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Financial Development and Economic Growth in Lao PDR

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Abstract

The relationship between financial sector development and economic growth is inconclusive in current literature. To further look into this, this paper tests two hypotheses: the ”supply-leading” hypothesis and ”demand-following” hypothesis using Laos as the case study. The Autoregressive Distributed Lag **(**ARDL**)** bounds test approach was used to carry out this task.

The study’s empirical results show that financial development contributes to economic growth in the long run, thereby supporting the ”demand-following” hypothesis. It indicates that the promotion of financial development can, in turn, promote economic development in Laos.

KEY WORDS: Finance-growth nexus, ARDL approach, Laos.
JEL CLASSIFICATIONS: O11, O16, O53

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Financial Development and Economic Growth in Lao PDR[1]

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Introduction

As financial sector development has long been considered a source of economic growth, its contribution to economic growth has naturally been examined extensively in relevant literature. Despite the significant amount of work in this area, the relationship between financial sector development and growth is inconclusive. Most of the literature finds a positive relationship between financial development and economic growth (Levine et al. 2000; Christopoulos and Tsionas 2004) but other studies have found a negative relationship between the two said variables (Friedman and Schwartz 1963; Lucas 1988). Moreover, some studies have found a bi-directional relationship between financial development and economic growth (Demetriades and Hussei 1996; Roussea and Vuthipadadorn 2005).

The direction of causality between financial development and economic growth is complex and differs between countries, depending on the individual characteristics of their financial development and varied growth patterns. Laos became market-oriented in 1986 and has since undergone financial reforms. Nonetheless, the Lao financial system is still weak, highly regulated, and is dominated by the state-owned commercial banks (SOCBs) in terms of assets, savings, and loans (Kyophilavong 2010). The financial sector in Laos faces various challenges such as a lack of financial depth, poorly performing loans, an undiversified financial system, and weak institutions (Kyophilavong 2010). However, according to the ASEAN cooperation scheme, Laos plans to deregulate and liberalize its financial sector.

[1] This is a revised version of the paper presented at the East Asian Development Network (EADN) Annual Forum, Manila in July 2012.

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It is the dearth of empirical studies that does not allow the relationship between financial development and economic growth to be well understood. Therefore, this research paper aims to investigate the relationship between financial sector development and economic growth in Laos. It plans to provide important information for the Lao government and the Bank of Laos in their twin tasks of formulating and implementing monetary policy and financial reforms---both of which are vital if Laos is to maintain and increase its economic growth.

This paper intends to make three main contributions. First, as the literature on the relationship between financial development and economic growth is inconclusive, this paper will help with further research in this area. Second, based on the authors' best knowledge, this paper is the first study of its kind on financial development and economic growth specific to Laos. Finally, this study is crucial for the formulation of appropriate economic policies in Laos.

This paper is organized as follows: Section 2 reviews the literature. Section 3 briefly discusses the economic growth and financial development in Laos. Section 4 explains the data and methodology. Section 5 presents empirical results. Finally, Section 6 reveals the study's conclusion.

Review of Literature

From a theoretical standpoint, different theoretical approaches exist regarding the finance–growth nexus. Schumpeter (1911) argues that a well-performing banking system can contribute to economic growth via technological innovations that may occur as a result of efficient allocation of funds. In contrast, Robinson (1952) states that financial development is a result of improvements in economic performance. The theoretical link between financial development and economic growth in the first school of thought described above is called the "demand-following" hypothesis. On the other hand, the second school of thought is called the "supply-leading" hypothesis (Patrick 1966).

This paper thus examines the relationship between financial development and the economic growth of developing nations. The fundamental question in the relevant empirical literature is:

What role does financial development play in the economic growth of a nation? To answer this, it is necessary to investigate the causal relationship between the two variables (Levine 2005; Ang 2008; Demirgüç-Kunt and Levine 2008). Although the direction of causality has received much attention from researchers, the nature of this causal relationship remains vague (Calderon and Liu 2003). As characteristics (such as political history, economic history, culture, institutional arrangements, level of financial development, role of financial institutions, etc.) of countries differ, the causality between the financial development and economic growth of each nation can likewise differ.

Results from earlier studies on financial development and economic growth fall into four broad categories: (1) unidirectional causality from financial development to economic growth; (2) unidirectional causality from economic growth to financial development; (3) bi-directional causality between financial development and economic growth; and (4) no causality between financial development and economic growth.

Empirical studies that support the supply-leading hypothesis-unidirectional causation that runs from financial growth to economic growth is found in, for example, McKinnon 1973; King and Levine 1993; Neusser and Kugler 1998; Levine et al. 2000; and Quartey and Prah 2008. On the other hand, the demand-following hypothesis-unidirectional causation running from economic growth to financial development was supported by Gurley and Shaw 1967; Goldsmith 1969; Atindehou et al. 2005; Ghirmay 2004; Levine 2005; Ang 2008; Demirgüç-Kunt and Levine2008; and Quartey and Prah 2008.

In contrast, other studies have documented a bi-directional relationship between financial development and economic growth (Greenwood and Smith 1997; Blackburn and Hung 1998; Blackburn et al. 2005). While studies conducted in developing nations support the widespread existence of both bi-directional and unidirectional causality between the variables, others argue that financial development promotes growth (Ram 1999; De Gregorio and Guidotti 1995). The nexus between economic growth and financial development exists in a number of different ways, leading to support for competing hypotheses, but a consensus regarding the direction of causality has yet to be established (Levine 2005; Shan and Jianhong 2006; Shan 2005; Ang 2008; Apergis et al. 2007; Luintel et al. 2008; Demirgüç-Kunt and Levine 2008).

Economic Growth and Financial Development in Laos

The shift from a centrally planned economy to a market-oriented economy since 1986 brought high economic growth to Laos, along with exchange rate and price stability. This situation changed during the Asian financial crisis of 1997-1998. The macroeconomic environment quickly deteriorated during this crisis period, with the steep depreciation of the Lao currency (the kip) by more than 70 percent against the US dollar and inflation spike of about 150 percent in early 1999 (Kyophilavong 2010). Here, it was not only the external shock that made the Lao economy vulnerable; it was also due to weak macroeconomic management (Okonjo-Iweala et at. 1999).

This macroeconomy has recovered since 2000, with real GDP growth at about 6 percent to 7 percent from 2000 to 2010 and stable exchange and inflation rates (IMF 2011). However, the macroeconomic situation remains fragile due to the government's weak fiscal position and the undeveloped state of the financial system.

The Lao financial sector is still at an early stage of development. At the end of 2010, the banking sector consisted of four SOCBs, two private banks, two joint-venture banks and nine foreign bank branches. The SOCBs dominate more than 50 percent of the market in terms of assets, deposits, and loans (Tables 1 and 2). The Lao Stock Exchange was established in 2010 but only two companies are listed.

Compared to neighboring countries, Laos' financial sector lacks financial depth. For example, credit from the banking sector and the total assets of banks were less than 10 percent and 30 percent of GDP in 2010, respectively[2] (IMF 2011). Nonetheless, this situation may finally change since the Bank of Lao PDR (BOL) had recently liberalized regulations to encourage the private sector to establish banks, which in turn would mean more opportunities for businesses to gain access to finance.

[2] See key financial indicators in Appendix 3-1.

To achieve a stable inflation rate, spur economic growth, and reduce poverty, the BOL conducts monetary policy by setting the annual growth rate of money supply as an intermediate target (Kyophilavong 2010; Keovongvichith 2012). However, the effectiveness of the monetary policy is questionable due to a lack of monetary tools and institutional capability.

Table 1: Macroeconomic Indicators.

No.	Indicators	Unit	2006	2007	2008	2009	2010
1	GDP growth rate	%	8.2	8.0	7.8	7.6	7.9
2	GDP per capita	US$	745.0	838.8	935.0	966.3	1,087.5
3	Inflation rate (Year end)	%	4.7	5.6	3.2	3.9	8.4
4	M2/GDP	%	15.2	15.5	19.8	22.8	24.9
5	Budget deficit (excl. ODA)/GDP	%	-7.4	-6.7	-6.9	-6.9	-8.2
6	Current Account Balance/GDP	%	-7.2	1.4	2.5	1.7	-2.4
7	Trade deficit/GDP	%	-5.0	-3.4	-5.9	-7.3	-5.2

Sources: Ministry of Planning and Investment, Lao PDR, 2011

Table 2: Financial Statistic for Commercial Banks in Laos (End of 2010).

Type of Bank	Total Assets (Kip billion)	Market share (%)	Total deposits (Kip billion)	Market share(%)	Total loans (kip billion)	Market share(%)
SOCBs(4)	16548.56	59.3	11,654	67.4	7719.47	60.5
Private Banks(9)	5007.92	18	3,401	19.7	2583.62	20.2
Joint venture banks(2)	3362.38	12.1	1,248	7.2	946.09	7.4
Branches of foreign banks(11)	2976.95	10.7	985	5.7	1519.48	11.9
Total	27895.81	100.1	17288	100	12768.66	100

Source: Quarterly Satistics Review of Bank of Lao PDR (Various issues)

Methodology and Data

Based on literature from Rebelo (1991) and Pagano (1993), the relationship between economic growth and financial development is presented as follows:

$$\ln YL_t = \beta_1 + \beta_2 \ln F_t + \beta_3 \ln KL_t + \mu_t \qquad (1)$$

Where $\ln YL_t$ denotes the real per capita GDP, $\ln F_t$ denotes a proxy for financial development, $\ln KL_t$ denotes the real per capita, and μ_t is a residual term assumed to be normally distributed.

The GDP and proxy of financial development series are most likely to have unit roots and are thereby non-stationary. Nelson and Plosser (1982) find that most macroeconomic variables are characterized by unit-root processes. The variables must be integrated of order one, i.e. I (1), before they can be tested for cointegration. Hence, it is required to check the unit roots for all four variables. The Augmented Dickey-Fuller (ADF) test is widely used in this regard (Dickey and Fuller 1979; 1981). Phillips and Perron (1988) propose a modification of the Dickey-Fuller (DF) test and have developed a comprehensive theory of unit roots[3].

This paper employs the autoregressive distributed lag (ARDL) bounds testing approach to cointegration as developed by Pesaran et al. (2001) to explore the existence of long-run relationship between agriculture growth, financial development, capital and labor in the presence of structural break. The bounds testing approach is used here because it is applied irrespective of the fact that variables are I(0) or I(1). Moreover, a dynamic unrestricted error correction model (UECM) can be derived from the ARDL bounds testing through a simple linear transformation. The UECM integrates the short-run dynamics with the long-run equilibrium without losing any long-run information. The UECM is expressed as follows:

$$\Delta \ln YL_t = \alpha_1 + \alpha_{YL} \ln YL_{t-1} + \alpha_F \ln F_{t-1} + \alpha_{KL} \ln KL_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta \ln YL_{t-i} + \sum_{j=0}^{q} \alpha_j \Delta \ln F_{t-j} + \sum_{k=0}^{r} \alpha_k \Delta \ln KL_{t-k} + \mu_t \quad (2)$$

Where Δ is the first difference operator, and μ_t is the error term assumed to be independently and identically distributed. The optimal lag structure of the first differenced regression is selected by the Akaike information criteria (AIC). Pesaran et al. (2001) suggests F-test for joint significance of the coefficients of the lagged level of variables. For example, the null hypothesis

[3] Monte Carlo simulations show that the power of the various ADF tests can be very low (Enders 2010, p. 234). Maddala and Kim (1998, p. 107) comment that the ADF test is less powerful than the PP test. Choi and Chung (1995) assert that for low frequency data, the PP test appears to be more powerful than the ADF test.

of no long-run relationship between the variables is ($H_0 : \alpha_{YL} = \alpha_F = \alpha_{KL} = 0$) against the alternative hypothesis of cointegration ($H_1 : \alpha_{YL} \neq \alpha_F \neq \alpha_{KL} \neq 0$).

Pesaran et al. (2001) provide lower- and upper-bound critical values for the F-test. The lower bound critical values assume all variables are I(0), while the upper bound critical values assume all of the variables are I(1).[4] If the calculated F-statistics exceeds the upper bound, the null hypothesis of no cointegration among the variables can be rejected. If the calculated F-statistics falls below the lower bound, the null hypothesis of no long-run relation cannot be rejected.[5]

The next step is to estimate the long-run coefficients that are involved with determining the ARDL model with optimal lags. The selection criteria for the optimal lags such as the Schwarz Bayesian Criterion (SBC) and the Akaike Information Criterion (AIC) are mostly used to determine the order of the ARDL model.

Estimation Results

Table 3 presents the results of both the ADF and PP tests. Both tests provide a consistent set of results. All series have unit roots, whether the tests are I(0) and I(1). The results confirmed that the ARDL could be applied because the series are not I(2).

[4]Pesana *et al*. (2001) cautions that the critical values for the bound test are sensitive to the number of regressors (k) in the model, and Narayan (2004) argues that the critical value of the F-test depends on the sample size.

[5] The alternative efficient way of establishing cointegration is by testing the significant negative lagged error-correction term (Kremers*et al*.1992; Bahmani-Oskooee 2001; Iwata *et al.* 2012).

Table 3: Unit Root Test Results.

	ADF				PP			
	Level		Difference		Level		Difference	
	intercept	With trend	Intercept	With trend	Intercept	With trend	Intercept	With trend
$\ln GDPPO_t$	2.851 [1.000]	-1.761 [0.696]	-3.253** [0.028]	-5.125* [0.002]	5.607 [1.000]	-2.673 [0.254]	-3.752* [0.009]	-7.286* [0.000]
$\ln M2_t$	-2.824** [0.069]	-5.294* [0.001]	-5.107* [0.000]	-5.296* [0.001]	-1.635 [0.452]	-2.305 [0.417]	-4.808* [0.000]	-4.928* [0.003]
$\ln KPO_t$	2.724 [1.000]	0.379 [0.998]	-18.560* [0.000]	-3.623** [0.047]	-2.049 [0.265]	-4.733* [0.004]	-11.530* [0.000]	-18.443* [0.000]

Note: * and ** is significance level at 1 percent and 5 percent respectively.

Results of the ARDL bounds testing approach to cointegration are reported in Table 4.
It shows that the calculated F-statistics (6.12) exceeds the upper critical bound (UCB) at 1 percent level of significance when real GDP per capita ($\ln YL_t$) are used as predicted variables. It implies that there are cointegration between real GDP per capita, real capital stock, and financial development.

The coefficients of long-run and short-run results are reported in Table 5. In the long-run equation, results indicate the positive and significant impact of financial development on economic growth at 1 percent level. Here, capital has a positive and significant effect on growth at 1 percent level. It implies that labor plays a vital role in economic growth.

Table 4: Results of ARDL Cointegration Test.

Dependent Variable	$LnFL_t$	
F-statistics	6.192**	
Critical values	5 per cent level	10 per cent level
Lower bounds	4.389	3.475
Upper bounds	5.567	4.557
$Adj - R^2$	0.978	
F-statistics	13.108*	
Note: * and ** show the significance at 5% and 10% level, respectively.		

Table 5: Long-Run and Short-run Equations.

Dependent Variable = $LnYL_t$		
Long-Run Results		
Variable	Coefficient	T-Statistic
Constant	1.584*	57.565
F_t	0.233*	4.073
$LnKL_t$	0.241*	6.799
Short-Run Results		
Variable	Coefficient	T-Statistic
ΔLnF_t	0.043***	1.989

ΔLnF_{t-1}	-0.077*	-6.057
$\Delta LnKL_{t}$	0.374**	2.777
$\Delta LnKL_{t-1}$	0.087***	1.766
ECM_{t-1}	-0.467*	-5.261
Note: *, ** and *** denote the significant at 1, 5 and 10 per cent level respectively.		

In the short-run equation, empirical evidences show that financial development has a positive and statistically significant impact on economic growth. However, one-year lag of financial development has a negative and statistically significant impact on economic growth in the current period.

Results indicate that the estimate of lagged error correction term (ECM_{t-1}) is found to be statically significant with negative sign at 1 percent level of significance. This shows the speed of adjustment from short run to long run. Deviations in short run to long run are corrected by 46 percent in each year. This low speed of adjustment in growth might be due to the low level of competitiveness in the financial sector in Laos.

Diagnostic tests have also been applied to confirm the adequacy of the model's specification. The tests (Table 6) suggest that long-run and short-run estimates are free from serial correlation, misspecification of short-run model, non-normality of error term, and heteroskedasticity.

Table 6: Diagnostic Tests.

	LM-version		F-version	
	Statistics	P- Value	Statistics	P- Value
A: Serial Correlation	F(4, 50)=0.130	0.718	$\chi 2$ (4)=0.087	0.771
B: Functional Form	F(1, 53)= 3.379	0.066	$\chi 2$ (1)=2.575	0.1.26
C: Normality	$\chi 2$ (2)=0.579	0.748		
D: Heteroscedasticity	0.0412	0.839	$\chi 2$ (1)=0.0382	0.847

According to Hansen (1992), a potential biasedness and misspecification of the model should be avoided when testing for the stability of long-run parameters. Therefore, the stability of the ARDL parameters is tested by applying CUSUM and CUSUMsq tests developed by Brown et al. (1975). Furthermore, Brown et al. indicate that recursive residuals are to be less affected by small or regular changes in parameters, and these changes can be detected by using these residuals[6]. They argue that if the null hypothesis of parameter constancy is correct, then the recursive residuals have an expected value of zero. Also, if the parameters are not constant, then recursive residuals have non-zero expected values following the parameter change.

This paper's Appendix shows the graphs of both tests, respectively. Results show that the ARDL parameters are found to be stable because graphs of the CUSUM and CUSUMsq (blue lines) are within critical bounds (red lines) at 5 percent level of significance.

So as to capture how the series responds when there is a shock in one of the variables beyond the selected time period, this study employed the generalized impulse response analysis, developed

[6]The first of these involves a plot of the cumulative sum (CUSUM) of recursive residuals against the order variable and checking for deviations from the expected value of zero. The CUSUMsqs have expected values ranging in a linear fashion from zero at the first-ordered observation to one at the end of the sampling interval if the null hypothesis is correct. In both the CUSUM and CUSUMsq tests, the points at which the plots cross the confidence lines give some indication of value(s) of the ordering variable associated with parameter change.

by Pesaran and Shin (1998), using the vector autoregressive (VAR) framework. Several scholars argue that with the VAR framework, the generalized impulse response analysis produces better results compared to other traditional approaches (Engle and Granger 1987; Ibrahim, 2005). The main advantages of this approach, when compared to the orthogonalized impulse response analysis are: First, it is not sensitive to the ordering of the variables because ordering of the variables is uniquely determined by VAR systems; and second, generalized impulse response analysis estimates the simultaneous shock effects.

Table 7 shows the variance decomposition, which explains how much of the predicted error variance of a variable is described by the innovations generated from each independent variable in a system. It indicates that economic growth is explained by financial development of 16 percent, and capital of 10 at period10. The variance decomposition confirms the result from the short-run equation that represents how economic growth is explained by financial development.

Meanwhile, Figure 1 shows the impulse response function, which indicates how long and to what extent a dependent variable reacts to shocks in forcing variables. It shows a positive response of growth due to one standard deviation shock in capital. In addition, there are positive and negative responses of growth due to the shock in financial development, although this is decreasing and dies out after the 4^{th} time horizon. Hence, the impulse response function confirms that financial development has both positive and negative impact on growth in the short run.

Table 7: Variance Decomposition.

Period	S.E.	DLnYL	DLnKL	DLnF
Variance Decomposition of DLnYL				
1	0.008	100.000	0.000	0.000
2	0.009	83.077	3.939	12.984
3	0.010	74.894	8.197	16.910
4	0.010	74.301	8.594	17.105
5	0.010	73.991	8.802	17.207
6	0.010	73.571	9.175	17.254
7	0.010	73.285	9.580	17.134
8	0.010	73.098	9.842	17.060
9	0.010	72.978	10.005	17.016
10	0.010	72.888	10.126	16.987
Variance Decomposition of DLnKL				
1	0.010	15.318	84.682	0.000
2	0.014	17.314	79.500	3.187
3	0.017	21.173	75.221	3.606
4	0.019	23.128	73.695	3.178
5	0.020	24.052	73.123	2.825
6	0.021	24.484	72.859	2.657
7	0.022	24.753	72.666	2.581
8	0.022	24.950	72.519	2.531
9	0.023	25.092	72.419	2.489
10	0.023	25.190	72.352	2.458
Variance Decomposition of DLnF				
1	0.066	13.205	2.102	84.693
2	0.069	19.191	3.279	77.530
3	0.070	18.850	3.229	77.921
4	0.070	18.867	3.504	77.629
5	0.070	19.003	3.835	77.162
6	0.070	19.006	3.937	77.057
7	0.070	19.006	3.979	77.015
8	0.070	19.010	4.020	76.970
9	0.070	19.018	4.062	76.920
10	0.070	19.024	4.092	76.884

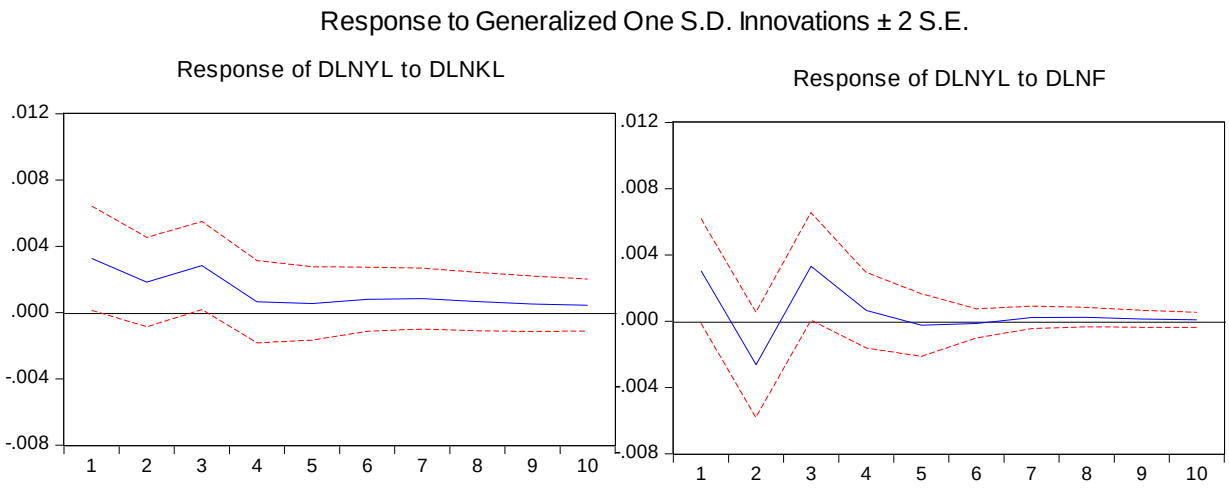


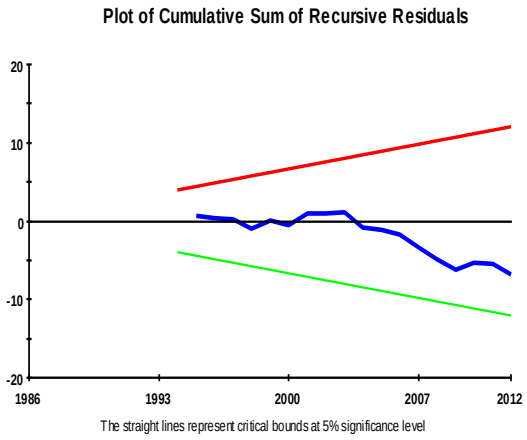
Figure 1: Impulse Response Function.

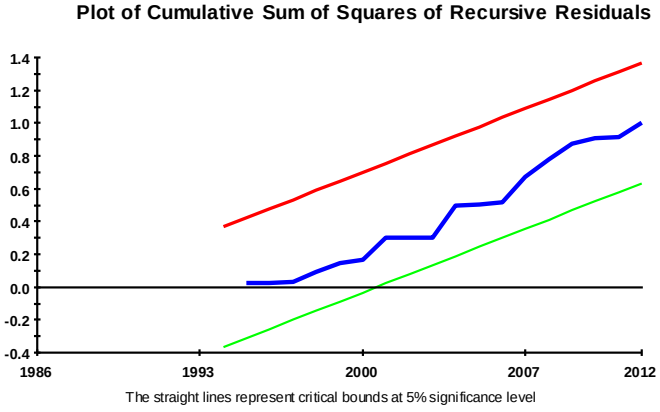
Conclusion and Policy Implications

This paper aimed to investigate the relationship between financial sector development and economic growth in Laos using the cointegration approach. It looked into the hypothesis that financial development promotes economic growth, which is largely supported by various empirical studies. The ARDL bounds testing approach to cointegration was used to examine the long-run relationship between financial development and growth by incorporating capital and labor as potential determinants.

The study found that financial development contributes to economic growth in the long run, thus supporting the demand-following hypothesis. In the case of Laos, its banking sector is dominated by SOCBs that are more interested in providing credit to state-owned enterprises (SOEs) only and lacks competition among banks during the past decade. Therefore, so as to promote its economic growth, it is important to improve the banking function and competition by liberalizing the banking sector and promoting private banks in Laos.

Appendix 1: Plot of the CUSUM and CUSUMsq





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