**Inclusive finance, growth and socio-economic development in Saudi Arabia**

Salem Hathroubi[[1]](#footnote-1)

*Al-Imam Muhammad Ibn Saud Islamic University. College of Economics and*

*Administrative Sciences. Department of Economics*

*Email:* [*shathroubi@yahoo.fr*](file:///C%3A%5CUsers%5CDell%5CAppData%5CLocal%5CMicrosoft%5CWindows%5CTemporary%20Internet%20Files%5CContent.IE5%5C11FU7IFX%5Cshathroubi%40yahoo.fr)

**Abstract**

In recent years, the importance of an inclusive financial system has become an important policy objective in many countries. Empirical literature argues that financial inclusion has positive impact on growth, reduce inequality and poverty. This paper has twofold. First, it aims to provide a measurement of financial inclusion in the Kingdom of Saudi Arabia (KSA) during the period 1980-2013 by the construction of a comprehensive index. Second, we study the incidence of financial inclusion on growth and human development through a set of socioeconomic leading variables. Using GMM methodology, our results suggest that financial inclusion is highly and positively correlated to human development index, and to employed share of adult population. Conversely, financial inclusion is insignificantly negatively correlated to per capita real GDP and highly negatively correlated to the share of rural population and to the share of women in adult population. The estimation of a trivariate error correction model allowed the study of the causal relationships between financial inclusion, human development and economic growth. Our findings show that there is causal relationship between the three variables in the long-run while in the short-run neither financial inclusion nor economic growth Granger-causes each other. This result is in concordance with previous empirical studies in the case of oil-based economies. Our findings could help policy-makers and regulators in KSA to design an inclusive financial sector taking into account the specificities of the Saudi economy.

***Key Words***: Inclusive finance. Economic growth. Human development. Inclusive Financial Index. VECM. Causality. Saudi Arabia.

**JEL**: G21, O16, O50.

1. **Introduction**

The relationship between financial development and economic growth has been examined extensively in the literature, but the effects of financial development and economic growth on socio-economic development is relatively scant. Since the start of the 20th century economists have highlighted the importance of financial development in the process of economic growth. Schumpeter (1911) supports that financial development leads economic growth, while Robinson (1952) argues that finance does not cause growth, but rather, it responds to demands from the real sector. Currently, there are several exiting views. According to the first view financial development is a “sine qua non” condition to economic growth and to a global socio-economic development (the supply-leading response). Cameron (1967), Goldsmith (1969), McKinnon (1973) and Chaw (1973) were the first to highlight the importance of liberalized financial system. They postulated that government intervention in the financial system of a country, which they termed “financial repression”, inhibits growth by depressing real interest rates. Later, many studies argue that financial deepening is vital to economic growth since it increases savings and facilitates capital accumulation leading to greater investment. Recent empirical works find positive causal relationship between economic growth financial development and identify two distinct channels, the accumulative channel which emphasizes the finance-induced positive effects of physical and human capital accumulation (Pagano, 1993; De Gregorio and Kim, 2000) and the allocative channel which focuses on the rising efficiency of resource allocation which is caused by financial deepening and which subsequently enhances growth (King and Levine, 1993, Chistopoulos and Tsionas, 2004).

The second view maintains that it is economic growth that drives the development of the financial sector (Rajan and Zingales 1998, Ang and Mckibbin 2007) (the demand-following response). As economy grows, it generates demand for financial services, so the lack of financial institutions in developing countries is due to the lack of the demand to their services. Growth creates opportunities and increases the return on investment, stimulating demand for credit. Concurrently, growth increases wealth and the pool of savings that could be available for credit supply, provided that a sophisticated financial system is in place to intermediate between savers and borrowers (Ben Naceur et al. 2014).

The third view contends that both financial development and economic growth Granger-cause each other, i.e. that there is a bi-directional causality between financial development and economic growth. Patrick (1966) was the first to posit that financial deepening as an outcome of economic growth, which in turn feeds back as a factor of real growth. Works by Greenwood and Jovanovic (1990), Greenwood and Bruce (1997) and Berthelemy and Varoudakis (1997) among others support this view. In this line, Choe and Moosa (1999), using data from Korea, concluded that financial development generally leads to economic growth just as financial intermediaries are more important than capital markets in the relationship[[2]](#footnote-2).

We also note that finance has a prominent role in the endogenous growth theory, through its positive impact on the levels of capital accumulation and savings (Romer 1986) or of technological innovation (Romer 1990, Grossman and Helpman 1991, and Aghion et al. 1999).

In this line of research, Benhabib and Spiegel (2000) argue that a positive relationship is expected to exist between financial development and total factor productivity growth and investment. However, their empirical results are very sensitive to model specification. Further, Beck et al. (2000) find that financial development has a large positive impact on total factor productivity (TFP), which feeds through to overall GDP growth.

In recent years, the paradigm of financial inclusion emerged and economists try to understand the microeconomic relations between financial development, economic growth and other socio-economic variables like poverty, unemployment and exclusion. Inclusive finance; safe savings, appropriately designed loans for poor and low-income households and for micro, small and medium-sized enterprises, and appropriate insurance and payments services; can help people help themselves to increase incomes, acquire capital, manage risk and work their way out of poverty. The central question asked in this field is how to bring access to these fundamental services to all people in developing countries and thus accelerate their economic development and that of their countries.

The concept, financial inclusion, was initially referred to the delivery of financial services to low-income segments of society at affordable cost. Recently, the concept has evolved into four dimensions. Mirakhor and Zamir (2012) formulated them as follows: 1- easy access to finance for all households and enterprises, 2- Sound institutions guided by prudential regulation and supervision, 3- Financial and institutional sustainability of financial institutions and 4- Competition between service providers to bring alternatives to customers.

According to Kelkar (2010), Financial Inclusion is perceived as a quasi-public good in most of the developing countries in the sense that it’s non-rival in consumption and non-excludable. The degree of ‘publicness’ in financial inclusion may be different from a typical public good like ‘defense’. But being as important as access to water, energy, health services, or basic education, it does qualify to be termed as ‘quasi-public good’ (Gupte et al. 2012, Mehtrotra et.al 2009). This recognition has made financial inclusion a policy objective for policy makers and others engaged in developmental activities. As a quasi-public good the government should provide it with other agencies[[3]](#footnote-3).

World Bank Global Findex Report (2014) indicates that in 2008 there are about 2.7 billion people in the world which are excluded from financial services and they are about 2 billion in 2014. Saudi Arabia as an oil-based economy is one of the wealthiest countries in the world. It’s classified among the high income economy with a high Human Development Index (HDI) but still with a non-generalized financial system and a low financial inclusion index (World Bank Report 2014). The purpose of this research is to measure the proportion of financially excluded in Saudi Arabia, as an oil-rich resource economy, and its consequences on growth and socioeconomic development. Most of the papers in the finance led growth literature drop natural-resource-based economies, arguing that economic development is driven by different factors and that the financial sector has different role and structure compared to non-based-natural-resource economies. The context of a natural-resource-dominated economy is worth to study in that resource-based countries can be subject to the natural resource curse in financial development (Beck 2011). In this kind of economy, financial repression leads banks to offer less credit to the private sector especially small and medium enterprises leading to less financial inclusion.

This paper attempts to show how financial inclusion is correlated with standard measures of economic development and economic well-being in the context of an oil-based economy, the Kingdom of Saudi Arabia (KSA). To this end, we first measure the extent of financial inclusion in the KSA over time according the availability of the data. Then, using the calculated index, we study, in a first step, the relationships between financial inclusion and socioeconomic variables (GDP, HDI, share of rural population, share of women in the adult population) using the Generalized Method of Moments (GMM). In a second step we focus our analysis on the causal interactions between economic growth, inclusive finance and human development using Granger-causality and Vector Error Correction Model (VECM). To the best of our knowledge no previous study, has calculated over time the inclusive financial index (IFI) for Saudi Arabia and use it to study the interaction between financial development, economic growth and other socio-economic variables. The remainder of the paper is organized as follows: Section 2 contains a survey of prior literature. Section 3 reviews the problems of definition and measurement of financial inclusion. Section 4 exposes the methodology to construct financial inclusion index and apply it to the case of Saudi Arabia. Section 5 studies the interactions between financial inclusion and its determinants using GMM estimation. In section 6 we formulate a trivariate ECM in order to study the causal relationships between IFI, HDI and economic growth. Section 7 concludes the paper and proposes some political recommendations.

1. **Literature review**

Since the contribution of King and Levine (1993), economists have shown renewed interest in the finance-growth nexus. Many works have shown that considerable part of the differences in long-run economic growth across countries can be elucidated by disparity in their financial development (King and Levine 1993, Levine and Zervos 1998, Demirguc-Kunt and Maksimovic 1998, Rajan and Zingales 98, Beck, Demirguc-Kunt and Levine 2006). Recent literature emphasizes the importance of financial inclusion as a broader concept than financial depth. Financial inclusion has proven to be linked to desirable outcomes above and beyond those associated with financial depth (Ben Naceur et al. 2015). Financial inclusion aims at addressing systemic change and institutional strengthening to attain both social targets and operational and financial sustainability. Understanding the specific constraints generating lack of financial inclusion in an economy is critical for tailoring policy recommendations. The survey of the literature reveals that there are three main constraints that stand out for financial inclusion namely, geography or physical access, lack of proper documentation and high prices and minimum account requirements and fees (Demirgüç-Kunt, 2010). Relaxing these kinds of constraints could lead to more access to credit, an increase in entrepreneurship and poverty reduction. Beck et al. (2007) show that financial development can alleviate poverty as the poor benefit enormously from basic payments and insurance services that can help smooth shocks.

In explaining the differences in financial depth across countries, the empirical literature distinguishes between structural factors and policy factors. Structural factors are country-specific characteristics that cannot be altered by policy factors in the short-run. Structural factors, such as, income per capita, population size and population densities, urban versus rural, natural nonrenewable-resources GDP ratio, can promote financial inclusion (Demetriades and Fielding, 2011). For example, larger population and higher density can have deeper financial penetration and lower cost of financial intermediation from economies of scale. Policy sensitive factors, such as, inflation, fiscal balance, contract enforcement and property rights, credit infrastructure, market liberalization, are also found to be relevant in creating an enabling environment for financial inclusion (Demetriades and Fielding 2011, Ahokpossi 2013; Ben Naceur et al. 2015). For example, Demetriades and fielding (2011) investigate the determinants of individual banks’ loans in African countries and find that banks are reluctant to lend, despite liquidity and low inflation, because infrastructure to screen and monitor borrowers is not developed. Thus, banking infrastructure is expected to reduce information asymmetries between lenders and borrowers and boost financial development. It’s also ascertained by some researchers that governance and institutional variables, such as, government effectiveness, control of corruption and rule of law, and political stability, play a role in financial inclusion/exclusion. According to Alter and Yontcheva (2015), improved financial supervision and financial sector governance contribute to promoting financial development.

Although financial deepening has accelerated in emerging market and low-income countries over the past two decades, firms continue to face barriers in accessing financial services. According to the World Bank (2014), 51% of firms in advanced economies use a bank loan or line of credit as compared with 34% in developing countries. Given that financial inclusion is multi-dimensional, policy implications to foster financial inclusion are likely to vary across countries. For example, Dabla Norris et al. (2015) find that as financial inclusion increases, income inequality first increases and then decreases in low-income countries consistent with Kuznets’ hypothesis. By contrast, in emerging market economies the Kuznets’ pattern is not observed. Their findings suggest that country-specific characteristics play a central role in determining the impacts, interactions, and trade-offs between macroeconomic variables and policies.

Although there is a growing literature on inclusive finance and its effect on sustainable and inclusive growth and poverty reduction in less-developed and emerging countries, it’s worth noting that the context of natural-resource-based economy has been relatively scant in the literature. Scarce are studies which attempt to investigate the inclusive finance-growth nexus in oil-rich economy. Exceptions are papers by Samargandi et al. (2013), Nili and Rastad (2007) and Beck (2007, 2011). Beck (2007) finds no significant difference in the impact of financial development on economic growth between both oil-based economies and non-oil-based countries. His findings are contrary to those of Nili and Rastad (2007) who find that financial development has weaker effect in oil-exporting countries than in oil-importing countries. They argue that this result is not only due to the high dependence on oil in the former but also because of the general inefficiency of financial institutions in oil-dependent countries. In the specific case of Saudi Arabia, Samargandi et al. (2013), using ARDL approach, find that financial development has a positive impact on the growth of non-oil sector. In contrast, they find no evidence of an impact on oil-sector and a negative but insignificant impact on total GDP growth[[4]](#footnote-4). Their results are in line with Al-Malkawi et al. (2012) who argue that the financial sector in Saudi Arabia is still in the transition stage and it needs to pass the threshold point of development before it could instrumental in promoting economic growth. These results highlight the specific nature of oil and resource-based economies which do not necessarily follow the same pattern as manufacturing economies. Our purpose is to contribute to this debate and fill the gap of the literature by studying the case of one of the most important oil-based economy, Saudi Arabia.

1. **Inclusive finance: definition and measurement**

Financial Inclusion needs to be interpreted in a relative dimension. Depending on the stage of development, the degree of financial inclusion differs among countries. While there is a growing consensus on the importance of financial inclusion, the same consensus does not exist around its

definition. The provision of financial services from banks is sometimes referred to as financial inclusion, but financial inclusion actually refers to a broader concept. United Nations (2006), in

its blue book defines financial inclusion as the “access to the range of financial services at a reasonable cost for the bankable people and farms”. Basic financial services include savings, short and long-term credit, leasing and factoring, mortgages, insurance, pensions, payments, local money transfers and international remittances. Claessens (2006) has defined financial inclusion as the “availability of a supply of reasonable quality financial services at reasonable costs, where reasonable quality and reasonable cost have to be defined relative to some objective standard, with costs reflecting all pecuniary and non-pecuniary costs”. Financial inclusion also refers to the ability of individuals to access appropriate financial products and services.

Understanding appropriate financial products and services includes financial awareness, knowledge about banks and banking channels, facilities provided by the banks and advantages of using the banking channel. Thus, the definitions of financial inclusion indicate that appropriate financial inclusion is multidimensional in nature offering quality financial services in a convenient way, extending access to all segments of the population and providing equal opportunities and reducing inequalities in an economy. Beyond the problem around its definition, it’s the measurement of inclusive finance which is fundamental for the rest of the analysis.

The Index of Financial Inclusion (IFI) is a measure of inclusiveness of the financial sector of a country. The IFI incorporates information on many dimensions in one single number lying between 0 and 1, where 0 denotes complete financial exclusion and 1 indicates complete financial inclusion in an economy. Studies by Mehrotra et al. (2009), Sarma (2008, 2010, 2012) Sarma et al. (2008, 2011) and United Nation (2006) use various criteria to measure the status of financial inclusion in an economy. Sarma *et al.* (2010) constructed a multidimensional index for measuring the degree of financial inclusion that includes information on bank penetration, availability of banking services and usage of the banking system. Demirgüc-Kunt et al.(2008) also compiled demographic and geographic penetration data on access of general banking branches or ATM booths. These dimensions for measuring financial inclusion are usually known as outreach dimension and usage dimension. In terms of outreach dimension, there are three types of indicators: geographical penetration or availability (number of bank branches or ATMs per 1000 square kilometers), demographic penetration (number of bank branches or ATMs per 100000 people) and the number of accounts (deposits and loans) per 1000 adults. More bank branches and ATMs per 1000 square kilometers indicate smaller distances to nearest physical bank outlets and easier geographical access. Demographic penetration measures the average number of people served by each bank branch or ATM. Higher numbers imply that there are fewer clients per branch or ATM and also indicate easier access to banks’ services.

In terms of usage dimension the frequently used indicator is the ratio of deposits/GDP or credit/GDP or (deposit + credit)/GDP. In this vein, we should mention that large amounts of credit in a financial system do not always correspond to broad use of financial services, because the credit can be concentrated among the largest firms and wealthiest individuals. Country examples could reveal this situation. Vietnam has domestic credit to the private sector amounting to 125 percent of GDP, but only 21 percent of adults in the country report having a formal account. Conversely, the Czech Republic, with relatively modest financial depth, with domestic credit to the private sector at 56 percent of GDP, has relatively high account penetration (81 percent). Similarly, over 85% of households have accounts in Estonia and Switzerland, but while Estonia’s financial depth is around 20%, Switzerland is over 160% (Demirgüc-Kunt and Klapper 2012). This suggests that financial depth and financial inclusion are distinct dimensions of financial development and that financial systems can become deep without delivering access for all. The large variation in account penetration among economies with similar levels of national income and financial depth also suggests that there is likely to be room for policy interventions to increase financial inclusion. In sum, the measurement of financial inclusion depends on the level of development of a country and varies across countries/regions.

In the recent literature (Gupte et al. 2012, Arora 2010) two other dimensions have been added in the construction of an inclusive financial index, Ease and Costs of Transactions. The Ease of Transactions dimension comprises variables related to whether it is easy or difficult for people, to afford the opening of savings or checking accounts, or get loans. The cost of Transactions dimension includes variables like annual fees charges to customers for ATM cards or accounts and the costs of international transfer of money. In the present study, taking into account the availability of data, we consider only the three dimensions of penetration, availability and usage.

1. **Index of Financial Inclusion (IFI): construction and application to Saudi Arabia**
	1. **A Methodological review**

In the literature, we can find different methods to compute the IFI. The differences are due to the number of dimensions, the number of variables in a dimension and the way dimensions are combined. For example, Gupte et al. (2012) have considered four dimensions namely, outreach (penetration and accessibility), usage, ease of transactions and cost of transactions whereas Arora (2010) didn’t include usage dimension and Sarma (2008, 2010, 2012) didn’t include ease and cost dimension. Some authors have used arithmetic average of the different dimensions, while others have used geometric mean to take into account the imperfect substitution across all the dimensions (Gupte et al. 2012). Following the literature, the approach employed in this paper to construct IFI is similar to United Nations Development Program (UNDP)’s computation (2010) for well-known development indices such as the HDI (Human Development Index), the GDI (Gender-Related Development Index), and the HPI (Human Poverty Index). The computation for IFI starts by first calculating an index for each aspect of financial inclusion. The index of the $i^{th} $variable in a dimension i, δi, is computed by formula (1) (Sarma, 2010, Gupte et al. 2012, Gupta 2014).

$δ\_{it}=\frac{A\_{it}-m\_{i}}{M\_{i}-m\_{i}}$ (1)

Where

(Ait) = Actual value of variable i

(Mi) = Maximum value of variable i

(mi) = Minimum value of variable i

This ensures that $δ\_{it} $lies between 0 and 1 and the higher the value of $δ\_{it} $higher the country’s achievement in dimension i. Each dimension is a simple average of all the$ δ\_{it}$. Finally, the index of financial inclusion, IFIt, can be measured either by the formula (2) (Sarma, 2008) or by formula (3) (Gupte et al. 2012). In Formula (2), the IFI is “the normalized inverse Euclidean distance” of the point $Δ\_{i}=(δ\_{1t},δ\_{2t},….δ\_{nt})$ from the ideal point I = (1, 1, 1, …, 1) (Sarma, 2010)[[5]](#footnote-5) while in formula (3) it’s a geometric mean of the different dimensions $ δ\_{it}$ (Gupte et al. 2012).

 $IFI\_{t}^{Sarma}=1-\frac{\sqrt{(1-δ\_{1t})^{2}+(1-δ\_{2t})^{2}+…….+(1-δ\_{nt})^{2}}}{\sqrt{n}}$ (2)

$ IFI\_{t}^{Gupte}=\prod\_{i=1}^{n}δ\_{it}^{1/n}$ (3)

In formula (2), the second component’s numerator is the Euclidean distance of $Δ\_{i}$ from the ideal point I. We obtain the inverse normalized distance dividing it by $\sqrt{n}$ and subtracting from 1 in order to make the values lie between 0 and 1. A high IFI value represents higher financial inclusion with the normalized inverse distance (Sarma, 2010). In this research, we consider three basic dimensions of an inclusive financial system as considered in Sarma (2008, 2010) and in Gupta (2014): banking penetration, availability of the banking services and usage of the banking system.

The size of the banked population is a measure of the banking penetration of the system. However, there is no available data for the numbers of people that have bank accounts[[6]](#footnote-6); therefore in the absence of such data for KSA, following Arora (2010), we use data on the number of bank branches and/or the number of ATM per 100000 of persons to measure the penetration dimension. We use the number of bank branches and/or the number of ATM per 1000 km2 as an indicator of the banking availability dimension. Moreover, the inclusiveness of a financial system implies that financial services are available for users. Long distances to the nearest bank branch may deter individuals from using formal accounts[[7]](#footnote-7). Having a bank account by itself is not enough for a financial system to be inclusive; in addition, the banking services must be adequately utilized. Thus, the volume of credits and deposits as the proportion of GDP is used to measure usage dimension for KSA. In this vein, one should distinguish between use and access to financial services. While use indicates consumption of financial services and hence is related to the demand side, access comprises both the demand and supply sides of financial services[[8]](#footnote-8).

Being given these three dimensions (penetration ($π\_{it})$, availability ($α\_{it}) $and usage ($µ\_{it})$), we can identify a country or a region i by a point$(π\_{it}$, $α\_{it},$ $µ\_{it})$ in the three dimensional Cartesian space where $π\_{i}$, $α\_{i}$ and $µ\_{i}$ are the dimension indices computed using formula (1). In our study the IFI for the KSA is measured by the normalized inverse Euclidean distance of the point $(π\_{t}$, $α\_{t},$ $µ\_{t}) $from the ideal point (1, 1, 1) using formula (2) (Sarma, 2010) and by formula (3) (Gupte et al. 2012). The new formulas are:

$IFI\_{KSAt}^{Sarma}=1-\frac{\sqrt{(1-π\_{t})^{2}+(1-α\_{t})^{2}+(1-µ\_{t})^{2}}}{\sqrt{3}}$ **(2’)**

$ IFI\_{KSAt}^{Gupte}=π\_{t}^{1/3}α\_{t}^{1/3}μ\_{t}^{1/3}$ **(3’)**

The approach taken in this paper differs from previous works in some aspects. For example, it differs from Sarma’s work in that, while Sarma’s data included a cross-section of countries, our analysis focuses only on the case of Saudi Arabia. It’s also different from Arora (2010) and Gupte et al. (2012) contributions in that, while they calculated the index only for few years in the case of India our calculation is concerned by a long period. A potential contribution of this paper is the time series measure of financial inclusion. The time dimension allows a look at how financial inclusion has changed over time and how it has impacted or been impacted by other events. Generating time series for an inclusive financial index is also useful for econometric estimations in relation with macroeconomic variables.

* 1. **Computing IFI for the KSA**

The main problem that encounters this computation is the unavailability of adequate data. This is not specific to the KSA but characterizes most of the developing countries. In this paper we combined several sources of data to construct the three dimensions of financial inclusion for the KSA. We have collected data from various sources for each dimension for the period 1980-2013. The World Banks’ “World Development Indicators” (WDI), the International Monetary Funds’ “International Financial Statistics” (IFS), the Saudi Central Department of Statistics and Information (SCDSI) Annual Report and the Saudi Arabian Monetary Agency (SAMA) Yearly Book were our main sources to gather data. The computation of the IFI is set on two distinct periods 1980-1994 and 1990-2013. On the first period our indicator is composed only of the usage dimension because the only available data are on credit and deposits. Beginning 1994, data on ATM and bank branches are available, and then we can calculate the availability and penetration dimensions. The computed index is reported in table 1 in the appendix. We can see that both methods (Sarma 2010 and Gupte et al. 2012) give almost the same IFI. We can use either one or the other for the rest of the analysis. Results show also that the IFI has grown considerably especially during the last two decades. The KSA has a low financial inclusion till 2004 (IFI<0.3), becomes medium financial inclusion during the period 2005-2008 (0.3<IFI<0.6) and it could be considered, according to our calculation, as a high financial inclusion economy in the last decade. This growth can be attributed mainly to the development of the bank sector which accounts in 1995, 1192 bank-branches and 1937 in 2015 and then a mean growth rate of about 37 new branches each year. Indeed, since the beginning of the 21 century the authorities have launched a number of reforms of the financial system. These include the introduction of new laws, for small-medium-sized enterprises loan guarantee scheme and the liberalization of insurance of banking licenses to non-Saudi banks. These reforms allowed the expansion and diversification of financial services beyond commercial banks with wider reach and access. They aimed at developing a more diversified intermediation framework, with a larger role for the private sector to meet the financing needs of the population.

1. **Inclusive finance, inclusive growth and socio-economic development**

Policies for inclusive growth are an important component of most government strategies for sustainable development and poverty reduction. Financial inclusion is one of the main instruments that could help governments to achieve these goals. Empirical evidence suggests that improved access to finance is not only pro-growth but also pro-poor, reducing income inequality and poverty (Beck et al. 2008). Financial inclusion encompasses improving the range, quality and availability of financial services to the underserved and the financially excluded. Expanding the reach of financial access holds significant promise to enhance the livelihood and well-being of the poor and the growth of small and medium enterprises. It’s argued in the literature that there exist two channels through which financial inclusion could impact human well-being of the population. One works indirectly through growth. The other works directly through the poor benefiting from accessing financial services. Concerning the indirect channel, although the earlier researches (Kuznets 1955, 1963) suggested that economic growth may increase income inequality at the early stage of development, but reduces it at the mature stage of industrialization, a consensus has emerged recently among big number of economists that economic growth overall leads to poverty reduction through job creation and the reduction of wage differential between skilled and unskilled labor(Galor and Tsiddon 1996). Higher growth could also lead to high tax revenues, enabling the government to allocate more fiscal resources on social spending such as health, education, and social protection, and hence benefiting the poor (Perroti 1993). Aghion and Bolton (1997) argue that capital accumulation increases with high economic growth and more funds will be available to the poor for investment purposes, thus increasing their income and reduce poverty. Other empirical researches (Datt and Ravallion 1992, Kakwani (2000), Fields (2001)) attempted to explain changes in poverty in terms of a “growth effect”, stemming from a change in average income, and a “distribution effect”, caused by shifts in the Lorenz curve holding average income constant. They find the growth effect to explain the largest part of observed changes in poverty. Fields (2001) qualifies that the extent of the impact of growth on poverty alleviation depends on the growth rate itself and the initial level of inequality. Ravallion and Chen (1997) show that a 10% increase in the mean standard of living leads to an average reduction of 31% in the proportion of the population below the poverty line, indicating that growth leads to a reduction in poverty incidence.

The direct channel is assessed on the belief that inclusive financial development can directly contribute to poverty reduction by providing or broadening the poor’s access to financial services (Aghion and Bolton 1997). It’s argued that under a perfect financial market people with entrepreneurial abilities can become entrepreneurs whether they are rich or poor because everybody has equal access to the required funding. Contrarily, imperfect financial market affects the level of education or the level of human capital of the poor, thereby promoting persistent poverty (Demirguc-Kunt and Levin (2008)). Poor people are usually credit constraint because of the lack of collateral. These credit constraints restrict the poor from exploiting investment opportunities, thus slowing aggregate growth by keeping capital from flowing to its highest-value use. A poorly functioning financial system will produce higher income inequality by disproportionately keeping capital from flowing to “wealth-deficient” entrepreneurs. Inclusive financial sector development reduces information and transaction costs and, therefore exerts a positive impact on the poor. Fields (2001) argued that through better access to credit, the poor are given the opportunity to participate in more productive endeavors, in turn increasing their incomes. Access to financial services also enables the poor to better respond to economic or health-related shocks, reducing the likelihood of falling into poverty when such shocks occur.

In some, financial inclusion can act as a fundamental source of poverty reduction. This implies that poverty causes low demand for organized financial system and financial exclusion causes poverty. Therefore, there could exist a bidirectional cause and effect relationship between poverty and financial inclusion.

* 1. **IFI, HDI and the Saudi Arabian paradox**

Sarma (2008, 2010, 2012) has shown that countries with low income have low IFI and a comparison of IFI with human development index (HDI) shows that all countries with high and medium IFI values belong to the group that is classified by the United Nations Development Program (UNDP) as countries with high human development (HDI > 0.7). In the studies of Sarma (2008, 2010, 2012) the case of Saudi Arabia was treated as an exception in the sense that it is a high income country with high level of HDI but with a low level of IFI (according to her calculation). In the specific case of Saudi Arabia the low level of IFI could be explained, among other reasons, by the way the author has calculated the geographic penetration dimension. Saudi Arabia has an area of about 2149690 km2 but a huge zone (Rub’ Al-Khali which signifies the empty quarter) covering 650000 km2 is inhabitant. In this study we revise the calculation of IFI for Saudi Arabia by reconsidering these geographic characteristics. If we compare our results (table in the appendix) to those of Sarma (2012) we can see significant differences. For example for the years 2005 and 2009, Sarma has found an IFI of 0.202 and 0.318 respectively while our calculation gives 0.277 and 0.669. This shows that the Saudi Arabian economy is financially dynamic and moves from low to high financial inclusive economy in the space of one decade. This shift is due crucially to the reforms of the Saudi financial system as explained below. Figure 1 and table 1 show that the IFI and HDI have similar dynamics and highly correlated with a more pronounced accelerated rhythm for the IFI during the last decade.

In order to study the relationship between IFI, HDI and other socioeconomic variables in section 7, we have to transform the IFI. Unlike the IFI which lies between 0 and 1, the transformed variable (TIFI) lies between -∞ and ∞. This allows us to carry out classical econometric regression. The transformed variable (TIFI) is a monotonically increasing function of IFI, and hence it preserves the same ordering as IFI. The transformed variable is a logit function of the original variable IFI, as defined below (Sarma 2010).

$$TIFI\_{t}=ln⁡(\frac{IFI\_{t}}{1-IFI\_{t}})$$

Figure 1. Inclusive Financial Index (IFI) and Human Development Index (HDI)

.0

.1

.2

.3

.4

.5

.6

.7

.8

.9

1980

1985

1990

1995

2000

2005

2010

I

F

I

H

D

I

ure

* 1. **TIFI and socio-economic variables**

The literature has identified financial exclusion as reflection of a broader problem of “social exclusion”. In the industrialized and high income countries having a well-developed banking system, studies have shown that the exclusion from the financial system occurs to persons who belong to low-income groups, the ethnic minorities, immigrants, aged and so on (Barr, 2004; Kempson and Whyley, 1998; Connoly and Hajaj, 2001). There is also a geographical factor; people living in rural areas and in locations that are remote from urban financial centers are more likely to be financially excluded (Kempson et al. 2000). Further, countries with low levels of income inequality tend to have relatively high level of financial inclusion (Buckland et al, 2005; Kempson and Whyley, 1998). In other words, the levels of financial inclusion inevitably rise in response to both prosperity and declining inequalities.

In developing countries the reality of financial inclusion is disparate and varies widely from country to another. In many countries, with similar income levels and in the same region, there can be significant differences in account penetration and then in financial inclusion. Among other examples, in 2008 World Bank report indicates that Ghana and Benin have a GDP per capita of about $560. But while 29% of adults in Ghana report having a formal account, only 10% in Benin do. This suggests that the variation across economies is not determined solely by national income measured by GDP per capita.

As an oil-based economy, the KSA is one of the wealthiest economies in the world. According to the World Bank report, in 2014 the GDP per capita at purchasing power parity is about 51924 USD and is ranked 10 in the World classification. Saudi Arabia has a high HDI of 0.837 in 2014 and ranked 39 among 188 countries, but has a low financial index of about 0.185 in 2004 and is ranked 34 among 49 countries (Sarma 2010) and a value of 0.318 in 2009 and ranked 52 among 94 countries (Sarma 2012). The Saudi financial system has evolved considerably during the last two decades. Between 1994 and 2013, the number of ATM has been multiplied by 30 and the number of bank branches has increased of about 14.5% during the same period accounting 8.75 branches for 100000 adults in 2013. One of the objectives of this paper is to verify whether this specific characteristic to the Saudi economy has been messes during the last decades.

1. **Data and empirical methodology**
	1. ***Data sources and statistical proprieties of the variables***

In order to study the effect of financial inclusion on growth and socio-economic development we use annual time series data for the period 1980-2013. As mentioned before, our data are gathered from different sources, including the World Banks’ “World Development Indicators” (WDI), the International Monetary Funds’ “International Financial Statistics” (IFS), the Saudi Central Department of Statistics and Information (SCDSI) Statistical Year book and the Saudi Arabian Monetary Agency (SAMA) yearly book. To measure Financial Inclusion we use the Transformed Index of Financial Inclusion (TIFI) which has been computed in the third section. As it has been assessed this index takes into account the three dimensions of financial inclusion, availability, usage, and penetration for the period 1994-2013 and only the usage dimension on the period 1980-1994. This subdivision has been imposed by the availability of the data. Till the beginning of the nineties, the only data we dispose are credit and deposits. We then were able to construct usage dimension measure. Beginning 1994, data on ATM and bank branch number are available; the three-dimension-index can be calculated. Economic growth is measured by the logarithm of real per capita GDP*.* The logarithm transformation is usually used to achieve stationarity in variance.Speaking about poverty in the oil-rich countries in general and in the KSA in particular seems to be a paradox but the reality is always different. In Saudi Arabia, like the majority of developing countries, data on poverty, inequality and income distribution are scarce and in most cases inexistent. Most of the developing countries started recording poverty data only in the late 1990s. Thus, a number of proxies for measuring poverty have been proposed in the literature. Some have used data on both income and headcount data for the poor, as well as Gini coefficient. Others have used annual income per capita as a proxy for poverty. However, these proxies are not without fundamental problems. For example, the annual income per capita does not account for other dimensions of poverty. In addition, studies have shown that consumption expenditure among the poor is usually more reliably reported and more stable than income (see Ravallion, 1992; Quartey, 2005). In the case of Saudi Arabia, none of these proxies is available. For this reason, the current study uses the Human Development Index and other socio-economic variables, like the share of rural population, the share of women in the adult population and the share of active population in order to evaluate the interactions between financial inclusive development and socio-economic development. Results of table 2 show a high and positive correlation between inclusive financial index and human development index. This is in line with major previous works (Sarma 2008, Yorulmaz 2012) and suggests that countries with high standing of living usually have a well-developed financial sector allowing a high fraction of the population to benefit from its services. The positive relationship between inclusive financial index and the share of active population indicates that more safety and regular jobs in the formal sector are likely to encourage people to engage in the financial sector. Inclusive financial index is very weakly correlated to the logarithm of per capita real GDP. This result is specific to the KSA, as an oil-based economy, and in opposition to the findings of the major previous works, which assess a high and positive correlation between financial inclusion and economic growth (see among others Yorulmaz (2012) in the case of Turkey and European Union Countries and Odhiambo (2009) in the case of South Africa). Results of table 2 indicate also that being a women and/or living in rural areas is a source of financial exclusion. These intuitive findings will be analyzed in more details in section 7.

**Table1**

**Descriptive statistics of TIFI and socio-economic variables**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | TIFI |  gdp | hdi | ap | Rural | female |
|  Mean | -1.066 |  10.820 | -0.346 |  0.320 |  0.223 |  0.445 |
|  Maximum |  1.228 |  11.400 | -0.179 |  0.389 |  0.340 |  0.462 |
|  Minimum | -9.179 |  10.384 | -0.539 |  0.256 |  0.170 |  0.434 |
|  Std. Dev. |  1.693 |  0.332 |  0.108 |  0.027 |  0.045 |  0.007 |
|  |  |  |  |  |  |  |
|  Observations |  34 |  34 |  34 |  34 |  34 |  34 |

Source: Author calculation.

**Table 2**

 **Correlation of socio-economic variables with TIFI**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | TIFI | gdp | Hdi | ap | Rural | female |
| TIFI |  1.000 |  0.097 |  0.701 |  0.768 | -0.760 | -0.714 |
| Gdp |  0.097 |  1.000 |  0.463 |  0.362 | -0.185 | -0.181 |
| Hdi |  0.701 |  0.463 |  1.000 |  0.666 | -0.945 | -0.764 |
| Ap |  0.768 |  0.362 |  0.666 |  1.000 | -0.651 | -0.792 |
| Rural | -0.760 | -0.185 | -0.945 | -0.651 |  1.000 |  0.852 |
| Female | -0.714 | -0.181 | -0.764 | -0.792 |  0.852 |  1.000 |

Source: Author calculation.

* 1. **Model specification and econometric techniques**

In order to investigate the relationships between financial inclusion, economic growth and socioeconomic development we regress the transformed inclusive financial index (TIFI) on a set of socioeconomic variables relative to the KSA, such as real per capita GDP, rural population rate, and human development index. Given the woman status in the Saudi Arabia we should consider the proportion of women in adult population[[9]](#footnote-9). We also add a quadratic form of rural population in order to appreciate if financial exclusion in rural areas tends to decrease or not. Education level and the literacy rate for the population 15 years and above also help explaining the large variation in the use of formal accounts. In developing economies adults with a tertiary or higher education are on average more than twice as likely to have an account as those with a primary education or less (World Bank 2014). As HDI integrated these two components and in order to avoid co-linearity we don’t introduce these two variables with HDI[[10]](#footnote-10). According to Demirguc and Klapper (2012), having a job is one of the major factors of social inclusion. Therefore, employment relative to the number of individuals that are active in the formal sector is a key indicator for the extent of the financial inclusion[[11]](#footnote-11).

Our model can then be written as follows:

$TIFI\_{t}= α\_{0}+α\_{1}gdp\_{t}+ α\_{2}hdi\_{t}+α\_{3} ap\_{t}+ α\_{4}rural\_{t}+α\_{5}rural\_{t}^{2}+α\_{6} female\_{t}+ε\_{t} (1)$

TIFI : is the transformed financial inclusion index.

hdi : is the logarithme of the Human Development Index.

gdp : is the logarithm of real per capita GDP.

ap : is the share of active population in the adult population.

rural: is the share of rural population.

female: is the share of women in the adult population.

$ε\_{t}$ : is iid random variable.

In order to study the interactions between the inclusive financial index and its determinants we adopt a strategy in two steps. First we estimate equation (1) using the Generalized Method of Moments (GMM), because many empirical works argue that the relationship between financial development and economic growth and between growth and its determinants is not linear. Berthelemy and Varoudakis (1996), Abdelkarim and Rahmani (2009) among others attach this non-linearity to the presence of a threshold effect. This method is also used to correct for bias caused by endogenous explanatory variables. In a second step we focus on the causality relationships between financial inclusion, economic growth and human development index using a trivariate Vector Error Correction Model (VECM). VECM has the advantage to detect short and long term causality.

1. **Empirical results**
	1. **Unit roots tests**

In order to test the stationarity of the variables and avoid spurs regression we use NP test of Ng-Perron (2001) and the DF-GLS test of Elliot-Rothenberg-Stock (1996) unit root tests because the ADF and PP (Phillips-Perron) tests are known to suffer potentially severe finite sample power and size problem. Results of table 3 on differenced variables show that all variables used in the study are stationary in difference. The exception is the series of women share in adult population for which the test of NP and DF-GLS don’t give clear results. To this series we apply the Phillips-Perron test which proposes a non-parametric method of controlling for serial correlation.

**Table 3**

**Unit root tests of variables on difference**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Ng-Perron test statistics\*  | DF-GLS test\*\* | Result |
|  |  | MZα | MZt  | MSB | MPT |  |  |
| Variables |  |  |  |  |  |  |  |
| Δ(TIFI)  |  | -12.298 | -2.475 | 0.201 | 2.008 | -3.76 | I(1) |
| Δ(gdp) |  | -17.129 | -2.920 | 0.170 | 1.453 | -3.90 | I(1) |
| Δ(hdi) |  | -11.911 | -2.118 | 0.178 | 3.224 | -2.81 | I(1) |
| Δ(ap) |  | -12.030 | -2.264 | 0.188 | 2.738 | -4.45 | I(1) |
| Δ(rural) |  | -19.073 | -3.054 | 0.160 | 1.404 | -5.78 | I(1) |
| Δ(female) |  | -2.052 | -0.967 | 0.471 | 11.483 | -1.99 | ND |
| Asymptotic critical values  | 1% | -13.8 | -2.58 | 0.174 | 1.78 | -2.63 |  |
|  | 5% | -8.1 | -1.98 | 0.233 | 3.17 | -1.95 |  |
|  | 10% | -5.7 | -1.62 | 0.275 | 4.45 | -1.61 |  |

\*Ng-Perron (2001). \*\*Elliot et al. (1996)

The test gives a value of (-3.03), compared to the critical value at 5% of (-2.95), we can conclude that the series is stationary in difference with constant and trend. In sum, we can conclude that all the variables used in the study are integrated of order one and this will allow performing cointegration relationships.

* 1. **GMM estimation**

Table 4 presents the results of GMM estimation developed by Arenello and Bond (1991). We regress the transformed index of financial inclusion (TIFI) on the logarithm of real per capita GDP, the logarithm of HDI and the other socioeconomic variables. In our context the GMM, as a generalization of the Instrumental Variables estimator is straightforward if the error distribution cannot be considered independent of the regressors’ distribution. In this vein researchers usually use instruments lagged two times and more to obtain the orthogonality conditions. The number

|  |  |
| --- | --- |
| **Table 3** |  |
| **Method: Generalized Method of Moments** |  |
|  |
| Dependent Variable: TIFI |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| Gdp | -0.933172 | 0.330447 | -2.823974 | 0.0090 |
| Hdi | 9.721466 | 2.382536 | 4.080302 | 0.0004 |
| Ap | 2.628699 | 0.568982 | 4.620006 | 0.0001 |
| Female | -16.42660 | 5.490661 | -2.991734 | 0.0060 |
| Rural | -0.949446 | 18.01661 | -0.052698 | 0.9584 |
| rural2 | 36.17935 | 40.63441 | 0.890362 | 0.3814 |
| Constant | -0.00364 |  0.00168 |  -0.46209 |  0.1702 |
|  |  |  |  |  |
| R-squared | 0.937243 |  |  |
| Adjusted R-squared | 0.925175 |  |  |
| S.E. of regression | 0.137443 |  |  |
| J-statistic | 0.009528 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Note: Instrument list: TIFI(-2) gdp(-2) hdi(-2) ap(-2) female(-2) rural(-2).

 J-statistic is Hansen statistic for over-identification of instruments.

of optimal lags is determined by an information criterion (Akaike Information Criterion (AIC) and Schwarz Criterion). Another strong reason to use GMM is when data face heterosketasticity of unknown form. The validity of the instruments is tested using the overidentification J-statistic of Hansen (1982) which is distributed as chi-two with degrees of freedom equal to the number of overidentifying restrictions.

Results of table 4 indicate a positive and significant relationship between TIFI and HDI. This result is in line with previous findings. Sarma (2010), Demirguc-Kunt and Klapper (2012) in the case of country comparison have shown that countries with high HDI have a high financial inclusion. Gupta et al. (2014) in the case of India and Yorulmaz (2012) in the case of Turkey conclude that regions or states with high HDI have also a high IFI. During the three last decades Saudi Arabia has invested considerable efforts in the major human development dimensions like education, health and infrastructure. The impressive education track record has led to a more financial literacy allowing more financial inclusion. This suggests that Saudi government should incorporate financial inclusion as one of its objectives in the process of economic and social development.

The estimated coefficient of the share of active population is positive and significant at 1% level meaning that more population engaged in the formal sector is one condition to accelerate the process of financial inclusion. Nevertheless, Saudi economy faces a relatively high rate of unemployment among citizens (12% in 2014) and this rate is about 22% among young with university diploma. This high fraction of adult population will remain financially excluded unless future governments will be able to propose new employment policy. The coefficient of the share of adult female population is negative and highly significant. This result is the reflection of multiple socioeconomic constraints women face in the KSA. Among others, the rate of female unemployment among Saudi women citizens is about 33% in 2014 and only 61% of adult women have an account in a formal financial institution (SCDSI) which is very below the average of 94% in OECD countries.

The negative relation between inclusive financial index and economic growth, measured by the real per capita GDP, could infirm the demand following-response hypothesis which states that economic growth leads to financial development. This result is in line with previous works (Mahran 2012) and could indicate that the process of development in the Saudi economy is still heavily dependent on government spending and the dominant role of the public sector. As an oil-based economy the government has a strong control over the major economic activity. Even though during the last decade several key services were privatized, the share of private sector in the real GDP is still low and represents about 38% in 2013. Inclusive finance benefits essentially to poor households through microfinance and microcredit which should be afforded by the banks, nevertheless, lending to small and medium sized enterprises still very low in the KSA and represents only 1.7% as a share of total lending in 2014. One possible explanation of this is the limited bank risk appetite and the inability of banks to adjust their operating models to the small and medium enterprises. This situation is in line with GCC countries but below benchmarks elsewhere in MENA region and internationally.

* 1. **Causal interactions between IFI, HDI and economic growth**

Many empirical works argue that financial inclusion and human development move closely. On the micro level, an inclusive financial system allows households to organize their income and to plan future consumption. On a macro level, it builds entrepreneurial spirit and job creation. It also allows governments’ greater visibility of the fiscal system. As such it can be argued that financial inclusion is linked to development. Recognizing its importance to development, financial inclusion was included in the UN’s Millenium Goals (UN report 2015). Inclusive finance is also linked to growth, as explained in section 2.

This section focuses on the causal relationships between financial inclusion, economic growth and human development through HDI in the KSA. In this vein, a trivariate dynamic Granger causality test is used. This technique is chosen because of its favorable response to both large and small samples. The trivariate Granger causality model based on the Error-Correction Mechanism (ECM) can be expressed as follows:

$$gdp\_{t}= α\_{0}+\sum\_{i=i}^{n}α\_{1i}gdp\_{ti}+\sum\_{i=i}^{m}α\_{2i}TIFI\_{ti}+\sum\_{i=i}^{k}α\_{3i}hdi\_{ti}+α\_{4}ECT\_{t-1}+ε\_{1t} (4)$$

$$TIFI\_{t}= β\_{0}+\sum\_{i=i}^{n}β\_{1i}gdp\_{t-i}+\sum\_{i=i}^{m}β\_{2i}TIFI\_{t-i}+\sum\_{i=i}^{k}β\_{3i}hdi\_{t-i}+β\_{4}ECT\_{t-1}+ε\_{2t} (5)$$

$$hdi\_{t}= δ\_{0}+\sum\_{i=i}^{n}δ\_{1i}gdp\_{t-i}+\sum\_{i=i}^{m}δ\_{2i}TIFI\_{t-i}+\sum\_{i=i}^{k}δ\_{3i}hdi\_{t-i}+δ\_{4}ECT\_{t-1}+ε\_{3t} (6)$$

Where ECT*t*−1 is the Error Correction Term lagged one period; $gdp\_{t}$ is the logarithm of real per capita GDP;$ TIFI\_{t}$ is the Transformed Inclusive Financial Index and $hdi\_{t}$ is the logarithm of Human Development Index. $ε\_{1t} $, $ε\_{2t}$and $ε\_{3t}$ are mutually uncorrelated white noise residuals.

The ECM form has the privilege to detect the direction of the Granger causality between variables and allows distinguishing between the short-run and long-run causality. The short-run causality can be detected through the individual t-test of the explanatory variables and the F-statistic, whereas log-run causality is depicted through the t-test of the lagged error correction term. Based on the equations 4-5-6, we can derive causal relationships between financial inclusion, economic growth and human development as follows:

|  |  |
| --- | --- |
| Causality direction  |  Conditions  |
| 1. Inclusive finance(TIFI) Economic Growth (gdp)
2. Inclusive finance(TIFI) Human Development (hdi)
3. Economic Growth(gdp) Inclusive finance(TIFI)
4. Economic Growth (gdp) Human Development(hdi)
5. Human Development(hdi) Economic Growth(gdp)
6. Human Development(hdi) Inclusive Finance(TIFI)
 | $$ α\_{2i}\ne 0;α\_{4}\ne 0$$$$ δ\_{2i}\ne 0;δ\_{4}\ne 0$$$$ β\_{1i}\ne 0;β\_{4}\ne 0$$$$ δ\_{1i}\ne 0;δ\_{4}\ne 0$$$$ α\_{3i}\ne 0;α\_{4}\ne 0$$$$ β\_{3i}\ne 0;β\_{4}\ne 0$$ |

* + 1. **Cointegration relationships**

Table 5 reports the Johansen-Juselius cointegration test results between the transformed financial index (TIFI), the logarithm of real per capita GDP and the logarithm of HDI. They indicate that there exist one cointegration relationship between inclusive finance, human development and economic growth. Both the trace test and the maximum eigenvalue statistics reject the null hypothesis of no cointegration at 5% levels of significance.

 These findings corroborate those of the correlation matrix presented in section 2. We can deduce that there exist a stable long-run relationship between Inclusive Financial Index, Human Development Index and real per capita GDP in Saudi Arabia. However, cointegration test cannot tell us which variable is leading and which variable is lagging and then cannot indicate the direction of causality. To surpass this shortage we apply the error correction technique in order to detect the causality relationships between variables and distinguish between short-run and long-run Granger-causality.

**Table 5**

**Johansen–Juselius maximum likelihood cointegration tests.**

|  |
| --- |
| Null Hypothesis Alternative Statistic 5% critical value P-value\*  hypothesis  |

Trace test

*r*=0 *r*≥1 52.37669 29.79707 0.0000

*r*≤1 *r*≥2 8.522179  15.49771 0.4114

*r*≤2 *r*≥3 0.016664 3.841466 0.8972

Maximum Eigenvalue test

*r*=0 *r* = 1  43.85451  21.13162 0.0000

*r*≤1 *r* = 2 8.505515 14.26460 0.3296

*r*≤2 *r* = 3 0.016664 3.841466 0.8972

|  |
| --- |
| *Note*: *r* stands for the number of cointegrating vectors; The lag structure of VAR is determined by the highest values of the Akaike information criterion and Schwartz Bayesian Criterion.*\** MacKinnon-Haug-Michelis (1999) p-values. |

* + 1. **Error Correction Model results and Causality tests**

Empirical results of the trivariate ECM (equation 4, 5 and 6) are presented in table 6. They show that in the gdp equation (equation 4), the coefficient of the lagged error-correction term is negative and significant at 5%. This finding supports the existence of a long-run causality from financial inclusion and human development to economic growth while in the short-run only the causal-flow from human development to economic growth is accepted$ (α\_{31}\ne 0 and α\_{33}\ne 0 $). These results could support some earlier findings and in opposition to others in the case of KSA. For example, Mahran (2012) has shown that financial development does not cause economic growth while Samargandi et al. (2014) has found that financial development has a positive impact on growth of the non-oil sector and, in contrast, its impact on the oil-sector growth and total GDP is either negative or insignificant. Marashdeh and Al-Malkawi (2014), using ADRL model and causality tests, find that in the short-run, neither the financial deepening nor the economic growth Granger-cause each other. In contrast, their findings suggest that there exist a positive and statistically significant long-run relationship between financial deepening and economic growth and conclude that financial deepening spurs growth and support the supply-leading hypothesis.

In the equation of human development index (equation 6) both economic growth and inclusive finance Granger-cause human development in the long-run, the coefficient of the error correction term is negative and significant ($δ\_{4}\ne 0), $while the causality in the short-run stems only from economic growth to human development ($ δ\_{12}\ne 0, δ\_{14}\ne 0$). These findings corroborate the theoretical analysis developed in the second section according to which economic growth is a sine-qua-non condition to human development.

In the TIFI equation (equation 5), the lagged error-correction term is negative and statistically significant $(β\_{4}\ne 0)$ supporting a long-run equilibrium between inclusive finance, economic growth and human development index while in the short-run only the human development index Granger-causes inclusive finance ($ β\_{1i}=0 and β\_{3i}\ne 0)$. The above findings establish that in the case of KSA as an oil-based economy, economic growth can induce financial inclusion only in the long-run. In the short-run, neither financial inclusion nor the economic growth Granger-causes each other. Put it in another way, there are no short-run bidirectional causations between financial inclusion and economic growth. One possible explanation advanced by Marashdeh and Al-Malkawi (2014) is that policymakers in Saudi Arabia do not promote short-run economic policy.

**Table 6**

**VECM estimation and Granger-causality between gdp, TIFI and hdi**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  | dependent  | Variables |  |
| Variables |  |  |  |
| Gdp | TIFI | hdi |
| D(gdp-1) | **0.822746** | -0.035493 | 0.108961 |
|  | [4.08029] | [-0.51879] | [0.08384] |
| D(gdp-2) |  0.188501 |  0.023135 |  0.037140 |
|  | [ 0.59180] | [ 1.46026] | [ 0.02542] |
| D(gdp-3) |  -0.086183 | 0.006319 | **0.460156** |
|  | [ -0.30299] | [0.44665] | [ 2.35267] |
| D(gdp-4) | **0.042974** |  0.024776 |  **1.073014** |
|  | [3.17483] | [ 1.02645] | [ 2.95164] |
| D(TIFI-1) |  0.574528 | **0.757608** | 3.006036 |
|  | [ 0.34520] | [ 3.33934] | [0.14367] |
| D(TIFI-2) | -0.699817 | -0.514789 | -3.201193 |
|  | [-0.71847] | [-1.00983] | [-0.13552] |
| D(TIFI-3) | -1.956864 | **0.356996** | 1.061767 |
|  | [-1.44369] | [2.62735] | [1.06853] |
| D(TIFI-4) |  1.946296 | -0.092501 |  1.003658 |
|  | [ 0.29521] | [-0.28208] | [ 0.49720] |
| D(hdi-1) | 0.025041 | -0.017677 |  0.292757 |
|  | [0.30601] | [1.34308] | [ 0.77993] |
| D(hdi-2) | **0.076938** |  **0.014605** |  **0.093452** |
|  | [ 2.69622] | [ 2.65717] | [ 2.18436] |
| D(hdi-3) | 0.932145 | 0.008380 |  **1.334959** |
|  | [0.08588] | [1.58211] | [ 2.68573] |
| D(hdi-4) | **0.201957** |  **0.009005** |  **1.020936** |
|  | [ 5.02330] | [ 2.15496] | [ 3.05433] |
|  |  |  |  |
| ECT-1 | **-0.125620** |  **-0.002045** | **-0.304053** |
|  | [-2.84231] | [ -1.97028] | [ -4.49977] |
| Constant | **0.032757** |  **-0.009305** |  0.090969 |
|  | [ 2.57428] | [ -3.27975] | [ 0.34767] |
|  |  |  |  |
|  |  |  |  |
|  R-squared |  0.722275 |  0.407172 |  0.834930 |
|  F-statistic |  3.000794 |  0.792495 |  5.836197 |
|  Log likelihood |  74.62175 |  30.44739 |  161.6495 |

The totality of the causal relationships is summarized in table 7. Overall, the above results show that human development Granger-causes both economic growth and financial inclusion in the short and long-run while economic growth is Granger-caused only by human development in the short-run and in the long-run. Financial inclusion is Granger-caused by human development and economic growth in the long-run but only human development causes financial inclusion in the short-run.

**Table 7**

**Causality between TIFI, HDI and economic growth**

|  |  |
| --- | --- |
| Causality direction | Causality nature |
| Short-run | Long-run |
| Inclusive finance(TIFI) Economic Growth(gdp)Inclusive finance(TIFI) Human Development (hdi)Economic Growth(gdp) Inclusive finance(TIFI)Economic Growth (gdp) Human Development(hdi)Human Development(hdi) Economic Growth(gdp)Human Development(hdi) Inclusive Finance(TIFI) |  No No No Yes Yes Yes |  Yes Yes Yes Yes Yes Yes |

**7.3.3. Impulse-Response functions**

The VECM and Granger-causality tests developed in the previous section don’t give information on the instant reaction of the variables of the model to a shock in one of them. In addition, because it is usually difficult to interpret the coefficients of an estimated VAR model, impulse responses are often computed in order to study the interrelationships within the variables of a system (Griffiths and Lutkepohl 1990). Impulse-response functions are a tool to trace the effects of a one-time shock to one of the innovation on current and future values of all the endogenous variables of the model. A shock on one variable not only affects the variable itself but also transfers its impact to all other endogenous variables via the dynamic lag structure of the VAR. In order to depict the outcomes of impulse-response on the variables under consideration, TIFI, the logarithm of the real per capita GDP and the logarithm of HDI, we reproduce the graphics of the response to one-time shock and the cumulative response. We can observe when the TIFI is the impulse; the response of GDP is negative during the five-six first years following the shock and becomes positive during the rest of the propagation period. Human development index responds positively to an impulse in TIFI while the effect of shock for HDI to TIFI is quasi-null during the five first years and becomes positive after.



The reaction of financial inclusion to an impulse in GDP is positive and increases remarkably during the first years then it remains quasi-stable. When the HDI is the impulse, the response of GDP is positive and quasi-stable during all the period. The accumulated response show that the reaction of financial inclusion to a shock in GDP is positive and monotonically increasing but its reaction to a shock in HDI takes off from zero only after seven periods. When inclusive finance is the impulse the accumulated response of HDI is linearly increasing while that of GDP is negative and remains stable during all the period. Finally the analysis of the confidence intervals indicates that all individual impulse responses coefficients are significant at 95%.



1. **Conclusion and policy recommendations**

This research was an attempt to construct an inclusive financial index for Saudi Arabia as an oil-rich economy and to study the causality interactions between financial inclusion and its determinants. Using UNDP approach and Sarma (2008) methodology our transformed financial inclusion index (TIFI) takes into account three dimensions, availability, penetration and usage of the bank system. The computation of the TIFI during the period 1980-2013, taking into account geographic specificities, shows that the Saudi Arabian economy is a financial dynamic one and evolved from a low inclusive financial economy at the beginning of the century to a high inclusive one during the last decade. This result allows resolving the Saudi-paradox stressed by Sarma, according to whom KSA has a high human development index and high per capita GDP but a low financial inclusion. Our statistical analysis shows that financial inclusion and human development are highly correlated in KSA.

The second step of this research was devoted to study the interactions between inclusive finance and its determinants using macroeconomic leading variables such as, real per capita GDP, human development index, and active population, share of the women in adult population and the share of rural population. We assessed our estimations on GMM methodology, in order to avoid statistical problems, such as endogeneity and heteroscedasticity. Our results show that financial inclusion is negatively correlated to per capita GDP and the share of women while it’s positively related to the human development index and the active population.

These findings are corroborated by the lead/lag causality interactions based on the VECM estimation. We depict that HDI causes financial inclusion and economic growth both in short-run and in the long-run while neither inclusive finance nor economic growth Granger-causes each other in the short-run. In Saudi Arabia, the causality between financial inclusion and economic growth runs only in the long-run. This result is in line with the general consensus that in natural resource-based economies, financial systems deepen at a slower rate than in other countries (Beck 2011). In Saudi Arabia the high dependence of the economy on oil and the dominant role of public sector leave little room for the private sector to play a significant role in the economy. In this kind of economy, banks are interested in big projects leaving aside small and medium enterprises enhancing financial exclusion of a part of the population especially women and young without collaterals. In order to avoid the emergence of pockets of poverty and reduce certain inequalities specifically due to the relatively high unemployment rate among young and high graduate, policymakers in Saudi Arabia should accelerate reforms in bank system. The latter should allocate more resources to the private sector especially to the small and medium enterprises allowing more financial inclusion.

Although the KSA has made continuous efforts towards greater financial inclusion, supplement measures are needed for a coordinated endeavor between government, banks and microfinance institutions to facilitate access to financial services amongst young, women and low-income groups. Government has an important role to play in building inclusive financial system by increasing the outreach to un-served and underserved households and enterprises.

Finally, the current study may suffer from potential shortages related to the variable used to measure financial inclusion. The inclusive financial index we have constructed and used is a better proxy than those usually used by previous works; it brings interesting information but suffers from many problems due to the lacking of data. Nevertheless, the IFI developed here can be used to monitor the progress of policy initiatives for financial inclusion over a period of time. It can be also of interest to the research community in order to investigate empirical questions between development and financial inclusion.

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6. **Appendix 1**

 **Financial Inclusion Index in the Kingdom of Saudi Arabia 1980-2013**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Penetration | Availability | Usage | IFI-Gupte | IFI-Sarma |
| 1980 |  |  | 0.0586 | 0.0586 | 0.0586 |
| 1981 |  |  | 0.0603 | 0.0603 | 0.0603 |
| 1982 |  |  | 0.0820 | 0.0820 | 0.0820 |
| 1983 |  |  | 0.1442 | 0.1442 | 0.1442 |
| 1984 |  |  | 0.1732 | 0.1732 | 0.1732 |
| 1985 |  |  | 0.1980 | 0.1980 | 0.1980 |
| 1986 |  |  | 0.2302 | 0.2302 | 0.2302 |
| 1987 |  |  | 0.2385 | 0.2385 | 0.2385 |
| 1988 |  |  | 0.2752 | 0.2752 | 0.2752 |
| 1989 |  |  | 0.2639 | 0.2639 | 0.2639 |
| 1990 |  |  | 0.1951 | 0.1951 | 0.1951 |
| 1991 |  |  | 0.2205 | 0.2205 | 0.2205 |
| 1992 |  |  | 0.2192 | 0.2192 | 0.2192 |
| 1993 |  |  | 0.2523 | 0.2523 | 0.2523 |
| 1994 | 0.532 | 0.0443 | 0.2731 | 0.1860 | 0.2560 |
| 1995 | 0.489 | 0.0333 | 0.2837 | 0.1666 | 0.2453 |
| 1996 | 0.500 | 0.0557 | 0.2821 | 0.1989 | 0.2568 |
| 1997 | 0.484 | 0.0584 | 0.2947 | 0.2028 | 0.2585 |
| 1998 | 0.500 | 0.0904 | 0.3645 | 0.2544 | 0.2973 |
| 1999 | 0.429 | 0.0692 | 0.3586 | 0.2201 | 0.2689 |
| 2000 | 0.369 | 0.0678 | 0.3459 | 0.2054 | 0.2484 |
| 2001 | 0.331 | 0.0934 | 0.3941 | 0.2301 | 0.2614 |
| 2002 | 0.287 | 0.1170 | 0.4628 | 0.2497 | 0.2752 |
| 2003 | 0.248 | 0.1428 | 0.4542 | 0.2528 | 0.2704 |
| 2004 | 0.213 | 0.1648 | 0.5445 | 0.2675 | 0.2872 |
| 2005 | 0.192 | 0.1896 | 0.5891 | 0.2779 | 0.2981 |
| 2006 | 0.272 | 0.3006 | 0.6445 | 0.3753 | 0.3824 |
| 2007 | 0.351 | 0.4098 | 0.7501 | 0.4763 | 0.4736 |
| 2008 | 0.416 | 0.5087 | 0.8091 | 0.5555 | 0.5460 |
| 2009 | 0.500 | 0.6412 | 0.9328 | 0.6691 | 0.6429 |
| 2010 | 0.547 | 0.7375 | 0.8649 | 0.7041 | 0.6879 |
| 2011 | 0.577 | 0.8172 | 0.8489 | 0.7370 | 0.7200 |
| 2012 | 0.584 | 0.8951 | 0.9177 | 0.7829 | 0.7478 |
| 2013 | 0.619 | 0.9289 | 0.9346 | 0.8134 | 0.7736 |

1. Source: Author calculation
1. Corresponding Author: +966590873388.

The Author would like to thank Mandira Sarma and David Hulme for their help and cooperation. [↑](#footnote-ref-1)
2. A forth view, usually scant in the literature, was put forward by Lucas (1988) and supported by Stern (1989), states that financial development and economic growth are not causally related. Other empirical studies highlight the potential negative effects of financial development on economic growth (see De Gregorio and Guidotti (1995), Loayza and Ranciere (2005)). [↑](#footnote-ref-2)
3. In this field one should distinguish between conventional inclusive finance and Islamic inclusive finance. Islamic finance addresses the issue of inclusive finance from two directions, one through promoting risk-sharing contracts which provide an alternative to conventional debt-based financing and the other through specific instruments of redistribution of the wealth among the society. This discussion is beyond the scope of this paper. For more details see Ben Naceur et al. (2015). [↑](#footnote-ref-3)
4. Studies focusing on a single country case are numerous. See among others, Bader et al. (2008) for Egypt, Muhsin and Pentecost (2000) for Turkey and Al-Malkawi et al. (2012) for UAE. [↑](#footnote-ref-4)
5. Sarma (2012) calculated IFI as a simple average of the distances from both the worst point and ideal point:

 $IFI\_{t}=\frac{1}{2}\left[\frac{\sqrt{δ\_{1t}^{2}+δ\_{2t}^{2}+…….+δ\_{nt}^{2} }}{\sqrt{n}}+\left(1-\frac{\sqrt{(1-δ\_{1t})^{2}+(1-δ\_{2t})^{2}+…….+(1-δ\_{nt})^{2}}}{\sqrt{n}}\right)\right]$ [↑](#footnote-ref-5)
6. World Bank (Global Findex Report (2014)) began publishing this kind of data only since 2011. [↑](#footnote-ref-6)
7. World Bank Global Findex Survey (2014) finds that 20 percent of adults in developing countries cite distance as a reason behind not having an account. [↑](#footnote-ref-7)
8. One of the debates on the use and access to financial services is the voluntary and involuntary exclusion. The first is due to cultural and religious reasons; the second is mainly due to the unaffordability of financial services. [↑](#footnote-ref-8)
9. Among other restrictions, in Saudi Arabia, a woman cannot open a bank account without her husband’s permission. This could serve as an indicator of inequality. [↑](#footnote-ref-9)
10. Human Development Index (HDI) is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living (UNDP). Long and healthy life is measured by life expectancy. Access to knowledge is measured by the mean years of education among the adult population and the expected years of schooling for children of school-entry age. Standard of living is measured by real Gross National Product (GNI) per capita. [↑](#footnote-ref-10)
11. It would be more informative to study the interaction between unemployment and financial exclusion, unfortunately, in Saudi Arabia, unemployment rate is available only since 1999. [↑](#footnote-ref-11)