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An analysis of Human Development Index and Economic Growth. A **Case Study of Pakistan**

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ABSTRACT

Article History:		Economic growth is an important factor in the economic
Received:	October 21, 2021	development of a country. There are some factors that can favor
Revised:	December 14, 2021	economic growth, namely human development. The level of
Accepted:	December 15, 2021	human development in a country is reflected in the value of the
Available Online	: December 15, 2021	Human Development Index (HDI). The growth rate of a country
		is measured by the value of its Gross Domestic Product (GDP)
Keywords:		per capita. The influence of human power resources is shown in
Human Developr	ment Index	the value of HDI, which is able to influence the level of economic
Welfare		growth in the value of its GDP. This study examines the effect of
Economic Growt	h	HDI on economic growth in Pakistan during the period 1980–
		2018, measuring its economic growth in its GDP per capita. The
JEL Classificati	on Codes:	result of this research indicated that each country had a strong
015, 047, R13		and significant correlation between HDI and GDP. It is concluded
		that the level of HDI can affect the GDP per capita. On the one
		hand, rising levels of human development open up new avenues
		for economic growth. The causal relationship between economic
		growth and human development has become a mutually
		influential relationship. So, it is clear that human development in
		the country relates to the influence of economic growth, which is
		seen in per capita income (GDP per capita), which can be an
		indicator of welfare in the country.



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1. Introduction

The human development index (HDI) refers to an environment for people to enjoy healthy, prosperous, and long lives. Therefore, it becomes vital to generate a situation where the individuals of society may afford a decent standard of living. For the last two decades, the United Nations Development Program (UNDP) has released an annual report which provides a framework for the measurement of the human development index (HDI). The HDI is a combination of better education, health, and living standards. Despite that the income per capita is not the only factor that regulates the human development because an increase in per capita does not mean that the lives of the people would be better off.

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The constraint of GDP as an extent of a country's very own fulfillment or flourishing of the overall population has been the subject of huge conversation throughout the last numerous years. The discernment that the idea of life doesn't show upgrades for an immense collection of people, in spite of high GDP advancement, has provoked the conviction that GDP calculation ought to be extended toward consolidating individual fulfillment as well as human thriving. Close by the general thought that success is a multidimensional thought that can't be assessed by market creation or GDP unaccompanied, thoughts of multi-dimensional pointers of progress similar to the Human Development Index (HDI) wound up being more reasonable than the extent of GDP improvement, which is one-dimensional in pay.

The United Nation Development Program (UNDP) has been giving the Human Development Index (HDI) since 1990, which has consequently changed into the majority's most prominent supreme degree of prospering. Since its introduction, the HDI has had the choice to grab the eye of scholarly circles, and has really had the decision to move the mark of assembly of progress money-related issues from monetary improvement to individual-focused strategies (UI Haq, 1995). Different specialists recognize this mix-up by means of per capita open disburse as a particular degree of achievement as the fundamental legitimization of this change. The HDI joined 3 fragments of progress, viz., proceeding by means of an extended as well as hard life, being told, and having a sensible method of life in the supreme summary. Under the past HDI recipe, success was surveyed through the future in the wake of entering the world; getting ready or information through a mix of the grown-up guidance rate as well as school enrolment rates (for crucial during school years); along with pay or way of life by GDP per capita changed in accordance with buying control consistency (PPP US\$). The dimensional records obtained from the corresponding markers were standardized by using a fixed minimum and maximum value. According to the previous strategy, the last HDI was settled as a mathematical mean utilizing indistinguishable stores of 33% for three-dimensional records. The 2010 HDI underwent a few changes in terms of the indicators, database, and changes in most important terms, those worth using for standardization and the blend strategy. The HDI is, as of now, the mathematical mean of standardized archives for the entirety of the three assessments. In any case, the HDI's planning component is currently evaluated by broad stretches of tutoring for grown-ups created over 25 years and anticipated broad stretches of tutoring for any kind of family down the line of school entering age. The way of life assessment is surveyed by net public pay (GNI) per capita.

Pakistan is arranged as the 6th significant distance country on the planet, and the state of human movement isn't lovely. Pakistan gets the 146th condition among 186 nations on the planet. Additionally, Pakistan is arranged as the 123rd amongst the 146 nations of the globe to the degree weakness (Wang, Zhang, & Wang, 2018). In 2013, the HDI a helper for Pakistan was documentation at 0.537, which set the nation at the most immaterial 146th condition in the outline of 187 nations. There a few purposes for the most detectably appalling human improvement markers, for example, energy emergencies, radicalism, and unlawful threatening, unfavorably pressure the monetary circumstances (Estrada, Park, Kim, & Khan, 2015).

Along these lines, a relative degree of GDP can be found to pass on through and through various improvement shows depending upon the flow of pay across pay classes. In all honesty, restricted input communication in a variety of human development information leftovers so as to financial improvement unaccompanied doesn't normally change over time on human headway expansion. For case in point, the 1996 arrival of the Human Development statement recognized five habits by which monetary advancement can be perilous, viz., I) jobless turn of events, wherever financial improvement doesn't expand work openings; ii) hardhearted turn of events, where advancement benefits only the rich; iii) voiceless turn of events, where money-related advancement isn't joined by dominant part rule government or fortifying; iv) rootless turn of events, which makes minority social orders be overpowered by the common society; and v) futureless advancement anywhere capital designed for prospect improvement is manhandled (UNDP, 1996). The high financial development rate may not translate into progress unless

appropriate distributional methodologies and an all-around planned movement framework are used to decipher the advantages of advancement in the presence of the under-served.

2. Literature Review

Ranis and Stewart (2007) clarify that human improvement is considered as "the objective of human action and monetary development, simultaneously, is an essential instrument in propelling it". So there is a double connection between causality and the human turn of events and financial development. According to one point of view, human advancement creates more opportunities for monetary development.

In their examination, Shome and Tondon (2010) explored the development of two GDP and HDI boundaries and analyzed whether there was a critical relationship between their patterns. The circumstance that more elevated levels of yield are coordinated with higher spending on training, wellbeing, and destitution decreases, which will at last affect population efficiency, prompting higher development. That is, the greater the financial development with expanding levels of yield, the higher the spending on HDI and destitution lightening programs. Demonstrate that monetary development is centered solely on a single level of purchasing pay Human improvement suggests the solidification of all things considered, regardless of whether they are financial, social, political, or both, with the goal that pay implies for human development, yet not alone. Monetary development is an essential yet lacking necessity for human development. Regardless of the amount we attempt and how well we plan everything, training has been the main social thing. This predominantly serves the local area and is associated with financial issues. Whatever is done in this situation, instruction brings monetary success and is impossible without thinking about significant advances, to be specific, social measures.

Past writing has discussed that energy is a significant marker of human turns of events. Electric utilization is one of the fundamental reasons for encouraging individual existence. Energy accessibility is critical to a country's financial and social dependability (Danish & Wang, 2018). The flourishing of the general public can be estimated by per capita power utilization. A large portion of the world's nations rely on the standard foundation to meet their force requirements (Baloch, Shah, Noor, & Magsi, 2018; Xu, Li, & Ahmad, 2018). Throughout the most recent couple of decades, an evident hole has been recorded between request and supply. In spite of that, illegal intimidation is one more basic aspect that impacts individual improvement measures in Pakistan.

Unmistakable clash effects appear to be people fleeing, destruction of establishments (schools and hospitals), swaying policies, prosperity, and the environment. This combination resulted in direct destitution as well as little human new growth (Miguel & Roland, 2011). A couple of examinations have discussed the nexus between mental fighting and human improvement pointers. Estrada et al. (2015), for example, express monetary inequity (Fair & Gregory, 2016) by drawing additional manipulators molest as a result of monetary and political standards. The improvement of GDP per capita is conversely connected to the brutality charge. A development within tutoring as well as a reduction in destitution assists in the alleviation of illicit terrorizing (Durodie, 2016).

There is a prompt, frustrated, as well as almost certainly delicate relationship stuck between guidance, destitution, and unlawful terrorizing (Brockhoff, Krieger, & Meierrieks, 2015). Mental fighting lessening is connected to educational associations as well as financial expansion. Inferior preparation speed as well as financial advancement guide toward mental fighting as well as powerless person advancement conditions. The advancement of education in less-developed countries may result in aggression if monetary and political institutions are not superior at the same time (Brockhoff et al., 2015).

GDP present occupation addresses different issues. A huge issue is that it interprets each cost as certain and doesn't perceive welfare-enhancing development from government help

decreasing movement (C. Cobb, Halstead, & Rowe, 1995; Talberth, Cobb, & Slattery, 2007). For example, an oil spill increases GDP because of the associated costs of onslaught and remediation; in any case, it clearly reduces daily thriving (Costanza et al., 2004). Furthermore, GDP moreover leaves out a huge number so as to improve government help, and in this manner, plunges outside the marketplace. For example, the showing of option vegetables as part of a nursery as well as cooking them for people or colleagues is prohibited by GDP. Regardless, business, a related banquet in the frozen foodstuff way of the general amasses, incorporates a currency switch as well as a subsequent GDP enlarge. GDP furthermore doesn't address the course of pay among individuals, which impressively influences entities as well as social achievement (Wilkinson & Pickett, 2009).

A supplementary extensive marker would join financial, biological, and social parts into an ordinary design in the direction of demonstrating net headway (Costanza et al., 2004). Different researchers have planned choices rather than GDP to create at least one of these progressions through fluctuating parts as well as estimations (Smith, 2013). Several have, in a similar manner, seen the hazards of relying upon a lone marker as well as planned a "dashboard" move toward various pointers. One such elective pointer that has been widely used is the Genuine Progress Indicator (GPI). At the same time, because GDP is a measure of progress creation, the GPI is proposed as a method of determining the monetary government assistance provided by monetary development, essentially counting the downgrading of a neighborhood as a financial charge. The GPI is a variation of the Index of Sustainable Financial Interests (ISEW), first planned in 1989 (C. W. Cobb & Daly, 1989). In any case, on behalf of the explanations behind this document, we use GPI as well as ISEW on the other hand. GPI creates by means of Personal Consumption Expenditures (a critical piece of GDP) and transforms them by means of 24 interesting sections, counting pay scattering, characteristic costs, and adversarial practices like bad behavior and defilement, among others. GPI additionally includes positive sections that are not included in GDP, such as the profit from chipping and family work (Talberth et al., 2007).As a result of unscrambling practices that lessen government help by starting people to overhaul it, GPI better approximates acceptable financial government help (Costanza et al., 2011; Posner & Costanza, 2011). The GPI isn't intended to be a pointer of sensibility. It is the extent of monetary government help that ought to be seen nearby biophysical along with various pointers. In the end, since one potentially knows whether a structure is down to earth in a little while, there can be no prompt markers of sensibility, just pointers (Costanza & Patten, 1995).

3. Data and Methodology

3.1. Source of data

The objective of the investigation is to discover relationship of HDI and GDP per capita. For this reason, we utilized board arrangement data of the Pakistan from period 1981 to 2018. The dependent variable is GDP per capita as well as HDI is measured by the index of health, education, and life expectancy. The data of these variables are gotten from World Bank.

3.2. Panel Unit Root Tests

The board arrangement data generally go behind a number of pattern like reliable descending or upward patterns. There are numerous variables behind it like occasional effect, exchange cycle, climate conditions or numerous other monetary circumstances. The exactness of assessment of model relies upon the particular qualities of data, for example, mean and fluctuation of factors are consistent. There are more prominent odds of fake relapse it the data have aloft or descending patterns as well as non-fixed of the data similarly. Unit root tests are comprehensively used to prove the stationary level of statistics like ADF (Augmented Dickey Fuller), DF (Dickey Fuller), PP (Phillips-Perron), as well as various additional unit root tests. These examinations grant us on the way to realize the levels of stationarity with the aim of are level,

first or second differentiation. It assists with picking the fitting evaluation method that guide to botch at no cost result.

3.2.1.ADF-Fisher Test

ADF is by and large used unit root test as well as it licenses sympathetic concerning the presence or non-presence of unit root during the time course of action statistics. The aftereffects of the test apparent also data is fixed at level, primary exceptional or at subsequent differentiation. The increased Dickey Fuller used the t estimations along with it is differentiated and the fundamental worth. There is adequate substantiation in the direction of excuse the invalid hypotheses its fundamental worth isn't by and large the decided and it shows the stationary of information (Gujarati, 2003).

Here are the common mathematical equations of Augmented Dickey Fuller test,

$$\Delta y_{s} = \varpi y_{s-1} + \sum_{s=1}^{\infty} \alpha_{i} \Delta y_{s-p} + u_{ns}$$
⁽¹⁾

$$\Delta y_t = \beta_o + \sigma y_{s-1} + \sum_{s=1}^{o} \alpha_i \Delta y_{s-p} + u_{ns}$$
⁽²⁾

$$\Delta y_{t} = \beta_{o} + \varpi y_{s-1} + \beta t + \sum_{s=1}^{\sigma} \alpha_{i} \Delta y_{s-p} + \boldsymbol{\mathcal{U}}_{ns}$$
(3)

The terminology

$$H_0: \beta = 0$$
$$H_0: \beta < 0$$

Ho specify the null hypothesis as well as substitute hypothesis can designate by H1 as well as here is its all-purpose turn of phrase for ADF test

$$H_1: \beta \neq 0$$

3.2.2. Phillips-Perron test

Phillips-Perron test is utilized as unit root test as well as it gives the outcomes moreover statistics is fixed at echelon, primary distinction or by subsequent contrast. PP trial of unit root covers the higher request relationship consequently its outcomes are additional solid instead of the ADF test. The blunder expression makes issue in ADF test since it is permanent as well as uncorrelated. First time PP examination was presented by Perron as well as Phillips in 1988 with it numerically articulation is as pursue,

 $\Delta Y_{p-1} = \beta_o + \delta y_{p-1} + \varepsilon t$

PP test utilized the t measurements as well as it is contrasted and the basic worth. There are sufficient proofs to dismiss the invalid speculations it basic worth is not exactly the determined as well as it demonstrates the stationary of statistics (Gujarati, 2003).

The terminology

$$H_0: \beta = 0$$
$$H_0: \beta < 0$$

Ho point to the null hypothesis as well as other hypothesis can point to by H1 as well as here is its universal appearance for PP test

 $H_1: \beta \neq 0$

3.3. Model Specification

The basic model is a variation of the neoclassical invention purpose:

Y = TF(K, L)

To analysis used for the impacts of relationship of HDI and GDP per capita, we go after A. Dar and Amirkhalkhali (1999); A. A. Dar and AmirKhalkhali (2002) as well as expect to the TFP of little economies relies upon mutually the public authority as well as the fare. The methodology depends on the reason that the yield development rate is controlled by the paces of factor gathering just as by the pace of fare extension as well as the dimension of government, whereby influencing TFP throughout their effects on proficiency. Accordingly, we adjust the capacity in Equation 3 to incorporate the public authority size (g/y) as well as the pace of fare development (dx/y). The capacity can be communicated as d/y=f(g/y dk/y dx/y)Our specific model is

 $Y_t = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_t$

 $GDPPC_t = \beta_o + \beta_1 HDI_t + \beta_2 GCF_t + \beta_3 EXP_t + \varepsilon_t$

GDP = Gross Domestic Product Per Capita HDI = Human Development Index GCF = Government Capital Formation EXP = Exports of goods and services

4. Results and Discussion

4.1. Introduction

In this chapter, we are talking about the estimation of the consequences on the foundation of method so as to be arguing inside the previous chapter as well as consequences from the conversation area at the conclusion of this chapter. The major worry of the study is to check the relationship of HDI and GDP per capita. The study depends on panel series data as well as data is composed since 1981 to 2018 in Pakistan. The dependent variable of the study is economic growth as well as economic growth is deliberate by means of the GDPPC growth rate. The HDI is measured by the index of health, education and income. And other variables like capital formation and exports of goods and services are also included in independent variables. To discover the examination of the study, the panel data of 38 years from 1981 to 2018 of Pakistan will estimate. The data is get foundation as of the International Financial Statistics (IFS) of the International Monetary Fund (IMF) as well as the country's central bank website.

We used diverse statistical estimation methods to estimation star empirical examination into this research. The estimation method is mostly used in VAR analysis to discover out the consequences as well as explanation of these outcomes in brief in this chapter.

4.2. Variables Movement

The facts are deliberate yearly. The major purpose of the reading is the relationship of HDI and GDP per capita. In this study, there are four variables that are used to gauge the psychiatry. These variables are Gross Domestic Growth Per Capita (GDPPC), capital formation

(GCF), and Government final consumption, Exports of goods and services. The leaning of the variable is exposed in the graphs which are specified below,

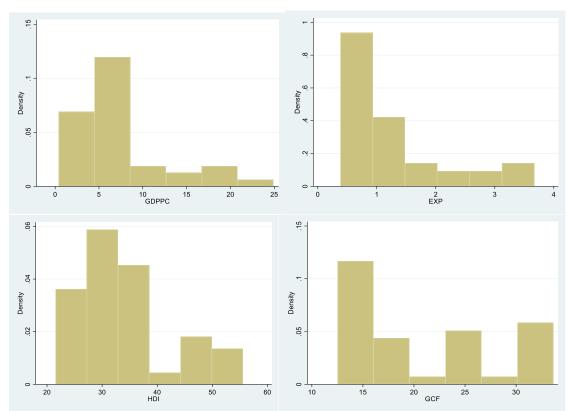


Figure 1: Trend of Four Variables

The above diagram shows trend of the variables of the Pakistan. The first graph shows the GDPPC Pakistan from the year 1981 to 2018. The GDPPC trend in higher growth in Pakistan. The second diagram shows the exports of goods as well as services increase in at the identical trend. The third diagram shows that HDI are a higher trend. The last diagram shows the capital formation of both countries that shows an increasing and a decreasing trend in Pakistan.

The above diagram is the combinations of all variables trend that are taken in our estimation process. It shows that gross capital formation is initially higher than all other variables and the gross domestic product is lower in all other variables in the country of China. In India, it indicates the same impact and trend of the variables that capital formation is higher than the growth rate.

4.3. Descriptive statistics

Descriptive Analysis is totally give details in table 4. Table 4 has 116 explanations of all the variables. GDPPC, HDI, GCF, as well as EXP are variables. The dependent variable is GDPPC whereas the independent variables are HDI, GCF, and EXP. The mean value of GDPPC is 7.85 with a standard value is 2.9 and the mean value of HDI size is 12.80 by means of a standard deviation is 2.1. The mean value of capital formation is 34.44 with a standard deviation is 7.31 and the mean worth of exports of goods with services is 16.89 with a standard deviation is 7.81. The detail is given below in the table 4.

Table 1	
Descriptive Analys	is

	EXP01	GCF	GDPPC	HDI
Mean	16.89098	34.44996	7.854800	12.80020
Median	17.93716	35.37965	7.803115	12.33668
Maximum	36.03503	46.66012	15.13917	16.83843
Minimum	5.196222	20.04817	1.056831	9.626166
Std. Dev.	7.813485	7.314555	2.912731	2.161573
Skewness	0.381601	-0.234141	0.373800	0.281608
Kurtosis	2.505274	2.038150	2.958887	1.686708
Jarque-Bera	2.619563	3.624070	1.775216	6.466164
Probability	0.269879	0.163321	0.411639	0.039436
Sum	1283.714	2618.197	596.9648	972.8148
Sum Sq. Dev.	4578.791	4012.703	636.3002	350.4299
Observations	38	38	38	38

Source; Author's calculation based on Stata.

4.3.1.Correlation Matrix

The Correlation Matrix is shown in below table 5.

Table 2 Correlation Matrixes

	CDDDC	UDT	005	EVD01
	GDPPC	HDI	GCF	EXP01
GDPPC	1.000000			
HDI	0.464189	1.000000		
GCF	0.519108	0.633032	1.000000	
EXP01	0.376720	0.418369	0.759563	1.000000

Source; Author's calculation based on Stata.

4.3.2. Unit Root Analysis

Table 3

	Unit I	Root Test (Base	ed on ADF-Fishe	er (1999))	
Variables	Level		1st Differen	Conclusion	
	Intercept	Intercept with Trend	Intercept	Intercept with Trend	
GDPPC	26.185	3.607	123.583	371.873	I(1)
	(1.000)	(1.000)	(0.000)	(0.000)	
GCF	14.074	2.219	33.762	321.652	I(1)
	(0.948)	(1.000)	(0.115)	(0.000)	
HDI	2.112	26.506	421.028	126.68	I(1)
	(1.000)	(0.997)	(0.000)	(0.000)	
EXP01	12.034	3.1309	412.786	211.920	I(1)
	(0.618)	(1.000)	(0.004)	(0.000)	

Source; Author's calculation based on Stata.

Before to applying the distinctive econometric assessment methods like OLS, and different procedures, first checked by the stationary of the factors by various unit root tests. The unit root trials of Philip-Perron along with ADF (1999) are utilized. The consequence of Philip-Perron as well as ADF Fisher (1999) demonstrates that all factors are stationary from the outset distinction. The aftereffects of the ADF and PP tests demonstrate a potential non-stationary of government last utilization consumptions in first contrasts, i.e., the likelihood that it is coordinated of request I(2). Nonetheless, the ADF Fisher test dismisses this chance. In this manner, for the investigation it very well may be reasoned that all the arrangement are

coordinated of request I(1), i.e., they are fixed in their first contrasts. The total outcomes are appeared in the below tables,

4.3.3. Regression Analysis

The major purpose of this study is result of government size on monetary expansion. We estimated the relationship of HDI as well as GDP Per Capita in Pakistan for the period of 38 years from 1981 to 2018. Our data is panel data and panel regression results are given below the table 8.

Table	4	
Panel	OLS	Regression

Dependent Variable: GDPPC Growth Rate				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
GCF	0.1524	0.0713	2.1354	0.0361
EXP01	0.0030	0.0060	2.1719	0.0267
HDI	0.3036	0.0713	2.7559	0.0049
С	0.2307	0.0828	2.9486	0.0060
R Square	0.3001			

Source: Author's calculation based on Stata.

Table 8 represents the panel OLS regression results. The results indicate that economic growth per capita and HDI have a positive relationship between them and highly significant. It indicates that if HDI increases, then the economic growth also increases. The result indicates that if 1% increase in HDI then 30% increases in the financial enlargement of these states. The exports of goods as well as services have a positive along with large impact on economic development. It indicates that if sell abroad goods as well as services increase within the Pakistan, then the economic expansion also increases. The consequence indicates that if 1% increases in exports of goods and services then 3% increases in economic growth. The consequences point to that all the variables are positive as well as highly considerable effect on economic increase. The R square demonstrates that the change within economic growth by these independent variables is 30%.

4.4. Diagnostic Tests 4.4.1.Heteroskedasticity Test

The Heteroskedasticity test is calculated by the Bruesch Pagan LM test that is given below the table 7. The null hypothesis is constant variance that is not rejecting because p value is greater than 5%. So, variance is constant and there is no heteroskedasticity in the model.

Table 7		
Heteroskedasticity Test		
chi2(1)	0.79	
Prob> chi2	0.3748	

4.4.2. Ramesy RESET test

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The Ramsey RESET test is calculated in below the table 8. The null hypothesis shows model has no omitted variables that is rejecting because p value is greater than 5%. So, model has omitted variables.

Table 8

Ramesy RESET test		
F(3, 21) =	0.87	
Prob> F =	0.4738	

Ho: model has no omitted variables

4.4.3. Akaike info Criterion

The Akaike info Criterion is given below the table 9. It is an estimator of forecast error as well as thereby relative excellence of statistical models for a agreed set of information. Given a collection of models for the data, AIC approximates the value of every model, relative to all of the additional models.

Table 9 Akaika info Criterion

AKAIKE II		ILEITOIT					
Model	Ν	ll(null)	ll(model)	df	AIC	BIC	
	30	-86.68413	-60.50588	6	133.0118	141.419	
Note: BIC	uses N	= number of obs	ervations. See [I	R] BIC no	ote.		

Table 4.9 demonstrates the diagnostic tests of OLS model that there is no autocorrelation in the model. There is no heteroscedasticity in the model. The model is ideal.

5. Conclusion

Investigation of the connection among HDI and financial development per capita is anything but another theme. In any case, a decrease of GDP development per capita and an expansion in HDI in nearly nations lately absurd cause it to turn into a relentless subject. Numerous creators have attempted to display this connection under different methodologies and utilize distinctive datasets. Results among of them appear to be very conflictive. In this paper, we support the non-straight nexus between GDP development and HDI and examine this connection under another methodology of Smooth Transition Autoregressive model. Led examination showed that it is exceptionally suspicious whether Pakistan's HDI may more noteworthy impact on financial development. The outcomes demonstrate that Pakistan's HDI greater affects the monetary development per capita and profoundly huge affects on financial development per capita. At last, it doesn't propose a decrease in HDI. The issue is the utilization of assets. A wasteful assignment of assets causes swarming out impacts and expenses. Subsequently, we need to focus on government's proficient asset use to improve profitability, which likewise implies an increment in monetary development per capita.

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