ISIR Journal of Business and Management Studies (ISIRJBMS)
ISSN: 3048-7684 (Online)
Frequency: Bimonthly
Published By ISIR Publisher
Journal Homepage Link- https://isirpublisher.com/isirjbms-home/

Does sectoral Foreign direct investment improve subjective wellbeing: An empirical investigation in developing countries

By

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Article History

Received: 15/08/2025
Accepted: 23/08/2025
Published: 25/08/2025

Vol –2 Issue – 4

PP: -49-59

DOI:10.5281/zenodo.16941798

Abstract
This paper aimed at determining the contribution of sectoral FDI on subjective wellbeing of developing countries. Considering a sample of 37 developing countries, studied from 2006 - 2019. Result obtained using the ordinary least square and fractional logistic estimation technic reveal that sectoral FDI contribute positively and significantly to happiness with secondary and tertiary sector FDI performing the highest on happiness, the government should encourage economic policies to be oriented toward bringing in more FDI secondary and tertiary whose technology diffusion and employment opportunities will benefit the population. Again, a policy concerning wage payment according to your qualification level and skill should be adopted in the sense that employers in general (state and private individual) should consider remunerating employees with respect to their highest certificate.

Key words: *Sectoral FDI, subjective wellbeing, OLS, Fractional logit, developing countries*

I. Introduction

There is a significant belief that a country's performance is determined by the level of happiness of its population (World Happiness Report, 2023). As a result, a country will only achieve high levels of total life satisfaction if its people are pro-social, healthy, and rich. Or, better still, its people must possess a high level of what Aristotle referred to as 'eudaimonia', as well as an unselfish mindset. Furthermore, at the societal level, life pleasure and eudaimonia are inextricably linked. Six elements can explain or be used to evaluate the state of an individual's life happiness: income, health, having someone to rely on, having the freedom to make important life decisions, generosity, and the absence of corruption (WHR, 2023). People are expected to acquire meaning from their social activities and life experiences in general. In the absence of basic rights, we can expect nothing more than students' contentment at school and employment. For example, in several Emirates nations, citizens are prevented from freely expressing their sympathy or solidarity with any human being for fear of facing repercussions.

At the end of 2018, an estimated 7.6 billion people lived on Earth (United Nations, 2017a). Improving the well-being of all of these people, particularly those who are less affluent or vulnerable, should be the primary goal of any policy agenda. Achieving the Sustainable Development Goals (SDGs) is a critical component of policymakers, as the priorities of most developing countries government is to reduce poverty and improve wellbeing condition, foreign direct investment can be a source through which this can be possible given that investment create job or employment opportunities, develop local skills and stimulate technological progress.

According to (Ott, 2011; Frey, 2010; and Helliwell and Huang, 2008) people with higher incomes worldwide expressly believe that they are happier with their lives than those with lower incomes. Similarly, those who lose their jobs are far less satisfied with their lives than those who keep or continue to hold their jobs. Married people are happier than single people, according to sociodemographic factors. Both mental and physical health have a significant impact on wellbeing. Cultural differences are also important because there is evidence that religious people are happier than nonreligious people. Furthermore, political decentralization, democracy, and governance all have a positive impact on happiness (Njangang, 2019; Frijters et al., 2019).

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Literature pointed out from growth theory that research and innovation are engines of growth. The policy implication of these growth theories is that foreign direct investment fosters growth through technological access. (Romer, 1993) proposes that developing countries should open their economies to foreign direct investment. The Stiglitz Commission proposed that measuring SWB should be at the core of public policy in the twenty-first century (Johnston et al., 2012). Similarly, the former UK Prime Minister David Cameron announced that increase in quality of life should be a major goal of the government and happiness should serve as a measure of the country's progress.

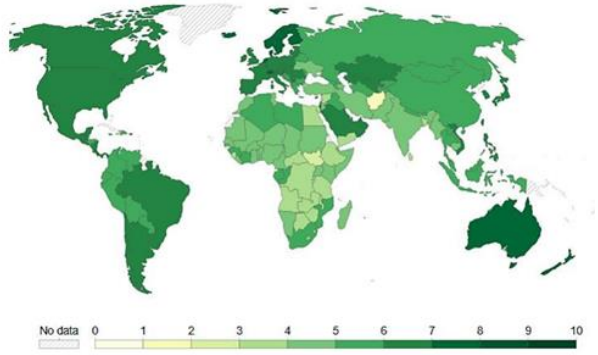
Previous studies analyze the impact of FDI on growth under an assumption of perfect correlation between wellbeing and growth. Education is considered to play a pivotal role in improving the quality of life. In general, a higher level of education can lead to a higher level of income and increasing personal life satisfaction or subjective well-being (Blanchflower and Oswald, 2004; Easterlin, 2001; Michalos, 2007). (Chen, 2012; Oreopoulos and Salvanes, 2011) explained that education is essential in several life factors, more than just monetary indicators represented by income. it is well known that richer individuals are more satisfied with their lives (Diener et al. 2010). In addition, it has recently been shown that self-reported satisfaction with life is lower for those who are classified as being in poverty (Clark et al. 2015, 2016). With respect to unemployment, it is well established that not only personally being unemployed, but also the aggregate level of unemployment negatively affects SWB (Di Tella et al. 2001).

According to the (WHR, 2021), which ranks more than 146 countries worldwide according to their level of national happiness, developing countries are considered to be the least happy in the world. Almost all developing countries appear in the bottom of the report's ranking. Afghanistan, ranked as the country with the lowest gender equality score in the world by the WEF, is also ranked by the WHR as the least happy country in the world, with the lowest happiness score. Developing countries are mostly faced with health problems such as infectious, perinatal and nutritional disorders and these problems burden is mostly on children who are more vulnerable to disease and death than adults. The top seven happiest countries in the world for 2021 were all Northern European countries with Finland at the top with an overall score of 7.842, followed by Denmark (7.620), Switzerland (7.571), Iceland (7.554), Netherland (7.464), Norway (7.392) and Sweden (7.363). the least happy country in the world for 2021are mostly developing Asian and Africa with the least happy country being Afghanistan with an overall score of 2.523, reason being attributed to lowlife expectancy and low gross domestic product rates per capita. Its worthwhile noting that the report was released before the recent Taliban takeover of Afghanistan. The next country is Zimbabwe (3.145), Rwanda (3.415), Botswana (3.467) and Lesotho (3.512).

Happiness studies has gained wide interest in academia and public policy research worldwide. Developed countries such as Australia, Canada, New Zealand, United Kingdom, and the European regions have started considering citizens' happiness maximization as their national objective. Even though happiness studies have become a popular debated topic, they are comparatively new in economics and psychology. The advent of serious debates about including happiness in the policy and goals has made the study of potential happiness policies even more vital (Layard, 2006). A vast empirical literature is available on the determinants of happiness and SWB. Now, this matter has attracted the attention of psychologists, economists, and clinical researchers (Helliwell and Putnam, 2004; Kahneman and Krueger, 2006; Deaton, 2008).

Figure 1: Self -reported life satisfaction, 2023

Average of responses to the "Cantril Ladder" question in the Gallup World Poll. The survey asks respondents to think of their current place on a ladder, with the best possible life for them being a 10, and the worst possible life being a 0



Source: World happiness report (2012-2024)

After the introductory section, the rest of the document is structured as follows. Section 2 presents the literature review. Section 3 describes the data and the econometric methodology. Section 4 presents and discusses the main empirical results. Section 5 concludes with policy implications.

II. Literature review

The impact of sectoral FDI on wellbeing is complex and varies depending on the sector and the characteristics of the economy. (Anwar, 2009 and Otto, 2003) both highlight the potential for FDI to increase welfare, but also note negative effects on established industries. (Lu, 2014) further complicates the picture by showing that the welfare effects of FDI in the service sector are influenced by trade liberalization. (Herman, 2004) emphasizes the need for major domestic policy reforms in order for developing countries to realize the potential benefits of FDI. The determinant factors of subjective wellbeing such as social, economic, institutional are bound to have positive or negative effect depending on the context it is been study.

For a positive determinant point of view, Using the Gallup–Health ways well-being index, (Kahneman and Deaton, 2010) found that subjective well-being has two aspects: emotional well-being and life evaluation. They found that emotional well-being and life evaluation impact people's lives differently. For instance, better income and education are

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more closely related to life evaluation, while health, caregiving, loneliness, and smoking are relatively stronger predictors of daily emotions in individuals' lives. (Ugur,2021a) examines the relationship between income and happiness for individuals residing in Turkey, using data from 2003 to 2017. The study finds a positive and statistically significant relationship between household absolute income and happiness. But, the increase in relative income between households, between rural and urban areas, and between men and women reduces happiness.

(Karademas, 2006) applied structural equation modeling on a sample of 201 individuals and investigated the mediating role of optimism on the relationship between self-efficacy, social support, and well-being. The findings reveal that optimism partially mediates the relationship between self-efficacy and social support for happiness. (Mei et al., 2021) examined the link between social support, resilience, and happiness during the COVID-19 pandemic using data from 104 Malaysian adults and found a positive association between social support, resilience, and happiness. (Sun, Wang, and Jiang, 2020) use the data of China Household Finance Survey in 2011, 2013 and 2015 to empirically analyze the impact of trade liberalization on individual entrepreneurial propensity and find that trade liberalization has significantly increased happiness through individual entrepreneurial propensity.

While for a negative determinant effect, (Ugur, 2021b) investigates the relationships between income inequality and individuals' subjective well-being in 51 countries from 1990 to 2014; the findings show that inequality is negatively associated with life satisfaction and happiness for both lower and higher income groups. (Schyns,1988) cross-country study reveals a substantial correlation between happiness and economic and cultural variables in about 40 countries. (Mookerjee and Beron, 2005) found that happiness decreases with increased religious fractionalization and increases with gender equality, based on data from 60 nations. (Carmignani and Avom, 2010) found that natural resource dependence and abundance have a negative impact on health and human capital although the effect depends on the degree of wealth on resources.

Using panel data from a household survey in Viet Nam, (La et al., 2020) find that income comparison between two groups in a society negatively impacts people's subjective well-being. (He and Zhou, 2019) use the tariff and employment data of 2000 and 2010 to study the impact of trade liberalization of final and intermediate goods on employment in regional labour market. They find that both intermediate and final goods trade liberalization could promote the expansion of informal employment. (Yin, 2018) suggests that trade enhances happiness, and the impact of export is more salient. Using the World Value Survey data, (Li, Chen, and Lin, 2018) find that trade dependence leads to negative outcomes on people' happiness, especially for those countries with a high unemployment rate or an inflation rate.

(Herzer and Nunnenkamp, 2012) were the first to attempt to explore the relationship between FDI stocks and life expectancy in developed economies. They focus on 14 highly developed countries and find that FDI is associated with reduced life expectancy. Reason being that FDI puts pressure on skilled-labor wages, as multinational firms are generally more labor-intensive than domestic firms.

Nevertheless, the majority of subjective wellbeing research ha s upto date been conducted in the developed world, and, altho ugh steadily increasing, research using data from developing c ountries is relatively scarce. Africa, in particular, has received very little attention in the study of subjective wellbeing. Such a lack of research could be attributed partly to the absence of r elevant and reliable data for many African countries.

Most economist in the past predominantly use economic indicators as proxy for wellbeing and although objective measures such as GDP are testable and easy to operationalize and quantify (Moons et al., 2006), they are not ideal (Cummins, 2000) and generally count as poor indications of a country's well-being (Kuznets, 1934). The literature also agrees that happiness is subjective in nature and context-specific, hence, an absolute increase in income or increase in the standard of living without assessing other parameters of happiness or life satisfaction such as social cohesion and status, culture, trust, and environmental factors cannot measure the level of happiness (Kingdon and Knight, 2007; Luechinger and Raschky, 2009; Lun and Bond, 2013).

This paper will contribute firstly at the level of determinants and secondly at the level of empirical method. Most past studies have used life ladder index taking from WHR and some other life satisfaction take from as proxy for happiness. This work uses life ladder as proxy for happiness in developing countries because it captures individual happiness at country level.

The determine factors of subjective well-being have been look for by numerous research which indicate that economic issues, such as income, unemployment, and inflation, might impact happiness (Muresan, Ciumas, and Achim 2020; Obydenkova and Rodrigues Vieira 2023; Easterlin 2017; Easterlin et al. 2010; Chen and Hou 2019; Graafland and Lous 2018), government size (Obydenkova and Salahodjaev 2017) and institutional quality (Li and An 2021; Loubser and Steenekamp 2017; Njangang 2019; Obydenkova and Rodrigues Vieira 2023); gender equality (Ndoya et al, 2024) have been studied but the study which uses sectoral FDI as determinant of happiness do not exist. This study emerges among the first to use sectoral FDI to explain happiness at country level while taking as case study developing countries.

III. Data and methodology

III.1 Data

Happiness is measured by life ladder which is a composite index of six variables which are (Log GDP per capita, social support, life expectancy, freedom, generosity, perception of corruption), it measures happiness as the average level of subjective wellbeing of the population of country i approximated by the "life ladder" index, it is one of the most used measures in the literature of happiness (Ram, 2017;

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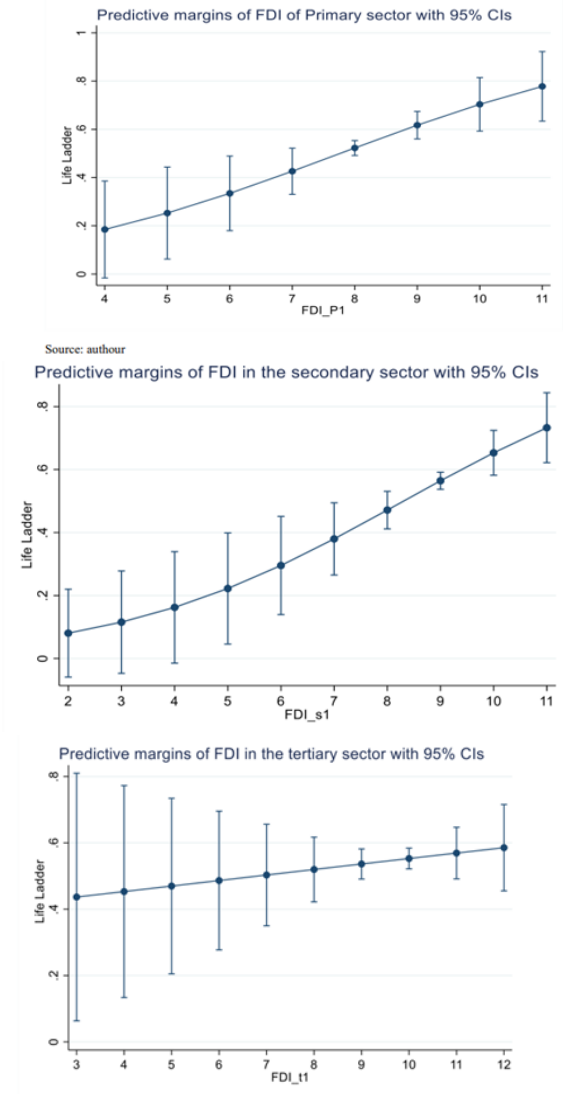
Helliwell et al., 2017, 2020; Njangang, 2019; Mignamissi and Malah, 2020).taken from the WHR 2024 and varies in a range of 0 and 10, it takes the value 0 when citizens are not happy or when the individual is at its lowest position on the ladder and 10 very happy or highest position on the ladder. This data set corresponding to dependent variable of this article varies from 2006 to 2019, investigating a panel of 35 developing countries for 14 years of observation. Concerning sectoral FDI which is our variable of interest, they are taken from UNCTAD, while our control variables are taken from diverse sources such as WDI, V-Dem for political regime, WID for gender gap index and from Encyclopedia Britain for religion attendance. We run a multicollinearity test to check for inter-dependency between variables and obtain a Vif of 1.37 indicating the absence of multi collinearity. We went further running an exogeneity test (Wald test) for the validity of instruments. To do away with the negative sign in the minimum value when summarizing our variable of interest, we added it with a value slightly above it that can render it positive and we then applied logarithm to bring it on the same scale with others.

Figure 2 : Predictive margins of sectoral FDI and happiness



III.2 Methodology

We are specifying our model here while precising along our method of estimation. Our theoretical model is then specified as follows:

$$\text{Happiness}_{it} = \propto_0 + \partial \text{sectoral FDI}_{it} + \gamma M_{it} + \mu_{it} \quad (1)$$

With happiness of a country i capture in time t; $\propto_0$, ∂, γ respectively represent the unknown parameters of our bounded model; sectoral FDI is a vector of primary, secondary and tertiary FDI; M is the vector of control variables and μ is an error term.

Our main model will be estimated using the fractional logit method. This estimation technique is justified by the fact that, after standardization, happiness indicator now ranges between 0 and 1 (Acemoglu et al., 2009). Fractional regression is a well-established method for modeling bounded dependent variables. It is comparable to ordered logit regression in many ways, but is more adaptable because the dependent variable can be assessed as continuous across a defined restricted range. This technique of estimation is preferable to some other technics of estimation of linear models like OLS, instrumentals variable model etc in that OLS assumes the dependent variable is observed in an unbounded scale (there can be regress in either direction).

The problems with OLS will usually be moderate or even negligible when predictions for Y are in the range 0.2-0.8 (assuming Y is rescaled to 0-1, continuous). Fractional regression, like logistic regression, may model variables with a bounded range of values. A key difference is that Y can be measured as continuous and does not need to be converted to categories Thus, fractional regression will not lead to misleading findings (in comparison to OLS) when modeling bounded dependent variables.

$$L_{it}(\theta) = y_{it}(\ln g(X_{it}\theta)) + (1-y_{it})(1-\ln g(X_{it}\theta)) \quad (2)$$

Where $g(X_{it}\Theta)$ represents the logistic cumulative distribution function and the outcome $y_{it} \in [0,1]$ unlike the binary logit where the outcome takes the value 0 or 1. The mechanisms for obtaining parameter estimates are identical to those for the binary response, but a fully robust variance estimator must be obtained. According to (Papke and Wooldridge,1996), the functional form of the expectation of happiness is specified as follows:

$$E(y_{it} \mid X_{it}) = \frac{\exp(X_{it}\theta)}{[1+\exp(X_{it}\theta)]} = h(X_{it}\theta) \quad (3)$$

The limiting probabilities for the dependent variable and the regression variables are therefore specified as follows: $P(y_{it}=0 \mid X_{it}) \succ 0$ and $P(y_{it}=1 \mid X_{it}) \succ 0$. To check that the results produced by the fractional logit model are robust, the multivariate Tobit model is used. This model adjusts the mixed-effects models for continuous responses where the outcome variable is censored. Secondly, the Tobit model with instrumental variables. The advantages associated with this

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model are twofold. The IV-Tobit model is commonly used on models with limits outcomes and is applicable to fractional outcomes in the interval [0, 1]. (Nchofoung et al., 2023). Also, this model controls for endogeneity, the possible sources of which are related to the measurement of happiness and the possible omission of relevant variables from the model. The two-stage IV-Tobit regression resolves this possible bias. The exogeneity of this instrument in two-stage IV-Tobit regressions is examined using the Wald exogeneity test.

Table 1: Descriptive statistics table

Variable		Mean	Std. dev.	Min	Max	Observations
LifeL	Overall	.5122154	.2576813	0	1	N = 444
	Between		.2272892	.030721	.9795877	n = 36
	Within		.1259182	.0187183	.92412	T bar = 12.3333
FDI_P1	Overall	8.185821	.4509642	4.070395	10.12516	N = 342
	Between		.3125927	7.911658	9.221155	n = 38
	Within		.309618	3.890415	9.107925	T bar = 9
FDI_s1	Overall	8.797987	.4272791	7.859116	10.74052	N = 332
	Between		.4824368	8.521619	10.74052	n = 37
	Within		.1651923	7.944819	9.45339	T bar = 8.97297
FDI_t1	Overall	9.629935	.4381431	3.883013	11.57346	N = 332
	Between		.3769234	9.459228	11.57346	n = 37
	Within		.3691882	3.803872	10.86002	T bar = 8.97297
GDPcap	Overall	3.492948	3.183542	-13.54579	23.59069	N = 496
	Between		1.601274	.5427398	8.175418	n = 39
	Within		2.78996	-14.55675	23.57181	T bar = 12.7179
Popgrow	Overall	1.275671	1.009395	-.888185	3.571097	N = 496
	Between		.9892808	-.6674025	3.364437	n = 39
	Within		.212489	.5317401	2.092728	T bar = 12.7179
Lifeexp	Overall	62.34216	5.193469	44.26	69.6	N = 444
	Between		5.114277	50.32	68.08571	n = 36
	Within		1.579258	56.17645	67.82216	T bar = 12.3333
Education	Overall	.9897886	.0550916	.7791778	1.103871	N = 380
	Between		.0542154	.8216993	1.076676	n = 37
	Within		.0162427	.9216853	1.063145	T bar = 10.2703
Internet	Overall	30.94499	22.52778	.4683567	84.18715	N = 463

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	Between		17.12096	4.857082	65.58871	n = 37
	Within		14.64227	-15.25273	70.41218	T bar = 12.5135
Access~u	Overall	82.41586	26.66873	9	100	N = 496
	Between		26.45116	20.85745	99.99286	n = 39
	Within		6.586184	52.42019	121.2902	T bar = 12.7179
Access~o	Overall	57.16822	34.95585	.7	99.8	N = 450
	Between		35.16963	.8535714	99.35833	n = 36
	Within		6.614093	24.06822	85.96822	T bar = 12.5
e_poli~2	Overall	4.12854	5.510097	-9	10	N = 459
	Between		5.62642	-9	10	n = 39
	Within		1.768521	-6.025306	10.20546	T bar = 11.7692
gggi_ggi	Overall	.6792115	.0457175	.5433	.822	N = 496
	Between		.044272	.5514714	.7994	n = 39
	Within		.0183484	.6064972	.7691297	T bar = 12.7179
NRR	Overall	1.135345	1.42613	-6.049184	3.762146	N = 496
	Between		1.334269	-3.974478	3.244413	n = 39
	Within		.504036	-2.916207	2.937822	T bar = 12.7179

The mean of happiness through life ladder is 0.512, indicating that, on average, the happiness level of developing countries is 0.512 and this value of mean is very dispersed between countries than within countries, showing that happiness level of countries minimum value is 0 and maximum is 1. FDI primary has a mean of 8.10 indicating that FDI primary on average makes people happy between and within countries in the range of 4 and 10.13, then FDI secondary average performance on happiness is 8.79 between and within countries in the range of 7.8 and 10.74, while FDI tertiary on average influence happiness at 9.62 between and with countries in a range of 3.8 and 11.57.

IV. Results and Discussion

IV.1 Baseline result

Table 2 : Basic result with OLS and fractional logit

	Dependent variable : Life Ladder					
Estimation technic	**OLS**				**Fractional Logit**	
VARIABLES						
FDI_P1	0.142***	0.094***			0.431**	
	(0.031)	(0.028)			(0.170)	
FDI_s1			0.164***	0.094***		0.417***
			(0.033)	(0.031)		(0.145)
FDI_t1					0.046	0.019
					(0.033)	(0.029)

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GDP/capi		-0.010***		-0.017***		-0.016***	-0.045**	-0.078**	-0.072**
		(0.004)		(0.005)		(0.005)	(0.020)	(0.031)	(0.031)
Popgrow		0.053***		0.052***		0.058***	0.255***	0.249***	0.280***
		(0.018)		(0.018)		(0.018)	(0.083)	(0.091)	(0.093)
Lifeexp		0.026***		0.022***		0.024***	0.123***	0.102***	0.114***
		(0.004)		(0.004)		(0.004)	(0.019)	(0.020)	(0.020)
Schoolenrol		0.006***		0.006***		0.006***	0.030***	0.027***	0.026***
		(0.001)		(0.001)		(0.001)	(0.006)	(0.006)	(0.006)
Internet		0.002**		0.003***		0.003***	0.009**	0.012***	0.013***
		(0.001)		(0.001)		(0.001)	(0.004)	(0.004)	(0.004)
Constant	-0.627c**	-2.042***	-0.909***	-1.814***	0.096	-1.337***	-11.883***	-10.635***	-8.508***
	(0.252)	(0.343)	(0.292)	(0.342)	(0.320)	(0.365)	(1.962)	(1.565)	(1.683)
Observations	327	259	314	248	314	248	259	248	248
Country	35	35	35	35	35	35	35	35	35
R-square	0.061	0.410	0.073	0.422	0.006	0.401			
Chi2							136.9	147.6	133.5
F	21.21	29.16	24.50	29.32	1.896	26.93			

Source: author. Robust standard errors in parentheses ***P<0.01,** p<0.5*p<0.1

Where FDI p1, s1, t1 represent respectively FDI primary, secondary and tertiary, GDP/capi stands for GDP pet capita, popgrow stands for population growth, lifeexp stands for life expectancy at birth, schoolenrol stands for secondary school enrollment, internet stands for individual using internet.

Our basic result obtained with the aimed of determining the contribution of sectoral FDI on happiness in developing countries is provided by applying the technic of fractional logistic and ordinary least square, results are presented thus in the table; the first and second rows of the table indicate our explained variable and technics of estimation respectively. The last five rows indicate the number of observations, countries, the coefficient of determination, chi 2 and Fischer statistics is significant at 1% level. The table is fragmented into two major column indicating result obtained using the OLS technic on one hand and on the other hand fractional logistic with each column providing results of happiness obtained without including control variables and others obtained when adding control variables.

Four interpretations of this basic result emanate, firstly, sectoral FDI has a positive impact on happiness which is significant at 1% level in equation without control variables; secondly the impact is still positive and significant at 1% but with a reduce effect when control variables are introduced in the equation; thirdly, sectoral FDI positive impact on happiness level is higher when using the fractional logistic estimation technique (which take in account bounded variables) than when we use an OLS technic of estimation which do not take in account bounded variables; and fourthly, it is observed from our basic result table that when using the OLS technique , FDI secondary exert the greatest positive significant at 1% level impact on happiness when using the OLS but when using the fractional logistic estimation technic, FDI primary has the greatest impact but significant at 5% and followed by FDI secondary which is significant at 1% and tertiary which is not significant. This can be due to the fact that since FDI in the secondary sector has to do with the transformation of raw materials from their primary sources into refined consumer goods, then the quality of task performed by an employee can be influenced by the coexisting affective states (Beal et al., 2005).

As for what concern control variables, GDP per capita negatively but significantly affects happiness at 1% level when using OLS and at 5% when using fractional logit. A 1% change in GDP per capita will reduce happiness by 0.045, 0.078, and 0.072 in the primary, secondary and tertiary sectors respectively. This result shows that an increase in the level of per capita income is not always an indicator of wellbeing and quality of the population life. Happiness is not proportional to the level of income (Easterlin,1974). (Paul and Guilbert, 2013) found this negative evidence in Australia. Population growth positively and significantly affect happiness at 1% level when using both OLS and fractional logistic technics of estimation. Health measured by life expectancy has a positive

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and significant at 1% level effect on happiness when using both technics, but it turns to be higher in the primary sector than the others. Reason lies in the fact that in most developing countries the primary sector still uses the subsistence technic which the population is acquainted to and feels more satisfy to use than the innovation technic in the secondary sector which turn to frustrate and affect the metal health of people in case of adaptability fear.

Education captured by school enrollment also affect positively and significantly at 1% level in all the three sectors when both technics are involved. A positive impact of education on happiness is mainly due to it contribution to the improvement of people's material living conditions, especially the increase of wage earnings (Yang et al., 2022). Internet affect happiness in a positive and significant manner but at 5% level in the primary sector when using both technics and in the secondary and tertiary at 1% level. The positive effect is more accentuated in the tertiary sector than the other two sectors. Reason for such a result might be that individual turn to be more satisfy and happy when using internet in the process of trade or e-commerce.

IV.2 Robustness check

Table 3: sensitivity with renewable energy

Dependent Variable : Life Ladder

Estimation Technic : Fractional Logit

VARIABLES	eq1	eq2	eq3	eq4	eq5	eq6	eq7	eq8	eq9
FDI_P1		0.354**	0.435**	0.330**					
		(0.141)	(0.176)	(0.133)					
FDI_s1					0.398***	0.411***	0.364**		
					(0.145)	(0.146)	(0.143)		
FDI_t1	0.044							0.058	0.077
	(0.117)							(0.125)	(0.127)
GDP/grow	-0.071**	-0.045**	-0.046**	-0.047**	-0.063*	-0.082**	-0.064**	-0.057*	-0.076**
	(0.031)	(0.019)	(0.021)	(0.019)	(0.032)	(0.033)	(0.031)	(0.032)	(0.033)
Popgrow	0.369***	0.323***	0.241***	0.401***	0.367***	0.234**	0.464***	0.395***	0.257**
	(0.097)	(0.088)	(0.087)	(0.089)	(0.098)	(0.097)	(0.097)	(0.102)	(0.101)
Lifeexpec	0.079***	0.086***	0.127***	0.073***	0.053**	0.102***	0.044**	0.064***	0.113***
	(0.021)	(0.024)	(0.023)	(0.023)	(0.023)	(0.022)	(0.022)	(0.022)	(0.022)
Schoolenrol	0.019***	0.028***	0.029***	0.022***	0.023***	0.026***	0.015**	0.022***	0.026***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Internet	0.012***	0.004	0.010**	0.005	0.004	0.013***	0.006	0.005	0.014***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
ACF&T		0.011***			0.016***			0.016***	
		(0.004)			(0.004)			(0.004)	
ACF&TR			-0.002			-0.001			-0.001
			(0.003)			(0.004)			(0.004)
ACF&TU				0.015***			0.020***		
				(0.004)			(0.004)		
Constant	-8.122***	-9.461***	-12.071***	-9.030***	-8.249***	-10.550***	-8.001***	-6.056***	-8.419***
	(1.616)	(2.025)	(2.175)	(1.853)	(1.602)	(1.691)	(1.595)	(1.688)	(1.738)
Observations	248	254	254	254	243	243	243	243	243
Country	35	35	35	35	35	35	35	35	35

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Rsquare	0.0934	0.0947	0.0906	0.0993	0.104	0.0956	0.110	0.0998	0.0914
Chi2	121.2***	165.6***	133.4***	177.5***	189.0***	146.7***	202.6***	165.2***	133.5***

Source: author. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Where ACF&T is access to clean fuel and technology population total, ACF&TR is access to clean fuel rural population, ACF&TU is access to clean fuel urban population.

Table 1 *: Estimation with additive institutional variable*

	Dependent variable : Life Ladder		
VARIABLES	Eq1	Eq2	Eq3
FDI_P1	0.405**		
	(0.160)		
FDI_s1		0.581***	
		(0.157)	
FDI_t1			0.117
			(0.175)
GDP/cap	-0.048**	-0.070**	-0.064**
	(0.023)	(0.031)	(0.031)
Popgrow	0.330***	0.307***	0.342***
	(0.091)	(0.094)	(0.098)
Lifeexpec	0.125***	0.102***	0.117***
	(0.020)	(0.020)	(0.020)
Schoolenrol	0.025***	0.023***	0.023***
	(0.006)	(0.006)	(0.006)
Internet	0.008**	0.010**	0.012***
	(0.004)	(0.004)	(0.004)
e_polity2	0.042***	0.045***	0.037***
	(0.012)	(0.014)	(0.013)
Constant	-11.996***	-12.287***	-9.318***
	(1.921)	(1.627)	(2.089)
Observations	233	224	224
Country	35	35	35
Chi2	129.4	145.0	116.5
Rsquare	0.0863	0.0906	0.0825

Source: author. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table5 *: Robustness with control gender and natural resource value*

Dependent variable: Life Ladder						
Estimation Technic: Instrumented variable Tobit						
VARIABLES	Eq 1	Eq 2	Eq 3	Eq4	Eq5	Eq 6
FDI_P1					0.387***	
FDI_s1		0.724***	0.823***			
		(0.210)	(0.231)			
FDI_t1	0.952*			1.328		0.952*

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	(0.526)			(0.868)		(0.526)
GDPcap	-0.033	-0.010	-0.012	-0.047	-0.004	-0.033
	(0.021)	(0.009)	(0.010)	(0.033)	(0.007)	(0.021)
Unemplo	-0.013	-0.004	-0.005	-0.018	-0.022***	-0.013
	(0.010)	(0.007)	(0.007)	(0.013)	(0.004)	(0.010)
Inflation	0.009	-0.028***	-0.027***	0.027	-0.028***	0.009
	(0.018)	(0.008)	(0.010)	(0.031)	(0.007)	(0.018)
school	0.203	-1.424	-1.225*	0.720	0.796	0.203
	(1.211)	(0.923)	(0.736)	(1.346)	(0.497)	(1.211)
internet	0.003	0.001	0.000	0.003	0.001	0.003
	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)
Ggi	-0.136	0.319			-1.323**	-0.136
	(1.326)	(0.768)			(0.518)	(1.326)
NRR			-0.034	-0.094		
			(0.028)	(0.083)		
Constant	-8.625*	-4.429***	-5.232***	-12.754	-2.195***	-8.625*
	(5.172)	(1.535)	(1.652)	(8.644)	(0.763)	(5.172)
Observations	154	154	154	154	156	154
chi2_exog	34.10	25.25	32.61	43.26	24.12	34.10
chi2	17.46	62.80	51.71	9.541	87.97	17.46

Source: author. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Where Ggi stands for gender gap index and NRR is natural resource rent

This result shows that unemployment reduces happiness even though it is not significant and in the same way, inflation reduces or it have a negative and significant impact on happiness. That is a change of 1% in the rate of inflation associated to FDI primary and FDI secondary will reduce happiness by 0.028, and when associated to FDI tertiary will instead increase happiness but the value is of significant. This can be explained economically in the sense that inflation reduces the purchasing power of consumers dealing with these two sectors of activities (Mignamissi and Malah, 2021) Gender inequality reduce happiness and it is significant at 5%, so if gender gap index changes by 1, it is going to reduce happiness by 1.323. natural resource rent is not significant.

V. Conclusion and recommendations

The aimed of this paper was to determine the effect of sectoral FDI on subjective wellbeing. This aimed was possible by adopting a sample of 35 developing countries with data ranging from 2006 -2019, by employing the method of a fractional logistic technique which is good to determine regressors of a bounded endogenous variable to obtained Our basic result, then use instrumented variable tobit to check for robustness discloses from the first point of view that sectoral FDI exert a positive impact on happiness in developing countries whether we use a simple technic of estimation such as OLS which do not take into consideration bounded variable or fractional logit technic which is bounded.

Sectoral FDI in a general manner is found to positively impact happiness, we therefore encourage economic policies to be oriented toward bringing in more FDI secondary and tertiary whose technology diffusion and employment opportunities will benefit the population. Again, a policy concerning wage payment according to your qualification level and skill should be adopted in the sense that employers in general (state and private individual) should consider remunerating employees with respect to their highest certificate.

VI. Availability of data and materials

Data are available on request from the authors.

VII. Author's statement

The authors declare no conflicting financial interests or personal relationships that could have appeared to influence this piece of work.

VIII. Funding

This study has not received any form of funding for its realization

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