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Impact of the Moroccan tax structure on economic growth

Nora Angour[1]
[1]*Research Laboratory in Management, Finance and Social Economy (LAREMFES), Faculty of Economic and Social Sciences, Sidi Mohamed Ben Abdellah University, Fez, Morocco*

Abstract:
The aim of this study is to investigate the impact of different types of tax on the economic growth in Morocco during the period from 1980 to 2018. The study used Auto Regressive Distributed Lag modelling which was appropriate for the purpose of research. Using time series data, the empirical study found that direct tax burden, and registrations and stamps are positively affecting the economic growth in both the short-run and long-run. Whereas indirect tax burden reveals a positive impact in short-run and a negative effect in long-run. Customs duties appear as a damp of the economic growth.
Key Word*: Tax structure; Direct tax burden; Indirect tax burden; ARDL modelling; Economic growth; Morocco.*

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I. Introduction

Fiscal policy is a central element of economic policies. Optimal taxation allows the financing of public expenditure, income redistribution, allocation and stabilisation of resources, and support for economic growth.

In this sense, several theoretical and empirical studies assume the existence of a relationship between the fiscal policies undertaken by the state and the evolution of the economic growth. Econometric models are thus proposed, relaying the relationship between a dependent variable relating to economic growth (GDP, GDP per capita, non-agricultural GDP, etc.) and several independent variables explaining the latter. These explanatory variables differ from one study to another depending on whether the objective is to investigate the impact of taxation as a whole on economic growth or to refine the individual influence of each type of tax.

In Morocco, the tax system consists of direct taxes, indirect taxes, customs duties and registration and stamp duties. Although Morocco's tax system has been undergoing frequent changes over the last four decades, the impact of such changes on the economic sphere has received little attention. Estimating the impact of one type of tax on economic growth could guide policymakers in taking fiscal orientations that are favorable to the positive development of the Moroccan economy.

The present work examines the impact of an increase or decrease in one type of tax on the Moroccan economy. Do all taxes have the same effect on economic growth?

In the following part of this paper, a brief analysis of the Moroccan tax structure is presented in section 2. In section 3, a literature review of works related to our study is synthesized. In section 4, we describe our work methodology by explaining the principle of the model used and the data considered in our study. The empirical application to the Moroccan case is presented with the results obtained in section 5.

II. Overview of the tax structure in Morocco by type of tax

In Morocco, the State's tax revenues, which represent more than 85% on average of its total revenues, have shown remarkable growth since 1980. Since the 1990s, a change in the structure of tax revenues in favor of direct taxation has been recorded, due to the good performance of the economic situation, particularly in sectors that are buoyant in the Moroccan economy, such as the financial sector, construction and public works, and telecommunications. Thus, the share of direct taxes has increased significantly since 1999, rising from 32.4% to 45.5% between 1999 and 2018. Indirect taxes, although they represent a very important proportion, have seen their contribution decrease from 57.1% to 50.9% between 1999 and 2018.

Analyzed by type of tax, the structure of tax revenues in Morocco has undergone a major change in the share of tax revenues from corporate income tax (CIT), which doubled from 10.8% in 1990 to 23.9% in 2018, and from income tax (IT), which increased from 8.1% to 20%, reflecting the performance of these two taxes, but also the inclusion of a number of direct taxes on a constant basis between 1999 and 2001 in both IT and CIT. This development reflects the efforts of the tax administration to strengthen tax control, in addition to the dynamism of large companies.

Value added tax (VAT) revenues amounted to 60 MDH in 2018 against 8.3 MDH in 1999, i.e. an average increase of 7.6%. The introduction of VAT at a rate of 20% and the start of the tax reform as of 2005 resulted in a gradual broadening of the tax base and the strengthening of control.

At the same time, the share of the domestic consumption tax (DCT) fell from 24.3% in 1995 to 13.5% in 2018. Indeed, the reduction in the share of DCT can be explained in particular by the tax reform in 2003, which consisted in reducing the share of DCT applicable to tobacco from 65% to 52%.

In addition, the drop in customs duties, which fell by more than 18 points from 23.4% to 4.6% between the two dates. This drop is undeniably due to the strengthening of the tariff dismantling process.

Registration and stamp duty revenues rose from 4 million dirhams in 1999 to 15.6 million dirhams in 2018, i.e. an increase of 11.6 million dirhams, mainly due to the improvement in real estate activity.

Tax pressure in Morocco

The graph in Figure 1 illustrates the historical evolution of the tax burden rate in Morocco from 1980 to 2018. It can be seen that since 1980, the tax burden has steadily increased to reach a historical peak of 23.4% in 2008, and the tax burden rate has been declining since then. This is due to a number of economic and administrative factors such as the favorable economic conditions marked by a sustained performance of the real estate and financial sectors, collection efforts, the tax control and measures to broaden the tax base.

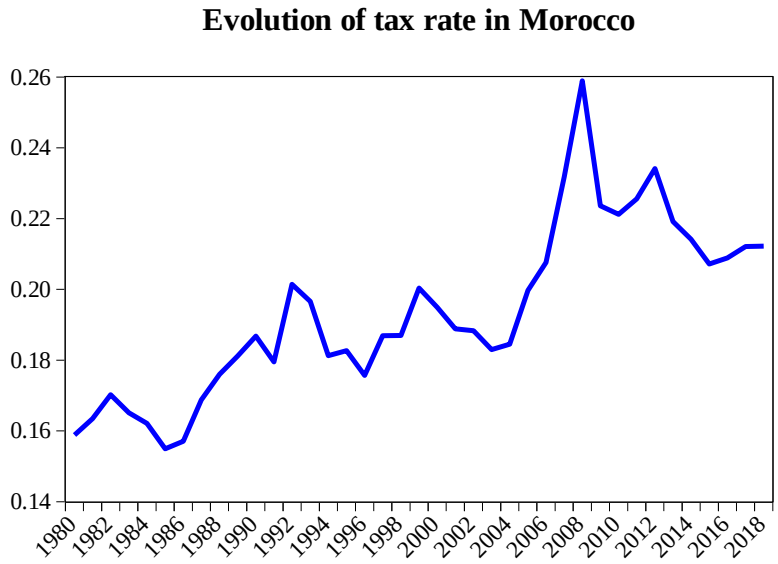

Figure 1: Evolution of tax rate in Morocco

Elasticity of tax revenues to economic activity

On the whole, the study of the elasticity of tax revenues to current GDP over the period 1980-1998 shows that the elasticity has been slightly high, with the exception of 1992 (Figure 2). Indeed, Morocco had recorded elasticities equal to or less than unity. It saw its elasticities reduced between the two periods, which means that tax revenues evolve less quickly than economic activity.

From 2001 onwards, the analysis of tax revenues revealed a greater sensitivity of tax revenues to economic activity, due to the implementation of the tax policy reform and the modernisation of the tax administration. It is also explained, among other things, by the predominant role of domestic demand, which leads to VAT surpluses, the very high performance of large taxpayers in the financial, telecom and real estate sectors.

It should also be noted that some years have been marked by a negative elasticity, which can be explained by the decline in tax revenues.

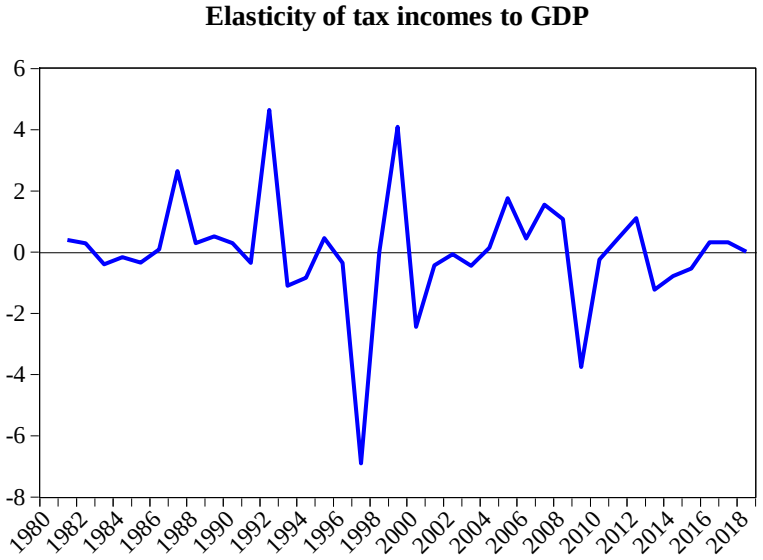

Figure 2: Elasticity of tax incomes to GDP

III. Literature review

The issue of the impact of taxation on economic growth has been widely studied. Several studies have examined the relationship between fiscal policy and economic growth, with reference to neoclassical and endogenous growth models. Indeed, endogenous growth models assume that tax measures and public spending are variables that make it possible to analyse the relationship between fiscal policy and long-term growth ([1]; [2]; [3] ; [4] ; [5]). In contrast, neoclassical models postulate that the accumulation of human and physical capital are the determinants of the economic growth ([6]; [7]).

In this sense, several research works have been carried out for various countries to determine the existence of a relationship between the economic growth and taxation, using a variety of data, methodologies and study periods.

Referring to Barro's model, [8] studied the effect of taxation on growth through an econometric study of a large sample of countries at various levels of development. The results obtained demonstrate the harmful effect of a tax base on foreign trade. Also, the overall tax rate correlates negatively with the product on growth.

[9] analyzed the impact of taxation on the economic growth in South Africa over the period 1960-2002. They found that a decrease in tax burden was correlated with an increase in the potential for the economic growth. In addition, the authors provided that any decrease in the indirect taxation in relation to the direct taxation is associated with an increase in the potential for the economic growth.

[10] investigated tax structure to economic growth for a panel of 21 OECD countries. Taking into account the accumulation of physical and human capital, the author showed that taxes on income were less favorable to the economic growth, while taxes on consumption and wealth were more favorable.

On another front, others contributions examined specifically how changes in the tax structure - rather than changes in the overall tax burden - affect the level of income or the growth rate of the economy over the medium and long term.

[11] found a correlation between the level of development and the tax structure. Indeed, developing countries relied on taxes on international trade while developed countries had a large share of income taxes.

[12] conducted a study of a panel of 22 OECD countries over the period 1970-1995. They concluded that distortionary taxation (taxation on income and profit, social security contributions, taxation on property) reduced growth, unlike non-distortionary taxation (taxation on domestic goods and services). Also, productive public expenditure (general public services expenditure, defence expenditure, educational expenditure) increased growth against non-productive expenditure (social security and welfare expenditure).

[13] analyzed a panel of 21 OECD countries to demonstrate that economic growth can be increased by shifting the tax base progressively towards consumption and real estate.

[14] conducted a comparative analysis of 27 European Union countries over the period 1995-2010. They found that the tax structure based on direct taxes was more effective in supporting economic growth in EU countries. This was principally due to the taxation of wealth.

[15] extended the analysis of [13] to a wider range of countries with different income levels. Similar results were found. Indeed, a shift from consumption and property taxes to income taxes was negatively associated with long-term growth. On the contrary, a shift from income taxes to property taxes had a more

significant and positive association with long-term growth than a shift to consumption taxes. A reduction in income taxes while increasing value added and sales taxes was also associated with faster growth. These results remained valid in high- and middle-income countries, in contrast to low-income countries where no evidence of the importance of changes in tax mix and the economic growth was found.

[16] tested the impact of the tax structure on economic growth for a panel of over 100 countries over the period 1980-2010. They obtained that raising income taxes and reducing taxes on trade or consumption do not had a positive effect on the growth.

[17] studied the impact of the tax structure on economic growth in Kosovo. The obtained results showed that all the taxes studied had a positive impact on GDP growth during the period 2007-2015, with the exception of the personal tax and withholding tax, which had a negative correlation with the economic growth.

IV. Methodology

This work examines the effects of the tax structure on economic growth in Morocco using the Auto Regressive Distributed Lag (ARDL) model. Using the latter, the evolution of economic growth is modelled as a function of the lags of the considered variables.

ARDL description

The Auto Regressive Distributed Lag (ARDL) is a model that considers the time dynamics of some variables to explain a dependent time variable. It is composed of two parts:

- Auto Regressive: the dependent variable is regressed on its own time lagged values.

$$Y_t = f(Y_{t-1}, \dots, Y_{t-p})$$

- Distributed Lag: the dependent variable is regressed on the current values of one or more independent variables and their lagged values.

$$Y_t = f(X_t, X_{t-1}, \dots, X_{t-q})$$

By a combination of these two components, the ARDL model can be written as follows:

$$Y_t = f(Y_{t-1}, \dots, Y_{t-p}, X_t, X_{t-1}, \dots, X_{t-q})$$

In the linear form, the ARDL model becomes:

$$Y_t = \theta + a_1 Y_{t-1}, + \cdots + a_p Y_{t-p} + b_0 X_t + b_1 X_{t-1} + \cdots + b_q X_{t-q}$$

Thus, this model takes into account the past and instantaneous effects of the explanatory variables to properly explain the dependent variable. However, the problem of non-stationarity that could cause spurious regressions remains.

To set the optimal lags (p and q), the AIC, SIC information criteria are the most widely used. Note also that the chosen ARDL model must satisfy the underlying assumptions: the model must not suffer from autocorrelation, heteroskedasticity, the coefficients must be stable, there must be no model specification error, and the errors must have a normal distribution.

Moreover, since the ARDL model is a dynamic model, estimates of short- and long-term effects are made under the condition that the studied series are cointegrated or integrated at different orders.

Data

To study this relationship, we use time-series data for the period 1980-2018. These data are collected from the Treasury and External Finance Direction (DTFE) of the Ministry of Economy and Finance of the Kingdom of Morocco. They represent the gross domestic product (GDP) considered as our dependent variable, variables related to the tax structure and the opening rate (TAOUVER) used in our case as a control variable. Given the decomposition of the Moroccan tax structure we consider the following independent variables: the direct tax pressure calculated as the ratio of direct tax revenues to GDP (PRESSD), the indirect tax pressure as the ratio of indirect tax revenues to GDP (PRESSI), the rate of revenue from customs duties to GDP (DOUANE) and the rate of revenue from registration and stamp duty to GDP (TIMBRE). In order to make the results consistent and reliable, these variables are converted to natural logarithmic values.

Table 1 presents the statistical description of the data used in our study. From this table, observing the standard deviation, we note a stability of all variables and the absence of volatility. This is most visible in Figure 3 illustrating the evolution of these variables. Also, in Table 1, the Jarque-Bera test indicates that the studied data follow a normal distribution (Prob. Jarque-Bera> 0.05).

Table 1: Statistical description of the data

	LPIB	LTAOUVER	LPRESSD	LPRESSI	LDOUANE	LTIMBRE
Mean	12.85794	4.116860	-2.795111	-2.479473	-3.748981	-4.422917
Median	12.91946	4.080277	-2.762372	-2.452806	-3.586689	-4.409335
Maximum	13.91700	4.477225	-2.170411	-2.162582	-3.070745	-4.084276
Minimum	11.35671	3.852178	-3.298835	-2.827285	-4.852440	-4.773781

Std. Dev.	0.736272	0.207744	0.326593	0.200345	0.565572	0.231560
Skewness	-0.408717	0.425083	-0.006322	-0.091466	-0.769024	-0.094236
Kurtosis	2.178111	1.688934	1.705216	1.751829	2.288449	1.455698
Jarque-Bera	2.183509	3.967726	2.724516	2.586019	4.666835	3.933137
Probability	0.335627	0.137537	0.256082	0.274444	0.096964	0.139936
Sum	501.4595	160.5575	-109.0093	-96.69946	-146.2103	-172.4938
Sum Sq. Dev.	20.59968	1.639988	4.053187	1.525250	12.15511	2.037561
Observations	39	39	39	39	39	39

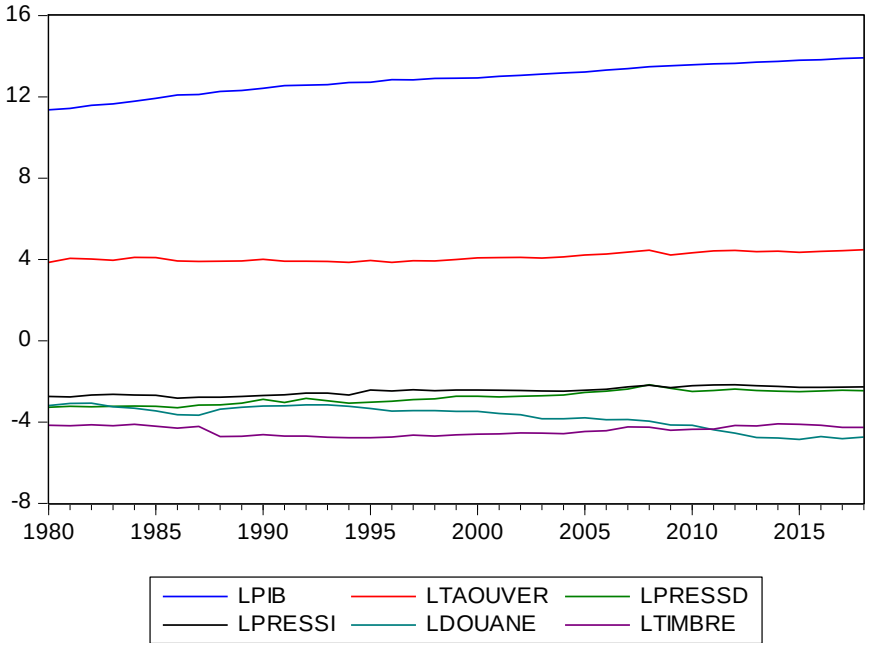

Figure 3: Evolution of the different studied data values

Still with the objective of establishing the relationship between the tax system and economic growth, we can see in Figure 4 the individual relationships between each explanatory variable and GDP. Informally, Figure 4 shows that the openness rate, direct and indirect tax pressure have a preliminary positive impact, while customs duties have a negative impact on GDP. Registration and stamps seem to have a small and slightly positive impact on GDP.

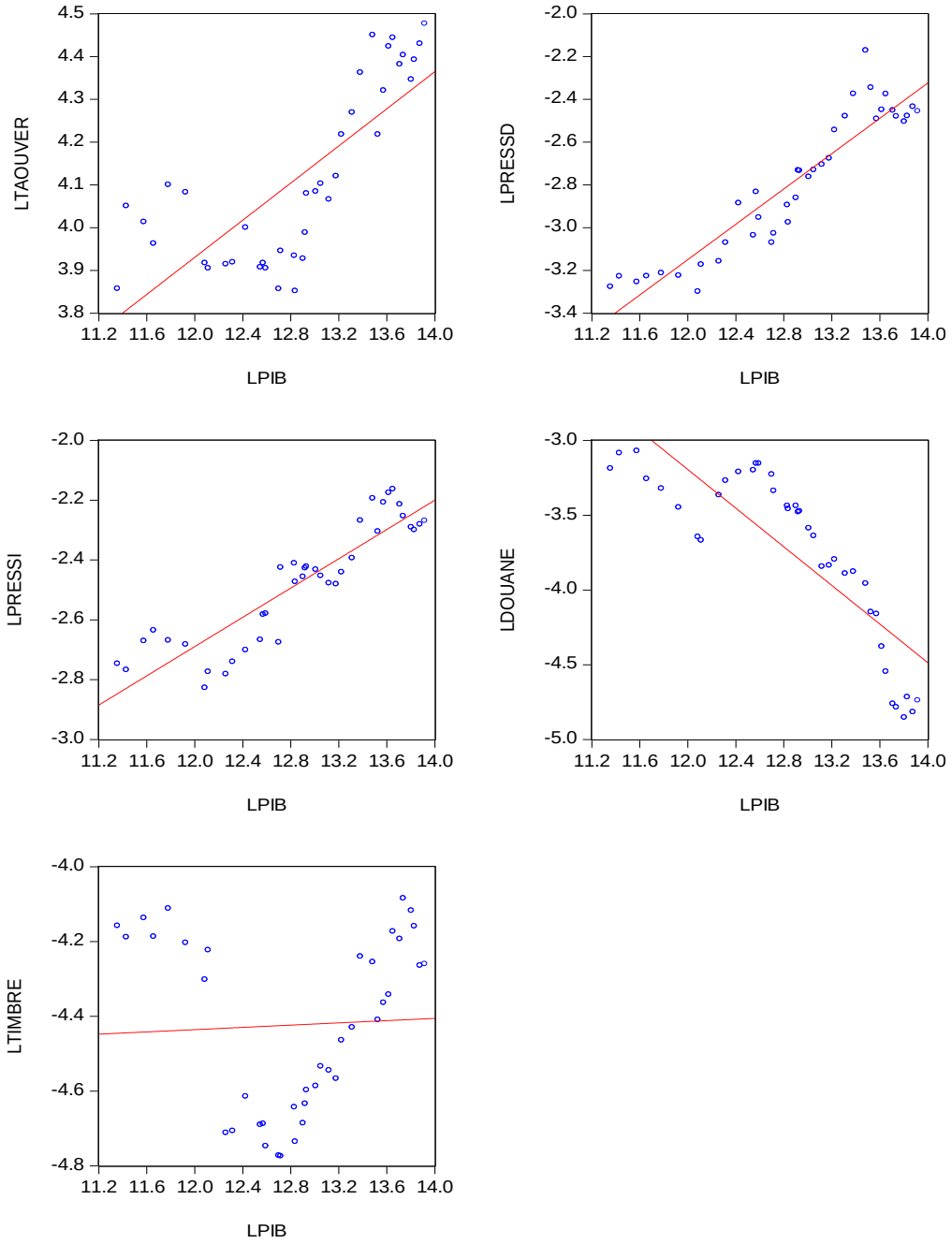

Figure 4: Relationship between GDP and explicative variables

V. Empirical study and results

In this study, we apply the dynamic ARDL model to investigate the effects of the preceding explanatory variables on the economic growth represented by the variable GDP. Thus, to analyze the short- and long-term effects, our model can be written as follows:

$$\Delta LPIB_t = \theta + \sum_{i=1}^{p} b_{1i}\,\Delta LPIB_{t-i} + \sum_{i=0}^{q-1} b_{2i}\,\Delta LPRESSD_{t-i} + \sum_{i=0}^{c-1} b_{3i}\,\Delta LPRESSI_{t-i} + \sum_{i=0}^{d-1} b_{4i}\,\Delta LDOUANE_{t-i} + \sum_{i=0}^{k-1} b_{5i}\,\Delta LTIMBRE_{t-i} + \sum_{i=0}^{r-1} b_{6i}\,\Delta LTAOUVER_{t-i} + \lambda_1 LPIB_{t-1} + \lambda_2 LPRESSD_{t-1} + \lambda_3 LPRESSI_{t-1} + \lambda_4 LDOUANE_{t-1} + \lambda_5 LTIMBRE_{t-1} + \lambda_6 LTAOUVER_{t-1} + e_t$$

With $b_1, \dots, b_6$: short-run coefficients; $\lambda_1, \dots, \lambda_6$: coefficients of long-run dynamic; Δ : first-order difference operator; θ: constant; e : error term (white noise).
All of the following empirical study is performed under EViews 10 software.

Our study is based on time-series data. In order to avoid spurious regressions, it is necessary to check beforehand the stationarity of the different used variables. In our case, we chose to examine the stationarity of the variables using the Dickey-Fuller test (AFD, 1979). The results of this test are shown in Table 2, where we can see that all independent variables are integrated at order 1 (stationary after the first differentiation) and that the dependent variable is level-stationary. Thus, all variables have an order of integration that does not exceed 1.

Nevertheless, since the series are integrated at different orders, this leads us to adopt the cointegration test at the bounds of Pesaran et al. ([18]). After specifying the ARDL model by determining the optimal lags and parameter values, this test is carried out to test the existence of cointegration between the variables or not. Specifically, the Fisher F-value is calculated and then compared to critical values called bounds. If the calculated value is greater than the upper bound, there is cointegration between the variables. If the calculated value is below the lower bound, cointegration does not exist. On the other hand, an F value between the two bounds does not allow any conclusion about the existence of cointegration.

We thus calculated the optimal model shifts as (5, 4, 4, 4, 4, 4) considering the AIC information criterion. In our case, we confirm that a cointegrating relationship exists between our variables. Indeed, the Fisher value obtained (15.03) is higher than the upper bound at the 1% significance level (see table 3). Consequently, it is possible to estimate the long-term effects of the explanatory variables on GDP (variable LPIB).

Table 2: results of the integration test

Variables	**AFD**	
	I(0)	**I(1)**
LPIB	-4.67* (0.0006)	-
LTAOUVER	-0.93 (0.7676)	-7.85* (0.0000)
LPRESSD	-1.19 (0.6669)	-6.80* (0.0000)
LPRESSI	-1.22 (0.6533)	-7.61* (0.0000)
LDOUANE	0.29 (0.9752)	-3.33* (0.0204)
LTIMBRE	-1.60 (0.4714)	-6.77* (0.0000)

Table 3: results of the cointegration test of Pesaran et al. ([18])

F-Bounds Test	**Null Hypothesis: No levels relationship**	
F-stat calculée	15.03074	
Valeur critique	Borne inférieure	Borne supérieure
10%	3.087	4.277
5%	3.673	5.002
1%	5.095	6.77

Table 4 presents the results of the long-run coefficient estimates. These results show manifold effects of the different types of taxes on the economic growth. Precisely, direct taxes and registration and stamping have a positive long-run impact on economic growth: an increase in direct tax revenues of 1% of GDP would increase GDP by 0.99%, and an increase in registration and stamping revenues of 1% of GDP would increase GDP by 0.68%. On the other hand, indirect taxes and customs duties have a negative influence, and an increase of 1% of GDP in each one would decrease GDP by 0.76% and 0.26% respectively. The control variable, openness rate, shows a negative long-run impact with a decrease in GDP of 1.9% for every 1% increase in GDP. It should be noted that our coefficients obtained in the long run estimation are significant at 1% except for the customs duties coefficient which is significant at 5%.

Table 5: ARDL long-run estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPRESSD	0.996236	0.076527	13.01804	0.0058
LPRESSI	-0.762666	0.065666	-11.61436	0.0073
LDOUANE	-0.263848	0.041228	-6.399663	0.0236
LTIMBRE	0.689108	0.060877	11.31962	0.0077
LTAOUVER	-1.903486	0.147379	-12.91554	0.0059
EC = LPIB - (0.9962*LPRESSD - 0.7627*LPRESSI - 0.2638*LDOUANE +0.6891*LTIMBRE -1.9035*LTAOUVER)				

In the case of short-run, we observe in table 5 that the signs of effects remain the same as those achieved in the long-run, except for the indirect tax burden, which is having a positive impact on the economy's growth. Over time, by observing the lagged effects, they remain the same for the indirect tax burden and customs duties, while they are reversed for the direct tax burden and registration and stamp duty. Indeed, one or two years ago, fiscal policies concerning direct taxes and registration and stamp duties contributed to holding back growth in Morocco. On the other hand, the policies taken for VAT and DCT are favorable to the positive development of growth. Customs duties continue to be unfavorable to growth over time. The control variable, openness, is unfavorable to growth, but with the delay its impact becomes slightly favorable. Note that all the coefficients obtained are significant. The adjustment coefficient CointEq(-1) is significant at the level of 1% and has a negative value of -1.23. This means that our model provides a correction process for imbalances that may occur during a year in the following year.

Table 5: short-term estimation using ARDL error correction approach estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28.17124	1.582490	17.80185	0.0031
@TREND	0.067765	0.003892	17.40927	0.0033
D(LPIB(-1))	-1.114692	0.097907	-11.38524	0.0076
D(LPIB(-2))	-1.469928	0.120584	-12.19005	0.0067
D(LPIB(-3))	-0.652436	0.062870	-10.37747	0.0092
D(LPIB(-4))	0.113164	0.046224	2.448156	0.1341
D(LPRESSD)	**0.620494**	**0.053834**	**11.52615**	**0.0074**
D(LPRESSD(-1))	-0.260028	0.030653	-8.483045	0.0136
D(LPRESSD(-2))	-0.092928	0.032072	-2.897433	0.1013
D(LPRESSD(-3))	0.358373	0.030614	11.70611	0.0072
D(LPRESSI)	**0.114020**	**0.029001**	**3.931661**	**0.0590**
D(LPRESSI(-1))	1.644552	0.086796	18.94735	0.0028
D(LPRESSI(-2))	0.960065	0.074550	12.87807	0.0060
D(LPRESSI(-3))	0.643435	0.045021	14.29196	0.0049
D(LDOUANE)	**-0.497204**	**0.035718**	**-13.92026**	**0.0051**
D(LDOUANE(-1))	-0.133334	0.022881	-5.827204	0.0282
D(LDOUANE(-2))	-0.311678	0.022746	-13.70234	0.0053
D(LDOUANE(-3))	0.070525	0.020329	3.469267	0.0740
D(LTIMBRE)	**0.280189**	**0.025488**	**10.99302**	**0.0082**
D(LTIMBRE(-1))	-0.455140	0.037440	-12.15648	0.0067
D(LTIMBRE(-2))	-0.329307	0.019893	-16.55385	0.0036
D(LTIMBRE(-3))	-0.527849	0.031271	-16.87964	0.0035
D(LTAOUVER)	**-0.878912**	**0.064579**	**-13.60985**	**0.0054**
D(LTAOUVER(-1))	0.051536	0.042084	1.224601	0.3454
D(LTAOUVER(-2))	0.270737	0.042319	6.397587	0.0236
D(LTAOUVER(-3))	-0.318657	0.041470	-7.683979	0.0165
CointEq(-1)*	-1.238273	0.069697	-17.76641	0.0032

To examine the robustness of our model, we conducted further tests. Specifically, we tested serial correlation using the Breusch-Godfrey serial correlation LM test and heteroskedasticity using the Breusch-Pagan-Godfrey test. The results of the model's diagnostic tests are presented in Table 6. The Breusch-Godfrey LM test shows no autocorrelation in the model. Similarly, the results of the Breusch-Pagan-Godfrey test do not indicate any heteroskedasticity. In addition, the Jarque-Bera test shows that the errors follow a normal distribution.

Table 6 : ARDL diagnostic test estimates

Test hypothesis	Test	F-stat Value (probability)
LM correlation	Breusch-Godfrey	0.17 (0.84)
Heteroskedasticity	Breusch-Pagan-Godfrey	1.01 (0.44)
Normality	Jarque-Bera	1.12 (0.56)

We also performed the causality test of Toda-Yamamoto ([19]) to map causality between variables. Table 7 shows the findings identifying several mono-dimensional causal relationships. Openness and indirect taxation cause GDP dynamics, while changes in customs duties are caused by economic growth, direct and indirect taxation, and openness. Registration and stamp duty are only caused by indirect taxation.

Table 7: Toda-Yamamoto causality test

Variable dépendante	**Variables explicatives**					
	LPIB	*LPRESSD*	*LPRESSI*	*LDOUANE*	*LTIMBRE*	*LTAOUVER*
LPIB	-	0.69 (0.70)	5.49*** (0.06)	0.58 (0.74)	0.16(0.92)	6.04**(0.04)
LPRESSD	4.12 (0.12)	-	1.33 (0.51)	0.49(0.77)	1.6(0.44)	0.14(0.92)
LPRESSI	2.83(0.24)	3.45(0.17)	-	0.35(0.83)	1.98(0.36)	1.06(0.58)
LDOUANE	4.91*** (0.08)	24.93*(0.00)	11.21*(0.003)	-	0.04(0.97)	27.45*(0.00)
LTIMBRE	3.90(0.14)	1.24(0.53)	4.77***(0.09)	1.91(0.38)	-	3.63(0.16)
LTAOUVER	0.63(0.72)	3.23(0.19)	0.04(0.97)	1.46(0.48)	0.54(0.75)	-

VI. Conclusion

In Morocco, tax revenue comes essentially from four sources: direct taxes, indirect taxes, customs duties, registrations and stamps. Most of these revenues are obviously used to finance state expenditure for various purposes (operation of public services, public investment, support for the private sector, etc.). Any decrease or increase in tax rates could affect economic indicators. It can be assumed that the government could conduct fiscal policies that would raise direct tax rates in order to boost its revenues. This would cause a drop in personal income which in consequence affects economic growth by reducing the overall demand for goods and services. VAT and DCT revenues are thus reduced. Hence, an increase in the tax burden slows down economic growth.

The present work aims at empirically analysing the impact of tax revenue increases on economic growth in Morocco. We thus used ARDL modelling to determine whether there is a long-run equilibrium relationship between economic growth and the various taxes for the period 1980-2018. Finally, the results of this study suggest that there is a positive and significant impact of direct taxes on economic growth in both the short and long term, and a positive and significant impact of indirect taxes in the short term and a negative impact in the long term. Customs duties seem to contribute to dampening economic growth while registrations and stamps keep a favorable effect in the short and long term.

Personal and corporate income taxes levied on Moroccan taxpayers have a positive effect on economic growth, as they increase government revenues, more than half of which are collected by these taxes. However, value added tax and domestic consumption tax, considered as indirect taxes, have a negative long-term effect on economic growth, but are felt to have a positive effect in the short term.

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