Research on the Influence of Officials Economics Professional Background on Local Economy

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Abstract. Local officials are not functional in production, but they can affect the economic development in their jurisdiction. To examine the data of officials of economics majors and non-economics majors, we used the double independent sample Mann-Whitney test method based on non-parametric statistics. We draw conclusions that officials with a economics background can better improve the development of economy than others; and local economic level and the degree of influence of officials’ economics background on the economic development is an inverted “U” nonlinear relationship.

Introduction

Local economic decentralization has made local governments play a leading role in the economic development of the area. As officials of the local government, officials’ personal ability directly affects the development of economy. Among them, officials' work experience, education level, and professional endowments have become the most intuitive basis for many scholars to assess the individual's personal abilities. The relationship between economics professional background and economic development is particularly close. Therefore, this article takes the background of local officials' economics as the main reference condition, and uses the method of empirical analysis to compare the difference in the economic performance between the economics and non-economics majors officials.

Propose Hypothesis

Many literatures mention that local officials will show different degrees of enthusiasm for the economic growth of the area, and the performance of economic development will be affected by regional competitiveness and the characteristics of officials themselves. In areas where the economic competitiveness is stronger, officials are more eager to develop the economy, but eagerness does not mean that they are effective. It may even reduce their influence because the government is not a production department. As a result, there is a speculation that as the degree of market economy becomes higher, the influence of the professional background of economics on economic development will gradually decrease. This article makes the following assumptions:

H1: The economic background of officials has a significant impact on local economic growth.
H2: Local economic level and the degree of influence of officials’ economics background on the economic development is an inverted “U” nonlinear relationship.

Non-parametric Test Design

Variable Sorting Method

The Definition of the Antecedent Variables. The antecedent variables chosen in this paper are based on whether the top government officials (provincial governors, mayors or chairmen) of the Chinese administrative subdivision have economic background. A background with economics is defined as 1, otherwise 0. Taking into account the diversity of China's education system and academic qualifications, this article combines the actual situation of official data to define the
professional background of economics as follows: first, obtaining the titles of intermediate or senior economists; second, Obtaining Degree or Diploma of Bachelor, Master, Ph.D.in Economics.

**Outcome Variable Selection Method.** This article observes the development of economy from the two dimensions including national economic production and people's living standards. In the first dimension, one chooses the growth rate of regional gross domestic product (RGDP) to reflect the level of productivity. Second, the proportion of the secondary industry in RGDP is taken as variable. In addition, the proportion of total investment in fixed assets in GDP is also included in the index. In the dimension of people’s living standards, the per capita disposable income and per capita cash consumption expenditure are selected as the outcome variables. Per capita disposable income is an important factor that influences residents' spending power, individual investment ability, and anti-risk ability. The residents' cash consumption expenditures reflect the residents' ability to supply living goods and services and their possession of living materials.

| Variables                        | Dimensions                                           | Outcome variable indicator                          | Variable index calculation formula                                    | Variable coding |
|---------------------------------|------------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------|-----------------|
| Economic development variables  | National economy production status                   | Growth rate of RGDP                                 | (Current Output - Output in the Last Period) / Output in the Last Period | A₁              |
|                                 |                                                      | Proportion of the secondary industry in RGDP        | Gross secondary industry/GDP                                           | A₂              |
|                                 |                                                      | Percentage of fixed assets investment in RGDP       | Total Investment in Fixed Assets/GDP                                   | A₃              |
| People’s standard of living     |                                                      | Per capita disposable income                        | Direct adoption                                                        | B₁              |
|                                 |                                                      | Per capita cash consumption expenditure             | Direct adoption                                                        | B₂              |

**Regional Division Method**

According to the 2014 "China Provincial Competitiveness Blue Book", we divide 31 provinces, municipalities, and autonomous regions into three levels: upstream, midstream, and downstream. Shanghai, Beijing and other ten provinces are designated as the upstream areas. Henan Province, Anhui Province and other nine provinces are classified as the middle reaches; Jiangxi Province, Shanxi Province and other twelve provinces were designated as downstream regions.

**Hypothesis Test Method**

First, a single-sample Kolmogorov-Smirnov normality test was performed on each outcome variable using SPSS software, which determine whether the sample was in a normal distribution and the non-parametric test was reasonable. Then, using the non-parametric statistics-based double-independent sample Mann-Whitney test, we observed whether the result variables with a defined value of 1 and 0 were significantly different across the country. If there were differences, then the H₁ hypothesis was supported, otherwise the H₁ hypothesis was rejected. The verification of the H₂ hypothesis depends on whether or not significant differences in the middle reaches of the area appear upwardly inflection points. The same method is used to test the upstream, midstream, and downstream data. If the middle reaches exhibit more influence than the upstream and downstream areas, it can be assumed that the degree of the influence of the professional background of the economics on the economic growth has highlighted the turning point. Once this turning point occurs, the H₂ assumption is accepted.

**Data Sources**

The sample of this article was compiled through the statistical yearbooks and the People's Network of all provinces and cities from 2005 to 2015. Since the statistics are based on the year and some officials are under one year of service, the treatment in this paper is that when the officials with the
same definition value are added for more than half a year, their corresponding economic growth performance is calculated on the basis of annual statistics.

Empirical Test

Statistical Description of the Outcome Variable

It can be seen from Table 2 that the mean value of all other variables is higher than the median except that the A2 mean value is lower than the median value. The overall sample shows an asymmetric distribution, and the number of samples for each variable exceeds 35, which is higher than the large sample standard required for nonparametric tests. Therefore, a double independent sample Mann-Whitney test based on the median and rank to determine the sample difference has a good effect.

Table 2. Outcome variables mean, median, and extreme values.

| Variable | N  | Mean | Median | Minimum | Maximum |
|----------|----|------|--------|---------|---------|
| A1       | 372| 0.134| 0.129  | 0.009   | 0.254   |
| A2       | 372| 0.459| 0.492  | 0.202   | 0.590   |
| A3       | 372| 0.535| 0.506  | 0.254   | 0.995   |
| B1       | 341| 13893.526| 12,691.900 | 5944.100 | 40188.300 |
| B2       | 341| 9969.207| 9,327.600 | 4462.100 | 26253.500 |

Note: The data is calculated by the sample, and the calculation result retains 3 decimal places. N is the sample size.

One-sample Kolmogorov-Smirnov Normality Test

Table 3 shows that the P value of all A1 is less than 0.05 passing a test of 5% of the significance level, and the P values of A2, A3, B1, and B2 are all less than 0.01 and passed the 1% significance level test. Therefore, we reject the original test hypothesis, that is, the results of the variables selected in this paper do not meet the normal distribution. The non-parametric test is better than the parameter test when the variables do not meet the normal distribution.

Table 3. Non-parametric normal distribution test.

| Testing method                  | Test value | A1  | A2  | A3  | B1  | B2  |
|---------------------------------|------------|-----|-----|-----|-----|-----|
| sample size                     | N          | 372 | 372 | 372 | 341 | 341 |
| One-sample Kolmogorov-Smirnov   | Z          | 1.447| 1.967| 1.687| 1.904| 1.655|
| test                            | P          | 0.030| 0.001| 0.007| 0.001| 0.008|

H1 Hypothetical Dualindependent Sample Mann-Whitney Test

It can be seen from Table 4 that the median and average values of the three groups of A1, A3, B2, and B1 variables of the officials of the economics profession are better than those of non-economics professionals. The A2's median and average performance are inconsistent and it is difficult to judge the pros and cons.

Table 4. Descriptive statistics(Unit: 100 million RMB).

| Defined value | Observed value | A1  | A2  | A3  | B1  | B2  |
|---------------|----------------|-----|-----|-----|-----|-----|
| 0             | Mean           | 0.130| 0.500| 0.512| 13030.285| 9405.993 |
|               | Median         | 0.131| 0.469| 0.477| 11,496.100| 8531.900 |
|               | N              | 246 | 246 | 246 | 219 | 219 |
| 1             | Mean           | 0.141| 0.476| 0.580| 15443.113| 10980.221 |
|               | Median         | 0.138| 0.485| 0.598| 14327.350| 10450.250 |
|               | N              | 126 | 126 | 126 | 122 | 122 |

Table 5 shows the test results of the data in Table 4. The results show that the data of economic
professional officials on all economic development indicators examined are significantly better than those of non-economics professional officials (P_{a1}<0.05, P_{a2}<0.01, P_{a3}<0.01, P_{b1}<0.001, P_{b2}<0.001). The test results generally support the H1 hypothesis that the background of officials’ economics has a significant impact on local economic growth.

| Testing method | Test value | A_1         | A_2         | A_3         | B_1         | B_2         |
|----------------|------------|-------------|-------------|-------------|-------------|-------------|
| Dual independent sample Mann-Whitney test | U          | 13392.000   | 12744.000   | 11857.000   | 10152.500   | 10231.500   |
|                | P          | 0.031       | 0.005       | 0.000       | 0.000       | 0.000       |
|                | Rank       | 0           | 177.940     | 175.300     | 171.700     | 156.360     |
|                | mean       | 1           | 203.210     | 208.360     | 215.400     | 197.280     |

**H1 Hypothetical Dualindependent Sample Mann-Whitney Test**

From Table 6, Table 7 and Table 8, it can be seen that in addition to A_2 and A_3, officials in the upstream area, the average and median of economics professional officials are higher than others; The average value and median value of all the indicators examined by officials in the midstream area are higher than those of non-economics professionals; the median and average A_2, B_1, and B_2 officials in downstream area are slightly higher than non-economics officials.

**Table 6. Upstream area description statistics(Unit: 100 million RMB).**

| Area Defined value | Observed value | A_1 | A_2 | A_3 | B_1 | B_2 |
|--------------------|----------------|-----|-----|-----|-----|-----|
| Upstream area 0    | Mean           | 0.130 | 0.481 | 0.448 | 16653.910 | 11867.629 |
|                    | Median         | 0.129 | 0.500 | 0.438 | 14769.900 | 10715.200 |
|                    | N              | 83   | 83   | 83   | 73   | 73   |
|                    | Mean           | 0.135 | 0.465 | 0.469 | 20538.486 | 14658.778 |
|                    | Median         | 0.138 | 0.485 | 0.408 | 19422.500 | 13696.300 |
|                    | N              | 37   | 37   | 37   | 37   | 37   |

**Table 7. Midstream area description statistics(Unit: 100 million RMB).**

| Area Defined value | Observed value | A_1 | A_2 | A_3 | B_1 | B_2 |
|--------------------|----------------|-----|-----|-----|-----|-----|
| Midstream area 0   | Mean           | 0.129 | 0.469 | 0.497 | 11095.423 | 8253.720 |
|                    | Median         | 0.128 | 0.470 | 0.413 | 9647.350 | 7319.100 |
|                    | N              | 72   | 72   | 72   | 64   | 64   |
|                    | Mean           | 0.148 | 0.497 | 0.621 | 13986.907 | 9771.789 |
|                    | Median         | 0.151 | 0.497 | 0.656 | 13838.850 | 9679.350 |
|                    | N              | 48   | 48   | 48   | 46   | 46   |

**Table 8. Downstream area description statistics(Unit: 100 million RMB).**

| Area Defined value | Observed value | A_1 | A_2 | A_3 | B_1 | B_2 |
|--------------------|----------------|-----|-----|-----|-----|-----|
| Downstream area 0  | Mean           | 0.133 | 0.406 | 0.557 | 11314.513 | 8113.872 |
|                    | Median         | 0.132 | 0.407 | 0.654 | 10495.900 | 7898.050 |
|                    | N              | 91   | 91   | 91   | 82   | 82   |
|                    | Mean           | 0.132 | 0.462 | 0.633 | 12326.618 | 8915.638 |
|                    | Median         | 0.129 | 0.471 | 0.654 | 10969.400 | 8192.600 |
|                    | N              | 41   | 41   | 41   | 39   | 39   |

The non-parametric dual independent samples Mann-Whitney test results for the variables of Tables 6, 7, and 8 are shown in Table 9.

In the upstream area, the economics professional group A variable didn’t pass the 5% significance level test (P_{a1}, P_{a2}, P_{a3}<0.1), The variables of group B passed the 1% significance level test (P_{b1}, P_{b2}<0.01). It shows that in upstream area, the officials of economics have a significant effect on the improvement of people's living standards, and have no significant effect on productivity growth.

In the midstream area, the economics professional officials are significantly higher than non-economics professional officials in all indicators. The RGDP growth rate passed the 5% significance level test (P_{a1}<0.05), and the remaining indicators passed the 1% significance level test.

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It shows that the economics professional officials in midstream area have a significant positive effect on the five indicators than non-economics professional officials. In the downstream region, the economics professional officials passed the 1% significance level of the A2 indicator ($P_{a2} < 0.001$) to the non-economic professional officials, and none of the other indicators passed the 10% test of the significance level ($P_{a1}, P_{a3}, P_{b1}, P_{b2} > 0.1$).

### Table 9. Regionally and dual Independent Sample Mann-Whitney Test.

| Testing method                        | Area       | Test value | A1      | A2      | A3      | B1      | B2      |
|--------------------------------------|------------|------------|---------|---------|---------|---------|---------|
| Regionally and dual Independent Sample Mann-Whitney Test | Upstream area | U 1320.000 | 1361.000 | 1411.000 | 943.000 | 912.000 |
|                                      | P 0.219     | 0.321      | 0.479   | 0.010   | 0.006   |
|                                      | 0 57.900    | 62.600     | 59.000  | 49.920  | 49.490  |
|                                      | 1 66.320    | 55.780     | 63.860  | 66.510  | 67.350  |
|                                      | Midstream area | U 1259.000 | 1236.000 | 1010.500 | 953.000 | 1028.000|
|                                      | P 0.012     | 0.008      | 0.000   | 0.002   | 0.007   |
|                                      | 0 53.990    | 53.670     | 50.530  | 47.390  | 48.560  |
|                                      | 1 70.270    | 70.750     | 75.450  | 66.780  | 65.150  |
|                                      | Downstream area | U 1833.000 | 1115.000 | 1538.500 | 1363.000 | 1325.000|
|                                      | P 0.873     | 0.000      | 0.108   | 0.191   | 0.129   |
|                                      | 0 66.860    | 58.250     | 62.910  | 58.120  | 57.660  |
|                                      | 1 65.710    | 84.800     | 74.480  | 67.050  | 68.030  |

### Analysis of Empirical Test Results

Table 10 shows that in upstream area, two indicators are significantly better than non-economics professional officials; in the midstream region, five indicators are significantly better than non-economics professional officials. One indicator in the downstream region is significantly better than non-economics professional. That is, there is a convex turning point, and the figure shows an inverted “U” shape. Local economic level and the degree of influence of officials’ economics background on the economic development is an inverted “U” nonlinear relationship.

### Table 10. Regionally significant result variables.

| Area         | A1 | A2 | A3 | B1 | B2 | Total |
|--------------|----|----|----|----|----|-------|
| Upstream area| _  | _  | _  | +  | +  | 2     |
| Midstream area| + | + | + | + | + | 5     |
| Downstream area| _ | _ | + | _ | _ | 1          |

Note: "+" indicates the index of $P<0.05$ at the time of the test, and "-" indicates the index of $P>0.05$ at the time of the test.

### Summary

By using the non-parametric statistical double-independent sample Mann-Whitney test method to empirically examine the influence of officials on the background of economics and local economic growth, the following conclusions are drawn:

First, local officials with economics background are better able to improve the development of the local economy. However, they perform differently in different levels of domestic economic competitiveness. Second, Local economic level and the degree of influence of officials’ economics background on the economic development is an inverted “U” nonlinear relationship. It works best in midstream area. The effect in the upstream area is lower than that in the midstream area, which only has a significant effect on the improvement of the living standards of the residents, but has no significant effect on the development of the productivity level. The worst effect in the downstream areas, only help the upgrading of regional industrial structure.

Officials’ economic professional background can play a positive role in economic development in various regions and periods of different economic levels. The central government can focus on increasing the investment of economic professional officials in the middle-level economy, and strengthen the professional training of officials in various areas of economics.
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