



TESTING MCKINNON'S COMPLEMENTARITY HYPOTHESIS: A BOUNDING TESTING APPROACH FOR BAHRAIN

Wahib Ali Musleh Elayah 

College of Economics and Trade, Hunan University, Changsha, China

wahibelayah@gmail.com

Wen Hu

College of Economics and Trade, Hunan University, Changsha, China

wenhuhu@sina.com

Othman Mohammed

College of Economics and Trade, Hunan University, Changsha, China

malathwri15@hotmail.com

Abstract

McKinnon's complementarity hypothesis articulates that money and physical capital complements each other instead of substituting under a repressed financial sector. In spite of various economic and financial reforms in Bahrain, the financial sector of Bahrain is lagging behind international standards. Thus, this study is considered to test McKinnon's complementarity hypothesis in case of Bahrain. A time series study has been analyzed for said purpose. This study not only determines unit root problem but also tests unit root problem in existence of structural break. Long run correlation is testified through bounds test in existence of structural break. Long and short run analysis are determined in order to check the hypothesis in static and dynamic setting as bounds testing approach distinguish feature is to provide static long run estimates along with dynamic short run estimates. Moreover, this study applies ARDL model to investigate the short and long run correlation between the taken variables. Outcomes of the study confirms McKinnon's complementarity hypothesis in long run and no evidence is found in case of short run. Thus, it can be deduced that investment is restricted due to accessibility of finance rather than cost of capital in Bahrain.

Keywords: McKinnon's complementarity hypothesis; money; investment; bounds testing approach



INTRODUCTION

Investment is one of the key of sustainable economic growth and level of investment in an economy depends on internal as well as external sources of finance. Thus; macroeconomic policies should be adopted in such a way that can mobilize savings from these sources. In developing countries, domestic investment is financed through three channels: self-finance, government appropriation, and from banking sector. Moreover, relative importance of these channels depend on level of economic development and the roles given to public and private sectors (Than, 2000). Ideally banking sector has to ensure a match between loan assessment behavior and business strategy (Berger & Udell, 2004). On the other, in reality, banking sector works in a highly institutionalized environment that determines their lending behavior. Usually, banking sector is operating between two spectra as for as banking regulatory environment is concerned; either policy is based on financial repression or liberalization. Moreover, banking sector is more repressed than capital markets (Win, 2018).

Financial markets are categorized repressed financial markets that carry domestic credit controls, concessional credit practices, high reserve requirements and not only have low but administered interest rates. Repressed financial markets are responsible for lower economic growth as these markets leads to financial markets segmentations, hinders efficient allocation of resources, and discourages savings and consequently constrained investment. McKinnon (1973) argued that developing countries rely on internal finance for domestic investment that is of low quality as financial markets are repressed. Consequently, investment is of low quality and production depends on traditional technology in less developing countries. These developing countries not only unfamiliar with external sources of finance for investment but may also unable to provide collateral for borrowing in international financial market. In such situation, monetary policy can play a vital role as it can influence private propensity to save. For instance, high rate of interest may help to mobilize savings and can channelize it to more productive sectors. Thus; McKinnon's complementarity (MC) hypothesis articulates that money and physical capital accompaniments each other instead of substituting under a repressed financial sector.

Financial liberalization policies are adopted in many less developing countries to alleviate repressed financial markets. Financial liberalization refers to moving from administered rate to market based rate of interest, gradually alleviating directed and subsidized credit schemes to lessen credit controls. Moreover, financial liberalization encourages opposition and efficiency in financial sector through privatization of nationalized commercial banks and leads to sound and developed securities markets. Success of financial liberalization in McKinnon-Shaw model depends on actual expanding of financial sector, saving and real interest rate are positively correlated, and on complementarity among investment and money demand.

The Empire of Bahrain originated broadening strategies in 1970s. It was first state who started diversification in the way of preparing for post gas and oil era. The basic reason for diversification is to attain the societal and economic goal of the economy. Oil side produces 70 percent revenue for the government while 60 percent from exports. Furthermore, in direction to reduce rely on oil, the government better infrastructure of economy by introducing structural reforms. These reforms prepared the Bahrain as open economy which increases trade liberalization and capital mobility and it is also encouragement for investors. Fiscal shortfalls are adding in Bahrain which is economic growth is diminishing because of weak overall demand. Similarly, international reserves are declining in current account by which exchange rate is pressurized. Bahrain took soberness actions but still establish it is more weak country in the Gulf Cooperation Council (GCC) that it with low savings and is very grateful. The economy is much unprotected to financing risks (Elayah et al., 2021).

The main purpose of the study is to investigate money as factor of production in case of Bahrain. Moreover, this is first study that will test McKinnon's complementarity hypothesis for Bahrain as researchers did not trace any research study for Bahrain in this regard. Thus; this study adds the case of Bahrain to existing literature on McKinnon's complementarity hypothesis. The rest of research paper is designed in such manner that next section emphasizes on related literature and theoretical framework along with empirical models of the study. Research methodology is explained in third section. Results are interpreted and discussed in fourth section of the study while last section concludes the study.

REVIEW OF LITERATURE

Researchers argued that financial liberalization is key to sustainable economic growth as it not just bring efficiency in resource allocation but also ensures financial stability. On other hand, there are research studies that concluded that some economies performed well under financial repression. For instance, Demetriades and Luintel (2001) documented that South Korea experienced financial development despite of financial repression. Similarly, Huang and Wang (2011) argued that China's economy performed well as it experienced sound and sustainable economic growth although China's financial sector is considered most repressed financial systems. Besides, Caprio and Klingebiel (1996) opined that Chile experienced banking crisis as a result of financial deregulation.

Numerous studies are carried to examine the MC hypothesis among money and physical capital. Some of research studies testified MC hypothesis. For instance, Thornton (1990) examined the MC hypothesis in India and confirmed the complementary hypothesis in India through money demand and saving function. Likewise, Nyagetera (1997) carried out study

to test MC hypothesis and outcomes of the study confirmed MC hypothesis in Tanzania. In similar fashion, study conducted by Khan and Hasan (1998) also found robust support for MC hypothesis in Pakistan. In a study by Kendell (2000) also found argument in favour of MC hypothesis in Guyana as researcher investigated connection among interest rate, growth and saving. In the Jamaican context, Howard (2001) documented that financial liberalization not only raised saving level but also raised investment level. Outcomes of the study confirmed the MC hypothesis. On other hand, some of the research studies reached to conclusion that McKinnon's complementary hypothesis is not effective in case of developing countries as financial liberalization lead to detrimental effect on saving and investment (Okpara, 2010; Ogwumike & Ikenna Ofoegbu, 2012).

Some of the studies on MC hypothesis stressed that confirmation of this hypothesis depends on other characteristics of the countries for example income level, financial development, trade restrictions etc. For instance, Adebisi (2003) argued that confirmation of MC hypothesis in developing countries depends on financial and economic level of the countries. In similar fashion, the study conducted by Moore (2009) reached to conclusion that MC hypothesis exists in developing countries however; when investment function is conditioned to other factors such income level, financial development, trade restriction and public finance this hypothesis is no more valid in developing countries.

There are some studies that tested MC hypothesis through static long run and dynamic models. For example, Odhiambo (2004) examined MC hypothesis in static long run and also for dynamic short run model. He investigated static long run model through cointegration and dynamic short run model through vector error correction model. Results of his study suggested that MC hypothesis is valid in Kenyan economy. However, the study conducted by Rahman and Gill (2005) who followed same econometric methods like Odhiambo (2004) reached to conclusion that there is no evidence of MC hypothesis in Pakistan. The study conducted by Algaeed (2016) for Saudi Arabia also did not find sustenance in favour of MC hypothesis as cointegration method and vector autoregressive model were adopted for analysis.

Some research studies applied bounds tested approach also refers as autoregressive distributed lagged model (ARDL) to investigate static long run and dynamic short run model to test MC hypothesis. For instance, Gounder (2007) applied ARDL model to examine MC hypothesis in Fiji and his findings are in support of this hypothesis in case of Fiji. Similarly, Awan et al. (2010) applied autoregressive distributed lagged model (ARDL) to test MC hypothesis in case of Pakistan. Results of this study testified MC hypothesis and suggested that de-regularization of rate of interest will encourage domestic savings and

investment in Pakistan. Likewise, Azeem and Mohammed (2015) investigated MC hypothesis for Turkish economy through autoregressive distributed lagged model (ARDL). Results of their study confirmed limited support for MC hypothesis. In the above studies researcher applied ARDL model and found that MC hypothesis is valid in the context of respective developing country however; Peter and Temidayo (2017) also applied ARDL model to check MC hypothesis in case of Nigeria but they did not reached to conclusion that MC hypothesis holds in Nigeria.

THEORETICAL FRAMEWORK

MC hypothesis provides background to gauge success of financial liberalization policy in an economy. This hypothesis can be tested by taking model, in real money demand (real money balances) function. Moreover, this hypothesis suggests that the demand for real money is not only explained by transaction and speculative motives but importantly by need of finance through capital formation in economies where institutional credit is constrained. Thus, real money demand function can be expressed in Equation 1 as follows:

$$MD = f (RI, RC, RRI) \quad (1)$$

Where, MD , RI , RC and RRI represents real money demand, real income, return on capital and real rate of interest respectively. However, it is difficult to measure return on capital so, McKinnon suggested that it can be replaced with investment. ratio of investment to real income (INV). Thus, Equation 1 can now be written as in Equation 2.

$$MD = f (RI, INV, RRI) \quad (2)$$

The success of financial liberalization policy depends on this condition to transmit investment into saving. Moreover, partial derivative of real money demand with respect to real income ($\frac{\partial(RM)}{\partial PC} > 0$) shows transaction demand for money and a rise in income will lead to higher demand for money. Similarly, partial derivative of real money demand with respect to investment ($\frac{\partial(RM)}{\partial(INV)} > 0$) is investment demand for money and a rise in investment will also lead to increase in demand for money henceforth; increases monetary savings. Although traditional theory states that investment is inversely proportional to rate of interest however; under McKinnon's hypothesis increase in real rate of interest is responsible for increase in investment level. Moreover, Pentecost and Moore (2006) argued that increase in credit facilities as a result of financial liberalization removes need for making savings before investment. Besides, Moore (2009) argued that financial liberalization in many developing countries initiates different forms of deregulations in financial markets as it has implications for economic activity that may be transmitted through changes in quantity of credit.

Thus, investment function in context of financial liberalization policies can be expressed as in Equation (3) as follows:

$$INV = f(PC, DCP, RRR) \quad (3)$$

Most of researchers analyzed time series data in case of single countries and closely following research studies, for instance, Bouzid (2012), Ogwumike and Ikenna Ofoegbu (2012) and Azeem and Mohammad (2015) thus; the empirical models of this study based on Equation 2 and 3 are expressed as follows:

$$\text{Model 1} \quad \ln MD_t = \alpha_0 + \alpha_1 \ln RI_t + \alpha_2 \ln RC_t + \alpha_3 RRI_t + \epsilon_1 \quad (4)$$

$$\text{Model 2} \quad \ln INV_t = \beta_0 + \beta_1 \ln RI_t + \beta_2 \ln DCP_t + \beta_3 RRI_t + \epsilon_2 \quad (5)$$

In Model 1 and 2 \ln , t and ϵ_i is natural log of respective variable of the study, time period and error term respectively. All variables are transformed into natural log except real rate of interest as some times real rate of interest maybe negative. Now, McKinnon's complementarity hypothesis can be confirmed when $\alpha_2 > 0$ and $\beta_3 > 0$ thus; it can be deduced that investment is restricted due to availability of finance rather than cost of capital in financially repressed economies.

METHODOLOGY

In order to test MC hypothesis for Bahrain's economy, this study will analyzed time series data. Time series data on variables of the study is being collected from international financial statistics (IFS) and World Bank (WB). Data on real income, money demand, and interest rate is collected from IFS and data on investment and domestic credit to private sector is collected from World Bank. Moreover, money demand and interest rate are adjusted to get real values of these variables. This study collected time series data on variables from 1985 to 2015 and this time period is based on availability of the data.

Before estimation of study's models, data has to be checked whether data meet assumptions of regression. One of the assumptions of regression is that data has to be normally distributed and there should be no trend in data over time otherwise regression results will not be reliable. So, it is advisable to check time series data for trend (unit root problem) and if there is evidence of trend in data it has to be eliminated before applying regression. Thus; in this study we will apply Augmented Dickey-Fuller unit root test (1979) and Phillips-Perron test (Phillips & Perron, 1988) to determine whether data is trended over time or not. If it is found that data is trended over time then we have to look for method to de-trend time series data. The reason is that trended data does not have constant mean and variance over time. However, ever if data is trended at level and if someone applies differencing method then data can be de-trended and time series data can be stationary.

After done with unit root tests discussed above and once we are clear about whether time series data is free from unit root at level or first difference, this study will get benefit from ARDL cointegration test as this cointegration test can determine long run relationship if exists and it is not necessary for this cointegration test whether time series data (variables) becomes free from unit root problem at level or at difference or some of time series variables are free from unit root at level and some are at first difference. However, none of the time series variables have to be free from unit root problem higher than first difference. Moreover, this ARDL cointegration test can accumulate unknown structural break when determining long run correlation among variables. ARDL model is the union of autoregressive and distributed lag models developed by Pesaran, Shin and Smith (2001). There are lower and upper bounds critical bounds (F-statistics) of this cointegration test. If calculated F-statistic is lower than lower bounds then there is no cointegration among variables of the model to be tested and if calculated F-statistic is higher than upper bounds then it can be deduced that variables of the model are cointegrated in long run however; if calculated F-statistic is among lower and upper bounds then result of this cointegration test is inconclusive. Besides, ARDL not only finds cointegration but one can also determine short and long run estimates. The results from ARDL model are even more consistent in small sample sizes (Pesaran & Shin, 1999). Moreover, Laurenceson and Chai (2003) argued that ARDL overcome the problems that may associate due to non-stationarity of the data. ARDL model is use to investigate the short as well as long run relationship among the variables, it shows the dynamic stability of the model and it reduces the problem of endogeneity.

RESULTS AND DISCUSSION

This study is designed to test MC hypothesis in case of Bahrain. So, time series data has been analysed for said purpose. Before going to perform any type of regression it is important to check data for normality. Descriptive statistic is performed for this purpose and its results are provided in Table 1.

In Table 1, results in Part (a) shows that time series data of real money demand, real income and investment are not normality distributed. However; Part (b) of Table 1 presents descriptive statistics after taking natural log of variables except real rate of interest. These results indicate that data of variables that were suffering from non-normality problem are now free from this problem so one can move one to analyse the empirical models of the study.

Table 1. Descriptive Statistics

Part (a)					
	MD_t	RI_t	INV_t	RRI_t	DCP_t
Mean	69.74	12065.08	3.24e+09	6.86	49.38
Maximum	82.54	20631.12	8.99e+09	31.89	73.89
Minimum	58.00	4691.31	5.23e+08	-14.14	29.84
Std. Dev.	7.06	5144.82	3.02e+09	9.45	12.95
Jarque-Bera	9.61	6.82	7.79	4.89	3.03
Probability	0.01	0.03	0.02	0.09	0.22
Part (b)					
	$\ln MD_t$	$\ln RI_t$	$\ln INV_t$	RRI_t	$\ln DCP_t$
Mean	4.24	9.30	21.46	2.20	3.86
Maximum	4.41	9.93	22.91	3.46	3.39
Minimum	4.06	8.45	20.07	1.07	4.30
Std. Dev.	0.10	0.44	0.94	0.68	0.25
Jarque-Bera	3.68	4.51	3.78	4.89	1.55
Probability	0.16	0.11	0.15	0.09	0.45
Observations	30	30	30	30	30

Table 2 presents correlation results and Part (A) and Part (B) depicts correlation results for specified Model 1 and 2 of the study respectively. All variables are positively correlated with real money demand except real rate of interest and Real rate of interest is highly correlated with real money demand followed by investment. Similarly, real rate of interest is highly correlated with investment than with real income. Moreover, real income is least correlated with real money demand. Moreover, real income is least correlated with real money demand. Besides, correlation results for Model 2 indicate that real rate of interest and nominal rate of interest are positively correlated with investment whereas real income is not only least correlated but also negatively correlated with investment.

Table 2. Correlation Results

Part (a)				
	$\ln MD_t$	$\ln RI_t$	$\ln RC_t$	$\ln RRI_t$
$\ln MD_t$	1.00			
$\ln RI_t$	0.23	1.00		
$\ln RC_t$	0.41	0.88	1.00	
$\ln RRI_t$	-0.35	-0.09	0.06	1.00
Part (b)				
	$\ln INV_t$	$\ln RI_t$	$\ln DCP_t$	RRI_t
$\ln INV_t$	1.00			
$\ln RI_t$	-0.15	1.00		
$\ln DCP_t$	0.28	0.05	1.00	
RRI_t	0.71	-0.03	0.71	1.00

Results of unit root tests are provided in Table 3. Results of ADF as well as PP unit root tests indicate that some variables of the study have the problem of unit root and some are stationary at level. However, the variables which have the unit root problem are free from unit root problem after taking their first difference. In other words, some variables are stationary at level while some variables become stationary at first difference. Thus, it can be concluded from these unit root tests that variables of the study are integrated of order one.

Table 3. ADF and PP Unit Root Tests Results

	<i>ADF t-statistic</i>	<i>PP t-statistic</i>	<i>Conclusion</i>
$\ln MD_t$	-2.754 ^c	-2.835 ^c	Stationary
$\ln RI_t$	-1.589	-1.693	Non-stationary
$\Delta \ln RI_t$	-5.428 ^a	-5.491 ^a	Stationary
$\ln INV_t$	-0.45	-0.66	Non-stationary
$\Delta \ln INV_t$	-4.15 ^a	-3.97 ^a	Stationary
$\ln RC_t$	-0.536	-0.180	Non-stationary
$\Delta \ln RC_t$	-8.302 ^a	-8.387 ^a	Stationary
RRI_t	-4.257 ^a	-4.227 ^a	Stationary
$\ln DCP_t$	-0.46	-0.70	Non-stationary
$\Delta \ln DCP_t$	-4.56 ^a	-4.60 ^a	Stationary

Note: ^a, ^b and ^c show rejection of null hypothesis of unit root at 1 %, 5 % and 10% significance level respectively

These results indicate that a variable of Model 1 is in long run correlation as in Table 4, and calculated F-statistic of bounds test is greater than upper critical bound. As we know that long run correlation exists among variables of Model 1. So we can get long run as well as short run estimates of both models of the study. As we know that long run relationship exists among variables of Model 1 and Model 2 so we can get long run as well as short run estimates of both models of the study.

Table 4. Bounds Test Results

Model	Selected ARDL Model	F-stat.	Decision
$\ln MD_t / f(\ln RI_t, \ln RC_t, RRI_t)$	(1, 1, 1, 1)	2.629 ^a	Cointegrated
$\ln INV_t / f(\ln RI_t, \ln DCP_t, RRI_t)$	(1, 1, 1, 1)	4.54 ^b	Cointegrated
Critical Value Bounds			
Lower Bound	Upper Bound	Significance	
2.72	3.77	10%	
3.23	4.35	5%	
4.29	5.61	1%	

Note: ^a and ^b show significance at 1 % and 5 % level respectively

A results estimate for Model 1 is presented in Table 5 and results estimates for short run and long run respectively. As for as significance of variables are concerned real rate of interest is only variable that has significant effect on real money demand in long run whereas in long run investment and real rate of interest are having positive effect on real money demand. These results indicate that real income is not a significant factor of real money demand in case of Bahrain. Real rate of interest is positively associated with real money demand in short run and negative in long run whereas capital return and real income are positively associated with real money demand in long run. Thus, it can be concluded that one of the condition to confirm MC hypothesis is met as investment has positive and significant effect on money demand in long run. In addition, this result also highlighted that investment has led to increase in demand for money henceforth; it increased monetary savings in case of Bahrain.

Real money demand is positively associated with investment thus, it supports assumption of self-finance. An increase in average rate of return to physical capital would lead to increase in desire investment and so would increase rate of interest. Consequently, it would increase in real demand for money. Besides, error correction term (ECT) has to be significant with negative sign to conclude that model is dynamically stable. The magnitude of ECT is 0.36 with negative sign and it is significant thus; it can be concluded that model would come to equilibrium in case of any external shock that may disturb the model. This also suggests that financial reforms lead to complementarity of money demand and physical capital in Bahrain. If ECT term was not carrying expected sign then it can be inferred that financial reforms have yet to have impact on the relationship between real money demand and investment in Bahrain.

Table 5. Results Estimates for Model 1

Part (a): Short run estimates		
Dependent variable: $\Delta \ln MD_t$		
Regressors	Coefficient	t-Statistic
$\Delta \ln RI_t$	0.20	0.28
$\Delta \ln INV_t$	0.10 ^b	0.06
$\Delta \ln RRI_t$	-0.09	0.03
$ECT (-1)$	-0.36	-1.20
Part (b): Long run estimates		
Dependent variable: $\ln MD_t$		
$\ln RI_t$	-0.29	-1.09
$\ln INV_t$	0.24	1.58
$\ln RRI_t$	0.20	0.73
<i>Constant</i>	0.47	0.38

Note: ^a and ^b show significance at 1 % and 5 % level respectively

Short run and long run estimates for model 2 are presented in Part (a) and Part (b) respectively in Table 6. Like in case of Model 1, real income that can be used as a proxy for economic growth, is not a significant contributor as it does not have significant effect on investment in short run as well in long run. Domestic credit to private sector is positive contributor of investment in Bahrain as it is carrying positive coefficient and is significant. Real rate of interest is not only having positive and significant effect on investment in short run but also in long run. After documenting positive and significant effect of real rate of interest on investment, this result indicate that second condition is also met for confirmation of McKinnon's complementarity hypothesis in case of Bahrain. This finding of study is resembled with findings of Shrestha and Chowdhury (2007) and Tareef and Shawaqfeh (2019). Likewise, this results also in line with Nyagetera (1997), Odhiambo (2004), and Howard (2001) who testified McKinnon's complementarity hypothesis in case of Tanzania, Kenya and Jamaica respectively. Similarly, results of this study also endorse finding of Francis and Waithe (2013) in case of Trinidad and Tobago. These study findings are against the conclusion of Okpara (2010) and Ogwumike and Ikenna Ofoegbu (2012) who argued that McKinnon's complementarity hypothesis is not valid in case of developing countries. Moreover, results of this study at hand also go against the finding of Algaeed (2016) who did not confirm McKinnon's complementarity hypothesis in case of Saudi Arabia. Moreover, dummy variable is insignificant in case of investment function in long run as well as in short run. Thus; it can be concluded that financial reforms has to mark in Bahrain. Besides, Model 2 of the study is also dynamically stable.

Table 6. Results Estimates for Model 1

Part b: Short run estimates			
Dependent variable: $\Delta \ln INV_t$			
Regressors	Coefficient	t-Statistic	
$\Delta \ln RI_t$	0.06	0.66	
$\Delta \ln DCP_t$	0.30 ^a	4.28	
ΔRRI_t	0.03 ^b	2.51	
$ECT(-1)$	-0.16 ^c	-1.83	
Part B: Long run estimates			
Dependent variable: $\ln INV$			
$\ln RI_t$	0.01	0.06	
$\ln DCP_t$	0.50 ^a	2.83	
RRI_t	0.03 ^c	1.86	
Constant	0.47	0.19	

Note: ^{a, b} and ^c show Significance at 1 %, 5 % and 10 % level respectively

CONCLUSIONS AND DISCUSSION

This study was designed to empirically test MC hypothesis in case of Bahrain. As its financial sector can be considered as repressed financial sector although financial reforms are taken from time to time. This study analyzed time series data for this purpose. Unit root tests and unit root test along with structural break are applied. Similarly, long run relationship between variables of the study is determined through bounds testing approach in presence of structural break. Moreover, short run and long run estimates are determined for real money demand function (Model 1) and investment function (Model 2). Results of the study indicated that McKinnon's complementarity hypothesis exists in case of Bahrain as investment positively contribute to real money demand and real rate of interest positively contribute to investment. Thus, it is concluded that money and physical capital complements each other in case of Bahrain. McKinnon contended that in such situation monetary policy has crucial role as it can alter propensity to saving and investment. Thus, based on research findings of this study, financial liberalization would increase rate of capital formation in Bahrain. Moreover, it is recommended that Bahrain's government should pursue monetary policy to change negative real rate of interest to positive levels in Bahrain so that Bahrain can achieve high rate of economic growth in future. Bahrain can change negative real interest into positive by keeping price stability and give more autonomy to its central bank.

LIMITATIONS OF THE STUDY

This study is not without limitations. Firstly we have taken data time period from 1985 to 2015 due to availability of data. Secondly, in this research only we find only cointegration between the taken variables and it is the encouragement to the future researches to find the causality between the same variables. Besides, future studies may also consider structural breaks in time series analysis.

REFERENCES

- Adebiyi, M. A. (2003). A re-examination of Mckinnon-Shaw financial development hypotheses: evidence from seven African countries. *The Nigerian Journal of Risk and Insurance*, 4(1), 46-67.
- Algaeed, A. (2016). Financial development and the Saudi Arabian economy: Re-examining Mckinnon's hypothesis. *International Journal of Economics, Commerce, and Management*, 4 (10), 86-102.
- Awan, R. U., Munir, R., Hussain, Z., & Sher, F. (2010). Rate of interest, financial liberalization & domestic savings behavior in Pakistan. *International Journal of Economics and Finance*, 2(4), 75.
- Caprio, G., & Klingebiel, D. (1996, April). Bank insolvency: bad luck, bad policy, or bad banking?. In *Annual World Bank conference on development economics* (Vol. 79).
- Demetriades, P. O., & Luintel, K. B. (2001). Financial restraints in the South Korean miracle. *Journal of Development Economics*, 64(2), 459-479.

- Dickey, D.A. & Fuller, W.A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74, 427–431.
- Elayah, W. A. M., Hu, W., Mohammed, O., ul Haq, I., & Awais, M. (2021). Analyzing the Role of Money Balances as a factor of Output in Context of Globalization: A Case Study of Bahrain. *iRASD Journal of Economics*, 3(2), 177-187.
- Foerch, T., Ki, O., Thein, S. & Waldschmidt, S. (2016). Bahrain's Financial Sector - A Challenging Environment for Banks, 3, Yangon, Bahrain: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Francis, B. M., & Waithe, K. (2013). Financial Liberalisation in Trinidad and Tobago. *Global Economy Journal*, 13(3), 371-390.
- Gounder, R. (2007). Financial sector in Fiji: Empirical analysis using the complementarity hypotheses. Paper Presented at the European Economics and Finance Society 6th International Conference, Sofia, Bulgaria
- Howard, M. (2001). Financial liberalization in Jamaica. *Savings and Development* 25(4), 457-473.
- Huang, Y., & Wang, X. (2011). Does financial repression inhibit or facilitate economic growth? A case study of Chinese reform experience. *Oxford Bulletin of Economics and Statistics*, 73(6), 833-855.
- Kendall P. (2000). Interest Rates, Savings and Economic Growth in Guyana. Caribbean Development Bank Staff Papers (August).
- Khan, A. H., & Hasan, L. (1998). Financial liberalization, savings, and economic development in Pakistan. *Economic Development and Cultural Change*, 46(3), 581-597.
- McKinnon, R. I. 1973. *Money and Capital in Economic Development*. Washington, DC: Brookings Institution.
- Mohammad, A., & Azeem, M. M. (2015). Money and Physical Capital Relationship: McKinnon's Complementarity Hypothesis on Turkey's Economy. *Expert Journal of Finance*, 3(1).
- Moore, W. (2010). How do financial crises affect commercial bank liquidity? Evidence from Latin America and the Caribbean. MPRA Paper, no. 21473
- Nyagetera, B. M. (1997). *Financial repression in Tanzania: Its impact on savings, investment, credit and growth* (Doctoral dissertation, University of Dar es Salaam).
- Odhiambo, N. M. (2004). Money and physical capital are complementary in Kenya. *International Economic Journal*, 18(1), 65-78.
- Ogwumike, F. O., & Ikenna, O. D. (2012). Financial liberalization and domestic savings in Nigeria. *Journal of Social sciences*, 7(4), 635-646.
- Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed lag modeling approach to cointegration analysis. Chapter 11. In S. Strom (Ed.), *Econometrics and economic theory in the 20th century: The Ragnar Frisch centennial symposium*. Cambridge: Cambridge University Press.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2000). Structural analysis of vector error correction models with exogenous I(1) variables. *Journal of Econometrics*, 97(2), 293–343.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326
- Peter, A., & Temidayo, O. J. (2017). Testing the validity of McKinnon-Shaw Hypothesis: empirical evidence from Nigeria. *Asian Journal of Economics, Business and Accounting*, 1-24.
- Phillips, P.C.B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika* 75, 335–346.
- Rehman, H.U., & Gill, A.R. (2005). A test of McKinnon's complementarity hypothesis: a case study of Pakistan. *Pakistan Economic and Social Review*, 43(1), 21-37.
- Shrestha, M. B., & Chowdhury, K. (2007). Testing financial liberalization hypothesis with ARDL modelling approach. *Applied Financial Economics*, 17(18), 1529-1540.
- Tareef, O. B., & Shawaqfeh, W. (2019). Capital Formation in Monetary Growth Models: An Empirical Study of Selected Arab Countries. *International Journal of Business and Economics Research*, 8(2), 50.
- Than, M. (2000). *Financial resources for development in Myanmar: Lessons from Asia*. Institute of Southeast Asian Studies, Singapore.
- Thornton, J. (1990). The demand for money in India: A test of McKinnon's complementarity hypotheses. *Savings and Development*, 14, 153-157.