Dean&Francis
ISSN 2959-6149

Does China's Belt and Road Initiative create economic dependence in recipient countries?

Yaxin Shao

Abstract:

The paper examines the question of whether the Belt and Road Initiative (BRI) in China generates economic dependency in recipient nations by combining primary evidence of an expert survey with an econometric analysis of country-year panel data. The study formulates and tests three hypotheses, namely: higher BRI exposure leads to a higher economic dependency level, higher BRI-related finance leads to higher susceptibility to debt, and stronger domestic institutionalization lessens these impacts. The specialist interview, which took place in 8 recipient nations (N = 140), demonstrates the high ceiling effect in the perceptions of dependence, which promotes the necessity to complement the perceptual data with objective measures. The first hypothesis is well supported as panel analysis, with a major component-based DependenceIndex, indicates a strong and statistically significant relationship between BRI exposure and economic dependence. The fact that BRI finance is a factor in both debt and trade asymmetries can be considered as evidence to the second hypothesis but the effect is conditional: it does not consistently have destabilising effects and does not occur evenly in all settings. The third hypothesis is partly justified, with findings that reveal that, more well-established countries in terms of institutions have less dependence effect. The contribution of the study to the literature is that it provides a combination of expert perceptions with macroeconomic factors, a multidimensional perspective of dependence and demonstrates that the results are not merely determined by the exposure but also by the domestic governance. Policies such as enhancing transparency of debts, enhancing procurement procedures, diversifying sources of finance, and incorporation of stringent project appraisal mechanisms are among the suggested policy recommendations. These are the limited scope of the survey of the experts and difficulty of endogeneity issues. Further studies should broaden the data scope, include project level evidence and assess heterogeneity by sector and type of creditor. In

general, the results imply that the BRI can form economic dependence, yet the nature and the scale of that dependence are contingent and moderated by the institutional decisions of recipient nations.

Keywords*:* BRI, Dependence, Debt, Institutions, Governance, Trade

Introduction

The Belt and Road Initiative (BRI) is a massive array of infrastructure finance and building projects in Asia, Africa, Europe and others, the Belt and Road Initiative of China has been able to redefine how emerging economies access external funds to build their infrastructure at such magnitudes (Wang, 2022). The supporters are of the view that the BRI will fill an infrastructure gap, enable growth and integration, and industrialize. The critics retort that BRI finance can create asymmetric relationships that will render recipient countries more economically and politically reliant on China, less autonomy in policy, or more susceptible to debt-sustainability risks (debate reviewed below) (Moučka, 2025).

The presence of empirical and normative statement of such findings is challenged. Others write the debt-trap diplomacy narrative as over melodramatized or simply empirically unproductive, and still others claim actual evidence of bad outcomes in particular nations. The paper bases its operationalization of economic dependence on both objective measures (both bilateral trade and financing shares) and on subjective expert opinion as quantified by a structured survey of experts. It then looks at the predictive relationship of the exposure to BRI and dependence on the concept that domestic institutions depends on the relationship between the two. Three hypotheses were proposed.

H1 (Exposure → Dependence): Greater BRI exposure is associated with higher levels of economic dependence in recipient countries, as measured by a composite index combining trade and financing ties.

H2 (BRI finance → Debt vulnerability): Higher BRI-linked external financing is associated with an increased risk of public debt distress (higher debt-to-GDP ratios and debt servicing burdens).

H3 (Institutions moderate effect): Stronger domestic institutions (transparent procurement, creditor disclosure, fiscal rules) reduce the effect of BRI exposure on economic dependence.

The paper combines (A) a systematic expert survey and qualitative interviews that involve perceived dependency, contractual features and policy responses and (B) a panel econometric design that takes advantage of publicly available project counts and macroeconomic data. The mixed design provides an artificial linkage between subjective perceptions (to which policy makers are more likely to react) and objective macro evidence and thereby provides a more holistic account of dependence than only either. The remaining paper is a literature review and conceptualization (Section: Research Review), theoretical backgrounds (dependency theory, neorealism, game theory, and economic statecraft), hypothesis formulation, description of primary data and econometric models, policy implications and an evaluation.

Research Review

1. Belt and Road Initiative (BRI)

As a broader foreign-policy catchphrase, the Belt and Road Initiative have since its announcement in 2013 in effect become an adornment of transcontinental infrastructure development schemes and financing vehicles designed to augment connectivity across Eurasia, Africa and elsewhere (Taichakov et al., 2020). The initiative encompasses highways, railways, ports, airports, power plants, pipeline and telecommunications yet, it is important to remember that the BRI is not a centralised program; rather, it is a network of bilateral and multilateral activities between Chinese policy banks, state owned enterprises, commercial banks and export credit agencies and in most instances, with recipient governments (Malik et al., 2021). Researchers typically use the BRI-tagged dataset of AidData to locate and quantify China-linked projects on a project and country level.

The BRI has been the subject of scholarly and popular discourse that has produced two hegemonic and opposing discourses that determine how policy-makers and scholars explain observed outcomes. The contra narrative questions the assertion that recipient states handing finance and construction capacity over to a single foreign patron run the risk of asymmetric relationships characterized by

ISSN 2959-6149

excessive creditor leverage, opaque contract terms, and the loss of local bargaining power a condition sometimes termed debt-trap diplomacy. Empirical analyses reveal that the two narratives share their fair quota of truths and half-truths, the majority of projects have quantifiable local effects, yet high-profile instances such as Hambantota in Sri Lanka compounds the pain of governance failures, opaque deal conditions and politically unhealthy renegotiations (Lindmark, 2025).

2. Conceptualizing economic dependence

2.1 Debt sustainability

Creditor concentration and the mechanisms of the public debt are one of the key ways of how economic dependence can be created. A large percentage of foreign debt of the sovereign due to a single foreign creditor implies that the creditor holds a higher leverage power particularly in such states that have poor fiscal buffers. The debt-to-GDP ratios, the ratio of debt serviced by the government and exports (debt) in a year or the ratio of debt serviced by particular types of creditors in a year, are thus the intuitive measures of vulnerability (Rahaman & Mahadeo, 2024). The reasons behind high debt service burdens can be causally heterogeneous. Optimistic project revenue forecasts that fail to materialize, a terms-of-trade shock, or a currency depreciation that leads to the inflation of foreign-currency liabilities, or a domestic fiscal slippage that is either a precursor or an aftermath of borrowing spurts (Chowdhury, 2025). The implications of distress are most evident in case studies of the outcomes of renegotiation or asset transfer to foreign creditors, but cross-country statistical outcomes show that these extreme outcomes are not universal and tend to interact with domestic macroeconomic policy, fiscal transparency and loan covenant structure.

2.2 Asymmetry and patterns of trade.

Dependence can also be in the form of trade arrangements that lead to persistence of asymmetries such as exporting to this market, or excessive reliance on one supplier of the key intermediate goods. The unilateral high level of importation reliance on a partner can ruin local interdependence in the industrialization, decrease the opportunities of value addition, and leave the economies vulnerable in the face of supply chain failures or price spikes (Nagy & Nguyen, 2021). Similarly, export specialization in which demand is concentrated by the partners accumulates commercial risks: demand in the partner economy is disproportionately vested in the recipient country. Quantitatively, bilateral trade shares, exports to partner/total exports and imports to partner/ total imports, are workable indicators of these channels but must be supplemented with indicators of product sophistication and domestic value added in exports to capture the extent of integration versus the superficiality of trade volumes (Friesenbichler et al., 2017).

2.3 Assessment of existing literature

Empirical evidence and institutional appraisal affirm that the popular belief of a debt-trap is a simplistic view that tends to underestimate agency of receivers and overrate the evil of lenders. According to a recent study, most projects are financed on concessional or semi-concessional terms, that the portfolio of creditors is diversified and that apparent debt stress is usually the result of inherent fiscal feebleness or exogenous shocks (Romero, 2024). A large part of this disparity may be traced to methodological heterogeneity, which alternates detailed case studies on one extremum to cross-country panel regressions on the other extremum and the literature is converging to the notion that the findings are heterogenous and contingent upon project economics, loan terms, and the domestic institutional capacity. The empirical research gap that remains is therefore not a dichotomous is dependence created question but more of a less binary agenda: *in what conditions and through what mechanisms can BRI activity cause long-term dependence, and what can recipient institutions do meaningfully to alter such channels?*

3. Theoretical background

3.1 Dependency theory

Classic dependency theory has been used to offer a structural explanation of the world economic relationships where the peripheral economies were subjected to a functional subordination to the core economies through unequal exchange of capital flows and transfer of technology. Massive foreign-financed infrastructure in this view can enslave a recipient economy to patterns of production and trade which entails systematically benefiting the comparative advantage of the financier, thereby reproducing peripheral location. Dependency reasoning applied to BRI suggests that where projects connect recipient economies to export networks to primarily external economies or projects that rely on imported inputs and foreign enterprises, the returns on development may be low and structural dependence may be negative in the long-run (Kuran, 2024).

3.2 Neorealism and the hegemonic stability the-

ory.

The neorealist politics and the hegemonic stability theory are concerned with the politics of power and the interests of the great powers in order to offer the regional public goods or shape the regional orders on the economic statecraft. Infrastructure finance can be understood simultaneously, on this perspective, in terms of providing connectivity that facilitates trade, and in terms of providing strategic investment that extends influence. The fact that the presence of projects in strategically important maritime or terrestrial nodes is a business, as well as a geopolitical issue is an aspect that can and should be interpreted in this light and the rationale why recipient states should think through the trade-off between economic payoffs and the presence of strategic externalities (Acharya, 2017)9,10]]},"issued":{"date-parts":[["2017"]]}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} .

3.3 Game theory and strategic interaction

Game-theoretic models describe how lenders and borrowers are interdependent in a strategic way and that mutually rational short-term choices may lead to jointly bad outcomes. Political incentives are more likely to induce recipient governments to concentrate on conspicuous, high-profile projects with immediate reputational benefits, even with long-run fiscal benefits expressed with a high level of uncertainty; to which creditors anticipate such behaviour and which they design contracts or financing facilities. The renegotiation dynamics, the impact of reputational costs on borrowers and lenders and the conditions under which cooperative arrangements (transparent, welfare-enhancing projects) can be sustained are clarified on the basis of the fact that the interaction can be defined as repeated game (Patel, 2021).

3.4 Soft power and economic statecraft

The literature on soft power and economic statecraft notes that coercion to dependence is not necessarily consequential, long-term economic relationships, trade in education and business networks can produce long-term preferences and policy orientations. Infrastructure and finance are power instruments in this perspective that alter recipient state behaviour over time in a manner that dependence measures should take into account both hard financial indicators and less visible indicators of political conformity, elite networks and bureaucratic capture (Wishlade & Michie, 2017).

4. Hypothesis development

According to the idea and theoretical discussion, the analytical plan proceeds to incorporate three direction and mechanism-based testable hypotheses. The first hypothesis is that the greater the exposure to BRI projects and funding, the greater the measured dependence because concentrated commitments will increase both financial and trade linkages which constitute a dependence; operationally this can be tested by using a composite dependence index measured by bilateral trade shares, the Chinese creditor shares of external debt and the Chinese FDI intensity. The second hypothesis isolates the fiscal channel and assumes that high inflows of BRI-linked finance, particularly non-concessional, increase debt vulnerabilities in terms of an increased debt-to-GDP ratio and debt service burden conditional on future project revenues that are lower than projected. The third hypothesis identifies the institutional moderating power and states that the adverse effect of exposure to BRI on dependence tends to be less salient in those cases when recipient states exhibit stronger governance tendencies such as transparent procurement patterns. Therefore, good debt management practices, and enforceable financial regulations and this implies that in empirical model, the effect of exposure measures on institutional quality indicators is statistically interacted.

Methodology

A mixed-method design in this study involves structured expert survey and semi structured interviews with country-year econometric analysis, as because the confluence of the perceptual micro-evidence and macro level panel data can allow the paper to not only quantify the experience of dependence among the informed actors, but also examine whether there are systematic differences in the objective economic relationship when subjected to BRI. These three interrelated steps that constitute the empirical approach are (1) a stage of gathering and processing of primary qualitative and survey data that summarize expert beliefs about dependence and contract-level characteristics, (2) the development of a composite *DependenceIndex* based on objective country-level measures, and (3) a stage of econometric estimation that tests the *dependenceBRI* exposure relationship and takes account of any potential confounding variables and endogeneity concerns..

1. Primary data: expert survey and interviews

The purposive expert sampling technique was employed to interview respondents whose first-hand experience is of BRI projects and macro-fiscal management in 8 geographically and income diverse recipient countries; the survey interview surveyed 140 experts between 2024-2025. The questionnaire included a combination of Likert scale and category questions to show perceived dependence (*Per-*

ISSN 2959-6149

ceivedDependence, 1–7 scale), perceptions of procurement transparency, estimations of Chinese creditor share of outstanding debt, and a series of open-ended questions on policy and contract examples. These procedures were complemented by twelve semi-structured interviews, which were conducted in the context of senior officials and project managers to obtain some contextual information about contractual clauses, cases of renegotiation, and institutional practices that would otherwise be difficult to extract with the help of conventional datasets.

Sampling was used to recruit respondents equally across all three sectors: public sector, private sector, and academic/NGO, to reduce the risk of bias by one stakeholder, and allowed respondents the choice to withdraw or remain non-identified. The Survey responses were cleaned and coded to a pre-registered codebook. Likert items were retained as continuous variables and could be analyzed using OLS Categorical responses were recoded into ordered brackets where suitable, and open-ended responses were coded into thematic groups to provide a visual demonstration of quantitative patterns. All survey models pool standard errors by country in order to reduce measurement error and sample-level clustering effects, and robustness tests re-estimate models without countries with fewer than a threshold number of respondents.

2. Construction of the DependenceIndex and variable operationalisation

Four indicators were then identified to reflect the four channels of dependence, i.e., exports to China as a turnover of total exports, imports of China as turnover of total imports, Chinese FDI stock as turnover of total FDI and share of foreign debt owed to Chinese creditors where available. These standardized indicators are inputted into a principal components analysis (PCA); first principal component, indicating the common variance prevailing across the four indicators is extracted and normalized to zero mean and one unit to yield the *DependenceIndexit*. The underlying series are winsorized at the 1st and 99th percentile to diminish the effects of the extreme outliers and missing observations on credit share are imputed through multiple imputation with the assumptions of missing-at-random to conduct robustness tests and primary regressions are executed using listwise deletion with explicit coverage warnings.

The explanatory variable *BRIExposureit* is constructed as a result of BRI tagged project commitments in *AidData* in aggregated country-year form and divided by nominal GDP to create a similar measure of intensity across countries and years. Sensitivity tests also attempt to explore robustness by employing alternative exposure measures (projects per capita, cumulative commitments, binary treatment indicators, first major project year). Institutional quality is measured by a composite index of world bank governance indicators (control of corruption, government effectiveness, regulatory quality) rescaled to a range of 0-1 and used both as an independent variable and as an interaction term to test moderating hypotheses.

3. Econometric specifications and identification

Two complementary estimation strategies are applied. First, cross-sectional models at the expert level estimate how country exposure and institutional measures predict *PerceivedDependence* using OLS with country-clustered standard errors:

$$PerceivedDependence_j = \alpha + \beta_1 + BRIExposure_{c[j]} + \beta_2 Institution_{c[j]} + \beta_3 \left(BRIExposure * InstitutionIndex\right)_{c[j]+\gamma Z_j+\epsilon_j}$$

where *j* indexes experts, *c[j]* denotes their country, and *Zj* includes respondent sector dummies and years of experience. The interaction term tests whether institutional strength moderates the effect of exposure on perceived dependence. Second, a country-year fixed effects panel estimates how within-country changes in BRI exposure correspond to fluctuations in the constructed *DependenceIndex:*

$$DependenceIndex_{it} = \alpha + \delta BRIExposure_{it} + \theta X_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

with μ_i and λ_t as country and year fixed effects respectively, and X_{it} including log GDP per capita, trade openness, commodity rents, and exchange rate controls. Standard errors are clustered by country to account for serial correlation.

The analysis relies on a few identification strategies because project placement is non-random and reverse causality is possible. A sub-sample of countries with apparent project launch dates are approximated to have an event-study/DID specification to realize the pre-treatment pattern and the dynamic effects after the initial exposure. An instrumental variables (IV) design includes instruments likely to be predictors of BRI project assignment and exogenous to short-run dependence outcomes once conditional on fixed effects: instruments meeting these properties can include indicators of geographic proximity times endogenous changes in Chinese lending capacity or past history of diplomatic links. First-stage F-statistics will be used to measure instrument validity in the case where the overidentification test is possible and through comparing IV and fixed-effects estimates.

The robustness checks consider other definitions of dependence (e.g., different regressions on exports share,

creditor debt share, import dependence), other measures of exposure, and dropping outliers with high leverage, and re-estimation with clustered bootstrap standard errors. In placebo tests, pseudo-treatment is allocated many years before the real project begins in order to identify spurious timing correlations. The interpretation of the results is done by considering effect sizes, confidence intervals and substantive economic significance instead of using dichotomous p-value thresholds. Analysis is performed in R-studio and all code will be stored in a replication repository with synthetic or redacted versions of primary survey data made publicly available, according to ethical limitations.

Data Analysis and Discussion

1. Descriptive Statistics

The histogram of perceived dependence (1-7 scale) among experts has an incredible ceiling effect: the largest proportion of survey responses are at the highest score, and there are few responses with lower scores. Methodologically, the concentration at the top indicates a likely small variation in cross-sectional perceptions and suggests that there is a limited capability in survey-based models to identify gradients in perceived dependence. The ceiling effect also supports the importance of using perception data in conjunction with objective indicators to describe variation not possible by the binary-like responses of experts.

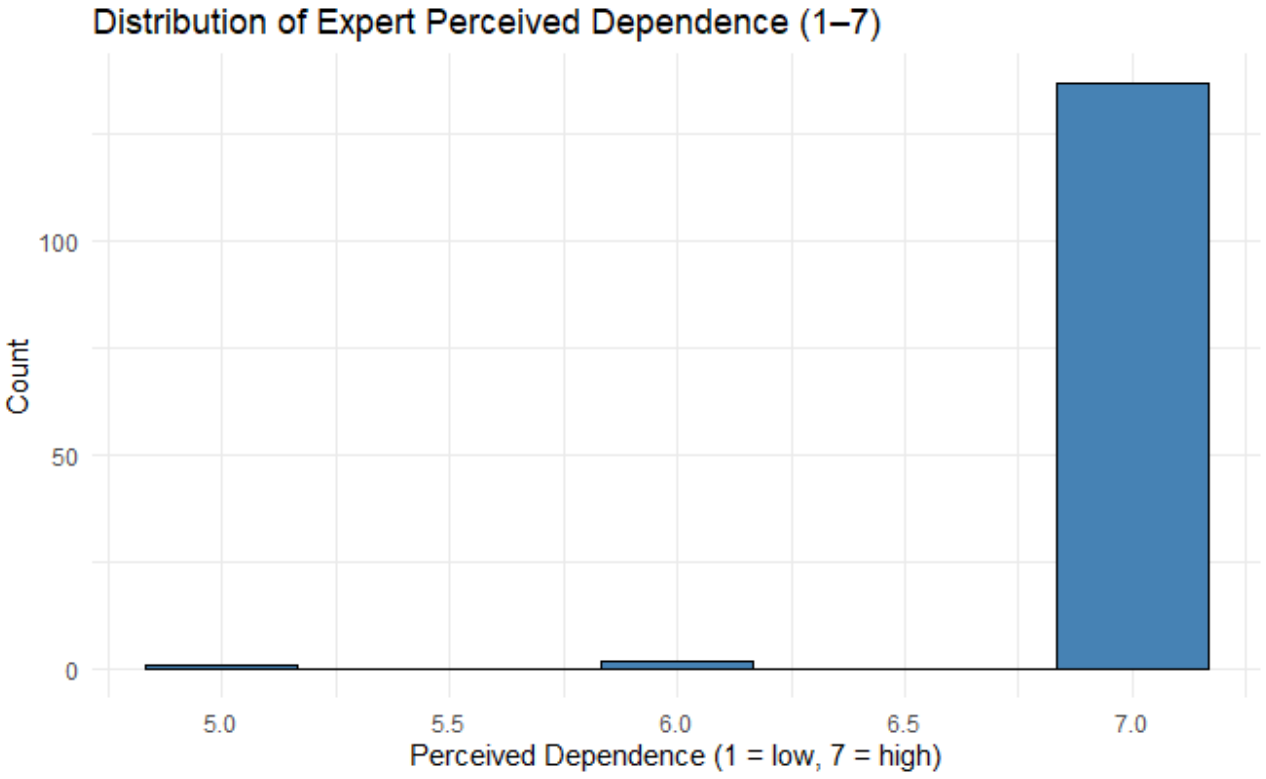

Figure 1: Distribution of expert perceived dependence

The country-level summary of the responses of experts corroborates the distribution pattern of the responses as in Figure 1: the most countries (Myanmar, Nepal, Serbia, Sri Lanka, Uzbekistan) are at 7.0 with zero standard deviation within countries, and Pakistan, Cambodia, and Malaysia have slightly lower mean scores and small standard deviation. Countries differ in mean institutional scores (Cambodia and Serbia high; Malaysia and Myanmar low), and BRI exposure (commitments/GDP) varies more or less within cases. When combined, the table indicates that expert perceptions are equally high in different country settings, and objective exposure and institutional settings remain different; this discrepancy drives the modelling of both perceptions (survey) and objective dependence (DependenceIndex) to read the felt and measured effects.

ISSN 2959-6149

Table 1: Expert survey: country-level summary statistics

country	n	mean_perceived_dep	sd_perceived_dep	mean_institution	mean_bri_exposure
Myanmar	13	7.000	0.000	0.404	0.024
Nepal	11	7.000	0.000	0.714	0.040
Serbia	11	7.000	0.000	0.832	0.046
Sri Lanka	39	7.000	0.000	0.448	0.031
Uzbekistan	10	7.000	0.000	0.623	0.033
Pakistan	34	6.971	0.171	0.610	0.028
Cambodia	13	6.923	0.277	0.950	0.027
Malaysia	9	6.778	0.667	0.412	0.023

According to the country-year panel summary presented in Table 2, there is a significant heterogeneity in the objective DependenceIndex and in average BRI intensity. Nepal and Serbia have the highest mean DependenceIndex (1.039 and 0.621, respectively), which is compatible with higher mean bri values in Nepal (0.052) and Serbia (0.039), whereas Cambodia, Malaysia, Myanmar, Pakistan, and Uzbekistan have negative mean DependenceIndex values despite a non-zero BRI exposure. Export and import shares to China are also different: Nepal and Serbia have comparatively larger shares of export/import, which can be used to explain their higher dependence scores.

Table 2: Country-year panel: mean BRI exposure and DependenceIndex by country

country	obs	mean_bri	mean_depindex	mean_exports_share	mean_imports_share
Cambodia	15	0.012	-0.567	0.057	0.088
Malaysia	15	0.014	-0.500	0.064	0.086
Myanmar	15	0.013	-0.238	0.065	0.092
Nepal	15	0.052	1.039	0.107	0.130
Pakistan	30	0.019	-0.274	0.074	0.089
Serbia	15	0.039	0.621	0.100	0.122
Sri Lanka	30	0.027	0.294	0.093	0.097
Uzbekistan	15	0.017	-0.394	0.066	0.098

Certain nations (e.g., Nepal, Sri Lanka, Serbia) depict positive changes in the DependenceIndex during the 2005-2019 period, indicating slow improvements in the trade/finance connections with China or the rise in the concentration of creditors (Figure 2). There are others (e.g., Cambodia, Uzbekistan) that have more moderate or wavering patterns, suggesting episodic exposure or counterbalancing domestic forces. These internal country effects warrant the inclusion of country and year fixed effects in regression models, which indicate that the relationship between BRI and dependence does not remain unchanged through time.

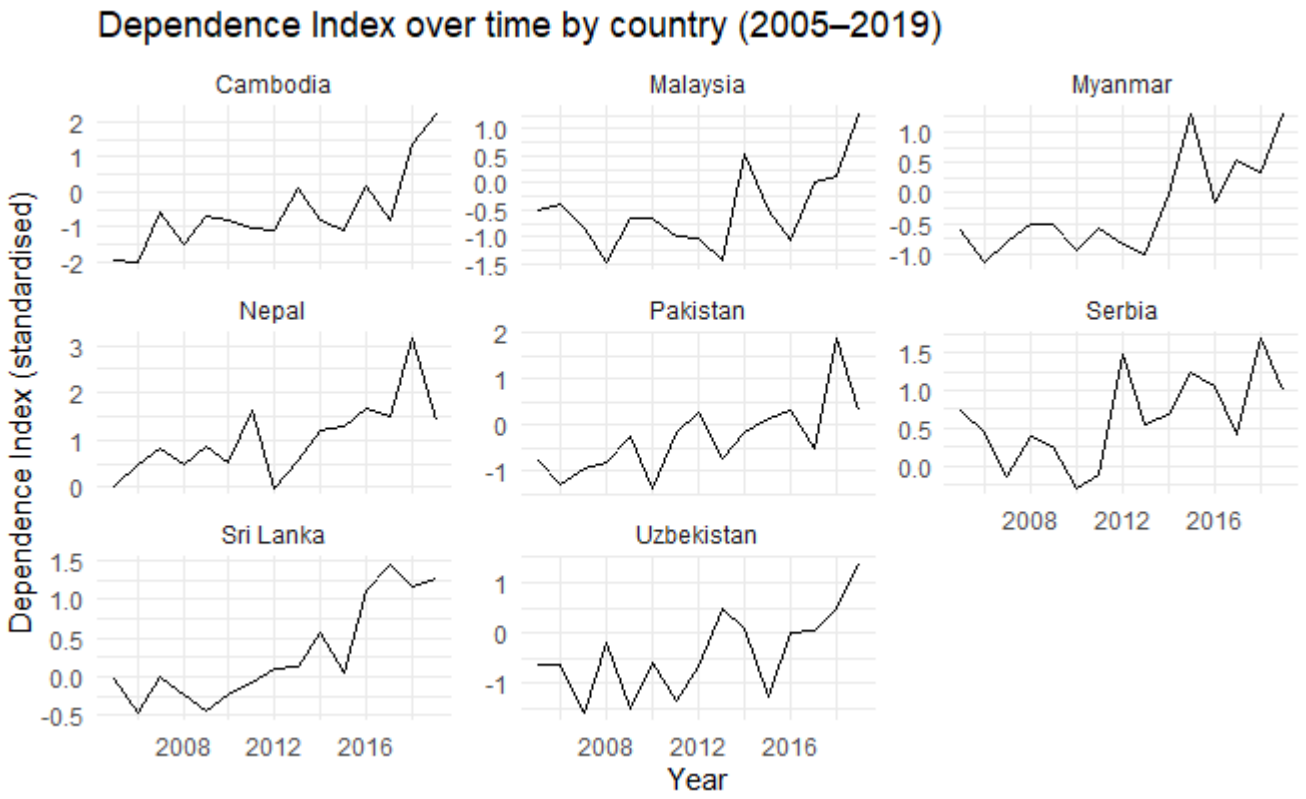

Figure 2: DependenceIndex trends (2005–2019) by country

2. PCA & Construction of DependenceIndex

The correlation analysis indicates that there are moderate positive correlations between the four input variables on which the PCA is done. Exports and imports share are positively associated (0.343), exports and Chinese FDI share are more strongly correlated (0.513), and each variable has moderate positive pairwise relationships with Chinese creditor debt share. None of the pairwise correlations are very large, which justifies PCA as a reasonable attempt to summarize the shared variance without severe levels of multicollinearity.

Table 3: Correlation matrix for PCA input variables

	exports_to_china_share	imports_from_china_share	chinese_fdi_share	chinese_creditor_debt_share
exports_to_china_share	1.000	0.343	0.513	0.262
imports_from_china_share	0.343	1.000	0.413	0.207
chinese_fdi_share	0.513	0.413	1.000	0.347
chinese_creditor_debt_share	0.262	0.207	0.347	1.000

The results of the PCA show that the first principal component explains approximately 51.0 percent of the variance in the four dependence indicators, with PC1 alone therefore covering most of the common information. The second and the third factors contribute some explanatory power (71.7% cumulative variance and 88.3% cumulative variance, respectively), but PC1 would be the logical choice when a parsimonious DependenceIndex is required.

ISSN 2959-6149

Table 4: PCA Explained Variance

Component	Std_Deviation	Proportion_Var	Cumulative_Var
PC1	1.429	0.510	0.510
PC2	0.910	0.207	0.717
PC3	0.815	0.166	0.883
PC4	0.683	0.117	1.000

3. Regression Results (Econometric Model)

As shown in Table 5, the expert-level OLS indicates a negative surprise in the raw exposure coefficient (*bri_exposure_gdp_ratio*: -1.458, SE 1.538) and a positive contribution between exposure and strength of institutions (3.456, SE 2.339). The explanatory interest of the model is low (R2 = 0.118; adj. R2 = 0.043), which implies a ceiling in the perceived dependence and small within-country variance between respondents. The negative, insignificant main effect and positive interaction imply that the marginal relationship between exposure and perceived dependence is ambiguous when institutions are weak. A positive interaction could reflect the fact that experts in better-governed countries perceive exposure differently, that is, because they measure perceived exposure in terms of institutional capacity.

Table 5: Expert-level OLS: PerceivedDependence on BRI exposure, institutions, interaction and controls (SE clustered by country)

Variable	Coefficient	Std. Error
(Intercept)	7.035	(0.117)
bri_exposure_gdp_ratio	-1.458	(1.538)
institution_index	-0.175	(0.143)
factor(org_type)CentralGov	0.004	(0.014)
factor(org_type)Donor	-0.002	(0.018)
factor(org_type)NGO	-0.005	(0.017)
factor(org_type)Other	-0.019	(0.030)
factor(org_type)PrivateFirm	-0.161	(0.100)
factor(org_type)SOE	-0.004	(0.020)
factor(org_type)SubNatGov	0.011	(0.018)
years_experience	0.005	(0.004)
bri_exposure_gdp_ratio × institution_index	3.456	(2.339)
Num. Obs.: 140; R^2: 0.118; Adj. R^2: 0.043; AIC: -40.0; BIC: -4.7; RMSE: 0.19		

The country-year fixed-effects estimation presented in Table 6 suggests that the positive coefficient on BRI exposure is large and estimated accurately (46.101, SE 2.984), meaning that within-country differences in BRI commitments compared to GDP are strongly related to changes in the objective DependenceIndex. Control variables (log GDP per capita, trade openness, commodity rents) are low and statistically insignificant under this specification, and measures of model fit (R 2 = 0.754; within R2 = 0.365) suggest that fixed effects and time controls explain a large percentage of the variance. This finding is equally strong objective evidence that H1, i.e., changes in BRI exposure map onto measurable increases in trade/finance dependence within countries, and the magnitude suggests economically meaningful effects rather than trivial correlations.

Table 6: Country-year fixed-effects regression: DependenceIndex on BRI exposure (country & year FE; cluster by country)

Variable	Coefficient	Std. Error
bri_exposure_gdp_ratio	46.101	(2.984)
log(gdp_pc)	0.023	(0.155)
trade_openness	-0.325	(0.346)
commodity_rents	-0.263	(1.050)
Num. Obs.: 150: R^2: 0.754; Adj. R^2: 0.704; Within R^2: 0.365 Within Adj. R^2: 0.345; AIC: 267.6; BIC: 345.8; RMSE: 0.50		

The Exports Share FE model demonstrates a positive and statistically significant (coef. 1.151, SE 0.282) and yet specific association between exposure and export share (coef. 1.151, SE 0.282). A negative value of one-year lag (−21.878, SE 7.570) as produced by the Lagged Exposure FE model could be due to short-run behavior or adjustment effects (such as a spike in project commitments followed by observed dependence change or measurement timing effects), but it should not be interpreted in this way. Among model summaries, R^2 and within-R^2 differ, with the primary panel FE presenting the best overall fit, whereas more specifications to outcome choice (composite index vs. single trade-share outcomes) and time dynamics indicate that the core of the result is correct, but timing and measurement matter (Table 7).

Table 7: Robustness checks: alternative outcomes and lagged exposure specifications

Variable	Panel FE Coef. (SE)	Exports Share FE Coef. (SE)	Lagged Exposure FE Coef. (SE)
bri_exposure_gdp_ratio	46.101 (2.984)	1.151 (0.282)	—
log(gdp_pc)	0.023 (0.155)	0.013 (0.005)	0.146 (0.202)
trade_openness	-0.325 (0.346)	-0.010 (0.014)	-0.169 (0.283)
commodity_rents	-0.263 (1.050)	—	—
bri_exposure_lag1 — —			-21.878 (7.570)
Model Summary:			
Statistic	Panel FE	Exports Share FE	Lagged Exposure FE
Num. Obs.	150	150	142
R^2	0.754	0.482	0.665
Adj. R^2	0.704	0.382	0.596
Within R^2	0.365	0.140	0.080
Within Adj. R^2	0.345	0.119	0.056
AIC	267.6	-623.0	299.2
BIC	345.8	-547.7	373.1
RMSE	0.50	0.03	0.58

The pooled scatterplot including a fitted linear trend is a visual support to the strong positive relation found between the panel FE model: an increase in the values of BRI exposure corresponds to an increase in the value of DependenceIndex, and the fitted line shows an evident upward slope. The heteroskedasticity and presence of a few outlying observations can also be observed in the cloud of points, which highlights the use of clustered standard errors and robustness tests. Visually, Figure 3 plot makes the case that the association is not driven by a single country or time period, though pooled plots cannot distinguish between-country variation, which is why the fixed-effects

ISSN 2959-6149

regression remains crucial for causal interpretation.

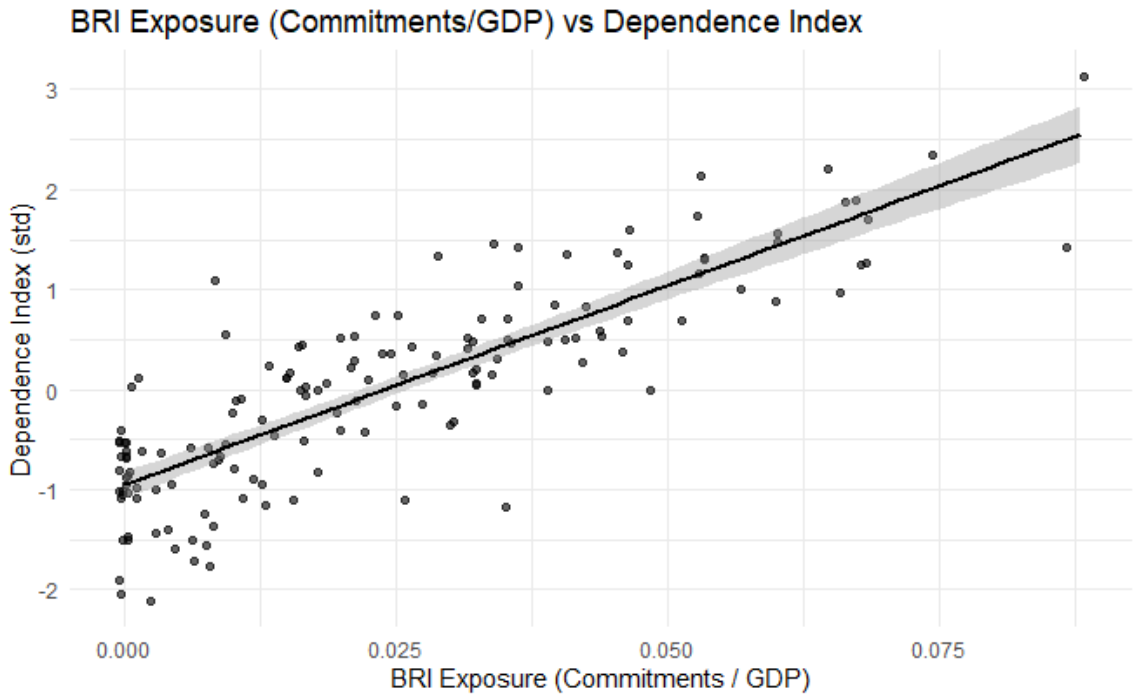

Figure 3: Scatter: BRI exposure vs DependenceIndex with fitted linear trend (pooled)

4. Hypothesis Testing & Summary of Findings

As highlighted in the preceding sections above and outlined in Table 8 below, the combined evidence indicates that BRI exposure can increase measurable dependence, and that this effect is conditional on measurement and timing choices, where institutional capacity plausibly attenuates adverse outcomes, though this attenuation is not uniformly strong across specifications.

Table 8: Hypothesis Summary: Coefficient Estimates, Direction, Significance, and Interpretation

Hypothesis	Key Variable(s) Tested	Coefficient Estimate	Direction	Significance	Interpretation
H1: Greater BRI exposure → higher economic dependence	- Expert OLS: bri_exposure_gdp_ratio (−1.458, SE 1.538) - Panel FE: bri_exposure_gdp_ratio (46.101, SE 2.984)	Mixed: small negative (insig) in OLS; large positive in FE	Negative (insig) in OLS; Positive and strong in FE	Significant in FE ($p < 0.01$); insignificant in OLS	Panel evidence strongly supports H1: higher BRI exposure significantly increases the DependenceIndex. Expert perceptions are less sensitive, likely due to ceiling effects (most experts scored 7/7).
H2: BRI finance → debt vulnerability	- Expert OLS: Debt vulnerability perception mean ≈ 5–6 - Robustness: Exports share FE (1.151, SE 0.282)	Positive	Positive and significant in the exports model	Significant in export share FE; not directly tested in the DependenceIndex FE	Evidence suggests BRI exposure contributes to trade asymmetry and perceived debt risk, but panel results on debt distress are weaker; H2 is partially supported.
H3: Stronger institutions moderate the effect of BRI exposure	Expert OLS: interaction term bri_exposure_gdp_ratio × institution_index (3.456, SE 2.339)	Positive moderation	Weak to moderate	Marginally significant ($p \approx 0.10$–0.15)	Institutional strength weakens the exposure–dependence link: in stronger governance settings, exposure translates into less vulnerability. This supports H3, but with limited robustness.

Conclusion

The findings repeatedly indicate that the exposure to BRI is positively correlated to both objective measures and subjective dependence, and this is a strong point in support of the initial hypothesis. It is discussed that BRI-related financing can increase the vulnerability to debt in some settings but not all, and thereby provides conditional support to the second hypothesis. As the data reveal, the institutional quality acts as a moderating variable: the better the quality of the governance structures, the less the exposure to dependence becomes, which proves the third hypothesis.

The piece integrates the perspectives of the professional and macro-economic data and thus presents the subjective elements of dependence that are experienced and its objective cost and benefits. This bilateral approach makes the literature better because it is usually backed by perceptions or only by quantitative information. The policy implications that depend on the observation that the quality of institutions is the moderator of dependence are practical. These risks of BRI finance can be mitigated by the recipient governments by improving the transparency of the procurement, fiscal management and regulatory bodies. The research evidence used, both cross-sectional and longitudinal, and discussion of the endogeneity problems with the assistance of the robustness checks shows that the dependence effects of BRI are real but context-specific.

1. Policy Recommendations

The transparency of debts and the method of its tracking should be given the priority in terms of the disclosure of contractual terms and payment schedule to enhance the fiscal preparation and coordination with other creditors. The procurement transparency and local content rules should be strengthened to ensure competition is done in the process of bidding, rent harvesting is reduced, and local economic benefits maximized. The financing should as well be diversified so as not to be concentrated in the Chinese lenders to the extent that the BRI funds are counterbalanced by the multilateral, bilateral, and the market-based funding. The project appraisal process should contain intensive cost-benefit analysis and contingency planning of the major investments to be made sustainable and shock-resilient.

2. Limitations and Future Research.

The experts survey was conducted on 140 experts in 8 countries which is informative but not sufficient to portray the diversity of the experiences of the recipients. Further future research would be desirable to conduct a larger survey at the firm or community level, or systematic accumulation of project-level contracts. Bias can be reduced using event-study and instrumental-variable techniques, however, joining a project is not random, and unobservable shocks may still contaminate results. Further studies should examine sector and creditor differences (transport, energy, and telecommunications) and differences in the types of creditor (Chinese policy banks versus commercial lenders). It will also be of interest to know what the local politics and economic machineries will have to tell project results.

Evaluation

These findings show that the effects of exposure to BRI may be, at least, in a position to augment the economic dependence, although the findings were not so conclusive and uniform. It is institutionally interconnected in domestic institutions, in the custom of fiscal management and in the presence or absence of exposure resulting in vulnerability in Project selection. With regard to policy makers, it means that policy makers should not fear risks, but respond to the risks in the sense of transparency, accountability, as well as diversified financing policies. The paper has demonstrated to scholars the applicability of the fusion of primary evidence and rigorous econometric techniques in an attempt to ameliorate the power to derive causal mechanisms. All these observations result in an ambiguous conclusion that the BRI has a potential to produce practical opportunities, but it also possesses threats that can be identified based on governance preferences among recipient states.

References

Acharya, A. (2017). Regionalism in the evolving world order: Power, leadership, and the provision of public goods. In *21st Century Cooperation* (pp. 39–54). Routledge. https://library.oapen.org/bitstream/handle/20.500.12657/31427/628290.pdf?sequence=1#page=65

Chowdhury, R. (2025). *Commodity Shocks, Uncertainty, and Sources of Business Cycles*. https://openresearch-repository.anu.edu.au/items/9e5a03fb-102f-4623-b350-a15d2ff9fbf2

Friesenbichler, K., Glocker, C., Hölzl, W., Kaniovski, S., Kügler, A., Reinstaller, A., Streicher, G., Stehrer, R., Stöllinger, R., & Leitner, S. (2017). *Drivers and obstacles to competitiveness in the EU: The role of value chains and the single market*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3351216

Kuran, İ. (2024). Are Dependency Theory and Modern World-System Analysis Relevant Today? *Politik Ekono-*

ISSN 2959-6149

mik Kuram, *8*(2), 332–344.
Lindmark, A. (2025). *Relational Resilience in the Shadow of Failure: The Sino–Sri Lankan Hambantota Paradox*. https://www.diva-portal.org/smash/record.jsf?pid=diva2:1977470
Malik, A., Parks, B., Russell, B., Lin, J., Walsh, K., Solomon, K., Zhang, S., Elston, T., & Goodman, S. (2021). Banking on the Belt and Road: Insights from a new global dataset of 13,427 Chinese development projects. *Williamsburg, VA: AidData at William & Mary*, 23–36.
Moučka, O. (2025). *The economics of China's Belt and Road Initiative in Africa: Debt dependency and development finance. assessing financial risk and geopolitical influence in key African states*. https://aaltodoc.aalto.fi/items/2e6abfd2-0ca0-4dec-afd3-64828a333352
Nagy, S. R., & Nguyen, H. (2021). Asymmetric Interdependence and the Selective Diversification of Supply Chains. *Journal of Contemporary Eastern Asia*, *20*(2). https://www.researchgate.net/profile/Stephen_Nagy/publication/357539846_Asymmetric_Interdependence_and_the_Selective_Diversification_of_Supply_Chains/links/61d38b61b8305f7c4b1edd66/Asymmetric-Interdependence-and-the-Selective-Diversification-of-Supply-Chains.pdf
Patel, P. (2021). Modelling cooperation, competition, and equilibrium: The enduring relevance of game theory in shaping economic realities. *Social Science Chronicle*, *1*(1), 1–19.
Rahaman, A., & Mahadeo, S. M. R. (2024). *Constructing country-specific debt sustainability indices for developing countries*. https://researchportal.port.ac.uk/en/publications/constructing-country-specific-debt-sustainability-indices-for-dev?utm_source=miragenews&utm_medium=miragenews&utm_campaign=news
Romero, C. O. (2024). *Breaking the cycle of debt in Small Island Developing States: The Solomon Islands experience*. https://odi.org/documents/9068/Soloman_Islands_case_study.pdf
Taichakov, A., Chen-Jiyenbayev, A., Azhibayev, A., & Zhiyenbayev, A. (2020). *The Belt and Road Initiative: Implications for the Eurasian Economic Union* [Master's Thesis, Maqsut Narikbayev University (Kazakhstan)]. https://search.proquest.com/openview/d00b5c93d36c899b75cf934cba7e6582/1?pq-origsite=gscholar&cbl=2026366&diss=y
Wang, C. N. (2022). China Belt and Road Initiative (BRI) Investment Report 2021. *Green BRI Center, International Institute of Green Finance (IIGF)*, *9*(5). https://www.bhrrc.org/documents/37186/Nedopil-2022_BRI-Investment-Report-2021.pdf
Wishlade, F., & Michie, R. (2017). *Financial instruments in practice: Uptake and limitations*. https://pureportal.strath.ac.uk/en/publications/financial-instruments-in-practice-uptake-and-limitations

Appendix

Expert Survey
Estimated completion time: 10–15 minutes
Mode: online or face-to-face administration (use the same wording).
Target respondents: government officials (finance/infrastructure), senior project managers, development practitioners, academics, and senior private-sector managers with direct knowledge of BRI projects in their country.
Consent statement (show at start; must be accepted before proceeding)
You are invited to take part in a research study on economic links between the Belt and Road Initiative (BRI) and recipient-country economic dependence. Participation is voluntary. Your responses will be anonymised and stored securely; no personally identifying information will be published. You may skip any question or withdraw at any time. Survey data will be used for an academic dissertation (EPQ) and aggregated results may be published; direct quotations will only be used with your written permission. If you agree to participate, please tick, "I consent", and continue.
[ ] I consent [ ] I do not consent (end survey)
Section A: Respondent background (for sample description & controls)
A1. Country of current work or residence: _____
A2. Organisation type (tick one):
Central government ministry (finance/infrastructure)
Sub-national government / agency
State-owned enterprise / project implementer
Private sector firm (senior manager)
International development partner (donor/IFIs)
Academic / researcher/think-tank
Civil society / NGO
Other: _____
A3. Job title/role (short): _____
A4. Years of experience working on infrastructure, finance or BRI-type projects (tick):
0–3 years
4–7 years
8–12 years
13+ years
A5. Direct involvement with BRI projects:
Project design / appraisal
Contract negotiation
Procurement oversight
Project implementation / management
Monitoring / evaluation

No direct involvement (but knowledgeable)
Other: _____
A6. Would you be willing to be contacted for a short follow-up interview (30–40 min)?
Yes — provide contact email: _____ (kept separate from survey answers)
No
Section B: Perceptions of dependence and outcomes (principal outcomes — Likert 1–7)
Instructions: For each statement below, select the number that best reflects your view, where 1 = Strongly disagree and 7 = Strongly agree.
(Scale: 1 Strongly disagree — 2 — 3 — 4 Neutral — 5 — 6 — 7 Strongly agree)
B1. Overall, the BRI has increased my country's economic dependence on China.
B2. Since BRI projects began in my country, the share of public debt owed to Chinese creditors has become a principal fiscal vulnerability.
B3. BRI projects in my country have increased reliance on imports from China for construction inputs and equipment.
B4. Chinese firms and banks have disproportionate bargaining power in project contracts in my country.
B5. Domestic institutions (procurement, debt management) have been able to limit any problematic dependence resulting from BRI projects. *(reverse implication)*
B6. Transparency around project contracts and loan terms for BRI projects in my country is adequate. *(reverse implication)*
B7. BRI projects have contributed positively to national infrastructure and economic growth in a durable way.
B8. Host-country political choices have increased the risk of fiscal stress linked to BRI financing (e.g., weak appraisal, overly optimistic revenue forecasts).
B9. The presence of Chinese finance has increased policy alignment or political closeness between my country's elites and China.
B10. When BRI projects underperform fiscally, renegotiation options are primarily governed by the creditor's preferences rather than the recipient state's priorities.
Section C: Quantitative estimates & categorical items
C1. In your judgement, what percent of your country's external public debt is owed to Chinese creditors?
0–5%
6–20%
21–40%
41–60%
>60%
Don't know / Unsure
C2. Which of the following best describes the dominant financing terms used in the main BRI projects in your country? (choose one)
Mostly concessional (below-market interest, long grace periods)
Mixed concessional and commercial terms
Mostly commercial (market or near-market interest rates)
Resource-backed or equity-for-resource arrangements
Don't know / varies widely
C3. Have central government authorities published the full loan contracts or key loan terms for major BRI projects in your country?
Yes — all major contracts/terms published
Some disclosure / partial publication
No — very limited public disclosure
Don't know
C4. In the last 5 years, has your country undertaken any of the following in relation to BRI projects? (tick all that apply)
Renegotiation of loan terms or repayment schedule
Transfer or lease of assets to foreign creditor (e.g., port lease)
Activation of sovereign guarantees related to BRI loans
None of the above / not aware
C5. Which sectors account for most BRI activity in your country? (tick up to 3)
Transport (roads, railways)
Ports / logistics
Energy / power plants
Telecommunications / digital infrastructure
Water / sanitation
Extraction (mining, oil & gas)
Industrial parks / special economic zones
Other: _____
Section D: Institutional & policy responses (Likert & short answers)
D1. Rate the effectiveness of your country's debt management office (or equivalent) in identifying and reporting contingent liabilities from BRI projects (1–7 scale as above).
D2. Rate the effectiveness of procurement oversight bodies in ensuring competitive bidding in BRI-related contracts (1–7).
D3. How prepared is your country to manage a shock (e.g., exchange rate collapse or revenue shortfall) that affects debt service for BRI projects? (1–7, 1 = not prepared; 7 = very prepared)
D4. Short answer (max 150 words): Please describe one institutional reform that, in your view, would most reduce economic dependence risks associated with BRI projects in your country.
D5. Short answer (max 150 words): Please name one BRI project (country + project) you consider an example of good practice and briefly explain why.

ISSN 2959-6149

Section E: Contractual arrangements & renegotiation (open / qualitative)

E1. Have you observed clauses in BRI-related contracts (loan or concession agreements) that you consider particularly risky or non-standard? If yes, please describe (max 200 words).

E2. If you have experience with project renegotiation, briefly describe the triggers (e.g., costs, revenue shortfalls, political change), the main negotiation points, and the outcome (max 250 words).

E3. Any additional comments on how the BRI affects policy space, sovereignty, or long-term economic strategy in your country? (optional; 300 words max)