



## The role of FDI in structural transformation in Morocco (1995-2022)

Ahmed Ait Bari<sup>1</sup>  
Mustapha Amzil<sup>2\*</sup>

<sup>1</sup>Laboratory for Studies and Applied Research Economic Sciences, Faculty of Legal, Economic and Social Sciences, Ibn-Zohr Agadir University, Morocco.  
Email: [a.aitbari@uiz.ac.ma](mailto:a.aitbari@uiz.ac.ma)  
<sup>2</sup>Finance and Territorial Economy, Ibn-Zohr Agadir University, Morocco.  
Email: [mustapha.amzil@edu.uiz.ac.ma](mailto:mustapha.amzil@edu.uiz.ac.ma)

### Licensed:

This work is licensed under a Creative Commons Attribution 4.0 License.

### Keywords:

Export diversification and sophistication  
Foreign direct investment  
Morocco  
Structural transformation.

**Received:** 5 June 2023

**Revised:** 8 August 2023

**Accepted:** 16 August 2023

**Published:** 24 August 2023

(\* Corresponding Author)

### Abstract

In the general context of Morocco's New Development Model (NDM), where the policy of territorial attractiveness requires all its credentials, and more specifically within the framework of the regional decline of the Industrial Acceleration Plan (IAP), the issue of the structural transformation (ST) of the Moroccan economy is highly topical and of great interest to the Kingdom. This article examines, under external constraints and international openness, ST through the relationship between Foreign Direct Investment (FDI) and the diversification and sophistication of Moroccan exports, over the period from 1995 to 2022. After outlining the theoretical foundations of such a relationship, curiously neglected in the literature, it was specified and estimated by two ARDL (Auto Regressive Distributed Lag) models. The latter, supported by the cointegration bounds test highlighted the existence of a long-term link between FDI and export diversification on the one hand, and export sophistication on the other. However, the results showed a negative influence of FDI on the diversification of Moroccan exports. This negative influence was more significant on export sophistication. Consequently, during the study period, FDI did not play the desired role in the Moroccan economy's ST. It did not contribute to the enhancement of its productive structure, particularly its export structure, which suffered from a chronic double handicap: a low degree of diversification coupled with a lack of sophistication. The Moroccan economy has not reached the level of development required to leverage export diversification and sophistication in its ST.

**Funding:** This study received no specific financial support.

**Institutional Review Board Statement:** Not applicable.

**Transparency:** The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

**Competing Interests:** The authors declare that they have no competing interests.

**Authors' Contributions:** Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

## 1. Introduction

Since the end of the Structural Adjustment Program (SAP) in the 1980s, Morocco has implemented proactive, sector-based public policies to promote private investment, including foreign investment, in promising export sectors with dynamic global demand. Several plans and strategies, backed by bilateral and multilateral trade agreements, have been deployed to diversify the national offer: "Export Plus" Morocco, the Emergence Plan, the Green Morocco Plan, the Halieutis Plan, the Azure Plan, the Action Plan for Business Growth and Transformation, action plans for local authorities, regional development plans, the National Sustainable Development Strategy, the Digital Transformation Strategy, the NDM financing strategy, Morocco's energy strategy, the logistics strategy, and many other visions for the future backed up by a new, highly incentive-based investment charter.

Indeed, in all these plans and national strategies, the focus is on exporting high value-added products and services. The great hope is to create a technology-intensive export production structure. This will be the key

to integrating the Moroccan economy into global value chains. To achieve such integration, it is necessary to initiate and accelerate the process of ST towards and in the industrial and tertiary sectors, where global demand is strong and more dynamic, to sustain economic growth and continually ensure the competitiveness and attractiveness of the national economy. So, what does ST involve, and how is it approached in economic literature, and more specifically in the context of the Moroccan economy?

SC often refers to the progressive redeployment of production factors within an economy between primary, secondary, and tertiary sectors. Such redeployment reorganizes economic activities, production, and exchange structures, and thus the country's overall national innovation system. ST then determines, on the one hand, new supply conditions and the pattern of emergence and development of new agricultural, industrial and/or tertiary production chains, which feed new markets through increased export flows (BAD, 2013). In addition, on the other hand, through the Keynesian effective demand mechanism stimulated by the latter, economic growth becomes firmer. Consequently, for a ST to be more economically significant, it should be the bearer of real growth driven by positive shocks to both supply and effective demand. It thus reflects the reorientation of economic activity from low-value-added (often primary) sectors to high-value-added ones, to maintain more solid growth over the long term.

In practice, and as a corollary to the movement and desire to industrialize economies, ST is reflected in an increase in the share of the industrial and service sectors at the expense of that of the primary sector in the national product (Jacquemot, 2013). This restructuring of sectoral contributions to economic growth is characterized by two major, deliberate aspects of productive specialization. The first is to favor the manufacturing industrial sector and the high value-added services sector, accompanied by a sustained decline in low value-added agricultural activity. The second focuses more on factor mobility, in terms of shifting the labor force from agricultural employment to employment in other industrial and service sectors considered more productive, with high economic growth content and greater potential for integration into the global economy.

In this framework, the ST of an economy is therefore theoretically the shift of its most predominant economic activity in its national product from the low-value-added sector to the high-value-added sector (McMillan & Rodrik, 2011). Therefore, seeing the induced change in productive structures is one of the fundamental drivers of economic development. It is a process by which the relative importance of the traditional sector changes over time in a country in favor of other, more productive sectors, in this case secondary and tertiary. From a supply-side perspective, it is expressed through the reallocation of production factors, notably via labor mobility, from the agricultural sector to the manufacturing sector. It is accompanied by investment in human capital training. It takes the form of developing the absorption capacity of the national economy, on the one hand, and its ability to adopt new production technologies, on the other.

Furthermore, from a demand-side perspective, the study of ST quality has been based in economic literature on two dimensions of export value creation: diversification and sophistication of exported products. These two dimensions are considered major foundations for economic growth as the national economy opens. Based on the principles of new supply conditions on the national territory and demand conditions on the scale of a more relevant world market, ST theorists emphasize the substitution of low-value-added primary exports by technology-intensive manufactured exports in promising market niches. They show that exports resulting from SC gain in diversification and sophistication, which is conducive to sustained economic growth (Herzer, Nowak-Lehmann, & Siliverstovs, 2006) and Iwamoto and Nabeshima (2012).

While exported goods directly affect an exporting country's economic growth via demand-side mechanisms, an improvement in the diversification and sophistication of its exports, via supply-side mechanisms, also reflects its competitiveness and the success of its effective ST (Felipe, 2007). For a given income level, a sophisticated and diversified export basket is a strong indication of viable economic growth (Hausmann & Klinger, 2008). This implies that each export basket is proportionate to the income and development levels of the exporting country.

Often, the most sophisticated products are exported by wealthy, developed countries, while the least sophisticated are exported by less developed, low- and middle-income countries. As a result, countries that specialize in and export less sophisticated products experience low levels of economic growth (Hausmann & Klinger, 2007). This is why the link between a country's ST and its economic development is often approached via the two indicators of export diversification and sophistication.

Two forms of export diversification have been identified: horizontal and vertical. The first, quantitative, increases the number of products and services exported (Taylor, 2003) whereas the second, more qualitative, requires greater sophistication<sup>1</sup> of exported products and services (Cottet, Madariaga, & Gou, 2012). It represents a shift in the productive structure from primary sector exports to exports of industrial products. The choice between the two forms of diversification depends not only on factor endowments and natural resources, but also on the geographical location of each country (Matthee & Naudé, 2007).

Significant progress in terms of export diversification has been seen as an indicator of successful economic development for some countries. Several factors can have an impact on this diversification: trade openness,

---

<sup>1</sup> Wang and Wei (2010) have developed a country-specific indicator of industrial sophistication.

exchange rate, investment level, governance, income level, and FDI. The latter is often considered to be one of the factors explaining the effect of the diversification of a host country's exports on the success of its ST process (Kamgna, 2007).

What about Morocco? The performance of the Moroccan economy remains highly dependent on agriculture, climatic conditions (especially rainfall) and the price of raw materials, particularly hydrocarbons. Hence the need for a ST aimed at making the diversification and sophistication of the Kingdom's exports a priority of its economic reforms. Given that Morocco is a favored business destination on the African continent, and an increasingly attractive one, for many foreign investors, it would be important to question the role of FDI in the ST process of the Moroccan economy. Has Morocco reached the level of development that enables it to leverage the diversification and sophistication of its exports in its ST?

The present article, a pioneer in this exercise, is in line with the empirical literature cited. It places greater emphasis on the role that FDI could play in the diversification of Moroccan exports, on the one hand, and in their sophistication, on the other. In other words, it examines whether FDI, which has been welcomed in Morocco over the last thirty years, has contributed to the success of the national economy's ST via the diversification and sophistication of the Kingdom's exports.

To answer this question, we begin with a literature review to theoretically identify the relationship between FDI and ST (1). This relationship is then specified and empirically verified in the case of Morocco using two ARDL models (2). The main results obtained are presented and analyzed (3). In the light of these results, we conclude with a discussion of the possible contribution of FDI to the ST of the Moroccan economy (4).

## **2. The FDI's Role in ST: A Literature Review**

If international trade theory, under the principle of comparative advantage, considers specialization as a factor of economic growth (Lewis, 1954); (Myrdal, 1957); (Hirschman, 1958); (Rostow, 1959); (Gerschenkron, 1962); (Kuznets & Murphy, 1966); (Kaldor, 1967) and (Chenery and Taylor (1968), FDI can stimulate export diversification through the diffusion of technological and organizational spillover effects into host country territories (Alaya, 2012); (Alemu, 2008); (Ancharaz, 2003); (Banga, 2006); (Crespo & Fontoura, 2007); (Harding & Javorcik, 2007); (Imbs & Wacziarg, 2003); (Klinger & Lederman, 2006); (Marouane, Nicet-Chenaf, & Rougier, 2008); (Rodrik, 2006) and (Tadesse and Shukralla (2013). But in the case of countries with a primary specialization that export natural resources, FDI is more likely to encourage export concentration than diversification (Jayaweera, 2009).

This is why export-led ST is of such great interest to developing countries with primary or natural specialization. Indeed, the diversification and sophistication of exports would boost their ST through complex, high-value-added products, improving their competitiveness and facilitating their integration into global value chains. Significant efforts are therefore being made by these countries to attract FDI in the hope of succeeding in the ST process and its challenges. But, curiously, the role that FDI could play in this ST of the host country via its contribution to export diversification and sophistication has been neglected in the literature!

Indeed, several empirical studies have identified certain factors to explain the process of export diversification and sophistication, and their role in the ST of economies. Basically, they often refer either to economic determinants, such as investment, growth, human capital, exchange rates and inflation; or to institutional determinants, such as the quality of governance, the business climate, or the investment environment, including related conflicts (Berthélemy, 2005). However, the contributions of development economic theories have neglected the contribution of FDI not only to diversification, but also to the sophistication of exports; whereas this contribution would reduce the risks of commercial dependence on the outside world, consolidate the economic development process of host territories and their ST.

There are several ways in which FDI can help export diversification and sophistication to initiate and accelerate an economy's ST process. These include, for example, import substitution by local production, which would reduce the country's dependence on certain products whose volumes and prices are volatile on the international market, and which can generate imbalances for the country in terms of international trade. Similarly, the greater the diversification of exports resulting, directly or indirectly, from FDI, the more significant its spillover and multiplier effects, and the greater its impact on the relative productivity of factors incorporated in exported production (Melitz, 2003). Thus, an increase in export diversification via FDI would promote comparative advantage in trade and economic growth in the long term, notably through such productivity gains.

In particular, several empirical studies have demonstrated a quadratic relationship between export diversification and economic development. An increase in export diversification is positively correlated with GDP per capita, up to a certain development threshold (Imbs & Wacziarg, 2003). This positive relationship between rising export diversification and economic development has been widely confirmed in several other studies (Hesse, 2008); (Cadot, Carrère, & Strauss-Kahn, 2011); (Naudé & Rossouw, 2011) and (Agosin, Alvarez, and Bravo-Ortega (2012). According to the latter, a fundamental result was raised: a fairly advanced stage of development is required before the positive relationship between export diversification and economic development is reversed. Doesn't the onset of ST also require such a threshold of development?

Moreover, other empirical studies have shown the crucial role of export sophistication in accelerating economic growth (Hausmann, Hwang, & Rodrik, 2007). A low level of export sophistication, on the other hand, can act as a brake (Jarreau & Poncet, 2012). In this sense, attracting FDI has often been seen as an important instrument for encouraging upgrades in the productive structures of the host country. Multinational firms can act as channels of transformation via their participation in the local innovation system and, in particular, via the ecosystem of existing businesses (Moran, 2011). They can also bring new ideas and best practices in production, management, and marketing (Ricardo Hausmann & Rodrik, 2003).

The presence of multinational firms in each region affects exports via two main channels.

The first is direct. It is associated with qualitative improvements in the country's export structure, more specifically in more complex, high-quality specializations and production (Iacovone & Javorcik, 2008; Wang & Wei, 2010). This is reflected in an increase in both the intensive margin, in terms of export volume and number of partners, and the extensive margin, in terms of the multitude of products exported. In 2009, studies showed that the growing sophistication of China's exports can be explained in particular by the growing presence of foreign-controlled multinational firms (Xu & Lu, 2009). Indeed, the exports of multinational firms established in China have the capacity to achieve higher unit export values than those of Chinese companies, which is explained by their production of high-end varieties. Wang and Wei (2010) found that FDI plays no role in the growing similarity of Chinese exports with those of developed countries originating from such multinational firms, even if it does contribute to the increase in unit values (quality) of their exports.

Arnold and Javorcik (2009), on the other hand, show that foreign acquisitions in Indonesia lead to an increase in export intensity in the acquired plants. Similarly, Jayaweera (2009) reported a positive association between an increase in inward FDI and export diversification, using data from 29 low-income countries. Alemu (2008) also used feasible generalized least squares to examine the impact of FDI on export diversification. He concludes that FDI is the key factor in hastening vertical and horizontal export diversification in East Asia. In Torfinn Harding and Javorcik (2012) studied the link between FDI and export upgrading in developed and developing countries. Export upgrading was measured as the unit value of exports in a sample of 105 countries over the period 1984–2000. They showed a positive impact of FDI on export unit values in developing countries, while the result was mixed for developed countries.

The second channel of FDI's impact on an economy's export sophistication is through spillovers that facilitate the modernization of the local productive fabric. Given that multinational firms are more productive and possess superior skills in management, marketing, and R&D-intensive trades, it is naturally expected that some of this knowledge and technology will spread to local firms (Caves, 1996). This should impact their export competitiveness in two ways. Firstly, through technological spillovers, which increase their productivity and competitiveness as a result of demonstration, imitation, competition, and labor mobility effects. However, the effects will vary according to the domestic absorptive capacity and production activities of technology-intensive or high-skill multinational firms (Sjöholm, 1999). Such technological spillovers are associated with the upstream and downstream links in the investor's business. In backward linkages, multinational firms collaborate with domestic suppliers of intermediate inputs and immediately transfer, at least in part, their knowledge of product design, quality control, and inventory management, as well as providing financial and procurement assistance (Zanfei, 2012). In downstream links, multinational firms customers can benefit from the spinoffs and knowledge contained in products, processes, and marketing and distribution technologies. In each of these cases, a growing multinational firms presence can improve the quality and diversity of products offered by local firms (Jindra, Giroud, & Scott-Kennel, 2009). In the same vein, Crespo and Fontoura (2007) have shown that the effects of FDI depend on a number of factors, including the technological gap between multinational firms and their local counterparts, local absorptive capacity, political and geographic variables linked to trade, labor mobility, and intellectual property rights. Moreover, the actual occurrence of these spillovers is conditioned by the origin of investors (Javorcik & Spatareanu, 2011) and the very motivations of such investors (Driffield & Love, 2007).

Secondly, in addition to technological spillovers, multinational firms can generate export information effects, particularly concerning export market indications, international marketing know-how, and multinational firms export operations to local partner firms or subsidiaries. This can occur, for example, through demonstration mechanisms or worker mobility (Fu, 2011). Banga (2006), for example, also found that US FDI flows to India have a positive effect on the export intensity of Indian manufactured goods. In contrast, there is no clear evidence of multinational firms export spillovers in Spain (Barrios, Görg, & Strobl, 2003) or Ireland; on the contrary, even multinational firms export intensity is negatively correlated with the decision and export intensity of indigenous firms in the Irish manufacturing sector (Ruane & Sutherland, 2005).

To conclude this literature review, in general, studies that have examined the relationship between FDI, diversification and export sophistication are generally scarce despite the availability of an abundant literature about FDI, international trade and economic growth (Tadesse & Shukralla, 2013). The latter stresses that FDI positively influences the export sophistication of host countries, particularly local firms, by facilitating their modernization and improving the quality of their export structure. However, the results of the various empirical studies highlighted are far from homogeneous, and depend on the econometric methodology, the study period, the sample chosen and many other factors (Alemu, 2008; Amighini & Sanfilippo, 2014; Arnold & Javorcik, 2009; Banga, 2006; Torfinn Harding & Javorcik, 2012; Iacovone & Javorcik, 2008; Jayaweera, 2009;



Wang & Wei, 2010; Xu & Lu, 2009). Moreover, it should be remembered that the role that FDI could play in the host country's ST via its contribution to export diversification and sophistication has been neglected in both theoretical and empirical literature. And it is in this empirical aspect that one of the substantial contributions of this article lies.

### 3. Empirical Method

To examine the impact of FDI on the ST of the Moroccan economy via the two channels of export diversification and sophistication between 1995 and 2022, two staggered lag autoregressive (SLAR) models are specified and estimated in Eviews 12. There are two main reasons for choosing the two dynamic models à la Pesaran et al. (2001). Firstly, because this method overcomes the problems of conventional testing Engle and Granger (1987) and Johansen (1991) which requires serial integration of the same order. Secondly, it enables us to estimate both short- and long-term effects simultaneously, despite the limited number of observations. Let's look at the "proxy" variables relating these observations, their descriptions, and their expected theoretical impacts on the FDI-ST relationship according to the literature.

#### 3.1. Data Type and Sources

Table 1 shows the data used in our empirical study. The data used in our study are annual, taken from the databases or reports of the World Development Indicators (WDI), UNCTAD Beyond 20/20, and the Atlas of Economic Complexity (AEC). They cover the period from 1995 to 2022. The choice of this period was mainly conditioned by the availability of data at the time of collection.

Table 1. Variables used.

Variables	Descriptions	Expected effects
DI <sup>2</sup>	Diversification index	-
ECI <sup>3</sup>	Economic complexity index	-
FDI <sup>4</sup>	Foreign direct investment as % of GDP	Short-term (Positive or negative) Long-term (Positive or negative)
GFCF <sup>5</sup>	Gross fixed capital formation as % of GDP	Short-term (Positive or negative) Long-term (Positive or negative)
LGDP/P <sup>6</sup>	Logarithm of GDP per capita expressed in constant dollars	Short-term (Positive or negative) Long-term (Positive or negative)

#### 3.2. Unit Root Test

Table 2 shows the results of the stationary tests: the Augmented Dickey-Fuller (ADF) test, the Phillippe-Perron (PP) test, and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The first ADF test indicates that the ID, GFCF, GDPH, and ECI series are integrated in order 1 (I (1)), while the EDI series remains stationary at level (I(0)). As for the PP test, it shows that the ID, GFCF, GDPH, and ECI series are I (1), while the IDE series is stationary at I (0). The third KPSS test shows that all series are stationary at level (I (0)). The Engle and Granger (multivariate case) and Johansen cointegration tests are therefore inappropriate. We have opted for Pesaran et al. (2001) bounds cointegration test.

Table 2. Results of stationary tests.

Variables	Stationarity		
	ADF	PP	KPSS
DI	I(1)	I(1)	I(0)
FDI	I(0)	I(0)	I(0)
GFCF	I(1)	I(1)	I(0)
LGDP/P	I(1)	I(1)	I(0)
ECI	I(1)	I(1)	I(0)

#### 3.3. Representation of the Two ARDL Models

$$\Delta DI_t = \alpha_{it} + \sum_{i=1}^p \alpha_{1i} \Delta DI_{t-1} + \sum_{i=0}^q \alpha_{2i} \Delta FDI_{t-1} + \sum_{i=0}^q \alpha_{3i} \Delta GFCF_{t-1} + \sum_{i=0}^q \alpha_{4i} \Delta LGDP/P_{t-1} + b_1 DI_{t-1} + b_2 FDI_{t-1} +$$

<sup>2</sup> DI: An index that measures the absolute deviation between the product structure of world exports and the structure of a country. Here the DI is the dependent variable of the first DI-FDI econometric model.

<sup>3</sup> ECI: An index that measures a country's production capacity, through the accumulated knowledge of a population. Here, ECI is the dependent variable of the second econometric model, ECI-FDI.

<sup>4</sup> FDI: variable of interest for both models.

<sup>5</sup> GFCF: control variable 1 for both models.

<sup>6</sup> LGDP/P: control variable 2 for both models.

$$b_3GFCF_{t-1} + \frac{b_4GDP}{P_{t-1}} + \varepsilon_t \tag{1}$$

Equation 1 represents the first model to assess the short- and long-term effects of the explanatory variables on export diversification.

$$\Delta ECI_t = \alpha_{it} + \sum_{i=1}^p \alpha_{1i}\Delta ECI_{t-1} + \sum_{i=0}^q \alpha_{2i}\Delta FDI_{t-1} + \sum_{i=0}^q \alpha_{3i}\Delta GFCF_{t-1} + \sum_{i=0}^q \alpha_{4i}\Delta GDP/P_{t-1} + b_1ECI_{t-1} + b_2FDI_{t-1} + b_3GFCF_{t-1} + \frac{b_4GDP}{P_{t-1}} + \varepsilon_t \tag{2}$$

Equation 2 represents the second model to capture the short- and long-term effects of explanatory variables on export sophistication.

With:

$\Delta$ : First difference operator.

$\alpha_1 \dots \alpha_4$ : Short-term effects.

$b_1 \dots b_4$ : Long-term dynamics.

$\alpha_0$ : Constant.

$e$ : iid  $(0, \sigma)$ : Error term.

The two models have integrated variables of different orders (I (0), I (1)). Pesaran et al. (2001) bounds test is undertaken to verify the existence of a cointegrating relationship between the variables in the two specified ARDL models. After determining an optimal lag, the Fisher test is used to test the hypotheses of the absence or existence of a cointegrating relationship.

$$\Delta DI_t = \alpha_0 + \sum_{i=1}^p \alpha_{1i}\Delta DI_{t-1} + \sum_{i=0}^q \alpha_{2i}\Delta FDI_{t-1} + \sum_{i=0}^q \alpha_{3i}\Delta GFCF_{t-1} + \sum_{i=0}^q \alpha_{4i}\Delta GDP/P_{t-1} + \theta u_{t-1} + \varepsilon_t \tag{3}$$

Equation 3 represents the form of the first error-correction model to show whether or not there is cointegration between the sub study variables.

$$\Delta ECI_t = \alpha_0 + \sum_{i=1}^p \alpha_{1i}\Delta ECI_{t-1} + \sum_{i=0}^q \alpha_{2i}\Delta FDI_{t-1} + \sum_{i=0}^q \alpha_{3i}\Delta GFCF_{t-1} + \sum_{i=0}^q \alpha_{4i}\Delta GDP/P_{t-1} + \theta u_{t-1} + \varepsilon_t \tag{4}$$

Equation 4 represents the form of the second error-correction model to show whether or not there is cointegration between the sub study variables.

With:

$u_{t-1}$  Error correction term.

$\theta$  Return to equilibrium parameter.

#### 4. Results and Analysis

For the diagnosis of both models, hypothesis testing for the presence of error autocorrelation (Breusch-Godfrey Serial Correlation Lagrange multiply (LM) Test), heteroscedasticity (Breusch-Pagan-Godfrey test and Autoregressive Conditional Heteroscedasticity (ARCH) test) and error normality (Jarque-Bera test) showed no sign of misspecification. Both models are also well specified according to the Cumulative sum (CUSUM) and CUSUM of squares tests.

Table 3. Hypothesis testing.

Models	Autocorrelation of Breusch Godfrey errors	Heteroskedasticity-test BPG	Heteroskedasticity-test ARCH	Error normality	CUSUM test and CUSUM of squares test
DI-FDI	0.35 > 5%	0.17 > 5%	0.42 > 5%	0.29 > 5%	See Appendices
ECI-FDI	0.48 > 5%	0.46 > 5%	0.94 > 5%	0.46 > 5%	See Appendices

Table 3 shows the diagnosis of the two models. Indeed, hypothesis testing for the presence of error autocorrelation, heteroscedasticity, and error normality shows no sign of misspecification. Both models are also well specified, according to the CUSUM and CUSUM of squares tests.

Table 4. Pesaran boundary cointegration test.

F-bounds test					
Model	Test statistic	Value	Signif	I(0)	I(1)
DI-FDI	F-statistic	4.18	2.5%	3.15	4.08
ECI-FDI	F-statistic	4.54	2.5%	3.15	4.08

Table 4 summarizes the results of the cointegration test. It shows the existence of a long-term relationship between the variables used for the two models. For the first model, the F-statistic value of 4.18 exceeds the upper bound value of 4.08, at the 2.5% threshold. Similarly, for the second model, the F-statistic value of 4.54 exceeds the upper bound value of 4.08 at the 2.5% threshold. This implies that the null hypothesis of no cointegration between variables for both models is rejected.

Starting with the major results of the first DI-FDI model and its short-term coefficients:

Table 5. Estimation results for short-term coefficients.

Conditional error correction regression				
Variable	Coefficient	Std. error	T-statistic	Prob.
C	1.193	0.347	3.435	0.002
DI(-1)	-0.740	0.197	-3.756	0.001
FDI(-1)	-0.017	0.007	-2.338	0.030
GFCF	0.007	0.002	2.840	0.010
LGDP/P (French only)	-0.274	0.084	-3.237	0.004
D(DI(-1))	0.485	0.189	2.560	0.019
D(FDI)	-0.003	0.004	-0.663	0.515
Variable	Coefficient	Std. error	T-statistic	Prob.
D(DI(-1))	0.485	0.161	3.014	0.007
D(FDI)	-0.003	0.002	-1.058	0.303
CointEq(-1)	-0.740	0.147	-5.029	0.000
R-squared	0.571	Mean dependent var		-0.003
Adjusted R-squared	0.533	Dependent var		0.034
S.E. of regression	0.023	Akaike info criterion		-4.555
Sum squared resid	0.012	Schwarz criterion		-4.410
Log likelihood	62.223	Hannan-Quinn criter.		-4.513
Durbin-Watson stat	1.664			

According to Table 5, the cointegration coefficient is statistically significant, and negative, which justifies the existence of a long-term relationship (cointegration) between variables.

The results show that FDI has no short-term impact on the diversification index of Moroccan exports. Indeed, the results show a non-significant probability of 0.52, which does not exceed the 5% threshold. Concerning the other control variables: GFCF showed the expected effect (positive), thus constituting a catalyst for the diversification of Moroccan exports. A 1% increase in investment as a percentage of GDP accelerated the diversification of Moroccan exports by 0.7%. In contrast, GDP per capita showed a negative coefficient of 27%. This shows that the current level of GDP per capita is insufficient to encourage the diversification of Morocco's production and export structures.

Table 6. Long-term coefficient estimation results.

Variable	Coefficient	Std. error	T-statistic	Prob.
FDI	-0.023	0.009	-2.452	0.024
GFCF	0.010	0.004	2.545	0.019
LGDP/P	-0.370	0.084	-4.363	0.000
C	1.612	0.208	7.734	0.000

Table 6 shows the estimated long-term coefficients. It shows that FDI has a negative impact on the diversification of Moroccan exports over the period studied, whereas most econometric studies on this subject have found a positive impact of FDI on export diversification, Imbs and Wacziarg (2003); Klinger and Lederman (2006); Ancharaz (2003); Rodrik (2006); Banga (2006); Harding and Javorcik (2007); Crespo and Fontoura (2007); Alemu (2008); Marouane et al. (2008) and Tadesse and Shukralla (2013).

Indeed, in the Moroccan case, a 1% increase in the share of FDI as a percentage of GDP slows the diversification index of Moroccan exports by 2% over the long term. This result can be explained by the

absence of spillover effects from the FDI attracted to Morocco. This confirms (Hausmann & Rodrik, 2003) view that the presence of multinational firms in each territory does not necessarily lead to a diversified exportable offer. In Jayaweera (2009) also highlighted this negative relationship between FDI and export diversification, but only in the case of countries exporting natural resources. Is this not also the case for Morocco?

On the other hand, GFCF showed the expected theoretical result (positive). Thus, an increase of 1% in the share of investment as a percentage of GDP accelerates the export diversification index by 1% in the long term. This shows that public and private investment is a key factor in the diversification of Moroccan exports. In the long term, per capita GDP has a negative impact on the diversification of Moroccan exports. Morocco's current level of development is still insufficient to encourage export diversification. In addition, the attractiveness of Moroccan territories for new FDI projects in diversified export specializations is very average and below potential. The FDI received by Morocco between 1995 and 2022 has not helped to initiate the process of an inclusive ST for the Kingdom's economy. This requires more reform efforts and more proactive public policies, particularly in terms of a more active and segmented attractiveness policy. Turning now to the major results of the second ECI-FDI model and its short-term factors:

Table 7. Estimation results for short-term coefficients.

Variable	Coefficient	Std. error	T-statistic	Prob.
C	-0.526	0.746	-0.705	0.500
ECI(-1)	-0.486	0.340	-1.430	0.190
FDI(-1)	-0.094	0.027	-3.419	0.009
GFCF(-1)	-0.007	0.015	-0.506	0.625
LGDP/P(-1)	0.215	0.249	0.863	0.413
D(ECI(-1))	-0.420	0.410	-1.022	0.336
D(ECI(-2))	-0.010	0.303	-0.035	0.972
D(ECI(-3))	0.271	0.180	1.499	0.172
D(FDI)	-0.014	0.011	-1.205	0.262
D(FDI(-1))	0.029	0.017	1.649	0.137
D(GFCF)	-0.025	0.013	-1.827	0.105
D(GFCF(-1))	-0.000	0.011	-0.025	0.980
D(GFCF(-2))	-0.021	0.011	-1.766	0.115
D(LGDP/P)	1.337	0.884	1.511	0.169
D(LGDP/P(-1))	1.160	0.738	1.570	0.155
D(LGDP/P(-2))	2.179	1.031	2.112	0.067
CointEq(-1)	-0.486	0.083	-5.835	0.000
R-squared	0.898	Mean dependent var		0.017
Adjusted R-squared	0.805	Dependent var		0.104
S.E. of regression	0.046	Akaike info criterion		-3.007
Sum squared resid	0.025	Schwarz criterion		-2.418
Log likelihood	48.09	Hannan-Quinn criter.		-2.851
Durbin-Watson stat	2.380			

According to Table 7, the value of the adjustment coefficient (cointegration) is negative and statistically significant, confirming the existence of a long-term relationship between the variables in the model studied. However, the estimation results showed non-significant probabilities, exceeding the 5% threshold, even for a threshold of 10%, for the FDI variable of interest, as well as for the two control variables GFCF and LGDP/P.

Table 8. Long-term coefficient estimation results.

Long run coefficients				
Variable	Coefficient	Std. error	t-statistic	Prob.
FDI	-0.043	0.020	-2.143	0.045
GFCF	0.029	0.008	3.489	0.002
GDP/P	-0.000	0.000	-0.561	0.581
C	-1.278	0.166	-7.679	0.000

Table 8 provides information on the estimated long-run coefficients. The results show that the second variable of the GDP/P control has no effect on the process of Moroccan export sophistication over the period 1995-2022. However, the FDI interest variable also has a negative effect on the sophistication of Moroccan exports. Indeed, a 1% increase in the share of FDI as a percentage of GDP slows the sophistication of Moroccan exports by 4% between 1995 and 2022! This result runs counter to the work of, for example,



Iacovone and Javorcik (2008) and Xu and Lu (2009) for Chinese exports, and Arnold and Javorcik (2009) for Indonesia, Jayaweera (2009) and Alemu (2008) for East Asia, Torfinn Harding and Javorcik (2012) for developing countries, Amighini and Sanfilippo (2014) for South-South African countries, Banga (2006) for India. Rather, our results concur with those of Barrios et al. (2003) and Ruane and Sutherland (2005) who found that MNF export intensity is negatively correlated with the export sophistication of the countries of location.

GFCF showed the expected (positive) result. In fact, a 1% rise in the share of investment as a percentage of GDP accelerated the sophistication of Moroccan exports by almost 3% over the study period. This shows the vital role that domestic investment (public and private) can play in boosting export sophistication and ST in the Moroccan economy.

All in all, the negative effect of FDI on the sophistication of Moroccan exports does not encourage the success of a Moroccan ST during the period between 1995 and 2022. FDI has not been directed towards diversified, sophisticated and technology-intensive production and export specializations. This result can also be explained by the nature of the FDI projects received, either in sectors that are not very productive and do not export, such as real estate, or in natural specializations that only encourage the concentration of exports on raw agricultural products, rather than making them more sophisticated. A real policy challenge of territorial attractiveness and promotion, industrial acceleration, promotion of high-tech intensity services that must succeed to consolidate the Moroccan ST process and ensure future, inclusive, and sustainable growth (AIT BARI, 2017).

## 5. Conclusion

After defining and specifying the contours of the ST concept and its two main operational channels via export diversification and sophistication in the context of the Moroccan economy and based on a review of theoretical and empirical literature, the present article specified and estimated two ARDL models that highlighted the link between FDI and ST in Morocco over the period 1995–2022. This ARDL approach clearly justified, for both cases, the existence of a long-run relationship between FDI and the dependent variables of both the DI-FDI and ECI-FDI models.

On the one hand, for the first model, the results showed that FDI did not affect the Kingdom's export diversification in the short term and therefore its TS process. On the other hand, GFCF has a positive impact on this process. A 1% increase in the share of investments as a percentage of GDP accelerated the diversification of Morocco's export structure by almost 1%. In the long term, the estimate shows a negative effect of FDI. A 1% increase in the share of FDI as a percentage of GDP slowed the diversification index of Moroccan exports by 2%. This confirmed the findings of Hausmann and Rodrik (2003). They showed that the presence of multinational firms in a given territory does not necessarily lead to a diversified exportable offer. The results also showed the positive effect of domestic investment on export diversification. This underlined the important role of this investment as a catalyst for the success of the Moroccan ST process. On the contrary, it was shown that the insufficiency of the current GDP per capita had a net negative effect, which slowed down the triggering and maintenance of this process.

On the other hand, for the second model, the estimation results did not detect a significant short-term effect of FDI on the sophistication of Moroccan exports and therefore on the country's ST. Even more surprisingly, in the long term, a perverse and negative effect of FDI on the sophistication of Moroccan exports was highlighted. A 1% increase in FDI as a percentage of GDP reduces the sophistication of Moroccan exports to 4%. As for GFCF, it showed its expected positive theoretical effect. An increase in the share of investment as a percentage of GDP accelerated the sophistication of Moroccan exports over the study period. This demonstrated the important role of domestic investment, both public and private, in the sophistication of Moroccan exports and in the country's ST.

In the end, analysis of the empirical relationship between FDI and the diversification and sophistication of Moroccan exports has not shown the crucial and desired role of such FDI on the Kingdom's ST. This can be explained by the very nature of the FDI received on Moroccan soil, its unproductive orientation, often in the real estate sector, or in activities that are productive but have low export capacity. FDI in these sectors, or in others with natural, concentrated specializations - tourism in particular - did not have the expected industrial and technological knock-on effects, and their contribution in terms of exports and innovation was too weak to boost the Moroccan economy's ST and its industrial genius. Consolidating the latter would require a more selective and well-segmented attractiveness policy to attract FDI projects with high export capacities and in areas of specialization other than natural ones. A real challenge for voluntary specialization in more specialized local trades and skills, with greater knock-on effects, to encourage a diversified and sophisticated exportable offering. A challenge that will ensure the success of ST, notably through a measured migration of labor to technology-intensive, high value-added sectors. How can we meet this challenge when Morocco seems to be suffering from a double handicap: non-diversified exports coupled with a low level of complexity?

## References

- Agosin, M. R., Alvarez, R., & Bravo-Ortega, C. (2012). Determinants of export diversification around the world: 1962–2000. *The World Economy*, 35(3), 295–315. <https://doi.org/10.1111/j.1467-9701.2011.01395.x>
- AIT BARI, A. (2017). The paradox of L'Attractivité durable case of Morocco, 1970–2014. *Journal of Multidisciplinary Studies in Economic and Social Sciences*, 2(2). <https://doi.org/10.48375/IMIST.PRSM/remses-v2i2.6126>
- Alaya, M. (2012). *The determinants of MENA export diversification: An empirical analysis*. Paper presented at the Corruption and Economic Development ERF 18th Annual Conference March.
- Alemu, A. M. (2008). Determinants of vertical and horizontal export diversification: Evidences from sub-Saharan Africa and East Asia. *Ethiopian Journal of Economics*, 17(2), 107–107. <https://doi.org/10.4314/eje.v17i2.47311>
- Amighini, A., & Sanfilippo, M. (2014). Impact of South–South FDI and trade on the export upgrading of African economies. *World Development*, 64, 1–17. <https://doi.org/10.1016/j.worlddev.2014.05.021>
- Ancharaz, V. D. (2003). Determinants of trade policy reform in Sub-Saharan Africa. *Journal of African Economies*, 12(3), 417–443.
- Arnold, J. M., & Javorcik, B. S. (2009). Gifted kids or pushy parents? Foreign direct investment and plant productivity in Indonesia. *Journal of International Economics*, 79(1), 42–53. <https://doi.org/10.1016/j.jinteco.2009.05.004>
- BAD, B. A. (2013). *Assessment of progress made in Africa towards the achievement of the millennium development goals*. Retrieved from [https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/MDG\\_Report\\_2014\\_11\\_2014.pdf](https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/MDG_Report_2014_11_2014.pdf)
- Banga, R. (2006). The export-diversifying impact of Japanese and US foreign direct investments in the Indian manufacturing sector. *Journal of International Business Studies*, 37(4), 558–568. <https://doi.org/10.1057/palgrave.jibs.8400207>
- Barrios, S., Görg, H., & Strobl, E. (2003). Explaining firms' export behaviour: R&D, spillovers and the destination market. *Oxford Bulletin of Economics and Statistics*, 65(4), 475–496. <https://doi.org/10.1111/1468-0084.t01-1-00058>
- Berthélemy, J.-C. (2005). International trade and economic diversification. *Revue d'Economie Politique*, 115(5), 591–611. <https://doi.org/10.3917/redp.155.0591>
- Cadot, O., Carrère, C., & Strauss-Kahn, V. (2011). Export diversification: What's behind the hump? *Review of Economics and Statistics*, 93(2), 590–605. [https://doi.org/10.1162/rest\\_a\\_00078](https://doi.org/10.1162/rest_a_00078)
- Caves, R. E. (1996). *Multinational enterprise and economic analysis* (2nd ed.). Cambridge, New York and Melbourne: Cambridge University Press.
- Chenery, H. B., & Taylor, L. (1968). Development patterns: Among countries and over time. *The Review of Economics and Statistics*, 50(4), 391–416. <https://doi.org/10.2307/1926806>
- Cottet, C., Madariaga, N., & Gou, N. J. (2012). The diversification of exports in the franc zone: Degree, sophistication and dynamics. *MacroDev*, 1–32.
- Crespo, N., & Fontoura, M. P. (2007). Determinant factors of FDI spillovers—what do we really know? *World Development*, 35(3), 410–425. <https://doi.org/10.1016/j.worlddev.2006.04.001>
- Driffield, N., & Love, J. H. (2007). Linking FDI motivation and host economy productivity effects: Conceptual and empirical analysis. *Journal of International Business Studies*, 38(3), 460–473. <https://doi.org/10.1057/palgrave.jibs.8400268>
- Engle, R. F., & Granger, C. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, 55(2), 251–276. <https://doi.org/10.2307/1913236>
- Felipe, J. (2007). A note on competitiveness and structural transformation in Pakistan.
- Fu, X. (2011). Processing trade, FDI and the exports of indigenous firms: Firm-level evidence from technology-intensive industries in China. *Oxford Bulletin of Economics and Statistics*, 73(6), 792–817. <https://doi.org/10.1111/j.1468-0084.2011.00673.x>
- Gerschenkron, A. (1962). The changeability of a dictatorship. *World Politics*, 14(4), 576–604.
- Harding, T., & Javorcik, B. (2007). *The effect of FDI on export diversification in Central and Eastern Europe*. Paper presented at the Note for the Trade Policy Conference Export Growth and Diversification: Pro-Active Policies in Export Cycle.
- Harding, T., & Javorcik, B. S. (2012). Foreign direct investment and export upgrading. *Review of Economics and Statistics*, 94(4), 964–980. [https://doi.org/10.1162/rest\\_a\\_00226](https://doi.org/10.1162/rest_a_00226)
- Hausmann, R., Hwang, J., & Rodrik, D. (2007). What you export matters. *Journal of Economic Growth*, 12(1), 1–25. <https://doi.org/10.1007/s10887-006-9009-4>
- Hausmann, R., & Klinger, B. (2007). *The structure of the product space and the evolution of comparative advantage*. Retrieved from Center for International Development at Harvard University. No. 146.
- Hausmann, R., & Klinger, B. (2008). South Africa's export predicament. *Economics of Transition*, 16(4), 609–637.
- Hausmann, R., & Rodrik, D. (2003). Economic development as self-discovery. *Journal of Development Economics*, 72(2), 603–633. [https://doi.org/10.1016/s0304-3878\(03\)00124-x](https://doi.org/10.1016/s0304-3878(03)00124-x)
- Herzer, D., Nowak-Lehmann, D. F., & Siliverstovs, B. (2006). Export-led growth in Chile: Assessing the role of export composition in productivity growth. *The Developing Economies*, 44(3), 306–328. <https://doi.org/10.1111/j.1746-1049.2006.00019.x>
- Hesse, H. (2008). *Export diversification and economic growth (English)*. Retrieved from Commission on Growth and Development Working Paper; No. 21 Washington, D.C.: World Bank Group.
- Hirschman, A. (1958). *The strategy of economic development*. New Haven: Yale University Press.
- Iacovone, L., & Javorcik, S. B. (2008). *Multi-product exporters: Diversification and micro-level dynamics*. Retrieved from World Bank Policy Research Working Paper, No. (4723):
- Imbs, J., & Wacziarg, R. (2003). Stages of diversification. *American Economic Review*, 93(1), 63–86. <https://doi.org/10.1257/000282803321455160>

- Iwamoto, M., & Nabeshima, K. (2012). *Can FDI promote export diversification and sophistication of host countries?: Dynamic panel system GMM analysis*. Retrieved from Institute of Developing Economies, Japan External Trade Organization (JETRO). (No. 347):
- Jacquemot, P. (2013). Economic prospects for Sub-Saharan Africa. Questions and scenarios. *L'Économie Politique*, 59(3), 6-33.
- Jarreau, J., & Poncet, S. (2012). Export sophistication and economic growth: Evidence from China. *Journal of Development Economics*, 97(2), 281-292. <https://doi.org/10.1016/j.jdeveco.2011.04.001>
- Javorcik, B. S., & Spatareanu, M. (2011). Does it matter where you come from? Vertical spillovers from foreign direct investment and the origin of investors. *Journal of Development Economics*, 96(1), 126-138. <https://doi.org/10.1016/j.jdeveco.2010.05.008>
- Jayaweera, S. (2009). Foreign direct investment and export diversification in low income nations. Available at SSRN 1566044. <https://doi.org/10.2139/ssrn.1566044>
- Jindra, B., Giroud, A., & Scott-Kennel, J. (2009). Subsidiary roles, vertical linkages and economic development: Lessons from transition economies. *Journal of World Business*, 44(2), 167-179. <https://doi.org/10.1016/j.jwb.2008.05.006>
- Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica*, 59(6), 1551-1580. <https://doi.org/10.2307/2938278>
- Kaldor, N. (1967). *Strategic factors in economic development* (Vol. 83). Ithaca: New York State School of Industrial and labor Relations.
- Kamgna, S. (2007). *Economic diversification in Central Africa: State of play and lessons*. Germany: University Library of Munich.
- Klinger, B., & Lederman, D. (2006). *Diversification, innovation, and imitation inside the global technological frontier*. Retrieved from World Bank Policy Research Working Paper, No. (3872):
- Kuznets, S., & Murphy, J. T. (1966). *Modern economic growth: Rate, structure, and spread* (Vol. 2). New Haven: Yale University Press.
- Lewis, W. A. (1954). Economic development with unlimited supplies of labor. *The Manchester School*, 22(2), 139-191. <https://doi.org/10.1111/j.1467-9957.1954.tb00021.x>
- Marouane, A., Nicet-Chenaf, D., & Rougier, E. (2008). *The law of growth and attraction: An endogenous model of absorptive capacities, FDI and income for MENA countries*. Retrieved from Groupement de Recherches Economiques et Sociales (No. 2008-21):
- Matthee, M., & Naudé, W. (2007). *Export diversity and regional growth: Empirical evidence from South Africa*. Retrieved from WIDER Research Paper No. (11):
- McMillan, M. S., & Rodrik, D. (2011). *Globalization, structural change and productivity growth*. Retrieved from National Bureau of Economic Research. (No. w17143):
- Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*, 71(6), 1695-1725. <https://doi.org/10.1111/1468-0262.00467>
- Moran, T. (2011). *Foreign direct investment and development: Launching a second generation of policy research: Avoiding the mistakes of the first, reevaluating policies for developed and developing countries*. Columbia University Press.
- Myrdal, G. (1957). *Economic theory and under-developed regions*. London: Gerald Duckworth.
- Naudé, W., & Rossouw, R. (2011). Export diversification and economic performance: Evidence from Brazil, China, India and South Africa. *Economic Change and Restructuring*, 44(1-2), 99-134.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326. <https://doi.org/10.1002/jae.616>
- Rodrik, D. (2006). What's so special about China's exports? *China & World Economy*, 14(5), 1-19. <https://doi.org/10.1111/j.1749-124x.2006.00038.x>
- Rostow, W. W. (1959). The stages of economic growth. *The Economic History Review*, 12(1), 1-16.
- Ruane, F., & Sutherland, J. (2005). Export performance and destination characteristics of Irish manufacturing industry. *Review of World Economics*, 141(3), 442-459. <https://doi.org/10.1007/s10290-005-0038-4>
- Sjöholm, F. (1999). Technology gap, competition and spillovers from direct foreign investment: Evidence from establishment data. *The Journal of Development Studies*, 36(1), 53-73. <https://doi.org/10.1080/00220389908422611>
- Tadesse, B., & Shukralla, E. K. (2013). The impact of foreign direct investment on horizontal export diversification: Empirical evidence. *Applied Economics*, 45(2), 141-159. <https://doi.org/10.1080/00036846.2011.595692>
- Taylor, T. (2003). Export diversification in Latin America and the Caribbean. *The International Trade Journal*, 17(2), 101-128. <https://doi.org/10.1080/08853900390200157>
- Wang, Z., & Wei, S.-J. (2010). What accounts for the rising sophistication of China's exports? China's growing role in world trade. In (pp. 63-104). University of Chicago Press.
- Xu, B., & Lu, J. (2009). Foreign direct investment, processing trade, and the sophistication of China's exports. *China Economic Review*, 20(3), 425-439. <https://doi.org/10.1016/j.chieco.2009.01.004>
- Zanfei, A. (2012). Effects, not externalities. *The European Journal of Development Research*, 24(1), 8-14.

### Appendices

Figure 1 shows the most optimal model among the others presented in the case of the first model, as it gives the smallest value of the Akaike information criterion (AIC).

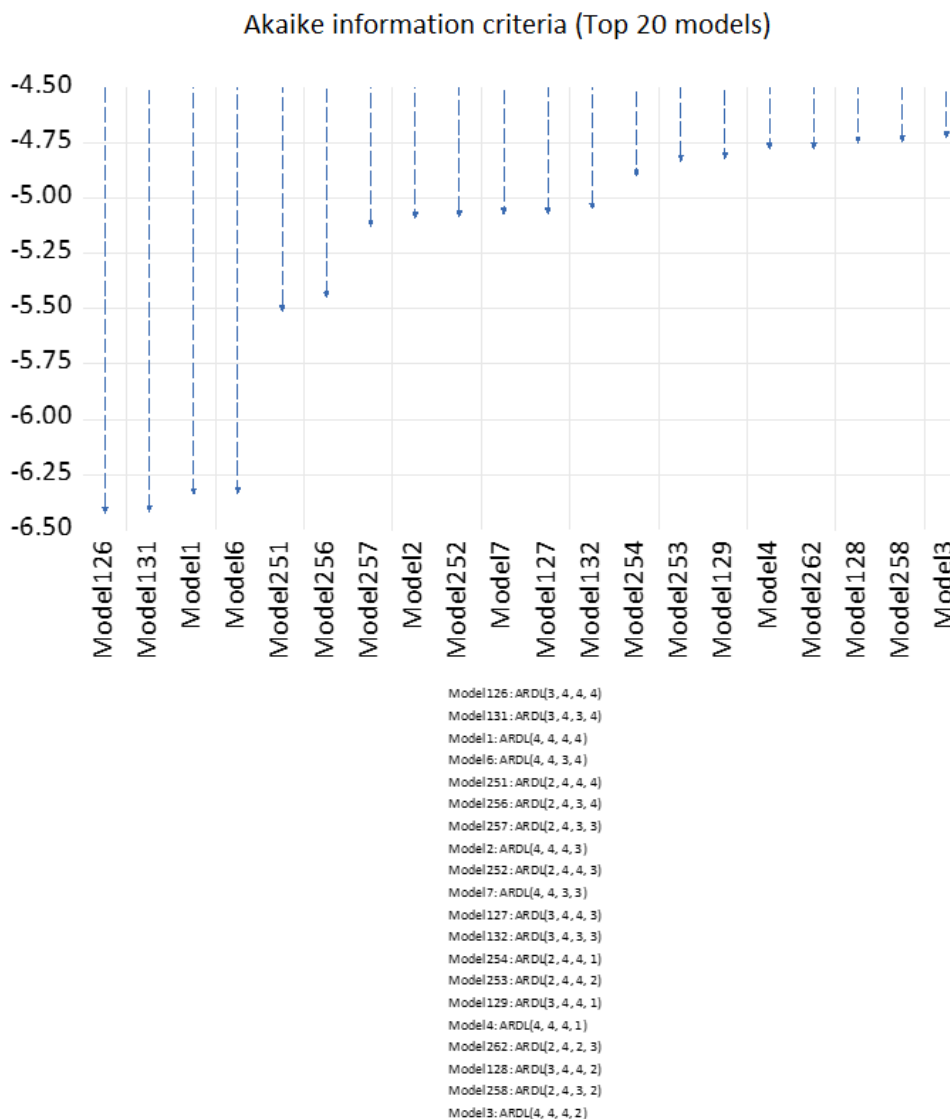


Figure 1. AIC graphic values

Figures 2 and 3 show the global specification tests for the first model.

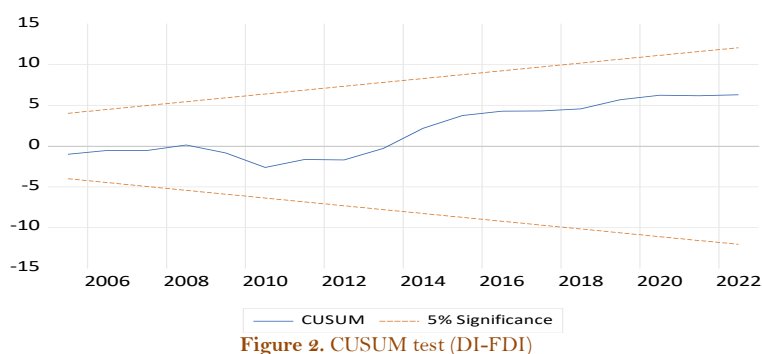


Figure 2. CUSUM test (DI-FDI)

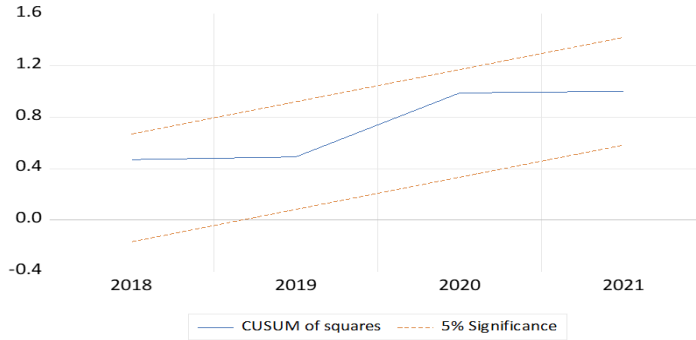


Figure 3. CUSUM of squares test (DI-FDI).

Figure 4 shows the most optimal model among the others presented in the case of the second model, as it gives the smallest value of the Akaike information criterion (AIC).

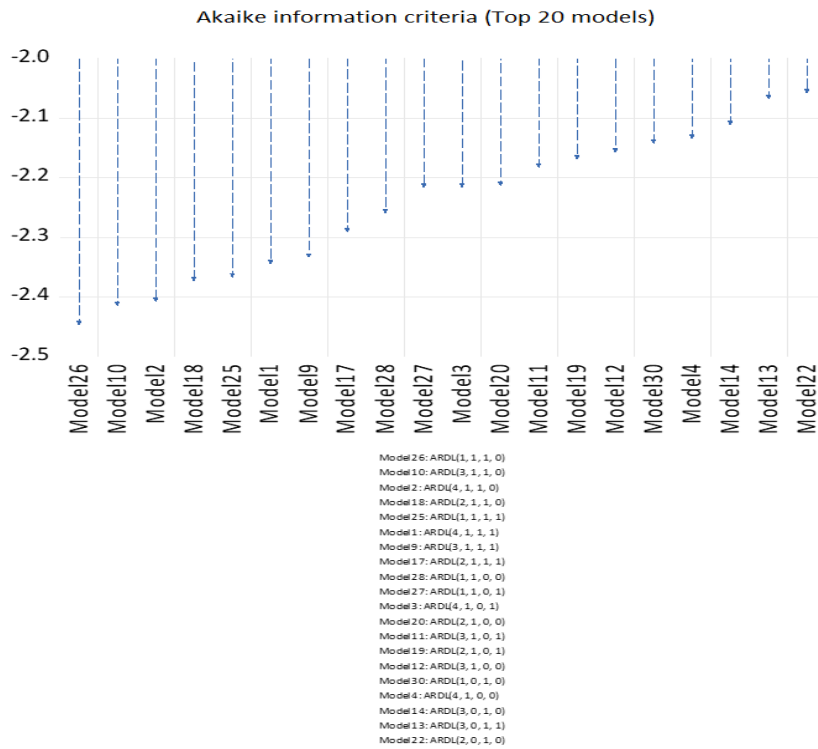


Figure 4. AIC graphic values.

Figures 5 and 6 show the global specification tests for the second model.

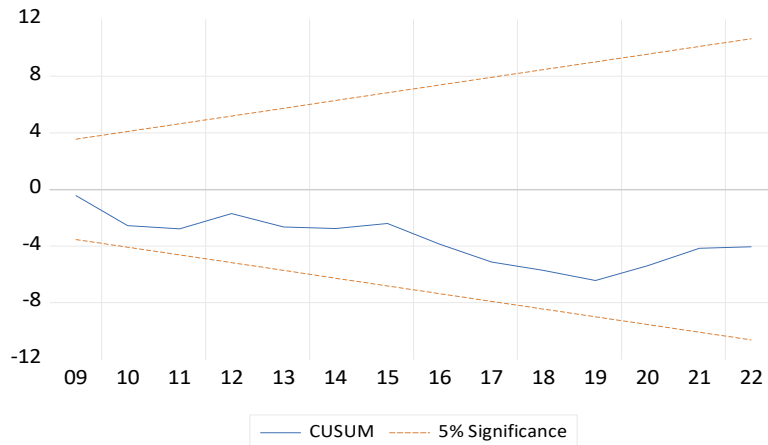


Figure 5. CUSUM test (ECI-FDI).



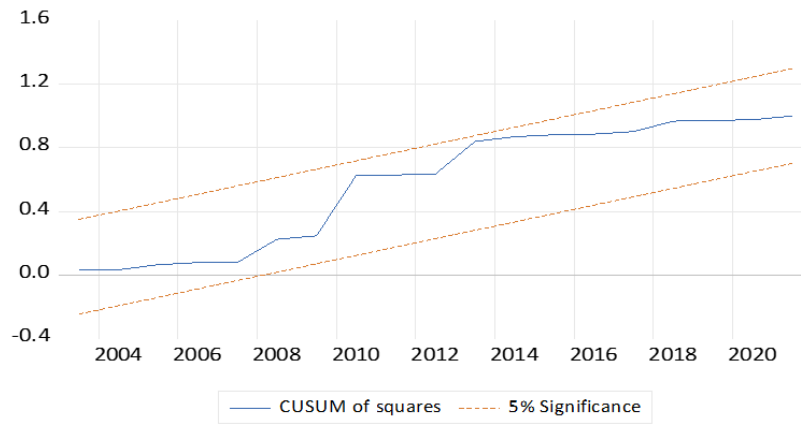


Figure 6. CUSUM of squares test (ECI-FDI).