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IMPACT OF TAX INCENTIVES ON THE ATTRACTIVENESS OF FDI IN MOROCCO: ECONOMETRIC MODELLING BETWEEN 2003 AND 2022

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Abstract
In the current context of increasing economic integration, public authorities have implemented a number of measures aimed at promoting the attractiveness of FDI. Tax policy is one of the key determinants in promoting FDI. Taxation may influence the three aspects outlined in the OLI paradigm proposed by Dunning (1977). However, analysis of its impact on the attractiveness of FDI has been marginalised in favour of other determinants such as the unit cost of production and the market potential of the host country.
In Morocco, tax revenues constitute the bulk of ordinary revenues. Any increase in tax incentives leads to an increase in tax expenditures. In this sense, our research focuses on the impact of tax incentives implemented in Morocco on the promotion of FDI, using tax expenditures as an indicator of fiscal measures. Our methodological approach consists of developing an econometric model based on an ARDL model with the following variables, fiscal expenditure, GDP and the degree of openness. In this analysis, we will first examine the impact of these determinants on the attractiveness of FDI. Secondly, we will discuss the results obtained.
Keywords: Taxation; FDI; OLI paradigm; Tax expenditures; ARDL.

Introduction

Due to the predominant influence of foreign direct investment (FDI) on job creation, economic growth stimulation and technology transfer in host countries, attracting foreign investors remains a strategic challenge in an economic context characterised by globalisation and increased competition between states. Due to its geostrategic position, political stability and modernisation policy, Morocco aims to position itself as an attractive market for FDI in Africa. One of the key measures taken to enhance this attractiveness is the introduction of tax incentives, ranging from reduced tax rates to tax exemptions. Most theoretical and empirical models dealing with FDI behaviour refer, directly or indirectly, to the "OLI" approach proposed by Dunning (1977). This model links FDI to three key factors: ownership, location and internalisation. Taxation can potentially influence all three of these aspects. For example, the level of corporate taxation in the host country can play a decisive role in its attractiveness as an investment location, thereby influencing location decisions in comparison with other destinations. More generally, the tax regime applied to foreign income can alter the pre- and

post-tax profitability differentials of FDI, which in turn can shift the perceived benefits of internalisation by multinational firms relative to other options such as exporting or licensed production in host countries. (Hajkovan et al., 2006).

In this sense, any increase in tax incentives results in an increase in tax expenditure. Hence, the main objective of this paper is to examine the effectiveness of these tax incentives in attracting FDI to Morocco. Using statistical sources provided by the World Bank and various relevant Moroccan institutions and administrations, our methodological approach consists of analysing the Moroccan tax system as a modelling element that governs FDI inflows into Morocco, using econometric modelling, and examining how other determinants, such as gross domestic product (GDP), economic growth rate, openness rate, inflation rate, market size, political and economic stability, and free trade areas, can also influence FDI flows. With this in mind, we will first present a literature review of the main theories explaining FDI production. We will then break down the Moroccan context as a space for this FDI dynamic. Next, we will present our conceptual econometric model and the specification of its variables and the various stages of its validation. We will also present the main results, test the various hypotheses and conclude by opening a debate on these different results. Finally, we will highlight the main contributions of this research, its limitations and possible recommendations.

1. Literature review:

It is clear that the literature on FDI is quite extensive, with research and studies addressing various issues aimed at identifying, on the one hand, explanatory theories of FDI production and, on the other hand, the determining factors in the choice of location.

1.1 Theories of foreign direct investment

The main explanatory theories of the FDI phenomenon seek to identify the key drivers that push multinational companies to produce abroad.

Monopolistic behaviour theory: This approach argues that the way in which a company can become a multinational may depend largely on the functioning of the market in its country of origin, as well as on the decisions taken by the large companies that dominate it. This strategic move generally prompts their direct competitors to follow suit, not simply because it is an opportunity, but to prevent the initiating company from gaining a dominant position on its own. (Knickerbocker 1973)

Risk aversion theory: This theory is based on the idea that investors generally tend to favour caution. Thus, when deciding in which country to invest their capital, they are often reluctant to commit to areas where the economic or political environment appears unstable. Markets in developing countries or those marked by political tensions, for example, are more likely to cause hesitation due to the high level of uncertainty surrounding them. (Gannagé, 1999).

The theory of production cycles: Foreign direct investment is not random, but rather follows the evolutionary path of the product. In general, companies start up in industrialised countries, where they can rely on solid research and development infrastructure. Once the innovation phase is complete, they often transfer production to regions where costs, particularly labour costs, are more advantageous, especially in certain developing countries. Then, as the product matures, the company seeks to establish itself in new, dynamic markets, often located in rapidly expanding emerging countries. (Vernon, 1966).

The theory of transaction cost internationalisation: This theory is based on the observation that international markets do not always function smoothly. Faced with these dysfunctions (customs barriers; significant costs associated with information gathering, negotiations or contract management), some companies choose to invest directly abroad. By establishing a local presence, they reduce these costs and find it easier to integrate into markets that would otherwise be easily accessible to them. (Coase 1937).

The eclectic theory: This is a comprehensive approach to the factors explaining FDI. It is also known as the "OLI paradigm" in reference to its three pillars, which are the specific advantages available to a firm:

- OWNERSHIP: The specific advantages available to the firm.
- LOCATION: The specific advantage of countries.
- INTERNALISATION ADVANTAGE: The advantages of factors related to internationalisation, such as imperfect competition and the country's comparative advantage.

FDI is driven by a combination of these three factors: the ownership advantage (specific skills possessed by the company), the location advantage (specific resources or markets available in the host country) and the internalisation advantage (the ability to directly control and exploit these advantages). (Dunning 1977).

1.2 Determinants of FDI location:

The aim here is to unravel some of the factors that govern multinational companies and encourage them to invest in one country rather than another. In other words, to identify some of the possible determinants that may be responsible for the global distribution of FDI.

Taxation: A country's tax regime often plays a decisive role when a company decides where to locate its foreign investments. Incentives such as profit tax relief, exemptions or reductions in certain taxes are often seen as powerful levers for attracting international investors. Conversely, an overly restrictive tax environment, particularly in the case of high tax pressure, may discourage firms, as it significantly increases production costs. In this context, authorities must constantly strike a balance between the desire to attract foreign capital and the obligation to ensure that large companies contribute fairly to public financing. (El Ameli 2018).

Market size (of the host country): The size of a market, often measured by gross domestic product, plays a central role in companies' decisions to invest abroad. When a country has a sufficiently large market, it becomes more attractive to investors, as this paves the way for more efficient use of available resources and facilitates economies of scale. A large market is also generally associated with significant domestic demand, which represents a significant business opportunity for companies seeking to expand internationally. (Levasseur 2002).

Growth rate: A country's economic growth is often seen as a key indicator of its dynamism and ability to offer attractive investment opportunities. This potential generally attracts the attention of companies seeking to establish a long-term presence. In fact, a study conducted by UNCTAD in 1997 revealed that for a large majority of investors surveyed, approximately 91%, the growth prospects of the host country's economy were the most important factor in their choice of location. (El Ameli 2018).

Inflation rate: Inflation is one of the most revealing indicators of a country's macroeconomic health. A high level of inflation tends to signal internal imbalances, as well as a lack of

responsiveness or willingness on the part of monetary and fiscal authorities to control the situation. In this context, foreign investors often err on the side of caution. The higher inflation rises, the more their confidence erodes, which dampens their willingness to engage in that market. (Schneider & Frey 1985).

Public spending: Public authorities can also use their national budgets to steer the country's economic trajectory. Public spending is one of the key tools at their disposal. It encompasses all the financial resources mobilised by the state and its institutions to meet collective needs. It often plays a driving role in stimulating growth, particularly through infrastructure financing. When a country succeeds in developing a high-quality infrastructure network, whether roads, ports, rail connections or digital services, it becomes more attractive to international investors. These facilities facilitate production flows, reduce logistics delays and support the competitiveness of foreign companies operating locally. In its 1998 report, UNCTAD already emphasised that the success of global integration strategies depends largely on the ability to connect the different units of a multinational group. This requires high-performance infrastructure, such as efficient communication networks and reliable transport systems, which are particularly crucial for subsidiaries operating on a just-in-time basis or the regional headquarters of large firms. (B. De Prost 2012).

Resources: When a company considers investing abroad, it takes a close look at the resources offered by the host country, both human and natural. On the one hand, the availability of a skilled and affordable workforce is often a decisive factor in the choice of location. This is why the level of training of workers and efforts to improve vocational education are particularly important. On the other hand, natural resources, their accessibility, abundance and quality play an equally central role, particularly for industrial or extractive sectors whose activities depend directly on these raw materials. (El Ameli 2018).

2. Empirical literature:

Numerous studies have sought to measure the effect of income tax on multinationals' choice of location abroad. These include analyses by De Mooij and Everdeen (2006), Bellak and colleagues (2007, 2009), and Feld and Herckmeyer (2011). These studies are based on a variety of econometric approaches, each using specific data, which partly explains the marked differences between the results obtained. However, one common point emerges: the influence of taxation on corporate decisions is never uniform. It depends largely on the specific context of each company, and in particular on the strategic choices related to their international expansion. (Benha, 2022)

Recent studies show that the sensitivity of foreign direct investment to taxation depends heavily on the specific characteristics of the country where companies wish to set up, as well as on the degree of mobility of their activities. In cases where companies locate their production in large markets in order to limit certain costs, such as those related to transport, the impact of taxation on their decision tends to be mitigated. Furthermore, when the capital invested is not very mobile and the host country offers attractive incentives, the authorities have some leeway to tax profits without compromising the territory's attractiveness to investors. (OECD Syntheses March 2008).

Thus, in some studies on the determinants of FDI, it has been found that market size, infrastructure quality, political and economic stability, and free trade areas are relevant, while

the results are mixed with regard to the importance of tax incentives, the business/investment climate, labour costs, and economic openness (Lim, 2001).

2.1 FDI dynamics in Morocco:

During the first eight months of 2024, Morocco recorded an inflow of foreign direct investment exceeding 13 billion dirhams. This figure marks a significant rebound, with an increase of around 47% compared to the same period last year, when FDI fell sharply by more than 50%. This positive trend can be explained in part by a more favourable international context, but also by the solidity of the Moroccan economy in the face of a situation marked by numerous uncertainties. (OECD September 2024).

The OECD report on Morocco's economic situation highlights the efforts made by the authorities to stimulate investment and promote entrepreneurship, with the aim of improving the business environment. The organisation also welcomes certain major reforms, such as those aimed at strengthening competition or extending basic medical coverage. That said, despite these advances, the standard of living remains modest, largely due to the significant weight of the informal economy. The labour market continues to face several challenges, including the low quality of jobs on offer and skills shortages, particularly in specialised technical fields. Furthermore, the incentives put in place to encourage private investment still lack clarity, which limits their effectiveness.

3. Data preparation

After running several simulations using data extracted from the HCP, Manar-Statistiques (Ministry of Finance) and World Bank databases, we created a database expressed in millions of current dirhams. Before beginning the modelling phase and testing the stationarity of the series, we will apply the natural logarithm to all variables. This transformation aims to make their changes more comparable over time and to mitigate the effects of scale variation.

Table 1: Databases of different HCP variables

Budget	Tax	Foreign direct	Exports	Degree of	Gross	Tax
deficit	expenditures	investment		openness	domestic product	revenue
DB	**DFISC**	**FDI**	**X**	**OPEN**	**GDP**	**RFISC**

Source: HCP

3.1 Logarithmic transformation of study variables:

The table presents the natural logarithm-transformed version of the variables selected for econometric analysis, covering the period from 2003 to 2022. Each of the variables, such as FDI, trade openness (LOPEN), public expenditure (LPHB), tax revenue (LREFISC), exports (LEX), public debt (LDB), and tax expenditure (LDPFISC), has been converted in order to harmonise variations and facilitate comparisons. This transformation also allows the series to be prepared for stationarity tests and modelling.

Table 2: Logarithmic transformation of variables

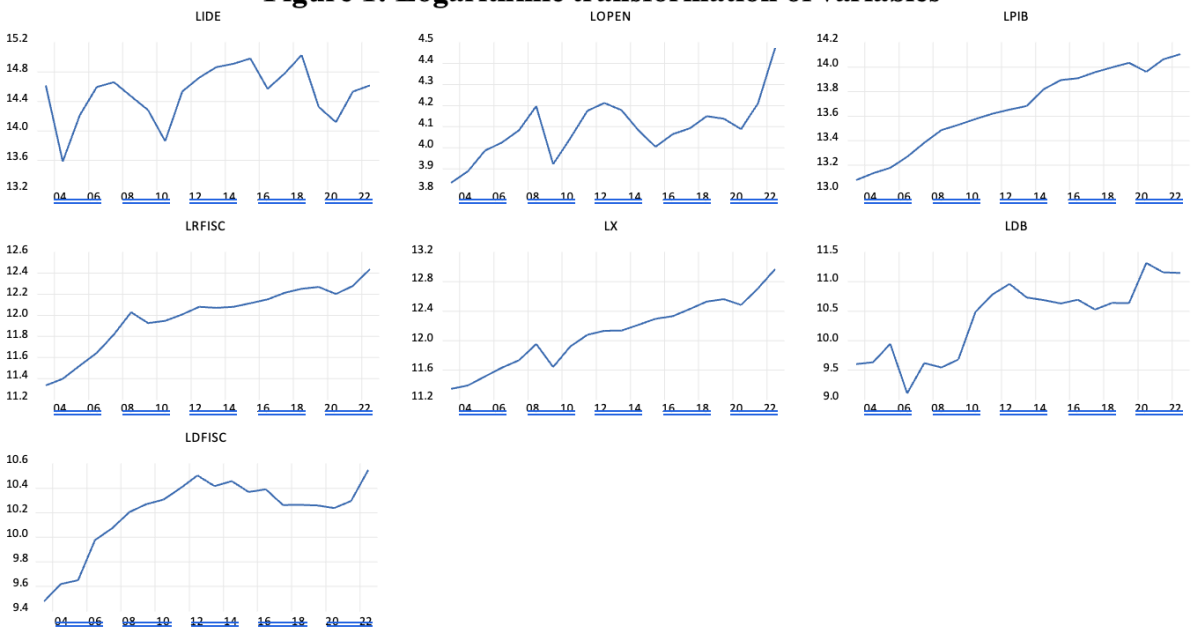
Year	LIDE	LOPEN	LPIB	LRFISC	LX	LDB	LDFISC
2003	14.61049	3.831042	13.07532	11.33160	11.33723	9.593969	9.473704

2004	13.58257	3.885169	13.13234	11.39335	11.38391	9.623575	9.615472
2005	14.20823	3.984405	13.17624	11.51894	11.50555	9.938999	9.645817
2006	14.58766	4.022937	13.26619	11.64025	11.62607	9.096387	9.973760
2007	14.65492	4.081835	13.38092	11.81440	11.72756	9.610525	10.06951
2008	14.46337	4.196460	13.48277	12.02740	11.94790	9.536041	10.20152
2009	14.27768	3.919372	13.52580	11.92406	11.63532	9.674074	10.26584
2010	13.85881	4.043745	13.57296	11.94474	11.91561	10.48470	10.30230
2011	14.52834	4.173850	13.61715	12.00509	12.07251	10.78459	10.39580
2012	14.71248	4.211279	13.65050	12.07863	12.12749	10.96058	10.49985
2013	14.85402	4.177543	13.67945	12.06788	12.13020	10.72961	10.41283
2014	14.90190	4.079644	13.81696	12.07914	12.21010	10.68382	10.45291
2015	14.97121	4.002769	13.89073	12.11316	12.29243	10.62542	10.36562
2016	14.56310	4.062915	13.90558	12.14928	12.32674	10.68958	10.38662
2017	14.77008	4.090834	13.95431	12.21169	12.42457	10.52253	10.25945
2018	15.01752	4.148279	13.99386	12.25092	12.52613	10.63725	10.25969
2019	14.31927	4.135878	14.03049	12.26735	12.55847	10.63386	10.25495
2020	14.11364	4.086306	13.95742	12.20002	12.48025	11.31864	10.23376
2021	14.52607	4.209259	14.05824	12.27637	12.70504	11.15927	10.29218
2022	14.60979	4.473497	14.10081	12.43677	12.96831	11.14839	10.54421

Source: Output Eviews

The graphs show the evolution of logarithmic variables over time for the period 2003–2022. Each curve illustrates the dynamics specific to a variable, highlighting general trends, possible breakpoints, and fluctuations specific to certain years. These visual representations provide a better understanding of long-term movements, periods of stability or instability, and prepare the ground for the more detailed analysis that will be carried out in the subsequent econometric work.

Figure 1: Logarithmic transformation of variables



Source: Output Eviews

3.2 Descriptive statistics:

The variables as a whole appear, to a large extent, to be close to a normal distribution, as shown by the results of statistical tests. After this stage, the analysis continues with an examination of the stationarity of the transformed series. To do this, we use the ADF (AUGMENTED DICKEY- FULLER) test, starting by checking for the existence of a trend (model with trend, M3). If this model is not conclusive, we test for the presence of a constant only (M2), then, in the absence of both, we consider the model without trend or constant (M1).

Table 3: Descriptive statistics of the variables

	LIDE	LOPEN	LPIB	LRFISC	LX	LDB	LDFISC
Mean	14.50656	4.090851	13.66340	11.98655	12.09507	10.37259	10.19529
Median	14.57538	4.084070	13.66497	12.07326	12.12885	10.62964	10.26276
Maximum	15.01752	4.473497	14.10081	12.43677	12.96831	11.31864	10.54421
Minimum	13.58257	3.831042	13.07532	11.33160	11.33723	9.096387	9.473704
Std. Dev.	0.364620	0.139918	0.329372	0.303887	0.455875	0.646682	0.298846
Skewness	-0.886433	0.561888	-0.382216	-0.871674	-0.040849	-0.435797	-1.270560
Kurtosis	3.453656	4.266448	1.885389	2.832212	2.126970	1.957712	3.557124
Jarque-Bera	2.790713	2.388969	1.522262	2.556180	0.640714	1.538367	5.639735
Probability	0.247745	0.302860	0.467138	0.278569	0.725890	0.463391	0.059614
Sum	290.1311	81.81702	273.2681	239.7310	241.9014	207.4518	203.9058
Sum Sq. Dev.	2.526007	0.371963	2.061226	1.754602	3.948625	7.945760	1.696866
Observations	20	20	20	20	20	20	20

Source: Output Eviews

In cases where a variable is not stationary at its initial level, the ADF test is applied to the first difference. The interpretation is based on a comparison with the critical values from the ADF table: for a model with a trend, the statistic must exceed 3.25, while for a model with a constant only, the threshold is set at 3.59, in both cases with a probability of less than 5%. These thresholds are adapted to a time series of approximately 20 years, close to the statistical reference of 25 periods.

1. Econometric validation of the estimated model:

1.1 The stationarity of the variables:

Different lags caused by the different variables by searching for stationarity in level and first difference, and so on. In this regard, an ARDL-type model requires stationarity in Level I(0) and first difference I(1), and that no variable is stationary in I(2), as shown in the following table:

Table 4: Levels of stationarity

Variable	LIDE	LPIB	LX	LDB	LOPEN	LDFISC	LRFISC
Stationarity level	**I(1)**	**I(1)**	**I(O)**	**I(1)**	**I(1)**	**I(1)**	**I(1)**

Source: Output Eviews

The results of the stationarity test for the variables used in our conceptual model show that they are stationary either at level (LX) or in first difference (the other variables), and none of these variables are stationary in second difference. We can therefore apply the ARDL model proposed by Pesaran, in the form of a single equation.

Consequently, our model is as follows:

$$LIDE = \beta 0 + \beta 1*LPIB + \beta 2*LDFISC + \beta 3*LOPEN + \beta 4*LX$$

Under ARDL, we can rewrite such a model as follows:

$$LIDE = \alpha 1*LIDE(-1) + \alpha 2*LIDE(-2) + \alpha 3*LPIB(-1) + \alpha 4*LPIB(-2) + \alpha 5*LDFISC(-1) + \alpha 6*LDFISC(-2)$$
$$+\alpha 7*LOPEN(-1) + \alpha 8*LOPEN(-2) + A7*LX(-1) + \alpha 8*LX(-2)$$
$$+ \beta 0 + \beta 1*GDP + \beta 2*LDFISC + \beta 3*LOPEN + \beta 4*LX$$

Equating such a model under ARDL will allow us to set the maximum number of lags (2). probabilities below 5% indicate that the βi coefficients are different from zero, whereas a probability above 5% indicates that the βi coefficient is zero, and the variable concerned will not be included in our model to be estimated subsequently, once all the conditions and validation tests have been demonstrated in the short and long term as follows:

1.2 Determining the optimum delays:

The optimal model test in Eviews is verified using several criteria, mainly AIC, as follows:

Figure 2: Estimation of model validation

Model Selection Criteria Table
Dependent Variable: LIDE
Date: 06/02/24 Time: 21:54
Sample: 2003 2022
Included observations: 18

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
13	17.833587	-0.537065	0.105981	-0.448398	1.000000	ARDL(2, 2, 1, 1, 2)
4	18.497035	-0.499671	0.192841	-0.404183	1.000000	ARDL(2, 2, 2, 1, 2)
10	18.121956	-0.457995	0.234516	-0.362507	1.000000	ARDL(2, 2, 1, 2, 2)
1	18.637193	-0.404133	0.337844	-0.301824	1.000000	ARDL(2, 2, 2, 2, 2)
19	15.861471	-0.317941	0.325105	-0.229274	1.000000	ARDL(2, 2, 0, 2, 2)
46	14.568844	-0.285427	0.308154	-0.203580	1.000000	ARDL(2, 1, 0, 2, 2)
37	15.187617	-0.243069	0.399978	-0.154401	1.000000	ARDL(2, 1, 1, 2, 2)
22	13.501870	-0.166874	0.426707	-0.085028	1.000000	ARDL(2, 2, 0, 1, 2)
28	15.361772	-0.151308	0.541203	-0.055820	1.000000	ARDL(2, 1, 2, 2, 2)
31	13.061211	-0.006801	0.636245	0.081866	1.000000	ARDL(2, 1, 2, 1, 2)
7	13.006635	-0.000737	0.642309	0.087930	1.000000	ARDL(2, 2, 2, 0, 2)
47	10.789017	0.023443	0.567559	0.098469	1.000000	ARDL(2, 1, 0, 2, 1)
127	10.159167	0.093426	0.637542	0.168452	1.000000	ARDL(1, 1, 0, 2, 2)
112	11.065109	0.103877	0.697458	0.185724	1.000000	ARDL(1, 1, 2, 1, 2)
38	10.865297	0.126078	0.719659	0.207925	1.000000	ARDL(2, 1, 1, 2, 1)
118	10.862435	0.126396	0.719977	0.208243	1.000000	ARDL(1, 1, 1, 2, 2)
20	10.861944	0.126451	0.720032	0.208297	1.000000	ARDL(2, 2, 0, 2, 1)
40	10.832131	0.129763	0.723344	0.211610	1.000000	ARDL(2, 1, 1, 1, 2)
34	10.782001	0.135333	0.728914	0.217180	1.000000	ARDL(2, 1, 2, 0, 2)

Source: Eviews output

This table presents the validated model estimation. To identify the most appropriate ARDL specification, we use the AIC information criterion. This allows us to select the model that best combines statistical relevance and parsimony, minimising the number of parameters while maintaining robust results. The configurations selected are shown in the table corresponding to the ARDL model with the optimal lags selected.

1.3 The test for the absence of autocorrelation of errors

Checking the autocorrelation of errors shows that all probabilities associated with autocorrelation terms exceed the 5% threshold, indicating no significant autocorrelation between residuals. The model errors can therefore be treated as white noise. Furthermore, all the coefficients in the correlogram remain within the confidence bands, confirming that the residuals do not exhibit any repetitive structure or dependence over time.

Figure 3: The correlogram test

Date: 06/02/24 Time: 21:55
Sample (adjusted): 2005 2022
Q-statistic probabilities adjusted for 2 dynamic regressors

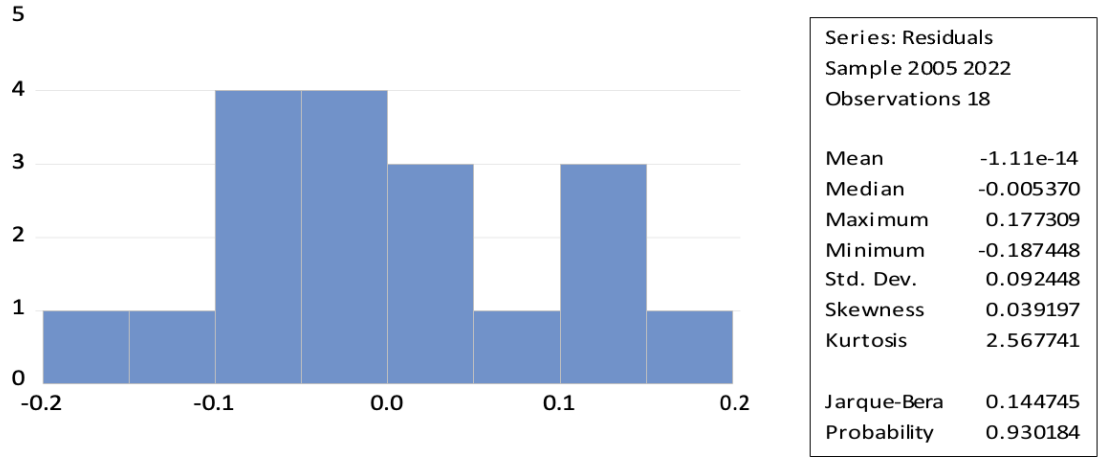
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.**| . |	.**| . |	1	-0.275	-0.275	1.6015	0.206
.**| . |	.***| . |	2	-0.280	-0.385	3.3678	0.186
. |* . |	. *| . |	3	0.147	-0.084	3.8850	0.274
. | . |	. *| . |	4	-0.018	-0.124	3.8932	0.421
.*| . |	.**| . |	5	-0.171	-0.236	4.7015	0.453
. | . |	.**| . |	6	-0.009	-0.257	4.7039	0.582
. |* . |	. *| . |	7	0.152	-0.105	5.4584	0.604
.*| . |	.**| . |	8	-0.167	-0.315	6.4645	0.595
. | . |	.**| . |	9	-0.010	-0.316	6.4682	0.692
. |* . |	.**| . |	10	0.153	-0.321	7.5244	0.675
. |** . |	. | . |	11	0.215	0.062	9.8984	0.540
.**| . |	. *| . |	12	-0.206	-0.090	12.452	0.410

Source: Eviews output

1.4 Normality test:

The histogram of the residuals shows their distribution over the period from 2005 to 2022. It is relatively symmetrical, with no extreme peaks or noticeable flattening. This impression is confirmed by the associated statistics: the skewness is close to zero, indicating a balanced distribution around the mean. The kurtosis, with a value slightly below 3, indicates that the residuals do not show excessive concentration around the mean or frequent extreme values.

Figure 4: The normality test



Source: Eviews output

The Jarque-Bera statistic is very low (0.144), and its associated probability is well above 0.05 (approximately 93%), which means that there is no reason to reject the hypothesis of normality. The residuals can therefore be considered normally distributed. This reinforces the validity of the model used, from the point of view of classical regression assumptions.

1.5 Linearity test:

The linearity of the residuals was examined using the Breusch-Godfrey test, as implemented in EViews. The results show that the probability associated with the F-test is well above the 5% threshold, suggesting that there is no serious correlation between the error terms.

Table 5: The linearity test

F-statistic	**5.057657**	**Prob. F(2,3)**	**0.1094**
Obs*R-squared	**13.88268**	**Prob. Chi-Square(2)**	**0.001**

Source: Eviews Output

In other words, the residuals do not show any apparent non-linear structure, which is a good sign for the model specification. This absence of residual autocorrelation confirms that the relationships estimated in the model do indeed follow a linear dynamic, with no memory or distortion effects on previous periods.

1.6 Test for non-heteroscedasticity of errors:

The ARCH test was used to assess the presence of heteroscedasticity in the model residuals. The results show that the F statistic is relatively low, with an associated probability of nearly 23%. Similarly, the Obs*R-squared statistic is modest, with a probability greater than 20%.

Table 6: The heteroscedasticity test

Heteroskedasticity Test: ARCH			
F-statistic	1.566727	Prob. F (1.15)	0.2299
Obs R-squared	1.607702	Chi-square probability (1)	0.2048

Source: Eviews output

These two indicators lead to the same conclusion: no significant instability in the variance of the errors is detected. In other words, the residuals have a constant variance over time, which complies with one of the fundamental assumptions of classical linear regression.

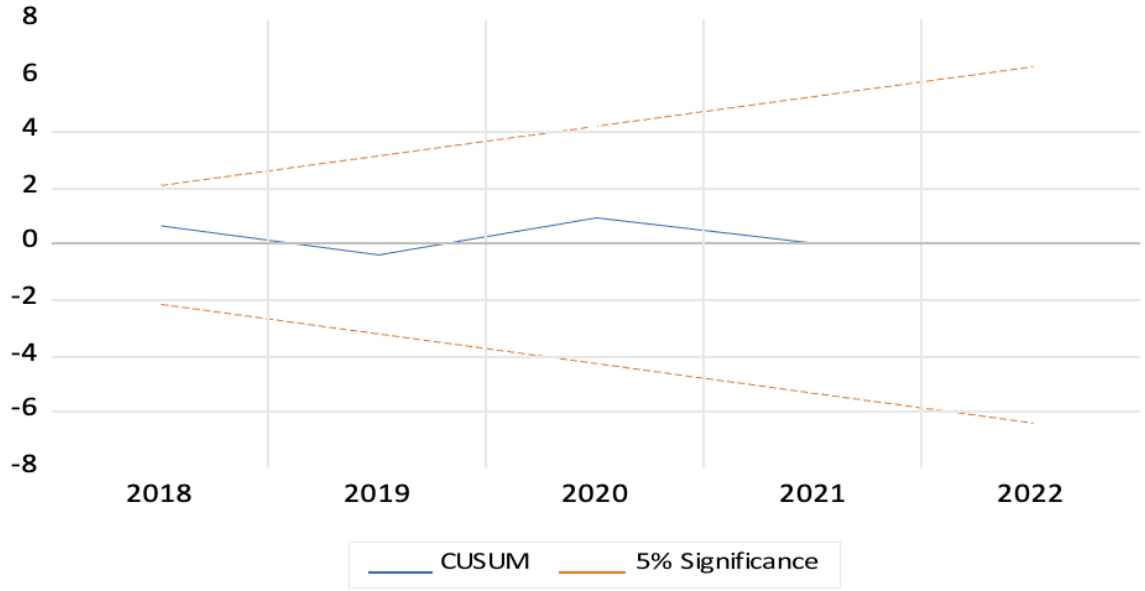
2. Model stability test:

The model stability test in Eviews is verified using the CUSUM and CUSUM-Square tests as follows:

2.1 The model stability test with CUSUM is as follows:

The graph produced by the CUSUM test allows us to assess the stability of the coefficients estimated in the model over the entire period studied. The blue curve, representing the cumulative e evolution of the standardised residuals, remains entirely within the two limit bands corresponding to the 5% confidence interval. This configuration indicates that the model parameters show no signs of breakage or major structural change over time.

Figure 5: Model stability test with CUSUM



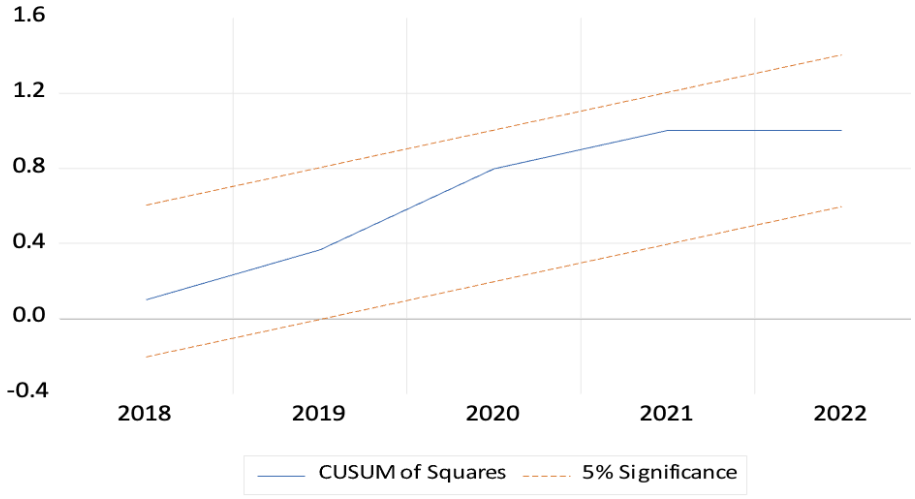
Source: Eviews output

The graph is relatively smooth and shows no sudden deviations or marked instabilities. This reflects the good consistency of the estimated econometric model, with the relationships established between the variables remaining constant throughout the period covered by the sample. The stability of the coefficients is therefore confirmed, which reinforces the reliability of the results obtained and validates the use of the model for interpretation and projection.

2.2 The model stability test with CUSUM-squared is as follows:

The CUSUM of Squares graph allows us to examine the stability of the variance of the coefficients estimated in the model. The blue line traces the cumulative evolution of the square of the residuals, while the dotted lines delimit the critical limits at a threshold of 5%. In this representation, the curve remains within the limits throughout the period, suggesting that there are no significant breaks or structural changes affecting the variance of the estimates. The curve rises gradually, without sudden variations or crossing the bands, confirming that the variance of the coefficients has remained relatively constant over time.

Figure 6: Model stability test with CUSUM-square



Source: Eviews output

The diagram shows that our model (blue curve) lies between the two parallel confidence interval lines (red). At the critical threshold of 5%, our model proves to be stable in the long term. After checking the various tests indicated, we will check the last two tests relating to the bounds test and the test of cointegration or non-cointegration of the different variables in our model in the short and long term as follows:

2.3 Bound test:

The Bound test of the model in Eviews is verified using the F-Statistics value, as follows:

Table 7: test called Bound

ARDL Long Run Form and Bounds Test Dependent Variable: D(LIDE)
Selected Model: ARDL(2, 2, 1, 1, 2)
Case 2: Restricted Constant and No Trend Date: 06/02/24 Time: 21:59
Sample: 2003–2022
Included observations: 18

Conditional Error Correction Regression

Variable	Coefficient	Standard Error	t-Statistic	Prob.
C	55.06684	13.94763	3.948115	0.0109
LIDE(-1)*	-1.657794	0.345845	-4.793460	0.0049
LPIB(-1)	-6.239929	2.783055	-2.242114	0.0750
LOPEN(-1)	-3.104484	2.157351	-1.439026	0.2097
LX(-1)	4.840177	2.095382	2.309926	0.0689
LDFISC(-1)	0.824274	0.676836	1.217834	0.2776
D(LIDE(-1))	0.739034	0.263754	2.801983	0.0379
D(GDP)	1.917014	2.415396	0.793664	0.4634
D(LPIB(-1))	3.514601	1.448792	2.425884	0.0597
D(LOPEN)	-0.273376	1.813863	-0.150715	0.8861
D(LX)	0.669891	1.662319	0.402986	0.7036
D(LDFISC)	-3.201809	1.085822	-2.948742	0.0319
D(LDFISC(-1))	-2.171000	0.682428	-3.181288	0.0245

* p-value incompatible with t-Bounds distribution.

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Standard Error	t-Statistic	Prob.
LPIB	-3.763994	2.096483	-1.795385	0.1325
LOPEN	-1.872659	1.453814	-1.288101	0.2541
LX	2.919648	1.561994	1.869181	0.1205
LDFISC	0.497211	0.456203	1.089889	0.3255
C	33.21693	11.25433	2.951480	0.0318

EC = LIDE - (-3.7640*LPIB -1.8727*LOPEN + 2.9196*LX + 0.4972*LDFISC + 33.2169)

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1) Asymptotic: n=1000
F-statistic	7.842264	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
			Finite Sample:	
Actual Sample Size	18		n=35	
		10%	2.46	3.46
		5%	2.947	4.088
		1%	4,093	5,532
			Finite sample: n=30	
10%			2.525	3.56
5%			3.058	4,223
1%			4.28	5.84

Source: Output Eviews

Since F-Statistics is greater than the upper limits for the different types of samples, we can conclude that there is cointegration of the model variables, whose correction equation is estimated as follows:

EC = LIDE - (-3.7640*LPIB -1.8727*LOPEN + 2.9196*LX + 0.4972*LDFISC + 33.2169)

The error correction equation (EC) expresses the difference between the observed value of foreign direct investment (LIDE) and its theoretical equilibrium level, determined by a set of explanatory variables. There is a negative relationship with GDP (LPIB) and the degree of trade openness (LOPEN), which may reflect a crowding-out effect or local substitution of foreign financing. On the other hand, exports (LX) and fiscal expenditure (LDFISC) have a positive influence, suggesting that a favourable fiscal environment and sustained trade dynamics encourage FDI. The high constant term (33.2169) adjusts the model to capture fixed effects or factors not included in the specification.

2.4 The cointegration test:

The estimated ARDL model explains short-term variations in FDI while incorporating long-term dynamics through the adjustment term. The latter, denoted CointEq(-1), is highly significant and negative (coefficient of -1.657794, $p < 1\%$), confirming the existence of a stable

equilibrium relationship between the variables and indicating a rapid adjustment towards this equilibrium when a deviation is observed. In other words, approximately 166% of the deviation is corrected each period, suggesting a rapid return to the long-term trend. Among the short-term variables, the lagged FDI variable (D(LIDE(-1))) is significant and positive, highlighting inertia in investment flows. GDP (in differentiation) has a positive influence on FDI, especially with a significant lagged effect (D(LPIB(-1))) at 1%, confirming the role of economic growth as a driver of attraction. On the other hand, trade openness (D(LOPEN)) and exports (D(LX)) do not appear to play a significant role in the immediate term.

Table 8: The cointegration test

ARDL Error Correction Regression Dependent Variable: D(LIDE) Selected Model: ARDL(2, 2, 1, 1, 2)
Case 2: Restricted Constant and No Trend Date: 06/02/24 Time: 22:00
Sample: 2003–2022
Included observations: 18

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Standard Error	t-Statistic	Prob.
D(LIDE(-1))	0.739034	0.130357	5.669300	0.0024
D(LPIB)	1.917014	1.029986	1.861204	0.1218
D(LPIB(-1))	3.514601	0.783807	4.484016	0.0065
D(LOPEN)	-0.273376	0.862775	-0.316857	0.7642
D(LX)	0.669891	0.760557	0.880789	0.4188
D(LDFISC)	-3.201809	0.520041	-6.156833	0.0016
D(LDFISC(-1))	-2.171000	0.411005	-5.282178	0.0032
CointEq(-1)*	-1.657794	0.170891	-9.700885	0.0002

R-squared	0.934400	Mean dependent var	0.057067
Adjusted R-squared	0.888480	S.D. dependent var	0.360947
S.E. of regression	0.120537	Akaike information criterion	-1.092621
Sum squared residual	0.145291	Schwarz criterion	-0.696900
Log likelihood	17.83359	Hannan-Quinn criterion	-1.038056
Durbin-Watson stat	2.454173		

* p-value incompatible with t-Bounds distribution.
F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.842264	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Output Eviews

Also noteworthy is the very marked impact of differentiated tax expenditures: D(LDFISC) and D(LDFISC(-1)) have negative and highly significant effects. This could suggest that increases in these expenditures in the short term do not encourage FDI or are perceived as a sign of fiscal imbalance. The high adjusted R^2 (close to 0.89) shows that the model has good explanatory

power, and the absence of autocorrelation (Durbin-Watson ≈ 2.45) confirms the quality of the residuals. The F-Bounds test indicates, with a value of 7.84 (above the critical thresholds), that there is indeed a long-term relationship between the variables.

3. Model estimation:

Following all these tests and demonstrations, we can formalise our specified model as follows:

Table 9: Model estimation

Dependent Variable: LIDE Method: ARDL

Date: 06/02/24 Time: 10:51 Sample (adjusted): 2005 2022

Included observations: 18 after adjustments Maximum dependent lags: 2 (Automatic selection) Model selection method: Akaike information criterion (AIC) Dynamic regressors (2 lags, automatic): LPIB LOPEN LX LDFISC Fixed regressors: C

Number of models evaluated: 162 Selected Model: ARDL(2, 2, 1, 1, 2)

Variable	Coefficient	Standard Error	t-Statistic	Prob.*
LIDE(-1)	0.081239	0.184866	0.439450	0.6787
LIDE(-2)	-0.739034	0.263754	-2.801983	0.0379
LPIB	1.917014	2.415396	0.793664	0.4634
LPIB(-1)	-4.642342	2.260898	-2.053317	0.0952
LPIB(-2)	-3.514601	1.448792	-2.425884	0.0597
LOPEN	-0.273376	1.813863	-0.150715	0.8861
LOPEN(-1)	-2.831108	1.610327	-1.758095	0.1391
LX	0.669891	1.662319	0.402986	0.7036
LX(-1)	4.170286	1.394385	2.990772	0.0304
LDFISC	-3.201809	1.085822	-2.948742	0.0319
LDFISC(-1)	1.855082	0.792200	2.341684	0.0662
LDFISC(-2)	2.171000	0.682428	3.181288	0.0245
C	55.06684	13.94763	3.948115	0.0109

R-squared	0.910540	Mean dependent var	14.55212
Adjusted R-squared	0.695837	S.D. dependent var	0.309087
S.E. of regression	0.170465	Akaike information criterion	-0.537065
Sum squared residual	0.145291	Schwarz criterion	0.105981
Log likelihood	17.83359	Hannan-Quinn criterion	-0.448398
F-statistic	4.240918	Durbin-Watson statistic	2.454173
Prob(F-statistic)	0.060805		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Eviews output

LIDE= -55.06684+ -0.739034* LIDE(-2)+ 4.170286 * LX(-1) + 2.171000* LDFISC(-2) - 3.201809*LDFISC

Each term in the model provides specific information:

- LIDE(-2): The negative coefficient associated with the second lagged value of the IDE (-0.739) indicates that past flows have an inverse influence on current trends. This may reflect a correction phenomenon following a previous peak or a saturation effect of recent investments.
- LX(-1): The positive coefficient on exports with a lag (4.17) suggests that an increase in exports has a favourable impact on FDI with a slight delay. This can be interpreted as a sign that a country's trade dynamism attracts foreign investors in the short term.
- LDFISC: The coefficient on the current variable for tax expenditures is negative (-3.20), indicating that an immediate increase in tax expenditures appears to discourage FDI. This could be explained by a perception of fiscal instability or poorly targeted fiscal policy.
- LDFISC(-2): On the other hand, the positive coefficient on the same variable with a two-period lag (2.17) suggests that these expenditures produce positive effects that are delayed over time, perhaps once the measures take effect or the incentives are better understood by investors.
- Constant (-55.06684): This residual term adjusts the model to capture elements not explained by the variables included.

4. Results and discussion

The ARDL (Auto Regressive Distributed Lag) model was appropriately used in this context, as the explanatory variables exhibit mixed levels of stationarity, with some being integrated of order 0, others of order 1, but none of order 2. This compliance with the preconditions makes the ARDL approach suitable for exploring the short- and long-term relationships between tax expenditures, GDP, trade openness, exports and FDI flows. The choice of the optimal model was based on the Akaike information criterion (AIC), which ensures a balanced specification between the quality of the model fit and the parsimony of the number of parameters. The model results reveal that several variables have a significant influence on foreign direct investment in the short term. Fiscal expenditure, whether observed in the current period or with a slight lag, has negative and statistically significant coefficients. This behaviour suggests that these measures, far from immediately encouraging investment flows, could be perceived as a sign of fiscal uncertainty or instability in economic policy, or even suffer from a lack of clarity or transparency at the time of their implementation. Conversely, exports have a delayed positive effect: after a certain period of time, an increase in exports seems to enhance the country's attractiveness to foreign investors, confirming the idea that dynamic commercial activity acts as a factor of confidence. As regards gross domestic product, its impact becomes significant after a lag of one period, which tends to show that national economic growth is indeed an attractive factor, even if its direct effects are not immediately apparent. Finally, the inertia variable representing the past value of FDI appears to be highly significant and positive, highlighting a phenomenon of continuity in investment flows: these tend to continue once they have started, illustrating a persistence effect common in economic dynamics.

The existence of a stable long-term relationship between the model variables is confirmed by the results of the F-Bounds Test, whose statistic reaches 7.84, a level well above the critical thresholds. This value validates the presence of a cointegration link, suggesting that the variables evolve jointly over time. The analysis of the equilibrium equation provides several

insights. It shows that gross domestic product and the degree of openness have a negative effect on long-term foreign direct investment. While this relationship may seem surprising, it can nevertheless be interpreted as a market saturation effect or a reallocation of capital to emerging economies perceived as more advantageous from a tax perspective. On the other hand, exports and tax expenditures make a positive contribution, which is in line with theoretical approaches emphasising the importance of an attractive tax environment and tangible business opportunities in the strategy of international investors. The adjustment term, which is highly significant and negative, with a coefficient of -1.6577, reflects a rapid correction mechanism in the event of an imbalance. In concrete terms, this means that when FDI deviates from its equilibrium level, more than 160% of this deviation is corrected in the following period, reflecting a rapid return to the long-term trend.

Diagnostic tests applied to the econometric model confirm its robustness and the quality of its adjustment. The distribution of residuals follows a normal distribution, as evidenced by the Jarque-Bera test, whose statistics are not significant. This result confirms the validity of the statistical tests used to assess the significance of the coefficients. Furthermore, no signs of autocorrelation were found, either through the Breusch-Godfrey test or the correlogram analysis, indicating that the errors are independent over time and that the model does not suffer from the omission of important variables. The homoscedasticity hypothesis is also verified using the ARCH test, which does not indicate any abnormal variation in the variance of the residuals over time. Finally, the stability of the coefficients is confirmed by the results of the CUSUM and CUSUM of Squares tests, with the tracking curve remaining within the critical bands at all times. This demonstrates that the model parameters did not undergo any significant break or structural change during the entire period analysed. The ambivalent role of tax expenditures is particularly interesting. While one would expect them to automatically favour FDI, the results indicate that their effect is negative in the short term but positive in the long term. This highlights the importance of the calibration, clarity and stability of tax incentives. A tax regime that is unclear, unstable or excessively costly in the short term can have the opposite effect to that expected, even if it ultimately bears fruit once it has been consolidated and understood by investors. The results also confirm that exports are an important driver of FDI attraction. On the other hand, the effect of the degree of openness is more complex, perhaps because openness is considered insufficient or poorly controlled in certain sectors.

5. Discussion of the results in light of previous work:

Analysis of the results highlights the paradoxical behaviour of tax incentives on the attractiveness of foreign direct investment. Indeed, these measures seem to have a negative effect in the short term, before revealing a positive impact in the longer term. This observation, although surprising at first glance, is echoed in the economic literature, which highlights the complexity of the relationship between fiscal policy and investment flows. First, the work of Benha (2022), as well as the OECD reports (2008), draw attention to the fact that the context in which tax incentives are implemented plays a decisive role in their actual effectiveness. It is not enough to offer tax breaks or exemptions to attract investors. Second, research by De Mooij and Ederveen (2006) shows that the sensitivity of FDI to taxation varies greatly depending on the country, period and sector concerned. In other words, in some contexts, a tax reduction can

lead to a significant inflow of capital, while in others, the effect is almost nil or even negative. This variability helps explain why some seemingly attractive tax policies do not always produce the desired effects. The conclusions of Feld and Heckemeyer (2011) complete this picture by emphasising an often-overlooked aspect: tax incentives are only truly effective when they are part of a solid institutional framework that offers investors guarantees of consistency and continuity. This directly echoes the situation in Morocco, where incentive schemes sometimes lack clarity, coordination or transparency. This lack of visibility can blur the message sent to international investors, mitigating or even negating the positive effects that these incentives could generate in another context.

Although Moroccan exports do not have an immediate effect on foreign direct investment (FDI), they do have a positive influence with a certain time lag. This time lag suggests that the benefits of strong foreign trade performance are not immediate, but rather build up gradually as economic partners, particularly potential investors, observe the consistency and strength of the country's export activity. This observation reinforces the conclusions of previous studies, notably those by UNCTAD (1997) and Levasseur (2002), which showed that a country's trade dynamism plays a structuring role in foreign investors' assessment of risks and opportunities. Indeed, a country that manages to maintain or increase its export volumes sends a clear signal of competitiveness, production capacity and successful integration into global value chains. For multinational companies, this is a tangible indicator of a stable, open market capable of absorbing investment over the long term. Export performance also reflects the culmination of efforts on several fronts, including market diversification, modernisation of logistics infrastructure, and the ability to meet international standards for quality, delivery times and regulatory compliance. These elements are all guarantees sought by investors, particularly those whose business model is based on the export of locally produced goods. GDP is often interpreted as a reflection of a country's economic vitality. It is true that GDP growth attracts the attention of investors looking for dynamic opportunities. But as this growth stabilises at high levels, or as the market reaches a certain degree of maturity, the attraction effect may wane. In other words, an economy where the majority of investment opportunities have already been seized by well-established players may appear less promising for new entrants. This phenomenon, which could be described as a saturation effect, limits the room for manoeuvre for foreign firms, particularly in sectors where competition is already intense or where profit margins are tending to shrink. Lim's (2001) research rightly points out that the impact of openness on FDI flows is not always linear or systematically favourable. In some cases, rapid or poorly managed openness can lead to macroeconomic imbalances, expose the local economy to fierce foreign competition, or harm domestic players who are insufficiently prepared for this integration. These tensions can generate a perception of vulnerability rather than stability, which, paradoxically, encourages investors to be cautious. Furthermore, a largely open economy without efficient logistics infrastructure, a secure legal framework or specific incentives will find it difficult to convert its openness into a sustainable competitive advantage. In his theory of oligopolistic behaviour, Knickerbocker (1973) explains that companies do not make decisions about setting up operations abroad in isolation. On the contrary, they closely observe the movements of their direct competitors. When a firm decides to invest in a given

country, this can be interpreted as a positive signal by other players in the same sector, particularly those who wish to avoid falling behind in a market considered to be promising. This strategic mimicry leads to a form of replication of location decisions, which is reflected in economic statistics by a persistence of FDI flows over time. In the case of Morocco, this means that the waves of investment recorded in previous periods continue to bear fruit today. Each project completed and each successful location reinforces the country's credibility as a destination for foreign investors. This cumulative logic is all the more important given that FDI is often accompanied by networks of partners, subcontractors and suppliers, who in turn may consider setting up in the country to be closer to the principal. Furthermore, the results obtained are fully in line with the analytical framework of the OLI paradigm, proposed by John Dunning in 1977, which remains one of the major references for understanding companies' internationalisation choices. This model is based on three pillars: Ownership, Location and Internalisation. The first pillar, related to the advantages of ownership, refers to what the firm owns: technologies, know-how, brands. However, these advantages are not sufficient to justify setting up abroad if the tax framework of the host country significantly reduces the expected profitability. In this sense, tax policies, particularly incentive schemes, play a direct role in calculating net margins and therefore in the location decision. The second pillar, location, encompasses the specific characteristics of the host country: infrastructure, institutional stability, labour costs, but also the quality of tax governance. A fluctuating, poorly communicated or unclear tax system may discourage investors, even if other conditions are favourable. This reinforces the idea that regulatory clarity and stability are just as essential as the rates themselves.

Conclusion:

The objective of our study was to empirically examine the role of tax incentives in attracting foreign direct investment to Morocco, using econometric modelling based on the ARDL approach, applied to data covering the period 2000–2022. The analysis revealed a significant relationship between tax expenditures and FDI flows, but with different effects depending on the time horizon. In the short term, the results indicate that tax expenditures can have a negative effect, suggesting that their immediate implementation does not necessarily generate sufficient confidence to trigger new investment. This finding may be linked to a lack of clarity, stability or visibility on the tax policies adopted. On the other hand, in the long term, these same expenditures have a positive influence, which tends to confirm that an incentive-based tax environment, when credible and well structured, ultimately has a favourable effect on international investment decisions.

The study also highlighted the importance of other macroeconomic variables, such as exports and GDP growth, in explaining FDI flows. Trade dynamism proved to be a key driver, while the degree of openness had a less expected, even ambiguous, effect, prompting reflection on the quality of trade agreements or market entry regulations. From a methodological point of view, the model proved to be robust: diagnostic tests confirmed the normality of the residuals, the absence of autocorrelation and heteroscedasticity, and the stability of the estimated coefficients. The presence of a rapid adjustment mechanism towards equilibrium, validated by

a significant corrective term, reinforces the consistency of the approach adopted. Tax incentives can play a key role in attracting FDI, but their effectiveness depends heavily on their clarity, consistency over time and how they fit into a broader economic strategy. To maximise their impact, it is essential that these measures be accompanied by clear governance, regulatory stability and a transparent communication policy towards investors. These conditions would enable Morocco to better consolidate its position as a competitive and sustainable investment destination on the international stage.

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