

# Poverty, Borders and Regional Development: The Experience of the Three Provinces in Southwest China

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**ABSTRACT.** The concentration of poverty usually occurs in specific regions. This article aims at the administrative border area, and takes the three provinces in southwestern China as the research objects, using independent sample T test and the random effect regression method to confirm the existence of the border effect. The counties on the border line lag significantly behind other counties in the province in terms of economic development. According to empirical analysis, this paper proposes that regional poverty reduction and development need to consider multiple factors, with the focus on promoting communication and cooperation across administrative regions and breaking economic, political, and cultural barriers.

## 1. INTRODUCTION

From the perspective of economic geography and political economy, the accumulation of poverty often occurs in specific areas: areas with poor natural conditions and areas on administrative borders. In order to solve this problem, the Chinese government has successively implemented the strategy of regional poverty alleviation and coordinated development. It has achieved fruitful results in ensuring the survival of the poor and promoting the development of poor areas, and has become a force that cannot be ignored in the world's poverty reduction and development. The objective existence of administrative boundaries affects the material exchange and energy transfer of administrative units on both sides of the border. It may not only promote the common development of cross-border economies, but also may hinder the normal communication and operation between administrative units because of administrative borders.

The development of various countries in the world has proved that development and coordination are inseparable. It is emphasized that development will bring imbalances and endanger social stability; while emphasizing balance is difficult to stimulate growth momentum, which is not conducive to economic development. The development of the world also shows that only openness and cooperation can meet the requirements of the times. In the new era, how to correctly understand the border effect and correctly guide the border to play a positive role in regional poverty reduction and coordinated development has a profound impact on promoting coordinated development across administrative regions.

### 1.1. Related Work

#### 1.1.1 Research on border effects

The definition of the connotation of the border effect is usually based on its nature and put forward based on trade practice. Long-term trade data show that the existence of border effects has a negative impact. McCallum (1995) found that the trade volume between Canadian provinces is 22 times that of these provinces to the U.S. states [1]. He and Helliwell (1996) [2], Evans (2003) [3] combined their empirical results as a "border effect" and considered national borders to impede trade. But with the development of regional integration, the positive effect of the border effect began to appear.

Chinese scholars also have empirical research on the analysis of administrative border effects through interregional trade flow data or price indexes [4-6], and supplemented the concept of border effects on this basis. Tieli Li(2005) proposed a neutral definition: the impact of borders on cross-border economic behavior, and this impact (both positive and negative) is associated with the unique

political, economic, security, cultural and other attributes of the border, which was transformed into a shielding effect and a mediating effect [7]. Shielding effect is a phenomenon in which borders hinder cross-border interactions and spatial interactions. From the perspective of economics, it can be summarized as increasing transaction costs. The border mediation effect refers to the spatial mediation function that it has in contact and exchange with each other, which reflects the open nature of the border[8].

### 1.1.2 Study on the coupling between border areas and poverty

The theory and practice have found that the occurrence of regional poverty is often concentrated at the provincial-provincial border. Scholars have researched the formation mechanism of regional poverty traps and proposed ideas for cross-regional economic cooperation.

Regarding the formation mechanism of regional poverty traps, the existing research proposes development ideas for the “weak-weak” inter-provincial marginal areas, starting from the occurrence of poverty and the formation of poverty traps. Longbin He(2016) took Shaanxi, Hubei, Sichuan, and Gansu inter-provincial marginal areas as examples to analyze the formation mechanism and breakthrough strategy of the “poverty trap” [9]. Baojian Xie(2016) believe that the weak infrastructure, the fragile ecological environment, and the closed and backward region of the inter-provincial marginal region make it easier to fall into the state of overall regional poverty[10].

At the same time, in further research, scholars also found that China’s “weak-weak” inter-provincial border areas have issues such as the convergence of industrial structures, severe resource destruction, inadequate coordination and cooperation mechanisms, and limited policy support [11]. In the context of regional overall poverty, both the overall level of economic development and the relative economic development rate are relatively low, and it is easy to put economic development into a low-level vicious circle [12]. Based on this, the need for inter-regional government cooperation has gradually become apparent. As the scholars said: “To reduce the gap in regional development and achieve coordinated regional development, in addition to the central government’s regional development strategy and regional policies, other areas of effort are needed. One of the very important aspects is the activeness between local government cooperation” [13]. However, under China’s political system, cross-administrative areas often have border effects due to competition, which inhibits the development of regional integration to a certain extent.

## 1.2. Our Contribution

This paper aims at western provincial border areas in China, taking Sichuan, Guizhou, Yunnan as our study area. Combining data description and empirical regression, we prove the existence of border effects, and find out its impact on the economy and development. Policy implications for strengthening regional cooperation and promoting coordinated regional development.

## 1.3. Paper Structure

The rest of the paper is organized as follows. Section 2 introduces the model used in this paper. Section 3 describes the status of the study area. Then, the results of the empirical analysis will be shown in Section 4. Section 6 concludes the paper and presents inspiration we get from this paper.

## 2. Model

In order to investigate whether the border effect exists, this article selected Sichuan, Guizhou, and Yunnan in southwestern China as the study area to analyze the economic impact of the border between provinces and regions. That is, whether there is a difference in the economic level between the counties on the provincial border and the counties within the province. Drawing on the research by Wei Tang (2019) [14]and Li’an Zhou (2011) [15], this paper uses panel data random effect regression model, which is set as follows:

$$D_{it} = G_{it}\beta_1 + X_{it}\beta_2 + \gamma + \alpha_t + \mu_{it} \quad (1)$$

Among them, the explained variable  $D_{it}$  represents the economic development index of the  $i$ -th county in the  $t$ -year: the logarithm of GDP per capita, the logarithm of GDP level, and whether it belongs to a state-level poverty county.  $G_{it}$  is a key explanatory variable. It is a set of dummy

variables representing the geographic location of a county. When county  $i$  is on the provincial border, the value is 1 and vice versa.  $X_{it}$  is a set of other control variables that may affect the level of the economy, using: the logarithm of fixed assets investment in the whole society, the logarithm of value added of the secondary industry, population density, GDP location quotient. Among them, GDP location quotient is expressed by  $i$  county's GDP to the GDP of the city to which  $i$  county belongs.  $\alpha_t$  is a dummy variable in year  $t$ , and  $\mu_{it}$  is a random perturbation term. According to research by Li'an Zhou (2011), since the geographical environment and geographic location of each county do not change with time, a random effect model is used in this panel data.

### 3. Problem Statement

Sichuan, Guizhou and Yunnan are located in the southwestern border of China, with a total area of 1.0563 million square kilometers and a resident population of 16.67665 million. In 2018, they achieved a GDP of 7,336.57 billion yuan, accounting for 8% of the country. From the distribution of the sample, the counties on the provincial border accounted for 34.25% of the total, of which 42% were national-level poor counties. Among non-provincial border counties, the proportion of national-level poor counties was only 22%. 20 percentage lower than the provincial border counties.

Generally speaking, the average GDP of counties in the three provinces of Sichuan, Yunnan, and Guizhou is 14.2 billion yuan, but the average GDP of provincial border counties is only less than 9.7 billion yuan, while the GDP of non-provincial border counties exceeds 16.6 billion yuan. The distribution of GDP per capita, investment in fixed assets in the whole society, and the added value of the secondary industry are also roughly shown. Provincial border counties have a population density of 0.018 million people per square kilometer, while non-provincial border counties are more than three times as dense. The GDP location quotient (the proportion of the county's GDP to the GDP of the city it belongs to) does not differ significantly between provincial border counties and non-provincial border counties.

Table 1 Descriptive statistics of main variables

|  | Number of samples | Mean     | variance | Max      | Min    |
|--|-------------------|----------|----------|----------|--------|
| Proportion of provincial border counties                       | 2000              | 0.3425   | 0.4747   | 1        | 0      |
| Proportion of national poverty counties                        | 2000              | 0.2875   | 0.4527   | 1        | 0      |
| GDP (billion yuan)   | 2000              | 142.4889 | 165.2524 | 1200.876 | 4.6296 |
| GDP per capita (yuan)  | 2000              | 31630.7  | 19939.15 | 138685   | 6192   |
| Investment in Fixed Assets in the Whole Society (billion yuan) | 2000              | 126.0874 | 119.6325 | 1191.688 | 2.6977 |
| Added value of the secondary industry (billion yuan)           | 2000              | 65.1610  | 89.3453  | 1464.578 | 0.4676 |
| Population density   | 2000              | 0.0498   | 0.1670   | 2.351    | 0.0004 |
| GDP Location Quotient  | 2000              | 0.1153   | 0.0952   | 0.6203   | 0.0110 |

Table 2 Comparison of economic development between provincial and non-provincial border counties

| variable name  | Mean                       |                                | T statistic       |
|--|----------------------------|--------------------------------|-------------------|
|  | provincial border counties | non-provincial border counties |                   |
| Proportion of national poverty counties                        | 0.42                       | 0.22                           | 9.920<br>(1998)   |
| GDP (billion yuan)   | 96.5953                    | 166.3955                       | -9.147<br>(1998)  |
| GDP per capita (yuan)  | 24429.4905                 | 35381.9049                     | -12.072<br>(1998) |
| Investment in Fixed Assets in the Whole Society (billion yuan) | 96.8487                    | 141.3183                       | -8.012<br>(1998)  |

|   |         |         |                  |
|---|---------|---------|------------------|
| Added value of the secondary industry<br>(billion yuan) | 43.0094 | 76.7000 | -8.132<br>(1998) |
| Population density                                      | 0.0180  | 0.0663  | -6.191<br>(1998) |
| GDP Location Quotient                                   | 0.1133  | 0.1163  | -0.668<br>(1998) |

Note: The degrees of freedom for the t statistic are in parentheses.

Based on the results of Tables 1 and 2, it can be initially concluded that there are significant differences in economic development between provincial order counties and non-provincial border counties. That is, the counties located on the provincial border line are significantly behind in economic level compared with other counties in the province, and the proportion of poor counties on the provincial border line is significantly higher than that in other counties.

#### 4. Result

Part 4 shows the difference between the border and non-border counties through the description of the data, and to a certain extent, confirms the existence of the border effect. But to further determine the border effect, regression analysis is also needed. The data is simply processed to eliminate the impact of the price index, and then the corresponding data is logarithmically processed and brought into the model (1), which is arranged to obtain Table 3.

Table 3 reports a complete regression result. The results in columns 1-3 show that, whether measured in terms of per capita GDP, GDP, or whether it is considered as a nation-level poverty county, the economic level of counties on the provincial border lags behind other counties in the province. In terms of coefficients, the per capita GDP level of provincial border counties is about 9.5% lower than that of non-provincial border counties, while GDP level is about 3.3% lower than that of non-provincial border counties, and the incidence of poor counties is about 10.4% higher than that of non-provincial border counties. Although there are some differences in significance, the results in Table 3 demonstrate again that the inter-provincial border effect is significant. Relative to the central area of the province, the counties located on the borderline of the province are relatively backward in economic development. Among them, poverty-stricken counties at the national level serve as an important indicator, indicating that inter-provincial border areas are also more likely to become poverty-stricken areas.

Table 3 Regression results of random effects

|  | (1)<br>Log of GDP per capita | (2)<br>Log of GDP    | (3)<br>Whether it belongs to a national<br>poverty county |
|--|------------------------------|----------------------|---|
| On the provincial border line                      | -0.0954***<br>(-4.15)        | -0.0334**<br>(-1.98) | 0.1037***<br>(5.30)                                       |
| Investment in Fixed Assets in<br>the Whole Society | 0.1206***<br>(8.82)          | 0.2117***<br>(20.01) | -0.0300***<br>(-2.80)                                     |
| Added value of the secondary<br>industry           | 0.2987***<br>(19.99)         | 0.5696***<br>(51.91) | -0.0139<br>(-1.08)  |
| Population density                                 | 0.4401***<br>(4.40)          | 0.7468***<br>(11.11) | -0.3521***<br>(-3.31)                                     |
| GDP Location Quotient                              | 0.4481***<br>(3.59)          | 1.2222***<br>(13.30) | -0.0137<br>(-0.13)  |
| C  | 8.6903***<br>(170.37)        | 1.3583***<br>(36.55) | 0.4522***<br>(9.87)                                       |
| Number of samples                                  | 2000                         | 2000                 | 2000  |
| R square   | 0.5350                       | 0.9372               | 0.1111  |

Note: \*, \*\*, and \*\*\* indicate significant levels at 10%, 5%, and 1%, respectively.

Almost all of China's 14 concentrated and extremely poor areas are at the borders of provinces.

In terms of physical geography, most of these areas belong to alpine hills, deserts or high altitude areas, where climate disasters occur frequently, natural ecology is fragile, and innate conditions for agricultural production are insufficient. High infrastructure construction costs, difficulties, and high maintenance costs have led to bottlenecks in industrial development and a long-term lag in market economy. From a political point of view, most of these areas are located at the inter-provincial border area, also known as the provincial border areas. Under China's special administrative system, local officials lack attention to border areas due to promotion, assessment, and other considerations. As a result of lacking investment, economic externalities are difficult to play effectively. In terms of social culture, regional poverty is also often highly coupled with ethnic minority settlements. Cultural conflicts between ethnic minorities and cultural conflicts between ethnic minorities and Han nationalities have hindered the exchange and cooperation between regions.

## 5. Conclusion

In this paper, the independent sample T test and the random effects regression method are used to confirm the administrative border effects in Sichuan, Guizhou, and Yunnan: The economic development level of provincial border counties is obviously lagging behind other counties in the province. On the one hand, the per capita GDP of provincial border counties is significantly lower than non-provincial border counties by about 9.5%. On the other hand, the GDP level of provincial border counties is also significantly lower than non-provincial border counties by about 3.3%. In addition, counties located on provincial boundaries are more likely to become poor counties across the country. This is affected by both physical and geographical factors and political and sociocultural factors. This study also confirms the positive impact of investment, industrial structure upgrade, population density, and GDP location quotient on the county economy.

Based on the above research conclusions, this article believes that in order to realize the development of the border zone and regional poverty reduction, the border effect must be viewed rationally and objectively, which is of great significance for analyzing and understanding how to reduce regional disparities in China's provinces. To reduce economic differences between regions, we must grasp the root causes of regional disparities not only from the economic side, but also from the political, social, and cultural aspects, optimize the political system, and strengthen regional specialization and economic cooperation. At the same time, we must accelerate the penetration of modern cultural ethics, break political, economic, and cultural barriers between regions, and weaken conflicts and antagonisms. Only in this way can we promote regional cooperation and achieve coordinated development and win-win development.

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