as DZs. A substantial amount of research has extensively examined the policy impacts of place-based policies across various categories. These include place-oriented policies implemented by advanced economies, such as regular place-based policies, regional tax concessions (Hasan et al., 2021), regional investment subsidies (Brachert et al., 2019), regional infrastructure development (Donaldson, 2018), and regional resource allocation (Ma and Ma, 2021), as well as special place-based policies like Germany's Innovative Regional Growth Cores (IRGC) program (Falck et al., 2019), the United States' corporate industrial park policy (Freedman, 2013), the British relocation program (Faggioo, 2019), and the French urban region program (Briant et al., 2015). Furthermore, it is important to consider the place-based policies implemented by developing nations. Based on existing research, it has been observed that corruption and local capture have the potential to diminish the efficacy of place-based policies in developing nations, hence resulting in weak implementation outcomes (Mukherjee, 2015). In developing nations current research regarding the assessment of place-based policies is relatively recent and limited; it predominantly focuses on China's development zone policies as examined by Wang (2013), China's strategic development of the western region as investigated by Jia et al. (2020), China's poverty

reduction policy as analyzed by Liu and Ma (2018), and India's tax reduction program as explored by Hasan et al. (2021). Overall, the existing research on the impacts of conventional place-based policies tends to align with the findings of the first branch of research literature.

The focus of the second branch of research has been on analyzing the policy implications that arise from China's DZs. The identification of DZs has been recognized as a significant driver for China's economic expansion following the introduction of reform and opening-up policies in 1978 (He et al., 2016; Kong and Chai, 2021). Extensive academic research has been devoted to the analysis of their influence on economic activity. Researchers have examined the policy implications of industrial agglomeration and corporate productivity improvement (Wang and Zhang, 2016). Additionally, studies have investigated the potential for efficiency improvement (Huang et al., 2017), the impact on investment and employment (Lu et al., 2015), the role in promoting technological innovation (Wu et al., 2021; Zhang et al., 2021), the influence on household income (Wang et al., 2013), and the overall economic efficiency (Luo et al., 2015). Moreover, some academic studies have brought attention to the existence of distortions associated with "policy rent" within China's DZs (Zheng et al., 2008; Xiang and Lu, 2015). These distortions are observed in the form of input-output diseconomies and inefficient protection in the form of subsidies (Yang et al., 2018). These studies provide a substantial amount of information and empirical evidence for evaluating the impacts of implementation of China's DZs.

The third branch of research has examined the investment promotion strategies and practices exhibited by China's DZs. The present literature looks at the investment promotion efforts undertaken by DZs, with a particular focus on their mechanisms and tactics. Different categories of DZs exemplify China's effective implementation of market-driven strategies for regional development. Once a DZ is established, the administrative body assumes the responsibility for the implementation of infrastructure development and the provision of supplementary services, including road networks, drainage systems, water supply systems, electric power systems, as well as site preparation activities (Liu and Zhao, 2015). They have the potential to offer "policy rent" through various means such as tax credits, fiscal subsidies, credit facilities, land preferences, and administrative review and approval, as highlighted by Wu et al. (2021). These incentives are designed to attract enterprises and projects to these zones. Furthermore, this specific area of research has also examined the policy inclinations and actions pertaining to investment promotion within zones. In their study, Ma et al. (2021) conducted a comprehensive analysis of China's local government investment promotion policies following the initiation of reform and opening up in 1978. The authors identified three distinct stages in the transformative trajectory of these policies. These stages encompassed the initial predominance of foreign capital, a subsequent shift towards a balance of domestic and foreign capital and ultimately the adoption of strategies aimed at attracting both financial and intellectual capital. Several studies have indicated a preference for large enterprises (Liu, 2019), foreign-funded enterprises (Chen, et al., 2021), and local businesses (Lu et al., 2017) in DZs. One of the key areas of investigation pertains to the organizational structure and temporal context of investment promotion. Typically, inside a higher-level governmental department (Party organization) is responsible for establishing an administrative committee (Party working committee), as well as a supervision corporation within the development zone. This dual-entity institution, referred to as a "government plus market" model, is considered representative (Shi et al., 2022). The central government has consistently advocated for the demarcation of government and enterprises, leading to the transfer of administrative responsibilities to local governments (Wu, 2019). Nevertheless, the management of DZs continues to be predominantly controlled by an administration committee. DZs refer to delineated areas within administrative districts that are subject to evaluation by various governmental bodies such as the Ministry of Commerce, the Ministry of Science and Technology, and the local government. Additionally, investment promotion in these zones is evaluated by administrative committees (Wu et al., 2018). Hence, the concept of "competition for development" continues to be of utmost importance for DZs, leading to competition and strategic interactions among government entities to attract investments (Deng et al., 2018).

Several conclusions can be derived from the research literature. Firstly, it is worth noting that China's DZs represent a prominent example of a place-based strategy, which has generally yielded positive outcomes, despite the ongoing debates surrounding the efficacy of such policies and the factors that contribute to their success. Secondly, it is evident that the achievements of China's DZs are closely tied to their proactive efforts in investment promotion. These zones exhibit a discerning approach in selecting businesses and projects for their investment promotion activities. Lastly, to gain a comprehensive understanding of the investment promotion strategies employed by China's DZs, it is crucial to consider the organizational structure, contextual circumstances, and intergovernmental relationships that shape these zones. This approach will help shed light on the underlying mechanisms of investment promotion by China's DZs, which have often been regarded as enigmatic. This paper aims to empirically examine the fundamental rationale underlying investment promotion in China's DZs by analyzing key factors such as the organizational structure and developmental context. The study uses macroscopic database and measures distinct variables to elucidate the strategies employed by China's DZs to attract investment and the factors contributing to their success in this regard.

In contrast to the existing body of research, this paper presents several notable contributions. Firstly, it conducts a novel examination of the investment promotion preferences exhibited by China's DZs. This analysis is grounded in established theories and empirical evidence pertaining to investment promotion strategies employed by DZs. Secondly, the study incorporates a comprehensive dataset, thereby furnishing a solid empirical foundation for understanding the functioning of these DZs. Lastly, this study enhances the comprehension and theoretical exploration of DZs by elucidating the key factors that contribute to the success of China's DZs, such as industry attributes, corporate characteristics, agglomeration theory, and the interconnections within the industrial chain. Additionally, this study establishes a comprehensive database that covers different levels, including country, city, and development zone, utilizing both manual and textual analysis. A non-parametric estimation method is employed to quantify the agglomeration externalities of China's manufacturing and service sectors. This research endeavor will provide distinctive data and a fresh perspective for the investigation of DZs and their endeavors in attracting investments.

3. Review of Facts Regarding DZs

DZs have a significant role in driving the implementation of national strategies and fostering local economic growth, making them a prominent component of industrial space within the industrial sector.

3.1 Functions and Objectives of China's DZs

Since the initiation of China's reform in 1978, local governments have established DZs at different administrative levels. The primary objective of these zones is to attract firms, capital, labor, and technology through investment promotion strategies. Consequently, DZs have emerged as a conventional mechanism for the concentration of economic activity and the distribution of resources. Table 1 displays indicators pertaining to China's state-level economic and technological DZs, as well as high-tech industries zones for the years 2015 and 2019; the number of state-level DZs was documented from 2015 onwards. The data indicates that the two distinct categories of state-level DZs have significantly contributed to China's economic progress.

DZs play a crucial role in facilitating local economic development, reform, and innovation. Besides, these zones serve as a strategic mechanism for effectively executing national and regional development objectives. As an illustration, the 14th Five-Year Plan of Beijing Municipality designates DZs as platforms for efficient collaborative innovation, demonstration zones for high-end industries and commercialization of research and development. Similarly, the 14th Five-Year Plan of Shanghai Municipality outlines the functions of DZs as enhancing factor resources supply and service assurance, as well as promoting reform and innovation within the Shanghai Free-Trade Pilot Zone. Local

Table 1: Overall Economic Performance of China's DZs

	GDP		Tax payments		Total exports	
	Amount (in trillion yuan)	Share	Amount (in trillion yuan)	Share	Amount (in trillion yuan)	Share
2015	23.040	23.25%	3.710	23.48%	7.670	44.52%
2019	15.820	23.38%	2.890	22.51%	5.660	40.03%

Notes: (i) DZs in this table only include economic and technological DZs and high-tech industries zones; (ii) data of economic and technological DZs are from the *China Commercial Yearbook*, and data of high-tech industries zones are from the *China Torch Statistical Yearbook*; (iii) the share is the ratio between DZs and national aggregate.

governments have implemented a range of objectives and functions for the establishment of DZs. In Table 2 we have compiled the stated objectives and functions of China's DZs as outlined in the 10th, 11th, 12th, and 13th Five-Year Plans[1] of prefecture-level cities.

Table 2: Objectives and Functions of China's DZs

Objectives & functions	Manifestations	Means of realization
Technology innovation	Spatial agglomeration for tech innovation resources and commercialization of R&D results	Attraction, cultivation, retention, and use of innovators, resources, and platforms
Reform and transition	Reform and transition experiment and major strategy implementation	Endow DZs with the strategic role as the experiment fields for reform and transition
Industrial cultivation	Vibrant entrepreneurial activities in "high-end, precision, special and dedicated" industries	Conduct planning and offer policy incentives to cultivate economies of new technology, new industry, new business mode, and new paradigm
Economic growth	Improving indicators of DZs such as GDP and growth rate	Attract local key industries and enterprises to DZs
Industrial clustering	Collaborative agglomeration of major industrial clusters and upstream and downstream industries	Conduct industrial chain investment promotion and strengthen industrial chains
Tax and employment	Relatively high level of tax revenue and employment rate of DZs	Improving spatial layout of leading enterprises and major taxpayers
Driving effects	Driving effects and spillovers of technology and productivity	Industrial layout based on industry endowments and characteristics
Opening up	Vibrant exports, FDI and OFDI of DZs	Policy preferences for foreign trade, foreign-funded, and foreign economic entities

The operational and managerial modes of management entities in DZs are determined by the goals and purposes of these zones. Meanwhile, DZs and their respective authorities are subject to performance evaluation pressures and are accountable for achieving their respective development goals. The combination of these factors will exert an influence on the investment promotion preferences of DZs.

3.2 Investment Promotion Policy Instruments for China's DZs

DZs have made significant efforts to attract business investments. There has been a persistent effort to enhance infrastructure and foster a favorable business climate, resulting in an augmentation of policy preferences. In addition to site preparation, DZs provide investors an expanding array of essential utilities, comprising electricity, road infrastructure, water supply, communication networks, drainage systems, as well as heating supply and fuel gas provisions. Rather than passively awaiting investors, DZs

[1] Data for some prefecture-level cities and some years are unavailable.

have proactively undertaken the task of seeking out potential investors. To facilitate this process, they have established an online interactive platform that serves as a comprehensive guide for investors. The investment promotion strategy has transitioned from being indiscriminate to becoming more targeted, with a specific emphasis on developing a comprehensive industrial chain. According to Branstetter et al. (2022), firms receive many types of subsidies from the government. As part of the investment promotion process, the policy preferences provided by DZs play a crucial role in attracting high-quality enterprises and projects. The aforementioned factors encompass "policy rent" derived from policy incentives and "agglomeration rent" resulting from market proximity and spillovers. Policy incentives can be categorized into three distinct groups: Project investment incentives, technology innovation incentives, and incentives aimed at attracting talented individuals. For example, the economic and technological development zone in Wenzhou provides comprehensive subsidies to firms, including reductions or preferences in rent, entrepreneurial allowances, investment subsidies, technology innovation awards, and competition bonuses.

This paper aims to assess the investment promotion policy preferences currently provided by DZs, as outlined in the *Catalogue of Announcements on the Review of DZs in China 2018*. This Catalogue was jointly released by the National Development and Reform Commission, the Ministry of Science and Technology, the Ministry of Land and Resources, and three other ministries. Based on the examination of the Catalogue, we conducted an extensive investigation on the authorized online platforms of more than 2,000 DZs at different administrative tiers. The purpose of this inquiry was to perform a comprehensive textual analysis and evaluation of their policy inclinations. In general, the policy preferences put forth by China's DZs essentially encompass the reduction of taxes and fees, incentives for technological innovation, attraction of skilled employees, improvement of the business environment, preferences for investment and financing, and a combination of various other incentives.

3.3 Basic Rationale of Investment Promotion by China's DZs

The investment promotion operations of China's DZs are guided by their objectives and orientations, which encompass economic development, reform, and innovation. DZs break down their objectives and orientations into precise and realistic metrics when selecting leading industries or firms. While the specific variables used in the evaluation of DZs are not publicly disclosed, it is possible to provide a concise summary of their investment promotion rationale.

(i) Planning as guidance for significant national and regional development strategies. Given their roles as vehicles for the implementation of national and regional development strategies, it is imperative for DZs to align their priorities with those outlined in national and regional five-year plans. These plans encompass key strategies such as the transformation of the country into a manufacturing powerhouse, the promotion of innovation-driven development, and the advancement of the digital economy. The articulation of national and regional goals is frequently manifested in the five-year plans of relevant tiers, with the aim of leading high-quality growth. At the industry level, prominent national or regional development strategies are typically manifested by the provision of support and promotion for specific industries, sometimes referred to as the planning of dominating industries.

(ii) Local conditions and level of industrial development. During the implementation of national and regional development strategies, DZs assume the additional responsibility of facilitating local economic development. They function as the driving force and stabilizing factor for local economic activities. DZs often prioritize regional favorable and priority industries to promote investment. This strategy aims to leverage the benefits of agglomeration and economies of scale, hence enhancing the competitive advantage of existing businesses. Also, it is possible for them to prioritize local advantages or specific industries when considering the expansion or enhancement of upstream and downstream activities within these industries.

(iii) Externalities of industrial agglomeration. DZs use government initiatives to attract suitable sectors or firms, serving as the conduit for corporate spatial agglomeration with distinct institutional arrangements. Based on the agglomeration theory, it is advantageous for firms or industries characterized

by significant agglomeration externalities to be situated near one another, since this facilitates the optimal utilization of knowledge spillovers. DZs, characterized by limited capabilities and demanding priorities, are well-suited to attract firms or industries that possess significant externalities of industrial agglomeration. The objective is to generate "agglomeration rent" by means of "policy rent".

(iv) Corporate competitiveness. Outstanding enterprises are highly valued and sought after in various regions, especially DZs. The list of investment promotion by DZs includes the Fortune Global 500 businesses, the top 500 Chinese enterprises, industry leaders, unicorns, little giants, and listed companies. These firms possess distinctive assets, including technological innovation, export capabilities, job creation, and tax contributions, making them highly competitive candidates for investment promotion policy preferences.

(v) Industry-specific preferences. Every city may exhibit a distinct inclination towards specific sectors. This choice can be attributed to either fundamental natural conditions, such as location and climate, or secondary natural conditions, as well as occasional variables in certain cases. Over time, these preferences have been entrenched in diverse urban areas.

3.4 Realistic Options for China's DZs Investment Promotion

In the preceding section, an examination has been conducted on the potential of China's DZs to facilitate investment. In practice, the selection of firms, projects, or industries is influenced by a range of factors, including the geographical location and governmental incentives offered by the development zone. While DZs consider the prevailing conditions in regional industrial planning, it is indisputable that the industries outlined in their blueprint may not necessarily come to fruition. Here we present an analysis of the key industries in China's DZs in 2016. The analysis is conducted using word clouds that are generated based on industrial and service classifications. In addition to elucidating the practical costs associated with investment promotion in China's DZs, this analysis provides a concise comparison with the prevailing priority industries, as depicted in Figure 1. Significant disparities can be observed between the designated leading industries in DZs and the industries that are actual key industries.

Figure 1a: Designated Dominant Industry: Manufacturing

Figure 1b: Actual Key Industry: Manufacturing

Figure 1c: Designated Dominant Industry: Services

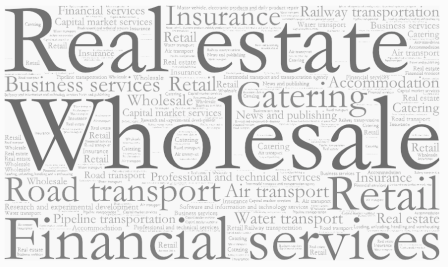

Figure 1d: Actual Key Industry: Services

Note: The data utilized for the creation of word clouds is sourced from China's tax survey database for the year 2016, as well as the database containing information on designated leading industries at various levels, including DZs, cities, and countries. The subsequent section provides comprehensive explanations regarding the definitions of designated leading industries and actual key industries within the DZs.

4. Specifications of Models, Variables and Data

In the previous section, the underlying rationale of investment promotion by China's DZs was identified based on factual evidence. However, it is observed that the actual selection of businesses or industries by DZs may not align with their stated principles, as discussed in the preceding section. Consequently, the subsequent section will conduct an empirical examination of this matter.

4.1 Specification of the Econometric Model

The administrative committee does not have the sole discretionary power over all affairs of a development zone. The leaders of a DZ's Party working committee, administrative committee, and other administrative agencies are usually appointed by officials from the high-level Party committee or government departments. As such, the locality will coordinate the division of labor and cooperation between DZs in its jurisdiction. For instance, when there are two DZs in one locality, this locality may opt to differentiate the functions of DZs in its jurisdiction and facilitate division of labor and cooperation between them. In other words, it could be more appropriate to discuss the question of investment promotion by DZs at the city level instead of the development zone level. Hence, we employ the following model for an all-round assessment of the business screening mechanism of DZs:

$$Y_{ijkt}=\alpha+X'_{ijk}\Omega+X'_{ijkt}\Gamma+\eta_t+\mu_i+\nu_j+\varepsilon_{ijkt} \quad (1)$$

In equation (1), Y_{ijkt} means whether company k in industry j of city i in year t is located in a development zone or not[2]; X'_{ijk} is the vector of the explanatory variable in this paper to capture the screening standard of DZs for investment promotion, and Ω is a set of parameters to be estimated; X'_{ijkt} and Γ are a series of covariates and their parametric estimation values at the firm level; η_t, μ_i and ν_j respectively denote the fixed effects of time, city and industry; ε_{ijkt} is the stochastic disturbance term. Notably, the scope of DZs in this paper includes state-level economic and technological DZs, state-level high-tech industries DZs, special customs regulatory zones, state-level indigenous innovation demonstration zones, state-level free-trade experiment zones, as well as various provincial-level DZs.

Meanwhile, the elections of local government officials may also affect the formulation of investment promotion standards and rules of DZs, whose preferences may also change during the same term of government. That is to say, the fixed effect of city may change with time. This paper will also adopt the following empirical design:

$$Y_{ijkt}=\alpha+X'_{ijt}\Omega+X'_{ijkt}\Gamma+\mu_{it}+\nu_j+\varepsilon_{ijkt} \quad (2)$$

In equation (2), μ_{it} represents the fixed effect of temporal change with respect to the city. This study focuses on the promotion of investment in DZs, rather than the selection process of development zone sites. The context reveals that the primary elements influencing investment promotion in growth zones are industry-level drivers. According to the specification proposed by Nunn and Wantchekon (2011), the econometric specification we have employed excludes the fixed effect of company.

4.2 Variable Selection and Explanation

The primary emphasis of the baseline regression analysis is the examination of investment promotion by industrial enterprises. The variable representing firm attribute is derived from the database of large industrial enterprises. The dependent variable in this study is a binary variable, specifically indicating whether the company is situated within a development zone. This study presents our response to the inquiry, which is grounded in the employment of the longitudinal and latitudinal distance approach. The primary explanatory variable is the theoretical justification behind investment promotion

[2] Since the explained variable is "Whether the company is located in a development zone", it may measure not only the investment promotion activities of DZs, but also the reduction and reorganization of DZs.

in DZs, encompassing the subsequent components:

First, the national and regional designation of leading industries for the measurement of how DZs implement major national strategies. Specifically, the following three binary variables are[3]: The first variable *Maj_couonly*[4] denotes whether the industry in the city is only a state-designated leading industry; the second variable *Maj_cionly* denotes whether the industry is only a designated leading industry of the local city; the third variable *Maj_dual* means the industry is a designated leading industry of both the country and local city. Given the inconsistency between the statistical scope of the designated leading industries and the database of industrial enterprises, we have manually listed industrial sectors for comparison.

Second, actual key industries at the national and regional levels reflect the investment promotion effects of DZs' preexisting industrial strengths and conditions. Similarly, such effects are measured by three binary variables: The first variable *Core_couonly*[5] denotes whether the industry of the city is an actual key industry at the national level; the second variable *Core_cionly* denotes whether the industry is an actual key industry of the city; the third variable *Core_dual* means the industry is an actual key industry at both the national and city levels.

Third, the designated leading industries within DZs, as well as their corresponding upstream and downstream sectors. One prevalent approach employed by DZs is prioritizing investment promotion for leading sectors and their corresponding supply chains. This strategy aims to foster synergistic relationships and interdependencies between upstream and downstream industrial chains, ultimately leading to the formation of industrial clusters. The impact of the strategy is assessed using two variables: The designation of leading industries in DZs (*Maj_zone*), which indicates whether a company is included in the list of designated leading industries, and the presence of upstream and downstream links to the designated leading industries in DZs (*Chains_claimed*), which indicates whether a company is connected to the designated leading industry in a development zone.

In this paper, the relationship between upstream and downstream industrial processes is primarily measured by the input-output tables of 2002. It is possible to compute the input of any industry a industry into industry b as a share σ_{ab} of industry b's total input X_b. Greater value of σ_{ab} means the more input from industry a into industry b, so that industry a is more likely to be an upstream industry of industry b. Referencing Ahern and Harford (2014), we choose 1% as the critical value of σ_{ab}, i.e. when the input of industry a into industry b as a share of the latter's total input σ_{ab} exceeds 1%, industry a is considered as an upstream industry of industry b whereas industry b is a downstream industry of industry a, and vice versa. Finally, the upstream and downstream industries of each industry can be obtained.

Fourth, it is important to consider the primary industries inside DZs and their corresponding upstream and downstream sectors (*Chains_real*). In order to fully leverage competitive advantages and capitalize on cluster benefits, it is advisable for industries that currently possess strong competitive strengths to expand their operations into both the upstream and downstream sectors. The measurement of industrial chain extension involves the consideration of two variables. The first variable, referred to as *Core_zone*, indicates whether the company is listed as one of the key industries in DZs. The second variable, i.e. *Chains_real*, pertains to the presence of the company in the upstream and downstream sectors of the actual key industries in DZs. The evaluation of both upstream and downstream connections adheres to the identical approach as outlined previously.

Fifth, agglomeration externalities (*Agg*) measures the intensity of technology externalities of an

[3] Without special explanations, the values of the binary variables in this paper are all defined as follows: 1 for yes, or 0 for no.

[4] The variable prefixed with "Maj" denotes the designated leading industry, and the method for defining whether an industry is a designated leading industry is explained in detail in the treatment method section of the "Database of Designated Leading Industries at 'DZ, City and Country' Levels".

[5] Variables prefixed with "Core" denote actual key industries, and the method for defining whether an industry as an actual key industry is elaborated in detail in the treatment method section of the "Database of Designated Leading Industries at 'DZ, City and Country' Levels".

industry. To identify whether DZs select enterprises based on the agglomeration externalities of an industry, the first step is to measure the level of the industry's agglomeration externalities. Referencing Chen et al. (2016), we measure and define the agglomeration externalities of each two-digit industry. We have estimated coefficients A, D, $\underline{W}$ and $\overline{W}$ based on the nonparametric bootstrap (50 times) method. A denotes the agglomeration effect, D is the competition effect, $\underline{W}$ is the classification effect, and $\overline{W}$ is the selection effect. We have estimated the magnitude and significance of the agglomeration externalities and other coefficients for 2013 as an example. While agglomeration externalities significantly exist for manufacturing sectors with industry codes no more than 46, there is a significant difference in the level of agglomeration externalities for various industries, some of which are free from agglomeration externalities. Take 2013 for instance, the agglomeration externalities are the highest for plastic products (sector 22, A's value is 1.388), followed by electric power and heat production and supply (sector 44, A's value is 1.060), while the agglomeration externalities are the worst for chemical fiber manufacturing (sector 43, A's value is only 0.000). The agglomeration externalities are also significant for high-end manufacturing sectors such as computer, communications and other electronic device manufacturing, and electrical machinery and apparatus manufacturing. As far as the listed service sectors (sector code greater than 46) are concerned, the agglomeration externalities exist for most service sectors with the exception of sports (section 89, A's value is -0.257), and the agglomeration externalities are the highest for the broadcasting, TV, film and audio recording industry (sector 87, A's value is 1.000).

We have calculated the annual average values of all agglomeration externalities across all industries. Specifically, the numbers in parentheses represent the deviation ratios between the average value and total value of all industries. Increasing value raises agglomeration externalities, and vice versa. In determining which sectors have stronger agglomeration externalities, we used the following methodology: First, samples with fewer than 50 companies of a certain industry in the DZs are excluded to avoid the potential problem of estimation bias due to the lack of samples; second, the magnitude of agglomeration externalities is calculated for various sectors; and third, the top 10% sectors with the highest agglomeration externalities are identified.

Lastly, firm attribute. DZs include several factors, such as regional technology innovation, economic growth, taxation, employment, and foreign economic activity, into their screening standards for investment promotion. Therefore, we propose the inclusion of a set of firm-level covariates to account for these characteristics. The variables considered in this study are as follows: Firstly, technology ingenuity (*Patent*), represented by the number of licensed invention patents obtained by the firm in the current year; secondly, tax burden (*Tax*), indicated by the amount of value-added tax payable by the firms; thirdly, the number of employees (*Employee*), denoted by the total workforce employed by the firm in the current year; fourthly, corporate value-added (*Addvalue*), measured by the firm's value-added in the current year; fifthly, foreign ownership (*Ownship*), indicating whether the firm is a foreign-funded enterprise; and lastly, total exports (*Expo*), represented by the total amount of exports adjusted for inflation using the price index in the current year.

4.3 Explanations on Data Sources

The empirical analysis conducted in this study relies on a comprehensive collection of data from various sources, including enterprises, DZs, prefectural-level cities, and country-level data. These datasets were manually gathered and cross-referenced to ensure precise measurements of designated leading industries, actual key industries, the interconnection between upstream and downstream sectors in the industrial chain, the characteristics of agglomeration externalities, and firm attributes. The databases utilized in this study include the followings.

4.3.1 Database of designated leading industries at the "DZ, City and Country" levels

This study presents the establishment of a comprehensive database that includes identified leading

industries across three levels of analysis: DZs, prefectural-level cities, and the country as a whole. The database consists of three sub-databases, each corresponding to one of these levels.

First, the database of leading industries inside the DZs of China. The official websites of DZs offer comprehensive information regarding the designated leading industries within each zone, accompanied by thorough explanations of the specific sectors involved. For example, the State-Level High-Tech Industries Development Zone of Guiyang City has recognized four new industrial clusters as clusters of designated leading industries[6]. Utilizing the 2018 edition of the Catalogue, an extensive examination was conducted on the official websites of diverse state-level and regional DZs. Subsequently, a manual compilation was undertaken to gather a comprehensive inventory of designated leading industries throughout the numerous DZs. The provided list of names serves as a representation of the strategic planning and guidance for important industries within different DZs throughout the present phase. Incomplete or missing data related to certain DZs has been incorporated and validated based on the information available on the China DZs website[7]. As a result of the disparities in industrial classification between the designated leading industries in DZs and the national classification and codes of economic sectors, we have developed a comprehensive list of related sectors based on manual identification. Ultimately, we have generated a comprehensive cross-section of the database comprising 2,543 DZs representing designated leading industries.

Second, the database of designated leading industries of China's prefecture-level cities. The construction of this database aligns with the objectives outlined in China's 10th through 13th Five-Year Plans for its prefecture-level cities. It encompasses panel data from many prefecture-level cities, spanning four distinct time periods. The identification of leading industries in the prefecture-level cities was conducted by the subsequent procedure: First, a comprehensive examination was conducted on the texts and contents pertaining to industrial planning and priorities in the five-year plans of multiple prefecture-level cities. This examination involved the identification of specific keywords such as "strengthen", "invigorate", "vigorously develop", "proactively develop", "accelerate the development", "foster", and "propel". The purpose of this analysis was to ascertain the priority industries designated for the planning and development of said cities. Furthermore, we have achieved the harmonization of disparate industrial sectors and codes across many temporal frameworks through the implementation of a comprehensive classification system for both industrial and service sectors. The industry classification codes for the designated leading manufacturing industries in prefecture-level cities have been standardized to align with the classification and codes of national economic sectors (G/BT 4754-2002). Similarly, the industry classification codes for the designated leading service industries have been standardized to align with the classification and codes of national economic sectors (GB/T 4754-2017). The name list of designated leading industries for 105, 252, 261, and 293 prefecture-level cities in each of China's 10th through 13th Five-Year Plan periods respectively has been acquired.

Third, the database of national designated leading industries. This database is constructed in a manner akin to the existing database that encompasses the designated leading industries of China's prefecture-level cities. The compilation of this database is predicated on the identification of keywords such as "optimization and upgrading of industrial structure" and "optimization of the modern industrial system" within the national 10th through 13th Five-Year Plans.

4.3.2 Database of actual key industries at the "DZ, City and Country" levels[8]

We have also analyzed and compiled a database of actual key industries on the three dimensions of DZs, prefecture-level cities, and the country as a whole, which also encompasses three sub-databases.

[6] Refer to the website: https://gxq.guiyang.gov.cn/tzzs/tzzszdcy/202005/t20200512_60415188.html.
[7] Source: https://www.cadz.org.cn/.
[8] This database has a temporal dimension due to the identification and calculation by year.

First, the database of actual key industries of China's DZs. This database is further divided into the database of actual key manufacturing sectors of China's DZs and the database of actual key service sectors of China's DZs. We adopt the following method for identifying the actual key industries of China's DZs. First, the longitudinal and latitudinal distance measurement method is employed to identify whether a company is located in a development zone and in which development zone. This method has been explained in detail in the previous section, and will not be elaborated here. Second, the value-added of various sectors in a development zone is calculated by aggregating value-added of firms over the years[9]; lastly, the value-added of various sectors is ranked in the descending order to identify the actual key industries of DZs by the following rule: If there are more than ten industries in a development zone, the top 10% industries with the highest value-added are identified as actual key industries; if there are fewer than ten industries, the No.1 industry is identified as the actual key industry. We have substituted the missing value-added information of services with aggregate output value, and the rest steps and methods are the same with industrial sectors. Additionally, the database of actual key industries is based on the matched data of the database of large industrial enterprises in China over the span between 1998 and 2013. The database of actual key service industries in China's DZs is based on China's tax survey to the base over the span between 2010 and 2015.

Second, the database of actual key industries in China's prefecture-level cities. This database encompasses the actual key manufacturing and service industries of China's prefecture-level cities. The process of identifying the actual key manufacturing sectors in prefecture-level cities is akin to the approach used for identifying key industries in DZs. This involves two steps: Firstly, calculating and ranking the value-added contribution of each sector on an annual basis, in descending order; secondly, designating the top 10% industries with the highest value-added as the actual key industries in the city. In cases where there are fewer than ten industries, the industry with the highest value-added is considered the actual key industry. In this study, the estimation of the missing value-added of services is conducted using the aggregate output value. Furthermore, the duration of data collection for prefecture-level cities aligns with that of DZs.

Third, the database of actual national key industries. The process of identifying actual national key industries relies on the estimation of aggregate assets across multiple sectors as documented in the *China Statistical Yearbook*. By identifying the top 10 industries with the highest aggregate assets, we can determine the actual national key industries.

4.3.3 Database of upstream and downstream sectors of China's DZs

The database[10] encompasses two more sub-databases, namely the database that comprises upstream and downstream sectors of the actual key industries inside China's DZs, and the database that encompasses upstream and downstream sectors of the designated leading industries within China's DZs. To illustrate our calculation approach, let us consider the database containing upstream and downstream sectors of the actual key industries within China's DZs. Our methodology entails two steps: Firstly, the identification of the upstream and downstream sectors associated with each industry; and secondly, the identification of the upstream and downstream sectors specifically linked to the actual key industries within the development zone. The calculation process used for the database of upstream and downstream sectors in the designated leading industrial chains of industrial enterprises in China's DZs has been followed, with the exception that the actual key industries have been replaced with the designated leading industries of DZs in step two. Further elaboration on these details will not be provided in this context. The identification of the upstream and downstream sectors of services is a more challenging task in comparison to manufacturing sectors, as this study does not provide explicit identification of service sectors.

[9] Our calculations are also carried out based on gross corporate output value, and the results are similar.

[10] Such data are identified and calculated on an annual basis, and therefore are non-equilibrium panel data on the dimension of DZs.

4.3.4 Matched data of microscopic databases

A multitude of databases have been utilized in our study, following a meticulous process of matching. Noteworthy among these databases are China's tax survey database spanning from 2010 to 2015, the database encompassing China's large industrial enterprises from 1998 to 2013, and the database comprising China's licensed invention patents from 1998 to 2015. These matched datasets have been employed to account for various firm attributes, including but not limited to technology innovation, taxation, workforce, value-added, ownership, and imports and exports. It is worth mentioning that the tax survey database contains samples of service sector businesses, rendering it suitable for examining service sector investment promotion activities within DZs.

4.4 Descriptive Statistical Results

Based on the foregoing variables and data descriptions, we present descriptive statistics of key variables, encompassing industry and firm attributes. In this context, the industry attributes encompass a collection of binary variables that indicate whether a firm is situated in a development zone, falls under the category of designated leading industries, actual key industries, or operates inside the upstream and downstream sectors of industrial chains. In addition, several variables at the firm level are also incorporated. In general, the variables exhibit a somewhat normal distribution.

5. Empirical Results

Utilizing the provided model parameters, variables, and data explanations outlined in the preceding section, we have conducted an empirical examination to assess the investment promotion rationale of China's DZs. Our objective is to explore the mechanisms through which DZs effectively attract enterprises and investments.

5.1 Basic Regression Results

5.1.1 Guidelines: National strategy or local planning?

China's planning system plays a significant role within the national governance system, effectively coordinating the participation of diverse stakeholders from the government, market, and private sector; such coordination is aimed at attaining national or regional objectives through the implementation of flexible macroeconomic plans and the provision of incentives (Yin and Xu, 2021). DZs have a pivotal role in driving national policies and regional agendas, assuming critical functions in national and regional reform, transition, and economic development. The point in question is the extent to which national and regional planning systems have taken the lead in implementing investment promotion initiatives within DZs, and what are the disparities in the investment promotion benefits of planning systems across different hierarchical levels in DZs. Based on the aforementioned data and model specifications, we have tried to answer these questions through the use of the empirical findings presented in Table 3.

We use different fixed effects in each column of Table 3. To consider the diverse impacts of historical and cultural factors across different regions, we have included fixed effects for city and year in column (1). In column (2), we have considered the fixed effect of industry-specific preferences of DZs. Furthermore, the development zone investment promotion behaviors can also be influenced by the governance philosophies and preferences of local government and development zone authorities. Therefore, in column (3) we have presented the interactive fixed effect between the city and time variables, and the corresponding outcomes.

The impact of national strategic planning on investment promotion in DZs is generally significant. Consider column (3) as an example. In the case when a company operates inside a key industry identified in the national five-year plan, there is a 2.56% higher probability of it being situated in a development zone, in comparison to enterprises belonging to industrial sectors that are neither recognized as national

Table 3: Development Zone Investment Promotion Effects of National and Regional Planning Systems

Variable	(1)	(2)	(3)
Maj_couonly	0.034*** (0.001)	0.027*** (0.001)	0.026*** (0.001)
Maj_cionly	-0.001** (0.001)	0.002** (0.001)	0.001 (0.001)
Maj_dual	0.038*** (0.001)	0.024*** (0.001)	0.025*** (0.001)
Fixed effect of city	Yes	Yes	No
Fixed effect of year	Yes	Yes	No
Fixed effect of industry	No	Yes	Yes
City × time	No	No	Yes
R^2 value	0.069	0.078	0.082
Sample size	2,331,021	2,331,021	2,328,670

Notes: (i) Numbers in parentheses are *t* values; (ii) ***, ** and *denote significance at the 1%, 5% and 10% statistical levels, respectively; (iii) panel logit model is employed; (iv) the coefficient is average marginal effect; (v) the same below.

nor as local leading industries. Moreover, for enterprises belonging to local recognized leading sectors there is a 2.54% higher likelihood to be located in a development zone. When a company exclusively operates within a specific local designated leading industry, there is no discernible variation in its likelihood of being situated within a development zone. The above outcome underscores the impact of China's national development policy on investment promotion in DZs within the framework of five-year plans. It is important to acknowledge that this outcome may be due to the intensity of investment promotion and preferences exhibited by DZs. Additionally, it could be attributed to the increased focus on attracting industries that offer greater agglomeration externalities, as we explain in the subsequent section.

5.1.2 Reality: National advantage or regional conditions?

The facilitation of investment requires collaborative efforts from both development zone regulators and enterprises and project developers. Consequently, the investment promotion efforts of DZs have been mostly directed at the actual national and regional key industries. It is worth noting the potential influence of the national or regional industrial strengths, as defined by the presence of key industries, on investment promotion behaviors within DZs. Furthermore, there are disparities in the impacts observed among nationally favored industries and regional industrial strengths. In Table 4 we present some empirical observations to analyze these two questions.

Based on their existing industrial capacities, DZs tend to prioritize national key industries over local key industries when it comes to attracting investments. For instance in column (3) of Table 4 it can be observed that enterprises belonging to national key industries exhibit a 0.77% higher likelihood of being in a development zone. Furthermore, if these companies also fall under the category of local key industries, such probability increases by 1.08%. Nevertheless, it is worth noting that enterprises exclusively belonging to local key industries exhibit a 0.23% decreased likelihood of being located in a development zone. There are multiple explanations for this phenomenon. Firstly, national DZs transcend their local administrative authorities, hence attracting firms from beyond regions. Additionally, it is possible for cities that have a significant presence of labor-intensive businesses to exhibit a negative coefficient of *Core_cionly* due to the combination of low per unit area productivity and the substantial spatial requirements of such industries. Finally, the provision of tax incentives in DZs has had the unintended consequence of discouraging local governments from actively pursuing critical sectors within these zones. These assumptions will be further examined and confirmed in the subsequent section.

Table 4: Effect of National Advantages and Regional Conditions on Development Zone Investment Promotion

Variable	(1)	(2)	(3)
Core_couonly	0.012*** (0.001)	0.008*** (0.001)	0.008*** (0.001)
Core_cionly	-0.008*** (0.001)	-0.000 (0.001)	-0.002*** (0.001)
Core_dual	0.017*** (0.001)	0.009*** (0.001)	0.011*** (0.001)
Fixed effect of city	Yes	Yes	No
Fixed effect of year	Yes	Yes	No
Fixed effect of industry	No	Yes	Yes
City × time	No	No	Yes
R^2 value	0.069	0.077	0.082
Sample size	2,242,052	2,242,052	2,239,840

Note: Same as Table 3.

5.1.3 Consideration of the agglomeration externalities theory

Agglomeration externalities justify the existence of DZs. Corporate or industrial spatial agglomeration gives full play to such externalities as knowledge spillover, upstream and downstream input-output correlation, and workforce pool, thus giving rise to the "agglomeration rent". In this process, "policy rent" should only serve as a guidance. Otherwise, DZs as a place-based initiative would have no justification to exist and should be replaced with spatially neutral policies (World Bank, 2009). The question is whether there is any economic theory that follows agglomeration externalities during the investment promotion of China's DZs. In Table 5, we provide results of relevant empirical observations.

The presence of agglomeration externalities provides a rationale for the establishment of DZs. Corporate or industrial spatial agglomeration effectively utilizes externalities such as knowledge spillover, upstream and downstream input-output correlation, and workforce pool, resulting in the emergence of "agglomeration rent". In this process, the concept of "policy rent" should solely function as a guiding principle. According to the World Bank (2009), if DZs as a place-based initiative lack reason for their existence, they should be substituted with policies that are not place-specific. We should consider the validity of an economic theory that examines the impact of agglomeration externalities associated with investment promotion in China's DZs. The relative empirical findings are presented in Table 5.

Results shown in Table 5 consider various fixed effects and businesses' features. In general, firms belonging to industries with higher externalities tend to be situated within a development zone. Consider column (7) as an example, firms belonging to such industries have a 0.25% higher probability of being situated in a development zone. This outcome was supported by the robustness analysis. Numerous academic investigations have established that being situated within a development zone leads to a notable rise in the "agglomeration rent" related to company productivity (Shi et al., 2022). This paper presents a novel theoretical framework to elucidate the concept of "agglomeration rent", wherein companies exhibiting strong agglomeration externalities tend to be located within DZs.

5.1.4 Industrial chain investment promotion strategy: Industrial chain consolidation and extension

Typically, the Party committee and government will establish an ad hoc delegate agency, known as the administrative committee (Party working committee), within DZs. This arrangement delegates the responsibility of market-based investment promotion to the development zone agency. DZs typically engage in the proactive formulation of investment promotion plans to effectively identify and prioritize

Table 5: Investment Promotion by DZs: Impact of Agglomeration Externalities

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agg	0.003*** (0.001)	0.004*** (0.001)	0.002** (0.001)	0.003*** (0.001)	0.002** (0.001)	0.004*** (0.001)	0.003** (0.001)	0.001 (0.001)
Fixed effect of city	Yes	No	Yes	No	No	No	No	No
Fixed effect of year	Yes	No	Yes	No	No	No	No	No
Fixed effect of industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City × time	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Firm attribute	No	No	Yes	Yes	No	No	Yes	Yes
Attributes of designated leading industries	No	No	No	No	Yes	No	Yes	No
Attribute of actual key industries	No	No	No	No	No	Yes	No	Yes
R^2 value	0.075	0.082	0.082	0.087	0.080	0.087	0.087	0.087
Sample size	2,270,663	2,268,825	2,076,204	2,074,472	2,268,825	2,268,825	1,992,956	2,074,472

Note: The same with Table 3.

industries of strategic importance. In practical implementation, DZs employ two investment promotion strategies: Enhancing the competitive advantage of existing companies or facilitating the transfer of competitive advantage through investment promotion in the upstream and downstream sectors of the industrial chain. Specifically, the former relates to the promotion of investments in the planned or key industries of industrial parks, while the latter pertains to the promotion of investments in the upstream and downstream processes of the planned industries. It is worth noting that these two tactics are not mutually exclusive, but rather reflect distinct patterns in investment promotion. The relevant empirical findings are shown in Table 6.

Table 6 reveals that the coefficients of *Maj_zone* and *Real_zone* are both significantly positive. This suggests a notable rise in the likelihood of enterprises being located in a development zone when they belong to the group of key industries for investment promotion or the key industries of that particular

Table 6: Development Zone Investment Promotion Strategies: Industrial Chain Consolidation and Extension

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maj_zone	0.026*** (0.002)	0.025*** (0.002)						
Real_zone			0.097*** (0.001)	0.095*** (0.001)				
Chains_claimed					-0.001 (0.001)	-0.000 (0.002)		
Chains_real							0.017*** (0.001)	0.016*** (0.001)
Fixed effect of city	Yes	Yes	No	No	Yes	Yes	No	No
Fixed effect of year	No	No	No	No	No	No	No	No
Fixed effect of industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City × time	No	No	Yes	Yes	No	No	Yes	Yes
Firm attribute	No	Yes	No	Yes	No	Yes	No	Yes
R^2 value	0.074	0.083	0.094	0.102	0.073	0.082	0.082	0.089
Sample size	290,972	256,065	2,239,840	2,040,298	290,972	256,065	2,239,840	2,040,298

Note: The same with Table 3.

zone. In other words, DZs will engage in investment promotion strategies that are aligned with the current industrial chains, thereby enhancing the existing strengths. The published investment promotion catalogue of DZs shows a greater influence on investment promotion in comparison to the key industries within industrial parks. Furthermore, we tried to determine if DZs have implemented investment promotion strategies for the upstream and downstream sectors of industrial chains. The results of this investigation are presented in columns (5) through (8) of Table 6; they show no statistically significant disparity in the likelihood of location in a development zone among enterprises within the upstream and downstream sectors of the investment promotion catalogues of DZs. However, enterprises from the upstream and downstream sectors of actual key industries in DZs exhibit a higher tendency to be in DZs. Indeed, it is possible for the two outcomes to align: When creating a list of industries for the purpose of promoting investment, DZs may opt to incorporate both the upstream and downstream sectors of pivotal industries into the investment promotion catalogue. This inclusion serves as a guide for their endeavors in promoting investment activities. Therefore, primary consideration will not be given to the upstream and downstream sectors of relevant industries in the investment promotion catalogues. Consequently, the estimated parametric value of *Chains_claimed* lacks statistical significance, whereas the estimated value of *Chains_real* is significantly positive.

5.1.5 Types of enterprises preferred for investment promotion by DZs

In the context of investment promotion, DZs place greater emphasis on firm attributes such as being included in the Global 500 list, Chinese top 500 list, industry leaders, and listed companies. It is worth noting that the number of firms meeting these criteria is very modest compared to the total number of observations, which exceeds two million in this study. Furthermore, capturing the primary firm qualities based on the aforementioned attributes presents a challenge. Therefore, we assess firm attributes using the six variables of taxation, workforce, value-added, number of patents, corporate ownership, and export volume. These variables are chosen based on the perspectives of DZs' functions and evaluation criteria. This approach allows us to capture the multidimensional performance of enterprises within the investment promotion evaluation system.

Let us examine column (6) of Table 7 as an example. In this column, the estimated parametric values for value-added (*Addvalue*), innovation (*Patent*), company ownership (*Ownship*), and export volume (*Expo*) are 0.72%, 1.13%, 5.21%, and 0.06%, respectively. This implies that DZs tend to attract

Table 7: Investment Promotion Preferences of DZs: Firm Attributes

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Tax	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Employee	-0.003*** (0.001)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.003*** (0.001)	-0.002*** (0.001)
Addvalue	0.008*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.008*** (0.002)	0.007*** (0.002)
Patent	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)
Ownship	0.053*** (0.001)	0.052*** (0.001)	0.054*** (0.001)	0.053*** (0.001)	0.053*** (0.001)	0.052*** (0.001)
Expo	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Attribute of designated leading industry	No	No	Yes	Yes	No	No
Attribute of actual leading industry	No	No	No	No	Yes	Yes

Table 7 Continued

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Fixed effect of city	Yes	No	Yes	No	Yes	No
Fixed effect of year	Yes	No	Yes	No	Yes	No
Fixed effect of industry	Yes	Yes	Yes	Yes	Yes	Yes
City × time	No	Yes	No	Yes	No	Yes
R^2 value	0.0765	0.0890	0.0838	0.0872	0.0838	0.0888
Sample size	2,126,170	2,124,290	2,126,170	2,124,290	2,042,040	2,040,298

Note: The same with Table 3.

and host firms that are both innovative and export-oriented, with a focus on generating high value-added products or services. The outcome aligns with the analysis, indicating that DZs have effectively fulfilled their roles of promoting economic development, innovation, and openness. The estimated values for taxation (*Tax*) and employment (*Employee*) are both significantly negative. This finding provides some degree of corroboration for the negative results of *Core_cionly* reported in Table 4, suggesting that labor-intensive companies and major taxpayers are not favorably received within DZs. The above results are robust when controlling for different fixed effects.

5.2 Heterogeneity Analysis

5.2.1 Heterogeneity of service sectors

Services play a crucial role in the promotion of investments within DZs. In the context of China's ongoing economic transition and modernization efforts, there has been a growing recognition of the significance of services as key areas for investment promotion within DZs. Examples of these enterprises encompass software and information technology services, research and experimentation, professional technical services, technology promotion and application services, and financial leasing. In the preceding inspection, this study focused on the manufacturing sector. In the next step, an empirical examination will be conducted to evaluate the investment promotion strategies employed by DZs specifically targeting the service sector. The primary data source utilized for service enterprises[11] is the Tax Survey Database of China, covering the period from 2010 to 2015.

In general, DZs place a high emphasis on promoting innovative service enterprises that are backed by foreign investments and have a strong focus on export-oriented activities. These enterprises are expected to provide significant tax revenue, employment opportunities, and overall economic output. This finding remains valid even when accounting for various combinations of fixed effects[12]. A comparative analysis reveals that service enterprises, which provide tax income and employment opportunities, receive of the same level of attention from DZs as industrial enterprises. One plausible explanation is that local governments provide preferential policies to DZs to incentivize service businesses to remain within their district. This is motivated by the concern that any enterprises moving to other areas may result in a decline in government revenue. The low requirement of physical assets from service companies is also well-suited for the spatial constraints of DZs.

Additionally, our investigation has explored whether DZs consider agglomeration externalities in their efforts to attract investments. The findings of our study indicate that this outcome aligns with

[11] In this paper, the LP method is also employed to estimate the total factor productivity (TFP) of service enterprises. To estimate more service enterprise samples, we measure intermediate input value by the "Total corporate output value - corporate value-added + value-added tax payable", measure labor force by the "year-end number of employees", and measure capital by the "year-end amount of the original value (price) of fixed assets".

[12] Although Patent's regression results are insignificant in columns (6) and (7), we may still consider that innovative service firms are more welcomed since they apply more for software copyrights rather than invention patents and the *t* values corresponding to their parametric estimated values are closer to significance.

the patterns observed in industrial enterprises. DZs have also adhered to the notion of agglomeration externalities in their efforts to attract investments in the service sector. There is a 0.63% higher likelihood for service enterprises originating from sectors characterized by significant agglomeration externalities to be situated within a development zone[13].

5.2.2 Hierarchical heterogeneity of DZs

Differences can be observed in the demonstrative hierarchy, responsibilities, development goals, and policy preferences among DZs. Provincial-level DZs are subject to the authority of provincial governments or are overseen by the province's development and reform commission and department of commerce, with a deputy-division administrative hierarchy. State-level DZs are established via the permission of the State Council and function as delegate agency of the municipal people's government or higher authorities within the respective local district. State-level DZs have the authority to examine and approve activities, which is equivalent to that of the corresponding level of the people's government. Additionally, a vice mayor or a member of the standing committee of the municipal Party commission simultaneously holds the position of secretary of the Party working committee. Furthermore, it is important to note that provincial DZs, being under the authority of provincial governments, exhibit varying policy preferences across different provinces. These preferences are notably less favorable compared to state-level DZs, particularly in terms of foreign investment, fiscal subsidy, and land policy. In conclusion, it is observed that local governments commonly employ provincial-level DZs as a strategic tool to foster local competition. The establishment and progress of these zones are often shaped by the dynamics of local GDP rivalry and the pursuit of economic development objectives. In contrast, state-level DZs place significant emphasis on national development strategies and enjoy relatively autonomous privileges in terms of planning, development, economic management, and policy support. These privileges facilitate the establishment of adaptable and efficient administrative and operational systems (Kong and Chai, 2021). Disparities may arise in investment promotion among DZs of varying hierarchies. In this particular instance, we perform a heterogeneity analysis on the hierarchies of DZs.

The previous results indicate the presence of notable disparities in the investment promotion preferences between state-level and provincial-level DZs. Firstly, it is observed that provincial-level DZs prioritize the creation of employment opportunities, in contrast to state-level DZs. Secondly, state-level DZs place greater emphasis on technological innovation, value addition, and the attraction of foreign capital. Lastly, state-level DZs also prioritize the positive effects of industry agglomeration in their investment promotion efforts, whereas this aspect is not a significant consideration for provincial-level DZs[14].

5.2.3 Heterogeneity of types of DZs

DZs of several types serve distinct purposes. For example, the DZs dedicated to high-tech industries prioritize the growth of high-tech sectors, innovation, and the conversion of research and development outcomes into commercial products. Economic and technological DZs specialize in industries that heavily rely on knowledge and technology, aiming to enhance the overall economic output of the region (Hang et al., 2022). Consequently, we conducted a regression analysis on the categorization of state-level economic and technological DZs and state-level high-tech industries DZs. There are discernible disparities between these categories of DZs in terms of their approaches to investment promotion. Economic and technological DZs prioritize the attraction of enterprises that generate higher output value, foreign investments, and exports. Conversely, high-tech industries DZs prioritize enterprises fostering

[13] Given the absence of apparent upstream and downstream sectors of services, we did not perform any empirical test of whether DZs adopted any upstream and downstream investment promotion strategies for service sectors.

[14] It should be noted that the comparison of the two types of DZs is performed based on Chow test rather than a direct comparison of coefficients.

innovation and generating tax revenue. In addition, high-tech industries DZs exhibit a preference for enterprises that offer significant agglomeration externalities.

5.3 Robustness Test and Treatment of Endogeneity Problem

In the preceding section, an empirical examination was conducted to assess the investment promotion preferences of DZs. The objective was to ascertain the investment promotion strategies employed by DZs based on their consideration of industry attributes, firm attributes, agglomeration externalities, and industrial chain attributes. The present analysis offers an empirical foundation for elucidating the factors contributing to the achievements observed in China's DZs. The complex nature of the rationale behind investment promotion has resulted in variances in our empirical findings because of endogeneity. In the context of this paper, endogeneity arises primarily from omitted variables. Despite our inclusion of various fixed effects (city × time, city, year, and industry) as controls, it is plausible that certain policy changes may still affect both the independent and dependent variables in our model. For example, a development zone may undergo a significant policy shock that leads to modifications in both firm attributes, such as the withdrawal of underperforming enterprises, and industry attributes, such as the gradual elimination of high-investment, energy-intensive, and polluting industries with low productivity. Furthermore, this policy shock also influences the investment promotion preferences of DZs. An illustrative instance is the reorganization and upgrade of DZs. To mitigate the potential impact of omitted variables and associated estimation errors, we conducted a robustness analysis by implementing two often used policy shocks.

5.3.1 Evidence for the reorganization of DZs

During the late 1990s there was a proliferation of DZs in China because of the achievements witnessed in existing DZs. This prompted governmental entities at different administrative levels to engage in the strategic planning, application, and establishment of new DZs with diverse structures and hierarchical arrangements throughout the country. Some localities have advocated for the creation of DZs and industrial parks in every town. This has resulted in the phenomenon of land enclosure and a noticeable increase in "race to the bottom" policy competition. In 2003, the State Council General Office issued a circular on the rectification of DZs and enhancement of land management. This circular introduced a comprehensive government initiative aimed at addressing the uncontrolled growth of DZs. The strategy involved implementing measures such as limiting land supply and shutting down certain DZs. The rectification of DZs was completed by the end of 2006, coinciding with the publication of the *Catalogue of Review and Approval Announcements of DZs in China* (2006 Edition) (Kong and Chai, 2021). The elimination of substandard DZs that are situated at or below the city level has resulted in enhanced rationality and efficiency in the functioning of DZs. The empirical research conducted in this study examines the changes in investment promotion preferences of DZs before and after the rectification. The objective is to ascertain the impact of the rectification on investment preferences and to assess the reliability of the baseline regression findings. The period from 1998 to 2007 is designated as the pre-rectification phase, whereas the period from 2007 to 2013 is referred to as the post-rectification phase.

This study also examines the impact of industrial planning on investment promotion both prior to and after the rectification of DZs. The findings indicate a notable disparity in the impact of industrial planning on the behaviors related to investment promotion within DZs. DZs often prioritize the direction provided by local and national plans, substantially decreasing the likelihood of firms that are just listed as designated key local industries to find a place within a development zone. This explains that most DZs that were terminated during this campaign were within the city level. In addition, we examined the characteristics of prominent sectors and the impact of agglomeration externalities on the investment

promotion preferences of DZs. The investment promotion preferences and baseline regression results of DZs exhibit a general consistency, despite notable disparities observed prior to and after the rectification.

5.3.2 Impact of development zone upgrade

According to Kong and Chai (2021), state-level DZs exhibit certain benefits in comparison to provincial-level DZs. These advantages relate to the administrative hierarchy, economic planning, and administration privileges, as well as policy intensity. Due to this rationale, local authorities actively seek the elevation of provincial-level DZs to state-level DZs. According to Chu et al. (2021), there was an observed increase in the number of provincial-level DZs that attained state-level status between 2008 and 2017, with a total of 267 zones undergoing this transition. In a theoretical context, it can be postulated that the upgrade of DZs should induce changes in investment promotion behaviors and preferences, leading them to align more closely with the operational principles of state-level DZs. Therefore, we have conducted additional tests to examine the impact of upgrading DZs on investment promotion. These tests validate the findings of the baseline regression analysis.

The establishment of provincial-level DZs is also subject to the effect of local government actions. DZs exhibit varying responses when subjected to an upgrade. This study focuses on the dependent variable, which relates to the determination of whether firms are situated within a city development zone. In places where state-level DZs are already established, it is a challenge to ascertain whether firms relocate due to an upgrade in the development zone inside the city or due to the presence of other state-level DZs within the same city. Therefore, we have compiled a list of city samples that underwent a development zone upgrade between the years 2007 and 2013 and we have excluded examples of DZs at the state level that were upgraded before this. A total of 78 city samples were obtained. We designate the previous year of development zone upgrade as a binary variable representing policy shock because of the time needed for review and approval for the upgrade of DZs. To assess the influence of development zone upgrade on the investment promotion preferences of DZs, we employ the interaction term between variables and the binary variable of policy shock.

The regression results indicate that the upgrade of DZs has resulted in a notable augmentation of the effects of national industrial planning in relation to both national and local plans. Given the greater involvement of local governments prior to the upgrade of provincial-level DZs, it is reasonable for these zones to incorporate both national and local industrial planning after the upgrade. This study also examines the investment promotion preferences of DZs considering the upgrade's influence. It is evident that following the upgrade, DZs place significant emphasis on the attraction of firms operating in industries identified as critical sectors at both national and local levels. It has been observed that firms belonging to local key industries have received greater emphasis on investment promotion, in comparison to industries that are not recognized as key industries. Nevertheless, the disparity holds little significance for firms operating within the national important industries. The presence of disparities between the industries targeted for investment promotion and the industries attracted suggests the potential for deviations in the implementation of investment promotion strategies following the upgrade of provincial-level DZs. The regression findings indicate that following the upgrade, DZs place significant emphasis on the magnitude of agglomeration externalities.

5.3.3 Retest based on start-up samples

To address potential influence from historical factors, we conducted tests on start-up samples as an alternative approach to examining investment promotion preferences in DZs. In this study, we have conducted a comprehensive analysis by aligning the data obtained from the national enterprise credit information disclosure with the database encompassing China's large industrial enterprises. To ensure the accuracy and relevance of our findings, we have specifically focused on start-up businesses when

selecting our regression samples. The findings of our research exhibit a general alignment with the outcomes shown in Table 3 through Table 7. Firstly, the national strategic plan significantly influenced the promotion of investment in DZs, with a particular emphasis on national key industries. Secondly, DZs tended to attract enterprises that benefit from agglomeration externalities. Thirdly, DZs enhanced their competitive advantage by promoting investment within established industrial chains, thereby attracting priority industries. Lastly, DZs were more likely to attract innovative and export-oriented enterprises that generate higher value addition.

5.3.4 Treatment of the reverse causation problem

Numerous studies in the research literature have demonstrated that the phenomenon of industrial spatial agglomeration has a significant impact on various aspects, including corporate productivity (Chen et al., 2016; Wang and Zhang, 2016), so the findings may be susceptible to the problem of reverse causation. Consequently, we have implemented the subsequent approach to address the endogeneity issue arising from reverse causation. First, a regression analysis is conducted using samples of start-ups to obtain a relatively accurate understanding of the screening behaviors exhibited by DZs. Second, a regression analysis is conducted, incorporating a one-phase lag of explanatory variables, to minimize the influence of development zone policy effects. Third, a regression analysis was conducted using samples from the year in which a development zone was established, while still considering a one-phase lag of firm attributes. Upon employing those three methodologies, our research findings remained robust and dependable.

6. Concluding Remarks and Policy Recommendations

The success of China's DZs, seen as a significant accomplishment of Chinese socialism, may be primarily attributed to the emphasis placed on investment promotion. This article has addressed inquiries about the factors as specific preferences that guide investment promotion efforts within China's DZs. What factors contribute to the success of China's DZs in terms of promoting investment? This research presents a theoretical analysis and empirical investigation to address the inquiries using a collection of distinct microscopic databases.

In the context of China's development zone investment promotion, it is observed that certain preferences tend to prevail. Firstly, it is noteworthy that China's DZs, particularly those at state level, place significant emphasis on the industrial planning of major national development strategies. Secondly, there exists a clear preference within China's DZs for state-level key industries over local ones. Thirdly, it is evident that DZs, especially those at the state level, exhibit inclination towards attracting industries with significant agglomeration externalities. Lastly, it is important to highlight that DZs not only attract investments to enhance existing industrial chains but also make concerted efforts to expand into both upstream and downstream industries, thereby enhancing overall competitiveness. Furthermore, DZs show preference for enterprises that are both innovative and export-oriented, as well as those that contribute significantly to value addition. Nevertheless, provincial DZs assign significant importance to job creation. These results are substantiated by the outcomes of robustness tests conducted on the impacts of rectification and upgrade shocks within DZs.

From our perspective, the achievements observed in China's DZs can be attributed to a combination of distinct regional institutional setups and the deliberate choices made in investment promotion during the implementation process. China's DZs typically adhere to five investment promotion principles. These principles encompass the adherence to national and regional strategic planning, the prioritization of actual industrial foundation, compliance with the theory of agglomeration externalities, consideration of corporate competitiveness advantage, and the reorganization and extension of industrial chains. China's

DZs have effectively executed national and regional development goals by considering different "Chinese scenarios" in terms of organizational structure, narrative scenarios, and intergovernmental relationships. Based on the empirical evidence of national and regional industrial development, China's DZs have effectively attracted competitive companies by leveraging the principles of agglomeration externalities and capitalizing on the advantages offered by industrial chain competitiveness. One practical conclusion of this study is that DZs should shift from "policy rent" to "agglomeration rent". Priority should be given to industries that exhibit significant agglomeration externalities, while effectively utilizing the concept of "policy rent" to leverage the benefits of "agglomeration rent". In addition to their commitment to economic development, provincial-level DZs should actively foster the spillover effects of productivity, technology, and labor force pools. This strategic approach is crucial for the successful implementation of regionally targeted policies. Furthermore, it is recommended that DZs change their focus from simply selecting superior industries to actively nurturing and developing such industries. The remarkable accomplishments of China's DZs can be attributed to the implementation of a very effective enterprise screening procedure. However, it should be noted that the mere selection of high-quality industries is insufficient for DZs to successfully accomplish their policy objectives. China's DZs are currently at a crucial juncture; to ensure sustainable development, it is imperative for these zones to transition their focus from industry selection to industry cultivation. Therefore, it is recommended that China's DZs enhance their business incubation and cultivation mechanisms, which can be achieved by leveraging policy incentives, capitalizing on agglomeration advantages, and harnessing industrial strengths. By doing so, these zones can evolve into highly conducive environments for business incubation, fostering the growth of a substantial number of promising start-ups. Finally, it is recommended that state-level DZs assume a leadership role and collaborate closely with local DZs to foster regional and national economic development on a larger scale. State-level DZs should assume the responsibility of exploring novel mechanisms for the prospective advancement of industrial zones by means of investment promotion and take the lead in the comprehensive development of industrial zones. It is recommended that policy incentives be provided to state-level DZs to encourage innovation and optimization. Since the majority of DZs in China are provincial, they should carry more responsibility in researching novel techniques of investment promotion and development, as well as championing the comprehensive advancement of DZs. It is recommended that provincial DZs enhance their operational efficiency by drawing on the state-level DZs' successful experiences in promoting investment.

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