
Munich Personal RePEc Archive

On the Nexus Between Economic Growth and Bank-based Financial Development: Evidence from Morocco

KCHIKECHE, Ahmed and KHALLOUK, Ouafaà

Department of economics and business administration, Mohammed V University, Rabat, Morocco

31 May 2021

Online at https://mpra.ub.uni-muenchen.de/118294/
MPRA Paper No. 118294, posted 24 Aug 2023 08:09 UTC

On the nexus between economic growth and bank-based financial development: evidence from Morocco[1].

Ahmed KCHIKECHE[a]* and Ouafaà KHALLOUK[b]

[a] *Department of economics and business administration, Mohammed V University, Rabat, Morocco;*

[b] *Department of economics and business administration, Mohammed V University, Rabat, Morocco*

Postal address: RUE 37 N 30 HAY Al BARID CYM, RABAT, MOROCCO;
Email: ahmed_kchikeche@um5.ac.ma

[1] This is an Accepted Manuscript of an article published by Taylor & Francis in **Middle East Development Journal** on *26 Nov 2021*, available at: https://doi.org/10.1080/17938120.2021.1930830 .

On the nexus between economic growth and bank-based financial development: evidence from Morocco

In this paper, we investigate the causal link between bank-based financial development and economic growth in Morocco between 2003 and 2018 using a vector autoregression framework. We test for causality between economic growth and four different measures of bank-based financial development in the short and long run. Our results show that bank-based financial development causes economic growth in the short and long run. Moreover, our results show that economic growth only causes bank-based financial development in the long run. At last, we show that the Moroccan banking sector's integration with the international financial markets only affects the causal link between economic growth and bank-based financial development by providing short-run liquidity to Moroccan banks. Based on these results, barriers to the financial development of the Moroccan banking sector should be investigated, and public policy should focus on designing appropriate policies and programs to alleviate these barriers in order to stimulate the growth of the Moroccan economy.

Keywords: bank-based financial development, economic growth, causality, Vector autoregression, error correction model.

JEL classification: C32, E44, G21

Introduction

A growing body of theoretical and empirical literature suggests an important causal relationship between financial development and economic growth. In particular, a well-developed financial system tends to help foster economic growth, while an underdeveloped inefficient financial system can severely hinder an economy's growth potential (Čihák et al., 2012). At the micro-level financial development helps alleviate the adverse effects of exchange frictions and market imperfections. While at the macro level, a developed financial system improves the quality of the allocation of financial resources, thus boosting investment and economic growth. This relation is in no way unidirectional. That is, the financial sector development is closely tied to the growth in the demand for financial services resulting from a rising economy.

According to Čihák et al. (2012), financial development occurs when financial markets and intermediaries – through the production and commercialization of financial instruments and services – alleviate the adverse effects of market frictions and imperfections. A broader definition of this phenomenon is suggested by Levine (1997), who defines financial development as "improvements in the quality of the functions that the financial sector provides to alleviate market the effects of market imperfections". These functions are: (1) the facilitation of trading, diversification, and management of risk (2) the allocation of resources (3) the monitoring of managers and the exertion of capital control (4) the mobilization of savings (5) the facilitation of the exchange of goods and services (Levine, 1997, p. 691).

The causal link between economic growth and financial development was and remains a controversial subject. According to the growing and diverse literature on the subject, we can distinguish four theoretical arguments regarding this highly debated issue.

First, the proponents of the so-called "demand following hypothesis" argues that the development of the real economy leads to financial development. That is, where economic

growth goes, financial development follows (Nyasha & Odhiambo, 2018). The second view, termed by Patrick (1966) as "the supply leading hypothesis," suggests that the financial sector plays an important role that leads to economic growth. In the same paper, Patrick argues for a more nuanced view which other economists will call "the feedback hypothesis" (Nyasha & Odhiambo, 2018). This view postulates that, in practice, there is likely to be an interaction between the supply-leading and demand-following explanations. Finally, Lucas (1988) argues that the importance of financial matters for economic development is badly over-stressed in popular and professional discussions, implying no causal link between financial development and economic growth. We call this view "the neutrality hypothesis." Despite the extensive empirical work on the subject, the empirical results vary across countries, over time, and depend on the measure of financial development.

The purpose of this paper is to investigate the causal link between bank-based financial development (henceforth referred to as BBFD) and economic growth in Morocco between 2003 and 2018. To empirically test the causality, we use four BBFD indicators. The first three are based on the most popular indicators in the literature, while the fourth is a composite index based on these three indicators. By testing for causality using multiple measures, we aim to explore various dimensions of bank-based financial development and check the robustness of our results. The empirical investigation is performed in a vector autoregression/error correction model framework using cointegration and causality analysis to distinguish between short-run and long-run causality.

This paper is organized as follows. The first section presents an overview of Morocco's economic growth and banking sector development in the last decades. The second section discusses a review of both theoretical and empirical literature, while the third section presents the data and empirical methodology used in this paper. The fourth section will be

dedicated to describing the empirical results. Finally, we conclude this paper with a summary of our empirical findings and some of their policy implications for Morocco.

An overview of economic growth and banking sector development in Morocco

During the 70s and 80s, the Moroccan government pursued an economic development strategy in which the state played a prominent role. This period was characterized by: (i) a heavily controlled banking system where the central bank could administratively set the interest rate and have direct control on credit extension, (ii) an underdeveloped money and stock markets, (iii) tightly regulated capital flows and restricted foreign investment in the financial sector.

The inefficiencies of the Moroccan financial system were aggravated by some extremely bad macroeconomic conditions, such as high levels of national debt, government budget, and trade deficits. To surmount these problems, the Moroccan government, with the support of the IMF and the World Bank, embarked on structural reform and stabilization plans. The main objectives of these programs were to reduce government intervention, establish an open market economy, and enhance economic growth prospects (Jbili et al., 1997).

The financial sector reform became an important element in the structural adjustment program to support and complement the reforms in other sectors. The financial system reforms included steps toward liberating interest rates, prudential regulation, and enhancing bank supervision. In 1993, a new banking law granted greater autonomy to the central bank and strengthened prudential regulation in line with the Basel Committee standards. By the end of the decade, credit control and obligatory liabilities were abolished, an interbank foreign exchange market was established, and interest rates were liberated (Abdelkhalek & Solhi, 2009; Jbili et al., 1997)

Between 2000 and 2018, the Moroccan banking sector went from 21 banks in 2000 to 16 banks in 2006 to reach 24 banks in 2018 (Bank Al-Maghrib, 2018). This period was marked by merger-absorption operations, new approvals, and changes in the shareholding structure (Benazzi & Rouiessi, 2017)

Figure 1. The growth of real bank credit between 2003 and 2018

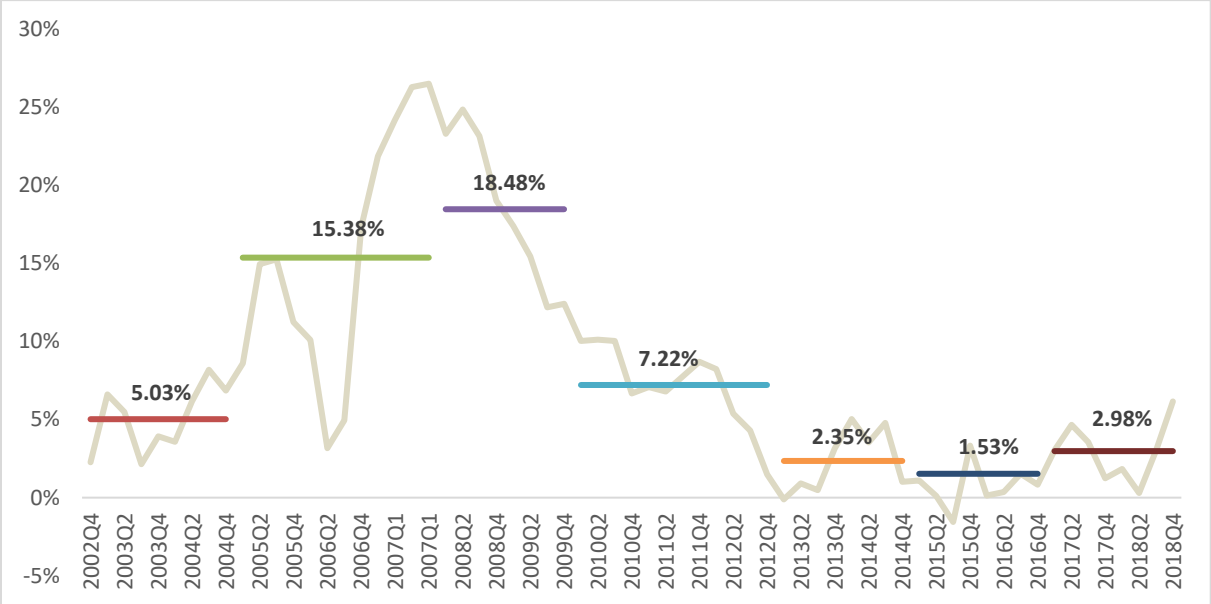
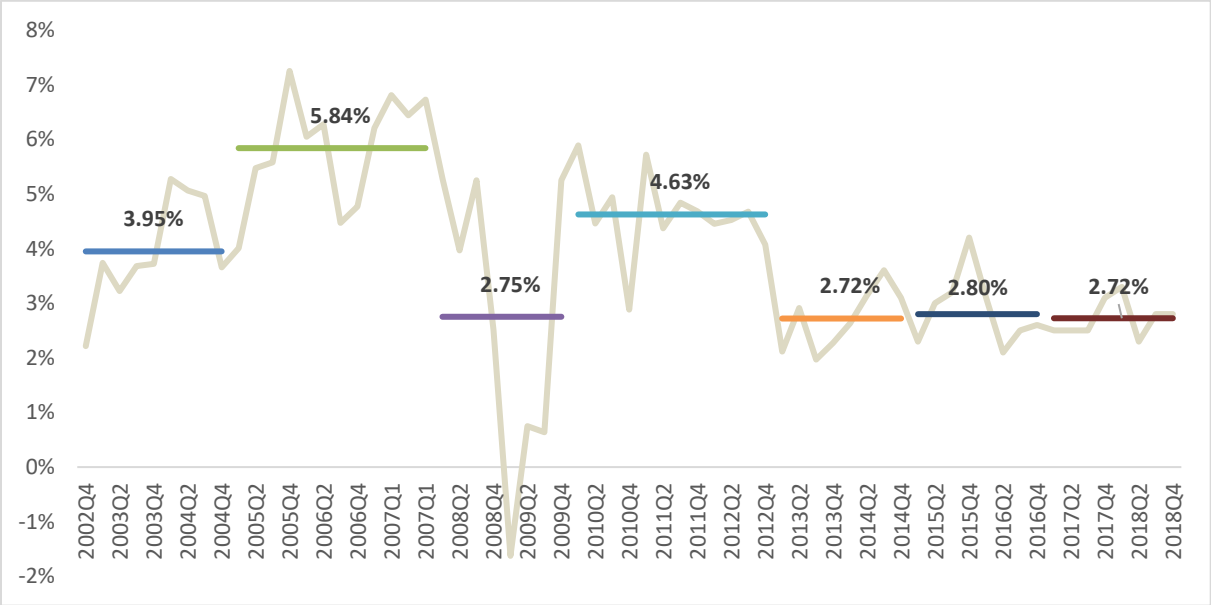


Figure 2. The growth of real non-agricultural GDP between 2003 and 2018



Analyzing the growth of total bank credit – as one of the main measures of BBFD – and non-agricultural GDP suggests a clear positive correlation between BBFD and economic growth in this period. Figures 1 and 2 shows clearly the co-movement between the phases of the credit and the business cycle in Morocco between 2003 and 2018. We can distinguish between three phases: an expansion phase between 2003 and the end of 2007, a contraction phase between 2008 and 2012, and a remarkable stagnation phase between 2013 and 2018. Today, commercial banks dominate the Moroccan financial system and continue to expand domestically and regionally (notably in Sub-Saharan Africa) (International Monetary Fund, 2016). The banking sector is Morocco's main provider of credit and other financial services. For instance, comparing the banking sector balance sheet size and the stock market capitalization (as ratios to GDP) shows both sectors' relative size and evolution.

Figure 3. The relative size of the banking sector and the stock market in Morocco between 2003 and 2018

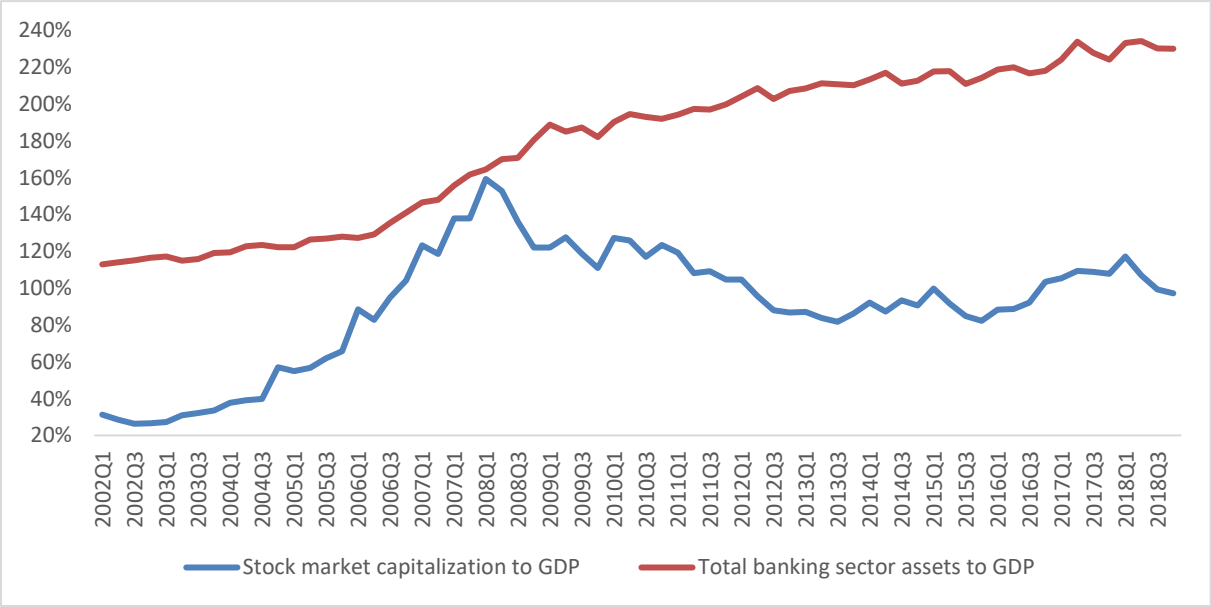


Figure 3 illustrates three characteristics of the evolution of financing the Moroccan economy through the two main actors of the financial sector. First, the difference in relative size is quite outstanding. In 2003, the ratios of stock market capitalization and banking sector balance sheet size to GDP were 27% and 117%, respectively. Over time, both ratios increased

significantly. However, the banking sector maintained its dominance as the ratio of its total assets to GDP reached nearly 230%. In comparison, the stock market capitalization rose to around 97% in the last quarter of 2018. Second, while the banking sector continues to expand at a steady (but slowing) pace, the ratio of stock market capitalization to GDP has declined since the 2008 financial crisis. Figure 3 also shows that, for the study period, how the banking sector has expanded over time. In particular, the balance sheet's relative size has nearly doubled in the last 17 years. However, the pace of this growth was not steady and decelerated over time.

Furthermore, comparing the banking sector and other intermediaries shows the dominant role played by the banking sector. As data from the last quarter of 2018 shows, the banking sector's balance sheet is six times bigger than the balance sheets of all other intermediaries combined. These intermediaries include Financing companies, consumer credit companies, and leasing companies. Considering these characteristics, we focus our empirical investigation on the development of the banking sector.

Literature review

According to a large portion of the existing literature, the state of financial systems and institutions' development is closely tied to the growth of real activity. However, no consensus has been reached on the nature of this relationship. Although, it is crucial to determine the existence, or the lack thereof, and the direction of this causality due to the importance of economic policy implications (Nyasha & Odhiambo, 2018).

Theoretical foundations

According to Nyasha & Odhiambo (2018), we can distinguish between four main views (hypotheses) on this matter, three of which were first termed by Patrick (1966).

The demand following hypothesis

The first hypothesis was defined by (Patrick, 1966) as "the phenomenon in which the creation of financial institutions, assets, and services is a reaction to the existing demand for these services by investors and savers." Thus, financial development is a consequence of economic growth. As the economy grows, the supply of savings, the demand for funds, and the need for financial intermediation become more substantial to the sustainability of economic growth. Under these circumstances, internally generated funds become less sufficient to finance entrepreneurs' new projects and firms' new expansions.

Therefore, financial intermediation becomes crucial for efficiently allocating financial resources. The financial system can thus support and sustain the process of economic growth. Hence, it is the development of the real economy that leads to financial development, that is, where economic growth goes, financial development follows (Nyasha & Odhiambo, 2018).

Some theoretical support for this view could be traced back to Robinson (1952), who argued that the supply of finance tends to follow the demand for it. In other words, financial instruments are created mainly as a response to savers' and investors' needs. The need for financing is thus the primary driver of financial instruments and institution development. Other researchers that came to the same conclusion are Gurley & Shaw (1967, p. 258), who underlined that financial development can be achieved only in the context of real economic growth. In this context, the division of labor in production associated with economic development is a prerequisite to financial development. This division involving the exchange of goods and factors of production induces monetization and leads to the emergence of lending and borrowing operations which create the demand for financial assets and services. Furthermore, during the economic growth process, the emergence of lending and borrowing operations leads to a division of labor between savers and borrowers which, in turn, induces the accumulation of financial assets and liabilities. This ultimately results in the specialization

in saving, investment, and intermediation, and thus, the development of financial tools, markets and institutions.

The supply leading hypothesis

The second view, termed by Patrick (1966) as "the supply leading hypothesis," suggests that the creation of financial institutions and the development of financial services leads to economic growth by providing two key functions:

(1) Transferring financial resources toward more innovative and productive sectors, thus enhancing the allocation efficiency of these resources.

(2) Promoting and stimulating the entrepreneurial drive to create new projects. Therefore, enabling and assisting the emergence and development of new industries.

Therefore, according to this hypothesis, the financial sector plays an important role in promoting economic growth (Nyasha & Odhiambo, 2018).

The first advocate of this view was Schumpeter (1983), who argued that financing the commercial applications of innovative entrepreneurial ideas has a crucial role in stimulating economic development. These new projects cannot be financed using the revenues of existing enterprises because they are necessary to cover the production costs and capital depreciation. Therefore, a source of credit, namely commercial bank credit, is the appropriate financing source for new entrepreneurial projects to emerge and grow.

Later, support of the supply leading came from the proponents of what we can call the "Financial repression school" – mainly from McKinnon (1973); Shaw (1973) – who claims that aggressive monetary policy tools - such as interest rate ceilings, high required reserve ratios, and directed credit programs – and financial regulation restrain financial development and therefore hinder economic growth.

By the same token, the endogenous growth literature argues that by providing important services to savers and investors, financial markets play a crucial role in mobilizing saving toward their most effective uses, reducing informational costs, and promoting specialization. Therefore, financial development causes economic growth by enhancing capital accumulation and overall productivity (Greenwood & Smith, 1997).

This view was also mirrored in Levine (1997), who reviewed a large body of economic literature that supports the supply-leading hypothesis. According to Levine, financial markets and intermediaries stimulate economic growth by providing five functions that reduce market frictions caused by informational and transactional costs. This effect goes through two channels; capital accumulation and technological innovation.

On one hand, the capital accumulation channel literature argues that the functions provided by the financial system influence the rate of capital formation (i.e., generating long-term per capita growth) either by changing the savings rate or by reallocating the existing saving among capital-producing technologies. On the other hand, the technological innovation channel argues that the functions performed by the financial system alter the rate of technological innovation, thus affecting steady-state economic growth.

The feedback hypothesis

Patrick (1966) argues for a more nuanced view which will be called by Nyasha & Odhiambo (2018) "the feedback hypothesis." This view postulates that, in practice, there is likely to be an interaction of supply-leading and demand-following phenomena.

This could be explained either by a bi-directional causality between financial development and economic growth (That is, both hypotheses are valid simultaneously) or by a temporal change in the causality pattern. The latter possibility is further explained by Patrick (1966), who argues that the supply-leading phenomena may play a more important role in the early stages of economic growth by inducing real innovative investments. However, as real

economic growth occurs, this role gradually becomes less important, and the demand-following phenomena dominate the interaction between financial development and economic growth. Patrick adds that this sequential process is not only valid for economy-level analysis but is also likely to occur within and among specific industries or sectors. In particular, the development of an industry may be initially encouraged by the supply-leading phenomena but, as it develops, have its financing shift to be demand-following.

The neutrality hypothesis

One of the most recent comprehensive literature reviews on the subject (Nyasha & Odhiambo, 2018) adds a fourth hypothesis called "the neutrality hypothesis." In this view, there is no causal relationship between financial development and economic growth. (Lucas, 1988) argues that the importance of financial matters for economic development is badly over-stressed in popular and professional discussions.

Empirical evidence

After more than a century of theoretical debates and extensive empirical work on the subject, economists still have no consensus on the nexus between economic growth and financial development. The extensive empirical literature on this issue suggests that the causality between the real and financial spheres varies across countries over time and depends on the measure of financial development.

As we will see, it is also noteworthy that the recent literature split financial development into bank-based and market-based components and tests the relationship between them and economic growth separately (Nyasha & Odhiambo, 2018).

This section will discuss the empirical literature based on two distinctions. The first is whether a study examines the causality in a case study or cross-country setting. The second is whether a study uses panel data or time-series econometric methods.

By performing a cointegration analysis Arestis et al. (2001); Demetriades & Hussein (1996) built vector error correction models to test the causal link between indicators of financial development and economic growth in the short-run – testing for the joint significance of the dynamic terms (i.e., the standard Granger causality test) – and in the long-run – using weak exogeneity test. While, (Demetriades & Hussein, 1996) result shows that the causality pattern varies across countries, (Arestis et al., 2001) found supporting evidence of the supply-leading hypothesis with a much stronger effect in the case of BBFD.

Other cross-country time-series studies focused only on causality tests. For example, (Shan & Morris, 2002) performed the Toda & Yamamoto (1995) causality testing procedure to investigate the relationship between the variables in 19 OCDE countries and found insufficient evidence for the supply leading hypothesis.

Furthermore, using the standard Granger causality test in both VAR and VECM frameworks, Enisan & Olufisayo (2009) found that market-based financial development can lead to economic growth in seven sub-Saharan African countries if the stock market in these countries is further developed.

Panel data econometrics methods have also addressed the nexus between financial development and economic growth. For instance, Rousseau & Wachtel (2000) used a panel VAR to perform a Granger causality test between economic growth, bank-based financial development, and market-based financial development. They concluded that both types of financial development lead to economic growth in support of the supply-leading hypothesis.

Another study of the direction of the causal link was carried out by Calderón & Liu (2003), who performed the Geweke decomposition test on a panel of 109 developing and industrial countries. Generally, their results were in line with both the supply-leading and the bi-directional causality hypothesis. Remarkably, the causal relation from financial development

toward economic growth is more apparent in developed countries. Another intriguing result from this study is that BBFD is more effective in the case of developing countries.

Other empirical studies in support of the supply-leading hypothesis were done by Christopoulos & Tsionas (2004); Pradhan et al. (2018) using panel-based vector error correction models. Additionally, Swamy & Dharani (2018) used an alternate approach of moderated mediation effect framework. Their main finding is the existence of bi-directional causality between economic growth and financial development.

One of the major drawbacks to using panel data econometrics is that it does not allow for different countries to exhibit different patterns of causality (Arestis et al., 2001; Demetriades & Hussein, 1996; Odhiambo, 2009). To address this issue, some authors kept the cross-country setting but used time series methods, while others addressed the causality for a single country. The latter solution seems more popular among researchers as it is used more frequently.

For instance, Van Nieuwerburgh et al. (2006) studied the causality between the stock market development and economic growth in Belgium and found supporting evidence of the supply-leading hypothesis. Odhiambo (2009) reached the same conclusion for the case of Zambia, although they found a short-run feedback causality from economic growth to financial development. Another supporting evidence of the supply-leading hypothesis can be found in the case of Botswana (Eita & Jordaan, 2010) and Turkey (Araç & Özcan, 2014; Bayar et al., 2014).

Additionally, Ang & McKibbin (2007) composed a composite indicator of financial development in Malaysia and found that growth exerts a positive and unidirectional causal effect on finance in the long run, which is in line with the demand-following hypothesis. The same conclusions were reached by Nyasha & Odhiambo (2015) in the case of Kenya.

In line with Demetriades & Hussein's (1996) 's empirical methodology, Hondroyiannis et al. (2005) findings suggest the existence of bi-direction causality between financial development (bank-based or market-based) and economic growth in Greece. The same results were reached by Marques et al. (2013), who found bidirectional causality between market-based financial development and economic growth. Bank-based financial development, however, did not exhibit any causality pattern in the Portuguese case.

Other methods for testing causality are also used in some single-country studies. For instance, the bootstrap approach Toda & Yamamoto (1995) modified causality test was conducted by Ahmed (2018) to test the direction of causality in a rolling window procedure for the case of Egypt and found bidirectional causality between financial development and economic growth. Our paper is mainly interested in studying the nexus between economic growth and BBFD in Morocco.

While using a panel of countries that include Morocco may seem appropriate, it should be noted from the reviewed literature that the causality test results vary across countries mainly because of the impact of the quality of institutions and public policy on the relationship between financial development and economic growth. Thus, we choose to focus on a case study of the nature of the relationship in Morocco using time series methods.

To our knowledge, the only time-series empirical study of the causality between financial development and economic growth in Morocco was done by Enisan & Olufisayo (2009), who investigated the causality between market-based financial development and economic growth between 1980 and 2004. A key problem of this study is that it focuses only on the stock market in a country where the banking system predominates. Another issue with this paper is the study period. The Moroccan financial sector has undergone many transformations since 2004. Thus, the results may be no longer valid.

We'll address these limits by focusing on "bank-based" financial development, extending the study period (by covering the period extends from 2003 to 2018, and testing and controlling for structural breaks in our econometric models.

Data and econometric methodology

The objective of the paper is to empirically investigate the causal link between bank-based financial development and non-agricultural economic growth in Morocco. This empirical investigation aims to respond to two main questions: which one of the four theoretical hypotheses explored in our theoretical literature review is generally valid for the Moroccan economy? And what role does the financial integration of Morocco with the global financial market play in the interaction between bank-based financial development and economic growth?

Data

Financial systems are a highly complex and multidimensional phenomenon (Čihák et al., 2012). This complexity only increases with time and the stages of economic development. Thus, choosing an appropriate measure for bank-based financial development in Morocco is critical to properly investigating its relation to economic growth.

The previous empirical literature on the subject suggests that the results may vary according to the proxy of BBFD. In our study, we use the most popular three bank-based financial development indicators to investigate if the chosen measure of BBFD has an impact on the empirical results. Besides, we use a composite indicator of financial depth as a robustness check to validate our results and to better understand which measure better captures BBFD in Morocco.

Real gross domestic product and real domestic product per capita are usually used as measures of economic growth. We differ from the previous literature by using non-agricultural GDP per capita as the agricultural sector output growth in Morocco is highly vulnerable to exogenous climate factors such as annual rainfall variability (Sraïri, 2017).

Hence, the value added by the agricultural sector is highly unstable and does not reflect endogenous economic growth patterns.

A large portion of the early literature used money supply aggregates as a measure of financial development (Demetriades & Hussein, 1996). This choice is in line with McKinnon's outside money model that views the accumulation of real money balances as a prerequisite to self-financed investment. In this view, real money balances and physical capital are substitutes for investors (McKinnon, 1973). Thus, holding monetary assets must happen before investment can take place.

Taking this into account, using the narrow definition of money stock (M1) may seem like a good measure for bank-based financial development mainly because the broad definition of money also includes financial assets issued by other financial institutions. However, this definition includes the physical currency issued by the central bank and helps outside the banking system. Thus, a rise in the ratio of M1 to GDP does not necessarily mean an increase in deposits as a financial service offered by the banking system (Demetriades & Hussein, 1996). Bank deposits are supposed to offer a quantitative measure of how the banking sector alleviates the adverse effect of transactional costs. Accordingly, we use the ratio of bank deposits to non-agricultural GDP as a direct measure of financial deepening and the extent of financial intermediation.

Another popular measure of bank-based financial development is bank credit to the private sector. This indicator is commonly used to measure the effect of bank credit as the main source of financing investments and allocating savings in an economy where commercial banks dominate the financial sector (Swamy & Dharani, 2018). Excluding bank loans to the public sector and other financial intermediaries, thus focusing only on bank credit extended by to the private sector, helps better capture the quality of the banking sector funds' allocation as the private sector is commonly tough of as more efficient and productive

compared to the public sector (Ang & McKibbin, 2007). We use the ratio of bank credit to the private sector to non-agricultural GDP as a direct measure of financial deepening and the efficiency of financial intermediation. Bank deposits and credit are essentially two sides of the same coin, as banks create new money in the form of demand deposits when they lend (Mcleay et al., 2014). Bank credit to the private sector is thus a more direct measure of the effect of arguably the most important function of the banking sector.

Finally, we use the total of the banking sector assets as our third measure of BBFD to measure if taking into account credit to the public sector and other forms of financial assets such as bonds affect the causal link between economic growth and bank-based financial development. This variable can also measure the impact of the overall size of the banking sector on economic growth in Morocco.

Using multiple indicators of BBFD can lead to conflicting conclusions on the link between our variables of interest. Therefore, we use principal component analysis the extract information from our three BBFD measures and construct a single index of financial deepening. To achieve this, we first normalize the three variables using the min-max method to unify the scale before calculating the weight of each variable in our index by using the Eigenvectors (loadings) relative weights obtained from the first principal component. A full description of the use of PCA to construct a composite index of financial development can be found in (Pradhan et al., 2014). Table 1 summarizes the result of our principal component analysis.

Table 1. The summary of PCA-related information used to construct the financial depth index

Eigenvalues of the principal components (PCs)			
PC number	Eigenvalue	Proportion	Cumulative proportion
1	2.948110	0.9827	0.9827
2	0.044355	0.0148	0.9975
3	0.007535	0.0025	1.0000
Eigenvectors (loadings) of the principal components			
Variable	PC 1	PC 2	PC 3
NDEPOSITS	0.577209	-0.588491	0.566134
NCREDIT	0.574267	0.785421	0.230935
NASSETS	0.580557	-0.191814	-0.791303

In addition to the indicators of economic growth and bank-based financial development indicators, we use two control variables to account for short-run macroeconomic dynamics. The ratio of government expenditure (excluding subsidies) to non-agricultural GDP is used to account for government spending, one of the main drivers of domestic demand in Morocco.

The second control variable is a proxy of the financial integration of Morocco with the rest of the global financial markets. We use the ratio of capital inflows to non-agricultural GDP to account for the effect of the Moroccan economy's interaction with the rest of the world on economic growth and BBFD. Including this variable in our models should help single out the causality between our main two variables of interest and evaluate the effect of the financial integration of Morocco with the global financial markets on the causal link between our two main variables of interest.

We use quarterly data between 2003 and 2018. Data on the non-agricultural gross domestic product is obtained from the Higher Planning Commission of Morocco. The consumer price index used to deflate our variables is acquired from the IMF, while other monetary and financial data are acquired from the central bank of Morocco (Bank Al-Maghrib, BAM). Government spending data is obtained from the Moroccan Ministry of

Economy and Finance's MANAR-Stat platform. Finally, capital inflows are obtained from the IMF's International Financial Statistics database. All the variables are in real terms (deflated by the consumer price index) and seasonally adjusted using the X-13 quarterly seasonal adjustment Method. Besides, the log transformation is also used for the usual statistical reasons. Data descriptions are summarized in Table 2 below.

Table 2. Data description

Variable name	Description
Eg	The log of Real non-agricultural gross domestic product per capita
BBFD_deposits	The ratio of the banking sector's total deposit liabilities to non-agricultural GDP
BBFD_credit	The ratio of bank credit to the private sector to non-agricultural GDP
BBFD_assets	The ratio of the banking sector assets to non-agricultural GDP
fi	The ratio of capital inflows to non-agricultural GDP
Lrgov_exp_gdp	The ratio of government expenditure (excluding subsidies) to non-agricultural GDP

Methodology

A close examination of time series characteristics is highly important to the selection of a suitable representation of the data generation process (Lütkepohl, 1999). For instance, whether a time series has a unit root or not can drastically change the appropriate model to capture its dynamics and the proper test to investigate causality. Moreover, the order of integration of the variable of interest has a significant impact on the choice of the econometric framework that could best accommodate their interactions.

Following the majority of the empirical literature (See, for example (Ahmed, 2018; Arestis et al., 2001; Cheng, 2012; Demetriades & Hussein, 1996; Marques et al., 2013), our empirical investigation will be conducted in a vector autoregression/error correction framework. This econometric methodology has two objectives; the first is examining the long-term relationships between the variables of interest, and the second is studying the dynamic temporal causal relationship between these variables to infer the existence (or the lack thereof) of both short and long-run causality.

We start our empirical investigation by conducting the usual unit root tests for all the variables to determine their order of integration. The order of integration *d* (also known as the order of differentiation) of a non-stationary series *X* is the number of differences *d* needed to make the series stationary. If a non-stationary series become stationary after *d* differences, it is said to be integrated of the d^{th} order. To determine whether a time series is stationary, we apply the standard unit root tests, including the augmented Dickey-Fuller (Dickey & Fuller, 1979), Phillips-Perron (Phillips & Perron, 1988), and Kwiatkowski-Phillips-Schmidt-Shin (Kwiatkowski et al., 1992) tests. For a formal presentation and discussion of these tests, see (Marketa & Darina, 2016).

The choice of the appropriate model to capture the causal link depends on three factors:

(1) Whether the series is stationary or not;

(2) Whether they have the same order of integration, and

(3) Whether they are cointegrated or not.

If the two variables of interest are both stationary, the possibility of cointegration is not present, and a stable vector autoregressive model can be estimated in levels. A K-dimensional p-lags basic vector autoregression (VAR(p)) can be expressed as follow (Lütkepohl, 1999):

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + u_t \quad (1)$$

Where $y_t = (y_{1t}, \dots, y_{Kt})'$ is a $K \times 1$ vector of endogenous variables, $A_1, \dots, A_p$ are $K \times K$ matrices of coefficients, and $u_t = (u_{1t}, \dots, u_{Kt})$ is a $K \times 1$ vector of unobservable zero mean independent white noise process with time-invariant positive definite covariance matrix

$E(u_t u_t') = \sum_u$. The vector y_t is stable if it does not contain a unit root and can be used to perform the standard Granger causality test.

If the VAR is stable (i.e., has no unit roots), we can use it as a framework to conduct the standard Granger causality test. A variable y_{1t} is said to Granger cause y_{2t} if the information contained in y_{1t} helps improve the predictions of y_{2t+1} (Granger, 1980). Practically, we test if adding new lagged values of y_{1t} can improve the explanation of y_{2t} (e.i. if the coefficients of the lagged value of y_{1t} are statistically significant). This is done by testing the joint significance of all the lagged endogenous variables in each VAR equation using the standard Wald test statistic.

However, if the two variables are not stationary and integrated in the same order, which is the case for most macroeconomic indicators, a test of cointegration should be conducted to investigate the long-run relationship between the two variables. If a cointegration relationship is detected, a long-run cointegration equation can be estimated. Therefore, a vector error correction model is more appropriate as a basis for causality testing. A vector of I(d) ($d > 0$) time series y_t is said to be cointegrated if there exists a linear combination $\alpha' y_t$ that is stationary. The time series y_t are said to be co-integrated of order d with a cointegrated vector α (Engle & Granger, 1987). To test for cointegration, A VAR-based cointegration test is performed using the (Johansen, 1991, 1995) trace and maximal eigenvalue statistics. The existence of a cointegrating vector may indicate the existence of a long-term relationship that can be formalized using a vector error correction model (Engle & Granger, 1987). The corresponding VECM(p) could be expressed as follows:

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \ldots + \Gamma_{p-1} \Delta y_{t-1} + u_t \qquad (2)$$

Where $\Pi = -(I_K - A_1 - \ldots A_p)$ and $\Gamma_i = -(A_{i+1} + \ldots + A_P)$ for $i = 1, \ldots, p-1$. This representation is obtained by subtracting y_{t-1} from both sides of the VAR equation and

rearranging terms (Lütkepohl, 1999). Πy_{t-1} contains the cointegrating relations representing the long run equilibrium and Π are referred to as the error correction terms. The Γ_j represent the short-run parameters.

As suggested by Granger (1988), If two I(1) variables are cointegrated, a causal link between them must exist in at least one direction. This causality can be captured using a VECM-based Granger causality test (Granger, 1986, 1988). This test is performed by testing the joint significance of the Γ_i in each error correction equation. In addition, a weak exogeneity test can be performed by using a zero-significance test of the error correction terms in Π (Johansen & Juselius, 1992). The weak exogeneity test is based on a likelihood ratio test that follows the chi-squared distribution (Ang & McKibbin, 2007). Performing a weak exogeneity test in a cointegrated system can be interpreted as a notion of long-run causality (Hall & Milne, 1994).

Results

Unit root tests

As we discussed in the preview section. The order of integration of each variable is determined using three commonly used unit root tests. The results from the Augmented Dicky-Fuller test are summarized in Table 3.

Table 3. Unit root test (ADF)

Variable		Model specification	The test statistic (ADF)	Stationarity status	Integration order
Eg	Level	Intercept	-1.698845	Not stationary	I(1)
	1st difference	Intercept	-3.743773***	Stationary	
BBFD_credit	Level	Intercept	-1.664052	Not stationary	I(1)
	1st difference	Intercept	-4.854175***	Stationary	
BBFD_assets	Level	Trend & intercept	-0.762028	Not stationary	I(1)
	1st difference	Intercept	-7.391896***	Stationary	
BBFD_deposits	Level	Intercept	-2.478804	Not stationary	I(1)
	1st difference	Intercept	-7.576005***	Stationary	
Depth_index	Level	Intercept	-1.873533	Not stationary	I(1)
	1st difference	Intercept	-5.941812***	Stationary	
fi	Level	None	0.378201	Not stationary	I(1)
	1st difference	Intercept	- -7.883959***	Stationary	
lrgov_exp_gdp	Level	Intercept	-1.185895	Not stationary	I(1)
	1st difference	None	-8.767591***	Stationary	

Note 1. *, ** and *** indicate 10%, 5% and 1% significance level respectively.

Note 2. The PP and KPSS unit root test results are not reported and are available from authors upon request.

As one would expect, all variables are not stationary in level but are stationary after differencing one time. Thus, our variables are all integrated in the first (and the same) order. After verifying that all our variables are I(1) processes, we test for the existence of stable linear relationships between the variables of interest in each of our four models.

Cointegration tests

To test for cointegration, we estimate four VAR(p) models (one for each BBFD indicator). The lag order of each model is based on the information criteria and the examination of the OLS properties of the VAR residuals. To ensure the validity of the cointegration test, we test for structural breaks in the slope and the intercept using the Quandt-Andrews Breakpoint Test[2] (Andrews, 1993; Andrews & Ploberger, 1994) and control for the effect of the break using exogenous time dummies in each model. We report the trace and maximum eigenvalue test statistics obtained from the cointegration test in table 4.

[2] The test results are not reported but available from the authors upon request.

Table 4. Cointegration analysis results

Cointegration test using the trace statistic					
Model N° (BBFD indicator)	**H0**	**Eigenvalue**	**Trace Statistic**	**5% Critical Value**	**p-value**
Model N°1 (deposits)	r = 0	0.558870	72.49363	47.85613	0.0001
	r ≤ 1	0.275156	25.84390	29.79707	0.1335
	r ≤ 2	0.103762	7.501343	15.49471	0.5201
	r ≤ 3	0.021812	1.257031	3.841466	0.2622
Model N°2 (Credit)	r = 0	0.638105	86.60001	47.85613	0.0000
	r ≤ 1	0.243822	30.69796	29.79707	0.0393
	r ≤ 2	0.159673	15.32663	15.49471	0.0530
	r ≤ 3	0.099407	5.758626	3.841466	0.0164
Model N°3 (Assets)	r = 0	0.575277	91.22607	47.85613	0.0000
	r ≤ 1	0.357489	42.41595	29.79707	0.0011
	r ≤ 2	0.246165	17.20077	15.49471	0.0274
	r ≤ 3	0.019003	1.093579	3.841466	0.2957
Model N°4 (Depth)	r = 0	0.510489	62.27566	47.85613	0.0013
	r ≤ 1	0.253668	21.55781	29.79707	0.3238
	r ≤ 2	0.081915	4.880464	15.49471	0.8214
	r ≤ 3	0.000157	0.008950	3.841466	0.9243
Cointegration test using the maximum eigenvalue statistic					
Model N° (BBFD indicator)	**H0**	**Eigenvalue**	**Max-Eigen Statistic**	**5% Critical Value**	**p-value**
Model N°1 (deposits)	r = 0	0.558870	46.64973	27.58434	0.0001
	r ≤ 1	0.275156	18.34256	21.13162	0.1176
	r ≤ 2	0.103762	6.244313	14.26460	0.5821
	r ≤ 3	0.021812	1.257031	3.841466	0.2622
Model N°2 (Credit)	r = 0	0.638105	55.90205	27.58434	0.0000
	r ≤ 1	0.243822	15.37133	21.13162	0.2637
	r ≤ 2	0.159673	9.568005	14.26460	0.2419
	r ≤ 3	0.099407	5.758626	3.841466	0.0164
Model N°3 (Assets)	r = 0	0.575277	48.81012	27.58434	0.0000
	r ≤ 1	0.357489	25.21517	21.13162	0.0126
	r ≤ 2	0.246165	16.10720	14.26460	0.0253
	r ≤ 3	0.019003	1.093579	3.841466	0.2957
Model N°4 (Depth)	r = 0	0.510489	40.71785	27.58434	0.0006
	r ≤ 1	0.253668	16.67734	21.13162	0.1878
	r ≤ 2	0.081915	4.871515	14.26460	0.7580
	r ≤ 3	0.000157	0.008950	3.841466	0.9243

The cointegration test results reject the hypothesis of non-cointegration in the four models and thus detect the existence of at least one cointegration equation in each model. Therefore, VECM-based causality and weak exogeneity tests between our variables of interest in each model can be used to capture the causality patterns between the variables.

Causality tests

The Granger causality test results summarized in Table 5 below show a consistent causality pattern between our two main variables of interest.

Table 5. VECM-based Granger causality test between real gross domestic product per capita and bank-based financial development indicators.

Model N°	Null hypothesis	Chi-sq	p-value
1	D(eg) does not Granger cause D(bbfd_deposits)	8.509919	0.2898
	D(bbfd_deposits) does not Granger cause D(eg)	17.19154	0.0162
2	D(eg) does not Granger cause D(bbfd_credit)	5.896779	0.7502
	D(bbfd_credit) does not Granger cause D(eg)	26.83976	0.0015
3	D(eg) does not Granger cause D(bbfd_assets)	8.532017	0.1293
	D(bbfd_assets) does not Granger cause D(eg)	13.46123	0.0194
4	D(eg) does not Granger cause D(depth_index)	6.327639	0.3875
	D(depth_index) does not Granger cause D(eg)	15.44198	0.0171

In all four models, we reject the null hypothesis that the BBFD does not cause non-agricultural economic growth, but we cannot reject the null that non-agricultural GDP does not cause BBFD. Therefore, there is a consistent short-run unidirectional causality from BBFD to non-agricultural GDP per capita.

For ease of presentation, we have summarized the Granger causality results between capital inflows and our two main variables of interest in Table 6. These results should help us answer our second research question and thus better understand the impact of the Moroccan banking sector's integration with the international financial system on the nexus between economic growth and bank-based financial development in Morocco.

Table 6. VECM-based Granger causality test between capital inflows and economic growth and bank-based financial development indicators in each model.

Model N°	Null hypothesis	Chi-sq	p-value
1	D(fi) does not Granger cause D(bbfd_deposits)	21.64895	0.0029
	D(fi) does not Granger cause D(eg)	5.399600	0.6113
2	D(fi) does not Granger cause D(bbfd_credit)	6.890844	0.6485
	D(fi) does not Granger cause D(eg)	11.69376	0.2311
3	D(fi) does not Granger cause D(bbfd_assets)	4.289658	0.5085
	D(fi) does not Granger cause D(eg)	3.296082	0.6544
4	D(fi) does not Granger cause D(depth_index)	16.33614	0.0121
	D(fi) does not Granger cause D(eg)	2.188088	0.9016

Table 6 shows that the short-run non-causality between capital inflows and non-agricultural economic growth is consistent across the four models. That is, we cannot reject the null hypothesis that capital inflows do not cause non-agricultural economic growth. Therefore, there is no evidence that capital inflows have a short-run impact on economic growth. On the other hand, we cannot reject the null hypothesis that capital inflows cause BBFD in the first and the fourth model. The results show that capital inflows cause banks' deposits and financial depth but do not cause credit to the private sector or the banking sector assets.

To summarize, the results from Table 6 show a one-way short-run causal link between capital inflows and BBFD through bank deposits but did not detect any short-run causal link between capital inflows and economic growth.

The results of the long-run causality tests are reported in Table 7 can be summarized in three main points; first, the consistent short-run causal link between BBFD and economic growth still holds in the long run. Second, economic growth causes BBFD in the first three models but not in the fourth model. Finally, we found no evidence of a long-run causality-link between capital inflows and neither economic growth nor BBFD.

Table 7. Weak exogeneity tests

Model N°	Restricted coefficient of the VECM	Chi-square(1)	p-value
1	The error correction coefficient of the eg ECM	4.594934	0.032067
	The error correction coefficient of the deposits ECM	5.457582	0.019484
	The error correction coefficient of the fi ECM	3.716098	0.053890
2	The error correction coefficient of the eg ECM	6.150686	0.013136
	The error correction coefficient of the credit ECM	16.50088	0.000049
	The error correction coefficient of the fi ECM	2.263865	0.132423
3	The error correction coefficient of the eg ECM	10.13635	0.001454
	The error correction coefficient of the assets ECM	13.94256	0.000188
	The error correction coefficient of the fi ECM	1.103213	0.293562
4	The error correction coefficient of the eg ECM	0.942604	0.331609
	The error correction coefficient of the depth ECM	14.90495	0.000113
	The error correction coefficient of the fi ECM	3.788086	0.051619

These results are in support of a bidirectional causal link between bank-based financial development and economic growth. Besides, they show this link is not affected by capital inflows, i.e., capital inflows are weakly exogenous in all our VECM models.

Conclusions

This study's main objective is to examine the causality between bank-based financial development and economic growth in Morocco between 2003 and 2018. Using two time-series methods for testing causality in a vector autoregression framework, we investigated the causal-link existence and direction using four different measures of bank-based financial development.

The reviewed economic literature on the nexus between economic growth and financial development distinguishes between four theoretical explanations of the possible causality patterns between the two phenomena. Our main objective in this paper is to determine which one of the four theoretical hypotheses explored in our theoretical literature review is generally valid for the Moroccan economy. To answer this question, we conducted two types of causality tests to distinguish between the short and the long run. The results summarized in Table 8 support the supply-leading hypothesis in the short run and the feedback hypothesis in the long run.

Table 8. Causality test results summary

Model	Bank-based financial development proxy	Short-run causality	Long-run causality
1	Bank deposit liabilities	$BBFD \rightarrow EG$	$BBFD \leftrightarrow EG$
2	Bank credit to the private sector	$BBFD \rightarrow EG$	$BBFD \leftrightarrow EG$
3	Total bank assets	$BBFD \rightarrow EG$	$BBFD \leftrightarrow EG$
4	Financial depth index	$BBFD \rightarrow EG$	$BBFD \rightarrow EG$

The causal effect of bank-based financial development on non-agricultural economic growth in Morocco is robust and insensitive to the BBFD measure and the time horizon. However, non-agricultural economic growth cause BBFD only in the long run.

Our results shed light on an important issue for the Moroccan economy; the observed bank credit growth decline since 2008 (see Figure 1) is, at the least, a substantial loss of economic growth potential for the Moroccan economy. If the answer to whether bank-based development causes economic is affirmative, as we demonstrated in this paper, then there is another equally important question to ask: What caused the credit growth stagnation since 2013?

The policy implications of our results largely depend on answering this question. The credit stagnation could be considered a credit crunch (i.e., a credit slowdown caused by the inability or the unwillingness of banks to lend). In particular, a credit crunch might be the result of the deterioration of Moroccan banks' lending capacity due to supply-specific factors such as liquidity or capital constraints but may also be interpreted as a signal of a decline in banks' willingness to lend as the quality of their credit portfolio deteriorates as a consequence of an increase of the non-performing loans ratio.

It is noteworthy that the observed credit growth stagnation could also be the result of a declining credit demand which, in turn, could be caused by a weakening of aggregate demand. Finding a definite answer to this question, however, needs further empirical investigation as our models are neither designed to specify the credit supply function nor to distinguish credit supply from credit demand.

Public policy should focus on alleviating barriers to credit growth. On the one hand, if the credit slowdown is indeed a credit crunch, then an inquiry is required to find the specific constraints to credit supply and design monetary policy action to address these constraints. On the other hand, if the credit slowdown is caused by declining demand, then the Moroccan government should either use countercyclical fiscal policy to stimulate aggregate demand or design public programs to encourage the banking sector to facilitate access to credit by lowering cost and required collateral. The program "INTELAKA" targeting self-employed entrepreneurs and small businesses, is an excellent example of the needed public policy to stimulate economic growth in Morocco.

Regarding our second research question, our results show that the Moroccan economy's integration with the international financial markets has no causal effect on economic growth. However, there is evidence that capital inflows can cause bank-based financial development in the short by providing liquidity to the banking sector. We found no evidence that capital inflows directly stimulate financial asset creation (bank credit or otherwise). Thus, the impact of Morocco's financial integration with the rest of the world is limited to providing short-run liquidity to the banking sector.

Acknowledgments, we would like to thank Youssef SAADANI for his assistance and guidance through various stages of this paper production. We would like also to thank Assil El MAHMAH for providing valuable comments on the final manuscript. Thanks are also due to the two anonymous reviewers for their useful comments and suggestions.

Disclosure Statement, No conflict of interests

References

Abdelkhalek, T., & Solhi, S. (2009). *Efficience et Productivité des Banques Commerciales Marocaines : Approche non Paramétrique* (No. 466; Working Paper Series).

Ahmed, A. A. (2018). Bank-Based Financial Development and Economic Growth: Time-Varying Causality Analysis for Egypt. *International Journal of Economics and Finance*, *10*(4), 123–135.

Andrews, D. (1993). Tests for Parameter Instability and Structural Change With Unknown Change Point. *The Econometric Society*, *61*(4), 821–856.

Andrews, D., & Ploberger, W. (1994). Optimal Tests When a Nuisance Parameter is Present Only Under the Alternative. *Econometrica*, *62*(6), 1383–1414.

Ang, J. B., & McKibbin, W. J. (2007). Financial liberalization, financial sector development, and growth: Evidence from Malaysia. *Journal of Development Economics*, *84*(1), 215–233.

Araç, A., & Özcan, K. (2014). The causality between Financial Development and Economic growth: The case of Turkey. *Journal of Economic Cooperation and Development*, *53*(9), 1689–1699.

Arestis, P., Demetriades, P., & Luintel, K. (2001). Financial Development and Economic Growth: The Role of Stock Markets. *Journal of Money, Credit and Banking*, *2*(2), 43–55.

Bank Al-Maghrib. (2018). *Rapport annuel sur le contrôle, l'activité et les résultats des établissements de crédit*.

Bayar, Y., Kaya, A., & Yildirim, M. (2014). Effects of Stock Market Development on Economic Growth: Evidence from Turkey. *International Journal of Financial Research*, *5*(1), 93–100.

Benazzi, S., & Rouiessi, I. (2017). *Analyse de la concurrence bancaire au Maroc :*

Approche de Panzar et Rosse (No. 1).

Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, *72*(1), 321–334.

Cheng, S. Y. (2012). Substitution or complementary effects between banking and stock markets: Evidence from financial openness in Taiwan. *Journal of International Financial Markets, Institutions and Money*, *22*(3), 508–520.

Christopoulos, D. K., & Tsionas, E. G. (2004). Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics*, *73*(1), 55–74.

Čihák, M., Demirgüç-Kunt, A., Feyen, E., & Levine, R. (2012). Benchmarking Financial Systems Around The World. In *Policy Research Working Paper* (Issue August).

Demetriades, P. O., & Hussein, K. A. (1996). Does financial development cause economic growth? Time-series evidence from 16 countries. *Journal of Development Economics*, *51*(2), 387–411.

Dickey, D., & Fuller, W. (1979). Distribution of the Estimators for Autoregressive Time Series With a Unit Root. *Journal of the American Statistical Association*, *74*(366), 427.

Eita, J. H., & Jordaan, A. (2010). A causality analysis between financial development and economic growth for Botswana. *African Finance Journal*, *12*(1), 72–89.

Engle, R., & Granger. (1987). Cointegration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, *55*(2), 251–276.

Enisan, A. A., & Olufisayo, A. O. (2009). Stock market development and economic growth: Evidence from seven sub-Sahara African countries. *Journal of Economics*

and Business, *61*(2), 162–171.

Granger, C. W. J. (1980). Testing for causality: a personal viewpoint. *Journal of Economic Dynamics and Control*, *2*(2–4), 329–352.

Granger, C. W. J. (1986). Developments in the Study of Cointegrated Economic Variables. *Oxford Bulletin of Economics and Statistics*, *48*(3), 213–228.

Granger, C. W. J. (1988). Some recent development in the concept of causality. *Journal of Econometrics*, *39*(1–2), 199–211.

Greenwood, J., & Smith, B. D. (1997). Financial markets in development, and the development of financial markets. *Journal of Economic Dynamics and Control*, *21*(1), 145–181.

Gurley, J. G., & Shaw, E. S. (1967). Financial Structure and Economic Development. *Economic Development and Cultural Change*, *15*(3), 257–268.

Hall, S., & Milne, A. (1994). The Relevance of P-Star Analysis to UK Monetary Policy. *The Economic Journal*, *104*(424), 597–604.

Hondroyiannis, G., Lolos, S., & Papapetrou, E. (2005). Financial markets and economic growth in Greece, 1986-1999. *Journal of International Financial Markets, Institutions and Money*, *15*(2), 173–188.

International Monetary Fund. (2016). *Morocco: Financial System Stability Assessment* (Issue Report No. 16/37).

Jbili, A., Enders, K., & Treichel, V. (1997). Financial Sector Reforms in Morocco and Tunisia. *Finance and Development*, *September*, 29–31.

Johansen, S. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica*, *53*(9), 1689–1699.

Johansen, S. (1995). A Statistical Analysis of Cointegration for I(2) Variables. *Econometric Theory*, *11*(1), 25–59.

Johansen, S., & Juselius, K. (1992). Testing structural hypotheses in a multivariate cointegration analysis of the PPP and the UIP for UK. *Journal of Econometrics*, *53*(1–3), 211–244.

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root How sure are we that economic time series have a unit root ?*. *Journal of Econometrics*, *54*, 159–178.

Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, *35*(2), 89–115.

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, *22*(1), 3–42.

Lütkepohl, H. (1999). Vector Autoregressions. In *SFB 373 Discussion Paper* (1999,4; SFB 373 Discussion Paper).

Marketa, A., & Darina, F. (2016). Selection of unit root test on the basis of length of the time series and value of ar(1) parameter. *Statistika*, *96*(3), 47–64.

Marques, L. M., Fuinhas, J. A., & Marques, A. C. (2013). Does the stock market cause economic growth? Portuguese evidence of economic regime change. *Economic Modelling*, *32*(1), 316–324.

McKinnon, R. I. (1973). *Money and Capital in Economic Development*. Brookings Institution.

Mcleay, M., Radia, A., & Thomas, R. (2014). Money creation in the modern economy. *Quarterly Bulletin 2014 Q1*, *1*.

Nyasha, S., & Odhiambo, N. M. (2015). Do banks and stock markets spur economic growth? Kenya's experience. *International Journal of Sustainable Economy*, *7*(1), 54.

Nyasha, S., & Odhiambo, N. M. (2018). Financial Development and Economic Growth

Nexus: A Revisionist Approach. *Economic Notes*, *47*(1), 223–229.

Odhiambo, N. M. (2009). Interest rate liberalization and economic growth in Zambia: A dynamic linkage. *African Development Review*, *21*(3), 541–557.

Patrick, H. (1966). Financial Development and Economic Growth in Underdeveloped Countries. *Economic Development and Cultural Change*, *14*(2), 174–189.

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335–346.

Pradhan, R. P., Arvin, M. B., & Bahmani, S. (2018). Are innovation and financial development causative factors in economic growth? Evidence from a panel Granger causality test. *Technological Forecasting and Social Change*, *132*(February 2017), 130–142.

Robinson, J. (1952). The Generalisation of the General Theory and Other Essays. In *The Rate of Interest and Other Essays* (Macmillan).

Rousseau, & Wachtel, P. (2000). Equity markets and growth: Cross-country evidence on timing and outcomes, 1980-1995. *Journal of Banking and Finance*, *24*(12), 1933–1957.

Schumpeter, J. A. (1983). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Transaction Publishers.

Shan, J., & Morris, A. (2002). Does financial development "lead" economic growth? *International Review of Applied Economics*, *16*(2), 153–168.

Shaw, E. S. (1973). *Financial Deepening in Economic Development*. Oxford University Press.

Sraïri, M. T. (2017). New challenges for the Moroccan agricultural sector to cope with local and global changes. In N. T. DANH (Ed.), *Morocco: Environmental, Social and Economic Issues of the 21st Century* (Issue October, pp. 165–188). Nova

Science Publishers, Inc.

Swamy, V., & Dharani, M. (2018). An alternate approach in exploring the causal link between financial development and economic growth—Evidence from advanced economies. *International Journal of Finance and Economics*, *23*(1), 55–76.

Toda, H. Y., & Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of Econometrics*, *66*(1–2), 225–250.

Van Nieuwerburgh, S., Buelens, F., & Cuyvers, L. (2006). Stock market development and economic growth in Belgium. *Explorations in Economic History*, *43*(1), 13–38.