

# **Institutional and Functional Integration under State-orchestrated Regional Strategy: Yangtze River Delta (YRD)**

**Partner1: Zijing Zhao (cnetid:zijingz, github username:zijing328)**

**Partner2: Zekai Shen (cnetid:zekaishen, github username:zac-shen)**

## **1. Introduction**

In recent context of China's regional governance, state-orchestrated regional development strategies have been introduced to address the uneven and inadequate regional development. Examples include Yangtze River Delta (YRD), Beijing-Tianjin-Hebei, and Guangdong-Hong Kong-Macao Greater Bay Area. Inter-city cooperation has emerged as a critical vehicle for promoting regional integration, optimizing resource allocation, and eliminating administrative and market barriers. Top-down initiatives paired well-developed cities with left-behind ones. Through this process, new institutional frameworks and political orders have arisen.

Although regional cooperation has increased in regions that implemented the state-orchestrated regional development strategy, the effectiveness of such collaborative mechanisms has been questioned. The state-led top-down approaches frequently conflict with the ideals of mutual benefit, leading to ineffective inter-city cooperation. Therefore, it is important for institutional networks formed by inter-city collaboration match with the functional linkage of production factors to foster regional coordinated development. This raises the question about whether the institutional network established through inter-city cooperation is coupled with functional linkage.

## **2. Research Question**

Therefore, our research question is defined as the following: 1. How do state-orchestrated institutional networks formed by inter-city cooperation respond to dynamic functional linkages,

such as population flows? 2. How do different forms of inter-city cooperation respond to population flow?

### 3. Data

The YRD region is selected as the study area due to its advanced economic integration. The region encompasses 41 cities, forming 820 city pairs analyzed from 2018 to 2023. The intensity of inter-city cooperation among city pairs is derived from inter-city cooperation news data sourced from the official websites of the 41 city governments in the YRD region. We web scrapped each city government’s news website using the names of the other 40 cities as search keywords. A Large Language Model (LLM), GPT 3.5, was employed to categorize the data into four types of inter-city cooperation: study visits, inter-city agreements, inter-city planning projects, and joint conferences. The intensity of inter-city population flow is measured by the annual inter-city migration index from the AutoNavi.

### 4. Interpretation

After applying the dataset to the research questions, we were able to identify several trends regarding inter-city cooperation and population flow, respectively resembling institutional network space and functional linkage.

First, the shiny-app shows the movement of inter-city cooperation along with the population flow. As shown in the interactive plots, it can be observed that the population flow increased during the given period. It is especially notable that well-developed cities such as Shanghai, Hangzhou, Suzhou and Nanjing served as core cities of migration, which simultaneously transit population among themselves and boosting population migration towards left-behind cities.

The trend of inter-city cooperation shows a similar pattern of an over all increase bolstered by well-developed cities. However, it is noticeable that both population flow and inter-city cooperation faced a drop during 2022, which could result from the intensified COVID policy in China during the year. Both variables showed their rebound in 2023, justifying an increasing momentum.

This consistent trend may be explained by the local governments’ adherence to the project, and the synergy of institutional workspace and functional linkage. This assumption can be supported by the alignment of lines between the cities that represent inter-city cooperation and population flow respectively. In light of this, we further examined the trends of different types of cooperation, to see if the trend of cooperation is consistent among different types.

## **5. Limitation and Future Work**

We admit that this study is an simple plot of the trend between insitutional network and functional linkage. We consider employ regression analysis into our further study to prove the correlation between these two variables, other control variables like socioeconomic factors will be included.