



## **Fiscal Decentralization and Economic Growth in Morocco: A Panel Cointegration Analysis**

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### **ABSTRACT**

This article focuses on the effects of fiscal decentralization on economic growth in Morocco, taking into account three dimensions: Expenditure decentralization, revenue decentralization and the composite of these two indices. It uses a co-integration panel approach to separate long run effects from short run dynamics; by using and revising the set of data generally used in these empirical analyses. The results show that fiscal decentralization can lead to significant long-term economic growth (particularly significant for revenue decentralization), but in the short-term, this leads to a decrease in economic growth. Indeed, short-term results show that fiscal decentralization generates in the very short term a decrease in economic growth before improving over time until reaching a long-term increase between 2003 and 2014 in Morocco.

**Keywords:** Fiscal Decentralization, Economic Growth, Morocco

**JEL Classifications:** C2, H7

### **1. INTRODUCTION**

For developing countries, economic growth, based on indicators of macroeconomic stability, is the objective to be achieved. The major challenge is not only to focus on this mathematical increase in added values, but also to improve the living standards of people and their environment.

The dimension of economic growth and fiscal decentralization is highlighted for two reasons: (1) Stimulating economic growth is one of the main objectives of fiscal decentralization; (2) implementing policies that will ensure a sustained increase in per capita income is an important government objective (Davoodi and Zou, 1998).

The proposition that fiscal decentralization improves economic efficiency may have a corresponding effect on the dynamics of economic growth (Oates, 1993). Theoretically, greater fiscal autonomy may be associated with higher output per unit of labor and higher growth rates (Brueckner, 2006). However, the causal link is not clear, and decentralization can indirectly affect growth by its impact on other socio-economic variables

such as macroeconomic stability and government quality (Martínez-Vázquez and McNab, 2003) or by its interaction with what is institutional (Martinez-Vazquez et al., 2015).

There is hardly any other subject on the impact of decentralization that has received more attention in the empirical literature (Martinez-Vazquez et al., 2015). However, few empirical studies have been devoted to assessing the macroeconomic effects of decentralization in developing countries, thus unveiling relationship between decentralization and economic growth still ambiguous. Most of these few empirical studies are descriptive and anecdotal, and the empirical results are mixed between those highlighting positive links and those giving rise to negative or insignificant ones. Some experts such as Davoodi and Zou (1998) have shown that fiscal decentralization does not have a significant effect on the economic growth of developing countries. Meanwhile, Iimi (2005) shows the positive effects on economic growth.

However, the ambiguity of the results may arise from the fact that they are inter-country analyses. The results are influenced by the diversity of history, culture and degree of development

of the country. Therefore, focusing on one country helps to minimize these data divergences. In general terms, this game of data set reveals the true positive effect of decentralization. Martinez-Vazquez and Rider (2005), along these lines, argue that the effect of fiscal decentralization on economic growth is such a complex phenomenon that requires profound analysis.

The situation of Morocco has never been studied in the economic literature despite the important place that decentralization has in the various reforms of regionalization of the country. Indeed, Morocco has engaged in various reforms, laws and procedures throughout a process of decentralization worth assessing and confronting with all the theoretical and empirical studies carried out at the international level.

Using a data set covering the 16 Moroccan regions with respect to local finance, regional gross domestic product (GDP) and multitudes of other control variables, this paper attempts to empirically examine the link between fiscal decentralization and economic growth in Morocco from 2003 to 2014 following a panel cointegration approach to separate the long-term effects of decentralization from short-term dynamics. The challenge is to undertake an empirical study to determine the Moroccan situation concerning the link between the Moroccan fiscal decentralization and economic growth.

Several questions then arise. What is the effect of fiscal decentralization on economic growth in a developing country such as Morocco? What can this effect be like taking into account a multidimensional variable of this decentralization such as the composite? What is the relationship between variables of fiscal decentralization and economic growth in Morocco in the long term? And what is this effect in the short-term?

## 2. LITERATURE REVIEW

According to the theory of fiscal federalism, first and second generation (Oates, 2005), the effects of decentralization are classified according to the three branches of public economics defined by Musgrave (1959): Resource allocation, income redistribution and economic stabilization.

The expected effects of decentralization are a better allocation of public goods and services and greater efficiency in their production. These effects result from two major mechanisms, namely proximity and competition.

On the one hand, this proximity between local decision-makers and citizens generates an information advantage demonstrated by Hayek (1948) and Oates (1972). Local governments are supposed to have more information at lower cost on members of their community and thus be in a better position to recognize the poorest households, especially since the nature of poverty can vary from one jurisdiction to the other.

On the other hand, proximity should encourage the participation of citizens politically and, in turn, the responsibility of political decision-makers. As a result, local governors, subject to citizen

pressure, are encouraged to become more efficient in the provision of public goods and services. However, this assumption in the case of developing countries implies that local democracy works effectively, as well as a level of literacy and political awareness of citizens, which seems unrealistic in the poorest ones (Bardhan and Mookherjee, 2006).

Due to this proximity with the population and better knowledge of needs, local government also reduces supply chains and costs, potentially generating greater economic efficiency and even reducing the risks associated with the loss of redistributive power by the central government (Ezcurra and Pascual, 2008).

Following the theoretical predictions of the founding approaches of Tiebout (1956) and Oates (1972), competition between local governments should improve the match between the supply and demand of public goods and services and foster greater efficiency in public policies. Thus, individuals who are perfectly informed and mobile can move to the jurisdictions that satisfy their preferences. Most local and regional authorities aim to attract and retain mobile production factors in order to promote investment and economic activity.

Through competition, local governments are more vigilant limiting the possibility of inefficiency, rent seeking and corrupt practices (Breton, 1996). Fiscal decentralization is also often seen as a means to promote markets more effectively (McKinnon, 1997; Marks and Hooghe, 2004).

Likewise, in the public choice approach, fiscal decentralization can lead to competition between jurisdictions in regards to mobile factors of production. This forces discipline of public servants who tend to pursue their own interest and seek to maximize their income. In addition, tax competition between different levels of government leads to a federalism that preserves the efficiency of the market by minimizing the extent of government intervention, hence maintaining the efficiency of the market (Weingast, 1995 in Iqbal et al., 2012).

Decentralization can thus not only improve the potential for achieving efficiency, but also ensure greater economic equity between territories (Ezcurra and Pascual, 2008 in Rodriguez-Pose and Kroijer, 2009). Similarly, decentralization is likely to involve horizontal and vertical competition at a local and regional level, forcing governments to focus on efficient production of public goods and services and limiting bureaucratic capacity to act as revenue maximizing agent (Brennan and Buchanan, 1980; Breton (1983) and Thiessen (2003) in Rodriguez-Pose and Kroijer, 2009).

Finally, this interregional competition coupled with productivity in public sector production functions can help to assess the relationship between decentralization and economic growth (Blöchliger, 2013). In this context, the GDP of an economy is supposed to be based on three pillars: Stock of physical capital, human capital and technological progress. Factor productivity is influenced by institutions and policies from the country, including intergovernmental fiscal frameworks. Decentralization can also affect the stock of physical capital (through public and private

investments), human capital (through education spending), and the use of labor. Thus, local budget allocations can affect several key determinants of economic growth.

However, this allocative efficiency is limited by existence of economies of scale, spillover effects or limited technical, administrative or fiscal capacity. Prud'homme (1995) and Bardhan (2002) also point the risk of greater corruption that decentralization induces in a developing country. Local decision-makers have more ease to establish privileged relationships with local interest groups and are more sensitive to their pressure.

Other studies in this field also point disadvantages of decentralization at the macroeconomic level. The function of redistribution should remain the responsibility of central government because decentralization would contribute to a steady increase in inequality (Prud'homme, 1995, and Manor, 1999). In view of this risk, the literature agrees on the need to combine decentralization with a stable, equitable and efficient intergovernmental transfer system (Buchanan, 1950; Oates, 1972 and Gramlich, 1977).

Decentralization will also have an impact on the stabilization function because budgetary policy is difficult to manage at the local level. This is due to the overflow effects (Prud'homme, 1995), local budget incomes with low income elasticity (Smoke, 2001), and the low incidence of local governments in employment and developing countries.

A number of studies have examined the relationship between fiscal decentralization and economic growth. These studies can be distinguished according to whether it is one country analysis or an inter-country one. However, these studies have shown mixed results as many of them have shown the positive effect while others have found almost no relationship between the two variables or the negative one.

On the basis of our analysis, we will be interested in empirical studies within a single country, distinguishing between developed and developing countries. These two categories differ considerably in several respects.

Several studies in developing countries have highlighted a robust and positive relationship between fiscal decentralization and economic growth. Yulindra (2012) shows the positive effect of fiscal decentralization in Sumatera Barat province in Indonesia on indicators of economic growth in a significant way. While, Smith (2012) returns to almost the same conclusion regarding the case of Mexico. Devkota (2014) also showed that there is a significant and positive correlation between expenditure decentralization and the per capita GDP growth of 20 districts in Nepal. Faridi (2011) found that in Pakistan the two decentralization variables had a positive and significant effect on economic growth for four provinces.

However, Iqbal et al. (2012) comes to demonstrate more mixed results for Pakistan. Revenue decentralization has a positive and significant effect on economic growth, while expenditure decentralization has a negative and significant effect. The composite of decentralization has a positive and significant effect.

Before these two analyzes, Malik et al. (2005) found that for the period 1971–2005 in Pakistan, the share of spending and the share of own revenue have a positive and significant effect on growth (estimated coefficients are 0.54 and 0.62 respectively). When subsidies are included in SCG revenue, the effect of revenue decentralization is negative but insignificant.

In the same logic and using a data set that covers 61 provinces of Vietnam, Anwar and Nguyen (2011) finds that the effect of expenditure decentralization on economic growth has been negative, while the effect of revenue decentralization on economic growth has been positive. The results support the idea that provincial governments are effective in collecting revenue through taxes, while the central government appears to be more efficient in spending it.

Empirical studies within China are driving further diversification of results. Lin and Liu (2000) found the positive impact of fiscal decentralization on China's GDP growth during the 1980s. Zhang and Zou (1998) note the negative impact of fiscal decentralization on economic growth in China (based on data for the period 1980–1992). Zheng and Chu (2013) also estimate their empirical study of 31 Chinese provinces between 1996 and 2005 as the relationship between regional economic growth and provincial government spending. In addition, the relationship also exists in the opposite direction as provincial government spending is affected by regional GDP.

There are other studies that have shown that this relationship is non-linear. Samimi et al. (2010), for 30 provinces of Iran between 2001 and 2007, demonstrated a significant and positive correlation between the two decentralization variables and provincial GDP growth. Qiao et al. (2008) also demonstrated that fiscal decentralization has boosted growth, but the relationship between the two variables is non-linear.

However, other studies have found a statistically insignificant effect between the two variables. Adefeso (2015), for the case of Nigeria, has shown that there is no significant robust effect of revenue or expenditure decentralization on real GDP per capita growth.

This, while other studies highlight the negative impact of decentralization on economic growth. For Sagbas et al. (2005), the relationship between fiscal decentralization and economic growth is negative for 67 Turkish provinces. Huang and Cheng (2005) also show that the direct effect of fiscal decentralization on growth is negative. However, this effect becomes smaller with higher decentralization; and above a certain threshold of additional decentralization it is beneficial for regional growth.

In the same vein, several empirical studies have focused on developed countries. Akai and Sakata (2002) found a positive relationship between fiscal decentralization and US GDP growth for the period 1992-1996. Carrion-I-Silvestre et al. (2008) examined fiscal decentralization in Spain. They found that the impact of revenues decentralization on economic growth is positive, while the impact of expenditure decentralization is negative.

The results of inter-country analyses are also mixed between positive and negative results. For example, using panel data from 51 developed and developing countries for the period 1997 to 2001, Iimi (2005) has demonstrated a positive relationship between fiscal decentralization and GDP growth. 8 years later the same result was found for OECD countries between 1970 and 2010 in the two studies Blöchliger (2013) and Blöchliger and Ege (2013). While using a panel data set involving 46 developed and developing countries, Davoodi and Zou (1998) show a negative relationship between fiscal decentralization and economic growth in developing countries, while there is no relationship in developed countries.

While existing studies provide ample evidence of a link between fiscal decentralization and economic growth in developed and developing countries, none of the existing studies have empirically examined the impact of Morocco's fiscal decentralization on economic growth. The aim is to position ourselves in relation to the different empirical studies within a single country, especially in developing countries.

### 3. EMPIRICAL FRAMEWORK

#### 3.1. Database Used

We use different sources of information for this analysis. The General Treasury of the Kingdom of Morocco, which depends on the Ministry of Economy and Finance, provided us the accounts of Moroccan regions from 2003 to 2014 in terms of operating revenues, equipment revenues, operating expenditures and capital expenditures with details at the regional level, provinces and prefectures, urban communes and rural ones. This allowed us to draw the decentralization variables used.

The directorate of studies and financial forecast, which depends on the Ministry of Economy and Finance, provided us regional GDP from 2003 to 2014 in millions of Dhs and at the 2007 price.

The Office of High Commissioner has provided us various data: The regional population from 2003 to 2014 and urbanization rates by region. The Ministry of National Education has provided us the number of pupils in primary, secondary and secondary schools qualifying by region from 2003 to 2014. The Ministry of Higher Education has provided us the number of students in Moroccan universities by region 2003–2014. The Ministry of Industry, Trade, Investment and the Digital Economy provided us industrial exports by region from 2003 to 2014. The Ministry of Economy and Finance provided us the Gross fixed capital formation by region from 2003 to 2014.

#### 3.2. Econometric Models

##### 3.2.1. The effect of fiscal decentralization on economic growth

To test the nature of relationship between fiscal decentralization and economic growth, we will use growth's models generally used (Levine and Renelt, 1992; Xie et al., 1999; Iqbal et al., 2012; Anwar et al., 2011) based on the endogenous model of Barro (1990). For our study, we will focus on the following model with composite SU of Gu (2012) as an indicator of fiscal

decentralization. We then draw our model from the literature by integrating a set of necessary control variables into the growth models.

$$Pib_{k,t} = \beta_0 + \beta_1 CompSu_{k,t} + \beta_2 Huca_{k,t} + \beta_3 lnpop_{k,t} + \beta_4 Turb_{k,t} + \beta_5 lnFbcf_{k,t} + \beta_6 Opn_{k,t} + \epsilon_{k,t} \quad \text{Model (1)}$$

Where K indexes the 16 regions and t indicates the year in the 2003–2014 time interval. It is well known in the literature that Panel analysis can better represent economic dynamics among economic variables (Baltagi, 2008).

The estimate is made using the generalized least squares method (GLS), which is chosen following an autocorrelation observed in terms of errors using the ordinary least squares method. The GLS method then remedies this problem.

##### 3.2.2. The effect of fiscal decentralization on short- and long-term economic growth

After pointing out the correlation between fiscal decentralization and economic growth, our objective is to adopt a panel cointegration approach to separate the long-term effects of decentralization from short-term dynamics.

For the estimation of long run cointegration we present the equation below. However, three different estimates will be made using the Model (2) with composite of fiscal decentralization, Model (3) with revenue decentralization indicator and Model (4) with expenditure decentralization indicator.

$$Pib_{k,t} = \beta_0 + \beta_1 CompSu_{k,t} + \beta_2 Huca_{k,t} + \beta_3 lnpop_{k,t} + \beta_4 Turb_{k,t} + \beta_5 lnFbcf_{k,t} + \beta_6 Opn_{k,t} + \epsilon_{k,t} \quad \text{Model (2)}$$

$$Pib_{k,t} = \beta_0 + \beta_1 DecRev_{k,t} + \beta_2 Huca_{k,t} + \beta_3 lnpop_{k,t} + \beta_4 Turb_{k,t} + \beta_5 lnFbcf_{k,t} + \beta_6 Opn_{k,t} + \epsilon_{k,t} \quad \text{Model (3)}$$

$$Pib_{k,t} = \beta_0 + \beta_1 DecDep_{k,t} + \beta_2 Huca_{k,t} + \beta_3 lnpop_{k,t} + \beta_4 Turb_{k,t} + \beta_5 lnFbcf_{k,t} + \beta_6 Opn_{k,t} + \epsilon_{k,t} \quad \text{Model (4)}$$

Where K indexes the 16 regions and t indicates the year in the 2003–2014 time interval.

It is then that the equation of short run estimation is presented because the developments of Pedroni (1995; 1999), Kao (1999) allow us to establish a relationship first, in the long run, after which the short term can be studied. Three equations are then presented, each representing an estimate for the three indicators of decentralization (composite, revenue and expenditure).

$$\delta Pib_{k,t} = \beta_0 + \beta_1 \delta CompSu_{k,t} + \beta_2 \delta Huca_{k,t} + \beta_3 \delta lnpop_{k,t} + \beta_4 \delta Turb_{k,t} + \beta_5 \delta lnFbcf_{k,t} + \beta_6 \delta Opn_{k,t} + \alpha resid_{t-1} + \epsilon_{k,t} \quad \text{Model (5)}$$

$$\delta Pib_{k,t} = \beta_0 + \beta_1 \delta DecRev_{k,t} + \beta_2 \delta Huca_{k,t} + \beta_3 \delta lnpop_{k,t} + \beta_4 \delta Turb_{k,t} + \beta_5 \delta lnFbcf_{k,t} + \beta_6 \delta Opn_{k,t} + \alpha resid_{t-1} + \epsilon_{k,t} \quad \text{Model (6)}$$

$$\delta Pib_{k,t} = \beta_0 + \beta_1 \delta DecDep_{k,t} + \beta_2 \delta Huca_{k,t} + \beta_3 \delta lnpop_{k,t} + \beta_4 \delta Turb_{k,t} + \beta_5 \delta lnFbcf_{k,t} + \beta_6 \delta Opn_{k,t} + \alpha resid_{t-1} + \epsilon_{k,t} \quad \text{Model (7)}$$

### 3.2.3. Indicators (variables)

$Pib_{k,t}$  is the regional GDP at the current 2007 price in millions of Dhs for the 16 Moroccan regions.

For the degree of decentralization we will take several decentralization variables and analyze each time using one of these variables. It is also necessary to take into account the multi dimensionality of the concept.

Several empirical studies have examined the variables that measure fiscal decentralization and how to calculate them. The share of local public expenditure on public expenditure (revenues) has been widely used as a proxy of decentralization (Pryor, 1968; Oates, 1972; Panizza, 1999). Oates (1972) suggests that, although incomplete, this variable should be a good measure of fiscal decentralization since “the measurement of government activity in the area of taxation and the expenditure of public funds is certainly a component of fundamental importance in determining its influence on the allocation of resources” (Oates, 1972, p. 197). In addition, fiscal decentralization, particularly to the extent that the delegation of revenue collection and expenditure power corrects vertical fiscal imbalances between different levels of government, is often cited as an important ingredient for accountability and, therefore, good governance.

However, fiscal decentralization is a multidimensional phenomenon and requires multidimensional measures to capture the true image of reality. For this, Gu (2012) developed a multidimensional composite indicator that was chosen to be used in this analysis. This is the SU composite, which has the particularity of having a symmetrical impact on the decentralization of revenue and expenditure (Gu, 2012).

Thus we will use the index of expenditure decentralization  $DecDep_{k,t}$  which is the ratio of local expenditure in the region to total national expenditure. The decentralization index of revenues  $DecDep_{k,t}$  which is the ratio of local revenues in the region to total national revenues. The composite index  $CompSu_{k,t}$  of Gu (2012).

We then add to our model control variables generally used in growth analyzes such as human and physical capital, trade openness, population and urbanization.

$lnpop_{k,t}$ : Is the logarithm of population by region.

$Turb_{k,t}$ : The rate of urbanization by region.

$Huca_{k,t}$ : Represents human capital. It is calculated by the share of number of high school students and universities in the population by region.

$lnFbcf_{k,t}$ : Is the logarithm of Gross fixed capital formation which represents physical capital.

$Opn_{k,t}$ : Represents the openness by region which is calculated by the share of industrial exports by region in industrial value added by region. The argument for including this degree of openness as a determinant of growth indicates that more exports lead to more

efficient allocation of resources due to external competition on the world market (Zhang and Zou, 1998).

## 4. EMPIRICAL RESULTS

### 4.1. The Effect of Fiscal Decentralization on Economic Growth

An initial OLS estimate shows an autocorrelation of the residuals ( $P = 0.0000$ ), which leads us to opt for a regression method capable of solving this problem. For this we analyze using the method of the GLSs.

The results of the GLS estimate presented in Table 1 show a statistically significant correlation between decentralization composite and regional GDP in Morocco between 2003 and 2014. A 1 point increase in the composite of fiscal decentralization leads to an increase in regional GDP of 3343455 points.

All control variables represent a significant correlation with the endogenous variable except for human capital. This is a negative relationship for the population and the rate of urbanization and positive relationship for the openness and gross fixed capital formation. Thus, the more the region is populated and represents a high rate of urbanization the less the region is economically developed. On the other hand, the more the region has a high rate of openness and its gross fixed capital formation is high, the region has a high regional GDP.

According to this first analysis, the relationship between fiscal decentralization and economic growth is empirically proved. However, it is estimated that the correlation between the two short and long term variables should be distinguished, and for this purpose we will use the cointegration panel method to observe the evolution of this correlation.

**Table 1: GLS estimation of the effect of fiscal decentralization composite on economic growth**

Dependent variable: Regional GDP, $Pib_{k,t}$	Model (1)
Composite of decentralization, $CompSu_{k,t}$	3343455*** (228641.1)
Population, $lnpop_{k,t}$	-24734.28*** (2188.333)
Openness, $Opn_{k,t}$	1264.899*** (477.9470)
Urbanization rate, $Turb_{k,t}$	-19022.79*** (5445.756)
Human capital, $Huca_{k,t}$	27989.92 (47940.04)
Gross fixed capital formation, $lnFbcf_{k,t}$	36954.73*** (1593.327)
Observations	176
R <sup>2</sup>	0.92
Adjusted R <sup>2</sup>	0.92
P (F-statistic)	0.0000

Source: Results from E-Views 9 estimates. Robust standard errors is between parentheses. \*\*\*\*\*, \*\* and \* indicate that index is statistically significant at 1, 5 and 10% respectively. GLS: Generalized least squares, GDP: Gross domestic product

## 4.2. Long Run Effects

The main question of this section as well as the next one is to know the distinction between the long-term and short-term effects of fiscal decentralization on economic growth through panel cointegration. However, before any analysis it is advisable to start with the degree of integration of the variables. If they are all stationary, that is  $I(0)$ , the distinction between long-term and short-term relationships would be superfluous. If, on the other hand, some or all of the relevant variables are not stationary, the distinction becomes meaningful. The non-stationarity of the variables in our model is analyzed using the panel stationarity test of Im et al. (2003).

The results of these tests are presented in Table 2. We can then consider that all the variables are non-stationary  $I(1)$  and can therefore be integrated without problem in our cointegration estimate.

Before starting the cointegration estimate we proceed by the structural tests relating to individual cointegration in the sense of Johanson. This structure consists of two tests of Kao and Pedroni. The results are presented in the following Table 3.

The Kao test for the three models (Model (2), Model (3) and Model (4)), each representing an estimate for an indicator of fiscal decentralization (composite, decentralization of expenditure and revenues), indicate results which show that the p-value relative to the data groups to be integrated in the model is significant at the 5% threshold, which allows us to reject the hypothesis  $h_0$ . It considers absence of cointegration in the sense of Engle-Granger and accepts Hypothesis  $h_1$  which stipulates a cointegration in the sense of Engle-Granger for the three models.

But this test is insufficient to reassure us of reliability of hypothesis  $h_1$  which prompts us to use the Pedroni test with its three models (Non deterministic trend, Deterministic intercept and trend and Non deterministic intercept or trend). For the three tests and the three models tested on the 11 calculated statistics, it is found that 6 values are significant at the 5% threshold.

Hence, according to Pedroni and Kao tests, the group of structural test series concludes that there is a cointegration in the sense of

Johanson and we can then start by estimating the long cointegration term. We will use method of modified ordinary least squares modified.

From the results of the first model (Model (2)), there is a statistically non-significant and positive long-term relationship between the composite Su (which is a composite integrating the revenue and expenditure decentralization indicators) and regional GDP.

In the long run, there is a statistically significant and positive relationship between the indicator of revenue decentralization and regional GDP. A 1 percentage point increase in the decentralization of long-term revenue generates an increase of 232,992.1 points in regional GDP. However, the long-term relationship between expenditure decentralization and regional GDP is not proven.

For control variables, population, urbanization rate, human capital and technical capital have a significant impact on long-term regional GDP. However, the relationship is negative for the population while it is positive for urbanization, human and technical capital.

However, this estimate is insufficient if we do not proceed by a normality error test which proves that our regression is not misleading because the probability of Larque Bera (presented above in the Table 3) is  $<5\%$  which makes our results reliable. This is verifiable for the three models (Model (2), Model (3) and Model (4)).

Finally, the coefficients of Wald test of the three estimates are significant at 5% which makes our regression fair.

Thus, according to this estimate, revenue decentralization has a positive long-term impact on economic growth. However, expenditure decentralization alone or in combination with that of revenues has no long-term impact on economic growth.

We then move to short-term estimation for the relationship between fiscal decentralization and three indicators (composite Su, revenue decentralization, expenditure decentralization) on economic growth.

**Table 2: Results of test panel stationarity from Im et al. (2003) for economic variables (individual unit root test)**

Variables	Level			First difference		
	Individual intercept (no trend)	Individual intercept (with trend)	Result	Individual intercept (no trend)	Individual intercept (with trend)	Result
Pibk <sub>t</sub>	5.64	-0.045	NS	-3.27***	-0.69	NS
CompSu <sub>k,t</sub>	-0.82	-1.83**	NS	-6.47***	-2.48***	S
DecRev <sub>k,t</sub>	-1.046	-2.18**	NS	-5.50***	-1.55*	NS
DecDep <sub>k,t</sub>	-1.16	-1.08	NS	-5.61***	-2.30**	S
lnpop <sub>k,t</sub>	5.14	5.55	NS	1.95	1.64	NS
Huca <sub>k,t</sub>	2.90	-1.00	NS	-1.045	0.81	NS
lnFbc <sub>k,t</sub>	-1.62*	2.37	NS	-1.94**	-1.89**	S
Opn <sub>k,t</sub>	1.02	1.34	NS	-1.78**	-0.99	NS
Turb <sub>k,t</sub>	4.69	3.17	NS	0.15	1.34	NS

Source: Results from E-Views 9 estimates. \*\*\*, \*\*, and \* indicate that index is statistically significant at 1, 5 and 10% respectively. Values below -1.645 imply the rejection of the null hypothesis of a unit root at the level of 5%

**Table 3: Panel cointegration tests and cointegration panel estimations: long term results (according to FMOLS fully modified ordinary least squares)**

Dependent variable: Regional GDP, $Pib_{k,t}$	Model (2)	Model (3)	Model (4)
Composite SU, $CompSU_{k,t}$	420649.3 (267837.3)		
Revenue decentralization, $DecRev_{k,t}$		232992.1** (102871.7)	
Expenditure decentralisation, $DecDep_{k,t}$			92372.00 (189071.0)
Population, $Inpop_{k,t}$	-43251.25*** (2906.772)	-45570.35*** (2938.837)	-39247.25*** (2421.667)
Openness, $Opn_{k,t}$	141.6397 (1025.502)	957.9019 (863.2680)	-1092.251 (965.4167)
Urbanization rate, $Turb_{k,t}$	346722.2*** (23976.92)	331556.5*** (23341.72)	356024.4*** (24604.01)
Human capital, $Huca_{k,t}$	206584.8*** (57642.17)	249228.5*** (46718.36)	238106.1*** (45696.83)
Gross fixed capital formation, $lnFbcf_{k,t}$	19276.87*** (1884.975)	20798.19*** (1884.946)	16839.38*** (1657.264)
Observations	160	160	160
Jarque-Bera (probability)	0.0014	0.0006	0.0021
Wald test			
F-statistic	301.2120***	288.7957***	399.0485***
Chi-square	602.4241***	577.5917***	1995.243***
Kao tests			
ADF (t-statistic)	-2.092**	-1.899**	-2.039**
Augmented Dickey-Fuller test equation			
Resid(-1)	-0.317***	-0.296***	-0.314***
D (resid (-1))	0.181**	0.231***	0.163*
Pedroni tests			
Pedroni test 1 (non deterministic trend)	6/11	6/11	6/11
Pedroni test 2 (deterministic intercept and trend)	6/11	6/11	6/11
Pedroni test 3 (non deterministic intercept or trend)	6/11	6/11	6/11

Source: Results from E-Views 9 estimates. Robust standard errors are between parentheses. \*\*\*, \*\*, and \* indicate that the index is statistically significant at 1, 5 and 10% respectively. The results of the Pedroni tests show that are significant compared to the total tests during each step. GDP: Gross domestic product

### 4.3. Short Run Effects

For the short run estimation we will use the models named vector error correction model. The objective is to test and identify the presence of a causal link between fiscal decentralization and regional GDP through some parameters such as boost force coefficient and cointegration coefficient.

For Model (5), we find existence of two models of error-correcting vectors hence the need to choose the most reliable for our analysis which is the first one. It represents the first order differentiated regional GDP variable with respect to the delayed and differentiated order 1 decentralization variable as well as the undifferentiated control variables. Their additions are justified to eliminate the endogeneity bias in the model (Table 4).

The results of error correction vector estimates show that there is a short-term relationship between fiscal decentralization composite and regional but negative GDP. This relationship improves considering the value of the booster force coefficient  $C(1)$  which is  $-0.086$ .

The equation of our model is given in the following form:

$$D(PIB\_REG)=C(1)*(PIB\_REG(-1)-7007316.35901*COMP\_SU(-1)+759458.244707)(2)+C(4)*D(COMP\_SU(-1))+C(5)*D(COMP\_SU(-2))+C(8)*LNGFCF+C(9)*URBANIZATION+C(10)*OPENESS$$

$$SU(-1))+C(5)*D(COMP\_SU(-2))+C(8)*LNGFCF+C(9)*URBANIZATION+C(10)*OPENESS$$

The correlation is negative but the coefficient associated with exogenous variable improves positively but weakly over time, which explains existence of a long run positive causality in the sense of positive (which is proved in the previous section).

We are interested on estimates for coefficients  $C(4)$  and  $C(5)$  which represent the error-correction vector. The basic assumption states that these coefficients are significant at the 5% threshold. Thus, a 1 point increase in the previous year's value of the fiscal decentralization composite generates a regional GDP decrease of 536425.2 points and an increase in the prior value of order 2 of the fiscal decentralization composite results a decrease in regional GDP of only 384649.8 points.

This confirms an improvement of the value of regional GDP. The reliability of hypothesis is confirmed that fiscal decentralization generates an improvement in regional GDP over the long term.

This is then focused on two indicators of decentralization (revenue and expenditure). The results for both models with respect to the error-correction vector show that there is such a negative relationship between the two indicators and regional GDP.

**Table 4: Results of short run estimates: VECM**

Coefficients	Model (5)	Model (6)	Model (7)
C (1)	-0.086*** (0.015)	-0.08*** (0.016)	-0.0884*** (0.0145)
C (2)	-0.139* (0.079)	-0.116 (0.079)	-0.168** (0.078)
C (3)	0.0157 (0.082)	0.038 (0.083)	-0.0227 (0.081)
C (4)	-536425.2*** (131134.3)	-394663.2*** (116994.2)	-626828.7*** (136725)
C (5)	-384649.8*** (122465.3)	-385334.3*** (107148.4)	-325848.6*** (125238.9)
C (6)	-34722.77 (22807.46)	-36798.07 (23217.45)	185.3302 (235.1125)
C (7)	-4049.022*** (1433.937)	-3264.24** (1398.835)	-2953.977 (2342.333)
C (8)	5529.145*** (1359.45)	4650.131*** (1306.836)	6311.414*** (1383.715)
C (9)	-2082.248 (2324.809)	-1095.421 (2301.239)	-4707.071*** (1443.256)
C (10)	100.4558 (236.526)	33.100 (237.7687)	-32677.44 (22456.33)
Observations	144	144	144
R <sup>2</sup>	0.29	0.27	0.31
Wald test			
Chi-square	35.19257***	31.084***	40.072***
J-statistics			
P	0.000	0.000	0.000

Source: Results from E-Views 9 estimates. Robust standard errors are between parentheses. \*\*\*, \*\*, and \* indicate that the index is statistically significant at 1, 5 and 10% respectively. VECM: Vector error correction model

This relationship improves considering the value of recall force coefficient C(1) which is -0.08 for the revenues decentralization and -0.0884 for the expenditure decentralization.

The two equations of two models are as follows:

$$D(\text{PIB\_REG})=C(1)*(\text{PIB\_REG}(-1)-6271439.3021*\text{DEC\_REV}(-1)+705603.865228)(-2))+C(4)*D(\text{DEC\_REV}(-1))+C(5)(8)*\text{LNGFCF}+C(9)*\text{URBANIZATION}+C(10)*\text{OPENESS}$$

$$D(\text{PIB\_REG})=C(1)*(\text{PIB\_REG}(-1)-7945088.62268*\text{DEC\_DEP}(-1)+836408.214454)(-2))+C(4)*D(\text{DEC\_DEP}(-1))+C(5)*C(6)*\text{OPENESS}+C(8)*\text{LNGFCF}+C(9)*\text{LN\_POP}+C(10)*\text{HU\_CAP}$$

Thus, and according to results, correlation for both indicators is negative and significant. The difference between coefficients of the previous value of order 1 with coefficients of the previous value of order 2 shows that there is an improvement of the regional GDP with the time generated by the two indicators of fiscal decentralization. However, for revenue decentralization the negative impact goes from -394663.2 points to -385334.3 points which proves that there is a slight improvement in the short term with time to thus pass to a positive impact in the long term. For expenditure decentralization the negative impact goes from -626828.7 points to -325848.6 points which proves that there is a strong improvement.

For effects of control variables, there is a significant effect of population and physical capital while other variables remain

insufficient (human capital, urbanization rate and openness). The relationship is negative for population for three indicators of fiscal decentralization (composite, decentralization of revenues and expenditure). The most populated regions of a point have their regional GDP lower by 4049.02 points with composite of decentralization and 3264.24 points in the presence of revenues decentralization.

The correlation with technical capital (gross fixed capital formation) is positive. The more a region has a high level of gross fixed capital formation more the region has a higher regional GDP especially for expenditure decentralization. An increase of 1 percentage point in GFCF increases regional GDP by 6311,414 points in the presence of expenditure decentralization.

The error normality test proves that our regressions are not misleading because probability of Larque Berra for the three models is <5%. The Wald tests also of three estimates are significant at 5% which makes our regressions fair.

## 5. DISCUSSION AND CONCLUSION

This paper has verified the hypothesis of stimulation economic growth through fiscal decentralization in Morocco. The objective is to position ourselves against very mixed results of various empirical studies, especially within developing countries and in relation to analyzes within a single country.

Results of our analysis have shown that the correlation between fiscal decentralization and economic growth in Morocco is statistically proved. However, the results are different depending on the results of short run and long run cointegration.

In the long run, fiscal decentralization, especially that of revenues, generates a significant increase in economic growth in Morocco. This result is in line with positive effects of fiscal decentralization. Decentralization improves the potential for achieving allocative efficiency of public goods and services and ensures greater economic equity between territories (Ezcurra and Pascual, 2008 in Rodriguez-Pose and Kroijer, 2009). The two mechanisms of decentralization, proximity and competition, act in this way. The increased proximity between governors and governed allows for a networking between individuals and institutions which helps to reduce transaction costs. Similarly, decentralization is likely to involve horizontal and vertical competition at a local and regional level, forcing governments to focus on the efficient production of public goods and services and limiting bureaucratic capacity to act as a (Brennan and Buchanan, 1980; Breton, 1983 and Thiessen, 2003 cited in Rodriguez-Pose and Kroijer, 2009).

This result joins many other empirical results for developing countries that have found a robust and positive correlation between fiscal decentralization and economic growth, especially through the indicator of revenues decentralization: Yulindra (2012) for Case of Indonesia, Heidi Jane Smith (2012) for Mexico, Devkota (2014) for Nepal, Samimi et al. (2010) for Iran, Lin and Liu (2000) for China, Faridi (2011) for Pakistan and before Malik et al. (2005) for Pakistan as well.



However, the particularity of indicator of revenues decentralization seems to give a positive and significant long-term result in Morocco contrary to the indicator of expenditure decentralization which is insignificant. This is in line with many of studies which also find positive and significant effects for the indicator of revenues decentralization as opposed to those of expenditure decentralization such as Iqbal et al. (2012) and Anwar and Nguyen (2011). The results support idea that the positive effect of revenues decentralization for local and regional authorities seems to be successful, since local and regional authorities are effective in collecting revenue through taxes, whereas the central government seems to be more effective in spending it.

However, short-term results show that fiscal decentralization generates a decline of economic growth at very short term, but this is beginning to improve over time to decrease this regression until it reaches a long-term increase. This decline in economic growth is due to various negative effects of fiscal decentralization, especially in structures of developing countries. Indeed, in this category of countries of which Morocco is a part, there is the risk of greater corruption, limited technical, administrative or fiscal capacities, economies of scale and spillover effects.

Decentralization is also likely to lead to a permanent increase in interregional inequalities, which negatively affects the income redistribution function at the macroeconomic level. At the level of stabilization function, it is also possible to note the influence of local fiscal policy, which is difficult to manage at this level, especially in developing countries, which, as mentioned above, have the particularity of technical capacities, human and financial constraints (Smoke, 2001). For example, there are spill-over effects as well as a weak local government impact on employment and expenditure in developing countries.

This negative result in the Moroccan case joins the other empirical studies in this area: Zhang and Zou (1998) and Zheng and Chu (2013) for China, Sagbas et al. (2005) for Turkey.

Thus, Morocco's results show that fiscal decentralization can lead to significant long-term economic growth, but in the short term this leads to a decrease in economic growth. Indeed, local and regional authorities in Morocco, like most developing countries, are unable to cope with short-term economic fluctuations that are particularly important in this category of countries. The latter are particularly vulnerable to exogenous shocks (prices, climate, etc.), which necessitates coordination of policies at local level. This, without marginalizing the various problems that introduction of fiscal decentralization induces.

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