Navigating corporate venture capital: the role of industrial policy in China

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Abstract

This paper focused on Chinese data from 2006 to 2020 and explored the relationship between different industrial policies and corporate venture capital (CVC). The main result of this work was that only enterprises supported by provincial industrial policies are able to attract CVCs' investments and demonstrated that the implementation of provincial industrial policies enhances regional entrepreneurial activity that investees located in, thereby affecting CVCs' investments. In addition, this paper further found that this phenomenon of provincial industrial policies' derivative effects particularly happened in the central and eastern regions of China and the investees when conducting Series A and Series B financing.

CCS Concepts

• **General and reference** → Cross-computing tools and techniques; Empirical studies.

Keywords

Corporate Venture Capital, Industrial Policy, Entrepreneurial Activity

ACM Reference Format:
Peng Lin. 2024. Navigating corporate venture capital: the role of industrial policy in China. In *2024 5th International Conference on Big Data Economy and Information Management (BDEIM 2024), December 13–15, 2024, Zhengzhou, China.* ACM, New York, NY, USA, 7 pages. https://doi.org/10.1145/3724154.3724321

1 Introduction

Venture capital (VC) has emerged as an indispensable way for firms' finance and development within the financial market, primarily providing financial support for start-ups and their development[14][6] (Gompers and Lerner, 2001; Da et al., 2006). Corporate venture capital (CVC) is a significant part of VC, which has rapidly growth in recent years[17] (Lu and Li, 2024). CVC is defined as "a small equity investment made by a corporation in a newly established and unlisted start-up"[8] (Dushnitsky and Lenox, 2006). Compared to traditional VC, CVC has advantages in providing commercial construction to investees, as CVC institutions (CVCs) have richer industry-specific expertise and resources related to market dynamics and technology[19] (Maula et al., 2005). Prior academic research on CVC predominantly focused on the purpose of CVC, numerous studies indicated that enterprises aim to pursue technological innovation through CVC investment[9][21] (Dushnitsky and Yu, 2023; Pinkow and Iversen, 2020). In addition, CVCs pay more attention to the realization of strategic goals compared to financial returns[8][20] (Dushnitsky and Lenox, 2006; Park and Steensma, 2012).

However, numerous studies have focused on the regions of developed countries. Given the significant differences between developed and developing countries in some areas of institutional frameworks, economic structures, and financial markets, these findings may not be entirely applicable to developing countries. VC in developing countries is usually affected by government intervention, for example in China[24] (Suchard et al., 2021). The interplay between public policies and VC investment has become a popular research area since the growth of the VC market in China. Nevertheless, limited studies pay more attention on the relationship between government policies and CVC investment. Moreover, industrial policy is an important path for the Chinese government to catch up with developed countries, it is also one of the representative public policies. Therefore, this paper tend to explore the relationship between CVC and industrial policy based on Chinese data, and analyze whether the industrial policies are navigating CVCs' investments.

China offers as a ideal environment to investigate the relationship between industrial policy and CVC investment. China is the largest developing country and the second-largest economy in the world, VC market of China is the fastest growing market in the world[2][15] (Ahlstrom et al., 2007; Guo and Jiang, 2013). Although CVC in China emerged later than other developed countries, it has become an indispensable part of Chinese VC market after nearly 20 years of development[23] (Song et al., 2024). As of 2022, near 3,130 listed companies in China have carried out CVC investments, accounting for more than 60%[18] (Lu and Li, 2024). Therefore, China provides a valuable condition for exploring CVC investment within developing countries.

I utilized all venture capital investment event data in China from 2006 to 2020 to examine the impact of industrial policy on CVCs' investments and to analyze the potential mechanisms. My research results suggest that enterprises located in industries supported by provincial industrial policies are able to attract more CVCs' investments. By contrast, enterprises located in industries supported by national industrial policies will reduce the willingness of CVCs to invest, which phenomenon primarily occurs in eastern and central regions of China. Additionally, I find that the implementation of

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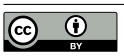

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BDEIM 2024, Zhengzhou, China
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ACM ISBN 979-8-4007-1186-2/2024/12
https://doi.org/10.1145/3724154.3724321

provincial industrial policies can enhance regional entrepreneurial activity that investees located in, subsequently affecting CVCs' investments. Notably, my heterogeneity analysis results further indicate that enterprises located in industries supported by provincial industrial policies are more likely to attract CVCs' investments during Series A and Series B financing rounds.

This paper contributes to the existing literature in three ways. First, this paper supplements the research on CVC in developing countries. Prior research on CVC in developing countries mainly focused on the purpose of CVC investment[10] (Dushnitsky and Yu, 2022) and the effects of CVC on corporate financial performance[15] (Guo and Jiang, 2022). This paper offers a novel perspective to explore the impact of industrial policy on CVC investment in developing countries. Second, this paper addresses the research gap of industrial policy and CVC. CVC has become an effective way for enterprises to accelerate innovation. Meanwhile, industrial policy plays an important role in the economic development of China and other developing countries. While prior studies have explored the interplay between public policy and VC[25] (Zhou et al., 2017) and government venture capital (GVC)[13] (Ge et al., 2024), the relationship between industrial policy and CVC investment remains under-explored. This paper aims to address this gap and supplement the current literature. Third, the research results of this paper revealed the derivative effects of industrial policies on financial markets. This paper suggests that the implementation of provincial industrial policies can improve CVCs' investment activities. Therefore, this study provides valuable references to the government in implementing promulgating industrial policies and offers new insights for startups seeking CVCs' investments.

2 Institutional background and hypothesis development

2.1 Institutional background

In 1953, China promulgated its first national short and medium-term plans over five-year periods, generally referred to as the "Five-Year plan". Each "Five-Year Plan" is a guideline for the Chinese government to carry out work and specifies the key industries that they will support in the next five years. Since the implementation of the 12th "Five-Year Plan" in 2010, the Chinese government has developed industrial policies for emerging industries, including energy conservation and environmental protection, new-generation information technology, biology, high-end equipment manufacturing, new energy, new materials and new energy vehicles. Subsequent to the promulgation of national industrial policy, provincial capitals formulated the provincial industrial policies according to their own specific economic situation and industrial structure respectively. These policies typically include financial subsidies, startup grants, R&D incentives, tax benefits, and accessible loans for enterprises[11] (Feng, 2019). Ultimately, enterprises located in emerging industries benefit from industrial policies, leading to significant development. Moreover, according to the data compiled from the "2023 Chinese CVC Industry Development Report" published by Bestla institution[1], Chinese CVC institutions pay more attention to 24 industries such as intelligent manufacturing, medical health, enterprise services, and new materials, which are basically located in the national strategic emerging industries.

[1]The website of the "2023 Chinese CVC Industry Development Report": https://new.qq.com/rain/a/20240301A07AVP00

2.2 Theoretical analysis and hypothesis development

The impact of industrial policy on CVC investment is concentrated in two aspects: first, mature firms build relationships with start-ups through CVC investment to acquire technological innovations. Industrial policies enhance investees' innovation by increasing regional entrepreneurial activity, making them more attractive to CVCs. Second, mature firms execute CVC investments to explore new growth opportunities in rapidly expanding industries. As an important means for government intervention in industrial development, industrial policy accelerates the entry of start-ups into the market by enhancing regional entrepreneurial activity. These start-ups inject new technologies and knowledge into the industries, subsequently promoting industrial growth. As a result, these start-ups may provide significant opportunities for mature firms to seek further development.

On the one hand, although CVC shares characteristics with traditional venture capital, particularly the pursuit of financial returns, these returns are are unimportant compared to the strategic objectives[16] (Lantz et al., 2011). Because enterprises are increasingly focused on achieving their own strategic goals to adapt to evolving technologies and market conditions[21] (Pinkow and Iversen, 2020). Innovation serves as a critical differentiation for enterprises, enabling them to distinguish themselves from competitors and improve competitive advantages in the market[16] (Lantz et al., 2011), it is also central point to their strategic objectives[5] (Cooper, 2000). CVC is frequently viewed as a significant mechanism for enterprises to acquire external resources of innovation[21][10] (Pinkow and Iversen, 2020; Dushnitsky and Yu, 2022). However, industrial policy significantly influences corporate innovation processes, existing studies have demonstrated that such policies can enhance the efficiency of corporate innovation[11][26] (Feng, 2019; Zhu and Tan, 2022). By improving the regional business environment, industrial policies attract more entrepreneurs, thereby improving entrepreneurial activity. This is a consensus supported by numerous scholars[1] (Agboli and Ukaegbu, 2006). Entrepreneurship and innovation usually have feedback effects on each other, the increase of entrepreneurial activity tends to stimulate more entrepreneurs to start their businesses and achieve more innovation[12] (Galindo and Méndez, 2014). Therefore, the implementation of industrial policies may enhance corporate innovation by improving regional entrepreneurial activity, which subsequently could attract CVCs' investments aimed at fulfilling their innovation or strategic goals.

On the other hand, the driving factors behind CVC investment in developing countries differ from developed regions. The "technology window" is only part of the reason for enterprises in developing countries to execute CVC investments, many enterprises participate in CVC investment primarily within rapidly expanding industries[9] (Dushnitsky and Yu, 2022). Several prior studies suggest that CVC serves as a mechanism for established firms to explore new business development opportunities[7] (Döll et al., 2022). Established

Table 1: The selection process of specific sample data

Venture capital investment events in mainland China from 2006 to 2020	114,356
Matching Chinese industrial policy	0
Exclude the data where the registered place of the invested enterprise is overseas	-15,614
Exclude missing data of investor type	-9,677
The resulting observation sample is used for analysis	89,065

enterprises are often located in traditional industries, which may gradually lose prominence as emerging sectors expand. In contrast, rapidly expanding industries typically offer abundant resources, presenting better growth opportunities for enterprises[3] (Barreto, 2012). Therefore, traditional enterprises are more likely to seek future growth opportunities and increase their CVC investments. However, industrial policy and industry expansion are usually inextricably linked, industrial policies enhance regional entrepreneurial activity, leading to the entry of new enterprises into the market. These new ventures contribute to industry evolution by introducing innovative technologies, networks, and knowledge[22] (Rypestøl, 2017). Therefore, the increase in regional entrepreneurial activity can promote the development of the industry, which is particularly attracting for CVCs in developing countries.

Based on the preceding analysis, this paper proposes hypotheses H1:

H1: enterprises located in industries supported by industrial policies are able to attract the participation of investment from CVCs.

3 Research design

3.1 Data and sample

I utilize the data on all venture capital investment events in China from 2006 to 2020 to research. Correspondingly, I incorporate Chinese industrial policy data from 2006 to 2020 and match these data with venture capital investment event data. For the source of data, the primary source for the venture capital investment event data is the CVsource database, as referenced by Dushnitsky and Yu (2022) and Chen et al. (2018)[10][4]. Compared to the Zero2IPO database commonly used by many scholars in studies of Chinese venture capital, the CVsource database offers a more granular categorization of CVC, making it more suitable for this research. Industrial policy data are sourced from the Industrial Policy Database (IPD) provided by the China Research Data Service Corporation (CNRDS), which has been extensively utilized by scholars in the field of Chinese industrial policy studies. The selection process of specific sample data report in Table 1

3.2 Model specification and variable definition

I construct the following regression model for research analysis:

$$CVC_i = \beta_0 + \beta_1 \times Pind_i\,(Cind_i) + Controls_i \times \gamma + \varepsilon_i \qquad (1)$$

CVC_i is the dependent variable and also a dummy variable. Specifically, the variable is assigned a value of 1 if a CVC institution is involved in the investment event and 0 otherwise. $Pind_i$ and $Cind_i$ are the independent variables respectively. When the invested enterprise is located in an industry supported by the provincial industrial policy in the venture capital investment event, the value of $Pind_i$ is equal to 1, otherwise, it is equal to 0. Similarly, when the invested enterprise is located in an industry supported by the national industrial policy in the venture capital investment event, the value of $Cind_i$ is equal to 1, otherwise it is equal to 0.

In addition, I also introduce some control variables including first-tier city, corporate age, historical financing, investment efficiency and CVC listed from three aspects of enterprise level, market level and CVC level. The definitions of explained variables, explanatory variables and control variables are reported in Table 2

3.3 Summary statistics

Table 3 present the descriptive statistical results of the variables studied in this paper:

4 Main results

4.1 Baseline regression

Table 4 below reports the baseline regression results obtained by regression based on equation 1) outlined above. The baseline regression results before the addition of relevant control variables are presented in column (1) and column (3), column (2) and column (4) demonstrate that after the fixed effect of the control province and the addition of relevant control variables, the participation of CVCs in enterprise financing and whether the enterprise is located in the provincial or national industrial policy support industries are both significant at the level of 1%. Notably, the coefficient of $Pind_i$ is significantly positive, while the coefficient of $Cind_i$ is significantly negative. As a result, with the support of provincial industrial policies, enterprises can attract CVCs to participate investment. However, enterprises under the support of national industrial policies reduce the investment willingness of CVCs.

The baseline regression results partially support our hypothesis H1. Enterprises located in industries supported by industrial policies can attract CVC institutions to participate investment, but this is limited to the level of provincial industrial policies. In order to analyze the reasons behind this phenomenon, it is essential to clarify the specific implementation methods and entities involved in industrial policies. As analyzed in the institutional background chapter, the primary implementation methods of industrial policy include financial subsidies, tax incentives, bank credit incentives, and import and export controls in China[11] (Feng, 2019).

However, those specific policies typically implement based on the provincial unit, Ma and Liu (2022) also point out that the policy implementation detail documents adopted at the provincial level

Table 2: Control variables definitions

First-tier city	Whether the location of the invested enterprise is a first-tier city, it is equal to 1 if located in first-tier cities, otherwise it is equal to 0.
Corporate age	The age of the invested enterprise at the time of the investment event.
Historical financing	Whether the invested enterprise has venture capital financing before, it is equal to 1 if financed, otherwise it is equal to 0.
Investment efficiency	the investment efficiency of the location of the invested enterprise, it is equal to 1 if the value is higher than the average, otherwise it is equal to 0.
CVC listed	Whether the CVC institution is a listed enterprise, it is equal to 1 if listed, otherwise it is equal to 0.

Table 3: Summary statistics

Variable	N	Mean	SD	Min	p50	Max
CVC_i	89065	0.384	0.486	0	0	1
$Pind_i$	89065	0.491	0.500	0	0	1
$Cind_i$	89065	0.414	0.493	0	0	1
FTC	89065	0.550	0.498	0	1	1
CA	88459	4.816	5.210	0	3	23
HF	89065	0.730	0.444	0	1	1
IE	89065	0.406	0.491	0	0	1
CL	89065	0.0674	0.251	0	0	1

Table 4: Baseline regression results

	(1) CVC_i	(2) CVC_i	(3) CVC_i	(4) CVC_i
$Pind_i$	0.012***	0.010***		
	(0.003)	(0.003)		
$Cind_i$			-0.008**	-0.009***
			(0.003)	(0.003)
_cons	0.394***	0.335***	0.404***	0.344***
	(0.005)	(0.012)	(0.004)	(0.012)
Controls	No	Yes	No	Yes
Province FE	Yes	Yes	Yes	Yes
N	89065	88459	89065	88459
r2	0.002	0.111	0.002	0.111

Note: Standard errors in parentheses , * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

were the result of provincial governments' re-formulation, the national policy is more like a guideline[18]. The final positive results of industrial policy fall to the regional level, the industry level and the enterprise level. For instance, government initiatives such as tax relief and financial subsidies for research and development directly reduce operational costs for enterprises. Additionally, preferential credit policies enacted by the government alleviate financing difficulties and lower the cost of capital, thereby enhancing the regional business environment. Consequently, compared to national industrial policies, enterprises or regions supported by provincial industrial policies may derive greater benefits, thereby attracting CVCs to engage in investment.

4.2 Robustness test

In order to further prove the reliability of these baseline regression results, I adopt the following methods to test the robustness of the model.

Narrow sample. I focus the sample on the period between 2016 and 2010, and examine whether the regression results remain significant following the reduction of the sample size. Columns (1) and (2) in Table 5 below indicate that the model's regression results continue to be significant after this adjustment.

Logit Model. Given that the dependent variable CVC_i in this study is a binary value, I displace the baseline linear regression model with a logit model to ensure the robustness of the regression results. Columns (3) and (4) in Table 5 below report the regression

Table 5: Robustness test results

	(1) CVC_i	(2) CVC_i	(3) CVC_i	(4) CVC_i
$Pind_i$	-0.062***		0.050***	
	(0.013)		(0.015)	
$Cind_i$		-0.026**		-0.043***
		(0.010)		(0.015)
_cons	0.121***	0.112***	-0.696***	-0.652***
	(0.037)	(0.037)	(0.061)	(0.060)
Controls	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
N	5886	5886	88459	88459
r2	0.176	0.174		

Note: Standard errors in parentheses , * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Mechanism analysis results

	(1) EA	(2) EA	(3) CVC_i	(4) CVC_i
$Pind_i$	0.159***	0.110***		
	(0.014)	(0.013)		
EA			0.012***	0.013***
			(0.001)	(0.001)
_cons	2.281***	-2.170***	0.373***	0.367***
	(0.010)	(0.079)	(0.004)	(0.012)
Controls	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
N	88292	87838	88292	87838
r2	0.585	0.629	0.004	0.113

Note: Standard errors in parentheses , * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

results of the logit model, which indicate that the results of the baseline regression model in this paper are robust.

4.3 Mechanism analysis

As discussed in chapters 2.2 and 4.1, the implementation of specific industrial policies such as tax incentives and financial subsidies can enhance the market business environment. The improvement of regional business environment will directly have a positive impact on regional entrepreneurial activities, which is also a view unanimously agreed by many academic studies[1] (Agboli and Ukaegbu, 2006). Furthermore, the increase of regional entrepreneurial activity may attract CVCs to participate in enterprise investment. On the one hand, CVCs gain access to a broader range of innovative opportunities from start-ups; on the other hand, there exists a significant positive relationship between industrial development and the growth of new enterprises. Therefore, I introduce the variable of regional entrepreneurial activity (EA) to analyze the mechanism of provincial industrial policies' impact on CVC investment. Then, I construct the following model for analysis:

$$\mathrm{EA} = \beta_0 + \beta_1 \times \mathrm{Pind}_i + Controls_i \times \gamma + \varepsilon_i \quad (2)$$

$$CVC_i = \beta_0 + \beta_1 \times \mathrm{EA} + Controls_i \times \gamma + \varepsilon_i \quad (3)$$

Table 6 shows the regression results for the mechanism analysis, which indicate that provincial industrial policies influence CVC investment by affecting local entrepreneurial activity, and this result is positive and significant at the 1% level. Under the support of provincial industrial policies, entrepreneurial activity in the region continues to increase, subsequently enhancing CVCs' investment willingness.

4.4 Heterogeneity analysis

Regional heterogeneity. In view of the large number of provinces in China, significant disparities exist in economy and industrial development levels across regions, resulting in variations in the industries supported by provincial industrial policies. Therefore, I categorize the provinces where the invested enterprises are located into three regions: eastern, central and western to analyze differences in the estimated results. Table 7 below describes the enterprises supported by the provincial industrial policies in the western region do not attract the attention of CVCs.

This phenomenon may be attributed to the lower fiscal revenue and expenditure in western region of China. According to the

Table 7: Regional heterogeneity regression results

	(1) East	(2) Central	(3) West
$Pind_i$	0.010***	0.033***	-0.011
	(0.003)	(0.011)	(0.012)
_cons	0.329***	0.358***	0.484***
	(0.012)	(0.042)	(0.036)
Controls	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
N	73385	6971	6633
r2	0.104	0.160	0.137

Note: Standard errors in parentheses , * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Financing rounds heterogeneity regression results

	(1) Angel Round	(2) Round A	(3) Round B	(4) Round C	(5) Round D	(6) Round E
Pindi	0.004	0.021***	0.028***	0.019	0.061*	0.018
	(0.006)	(0.006)	(0.011)	(0.019)	(0.035)	(0.011)
_cons	0.346***	0.276***	0.325***	0.363***	0.515***	0.360***
	(0.026)	(0.021)	(0.040)	(0.076)	(0.139)	(0.039)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
N	23913	27330	7883	2525	768	6377
r2	0.089	0.089	0.090	0.100	0.156	0.172

Note: Round A contains round A and round "A+" financing, Round B contains round B and round "B+" financing, Round C contains round C and round "C+" financing, Round D contains round D and round "D+" financing, Round E is for corporate strategic financing. Standard errors in parentheses , * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

"Chinese Regional Fiscal Development Index Report", the total fiscal development index in the western region has been at the lowest level all along between 2008 and 2020[2]. Consequently, given the lack of financial revenue and expenditure, enterprises located in western region struggle to secure sufficient financial subsidies to support their R&D initiatives, leading to a lower overall level of entrepreneurial activity in these areas, which in turn fails to attract attention from CVCs.

Financing rounds heterogeneity. For CVCs, some researchers point out that CVCs primarily connect with start-ups, participate in early stage financing of enterprises[21] (Pinkow and Iversen, 2020). Therefore, I also further analyze the relationship between different financing rounds of enterprises under provincial industrial policies and CVC investment. Table 8 presents the estimated results, indicating that enterprises benefiting from provincial industrial policy support are more likely to attract CVCs' investment during Series A and Series B financing rounds, while CVCs show less inclination to engage in the financing of mature enterprises within the same policy framework.

Enterprises located in Series A and Series B financing rounds usually already have core products and technologies, as well as are in a stage of rapid development, they may be more attractive to CVC investment institutions. In contrast, enterprises at the angel round stage usually lack mature products and technologies, possessing only preliminary frameworks of development. Moreover, for more mature enterprises in Series C and beyond rounds, participation in their financing is usually more expensive because these enterprises have higher valuations, which is not cost-effective.

5 Conclusion

In this paper, I adopt all venture capital events in China from 2006 to 2020 to analyze the relationship between industrial policy and CVC investment in developing countries. The baseline regression results indicate that enterprises located in industries only supported by provincial industrial policies are able to attract CVCs for investment. This trend can be attributed to the fact that provincial industrial policies represent specific strategies implemented by local governments to foster industrial development, whereas national industrial policies function more as general guidelines. Furthermore, through mechanism analysis, I find that enterprises located in industries supported by provincial industrial policies can stimulate the increase of entrepreneurial activity within their regions, thereby stimulates investment activities of CVCs. The spillover of a large number of start-ups provides more opportunities for corporations conducting

[2]"Chinese Regional Fiscal Development Index Report" website: http://ipft.ruc.edu.cn/docs//2021-12/372f67960e6042f1b1493c0586273668.

CVC investment to achieve technological innovation. Additionally, my heterogeneity analysis reveals that due to insufficient industrial financial input in western China, the level of entrepreneurial activity among regional enterprises is relatively low. Consequently, the impact of provincial industrial policy on CVC investment is more pronounced in eastern and central region in China. Notably, enterprises located in the industry supported by provincial industrial policy are more attractive to CVCs to participate in investment when conducting Series A and Series B financing rounds.

This paper enriches the existing literature on industrial policy and venture capital from the perspective of corporate venture capital, and puts forward the following implications: First, industrial policy plays an important role in CVC investment in China, which reveals the derivative role of industrial policy in the financial market, and verifies that Chinese venture capital market is influenced by the government. The Chinese government can further strengthen the implementation of industrial policy, thereby promote the integration of industry and finance, and promote the development of China's venture capital industry. Second, for enterprises that want to obtain financing from CVC institutions in order to transform, they can try to change the industry in which they are located, actively strive for industrial policy support and strengthen R&D, which may be more concerned by CVC investment institutions.

Lastly, this paper establishes a foundation for future investigations into the effects of industrial policy on the innovation efficiency and strategic development of CVCs. Meanwhile, this paper also provides a new perspective for further exploring the derivative effects of industrial policies in developing countries.

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