
Industrial policy in China: the planned growth of 400 industrial towns in the Cantonese region

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Industrial Policy in China: The Planned Growth of Specialised Towns in Guangdong Province

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We analyse one of the most important policy experiences for industrial clustering in Southern China—the Specialised Towns programme—that has transformed some Chinese clusters into the backbone of global production chains. We offer a long-term, detailed overview of the policy programme and of Guangdong's specialised towns, classifying them as endogenous or exogenous according to their features, and investigate their contribution to local growth and rebalancing. This analysis of the Specialised Towns programme contributes to the international debate on revisiting industrial policy and suggests that the discussion should conceive them as articulated processes to reach long-term societal objectives.

Keywords: China, Guangdong, industrial policy, specialised towns, clusters

JEL Classifications: O18, O25, R12, R58

Introduction

China is today at the centre of several global networks of production. Starting from the launch of the open-door policy in 1978, the country's growth and structural change have been remarkable and fast. While for some scholars this has happened despite state intervention (Nee and Oppor, 2007; Parish and Michelson, 1996), recent contributions emphasise the role of planning and policy activities of national and provincial governments (Veek et al., 2016; Yueh, 2013). This process has assumed a precise spatial shape. The open-door policy intentionally favoured the initial growth of selected

areas in a sort of “controlled” industrialisation. The underlying idea was that such development would then trigger the rest of the country (Groenewald et al., 2008; Knight, 2013).

Simultaneously, since the early 1980s, policy actors have interacted with overseas capitals, allowing them to build large and globally relevant production bases in the country. The Guangdong Province, Southeast China, offers a special viewpoint on this interplay. Half as large as Germany but with 20 million more people, Guangdong is the leading province for its contribution to national GDP—10.8%, corresponding to 1.3 billion US\$ in 2017. A feature

of the province's growth is its outward orientation. In 2017, Guangdong accounted for nearly 30% of China's national exports¹ and 15% of its total foreign direct investment (FDI).² It had a leading role during the open-door policy. When, in 1978, Deng Xiaoping launched it, Guangdong and Fujian were the first provinces to experiment the "special policies, flexible measures" (Di Tommaso et al., 2013; Li, 1997). Such initiatives were at the core of Xiaoping's plan of Chinese socialist economy modernisation, based on gradual opening up to the global capitalistic market, via trade and FDI, and power delegation to local governments. Guangdong was chosen as a pilot area for two reasons: (i) its strategic location, near Hong Kong and Macao, which was considered a booster to FDI and to the diffusion of entrepreneurial practices [Barbieri et al., 2009; Enright et al., 2005; Yeung et al. (1998)]—indeed, between 1988 and 1999, Hong Kong and Macao accounted for more than 66% of total FDI directed to the region,³ detaching themselves by far from the other Asian contributors—and (ii) its initial low economic performance, reducing the risk to test the opening-up process here with respect to other more powerful areas, such as Shanghai (Chung, 1998; Di Tommaso et al., 2013). In this context, national and local governments devoted special attention to the spatial organisation of production through spatially targeted incentives (Rubini et al., 2015; Zeng, 2010, 2012, and so on). As a result, Guangdong's industrialisation pattern is today largely based on industrial agglomerations (Lai et al., 2005; Zeng, 2010).

In this article, we focus on a crucial industrial policy initiative for industrial clustering in Guangdong—the so-called Specialised Towns⁴ (STs) programme. By July 2017, there were 416 STs, accounting for 40% of the provincial GDP. In some prefectures, such as Dongguan or Foshan, STs represent 90% of GDP. Furthermore, 70% of the European and US mass-market luggage is produced in the ST of Shiling; 30% of the toys manufactured globally

come from the ST of Chenghai (Jankowiak, 2017) and 20% of smartphones manufactured globally every year comes from Dongguan City (where 93% of the total townships participate in the programme).⁵ This means that a significant part of consumption in the West is today possible *because* these Chinese clusters have emerged, with the support of this programme.

Gradually, Guangdong has become economically polarised [Organization of Economic Cooperation and Development (OECD), 2010]. To correct this, since 2008, policymakers have used the STs programme also to promote within-province rebalancing (Di Tommaso et al., 2013), encouraging specialisations more related to existing local economic and social contexts (Su and Sun, 2016).

International scholars have increasingly focussed on China's clustering and spatial industrial agglomerations (for example, Barbieri et al., 2010; Butollo, 2015; Long and Zhang, 2012; Wang et al., 2010; Zhu et al., 2019). However, the literature on the specific case of Guangdong's STs programme is surprisingly small (cf. Bellandi and Caloffi, 2010; Bellandi and Di Tommaso, 2005; Barbieri et al., 2012). To the best of our knowledge, there is no systematic up-to-date overview of the phenomenon as a whole and no international contribution with empirical evidence on the linkages between the STs programme and local economic performances.

We attempt to fill this gap by offering a long-term, detailed overview of the STs programme, which we believe is worth of investigation for its distinctive features:

1. *Number of towns involved.* As far as we know, no other place worldwide has supported such a high number of clusters over such a long time with a unique and coherent policy programme.⁶
2. *Evolution from industrial park to cluster promotion.* The policy originally fostered industrial parks, but, after learning from the successful experiences of other countries'

clusters, the Chinese government restructured it to support, drive and accelerate clusters growth (Rubini et al., 2015).

3. *Central role of the Department of Science and Technology of Guangdong Government (DSTGG)*. Since the launch of the programme, innovation has been at the centre of the policy through publicly funded innovation platforms for the specialised sector (also when low-tech productions).
4. *Changing long-term aims*. From promotion of specialisation, competitiveness and investment rationalisation to territorial rebalancing.

To encouraging local growth, STs have also been used as means for structural transformation, economic upgrading and promotion of general economic and societal objectives (Department of Science and Technology of China (DSTC), 2011a, 2011b; DSTGG, 2003, 2006a, 2006b, 2008). In this sense, these tools have a broader industrial policy interpretation. Hence, our contribution is also valuable for the international debate on revisiting industrial policies (Bailey and Cowling, 2006; Chang, 1994; Cimoli et al., 2009; Rodrik, 2007; Vicente, 2018), which, we argue, needs to look to new economic giants' experience, such as that of China, often neglected by Western scholars (Heilmann and Shih, 2013).

We focus on two empirical research questions: (i) Is the ST programme associated with improved territorial economic performances? (ii) Can it contribute to territorial rebalancing within the province? With the first question, we investigate the capability of local industrial policy to promote local growth; with the second, we tackle the relationship between industrial policy and territorial rebalancing (Bellandi and Di Tommaso, 2005; Bianchi et al., 2000). In doing so, we focus on the so-called *endogenous* clusters, as they might be interpreted to some extent as a form of place-based policy (Bailey et al., 2015).

The article is organised as follows. After discussing the international literature useful to interpret the STs' experience, we describe data and methodology. Next, we offer a detailed analysis of the programme and its evolution and analyse the features of *endogenous* versus *exogenous* STs; we, then present and discuss the empirical analysis. The article ends with some implications for policy design and for the international debate on industrial policy, with ideas for future research lines.

Specialised towns in the context of industrial clusters

Since Marshall (1890), the economic advantages related to industrial clusters⁷ have been widely discussed (for example, Boschma and Fornahl, 2011; Delgado et al., 2014; Martin and Sunley, 2003; Porter, 2000; Vicente, 2018).⁸ Recently, the debate has interested experts on both the industrialised world (Eisingerich et al., 2010; Slaper et al., 2018) and emerging economies (Kesidou and Szirmai, 2008; Nadvi, 1999; Van Dijk and Rabellotti, 2005). Although scholars do not unanimously agree on these effects, there seems to be growing consensus that clusters' contribution to local economic performance is idiosyncratic to the hosting context (Puig and González-Loureiro, 2017).

Since Becattini's seminal contributions (Becattini, 1987, see also Becattini et al., 2014) on industrial districts and Schmitz's (1999) on clusters, a well-established literature has asserted the relevance of joint actions and trust to foster collective efficiency and produce positive effects of clustering on performance (Porter, 2000). To achieve collective efficiency, co-located economic actors need to engage in joint actions, either spontaneously or following policy incentives.

A specific literature has focussed on clustering as a target of industrial policies, given their potential economic gains (Humphrey and Schmitz, 1996; Rodriguez-Clare, 2007). Some

scholars have also warned that without proper design and implementation, cluster policies might even produce negative consequences (Brakman and van Marrewijk, 2013). Within such literature, some papers use case studies to analyse the effect of clustering policies (Elola et al., 2017; Kiese, 2017). However, the evidence is still too limited and difficult to interpret given the complex design of these schemes and the variety of their effects (Uyarra and Ramolgan, 2016; Vicente, 2018).

Within this debate, China is particularly interesting for the widespread use of spatially targeted initiatives (Wang, 2013), heterogeneous for types and aims (Barbieri et al., 2012). In the case of the STs, Chinese policymakers have drawn on previous international clustering experiences to enhance existing industrial agglomeration and specialisation, typical of clustering policies (Ketels, 2013).

In doing so, policymakers have been focussing on promoting upgrading, starting from local production contexts. In this sense, the STs' experience recalls the current debate about place-based policies (Bailey et al., 2015; Barca et al., 2012; Hildreth and Bailey, 2014; OECD, 2011), which recognises the importance of places' *context* in shaping and promoting development (Garretsen et al., 2013; Hildreth and Bailey, 2013). The recognition of local productive specialties at the centre of the ST programme is in line with place-based and space-tailored programmes. However, STs detach from place-based policies in many regards. While the interaction between local and provincial governments is consistent with the multilevel governance strategy of place-based approaches, there is no proof that other relevant stakeholders, such as firms and workers, participate in the design and implementation of the STs scheme. Additionally, although Guangdong policymakers have considered the experiences of Italian districts in designing the programme (Di Tommaso et al., 2013), the evolution of these places misses some districts'

key elements, in particular the existence of a community of firms and people giving rise to the industrial atmosphere (Becattini, 1987). In Guangdong, in fact, clusters often result from a joint action of planned policies and external forces, such as foreign capitals and migrations. In this context, STs can be classified as *exogenous* or *endogenous* (Barbieri et al., 2009; Di Tommaso and Bazzucchi, 2013; Lyu and McCarthy, 2015; Zeng, 2010; Zhu et al., 2017). The exogenous clusters mainly grew attracting FDI, and policies aimed at facilitating the relationships between foreign and local firms. The endogenous clusters stemmed from either the development of local firms, the evolution of ancient productive systems, the privatisation of town and villages enterprises or some locational and geographical advantages.

The few studies on STs in English illustrate the rationale and the content of the policy (Barbieri et al., 2012; Bellandi and Di Tommaso, 2005; Eng, 1997; Long and Zhang, 2012) but not its possible effects on the territory and, in particular, the possible heterogeneity of endogenous versus exogenous clusters. In particular, we expect two integrated processes to be at stake in endogenous STs:

1. Being rooted in the local territory, history and values, cluster actors are more likely to engage in mutual trust relationships and collaboration—key success factors of industrial districts (Becattini, 1987; Mistri and Solari, 2003 and many others);
2. Instituting some forms of collective action initiatives, such as innovation platforms, will reasonably have higher additional impact in terms of collective action on endogenous rather than exogenous clusters, thanks to the embeddedness of relevant actors to the local context.

A note on data and methodology

The remainder of the paper adopts a mixed-method approach (Cairns, 2018; Goertz, 2017;

Hesse-Biber and Johnson, 2015) by using both qualitative and quantitative data.

To analyse the STs, we built a novel database, containing information about the year of recognition, location and specialisation on 399 towns established by 2016.⁹ It results from several fieldwork visits, from 2004 to mid-2017, allowing us to collect official documents and statistics; to interview provincial and local policymakers, economic actors, scholars and think tanks as well as to visit some STs.¹⁰

In the empirical part, we matched this database with county- and district-level data on economic performances from the Guangdong Statistical Yearbooks [National Bureau of Statistics (NBS) 2001–2016]. The result was a panel data set of 75 counties and districts in Guangdong from 2000 to 2015.

The experience of Guangdong's specialised towns

The STs programme consists of an ex-post official certification by the provincial government, provided that the applicant town meets three criteria (Di Tommaso et al., 2013):

1. It must be a township from an administrative point of view or, less frequently, a county or urban district;
2. At least 30% of its industrial output (or employment) must be concentrated in one “specialized sector” (defined to the three-digit-level equivalent of international classification systems);
3. The annual industrial output value has to exceed 2 billion yuan.

With the certification, the specialised town receives a 30,000 yuan subsidy from the DSTGG, provided an additional proportion be financed by the local government¹¹ (Wang and Yue, 2010). These funds are to establish the so-called technology innovation platforms—the core of the STs policy—to assist firms in developing new

technologies and upgrading production. They also encourage cooperation among the town's firms, private and public engineering centres and public research institutions in innovative activities to improve the reputation of the town's entire productive system (Barbieri et al., 2010; DSTGG, 2003, 2006a, 2017; Guangdong Academy of Social Sciences (GDASS), 2017; Wang, 2004). The policymakers we interviewed have stressed that, to increase efficiency, the DSTGG has pushed the innovation centres to operate following a competitive market logic: several centres are created and encouraged to compete in serving the companies in the town. Meanwhile, their general strategies are policy driven: the political funding actors keep control over their operations through the board of directors, which is in charge of defining the strategic priorities and areas of intervention. In 2015, the innovation platforms have developed 620 projects for a total value of above 3 million yuan (Su and Sun, 2016).

According to the most recent data, the average degree of specialisation of the existing 416 towns exceeded by about 10% the minimum 30% required by law (GDASS, 2017). Figure 1 shows their localisation and some data about their growth in numbers over time.

Specialised towns' development and growth

We identify four phases in the STs programme's evolution. The first dates back to the 1990s, before the initiative's official launch. The programme stemmed from a previous national government intervention—the Spark Plan—which founded several Technology Investment Zones in rural areas to upgrade agriculture production and promote a gradual structural shift towards manufacturing (Barbieri et al., 2009; DSTGG, 2006b; Zhang and Ling, 2003). The underlying idea was that strengthening the innovative capacity of agriculture would have positive spill-over effects on the whole

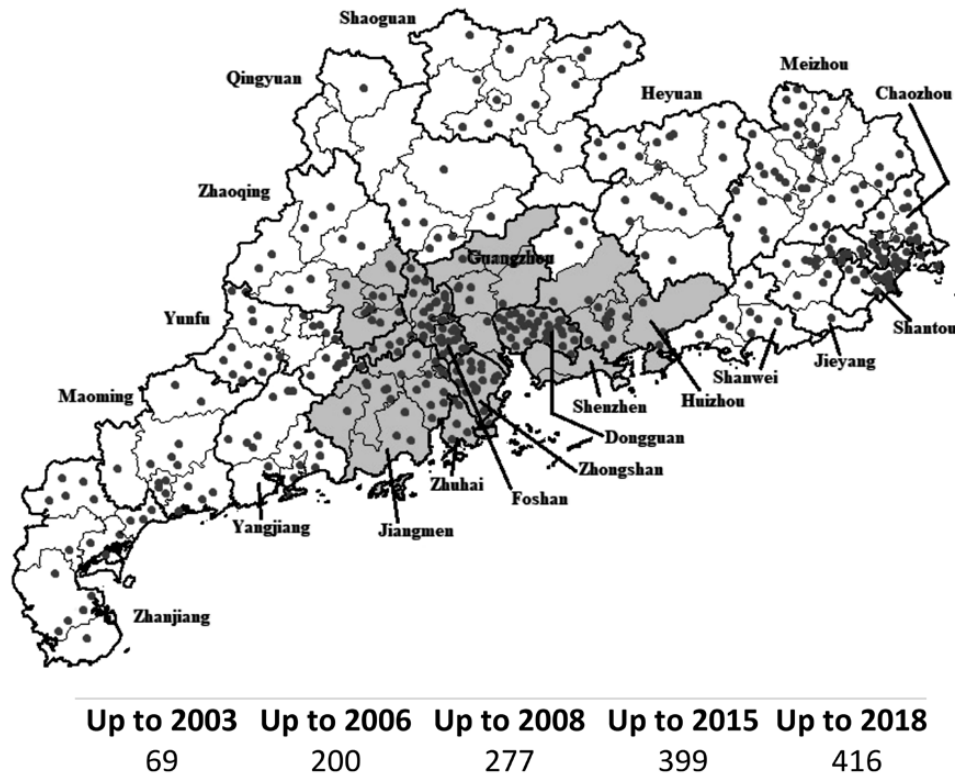


Figure 1. Specialised towns in Guangdong.

Source: Authors' elaborations on data from Guangdong Provincial ST Development Promotion Association.

economy, including industrial production (Di Tommaso et al., 2013). In the Spark Plan zones, firms could benefit from subsidies and loans (Barbieri et al., 2010). Some DSTGG experts realised that most of them tended to specialise in specific sectors—a process now known as “one city, one product” (Su and Sun, 2016; Wang and Yue, 2010), which rests at the foundation of the ST programme.

From 2000 to 2003, the second phase—a pilot development of the programme—took place, introduced by two formal documents: “Plan for the ST Technological Innovation: Pilot Test” and “Managerial Methods for the ST Technological Innovation: Pilot Test” (DSTGG, 2008). Most of the STs recognised in this phase are in the Pearl River Delta (PRD),

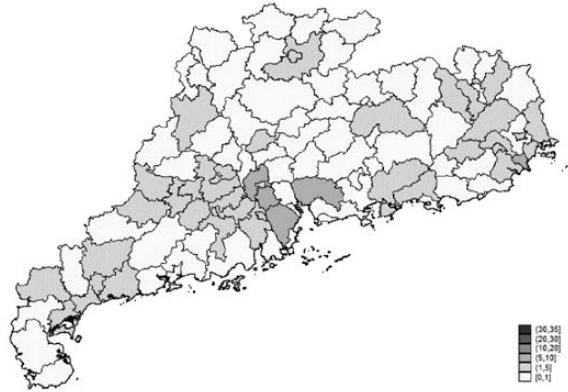
at the centre of Guangdong industrial growth since the beginning of China’s open-door policy (Figure 2(a)) (Zheng et al., 2016).

The concentration of STs in the PRD reflected policymakers’ effort to rationalise this area’s fast—and often chaotic—growth (Chen, 2007; Enright et al., 2005). Such economic expansion must be related with the career incentives given by national rules to local officials. Indeed, up to the beginning of the 2000s, local officials were mainly promoted according to their ability to produce economic improvements (mainly GDP growth) at the local level (Li, 2014). To this aim, local officials often used transactions in the land market, which indeed boomed between 1988 and 1992. Land conveyance fees generated by such transactions

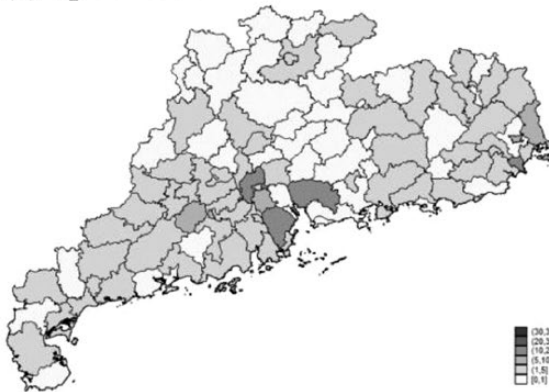
(a) up to 2003



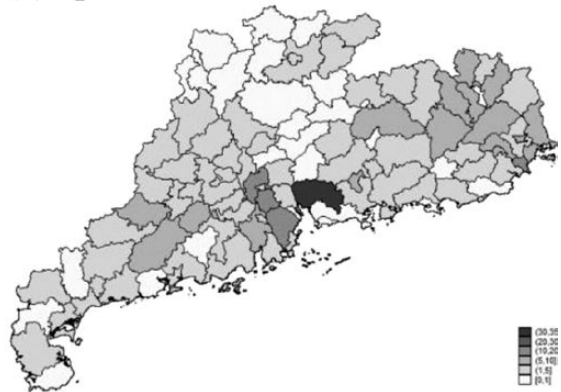
(b) up to 2006



(c) up to 2009



(d) up to 2015

**Figure 2.** *Geographical distribution of specialised towns.*

Source: Authors' elaborations on data from Guangdong Provincial ST Development Promotion Association.

were used for infrastructural financing and upgrading, ending in GDP growth (Ahmad et al., 2018; Cao and Zhao, 2011). Hence, this phase of the STs programme served the promotion of industrial growth and upgrading, while rationalising industrial development (Barbieri et al., 2009). The sectoral specialisation of these first towns reflected the features of Guangdong's—and the PRD's—manufacturing systems at the time, mainly based on low-tech production (Figure 3).

In the third phase (2003–2008), the STs programme extended to some non-PRD cities and, along with upgrading, started to be used

to encourage development of lagging areas (Barbieri et al., 2012; Sarcina et al., 2014). The new STs were established in the so-called Great PRD and on the coast and peripheral areas through 2006 (Figure 2(b)), with rural bases and mountainous territory through 2009 (Figure 2(c)). They had different productive peculiarities, such as being focussed on agriculture-related, resource-based activities or services (Figure 3).

Some official documents¹² highlighted the double path behind the policy implementation of this phase and recognised the strategic value of STs in Guangdong's development

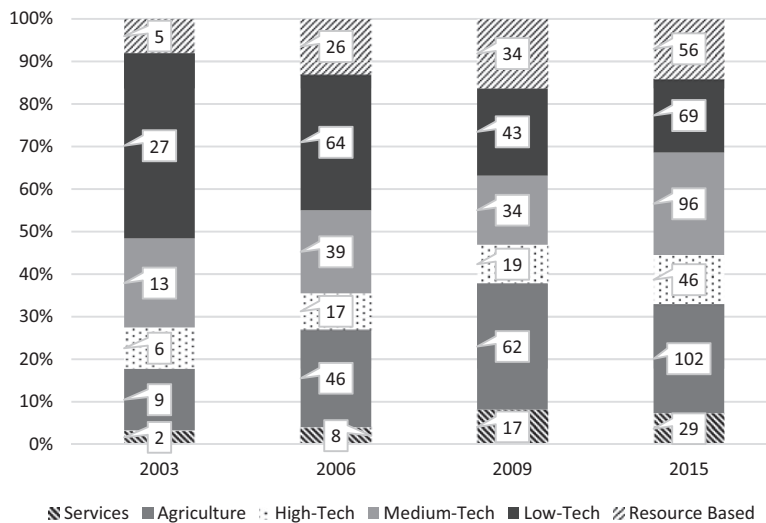


Figure 3. Sectoral distribution of specialised towns.

Source: Authors' elaborations on data from Guangdong Provincial ST Development Promotion Association.

(Barbieri et al., 2010; Lin, 2006; Su and Sun, 2016). They stressed how provincial and local institutions started to collaborate in clustering processes to avoid sectoral overlap and to coordinate the regional innovation system. This is reflected also in the establishment of the Guangdong Provincial ST Development Promotion Association (POTIC) (Su and Sun, 2016). Furthermore, many of these documents pointed to the diffusion of good practices related to knowledge diffusion and protection and territorial branding. Finally, they emphasised collaboration between local actors and universities and research institutions.

Since 2008, a fourth phase has begun, with a new emphasis on endogenous growth and innovation, in line with the whole change in post-crisis Chinese policy orientation. The most important measure in this framework is the “One Town, One Policy” (2010), incentivising each town to find its own developmental path while supporting the coordinated economic development of Guangdong Province (DSTC, 2011a, 2011b). This implies the following actions:

1. to further decentralise the economic management of STs to local authorities;
2. to optimise the industrial and urban structure of STs;
3. to restore public accounts and realise infrastructural investments;
4. to promote quality upgrading of traditional industries and
5. to increase GDP, innovation potential and, more generally, competitive capacity (Tsai, 2013).

Similar to this is the “One Town, One Institute” initiative (2012), aimed at founding a third-level degree institution in each township (Su and Sun, 2016). Finally, the initiatives issued by the provincial agencies stress two elements to empower endogenous sources: (i) promoting micro, small and medium enterprises (SME) and establishing dedicated public innovation services, and (ii) enhancing the quality and innovative performances of those towns specialised in locally rooted productions (Di Tommaso et al., 2013; DSTGG, 2017; Su and Sun, 2016).

Nowadays, almost all Guangdong counties host at least one ST, and while a high number is still in the PRD (particularly in Dongguan), many others are also localised in the north-eastern peripheral prefectures of Meizhou and Chaozhou (Figure 2(d)). While keeping a good proportion of agriculture-related STs, the sectoral distribution of towns has changed towards low-, medium- and high-tech specialisation (Figure 3).

The programme has inspired a 2-fold sectoral specialisation of the townships: on the one hand, the specialisation in resource-based and agriculture-related activities, consistent with the policy's aim to upgrade traditional production in areas less involved in manufacturing development; on the other, the growth of mid- to high-tech manufacturing to promote technological upgrading and innovative activities in core manufacturing clusters in Guangdong.

Endogenous and exogenous specialised towns

Notwithstanding the common policy framework, STs are heterogeneous for size, urbanisation degree, development period, etc. An in-depth analysis of the townships shows that some of them, which we call *endogenous*, followed an industrial development rooted in their own economic and cultural history; in some others, which we call *exogenous*, external forces such as foreign capital and national policies triggered their growth.

To identify the two groups, we referred to Becattini's (2015) contribution about industrial districts as originated by the historical profile of the production atmosphere of the hosting areas. We classified each township as *endogenous* if its specialisation had at least one of these features:¹³

1. rooted in the history of the town;
2. based on local resources (for example, aquaculture in townships next to water);
3. traditional, typical or mainly oriented towards national markets (for example, rice cookers or pottery);
4. derived from a production rooted in town's history (for example, machinery for stones processing in areas previously used as quarries) and
5. linked to the territory's physical characteristics (for example, port logistics on coastal areas).

Some specific productions [such as Information and Communication Technologies (ICT)] are considered per se exogenous, as they stemmed from the activity of foreign actors. Conversely, it is likely that some activities, naturally oriented to serve the local or national market (as the agriculture related), are automatically endogenous. Nonetheless, the distinction between these two groups only partially overlaps with sectoral distribution (Table 1).

Endogenous STs are 209 out of the total 399 and have grown since the mid-2000s in correspondence with the shift of policy towards

Table 1. Sectoral distribution of endogenous versus exogenous specialised towns.

	Sectors						Total
	Agriculture-related	High-tech	Low-tech	Mid-tech	Resource-based	Services	
Endogenous	102	3	37	8	41	18	209
Exogenous	0	43	32	88	15	12	190
Totals	102	46	69	96	56	30	399

Source: Authors' elaborations.

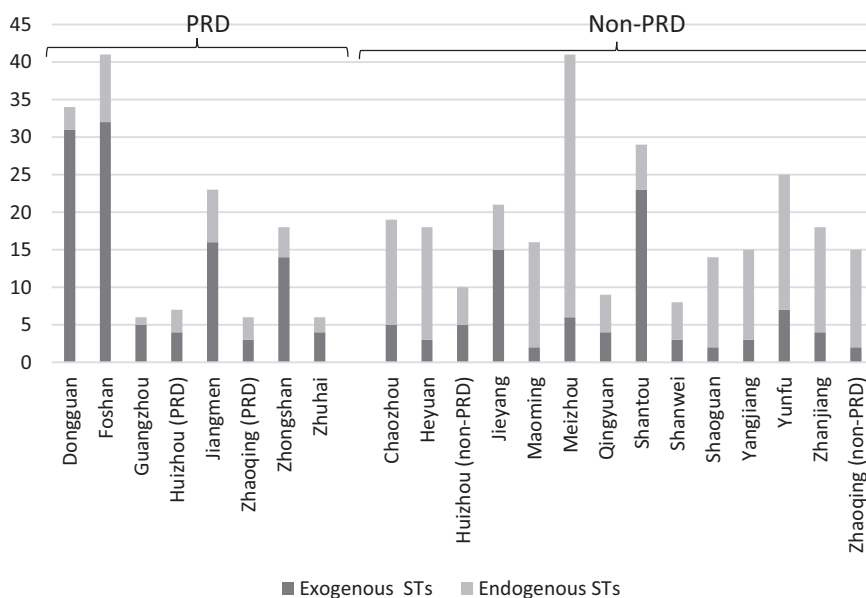


Figure 4. Geographical distribution of endogenous and exogenous specialised towns, year 2015.
Source: Authors' elaboration.

endogenous sources (Supplementary Figure A1). Their geographical distribution confirms different specialisation paths between PRD and non-PRD (Figure 4). Endogenous townships are mainly concentrated in non-PRD inner and mountainous areas, testifying to a larger policymaking investment to promote these prefectures by focussing on the local market and existing productions. The predominance of exogenous specialisation in the PRD, conversely, clearly indicates its exogenous economic growth path, based on foreign capital and national migrations, although with some notable exceptions that founded their economic growth on traditional productions.

Empirical analysis

We now turn to investigate the two empirical research questions:

1. RQ1: Is the ST programme associated with improved territorial economic performances?

2. RQ2: Can the policy contribute to territorial rebalancing within the province?

We use data at the most detailed territorial level—that is, counties and districts—which is yet above the township one. We mainly use panel fixed-effects models to test for robust correlations between the policy and local economic performance. Given the structure of the data and considering that policy implementation continuously changes through time and involves the great majority of Guangdong counties, there are obstacles in building proper counterfactuals to explore causality.¹⁴ However, to address some causal interpretation, we add a robustness check based on latest techniques to estimate dose-response effects, particularly fit for analysing non-binary treatments as in our case. We use the Cerulli (2015)¹⁵ fixed-effect dose-response method, which, compared with usual General Propensity Scores methods (Bia and Mattei, 2008; Hirano and Imbens, 2004), allows to include

non-treated units in the analysis and to consider increasing treatment intensity across time. Our outcome variables are industrial and agricultural output in county i at time t ($INDOUT_{i,t}$ and $AGROUT_{i,t}$) used as a proxy of economic performance.¹⁶

We test the association of clusters with economic performances at the local level (RQ1) first with panel data fixed effects with robust standard errors.¹⁷ Our independent variables of interest are:

1. the number of STs in county i (SP_TOWN_i) and
2. the ratio of endogenous towns on the total number of STs ($RATIO_ENDOG_i$).

Finally, we introduce the number of full-time workers in county i ($WORKERS_i$), to control for the economic activity, and year dummies. The variables enter the model with one or three lags to account for lagged effects. We also perform a subgroup analysis (Boyd-Swan et al. 2016) to study possible heterogeneous effect between PRD and non-PRD areas.

We then support the results with the dose-response analysis,¹⁸ including the variable of interest:

1. as a dummy variable (value = 0 if the unit is not treated and 1 otherwise) and
2. as intensity of the treatment—the dose—normalised in order to range from 0 (minimum dose in the sample) to 100 (maximum dose in the sample).

The latter is assumed to have a parametric polynomial form (Cerulli, 2015; Filippetti and Cerulli, 2018) that can be investigated through graphical representation. We run two series of models, one for specialised towns (SP_TOWN_i) and the other for endogenous towns ($ENDOG_i$).¹⁹ The outcomes of interest are industrial output ($INDOUT$) and agricultural output ($AGROUT$), forwarded by 1 and

3 years.²⁰ Summary statistics for the relevant variables are in [Supplementary Table A1](#).

To analyse the association between STs and territorial rebalancing (RQ2), we divide the counties into four groups (low, medium low, medium high and high) according to the level of industrial output in 2000 (t_0) using the distribution's quartiles as thresholds. We observe through a fixed-effects panel subgroup analysis whether the effects of SP_TOWN and of $RATIO_ENDOG$ is heterogeneous according to the initial level of local output. Specifically, if we find that the effects are stronger on lower than on higher groups, we may conclude that STs help territorial rebalancing. We also support these results with the evidence found in relation to RQ1. We summarise information on the subgroups in [Supplementary Table A2](#).

The effects of specialised towns and endogenous specialised towns on economic performances (RQ1)

[Table 2](#) shows the results of the fixed-effects estimation. For industrial performances for the whole sample, there is a positive association between the ratio of endogenous towns, at $t-1$, and industrial output. Additionally, in the PRD, endogenous towns show positive effects at $t-3$. For the whole sample, there is also quite robust evidence that agricultural output benefits from higher levels of endogenous STs 1-year lagged. The gains related to endogenous towns, in this case, appear to be stronger in non-PRD counties. In all such cases, there is no observable effect of specialisation per se.

[Figures 5](#) and [6](#) show graphically the results of the dose-response models (the coefficients are in [Supplementary Tables A3](#) and [A4](#)). The first focuses on STs total number. Regarding industrial output, both at $t-1$ and $t-3$, the response is (rather) flat or non-significant up to a certain dose of the treatment, and then it increases. The curves shapes for agricultural output are similar, although flatter in correspondence with

Table 2. Effects of specialisation and endogenous clusters on performances.

	Whole sample		Only PRD		Only non-PRD	
Dependent variable: \ln_INDOUT_{it}						
$hs_SP_TOWN_{i,t-1}$	-0.097 (-1.34)		-0.054 (-0.57)		-0.072 (-0.86)	
$hs_RATIO_ENDOG_{i,t-1}$	0.222** (2.21)		0.054 (0.23)		0.148 (1.20)	
$\ln_WORKERS_{i,t-1}$	0.342** (2.39)		0.055 (0.47)		0.874*** (5.87)	
$hs_SP_TOWN_{i,t-3}$		-0.047 (-0.72)		-0.042 (-0.52)		0.031 (0.38)
$hs_RATIO_ENDOG_{i,t-3}$		0.109 (1.01)		0.467* (1.86)		-0.071 (0.55)
$\ln_WORKERS_{i,t-3}$		-0.098 (-0.49)		-0.293 (-1.17)		0.326 (1.44)
Constant	18.54*** (12.11)	22.89*** (10.63)	23.87*** (17.47)	27.76*** (9.40)	12.43*** (7.97)	17.72*** (7.60)
year dummies	Y	Y	Y	Y	Y	Y
N	1050	900	238	204	812	696
N counties/districts	75	75	75	75	75	75
Adjusted R ²	0.771	0.821	0.776	0.84	0.793	0.834
Dependent variable: \ln_AGROUT_{it}						
$hs_SP_TOWN_{i,t-1}$			0.124 (1.28)		-0.051 (-1.05)	
$hs_RATIO_ENDOG_{i,t-1}$			0.140** (2.06)		0.136* (1.71)	
$\ln_WORKERS_{i,t-1}$			-0.055 (-0.40)		0.221 (1.10)	
$hs_SP_TOWN_{i,t-3}$		-0.017 (-0.41)		0.122 (1.13)		-0.151 (-0.91)
$hs_RATIO_ENDOG_{i,t-3}$		0.056 (1.18)		0.099 (1.21)		0.001 (0.01)
$\ln_WORKERS_{i,t-3}$		-0.292* (-1.94)		-0.124 (-0.58)		-0.151 (-0.91)
Constant	21.33*** (10.84)	24.41*** (15.06)	23.52*** (16.79)	23.43*** (9.31)	18.26*** (8.76)	22.64*** (13.09)
year dummies	Y	Y	Y	Y	Y	Y
N	1,050	900	238	204	812	696
N counties/districts	75	75	75	75	75	75
Adjusted R ²	0.820	0.711	0.820	0.65	0.841	0.741

Notes: Significance levels: *10%, **5%, ***1%. T-statistics in parenthesis.

intermediate doses. These results suggest a positive and significant relation between STs and output, when STs are sufficiently numerous (50–60% of the dose, corresponding to about 20 towns).

Figure 6 reports the dose-response related to endogenous towns. The first results (Figure 6(a))

suggest that the relation with industrial output is flat and non-significant up to 60% of the dose (about five towns), and then it significantly increases. This relation becomes U-shaped including the total number of STs as a control (Figure 6(b)): for small amounts of endogenous STs, the relation is decreasing—and negative—becoming then

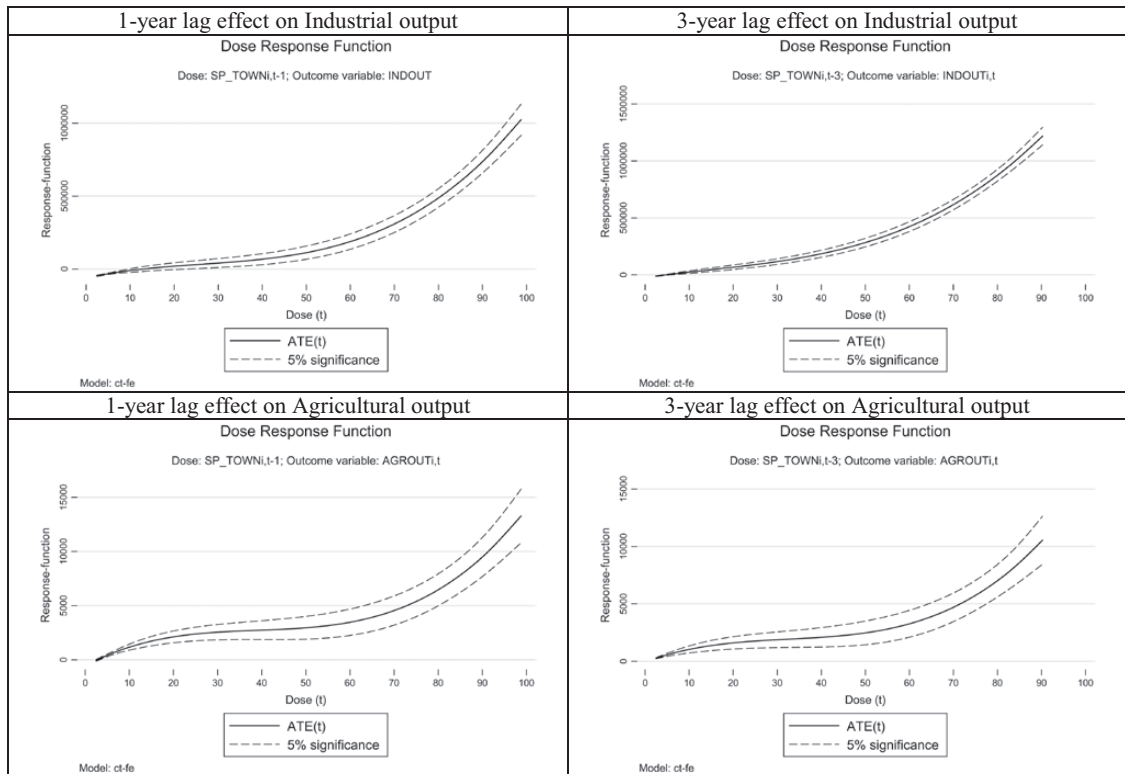


Figure 5. Dose-response function of number of STs on industrial and agricultural output.

positive and increasing. For agricultural output (in both cases), the relation between endogenous towns and output is positive and increasing, particularly for doses' amounts above 60% (again, five towns).

Our interpretation of the results comes from the combination of the panel fixed-effects estimations and the dose-response models. First, we observe significant and positive results in both models only for endogenous towns. Particularly, for industrial output, these results are relevant for PRD counties (Table 2) and for large numbers of endogenous towns (Figure 6). The results concerning the PRD can be read in the light of its economic development history (Di Tommaso et al., 2013; OECD, 2010; Zeng, 2010). They are further reinforced by the fieldwork interviews to

local policymakers and scholars about specific STs cases. Specifically, PRD's STs have followed two different paths. One is based on FDI and exports that generated some of the most important national production and export hubs. An example is Dongguan, whose specialisation has been mainly linked to FDI-led ICT production (Wang and Lin, 2008; Zhou et al., 2011; our interviews). The second development pattern, conversely, has been more based on local firms and traditional products for internal demand. This is the case, for example, of Foshan, whose industrialisation was based more on local forces than foreign capital but becoming, however, a core Guangdong's manufacturing centre (Di Tommaso et al., 2013; NBS, 2010; Zeng, 2010; our interviews). The positive relation

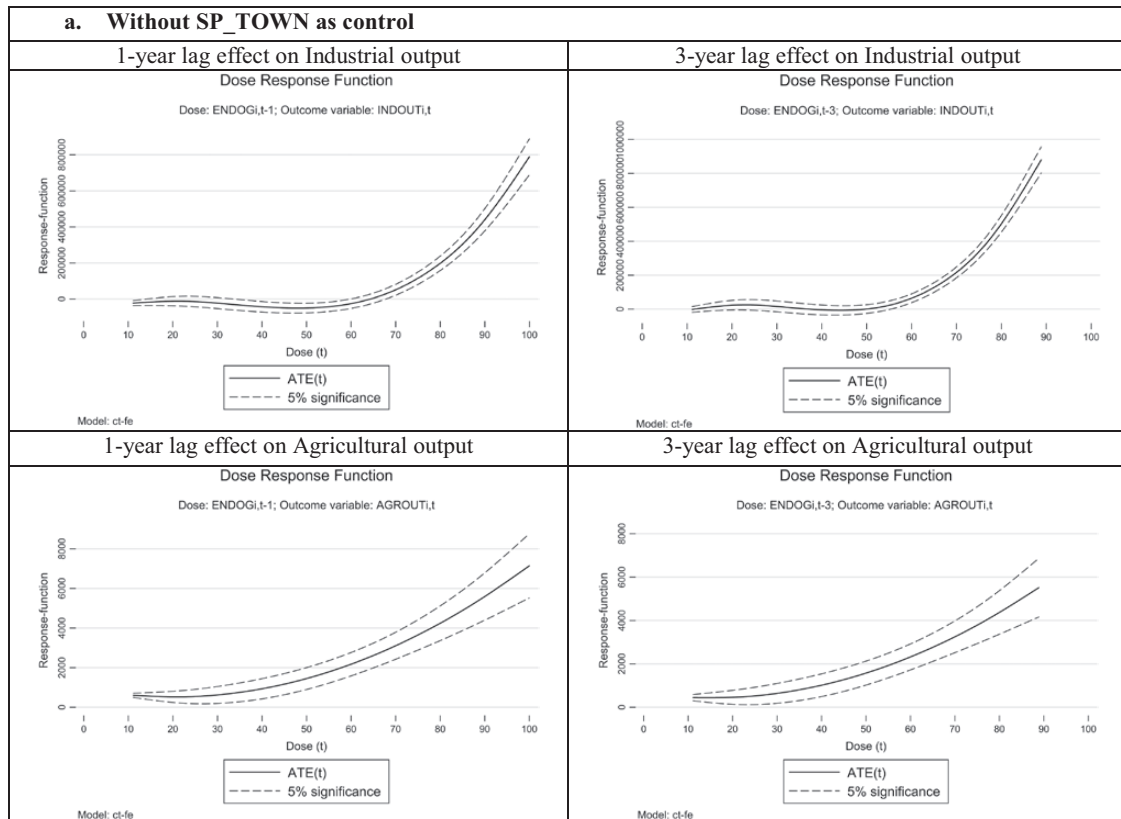


Figure 6. Dose-response function of number of endogenous towns on industrial and agricultural output.

between endogenous towns and industrial output seems to reflect the performance of this second group of clusters.

We also find positive association between industrial output and large numbers of endogenous townships. Excluding Foshan, all the counties hosting numerous endogenous townships are in few non-PRD peripheral counties. This would suggest that, for high numbers of endogenous clusters, positive effects could be observed also in remote areas.

The evidence related to agricultural output, consistent across the models, shows a possible positive effect of endogenous towns. This is linked with the pattern of specialisation of more

marginal, non-PRD areas, engaged in agriculture-related and resource-based productions.

The effects of specialised towns and endogenous specialised towns on territorial rebalancing (RQ2)

Table 3 reports the subgroup analysis results. The only persistent positive association is related to $t-1$ and $t-3$ $RATIO_ENDOG$ for areas with initial medium-low levels of output (all outside the PRD). Coupled with previous evidence of the dose-response, this result reinforces that, also for some non-PRD areas, large amounts of endogenous towns might promote industrial development. Therefore, although PRD may

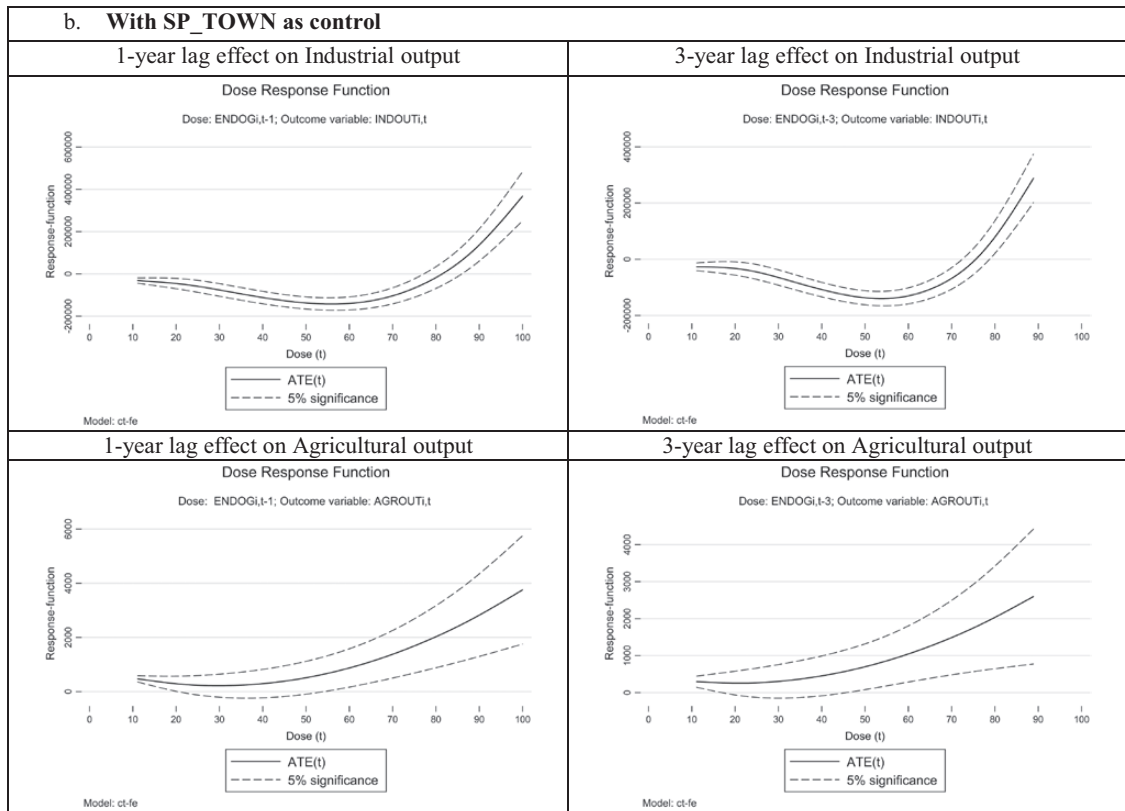


Figure 6. Continued

particularly benefit from the establishment of endogenous towns, under some circumstances, such types of clusters might be desirable also for marginal areas in a territorial rebalancing perspective.

Final remarks

Guangdong ST programme is perhaps one of the largest-scaled experiments of policy-supported territorial industrial transformation worldwide. It has contributed to the province's widespread industrial growth, shaping its geography of production and placing some of its towns at the centre of global production chains.

We believe this experience draws some useful lessons for the international debate about industrial policy.

1. The evolution of Guangdong clusters calls for attention on the relationship between policies' objectives and tools rather than only on the tools. Indeed, we have highlighted how the same tool, that is, specialised clustering promotion, was used for accommodating different evolving goals (for example, from mere industrialisation to territorial rebalancing). The ST experience reinforces the statement made in a number of academic contributions: industrial policy should no longer be viewed as a mere discussion on the best tools to achieve well-established aims. Conversely, it is a complex process entailing considerations on a society's long-term broad aims (Andreoni and

Table 3. Effects of specialisation and endogenous clusters on rebalancing (Dependent Variable – \ln_INDOUT).

	Low performing subgroup		Medium-low performing subgroup		Medium-high performing subgroup		High performing subgroup	
$hs_SP_TOWN_{t-1}$	0.184 (1.21)		-0.115 (-1.00)		0.126 (0.62)		0.100 (1.09)	
$hs_RATIO_ENDOG_{t-1}$	-0.248 (-1.17)		0.410** (2.65)		0.211 (0.70)		-0.083 (-0.31)	
$hs_SP_TOWN_{t-3}$		0.102 (0.71)		-0.128 (-0.90)		-0.045 (-0.31)		0.107 (1.59)
$hs_RATIO_ENDOG_{t-3}$		-0.037 (-0.16)		0.378* (1.76)		-0.016 (-0.06)		-0.0923 (-0.55)
$\ln_WORKERS_{t-1}$	0.717* (1.94)		1.425*** (5.68)		0.428* (1.90)		0.180* (2.07)	
$\ln_WORKERS_{t-3}$		0.088 (0.18)		0.626** (2.42)		-0.043 (-0.14)		-0.400 (-1.25)
<i>Constant</i>	13.04*** (3.54)	19.20*** (4.06)	6.671** (2.56)	14.45*** (5.49)	18.09*** (7.31)	22.41*** (6.98)	22.47*** (22.67)	29.22*** (7.68)
<i>year dummies</i>	Y	Y	Y	Y	Y	Y	Y	Y
<i>N</i>	252	216	280	240	266	228	252	216
<i>N counties/districts</i>	18	18	20	20	19	19	18	18
Adjusted R2	0.864	0.852	0.833	0.832	0.778	0.849	0.791	0.832

Notes: Significance levels: *10%, **5%, ***1%. *T*-statistics in parenthesis.

Chang, 2016; Andreoni and Scazzieri, 2014; Chang, 1994; Cimoli et al., 2009; Di Tommaso and Schweitzer, 2013). In this view, industrial policy is not just a set of instruments to achieve fixed purposes. It should be rather conceived as a process that drives structural economic and social change.

2. China's ability to implement industrial policies is founded on a well-defined institutional architecture, with agencies and personnel, whose functioning has been changing, dedicated to design, experiment and apply policies. In particular, career incentives have been lately aligned with new long-term industrial policy goals, shifting from mere economic growth to social and environmental issues.²¹ This would suggest that revitalised industrial policies must include investments in government capacity building.

3. Concerning clustering policies, our evidence suggests that using different types and combinations of specialisation and localisation can produce different results, corresponding to different policy aims. Additionally, STs experience confirms that, as for mature economies (Bailey et al., 2015), also for developing countries, an approach to sectoral specialisation and upgrading tailored to local contexts might improve local economic performances better than exogenous-driven growth. It appears to us that policymakers might have followed this path, passing from a place-neutral attitude in the beginning to a more place-based perspective later.

Finally, the STs programme is not free from important limitations, which also draw general policy implications and set the line for future research. Indeed, environmental and social sustainability issues have become increasingly

serious in Guangdong, also given its fast industrialisation. These aspects have recently generated growing concerns and some first policymaking reactions. Accordingly, it seems necessary that future studies realign researches on China with recent reflections about sustainability and industrial development (Aiginger, 2016). Focussing particularly on human development and capabilities (Sen, 1999), future empirical analysis may deepen the interactions between place-based policies, clusters and human development indicators in emerging countries, an aspect that has been neglected so far.

Supplementary material

Supplementary material is available at *Cambridge Journal of Regions, Economy and Society* online.

Endnotes

¹ Calculated according to the place of origin and not to the location of exporters.

² Data on Guangdong Province are from NBS (2018), while data on other countries are from OECD.com, last retrieved 4 May 2018.

³ Authors' calculation based on data retrieved from various editions of the China Statistical Yearbook.

⁴ Towns, or townships, are the fourth-level administrative units of political divisions in China. The higher administrative levels are provincial (first level), prefecture or city (second level) and county or district (third level).

⁵ http://www.hktdc.com/web/featured_suppliers/dongguan/index.html.

⁶ Even if there are other areas in China characterised by the presence of industrial clusters (such as Zhejiang Province), these are not the target of a specific policy programme.

⁷ The industrial clusters category includes very heterogeneous realities, ranging from agglomerations of high-tech companies in advanced countries (such as Sophie-Antipolis in France, the Cambridge region in the UK or the Silicon Valley in the USA) to groups of SMEs specialised in traditional sectors located

in developing areas, such as the garment cluster in Nairobi (Van Dijk and Rabellotti, 2005) or the knife cluster in Pakistan (Nadvi, 1999).

⁸ The debate is wide and cannot be treated here. For a thorough literature review, see Hervas-Oliver et al., 2015; Ketels, 2013.

⁹ From fieldwork interviews with DSTGG officials, we know that, by July 2017, there were 416 officially recognised STs. However, as of the writing of this article, there are no official data available about the 17 new towns recognised in 2017.

¹⁰ In the online [Supplementary materials](#), we list the main institutions that we visited.

¹¹ For each yuan granted from the province, a city should provide 10 yuan and a town 50 yuan.

¹² We mainly refer to “Thoughts and Strategies for the Development of Clusters in Guangdong and for Brands Creation” (2005), the “Coordinated Promotion Plan between Province and (Prefecture) City” (2005) and “Guangdong Province Government’s Suggestion on the Promotion of the Development of ST” (2006) (Su and Sun, 2016).

¹³ The identification of endogenous STs has followed different steps: first, a content analysis of POTIC website and the official websites of every specialised town in order to retrace the history of their development and identify possible traditional productions; second, a dedicated literature review, including documents provided by local and provincial institutions on some specific townships; third, for those cities that were classified as endogenous for their proximity to natural resources or the physical characteristics of their territory, a further check by means of geo-localisation.

¹⁴ This is in line with some international contributions that acknowledge the difficulties in making proper policy evaluation of clustering initiatives (Brakman and van Marrewijk, 2013; Vicente, 2018).

¹⁵ We use the fixed-effects version of the model. Compared to its ordinary least squares (OLS) version (Filippetti and Cerulli, 2018), the results are equivalent to that obtained by adding individual fixed effects to a pooled OLS estimation.

¹⁶ The main variable on which we analyse the possible effects of agglomerations is industrial output. With reference to the first part of the empirical analysis, however, we also observe the effects on agricultural output

for two reasons: first, one-fourth of the specialised towns specialise in agricultural products; second, many of the inner or peripheral areas count on its agricultural sector for a large part of their total output.

¹⁷The outcomes of interests and the controls are used in log form in the regression (we add the prefix *ln_* to the variables in the results tables); the variables of interests, instead, are used in hyperbolic sine form to include the cases when they are zero (we add the prefix *hs_* to the variables in the results tables).

¹⁸The dose response is embedded in a counterfactual design and, similarly to general propensity score, it yields consistent estimates of causal relations provided that the hypothesis of unconfoundedness is tenable (Cerulli, 2015). Therefore, some precautions are needed in terms of causal interpretation.

¹⁹In the first, the binary treatment is having/not having at least one specialised town, and the number of STs is used as a dose. In the second, the binary treatment is having/not having at least one endogenous town and the number of endogenous towns is the dose.

²⁰The doses enter the model in a three-degree polynomial form. When the joint significance tests on the parameters points towards accepting the null hypothesis, the dose is modelled as a two-degree polynomial. Additionally, when measuring the number of endogenous towns as dose, we run the model both with and without the total number of STs as a control.

²¹More precisely, from the end of 1990s, China has undertaken a reform in the cadre management system based on rigid performance evaluation mechanisms, which, especially in experimental areas such as Guangdong, has conferred on local public officials more and more formal responsibility for the accomplishment of priorities and targets fixed on a mutual agreement basis (Di Tommaso et al., 2013). While up to the mid-2000s, officials were evaluated mainly in relation to the economic performance of the administrative unit they were responsible for, since 2007 the State Council has issued specific measures explicitly including environmental protection among the objectives under evaluation (Pu and Fu, 2018)

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