Investigating the "Resource Curse" in China: Is it Sufficient to use the Usual Methods?

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Abstract: Our article on the study of the "Resource Curse" in Chinese provinces, was written with two objectives. First, by reviewing the international and Chinese literature and analyzing the economic development of the relevant Chinese provinces, we sought to explore

whether the resource curse phenomenon exists or can be demonstrated. And second, we want to draw the reader's attention to the fact that Chinese and Asian economies in general have central planning models, the main purpose of which is to define and focus on national economic development priorities. The sub-divisions of the central development plans include development targets for each region, which naturally take into account the economic performance of each province and the factors that determine it. It follows from the latter line of thinking that the economic development of the four Chinese provinces concerned (Gansu, Guizhou, Qinghai and Shanxi) cannot be interpreted in a 'piecemeal' way, based solely on the existence or otherwise of the resource curse phenomenon. In writing this article, we also wish to draw attention to this holistic, comprehensive Chinese (Asian) way of thinking.

Keywords: resource curse; China; regional development; energy consumption; energy policy

1 Introduction

The Government of Hungary, launched its *Opening to the East* foreign economic policy in 2012, more than a decade ago, with the main aim of diversifying Hungary's exports of goods and services. The 'diversification' of exports was justified by the huge dependence on exports to Europe, reinforced by the dominance of FDI from other European countries. The foreign economic policy of opening-up, to the East, thus aimed not only to increase exports of goods to the countries of East, South-East and South Asia, but also to attract further FDI from these countries, especially China, and seek substantial increases.

The domestic economic policy initiative coincided in time and objectives with the Belt and Road Initiative (BRI), a Chinese initiative established in 2013 and now involving 151 countries and international organisations, which aims to connect the two continents (Asia and Europe) via land, rail and water transport routes, starting from China and involving all regions of Asia.

However, in addition to the mutually reinforcing and supportive economic policy intentions, it is of paramount importance to understand and bridge the differences in mindsets that stem from the different geographical, historical and cultural backgrounds of the two continents. In the following paper, we have explored the interpretability of the resource curse theories of economic development based on the exploitation of non-renewable resources in China and in the resource-rich provinces of China.

Based on the international and Chinese literature and a review of the economic development of four resource-rich provinces (Gansu, Guizhou, Qinghai and Shanxi) in China, we conclude that although the resource curse is a phenomenon widely researched by Chinese authors, resource wealth or dependence on resource wealth does not become the sole determinant of the development of individual provinces in China, neither at the local nor at the regional level.

Our results have been used to argue that China, as is common in centrally planned Asian economies, sets national economic development priorities, and thus the mechanism for redistributing national economic revenues is aligned with central planning objectives, and that it is not appropriate to analyse the economic development of individual provinces in isolation from the economy as a whole. For this reason, proving or disproving the existence of a resource curse that determines the economic development of individual provinces is not only not possible, but, in our view, fundamentally alien to the Chinese way of thinking about economic development.

2 The Resource Curse Phenomenon

Economists have always been curious about the factors on which the economic development of a nation depends. The neoclassic growth theory, introduced by Solow [1] and Swan [2], says that the main drivers of economic dynamics in a country are capital formation and labour force. However, with time, other factors have been discovered which also contribute to a nation's growth and the model was extended by several other scholars. Stiglitz [3] was the first to include the endowment of natural resources into this model, by stating that the economic expansion of a country is affected by the amount of natural resources it has.

For several decades, it seemed that the greater amount of natural resources a country had, the bigger the economic growth it could realize and many countries with natural resource abundance were economically outperforming nations with poor resource stocks [4]. However, after the 1970s, when several shocks caused structural changes in the world economy, researchers noticed that many developing countries with significant natural resource bases were starting to fall behind in terms of economic development. Their growth rates were significantly slower than other nations with fewer natural resources [4]. Earlier theorists have also observed this phenomenon. "It is generally observed that in countries of the greatest plenty there is the poorest living" [5]. Auty has christened this phenomenon "the resource curse" [6]. This phenomenon, also known as the paradox of plenty or the poverty paradox, is when countries with an abundance of natural resources having less economic growth, less democracy, or worse development outcomes than countries with fewer natural resources [7].

The importance of the phenomenon is easily understandable based on the paper of Anthony J. Venables [8]. According to this article "the IMF classifies 51 countries, home to 1.4 billion people, as resource-rich. This classification is based on a country deriving at least 20 percent of exports or 20 percent of fiscal revenue from non-renewable natural resources based on 2006–2010 averages as explained by the IMF." The IMF measured the GNI per capita (2010 US$), the natural resource exports as a percentage of total exports (2006–2010 average), and natural resource

fiscal revenue as a percentage of fiscal revenue (2006–2010 average). In many of these countries, there is extreme dependence on natural resources for fiscal revenues, export sales, or both. In these low-income resource-rich economies savings have generally been low. The growth performance of all the resource-rich economies as a group has been generally poor.

Measuring the resource curse phenomenon involves conducting empirical research and analyzing various indicators and factors. There is no universally agreed methodology for measuring the resource curse, despite its importance. Without attempting to be comprehensive, there follow some common approaches and considerations:

- Economic indicators have a significant role in measuring the presence and impact of the resource curse. Macroeconomic performance indicators, natural resource dependency, export dependence on resources, income inequality, poverty rates and economic diversification play a significant role in indirectly measuring this phenomenon. Negative trends in macroeconomic performance, correlations between resource abundance and negative economic outcomes can all refer to the analysed phenomenon.
- Naturally, Governmental and Institutional factors are important in measuring macroeconomic performance. Indicators related to corruption, transparency, accountability, rule of law, and political stability are widespread. Weak governance and institutions can strengthen the resource curse, with rent-seeking behaviour, corruption and the fostering of mismanagement.
- Social and human development indicators are important to understand the effects of resource wealth on the well-being of the population. Education levels, healthcare outcomes, access to basic services, poverty rates, and social inequality are the most important indicators for measuring social and human development. Look for disparities or underperformance in areas that should benefit from resource wealth.
- The environmental consequences of resource extraction and its effect on sustainability are decisive. Indicators measuring deforestation, pollution, greenhouse gas emissions, biodiversity loss, and natural resource depletion are important in relation to this topic.
- Long-term economic diversification efforts are also essential. It is necessary to analyze the progress and effectiveness of efforts to diversify the economy away from resource dependence. The analysis of policies and initiatives aimed at promoting non-resource sectors, fostering innovation, and building a resilient and diversified economy could also be necessary.

After the initial observations, many scholars have started to analyse the resource curse from several points of view. Corden [9] has created a model on how a country's resource dependency causes harm to other sectors and to its economic development by analysing the decline of the Dutch manufacturing industry after the discovery of a natural gas field in 1959. Following this, by analyzing 97 developing

countries, Sachs and Warner [10] found evidence that countries with abundant natural resources generally increased less rapidly than economies with scarce natural resources.

The essence of the natural resource curse lies in several aspects which can be categorized into economical and political mechanisms [11]. Economically, one of the most important reasons for the resource curse is the so called Dutch disease model, coined after the phenomenon described by Corden above. This model states that when a natural resource boom happens, it increases income and the demand for goods in the country. This causes inflation and appreciation of the real exchange rates. Because of this, prices generally increase and all the goods of the country become more expensive on the international market, even those which are not connected to the natural resource industry. So these goods become less competitive, their export decreases, they attract fewer investments, and finally the sectors producing them regress [11]. The second economic aspect is the volatility of natural resource prices on the international market which, with their unpredictability, reduce economic growth. The third cause lies in the inadequate economic policies regarding natural resource revenue. Governments often do not use these incomes to develop other parts of the economy – they fail to invest in industries with more value-added products, research and development, or education. This is called the crowding-out effect. Collier and Laroche [12] did an analysis of the steps required to exploit natural resources and at each step examined what factors cause the appearance of the resource curse and what good practices governments should implement in order to avoid its occurrence. They concluded that it is especially hard for developing countries to get the natural resource management policies right, because there are next to no international guidelines or established best practices to follow. Most of the OECD countries being poor in natural resources, there was no demand for producing such documents. The problem with the natural resources in question is that they are non-renewable. Sooner or later they will run out and other sectors of the country's economy will not be able to take their place in the economic performance [4]. If we look at the political aspects of the resource curse, we find that one of the most important reasons is so-called rent-seeking behaviour. It means that the windfall from natural resource revenues will strengthen the power of the political elites and will widen the income inequality in the country. This immediately leads to corruption, weak institutional structure and social instability [4] [11].

Empirical evidence of the existence of the resource curse is not indisputable but there are significantly more studies supporting it. Van der Ploeg [13] argues that natural resources can be both a "blessing" or a "curse", as countries with low institutional quality, weak rule of law, widespread corruption, and underdeveloped financial systems are unable to take full advantage. As a result, fragile states with natural resources tend to face real exchange rate appreciation and deindustrialization, leading to milder economic growth. Moreover, based on Van der Ploeg's further hypothesis, resource rich developing countries can face rent

grabbing and social unrest, while they are unable to transform the advantages of natural resources into productive assets. Based on the World Bank's dataset, these results hold for a global aspect. Mehlum et al. [14] also conclude that the quality of institutions determine the existence of the "resource curse".

With time, studies criticizing or even denying the existence of the resource curse phenomenon have started to appear. Brunnschweiler and Bulte [15] argue that most studies supporting the relationship between resource dependence and slow economic growth threaten the former as an exogenous explanatory variable. But they found that resource dependence is endogenous in the regressions and, if treated this way, the correlation between resource dependence and slow economic growth vanishes. They also found that the causality between the factors of the natural resource curse model might be reversed, so natural resources are not the cause of weak institutions, conflict and slow growth, but these factors make the country dependent on resource extraction. Alexeev and Conrad [16] argue that abundant natural resources on economic growth have been balance positive in the long term and the claims of the existing literature supporting the natural resource curse is mainly due to the misinterpretation of the data available. They also concluded that these types of resources have neutral effects on the quality of institutions of a country.

This paper focuses on the resource curse phenomenon in China. The topic is especially interesting because China has had an exceptionally fast economic development since 1978 and is one of the countries with the largest reserves of natural resources, but there are huge differences in terms of regional development between the country's Eastern and Western provinces [17].

Just like their International Colleagues, Chinese scholars have also tried to investigate whether these large developmental differences can be traced back to the natural resource curse phenomenon. They have conducted numerous tests using several research methods and models and their results are just as ambiguous as those of their international counterparts. Shao and Qi [18] have examined the resource curse hypothesis by studying the relationship between energy exploitation and economic growth in Western China. They found evidence that energy exploitation did have a negative effect on economic growth in that region and concluded that the resource curse does exist in the area. Qiang and Jian [19] tried to explore the relation between economic growth (measured by the GDP of each region), natural resources and institutional quality, based on a sample of 30 provinces, cities and autonomous regions. They found evidence for the existence of the resource curse effect and conclude that the low quality of the former two institutional factors make "resource curse" more severe in Chinese provinces, whereas increasing market openness is able to weaken the negative effect. Sun and Wang [20] also analyze the effect of natural resources on economic growth in 30 Chinese regions, but they also include its impact on environmental pollution. They highlight the negative correlation between natural resources and economic growth, thus the existence of the "resource curse". Furthermore, the effect of natural resources on environmental pollution is

even greater than the impact on the per capita GDP of the region. Ma and Cheng [21] confirmed the existence of the resource curse at the provincial level in China by applying fixed effect model and threshold panel model, that is, rich natural resources inhibit technological progress and thus have negative effects on economic development. However, they also found that the initial development of the resource sector has a significant promoting effect on technological progress which can be called a resource blessing, but when the scale of the resource industry expands to a certain extent, the resource curse phenomenon begins to appear.

Some Chinese scholars have also analyzed the phenomenon on smaller scales. Wen and Jia [22] analyzed 236 cities in China to examine the relationship between natural resource dependence and economic development, measured by the GDP per capita. Cities with a declining number of resources tend to experience "resource curse", while an increasing resource base rather brings a "resource blessing". Moreover, based on the analyzed time period, the effect of resource dependency on growth differs, as it is negative in the short run, but positive in the long run. Based on the panel data of typical resource-based cities in China from 2003 to 2013, Zhao et al [23] retested the resource curse hypothesis by using the generalized method of moments, and under the condition of considering potential endogeneity, they also discussed whether the human capital of resource-based cities can effectively alleviate the resource curse. Results show that resource curse is common in resource-based cities in China. Han and Zou [24] divided natural resources into point resources and scattered resources conceptually for the first time, and used panel data of 12 provinces and cities in western China to carry out quantitative analysis, finding that resource curse does exist in western regions. Additionally, by referring to the successful case of solving resource curse in Norway, they put forward some policy suggestions for the government to solve resource curse. Lu et al [25] conducted a case study of various types of resource-dependent cities in China to analyze the resource curse effect by calculating the resource curse coefficient. They grouped the cities according to their resource development stages and found that regardless of whether these cities were in the early, intermediate or late stages of their resource development, they were always negatively affected by the resource curse phenomenon. They concluded that natural resources can support economic growth to a certain point, but the process results in many unfavorable aspects that make economic development unsustainable.

Other Chinese scholars found no evidence for the existence of the natural resource curse effect or even found that abundant natural resources support economic growth. Zhang and Brouwer's study [26] summarizes this ambiguous side of the research field by collecting and analyzing 44 studies published in Chinese at provincial and city level between 2005 and 2017. They discovered that, even though most of the research found evidence for the existence of the natural resource curse, there is not a negligible number of studies finding just the opposite. They also concluded that only a number of the studies included sufficient control in the estimated models to reliably investigate the existence of the phenomenon. Rui et al [27] used the functional coefficient regression model to examine the resource curse

hypothesis in 95 cities in China between 1997 and 2005 and found no evidence of its existence. They also examined the transmission channels between natural resources and economic development and found that the positive impact of the abundance of resources in one city flows through several transmission channels to another city in the province. Hu et al [28] also concluded that there is no resource curse in China in general, but they grouped the provinces under examination according to their different degrees of the resource curse and found that 6 of these provinces would display negative economic growth should they increase their resource dependence.

Most studies dealing with the resource curse phenomenon use macroeconomic performance indicators and their relation. If high dependence on natural resources is combined with a low GDP per capita, a declining population, a decrease in the number of school enrollments, and a negative trade balance, it reinforces the presence of the recourse curse phenomenon. In this study, following the mainstream literature, we follow this methodological path and investigate the presence of the resource curse phenomenon in relation to four Chinese provinces that rely on natural resources to varying degrees.

3 The Resource Curse Phenomenon in Selected Chinese Provinces

This chapter provides an overview of selected indicators of four Chinese provinces - Gansu, Guizhou, Qinghai and Shanxi - as they are rich in natural resources (see Figure 1). Occasionally, overall data for China has been included for the sake of comparison. The data has been collected from the respective Provincial Statistical Yearbooks [29]-[72] and the China Statistical Yearbooks [73]-[83]. The analysis covers the ten-year time period between 2010 and 2020. The cases of the four highlighted provinces are designed to underpin the statements of our paper.

Figure 1 reflects the fact that two of the analyzed provinces, Shanxi and Guizhou, have also produced large amounts of energy over the reviewed time period. It is noteworthy that in most cases high volatility can be detected, while certain time series show an increasing tendency, with others reflecting decreasing amounts. Overall, Shanxi province's natural resource output can be considered outstanding, within the analyzed group.

We refer to resource dependency as a percentage of tax revenue from mining in the percentage of the total tax revenue. Based on Figure 2, the four provinces under review reflect great differences, as this percentage amounted to 64.85% in Shanxi, while in Guizhou in 2020 it was merely 8.22%. Despite significant volatility, in all of the reviewed provinces the resource dependency showed a decreasing tendency over the time period analyzed. Nevertheless, the respective ratios are still over the Chinese average.

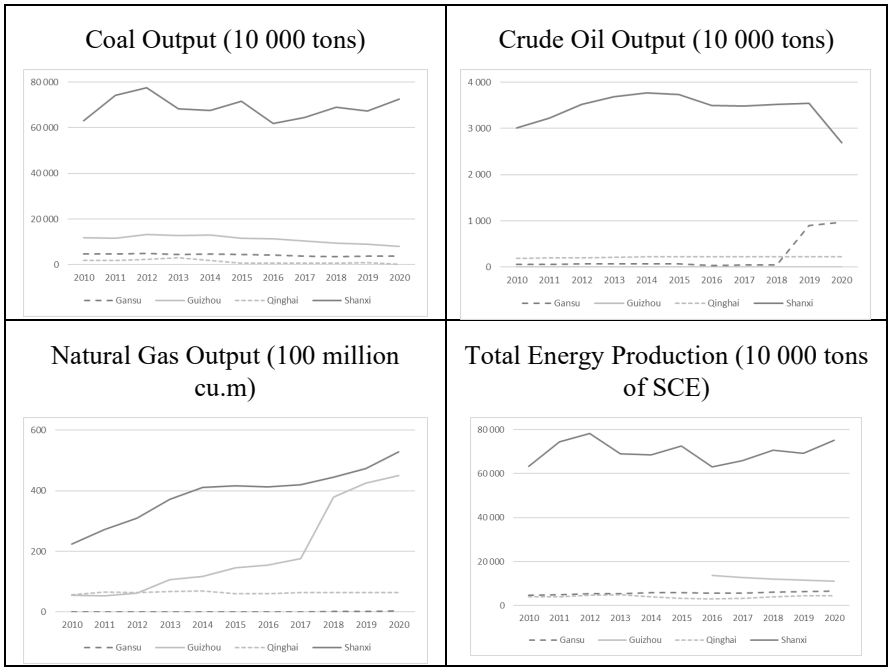

Figure 1

Output of selected natural resources

(Sources: Provincial Statistical Yearbook (selected years between 2011 and 2021) [29]-[72], China Statistical Yearbook (selected years between 2011 and 2021) [73]-[83])

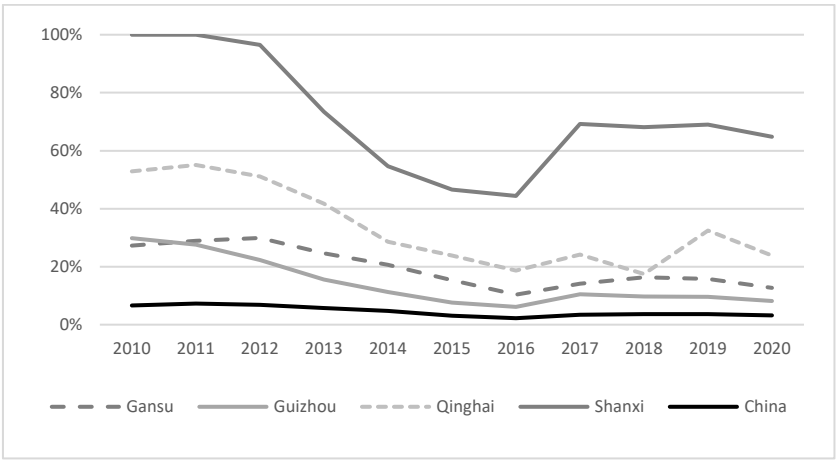

Figure 2

Resource dependency

(Sources: Provincial Statistical Yearbook (selected years between 2011 and 2021) [29]-[72], China Statistical Yearbook (selected years between 2011 and 2021) [73]-[83], own calculations)

As the resource curse phenomenon is usually analyzed by the variable of the GDP per capita, Figure 3 reflects the development of this indicator in the four provinces under review and in China. Generally, the four provinces have a lower GDP per capita level, and a rather modest growth compared to the overall Chinese average.

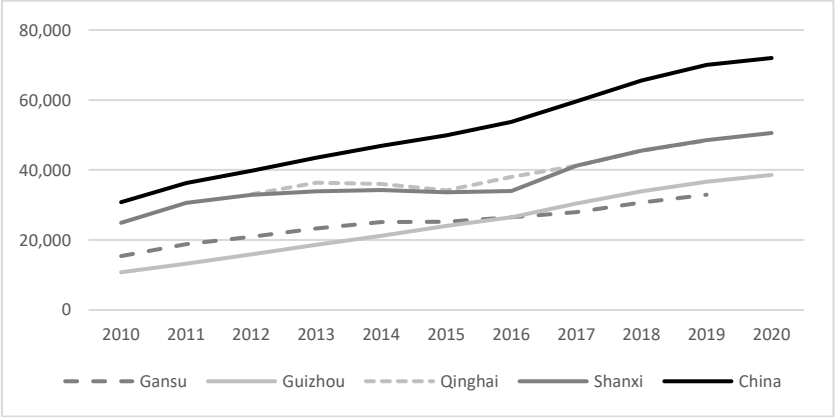

Figure 3
GDP per capita (Yuan)
(Note: Data for Qinghai in 2011 and 2020, and for Gansu in 2020 are not available.)
(Sources: Provincial Statistical Yearbook (selected years between 2011 and 2021) [29]-[72], China Statistical Yearbook (selected years between 2011 and 2021) [73]-[83])

During the reviewed time period, further macroeconomic indicators underpin economic stability (see Table 1). Namely, the average consumer price index in all of the provinces was constantly between two and four percent during the analyzed period. The percentage change of the trade balances reflects greater variety, as in the case of Guizhou a rapid surplus growth was registered, while in Qinghai the trade was rather balanced. Nevertheless, major external imbalances were not present. As for the labor market, in Shanxi, secondary school enrolment decreased by 34% and the number of employed persons by 3.55%, which might indicate certain labor market tension, also from the aspect of the Chinese average.

Resource dependency exceeding the national average and GDP per capita below the national average are typical in all 4 examined provinces. However, the population decline of Shanxi province and the stagnant population of the other investigated provinces, as well as the decrease in further education and employment data indicate a decrease in efficiency in addition to high resource exposure. All of these are combinations of phenomena that, according to the literature, point to the presence of the resource curse phenomenon.

Table 1
Selected macroeconomic indicators

	Average between 2010 and 2020	**Growth (percentage change between 2010 and 2020)**				
	Consumer price index (%)	Trade balance (%)	Local General Budgetary Revenue (%)	General Budgetary Expenditure (%)	Secondary School Enrolment (%)	Number of Employed Persons (%)
Gansu	2.60	(-)26.16	128.63	118.18	n.a.	n.a.
Guizhou	2.41	575.74	234.78	251.80	-0.42	6.35
Qinghai	3.20	-81.85	173.55	160.00	n.a.	n.a.
Shanxi	2.34	(-)213.78	135.58	164.63	-34.00	-3.55
China	2.58				0.05	-0.01

(Note: In the case of the trade balance, in Gansu and Shanxi, the deficit turned to surplus, in Qinghai there is continuously a minor surplus.)

(Source: Own calculations, based on the statistics of the Provincial Statistical Yearbook (selected years between 2011 and 2021) [29]-[72], China Statistical Yearbook (selected years between 2011 and 2021) [73]-[83])

At this level it is important to examine the relationship between natural resource exposure and GDP per capita. Analysis of the correlation of these indicators could be informative about the resource curse phenomenon. A strong negative correlation (high resource dependency and low -high negative- GDP/per capita) is the indirect indicator of the analyzed phenomenon. In order to check the relation between two key indicators, namely the GDP per capita and the natural resource dependency, a correlation analysis has been included in this section, using the results of Pearson correlation and autocorrelation (see Table 2). The strong positive relationship, i.e., high resource exposure, low GDP per capita indicates that the province that lives on the income from the extraction of natural resources operates with lower efficiency. Since we are analyzing time series, the analysis of the autocorrelation is obligatory. If the absolute value of the autocorrelation coefficient is high (above 0,7), it is worth investigating due to changes in natural resource exposure and per capita income and to calculate the correlation between them. The high negative correlations are interesting and important, to put it simply.

In Gansu province the GDP per capita and the natural resource dependency are autocorrelated. For this reason, we took their percentage change into account, which are not autocorrelated. The linear relationship between them is weak positive (0.30), meaning that the annual percentage change of the GDP per capita and the annual percentage change of the natural resource dependency show a weak correlation in the examined time interval. This indicates that the annual percentage change of the natural resource dependency can explain the annual percentage change of the GDP

per capita only to a small extent. We reach the same conclusion in the case of Guizhou province. In the latter case as well, the time series are autocorrelated, but at merely 0.01, the relation between the percentage change of the two indicators is even lower than in Gansu. Thus, only a very weak co-movement exists between the two variables. This is also the case in Guizhou.

It is only Qinghai province, where the GDP per capita and the natural resource dependency are not autocorrelated. However, in this case, the coefficient amounts merely to (-0.28), which reflects a weak negative correlation between the analyzed indicators. Last but not least, the most resource rich province within the analyzed group, Shanxi province, stands as a specific case, as autocorrelation exists here as well, but the correlation coefficient is 0.74, showing significant correlation. Nevertheless, this number indicates a positive relation between the GDP per capita and the natural resource dependency, which is not in line with the existence of the resource curse phenomenon. The analysis of the correlation between natural resource dependency shows the resource curse phenomenon may be present only in Qinghai.

Table 2

Correlation indicators (2010-2020)

Province	Indicator	Correlation between GDP per capita and natural resource dependency	Autocorrelation of GDP per capita and natural resource dependency	Correlation between percentage change of GDP per capita and percentage change of natural resource dependency	Autocorrelation percentage change of GDP per capita and percentage change of natural resource dependency
Gansu	GDP/capita	-0.78	0.98	0.30	0.53
Gansu	Natural resource dependency		0.87		0.18
Guizhou	GDP/capita	-0.82	1.00	0.01	0.85
Guizhou	Natural resource dependency		0.94		0.07
Qinghai	GDP/capita	-0.28	-0.31	-0.68	-0.07
Qinghai	Natural resource dependency		0.38		0.04
Shanxi	GDP/capita	-0.38	0.94	0.74	0.22
Shanxi	Natural resource dependency		0.81		0.18
China	GDP/capita	-0.82	0.99	0.48	0.42

China	Natural resource dependency		0.79		0.15

(Sources: Provincial Statistical Yearbook (selected years between 2011 and 2021) [26]-[69], China Statistical Yearbook (selected years between 2011 and 2021) [70]-[80])

4 Export-led Growth vs. Dual Circulation-driven Domestic Economic Strategy

After nearly 30 years of state control of all assets, the government of China embarked on a program of economic reform. In an effort to awaken a dormant economic giant, China encouraged the formation of rural enterprises and private businesses, liberalized foreign trade and investment, invested in industrial production and the education of its workforce. By nearly all aspects, the strategy has worked perfectly. Although, capital accumulation in China [84] was very important, as was the increased productivity of the Chinese workers, which proved to be one of the driving forces behind the economic boom. During 1979-94, productivity gains accounted for more than 42% of China's growth and by the early 1990s had overtaken capital as the most significant source of that growth [85].

Measuring Growth

Economists studying China tend to face theoretical issues related to the country's central planning and strict government control, which tend to distort prices and redistribute resources. Since the Chinese national accounting system differs from the systems used in most Western nations, it is difficult to draw a comparison, as figures for Chinese economic growth consequently vary, depending on the analyst's decision how to apply them.

In order to understand asset distribution and the order of command, we must acknowledge that the Chinese economy combines important features of a market economy and a planned economy. To research the potential existence of the resource curse we first need to study policy making and the role of economic planning in China by reviewing its history [86]. During the period from 1953, when the first Five-Year Plan [84] began, to the end of the 1970s, China practiced central planning under the direction of the State Planning Commission (SPC). The main function of planning was to direct the production of major products by state-owned enterprises. Although the market economy functions effectively in China, the idea that planning is essential for China's economic development remains in the mind of government officials until today. Production in many sectors of the Chinese economy is carried out by both state-owned and non-state enterprises. Both politically and economically, China is under the leadership of the Communist Party, hence the NDRC [87] is instructed by the Party in drafting the Five-Year Plan. The chain of command goes from the central government to governments at the provincial, city, county and small community level. Government actions at all levels

are under the direction of the Communist Party. The provincial level financial revenue derived from land and all kinds of natural resources have been one of the most important sources of local government revenue in China since the "paid transfer of land use rights" [88] programme was instituted in 1988. Local governments consider incomes from those sources as their own, in contrast to the central government, which via the state-owned enterprises (SOE) [89] drain and re-distribute revenues from the provinces, giving top priority to state-wide economic and social sustainable development goals. This process is also the main source of rapid urbanization, with a larger number and size of cities across the country. That process enhances efficiency and increases grassroots domestic demand, and has started to decrease its reliance on export-led economic growth. As such, the successful implementation of the dual-circulation strategy is a key indicator of whether China is capable of avoiding the middle-income trap (MIT) [90].

Conclusions

Although the vast number of natural resources across the country plays a very important role in the steady and swift economic rise of China, beyond capital accumulation, the untapped and very competitive labor force, and its fast-improving productivity, could be highlighted as one of the main underlying factors for the unprecedented growth. As suggested by this research paper, unlike in other countries - *where the resources curse is fairly easy to prove* - in China, revenues from natural resources are hardly the only, or the main source of economic growth, even on the wider regional or provincial level.

Regarding another key indicator of the *resources curse,* in China the volatility of both short and long-term global resource prices is balanced and cushioned at a central level, where Beijing smoothens the transitory effects. The potential regional excess revenues or deficits are swallowed up and balanced out by the state-owned enterprises, which strictly act upon the guidance and instructions of the state planning. Accordingly, the phenomenon of Dutch disease and its consequences, such as inflation and the appreciation of real exchange rates - both of which are measured and controlled at central government level - can hardly be applied. Following that logic from the political aspect, the rent-seeking behaviour and the consequent widening income inequality and corruption can also only be assumed by a weak supporting institutional structure, which it would not only be mistaken to assume, but in reality rather the opposite is true.

Having researched the *resource curse* and its potential implications on the regional and resource-rich provincial level in China, we can thereby conclude that such phenomena can only be interpreted in political and economic terms when the environment under research is considered closed-loop, and assuming that the goods produced are strictly redistributed within the given system. We examined the resource curse phenomenon in 4 provinces, characterized by higher dependence on natural resources than the Chinese national average. In each province, the high dependence on natural resources was accompanied by macroeconomic indicator

values (decreasing population, enrollment, negative external balance, negative linear relationship between GDP/capita and dependence) that make the resource curse phenomenon likely. Briefly about limitations and possibilities: The investigated indicators only give an indirect indication of real economic processes, their availability being limited. That is why only cautious conclusions can be drawn from their analysis.

Other economic indicators, governmental and institutional factors, social and human development indicators, environmental consequences can be analyzed further and access to these data is a significant limitation.

A further development opportunity is to change the number and composition of the provinces and to compare the analysis with the results of other countries.

References

[1] Solow, R. M. (1956) A contribution to the theory of economic growth. *The quarterly journal of economics,* 70(1), 65-94, https://doi.org/10.2307/1884513

[2] Swan, T. W. (1956) Economic growth and capital accumulation. *Economic record,* 32(2), 334-361, https://doi.org/10.1111/j.1475-4932.1956.tb00434.x

[3] Stiglitz, J. (1974) Growth with exhaustible natural resources: efficient and optimal growth paths. *The review of economic studies,* 41(5), 123-137, https://doi.org/10.2307/2296377

[4] Boos, A., & Holm-Müller, K. (2012) A theoretical overview of the relationship between the resource curse and genuine savings as an indicator for "weak" sustainability. Natural Resources Forum 36(3), 145-159, http://doi.org/10.1111/j.1477-8947.2012.01456.x

[5] Addison, J., & Steele, R. (1710) The Spectator, Volume 1, Sat, 1, 680, http://www2.scc.rutgers.edu/spectator/outputdjvu.php?filepath=./specv01/INDEX.djvu&pageno=p0680.djvu

[6] Smith, B. & Waldner, D. (2021) *Rethinking the Resource Curse.* Cambridge University Press

[7] Venables, A. J. (2016) Using Natural Resources for Development: Why Has It Proven So Difficult? *Journal Of Economic Perspectives,* 30(1), 161-184

[8] Auty, R. (1993) *Sustaining development in mineral economies: the resource curse thesis.* Routledge. https://doi.org/10.4324/9780203422595

[9] Corden, W. M. (1984) Booming sector and Dutch disease economics: survey and consolidation. *Oxford Economic Papers,* 36(3), 359-380, https://doi.org/10.1093/oxfordjournals.oep.a041643

[10] Sachs, J. D., & Warner, A. (1995) Natural resource abundance and economic growth. National Bureau of Economic Research. https://doi.org/10.3386/w5398

[11] Badeeb, R. A., Lean, H. H., & Clark, J. (2017) The evolution of the natural resource curse thesis: A critical literature survey. *Resources Policy,* 51, 123-134, https://doi.org/10.1016/j.resourpol.2016.10.015

[12] Collier, P., & Laroche, C. (2015) Harnessing natural resources for inclusive growth. Policy Brief, International Growth Centre. https://www.theigc.org/wp-content/uploads/2015/03/IGCGrowthBriefNRMCollier20151.pdf

[13] Ploeg, F. V. D. (2011) Natural resources: curse or blessing?. *Journal of Economic literature,* 49(2), 366-420, https://doi.org/10.1257/jel.49.2.366

[14] Mehlum, H., Moene, K., & Torvik, R. (2006) Institutions and the resource curse. *The economic journal,* 116(508), 1-20, https://doi.org/10.1111/j.1468-0297.2006.01045.x

[15] Brunnschweiler, C. N., & Bulte, E. H. (2008) Linking natural resources to slow growth and more conflict. *Science*, *320*(5876), 616-617, http://doi.org/10.1126/science.1154539

[16] Alexeev, M., & Conrad, R. (2009) The elusive curse of oil. *The review of Economics and Statistics*, *91*(3), 586-59,. https://doi.org/10.1162/rest.91.3.586

[17] Cao, S., Li, S., Ma, H., & Sun, Y. (2015) Escaping the resource curse in China. Ambio, 44, 1-6, http://doi.org/10.1007/s13280-014-0540-9

[18] Shuai, S. H. A. O., & Zhongying, Q. I. (2009) Energy exploitation and economic growth in Western China: An empirical analysis based on the resource curse hypothesis. *Frontiers of Economics in China,* 4(1), 125-152, https://doi.org/10.1007/s11459-009-0008-1

[19] Qiang, Q., & Jian, C. (2020) Natural resource endowment, institutional quality and China's regional economic growth. *Resources Policy,* 66, 101644, https://doi.org/10.1016/j.resourpol.2020.101644

[20] Sun, Z., & Wang, Q. (2021) The asymmetric effect of natural resource abundance on economic growth and environmental pollution: Evidence from resource-rich economy. *Resources Policy*, *72*, 102085, https://doi.org/10.1016/j.resourpol.2021.102085

[21] Ma, Y., & Cheng, D. (2017) Resource Gospel'or "Resource Curse". On Panel Threshold. *Finance and Trade Research,* 28(1) 13-25, https://doi.org/10.19337/j.cnki.34-1093/f.2017.01.002

[22] Wen, S., & Jia, Z. (2022) Resource curse or resource blessing: Perspective on the nonlinear and regional relationships in China. *Journal of Cleaner Production*, *371*, 133491, https://doi.org/10.1016/j.jclepro.2022.133491

[23] Zhao, L., Xu, L., & Zhang, L. (2016) Natural resource dependence, human capital and resource curse hypothesis revisited: evidence from resource-based cities in China. *Areal Research and Development,* 35(4), 52-57

[24] Han, J. & Zou, G. (2013) The Thinking of Resource Effect and Countermeasures of the Economic Growth in Western Regions of China. *Science & Technology Progress and Policy,* 30(21), 36-40

[25] Lu, C., Wang, D., Meng, P., Yang, J., Pang, M., & Wang, L. (2018) Research on resource curse effect of resource-dependent cities: Case study of Qingyang, Jinchang and Baiyin in China. *Sustainability*, *11*(1), 91, https://doi.org/10.3390/su11010091

[26] Zhang, Q., & Brouwer, R. (2020) Is China affected by the resource curse? A critical review of the Chinese literature. *Journal of Policy Modeling*, *42*(1), 133-152, https://doi.org/10.1016/j.jpolmod.2019.06.005

[27] Fan, R., Fang, Y., & Park, S. Y. (2012) Resource abundance and economic growth in China. *China Economic Review*, *23*(3), 704-719, https://doi.org/10.1016/j.chieco.2012.04.007

[28] Hu, H., Ran, W., Wei, Y., & Li, X. (2020) Do energy resource curse and heterogeneous curse exist in provinces? Evidence from China. *Energies*, *13*(17), 4383, https://doi.org/10.3390/en13174383

[29] Gansu Statistical Yearbook 2011 http://tjj.gansu.gov.cn/tjnj/2011/

[30] Gansu Statistical Yearbook 2012 http://tjj.gansu.gov.cn/tjnj/2012/

[31] Gansu Statistical Yearbook 2013 http://tjj.gansu.gov.cn/tjnj/2013/

[32] Gansu Statistical Yearbook 2014 http://tjj.gansu.gov.cn/tjnj/2014/

[33] Gansu Statistical Yearbook 2015 http://tjj.gansu.gov.cn/tjnj/2015/

[34] Gansu Statistical Yearbook 2016 http://tjj.gansu.gov.cn/tjnj/2016/

[35] Gansu Statistical Yearbook 2017 http://tjj.gansu.gov.cn/tjj/tjnj/2017/indexch.htm

[36] Gansu Statistical Yearbook 2018 http://tjj.gansu.gov.cn/tjj/tjnj/2018/indexch.htm

[37] Gansu Statistical Yearbook 2019 http://tjj.gansu.gov.cn/tjj/tjnj/2019/indexch.htm

[38] Gansu Statistical Yearbook 2020 http://tjj.gansu.gov.cn/tjj/tjnj/2020/indexch.htm

[39] Gansu Statistical Yearbook 2021 http://tjj.gansu.gov.cn/tjj/c117468/info_disp.shtml

[40] Guizhou Statistical Yearbook 2011

[41] Guizhou Statistical Yearbook 2012

[42] Guizhou Statistical Yearbook 2013

[43] Guizhou Statistical Yearbook 2014

[44] Guizhou Statistical Yearbook 2015

[45] Guizhou Statistical Yearbook 2016

[46] Guizhou Statistical Yearbook 2017

[47] Guizhou Statistical Yearbook 2018

[48] Guizhou Statistical Yearbook 2019

[49] Guizhou Statistical Yearbook 2020

[50] Guizhou Statistical Yearbook 2021

[51] Qinghai Statistical Yearbook 2011
http://tjj.qinghai.gov.cn/nj/2011/indexch.htm

[52] Qinghai Statistical Yearbook 2012
http://tjj.qinghai.gov.cn/nj/2012/indexch.htm

[53] Qinghai Statistical Yearbook 2013
http://tjj.qinghai.gov.cn/nj/2013/indexch.htm

[54] Qinghai Statistical Yearbook 2014
http://tjj.qinghai.gov.cn/nj/2014/indexch.htm

[55] Qinghai Statistical Yearbook 2015
http://tjj.qinghai.gov.cn/nj/2015/indexch.htm

[56] Qinghai Statistical Yearbook 2016
http://tjj.qinghai.gov.cn/nj/2016/indexch.htm

[57] Qinghai Statistical Yearbook 2017
http://tjj.qinghai.gov.cn/nj/2017/indexch.htm

[58] Qinghai Statistical Yearbook 2018
http://tjj.qinghai.gov.cn/nj/2018/indexch.htm

[59] Qinghai Statistical Yearbook 2019
http://tjj.qinghai.gov.cn/nj/2019/indexch.htm

[60] Qinghai Statistical Yearbook 2020
http://tjj.qinghai.gov.cn/nj/2020/indexch.htm

[61] Qinghai Statistical Yearbook 2021
http://tjj.qinghai.gov.cn/nj/2021/indexch.htm

[62] Shanxi Statistical Yearbook 2011
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2011/html/njcx.htm

[63] Shanxi Statistical Yearbook 2012
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2012/html/njcx.htm

[64] Shanxi Statistical Yearbook 2013
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2013/html/njcx.htm

[65] Shanxi Statistical Yearbook 2014
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2014/html/njcx.htm

[66] Shanxi Statistical Yearbook 2015
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2015/indexch.htm

[67] Shanxi Statistical Yearbook 2016
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2016/indexch.htm

[68] Shanxi Statistical Yearbook 2017
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2017/indexch.htm

[69] Shanxi Statistical Yearbook 2018
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2018/indexch.htm

[70] Shanxi Statistical Yearbook 2019
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2019/zk/indexch.htm

[71] Shanxi Statistical Yearbook 2020
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2020/zk/indexch.htm

[72] Shanxi Statistical Yearbook 2021
http://tjj.shanxi.gov.cn/tjsj/tjnj/nj2021/zk/indexch.htm

[73] China Statistical Yearbook 2011
http://www.stats.gov.cn/tjsj/ndsj/2011/indexeh.htm

[74] China Statistical Yearbook 2012
http://www.stats.gov.cn/tjsj/ndsj/2012/indexeh.htm

[75] China Statistical Yearbook 2013
http://www.stats.gov.cn/tjsj/ndsj/2013/indexeh.htm

[76] China Statistical Yearbook 2014
http://www.stats.gov.cn/tjsj/ndsj/2014/indexeh.htm

[77] China Statistical Yearbook 2015
http://www.stats.gov.cn/tjsj/ndsj/2015/indexeh.htm

[78] China Statistical Yearbook 2016
http://www.stats.gov.cn/tjsj/ndsj/2016/indexeh.htm

[79] China Statistical Yearbook 2017
http://www.stats.gov.cn/tjsj/ndsj/2017/indexeh.htm

[80] China Statistical Yearbook 2018
http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm

[81] China Statistical Yearbook 2019
http://www.stats.gov.cn/tjsj/ndsj/2019/indexeh.htm

[82] China Statistical Yearbook 2020
http://www.stats.gov.cn/tjsj/ndsj/2020/indexeh.htm

[83] China Statistical Yearbook 2021 http://www.stats.gov.cn/tjsj/ndsj/2021/indexeh.htm

[84] Li Y., Gabriel Z., Thomas P., (2017) Capital accumulation, private property, and inequality in China, 1978-2015, https://cepr.org/voxeu/columns/capital-accumulation-private-property-and-inequality-china-1978-2015

[85] Hu, Z. F., & Khan, M. S. (1997) Why is China growing so fast?. Economic Issues, 8(1), 1-10, https://doi.org/10.2307/3867499

[86] Gregory C. Chow, (2011) Economic Planning in China. https://gceps.princeton.edu/wp-content/uploads/2017/01/219chow.pdf

[87] Chow, G. C. (2011) Economic planning in China (pp. 1-9) Center for Economic Policy Studies, Princeton University

[88] Zhenhuan Y. (2004) Land Use Rights in China – Cornell Real Estate Review. https://core.ac.uk/download/pdf/145016427.pdf

[89] Carsten A. H. (2011) The unbalanced growth hypothesis and the role of the state: The case of China's state-owned enterprises

[90] https://www.sciencedirect.com/science/article/abs/pii/S0304387810001264

[91] Glawe, L., & Wagner, H. (2020) China in the middle-income trap?. *China Economic Review*, 60, 101264, https://doi.org/10.1016/j.chieco.2019.01.003