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Regional Economic Impact of Chinese FDI in South Asia

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Abstract

Contrary to the downward trend in global FDI inflows in South Asia, Chinese FDI increases. This increase is largely motivated by China's BRI, which aims to enhance regional economic integration and connectivity. This study examines the impact of Chinese FDI on per capita income in South Asia using country-level panel data between 2004 and 2023. For econometric estimation, this study applies Fixed Effects (FE), Generalized Least Squares (GLS), Dynamic Panel Generalized Method of Moments (GMM), Panel Quantile Regression (PQR), and Panel-Corrected Standard Errors (PCSE). The result consistently shows that a 1 percent increase in Chinese FDI is associated with a 0.224 percentage point increase in per capita income. Importantly, our finding indicates that institutional factors influence this association. Political stability and control of corruption moderate this effect, whereas military expenditure weakens it. The study underscores the need for improving institutional quality and effective resource allocation to enhance economic gains from FDI inflows.

JEL Codes: F15, F21, F50, F62.

1. Introduction

Globalization has played a pivotal role in the emergence and expansion of foreign direct investment (FDI) (Dunning, 2003; Nunnenkamp, 2002). This growth has been primarily driven by increasing interdependence among global economies, enabled by advancements in international trade, technological progress, and the liberalization of capital flows (IMF, 2018; Jaumotte et al., 2013; Maurice & Taylor, 2003). As a result, FDI has become a key factor of economic growth, addressing the increasing need for resource procurement, cost efficiency, and market entry. This trend has been further intensified by the expansion of multinational enterprises (MNEs), which increasingly invest abroad to diversify operations, access new markets, and enhance global supply networks. Additionally, governments contribute significantly to FDI growth by employing bilateral investment treaties (Neumayer & Spess, 2005), multidimensional cooperation (Busse & Hefeker, 2007), tax incentives (Blomström et al., 2003), and special economic zones (Farole, 2011) to establish conducive investment environments (Hartman, 1985).

Furthermore, geopolitical issues have unpreventable impact on FDI flows. UNCTAD (2024) highlights that political instability is a major deterrent to cross-border investment, which resulted in a decline in global FDI. Similarly, the OECD (2024) report indicates that investors are placing a higher value on regulatory predictability, political stability, and alignment with environmental objectives. Consequently, FDI is becoming more selective, influenced by both economic fundamentals and geopolitical factors. This shifting geopolitical and economic landscape not only modifies the strategic orientation of FDI, but it also establishes the foundation for understanding broader patterns in international investment. Historical data shows that global FDI flows have changed in recent decades. According to UNCTAD (2022), global FDI grew from 205 billion USD in 1990 to more than 2 trillion USD in 2015. However, since that FDI flows have decreased globally. For example, in 2022, global FDI dropped by 12% to USD 1.35 trillion, and in 2023, it dropped by an additional 2% to USD 1.33 trillion (UNCTAD, 2023; 2024).

This pattern is not the same in all regions. In 2023, FDI increases by 9% in developed economies but declines by 7% in developing economies (UNCTAD, 2024). In particular, Asia, which accounts for approximately 60% of the world's population (World Bank, 2025), experiences an 8% reduction in inflows, with South Asia most severely affected. Global FDI inflows in South Asia decreased by 37% in 2023 compared to 2022 (UNCTAD, 2024). This decline reflects the interaction between global and domestic factors. Tight global financial conditions, a slowing economy, and rising geopolitical tensions have all made it harder for cross-border investment. This has sent shocks from outside South Asia through trade and financial links. At the same time, long-standing problems at home, like policy ambiguity, unstable regulations, weak politics, and poor infrastructure, are making the region's investment climate worse and making it more vulnerable to the global drop in FDI.

Despite declining global FDI in South Asia, Chinese FDI presents a growing trend. China's escalating FDI in South Asia underscores its importance in the region. Chinese firms have progressively augmented their international footprint via outward investment to diversify operations, access new markets, and enhance supply chain resilience. As reported by the Ministry of Commerce of the People's Republic of China (MOFCOM, 2024), China's global FDI attained 1.04185 trillion yuan (about 147.85 billion USD) in 2023, reflecting a year-on-year rise of 5.7% in yuan terms. In particular, China's FDI has increased in South Asia. Figure 1 shows that Chinese FDI in the region has expanded in the last decades. This reflects Beijing's broader geopolitical and economic ambitions under the Belt and Road Initiative (BRI).[1]

Beijing is willing to gain a bigger economic presence in significant regional markets by creating infrastructure, making trade simpler, and forming strategic relationships. During this time when China was becoming more involved, accidently South Asia's per capita income progressively rose from around $564 in the early 2000s to over $2,000 in 2023 (See Fig. 2). In the 2000s, growth was modest, but it picked up pace in 2013, the year when BRI launched. This makes it plausible that there is a relationship between increased Chinese FDI and the development of South Asia. On the other hand, South Asian nations acknowledge the economic prospects presented by China but exercise caution. They reconcile their economic interests with China while preserving strategic relationships with India and the United States, cautious of excessive long-term dependence on China. The intricate interaction of economic, political, and security factors influences the region's reaction to China's growing presence via FDI under the BRI objectives.

China's BRI in South Asia is a tailored, country-specific strategy that reflects both China's evolving bilateral ties and the region's strategic importance. For instance, the China-Pakistan Economic Corridor (CPEC) (UNCTAD, 2022), India's Asian Infrastructure Investment Bank (AIIB) (Yu, 2020; Callaghan & Hubbard, 2016), Sri Lanka's Hambantota Port (BBC, 2017), and Bangladesh's industrial and energy zones (Razzaque et al., 2024) are representative of the BRI's economic contribution in the region. Figure 3 illustrates the allocation of Chinese FDI within the region, revealing that Pakistan accounts for 47% of this investment, signifying China's most proximate regional ally. Despite ongoing border tensions and geopolitical competition with China, India is the second-largest recipient of Chinese FDI, accounting for about 30% of total FDI. This apparent paradox points to the practical complexity of China-India economic ties, where growing economic interdependence coexists with geopolitical mistrust and military competition. Similarly, China's policies toward smaller South Asian nations vary according to regional political and economic conditions. For instance, China offers Nepal alternative port access, helping the landlocked nation reduce its reliance on India (Johny, 2024). Beijing intends to expand its economic cooperation with Afghanistan by investing in mining to support post-war reconstruction and regional stability. However, security concerns, particularly cross-border militancy affecting Xinjiang region, shape China’s policy toward Afghanistan (Zhu et al., 2022). Taken together, these examples highlight China's flexible BRI approach in South Asia, which aims to increase its economic and geopolitical might while navigating intricate regional dynamics.

As mentioned earlier, despite persistent geopolitical tensions—including the China–India border dispute—Chinese FDI in the region has expanded markedly. Yet systematic, data-driven evidence on its economic effects remains limited. This study addresses this gap by estimating the impact of Chinese FDI on per capita income in South Asia from 2004 to 2023 and assessing whether governance quality, population pressure, and military expenditure moderate this relationship. The findings inform debates on the economic consequences of the BRI and on regional interdependence amid strategic rivalry, with implications for both policymaking and international relations.

This paper makes several contributions to existing literature. Initially, it provides source- and region-specific evidence by examining Chinese FDI—an infrastructure-heavy, state-associated investment approach strongly tied to the BRI—within the South Asian setting. The study demonstrates that Chinese FDI significantly increase per capita income in the region. Secondly, it shifts the analytical emphasis from the average growth impacts of foreign capital to a conditional inquiry: under what institutional and political-economy frameworks can Chinese FDI result in per capita income increases? The results highlight that governance quality and effective resource allocation moderate FDI impact. Third, it offers policy-relevant insights on how South Asian governments can better harness FDI through stronger governance and screening, better project delivery, strategic alignment, and effective management of security and resource allocation.

2. Research Design

2.1. Data and variables

This study utilizes an annual balanced panel data spanning the period from 2004 to 2023 for selected South Asian countries.[2] The region is defined by intricate and interconnected geopolitical processes, encompassing enduring border conflicts and the ongoing threat of terrorism (Meng & Ghafoori, 2024), which persistently influence regional security and bilateral ties.These nations are selected due to their strategic significance, diverse developmental trajectories, and increased engagement with China's global investment strategy, particularly via the BRI project. The BRI has profoundly influenced South Asian geopolitics, increasing economic dependence on China while also raising substantial concerns regarding debt sustainability, political leverage, and national sovereignty (UNCTAD, 2022; Nedopil, 2025). Furthermore, the project is linked to broader regional security issues, particularly

China's actions in Xinjiang, a region bordering Afghanistan and home to the Uyghur minority, which has emerged as a sensitive issue impacting diplomatic relations and regional stability.

This study uses two primary datasets. First, the Ministry of Commerce of the People's Republic of China (MOFCOM, 2025) and the National Bureau of Statistics of China (2024) furnish data on Chinese FDI. Second, the World Bank's World Development Indicators (WDI) database provides macroeconomic indicators—GDP per capita, population, and military expenditure—and governance measures—political stability and control of corruption (World Bank, 2025). The GDP per capita is expressed in constant US dollars from 2015 to adjust for inflation and facilitate temporal comparisons.

The dependent variable in this research is GDP per capita, a widely recognized indicator of economic growth and average income levels. In South Asia, the world's most populous area characterized by significant income, infrastructure, and industrial development differences, GDP per capita serves as a valuable indicator for assessing the economic welfare of each country over time. Its application is well-documented in the growth literature, notably by Sala-I-Martin et al. (2004), who emphasize its significance in long-term development assessment.

The primary independent variable is Chinese FDI inflows. This variable captures the annual value of China's investment in each of the six South Asian economies. The emphasis on Chinese FDI arises from its unique characteristics compared to traditional Western FDI. Unlike conventional FDI, which is mostly market-driven, Chinese investment is often state-influenced, infrastructure-oriented, and strategically executed. Studies such as those by Buckley et al. (2007) and Kolstad & Wiig (2012), highlight the distinctive geopolitical and developmental consequences of Chinese investment, especially in emerging and vulnerable economies. In South Asia, where infrastructural shortcomings are apparent, the developmental potential of Chinese FDI requires comprehensive empirical analysis.

The model includes control variables that represent macroeconomic fundamentals and institutional quality to separate the distinct impact of Chinese FDI on economic growth. The initial factor is total FDI inflows, which accounts for the whole investment environment and prevents the conflation of the impacts of Chinese and non-Chinese foreign investments. Extensive literature, including Alfaro et al. (2004), indicates that FDI can enhance economic growth via capital accumulation, knowledge transfer, and increased productivity; however, the impacts may vary based on host-country attributes such as financial development and governance.

Military expenditure, represented as a percentage of GDP, is incorporated into the model to examine the fiscal and political stability dimensions of growth. In South Asia, military expenditures are frequently elevated because of persistent security challenges, including civil conflicts, border disputes, and internal insurgencies. For instance, from 2001 to 2021, Afghanistan designated about 45% of its national budget to war-related and conflict-affected expenditures (Meng et al., 2024). Collier and Hoeffler (2004) contend that increased military spending can reallocate resources from productive sectors, discourage private investment, and diminish the efficacy of development assistance. Consequently, military expenditure functions as a crucial control variable in the examination of economic outcomes in conflict-affected regions.

The total population is included as another control variable to mitigate demographic scale effects that significantly impact economic outcomes, particularly in South Asia (World Bank, 2025). In an environment marked by elevated population density and demographic heterogeneity, population size influences GDP per capita by impacting labor supply, domestic consumption, public service demands, and infrastructure needs. Neglecting population factors may distort econometric estimates, as nations with bigger populations often encounter distinct developmental challenges and opportunities compared to their smaller counterparts. Bloom et al. (2003) contend that demographic factors are crucial in fostering economic growth in emerging countries, particularly through their impact on human capital and labor productivity. Kelley and Schmidt (2005) assert that the inclusion of demographic variables enhances the explanatory power and validity of economic models. Incorporating population as a control variable enhances the accuracy of the research and facilitates comparisons among the many economies of the region.

Lastly, two governance indices, political stability and control of corruption, are used to measure the quality of institutions. Political stability indicates the probability of governmental failure, civil disorder, and political violence—enduring threats in various South Asian nations (Kaufmann et al., 2010). Political instability, which is a key indicator of governance, can stop people from investing in both their own country and other countries, slow down commerce, and make it less likely that the economy will grow (Globerman & Shapiro, 2003). The second measure, control of corruption, looks at how much public power is abused for personal benefit and how

well systems are meant to stop this abuse work. Empirical studies, including Meng et al. (2025), demonstrate that corruption substantially impedes investment efficiency and skews resource allocation, especially in nations with fragile institutional frameworks. By adding these two governance variables, the model takes into consideration differences in institutional quality between countries and overtime, which are important for understanding how the area is developing.

2.2. Econometric modelling

This paper employs multiple econometric models—static and dynamic panel estimators—to systematically evaluate the developmental impacts of Chinese FDI in South Asia. Using several complementary methodologies helps address important econometric problems with the data and makes the empirical results more reliable and robust. This multi-model approach is grounded in well-established theoretical and empirical research and follows best practices in applied econometrics.

The analysis begins with a fixed effects (FE) estimator to control for unobserved, time-invariant country heterogeneity—such as geographic, historical, and institutional factors—that may be correlated with the explanatory variables and bias estimates if omitted. Given the substantial structural, political, and institutional diversity across South Asian economies, the FE model is particularly appropriate and widely used in empirical growth and development studies (Baltagi, 2006; Wooldridge, 2010). Accordingly, it provides a reliable baseline for evaluating subsequent estimations.

Moving forward, the research employs the Generalized Least Squares (GLS) estimator, recognizing that regional economic panels often exhibit panel-specific heteroskedasticity and cross-sectional dependence resulting from shared exposure to global shocks, regional trade connections, or geopolitical spillovers (Wooldridge, 2010). The GLS model enhances estimation efficiency when error structures are non-spherical and accommodate diversity in variance-covariance matrices between countries, which are likely in a politically and economically interconnected region such as South Asia (Greene, 2003). The application of both FE and GLS strengthens the robustness of the findings and ensures the validity of conclusions across diverse and realistic data-generating processes.

To address potential endogeneity in Chinese FDI—particularly the possibility that more advanced economies may attract greater investment—the study employs a dynamic panel model utilizing the Arellano–Bond Generalized Method of Moments (GMM) estimator (Arellano & Bond, 1991). This strategy is a good fit for the panel format of the data and addresses the Nickell bias that arises from using lagged dependent variables in fixed-effects models (Nickell, 1981). The estimator uses past data to develop internal tools that help avoid timing issues and causal relationships. These are two of the most significant factors to consider when conducting development research, since investment and growth occur simultaneously. This method is considered more reliable because it has been used in important large-scale studies, especially by Acemoglu et al. (2019), who employed the Arellano–Bond GMM estimator to examine how democracy affects economic growth.

The study employs panel quantile regression in conjunction with mean-based estimators to clarify the diverse effects of Chinese FDI across different levels of economic growth. Koenker and Bassett (1978) assert that quantile regression provides a more thorough comprehension of the conditional distribution of the dependent variable and enables a more refined interpretation, especially in scenarios with distributional asymmetries. This is particularly relevant in South Asia, where countries exhibit considerable disparities in wealth levels and institutional capacities. The analysis use quantile regression to elucidate the differing marginal effects of Chinese FDI throughout the continuum of economic development, from lower income to more advanced economies in the region.

Lastly, to address issues of contemporaneous correlation and heteroskedasticity in the panel structure, the study uses the Prais-Winsten regression with panel-corrected standard errors (PCSE), as proposed by Beck and Katz (1995). The PCSE estimator is particularly well suited for panels with a relatively small number of cross-sectional units and long-time dimensions—precisely the structure of the current dataset. Its inclusion safeguards against inflated test statistics that could arise from underestimated standard errors in traditional panel models.

Taken together, this layered econometric strategy provides a rigorous, theoretically grounded approach for estimating the effects of Chinese FDI on economic development. Fixed effects make the results more reliable, GLS and PCSE make the analysis more efficient and correct errors, GMM addresses changes over time and related issues, and quantile regression shows how effects vary across quantiles. By using these methods together, the analysis ensures that the results are reliable and clearly link Chinese FDI to

GDP per capita in South Asia, rather than being influenced by a single way of looking at the data. This approach strengthens the credibility of the findings and offers a more nuanced view of how Chinese FDI shapes the developmental trajectories of host economies in the Global South.

3. Empirical Findings and Discussion

3.1. Descriptive statistics

Table 1 displays descriptive statistics and correlation matrix for the variables incorporated in the analysis. In Panel A the GDP per capita ranges markedly from USD 221 to USD 4,401, underscoring considerable developmental disparities across South Asia. India and Sri Lanka often demonstrate high income levels, whilst Afghanistan remains one of the most destitute and conflict-affected countries. Chinese FDI inflows average USD 1.17 billion, reaching a maximum of USD 7.49 billion, with Pakistan as the primary beneficiary, mostly attributable to projects under the CPEC (see Fig. 3). The average cumulative FDI inflows reach USD 6.82 billion, reflecting the region's overall attractiveness to foreign investors. Military expenditure averages 2.08% of GDP, exhibiting significant variance (0.94%–3.96%), with countries such as India and Pakistan committing larger percentages to military spending due to persistent security concerns. Governance indicators demonstrate considerable variability: the mean values for control of corruption (25.45) and political stability (12.66) reflect generally inadequate institutional quality, particularly in fragile states like Afghanistan and Pakistan, as opposed to relatively stronger performers such as Nepal and Sri Lanka.

The correlation matrix in Panel B reveals a significant positive correlation between Chinese FDI and GDP per capita ($r = 0.564$), highlighting the economic importance of Chinese investment in the region. Total FDI inflows demonstrate a robust correlation with population size ($r = 0.809$), indicating that substantial markets such as India and Pakistan attract considerable international investment. Furthermore, they have a positive correlation with GDP per capita ($r = 0.570$), consistent with the growth-enhancing role of foreign investment. Conversely, military expenditure demonstrates a negative link with political stability ($r = -0.107$), suggesting that increased defense spending correlates with weakened governance in conflict-prone environments. Governance indices exhibit strong positive correlations with GDP per capita—0.622 for control of corruption and 0.641 for political stability—highlighting the critical significance of institutional integrity in economic achievement. Panels A and B collectively illustrate that foreign investment, particularly Chinese FDI, promotes growth in South Asia, but elevated military expenditure in unstable countries such as Afghanistan may undermine political stability and long-term economic prosperity.

Table 1
Summary of statistics and correlation matrix

Panel A: Summary of statistics							
Variable	Obs	Mean	Std. dev.	Skew	Kurt	Min	Max
GDP per capita	120	1,412.50	1,048.86	1.35073	4.06965	221.76	4,401.06
Chinese FDI	120	1,170.40	1,734.46	1.77586	5.28143	0.45	7,485.38
Total FDI	116	6,822.60	14,142.98	2.26979	6.93490	0.42	64,362.36
Population	120	291.00	459.00	1.71815	4.15971	20.10	1,440.00
Military expenditure	118	2.08	0.85	0.30185	1.81022	0.94	3.96
Corruption control	120	25.45	15.27	0.04534	1.84484	0.47	52.91
Political stability	120	12.66	12.01	1.27672	4.05917	0.47	50.48
Panel B: Correlation matrix							
	GDP/ capita	Chinese FDI	Total FDI	Population	Military expenditure	Corruption control	Political stability
GDP per capita	1						
Chinese FDI	0.564	1					
Total FDI	0.570	0.573	1				
Population	0.151	0.447	0.809	1			
Military expenditure	0.213	0.163	0.401	0.346	1		
Corruption control	0.622	0.208	0.437	0.252	0.315	1	
Political stability	0.641	0.043	0.312	0.080	-0.107	0.660	1

Note. GDP per capita in constant 2015 USD, Chinese and total FDI in million USD, population in million, military expenditure as percentage of GDP, Corruption control index and political stability index range from 0 to 100. Source: Authors calculation.

3.2. Baseline findings: Fixed effect and GLS estimation

Table 2 presents the impact of Chinese FDI on GDP per capita in South Asian nations. Models 1 and 2 employ fixed-effects estimators, whereas Models 3 to 5 include GLS to mitigate heteroskedasticity and autocorrelation concerns. Model 1 examines the overall effect of Chinese FDI on GDP per capita. A statistically significant association of 0.199 indicates that a 1% increase in Chinese FDI is associated with an approximate 0.20% growth in GDP per capita. This result underscores that Chinese investment is crucial in fostering economic growth across South Asia. In Pakistan, Bangladesh, and Sri Lanka, Chinese FDI effect economic growth through infrastructure and manufacturing development (Nedopil, 2025; UNCTAD, 2025). In Afghanistan, targeted Chinese investments in sectors such as mining indicate prospects for economic advancement.

Table 2
Impact of Chinese FDI on South Asians' per capita income: Baseline findings

Depend variable: GDP per capita (ln)	**Fixed effect**		**GLS**		
	(1)	**(2)**	**(3)$^{\Delta}$**	**(4)$^{\phi}$**	**(5)$^{\mu}$**
Chinese FDI (ln)	0.199***	0.224***	0.144***	0.137***	0.147***
	(0.011)	(0.018)	(0.011)	(0.017)	(0.015)
Total FDI (ln)		0.0142	0.176***	0.093***	0.089***
		(0.022)	(0.022)	(0.020)	(0.022)
Military expend (ln)		0.100	0.170**	0.0931	0.0759
		(0.108)	(0.070	(0.094)	(0.090)
Total population (ln)		-0.977**	-0.347***	-0.185***	-0.185***
		(0.350)	(0.026)	(0.040)	(0.037)
Corruption cont. (ln)		0.0957**	0.102***	0.0795**	0.0962**
		(0.038)	(0.036)	(0.037)	(0.040)
Political stability (ln)		0.126***	0.209***	0.179***	0.164***
		(0.028)	(0.028)	(0.031)	(0.030)
Constant	5.900***	23.090***	10.660***	8.412***	8.404***
	(0.0625)	(6.389)	(0.412)	(0.671)	(0.608)
Observations	120	116	116	116	116
R-squared	0.754	0.858			
Country fixed	Yes	Yes			
Year fixed	Yes	Yes			

Note: Standard errors in parentheses. $^{\Delta}$GLS with Heteroskedastic Panels, $^{\phi}$GLS with AR (1) Autocorrelation, $^{\mu}$GLS with AR(1) autocorrelation and heteroskedastic panels. Source: Authors calculation. *** p < 0.01, ** p < 0.05, * p < 0.1.

Model 2 includes controls for military expenditure, population size, corruption control, and political stability. In comparison to the baseline estimate of 0.20%, the impact of Chinese FDI marginally increases to 0.224% after controlling for these variables. The demographic challenges encountered by populous countries like India, Bangladesh, and Pakistan are reflected in the significant negative effect (-0.977) of population size among the control variables. This finding aligns with previous literature indicating that rapid population growth can strain resources and reduce per capita income (Bloom et al., 2003). Moreover, the governance indicators—political stability (0.126) and control of corruption (0.0957)—are both significantly and positively correlated with per capita income. This underscores the fact that good governance enables the conversion of investment into economic growth (Acemoglu et al., 2019; Kaufmann et al., 2010). This insight is particularly critical given the governance challenges in South Asia, where corruption and political instability continue to hinder the full potential of foreign investment.

Models 3 to 5 employ GLS estimations. Model 3 accounts for heteroskedasticity across panels, acknowledging that the variance of error terms may markedly differ among South Asian nations due to their varied economic scales and institutional frameworks. Model 4 addresses AR(1) autocorrelation within panels, acknowledging that GDP per capita shocks in one year may extend into the following year, thus capturing the dynamic adjustment processes inherent in economic development patterns (Baltagi, 2006; Beck & Katz, 1995). Model 5 integrates adjustments for heteroskedasticity and AR(1) autocorrelation, enabling panel-specific error variances and serial correlation, thus producing the most efficient and unbiased estimates (Beck & Katz, 1995; Driscoll & Kraay, 1998).

The GLS adjustments enhance the fixed-effects model, hence increasing the reliability and validity of the estimated impacts of Chinese FDI and mitigating variability and temporal dependency that could distort the results across South Asia's diverse economic and institutional contexts. The GLS results indicate that Chinese FDI has a statistically significant and positive relationship with GDP per capita. This substantiates the notion that it has constantly facilitated regional growth. The impact of military expenditure is less distinct and diminished, likely due to its intersection with governance-related issues and data fluctuations. Nonetheless, governance indicators and total FDI remain statistically significant. The statistics from all models indicate that Chinese FDI constitutes a significant portion of South Asia's economic growth.

However, the efficacy of Chinese investment may depend on institutional quality, particularly governmental stability and the effectiveness of anti-corruption measures. Countries with robust governance frameworks may convert foreign investment into sustainable development more effectively. The region's diversity, characterized by Afghanistan's conflict, Bangladesh's rapid growth, and India's and Pakistan's geopolitical sensitivities, underscores the necessity for tailored policies that integrate governance reforms with strategies to attract and manage foreign investment. We empirically test this argument in the next section by adding interaction terms.

3.3. Moderation effect of domestic and institutional factors

This section adds a series of interaction terms into the model to estimate whether structural, institutional, and demographic factors moderate the effect of Chinese FDI. The results are reported in Table 3. Model (1) shows how military expenditure moderate the effect of Chinese FDI. The result is negative and significant at 10% level. This means that high military expenditure, which is common in countries like Pakistan, Afghanistan, and India, could cancel out the benefits of Chinese investment for development. Increased military spending is often linked to moving resources away from productive areas like education, infrastructure, and health, which make it harder for FDI to have positive effects (Dunne et al., 2005). In South Asia, particularly Afghanistan, protracted military conflict and ongoing defense expenditures have historically constrained public investment in essential development sectors (Meng et al., 2024). Because military goals are more important than economic development goals, Chinese FDI may not be able to boost per capita income as much as it could.

Model (2) reveals the result on the interaction between Chinse FDI and population size. Even though it is not statistically significant, the negative coefficient suggests that Chinese investment may not be as beneficial per person in South Asian countries with larger populations, like India and Bangladesh, because of problems with distribution or infrastructure. This finding aligns with the notion that large populations, in the absence of effective governance and inclusive infrastructure, can undermine the effectiveness of FDI spillovers (Asiedu, 2006).

Model (3) shows that there is a positive and statistically significant link between Chinese FDI and corruption control. This means that countries with stronger anti-corruption systems are better at using Chinese investment to help their economies grow. This goes against the common belief that Chinese FDI is good for weak institutions and shows that it can work better when governance systems are in place. Recent studies show that Chinese FDI is more likely to happen when host-country regulations are improved, and that good governance can affect its economic effects (Miao et al., 2021; Chen et al., 2018).

In the end, Model (4) shows that there is a strong and positive link between Chinese FDI and political stability. This means that stable democracies and good governance make FDI even more beneficial for development. This supports the idea that political stability reduces investor uncertainty and makes it easier to plan long-term investments, which in turn improves FDI outcomes (Busse & Hefeker, 2007; Globerman & Shapiro, 2003). In South Asia, this means that democracies that are relatively stable, like India or Sri Lanka during peaceful times, might be better at turning Chinese investment into real benefits for development.

Table 3
Impact of Chinese FDI on South Asians' per capita income: Interaction terms

Dependent variable: GDP per capita (ln)	**(1)**	**(2)**	**(3)**	**(4)**
Chinese FDI (ln)	0.217***	0.204	0.150***	0.138***
	(0.0136)	(0.124)	(0.0210)	(0.0132)
Chinese FDI (ln)*Military exp (ln)	-0.0350*			
	(0.0199)			
Chinese FDI (ln)* Population (ln)		-0.000273		
		(0.00670)		
Chinese FDI (ln)* Corruption control (ln)			0.0162***	
			(0.00615)	
Chinese FDI (ln)* Political stability (ln)				0.0249***
				(0.00391)
Constant	5.948***	5.900***	5.900***	5.965***
	(0.0657)	(0.0632)	(0.0609)	(0.0548)
Observations	118	120	120	120
R-squared	0.777	0.754	0.768	0.819
Number of ID	6	6	6	6
Year fixed	Yes	Yes	Yes	Yes
Country fixed	Yes	Yes	Yes	Yes
Note: Author calculation. Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1				

3.4. Robustness checks I: Arellano Bond GMM and panel quantile regression

In this section, to validate the robustness of the baseline results, we implement a two-pronged empirical strategy. The first approach, detailed in Table A1, combines the Arellano-Bond (1991) dynamic panel GMM estimator with Panel Quantile Regression techniques (Koenker & Bassett, 1978). These complementary methods address key econometric challenges—endogeneity, serial correlation, and heterogeneity in the conditional distribution of income—that conventional estimators might overlook.

The Arellano-Bond framework (Arellano & Bond, 1991) is particularly well-suited for our panel structure, characterized by a small number of countries observed over multiple years. By utilizing lagged dependent variables as instruments, this method effectively mitigates simultaneity bias and controls for unobserved country-specific effects. Consistent with theoretical expectations and prior empirical work (Borensztein et al., 1998; Alfaro et al., 2004), the dynamic specifications reveal a strong persistence in GDP per capita, underscoring the path-dependent nature of economic growth in South Asia. Importantly, Chinese FDI retains a positive and statistically significant association with per capita income across multiple dynamic specifications. This finding corroborates a growing body of literature emphasizing the catalytic role of Chinese investments in infrastructure and manufacturing sectors within developing economies (Dollar, 2017). The attenuation of statistical significance in some models likely reflects the conservativeness of the dynamic GMM estimators when controlling for multiple lags and instrument proliferation (Arellano & Bond, 1991).

Parallel to this, the panel quantile regression analysis elucidates significant heterogeneity in the returns to Chinese FDI across the income distribution. The elasticity of GDP per capita with respect to Chinese FDI systematically increases from the 25th to the 75th percentile. Such heterogeneity suggests that countries with higher baseline income levels and presumably stronger institutional and absorptive capacities—such as India and Sri Lanka—derive disproportionately greater growth benefits from Chinese investment

(Alfaro et al., 2004). This nuanced insight aligns with theories of conditional convergence and reinforces the critical role of domestic context in translating foreign investment into sustained economic growth.

Further, governance indicators—namely corruption control and political stability—exert positive and progressively stronger effects at higher quantiles, confirming that institutional quality not only fosters growth directly but also as mentioned in Section 3.3. moderates the developmental impacts of Chinese FDI (Globerman & Shapiro, 2003; Ali et al., 2010). In contrast, population size emerges as a consistent drag on per capita income, particularly in more populous states like India, Bangladesh, and Pakistan, reflecting demographic pressures that constrain income gains per capita. The role of military expenditure is more complex. While generally associated with lower income levels—echoing findings on the opportunity costs of defense spending (Meng et al., 2024; Collier & Hoeffler, 2007)—its significance at lower quantiles suggests a potential stabilizing role in more fragile or conflict-affected contexts, such as Afghanistan. This underscores the multifaceted interplay between security considerations and economic development in the region.

In sum, the robustness checks employing dynamic GMM and quantile regressions reinforce the baseline conclusion that Chinese FDI is a robust and significant driver of economic growth in South Asia. However, the effectiveness of such investments is contingent on prevailing institutional and demographic contexts, highlighting the need for nuanced, country-specific policy interventions that strengthen governance while leveraging foreign capital inflows.

3.5. Robustness checks II: PCSE estimation

To further verify the robustness of our empirical findings, we apply Panel Corrected Standard Errors (PCSE) estimation, which explicitly addresses key econometric concerns such as panel-level heteroskedasticity, contemporaneous correlation across panels, and autocorrelation (Beck & Katz, 1995; Hoechle, 2007). Table A2 presents results from multiple PCSE specifications incorporating different assumptions about error structure: panel-level heteroskedasticity with cross-panel correlation (Models 1–3), panel-level heteroskedasticity only (Models 4–6), and independent errors across panels (Models 7–9), each tested with no autocorrelation, AR(1) autocorrelation, and panel-specific AR(1) processes.

Across all specifications, the coefficient on Chinese FDI remains positive, statistically significant at the 1% level, and remarkably stable, ranging between 0.126 and 0.147. This robust association confirms that Chinese FDI continues to display a strong and consistent positive impact on per capita income across South Asian countries, reinforcing the baseline and dynamic panel results. The significance and magnitude of these coefficients suggest that even after controlling for heteroskedasticity and various error correlations, the contribution of Chinese FDI to economic development is substantial and resilient to alternative econometric treatments. Similarly, total FDI also retains positive and significant coefficients across all models, although the magnitude diminishes under more stringent autocorrelation corrections, reflecting the complex dynamics of broader foreign investment flows. This finding aligns with prior research emphasizing the general growth-enhancing role of foreign investment while acknowledging the heterogeneous effects across countries and time (Borensztein et al., 1998; Alfaro et al., 2004).

Regarding control variables, military expenditure yields a consistently positive but less robust effect, reaching significance primarily in specifications without autocorrelation corrections. This nuanced outcome could reflect short-term economic stimulus effects of military spending in certain contexts, but it remains secondary to the dominant effects of investment and governance variables (Collier & Hoeffler, 2004). The negative and statistically significant coefficients on total population in most models confirm the demographic pressures that dampen per capita income growth in populous South Asian countries, consistent with long-established development theories (Sala-I-Martin et al., 2004). However, the loss of significance under some autocorrelation specifications suggests complex dynamics that merit further investigation. Crucially, governance indicators—both corruption control and political stability—maintain positive and generally significant impacts across models, underscoring the vital role of institutional quality in shaping economic outcomes. These results further validate arguments that sound governance frameworks not only promote growth directly but also enhance the efficacy of foreign investments (Globerman & Shapiro, 2003; Ali et al., 2010).

The high R-squared values across all models (ranging from 0.878 to 0.995) reflect the strong explanatory power of the specified regressors, while the chi-square statistics confirm the overall model significance. In summary, the PCSE estimation strategy affirms the baseline and dynamic panel findings by demonstrating that Chinese FDI is a robust and significant determinant of per capita income growth in South Asia. Importantly, these results remain valid under different assumptions about error structures, highlighting the consistency and reliability of our empirical conclusions. The positive role of institutional quality and the negative

pressure from demographic factors are equally reaffirmed, emphasizing the multifaceted conditions necessary to harness the full developmental potential of foreign investment in this diverse and complex region.

Collectively, all employed alternative econometric techniques consistently underscore the positive and significant impact of Chinese FDI on per capita income across South Asian countries. This convergence of evidence highlights not only the pivotal role of Chinese FDI as a catalyst for economic development but also the critical importance of sound governance and demographic considerations in shaping its effectiveness. The coherence of findings across diverse modeling frameworks lends strong credibility to policy prescriptions aimed at improving institutional quality and strategically leveraging foreign investment to promote inclusive and sustainable growth across the region.

4. Conclusion and Policy Implementation

This study examines the economic impact of Chinese FDI in South Asia from 2004 to 2023. For econometric estimation, it employs various models, including Fixed Effects (FE), Generalized Least Squares (GLS), Dynamic Panel Generalized Method of Moments (GMM), Panel Quantile Regression (PQR), and Panel-Corrected Standard Errors (PCSE). These methods address critical methodological concerns such as endogeneity, heteroskedasticity, autocorrelation, and unobserved and distributional heterogeneity. The empirical evidence consistently indicates a statistically significant positive effect of Chinese FDI on per capita income. However, the magnitude and realization of this advantage depend heavily on the quality of domestic institutions and resource distribution.

The results demonstrate that foreign investment provides significant capital, facilitates technological transfer, and contributes to infrastructural development. The capacity of nations to effectively attract and utilize these inflows is influenced by underlying structural and political issues. Persistent geopolitical tensions and historical rivalry in the region complicate economic collaboration and create uncertainty for foreign investors. Countries with better governance performance, characterized by political stability and effective corruption control, derive significantly greater advantages from development. Conversely, nations that allocate substantial resources to their military often have slower economic growth. These findings underscore the imperative of aligning FDI inflows with robust governance, effective fiscal management, and institutional ability to enhance developmental outcomes in South Asia.

The results provide a more sophisticated picture of participation with the BRI from a policy standpoint. Recipient nations must manage the challenges of striking a balance between infrastructure-led growth goals and increased risks to fiscal stability, debt sustainability, and possible political reliance. The data emphasizes the need for more fiscal restraint, improved regulatory coherence, and extensive institutional reforms—especially through the deliberate reallocation of public spending from defense to more productive areas like infrastructure, education, and health. Furthermore, improved regional policy coordination is necessary to promote the growth of integrated cross-border infrastructure networks, standardize investment frameworks, and lessen regulatory fragmentation.

Declarations

Conflict of interest statement

This study did not receive any funding. The authors declare no conflicts of interest.

Author Contribution

Noorulhaq Ghafoori: Conceptualization, Data curation , Formal analysis , Software, Investigation, Methodology, Writing – original draft , Writing – review & editing .Jawid Ahmad Gulistani: Conceptualization, Formal analysis , Software, Investigation, Methodology, Visualization, Project administration, Writing – original draft , Writing – review & editing .

Data Availability

The data used in this study are available upon request.

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Footnotes

1. BRI with chines name (□□□□, yīdài yīlù), launched by China's president, Xi Jinping in 2013, aims to enhance connectivity across Central, South, and Southeast Asia, extending into the Middle East, Africa, and Europe. It focuses on five key priorities: policy coordination, facilities connectivity, unimpeded trade, financial integration, and people-to-people bonds. These priorities seek to foster cooperation, improve infrastructure, reduce trade barriers, integrate financial systems, and promote cultural exchanges, strengthening China's global influence and economic ties with participating regions. For further information please see the BRI website: https://eng.yidaiyilu.gov.cn/
2. Afghanistan, Bangladesh, India, Pakistan, Sri Lanka, and Nepal.

Figures

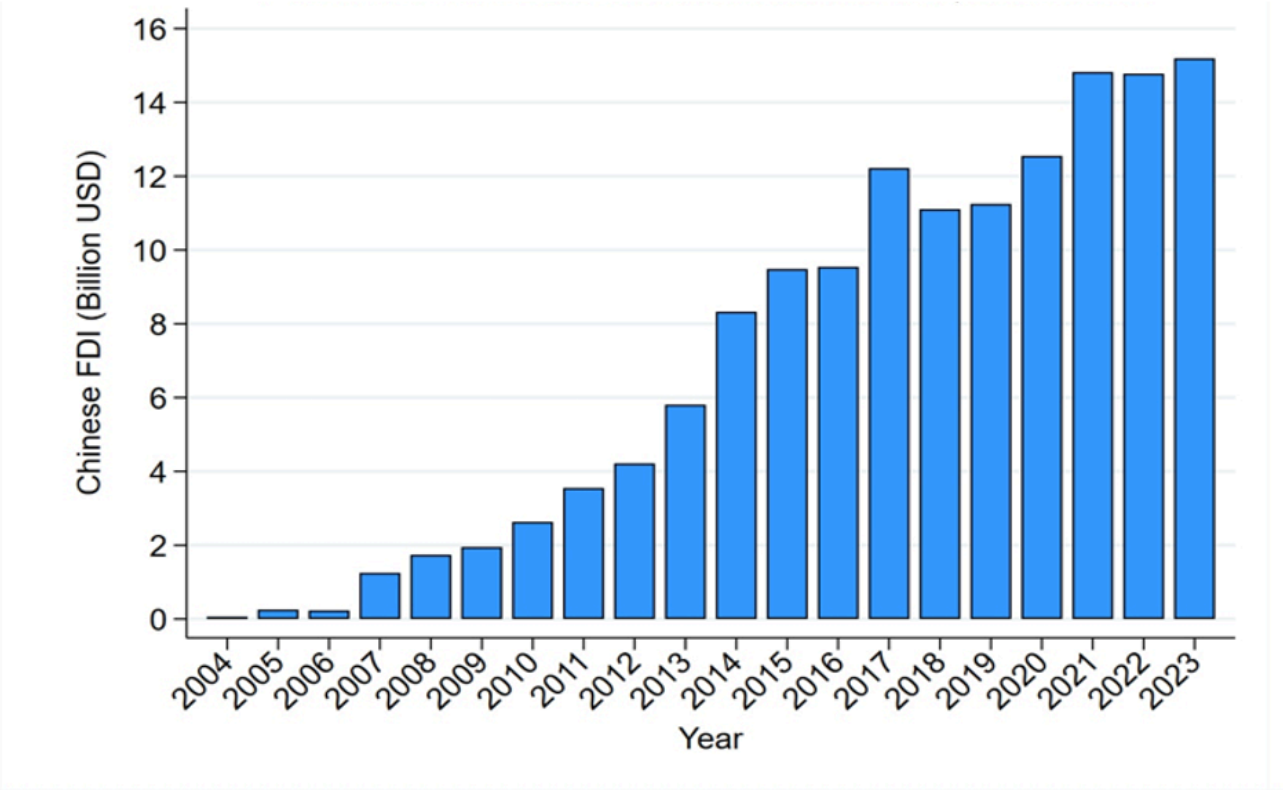


Figure 1

Chinese FDI in South Asia, 2004–2023

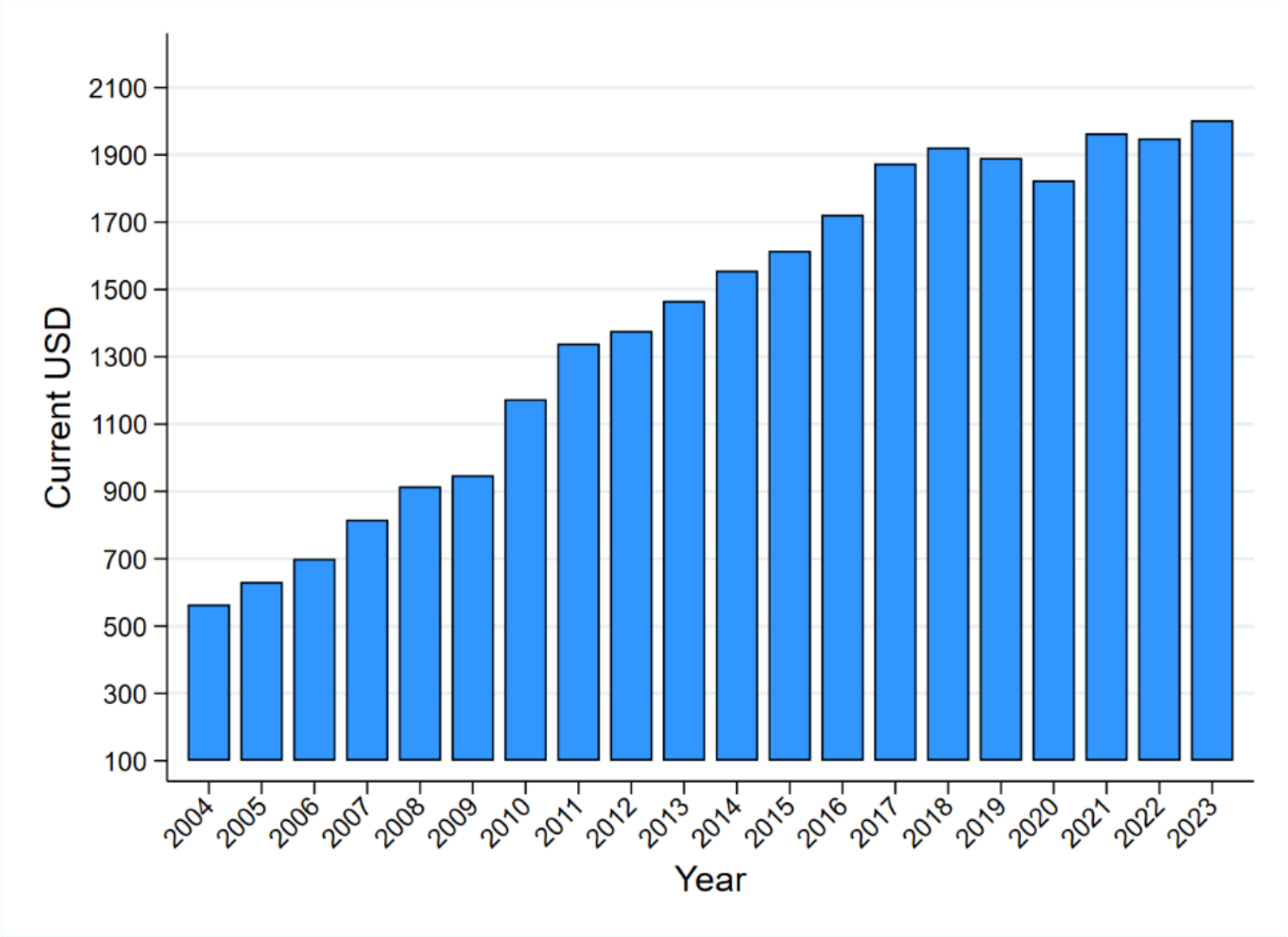


Figure 2

GDP per capita in South Asia, 2004-2023

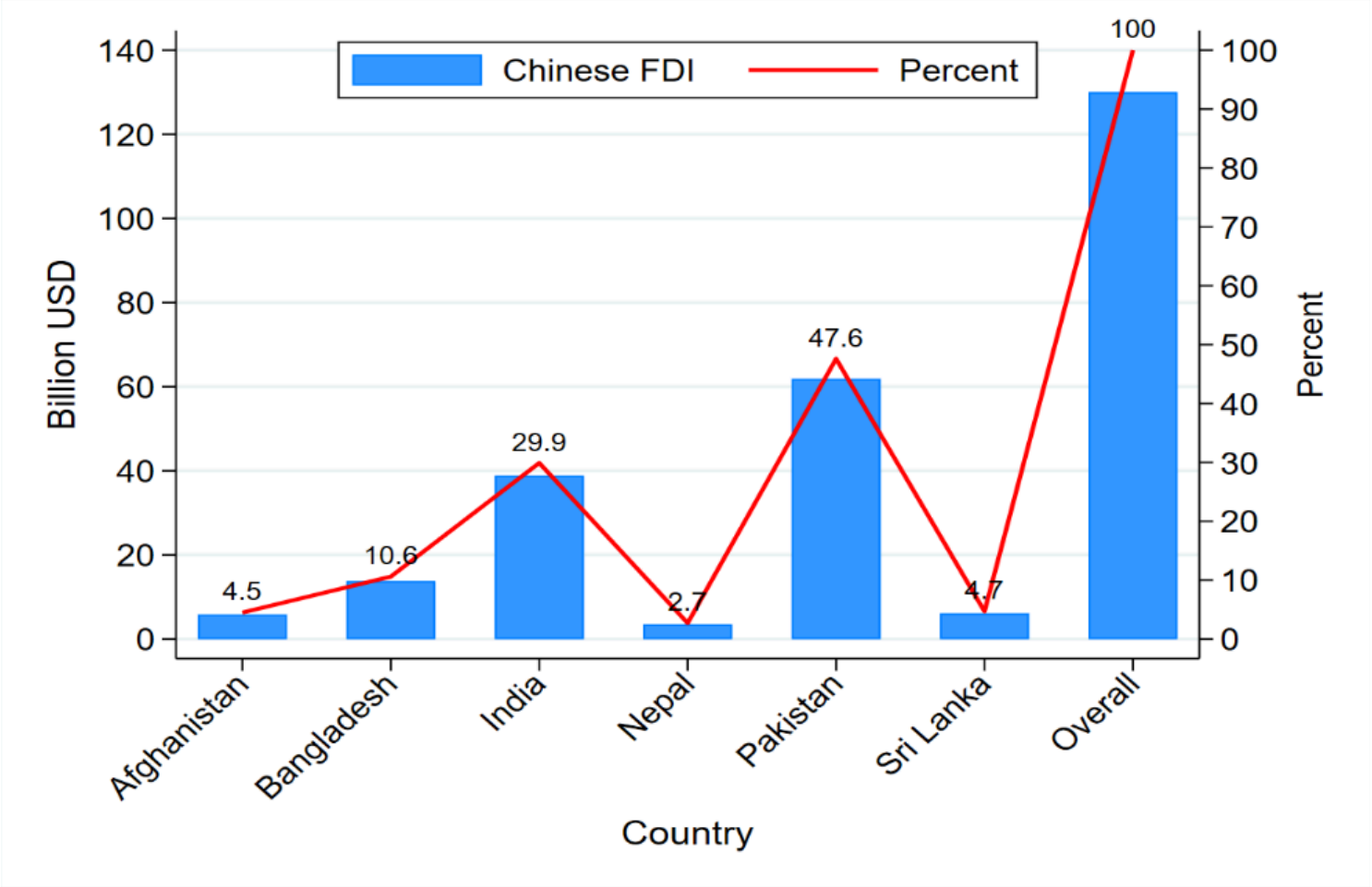


Figure 3

Proportion of Chinese FDI in the selected South Asian Countries (2004-2023)

Supplementary Files

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- TableA1andA2.docx