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How Does China Conduct Industrial Policy: Analyzing Words Versus Deeds

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Abstract
This paper analyzes how China's industrial policy works focusing on the setting of objectives ("words") and their implementation ("deeds"). In particular, we investigate how objectives vary across central and local Five-Year Plans (FYPs), in terms of industry preferences, and also compare such objectives with those included in China's landmark industrial policy, "Made in China 2025." Notwithstanding China's centralization of policy planning, we find relevant sectoral differences between central and provincial planning and key industrial policy documents. Secondly, we look at how decisions are made in the realm of China's industrial policy ("deeds"). To this end, we assess empirically why certain companies are selected under the most recent grand industrial policy strategy, the 10,000 Little Giants, a spin-off of "Made in China 2025." Out of the key four criteria of selection (i.e., "words"), one is missed in most cases, namely the concentration of the business activity in the relevant sector. Secondly, the intensity of R&D is only significant in the most recent batches of selected companies. For the last two (revenue generation and leverage), there is no noticeable difference between the selected companies and the others. Our results point to the complexities in conducting industrial policy in China as words and deeds do not necessarily align.

Keywords Industrial policy · China · Large-language models (LLM)

JEL Classification L5 · L52

1 Introduction

Industrial policy has become a buzzword recently as more and more governments claim they need it either to catch up with the developed world, among emerging and developing countries or, in the case of the US and Europe, to reduce critical dependencies from China. China itself has conducted industrial policy for decades and so did Japan and South Korea in the past.

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The first question to ask ourselves is what we really mean by industrial policy. Rodrik (2004) defines it as the discriminate support for specific sectors or firms over others to boost regional or national competitiveness. In the current environment, support for industrial policy has become easier, even among orthodox economists, as a second—but still necessary—best to achieve certain goals, such as the green transition or producing enough protective gear or medicines during a pandemic. In August 2022 the Biden administration introduced the Inflation Reduction Act, providing targeted subsidies for sector-specific purposes. In the same vein, a debate has arisen in the EU about how industrial policy could be leveraged to implement the European Green Deal as part of which the EU Commission has committed to reaching carbon neutrality by the year 2050. As of recently, several member states have provided heavy subsidies for investment in chip manufacturing as well.

Still, the revival of industrial policy in the West is rather recent and the learning curve is steep. Japan surely offers interesting lessons, but the world was very different in the 1970s and 1980s when Japan's industrial policy was most active. China, instead, has much more recent experiences with industrial policy, which is very comprehensive and tends to cover many sectors (Naughton 2021). Since 2006, several government agencies have promoted state guidance to support industrial upgrading. In 2015, a landmark industrial plan was announced under the name of "Made in China 2025." The plan singles out ten key sectors in which China should assume world-class status by 2025. Abroad, China's renewed vigor in industrial policy is increasingly observed by European and US policymakers because of the potential consequences, not only in the Chinese market but also globally given China's companies huge size and the risk of overcapacity. This is said to have been the case for several sectors already, such as the solar PV industry, aluminum, steel, and shipbuilding. As a recent outgrowth of this suspicion, the EU Commission has launched an anti-subsidy investigation into Chinese EV producers.

This paper aims to contribute to the existing literature on how China's industrial policy works in two specific ways. Firstly, it uses large language models to identify the main objectives of the key industrial policy documents of the last 20 years, focusing on the sectoral choice at the national and local levels. Based on such information, we evaluate whether state objectives (words), as far as the sectoral choice of industrial support is concerned, may differ between the central and the provincial governments. Finally, and still within the universe of industrial policy objectives (words), we also investigate what sectors may receive more attention in the two most relevant industrial policy plans of the last few years, namely Made in China 2025 (中国制造 2025) but also its spin-off, the "10,000 Little Giants" (小巨人) launched in 2018 for smaller companies. The second part of the paper investigates empirically whether the actual choices made by Chinese policymakers when implementing industrial policy (i.e., the deeds) match the words. In particular, we assess whether the profile of the companies chosen to be supported (i.e., "treated") matches the objectives set in the relevant industrial policy documents. For this exercise, we need to narrow our exercise to the Little Giants because it is the only one that makes the selected companies public while Made in China 2025 does not. Given the similarities between the two in terms of their origin and goals, we believe that the Little Giants initiative can be considered a good proxy for China's actual industrial policy choices. Analyzing how choices may differ from objectives in China's industrial policy is a very important first step before moving into analyzing the impact of such policies.

The paper's structure is as follows. Chapter 2 offers a brief review of China's industrial policy over the last couple of decades and how it has been covered in the economic literature. Chapter 3 states the paper's objective, namely assessing how China's industrial policy objectives (words) compared with the actions (deeds). Chapter 4 examines the differences

in objectives across industrial policy plans. Chapter 6 analyzes empirically how companies are selected to be supported by specific policies (deeds) focusing on the 10,000 Little Giants Chap. 9 concludes.

2 China's Industrial Policy in the Economic Literature

After Deng Xiaoping came to power in 1978, the reform and open era began which resulted in unprecedented economic growth in China. Productivity advances, combined with a surge in capital investment were made possible by a gradual liberalization of the previously state-dominated economy, as well as the introduction of private entrepreneurship into China's institutional framework. The peak of economic liberalization occurred under Prime Minister Zhu Rongji (1998–2003), who paved the way for China's accession to the WTO. This period saw the consolidation of large state-owned enterprises into conglomerates and the privatization of small local SOEs through the "grab tight the large ones, let go the small ones" (抓大放小) policy. In 2003, a turning point emerged shortly after the transition from the Jiang/Zhu administration to the Hu/Wen administration. While throughout the 1980s and 1990s the state had continuously retreated in comparison to the flourishing private sector, a more active state guidance of the economy started to be preferred, especially when the 2008 global financial crisis hit the Chinese economy. There are several views on the reasons for the turning point. Chen and Naughton (2016) argue that Prime Minister Wen was keen on reasserting the role of the state in guiding the Chinese economy into the future. Tan (2021) argues that the weak political leadership of Wen and Hu left considerable room for inter-ministerial competition between market-oriented agencies and developmental agencies, with the latter eventually coming out on top. Furthermore, Jiang/Zhu's reforms were increasingly perceived as having gone too far, all the more so given rising competition from foreign firms (Brandt et al. 2017). Wen and Hu were supported by state-economic institutions, especially state-owned enterprises (SOEs) as stronger state support should bring economic stability, which became a particularly important message at the time of the 2008 global financial crisis. Beyond stability, the push for innovation during the Hu/Wen administration was another reason to resort to more government intervention. In particular, in 2006, the State Council published the *National Medium- and Long-Term Program for Science and Technology Development* (2006–2020) (MLP) [1], which was the result of 3 years of consultations with over thousands of experts involved, outlining priority sectors for long-term economic development. The 2008 stimulus, as a response to the global financial crisis, also helped channel funds to industrial policy objectives under the decision *to Accelerate the Fostering and Development of the Strategic Emerging Industries*[2]. Already in the Xi/Li era, a significant industrial policy landmark was introduced in 2015, namely *Made in China 2025*[3], targeting ten manufacturing sectors in which China would aim to be a global leader by 2025. This coincided with the setup of so-called government industrial guidance funds, large-scale funds channeling both government and private capital into targeted support for critical sectors (Luong et al. 2021; Wei et al. 2023; Kajitani et al., 2022). The size and scope of China's industrial policy by 2015 were larger

[1] Available at: https://www.gov.cn/gongbao/content/2006/content_240244.htm.
[2] Available at: https://www.gov.cn/zwgk/2010-10/18/content_1724848.htm.
[3] Available at: https://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm.

than that of other Asian economies, including the Asian tigers (DiPippo et al. 2022). Simultaneously, efforts to stimulate the growth of small- and medium-sized enterprises (SMEs) have intensified, with government-supported venture capital proliferating (Li 2022; Colonnelli et al. 2023). Beyond the well-known Made in China 2025, the *Plan for the Promotion of Medium- and Small-Sized Enterprises (SMEs) 2016–2020*[4] was published as its complement focusing on *mass entrepreneurship and innovation*[5]. Finally, in 2018, another spin-off of Made in China 2025 was unveiled, namely the *10,000 Little Giants Initiative*[6], as a second step of the Plan for the Promotion of SMEs. The sectors targeted in this new initiative were meant to be the same as those in Made in China 2025, such as "basic materials, advanced basic technologies, and foundational industrial technologies." Since May 2019, a total of five annual batches of enterprises have been selected, totalling over 12,000 firms, which are officially named as little giant enterprises (LGEs). These companies constitute the elite of a three-step funnel, or "gradient" for China's plan to foster "high-quality growth" which started with one million innovative SMEs, from which 100,000 were selected as specialized and innovative. Out of that million, 10,000 firms were chosen as highly specialized and exceptionally innovative LGEs (see Brown et al. 2023 for an overview). The funnel works through an incentive mechanism that awards SMEs if they cultivate innovation. The rewards are increased subsidies and other forms of government support, such as discounted loan rates, assistance with patent applications, and access to digital infrastructure. One of the key objectives that a company's selection aims to achieve is to facilitate attracting talent and capital.

China's most important planning exercise, its Five-Year Plans (FYPs) also cover industrial policy issues and, in particular, sectoral preferences. Chen et al. (2017) analyze the industries mentioned most in China's Five-Year Plans from 1991 to 2010 and find that state-owned firms in government-supported industries enjoy significantly easier access to finance. Similarly, Wu et al. (2019) look into the industrial emphasis of China's national and provincial Five-Year Plans. They find that industries explicitly promoted had a higher output during the period of the respective Five-Year Plan.

3 Objective

We contribute to the existing literature on China's industrial policy by focusing on how it actually works and, more specifically, how its objectives match with its actions. We find this step essential before any cost/benefit analysis of such policies can be conducted. Assuming that China's industrial policy is flawless and that actions are perfectly aligned with objectives is generally assumed in the empirical literature looking into the impact of China's industrial policy. Things are not so easy, not even in a planned economy like China.

To understand better the extent to which China's industrial policy works, we conduct two different types of analysis. First, we investigate how China designs its industrial policy objectives, with particular focus to the sectoral choice and how such objectives may differ at the central and local level but also between the highest-order planning documents and more specific industrial policy objectives. To achieve this first goal, we use large language

[4] Available at: https://www.ndrc.gov.cn/fggz/fzzlgh/gjjzxgh/201706/t20170620_1196809.html.

[5] Available at: https://www.gov.cn/zhengce/content/2015-06/16/content_9855.htm.

[6] Available at: https://www.miit.gov.cn/zwgk/zcwj/wjfb/zh/art/2020/art_9dee2248b9244816a2820f91f7886ecb.html.

models (LLM) to distill the relative importance of different sectors in central and local Five-Year Plans (FYPs) and then compare them with key industrial policy documents, such as the Made in China 2025 and the 10,000 Little Giants. The goal is to determine how aligned objectives across different programs and provinces or, in other words, the degree of "cacophony" among guiding expectations about where China's industrial policy is heading.

As a second step, we move from big objectives to actions by exploring how companies are selected to receive the benefits related to industrial policy and whether such selection (deeds) fit the objectives (words) set out in the plans. One of the key difficulties in responding to this question is how to measure the "deeds" as China's industrial policy is conducted in a rather non-transparent way. This is particularly the case of China's landmark industrial policy tool, namely "Made in China 2025" since no information exists as to which companies have been selected to benefit from this program. This might be related to the increasing attention paid by the rest of the world to China's industrial policy and China's potential concern that other countries may take action against potential unfair competition stemming from such industrial policy. Interestingly, the spin-off of "Made in China 2025," the "10,000 Little Giants" program, does publish which companies have been selected to receive the program's benefits. This will allow us to investigate whether their choice follows the principles announced in the actual policy documents describing the program.

The next two sections describe the two different goals of the paper and our findings.

4 Words: How Industrial Policy Objectives Align at National and Regional Level

4.1 Data and Methodology

To assess how China's industrial policy differs across different policy instruments, we collect a range of key policy documents and extract the industry focus of each on them using LLM. We start with the Five-Year Plans (FYPs) for the last 20 years (4 in total) issued by the central government. These documents are the key tool to evaluate the economic performance of the previous period against a benchmark (Heilmann 2018) but also to plan for the next 5 years, with industrial policy being one of the key angles covered in such plans. We also extract the provincial-level Five Year Plans for the same 20-year period. More specifically, the period we cover ranges from 2001 when the tenth Five-Year Plan was launched until 2021 when the 14th Five-Year Plan was published. We our LLM models, we estimate how provincial FYPs deviate from the central one for the same period as far as the relative importance of key sectors is concerned. We focus on industrial sectors in our analysis and omit service ones.

Beyond the FYPs, we also use the same LLM to analyze "Made in China 2025," issued originally as a priority guideline to inform the industry focus of the 13th and 14th Five-Year Plan.

4.2 Sectoral Classification

To achieve the above goal, one key question is how to classify the sectors in the FYPs and policy instruments. The most straightforward, but not necessarily best, approach would have been to use the ten sectors highlighted in the Made in China 2025 original policy document. However, many other sectors receive government support and are mentioned

in the FYPs so we decided to use a broader classification of sectors, namely that of China Securities Regulatory Commission (CSRC)'s sectoral breakdown. By utilizing CSRC's classification, we aim to capture a more accurate representation of the industrial landscape, since it is much broader.

As a crucial validation step, our industry categorization methodology was cross-checked based on the existence of subsidies in the different industrial sectors within the CSRC classification and not only in the 10 which appear in the Made in China 2025 plan (see Appendix A.1). Beyond confirming the existence of subsidies, we exclude the services sector and eliminate subcategories with a tiny share. At the end of this process, we end up with 15 industries. This refinement helps us focus on the most important sectors from a bottom-up approach, rather than taking the classification of a single document, such as Made in China 2025. We also manage to increase the sectoral coverage by 50%. To determine the semantic nuances within each identified industry, we leverage available documents from the CSRC classification[7]. More specifically, we extract a granular semantic field, comprising a list of keywords and subindustries that characterize the top categories. This step helps us to obtain an exhaustive and precise classification of the industries. Subsequently, we calculate the share of each industry within the documents using the semantic fields. To achieve this, we quantify the occurrences of keywords present in the semantic field in each document (see Appendix A.2 for further details). Finally, to avoid capturing different messages, such as the criticism of a certain industry rather than an objective of planning or industrial policy, we perform a sentiment analysis of all the sentences in all documents to check which industries appear in a favorable context. We use the SnowNLP algorithm as it has been used before for Chinese policy documents (Meng and Yucheng 2023). The average sentiment on our documents was 0.82 in the scale from 0 to 1 (0 strongly negative, 1 strongly positive) which indicates that industries are mentioned in average in a positive context.[8]

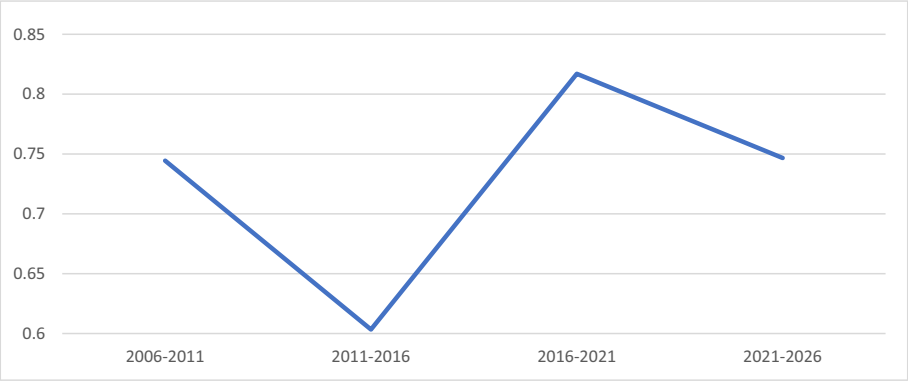
4.3 Results

The first question we ask ourselves is how close the objectives of the national FYPs are to those of the provincial plans. We find that national and provincial plans were very much aligned but such alignment was at a slightly lower level between 2011 and 2016 Central and Local Five-Year Plans (Graph 1). A plausible explanation for the smaller alignment of objectives during this period could be the change in administration for Hu/Wen to Xi/Li in the middle of it. With a closer look at the data, we can observe that the biggest difference lies in sectors such as Special Equipment Manufacturing (including medical devices), Agriculture and Computer, Communication, and Other Electronic Equipment Manufacturing that are mentioned more often in central plans. Instead, sectors such as Railway, Shipbuilding, Aerospace, and Other Transportation Equipment Manufacturing or Automotive gain more attention in local plans (Graphs 2 and 3).

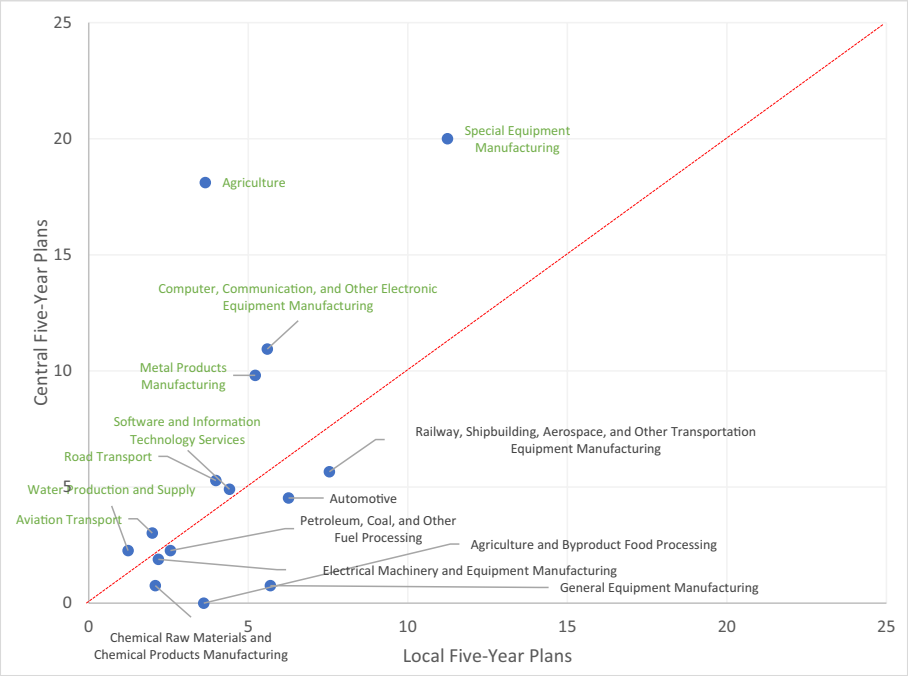
Moving to the more specific industrial policy documents, such as Made in China 2025, we compare its objectives with those of the central FYP during the same period and find divergences in the importance of certain sectors namely the "Computer, Communication, and Other Electronic Equipment Manufacturing" and "Software and Information

[7] Available at: https://www.mca.gov.cn/n156/n188/n2678/c1662004999979993527/content.html.

[8] The summary of our sentiment analysis yields 81% positive sentences, 6% neutral and 13% negative.



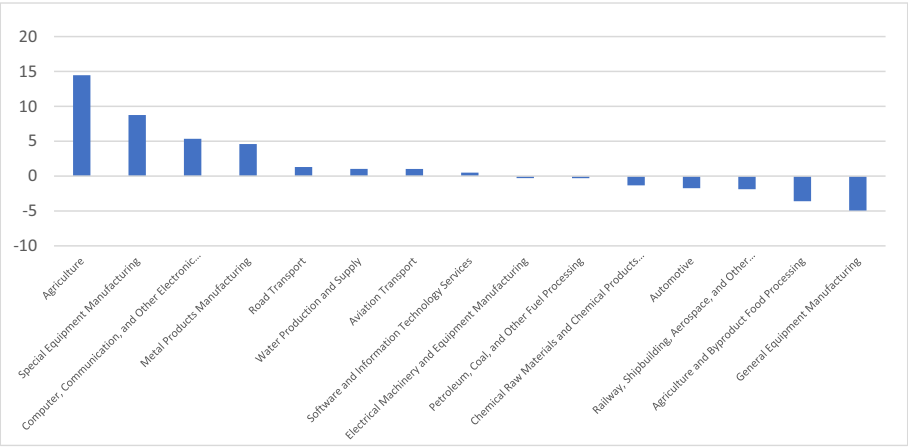
Graph 1 Correlation between the industry focus of central vs. local FYPs Source: China's central and provincial Five-Year Plans (FYPs) for the period 2001–2021 and authors' calculations



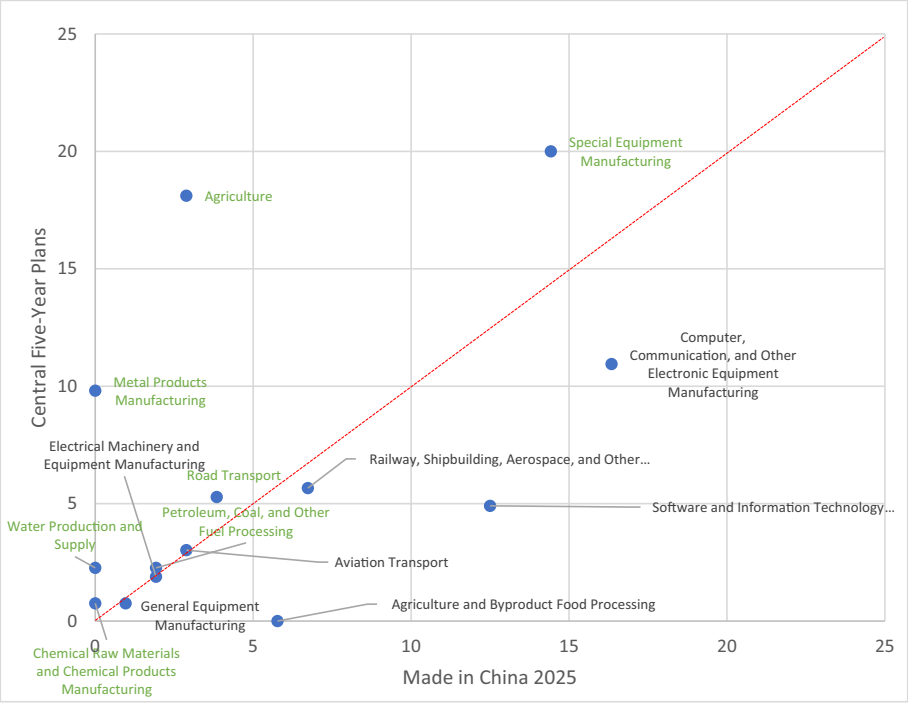
Graph 2 Industry focus of local vs central FYPs (2016-2020). Note: Green labels indicate that an industry is mentioned more often in Central Plans while black labels in Local Plans. Unit: % (share of industry). Source: China's central and provincial Five-Year Plans (FYPs) for the period 2001–2021 and authors' calculations

Technology Services" are much more prevalent in Made in China 2025 than in the central planning (Graphs 4 and 5).

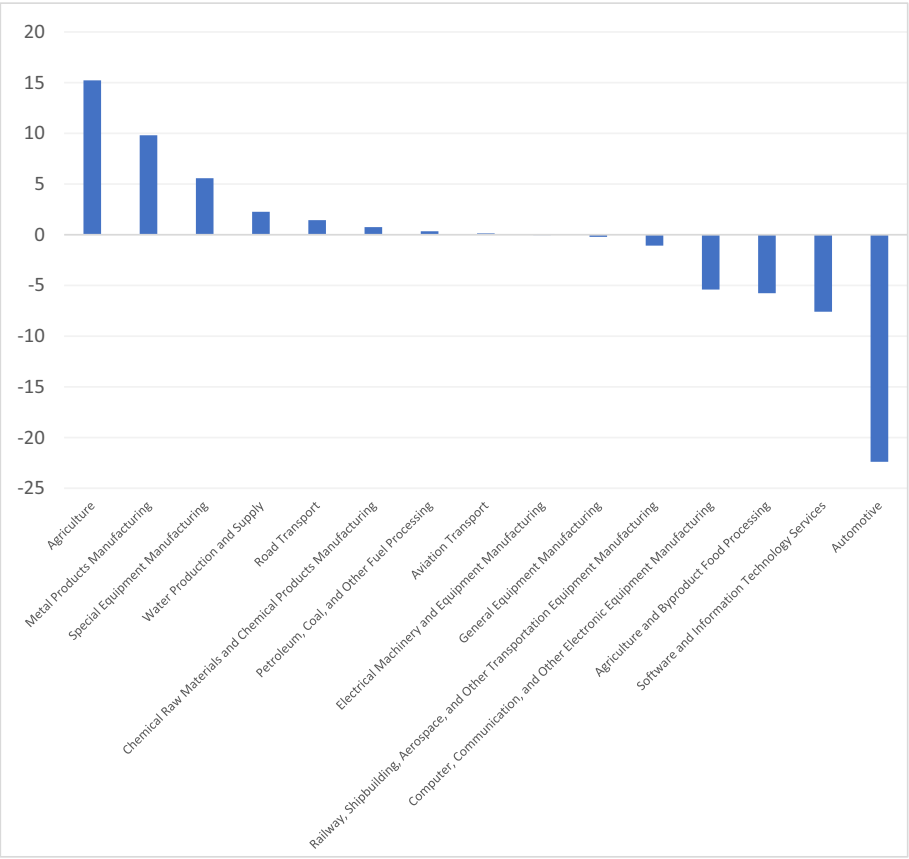
We finally compare the objectives in Made in China 2025 with the sectoral choices made in its spin-off, namely the 10,000 Little Giants but looking at the sectors of origin of



Graph 3 Industry focus of local vs central FYPs-average difference (2016-2020). Unit: percentage points difference. Source: China's central and provincial Five-Year Plans (FYPs) for the period 2001–2021 and authors' calculations



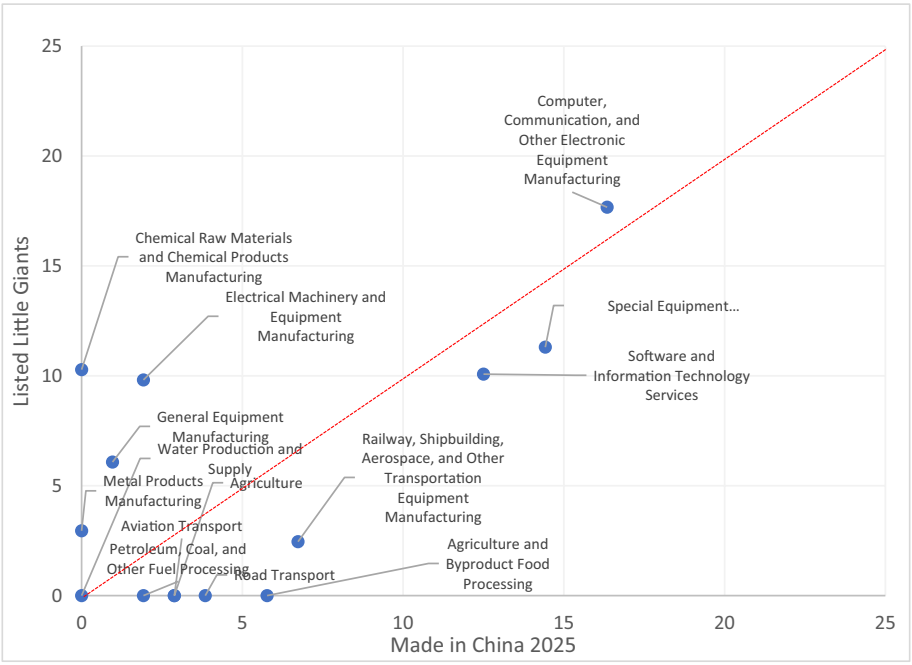
Graph 4 Industry focus of central FYPs (2021-2025) vs Made in China 2025. Note: Green labels indicate that an industry is mentioned more often in the central FYP than in the Made in China 2025 policy documents. Unit: % (share of industry). Source: China's central Five-Year Plans (FYPs) for the period 2021-25 and policy documents introducing Made in China 2025, as well as authors' calculations



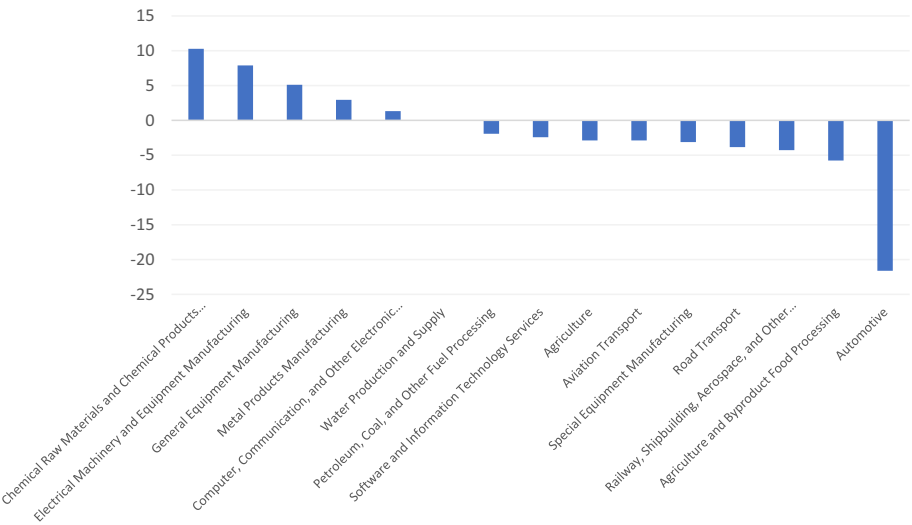
Graph 5 Industry focus of central FYPs (2021-2025) vs Made in China 2025. Unit: percentage points difference. Source: China's central Five-Year Plans (FYPs) for the period 2021-25 and policy documents introducing. Made in China 2025, as well as authors' calculations

the selected companies. Being a spin-off of the former, we would expect the objectives to be quite similar, but they are not. For example, a relatively large number of companies are selected in the "Chemical and Raw Materials" sector under the 10,000 Little Giants compared to the mentions of this sector under Made in China 2025. Instead, the opposite is true for the automotive sector which is among the most mentioned in the Made in China 2025 strategy but there are very few companies selected as little giants (Graphs 6 and 7).

All in all, our analysis using LLM of China's industrial policy documents, whether those for more general planning, such as central and local FYPs, as well as the more specific, sheds some light as to the similarities and differences in the sectoral objectives set in such documents. We find that some of the sectoral choices at the provincial level are quite different from those in the central policy planning. The same is true between the sectoral objectives mentioned in the Made in China strategy and the sectoral choices made under the umbrella of its spin-off program, the 10,000 Little Giants. The absence of full alignment may appear surprising in sectoral objectives may appear surprising given the resources that China spends on economic planning. There are several plausible explanations for our findings. Firstly, Chinese authorities may be taking into account geographical



Graph 6 Industry focus of Made in China 2025 versus Listed Little Giants. Unit: % (share of industry). Source: Policy documents introducing Made in China 2025 and authors' calculations of the sectoral distribution of the companies selected as Little Giants



Graph 7 Industry focus of listed Little Giants vs Made in China 2025. Unit: percentage points difference. Source: Policy documents introducing Made in China 2025 and authors' calculations of the sectoral distribution of the companies selected as Little Giants

differences when setting industrial policy objectives through different policy documents. In the case of the Made in China versus the 10,000 little giants, the different objectives may stem from the different company size targeted in both cases. In any event, further analysis would be needed to fully understand how China sets its sectoral objectives when planning but we hope this is a good start as it has so far being ignored in the literature.

5 Deeds: Do Actions Follow Industrial Policy Objectives

Although we find that words are not always fully aligned in China's industrial policy documents, these objectives are surely important for China's economic strategy. In this second part, we go one step further in understanding how China's industrial policy works. In particular, we investigate whether specific objectives are matched by actions; in other words, whether "deeds" align with the "words."

The empirical work on how China's industrial policy works is constrained by lack of data. In the case of the landmark industrial policy strategy, Made in China 2025, there is no official account of which companies have been selected to receive benefits, whether subsidies or others. Branstetter and Li (2022) attempt to deal with this issue by examining listed companies' annual statements and classify companies as "treated" (i.e., selected to be favored) if Made in China 2025 was mentioned. The reality is the latter could be mentioned for many reasons and not necessarily because the company has been selected but the authors do not have enough information to disentangle these different hypotheses. The margin of error that this entails weakens the results of their analysis Another potential venue to identify the companies could have been to look at the facts, namely the subsidies received by different companies, but the reality is that even companies outside of the sectors included in Made in China 2025 receive subsidies as shown in our Appendix A.1.

To circumvent the problem of identification of the "treated companies," we focus on the second grand initiative discussed in Sect. 2, the *10,000 Little Giants* because it is much more transparent. In fact, the list of "treated" companies is made public at the different points in time in which the selection occurs, namely in five different batches so far.

In the next section, we offer a brief description of the 10,000 Little Giants with special attention to the requirements (quantifiable and non-quantifiable) set out for companies to be selected as Little Giants Enterprises (LGEs). We then show some stylized facts to show whether the quantifiable requirements are met by the companies that have been selected as LGEs and compare the degree of alignment of results for the companies that have not been selected. As a last step, we asses empirically whether to companies selected as LGEs generally comply with the criteria set out in the 10,000 Little Giants policy documents. By doing this, we can determine which criteria are really taken seriously when selecting the companies to be "treated."

5.1 Stylized Facts on How Little Giants Differ from Other Firms on Stated Requirements

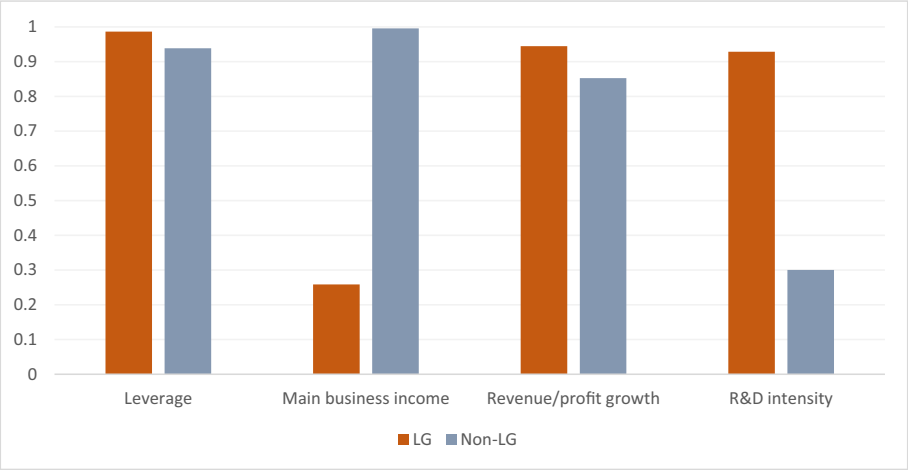
As one of China's major Industrial Policy initiatives under the framework of innovation-driven growth, the 10,000 Little Giants program is composed of two rounds of selection steps. The first occurs at the provincial level, during which relevant authorities review applications submitted by firms seeking to enrol in the program. A recommended batch of candidates is then submitted to the Ministry of Industry and Information Technology

(MIIT), which makes its final selection with the help of a committee of randomly picked experts who review application materials and conduct spot checks. Firms are judged on a range of criteria, including financial performance, market position, and spending on research and development (R&D). To dissuade a slowing of innovation efforts once enrolled, selected firms only retain their status for 3 years, after which they need to re-apply. According to the official communication firms who wish to apply should be "outstanding among specialized, refined, and innovative SMEs" and "engaged in core basic components, advanced basic processes, and critical basic materials.". Chosen firms must be "capable of providing key components, components, and supporting products for large enterprises or projects, with their leading products holding a high market share in the domestic industry" and be "well-managed with a strong reputation and sense of social responsibility"[9]. Apart from that, a range of quantifiable targets are mentioned, including maximum thresholds for leverage, as well as minimum requirements for R&D intensity, a minimum share of income from main business activities and sound growth prospects, measured by revenue growth. Some of these indicators are very specific, in particular leverage, measured as the ratio of liabilities to assets, must not exceed 70% in the year previous to the batch selection. Secondly, the share of revenue from main business activities *must* exceed 70% of total revenue in the year previous to the batch selection, revenue *or* profit growth over the2 years previous to the selection should average 10% for Batch 1 and Batch 2, or 5% from Batch 3 onwards. The lower benchmark for the revenue criterion is probably related to the worsening economic conditions of the Chinese economy during the last couple of years. The requirement for the R&D expenditure depends on the size of the firm. In particular, it should exceed an average 3% of total expenditure for the 2 years prior to selection for firms above a total of RMB 100 million annual revenue, and an average 6% for firms between RMB 50 million and RMB 100 million.

The names of the selected companies (LGEs) are announced by each province separately during a particular week of the year as previously agreed with central government. This has been done five times already so there have been 5 batches all in all from September 2018 to December 2022. We scrap the lists of companies announced manually from each provincial government's website. We then match the names with the firms listed on China's different stock markets. The reason why we narrow our sample of LGEs to listed ones stems from the need to have financial statements to calculate the financial ratios needed to assess the selection process. Finally, we keep only those industries in which more than ten selected little giant firms are located to avoid small sample problems. We are left with a sample of 2552 firms, of which 630 belong to the LG firms but we still need to adjust the sample for a very important reason: company size. To account for the fact that LGEs are generally smaller than other listed firms, we first remove outliers in the size of LGEs which we define as firms with an asset value above two standard deviations of the logged standardized normal distribution. We then truncate the set of non-LG firms at the maximum asset value for LGEs within our sample. Finally, we omit sectors in which there are no LGEs since our goal is to benchmark LGEs with other similar companies. This leaves us with a final sample of 743 LGEs out of 1934 listed firms.

The next step is to calculate the above-mentioned quantifiable criteria to become a LGE. These are (i) revenue/profit growth, (ii) R&D intensity, (iii) concentration in key business (i.e., main business revenue to total revenue of at least 70%), and (iv) the leverage ratio. We

[9] https://www.miit.gov.cn/zwgk/zcwj/wjfb/zh/art/2020/art_9dee2248b9244816a2820f91f7886ecb.html.



Graph 8 Requirement fulfillment rate, for LG and non-LG firms

do this for LGEs and non LGEs and compare the number of companies in the two groups which fulfill these criteria.

Graph 8 shows the fulfilment rate of all the key four quantifiable criteria, for both sets of firms. The vast majority of LGEs, above 90%, fulfill the requirements for the maximum leverage ratio, R&D intensity, as well as revenue/profit growth. However, only about 25% of LGEs comply with the fourth criterion, namely exhibiting a share of main business activities to total revenue above the required threshold of 70%. This is all the more surprising if we consider that nearly 100% of the other listed companies in our sample respect this criterion. There are two potential readings of this stylized fact. Firstly, the Chinese government might be willing to accept diversified firms to receive support if other standard criteria. A different, and more negative, reason could be that the companies selected are not focused in the sectors of interest to the Chinese government. We will go back to this when we move to the regression results although we will not be able to confirm any of the two hypotheses with remain speculative in our analysis. We also note that criteria are fulfilled in a very similar way across batches (see Appendix A.3 for a more detailed depiction).

5.2 Regression Analysis to determine the Factors Behind the Company Selection

As a second step to our analysis, we assess empirically whether the firms "treated" by industrial policy (deed) are those that comply with the criteria announced (words).

We use a probit model to estimate the probability of being selected as a LGE, with LGEs being identified as 1 and the rest of listed companies included but not chosen as 0. Our sample consists of the 2,677 listed companies described in the previous section, 743 of which are LGEs. We introduce the key criteria that a company needs to comply with to be selected as LGE described in the previous section as regressors.

$$\Pr(\textit{Certified Little Giant Firm}|\boldsymbol{x}) = G\left(\boldsymbol{x}_{t-1}\boldsymbol{\beta}\right)$$

where $G\left(\boldsymbol{x}_{t-1}\boldsymbol{\beta}\right)$ is the cumulative density function for the standard normal distribution.

Specifically, the variables included as regressors are *revenue growth* in the previous 2 years, average *profit growth* in the previous 2 years, *R&D intensity* in the previous 2 years, defined as the ratio of R&D expenditure to total operating income, share of *main business income*, defined as the share of income from main business activities in total operating income, and *leverage*, the latter defined as the ratio of total liabilities to total assets. In addition to the selection criteria, we include a range of control variables, such as firm size, using the log of a firm's total *assets*[10]. We then include *return on assets* as a proxy of economic performance. Next, we control for whether a company chosen for the program has received *ex ante* government support, in the form of direct subsidies, tax breaks or both. More specifically, we include the log of government *subsidies* in our specification, as well as the *effective tax ratio*, measured by the ratio of taxes and surcharges paid to revenue each year. Furthermore, we include the *age* of a firm in years, as well as a dummy variable for *state ownership*, which equals 1 if the firm is a centrally owned enterprise, (中央国有企业), locally owned enterprise (地方国有企业), or publicly owned enterprise (公众企业). Instead, if the company is private, the dummy takes the value of 0. Finally, we add several variables to gauge financial characteristics, such as *liquidity*, *intangible assets*, *cash flow ratio*, and *capital intensity*. Description of the entire set of variables, summary statistics and correlation tables are provided in the Appendix A.3. For the regression specification, we add industry dummies to our model to account for industry-specific variation in the causal effect of our explanatory variables. Besides the explanatory variables are lagged by 1 year which is commonly applied in the literature to reduce the risk of reverse causality (Leszczensky and Wolbring 2019).

5.3 Results

Our results (shown in Table 1) confirm our stylized facts in the previous section. Regarding the first criterion, profitability, neither Profit nor revenue growth are found significant. In other words, LGEs do not differ from other listed companies of a relatively similar size and operating in the same sector. Secondly, the leverage ratio is also insignificant for the same reason. Thirdly, the R&D intensity appears to be statistically relevant in the LGE choice for the third and fifth batch but not generally. In other words, for two out of the three most recent batches, R&D intensity is significantly higher for the companies that have been selected as LGEs. The fourth and last criterion, the business focus in the relevant sector, is the most surprising, as the stylized facts were pointing out. The probability that a company is selected as a LGE increases if a company share of revenue from main business is l. On the contrary, for all batches except the first, this variable is found significant but with the opposite sign. In other words, it is the most diverse companies in terms of economic activity that are selected to receive support under the 10,000 Little Giant program.

Beyond the quantifiable criteria, some characteristics mentioned in the 10,000 Little Giant documentation do seem to matter while others do not. Firstly, size is found significant and with the right sign in every batch. Namely smaller companies tend to have a higher chance of been treated for every single batch. Instead, there is no evidence that private companies are preferred. In fact, the type of company ownership is never significant. In the same vein, the age of the company is not found relevant, except for batch 3 in which

[10] In a separate regression we measure the size of the firms by the logarithm of total employment and find no difference in results.

Table 1 Characteristics of chosen firms

	Batch 1 (1)	Batch 2 (2)	Batch 3 (3)	Batch 4 (4)	Batch 5 (5)
Size (assets)	−0.701***	−0.664***	−0.552***	−0.684***	−0.595***
	(−3.73)	(−6.90)	(−7.03)	(−9.55)	(−6.37)
2Y revenue growth	−0.322	−0.0139	−0.0402	−0.230*	−0.0799
	(−0.66)	(−0.16)	(−0.69)	(−1.84)	(−0.58)
2Y profit growth	0.00323	0.000371	−0.00448	0.000462	−0.000293
	(0.44)	(0.10)	(−1.02)	(0.22)	(−0.05)
2Y R&D intensity	2.343	0.421	1.219**	0.514	1.383**
	(0.66)	(0.46)	(2.12)	(0.78)	(2.54)
Main business income	−0.433	−0.454**	−0.130*	−0.800***	−0.548***
	(−0.93)	(−2.31)	(−1.70)	(-4.99)	(−3.08)
Return on assets	0.309	0.0815	1.005*	0.948	0.563
	(0.18)	(0.10)	(1.69)	(1.46)	(0.63)
Intangible assets	4.034	−0.172	−2.102	−0.987	0.510
	(1.44)	(−0.10)	(−1.24)	(−0.68)	(0.26)
Liquidity	1.870*	−0.0364	−0.424	0.113	1.134***
	(1.87)	(−0.08)	(−1.18)	(0.50)	(2.63)
Cash flow ratio	−0.160	0.165	−0.600*	0.0179	−0.436
	(−0.15)	(0.40)	(−1.94)	(0.07)	(−1.37)
Capital intensity	0.192	0.507***	0.216***	0.476***	0.459***
	(0.90)	(4.97)	(2.79)	(6.44)	(4.88)
Leverage	−0.752	−0.362	0.113	0.323	0.437
	(−0.96)	(−0.97)	(0.39)	(1.47)	(1.32)
Age	0.00608	−0.00198	−0.0197**	−0.000975	−0.0104
	(0.33)	(−0.19)	(−2.25)	(−0.14)	(−1.07)
State ownership	−0.525	−0.200	0.00192	−0.312**	−0.238
	(−1.07)	(−1.10)	(0.01)	(−2.41)	(−1.41)
Subsidies	0.364***	0.207***	0.0239	0.117**	0.0392
	(2.58)	(3.21)	(0.44)	(2.38)	(0.64)
Effective tax ratio	0.141	−0.209	−0.0861	0.0477	0.163
	(0.69)	(−0.80)	(−0.39)	(0.25)	(1.05)
Industry FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.269	0.199	0.215	0.236	0.222
N. of firms	1394	1874	2050	2141	2011

t statistics in parentheses

*$p<0.10$, **$p<0.05$, ***$p<0.01$

younger companies seem to be preferred in the selection process. Finally, none of the additional variables measuring financial health (liquidity or cash flow) are significant, with the exception of the last batch of companies for which ample liquidity seems to help in their selection as LGE.

A very interesting result is that capital intensity is always significant. In particular, the larger the capex of a company, relative to its assets, the more likely it is to receive funds.

Another relevant result refers to companies having received subsidies in the past also increasing the probability of being selected.

All in all, there is very little evidence that the measurable criteria found in the policy documents introducing the 10,000 little giants are relevant in the selection of companies to become LGEs. This is particularly true for the concentration of business in the sector targeted by this industrial policy initiative. In other words, most of the funds go to companies which are occupied with our businesses, and not so much those targeted. Leverage and revenue are not significantly different for treated companies than others. Finally, R&D is only significantly higher for treated companies in some of the latest batches of selected companies.

Finally, for the not pre-determined characteristics, such as size, ownership, age and financial health, we only find evidence in favor of size being taken into account. Instead, other factors, which are not mentioned in the policy documents, such as having received subsidies in the past or with large capex, appear to be very relevant in the selection process. All in all, one could interpret our results as "deeds" generally not following "words" in China's most recent industrial policy drive, the 10,000 Little Giants.

6 Conclusions

China's industrial policy has become a hot topic globally, including in developed countries, which are starting to introduce their programs after years of laissez-faire. Analyzing how China's industrial policy works is, thus, more necessary than ever both because of its domestic and global consequences but also as a guidance for the design of industrial policy elsewhere.

In this paper, we investigate the way China's industrial policy works focusing on how much its objectives (i.e., "words") differ from its actions (i.e., "deeds"). We first focus on whether "words" are similar across policy documents or, in other words, whether objectives are aligned in the Five-Year Plans at the national and provincial level or among the landmark industrial policy strategies developed during the past few years. To answer this question, we use large language models to evaluate all of the relevant policy documents issued by China's central and local authorities and assess whether the sectoral classification is similar across them. We find relevant differences in the sectoral choices at the central and provincial level but also between the landmark industrial policy strategy (Made in China 2025) and its spin-off for smaller companies, the 10,000 Little Giants. The reasons for these differences could be positive, namely the quest for specialization within the general industrial policy but also more negative, such as lack of coordination. Our methodology does not allow us to disentangle the two potential explanations. More research would be need for this.

As a second step, we move from objectives to the actual choices made by China's central and local governments (i.e., from words to deeds). We focus on the most recent industrial policy program, the 10,000 Little Giants, because it is the only one that unveils the names of the selected companies (LGEs) as well as the specific criteria that local and central government authorities are supposed to take into account when selecting such companies. Our stylized facts show that LGEs do not differ from other comparable listed companies when it comes to compliance with the criteria stated in the 10,000 Little Giant policy documents. Other companies comply better with the specialization criterion. In other words, selected companies hardly specialize in the sectors that

this landmark industrial policy program wants to promote. In the same vein, revenue/profit growth or leverage are not found significant determinants of the LGE selection. Finally, a key criterion, namely R&D intensity, is not significant in all the batches of selective companies. Finally, other indicators which are not part of the 10,000 Little Giant program are key, such as capital intensity and having received subsidies in the past. All in all, our empirical investigation leads to the conclusion that "deeds" do not follow "words" as far as China's industrial policy is concerned, based on the case of the 10,000 Little Giants or, in other words, the way in which China's industrial policy works is not as clearcut as one may assume, which makes it even harder to analyze its outcomes.

All in all, our paper attempts to offer a deeper understanding of the way China's industrial policy works with a focus on how objectives differ across policy documents and how much actions follow such objectives. Our tentative answer is not only that objectives are quite different across policy documents, when focusing on the industry focus of industrial policy, but also that the company selection by no means rigorously follows the stated criteria.

Appendix

Subsidies across other major industries

Figure 1 shows the ratio of average subsidies to revenue for all listed companies in the CSRC classification. The sectors shown in red are neither part of the Made in China

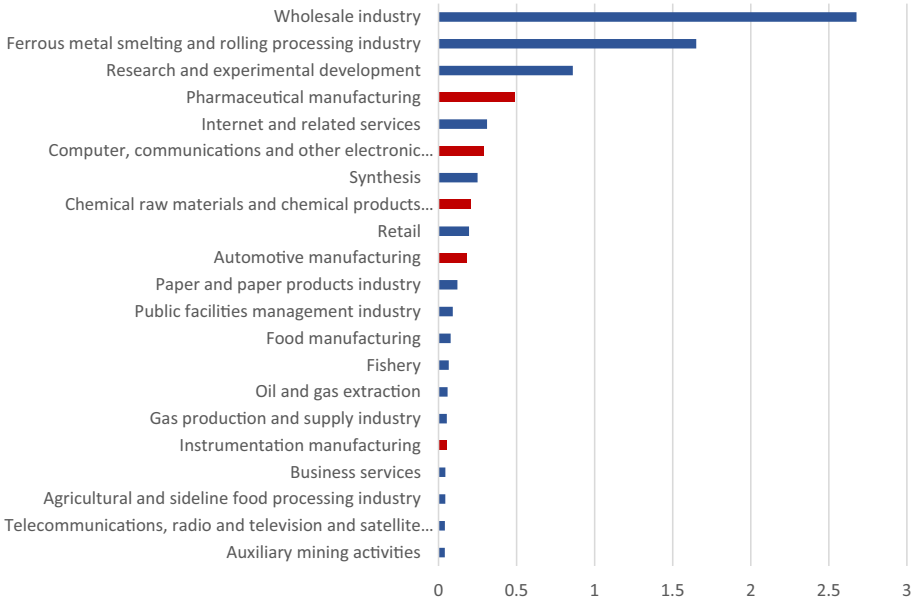


Fig. 1 Subsidies/revenue ratio of listed firms, by industry

2025 nor the 10,000 little giants. Some have very high subsidy intensity, such as the ferrous metal smelting and rolling processing industry, but also research and experimental development.

Methodology for the industry classification

1. Data preprocessing

All textual data from downloaded documents was parsed and cleaned using text mining methods, while images were converted to text using Tesseract Chinese Optical Character Recognition (OCR) https://github.com/gumblex/tessdata_chi.

2. Data analysis

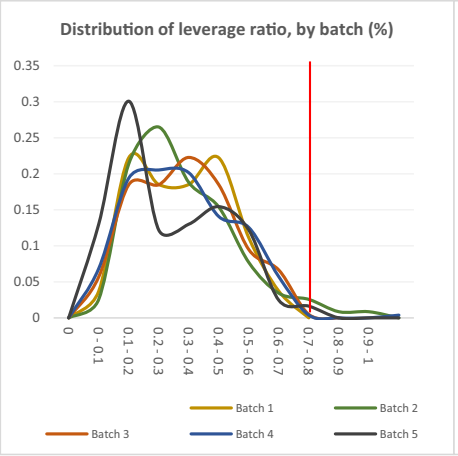
To gauge the emphasis on different industries within textual data (central Five-Year Plans, local plans, "Made in China 2025"), a semantic field describing these industries was constructed using Large Language Model LLaMA with additional instructions using InstructLLaMA method to control the outputs, and thus obtain only relevant results. The control mechanism used the data from the official CSRC industry classification documentation (http://www.csrc.gov.cn/csrc_en/c102034/c1371375/1371375/files/1638270238587_70960.docx). This allowed for precise identification of industry mentions within the text.

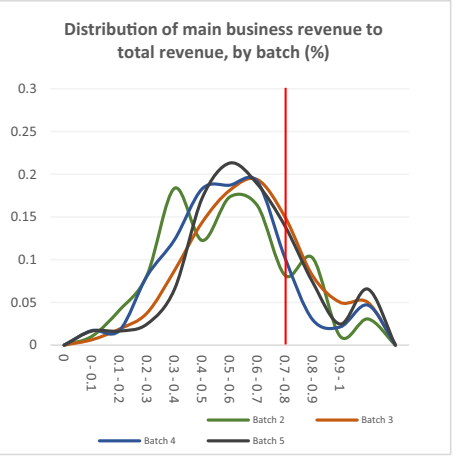

```
{
"category": "Pharmaceutical Manufacturing",
"cn_category": "医药制造业",
"synonyms": ["化学药品原料药制造","化学药品制剂制造","中药饮片加工","中成药生产","对下列中成药的生产活动","兽用药品制造","生物药品制品制造","生物药品制造","下列生物药品制造活动","基因工程药物和疫苗制造","卫生材料及医药用品制造","医用敷料","皮肤敷料","液体敷料","活性硅酸钙","磷酸钙复合骨水泥","人工骨","金属骨固定材料","药用辅料及包装材料制造"]
}
```

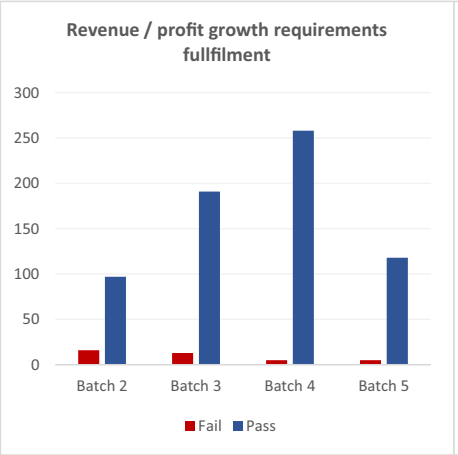

Data Extract 2. Example of semantic field for the industry: "Pharmaceutical Manufacturing"

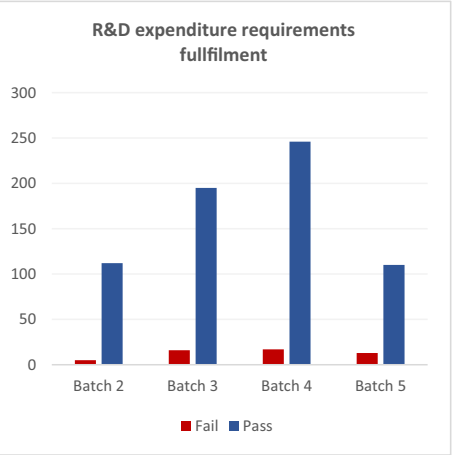
Finally, the frequency of these mentions was normalized by the total word count to ensure that each industry is weighted against the total length of each document.

Distribution of Required Criteria Across Batches of the 10,000 Little Giant Strategy









Empirical Analysis: Descriptive Statistics

Table 2 Variable description

	Description
Log total assets	Natural logarithm of total assets
ROA	The net income divided by total assets
2Y revenue growth	Average revenue growth rate for the previous 2 years
Main business income	Income from main business activities divided by total operating income
2Y profit growth	Average profit growth rate for the previous 2 years
R&D intensity	R&D expenditure divided by total operating income
Log subsidies	Natural logarithm of government subsidies received
Leverage	Total liabilities divided by total assets
Effective tax ratio	Taxes and surcharges divided by revenue
Age of the firm	2022 minus the founding year of the firm
Liquidity	Liquid assets divided by total assets
Intangible assets	Intangible assets divided by total assets
Cash flow ratio	Free cash flow for the firm divided by total assets
Capital intensity	Total assets divided by total employees.
State ownership	Dummy variable coded as 1 if a firm has some sort of state ownership, either as a centrally owned, locally owned, or publicly owned firm

Table 3 Summary statistics

	N	Mean	STD	Min	Max
Size (assets)	12,588	21.51	1.28	16.94	27.12
2Y revenue growth	12,040	0.28	3.46	−175.68	191.13
2Y profit growth	12,038	0.25	28.05	−699.73	1693.57
Main business income	12,717	0.69	1.44	−0.00	115.17
R&D intensity	12,717	0.08	0.24	0.00	17.84
Return on assets	12,588	0.05	0.21	−19.14	1.33
Intangible assets	12,588	0.04	0.04	0.00	1.12
Liquidity	12,588	0.66	0.24	0.05	11.23
Cash flow ratio	12,588	−0.04	0.18	−5.79	0.93
Capital intensity	12,582	14.38	0.73	10.80	17.19
Leverage	12,588	0.39	0.31	0.00	18.79
Age	12,760	20.33	6.50	4.00	67.00
State ownership	12,760	0.23	0.42	0.00	1.00
Subsidies	12,379	16.12	1.46	2.85	22.42
Effective tax ratio	12,590	0.11	0.38	−7.51	12.60

Table 4 Correlations between variables

	Size (assets)	Revenue growth	R&D intensity	Return on assets	Intangible assets	Liquidity	Cash flow ratio	Capital intensity	Leverage	Age	State ownership	Subsidies	Effective tax ratio
Size (assets)	1.00												
Revenue growth	−0.01	1.00											
R&D intensity	−0.18***	0.03***	1.00										
Return on assets	−0.06***	0.02*	0.02***	1.00									
Intangible assets	0.03***	0.00	−0.04***	−0.01	1.00								
Liquidity	−0.24***	0.01	0.15***	0.11***	0.02*	1.00							
Cash flow ratio	0.08***	0.01	−0.16***	0.33***	−0.01	−0.23***	1.00						
Capital intensity	0.39***	−0.01	0.00	−0.08***	0.00	−0.08***	−0.10***	1.00					
Leverage	0.16***	0.01	−0.15***	−0.50***	0.23***	0.31***	−0.09***	−0.01	1.00				
Age	0.28***	−0.01	−0.23***	−0.08***	0.06***	−0.14***	0.15***	0.03***	0.07***	1.00			
State ownership	0.32***	−0.01	−0.06***	−0.07***	0.05***	−0.11***	0.05***	0.16***	0.11***	0.22***	1.00		
Subsidies	0.73***	−0.01	−0.00	−0.09***	0.01	−0.17***	0.03***	0.15***	0.18***	0.15***	0.22***	1.00	
Effective tax ratio	0.11***	−0.00	−0.09***	−0.01	0.05***	−0.05***	0.05***	−0.00	0.06***	0.10***	0.11***	0.07***	1.00

Table 4 (continued)

	Size (assets)	2Y revenue growth	2Y profit growth	Main business income	R&D intensity	Return on assets	Intangible assets	Liquidity	Cash flow ratio	Capital intensity	Leverage	Age	State ownership	Subsidies	Effective tax ratio
Size (assets)	1.00														
2Y revenue growth	0.00	1.00													
2Y profit growth	0.02**	0.10***	1.00												
Main business income	0.01	−0.03***	−0.02*	1.00											
R&D intensity	−0.10***	−0.01	−0.01	0.07***	1.00										
Return on assets	−0.06***	0.02***	0.02**	−0.31***	−0.22***	1.00									
Intangible assets	0.03***	0.00	−0.01	0.15***	0.04***	−0.01	1.00								
Liquidity	−0.24***	0.01	0.00	−0.03***	0.06***	0.11***	0.02*	1.00							
Cash flow ratio	0.08***	−0.01	0.01	−0.05***	−0.22***	0.33***	−0.01	−0.23***	1.00						
Capital intensity	0.39***	−0.00	-0.00	0.05***	0.01	−0.08***	0.00	−0.08***	−0.10***	1.00					

Table 4 (continued)

	Size (assets)	2Y revenue growth	2Y profit growth	Main business income	R&D intensity	Return on assets	Intangible assets	Liquidity	Cash flow ratio	Capital intensity	Leverage	Age	State ownership	Subsidies	Effective tax ratio
Leverage	0.16***	0.00	-0.00	0.07***	−0.07***	−0.50***	0.23***	0.31***	-0.09***	−0.01	1.00				
Age	0.28***	−0.00	-0.01	0.11***	−0.11***	−0.08***	0.06***	−0.14***	0.15***	0.03***	0.07***	1.00			
State ownership	0.32***	−0.01	−0.02**	0.06***	−0.02**	−0.07***	0.05***	−0.11***	0.05***	0.16***	0.11***	0.22***	1.00		
Subsidies	0.73***	−0.01	0.02*	−0.05***	−0.02***	−0.09***	0.01	−0.17***	0.03***	0.15***	0.18***	0.15***	0.22***	1.00	
Effective tax ratio	0.11***	−0.01	−0.00	0.04***	−0.04***	−0.01	0.05***	−0.05***	0.05***	−0.00	0.06***	0.10***	0.11***	0.07***	1.00

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Declarations

Competing interests All data relevant to this paper is available upon request. All other errors are by the authors.

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