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Financial Development, Exchange Rates and Economic Growth in Kyrgyzstan: A Cointegration Analysis

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Abstract

In this study, the relationship among financial development, economic growth, and exchange rate is examined through the Kyrgyzstan example. It is accepted that the fluctuations in exchange rates negatively affect the economic growth in countries where financial markets are not developed. Since countries with weak financial development level, uncertainties in exchange rate affect investment and economic growth adversely. In this study, the relationship between financial development, exchange rate, and economic growth will be examined in the short and long term.

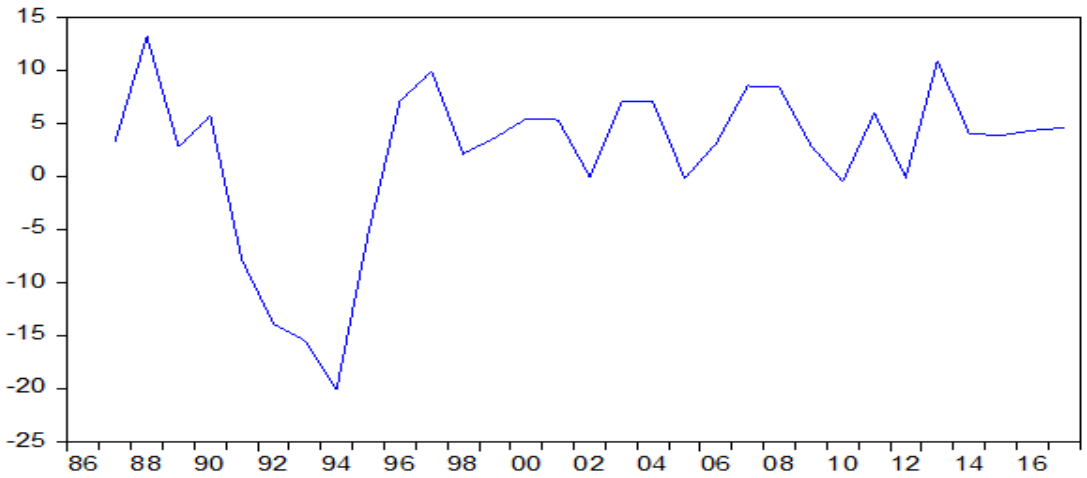
Keywords: Financial Development, Exchange Rate, Economic Growth, Cointegration
Jel Classification: G000, F410, E230

1. Introduction

Financial development can be defined as an increase in the diversity and prevalence of financial instruments used in a country. It is no doubt that there is an inextricably link between financial development and economic growth. Research has shown that countries with financial systems that mobilize a significant amount of funds will have more equal and higher growth rates in the long run. In parallel with the financial development, it is expected that higher growth of financial institutions in the financial system can increase the diversity of financial instruments, enhance the rate and amount of savings, raise real investments, decrease in fund transfer costs, and provide opportunity to reach the funds at the appropriate cost and term.

Kyrgyzstan is a lower middle-income country with a small economy dominated by minerals extraction, agriculture, and reliance on remittances from citizens working abroad. In 2017, GDP per capita was 1209 US Dollar. Graph 1 shows that GDP per capita in Kyrgyzstan is improving.

Graph 1: %Change in GDP per capita (Constant 2010US Dollar)



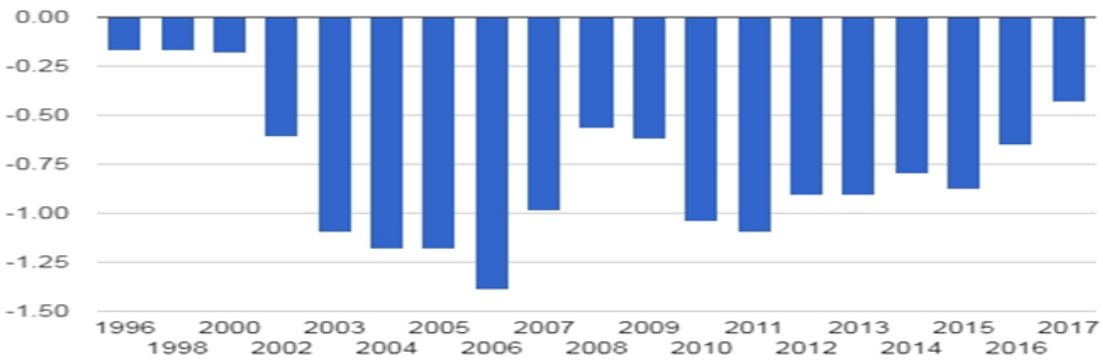
Source: World Development Indicator (WDI)

Graph 1 indicates that GDP per capita has declined seriously from 1991 to 1994 because of the collapse of the Soviet Union and Kyrgyzstan became an independent country. Kyrgyzstan has been committed to economic reform after independency and thus, the macroeconomic context as a whole has improved in since 1994. However, there are a number of general themes emerging from the literature as stated by Price (2018). These themes are as followed:

- Uneven access to economic opportunities and entrepreneurship development:
  Rudaz (2017) states that small and mid-sized enterprises employ two percent of the economically active population of Kyrgyzstan in 2014. It is necessary to create attractive business climates for private sector investment and entrepreneurship across the country.

- Political stability and corruption
  The Graph 2 provides political stability index from 1996 to 2017 for Kyrgyzstan. The average value for Kyrgyzstan during the period examined is -0.78 points with a minimum of -1.39 points in 2006 and a maximum of -0.17 points in 1996.

Graph 2: Kyrgyzstan-Political Stability



Source: The GlobalEconomy.com, The World Bank

Table 1 demonstrates corruption perception index for some Eastern Europe and Central Asian countries. According to the Table 1, public corruption in Kyrgyzstan is a serious problem, thus it is ranked 132th among 180 countries. The causes of corruption in Kyrgyzstan are similar to other corrupt

countries. For example, low income level, weak democratic institutions, massive state intervention, poorly operating legal system, and the cultural background.

Table 1: Corruption Perception Index

Country	CPI Score	Rank
Serbia	39	87
Ukraine	32	120
Kazakhstan	31	124
Kyrgyzstan	29	132
Russia	28	138
Azerbaijan	25	152
Tajikistan	25	152
Uzbekistan	23	158
Turkmenistan	20	161

Source: Corruption Perception Index 2018, published by Transparency International

- *Unemployment*
  The unemployment rate measures the number of people actively looking for a job as a percentage of the labor force. Most economists view unemployment as the most important macroeconomic problem. According to National Statistical Committee of the Kyrgyzstan Republic, Kyrgyzstan's unemployment rate dropped to 6.90% in 2017 from 7.20% in 2016. Unemployment was 12.5% in 2002. The expected unemployment rate was 6.799% in 2018. During the period from 1990 to 2018, the average value of the labor force participation in Kyrgyzstan was 63.57 percent with a minimum of 61.61 percent in 2018 and a maximum of 65.68 percent in 2006.

- *Shortage of skilled labor and uneven access to quality education*
  Shortage of skilled labor is an important problem in all developing countries. To solve this problem, it is necessary to improve the quality of education and training. For example, Technical and Vocational Education (TVC) system should be reorganized according to needs of the labor market. It is a fact that there is a gap between the skills of the existence workforce and the needs of employers in Kyrgyzstan as in other developing countries. Thus, Kyrgyz government must take regulatory steps which are necessary to increase labor productivity by enhancing training programs and collaborations with private sector.

- *Use of remittances*
  Remittances' role in Kyrgyz economy cannot be underestimated. However, as stated by Dubashov et al (2017) this dependency brings external risks to the economy. When there is a decrease in the volume of economic activity in foreign countries; for example a recession in Russia will negatively affect remittances, and thus mitigate the GDP growth in Kyrgyzstan.

- *Informal sector*
  Informal sector is pervasive in Kyrgyzstan like many CIS countries. The existence of informal economy presents a challenge to structural reforms to combat with corruption since informal economy creates more corruption on all layers of governmental bureaucracy. As Andrews et al (2011) state that informal economy warrants attention for several reasons; for example, informal workers lack social protection and insurance, which may adversely affect their income prospect, which in turn causes more inequality and poverty. In Kyrgyzstan, as in all other developing countries where unemployment is widespread, workers in the informal sector are forced to work without the advantage of appropriate working conditions and any social security.

- *Accession to the Eurasian Economic Union*
  Joining the Eurasion Economic Union (EEU) has a major economic impact on Kyrgyz economy. Choi et al (2014) discuss that the EEU will present both opportunities and challenges, and will most likely impact on agriculture, services, and garment sectors. But, Mogilevskii et al (2018) have stated that accession to the union may cause negative impacts. The authors used an economy-wide model to estimate the effects of EEU accession on the Kyrgyz economy, taking into account three impact channels: Tariff changes; re-export trade; and migration and remittances. Their results indicate that joining the EEU is likely to have an adverse effect on the Kyrgyz economy, with declines in national production and welfare.

After considering some of the prominent themes in the literature, we can analyze the variables in the study. Three variables are used in this study, which are the total number of credits granted by the financial sector representing the financial development, the quarterly exchange rates data which is taken from the Central Bank of Kyrgyzstan, and the quarterly GDP data collected from World Bank for the period 2001-2017.

Since credit is the most important part of the financial economy, credits are considered as indicators of financial developments. Credits are can be described as a transaction between a lender and a borrower, in which the borrower promises to pay back the money in the future along with interest. Thus, credits are one of the most important financial mechanisms that enable funds to transfer those who need money from the savers. Credit activity is largely carried out by banks. Therefore, the credit capacity of the banking sector can be seen as a measure of financial development. Another variable examined in the study is exchange rate. The exchange rate can be expressed as a price one currency in terms of another currency. With the globalization process, the mobility of people, commodity and finance has been facilitated and as a result international trade and international capital flows have reached large levels. Although physical boundaries in the world have lost their importance, different national currencies have continued to protect their noteworthiness. All of this has increased the importance of exchange rates and studies on which factors affect exchange rates have gained significance because of the increasing fluctuation in exchange rates and risk. The last variable analyzed in the study is GDP which signifies well-being of a country's individuals. Economic growth is defined as increase in real national income per capita produced in a given period in a country.

2. Previous Research

Demirguc-Kunt (2006) claims that a well-functioning financial system is considered as one of the key foundations on which sustained economic development can be built. However, it cannot be said that there is a consensus on the relationship between financial development and economic growth. Khan and Senhadji (2000) provide evidence which indicates that the effect of financial development on growth is positive, but the size of the effect varies with different indicators of financial development, estimation method, data frequency, and the functional form the relationship. Graff (2001) discusses the significance of financial development as a determinant of economic growth using a panel data analysis for 93 countries from 1973-90 and to explain the structure of causal relationships, a two-wave path model has estimated. It is shown that finance was predominantly a supply-leading determinant of growth and financial system plays an auxiliary role in the process of economic growth. Samiloğlu and Savas (2010) examine the impact of financial development on economic growth in Turkey considering the period of 1976-2006 by using the ARDL bound testing approach to cointegration and they stress that financial development plays an important role in enhancing economic growth. On the other hand, Adu et al (2013) investigate the long-run growth effects of financial development in Ghana and they find that the growth effect of financial development is sensitive to the proxy. For example, while both the credit to the private sector as ratios to GDP and total domestic credit are taken into account as a proxy, financial development conducive for growth; but if broad money stock to GDP ratio is considered as a proxy, financial development may not growth-inducing.

Ciftci et al (2017) examine the role of financial development on economic growth theoretically and empirically. In the theoretical part of the study, they augmented the Solow-Swan growth model by adding financial markets in the tradition of Wu, Hou, and Cheng (2010) and they showed that debt form credit markets and equity from stock markets are two long run determinants of GDP per capita. In the empirical part of the study, the authors estimated for a panel of 40 countries over the period 1989-2011 and they concluded that credit markets are substantially greater effect on level of GDP per capita.

Bist (2018) investigates the long-run relationship between financial development and economic growth using panel unit root and panel cointegration analysis in 16 selected low-income countries for the period of 1995-2014 by using the method of fully modified and dynamic OLS techniques. The results present that there exists a cross-sectional dependence across the countries. The Pedroni's panel cointegration analysis which was applied in this study provides clear support for the hypothesis that there exists a long-run cointegrating relationship between financial development and economic growth.

In the literature, there are some studies which found the evidences that there might be mutual interactions, meaning that financial development helps economic growth and economic growth improves financial systems. According to Berthelemy and Varoudakis, (1995) and Demetrades and Luintel (1996), causality between financial development and growth runs both ways. Also, Al-Yousif (2002) stresses that there is a two directional causality in many regions by using both time-series and panel data from 30 developing countries for the period 1970–1999. Hassan et al. (2011) claim that there is a two-way causality relationship between financial development and economic growth for most regions and one-way causality from growth to finance for the poorest regions, i.e.; Sub-Saharan Africa and East Asia & Pacific.

3. Economic Model and Methodology

The study has used three variables, which are the total number of credits granted by the financial sector representing the financial development, exchange rates, and the GDP data. All data for the variables studied are quarterly and which are collected from Central Bank of Kyrgyzstan and World Bank from 2001 to 2017. Since time series data are used in this study, stationary of the series must be provided. Granger and Newbold (1974) stated that if the time series are not stationary, the time series would include the trend and the analysis could result in false relationships. This means that if time series are not stationary, spurious regressions can arise; for example, the results obtained by using nonstationary time series may be spurious in which they may indicate a relationship between two variables where one does not exist. In order to receive consistent, reliable results, the nonstationary data needs to be transformed into stationary one. Therefore, Augmented Dickey Fuller (ADF) unit root test has been used to determine if the variables are stationary or not.

In order to test whether the variables move together in the long term, Johansen and Juselius (1990) cointegration analysis has been performed.

The ADF test results show that all the variables in the level (with only constant and constant with trend) are nonstationary, but all the variables become stationary after taking first difference at least 5 percent level. Therefore, it can be said that all the variables are integrated of order one. All series can be used in the regression analysis when stationary condition is proved, but as stated by Mallik (2008) the drawback of such a method that is the possibility of losing long-run information present in the variables. Thus, this study applies a cointegration technique which presents the long-run relationship among the nonstationary series. The rank of cointegrating vector is determined using the Johansen's cointegration test.

Table 2: ADF Unit Root Test Results

Variable	Levels		First Difference	
	Model with constant	Model with constant and trend	Model with constant	Model with constant and trend
Exchange rate	-0.334988 (0.9134)	-1.676199 (0.7511)	-3.236571 (0.0221)	-3.742978 (0.0260)
GDP	1.761267 (0.9997)	-2.221528 (0.4698)	-3.68801 (0.0065)	-4.582417 (0.0025)
Credits	1.195774 (0.9979)	-1.210839 (0.9003)	-3.183372 (0.0252)	-3.814472 (0.0215)

Note: The first value is t-statistic, and the value in parentheses is the probability value

MacKinnon Critical Values	
1%	-4.094550
5%	-3.475305
10%	-3.165046

3.1. Cointegration Analysis

The most appropriate length was tested before the presence of cointegration relationship was tested.

Table 3: Determining the Most Appropriate Length

Number of Observations: 63				
Lag	**FPE**	**AIC**	**SC**	**HQ**
0	5.52e+24	65.48352	65.58558	65.52366
1	2.03e+21	57.57614	57.98436	57.73670
2	5.63e+20	56.28981	57.00419	56.57078
3	3.39e+20	55.77794	56.79848	56.17932
4	3.96e+19	53.62011	54.94682*	54.14191
5	3.25e+19*	53.40593	55.03879	54.04814*
6	3.55e+19	53.47164	55.41067	54.23427
7	3.47e+19	53.41485	55.66004	54.29789
8	3.31e+19	53.32077*	55.87212	54.32423

FPE is final prediction error, AIC is Akaike Information Criterio, SC is the Schwarz' Bayesian Information Criterion, HQ is Hannan-Quinn Criterion

* Length selection criteria

Table 3 shows that the optimal length is 5.

The Cointegration procedure presents two likelihood ratio test statistics which are trace test and maximum eigenvalue statistics. The distribution of both test statistics follows chi-square distribution. The primary reason for using the Johansen's cointegration test is to detect the number of cointegrated vector, if there is no any cointegrating vector, it would imply that there is no long- run equilibrium relationship among the variables. On the other hand if there is at least one cointegrating vector, it suggests that there are common stochastic trends among the variables that link them together. Table 4 demonstrates cointegration test results.

Table 4: Cointegration Test Results

Null Hypothesis	Trace Statistic	Max-Eigen Statistic	5 Percent Critical Value	Probability
$r = 0$	32.24454	21.86193	29.79707	0.0256*
$r \leq 1$	10.38261	21.86193	15.49471	0.2524
$r \leq 2$	0.658719	0.658719	3.841466	0.4170

According to the Table 4, the null hypothesis which stress that there is no any number of cointegrating vector is rejected at 5 percent level using the trace statistic (the 5% critical value is 29.80 while the calculated value is 32.24), but in the case of maximum eigenvalue statistic, the critical value is higher than the calculated value. The next step is to test the null of $r \leq 1$ against the alternative of $r \leq 2$. In this case, the null hypothesis cannot be rejected using the trace statistic (the 5% critical value is 15.49 while the calculated value is 10.38), but the maximum eigenvalue statistic (the 5% critical value is smaller than the calculated value) shows that there is at most two cointegrating vector. Let us accept the result based on the trace statistic that there is exactly one cointegrating vector.

3.2. Vector Error Correction Model Results

Since exchange rates, GDP, and credits variables are found to be cointegrated, it can be proceed to test the vector error correction mechanism which also represents the short run relationship among the variables under study. In the Table 5, the log changes in the relevant variables represent short-run elasticities, while the error correction mechanism (ECM) term represents the speed of adjustment back to the long run relationship among the variables.

Table 5: VECM Estimates 2001Q3-2017Q3

Variables	**Eq. 1** ΔGDP
ECM_{t-1}	0.073711(0.051007)
ΔGDP_{t-1}	-0.286490 (0.170345)
ΔGDP_{t-2}	-0.557046 (0.178061)*
ΔGDP_{t-3}	-0.595650 (0.166036)*
ΔGDP_{t-4}	0.509077 (0.158765)*
ΔGDP_{t-5}	-0.368210 (0.177417)***
ΔEXC_{t-1}	-511.8259 (437.1148)
ΔEXC_{t-2}	468.6263 (494.0087)
ΔEXC_{t-3}	-118.8764 (564.5773)
ΔEXC_{t-4}	168.5413 (564.6342)
ΔEXC_{t-5}	-355.7717 (493.6884)
ΔCR_{t-1}	0.000398 (0.000560)
ΔCR_{t-2}	0.000629 (0.000695)
ΔCR_{t-3}	-0.001310 (0.000798)
ΔCR_{t-4}	0.000154 (0.000838)
ΔCR_{t-5}	0.000486 (0.000646)

According to the results of error correction model, error correction term (ECT) parameter is not negative and significant at 5% for Kyrgyzstan which suggests that there is not a significant long run relationship among the variables, and the coefficient of the ECT term is almost 0.074 which shows low speed of adjustment towards long run equilibrium. This results indicate, if the coefficient of ECT was negative and significant, in the short run only 7% of ΔGDP would be corrected in the case of any disturbance in the long run.

Therefore, in the long run, there is no causality from independent variables (financial development and exchange rate) to dependent variable (economic growth).

3.3. Short-term Causality Analysis

The Table 6 introduces short- term causality results in the short-term. It has been found that there is no causality from financial development towards economic growth (GDP). Since the probability value is above 5%, the null hypothesis of there is no causality from financial development to GDP cannot be rejected.

Table 6: Short-Term Causality: WALD Test Results

Test Statistic	Value	df	Probability
F-Statistic	0.934944	(4, 48)	0.4518
Chi-square	3.739777	4	0.4424
Null Hypothesis: c(7)=c(10)=c(13)=c(16)=0			
Normalized Restriction (= 0)	**Value**		**Std. Err.**
C(7)	-511.8259		437.1148
C(10)	168.5413		564.6342
C(13)	0.000629		0.000695
C(16)	0.000486		0.000646

Restrictions are linear in coefficients. Null Hypothesis: There is no any causality among dependent variable which is economic growth and independent variables that are exchange rate and credits or financial development.
In the Table 6; C(7), C(10), C(13), and C(16) represent respectively D(DKURU(-1), D(DKURU(-4), D(CREDITS(-2), and D(CREDITS(-5).

4. Summary and Concluding Remarks

In this study, it has been found that both in the short-term and in the long-run there is no causality from exchange rate and financial development towards GDP for Kyrgyzstan economy. This result can be meaningful considering some special circumstances of Kyrgyzstan. Although there have been large-scale reforms to move from planned economy to market economy within 30 years of independence, economic and financial environment in the country has not yet been ensured to facilitate the development and growth of private sector. Until 1991 to 1997, with the help of the regulations made and the external conjuncture, the more favorable conditions were provided for the free market economy and the basic indicators of the banking sector were improved. However, the financial crisis in Russia in 1998 had a negative impact on Kyrgyzstan's economy and financial system. In addition to the emerging global crises, the effects of the political and social crisis that emerged in Kyrgyzstan in 2010 caused instability in foreign exchange rates and other macroeconomic variables; for example labor force participation decreased to 63.84, which in turn prevented the banking and the financial sector from improving in a sufficient manner.

Financial development, such as the concept of economic growth, is a “long-term” concept. For this reason, it can be understood that there is no causality from financial development to economic growth in the short term, but it is expected that economic growth will increase in the long-run due to the development of financial markets. Unexpected results can be explained since Kyrgyzstan is a country that is trying to move to a market economy and has not developed enough financial markets.

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Appendix

Diagnostic Check

1. In the main model, R-square: 0.97
2. F-Statistics significant.
3. Heteroscedasticity Test:

Breusch-Pagan-Godfrey			
c(7)=c(10)=c(13)=c(16)=0			
F-statistic	**1.069387**	**Prob. F(18,46)**	**0.4100**
Obs*R-squared	19.17552	Prob. Chi-Square(18)	0.3811
Scaled explained SS	20.76668	Prob. Chi-Square(18)	0.2913

It has been found that there is no heteroscedasticity problem in the model