Guangxi's Primary and Non-Primary Cities: Wage Gap, Human Capital Gap and Economic Gap

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Abstract: Based on the panel data of 14 cities in Guangxi(China) from 2004 to 2021, a two-way fixed effect model is established to analyze the effects of wage gap and human capital gap on the economic gap between non-primary and primary cities. The results found that both the wage gap and the human capital gap have a significant positive impact on the economic gap between cities in general; regional heterogeneity tests show that some cities have a significant impact on the economic gap in terms of the wage gap and the human capital gap, while others do not; there is a positive moderating effect of industrial structure upgrading on the relationship between wage gap and economic gap. Based on this, non-primary cities should pay attention to the synergy between economic development and wage income improvement; actively create good development opportunities and enhance the ability to attract talents; improve self-development ability through industrial upgrading and opening up to the outside world.

Keywords: Primary City, Wage Gap, Human Capital Gap, Economic Gap.

1. Introduction

A provincial capital is usually the primary city of a province, and focusing on the development of the primary city has become the consensus of many regional officials, and all kinds of high-quality production factors will gather here. However, the excessive increase in the size of the primary city will also widen the regional gap within the province (Tian Chao, 2015). The primary city has good preferential policies and development prospects, which forms a "siphon effect" on the human capital of the non-primary city, resulting in a shortage of talents in the non-primary city. In addition, the different degrees of industrial structure upgrading will also make there be great differences in economic development between cities, and the process of labor transfer to the tertiary industry is also a process of continuous increase in added value and continuous rise in wage levels (Justin Yifu Lin et al., 2013). Conversely, as William Petty explains, relative wage differentials between industries lead to a continuous shift of labor to higher-income industries (usually the primary city develops a higher-income tertiary sector). Therefore, by narrowing the wage gap between regions and adjusting the allocation of human capital, balanced regional development may be achieved (Li Jinkai, 2022; Meng Xianghui, 2020). In 2021, Nanning (the capital of Guangxi, China) had 21.33% and 16.22% respectively in terms of "economic primacy" and "population primacy", and the gap between its total GDP and that of 13 other cities in Guangxi is widening. Prioritizing the development of the primary city is of great significance to drive regional economic development, but from the perspective of non-primary cities, what are the reasons for the development gap between cities? In what ways should Guangxi's non-primary cities achieve economic catch-up? This article only discusses the above issues from the perspective of non-primary cities, in order to provide reference suggestions for the coordinated economic development of cities in Guangxi.

2. Model Construction, Data and Variable Description

In order to explore the impact of wage gap and human capital gap on economic gap between 13 non-primary cities and primary cities in Guangxi, this paper constructs the following econometric model (Source: Guangxi Statistical Yearbook and annual statistical bulletins of each city, 2004-2021.) by referring to the research of Wu Chuanqing et al. (2022) and Acunto et al. (2018):

$$\ln\text{Grow}_{it} = \alpha + \beta_1 \ln\text{Inc}_{it} + \beta_2 \ln\text{Cap}_{it} + \gamma\sum\ln\text{CV}_{it} + v_i + v_t + \varepsilon_{it} \tag{1}$$

i and t represent the city and year, respectively. v_i and v_t represent the city fixed effect and the year fixed effect, respectively. ε_{it} represents the random perturbation term.

Dependent variable: *Economic Gap* (Grow), which is the ratio of each city's GDP to Nanning's GDP. The core explanatory variable: *Wage Gap* (Inc), expressed as the ratio of the average wage in each city to the average wage in Nanning. *Human Capital Gap* (Cap), expressed as the ratio of the number of full-time teachers in regular institutions of higher education in each city to Nanning. Control variables: CV is a series of control variables, including: *The Level of Government Support* (G), expressed as public budget expenditure as a proportion of GDP; *Financial Development* (Fd), expressed as total loans from financial institutions as a proportion of GDP; and *The Level of Openness to the Outside World* (Open), expressed as total imports and exports of each prefecture-level city as a proportion of GDP. In order to eliminate heteroskedasticity in the data, all variables are treated by taking logarithmic values.

2.1. Basic Estimates

After passing the unit root test (LLC) and variance inflation factor test (VIF), the estimation was made using the temporal and spatial bidirectional fixed model, and the regression

results are shown in column (1) of Table 1. The impact coefficients of wage gap and human capital gap on urban economic gap were significantly positive, and for every unit increase in the wage gap and human capital gap, the urban economic development gap increases by an average of 0.662 and 0.032 respectively, which is similar to the previous research conclusions of Li Jinkai and Meng Xianghui. There are two possible reasons. Firstly, there is a widespread labour exodus from non-prime cities in Guangxi due to development opportunities and low local wages, and a lack of manpower reserves, which affects productivity. Secondly, wages affect residents' income, which affects consumption, and lower consumption levels inhibit the overall economic development of the region.

Looking at other control variables: the influence coefficient of government support level (lnG) on the economic gap is significantly positive, and the higher the proportion of fiscal expenditure to GDP, the more it indicates that a city's self-development ability is weak. Financial development (lnFd) also has a positive impact on the economic gap. As the level of financial development rises, some cities that are relatively underdeveloped are experiencing rapid growth in highly collateralised and inefficient sectors such as real estate and construction, and even blind expansion. However, the consumption and purchasing power in these areas is already weak, which makes it easy to create a situation of rotten and empty properties, which is not easy for economic development. This is in common with the findings of Lu Chengchao and Mao Yi (2020). The level of openness to the outside world (lnOpen) has a significant negative effect on the economic gap. Guangxi faces a large international market and a lower level of urban openness inhibits imports and exports, which directly affects the level of regional economic development.

Table 1. Basic estimates, regulatory effects and robustness tests

	(1) Basic estimate	(2) Sz	(3) year≠2008&2020	(4) Fdi	(5) Edu
lnInc	0.662*** (6.18)	1.010*** (9.44)	0.639*** (5.46)	0.660*** (6.18)	0.656*** (6.14)
lnCap	0.032** (2.06)	0.024* (1.72)	0.044** (2.42)	0.033** (2.10)	0.031** (1.99)
lnG	0.316*** (8.42)	0.255*** (7.43)	0.312*** (7.90)	0.315*** (8.44)	0.338*** (8.42)
lnFd	0.233*** (7.45)	0.175*** (6.07)	0.222*** (6.68)	0.229*** (7.33)	0.229*** (7.31)
lnOpen	-0.027*** (-2.62)	-0.021** (-2.30)	-0.023** (-2.04)	-0.029*** (-2.81)	-0.027** (-2.60)
lnInc* lnSz		0.926*** (7.13)			
lnFdi				0.008 (1.54)	
lnEdu					0.029 (1.52)
R^2	0.684	0.752	0.674	0.688	0.688
	lnInc	lnCap	lnG	lnFd	lnOpen
LLC Prob.	0.0094	0.0316	0.0000	0.0000	0.0001
Mean VIF			1.56		

Note: Values in parentheses are t values. *, **, and *** respectively represent significance levels at 90%, 95%, and 99%.Standard deviations are in parentheses.

2.2. Testing For Regional Heterogeneity

In order to comprehensively examine the spatial impact of wage gap and human capital gap between different cities and the primary city on the gap in economic development level, the 13 non-primary cities in Guangxi were divided according to the five major economic zones of *Northern Guangxi* (Guilin), *Central Guangxi* (Liuzhou and Laibin), *Eastern Guangxi* (Wuzhou, Guigang, Yulin and Hezhou), *Southern Guangxi* (Beihai, Fangchenggang and Qinzhou, but excluding Nanning), and *Western Guangxi* (Baise and Hechi). The estimated results after grouping regression are shown in Table 2. It can be seen that the impact of wage gap and human capital gap on the gap in economic development level is still positive in most regions, especially in Northern Guangxi and Southern Guangxi. The three cities of Beihai, Fangchenggang and Qinzhou have relatively insufficient educational resources, especially the development of higher education is

relatively backward, and the supply of talents is not advantageous. The impact of the wage gap and human capital gap on the gap in economic development level in Eastern Guangxi is not significant. This may be due to the fact that as the integration strategy to eastern China continues to advance, Eastern Guangxi has received some of the industrial transfers and project investments from the Guangdong-Hong Kong-Macao Greater Bay Area, but Eastern-Guangxi's relatively weak economic base, poor transport infrastructure conditions and lack of resource integration capacity have largely constrained local economic development from its own strength (SHANG Maomao et al., 2021). The wage gap between Central Guangxi and Western Guangxi has an insignificant effect on the economic development gap. The reason may be that Liuzhou, as the second primary city, does not differ much from Nanning in terms of wage differentials. In contrast, the Western Guangxi region is mostly old revolutionary areas, ecological reserves and mountainous

terrain, and historical reasons and realistic objectivity are the main reasons for its slower economic development.

<div align="center">Table 2. Regional heterogeneity tests</div>

	Northern Guangxi	Central Guangxi	Eastern Guangxi	Southern Guangxi	Western Guangxi
lnInc	1.613***	-0.024	0.435	0.950***	0.564
	(3.61)	(-0.03)	(0.71)	(4.30)	(1.04)
lnCap	0.627**	0.439***	0.052	0.099***	0.104**
	(2.97)	(5.61)	(0.95)	(8.44)	(2.52)
N	17	34	68	68	34
R^2	0.955	0.967	0.348	0.835	0.775

<div align="center">Note: Due to space limitations, regression results for other control variables are not listed in the table.</div>

2.3. Mediating Effect of Industrial Structure Upgrading

The industrial structure influences the level of wage income. To test the moderating effect of industrial structure upgrading, the logarithm of the wage gap and the logarithmic interaction term of the industrial structure upgrading gap (Sz) (measured by the ratio of Nanning's tertiary industry share to that of other cities) are added to equation (1), and the estimation results are shown in column (2) of Table 1. It is found that the coefficient of the wage gap is still significantly positive, as in the previous section, and the interaction term of the wage gap and the industrial structure upgrading gap is also significantly positive. This shows that there is a positive moderating effect of the industrial structure upgrading gap on the relationship between the wage gap and the economic gap, i.e. as the gap between the share of tertiary industries in non-primary cities and primary city widens, the wage gap gradually increases its effect on the widening of the gap between the cities' economic development levels. The tertiary sector is a manifestation of rising productivity and social progress, and its average wage level is generally higher than that of the primary and secondary sectors, and its development provides backbone for the primary and secondary sectors and promotes higher social productivity.

2.4. Robustness Test

First, the effects of special years were excluded. 2008 crisis and 2020 epidemic led to different degrees of unhealthy financial development and slowdown in economic growth in each city, so the model was re-estimated after excluding the data of two special years (column (3) of Table 1). The coefficients on the wage gap and human capital gap are significantly larger than zero at the 1% and 5% significance levels respectively, consistent with the original estimation results.

Secondly, variables that may be missing or have an impact on the dependent and core explanatory variables are added. Since Guangxi faces a large international market, has superior conditions for foreign investment and the scale of education expenditure is an important factor influencing the level of human capital and indirectly the level of wages, the two indicators of *Foreign Investment* (lnFdi, the amount of actual foreign investment utilised in each city as a proportion of GDP) and the *Scale of Education Expenditure* (lnEdu, the proportion of education expenditure to fiscal expenditure in each prefecture-level city) are selected and the estimation results are shown in Table 1 columns (4) and (5). It can be found that the significance of the coefficients of the core explanatory and control variables remains consistent with the basic estimation results.

3. Conclusion

The widening of the wage and human capital gaps will reinforce the imbalance in economic development between the non-primary and primary cities. The high share of fiscal expenditure indicates that the capacity of a city to develop itself as a market economy needs to be strengthened. Financial development can lead to unhealthy economic development from the perspective of blind investment and demand mismatch. The level of openness to the outside world is a direct influence on a city's economic growth and economic development. The upgrading of industrial structure is an important regulating instrument to narrow the economic gap between regions.

Therefore, it is necessary to adopt the following means: firstly, we should innovate the development path, seize the opportunity of the Guangdong-Hong Kong-Macao Greater Bay Area and the ASEAN international market, and make use of industrial transformation to make the economic development vitality continue to burst forth; at the same time, we should also focus on optimising income distribution and narrowing the income gap, so as to promote the synergy of high-quality regional economic development and wage level improvement. Secondly, we should further improve the mechanism for training and introducing talents. We ought to actively bring in investment projects, take the initiative to create good development opportunities, and strengthen infrastructure development and improve the business environment in order to enhance the attractiveness of talents. Thirdly, each city should leverage on its own resources and geographical location to seek development directions that are in line with its own strengths, promote the upgrading of its industrial structure, and actively integrate into the Guangdong-Hong Kong-Macao Greater Bay Area and the ASEAN Regional Economic Circle to seek greater development opportunities with a higher level of openness.

References

[1] TIAN Chao. Is the Primary City too Big to Prevent the Harmonious Development of Provincial Economy: Based on an Empirical Analysis of Chinese Provincial Panel Data[J].China Population,Resources and Environment, 2015, 25 (10):87-94.

[2] Justin Yifu Lin, Binkai Chen. Development Strategy, Industrial Structure and Income Distribution[J].China Economic Quarterly, 2013, 12(04):1109-1140.

[3] LI Jinkai, ZHONG Changbiao. The Impact of China's Urban Spatial Structure on Balanced Economic Development [J]. Research on Economics and Management, 2022,43(09):17-31.

[4] Meng Xianghui，Yang Feihu. Human Capital Gap between Urban and Rural Area and Unbalanced Economic Development———Evidence from the Data from Local Night Light Intensity[J].Inquiry into Economic Issues,2020(08):170-179.

[5] Wu Chuanqing, Meng Xiaoqian. Siphon or Spillover?——Analysis of the Polar Effect of Economic Growth of The "Strong Provincial Capital" Strategy [J]. Journal of Anhui University(Philosophy and Social Sciences Edition), 2022, 46(01):124-136.

[6] ACUNTO F, FRESARD L. 2018. Finance, Talent Allocation, and Growth [R]. CESifo Working Paper, No.6883.

[7] Lv Cheng-chao, Song Jie. Has Financial Development Narrowed the Regional Economic Gap in China?--Based on the Relational Data Analysis Paradigm Lv Cheng-chao, Song Jie [J]. Economist,2020(09):42-52.

[8] MAO Yi. Impact of Wage Gap between Financial Industry and Real Economy Industry on China's Economic Growth [J]. Finance and Trade Research,2020,31(12):49-60.

[9] SHANG Maomao, CHE Jixuan, YAN Lan. Effect Analysis and Potential Measurement of Economic Development in Guangxi:Based on the Data of 14 Cities [J]. Journal of Nanning Normal University(Philosophy and Social Sciences Edition), 2021,42(06):13-28.