

Economic Stagnation and Transition for Shanxi Province in China

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Abstract: Shanxi province, a landlocked province in China, has struggled with the serious problem with economic reform since the beginning of this century. Traditionally, Shanxi is well-known for its abundant coal resources. However, the Gross Domestic Product (GDP) of Shanxi province has been lying below the national average level with a worrying downward trend. This paper investigates the reason that causes the stagnation of Shanxi's economy. Also, the paper compares Shanxi province to Guizhou province which faced the same problem but succeeded in overcoming the problem with the stimulus policy of promoting clouding computer and big data. The paper values the feasibility of implementing the similar policy in Shanxi province and offers two suggestions: 1) subsidizing these clouding computer and big data programs, and 2) attracting the investment from outside the local community by taking advantage of its own cheap labors and resources.

1. Introduction

Shanxi is well-known for its abundant natural resources in China. The Gross Domestic Product (GDP) of Shanxi has been lying below the national average level of China with a worrying downward trend[1][2]. Using difference-in-difference method, I find that the stimulus plan of Guizhou on big data and cloud computing that utilize its water and electricity resources helps to reduce the gaps in GDP between Shanxi and Guizhou by 92 billion in RMB (22 percent) within four years on average [3] [4].

The paper proceeds as follows. Section 1 describes the economic stagnation of Shanxi and explores possible reasons of the slowdown. Section 2 introduces the backgrounds of Guizhou, analyzes the reduction in the GDP gap between Guizhou and Shanxi associated with the Guizhou's stimulus policy in big data and cloud computing, and projects the GDP in 2016 if the same plan were implemented by Shanxi in 2012. Section 3 discusses the feasibility of the Guizhou stimulus policy for Shanxi. Section 4 concludes.

2. The Cause of Economic Stagnation of Shanxi.

Shanxi is a landlocked province in the middle of China, surrounded by the mountains. Given its

geographical characters, Shanxi has been the leading producer of coal and other natural resources in China. In 2015, the coal production sums to 954 million tons, which is approximately a quarter of China's total coal production [4]. Nonetheless, the GDP of Shanxi does not align with its strong performance in its coal mining industry in the recent years. Figure 1 presents the GDP of Shanxi and the national average level of China between 2009 and 2016. In particular, the time series of Shanxi GDP presents a worrying downward trend since 2011. In 2015, Shanxi's GDP is 1,277 billion RMB (equivalent to 189 billion USD in 2015), while the national average GDP by province is 2,487 billion RMB (equivalent to 383 billion USD in 2015) - 49 percent lower compared to the national average at the province level [6] [7].

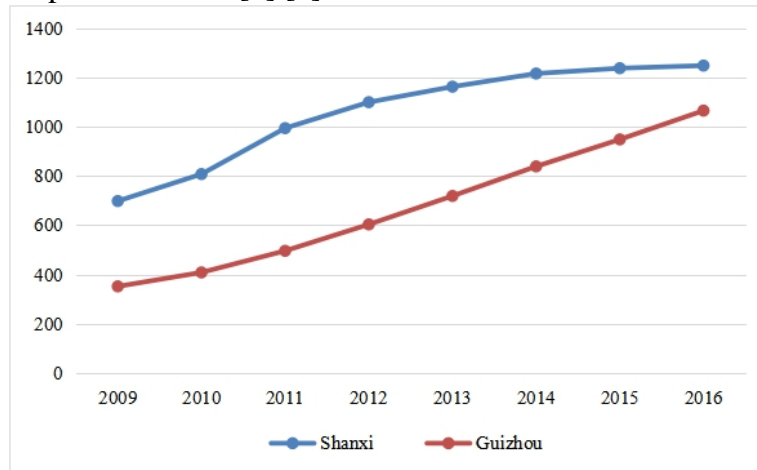


Fig.1 : Real Gdp of Shanxi and Guizhou (Rmb in Billions)

Shanxi's economy heavily relies on its natural coal resources and other traditional high polluting industries, which turn out to be extremely detrimental to the local environment. Since 2010, the air pollution problem has become a serious issue in North China. Regarding how serious air pollution can harm people's health, the Chinese government imposes special emission caps on Shanxi's coal mining industries and shuts down a significant amount of coal power plants. The heavy taxes and new environmental laws force many small coal mining firms to quit the market. At the same time, the Chinese government increases the spending on renewable energy with the money being saved from closed coal power plants. People's environmental awareness also improves significantly after witnessing the terrible haze haunting the sky of cities. Many more customers tend to purchase products from companies that use renewable energy as their primary source. Therefore, both the aggregate demand and aggregate supply of coal resources decrease importantly. The outcomes of these drastic changes are the significant decrease in coal prices and the decline of Shanxi's economy.

3. Evidence from the Stimulus Policy in Cloud Computing in Guizhou

Guizhou, another landlocked province in China, has similar geographical features and financial condition to Shanxi province. Likewise, Guizhou had been suffering from the slowdown of the economic growth for an extended period and facing the criticism of the over-exploitation of local natural resources. To stimulate the economy in Guizhou, the Governor of Guizhou issued the guidance "Opinions on Accelerating the Rapid Development of the Information Industry" on November 9, 2012. Later in July 2013, Guizhou released a strategic plan of cloud computing industry development. The transition of economic focus quickly shows its effect on Guizhou's GDP [5].

As seen in Figure 1, the real GDP of Guizhou has been increasing at an increasing speed since 2012, with no sign of economic stagnation. On Feb 25th, 2014, Guizhou province government continued to outline the Guizhou Future Economy Development Plan Guidelines, which purports to change the economic focus from traditional industry to Internet industry, such as cloud computing and big data. In 2015, Guizhou's GDP increased by 109.7 billion RMB (13.1 percent) than Guizhou's GDP in year 2014. The economic growth speed is about two times the average national growth speed (6.9 percent) in China [3] [4].

The Guizhou government's policy indeed encouraged the building of mass clouding computer and big data centers by offering relatively cheaper labors and imposing lighter taxes to the internet companies. Guizhou experiences a rise in aggregate demand in both production and labor markets, leading to a decrease in unemployment rate, and eventually, a boost of the overall economy as a general equilibrium effect.

Compared Shanxi to Guizhou between 2009 and 2016, we plot the difference in the real GDP between Shanxi and Guizhou in Figure 2. Before the implementation of the stimulus policy in cloud computing in Guizhou in 2012, we see a non-decreasing trend in the difference in the real GDP. Nonetheless, the gap between these two provinces has been shrinking since the initial policy guidance in 2012. In terms of the magnitude of the GDP gap reduction, we use difference-in-difference method to calculate the average GDP gap within three years before the policy implementation (415 billion RMB) and compare it to the average GDP gap within four years after the policy implementation (324 billion RMB). We conclude that the stimulus policy in cloud computing helps to reduce the GDP gap between Shanxi and Guizhou by 22 percent [5] [6].

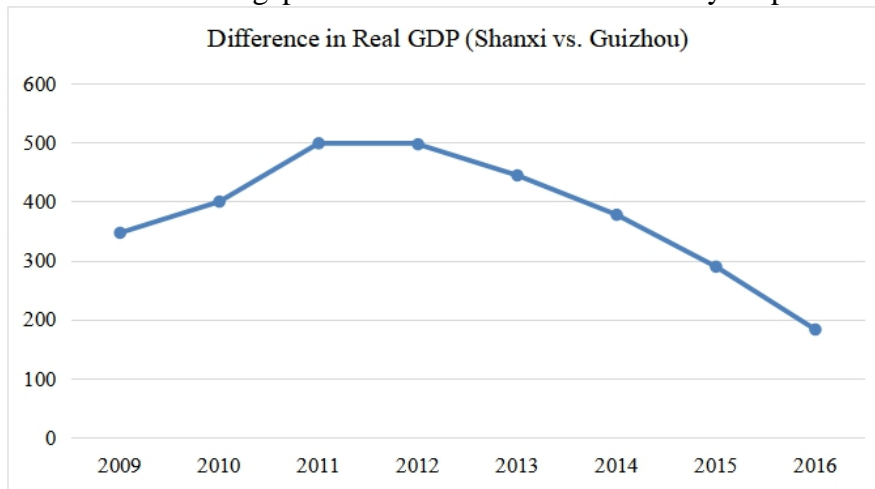


Fig.2 : Difference between Shanxi and Guizhou in Real Gdp

In addition, we use the magnitude reduction in GDP gap to calculate the counterfactual GDP for Shanxi if Shanxi government would have chosen to implement the same policy in the same year as Guizhou. My projection of the GDP of Shanxi would have been 1,524 billion RMB in 2016, assuming the same 22 percent increase rate in GDP within four years of policy implementation, compared to the realized GDP of 1,249 billion RMB. This counterfactual GDP for Shanxi is approximately 39 percent of the national average GDP by province. Given our earlier findings that the GDP of Shanxi is 49 percent lower than the national average by province, we conclude that the cloud computing stimulus policy is associated with an almost 10 percent reduction in the gap between Shanxi and the national average GDP at the province level [6] [7].

4. Feasibility of Guizhou Cloud Computing Stimulus Plan in Shanxi

Section 3 provides evidence that the cloud computing stimulus policy helps to keep Guizhou out of economic stagnation. Still, one natural question we face is if such policy is feasible to other provinces such as Shanxi.

It is true that Guizhou and Shanxi may face different situations due to their different political environment and economic baseline structure. Nonetheless, Shanxi shares a similar set of advantages to Guizhou to promote cloud computing and big data centers. The annual average salary in Shanxi is 65,917 RMB, while the average annual salary in Guizhou is 78,319 RMB. This suggests that Shanxi is feasible to provide high-tech companies labors at a comparative cost [8].

Besides the labor cost, one of the largest concerns is the operation cost of these cloud computing centers. Modern computing centers usually cost an extremely high level of electricity. It is fortunate that Shanxi has abundant coal resources and can provide cheap electricity. Shanxi's electricity price under 220kv is 0.45 RMB/KwH, which is 40 percent cheaper than Guizhou's electricity price at 0.75 RMB/KwH. Given the substantial sunk cost in the computing center investment, Shanxi's weather is more suitable than Guizhou's climate since Shanxi has a lower chance of heavy rain and flood [8].

From all the above, we conclude that if Shanxi province implements a similar stimulus plan, it would also help attract the investors to set up their new cloud computing and big data programs in Shanxi province. One caveat in my analysis is that I am ignoring the overall supply and demand of the cloud computing centers. However, given the rapid development of the technology in the near term, it is safe to assume that the market has not yet reached the equilibrium.

5. Conclusion

In conclusion, although Shanxi still faces many challenges in its economy, Shanxi has a great chance to save its economy by learning the successful policies from another province and stick to the transitioning of its traditional heavy industries. My policy recommendation is that could be given to the Shanxi province government here is to subsidize these clouding computer and big data programs and attract these investments from outside the local community.

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