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# *The impact of the establishment of high-tech zones on economic development*

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***Keywords:*** High-tech zone, Economic development, Heterogeneity

***Abstract:*** The high-tech zone is an important strategy to promote China's transformation and upgrading, and it has also played an important role in promoting the local economy, and there have also been development imbalances. Whether the establishment of high-tech zones promotes or hinders economic development in the region remains to be studied. This paper selects panel data of 262 cities in China from 2015 to 2016, and chooses the double difference method to construct an econometric model to quantitatively examine the impact of high-tech zones on the economy. Through regression and testing of the model, it is found that the high-tech zone still has a driving effect on economic development. There are gaps in the promotion of different regions. As the economy develops, shortcomings are gradually exposed, which has a counterproductive effect on the local economy. The research results provide a reference for improving the construction of high-tech zones and the implementation of policies.

## 1. Intruduction

This article is an empirical analysis article, which aims to examine the impact of the establishment of national high-tech zones on the economic development of corresponding cities. Although theoretically analyzed, high-tech zones are helpful to economic development, but at the same time, it can be noted that there are some uncoordinated developments in high-tech zones. This article is a quantitative analysis of this problem. The structure of the article is as follows: The first part is a historical review of the high-tech zone and the review of related theories; the second part is the selection and analysis of related variables; the third part is the setting and testing of the measurement model; the fourth part is The relevant robustness test for the benchmark results; the last part is a comprehensive discussion of the analysis results of the article, and some suggestions for the article results.

## 2. Literature review

The high-tech zone is an important strategy for the country to promote the development of high-tech industries and regional economy. It has always played an important role in undertaking the important tasks of national industrial upgrading and technological innovation. After more than

30 years of development, the national high-tech zone has also become a driving force for China's economy. An important support point towards a high-quality development path. However, the problem with the construction of China's high-tech zones is that development is heavily dependent on the country's industrial policies and preferential policies, and little attention is paid to the transformation of its own achievements. It is prone to problems such as structural imbalance and low efficiency, which may have a certain impact on the country's economic development. Hinder.

Many scholars have conducted research on the economic performance of the development process after the establishment of the high-tech zone. Yuan Hang et al. (2018) found that national high-tech zones are complicated in the transformation and upgrading of industrial structure through the construction of a double difference model, and the promotion of China's industrial upgrading is not very obvious; Liu Ruiming et al. (2015) found that the construction of high-tech zones is significant Promote the growth of regional GDP and per capita GDP; Li Lin (2005) believes that China's high-tech zones have not yet formed industrial clusters as a whole, and their competitiveness is still insufficient compared with some high-tech zones in the world; Xue Lijie et al. (2017) ) Through the construction of a panel model, it is found that human capital plays a significant role in promoting the economic growth of national high-tech zones.

## 3. Methods and data

Based on the existing theoretical research, the research period of this paper is from 2015 to 2018, and the following hypotheses are proposed:

H0: The high-tech zone still has obvious advantages to the economy;

H1: The high-tech zone no longer has an advantage in driving the economy;

H2: The advantage is obvious in the first half of the time, but the advantage is not shown in the second half.

This paper uses the double difference method to study the impact of high-tech zones on local economic development.This paper selects data from 262 cities for research, of which 132 cities have been approved to build high-tech zones. The relevant data comes from the "China Torch Statistical Yearbook". The main variables are as follows:

*Table 1. Definition of variables*

| variable name | Variable definitions |
|---|---|
| PGDP | GDP per capita (yuan) |
| High | Core explanatory variables |
| UR | Urban registered unemployment rate (%) |
| UBR | Urbanization rate (%) |
| IM | Total import and export (100 million yuan) |
| FA | Fixed asset investment (100 million yuan) |
| DE | Deposit balance of financial institutions (100 million yuan) |
| LO | Loan balance of financial institutions (100 million yuan) |
| IP | Total industrial profit (100 million yuan) |

*Table 2. Descriptive statistics of variables*

| variable | Number of variables | Aaverage | Standard deviation | Min | Max |
|---|---|---|---|---|---|
| General public budget revenue | 1028 | 242.757 | 364.333 | 17.25 | 3136.49 |
| Urban registered unemployment rate | 1027 | .657 | .489 | .068 | 3.649 |
| Urbanization rate | 1038 | 37.782 | 23.811 | 5.08 | 100 |
| GDP per capita | 1027 | 60014.3 | 35845.37 | 17642 | 224000 |
| Total import and export | 1027 | 198.901 | 639.496 | .48 | 5316.13 |
| Fixed asset investment | 1038 | 1453.275 | 1474.923 | 0 | 8352.5 |
| Financial institution deposit balance | 1027 | 4057.965 | 6523.602 | 329.74 | 59562.25 |
| Financial institution loan balance | 1027 | 3371.251 | 5463.452 | 246.57 | 39764.44 |
| Total industrial profit | 997 | 242.628 | 313.994 | 0 | 2022.144 |

## 4. Model and Result

The model in this article is set as follows:

$$PGDP_{it} = \alpha_{it} + \beta_1 High_{it} + \beta_2 Z_{it} + \gamma_i + \mu_{it}$$

Among them, $Z_{it}$ represents other control variables.We mainly focus on the coefficient $\beta_1$ of High to facilitate subsequent analysis of the model. Three tests are conducted in this section, namely basic test, counterfactual test and heterogeneity test. The specific results are shown in Table 3-5.

In Table 3, the coefficient of High is significantly positive before and after adding the relevant control variables, indicating that the establishment of high-tech zones does indeed promote local economic development without considering any heterogeneity.

*Table 3. Benchmark regression results*

| Variable | lnpgdp |
|---|---|
| High | 0.108*** |
| General public budget revenue | 0.000*** |
| Urban registered unemployment rate | 0.009 |
| Urbanization rate | 0.003 |
| Total import and export | 0.000*** |
| Total investment in fixed assets | -0.000*** |
| Total industrial profit | 0.000*** |
| Total loans of financial institutions | 0.000*** |
| Financial institution deposit balance | -0.000*** |
| Constant | 10.689*** |
| Observations | 915 |

For a city, there may be many factors that affect its economic development. We cannot determine whether other policies or uncertain factors will affect the level of economic development. In order to make sure that the analysis results of the benchmark model above are credible Yes, that is, the establishment of the high-tech zone has indeed promoted the economic development of the region, and relevant tests are needed. We assume that the time for the establishment of the high-tech zone is advanced, and then examine whether it has an impact on the local economy. In this part, we assume that the establishment time is advanced by 1 year, 2 years, and 3 years and then tested separately,

and the variables are set to High_1, HIgh_2, and High_3.

*Table 4. Counterfactual tests*

| | One year in advance | One year in advance | Two years in advance | Two years in advance | Three years in advance | Three years in advance |
|---|---|---|---|---|---|---|
| Variable | GDP per capita | | | | | |
| high_1 | - | - | | | | |
| high_2 | | | - | - | | |
| high_3 | | | | | - | - |
| Control variable | NO | YES | NO | YES | NO | YES |
| Constant | 10.851*** | 10.690*** | 10.758*** | 10.052*** | 10.731 | 10.760 |
| Observations | 778 | 684 | 517 | 450 | 257 | 218 |

The results in Table 4 show the impact on local economic development when the time of setting up a high-tech zone is advanced by 1, 2, and 3 years. The results in the first column to the sixth column all show that the coefficients we are concerned about are not displayed, indicating that before the establishment of the high-tech zone, it did not have a substantial impact on economic development, that is, the benchmark model believes that the high-tech zone will promote The conclusion based on the local economic development level is robust.

The heterogeneity test is mainly divided into three parts, according to the geographical division, according to the length of establishment, according to the city level, the test results are shown in Table 5-7.

*Table 5. Inspection of divided areas*

| | East | East | West | West | Central | Central |
|---|---|---|---|---|---|---|
| Variable | GDP per capita | | | | | |
| high | 0.103* | 0.063 | 0.047 | 0.119 | 0.181** | 0.150** |
| General public budget revenue | | 0.000 | | 0.000 | | 0.001*** |
| Urban registered unemployment rate | | -0.005 | | 0.055 | | 0.059 |
| Urbanization rate | | 0.001 | | 0.009 | | 0.003 |
| Total import and export | | 0.000*** | | 0.000 | | -0.000 |
| Total investment in fixed assets | | -0.000** | | -0.000 | | -0.000** |
| Total industrial profit | | 0.000 | | 0.001** | | 0.000 |
| Total loans of financial institutions | | 0.000*** | | 0.000** | | 0.000*** |
| Financial institution deposit balance | | -0.000*** | | -0.000** | | -0.000*** |
| Constant | 10.937*** | 10.959*** | 10.626*** | 10.154*** | 10.719*** | 10.735*** |
| Observations | 495 | 451 | 261 | 213 | 271 | 251 |

Due to my country's vast territory, the economic development of cities in different regions varies greatly. The establishment of high-tech zones in different regions naturally has different effects on economic development. In this part, we simply divide the city into three regions in the east, central and west to perform regression analysis to observe whether the impact on different regions is consistent.

Table 4 shows the regression results of dividing the city into different regions in the east, middle and west. The first column indicates that the coefficient before High is significantly positive for cities in the eastern region before the relevant control variable is added. The results in the second column indicate that after the relevant control variable is added, the coefficient before High is

positive but Not significant, but it can still be considered that the establishment of high-tech zones has a stimulating effect on the economic development of cities in the eastern region; the results of the third and fourth columns show that for cities in the western region, the establishment of high-tech zones is beneficial to the economy. The effect of is not obvious; the results of the fifth and sixth columns show that for the cities in the central region, the coefficients before High are all significantly positive, and compared with the eastern and western regions, the coefficients The value is relatively large, indicating that the establishment of high-tech zones has the most obvious role in promoting the economic development of cities in the central region.

*Table 6. Inspection of Year of Establishment*

| | Two years | Two years | Two years | Two years | Two years | Two years |
|---|---|---|---|---|---|---|
| Variable | GDP per capita | | | | | |
| High2 | -0.006 | -0.005 | 0.021 | 0.018 | 0.022 | 0.016 |
| General public budget revenue | | 0.001*** | | 0.001*** | | 0.000*** |
| Urban registered unemployment rate | | 0.007 | | 0.020 | | 0.012 |
| Urbanization rate | | 0.006* | | 0.005* | | 0.003 |
| Total import and export | | 0.001 | | 0.000*** | | 0.000*** |
| Total investment in fixed assets | | 0.000 | | -0.000*** | | -0.000*** |
| Total industrial profit | | 0.001*** | | 0.001** | | 0.000*** |
| Total loans of financial institutions | | -0.000 | | 0.000*** | | 0.000*** |
| Financial institution deposit balance | | 0.000 | | -0.000*** | | -0.000*** |
| Constant | 10.760*** | 10.058*** | 10.844*** | 10.685*** | 10.842*** | 10.737*** |
| Observations | 517 | 450 | 778 | 684 | 1,027 | 915 |

Some high-tech zones were not established in the same year, but have been established before. The high-tech zones may have unreasonable scale expansion or extensive development models, resulting in diseconomies of scale, etc. problem. In order to verify whether the expansion of the scale of the high-tech zone still has a positive impact on the economy, in this part we analyze the high-tech zones that already existed in 2015 and set the High2 variable, that is, the value of the high-tech zone established in 2015 is 1. , And the other values are 0, and the relevant tests are performed.

The results in Table 6 show the impact of the high-tech zones established in 2015 on the city's economic development after two, three, and four years. The results in the first to sixth columns all show the coefficient before the core explanatory variable High2 All of them are insignificant, indicating that they have no obvious impact on economic development.

*Table 1. City-level inspection*

| | Capital city | Capital city | Other city | Other city |
|---|---|---|---|---|
| Variable | GDP per capita | GDP per capita | GDP per capita | GDP per capita |
| High | 0.071 | 0.041 | 0.119** | 0.093** |
| General public budget revenue | | 0.000* | | 0.001*** |
| Urban registered unemployment rate | | 0.063 | | -0.007 |
| Urbanization rate | | 0.002 | | 0.004 |
| Total import and export | | 0.000 | | 0.000*** |
| Total investment in fixed assets | | -0.000 | | -0.000*** |
| Total industrial profit | | 0.000 | | 0.000** |
| Total loans of financial institutions | | 0.000 | | 0.000*** |
| Financial institution deposit balance | | -0.000 | | -0.000*** |

| | | | | |
|---|---|---|---|---|
| Constant | 11.285*** | 10.895*** | 10.739*** | 10.620*** |
| Observations | 119 | 97 | 908 | 818 |

The corresponding policy measures at different city levels vary greatly. For large cities and other cities, the degree of national policy implementation may be different. The initial economic endowment will also have a great impact on subsequent economic development. We divide cities into provincial capitals, municipalities directly under the central government, and other cities to test whether the establishment of high-tech zones in cities of different levels has different effects on their economic development. So set the level variable. When the city is a municipality directly under the Central Government or a provincial capital city, the level value is 1, and when the city level is other cities, the level value is 0.

The results in Table 7 report the impact of the establishment of high-tech zones on economic development after the cities are divided into two categories according to different levels. The results in the first and second columns show that for provincial capitals and municipalities, the coefficients of the core variable High are not significant before and after the control variables are added, indicating that for provincial capitals, the establishment of high-tech zones is important The economic development of the city has not played a significant role in promoting; and the results in the third and fourth columns show that before and after the control variables are added, the coefficient of High for other cities is significantly positive, indicating that Gaoxin The establishment of districts can obviously promote the economic development of non-provincial cities.

## 5. Conclusion

Based on the above results, we found that the establishment of high-tech zones in the central region has the greatest impact on economic development, while for the central and western regions, the results are not so obvious. After the establishment of the high-tech zone for more than a certain year, the impact on the regional economic development will no longer be significant. For non-provincial capital cities, the establishment of high-tech zones has a more obvious driving effect on the economy.

In order to further play the leading role of the high-tech zone, we must first focus on the technological innovation of enterprises within the high-tech zone. Second, all regions must adapt to local conditions and cannot adopt the same development model. Finally, it is inevitable to avoid the diseconomies of scale after the establishment of a high-tech zone for a certain year, but certain measures should be taken to minimize the impact. This requires that enterprises in the high-tech zone should not blindly pursue scale expansion and economic benefits, but should consider their own development strategies from a deeper perspective, such as changing development methods and corporate mechanisms. For the government, it also needs to treat these enterprises. The expansion of the country is subject to certain rules to prevent it from appearing external uneconomic problems for its own development and affecting the economic development of a region.

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