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The reciprocal relationship between foreign direct investment and Morocco's foreign trade

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Abstract

The development of Western and South-East Asian countries has been possible thanks to the massive and diversified FDI received over a very long period, directed towards the innovation and high technology sectors, exporting to foreign markets and thus generating trade surpluses as well as fabulous profits invested locally and elsewhere in search of profitable opportunities. The virtuous circle is then set in motion for the good of the country and its population.

Our study focuses on these two variables, FDI and foreign trade, and their reciprocal relationships. The econometric approach used is the cointegration law method and error correction models (ECM).

The results obtained highlight the following:

- There is no impact of FDI on exports and imports in the short term;

- In the long term, there is a real impact between the two variables.

Keywords: received FDI – Exports – Imports – High Technology – ARV – ECM – Short term – Long term.

Introduction

A thorough and detailed reading of the economic history of the international, industrial, financial and, in particular, geographical economy provides an understanding of the characteristics of globalisation.

This old and new and highly controversial concept is intertwined with development, growth, the migration of people and capital, specialisation, the localisation and delocalisation of activities, the territoriality of firms, the opening up of goods and services markets to trade, governance, the transfer of technological knowledge, the unprecedented development of international logistics and communication and information technologies, the fragmentation of the production process on a global scale, etc.

Among the general characteristics of globalisation (OECD 2005) [1] are foreign direct investment, trade, the internalisation of companies and production, and the localisation strategy of multinational companies.

These aspects have affected all continents, leading to the accelerated expansion of emerging countries, tougher international competition, a new international industrial division, rapid growth in international trade, the deindustrialisation of certain countries, etc.

From the traditional neoclassical model based on specialisation in the trade of goods and products, which was highly controversial given the tensions generated in the distribution of tasks across continents, the economic world has embraced the new paradigm of outsourcing functions and even tasks, with a view to reducing production costs and increasing productivity by exploiting the comparative advantages of FDI host countries.

We are witnessing a wave of acceleration and deceleration in international capital flows and global flows of goods and services.

According to economists, FDI backed by foreign trade is a proven driver of growth and development in countries. FDI is currently at the centre of political, economic and social concerns in countries regardless of their level of development. FDI, a vector for wealth creation for both sending and receiving countries, brings together capital transfers, trade in goods and services, and the democratisation of knowledge and information.

As an integrator of employment, foreign trade, local commerce, growth infrastructure, finance, innovation, etc., FDI is one of the main vectors and a sought-after driver of countries' integration into the global economy.

Highly prized and sought after, FDI offers benefits and advantages for both the originating and host countries, albeit to varying degrees.

FDI migrates in search of lucrative opportunities to promising countries offering the most favourable conditions for investment in terms of abundant labour, low wages, low production costs, good quality human capital, profitability of local sectors and supply of raw materials, country risk, commercial risk, exchange rate risk, interest rate risk, impartiality of the judicial system, soundness of the banking and financial system, exchange regulations, laws, procedures, etc.

Multinational companies (MNCs), in their quest for profit, may be interested in some of these factors, but not all of them, depending on their strategies for establishing themselves in host countries.

In short, host countries for FDI must cultivate their image and global rankings in all factors and determinants of business attractiveness in order to entice investors to set up there.

The countries at the top of the global economic power rankings have earned their reputation and achieved their development, or at least their transition to developed country status, thanks in part to their massive inward and outward FDI flows and their trade surpluses over a period of several decades.

With this in mind, and in line with this, our study focuses on the reciprocal relationships (feedback relationships) between inward FDI and Morocco's foreign trade, which has steadily improved its ranking in the Doing Business index.

Our work therefore examines these two pillars through the following question: "Does FDI boost Morocco's foreign trade?"

The sub-questions that our work will answer are:

- Has FDI mainly boosted exports?
- If so, how much US$ (or %) in export growth does US$1 (or 1%) of FDI generate?
- Has FDI led to an increase or decrease in imports?
- If so, in what proportion?

To answer these questions, we draw on theoretical approaches to FDI and international trade, as well as empirical literature on the subject.

We will then turn to modelling to identify, through equations, positive and/or negative links between the selected variables and FDI, while highlighting significant interactions and those with no impact.

I. Review of theoretical literature

1. Definitions:

It is necessary to present various definitions (OECD 2010) [2] of the terms used in this topic.

"Foreign Direct Investment (FDI) is motivated by the desire of a company resident in one economy (direct investor) to acquire a lasting interest in a company (direct investment company) that is resident in another economy." This investor must hold at least 10% of the voting rights of the company resident in another economy.

A foreign direct investor is an entity resident in one economy that has acquired, directly or indirectly, at least 10% of the voting rights in a company in another economy.

A foreign direct investment enterprise is an enterprise resident in an economy in which an investor resident in another economy holds, directly or indirectly, at least 10% of the voting rights in the case of a company.

A subsidiary is an enterprise in which the investor holds more than 50% of the voting rights.

An associated enterprise is an enterprise in which the investor holds at least 10% and no more than 50% of the voting rights.

2. The multinational firm

Stephen Hymer (1968) [3], in his article The Large Multinational Corporation, explains that the "thing" has several labels, including: Direct Investment, International Business, Large Multinational Company, International Firm, Large Multinational Company, International Corporate Group, Large International Unit, Multinational Corporation, Multinational Firm, Multinational Company, Large Multi-territorial Unit, Multinational Family Group, Giant Company, World Wide Company.

The company may operate autonomously and independently, or it may be linked to one or more other companies either through direct control, companies established or operating in foreign markets, or through indirect control, taking various forms such as the sale of licences, minority shareholdings, agreements or alliances.

The size of the company grows and its profits increase accordingly, thanks in particular to economies of scale, but in return it incurs administrative and management costs as it develops.

The company continues to grow until it reaches an optimal size, at which point demand becomes a constraint and the company is forced to produce for external demand.

Economies of scale at the industry level stem from technology, specialisation, process fragmentation, etc. As for the economies of scale achieved by the firm, they are based on the efficiency of information, organisation, the autonomy of units and their responsiveness to market signals.

In short, thanks to its structures, the company increases its ability to process information, its knowledge of how to organise its activities and its vision to expand its scope of action and its local and foreign markets.

The firm, whether small or large, reduced to a single unit with limited activity and scope, managed like a factory or workshop, has transformed itself into a vast, multi-sector corporation to seize the opportunities offered by the railways in the United States, thus covering several regions; its mode of organisation and structures have undergone multiple and profound changes as a result.

However, the expansion of the firm into new environments is problematic; when importing raw materials from abroad, the firm integrates the foreign producer. It sets up abroad and becomes more independent, freeing itself from the risks of competition and price fluctuations.

In addition to vertical integration, the imperfections of financial markets, market uncertainties and insufficient information all argue in favour of the multinational system and the international integration of companies.

When choosing to establish itself abroad, a multinational company or firm must weigh up the potential host countries based on economic, political, legal, financial and social factors.

The firm's international activities are not based solely on costs and demand, but also on the balance of power with other multinational firms, agreements to share foreign markets, countries, or even regions and continents; cooperation with other firms to share risks, confrontation and aggressive competition against certain firms to gain a foothold in each promising market, in order to establish its foundations, strengthen its competitive position and consolidate its leadership in a given market.

- Stephen Hymer: "The Large Multinational Corporation," Revue économique, vol. 19, no. 6, 1968, pp. 947-973 http//www.persee.fr/doc/reco_0035-2764_1968_num6_19_6_407842

They opt for various strategies in terms of territoriality in their expansion.

- The first strategy is adopted by Western powers that invest in developing countries in search of natural resources that are transformed into finished products to be exported to the FDI's country of origin and/or to other global markets.
- The second strategy, known as the horizontal strategy, consists of setting up in a host country to produce for its local market. This strategy is adopted in the context of cross-investment and intra-industry flows. These investments require an adequate level of development in the host country.
- The third strategy, known as the vertical strategy, concerns North-South investment flows and inter-industry trade. Highly specialised subsidiaries established in host countries, seeking their factor endowments, produce the same products as their parent companies.

2.1. Theories of Foreign Direct Investment

There are many theories dealing with the contours of FDI, starting with the theory or analyses underlying imperfect competition structures and oligopolies, followed by specific, eclectic and synthetic theories.

- Specific Advantage

There are many specific advantages that enable a company to stay ahead of its competitors and be more competitive:

A value chain that is effectively coordinated with those of partners (customers, suppliers, etc.)

Activity management backed by an agile organisation enabling the creation of added value for customers

Cost reductions resulting from economies of scale through innovation, technology, etc.

A range of flagship products at BCG

A range of differentiated products that are appreciated and genuinely valued by customers for their distinctive features, etc.

On this point, we cite Stephan Hymer (1960), who emphasises the need for companies wishing to establish themselves abroad to have or possess specific assets and advantages over their competitors. These advantages should offset the costs of moving abroad.

On the same subject, we also cite Vernon Raymond (1966), whose theory deals with the impact of innovations in the United States coupled with corporate strategies during the stages of the international product life cycle or the international production life cycle.

The high standard of living of Americans allows companies that take advantage of their competitive position to make high profits as a result of strong growth in demand for the new product created.

Subsequently, domestic demand for the product continues to grow, but at a slower rate than its results.

The supply of the product also increases in line with high production capacities; the company is therefore forced to sell its production in foreign markets, which it had to penetrate through exports. With the emergence of competing products and declining demand, and in order to mitigate the risk of disappearing from the local market, the company seeks to internationalise by relocating to countries with lower wages (Europe) than those in the United States.

The company is still searching for a solution, considering a second relocation to developing countries once demand has become widespread following product standardisation and strong competition from local (European) producers.

This theory explains and identifies the trigger for the firm's entry into foreign markets in response to threats from competitors seeking to erode its market share.

- The "OLI" paradigm or eclectic theory

This theory by John Harry Dunning is based on a three-pronged analysis of the firm, the sector and the country, combining the specific advantages of each of the three.

First, the internationalisation of the firm is achieved either through export, licensing or import into a host country.

Second, access to resources, innovation, economies of scale and supplies are advantages specific to the sector.

The availability of production factors, the system and investment incentives are advantages linked to the location relative to the country.

Thus, a firm that possesses all three components of the OLI paradigm should establish itself abroad.

With only two components, namely specific and international advantages (OI), it is in the firm's interest to engage in exporting.

However, with only the specific advantage, the firm should sell its patent.

- Jean Louis Mucchielli's synthetic approach

The economist Mucchielli reasons in terms of the firm's competitive advantages and the country's comparative advantages, while integrating industry as a level of analysis.

At this level, Mucchielli introduces two factors to measure the firm's competitive advantage in terms of factor demand and product supply, and then two other factors to assess the country's comparative advantage, with reference to factor supply and demand for the firm's product.

There are many combinations:

- Synthetic Approach, Competitive advantages vs Comparative Advantages

Competitive Advantages			Comparative Advantages		Strategy Adopted
Number	**Demand for factors**	**Product Supply**	**Supply of Factors**	**Demand for products**	
(1)	+	+	-	-	FDI/outgoing
(2)	+	+	-	+	FDI/re-imports
(3)	+	+	+	-	Export
(4)	-	-	+	+	FDI/inflow
(5)	-	-	-	+	Import
(6)	-	-	+	-	IDE/Re-export

For example:

- A country with low-cost production factors and a large market would encourage foreign firms to invest there (1).
- A country with disadvantages in terms of production factors would encourage the firm to set up abroad to invest there, in search of lower costs, produce and re-import to its country of origin (2).
- The firm establishes itself in a host country to benefit from its advantages by setting up production subsidiaries to penetrate the host country's market (4).
- The firm establishes itself in a host country to take full advantage of the factors on offer, produce and re-export to its local market (investor country) (6).

2.2. Theories of international trade

From ancient times to the present day, international trade, as old as humanity itself, has always served mankind, from Sumer to the present day. There were many trade routes, both land and sea, connecting kingdoms, empires and states. The great geographical discoveries, underpinned by advances in maritime navigation, were at the origin of the transformation and boom in international trade.

The Netherlands invented mercantile and financial capitalism in the 17th century, combining trade (the Dutch East India Company, considered the first multinational in 1602) with finance (the Bank of Amsterdam, founded in 1609).

English capitalism, combining free trade with specialisation, developed cotton industries in England, while specialising its colonies in various products by country, such as tea, poppies, indigo, cotton, etc. Trade flourished as far as possible and was enriched by new products, made available and accessible to distant states thousands of kilometres away.

In contrast to English free-trade capitalism, American capitalism displays a latent protectionism driven by technological innovation.

Today's economic landscape is different, with the centre of gravity shifting from the West to Asia and emerging or transitioning economies, the world of the BRICS (Brazil, Russia, India, China and South Africa).

The internationalisation of production, a consequence of the new global division of production and markets, has further boosted international trade.

Below we outline the main theories of international trade:

A central theory in economic thought from the late 16th to the mid-18th century, mercantilism has some well-known characteristics: wealth is essentially materialised through hoarding and the accumulation of precious metals (gold, silver, etc.) through the organisation of foreign trade, achieved by:

- Encouraging industry by importing raw materials at low prices.
- Taxing imports of manufactured goods to protect local industry.
- Stimulating exports of finished industrial products.
- Population growth beneficial for keeping wages low.

The essence of this vision is that the country benefits from a trade surplus, which is the source of its prosperity. The influx of wealth into England enabled it to repay its foreign debt in full, balance its budget and invest abroad first. These ideas gave rise to a society driven by the pursuit of wealth.

David Hume's book "Of the Balance of Trade", published in 1758, before Adam Smith's "The Wealth of Nations", published in 1778, a true economic model, is considered by economists to be the first true economic model.

Both economists deal with international trade and the wealth generated by exchange.

Adam Smith set out the principle of absolute advantage in terms of production costs. Indeed, it is in a country's interest to import a given good if its domestic production is more expensive than its price/cost on the foreign market. It is in the country's interest to export another good that it produces at a low cost, which is lower than its production cost in other countries. This thesis is based on the principle of the division of labour within each nation, specialising in the production of goods at the lowest possible cost.

David Ricardo was the first economist to advocate a theory of international trade based on the relative immobility of capital between nations. In his book "On the Principles of Political Economy and Taxation", published in 1847, Ricardo sets out his theory of comparative costs and demonstrates the advantages of the international division of labour. Common sense dictates that international trade can only result in gains for some nations and losses for others, given the differences in economic and technological power between countries.

The fundamental, controversial and innovative concept of comparative advantage reflects the benefits of international trade and specialisation for all countries [4].

Ricardo uses the relationship between trade and labour to explain the law of comparative advantage, demonstrating that openness to the outside world is beneficial to all countries, regardless of their level of development. Ricardo considered labour to be the sole factor of production. Differences in

labour productivity are the source of the comparative advantages that a country can exploit through cross-trade with other countries.

David Ricardo advocates the superiority of free trade over autarky. He argues that, provided each producer specialises in the production of a good where they have the greatest advantage or the least disadvantage, this exchange benefits both countries.

All economic literature after Adam Smith dealing with the same theme was essentially based on discourse, then shifted towards logic, empirical analysis and, above all, modelling using mathematics according to economic schools of thought.

The so-called specific factor model was developed by Paul Samuelson and Ronald W. Jones. Paul Krugman et al. explain this model using three factors, one of which is mobile (labour), while the other two are said to be specific (capital and land) because their movement from one sector to another is not instantaneous, or even difficult.

As prices are determined by global supply and demand, countries export products whose relative price has increased significantly and import goods whose price has fallen. *"International trade increases the income of the factor linked to the production of the exported good but harms the specific factor used for the production of the good competing with imports* [5]*."*

Elie Heekscher and Bertil Ohlin emphasised the mobility of all factors from one sector to another, and the relative abundance of production factors and technology in terms of the intensity of factors integrated into manufactured products and goods.

Their model, known as the "Theory of Factor Proportions" or "factor model", was further formalised by Paul Samuelson and subsequently named the HOS model.

With abundant endowments of production factors relative to each other, a country with a relatively large amount of labour compared to capital gains, for example, from producing clothing; the other country with a low labour/capital ratio has an interest in producing manufactured goods.

In fact, a country with a low labour endowment can take advantage of the abundant labour force in other countries not through immigration, but by importing labour-intensive goods, which is therefore an export of the labour services contained in the goods by the other country.

Michael Vivian Posner argues that new processes or products enable innovative countries to become exporters regardless of their factor endowments. Substantial R&D budgets drive growth and development and are a determining factor in export performance.

This theory of the technological gap has been expanded upon by R. Vernon's theory of the international product cycle, which argues that countries with access to scientific knowledge that they have been able to transform into innovative products are in great need of a large, promising consumer market. During the launch phase, the first models of a product are purchased by wealthy American consumers (high income). Once production of the product is automated, its costs fall, as do its selling prices, and the product is consumed by middle-income groups.

American capital will be invested in subsidiaries in developing countries, as the product will be in decline in the United States. The product is then exported to European consumers, and American capital will be invested in Europe to circumvent all tariff and non-tariff barriers and to benefit from the difference between European and American labour costs.

Internal economies of scale are achieved when a firm's production and efficiency increase, leading to lower costs. They benefit large companies that gain market share at the expense of small firms in imperfect competition. External economies of scale are due to exogenous variables (sustained demand, market size) and benefit small firms in perfect competition.

International openness and the resulting competition will cause firms with high production costs ( ) to disappear, while those with medium or low costs ( ) will trade in both directions, and consumers in partner countries will benefit from low market prices, if and only if firms apply low prices as a result of low production costs. An agreement between firms would lead to high prices and the resulting margins would benefit companies rather than consumers.

Products are evaluated by consumers according to their external characteristics (vertical differentiation), but diversity of tastes leads to the production of different product models (horizontal differentiation). Consumers purchase goods from abroad instead of those available on the local market, which leads to cross-trade between countries as a result of differences in demand or differentiated demand.

B. Linder believes that cross-trade is based on consumer demand and purchasing behaviour rather than on production factors. Firms tend to specialise in a particular variety if consumers are very satisfied with the many varieties of products available; in this case, international trade generates benefits for all consumers. In a situation of monopolistic competition, a country may export one good and import

another; this is inter-industry trade, which reflects comparative advantage. A country may export and import the same good; this is intra-industry trade, which highlights the gain in variety for consumers and the gain in economies of scale for businesses.

Intra-industry trade has become increasingly important in cross-trade. This thesis is confirmed by Marius Brulhart in his work based on the Grubel and Lloyd indicator.

$$G.L= (1-\frac{exportations\ i,j,k-importations\ i,j,k}{exportations\ i,j,k+imporations\ i,jk}) \times 100$$

(K = a good; j = importing country; i = exporting country)

Market size is certainly important in international trade, but ancillary costs related to logistics, sales and finance make exporting a delicate operation.

The most productive companies can bear these ancillary costs, while the least efficient would give up on exporting.

The former may opt for discriminatory pricing, with domestic prices differing from export prices, either higher or lower, depending on the market penetration strategy of the companies.

II. The interactions of FDI

1. General information on FDI

Foreign direct investment is an ancient phenomenon dating back to the Sumerian era. In order to develop foreign trade with their Egyptian, Sassanid and Ethiopian counterparts, Sumerian merchants set up trading posts outside their borders to sell their handicrafts, minerals and agricultural products.

Over the centuries, these trading posts evolved into multinational companies, the first of which was created in 1602 under the name East India Company.

The capital market has grown to phenomenal proportions over time. The destinations of FDI flows have undergone significant changes.

Europe and the United States, as recipients of FDI, gained ground on developing countries in the 1990s.

FDI has undergone significant changes on a global scale since 1992.

The marginalised southern Mediterranean region has attracted less FDI than other developing regions, such as Asia, Latin America and Central and Eastern Europe (CEECs).

FDI in Mediterranean countries in the 1980s rose from €3.99 billion in 1994 to €13.9 billion in 2001, a 3.5-fold increase, but still represents only 0.35% of Europe's FDI stocks invested abroad.

FDI in CEECs increased eightfold, from €10.8 billion to €89.7 billion between 1994 and 2001 (Avallone 2006) [6].

However, transition and emerging countries received nearly 60% of global FDI in 2014 [7].

In terms of ranking, China became the leading destination for FDI in 2014 with USD 129 billion, ahead of the United States, which received only USD 92 billion. (UNCTAD) [8].

The global indicators for FDI and international production in 2014, in billions of US dollars, are colossal [9]:

- Inward FDI: 1,228 - Outward FDI: 1,345
- Domestic FDI stock: 26,039 - External FDI stock: 25,875
- Turnover of foreign subsidiaries: 36,356
- Their added value: 7,882 - Their exports: 7,803
- Workforce: 75,075 (, in thousands) - Total assets: 102,040

2. FDI and the economy:

Companies invest in different foreign environments thanks to technological advances in communications, information processing and transport, especially maritime transport. The trend is towards fragmentation of international production within multinational firms.

The number of international firms worldwide rose to 83,000 with 800,000 subsidiaries in 2017, compared to 50,000 parent companies controlling 450,000 subsidiaries in 1998.

The relationship between local investment and foreign investment is highly complex; countries' budgetary, fiscal and debt constraints, among others, encourage companies to invest abroad rather than in their countries of origin. The host country, for its part, may crowd out local investment in favour of **FDI** inflows. However, local companies may invest locally to seize the opportunities offered by incoming **FDI** in terms of knowledge, technology, training, etc.

In this context, incoming **FDI**, which is highly prized on a global scale, leads to increased competition between host countries.

The countries benefiting from **FDI** are generally developing countries that have significant trade flows with developed countries (Helpmann 1995). However, technology remains concentrated at the level of parent companies, with subsidiaries using much more advanced technologies than companies in the host country, which take advantage of this to upgrade their processes and production equipment.

The dissemination of more effective management standards, the training of large numbers of highly skilled personnel,

quality human capital management and high-quality infrastructure backed by sophisticated means of communication are the horizontal benefits of inward **FDI** for the host country.

Vertical spillovers and benefits stem from the subsidiaries' need for efficient suppliers, hence the need for local upstream and downstream investment to market their products, thereby supporting technological progress in the host country.

The increase in the territoriality or scale of companies' operations is achieved through outward FDI, especially for the amortisation of R&D and innovation costs. Such FDI thus stimulates economic growth in the host country.

3. The links between FDI and trade:

The identification of links between **FDI** and trade can be extrapolated at the company, country and sector (or industry) levels. Each level has advantages and disadvantages. There are multiple angles from which to study these links at the levels of **FDI** issuance or receipt.

Exporting companies that choose to invest abroad and produce for the local market create detrimental consequences for the investing country in terms of employment and production. In this specific case, **FDI** is considered a substitute for trade. However, **FDI** can be considered complementary to trade if it improves competitiveness in the host country and, as a subsidiary, imports products and inputs, thereby increasing trade between the two countries (**FDI** sender and recipient).

The subsidiary established in the host country would replace or substitute its imports with local purchases of intermediate goods and inputs, thereby improving the host country's trade balance, employment and production. However, if **FDI** leads to the importation of intermediate goods and/, this would weaken the host country's balance of trade. Nevertheless, in the long term, the host country benefits from technology and management transfer, thereby improving the competitiveness of the **FDI** recipient country. The investing company can increase its market share in the host country and/or in the investing country.

Specialised companies, within the framework of vertical integration, exchange intermediate products; as they are complementary, trade between them is limited. Subsidiaries located in the host country, producing the same goods as the parent company, find themselves in competition with each other; the subsidiary's local sales compete with the parent company's exports for the same product.

The situation changes if the subsidiary produces/manufactures a part or a range of products for the parent company; the assembly of the finished product at the parent company's premises motivates the importation of the various parts, which can weaken the trade balance of the investing country.

4. FDI and global exports:

Globalisation processes, through the links between FDI and FIC, have changed the architecture of foreign trade.

Relations between FDI and trade/exports in terms of growth.

Year	FDI	% growth	Exports of goods and services	% growth
2000	1,300	-----	7,600	-------
2010	1,240	-5	18,900	+149
2019	1,500	+21	24,310	+29
2020	1,000	-33	22,000	-10
2021	1,580	+58	28,500	+42

Compiled by the author (USD billion)

- Global output rose from USD 10.5 trillion in 1980 to nearly USD 32 trillion in 2002.
- Merchandise exports increased from USD 2 trillion to USD 6.4 trillion between 1980 and 2002, and to USD 19.48 trillion in 2018.
- FDI stock also increased over the same period (1980-2002) from less than 700 billion to 7.1 trillion (UNCTAD database).
- Inward and outward FDI stocks of USD 2.20 and USD 2.25 trillion rose to USD 31.52 and USD 30.84 trillion respectively in 2017 (UNCTAD 2018, World Investment Report).

Global **FDI** peaked in 2007 at USD 1.83 trillion, while trade peaked in 2021 and is expected to reach a record USD 32 trillion by the end of 2022, according to UNCTAD [10].

There are several observations:

- Intra-firm trade is growing year on year (vertical integration)
- Intermediate goods and finished products are manufactured efficiently where production costs are lowest.
- Intra-industry trade is booming across the entire international trade sector.
- Competitiveness, a source of profit for businesses, draws its benefits from various sources, such as technology, continuing education, innovation, and

R&D, with the aim of ensuring responsiveness and speed in meeting customer expectations.

In 1996, at the ministerial conference held in Singapore, a **WTO** working group was set up to examine the links between trade and **FDI**.

The group submitted its report to the **WTO** in 1998 and invited researchers to also include other elements and external factors (technology transfer, etc.).

III. Review of empirical studies.

Economists James R. Markusen (1984) and Elhanan Helpman (1984) presented models explaining and clarifying the reasons why multinational firms adapt their strategies for investing in host countries, differentiating between horizontal and vertical **FDI**.

There are many incentives, including:

- Accessing markets at lower cost
- Avoiding customs duties
- Avoiding transport costs
- Having subsidiaries produce the same goods as the parent company

Economists have argued that horizontal FDI would replace trade on the one hand, and that the free movement of goods with trade liberalisation, underpinned by trade agreements and backed by reductions in taxes and customs duties, would reduce inward FDI on the other. At the same time, the size and growth of the markets in the host country are important factors that are taken into account when choosing the host country.

Helpman opts for the fragmentation of a firm's activities in order to exploit all the differences in the endowments and remuneration of production factors (very low wages, abundant labour, skills, etc.). He predicted the distribution of stages of production across different industrialised and developing countries, and the complementarity between FDI and trade.

David Carr, James Markusen and Keith Maskus (2001), after testing the hypotheses of Markusen's theoretical model with reference to the different motivations for FDI, published the main results below:

- The size of the economy of the FDI recipient country is important both for local consumption and for exports to other external markets.
- The host country of the FDI, with its abundant skilled labour, motivates the multinational firm to produce for the local market; conversely, if this resource is scarce, the international firm opts for export.
- An increase in sales by subsidiaries in both directions (on both sides) occurs when GDP converges between the FDI-sending and FDI-receiving countries.

The study by Ainzeman Joshua and Noy Ilan (2005) sought to identify the nature of the causal links between FDI and trade, based on a sample of 81 countries, including 21 developed countries. They concluded that the link between FDI and trade is positive and significant for a given percentage of developing countries, but positive and insignificant for developed countries.

The work of Bigglaiser, G and De Rouen.K (2006) concerned the effect of economic reforms on FDI. The authors explained the surge in FDI in Latin America by trade liberalisation and reform of the local financial system.

Cuadros, Ana, Orts, Vicente and Alguacil, Maria, Teresa (2001) examined the relationship between FDI and trade and concluded that there is a complementary relationship for Mexico and a substitution relationship for Brazil (an increase in exports would have a negative impact on FDI).

In short, studies sometimes produce contradictory results. They should therefore incorporate other variables to be tested in order to identify relevant and proven links between trade and FDI.

Markusen (1997-2002), the father of the "knowledge-capital model", based his theory on the importance of knowledge, expertise and skilled human capital within a firm, generating economies of scale, such as research and development in management, finance, marketing, science and technology, etc.

The hypotheses put forward revolve around:

- Fragmentation, in the sense that the parent company can provide its knowledge assets to subsidiaries abroad.
- These assets are highly intensive in skilled labour.
- Knowledge assets serve all units and subsidiaries where the need arises, without being reduced for certain factories or units.

It appears that firms are encouraged to locate in countries with an abundant supply of skilled labour, or in countries where unskilled labour is cheap (low wages).

Ultimately, according to this logic, trade liberalisation would render horizontal FDI unnecessary (substitution effect) on the one hand. On the other hand, trade develops further with vertical FDI flows, which stimulate the import of inputs and intermediate goods and the export of final products.

Lipsey, R.E and Weiss, M.E (1981-1984) found that US FDI had a positive impact on US exports on the one hand, and that

there was a correlation between the production of subsidiaries and the exports of the parent company on the other.

Sachs J.D and Shartz H.D (1994) concluded that "a 10% increase in the share of bilateral trade within companies leads to a 40% increase in trade with the country in question".

FDI can encourage other local companies to export through spillover effects and technology transfers, increased competition and improved competitiveness in the industry or sector.

FDI flows and trade flows are assessed in relation to the per capita income of the partner country on the one hand, and outward FDI has a positive link with exports and imports on the other, according to economists Eaton.J and Tamura.A (1994) in a study on the relationship between FDI and trade between Japan and the United States, however, the causal links are not equally strong in both directions.

There are eight links between outward and inward FDI and imports and exports (OECD 1998):

- Exports can generate FDI outflows (1) as well as trigger FDI inflows (2).
- Imports can trigger FDI outflows (3) as well as FDI inflows (4).
- Outward FDI causes imports (5) and generates exports (6).
- Inbound FDI creates imports (7) and causes exports (8).

However, it is possible to detect a single causal link between one of the components of trade (imports or exports) and one of the types of FDI (inflows or outflows) in a macroeconomic study of a given country.

The OECD's (1998) analysis of the causal links between FDI and trade revealed the following findings:

- Before 1985, in many countries, trade was the source of FDI.
- After 1985, FDI led to an increase in trade, in the sense that exports triggered FDI.

These findings were not detected in all countries. Ultimately, every dollar invested abroad generates an additional $2 in exports, the OECD concludes.

Other empirical studies examining the direct and indirect impacts and relationships of FDI on foreign trade include:

- Chédor and Mucchielli (1998): Substitution effect at the microeconomic level

- Fontagné and Pajot (1999): Overall relationship of complementarity between French firms' foreign investment and their exports

- Closing (2000): Complementarity in the case of intra-firm trade.

- Chiappini, (2013): contradictory results

- Shaker (2015): Reciprocal relationships between FDI and exports

- Tayara (2016): Complementarity at the most aggregate level, substitutability and complementarity at the most disaggregated level according to country groups.

IV. Foreign Direct Investment in Morocco

The globally mobile FDI market is becoming increasingly competitive and complex, with demand becoming very strong in most countries, including developed countries. However, supply is almost stagnant due to risks, the discontinuous business environment and changing strategies in the investment process.

In Morocco (OECD) [11], FDI flows reached a high level in 2014 of USD 3.5 billion; in 2015, they were only USD 3.3 billion and USD 2.3 billion in 2016, representing declines of 8% and 29% respectively. Despite this decline, FDI flows are on an upward trend, increasing by 11% annually since 2010.

The ratio of FDI flows to GDP, which has remained relatively stable since 2011, has been only 3% since 2011. Outward FDI flows reached their highest level since 2007, at USD 657 million in 2015. Morocco is the fifth largest international investor in the MENA region, the second largest African investor on the African continent and the largest African investor in West Africa.

While outbound FDI flows are dominated by equity investments, inbound FDI flows to Morocco are channelled towards inter-company operations.

The countries sending FDI to Morocco in 2015 were France, the United Arab Emirates and the United States. France's share of total inflows fell from 58.4% in 2010 to 22.6% in 2015. The UAE peaked at 24.3% in 2012, while the US share followed an upward trend, rising from 1.8% in 2010 to 10.7% in 2015. The sectors that benefited in 2015, prized by foreign investors, were real estate services at 27%, followed by manufacturing at 22% (food, automotive, etc.).

Inbound FDI stock in Morocco amounted to USD 55 million in 2016, compared to only USD 21 million in 2005, or 52% of GDP, making Morocco the third largest host country for FDI in the MENA region with 11% of the total. Morocco's stock

of outward FDI, estimated at USD 0.7 billion in 2005, increased to USD 5.2 billion in 2016 (representing 5% of GDP), ranking Morocco fifth among countries in the MENA region with 4% of the region's total stock of outward FDI.

Inbound FDI positions in Morocco reflect a sharp decline for France, whose position fell from 73.4% of total FDI stock in 2009 to 39.6% in 2015, on the one hand, and a sustained increase in the FDI position of the UAE, which rose from 2.5% in 2009 to 31.7% in 2016.

FDI income received by Moroccan companies from their foreign subsidiaries grew to USD 250 million over the period 2014-2016, compared to USD 80 million in 2010 and USD 175 million on average between 2001 and 2013. The average rate of return on FDI outflows from Morocco is around 6.4%.

Revenue transfers from FDI by Moroccan subsidiaries to their parent companies abroad fell from USD 2.2 billion in 2014 to USD 1.4 billion and USD 1.5 billion in 2015 and 2016, respectively. The rate of return on FDI inflows to Morocco is only 3.3%. It should be noted that of the USD 20.7 million in FDI received by Morocco between 1998 and 2010, USD 6.4 million related to privatisation operations.

These foreign investments linked to the privatisation process [12] were directed towards the industrial, telecommunications, tourism and energy sectors, as well as the financial sector. At the end of 2006, foreign investment in company acquisitions as part of privatisation was led by France with 60.90% of Maroc Telecom by Vivendi Universal and Régie des Tabacs by Atlandis, followed by Spain with 13.5%.

Industry accounted for 75% of total privatisation revenues from FDI between 1993 and 2003, as in the case of SONASID, CIOR and Régie des Tabacs. Banking institutions s (BMCE) and holding companies (SNI) received FDI between 1994 and 1997 representing 55% of total FDI. The services sector saw a significant flow of FDI, as in the case of the Dunes d'Or (Fram) and Malabata (Saudi company Malabata International) hotels.

The energy, mining and oil sector, with operations at Samir and Société Chérifienne des Pétroles (SCP) sold to the CORRAL group, accounted for 29% of total FDI during the period 1996-1998.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
FDI flows to Morocco in millions of USD	1,671	2,461	2,826	2,466	1970	1241	2521	2842	3361	3525	3253	2318
FDI flows to Morocco as a percentage of GDP	2.7	3.6	3.6	2.7	2.1	1.3	2.5	2.9	3.1	3.6	3.6	8.2
Outward FDI flows from Morocco in millions of USD	74	451	632	316	479	580	248	360	445	431	657	636
Total positions of inward FDI participation Loans	20,752 19,014 1735	29,939 28,214 1725	38,613 36,531 2082	39,388 37,348 2041	42,581 40,750 1831	45,082 43,428 1653	44,516 42,494 2022	45,620 42,798 2823	51,816 48,730 3086	51,192 48,049 3143	49,671 45,803 3,868	54,784 50,451 4333
Total positions of outgoing foreign direct investment Equity investments Loans	666 535 131	1,054 984 70	1337 1246 91	1669 1552 147	1861 1799 62	1914 1854 60	2019 1894 125	2175 2014 161	2,555 2173 382	4187 3808 379	4557 4000 501	5203 4739 463

In terms of investor participation, Samba Finance, Morgan Stanley, Morgan Grenfell, Quantum Emerging Growth Fund, Morocco Fund, Banque Pictet, Merrill Lynch, Framlington, BNP Paris, and Maghreb Fund are worth mentioning; other groups have invested in the context of privatisation, such as Total, Renault, Dragofina, etc.

These privatisation operations by incoming FDI have generated further FDI for the renovation, expansion, modernisation and improvement of procedures and management systems in privatised companies.

V. Morocco's foreign trade:

- Morocco's openness to the world dates back a long way and has become more diverse with the treaties and agreements on diplomatic, commercial and financial cooperation signed by the sovereigns of Morocco with the powers of past eras.

- From the 11th century onwards, Morocco turned inwards and only began to open up to Africa in the 16th century, thanks to the construction of the new port of Essaouira and the restoration of other ports on the Atlantic coast. A proponent of soft power, Morocco continued to open up to the rest of the world during the 20th and 21st centuries.

- As a reminder, Morocco is a signatory to all WTO multilateral agreements on international trade. Morocco has various preferential or free trade agreements with the European Union, the Arab economic world (GAFTA or GZALE), the Agadir Agreement, Turkey, the United States, Africa with more than 1,000 agreements, Southeast Asian countries, China and India, Latin American countries including Brazil, which has become Morocco's third largest trading partner, etc

- Morocco's foreign trade accounted for 87% of its GDP in 2019, compared to 80.9% in 2016 (according to the World Bank) [13]. Exports of goods and services as a percentage of GDP increased from 35.4% in 2016 to 39.1% in 2019. Imports of goods and services as a percentage of GDP rose to 48% in 2019, compared to 45.5% in 2016.

- Between 1990 and 2012, Moroccan exports increased by only 406%, compared with a growth rate of 1,509% for all middle- and low-income countries.

- They increased by an average of 16% per year over the period 1981-1990, 5% between 1975 and 1993, 9% over the decade 1992-2002 and 8% between 2003 and 2013.

- Moroccan imports, by comparison, increased by 547%, leading to a deterioration in the trade balance, with the trade deficit worsening from USD 2.7 billion to USD 23.3 billion.

- They rose by an average of 14.6% per annum over the period 1981-1990, compared with 7.7% between 1992 and 2002 and 11% between 2003 and 2013.

- The trade deficit widened year on year from MAD 44 million in 2001 to MAD 52 million in 2003, MAD 97.9 million in 2006 and MAD 195 million in 2013, representing 22% of GDP compared with 8% of GDP at the beginning of the 1990s.

- The coverage rate declined accordingly from 64.6% in 2001 to 61% in 2003, 53.3% in 2006 and 49% in 2013.

VI. EMPIRICAL STUDY

1-Description of variables

In our study, we will attempt to model the impact of FDI on Moroccan exports and imports. To this end, we first selected the variables. The variables used in our study are:

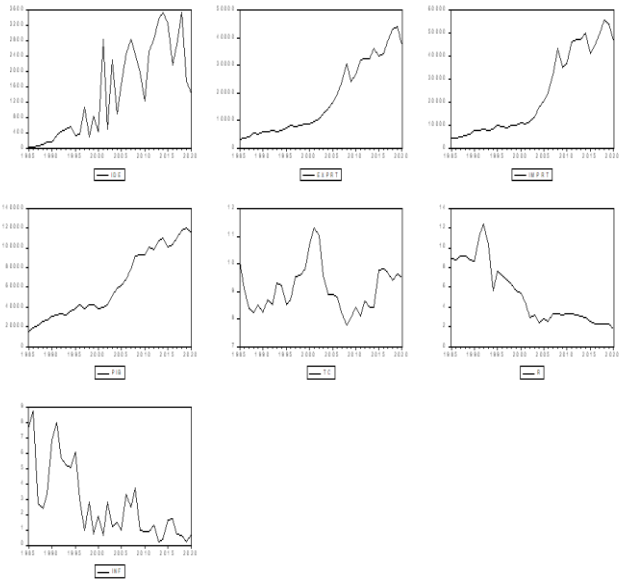
- FDI: foreign direct investment
- Exprt: exports
- Imprt: imports
- GDP: gross domestic product
- TC: the exchange rate between the dirham and the US dollar
- R: money market interest rate
- Inf: inflation rate

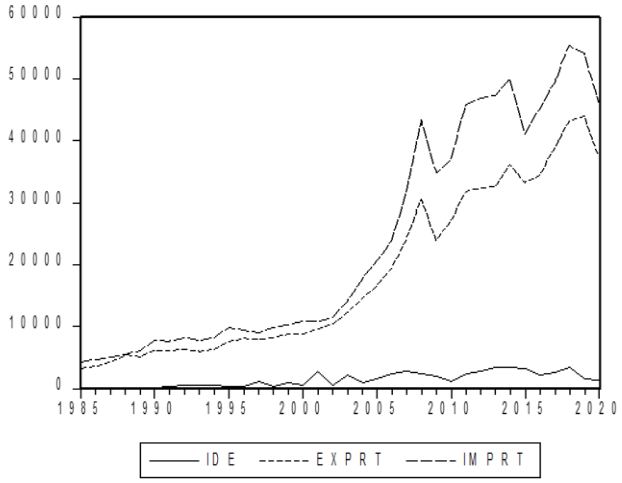
The study covers the period from 1985 to 2020. The data source is the World Bank and Bank Al Maghrib database and is presented in the following table.

Table 1: Data used in the empirical study

Année	IDE	Exprt	Imprt	PIB	TC	R	INF
1985	20	3 145	4 344	14 991	10,06249417	8,93	0,077
1986	1	3 561	4 637	19 462	9,104441666	8,72	0,087
1987	60	4 177	5 005	21 765	8,359225	9,17	0,027
1988	85	5 388	5 490	25 705	8,20915	9,16	0,024
1989	167	4 981	6 232	26 314	8,48817	8,82	0,033
1990	165	6 239	7 783	30 180	8,242341667	8,66	0,068
1991	317	6 117	7 690	32 285	8,70655	11,25	0,08
1992	422	6 377	8 286	33 711	8,537875	12,38	0,057
1993	491	6 067	7 676	31 655	9,298709167	10,28	0,052
1994	551	6 458	8 280	35 604	9,202715	5,61	0,051
1995	335	7 566	9 765	39 030	8,540235833	7,66	0,061
1996	357	8 178	9 411	43 161	8,715875833	7,29	0,03
1997	1 079	7 863	8 980	39 148	9,527106667	6,71	0,01
1998	309	8 280	9 735	41 806	9,604415833	6,3	0,028
1999	827	8 818	10 153	41 632	9,804419167	5,64	0,007
2000	427	8 851	10 944	38 857	10,62563617	5,42	0,019
2001	2 825	9 548	10 659	39 460	11,302975	4,44	0,006
2002	480	10 523	11 638	42 237	11,02058333	2,99	0,028
2003	2 313	12 334	14 062	52 064	9,574383333	3,22	0,012
2004	893	14 498	17 726	59 626	8,868016667	2,39	0,015
2005	1 671	16 592	20 543	62 343	8,865008333	2,78	0,01
2006	2 461	19 415	23 856	68 641	8,795583333	2,58	0,033
2007	2 826	23 950	31 370	79 041	8,192333333	3,29	0,025
2008	2 466	30 554	43 329	92 507	7,750325	3,37	0,037
2009	1 970	23 999	34 926	92 897	8,0571	3,26	0,01
2010	1 241	27 045	36 999	93 217	8,417158333	3,29	0,009
2011	2 521	31 845	45 907	101 370	8,089875	3,29	0,009
2012	2 842	32 339	47 013	98 266	8,628444583	3,19	0,013
2013	3 361	32 614	47 425	106 826	8,405503917	3,06	0,002
2014	3 525	36 213	49 904	110 081	8,406336688	2,95	0,004
2015	3 253	33 292	41 220	101 180	9,76434828	2,51	0,016
2016	2 153	34 394	45 134	103 312	9,807476032	2,27	0,017
2017	2 680	38 836	49 388	109 683	9,691997889	2,28	0,007
2018	3 544	43 253	55 385	118 096	9,386102421	2,28	0,006
2019	1 721	44 048	54 097	119 870	9,6170761	2,28	0,002
2020	1 419	37 545	46 358	114 725	9,496847322	1,79	0,007

As in any empirical study, the first step is to describe the evolution of the study variables through graphs, descriptive statistics and the correlation matrix.





During the period 1985-1989, exports and imports were modest, with respective annual averages of only 4.25 and 5.14 billion USD/year.

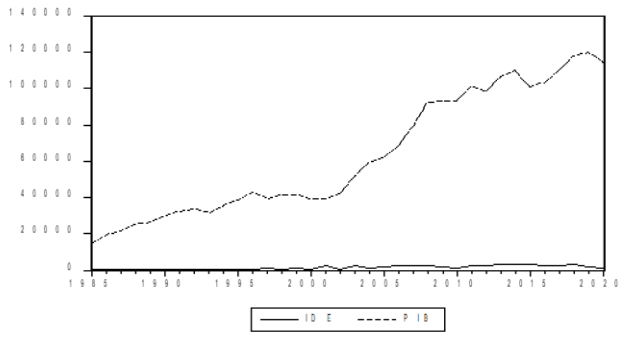
The decade from 1990 to 2000 saw an average annual increase of 73% in exports and imports.

Continuing this trend, the decade 2001-2010 saw rapid average growth in exports and imports of 156% to USD 18.85 billion per year and 173% to USD 24.51 billion per year, respectively.

During the decade 2011-2020, exports and imports achieved satisfactory average increases of 92% to USD 36.44 billion per year and 96% to USD 48.18 billion per year, respectively.

Moroccan exports of raw, low value-added products have given way to exports of refined industrial products and advanced technology with high added value.

The majority of Morocco's most significant imports are semi-finished products, machinery and equipment, due to the country's industrialisation, as well as consumables and raw materials, including hydrocarbons.



The FDI curve shows negligible amounts during the period 1985 to 2000.

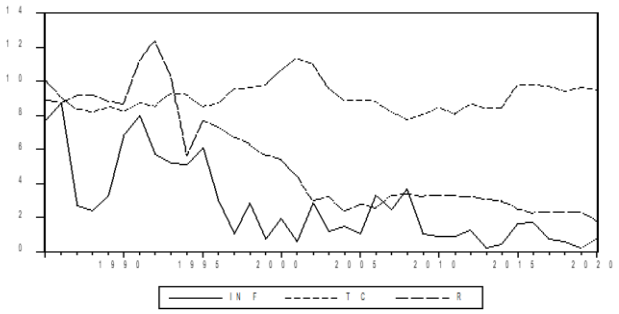
The average FDI, which was only USD 67 million per year from 1985 to 1989, increased to USD 482 million per year from 1990 to 2000, but without any significant effect on exports. Local investment was the main driver of growth in the Moroccan economy.

FDI was boosted during the period 2001-2010, averaging USD 1.92 billion per year, with peaks in 2001, 2006, 2007 and 2008. Of the USD 20.71 billion received between 1998 and 2010, USD 6.4 billion was related to privatisation operations in the telecommunications, hotel, banking and financial services, and industrial sectors (Tabacs, Sonacid, SCP, CIOR, etc.).

The boom in FDI became more pronounced in the decade from 2011 to 2020, with an average of USD 2.70 billion per year and peaks in 2013, 2014, 2015 and 2018. The sectors benefiting from this FDI inflows were real estate services, followed by manufacturing (automotive and food).

The arrival of FDI directed towards cutting-edge sectors, mainly the automotive and aerospace ecosystems, has been the catalyst for Morocco's continuous increase in exports. The rise in phosphate exports (rock and fertiliser) is the result of massive local investment by the OCP.

GDP has grown almost steadily, with declines in certain years due to lower agricultural value added, mainly during years of drought. Agriculture contributes nearly 13% of GDP.



Inflation has been on a downward trend since 1987, peaking at 8% in 1991 and hovering around 2% to 4% from 2000 to 2020. Inflation was kept under control during the decade from 2010 to 2020.

Money market interest rates have been falling since 1991, when bank lending was deregulated, and lending rates were liberalised in 1996.

The USD/MAD exchange rate reflects the importance of trade between the United States and Morocco and the economies of both countries.

The US dollar fluctuated between MAD 7.75 and MAD 11.30 in 2001, with an average of MAD 9.30 over the decade from 2000 to 2009, compared with an average of MAD 8.84 between 1985 and 1999. The annual average was MAD 9 over two periods: 1990-1999 and 2010-2020.

a-Descriptive statistics:

	FDI	EXPRT	IMPRT	GDP	TC	R	INF
Mean	1439.522	18191.76	23,648.58	63,354.22	9.087968	5.264167	2.719444
Median	1159.984	11,428.24	12,849.90	47612.76	8.866512	3.33	1.80000
Maximum	3,544.387	44,047.98	55,384.90	119,870.4	11.30297	12.38000	8.7000
Minimum	19.97517	3144.813	4,344.019	14,991.28	7.750325	1.790000	0.20

According to the descriptive statistics table, we can see that FDI recorded a minimum value of $19.98 million and a maximum value of $3,544.387 million. The average value recorded over the period studied is $1,439.522 million.

Exports over the same period were valued at $3,144.813 million, $44,047.98 million and $18,191.76 million, respectively.

Imports amounted to $4,344.019 million, £55,384.90 million and an average value of £23,648.58 million.

To further our descriptive analysis, we sought to study the correlation between FDI, exports, imports and other macroeconomic variables in our study. The results are shown in the following table:

b-Correlation matrix

	FDI	EXPRT	IMPRT	GDP	TC	R	INF
FDI	1.000000	0.807933	0.816787	0.816892	-0.035251	-0.751031	-0.630437
EXPRT	0.807933	1.000000	0.993747	0.989021	-0.096024	-0.777826	-0.623386
IMPRT	0.816787	0.993747	1.000000	0.988681	-0.157671	-0.760361	-0.605890
GDP	0.816892	0.989021	0.988681	1.000000	-0.137457	-0.804543	-0.658757
TC	-0.035251	-0.096024	-0.157671	-0.137457	1.000000	-0.160129	-0.133132
R	-0.751031	-0.777826	-0.760361	-0.804543	-0.160129	1.000000	0.747140
INF	-0.630437	-0.623386	-0.605890	-0.658757	-0.133132	0.747140	1.0000

Based on the correlation matrix above, we can conclude that FDI is highly correlated with exports and imports. The correlations are 80.79% and 81.68% respectively. As for FDI and GDP, the correlation is 81.68%, as shown in the same table.

2. Stationarity tests

We will focus on studying the statistical properties of the variables taken individually. This step is very interesting because it determines the modelling, which is the subject of our study, in the rest of the work. It should be noted that until the 1970s, variables were modelled as stationary using simultaneous equation models and linear regressions. However, from the 1970s onwards, statisticians and econometricians highlighted the risks involved in neglecting the individual stochastic properties of variables, in particular the problem of convergence speed and that of spurious regression. These latter problems were of great concern to modellers, notably BOX-JENKINS in the early 1970s and DICKEY-FULLER and PHILLIPS-PERRON and many others thereafter.

We present the results of the ADF and PP tests on the different variables, first in terms of levels and then in terms of first differences. For both tests, we formulate the following hypotheses, referred to as the null hypothesis (H0) and the alternative hypothesis (H1), where H0: the variable is non-stationary and H1: the variable is stationary. We accept H0 if the calculated Student's t-statistic or t-statistic is greater than the critical values tabulated by the authors mentioned above.

Table 2: ADF and PP tests of unit root of variables at level

Variables	ADF test		PP test	
	Stat-ADF	Conclusion	Stat-PP	Conclusion
IDE	-1.61	I(1)	-2.36	I(1)
EXPRT	-0.21	I(1)	-0.03	I(1)
IMPRT	1.29	I(1)	-0.41	I(1)
GDP	-0.23	I(1)	-0.23	I(1)
TC	-2.28	I(1)	-2.39	I(1)
R	-0.97	I(1)	-0.76	I(1)
INF	-0.89	I(1)	-2.73	I(1)

With: I (1) The variable is non-stationary or the variable incorporates a unit root.

According to the table above, we see that all variables are non-stationary in level. In other words, they all incorporate at least one unit root, and are therefore all classified as I (1). This led us to study the stationarity of the different variables in first differences in accordance with the teachings of econometric theory relating to non-stationary variables. Applying the same tests, namely ADF and PP, to the study variables taken in first differences again yielded the results presented in the following table:

Table 3: ADF and PP tests of unit root of variables in first differences

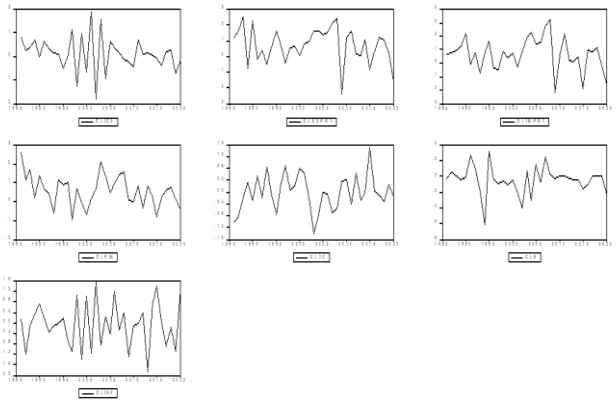
Variables	ADF test		PP test	
	Stat-ADF	Conclusion	Stat-PP	Conclusion
DIDE	-10.56	I(0)	-14.59	I(0)
DEXPRT	-5.048	I(0)	-5.26	I(0)
DIMPRT	-5.38	I(0)	-5.30	I(0)
DPIB	-4.77	I(0)	-4.71	I(0)
DTC	-4.75	I(0)	-4.70	I(0)
DR	-5.67	I(0)	-9.21	I(0)
DINF	-7.09	I(0)	-10.93	I(0)

Where: I (0) The variable is stationary or the variable is integrated with a zero-unit root.

D(X): means the first difference D(X) = Xt – XT-1

As expected, all the statistics calculated from the various tests are below their critical values. This leads us to reject the null hypothesis of non-stationarity of the variables in first differences. We therefore conclude that they are all stationary according to the ADF and PP tests. This confirms that these level variables contain a single unit root, as they become stationary after a single differentiation. The following graphs of the different series after their first differentiation visually confirm this conclusion.

Graphs of first-order differentiated variables.



Still in accordance with econometric time series theory, the next step would be to test for the existence of long-term relationships, also known as cointegration relationships, between the different variables in our study. This will allow us to decide whether to work with an unconstrained VAR model or a cointegrated (or constrained) VAR model.

As with stationarity tests, it is useful to first define the concept of cointegration and the principle of JOHANSEN's cointegration test.

Applying Johansen's multivariate cointegration test based on the maximum likelihood method and the two statistics, namely the trace statistic and the maximum eigenvalue statistic (Max-Eigen Statistic), yielded the following results.

Table 4: Trace test results

Hypothesised		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None	0.661003	47.11754	42.44	48.45
At most 1	0.236552	11.41932	25.32	30.45
At most 2	0.073304	2.512288	12.25	16.26
*(**) denotes rejection of the hypothesis at the 5% (1%) level				

Table 5: Results of the maximum eigenvalue test

Hypothesised		Max-Eigen	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None **	0.661003	35.69822	25.54	30.34
At most 1	0.236552	8.907028	18.96	23.65
At most 2	0.073304	2.512288	12.25	16.26
*(**) denotes rejection of the hypothesis at the 5% (1%) level				

Based on the results obtained for the two statistics, we find that there is a single cointegration relationship between the variables in our study. The null hypothesis of no cointegration is rejected since the calculated values of the two statistics are greater than their critical values. That said, and since our variables are cointegrated, the use of a cointegrated VAR (Error Correction Model) proves useful and necessary.

After estimating our base model using the ordinary least squares (OLS) method, in which we simulated a four-year lag calculated optimally using information criteria, we selected the following error correction model after several simulations:

Error correction model selected after several simulations:

Dependent Variable: DLIDE				
Method: Least Squares				
Sample (adjusted): 1989–2020				
Included observations: 32 after adjusting endpoints				
Variable	**Coefficient**	**Standard Error**	**t-Statistic**	**Prob.**
ECM1(-1)	-0.121629	0.048350	-2.516837	0.0308
DLIDE (-1)	-0.567832	0.179338	-3.166262	0.0040
DLEXPRT	1.534955	0.800903	1.916532	0.0668
DLIMPRT (-3)	-2.189750	1.048144	-2.089169	0.0470
DLPIB (-3)	3.918313	1.386337	2.826378	0.0091
DLINF (-3)	0.268825	0.118179	2.274716	0.0318
DLR (-1)	0.516753	0.513243	1.006838	0.3237
R-squared	0.683199	Mean dependent var		0.088089
Adjusted R-squared	0.607167	S.D. dependent var		0.752403
S.E. of regression	0.471580	Akaike information criterion		1.525182
Sum squared residual	5.559682	Schwarz criterion		1.845812
Log likelihood	-17.40291	Durbin-Watson statistic		1.723328

Thus, we can rewrite our estimated model as follows:

The DLIDE equation:

DLIDE= - 0.1216 *ECM t-1 - 0.5678* DLIDEt-1 +1.5349* DL EXPRT -2.1897* DLIMPRT (-2.5168) (-3.1662) (1.9165) (-2.0891) +3.918*DLPIB (-3) +0.2688*DLINF (-3) +0.5167*DLR (-1) (2.8263) (2.2747) (1.0068)

The values in brackets represent the student's t-statistics

R2=0.6831, DW=1.7233, σ =0.4715

According to the estimated model, we find, for example, a 1% change in exports in period t leads to a 1.53% increase in FDI.

Dependent Variable: DLEXPRT				
Method: Least Squares				
Sample (adjusted): 1989–2020				
Included observations: 32 after adjusting endpoints				
Variable	**Coefficient**	**Standard Error**	**t-Statistic**	**Prob.**
ECM1(-1)	-0.068006	0.020178	-3.370339	0.0024
DLIDE (-1)	-0.043955	0.018237	-2.410180	0.0236

DLIDE (-3)	-0.015119	0.015546	-0.972562	0.3401
DLIMPRT	0.785163	0.068596	11.44624	0.0000
DLPIB (-2)	-0.008038	0.099011	-0.081181	0.9359
DLINF (-3)	-0.007657	0.012900	-0.593540	0.5582
DLR (-1)	0.069254	0.055111	1.256643	0.2205
R-squared	0.842305	Mean dependent variable		0.060671
Adjusted R-squared	0.804459	S.D. dependent var		0.109337
S.E. of regression	0.048349	Akaike information criterion		-3.030098
Sum squared residual	0.058441	Schwarz criterion		-2.709468
Log likelihood	55.48157	Durbin-Watson statistic		1.818166

The DL EXPRT equation:

DL EXPRT= - 0.0680* ECM (-1) - 0.0439*DLIDE (-1) - 0.0151*DLIDE (-3) + 0.7852* DLIMPRT (-3.3703) (-2.4101) (-0.9725) (11.4412) - 0.0080*DLPIB (-2) -0.0076*DLINF (-3) + 0.06925*DLR (-1) (-0.0811) (-0.5935) (1.2566)

The values in brackets represent the student's t-statistics

R2 =0.8423, DW=1.8181, σ =0.0483

Based on the results of the estimation of this model, we can conclude, for example, that a 1% change in imports in period t leads to a 0.78% increase in exports. The model also shows that a 1% change in FDI in t-1 leads to a 0.04% decrease in exports.

Dependent Variable: DLIMPRT				
Method: Least Squares				
Sample (adjusted): 1989–2020				
Included observations: 32 after adjusting endpoints				
Variable	**Coefficient**	**Standard Error**	**t-Statistic**	**Prob.**
C	-0.125018	0.032229	-3.879025	0.0008
ECM1(-1)	-0.083419	0.036045	2.314334	0.0304
DLEXPRT (-2)	-0.272801	0.218863	-1.246446	0.2257
DLIDE	0.030752	0.026113	1.177634	0.2515
DLIMPRT (-3)	-0.422327	0.204294	-2.067251	0.0507
DLR	0.136383	0.096291	1.416369	0.1707
DLR (-1)	0.108239	0.097743	1.107383	0.2801
DLTC	-1.635525	0.293878	-5.565313	0.0000
DLTC (-2)	-0.331199	0.386169	-0.857653	0.4003
DLTC (-3)	-0.959149	0.377818	-2.538651	0.0187
R-squared	0.672197	Mean dependent var		0.066672
Adjusted R-squared	0.538096	S.D. dependent var		0.126544
S.E. of regression	0.086004	Akaike information criterion		-1.818544
Sum squared residual	0.162726	Schwarz criterion		-1.360501
Log likelihood	39.0967	F-statistic		5.012607
Durbin-Watson statistic	2.220421	Prob(F-statistic)		0.000975

The DL IMPRT equation

DL IMPRT= -0.1250 - 0.0834 *ECM (-1) - 0.2728*DLEXPRT (-2) + 0.0307*DLIDE (-3.8790) (2.3143) (-1.2464) (1.1776) -0.4223* DL IMPRT (-3) + 0.1363*DLR+0.1082*DLR (-1)-1.6355*DLTC-0.3311*DLTC (-2) (-2.0672) (1.4163) (1.1073) (-5.5653) (-0.8576) -0.9591*DLTC (-3) (-2.5386)

The values in brackets represent the student's t-statistics

R2 =0.6721; DW=2.2204; σ =0.0860

After estimating the three models relating to FDI, exports and imports, the following observations can be made:

- The three models have a fairly high predictive capacity of 67.22% to 84.23%.

- The coefficients of the error correction terms are all negative, in accordance with econometric theory. In addition, they are all significant in terms of Student's t-statistic, since this is greater than 2 in absolute value in all three models.

- The significance of the coefficients of the error correction terms in the three models validates the hypothesis of the existence of long-term causality between the different variables in the model.

- The speed of adjustment (or restoring force) of imbalances varies between 6% and 12% between each two consecutive periods (t-1) and (t).

That said, we also studied whether there are short-term causal relationships in Granger's sense between FDI and both exports and imports by applying Granger's causality test based on predictability.

To test the causality of variable Xt towards Yt, we formulate two hypotheses:

- The null hypothesis H0: Xt does not cause Yt in Granger's sense.

- The alternative hypothesis: Xt causes Yt in Granger's sense.

Considering a theoretical or tabulated threshold (α), generally a maximum of 5% (although in some studies up to 10% may be tolerated).

To avoid the risk of judging these relationships, we used different lags, namely lags 2, 4, 6 and 10. The results presented above show the acceptance of the null hypothesis of non-causality in Granger's sense at all simulated lags, thus indicating the absence of short-term causality between the different variables.

Pairwise Granger Causality Tests			
Sample: 1985–2020			
Lags: 2			
Null Hypothesis:	**Obs**	**F-Statistic**	**Probability**
DLEXPRT does not Granger Cause DLIDE	33	1.04212	0.36599
DLIDE does not Granger Cause DLEXPRT		0.50377	0.60962
DLIMPRT does not Granger cause DLIDE	33	0.61945	0.54545
DLIDE does not Granger cause DLIMPRT		0.76369	0.47540

Pairwise Granger Causality Tests			
Sample: 1985–2020			
Lags: 4			
Null Hypothesis:	**Obs**	**F-Statistic**	**Probability**
DLEXPRT does not Granger Cause DLIDE	31	0.25321	0.90459
DLIDE does not Granger Cause DLEXPRT		0.17404	0.94937
DLIMPRT does not Granger cause DLIDE	31	0.26944	0.89446
DLIDE does not Granger cause DLIMPRT		0.30634	0.87060

Pairwise Granger Causality Tests			
Sample: 1985–2020			
Lags: 6			
Null Hypothesis:	**Obs**	**F-Statistic**	**Probability**
DLEXPRT does not Granger Cause DLIDE	29	0.18653	0.97633
DLIDE does not Granger Cause DLEXPRT		0.59718	0.72853
DLIMPRT does not Granger cause DLIDE	29	0.11835	0.99265
DLIDE does not Granger cause DLIMPRT		0.28921	0.93347

Pairwise Granger Causality Tests			
Sample: 1985–2020			
Lags: 10			
Null Hypothesis:	**Obs**	**F-Statistic**	**Probability**
DLEXPRT does not Granger Cause DLIDE	25	0.27394	0.95597
DLIDE does not Granger Cause DLEXPRT		1.50856	0.36818
DLIMPRT does not Granger cause DLIDE	25	0.12777	0.99602
DLIDE does not Granger cause DLIMPRT		0.98006	0.55762

Conclusion:

Historically speaking, foreign trade predates foreign direct investment.

CI and FDI have undergone significant, sustained changes in nature, amount and expected objectives.

Their interactions are one aspect of the strategies employed by countries and regional groupings to benefit from the positive effects of the two main characteristics of globalisation. Studies and research have continued to analyse, detect and explain their interactions.

Generally, most FDI host countries were already trading with foreign countries; international trade therefore generated FDI before the 1980s. It seems that the influence has been reversed

since the rise of globalisation; FDI has had a fundamental influence on trade.

FDI from investor countries motivates and increases their exports. The empirical study would therefore focus on additional exports in dollars or euros for each unit of currency invested abroad. This result would encourage issuing countries to establish themselves or not in FDI host countries.

Complementarity would thus be observed between trade and FDI in the event of increased exports.

In host countries, FDI usually generates an increase in imports in the short term, but exports only see significant increases in the long term.

Admittedly, countries that benefit from FDI enjoy substantial advantages in terms of job creation, technology transfer, training, etc.

The complementarity or substitutability between trade and FDI is linked to economic contexts, and FDI is linked to the economic, monetary and financial contexts of each country, such as market size, the concentration of FDI in specific regions such as free trade areas, productivity, technology and the growth rate of countries.

The results obtained are sometimes contradictory between researchers and between the pilot countries studied, as not all internal and external factors are taken into account in empirical studies, generally due to the unavailability of the information necessary and useful for such analyses.

Studies should focus on the interactions between trade and FDI between countries, by country, by industry or by sector of activity, in order to obtain conclusive and proven results.

Our study focused on the close relationship between inward FDI and Morocco's foreign trade (exports and imports).

The figures for the three variables and the results of the empirical study clearly and unequivocally indicate that the impact of FDI on exports and imports is virtually non-existent, if not zero, in the short term, especially since the amounts of inward FDI are not significant enough to have a real impact on Morocco's trade.

However, the impact of FDI on foreign trade is significant in the long term, especially since FDI has recently been directed towards cutting-edge sectors that are heavy importers of semi-finished products, raw materials, inputs and consumables, and whose technological production is mainly exported, as corroborated by the continuous increase in FDI inflows into Morocco.

Morocco expects a massive influx of large international groups and firms with colossal investments directed towards key sectors, such as:

- Commercial shipbuilding (China, Japan and Korea);
- Electric and hybrid cars and their accessories (Germany, Japan, South Korea, etc.);
- Renewable energies (United States, Germany, Great Britain, etc.);
- The aerospace industry (United States, European Union, etc.).

With production destined almost entirely for export, the impact of FDI on Morocco's foreign trade would certainly be significant in the short term.

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