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Morocco's exports today: A real legacy from the past

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Abstract:

Exports of goods and services are a major driver of the economic and social development of countries, especially in the case of small open economies, such as Morocco. Since independence, Moroccan exports have been characterised by a concentration on basic products and a relatively weak evolution in comparison with competitors. Since 2005, these exports have undergone a profound structural transformation. The integration of the Moroccan economy in the new world trades has changed the base of specialisation of the country. It has gone from a country specialised in the production and export of agricultural products and textiles to a country producing and exporting automobile, electrical and aeronautical products.

Therefore, forecasting Moroccan exports are of great importance for policy makers and government. The most popular and appropriate model for forecasting macroeconomic series in the literature are times series models. In this paper, we test whether the Auto Regressive Moving Average (ARMA) model can forecast Moroccan exports. To do so, we follow the modelling process developed by Box & Jenkins (1976), namely: identification of the susceptible models, parameter estimates and validation testing.

The results show that satisfactory forecasts can be obtained using the ARIMA model (0,1,0) or AR (1). This confirms the idea that the behaviour of exports today is the result of a rich historical antecedent of events. The examination of the country's economic history allows us to deduce the importance of structural factors for the development of exports. This analysis can serve as the basis for a multivariate model for the behaviour of Moroccan exports in the future.

Keywords: Export, Forecast, ARIMA model, Morocco
JEL Classification: F17, C22.
Paper type: Empirical research.

1. Introduction:

Several studies have noted that improving the export sector is a major catalyst for economic growth ((Havrylyshyn 1990) and (McCombie and Thirlwall 1994)). In other words, exports of goods and services constitute a driving force for the economic and social development of countries in general and of small open economies such as Morocco in particular. In addition to their role in boosting foreign exchange reserves and covering imports, exports contribute favourably to the country's growth.

In this perspective, forecasting exports appears very useful. On the one hand, it enables Moroccan decision-makers to plan and programme commercial policies in the light of the new orientations of the national economy. On the other hand, it interests foreign investors and commercial partners because the country's industrial activity is based essentially on imported raw materials. Moreover, Morocco is the world's leading exporter of phosphate, thanks to its reserves which are close to 75% of the world reserves (IMIST 2013). Our objective in this study is to develop an ideal model that will satisfactorily represent Moroccan exports and allow forecasting them effectively.

To do this, we first present the methodology of the study, then the results obtained from the modelling and finally we carry out a retrospective analysis of the results.

2. Literature review and hypothesis development:

Indeed, little work has attempted to propose a model for forecasting exports. Some studies have shown the importance of time series methods in improving exports forecasting. Other studies have highlighted the role of surveys developed among importers and the calculation of indicators that determine the evolution of countries' exports.

2.1. Background

(Wang, Hsu, et Liou 2011) affirm that the autoregressive integrated moving average time series model (ARIMA) provides a better and more precise forecast of Taiwanese exports than the heuristic model. In the same vein, standard time series models improve trade forecasts for OECD-25 countries more than naïve forecasting methods (Keck, Raubold, et Truppia 2010).

Far from temporal methods, other techniques are important. In the Portuguese context, (Cardoso et Duarte 2006) highlight the importance of qualitative data collected from firms for short-term exports forecasting. In Germany, the (Institute for Economic Research) IFO regularly publishes an "Export Climate" indicator calculated on the basis of two elements: the global economic climate and price competitiveness (Elstner, Grimme, et Haskamp 2013) and (Grimme, et Lehmann, 2019). Export Climate is a valuable indicator for the short-term forecasting of German exports. In addition (Jannsen et Richter 2012) proposed a weighted indicator of capacity utilization in countries importing German goods, this is in order to forecast the development of German equipment goods exports. According to (Grossmann et Scheufele 2019), foreign economic activity is a leading indicator of export development, so the Purchasing Manager Index (PMI) of major importers improves forecasts of Swiss and German exports more than other indicators.

Moreover, (Lehmann 2020) uses a set of indicators based on surveys of several economic branches in several European countries. It confirms that the export climate, the production expectations of domestic manufacturing firms, the industrial indicator confidence and the economic sentiment indicator are indicators that produce accurate forecasts of exports. Thus, Dynamic Factor Models (DFMs) provide better forecasts for world trade compared to traditional benchmarking models or autoregressive models, especially when the number of series is large (Guichard and Rusticelli 2011). In addition, Zorzi and Schnatz (2010) examine different prices and cost competitiveness indicators to forecast extra-euro area exports, they

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argue that the effective exchange rate based on exports price index is the best indicator that improves forecasts relative to other measures for a recursive estimation approach.

For the case of Morocco, the Forecasting and Prospective Department (High Commission for Planning) in collaboration with the National Institute of Statistics and Economic Studies of France have developed a macro-econometric model known as PRESIMO (Forecasting and Simulation Model) for the Moroccan economy. This model has the following main objectives: obtaining medium and long-term economic forecasts and consequently detecting the best scenario among those constructed, simulating the impact of economic policies, essentially fiscal and budgetary policies, and constructing elements to measure the impact of internal or external shocks linked to the world environment. The PRESIMO model describes the equilibrium between supply and demand in a neo-Keynesian framework. In the short term, production depends on global demand (viz.consumption, investment and exports) (Bakhti, Brillet, et Sadiki 2011).

In the light of this literature review, it can be seen that little work has been done to improve exports forecasting, and this is even true to a greater extent in the Moroccan context. This work seeks to contribute to the literature by providing more insights regarding exports forecasting.

2.2. Hypotheses development

According to the literature, it is understood that exports forecasts can be obtained using several methods such as time series, composite indicators, etc.

Given that Morocco's foreign trade sector has experienced the implementation of a series of strategies and reforms to promote its exports and diversify its market portfolio; it is assumed that the current exports behaviour is the result of its eventful past. This finding leads us to assume the following hypotheses:

H1: The evolution of Moroccan exports depends on their past values.

H2: The evolution of Moroccan exports is independent of its exports past values.

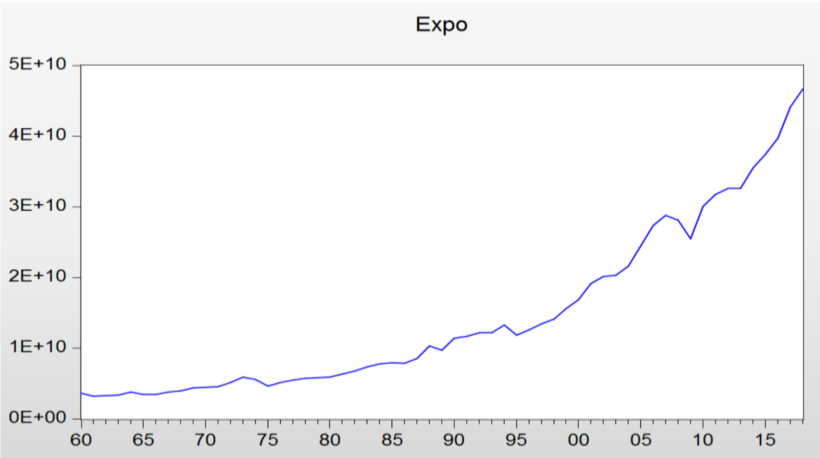
3. Methodology

The choice of Box and Jenkins ARMA's time series method is justified by the robustness of this method in macroeconomic series forecasting.

3.1. Descriptive data analysis

The annual data of Morocco's exports of goods and services were collected from the World Bank database for the period 1960 to 2018 and are presented in Figure 1.

Figure 1: Morocco's annual exports of goods and services in M of US dollars (Henceforth EXPO)



Source: *Figure prepared by the author. Data obtained from the World Bank database*

The observation of the figure 1 shows an upward trend in Moroccan exports during the period from 1960 to 2018.

Between 1960 and 1982, exports were almost stable, although they peaked in 1973 due to soaring prices of raw materials, particularly phosphates. This price rise was an opportunity for Morocco to overcome the hazards of colonialism and push the country towards industrialisation (Vermeren 2002a).

From 1983 onwards, exports started to record a gradual growth with two peaks, one in 1988 and the other in 1994. These peaks can be explained by significant agricultural production.

This growth was interrupted due to the 2008-2009 crisis. From 2010 onwards, exports have started to grow again.

Since the studied series shows a trend, the ARIMA model appears to be the most adequate for forecasting.

3.2. ARMA model description

ARMA is a forecasting method used to model a univariate chronological series based on its past values. ARMA follows an autoregressive process of order p and q. It comprises two components: the weighted sum of past values (AR) and the weighted sum of past errors (MA). The ARMA(p,q) model is written as follows:

$$\mathbf{y_t = \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \cdots \alpha_p y_{t-p} + \varepsilon_t - \beta_1 \varepsilon_{t-1} + \beta_2 \varepsilon_{t-2} + \cdots \beta_q \varepsilon_{t-q}} \qquad \textbf{(1)}$$

y_t = is the variable to be modelled

α and β = are the coefficients to be estimated.

p and q = are the parameters to be identified.

Ɛ = are the forecasting past and present errors.

The ARMA model is used if the series under study is stationary. Since the majority of the time series treated in practice are non-stationary, ARIMA modelling is necessary. The latter represents a particular class of non-stationary processes. It allows to treat non-stationary series after having defined the order of differentiation (I) of the series.

The ARIMA(p,d,q) process for the series (y_t) is a process of the following form :

$$\mathbf{\left(1 - \varphi_1 B - \cdots - \varphi_p B^p\right) \nabla^d y_t = \left(1 - \theta_1 B - \cdots - \theta_q B^q\right) \varepsilon_t} \qquad \textbf{(2)}$$

Or, alternatively:

$$\mathbf{\left(1 - \varphi_1 B - \cdots - \varphi_p B^p\right)(1 - B)^d y_t = \left(1 - \theta_1 B - \cdots - \theta_q B^q\right) \varepsilon_t} \qquad \textbf{(3)}$$

Where $\varepsilon_t \sim B(0, \sigma_\varepsilon^2)$, B is the retard operator such that $By_t = y_{t-1}$ and $B^p y_t = y_{t-p}$, $\Delta^d$is the difference operator of degree d (d is a positive integer), $(\varphi_1, \dots, \varphi_p)$ and $(\theta_1, \dots, \theta_q)$ represent the coefficients to be estimated.

4. Results and discussion

To model with ARIMA, we have to follow all the steps developed by Box & Jenkins (1976):

-1- Check the stationarity of the variable studied and choose the model;

-2- Estimate the selected model;

-3- Appreciate the quality of adjustment;

-4- Plan for the most suitable model.

This approach consists of modelling univariate time series using ARMA processes. These processes respect the principle of parsimony and allow for good forecasting results. It relies on past values to predict future values.

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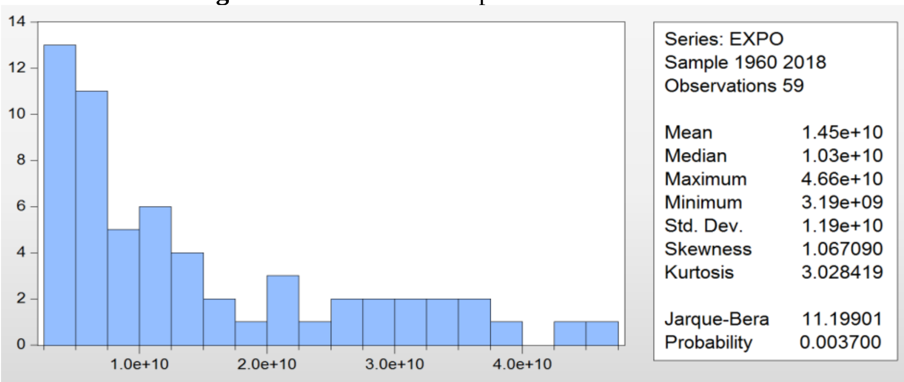
4.1. Preliminary normality test

Figure 2: Statistical description of the EXPO series



<u>Source:</u> *Elaborated by the author on the software Eviews 10*

Before moving on to the treatment of the series, we start with a normality analysis. This operation will allow us to check whether the distribution of the variable studied is following a normal law (Gaussian law). If the distribution of the series is not normal, the logarithmic transformation or another technique is used to fit it with the normal distribution.

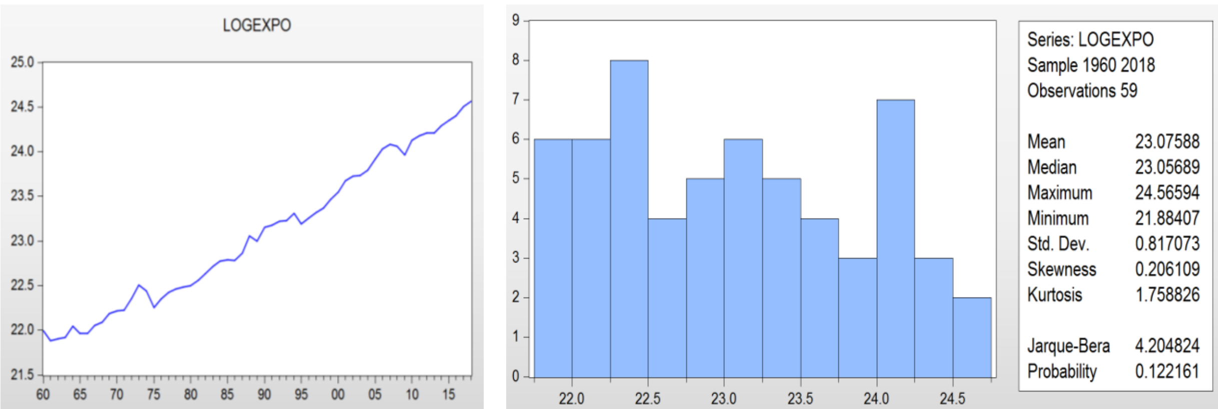
In order to verify if our studied series follows the normal law, we rely on the analysis of the statistical table resulting from the EVIEWS software.

According to the histogram we notice that the observations are widely distributed around the mean (Std.Dev.= 1.19e+10), the Skewness coefficient is superior to 0 so the distribution is asymmetrical towards the right. The Kurtosis coefficient is superior to 3 which means that the distribution is leptokurtic. And finally the probability of Jarque-Bera is lower than 0.05, therefore the non-normality of the series is decided. For these reasons, our series requires a transformation adapted to the Gaussian law.

4.2. Transformation of the Variable

In statistics, there are several techniques that allow the transformation of a variable (logarithm, square root, cubic root...). Nevertheless, the logarithmic technique appears to be the best one since our objective, in the case of our studied series EXPO, is to obtain a normal distribution of the variable .

Figure 3: Statistical description of the EXPO series after transformation



Source: *elaborated by the author on the software Eviews 10*

The histogram of our log transformed variable (LOGEXPO) shows a marked impact on the distribution of our series. Generally, the applied transformation allowed us to approach the extreme values in order to obtain a less extended distribution.

At this stage, the transformed series can be used to apply the statistical tests because it is the most compatible with the conditions of the normal law.

4.3. Examination of the variable's stationarity and choice of model

Referring to the figure 3, we can see that the series does not fluctuate around an average, so it is non-stationary. It remains to confirm this through formal tests such as the Augmented Dickey Fuller (ADF), Phillips-Perron or KPSS tests, and then to answer the question of the type of non-stationarity.

There are several tests for studying the stationarity of series, however the Augmented Dicky Fuller test is the most widely used. The ADF test will confirm the non-stationarity of the series as well as its type: deterministic/stochastic (TS/DS). At the same time, this test indicates the appropriate stationarity method for the series under study.

Figure 4: Results of ADF test in level

Null Hypothesis: LOGEXPO has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.699850	0.0302
Test critical values:	1% level	-4.124265	
	5% level	-3.489228	
	10% level	-3.173114	

*MacKinnon (1996) one-sided p-values.

Source: *elaborated by the author on the software Eviews 10*

In our case, the P-value of the ADF test is equal to 0.0302 , so we accept the H0: the series contains a unit root, so it is non-stationary at 1% risk. With regard to the results of the ADF test, we confirm the non-stationarity of the "LOGEXPO" series and conclude that it is stochastic.

Figure 5: Results of ADF test in first difference

Null Hypothesis: D(LOGEXPO) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.422002	0.0000
Test critical values:	1% level	-4.127338	
	5% level	-3.490662	
	10% level	-3.173943	

*MacKinnon (1996) one-sided p-values.

Source: *elaborated by the author on the software Eviews 10*

Applying the ADF test on the first difference of the LOGEXPO series, we find that the p-value of the ADF is equal to 0.0000<0.05 so the series is stationary with a first integration order I(1).

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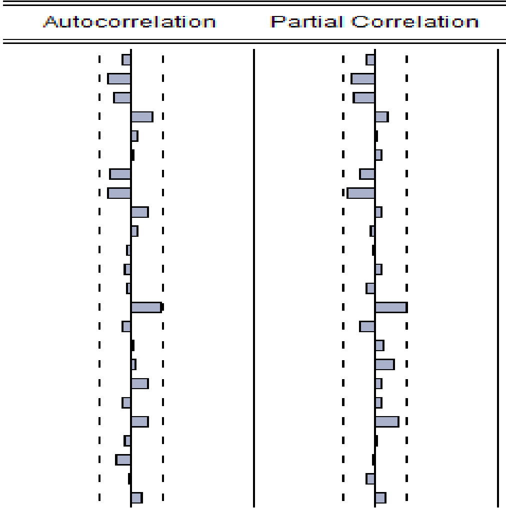
Figure 6: Test of Box and Jenkins

Date: 07/01/20 Time: 00:58
Sample: 1960 2018
Included observations: 58



	AC	PAC	Q-Stat	Prob
1	-0.078	-0.078	0.3753	0.540
2	-0.195	-0.202	2.7326	0.255
3	-0.139	-0.182	3.9624	0.266
4	0.178	0.111	5.9957	0.199
5	0.041	0.011	6.1076	0.296
6	0.016	0.060	6.1257	0.409
7	-0.176	-0.124	8.2277	0.313
8	-0.189	-0.245	10.708	0.219
9	0.148	0.054	12.257	0.199
10	0.065	-0.045	12.566	0.249
11	-0.043	-0.016	12.702	0.313
12	-0.053	0.045	12.916	0.375
13	-0.028	-0.072	12.975	0.450
14	0.258	0.268	18.252	0.196
15	-0.068	-0.123	18.629	0.231
16	0.012	0.077	18.640	0.288
17	0.030	0.169	18.718	0.345
18	0.140	0.056	20.419	0.310
19	-0.079	0.045	20.977	0.338
20	0.138	0.197	22.716	0.303
21	-0.053	0.022	22.975	0.345
22	-0.131	-0.015	24.624	0.315
23	-0.009	-0.068	24.632	0.370
24	0.093	0.083	25.524	0.378

Source: *elaborated by the author on the software Eviews 10*

Since the LOGEXPO series is stationary in the first difference (the I(1) integration order), then it is a model of the ARIMA family. The observation of the correlogram related to the stationary first differenced LOGEXPO series (DLOGEXPO) shows that the autocorrelation function and the partial correlation function are null, which implies that the ARIMA model (0,1,0) or AR(1) chosen is likely to be the most effective model to reflect the operating mode of the LOGEXPO series.

To confirm our choice, we are going to test the significance of all the models likely to represent our series for a maximum delay p=3. Then we will select the one which minimizes the AKAIKE and SCHWARZ criterion.

The selected model was validated by Automatic Arima Forcasting on Eviews, as shown below:

Figure 7 informs us about the autoregressive order of the chronological series. Since the p-value of the coefficient associated with AR(1) is less than 0.05, the null hypothesis is accepted, so the best model is the AR(1) model.

Figure 7: Model estimation

Dependent Variable: DLOGEXPO
Method: ARMA Maximum Likelihood (BFGS)
Date: 10/05/20 Time: 23:47
Sample: 1961 2018
Included observations: 58
Convergence achieved after 56 iterations
Coefficient covariance computed using outer product of gradients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045463	0.006715	6.770397	0.0000
AR(1)	-1.022628	0.229718	-4.451658	0.0000
AR(2)	-0.392116	0.266847	-1.469441	0.1479
MA(1)	1.022072	270.9403	0.003772	0.9970
MA(2)	0.137115	17.18111	0.007981	0.9937
MA(3)	-0.549170	547.9785	-0.001002	0.9992
SIGMASQ	0.003761	0.581588	0.006467	0.9949

R-squared	0.271383	Mean dependent var	0.044298
Adjusted R-squared	0.185664	S.D. dependent var	0.072474
S.E. of regression	0.065401	Akaike info criterion	-2.417633
Sum squared resid	0.218142	Schwarz criterion	-2.168959
Log likelihood	77.11136	Hannan-Quinn criter.	-2.320770
F-statistic	3.165941	Durbin-Watson stat	1.813034
Prob(F-statistic)	0.010225		

Inverted AR Roots	-.51-.36i	-.51+.36i	
Inverted MA Roots	.55	-.79+.62i	-.79-.62i

Source: *elaborated by the author on the software Eviews 10*

4.4.Estimation of the selected model

The theoretical model is written as follows:

$$\mathrm{DLOG}(\mathrm{EXPO}_t) = c + \alpha\,\mathrm{DLOG}(\mathrm{EXPO}_{t-1}) + \varepsilon_t$$

According to figure 7, and at 95% confidence, we can confirm that the coefficient associated to the AR(1) term is the only parameter significantly different from zero.

Therefore the estimated model is as follows:

$$\mathrm{DLOG}(\mathrm{EXPO}_t) = 0.045 - 1.02 * DLOG(EXPO_{t-1}) + \varepsilon_t$$

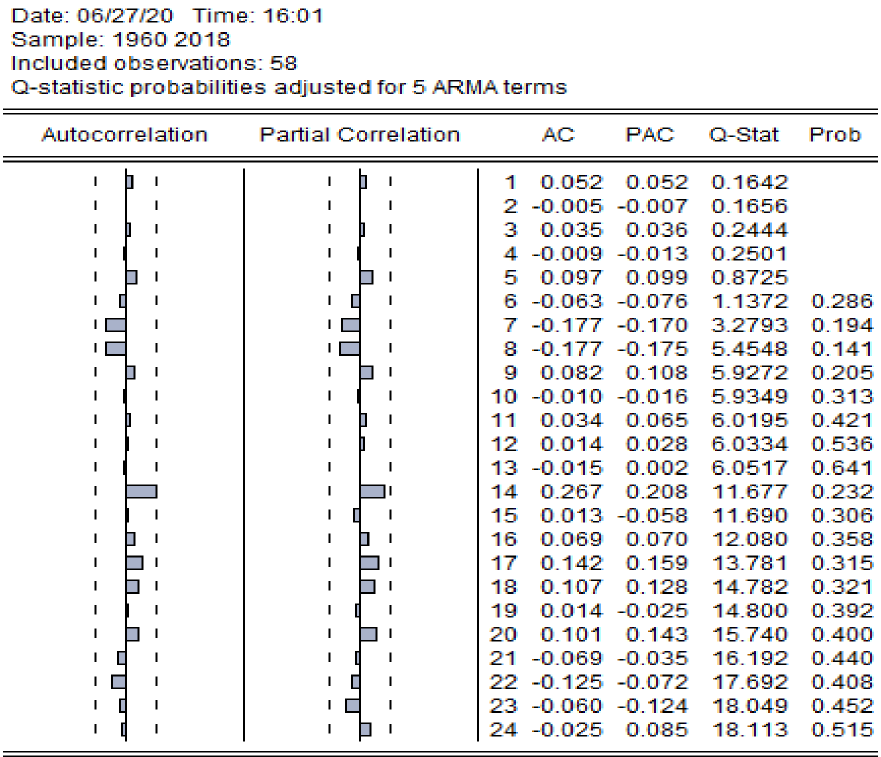
To validate this model, the autocorrelation and normality of the residuals are tested in order to evaluate the predictive capacity of the AR(1) model.

4.5. Appreciation of the quality of the model

In order to validate ARIMA models, it is necessary to analyse the estimated residues. The ARIMA model is validated if it meets two conditions: random walk and homoscedasticity of the estimated residuals.

4.5.1. Normality test

Figure 8: Analysis of the normality of the residuals of the ARIMA model



Date: 06/27/20 Time: 16:01
Sample: 1960 2018
Included observations: 58
Q-statistic probabilities adjusted for 5 ARMA terms

	AC	PAC	Q-Stat	Prob
1	0.052	0.052	0.1642	
2	-0.005	-0.007	0.1656	
3	0.035	0.036	0.2444	
4	-0.009	-0.013	0.2501	
5	0.097	0.099	0.8725	
6	-0.063	-0.076	1.1372	0.286
7	-0.177	-0.170	3.2793	0.194
8	-0.177	-0.175	5.4548	0.141
9	0.082	0.108	5.9272	0.205
10	-0.010	-0.016	5.9349	0.313
11	0.034	0.065	6.0195	0.421
12	0.014	0.028	6.0334	0.536
13	-0.015	0.002	6.0517	0.641
14	0.267	0.208	11.677	0.232
15	0.013	-0.058	11.690	0.306
16	0.069	0.070	12.080	0.358
17	0.142	0.159	13.781	0.315
18	0.107	0.128	14.782	0.321
19	0.014	-0.025	14.800	0.392
20	0.101	0.143	15.740	0.400
21	-0.069	-0.035	16.192	0.440
22	-0.125	-0.072	17.692	0.408
23	-0.060	-0.124	18.049	0.452
24	-0.025	0.085	18.113	0.515

Source: *elaborated by the author on the software Eviews 10*

From the correlogram of residuals, we deduce that the lags of the simple autocorrelation function and the partial autocorrelation function fall within the confidence interval. This indicates that the information is well represented by our model. Moreover, the p-values of the residuals are all greater than 0.05 which implies that the residuals from our model form a white Gaussian noise.

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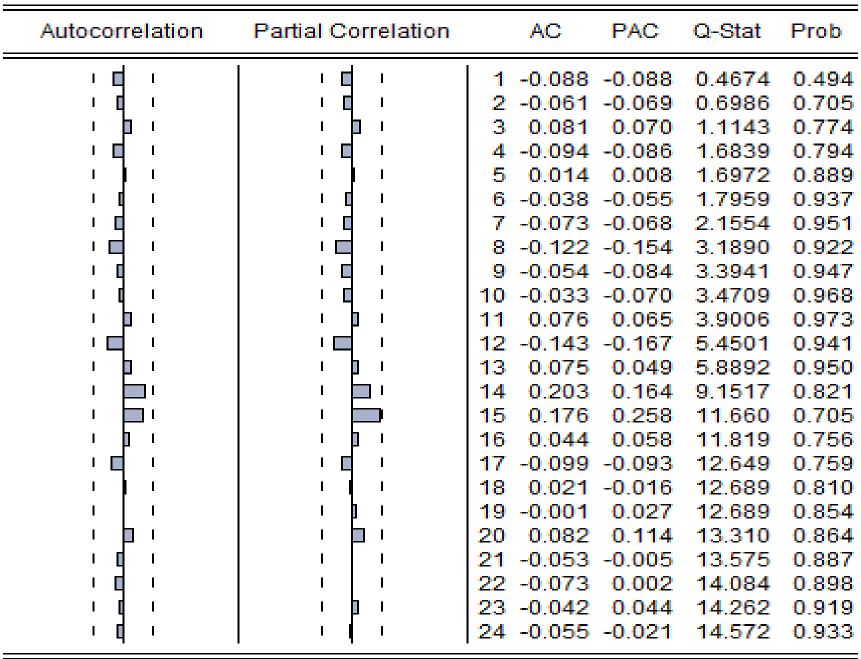
4.5.2. Autocorrelation test

Figure 9: Autocorrelation test of residuals



Date: 06/27/20 Time: 16:03
Sample: 1960 2018
Included observations: 58

	AC	PAC	Q-Stat	Prob
1	-0.088	-0.088	0.4674	0.494
2	-0.061	-0.069	0.6986	0.705
3	0.081	0.070	1.1143	0.774
4	-0.094	-0.086	1.6839	0.794
5	0.014	0.008	1.6972	0.889
6	-0.038	-0.055	1.7959	0.937
7	-0.073	-0.068	2.1554	0.951
8	-0.122	-0.154	3.1890	0.922
9	-0.054	-0.084	3.3941	0.947
10	-0.033	-0.070	3.4709	0.968
11	0.076	0.065	3.9006	0.973
12	-0.143	-0.167	5.4501	0.941
13	0.075	0.049	5.8892	0.950
14	0.203	0.164	9.1517	0.821
15	0.176	0.258	11.660	0.705
16	0.044	0.058	11.819	0.756
17	-0.099	-0.093	12.649	0.759
18	0.021	-0.016	12.689	0.810
19	-0.001	0.027	12.689	0.854
20	0.082	0.114	13.310	0.864
21	-0.053	-0.005	13.575	0.887
22	-0.073	0.002	14.084	0.898
23	-0.042	0.044	14.262	0.919
24	-0.055	-0.021	14.572	0.933

Source: *elaborated by the author on the software Eviews 10*

According to the Ljung-box autocorrelation test of the residuals, the p-values of the residuals are higher than 0.05, therefore the residuals are not autocorrelated.

4.5.3. Heteroskedasticity test

Figure 10: WHITE test of heteroskedasticity

Heteroskedasticity Test: White

F-statistic	1.90E+21	Prob. F(34,23)	0.0000
Obs*R-squared	58.00000	Prob. Chi-Square(34)	0.0063
Scaled explained SS	51.19421	Prob. Chi-Square(34)	0.0295

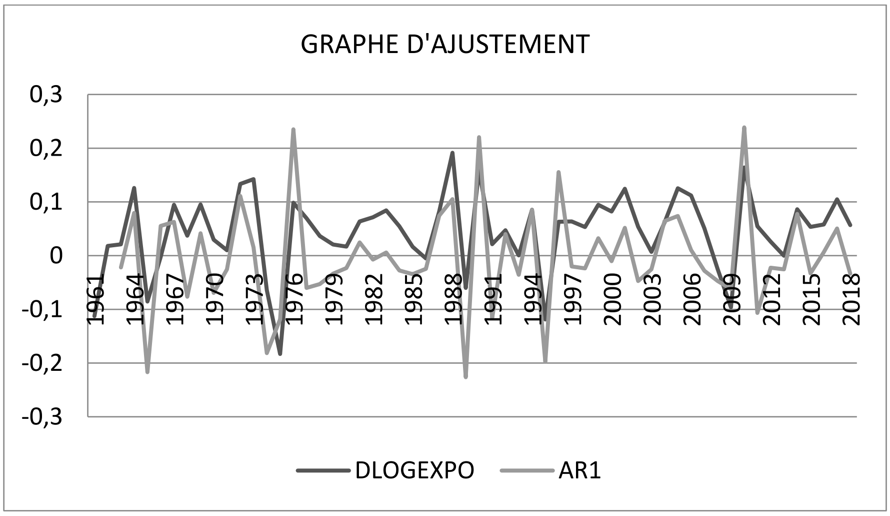
Source: *elaborated by the author on the software Eviews 10*

The absence of heteroskedasticity in the model can be deduced from the white test. Since the p-value linked to the F-statistic is less than 0.05, the residuals do not show heteroskedastisticity.

4.6. Predicting the right model

Observation of figure 11 shows that the estimated AR(1) model follows approximately the same pace as the raw series (DLOGEXPO), which confirms its validity.

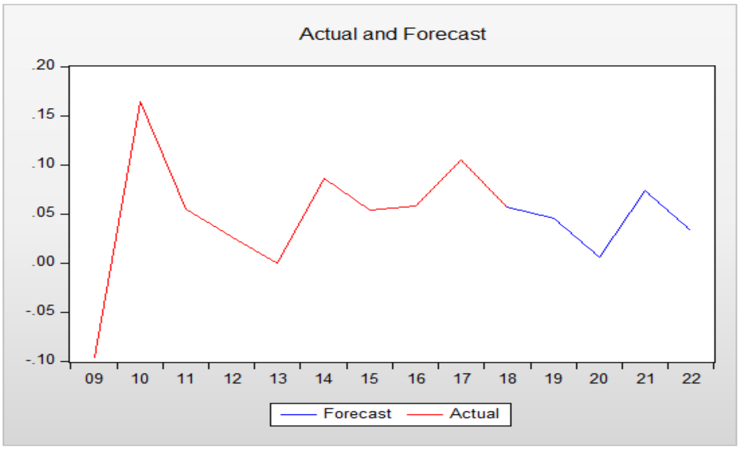
Figure 11: Graphic representation of the AR(1) model and the EXPO series



Source: *Authors*

At this level we can move on to the phase of forecasting the future values of the exports series.

Figure 12 : The graph of the actual and predicted exports series



Source: *Authors*

Table 1: Exports values of goods and services from 2019 to 2022

Years	Forcasts
2019	48791264815
2020	49088114284
2021	52827126272
2022	54563218521

Source: *Authors*

4.7.Retrospective analysis and discussion of results

The results of the empirical study confirm that Moroccan exports depend on their past. It is therefore necessary to go back to the past in order to raise the key factors which favoured the promotion of these exports at the time and marked the main factors which disadvantaged them. In order to do this, a retrospective analysis will be put in place which summarises on the one hand the main strategies deployed by the State to promote the national economy and on the other hand their impact on exports.

After independence, Morocco embarked on a strategy of reunification of its territory and its administrations. From 1956, the country gained its independence and concretised its sovereignty over all its territory. This sovereignty was to be acknowledged at both national and international level (Cantat 2018). Immediately afterwards, the Moroccan State faced several challenges. The fall in investments, the evasion of capital, the amplification of the rural exodus, the increase in unemployment are as many economic and social problems which Morocco faced just after its independence (Belal, et Agourram 1970).

To face these problems, several trade policies have been forged to improve its external position. From 1960 onwards, a protectionist policy was introduced in order to establish a productive apparatus capable of reducing the share of imports in the internal market. Despite the success of this policy in several countries such as Brazil, India and Argentina, it quickly came to a standstill in the Moroccan context (Jaidi 2013) . This is due to the weakness of the industrial sector and its inability to satisfy local demand (Marzak, M., Ghoufrane, A., Boubrahimi, N., Diani, A. 2014) .

From 1983 onwards, the country moved towards the adoption of export-led growth (Escribano and Lorca 2003). This strategy is implemented within the framework of the structural adjustment programme (SAP) required by the World Bank and the **International Monetary Fund** (IMF) (Vermeren 2002b). Exports at the time were limited to agricultural or fishery products, mineral products and products related to the outsourcing activity (Marzak, M., Ghoufrane, A., Boubrahimi, N., Diani, A. 2014). Indeed, the limitation of competitive factors to legacy advantages (natural resources, geographical location) and the poor business climate (payment defaults and corruption, smuggling) have handicapped the achievement of the objectives set by the exports promotion policy (Marzak, M., Ghoufrane, A., Boubrahimi, N., Diani, A. 2014).

In the light of the phenomenon of globalisation and competition, the country has been moving towards specialisation in the new global trades since 2005. To succeed in this new orientation, a mass of structural projects have been set up: the port of Tangier-Med, the valorisation of phosphate products, the installation of the High Speed Train, the creation of integrated industrial platforms, etc (Berrada 2018). This new strategy has favoured the structural transformation of the country's exports. By way of example: exports of finished equipment products increased from 8% in 2004 to 20% in 2018, as well as exports of semi-finished products increased from 6% in 2004 to 22% in 2018 according to the statistics of the Moroccan Exchange Office.

From this retrospective analysis, it can be deduced that the history of the Moroccan economy is rich in lessons. It reflects many achievements and records through several development policies and strategies. Nevertheless, these efforts always end in failure due to a series of structural constraints, namely: corruption, the absence of strong local industry, low-skilled labour, the development of the informal sector, specialisation in the manufacture of low value-added products, dependence on climatic hazards, etc. Therefore, the successes of future exports promotion strategies are conditioned by the country's capacity to develop its structural potential.

5. Summary and conclusions:

In recent years, the exports of goods and services have evolved continuously due to Morocco's orientation towards the new world trades. From 2005 onwards, Morocco began to weave its industrial potential to become a major producer on the international market of automobile, electronic and aeronautical products. Consequently, forecasting exports effectively appears to be of great importance in order to ensure efficient monitoring and planning.

Forecasting Moroccan exports of goods and services can be obtained using the ARIMA model (0,1,0). Therefore, exports depend on their past history. The retrospective analysis allows us to deduce that the improvement of exports requires the development of the local industry, the improvement of the workforce skills, the acquisition of know-how, specialisation in the manufacture of products of high technological value, the improvement of the business climate and the valorisation of phosphate products. In addition, the implementation of a marketing sales strategy is desirable in the light of the phenomenon of globalisation and competition.

Finally, our model can be used as a reference for forecasting Moroccan exports in the short term. However, updates are always desirable in order to improve the accuracy of the forecasts obtained. It should be noted that unexpected events or incidents may arise and consequently disrupt the results predicted by the model, such as the example of the COVID-19 pandemic, which confirms the importance of incorporating current data and the need to implement multi-varied modelling. Our future work will be the subject of an in-depth investigation of the factors explaining Moroccan exports.

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