Belt and Road gas cooperation evaluation - An empirical study on economic profits, environmental impact, and social values

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ABSTRACT

China's Belt and Road Initiative (BRI) provided itself with a stable foundation to deepen the gas cooperation with signatories in the global de-carbon trend. This paper explores the net policy effects of BRI in the aspects of environment, economy, politics, and culture, together with other impacts from the national traits, the governance mode, and the resource types. Results show there's a significant BRI effect on signatories' GHG emission deduction, GDP per capita   and Projects' net cash flow increment. But no significance in reducing the political & cultural distance between the host county and China. Gas, as vital low-carbon fossil energy, has its unique preference in the host country's traits and governance mode. Meanwhile, gas does have brought changes quite differently from the traditional oil business. What's more, value divergence exists between the official government & the masses even in the same country. Finally, Chinese oil & gas investment prefer "high risk, high return" and a host social hierarchy similar to its own.

Keywords: Gas, BRI, Economic Profits, Environmental Impact, Governance Mode, Cultural Values

NONMENCLATURE

Abbreviations	
BRI	Belt and Road Initiative
CD	Cultural Distance
CI	Confidence Interval
GHG	Greenhouse Gas
LNG	Liquefied Natural Gas

PD	Political Distance
PNG	Pipeline Natural Gas
WGI	World Governance Indicators
WVS	World Value Servery

1.   INTRODUCTION

In the past decades, domestic China's gas consumption outpaced its production at around 7.9% annually (Figure 1). Due to its production limitations, China has to confront an intensifying, long-lasting domestic gas shortage. Such expanding gap has already made China's gas import dependence reach 43% in 2020 and expects to be 50% in 2040.Thus, consolidating the gas suppliers becomes more and more critical for China to ensure its energy transition and security. The imported gas includes liquefied natural gas (LNG) and pipeline natural gas (PNG). In 2020, the total imported share of LNG was 67% (Figure 2), with BRI signatories contributing 51% volume. PNG share is 33%, with BRI signatories contributing 44% volume.
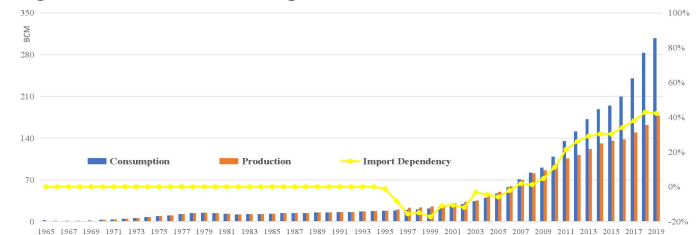

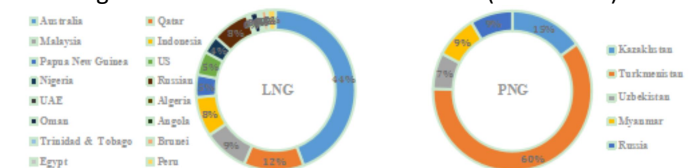Fig. 1. Domestic Gas Balance in China (1965-2019).

Fig. 2. China's LNG & PNG Suppliers in 2020.

Besides the downstream trade, BRI Signatories surpassed Non-signatories with launched upper & middle gas projects invested by China, in country numbers and volume likewise (Table 1). So the paper would like to explore several interesting questions. 1) Does there exist a BRI policy "Dividend" aside from the financial benefit, like the carbon neutrality, culture gap deduction, and governance improvement? 2) Would gas bring changes to the local society compared with the traditional oil business during the global energy transition? 3) Any differences among the streams throughout the industry chain? 4) What's other factors influencing Chinese oversea investment preference?

Tab. 1. Countries In Oil & Gas Business With China.

BRI Signatory	Gas	Up & Mid Stream	Indonesia, Kazakhstan, Mozambique, Myanmar, Oman, Peru, Russia, Tajikistan, UAE, Uzbekistan, Venezuela
		Downstream	Algeria, Angola, Bhutan, Egypt, Equatorial Guinea, Indonesia, Kazakhstan, Malaysia, Myanmar, Nigeria, Oman, Papua New Guinea, Peru, Qatar, Russia, Tajikistan, Trinidad and Tobago, UAE, Uzbekistan Stan, Venezuela, Yemen
	Oil	Up & Mid Stream	Azerbaijan, Chad, Ecuador, Iran, Iraq, Guinea, South Sudan, Sudan, Tunisia
		Downstream	Singapore, Kuwait, Saudi Arabia
Non-Signatory	Gas	Up & Mid Stream	Australia, Brazil, Canada, Turkmenistan
		Downstream	Australia, Norway, Turkmenistan, United States
	Oil	Up & Mid Stream	-
		Downstream	Japan, India, Mexico

2. RESEARCH METHODS AND DATA

2.1 Sample Countries

All the data is from 2002 to 2019 based on availability. There are 43 countries having oil & gas business with China throughout the whole industry chain. At the end of 2019, there are 34 BRI signatories accounting for 79% and 9 non-signatories accounting for 21%. Among them, 28 gas-related countries account for 65%, and 15 pure oil countries account for 35%. 14 countries involved in the upper & middle stream business, while 25 countries were associated with the downstream trade business.

2.2 Research Methods

Considering Signatories signed BRI treats in different years, a heterogeneous timing Differences-in-Differences (hereinafter referred to as DID) model is used to test the net BRI policy effect. The base model is as below:

$$Y_{it} = \alpha + \sum_{j=-M}^{N} \delta_j BRISIGN_{i,t-j} + \gamma Z_{it} + \lambda_i + \nu_t + \varepsilon_{it} \quad (1)$$

Y_{it} is the dependent variable, different indicators in economic, political and cultural aspects will be selected separately; γZ_{it} are a set of independent variables; $\lambda_i + \nu_t$ represents the group fixed effect & time fixed effect; $\sum_{j=-M}^{N} \delta_j BRISIGN_{i,t-j}$ as the interaction (BRI signatory×Signing year) is a dummy variable to test the net policy effect of BRI. If country i in year t-j signed BRI with China, then the value is 1; otherwise 0 (M and N respectively represent the years before and after the signing year.

Besides the BRI & Non-BRI group comparison, the paper also divides countries into gas-related and pure-oil groups. One reason is that many gas projects are associated with oil projects due to geological features. The other is that the gas industry does differentiate from oil in technology and market, which may trigger various changes involving all social aspects. The gas-related group includes 1) Host countries that launched the Chinese upstream & midstream gas projects with gas production regardless of its proportion; 2) Countries that have downstream gas trade with China. The Pure oil group includes 1) Host countries that launched the Chinese upstream & midstream oil projects with crude oil production only; 2) countries with downstream crude oil trade with China.

2.3 Index Selection & Construction

2.3.1 GDP per capita of Host Country (current US$)

The index objectively reflect a country's living standards and development potential.

2.3.2 GHG Emission in Energy Sector

It could closely reflect Oil&Gas environment impact.

2.3.3. Net Cash Flow of Chinese projects overseas

It refers to the balance of cash/cash equivalents inflow minus the outflow in a certain period.

2.3.4. World Governance Indicators

WGI measures the official government governance level with six aspects: 1) Voice & Accountability. 2) Political Stability & Absence of Violence. 3) Government Effectiveness. 4) Regulatory Quality. 5) Rule of Law. 6) Control of Corruption.

2.3.5. Political Distance

Based on WGI, the paper build the official PD between the host country and China. It integrates the 6-dimensional indicators into one dimension as below.

$$PD_{ij} = \frac{1}{6}\sum_{n=1}^{6} \frac{\left(I_{ni} - I_{nj}\right)^2}{V_n} \quad (2)$$

2.3.6. Hofstede's Culture 6-Dimensional Indicators

It represents the difference of national traits in six aspects: 1) Power Distance. 2) Individualism. 3) Masculinity. 4) Uncertainty Avoidance. 5) Long-term Orientation. 6) Indulgence.

2.3.7. World Value Servery

The WVS formed the Inglehart-Welzel cultural map presenting 2-dimensional discrepancy among countries:

1) Secular Values (Y-axis). The transition is from bottom (traditional value) to top (secular rational value). The traditional value emphasizes religion, authority, and family; the secular rational value is open to new cultures and diversity. 2) Emancipative Values (X-axis). The transition is from left (survival value) to right (self-expression value). The survival value emphasizes economic and personal safety; the self-expression value focuses on subjective happiness and life quality.

2.3.8. Civilian Cultural Distance

The paper built the civilian CD between the host country & China based on WVS. Euclidean distance is used to measure the gap.

Tab. 2. Index Characteristics Comparison.

Aspect	Indicators	Dimension	Time Series	Value Judgment
Economic	GDP per capita	1	Y	Higer the better
	Net Cash Flow	1	Y	Higer the better
Environmental	GHG Emission of Energy Sector	1	Y	Lower the better
Political	World Governance Indicators	6	Y	Higer the better
	Official Political Distance	1	Y	Lower the better
Cultural	Hofstede Culture Indicators	6	N	-
	World Value Survey	2	Y	-
	Civilian Cultural Distance	1	Y	Lower the better

3. THE ECONOMIC IMPACT: HOST COUNTRY'S GDP PER CAPITA

3.1 Index Description and Analysis

Non-signatories' GDP per capita is higher than signatories and China. China narrowed its gap to signatories while enlarged to Non-signatories. The trend between signatories & non-signatories diverged after 2015. Gas countries' GDP per capita is higher than oil and China. China narrowed its gap to oil faster than gas. The gap between oil & gas has enlarged in 2019 than 2002 (Figure 4).
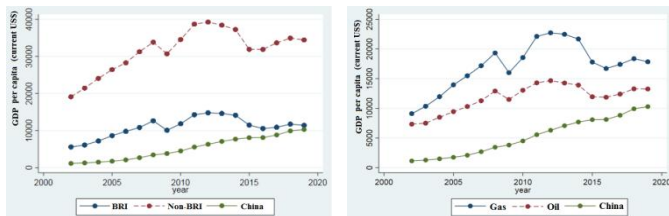

Fig. 4. Group Comparison: GDP per capita.

3.2 Two-Way Fixed-Effect DID Robust Regression

H_0: BRI has no effect on local GDP per capita

In Model (1), Y_{it} is a host country's GDP per capita; γZ_{it} is a set of independent variables. One is national traits presented by Hofstede cultural indicators; one is a dummy presented by $\sum_{j=-M}^{N} \delta_j BRISIGN_{i,t-j}$. $\lambda_i + v_t$ represent group fixed effect & time fixed effect. Model (2) is based on Model

(1) to explore the gas & oil differences in a subdivision level. Model (3) based on Model (1) setting gas as a dummy to examine its particular impact.

3.2.1. Parallel Trend Test

Set the BRI signing year as post0, post1 means one year after signing, and so on; pre1 means one year before signing, and so on. Compared with the benchmark year (pre1), all the coefficients of previous years are not statistically different from 0 in 95% confidence interval (hereinafter referred to as CI), while the coefficients of post years are the same until the fifth year (post5) showed a tremendous significant above 0 within 95% CI (Figure 5). Thus the parallel trend is valid. That means BRI signatories & Non-signatories had no apparent difference in the development trend before BRI signing; the changes later are too obvious to reject H_0. We could test the net policy effect of BRI.
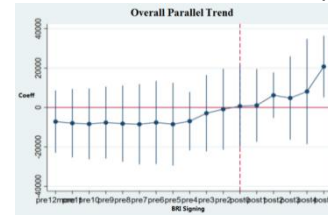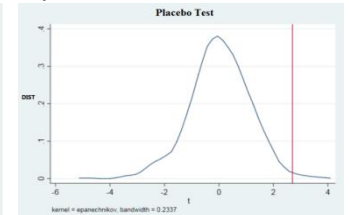

Fig. 5. Parallel Trend Test.   Fig. 6. Placebo Test.

3.2.2. Two-Way Fixed-Effect DID Robust Regression

From Table 3, we can tell: 1) National Traits. Overall, countries with stronger power centralization, success & competition orientation would lower GDP per capita. Yet countries valuing individualism, long-term orientation, and hedonism would increased, such positive effects are more remarkable than negative ones in 99% CI. At the subdivision level, in gas countries, risk-aversion showed a positive impact while negative for oil in 99% CI. In oil countries, stricter social stratification, success, & competition orientation would effectively increase GDP per capita in 99% CI, quite the opposite to gas. 2) BRI group discrepancy. The inherent between-group variance contributed a $9867 increment for signatories in 99% CI. 3) BRI Net Policy Effect. Only a significant positive effect on the overall level which increased the GDP per capita by $6670 in 90% CI. Nevertheless, no more significant net effect in the gas & oil segment. 4) Gas may decrease local GDP per capita by $1158 compared with oil, with a net policy effect still positive in 90% CI.

3.2.3. Placebo Test

After 1000 random assignments of a contract year, the coefficient's T value presented an inverted U shape around 0, very insignificant in 95% (Figure 6) that passed the placebo test. It confirmed BRI, not other random policies, cause the changes in GDP per capita.

Tab. 3. Robust Regression Results of GDP per capita.

	pdi	idv	mas	uai	lto	ivr	DID	BRI	Gas
(1)GDP per capita R^2=.3988	-269.79*** (-19.77)	556.01*** (20.24)	-131.63*** (-6.61)	15.44 (0.80)	362.99*** (20.67)	291.92*** (21.07)	6669.44* (1.99)	9867.10*** (14.34)	-
(2)Gas R^2=.4498	-160.08*** (-10.47)	652.91*** (23.94)	-238.17*** (-10.82)	213.98*** (11.71)	99.88*** (8.50)	203.29*** (14.20)	7233.78 (1.45)	3861.48*** (5.36)	-
Oil R^2=.7237	296.85*** (8.03)	1124.32*** (20.77)	313.33*** (11.05)	-154.79*** (-5.05)	765.05*** (21.34)	759.94*** (21.40)	-	42852.22*** (16.72)	-
(3)GDP per capita R^2=.3994	-274.08*** (-20.14)	564.25*** (20.00)	-144.12*** (-7.07)	19.37 (1.00)	366.59*** (20.48)	300.85*** (21.74)	6563.79* (1.95)	10337.66*** (14.02)	-1158.83*** (-5.06)
BRI fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y

4. THE ECONOMIC IMPACT: CHINESE OVERSEA PROJECTS' NET CASH FLOW

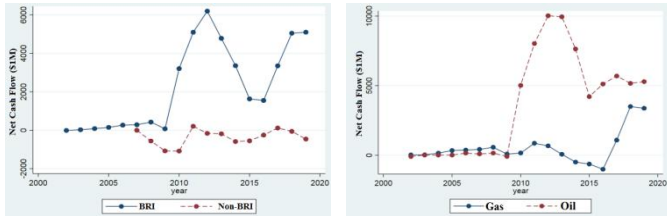### 4.1 Index Description and Analysis

Fig. 7. Group Comparison: The Net Cash Flow.

BRI signatories present a more positive net cash flow than Non-BRI. The gap enlarged first in 2009, then sharply reduced in 2013-2016, and enlarged again in 2017 due to signatorie' fluctuation. Oil countries present a much more positive cash flow than Gas; the gap widened in 2009, then sharply reduced due to a decrease in oil from 2014 and an increase in Gas from 2017 (Figure 7).

4.2 Two-Way Fixed-Effect DID Robust Regression (The National Traits Perspective)

H_0: BRI has no effect on Chinese projects' net cash flow

In Model (4), Y_{it} is the net cash flow; other variables are set as Model (1). Model (5) based on Model (4) to explore the gas & oil differences. Model (6) based on Model (4) setting gas as a dummy to examine its particular impact on the net cash flow.

4.2.1. Parallel Trend Test

Previous years (pre+) are not significantly different from 0 while post year(2nd-4th) are significant below 0 in 99% CI, the parallel testing is valid (Figure 8). The two groups had no different trend before BRI; the post changes are obvious enough to reject H_0.

4.2.2. Two-Way Fixed-Effect DID Regression

From Table 4, we can tell that: 1) National Traits. Overall, Chinese projects prefer "Higher Risk & Higher Return." Its cash grows faster in countries notable for power concentration, competition & success orientation, asceticism, short-term goal, and imperfect

risk avoidance system in 99% CI. Such inclination may be due to its domestic acquaintance. A similar power system would help the Chinese reduce the communication & negotiation cost and gain more profit in the short run. On the subdivision level, long-term orientation and hedonism significantly reduced the cash in 95% CI in gas countries but not in oil. It means that gas cash, quite different from oil, is eliminating the traditional impact from power concentration & competition orientation. While for oil cash, asceticism & short-term orientation do not even matter. 2) BRI Group Traits. BRI signatories' cash is significantly decreased by $7500 in gas countries in 95% CI, meaning BRI signatories are more willing to invest in gas business than Non-signatories. 3) BRI Net Policy Effect. BRI significantly incited new investment on the overall level in 90% CI. An apparent policy stimulus in net cash flow. Which decreased first in a new investment round (usually five years) and then rose as new production grew later. 4)Gas impact. The gas business could bring more cash than oil by $15000 in 99% CI, but no significant net policy effect anymore.
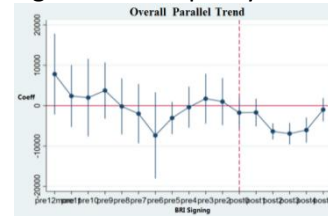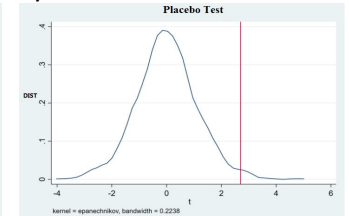

Fig. 8. Parallel Trend Test. Fig. 9. Placebo Test.

Tab. 4. Robust Regression Results of Net Cash Flow.

	pdi	idv	mas	uai	lto	ivr	DID	BRI	Gas
(4)Net Cash Flow R^2=.6117	582.65*** (5.66)	70.79 (1.52)	581.96*** (6.66)	-102.87*** (-4.21)	-392.35*** (-8.16)	-456.19*** (-6.83)	-2512.15* (-1.78)	-12378.63*** (-5.33)	-
(5)Gas R^2=.2319	441.47* (2.06)	42.69 (0.78)	542.47** (2.59)	-122.02** (-2.78)	-447.48** (-2.17)	-512.71** (-2.21)	179.65 (0.07)	-7521.01** (-2.27)	-
Oil R^2=.8127	739.36*** (5.10)	1316.46*** (7.06)	1525.50*** (7.23)	-198.81*** (-2.92)	omitted	omitted	-	omitted	-
(6)Net Cash Flow R^2=.7279	594.33*** (6.10)	64.74* (1.77)	785.37*** (7.46)	-170.63*** (-6.73)	-613.79*** (-8.18)	-744.84*** (-7.69)	-1690.76 (-1.19)	-9977.50*** (-5.17)	14948.52*** (7.37)
BRI fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y

4.2.3. Placebo Test

After 1000 random assignments of a contract year, the coefficient's T value presented an inverted U shape around 0, very insignificant in 95% CI (Figure 9), passed the placebo test. It double confirmed BRI, not other random policies, caused the changes in net cash flow.

5. THE ENVIRONMENTAL IMPACT: GHG EMISSION OF ENERGY SECTOR

5.1 Index Description and Analysis

BRI signatories' GHG Emission is much lower than Non-Signatories, a slight reduction in the gap due to

Non-signatories. Gas presents a much more higher emission than oil at first but the gap between reduced obviously due to oil countries' increment (Figure 10).
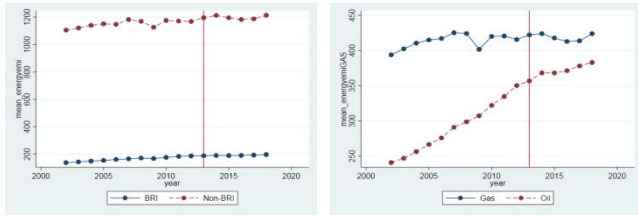

Fig. 10. Group Comparison: The GHG Emission.

5.2 Two-Way Fixed-Effect DID Robust Regression

H_0: BRI has no effect on Energy Sector's GHG Emission

In Model (7), Y_{it} is the GHG Emission; other variables are set as Model (1). In a subdivision level, Model (8) based on Model (7) to explore the gas & oil group differences; Model (10) explore the up&middle stream & downstream group differences. Model (9) based on Model (7) to examine gas impact. Model (11) and Model (12) examine the separate impact of up&middle stream gas and downstream gas business.

5.2.1. Parallel Trend Test

Previous years (pre+) are not significantly different from 0 while post4 year is significant below 0 in 99% CI, the parallel testing is valid (Figure 11). The two groups had no different trend before BRI; the post changes are obvious enough to reject H_0.
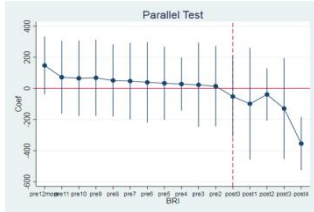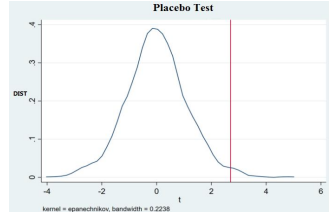

Fig. 11. Parallel Trend Test. Fig. 12. Placebo Test.

5.2.2. Two-Way Fixed-Effect DID Regression

From Table 5, we can tell that: 1) National Traits. Overall, GHG emission could be significant reduced in countries with less individualism, less competition orientation, less power concentration, short-term orientation, higher risk-aversion, and less hedonism. However, on the subdivision level, gas showed an contrary effect in risk aversion, while oil inverses on long-term orientation and hedonism. As for the up&middle stream, reversely, more competition & success orientation and risk preference could reduce GHG emission. While downstream opposites in higher hedonism to reduce GHG emission. 2) BRI Group Traits. Generally, BRI signatories would emit more GHG than Non-signatories, but the situation opposites in the pure-oil group. 3) BRI Net Policy Effect. It would obviously reduce the GHG emission on the Overall level, but no significant on the gas & oil subdivision level. BRI policy could significantly reduce GHG emission by 148 Mt CO2 e in downstream countries in 95% CI but not in up&middle stream. 4) Gas business would increase GHG emission by 226 Mt CO2 e than oil in 99% CI, but there's stream difference for the gas group. More specifically, up&middle stream could reduce GHG emission by 186 Mt CO2 e in 99% CI, while Gas down stream increased GHG emission by 378 Mt CO2 e in 99% CI.

Tab. 5. Robust Regression Results of GHG Emission.

	pdi	idv	mas	uai	lto	ivr	DID	BRI	Gas	Gas up&mi	Gas down	CE
(7)GHG Emission R^2=.395	8.952*** (13.34)	37.28*** (51.1)	13.228*** (100.16)	-1.993*** (-5.55)	6.92*** (27.7)	1.359*** (2.13)	-107.585*** (-2.92)	289.021*** (6.26)	-	-	-	-2451.76*** (-30.23)
(8) Gas R^2=.402	3.728*** (17.27)	45.32*** (77.9)	16.689*** (74.14)	1.415*** (7.08)	9.582*** (44.85)	0.896*** (5.4)	-112.791 (-1.35)	1034.79*** (68.93)	-	-	-	-3301.45*** (-63.65)
Oil R^2=.769	0.029 (0.04)	11.049*** (48.89)	3.437*** (7.23)	-4.595*** (-7.31)	-2.605*** (-3.98)	-6.914*** (-6.76)	-53.866 (-0.81)	-862.707*** (-10.86)	-	-	-	1259.933** (8.70)
(9) R^2=.403	9.787*** (15.46)	35.666*** (50.67)	15.674*** (79.01)	-2.764*** (-8.05)	6.208*** (26.22)	-0.563*** (-0.98)	-83.479* (-2.02)	197.588*** (4.39)	226.246*** (35.05)	-	-	-2484.719*** (-29.17)
(10)Upmi R^2=.542	11.27*** (53.95)	22.437*** (92.81)	-14.573*** (-78.8)	5.384*** (30.43)	12.025*** (78.49)	10.239*** (52.01)	28.116 (0.38)	559.085*** (40.11)	-	-	-	-2235.487*** (-53.68)
Down R^2=.461	9.134*** (9.82)	47.221*** (48.6)	15.468*** (70.57)	-0.727* (-2.03)	5.893*** (20.29)	-2.678*** (-3.58)	-147.733** (-2.68)	463.471*** (7.37)	-	-	-	-2789.576*** (-29.76)
(11) R^2=.401	8.489*** (11.99)	37.921*** (51.57)	12.269*** (123.86)	-0.845** (-2.14)	8.52*** (28.49)	2.816*** (4.04)	-136.485*** (-3.62)	330.579*** (7.14)	-	-186.13*** (-26.05)	-	-2565.293*** (-31.26)
(12) R^2=.418	10.996*** (17.54)	33.62*** (46.21)	15.861*** (100.84)	-3.692*** (-10.43)	5.38*** (21.75)	-1.245* (-2.07)	-65.397 (-1.41)	1.87 (0.04)	-	-	377.929*** (94.14)	-2303.914*** (-28.99)
BRI-fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time-fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

6. THE POLITICAL IMPACT: POLITICAL DISTANCE BETWEEN THE HOST COUNTRY & CHINA

6.1 Index Description and Analysis

The signatories' PD is around 5, smaller than non-signatories, which fluctuated between 15-20. Considering 2013 was the year China launched BRI, the PD of non-signatories has already reduced since then but is still larger than signatories. The overall PD of gas-related countries is higher than pure-oil countries; oil's PD has increased since 2014 and is closing to gas' in recent years (Figure 13).
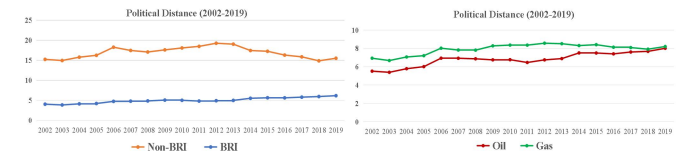

Fig. 13. Group Comparison: Political Distance to China.
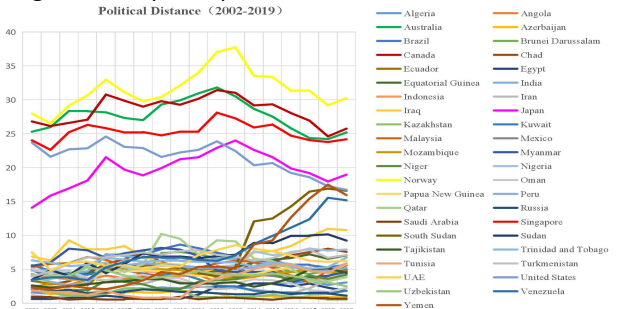

Fig. 14. Country Comparison: Political Distance to China.

Figure 14 shows that 1) Closer civilian values don't mean a closer political distance. Even In the same East Asian Confucian Cultural Circle, Japan & Singapore's PD are more significant than most Central Asian and African countries. Western countries have the largest

PD to China. Central Asian and African countries have the smallest PD to China. 2) Being BRI signatories and having upstream business links with China doesn't mean a closer political distance. Like South Sudan, Yemen, Venezuela, Iraq actually enlarged their PD after 2013 while most countries narrowed even the Non-signatories.

6.2 Two-Way Fixed-Effect DID Robust Regression

H_0: BRI Policy has no effect on reducing the PD

Model (13) based on Model (1), Y_{it} is the political distance between the host country & China; other variables are the same; Model (14) added the downstream variable as a dummy.

6.2.1. Parallel Trend Test

Compared with the benchmark year (pre1), previous years (pre+) differ from 0 significantly in 95% CI, while the post ones are not. It means a dissimilar development trend already existed between groups before BRI, parallel trend test failed and H_0 is accepted. Thus, we could only do the robust regression.

6.2.2. Robust Regression Analysis

In Table 6, we can see that: 1) National Traits. The PD is significantly reduced in countries with stricter social stratification & higher risk avoidance in 99% CI. While Individualism, Long-term orientation, Success Orientation, and Indulgence would increase PD in 99% CI. 2) For gas, it reduced PD significantly in 99% CI compared with oil. 3) Subdivision in industry chain also showed downstream gas trade reduced more PD than midstream & upstream gas business. Such a situation indicates the low-carbon quality of gas would promote the host governance following a global trend, thus could help in reducing PD to some extent. Besides, downstream trade is driven more by free-market than upper investment, which weighs politics much. With most downstream trade countries scoring high in WGI, we could say that China's governance mode is improving somehow by importing gas.

Tab. 6. Robust Regression Results of Political Distance.

	pdi	idv	mas	uai	lto	ivr	Gas	DownStream
(13) Political Dist. $R^2 = .8454$	-.16679*** (-27.41)	.08132*** (14.89)	.04435*** (8.61)	-.11510*** (-23.43)	.06904*** (17.17)	.038008*** (14.48)	-.230176*** (-4.52)	-
(14) Political Dist. $R^2 = .8467$	-.167167*** (-27.19)	.079737*** (14.67)	.040454** (8.55)	-.113328*** (-22.93)	.06806*** (17.05)	.038246*** (14.58)	-	-.751122*** (-9.30)

7. THE CULTURAL IMPACT: CULTURAL DISTANCE BETWEEN THE HOST COUNTRY & CHINA

7.1 Index Description and Analysis

Non-signatories have a larger CD than signatories. In the past decades, signatories' CD had a significant

decrease ever since 2015, while for non-signatories, just a slight decline. Thus it makes the gap between groups even larger. Gas' CD is larger than oil, but they both lowered down after 2015, with oil countries recently becoming even closer to China (Figure 15).
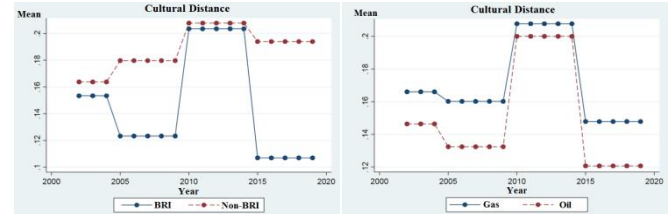

Fig. 15. Group Comparison: Cultural Distance to China.

Figure 16 shows 1) Asian Countries have a smaller CD than other areas. Qatar has the most prominent CD to China, while Russia the smallest. 2) Top 10 Countries with a smaller CD, except Singapore, are all BRI signatories launching Chinese gas projects. 3) Countries with the largest CD like Qatar, Norway, and Yemen, have close Downstream Gas Trade to China.
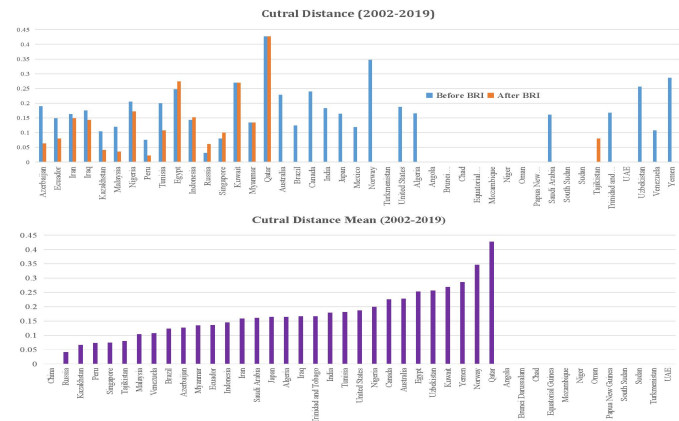

Fig. 16. Country Comparison: Cultural Distance to China.

7.2 Two-Way Fixed-Effect DID Robust Regressions

H_0: BRI Policy has no effect on reducing the CD

In Model (15), Y_{it} is the cultural distance (CD); other variables are the same as Model (1). Model (16) based on Model (15) to explore the gas & oil differences. Model (17) based on Model (15) setting gas as a dummy to examine its particular impact on CD.

7.2.1. Parallel Trend Test

For overall countries, both the previous and post years are not significantly different from 0 in 95% CI (Figure 17). In a subdivision test, oil countries' post years showed an apparent downward trend, the parallel test is valid in oil level, and H_0 is rejected. We can make a comparison between groups.

7.2.2. Two-Way Fixed Effects Regression Analysis

From Table 7, we can tell that: 1) National Traits. On the overall level, long-term orientation, hedonism, risk

aversion, and individualism can effectively narrow down the CD in 99% CI. On the subdivision level, risk aversion showed an opposite impact. It can significantly reduce CD in Gas countries while increasing in oil. Power distance also showed an opposite effect; it can considerably reduce oil's CD while increasing gas'. 2) Group Traits. Signatories' CD decreased significantly by 0.064 in 99% CI in the overall level. Oil's CD is reduced more by 0.11 in 95% CI than gas by 0.064 in 99% CI. 3) BRI Net Policy Effect. Effects are significantly opposite between oil & gas. BRI increased Gas' CD by 0.022 in 90% CI while decreased oil's by 0.024 in 95% CI. 4) Gas impact. Gas business, however, increased the CD by 0.008 in 90% CI than oil.

Tab. 7. Robust Regression Results of Political Distance.

	pdi	idv	mas	uai	lto	ivr	DID	BRI	Gas
(15) Civil Value $R^2=.6117$	.0001369 (.47)	-.000572*** (3.61)	-.0000588 (-0.94)	-.000144*** (-4.45)	-.002153*** (-16)	-.001478*** (-10.75)	-.004455 (-0.50)	-.063731*** (-7.62)	
(16) Gas $R^2=.2319$	.0003444*** (1.20)	-.001417*** (-5.46)	-.000357** (-2.46)	-.001483*** (-16.43)	-.002178*** (-36.39)	-.00153*** (-5.62)	.022285* (1.81)	-.06384*** (-7.77)	
Oil $R^2=.8127$	-.000921*** (-3.46)	-.001131 (-0.98)	-.001116* (-1.86)	.00092*** (4.46)	-.00224*** (-4.90)	-.002332*** (-4.09)	-.02394** (-2.85)	-.1088** (-2.46)	
(17) Civil Value $R^2=.7279$	.000164*** (0.59)	-.000651*** (-4.30)	.000045 (0.54)	-.000180*** (-4.18)	-.002180*** (-18.39)	-.001531*** (-9.23)		-.068251*** (-8.66)	.008159* (1.83)
BRI fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time fixed	Y	Y	Y	Y	Y	Y	Y	Y	Y

7.2.3. Placebo Test

After 1000 random assignments for the contract year, the coefficient's T value is distributed normally with an inverted U shape around 0, very insignificant in 95% CI (Figure 18), a stark contrast to the significance of the actual model, placebo test passed. It double confirmed BRI policy, not other random policies that cause CD changes.
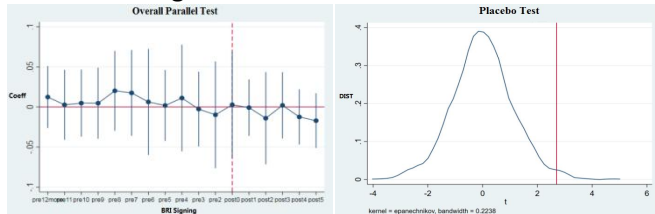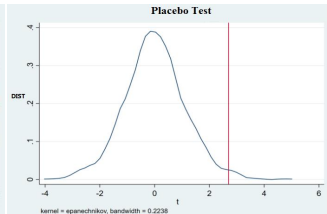

Fig. 17. Parallel Trend Test.   Fig. 18. Placebo Test.

8. CONCLUSION AND SUGGESTION

As low-carbon fossil energy during the global energy transition, gas has brought changes to a certain extent quite different from the traditional oil business. The lucrative gas projects are getting rid of the impact from the host country's conventional national traits like Power Concentration, higher Competition & Success Orientation. Downstream gas trade could reduce more Political Distance between the host country & China than the middle & upstream gas business. In addition, gas is less affected by the official governance mode, unlike oil which is entirely trapped by all the six factors, leaving investors more space for choice. Meanwhile, Since gas projects will be more profitable with a higher level governance mode like better corruption control and higher government efficiency, gas could, in turn, promotes local government to be a modern one.

In GHG emission reduction, Up&middle stream and downstream functions differently within diverse national traits. Especially gas up&middle stream business could benefit the environment significantly.

For China, it could optimize its overseas oil & gas assets portfolio. BRI Signatories would be a more lucrative choice to launch a gas-related business. Countries with less Power Concentration, less Success& Competition Orientation, Short-term Goals, more Risk Aversion, and Asceticism would benefit Chinese gas projects more. Also, an official government lacking the rule of law, low political stability, high corruption control, high government efficiency, and low public accountability would benefit all the Chinese projects more.

There have always been negative voices accusing China's BRI of "sabotaging" the liberal orders and values. This paper showed that BRI Policy is only of benefit to economical development and environment. It could increase the host country's GDP per capita; promote a new round of investment for Chinese projects overseas; and reduce GHG emission obviously. Nevertheless, at the overall level, neither the political distance nor the cultural distance is impacted significantly by BRI net policy effect. For those gas-related countries and non-signatories countries (most of which are western ones), BRI is not as politically & culturally aggressive as they thought it to be.

Last but not least, research limitations. We cannot just take the Reduced Distance as the priority value judgment. A closer distance is not equal to a more appropriate situation always. After all, Setting China as a benchmark had already embedded a value preference at the very beginning.

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