

Impact of Chinese FDI Stock on Urban Development of South African Cities

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Abstract. The relationship between Foreign Direct Investment (FDI) and the indicators of economic growth of the host country has been a much-debated issue among researchers and policymakers. However, there seems to be a positive response from host countries to FDI inflows as evident from a long history and growth of FDI over the recent years. In recent years, China has established itself as one of the biggest investors with its outward investment policies, especially in the African and Asian continents. Most of the recent investments by China have focused on the infrastructure development of the host country, specifically South Africa. The Chinese FDI stock in South Africa has been increasing each year from 44.7 million USD in 2003 to 5.4 billion USD in 2020. This report examines if there is any positive impact of Chinese FDI Stock in the Urban Development of South Africa. An Urban Development Index (UDI) has been formulated for the study using Principal Component Analysis of six different indicators of Urban Development in South Africa. Multiple regression analysis is then conducted using UDI as the dependent variable, Chinese FDI Stock as the Independent Variable, and Total FDI per Capita as the Control variable. The study concludes that there is a significant positive impact of Chinese FDI Stock on the Urban Development Index of South Africa.

Keywords: Urban Development Index (UDI), Foreign Direct Investment (FDI), FDI Inflows, FDI Stock, Principal Component Analysis (PCA), Multiple Regression Analysis.

1. Introduction

1.1. FDI and Economic Development

Foreign Direct Investment (FDI) represents the long-term participation by a country in the development of infrastructure, funding of projects, creating joint ventures, and aid in the technological development of another country. Economic studies based on the endogenous growth theory suggest that the degree of financial sector development may have an effect on foreign direct investment and how it affects technological diffusion in the host country, which may speed up economic growth. The "stock of foreign direct investment," or the overall quantity for a specific period, is made up of two types of FDI: inward and outward. Inflows of net FDI may be positive or negative.

It is a common belief among policymakers and most academics that FDI has a huge impact on the development rate and plans for the host country. Along with providing direct capital financing, FDI can also forge relationships with local companies allowing the transfer of crucial technology and knowledge that can help a nation's economy take off. These explanations have prompted both industrialized and developing countries to offer incentives to encourage FDI [1].

The advantages of FDI inflows for a host country can be summarized into the following points:

- Foreign investors may help meet the needs of the country, create jobs, and support local entrepreneurs and capital by establishing international corporations.
- Through research and adaptation, the host country can benefit from increased use of local raw materials and production inputs.
- FDI may promote the establishment of the industrial and technological foundation of the host country, ultimately aiding the process of economic development and increasing the GDP of the country.
- FDI and subsequent development plans may help utilize the labor and create jobs.

- Helps in the development and expansion of trading opportunities.

1.2. History of Chinese FDI investment in Africa and South Africa

The history of investments by China in African countries is quite old but has increased significantly since 2000; from 2000 to 2012, the total FDI stock of China in Africa reached from \$9 billion to \$166 billion. Regarding FDI inflows, they increased dramatically from US\$ 75 million in 2003 to US\$ 4.2 billion in 2020. Total FDI inflows from China reached their peak in 2008 at US\$ 5.5 billion.

The graphic below, Figure 1, demonstrates that FDI Inflow from China has exceeded that from the USA since 2013[2].

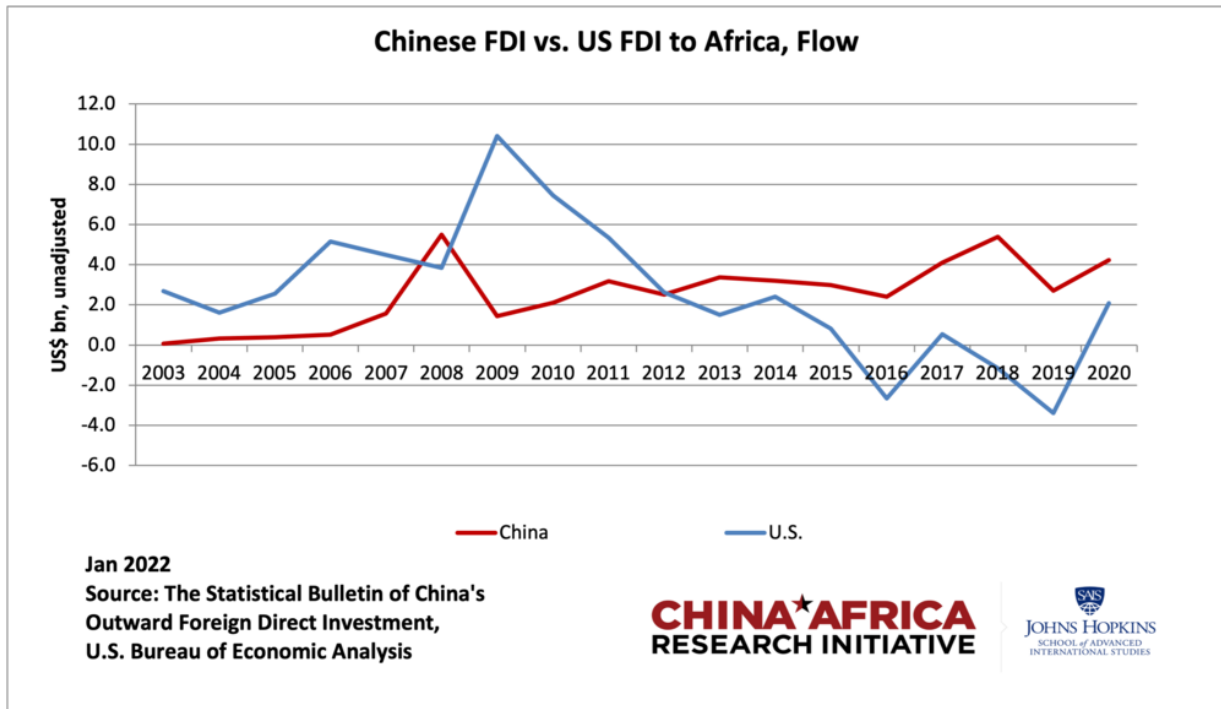


Fig 1. Chinese FDI flow in Africa (Source: <http://www.sais-cari.org/chinese-investment-in-africa>)

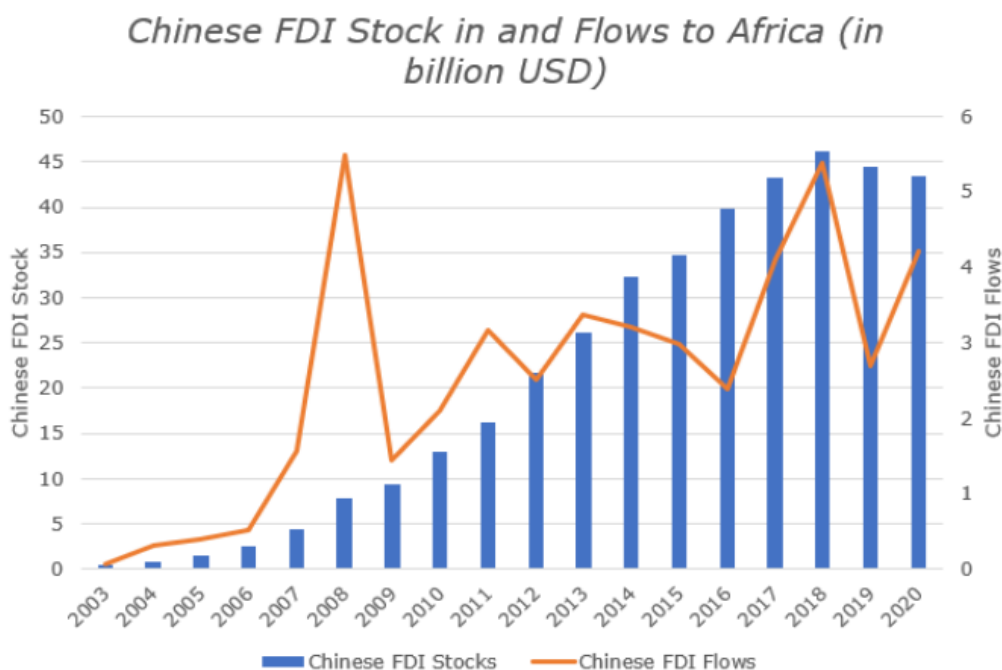


Fig 2. Chinese FDI stock in Africa

As a partner for investments in power generation, China has gained much significance in African countries in recent years. Because of this, Chinese contractors are significantly involved in the development of this new capability [3]. Increased investment by China in Africa, as evident by the graph presented in Figure 2, can be seen as a way to secure new opportunities for collaborative manufacturing. Natural resources, inexpensive labor, the transfer of underperforming industries, encouragement of modernization of industrial structure, and development of high-quality growth in China's economy.

From the African perspective, China's FDI may provide more funds for the development of the continent's economy. China's government policies help African countries address their challenges with unemployment and poverty and carry out the essential planning in the UN Millennium Development Goal for ending global poverty.

China's foreign investment used to be concentrated in the mining and energy sectors, but this trend has changed and is now more focused on high-tech and consumer goods. It has been noted that China's ODI prefers to focus on the financial, real estate, healthcare, agricultural, and technology sectors.

1.3. Chinese FDI stock in South Africa

Compared to other countries in the continent, FDI from China in South Africa has been more diverse and has focused not only on the natural resource industries but also on the automobile and building industries. The AEI's transaction-level FDI figures show that Chinese companies agreed to invest \$4.6 billion in South Africa between 2014 and 2018. Several different industries received the committed OFDI (AEI, 2018). For instance, in 2017, South African affordable housing was built with Greenfield finance of \$1.2 billion from China Minsheng Investment. Similarly, Beijing Automotive Group invested a total of \$1.3 billion in an automobile factory in 2016.

Fig 3 displays the line graph of FDI stock in South Africa from 2003 to 2020. We can see that the FDI stock, though it fluctuates year to year, has a continual upward trend throughout the years reaching a peak of \$74 billion in 2017.

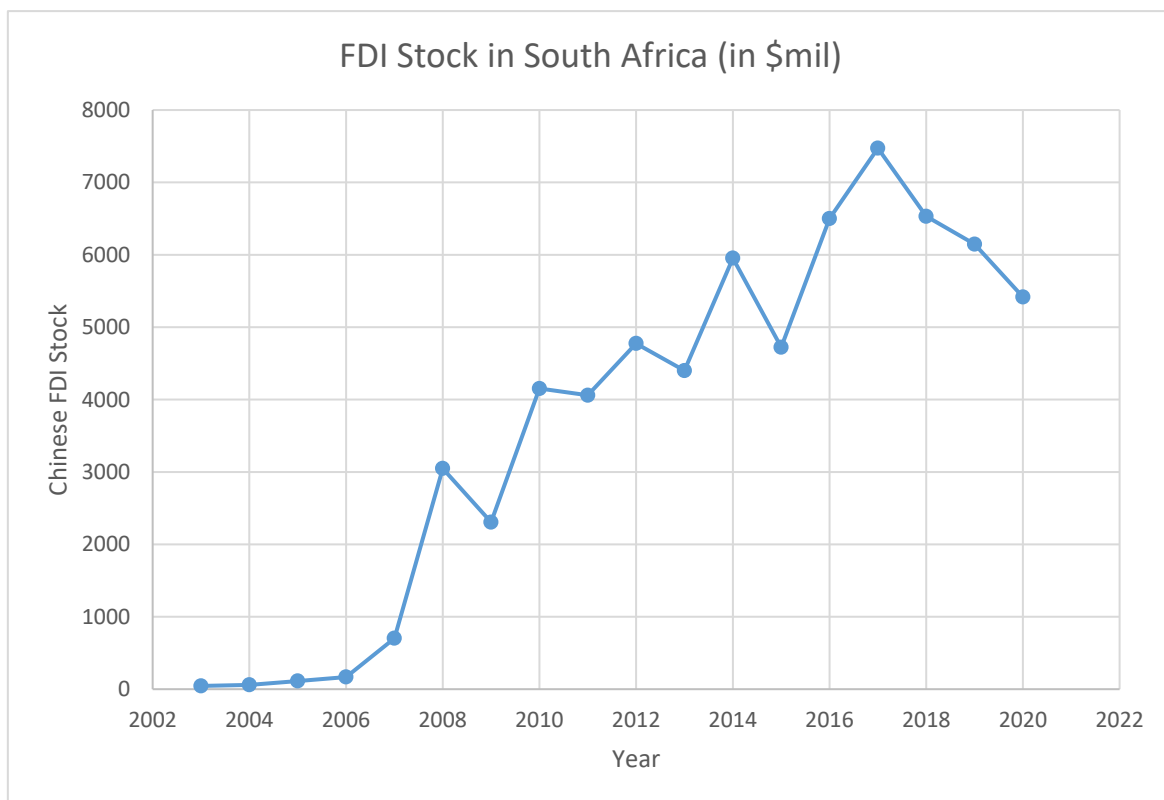


Fig 3. Chinese FDI stock in South Africa (Source: <http://fec.mofcom.gov.cn/article/tjsj/>)

1.4. Impact of Chinese FDI on various Economic and Development Indicators of South Africa

China has played a significant role in both economic and commercial partnerships and made a considerable contribution to the development and growth of sub-Saharan African country's economies. The volume of Chinese FDI demonstrates how crucial China is to the economic growth of African countries.

For instance, even though the majority of China's investments are focused on a limited number of countries with significant natural resources, a study finds that the economic relationship between African countries and china has been beneficial for the host countries [4]. Furthermore, it was seen that growth in the stock and flow of Chinese FDI into African countries has contributed to boosting the economic development of those countries.

The country's real GDP increases by 0.2 percent as a result of the entry of Chinese foreign direct investment into diverse South African industries. The entire output of South Africa increases by \$982 million. South Africa sees a 0.6 percent increase in the manufacture of automobiles and parts and a 1.2 percent increase in the production of construction services (\$445 million). The output of the South African motor vehicle industries has increased by 25.4%, while the output of the nation's construction services industries has increased by 37.0% [5].

2. Literature Review

Using time-series analysis from panel data, Mello, LR de looked at how FDI affected the growth of 32 different countries. He discovered that there is no meaningful connection between FDI inflows and national economic expansion [6].

Contrary to the report, another study by Basu et al. examined the issue of the reciprocal relationship between FDI and growth for 23 countries and found that countries with open economies had a significant impact on FDI inflows in their economic growth, in both small- and longer-time intervals, while the effect was less substantial for those with closed economy suggesting that foreign trade is a key factor to determine if the FDI causes economic growth.

Adenikinju and Overanti focused on studying the impact of FDI concerning the peculiar features of African labor markets [7]. The results of the study indicated that the dual economy that consisted of the small-scale modern sector and the large-scale traditional sector caused by foreign investment reduced the effectiveness of both markets, thus creating an imbalance in the market.

Wang, et al. [8] concluded that the positive impact of FDI on economic growth is dependent upon the development of the financial and developmental infrastructures of the host country. They contributed this relationship to the increase in efficiency of the utilization of FDI by the government. They also found an ambivalent relationship when it comes to spill-overs to local companies and industries which is dependent on various complex factors.

Can-Ming and Jin-Jun investigated the correlation between FDI inflows and the rate of urbanization in two provinces in China (Jiangsu and Guangdong) and found that the FDI inflow is highly positively correlated to the industrialization and infrastructure development of the cities in the provinces while the GDP growth is negatively correlated with FDI inflows [9].

A similar result was found by Jiaping Wu [10] previously in 2003 for Shanghai where he found that the impact of FDI is most prominent in urban development. However, he attributes the effect to the careful planning and execution of the use of FDI by the government.

The role of government policies to improve the quality of local and foreign institutions in the proper utilization of FDI has been further investigated by Miao et al[11]. They concluded that the positive impact of FDI on economic growth relies upon the formulation and execution of appropriate government policies to increase the effectiveness and efficiency of development projects by local or foreign institutions/companies.

3. Data

3.1. Variables Used for creating the Urban Development Index for South Africa

Table 1. Indicators of Urban Development in South Africa

Year	Access to Electricity	Population density per sq. km of land area	People living in the Biggest Cities	Population in urban agglomerations of more than a million	Mortality by road traffic accidents per 100000 population	Urban population growth annual
2000	85.6783	37.0687	3045543	12852959	44	2.2563
2001	85.7743	37.5663	3179320	13304774	38.3	2.1682
2002	85.869	38.0441	3292493	13668832	39.9	2.1835
2003	87.7	38.5126	3399183	14003132	43.4	2.1659
2004	86.0821	38.9844	3509485	14347725	41.3	2.1493
2005	86.2145	39.4699	3623048	14701493	38.1	2.154
2006	86.3712	39.9719	3740450	15066204	41.1	2.1682
2007	86.5487	40.4914	3861657	15441719	32.4	2.1847
2008	86.7413	41.0353	3986966	15828930	29.5	2.2178
2009	86.9433	41.6103	4115979	16226580	28.6	2.2593
2010	87.149	42.2203	4249354	16636669	28.6	2.3124
2011	87.3526	42.8688	4387051	17059047	27.8	2.3696
2012	87.5487	43.5521	4529409	17494728	26.5	2.4162
2013	87.7326	44.2565	4676386	17943558	22.8	2.4244
2014	87.9051	44.963	4828133	18405971	24	2.3941
2015	88.0681	45.6573	4984804	18882420	24.1	2.3314
2016	88.2234	46.3343	5146559	19373371	25.8	2.2601
2017	88.373	46.9955	5313563	19879305	23.2	2.1929
2018	88.5188	47.6408	5485986	20400727	22.7	2.1277
2019	88.6627	48.272	5635127	20836302	22.2	2.0685
2020	88.8063	48.8906	5782747	21272284		2.0155

Six different indicators are selected for the Urban Development Index as shown in table 1. These indicators will be used to conduct a factor analysis and create a singular matrix by combining the components.

3.2. Data for Independent Variables

Table 2. List of Independent Variables (Total FDI per capita and Chinese FDI Stock)

Year	FDI_percapita in USD/capita	Chinese FDI_STOCK in Million USD
2003	16.76262	44.77
2004	14.83185	58.87
2005	136.2159	112.28
2006	12.85417	167.62
2007	134.0966	702.37
2008	198.5759	3048.62
2009	151.0488	2306.86
2010	72.11032	4152.98
2011	79.59596	4059.73
2012	87.56003	4775.07
2013	153.3425	4400.4
2014	106.1829	5954.02
2015	27.46416	4722.97
2016	39.41291	6500.84
2017	36.10926	7472.77
2018	96.36995	6531.68
2019	87.36765	6146.57
2020	53.17185	5417.22

For the Independent variable, Chinese FDI Stock in South Africa has been selected along with Total FDI per capita as the control variable as shown in Table 2.

4. Methodology

Two main analysis tools have been used for the analysis. One of them is a factor analysis tool which is known as the Principal Component Analysis (PCA) tool in SPSS. PCA is used to extract the main components from the 6 indicators listed in Table 1. After the component analysis, two major components have been combined into a singular matrix which is proposed as the Urban Development Index. Then, a multiple regression analysis is conducted to evaluate the relationship between our independent variables and UDI as the dependent variable.

The main steps for the methodology used have been listed below:

- Factor Analysis of the different determinants for urban development using PCA
- Combining the components of the PCA into a single Urban Development Index Matrix
- Conducting a Hierarchical Regression Analysis with UDI as the dependent variable, Chinese FDI stock as the Independent Variable, and Total FDI per Capita as Control Variable.

4.1. Creating the Urban Development Index

One of the tools for Factor Analysis that can be used to condense the most important information from a large amount of data without lessening the dimensionality and noise of the original data is principal component analysis[12]. By putting the bulk of the variance burden on the first few components, the goal of PCA is to minimize the number of data in the set into as few components as possible. This way, we do not need to focus on all the variables but instead can use the components to account for the majority of the variance in the original lists of data.

The KMO test depicts the proportion of possible common variance among the variables. KMO values around 1.0 are regarded as exceptional, while values below 0.5 are deemed subpar. Nowadays, the vast majority of researchers assert that a KMO of at least 0.70 can be used to begin a factor analysis.

Bartlett’s test shows if the correlation matrix is significant. If the correlation is not significant, i.e. p-value less than 0.05, it means that the variables do not have much in common making the factor analysis not suitable.

4.1.1 Principal Component Analysis Results of the indicators for UDI

Table 3. KMO and Bartlett's Test Results

	KMO	.705
Bartlett's Test Results	Approx. Chi-Square	359.513
	df	15
	Significance	<.001

The KMO score of 0.705 is Middling as shown in Table 3, implying a substantial correlation between the variables and the PCA analysis can be conducted.

Moreover, since our P-value, as shown in Table 3, is less than 0.001, we can reject the null hypothesis and proceed with the component analysis.

The Eigenvalues column along with the percentage value column for different factors can be used to identify the most relevant factor. Only the factors with Eigenvalues more than 1 or with a cumulative percentage of more than 95% should be selected.

We can see from the table that, Component 1 has an Eigenvalue of 4.505, Component 2 has an Eigenvalue of 1.210, and for the rest of the components, the Eigenvalue is lower than 1.

Therefore, we will use component1 and component 2 for the analysis.

Table 4. Eigenvalues and Percentage of Variance for different components

Component	Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% Variance	Cumulative %	Total	% Of Variance	Cumulative %	Total
1	4.505	75.086	75.086	4.505	75.086	75.086	4.504
2	1.210	20.174	95.260	1.210	20.174	95.260	1.213
3	.193	3.219	98.478				
4	.091	1.519	99.997				
5	.000	.003	100.000				
6	1.345E-5	.000	100.000				

From Table 4, we can see that there are a total of six components after the PCA but only Component 1 and Component 2 have Eigenvalues over 1 and when combined, explain more than 95% of the variance in the data.

This has also been illustrated in Scree Plot in Figure 4 and the Component Matrix Table in Table 5 below

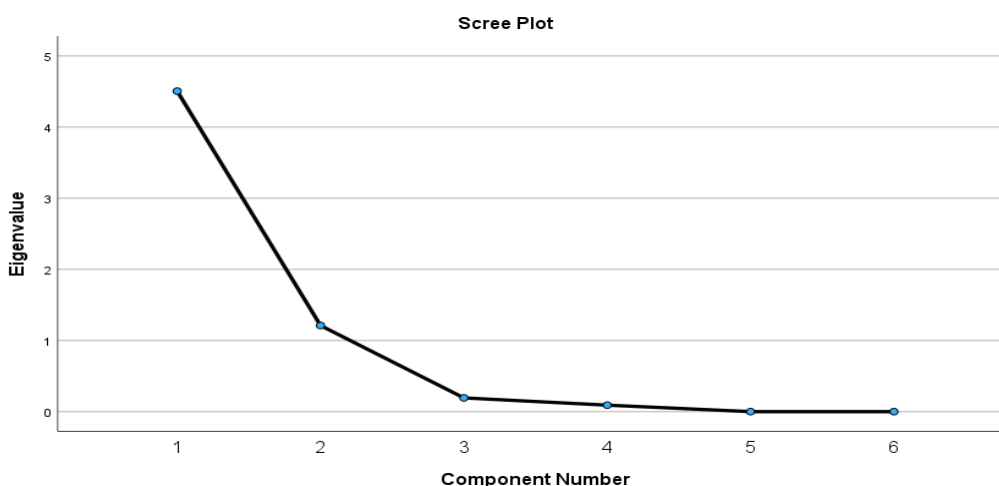


Fig 4. Scree Plot of the Components

Table 5. Component Matrix

	Component	
	1	2
Access to Electricity	.918	.084
Population density	.988	-.110
Population in the largest city	.986	-.126
Population in urban agglomerations of more than 1 million	.987	-.120
Mortality by road traffic injury per 100000 population	-.855	-.435
Urban population growth annual	-.099	.986

We can see from Table 5, the Component Matrix that Components 1 and 2 have been selected as they accounted for most of the variance. Here, it can be noted that Component 1 covers 4 out of 5 variables while component 2 covers the fifth variable (Urban Population Growth-Annual).

4.1.2 Combining the two components into a single index using weighted mean

Since it is easier and more effective to conduct the linear regression analysis when there’s a single dependent variable, the two selected components can be combined into a single component using weighted mean.

This was done using SPSS, Transform > Compute Variable, and using the formula below.

Combined Weighted Mean = Component1mean * (75.086/(75.086+20.174)) + Component2mean* (20.174/(75.086+20.174))

Table 6. Combining the components of PCA into a singular matrix

Year	Component 1	Component 2	Combined Weighted Mean
2000	-1.64779	0.0155	-1.3
2001	-1.37686	-0.33295	-1.16
2002	-1.31785	-0.3416	-1.11
2003	-0.95137	-0.54357	-0.87
2004	-1.15083	-0.69565	-1.05
2005	-0.9567	-0.54309	-0.87
2006	-0.91939	-0.62276	-0.86
2007	-0.56553	-0.12987	-0.47
2008	-0.35964	0.1954	-0.24
2009	-0.20174	0.48032	-0.06
2010	-0.06352	0.79644	0.12
2011	0.09939	1.17564	0.33
2012	0.27859	1.5066	0.54
2013	0.52414	1.697	0.77
2014	0.64202	1.39731	0.8
2015	0.79036	0.93556	0.82
2016	0.89665	0.33996	0.78
2017	1.11691	-0.02542	0.87
2018	1.28236	-0.47897	0.91
2019	1.43391	-0.88626	0.94
2020	1.33223	-1.70598	0.69
2021	1.11465	-2.2336	0.41

The two selected components are combined into a single matrix as demonstrated in Table 6. The combined weighted mean of the two components is our Urban Development Index.

4.2. Multiple Linear Regression

A statistical tool called regression analysis enables the assessment of the connection between two variables. Multiple Linear Regression can be used to assess the relationship between multiple independent variables with the dependent variable [12].

Multiple linear regression analysis can be used for one or more of the following reasons:

- To identify if there is any relationship between the dependent variable and multiple independent variables and if the relationship is positive or negative.
- To see how strong the relationship is.
- How much change in the value of a dependent variable can be attributed to the change in independent variables?

4.2.1 Multiple Linear Regression Analysis with control variable in SPSS

Hypothesis:

H0: Chinese FDI Stock in South Africa does not have a significant impact on the Urban Development Index of South Africa

H1: Chinese FDI Stock in South Africa has a significant impact on the Urban Development Index of South Africa.

$$\text{Model: } Y_{\text{Predicted}} = B_0 + B_1X_1 + B_2X_2 + e \quad (1)$$

$Y_{\text{Predicted}}$ = Dependent Variable (UDI) = Predicted Variable

B_0 = y-intercept (Value of Y when there are no variables or all other values are 0)

B_1 = Regression Coefficient for X_1

X_1 = Control Variable (Per Capita Total FDI inflows)

B_2 = Regression coefficient for X_2

X_2 = Independent Variable (Chinese FDI Stock)

e= Error or Residual. i.e.,

$$UDI = B_0 + B_1 (\text{Per capita FDI inflows}) + B_2 (\text{Chinese FDI Stock}) + e$$

Before carrying out the regression analysis, it is important to see if there's any linear relationship among our variables. A Scatter plot is one of the tools used for the analysis where a regression line is drawn through the data points.

The scatter plot was drawn with Chinese FDI_STOCK on the x-axis and the UDI on the y-axis using SPSS (Graphs<Chart Builder<Scatter Plot).

From the Scatter Plot in Fig 5, we can see that there is a direct linear relationship between Chinese FDI Stock and our proposed Urban Development Index.

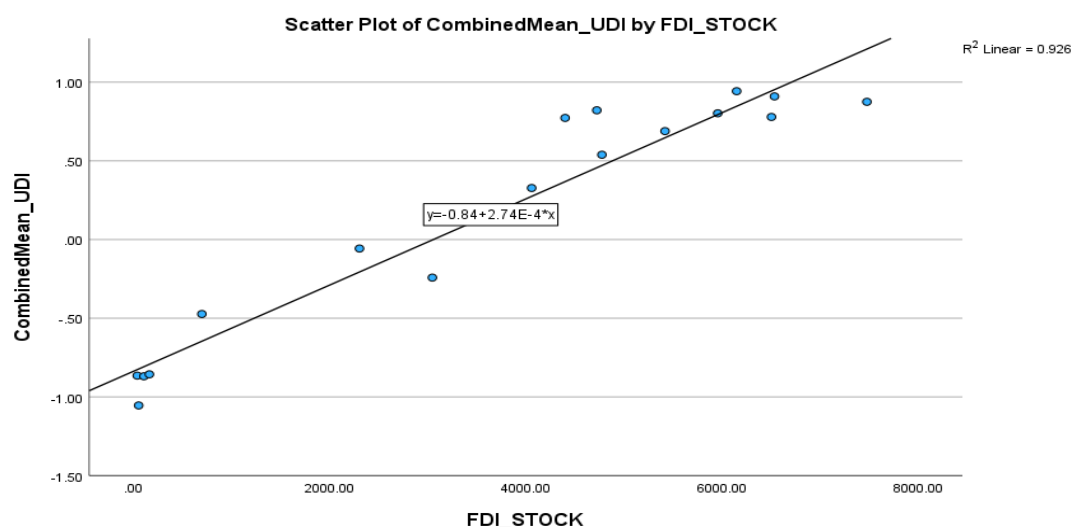


Fig 5. Scree Plot Chinese FDI_Stock vs UDI

Dependent Variable: Urban Development Index of South Africa

Independent Variable: Chinese FDI Stock in South Africa

Control Variable: FDI per capita for South Africa (All Countries)

Table 7. Unstandardized Variables

Year	CombinedMean_UDI	FDI_percapita (in USD per Capita)	Chinese FDI_STOCK (in Million USD)
2003	-0.87	16.76262	44.77
2004	-1.05	14.83185	58.87
2005	-0.87	136.2159	112.28
2006	-0.86	12.85417	167.62
2007	-0.47	134.0966	702.37
2008	-0.24	198.5759	3048.62
2009	-0.06	151.0488	2306.86
2010	0.12	72.11032	4152.98
2011	0.33	79.59596	4059.73
2012	0.54	87.56003	4775.07
2013	0.77	153.3425	4400.4
2014	0.8	106.1829	5954.02
2015	0.82	27.46416	4722.97
2016	0.78	39.41291	6500.84
2017	0.87	36.10926	7472.77
2018	0.91	96.36995	6531.68
2019	0.94	87.36765	6146.57
2020	0.69	53.17185	5417.22
2021	0.41		

In general, the regression analysis of unstandardized variables produces unstandardized coefficients that are more intuitive to comprehend. They can be used immediately in calculations and analysis since they show how raw data are related to one another. Additionally, it can be used to compare findings within the regression equation when only one measurement scale is used. Standardized coefficients are advised when contrasting the outcomes from various measuring scales.

For varying scales/units of multiple independent variables, using unstandardized variables may result in difficulty while interpreting the beta coefficients comparative to each other. In such a case, it is recommended to standardize the variables before conducting the regression analysis. So, it has been advised to standardize the variables before conducting the regression analysis, resulting in standardized coefficients that do not rely on scales/units.

Since the three variables that we have selected (as shown in Table 7) have different units (UDI is unitless, Chinese FDI Stock's unit is USD, and FDI per capita has USD per Capita as its unit), standardizing these variables would help us identify the precise magnitude of each variable's effect on our dependent variable. If the standardization is not done, the difference in units may misguide the analysis results as a smaller coefficient may denote a greater effect or vice-versa.

Table 8. Standardized Variable for the Multiple Regression Analysis

Year	Std.UDI (Dependent)	Std.FDI_percapita (Control)	Std.ChineseFDIStock (Independent)
2003	-1.06186	-1.2151	-1.43344
2004	-1.29439	-1.25025	-1.42791
2005	-1.06689	0.95967	-1.40695
2006	-1.0515	-1.28626	-1.38524
2007	-0.58097	0.92109	-1.17546
2008	-0.29719	2.095	-0.25501
2009	-0.07033	1.22972	-0.54601
2010	0.14559	-0.20744	0.17824
2011	0.4018	-0.07115	0.14166
2012	0.66124	0.07384	0.42229
2013	0.94833	1.27148	0.2753
2014	0.98448	0.41289	0.8848
2015	1.00797	-1.02027	0.40185
2016	0.95598	-0.80273	1.09932
2017	1.07411	-0.86287	1.48061
2018	1.11629	0.23424	1.11142
2019	1.15704	0.07034	0.96034
2020	0.84555	-0.55223	0.67421

The variables in Table 8 are the standardized variables that we will use for the regression analysis so that the difference in scale doesn't interfere with our analysis, especially the analysis of B coefficients.

5. Results and Analysis

5.1. Results of Hierarchical Linear Analysis (Multiple regression analysis with a control variable) in SPSS

Table 9. Model Summary with R values

Models	R-value	R Square Values	Adjusted R Square Values	Std. Error
1	.049 ^a	.002	-.060	.91795376
2	.964 ^b	.930	.921	.25081901
a. Predictors: (Constant), Std. Per Capita FDI Inflows				
b. Predictors: (Constant), Std. Per Capita FDI Inflows, Std Chinese FDI_STOCK				

Table 10. Anova Table with F-values and P-Values

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.033	1	.033	.039	.846 ^b
	Residual	13.482	16	.843		
	Total	13.515	17			
2	Regression	12.572	2	6.286	99.917	<.001 ^c
	Residual	.944	15	.063		
	Total	13.515	17			
a. Dependent Variable: Standardized CombinedMean_UDI)						
b. Predictors: (Constant), Std. Per Capita FDI Inflows						
c. Predictors: (Constant), Std. Per Capita FDI Inflows, Std. Chinese FDI_STOCK						

Table 11. Beta Coefficients for each variable

Model		Unstandardized Coefficients		Standardized Coefficients	t-value	Significance	95.0% Confidence Interval	
		B	Std. Error	Beta				Upper Bound
1	(Constant)	.215	.216		.995	.335	-.243	.674
	Zscore: Per Capita FDI Inflows	.044	.223	.049	.198	.846	-.428	.516
2	(Constant)	.215	.059		3.642	.002	.089	.341
	Zscore: Per Capita FDI Inflows	.056	.061	.063	.927	.369	-.073	.186
	Zscore (FDI_STOCK)	.859	.061	.963	14.118	<.001	.729	.989
a. Dependent Variable: Standardized CombinedMean_UDI)								

5.2. Analyzing the Results of Regression Analysis

Table 9, Table 10, and Table 11 show the result of our multiple regression analysis that was conducted using the Hierarchical Regression Analysis tool in SPSS.

Table 9 displays the R and R square values of our regression model. The R squared value represents the percentage of the variance seen in the dependent variable which can be attributed to the impact of the independent variables. As the R squared value of our model is 0.930, we can conclude that the selected independent variable explains 93% of the total variability observed in the dependent variable [13-15].

After controlling for total FDI per capita, the difference in R2 which is the “real” variability is found to be 0.928 meaning that the Chinese FDI Stock explains 92.8% of the variability of our Urban Development Index.

The ANOVA table (displayed as Table 10) is used to determine the significance of our model i.e. to check if the model is a “good fit”. To be statistically significant, the P-value has to be less than 0.05 (generally). The table shows that our model is statistically significant with, F(2,15)=99.917, p<0.001.

Since the model is significant, we can reject the Null Hypothesis (H0) and accept the proposed hypothesis (H1) i.e.

$$\text{Std. UDI} = B_0 + B_1(\text{Std. Per capita FDI inflows}) + B_2(\text{Std. Chinese FDI Stock}) + e$$

After substituting the value of coefficients from the coefficients table in Table 11 in our model, we get,

$$\text{Std. UDI} = .215 + .056 (\text{Std. Per capita FDI inflows}) + 0.859 (\text{Std. Chinese FDI Stock}) + e$$

This means that for every 1 unit increase in the standard deviation of Chinese FDI Stock, the standard deviation of UDI increases by 0.859 units.

The impact of Per Capita FDI inflows is very low and not significant as the p-value is more than 0.05.

6. Conclusion

The positive and negative impacts of FDI inflows in various aspects of the host countries have been a subject of research for many decades. With the growing outward investment by China into dozens of developing countries worldwide, the intent behind it and the impact of the investment have been vastly studied and debated by many scholars. However, the relationship between the FDI inflows or FDI Stock and the development of infrastructure in urban areas has been established. This relationship has been attributed to the focus on development projects in urban areas and the ability of the government of the host country to create and execute policies that increase the effectiveness of such projects.

Moreover, the FDI from China to South Africa has been significantly increasing over the years with the main focus on construction projects. Based on these observations and findings, a regression analysis model has been proposed to evaluate the impact of Chinese FDI Stock on the Urban Development Index of South Africa.

Two main components were extracted from six main indicators of urban development. Then, the two components were combined, using the weighted mean method, into a single set of data which was proposed as the Urban Development Index of South Africa. The UDI was used as the dependent variable for the multiple regression analysis with Chinese FDI Stock as the independent variable to analyze how significant the impact of Chinese FDI Stock is on the UDI. The total FDI stock per capita was used as the control variable for the analysis to control for the impact of FDI from other countries.

Before conducting the regression analysis, all the variables were standardized using SPSS so that the difference in units of the independent variables (as UDI has no unit while the variables used for PCA have different units, the Chinese FDI Stock has USD as its unit and FDI per capita has USD/Capita as its unit) does not impact the coefficients.

The multiple regression analysis showed that there is a strong relationship between Chinese FDI Stock on the UDI as the R squared value is 0.930 without accounting for the control variable and 0.921 after accounting for the control variable meaning that the Chinese FDI Stock explains 92%-93% of the variance in the UDI. Moreover, the coefficients table showed that the impact of Chinese FDI Stock on UDI is significant ($p < 0.005$) with a standardized beta coefficient of 0.859. The impact of FDI Stock per Capita, however, does not seem to be significant. The result of the analysis provides a clear consensus regarding the impact of Chinese FDI Stock on the development of urban areas in South Africa as a 1 unit increase in the standard deviation of Chinese FDI Stock causes the standard deviation of our UDI to increase by 0.859 units.

The highly significant positive relationship between Chinese FDI Stock and the Urban Development of South Africa can be attributed to the following factors:

The high concentration of development projects by China in major cities of South Africa

China's focus on construction projects and technology-based investments is mostly utilized by urban areas.

Infrastructure development in urban areas attracts people from less developed areas of the country, thus increasing the demand and creating a cycle: Foreign Direct Investment promotes the development of infrastructure in Urban areas which causes migration of people from rural areas resulting in increased demand and opportunity in Urban areas ultimately attracting FDI.

Though there seems to be a highly significant impact of Chinese FDI stock on Urban Development, the research falls short when it comes to incorporating more significant control variables in the analysis. Other control variables that may be significant could include Changes in Government Policies, Budget for City Development, and Population Growth of the Country).

For further research, one could focus on time series estimation and forecasting based on this model. The two-way causal relationship between the variables can also be studied further which will confirm if the proposed cyclic relationship has any strong foundation to it.

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