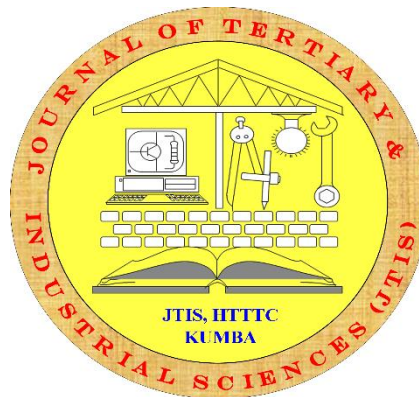


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ECONOMICS AND MANAGEMENT SCIENCES

Does Sectorial Foreign Direct Investment Improve Domestic Investment: An Empirical Investigation in Developing Countries

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Abstract

This study investigates the impact of sectorial foreign direct investment (FDI) on domestic investment in developing countries. Specifically, the study aims at assessing the influence of primary, secondary and tertiary FDI on the host country's domestic investment. Using a quantitative approach, it analyses data from 37 developing nations spanning 2000–2019. Secondary data were obtained from the International Trade Centre (ITC), World Development Indicators (WDI), and the World Happiness Report (WHR). The study employs Pooled Ordinary Least Squares (POLS) and System Generalized Method of Moments (System GMM) to ensure robust estimation. Results reveal that sectorial FDI significantly enhances domestic investment, with primary FDI contributing most to capital formation. Secondary FDI shows the strongest positive effect on human capital investment but negatively affects health-related investment. To attract more secondary and tertiary FDI, governments should implement moderate tax policies and provide land access, alongside industrial strategies that foster innovation, productivity, and support for SMEs and large-scale industries. These measures can amplify the developmental benefits of FDI and stimulate sustainable investment growth.

Key words: Developing countries, Domestic investment, GMM, Primary FDI, Secondary FDI, Sectorial FDI, Tertiary FDI

1. Introduction

Investments are widely recognized as the driving force behind economic expansion and human development. As Liesbeth et al. (2009) and Torabi (2015) highlight, they serve as effective mechanisms for wealth creation across national economies and societies. Among various forms of investment, foreign direct investment (FDI) plays a pivotal role in fostering economic development. It not only attracts external capital but also strengthens the workforce and enhances productivity. Economic theory underscores FDI's dual

contribution to development: directly, as a source of external financing, and indirectly, by stimulating domestic capital formation. In countries where domestic investment remains persistently low, FDI is often prioritized as a development strategy. This was notably emphasized in the Monterrey Consensus of 2002, which positioned FDI as a cornerstone of development finance. Lipsey et al. (2000) further affirm that FDI has become the most reliable source of investment for developing nations.

In developing economies, the distinctiveness of FDI is often linked to the growth of extractive industries and pronounced regional disparities (Ongo & Song, 2020). The flow of FDI is influenced by several factors, including economic and political stability, demographic dynamism, and—most critically for resource-rich countries a strong endowment of natural resources. The structural adjustment programs initiated by the World Bank and the International Monetary Fund in the early 1980s marked a turning point for Sub-Saharan Africa, opening the region to global capital flows. Since then, substantial FDI has financed the exploration and production of hydrocarbons, timber, and gas in oil-producing countries.

Capital formation and technological advancement are widely regarded as engines of economic development. According to Todaro and Smith (2011), foreign direct investment (FDI) plays four critical roles in developing countries. First, it compensates for the lack of domestic savings a particularly pressing issue in Sub-Saharan Africa (SSA), where low-income levels hinder capital accumulation. Second, FDI helps fill the foreign exchange gap, enabling countries to finance essential imports of goods and services. Third, it supports government revenue by bridging the gap between targeted tax income and locally generated taxes. Fourth, FDI addresses deficiencies in management, entrepreneurship, technology, and skills, introducing innovations that domestic economies often lack.

In the 21st century, FDI has become a significant component of Africa's investment landscape. The 2014 African Economic Outlook reports that between 2001 and 2011, FDI accounted for approximately 16% of domestic investment in Africa, compared to a global average of 11%. More recently, FDI has surpassed traditional sources of external financing—such as official development assistance and remittances—as a key driver of investment in developing countries (UNECA, 2013; World Bank, 2014). While the extractive sector has historically dominated FDI inflows, recent trends show a notable rise in investment in the services sector, reflecting a broader structural transformation across the region.

Studies have consistently shown that developing countries often suffer from a shortage of capital equipment, such as large-scale machinery and modern production lines. This scarcity makes the rate of return on new foreign investment particularly high, especially in capital-intensive industries (Zhang & Fu, 2008). One of the key benefits of foreign direct investment (FDI) is its role in facilitating technology transfer. However, the extent

to which FDI contributes to economic growth and capital formation depends significantly on a country's absorptive capacity defined by the development level of its human capital and financial systems (Nguyen et al., 2009). This relationship is crucial: economies with strong absorptive capacities are better positioned to harness the benefits of FDI, leading to positive effects on domestic investment and overall economic performance. Conversely, in countries with weak absorptive capacities often the case in less developed economies FDI may crowd out domestic investment or fail to generate meaningful spillovers (Borensztein et al., 1998).

In many African countries, limited investment in agriculture, manufacturing, and the tertiary sector remains a major constraint on production and service expansion. Domestic investment in these sectors is often hampered by low levels of domestic savings and a heavy reliance on foreign aid. For instance, most African governments allocate less than 10% of their public budgets to agriculture, despite its critical role in food security and employment (Cleaver, 2012). As a result, financing agricultural development through domestic sources alone is not only difficult but also strategically insufficient (Brzeska et al., 2012). This underinvestment extends to manufacturing and services, where infrastructure deficits and limited access to finance further inhibit growth. Strengthening domestic investment mechanisms and improving public sector prioritization are essential to unlocking the potential of these sectors.

South Africa stands out as one of the most significant sources of intraregional foreign direct investment (FDI) within the African continent. As of 2011, it was the fifth-largest holder of FDI stock in Africa, accounting for approximately 5% of the continent's total FDI stock (world investment report, 2011). This position reflects South Africa's strategic economic influence and its active role in regional investment flows. South Africa's outward FDI has been directed toward several neighbouring and regional economies, including Mauritius, Nigeria, Mozambique, and Zimbabwe. These investments span key sectors such as mining and quarrying, manufacturing, and financial services, underscoring the country's diversified investment portfolio across the continent (UNCTAD, 2011). According to UNCTAD's *World Investment Report 2011*, South Africa's FDI activities have contributed to infrastructure development and industrial expansion in these recipient countries, reinforcing its role as a regional economic anchor.

From a sectoral perspective, countries like India have strategically focused their FDI in Africa on manufacturing particularly textiles and garments construction, and services, with a notable emphasis on information and communication technology (ICT). Although still modest in scale, Brazil's FDI in Africa is growing, especially in Portuguese-speaking countries such as Angola and Mozambique, as well as in Ghana, South Africa, and Zambia. Angola has emerged as the largest recipient of Brazilian FDI, attracting investments worth US\$11.7 billion, primarily in energy, mining, and infrastructure, driven by large multinational corporations (UNCTAD, 2012).

Limited investment in developing economies agricultural, manufacturing and tertiary sectors is a key constraint on its production and service expansion. For most developing countries, domestic investment in these sectors is constrained by the limited availability of domestic savings and by heavy reliance on aid funding. Most developing countries governments spend less than 10% of their public budgets on agriculture (Cleaver, 2012). Hence, additional agricultural investment financing through domestic sources alone is not only difficult but also not strategic (Brzeska et al., 2012).

Although still small, Brazil's FDI to developing Africa is on the rise with the Portuguese-speaking countries such as Angola and Mozambique, as well as Ghana, South Africa, and Zambia as main destinations. Angola has been the largest recipient of Brazilian FDI so far, especially in energy, mining, and infrastructure, given the presence of a few large multinational corporations focusing on construction and mining. The Brazilian FDI in Angola reached US\$11.7 billion.

Foreign direct investment (FDI) in developing nations is no longer concentrated solely in the traditional natural resources sector. In recent years, substantial FDI inflows have also targeted manufacturing and services industries, reflecting a broader diversification of investment interests. These sectors have proven to be consistently profitable over time, attracting multinational companies seeking stable returns and strategic growth opportunities.

Despite the growing diversification of FDI across sectors in developing nations, several issues persist: (a) Uneven Distribution: FDI is not evenly spread across countries or sectors. Some nations, especially landlocked or small island states, still struggle to attract consistent investment despite recent growth, (b) Lack of Strategic Differentiation: Investors may overlook nuanced opportunities by applying broad strategies instead of tailoring their approach to specific country-sector combinations and (c) Institutional Weaknesses: Many developing countries face governance, infrastructure, and regulatory challenges that hinder their ability to attract and retain high-quality FDI.

Sectoral FDI can be both beneficial and detrimental to domestic investment. On one hand, it adds to the stock of domestic capital, contributing to gross fixed capital formation (Amighini et al., 2017). On the other hand, increased competition from foreign firms may force competitive domestic enterprises to shut down, thereby reducing overall investment a phenomenon known as crowding out (Jude, 2018). The importance of sectoral FDI for developing countries can be measured through its contribution to gross fixed capital formation as a percentage of gross national product, especially when multinational enterprises engage in manufacturing activities (Amighini et al., 2017). Although literature generally supports the idea that FDI increases total investment in host economies (Lautier & Moreau, 2012), it may simultaneously displace domestic investment depending on the sector and entry mode of foreign firms (Diallo et al., 2021).

Therefore, in order to determine the contribution of sectorial FDI on domestic investment, this article aims at identifying which types of sectoral FDI (whether primary, secondary, or tertiary) are more likely to foster domestic investment. This study is organized into 4 sections. Section 2 outlines the existing studies and empirical literature. Section 3 displays the methodology used, section 4, results and Section 5 concludes, gives Policy implications and limitation of the study.

2. An assessment point of existing studies

The liberal doctrine of the classical authors can be summed up in the expression "laissez-faire, laissez-passer". Every economy must produce the goods it needs, export the goods for which it has an advantage in terms of production costs and import the goods for which it has no advantage. Smith (1790) in his exploration into the nature to understand what causes countries to be richer, came out with the absolute advantage theory. According to this theory, it is in the interest of a country to produce a commodity itself if the cost of production of this commodity is lower than in other countries. Then the country must produce it and export it to other countries and import Goods whose production cost is too high; this process is called specialization.

For Ricardo (1823), even if a country has no absolute advantage, it can have interest in specializing and exchanging if he has a comparative advantage. A product's manufacturing is divided into many pieces or jobs that are carried out in different nations. Each country manufactures the component of the product over which it has a comparative advantage. This indicates an international division of production process. Another theoretical model emerges known as the HOS model. These three scholars argue that each country's comparative advantage stems or arises from disparities in factors of production, such as labour and capital. A country specializes in producing goods that make use of abundant resources in its territory. Companies should prioritize production that utilizes this abundant and cost-effective resource. Contrarily, countries have an interest in importing goods that demand scarce factor of production in the territory (Hecksher, 1952; Ohlin, 1979; Samuelson, 2009). These old growth theories demonstrated how nations can get rich by liberalizing their borders or by collaborating with other nations in term of export and import without specifying the role of FDI in the enrichment of nations but the 20th century gave birth to more growth theories which is classified under what we called modern theories of growth.

The neoclassical growth theory assumes that the long-run economic growth or development of a country is determined exogenously, and its emphasis on capital accumulation and savings as being the main determinant of economic growth. The model considered the production function with two factors; labour and capital, with an exogenous factor technology which are determinants of output. This model is written in the form $Y = A F(K, L)$. Where Y stands for gross domestic product (GDP), A stands for the exogenous factor technology, K stands for the level of capital accumulation, and L the

amount of unskilled labour force. The neo-classical model focuses on the supply side such as capital and technology to determine the level of growth of an economy. Growth rate of output is achieved at least in the short run through high rate of savings and capital formation. However, capital is subject to diminishing return which limits economic growth in this model.

Many neo-classical economists believed that financial systems had only minor effects on the rate of investment in physical capital, and changes in investment were viewed as having only minor effects on economic growth Solow (1957) analyses. Also, the neoclassical growth theory had some basic difficulties as follows; first, it implies that increase in saving rate has only a temporary or short-run effect on the growth rate and it does not affect the long-run rate of economic growth. Furthermore, the theory assumed that growth rate of the economy having a high rate of saving or that having a low rate of savings will converge in the long run. This convergence means both countries having a high and low rate of savings, but the same level of population will experience a growth in their national income in the long run.

However, endogenous growth models emphasize on the role played by specialization Rivera-Batiz (1991), economies of scale Romer (1986) and human capital externalities Lucas (1988); Azariadis and Drazen (1990) in the process of economic growth, all of them often related with the presence of foreign MNEs in the beneficiary economy. If foreign MNEs bring more efficient technologies to beneficiary countries, their impact on growth would be higher than a quantitatively equivalent investment made by a domestic firm. Endogenous growth models lay a scope to distinguish between different sources of investment according to their technological levels. MNEs are capable and have the potential to create and transfer knowledge across borders, both intentionally and unintentionally.

Empirical evidence on the relationship between sectorial FDI and domestic investment have not been concluded. Several studies show a possibility of a negative or positive evidence;

On one hand, FDI substitutes or crowd-out domestic investment; (Eregha, 2011; Acar et al., 2012). Oziengbe (2017) employs Granger causality test and DOLS estimation technique to investigate the effect of FDI on domestic investment in Nigeria. He equally investigated the effects of interactions between FDI and financial system development and, FDI and secondary school enrolment (proxy for human capital). They found empirical evidence that there is no short run causal relationship between FDI and domestic investment in Nigeria their results furthermore indicate a long run positive, but not statistically significant effect of FDI on domestic investment. It however reveals that when interacted with financial system development, FDI positively and significantly affects domestic investment. The study also found that the effect of interaction between FDI and secondary school enrolment on domestic investment is negative. This is

indicative of existence of a threshold level of human capital development required for FDI to positively affect domestic investment. Further evidence from their study is that low rate of inflation is favourable to domestic investment whereas high rate of inflation adversely affects domestic investment. Trade openness is also observed to negatively affect domestic investment in Nigeria.

While on the other hand, Faisal et al. (2020 – 2021) investigated the relationship between infrastructure and sectorial distribution of FDI inflow in China. They carried out their estimation by applying the method of Autoregressive Distributed Lag (ARDL) bound testing and Vector Error Correction Model (VECM) procedures of estimation. They equally use a composite index of infrastructure with more than 30 indicators. Their results showed that there is a long-run relationship between sectorial FDI and infrastructure. A bidirectional causal relationship is confirmed by using VECM. However, they found unidirectional causality between the primary sector's FDI and infrastructure, and it is running from infrastructure to primary sector FDI. Control variables such as; institutional quality, trade openness, and domestic investment, was robust in their analysis. Ghebreyesus and Cadet (1998) investigated the impact of FDI inflows on domestic investment in sub-Sahara Africa in the period between 1980 and 1990 using the ordinary least square estimation technique, and found that FDI had no significant impact on domestic investment.

3. Methodology

This study adopts a quantitative research approach aimed at generalizing findings across a broad set of developing countries. A panel dataset comprising 37 developing countries observed over a 20-year period (2000–2019) is used. The selection of countries and time frame is based on data availability constraints, particularly for sectorial FDI variables. Data was collected using documentary research from sources such as World Development Indicators (WDI), World Governance Indicator (WGI) and sectorial FDI data comes from United Nations Conference for Trade and Development (UNCTAD). Data was analysed using descriptive statistics and econometric tests. The periodicity and countries under investigation are chosen according to data availability constraints on sectorial FDI variables. The dependent variable of this essay is investment capture by GFCF% GDP. This variable is measured as a percentage of gross domestic product. In order to analyse the effects of different components of sectorial FDI, we used FDI in different sector expressed as a percentage of GDP. Hence independent or exogenous variables are; FDI primary, FDI secondary FDI tertiary. The control variables are: net foreign inflow, control of corruption, trade openness, inflation, exchange rate, tax and domestic credit to private sector (as proxy for financial development) a recipient country with a well-developed financial system is an important precondition for FDI to have a positive impact on domestic investment (Hermes and Lensink, 2003).

To assess the relationship between sectoral FDI and domestic investment, the following panel regression model is proposed:

$$GFCF_{it} = \alpha + \beta_1 FDI_Primary_{it} + \beta_2 FDI_Secondary_{it} + \beta_3 FDI_Tertiary_{it} + \gamma X_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Where $GFCF_{it}$: Gross Fixed Capital Formation (% of GDP) for country i at time t

$FDI_Primary_{it}$, $FDI_Secondary_{it}$, $FDI_Tertiary_{it}$: Sectoral FDI variables (% of GDP)

X_{it} : Vector of control variables and ε_{it} : Error term.

4. Results and discussion

We are commenting firstly on the descriptive analysis through descriptive statistics and correlation analysis and the next sub section is econometric analysis.

4.1. Descriptive analysis

Table 1 : Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GFCF	798	23.555	6.733	10.523	57.71
FDI primary	413	3.532	8.668	-7.327	101.355
FDI second	397	6.166	13.165	-2.608	76.622
FDI tertiary	397	10.766	24.229	-20.027	168.648
Fdi total	394	20.351	36.325	-.857	225.466
Health	819	1.557	.385	.617	2.432
Primary gov exp	487	100.166	9.693	68.113	135.061
Net FDI	813	3.957	4.983	-5.088	55.07
Domestic credit	663	40.578	32.612	3.113	165.39
Inflation	784	6.577	8.11	-1.71	96.094
Exchange rate	808	1436.695	3636.059	.545	23050.242
Taxes	561	9.266	4.474	2.371	22.088
Trade	807	70.681	32.916	11.855	220.407
Control Corruption	798	-.591	.456	-1.673	.829
CO2emission	820	.585	.487	.101	3.934

Source : Author's computing

Table 1 above describes the variables according to their mean (which measures the performance), standard deviation (which measures the disparities or dispersion in the values of variables), minimum (tells us the minimum value obtained by the variable), maximum (tells us the maximum value obtained by the variable) and observations (tells us the number of times we are observe each variable). Our descriptive statistic table indicates that tertiary FDI has an average performance of 10.766 on GFCF exchange rate has the highest performance on gross fixed capital formation (with a mean of 1436.695), exchange rate having the highest performance signifies a positive shock to the exchange

rate of the host country which implies that any unexpected appreciation of domestic currency will render her output expensive on foreign market and hence local firm becomes less competitive compared to foreign firms. This same variable equally records the highest value of dispersion telling us that it is moving away from the mean and there is a high disparity between observations with respect to their various years. Hence, the big gap between the maximum and minimum value.

Primary government expenditure is the second variable with the highest performance on GFCF, followed by trade openness and domestic credit to private sector. This is to say that for developing countries gross fixed capital formation or total investment to be increased, their exchange rate, trade openness and domestic credit to private sector should be favourable.

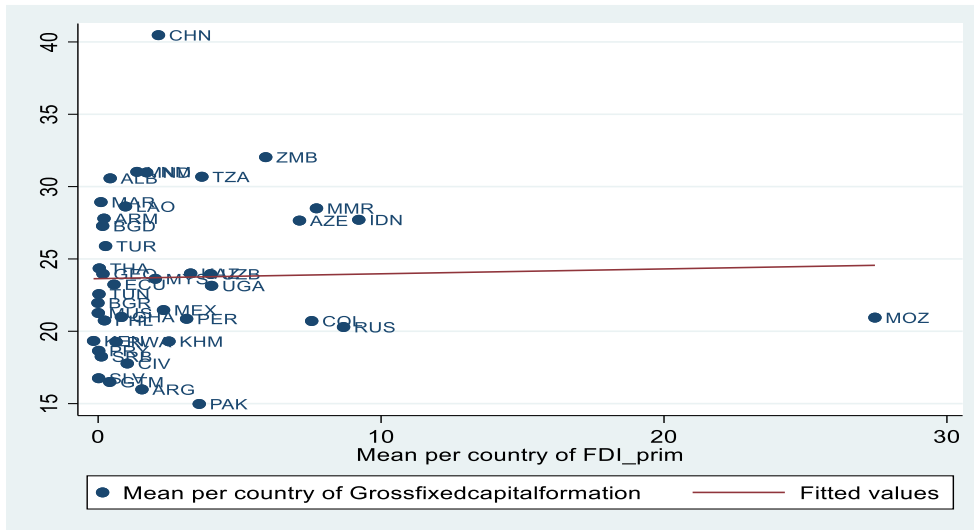
Table 2: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) GDPCF	1.000																
(2) INTR T	-0.131	1.000															
(3) Health	-0.565	0.296	1.000														
(4) Mil Exp	0.033	0.415	0.325	1.000													
(5) P G Exp	0.088	0.087	-0.003	0.180	1.000												
(6) FDIprim	0.344	-0.076	-0.030	0.032	0.074	1.000											
(7) FDI_sec	0.406	-0.186	-0.392	0.026	0.065	0.031	1.000										
(8) FDI_ter	0.338	-0.136	-0.291	0.146	0.068	0.028	0.813	1.000									
(9) Fdi_total	0.448	-0.170	-0.327	0.119	0.087	0.296	0.872	0.948	1.000								
(10) Fdi wdi	0.178	-0.062	0.188	0.031	0.183	0.727	-0.115	-0.029	0.141	1.000							
(11) DCPS	-0.043	0.020	-0.045	0.115	0.019	-0.120	-0.004	0.013	-0.024	-0.068	1.000						
(12) Inf	0.223	-0.057	-0.314	-0.036	0.169	0.009	0.120	0.108	0.113	0.061	-0.392	1.000					
(13) Exch R	0.274	-0.052	-0.216	-0.143	-0.224	0.110	0.221	-0.027	0.075	-0.084	-0.161	0.038	1.000				
(14) Taxes	-0.230	0.237	0.678	0.252	0.048	0.051	-0.340	-0.219	-0.239	0.372	0.106	-0.254	-0.146	1.000			
(15) Trade	-0.200	-0.035	0.183	-0.074	0.158	-0.006	-0.247	-0.218	-0.227	0.329	0.630	-0.257	-0.204	0.377	1.000		
(16) CC	-0.007	0.144	0.169	0.030	0.112	-0.096	-0.076	-0.019	-0.061	0.135	0.256	-0.124	-0.243	0.333	0.351	1.000	
(17) CO2	0.126	0.161	-0.154	0.388	0.289	0.004	0.402	0.412	0.408	-0.051	0.367	0.022	-0.072	0.062	0.205	0.028	1.000

Source: Authors. Note: GDPCF= gross domestic fixed capital formation, INTR T = international tourism, Mil Exp = Military expenditure, P G Exp = primary government expenditure, FDI prim = FDI primary, FDI sec = FDI secondary, FDI ter = FDI tertiary, DCPS = Domestic credit to private sector, Inf CP = inflation at consumer price, O Exch R = Official exchange rate, CC = control of corruption, CO2= CO2 emissions.

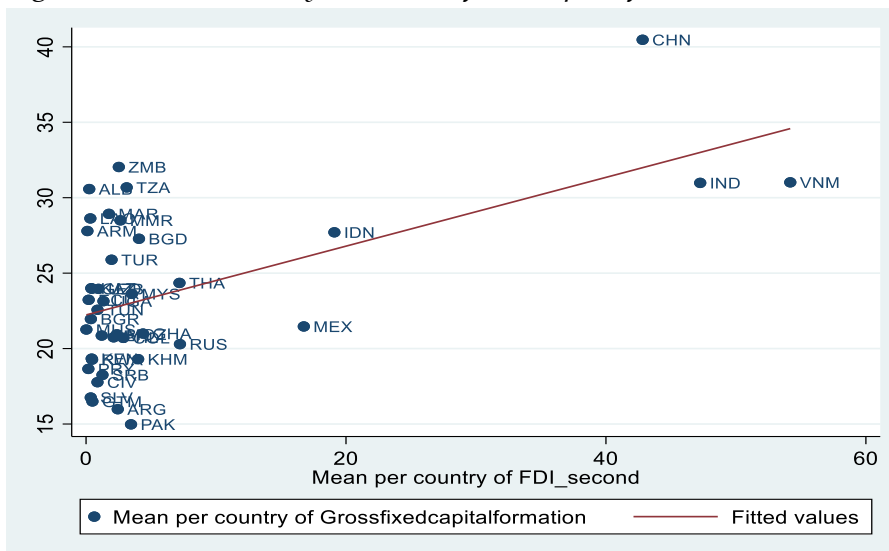
It is observed from correlation matrix that investment in health is strongly moving on the opposite direction with gross fixed capital formation, also variables like domestic credit to private sector which capture financial system development, trade openness, taxes and investment in tourism are all moving in the opposite direction with our dependent variable showing that they do not add up the formation of fixed capital. While on the other hand our variables of interest which are FDI primary, FDI secondary, FDI tertiary and net FDI inflow are directly link to capital formation, which implies that they participate to total domestic investment in developing countries.

Figure 1: FDI primary and Gross fixed capital formation



We observe from the above figure that Mozambique is the country that averagely receives the highest FDI primary but do not contribute the highest to gross fixed capital formation. Majority of developing countries are below the fitted values this signifies that they do not have sufficient entries of FDI in the primary sector. When considering the evolution of the fitted values in FDI primary, we can conclude that yes FDI primary is evolving but its evolution is almost affecting gross fixed capital formation in a linear manner which means that it is not actually FDI primary that carries gross fixed capital formation in most developing countries. To go further, we realized that China has the highest level of fixed capital formation but do not figure among the highest receivers of FDI primary.

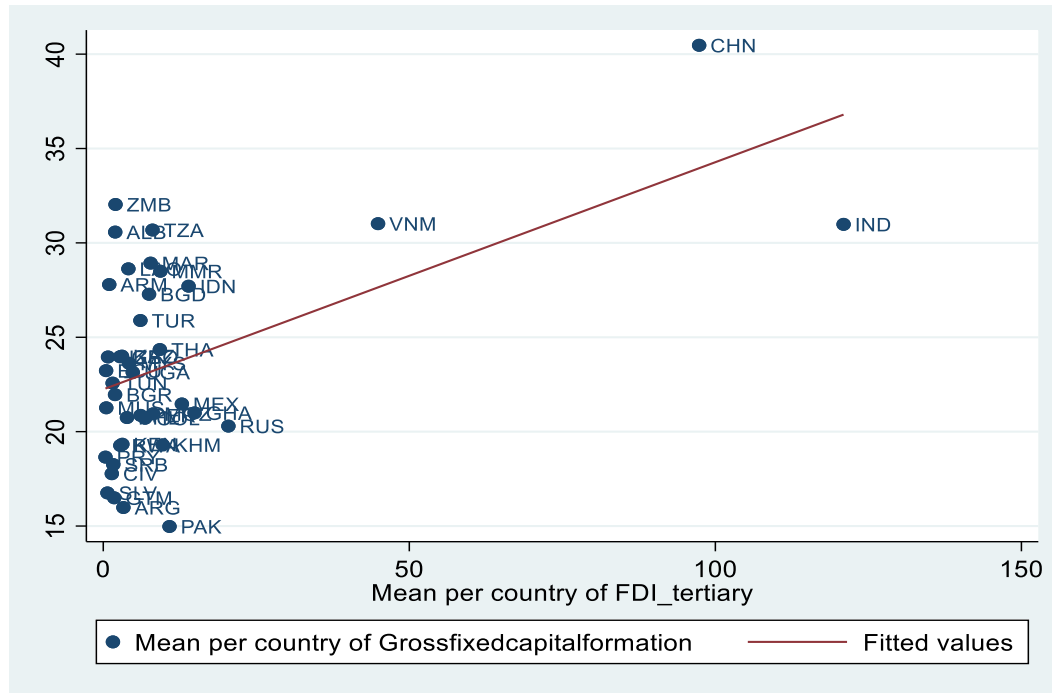
Figure 2: FDI secondary and Gross fixed capital formation



From the above, we can first of all realized that FDI secondary varies with gross fixed capital formation. It is seen that Vietnam records the highest FDI secondary but it does not vary with gross fixed capital formation. FDI secondary in Tunisia contribute to gross fixed capital formation but to a lower extend. If considering the fitted values line, we can

say this line is fairly elastic which means that a great proportion change or entering in FDI secondary will add gross fixed capital formation but not in the same proportion like the increase in FDI secondary. We can still see here that China records the highest level of gross fixed capital formation and she is equally among the highest receivers of FDI secondary.

Figure 3: FDI tertiary and Gross fixed capital formation



Here the fitted value line shows that FDI tertiary can contribute in an exponential manner to gross fixed capital formation but in a similar manner we can see that most countries move away from the fitted values line showing that majority of these developing countries tertiary sector is still under developed. Here the fitted values line is inelastic showing that a proportionate change in FDI tertiary will lead to a great if not the same proportionate change in gross fixed capital formation.

Estimation method

Our aim is to investigate the impact of sectorial FDI on capital formation in developing countries. For robustness checking and analyses of sensitivity, two types of equations are estimated and they are similar to the static panel data models estimated by (Barro, 1991; Garrison and Lee; 1995; Alfaro and al., 2004). We examine the impact of sectorial FDI on capital formation by constructing a growth equation where the economic development trajectory is made to depend on sectorial FDI and other standard controls as shown in Equation (1) below:

$$GFCF_{it} = f(\text{SEC FDI}_{it}, \text{FDI}_{it} X_{it}, \epsilon_{it}) \tag{2}$$

Where $GFCF_{it}$ is gross fixed capital formation; FDI_{it} is net foreign direct investment taken from WDI, SEC FDI_{it} is a vector of sectorial FDI while X_{it} is the vector of control variables including financial sector development, government expenditure and trade openness.

We denote the error term by ε_{it} while i and t respectively denote country and time indices. We explicitly specify Equation (2) to determine the effects of sectorial FDI on capital formation, we are using a direct approach by adopting ordinary least square robust (R-OLS) technique and GMM, and then an indirect effect analysis where a mediation analysis is carried out. The following equation model to be estimated is hence specify:

$$GFCF_{it} = \gamma_0 GFCF_{it-1} + \gamma_1 SEC FDI_{it} + \gamma_2 X_{it} + t + \varepsilon_{it} \quad (3)$$

Where $GFCF_{it-1}$ is the lag gross fixed capital formation. the inclusion of a lag accounts for a (di) convergence, it's to do away with the possible endogeneity and simultaneity biased that can arise given that the initial condition may potentially correlate with the error term (Greene, 2003), t is the time effects while ε_{it} is the white noise and γ is the estimation constant.

To contain the issues of endogeneity, we estimate our equations using the system generalized methods of moments (GMM) developed by (Arellano and Bond, 1991) and (Arellano and Bover, 1995). Arellano and Bond (1991) offered the use of lags of the explanatory variables as valid instruments. We use the system GMM which blends a regression in the first difference estimations and regression in levels (Arellano and Bover, 1995; Blundell and Bond, 1998). Indeed, estimating the system GMM necessitates additional moments that rely on the stationarity property of the variables (Blundell and Bond, 1998). To avoid biased results and influence of possible business cycles that may be present in our data, we considered a period of study from (2000 - 2019) which produces 20 periods of observations. To the extent that $T = 20$, $N = 42$ implying $N > T$ makes the GMM suitable for this study in addition to its advantage of controlling for the prospective endogeneity and simultaneity bias (Arellano and Bond, 1991). We determine the efficacy of our estimates using the serial correlation test and the Sargan tests which respectively test for the validity of our instruments and over-identifying restriction. The next section discusses the findings results of the empirical analysis of the impact of sectorial FDI, GFCF and control variables, and discussion of results.

4.2. Econometric analysis

Table 3: Basic results

Variables	Dependent variable: Gross fixed capital formation								
	(1)	(2)	(3)	Robust OLS			(7)	(8)	(9)
FDI_prim	0.171*** (0.030)			0.198*** (0.031)			0.195*** (0.030)		
FDI_second		0.185*** (0.019)			0.174*** (0.026)			0.171*** (0.030)	
FDI_tertiary			0.094*** (0.013)			0.071*** (0.012)			0.071*** (0.014)
Net FDI				0.067*** (0.016)	0.030* (0.017)	0.032* (0.017)	0.062*** (0.016)	0.027 (0.017)	0.029* (0.017)
Inflation				0.333*** (0.094)	0.254*** (0.090)	0.247*** (0.090)	0.341*** (0.103)	0.297*** (0.096)	0.298*** (0.093)
Exch rate				0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Taxes				-0.233*** (0.061)	-0.085 (0.067)	-0.136** (0.063)	-0.287*** (0.064)	-0.135* (0.070)	-0.186*** (0.067)
Trade				-0.049*** (0.014)	-0.022 (0.016)	-0.018 (0.016)	-0.045*** (0.015)	-0.016 (0.016)	-0.012 (0.017)
Constant	22.565*** (0.321)	21.789*** (0.316)	21.916*** (0.313)	23.067*** (0.961)	21.659*** (0.999)	21.772*** (0.980)	21.340*** (2.294)	20.225*** (2.513)	20.300*** (2.510)
Time effect	No	No	No	No	No	No	Yes	Yes	Yes
Observations	411	395	395	278	277	277	278	277	277
R-squared	0.052	0.159	0.140	0.296	0.271	0.270	0.335	0.309	0.312
F-stat	31.44	94.24	50.77	26.16	26.44	22.73	7.230	6.834	6.353

Source: Authors. Note: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Comment: Our main result show that, in the global manner sectorial FDI has a positive and significant impact on gross fixed capital formation. That is primary, secondary and tertiary FDI are all significant at 1% (this is to say it error rang is less than 1%). FDI from WDI is equally significant but not at all levels, inflation is significant, exchange rate significant but has a value of zero which indicates that the regime of exchange should be fixes, trade openness is significant but has a negative sign just like tax incidence.

To be more specific, the contribution of sectorial FDI to capital formation in developing countries, is still low. For example, the contribution is the lowest in the tertiary sector. That is a 1% change in the value of FDI tertiary, will change gross fixed capital by 0.094. The contribution is lower in the secondary sector, that is, a 1% change in the value of FDI secondary will change gross fixed capital by 0.185. The contribution is low in the primary sector, that is, a 1% change in the value of FDI primary will change gross fixed capital by 0.198. On the other hand, FDI collected from the world development indicator is the lowest when compare to sectorial FDI even in an individual manner (that is a 1% change in FDI_{WDI} will affect capital formation at only 0.067).

The tendency of our results obtained above shows that in developing countries, the tertiary sector is still underdeveloped given it lowest contribution to capital formation and this may equally be linked to the fact that service sector activities are non-tradable and are more often market seeking with the objective of making profit which is later repatriated to their various countries.

The negative and significant value of trade openness shows that most developing countries are not yet well integrated in the world. A decrease in the level of openness (trade restrictions) tends to increase horizontal FDI in host countries. However, vertical FDI that is viewed as a non-market seeking investment may prefer to locate in more open economies (where trade barriers are less). Tax incidence equally affects in a significant and negative manner capital formation; this is because tax reduces the return on investment and drives away foreign investors by making the environment not conducive for their investments. A positive and significant value of inflation turns to be bad for capital formation in that it increases the prices of goods and services makes the market uncertain or risky (investors cooperate margin might be reduced) there by affecting investors' confidence which in turn affects their willingness to keep stocks. Kannen (2020) also found a positive inflation rate on GDP per capita.

In a more objective manner, we subjected our data to a more rigorous econometric analysis, by presenting results in this case based on the system GMM. As earlier mentioned, our main objective is centred on the contribution of sectorial FDI on GFCF. To authenticate the efficacy of the estimates of the system GMM technique, it is important to report the absence of second order serial autocorrelation in the error term and the validity of the instruments is not rejected. However, a large number of instruments can

distort the over identifying restrictions of the Hansen test and therefore, the thumb's rule states that the number of instruments should be less than the number of countries (Roodman, 2009).

Table 4: Robustness with dynamism consideration and alternatives measures of FDI

Variables	Dependent variable : GFCF				
	Estimation method : SGMM				
	(1)	(2)	(3)	(4)	(5)
L.GFCF	0.875*** (0.006)	0.864*** (0.006)	0.862*** (0.013)	0.612*** (0.018)	0.937*** (0.016)
FDI_prim	0.147*** (0.004)				
FDI_second		0.124*** (0.020)			
FDI_tertiary			0.043*** (0.012)		
Fdi_total				0.094*** (0.008)	
Net FDI					0.329*** (0.019)
Domestic credit	-0.003 (0.002)	-0.025*** (0.005)	-0.028*** (0.007)	-0.046*** (0.006)	0.011 (0.006)
Inflation	0.073*** (0.014)	0.026** (0.012)	0.014* (0.008)	0.067*** (0.019)	0.118*** (0.015)
Exchange rate	0.000** (0.000)	0.000* (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000* (0.000)
Taxes	-0.075** (0.033)	0.003 (0.028)	-0.026 (0.032)	-0.219*** (0.053)	0.073* (0.040)
Trade	0.022*** (0.006)	0.026*** (0.007)	0.022*** (0.007)	0.048*** (0.012)	0.021*** (0.005)
Constant	1.188 (0.761)	1.617*** (0.562)	2.491*** (0.776)	7.406*** (0.749)	-2.951*** (0.656)
Observations	278	277	277	274	470
Number of country	37	37	37	37	37
Instruments	33	33	33	33	33
Ar1p	0.015	0.003	0.008	0.015	0.000
Ar2p	0.821	0.132	0.199	0.120	0.374
Hansenp	0.319	0.332	0.363	0.394	0.431

Source: Authors. Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Comment: our lag dependent variable is statistically significant in developing countries; its value indicate that the past value affects the present value by 0.325 (variation between 0.612 and 0.937). Also, the total sectorial FDI value is statistically significant but the impact is weak and this weak tendency is caused by the tertiary sector that drags the value downward, we can equally realize in a similar manner that FDI net inflow obtained from WDI is having a greater impact on capital formation (that is 0.329 compared to 0.094). Our estimation in table above shows that there is absence of correlation of the first and second order because the value obtained of Ar 1 and Ar 2 are not statistically significant. Also, Hansen test is statistically not significant implying that our instruments used are good.

We proposed ourselves to further our analysis on some other investment sectors which enclose GFCF with the aim of having an idea on whether these investment sectors engrossed or attract sectorial FDI. On the tables below we did robustness with alternative measures of GFCF.

Table 5: Alternative measure of domestic investment

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Military expenditure			Primary government expenditures		
L.Military exp	0.556*** (0.007)	0.586*** (0.006)	0.591*** (0.005)			
L.Prim gov exp				0.401*** (0.023)	0.241*** (0.055)	0.411*** (0.018)
FDI_prim	0.005*** (0.000)			0.082*** (0.011)		
FDI_second		0.005*** (0.001)			0.665*** (0.147)	
FDI_tertiary			0.003*** (0.000)			0.049* (0.028)
Domestic credit	-0.004*** (0.001)	-0.003*** (0.001)	-0.002*** (0.001)	0.028 (0.021)	-0.224*** (0.040)	-0.114*** (0.016)
Inflation	0.014*** (0.001)	0.013*** (0.001)	0.013*** (0.002)	0.659*** (0.040)	0.883*** (0.038)	0.852*** (0.038)
Exchange rate	-0.000** (0.000)	-0.000*** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
Taxes	0.018*** (0.003)	0.029*** (0.002)	0.030*** (0.002)	0.744*** (0.208)	-0.333 (0.259)	0.057 (0.152)
Trade	0.006*** (0.001)	0.006*** (0.000)	0.006*** (0.000)	0.085** (0.037)	0.184*** (0.032)	0.125*** (0.021)
Constant	0.217** (0.106)	-0.017 (0.075)	-0.083 (0.070)	41.626*** (4.745)	67.720*** (5.155)	49.276*** (1.512)
Observations	272	271	271	223	222	222
Number of country	37	37	37	37	37	37
Instruments	33	33	33	33	33	33
ar1p	0.041	0.005	0.002	0.001	0.017	0.005
ar2p	0.229	0.124	0.130	0.208	0.618	0.371
Hansenp	0.327	0.424	0.459	0.476	0.360	0.426

Source: Authors. Notes: Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Comment: when considering other measures of GFCF (i.e military expenditure% GDP and primary expenditure %GDP), we will realize that primary FDI, secondary FDI and tertiary FDI are positive and significant. Primary and secondary FDI both contribute to military expenditure with a value of 0.005 and are significant at 10%. As for what concerns human capital development, FDI in the secondary sector contribute the highest, that is, a 1% change in FDI secondary will affect investment in education by 0.665. This result can be justified from the point of view that FDI constitute a transfer of skills and technology to the host countries.

Table 6 : second robustness with alternatives measures of domestic investment

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Estimation method : sGMM two step					
	Investment in tourism			Investment in Health		
L.Tourism expenditure	0.893*** (0.026)	0.784*** (0.014)	0.818*** (0.010)			
L.Health				0.817*** (0.024)	0.705*** (0.046)	0.706*** (0.023)
FDI_prim	-0.025*** (0.002)			0.003*** (0.000)		
FDI_second		-0.177*** (0.010)			-0.020*** (0.001)	
FDI_tertiary			-0.046*** (0.006)			-0.008*** (0.001)
Domestic creditpriv	0.051*** (0.004)	0.060*** (0.004)	0.052*** (0.004)	0.001*** (0.000)	-0.000* (0.000)	-0.001*** (0.000)
Inflation	0.028** (0.011)	-0.015*** (0.005)	-0.002 (0.012)	0.000 (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
Exchange rate	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000*** (0.000)	-0.000*** (0.000)
Taxes	0.348*** (0.051)	0.357*** (0.030)	0.358*** (0.019)	0.019*** (0.005)	0.011*** (0.004)	0.019*** (0.002)
Trade	-0.038*** (0.002)	-0.046*** (0.003)	-0.039*** (0.001)	0.002*** (0.000)	0.000 (0.000)	-0.000 (0.000)
Constant	-2.195*** (0.353)	-0.578 (0.422)	-1.268*** (0.181)	-0.057** (0.023)	0.493*** (0.029)	0.457*** (0.041)
Observations	270	269	269	278	277	277
Number of countrycode	34	33	33	36	35	35
Instrument	33	33	33	33	33	33
ar1p	0.0590	0.0150	0.0457	0.0221	0.0339	0.0275
ar2p	0.747	0.199	0.477	0.326	0.230	0.895
Hansenp	0.392	0.450	0.626	0.318	0.262	0.372

Source: Authors. Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

In this analysis international tourism expenditure and health expenditure are dependent variables, we still lag it to avoid endogeneity problems. Both their values are statically significant and indicate that international tourism expenditure past value affects it present

value by 0.109 and that of health expenditure is by 0.112. Sectorial FDI (primary, secondary and tertiary) has a negative statistically significant impact on tourism expenditure but on the contrary primary FDI has a positive and significant impact on investment in health but secondary and tertiary FDI has a significant but negative impact on investment in health, even though most FDI was tilted toward health because of the Covid 19. The reduce effect of sectorial FDI on health investment is because most developing countries do not have industries in charge of fabricating drugs, medical equipment, vaccine and most at time make recourse to the services of specialists in developed countries for over complicated cases of health issues.

5. Analysis of indirect effect

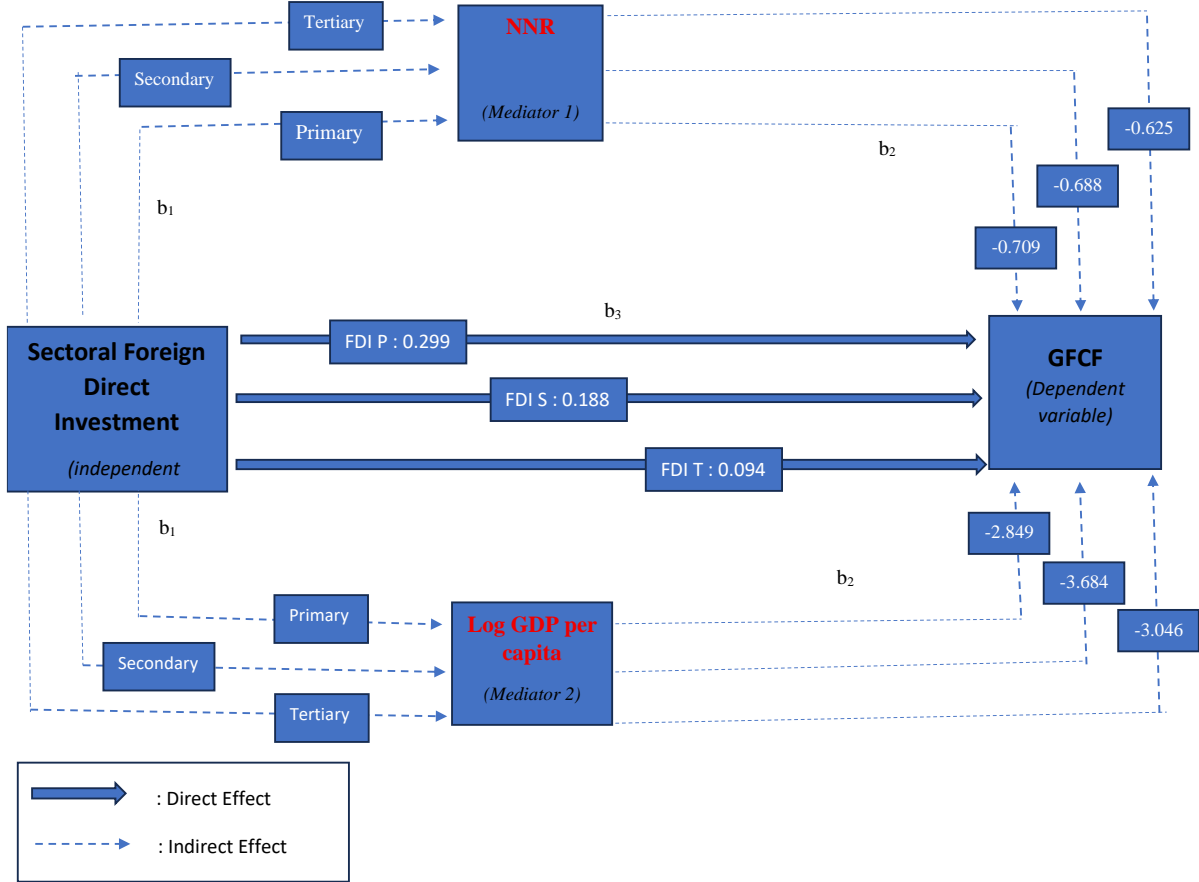
At this level, we are effectuating a mediation analysis by employing a structural equation model estimated using Stata's **-sem-** command. There are two methods medsem use as the basis for its procedures. The first method is commonly known as (Baron and Kenny, 1986) approach which is adjusted by (Iacobucci et al., 2007) for use with structural equation modelling. Two principal mediators are used in accordance to literature. The mediator natural resource rent is chosen following (Arshad Hayat, 2017 and 2018; Elizabeth Asiedu, 2013) who finds that while FDI can boost growth, this effect diminishes or even reverses when natural resource dependence increases suggesting a mediating or moderating role of resources in the FDI-investment-growth nexus, then the mediator GDP per capita is chosen following (Borensztein et al., 1998), GDP per capita (as a proxy for absorptive capacity) influences how FDI affects growth. This implies that GDP per capita can act as a mediating variable, shaping the effectiveness of FDI in stimulating investment.

$$\text{Model 1: Med}_{it} = \alpha_1 + b_1 \text{GFCF}_{it} + C_1 X_{it} + u_{it} \quad (4)$$

$$\text{Model 2: sectorial FDI} = \alpha_2 + b_2 \text{GFCF}_{it} + b_3 \text{Med}_{it} + C_2 X_{it} + V_{it} \quad (5)$$

Where Med_{it} represent mediation variable. The composition effect follows the above models in the manner that the indirect effect is captured by the coefficient of $b_1 \times b_3$ direct effect is capture by b_2 and total effect is capture by $(b_1 \times b_3) + b_2$. We will first of all estimate model 1, which is the effect of sectorial FDI on the mediator where b_1 is the parameter describing such effect and in the second stage, model 2, we are regressing sectorial FDI on gross fixed capital formation under the control of the retained mediator, this effect magnitude is given by the coefficient of the independent variable. The indirect effect will be obtained by multiplying b_1 and b_3 , where b_3 measures the correlation between gross fixed capital formation and the mediator in model 2. B_3 also reflects the weight of the mediator that depends on the extent to which gross fixed capital formation affects the mediator b_1 and the extent to which mediators influence sectorial FDI. Results are shown on the table below. To check for robustness of mediation analysis, we use the Sobel test and Monte Carlo methods.

Figure 4: modeling the indirect effect of sectorial FDI on GFCF (mediation analysis)



Source: author

Table 7: Transmission mechanism analysis of sectorial FDI effect on GFCF

var	Mediator 1: NNR				Mediator 2: Log GDP per capita			
	(1a)	(2a)	(3a)	(4a)	(1b)	(2b)	(3b)	(4b)
	NNR			GFCF	Log GDP per cap			GFCF
	FDI P	FDI S	FDI T		FDI P	FDI S	FDI T	
FDI P	0.747*** (0.121)			-0.709** (0.311)	0.423*** (0.093)			-2.849*** (0.598)
FDI S		0.384*** (0.129)		-0.688** (0.292)		0.296** (0.128)		-3.684*** (0.528)
FDI T			0.142 (0.125)	-0.625** (0.296)			-0.069 (0.091)	-3.046*** (0.526)
NNR								
Log GDP per c								
Control v	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bootstrap	500	500	500	500	500	500	500	500
Constant	-4.921*** (0.989)	-2.236* (1.145)	-0.207 (1.211)		5.723*** (2.098)	6.549*** (1.165)	9.913*** (0.892)	
Observations	288	285	285		90	90	90	90
Sobel p-val	0.032	0.065	0.319		0.001	0.028	0.453	
Monte Carlo	0.033	0.074	0.359		0.001	0.029	0.460	
% of total mediation effect	229 %	12 %	7 %		72 %	74 %	23 %	

Source: author computing. Note: Zhao et al. suggest bootstrap test of the indirect effect, medsem uses the Monte Carlo and Sobel test instead as it is less time-consuming and still acceptable (see Jose (2013)). ***, **, * indicate significance at 1%, 5% and 10% level, respectively. Robust standard errors reported in parenthesis.

Table 7 presents a mediation analysis examining how different types of sectorial Foreign Direct Investment (FDI) affect Gross Fixed Capital Formation (GFCF) through two potential mediators: Natural Resource Rents (NNR) and Log GDP per capita. The analysis is conducted separately for FDI Primary (P), Secondary (S), and Tertiary (T) sector. The table shows two sets of mediation analyses with different mediators (NNR in columns 1a-4a and Log GDP per capita in 1b-4b). Looking at the table's structure, columns 1a-3a show the first stage where sectorial FDI affects the mediator natural resource rent (NNR). FDI Primary and Secondary show strong positive effects (0.747*** and 0.384***), while FDI tertiary is insignificant. Then column 4a shows FDI reducing natural resource rent when gross fixed capital formation is the dependent variable. The Sobel p-values indicate significant mediation for FDI Primary and Secondary sectors.

For the GDP mediator in columns 1b-3b, FDI Primary and Secondary show positive effects on the mediator, while FDI Tertiary is insignificant. Column 4b shows sectorial FDI significantly reducing GFCF. The mediation effects are strongest for primary and secondary sectors.

In an economic order, both mediators (NNR and GDP pc) show significant negative indirect effects for Primary and Secondary FDI on GFCF. Higher FDI in these sectors increases the mediator, which in turn decreases investment (GFCF). This result reveals we are dealing here with developing/resource-dependent economies. The resource curse (Mignamissi and Mahla, 2020) might be the economic reasoning behind why natural resource rents (NNR) might mediate a negative effect on gross fixed capital formation (GFCF). FDI primary boosts resource extraction revenues or when resource rents rise (e.g., from oil or minerals), national income equally increases but this often leads to exchange rate appreciation (what is often known as the Dutch disease), making non-resource sectors (manufacturing/agriculture) less competitive, reducing their investment appeal.

Again, FDI primary and secondary increasing effect on the mediator GDP per capital, signifies that those two sectorial FDI increase individual income and FDI-driven income growth is associated with a decline in the investment rate. Higher incomes from FDI might increase consumption demand, not necessarily fixed capital formation. Households and governments may prioritize: Imports over local production, Short-term welfare spending over long-term infrastructure, Real estate, speculation, or external savings over manufacturing capacity or industrial diversification. Rodrik (2016) argues that many developing countries experience premature deindustrialization, where income growth is often fuelled by FDI.

6. Conclusion

The objective of this study was to determine the contribution of sectorial FDI on investment in developing countries. This aim was realized by adopting a sample of 37 countries with data running from 2000-2019 which correspond to 20 years of observations. This study implements the pool ordinary least square estimation technique to test hypothesis, results reveal on the first point of view that sectorial FDI has a positive and significant impact on domestic investment with FDI primary, secondary and tertiary significant at 1%. As for what concerns investment in human capital, FDI in the secondary sector contributes the highest to promote human capital. Sectorial FDI in the secondary and tertiary sector reduces investments in health. FDI net inflow was found to have a positive but lesser contribution to domestic investment than sectorial FDI.

We equally test for robustness of our result by using a system GMM technique of estimation and this technique confirms our results. But nevertheless, it is important to note that in

developing countries, FDI in the primary sector contribute the highest to capital formation because majority of developing countries especially sub-Sahara Africa are subsistence economy or agriculturally based. FDI in secondary sector comes second with-it contribution because some few countries especially Asian countries are industrialized and are equally developing their tertiary sector reason why FDI in the tertiary sector acts third in contributing for investment.

This result shows that foreign affiliate firms that are engaged in mining, agriculture, construction and manufacturing related activities are more likely to raise investment, unlike those operating in services and trade related activities. This is because the propensity to invest in middle stages of the value chain is higher compared to investments in upstream or downstream activities, where investment income is less likely to be reinvested. In a likewise manner, manufacturing or production-oriented FDI are more likely to generate domestic spill overs in the form of backward and forward linkages (Rodriguez-Clare, 1996). This is because trade is a non-productive activity and it is mainly aim at creating platforms either for exports to foreign countries or for imports from the investing country that can not only outperform domestic activities (up to the extent they stop investing or exit the market), but also not contributing to generate any new investments.

The mediation analysis reveals that FDI in the primary and secondary sectors significantly increases natural resource rents (NNR) and GDP per capita, but these mediators in turn negatively affect gross fixed capital formation (GFCF). This suggests that while sectoral FDI may boost national income and resource revenues, it does not necessarily translate into productive domestic investment. These results are consistent with the resource curse hypothesis (Mignamissi & Mahla, 2020) and Dutch disease dynamics, where rising resource rents can lead to exchange rate appreciation and crowd out investment in non-resource sectors (Cotobaly et al., 2022; Bannerman, 2007). Moreover, the finding that rising GDP per capita from FDI correlates with lower investment rates aligns with Rodrik's (2016) theory of premature deindustrialization, where income growth driven by FDI leads to increased consumption and reduced industrial investment.

The implications of our paper lie in that; our findings challenge the assumption that all FDI leads to increased domestic investment. In fact, FDI in primary and secondary sectors may undermine GFCF through indirect channels like rising resource rents and income-driven consumption. Again, the mediation through natural resource rents reinforces the resource curse narrative. Countries relying heavily on extractive industries may experience investment stagnation, even as revenues rise. Also, The GDP per capita mediation suggests that FDI-driven income growth may lead to consumption booms rather than productive

investment. This supports Rodrik's theory that developing countries may deindustrialize before fully industrializing, missing out on long-term growth benefits.

This article contributes to the economic literature by addressing a notable gap in research on the impact of sectoral foreign direct investment (FDI) on domestic investment in developing countries. While numerous studies have examined the general effects of FDI, few have disaggregated FDI by sector to assess its differentiated impact on gross fixed capital formation (GFCF). To the best of our knowledge, empirical analyses focusing specifically on sectoral FDI particularly in the context of developing economies remain limited or underexplored. Furthermore, this study introduces a comparative approach, contrasting sectoral FDI data from UNCTAD with aggregate FDI data from the World Development Indicators (WDI), thereby offering a more nuanced understanding of how different types of FDI influence domestic investment. Previous works such as Alessia et al. (2017) and Pineli et al. (2019) have investigated the relationship between FDI and capital formation in developing countries, but without sectoral decomposition. This article thus extends the literature by integrating mediation analysis and sectoral differentiation to uncover indirect pathways and policy-relevant insights.

Even though sectorial FDI contribute in positive and significant manner to domestic investment in developing countries, this contribution is still low across the three sectors of activities. So, in order to increase this contribution, the study recommend that to increase investment in developing countries, the government should put in place policies such as a moderate tax system and provide land that will attract more secondary and tertiary FDI, for example industrial policies that will promote productivity and innovation spill overs for small and medium size enterprises and that will equally favour the implantation of giant industries. Also, effort should be done again by governments of these various countries to encourage crop diversification by some of these economies that rely only on a single crop production. For example, India is mostly cultivating rice, Mexico cultivate maize, Ivory Coast coco etc. Again, for a greater beneficiary effect on host countries, FDI should be encouraged in the primary, secondary and tertiary sectors. Again, support domestic manufacturing through targeted subsidies, infrastructure investment, and skills development to counteract deindustrialization trends (Rodrik, 2016). And equally use macroprudential tools to prevent excessive currency appreciation that undermines competitiveness in tradable sectors.

The main limitation of this study on one hand lies in the fact that sectorial FDI data are aggregated data and on the other hand this data was not available for most developing countries. Further research can try to study subsectors FDI, so as to better oriented policies.

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Data is available on demand

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10. Appendices

Table 8: Elements that constitute our respective sectorial FDI

Sectorial FDI	Elements
Primary FDI	<ul style="list-style-type: none"> -Agriculture, forestry and fishing -Crop and animal production, hunting and related service activities -Forestry and logging -Fishing and aquaculture -Mining of coal and lignite -Extraction of crude petroleum and natural gas -Mining of metal ores
Secondary FDI	<ul style="list-style-type: none"> -Manufacture of food products -Manufacture of beverages -Manufacture of tobacco products -Manufacture of textiles -Manufacture of leather and related products -Manufacture of paper and paper products -Manufacture of furniture -Repair and installation of machinery and equipment -Manufacture of other transport equipment -Manufacture of motor vehicles, trailers and semi-trailers -Manufacture of electrical equipment -Manufacture of computer, electronic and optical products -Manufacture of fabricated metal products, except machinery and equipment -Manufacture of rubber and plastics products -Manufacture of pharmaceuticals, medicinal chemical and botanical products -Manufacture of chemicals and chemical products -Manufacture of coke and refined petroleum products -Printing and reproduction of recorded media

Tertiary FDI	<ul style="list-style-type: none"> -Electricity, gas, steam and air conditioning supply -Water supply; sewerage, waste management and remediation activities -Construction -Wholesale and retail trade; repair of motor vehicles and motorcycles -Transportation and storage -Accommodation and food service activities -Information and communication -Financial and insurance activities -Real estate activities -Professional, scientific and technical activities -Administrative and support service activities -Public administration and defence; compulsory social security -Education -Human health and social work activities
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Table 9: variables description

Variables	Descriptions	Sources
GFCF	Gross fixed capital formation (%GDP) to capture domestic investment	WDI (World development indicator)
FDI primary, FDI secondary and FDI tertiary	Capture sectorial FDI	UNCTAD
Trade	Trade openness (%GDP)	WDI
Net FDI	FDI inflow (%GDP)	WDI
Inflation	Measured in consumer's price index	WDI
Exch rate	Exchange rate (%GDP)	WDI
Taxes	Taxes (%GDP)	WDI
DCPS	Domestic credit to private sector(%GDP), to capture financial development	WDI
Control of corruption	Use as a proxy for institutional quality	WGI

Primary government expenditure	Use as a proxy for investment in education	WDI
Health	Investment in health	WDI

Source: author