China and Central Asia Regional Financial Cooperation

Gulnabat Orazgylyjova, (PhD candidate)
School of finance
Central University of Finance and Economics, Beijing, China

Emmanuel Owusu Oppong, (PhD student)
School of finance
University of International Business and Economics, Beijing, China

Daniel Elifross Lekey, (MSc)
School of finance
Central University of Finance and Economics, Beijing, China

Correspondence address:
School of finance, Central University of Finance and Economics, Beijing, China
Changping District, Beijing, Chine
District, Beijing, P.R.China, 100081
gulnabat2010@mail.ru

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Abstract
The thesis is an essay that is an outcome of exploring and evaluating financial cooperation amongst China and Central Asian countries. The unique catch-up interest is China is a fast-growing economy under "Socialism with Chinese characteristics" with strong financial system while Central Asian countries seek to strengthen their economies and financial capabilities since the collapse of the Soviet Union. This paper, evaluate the functions and actability of the designated financial cooperation by bringing together shreds of evidence from empirical findings and from formed financial functionalism and experience from other regional financial cooperation and draw lessons to China and Central Asia financial cooperation.

The government and market are promoting financial model drive the china and central Asia financial cooperation. Based on Principle Components Analysis (PCA) empirical evaluation on China-Central Asia cooperation on financial institutions and other government supported organization. The cooperation has significantly great potential to support regional financial development as its plays part in ensuring financial; stability, Accessibility, depth efficiency and intensifying the extent of local currency settlement, currency swap cooperation.

PCA context based on individual countries, realizes the considerable difference in the level of financial development between China and Central Asian countries, China is highly developed in both financial institution, financial markets and its internal financial system compared to central Asian countries which appears to only highly advanced into financial institutions than financial markets and low speed in financial system advancement. Into the regional level, Financial institutions are highly advanced than financial markets and financial institutions revealed to play great role in accelerating advancement of regional financial system than financial markets.

From that point, regional financial cooperation needs mechanisms to strengthening individual country and region financial system especially financial market system, a mechanism that can play part in heightening financial market access, depth and efficiency, that develop and integrate policies that allows private investor and financial market to fully participate in regional investments. China and Central Asian countries can shift from just financial “cooperation model” into “institutional integration model” by formulate a regional financial institution that can coordinate cross borders, mutual trades, local regional bank, regulator of capital market, controller of capital movement, establishing well exchange rate mechanism.

Keywords: Regional Financial Cooperation, Financial development, Financial Institutions, Financial Market, Financial Structure.
JEL Classification: F3, F36.
Paper type: Empirical Research
1. Introduction

Regional cooperation's "regionalism" falls under the modern models that drives countries not to integrate on geographical bases but with the rest of the world. The distinction on is the old regional cooperation constructed on state-led import, protectionist and narrow-minded (regionally limited) where new regionalism encompassing reforms, i.e., policy reforms that can stimulate free and competitive market-based economies in a modern way and establishment of democratic institutions to manage, Devlin and Castro (2004). Regional economic super idealness enlightened as a cause towards the dramatic economic deterioration but different initiatives taken to strengthening economic wellbeing by connecting economies into regional cooperatives, Linn (2004).

From 19th Century The Silk Road history elucidates a friendly exchange and mutual prosperity between China and Central Asian countries. Early in the 1990s, after the breakdown of the Soviet Union and declaration of their independence new five central Asian countries emerged: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan and late in historical period in the relationship between these Central Asia countries and china instigated. In the modern era of relationship between states, China is an influential socialist developed country pursuing independent, self-reliant, domestic and foreign policies worldwide, i.e., opening-up policy, while central Asian countries are: landlocked countries, economically and financially less developed. Despite of differences in economic systems, Chinese opening up policy under "Socialism with Chinese characteristics" Central Asian with western economic development model China and Central Asian states are successfully continue in centralization of state powers far-more from the experience of 1990's foreign exchange and financial crisis setting up regional financial liquidity stability is prioritized where regional financial cooperation integration initiated and centered through regional financial forums to couple up with their economic system.

China and Central Asian objectives aim First, to develop regional financial institutions and markets. Second, to develop trade, disbursement facilitation and short-term financing cooperation and Third, to develop monetary unions and exchange-rate system based on that essential doctrines on the subject of financial and economic cooperation developed and agreed on:

1. Banking sector development with the emphasis on lending to cutting-edge industries and export-oriented producers.
2. Establishment and strengthening securities markets in those countries where they still do not exist.
3. Creation and development of classes’ of institutional investors those are new to the region’s economies.
4. Diverse range of investment funds, venture institutions, reinsurance companies.
5. Establishment of a system of public-private partnership, integrating government resources and private business in various mutually complementary areas of manufacturing, finances and foreign trade
6. Creation of the currently non-existent advanced forms of financial instruments in order and diversify funding instruments available to the real economy in such as access to fixed capital assets, accelerated amortization, insurance coverage for export shipments, financing of current operations, and financial crisis management.
7. Integration of the financial markets of the Central Asian states, and their interregional integration with the financial markets of the major neighboring economies.

This article specifically strives to contribute to the literature in three ways. First, as stated, is presenting Analysis of China and Central Asian countries regional financial cooperation development from empirically tests and assess the potential role played by this regional financial cooperation in China and Central Asian countries financial development. Second,
from experience review of other regional financial and economic cooperation the paper analyses how do other regional financial cooperation’s succeeded to address obstacles and achieves their goals. Third, from empirical findings and reviewed experience of other financial cooperation the paper draws the conclusive lessons that can be supportive for China and Central Asia to pursues progress with a single-minded agenda for regional cooperation in finance and trade as core area of integration towards regional financial development.

2. An overview of the theoretical and empirical literature Review.

2.1. Theoretical literature overview

Financial cooperation considered as the progression through which a nation state’s financial markets become more closely integrated with neighbor countries world (IADB 2015, p.102) and state that financial cooperation occurs when a country opens its financial markets and institutions to neighbor country as well as permitting local market participants to invest abroad (Garcia-Herero and Wooldridge, 2007, p.58) Thus achieved by eradicating barriers against cross-border flow of capital and financial services, for instance capital controls (ibid, 2007, p.58). Financial cooperation found to be a better way of combining financial resources then after regional member states commencing to support the initiatives for the benefit of overcoming the limitations of fragmented capital markets and consolidate their markets as a vehicle for promoting regional financial and economic development, (AFMI, 2014). Financial cooperation nurture financial development by increase size and efficiency of financial sector and reduce financial repression (Mishkin, 2007). Through financial openness, information asymmetries minimized after international financial institutions incentive to implement accounting standards and regulations (Mishkin, 2007). Regional financial cooperation conferred as a method at which market driven and institutionalized widens and deepens financial connections within a region (Wakeman-Linn and Wagh, 2008, p.2) Also expansion of financial services to include the lower income and „unbanked” sectors by means of improving “financial inclusion” provide jobs, create safety networks, and ultimately reducing poverty (ibid, 2013). Regional financial cooperation designed to develop financial infrastructure, to boost domestic financial development and enlarge regional capital markets. The financial market lugs out the transaction rulebooks which can also adopt and developed to be useful to regional financial bodies, Financial markets afferent with trades and capital business on its well-established system, intra-regional financial agencies can regulate transactions by setting exchange rates and price control mechanisms inside the regional financial market purposely to keep the pace unvarying.

Regional financial cooperation “systemic scale economies” enlarge financial markets and offer significant opportunities for allocating capital to its most productive use, propel financial development and bring additional benefits including: (a) Larger markets become more cost effective to improve aspects of the financial infrastructure, such as payments systems, regulation and supervisory regimes, all of which have high initial fixed costs. (b) introduce efficiencies in financial markets by diversifying the types of financial institutions operate in a particular local market, integration fosters competition and lowers the prices of financial products and services. (c) Small financial systems are more likely to be incomplete. Smaller markets are typically skewed in terms of the available institutions (banks rather than non-bank institutions) and instruments (debt rather than equity). Information markets are also likely to be incomplete as high-cost credit rating services are usually absent. (d) Regional markets are better able to cope with risk. They allow for greater diversification of assets and markets for individual investors.

And they allow individual financial systems to tap into a collective pool of reserves in the event of an idiosyncratic shock or speculative attack.
(e) Regional reporting requirements can compel greater accountability and transparency on the part of national monetary authorities. Regional institutions can also inure central banks against pressures from national fiscal authorities. (f) Regional financial integration can lead to a harmonization of business practices, laws and institutions, closer to those prevailing in the most developed member state.

Foster risk-sharing and diversification, as regional business cycles tend to be more closely correlated among neighboring countries than among distant ones, thus happen to investors who are residents of financially integrated countries they can diversify between different types of domestic and foreign assets. Thereby, risk can be shared internationally which allows aggregate reduction of risk and higher macroeconomic stability (Garcia-Herrero and Wooldridge, 2007, p.59, Obstfeld, 1998).

Regional financial cooperation can also be inspired by political objectives (North, 1990; Chang and Rowthorn, 1995) where economic motives are strengthened where political relations among regional members are strong and craving to stop up divestitures caused by imperfect markets, encounter external development financing resource gaps and exploit economies of scale by (1) Merging their risks, through mutual access on superior terms to capital markets where regional or sub-regional financial Institution i.e. development banks, play role through financial intermediation (2) Establishing trade disbursements settlement systems, to reduce the transaction costs of regional trade among the regional member states. (3) Pooling foreign exchange reserves, to reduce individual reserve holdings and associated quasi-fiscal costs. (4) Complementing financial policies and institutions in the financial sector, establishing regional institutions that instituting regional financial monitoring and surveillance responsible for early warnings of financial trouble, to develop regional capital markets, fascinate foreign direct investment and reduce the threat of regional contagion. Weak political environment, the absence or insufficiency institutional quality can limit or counteract potential positive effects of financial cooperation, where poor political institutions which can not constitute the framework for the implementation of financial integration affects regional financial development. Thus happen when the focus appears to be on trade integration, while regional financial integration happens not to be a topic of priority. And sometimes when, a stronger emphasis directed on then the financial integration would face various problems on the political level “due to a lack of political commitment of member countries” (Hirschman, 1991, Greenaway and Milner, 2002, Khandelwal, 2004, p. 10, Petri, 2006, p. 389)

2.2. Empirical literature overview

Regional cooperation is positively significant on reduction of inadequate supply of financial services and liquidity funding as well reflects a positive significant impact on balance payments finances. Joso Antonio Ocampo (2006). Financial integration confirmed to have positive impact of on financial development, [Klein and Olivei (2000), Bekaert et al. (2001) and Edwards (2001)] Recent evidences confirm the positive impact of financial integration on financial development at attested (Quinn and Toyoda, 2008; Delechat et al., 2009; Smith et al., 2014; Mahajan and Vermar 2015). Financial cooperation is positive significant on enlargement of market sizes and liquidity. And they create financial access, strengthen provision of financial services at low costs with sustainable revenues and certain level of capital markets activities. Sahay et al. (2015)

The explored indices on development of financial institutions and financial markets focusing on access, depth and efficiency across 183 countries. Reflected that, financial cooperation’s development gives in to a positive significant impact on investment growth, consumption and lowering output volatility. it escalates savings diversification, funds rising and allocation through bonds, stocks and money markets, IMF working paper, (2016). This proved as a positive connection found between regional financial integration and stock market development.
for Gulf Cooperation Council as the investigates held on effects of general financial openness on financial development by using cross-country or panel data of individual countries (Levine, 1996; Barajas et al., 2000; Clarke et al., 2000; Claessens et al., 2001; Unite and Sullivan, 2003; Chinn and Ito, 2006; Espinoza et al. 2010).

Empirical investigation on Financial Integration in East Asia: with the use of gravity model, the analysis reflected that the interregional was more of trade linkage, and results yield a positive relationship between capital flows with an interference of political risks. Equity trading and bond are comparatively favorable with commodities trading. There is a positive significant correlation on market size and financial markets. Where equity rate of return is negative yet it is statistically significant in domestic countries while Bonds and stock markets are shallow. They recommended that, should be a development of an alternative source of finance in both public and private sector, a need to diversify capital bond markets toward effective and efficient allocation of savings as well as development of securities is required to assist liquidity management.: Hyun-Hoon Lee et al, (2011).

In contrast concluded that integration-growth does not only depend on levels of bank or stock market development but in greater institutional development, and sound macroeconomic policies, (Klein and Olivei, 2000; Edwards, 2001; Edison et al., 2002). That institutions sets up pressure on policymakers and consequently is an inducement for them to execute prudential macroeconomic policies and Macroeconomic policy get positive effects from financial cooperation, countries with Deficient economic policies i.e. unsanctionable fiscal and monetary policies and Malfunctioning regulatory system said to pave a way for pushing capital outflows and consequently create environment for higher domestic interest rates. (Obstfeld, 1998; Kose et al., 2007).

Financial cooperation facilitation helps to accelerate China-Central Asian relationship Sun Zhuangzhi, (2003, 2018). The relations helped Central Asia to record investments and loan agreements related to commodities, trade, infrastructure and tourism. Yakobashvile, (2013). China-central Asia financial cooperation rapidly increased mostly in investment and financing of infrastructure projects, Wolf et al. (2013). China-Asia cooperation relations had a positive significant impact through FDI and have maximized opportunities for investments and economic development which reflects regional growth at 4.6% in 2018. FDI found to have positive effect through trade and there is a significant two-way granger causality between imports and exports regional member states, Qizou (2016).

Roy Culpeper argued that, regional financial cooperation is mostly pursuit by political objectives with shallow economic goals. With investigation and an analysis, comparatively on the impact and responsiveness of China’s development towards Central Asia. Results revealed that, EU financial cooperation with central Asian countries is low due to political interference but the Chinese assistance seemed to be highly persuasive with a positive significant impact economically more in the financial deepening, Fabienne Bossuyt, (2017).

Contrary It’s also argued that, the financial integration between China and Central Asia resulted to Asian monetary integration not being conducive which demands the cooperation to establish exchange rates cooperation, capital flows coordination and enhancing of regional financial liquidity management. They also criticized the regional local currency performance on bond markets; they highlighted foreign exchange volatility, non-inclusive financing and procyclical and recommended expansion on regional financial institution and structures like long-term credit development banks with association with capital markets. Lim, Mar-Hun (Michael) and Joseph Lim: UNCTAD and Southern Center (2012) also Jee-young Jung: BIS papers NO.42: Study worked on the liquidity support, surveillance/ Monitoring, financial market development, monetary integration and capacity buildings found that there is a lack of consensus for the long run within the member states and the progress is slow and visible outcomes are on limited scale. The Financial Cooperation in Asia is not conducted step by step
and Asian integration is more heterogeneous. The advice is that, there should more focus on the monitoring of Central Banks expertise including financial markets and loan/ aid disbursements to promote larger regional monetary and financial stability. Moreover, the study reflected that,

- Correlation between capital flows and consumption growth is limited,
- Volume of interregional cross border portfolio investments is relatively small
- Cross border interest rates and bond yield differentials have narrowed with an increased co-movement
- Lastly, there is an increased integration in the global market.

Ulugbek concluded, Regional financial cooperation building processes in Central Asia is limited as it is more of imaginative terms and in Central Asia is common integrative space and this provides a social result to significant concepts like geopolitics, balance of power and threats. Ulugbek Azizov, (2017) where lack of investment mostly on the human capital brought a decline on some member state’s economic developments. Hohmann et al. (2014).

Roy Culpeper recommended that, member states should on increasing external development financing resources and should exploit economies of scale for access of capital markets and enhances regional development banks through finance intermediation. Moreover, focus should be on formation of trade payments settlements systems and creation of foreign exchange reverses pooling for reduction of regional trade transactions costs reserves holdings and associated quasi-fiscal costs. In addition. For efficient regional financial cooperation there should be harmonized, monitored and surveillance for provision of regional capital markets deepening to attract FDI. Lastly, member states should provide counter cyclical financing to eliminate procyclicality private and official financing from global institutions. Roy Culpeper, (2006).

3. Methodology and Model Specification
3.1 Methodology

Nine indices, assess levels of financial systems across countries. Sub-indices indicators used to measure depth, accessible, and efficient financial institutions and financial markets. These -indices named as FID, FIA, FIE, FMD, FMA, and FME, where I signify institutions and M signify markets, on the other hands D represent Depth, A for Access, and E for Efficiency. Sub-indices are aggregated into two groups FI and FM, which present financial institutions and financial markets. Finally, FI and FM sub-indices are aggregated into the overall measure of financial development –FD index. (See the tables 1 and 2)

<table>
<thead>
<tr>
<th>Financial Institutions</th>
<th>Dept</th>
<th>Acces</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Sector credit Bank Branches per 100,000 Adults</td>
<td>Net Interest Margin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pension Fund Assets ATM’s per 100,000 Adults</td>
<td>Lending Deposit Spread</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mutual Assets Funds Investments Financed by Banks</td>
<td>Non-Interest income to Total Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Premium, Life Working-capital Financed by Banks</td>
<td>Total Debt Security of Financial cooperation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance Premium, Non-Life</td>
<td>Total Debt Security of Non-Financial cooperation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors
Table 2: Financial Markets Indicators

<table>
<thead>
<tr>
<th></th>
<th>Financial Markets</th>
<th>Access</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stock Market Capitalization</td>
<td>Market Capitalization outside of top 10 largest companies</td>
<td>Stock Market turnover (Stock traded Market Capitalization)</td>
<td></td>
</tr>
<tr>
<td>Stocks Traded</td>
<td>Debt Issuers (domestic and external fin and non-fin cooperation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International debts securities of Government</td>
<td>Investment financed by Equity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total debt securities of fin-cooperation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total debt securities of non-fin cooperation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors

3.2. Data source and Analysis

1998-2018 (20) years of annual data 2018 for China and 5 Central Asian. Data from World Bank-GFDI and IMF FDI database. Data analysis performed by using STATA statistical software package.

3.3 Research Model Specification

3.3.1. Theoretical Model Specification

Financial sector involves financial institution and financial market. financial institutions banks are typically the largest and most important, investment banks, insurance companies, mutual funds, pension funds, venture capital firms, and many other types of nonbank financial institutions. Financial markets contemporary has developed in ways that allow individuals and firms to diversify their savings, and firms can now raise money through stocks, bonds, and wholesale money markets (foreign stock exchange). Features of financial systems include depth, access and efficiency. The paper creates a number of indices that summarize how developed financial institutions and financial markets are in terms of their depth, access, and efficiency, to culminating the final index of financial development.

Financial development can also be defined as a combination of depth (size and liquidity of markets), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets). Where Financial Markets and Financial Institution Development can be measured by their Depth, Access and Efficiency.


Financial Institution Development (FID) = Financial Institution Depth (FID), Financial Institution Access (FIA), Financial Institution Efficiency (FIE)

WHERE:

Regional Financial Development (RFD) = Financial Market (FM) + Financial Institution (FI)

3.3.2. Empirical Model Specification

Principal Component Analysis (Principal Component Analysis) multivariate analysis transforms the original variables that are correlated into new variables that are not correlated with the reduction of the number of variables that have smaller dimensions can explain most of the diversity of the original variables. The number of major components that are formed equals the number of original variables. Reduction (Simplification) dimensions do with the criteria of the percentage of diversity of the data described by some of the major components of the first. If the first few major components have explained more than 75% of the diversity of the original
data is, then the analysis is done up to the main component. When the main component is derived from a population of multivariate normal random vector \( X = (X_1, X_2, \ldots, X_p) \) and vector average \( \mu = (\mu_1, \mu_2, \ldots, \mu_p) \) and covariance matrix \( \Sigma \) with root characteristic (eigenvalue) that \( \lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_p \geq 0 \) obtained a linear combination of the main components is as:

\[
Y_1 = e' X_1 = e' X_1 + e' X_2 + \cdots + e' X_p
\]

\[
Y_2 = e' X_1 = e' X_1 + e' X_2 + \cdots + e' X_p
\]

\[
Y_p = e' X = e' X + e' X + \cdots + e' X
\]

follows

\[
\text{Var} (Y_i) = e_i' \Sigma e_i \quad \text{and} \quad \text{Cov} (Y_i, Y_k) = e_i' \Sigma e_i \quad \text{where} \quad i, k = 1, 2, \ldots, p.
\]

Requirements to form the main component is a linear combination of variable \( X \) in order to have maximum variant is to select a feature vector (eigen vector) that \( e = (e_1, e_2, \ldots, e_p) \) such that \( \text{Var} (Y_i) = \text{maximum} \quad e_i' \Sigma e_i \quad \text{and} \quad e_i' e_i = 1. \)

- The first main component is a linear combination that maximizes \( e_1' X \text{Var} (e_1' X) \) provided \( e_1' e_1 = 1. \)
- The second major component is a linear combination that maximizes \( e_2' X \text{Var} (e_2' X) \) provided \( e_2' e_2 = 1. \)
- The main components of all \( i \) is a linear combination that maximizes \( e_i' X \text{Var} (e_i' X) \) provided \( e_i' e_k = 1 \quad \text{and} \quad \text{Cov} (e_i' e_k) = 0 \quad \text{for} \quad k < 1. \)

The main components are uncorrelated and have the same variation with characteristic roots of \( \Sigma \). Root characteristic of variance covariance matrix \( \Sigma \) is a variant of the main components of \( Y \), so the variance covariance matrix of \( Y \) are:

\[
\Sigma = \begin{bmatrix}
\lambda_1 & 0 & \cdots & 0 \\
0 & \lambda_2 & \cdots & 0 \\
\vdots & \vdots & \ddots & \vdots \\
0 & 0 & \cdots & \lambda_p \\
\end{bmatrix}
\]

The total diversity of origin variable will be equal to the total diversity is explained by major components, namely:

\[
j = \sum \text{var}(X_i) = \text{tr}(\Sigma) = \lambda_1 + \lambda_2 + \cdots + \lambda_p = \sum \text{var}(Y_i)
\]

Depreciation dimensions of the original variable is done by taking a small number of components are able to explain the largest part of diversity data. If the main components are taken as the component \( q \), where \( q < p \), then the proportion of the total diversity can be explained by the main component to-\( i \) are:

\[
\frac{\lambda_i}{\lambda_1 + \lambda_2 + \cdots + \lambda_p} \quad \text{where} \quad i = 1, 2, \ldots, p
\]

Decreasing the main components of the correlation matrix is conducted when the data was first transformed into a raw form \( Z \). This transformation is performed on the data unit is not the same observation. When the size of the observed variables on a scale with a very wide differences or unit size is not the same, then these variables need to be standardized (standardized).
Raw variable \((Z)\) obtained from the transformation of the original variables in the following matrix:

\[
Z = (V2)^{-1}(x-u)
\]

\(V2\) is the standard deviation matrix with main diagonal elements are \((\sigma_{11})^{1/2}\)’ expected value \(E(Z) = 0\) and diversity is:

\[
\text{Cov}(z) = ([V2])^{-1}([V2])^{-1} = p
\]

4. Empirical Estimation Results and Discussion.

4.1.1. Statistical Test Summary

Table 1: Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>fdi</td>
<td>126</td>
<td>0.2319278</td>
<td>0.151713</td>
<td>0.0298885</td>
<td>0.6513166</td>
</tr>
<tr>
<td>fii</td>
<td>126</td>
<td>0.2727418</td>
<td>0.1276502</td>
<td>0.0590245</td>
<td>0.6178361</td>
</tr>
<tr>
<td>fmi</td>
<td>126</td>
<td>0.1878129</td>
<td>0.2014464</td>
<td>0</td>
<td>0.6753053</td>
</tr>
<tr>
<td>fidi</td>
<td>126</td>
<td>0.1237086</td>
<td>0.1365722</td>
<td>0</td>
<td>0.4713923</td>
</tr>
<tr>
<td>fiai</td>
<td>126</td>
<td>0.1754731</td>
<td>0.1667547</td>
<td>0</td>
<td>0.5032539</td>
</tr>
<tr>
<td>fiei</td>
<td>126</td>
<td>0.5361431</td>
<td>0.2050323</td>
<td>0.0926807</td>
<td>0.875704</td>
</tr>
<tr>
<td>fmdi</td>
<td>126</td>
<td>0.1357225</td>
<td>0.1778005</td>
<td>0</td>
<td>0.6808331</td>
</tr>
<tr>
<td>fmai</td>
<td>126</td>
<td>0.0477466</td>
<td>0.0881822</td>
<td>0</td>
<td>0.3576694</td>
</tr>
<tr>
<td>fmei</td>
<td>126</td>
<td>0.3008734</td>
<td>0.4162274</td>
<td>0</td>
<td>1.00000</td>
</tr>
</tbody>
</table>

Summary of 126 observations, the minimum value is 0 to Fmi, Fidi, Fiai while the maximum value is 1 for fmei followed by 0.6808331 for Fmdi, Variable with highest mean of 0.5361431 is Fiei and lowest mean 0.0477466 to Fmai, the variable with higher standard deviation of 0.4162274 is Fmei followed 0.2050323 for fiei and lowest standard deviation of 0.0881822 for Fmai.

4.1.2. Eigen analysis of the Correlation Matrix-Individual Country

Table 2: Correlations

<table>
<thead>
<tr>
<th>Countries</th>
<th>Components</th>
<th>Eigen-value</th>
<th>Proportion</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyrgyz Republic</td>
<td>Comp1</td>
<td>3.62611</td>
<td>0.6044</td>
<td>0.6044</td>
</tr>
<tr>
<td></td>
<td>Comp2</td>
<td>1.6021</td>
<td>0.267</td>
<td>0.8714</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>Comp1</td>
<td>2.70577</td>
<td>0.5412</td>
<td>0.5412</td>
</tr>
<tr>
<td></td>
<td>Comp2</td>
<td>1.13307</td>
<td>0.2266</td>
<td>0.7678</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>Comp1</td>
<td>4.3046</td>
<td>0.4783</td>
<td>0.4783</td>
</tr>
<tr>
<td></td>
<td>Comp2</td>
<td>2.42217</td>
<td>0.2691</td>
<td>0.7474</td>
</tr>
<tr>
<td></td>
<td>Comp3</td>
<td>1.04454</td>
<td>0.1161</td>
<td>0.8635</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>Comp1</td>
<td>3.80484</td>
<td>0.5435</td>
<td>0.5435</td>
</tr>
<tr>
<td></td>
<td>Comp2</td>
<td>2.42483</td>
<td>0.3464</td>
<td>0.89</td>
</tr>
<tr>
<td>China PR</td>
<td>Comp1</td>
<td>6.93962</td>
<td>0.7711</td>
<td>0.7711</td>
</tr>
<tr>
<td></td>
<td>Comp2</td>
<td>0.998342</td>
<td>0.1109</td>
<td>0.882</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>Comp1</td>
<td>3.5066</td>
<td>0.7013</td>
<td>0.7013</td>
</tr>
<tr>
<td></td>
<td>Comp2</td>
<td>1.4934</td>
<td>0.299</td>
<td>1</td>
</tr>
</tbody>
</table>

In Kyrgyz Republic, component one and two explains up to 87.4%, 77%, 86.4%,89% and 88.20% and 100% of the variations in the data of Kyrgyz, Kazakhstan, Uzbekistan, Tajikistan, China and Turkmenistan respectively. The screeplots of these data indicates a negative variation
after the second component. In Uzbekistan, the first, second and third components explains up to 86.4% of the variations in the data sets. According to the Kaiser criterion, used only the principal components with eigenvalues that are greater than 1.

4.2. Principal Components Analysis – PCA

Table 3: Eigen vector for FM and FI indicator variable indices

<table>
<thead>
<tr>
<th>Country</th>
<th>Principal Components</th>
<th>Financial Institution</th>
<th>Financial Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Depth (Fid)</td>
<td>Access (Fia)</td>
</tr>
<tr>
<td>Kyrgyz Republic</td>
<td>PC 1</td>
<td>0.5034</td>
<td>0.5014</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>0.0068</td>
<td>-0.0564</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>PC 1</td>
<td>0.5945</td>
<td>0.4868</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>0.0982</td>
<td>-0.4434</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>PC 1</td>
<td>0.5611</td>
<td>0.6352</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>-0.2044</td>
<td>-0.2115</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>PC 1</td>
<td>0.4419</td>
<td>-0.0265</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>-0.2056</td>
<td>0.6827</td>
</tr>
<tr>
<td></td>
<td>PC 3</td>
<td>0.6214</td>
<td>-0.3426</td>
</tr>
<tr>
<td>China PR.</td>
<td>PC 1</td>
<td>0.5945</td>
<td>0.5733</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>PC 1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Authors (Stata)

The explanation is based on table 3 and 4 above.

In Kyrgyz republic, component; PC1 loads positive on financial institutions developments indices, negative on financial markets indices and moderate association with financial institution depth and access. PC1 loads positively on FD and FM whiles negatively and on FI. Both FI, FM and FD sub-indices have moderate association with PC1. PC2 loads positively on depth and efficiency under financial institution and also on access and efficiency under financial markets. It also loads positively on FI, FM FD sub-indices. The zero value is due to zero variance.

In Kazakhstan, PC1 loads positively on depth, access and efficiency under both financial institutions, financial market and Sub-indices. PC1 loads moderate association with financial institution depth and access. PC2 loads positive on financial institution depth and on financial market depth and efficiency while negative on financial market access, financial market access and on financial institution sub-indices while loads positively on FM and FD sub-indices. From
the table above is only PC1 and access under financial institution and PC2 and efficiency under financial market reflect positive and moderate association to each other.

In Tajikistan, PC1 loads positively on depth, access and efficiency under financial institutions, financial markets (except for depth) and also to all sub-indices. PC1 reflect positive and moderate association with financial institution depth and access as well as to the FI and FD sub-indices. PC2 loads positive to all financial market indices and to FI, FM and FD Sub-indices and on financial market efficiency index and negativity to depth and access financial institution indices.

In Uzbekistan, PC1 loads positive on financial institution depth, efficiency and negative to financial institution access, positive to all indices under financial markets and positive on FI and FD sub-indices and negative on FM sub-indices. PC1 loads positively and moderate association with financial institution efficiency as well as to FI and FD sub-indices. PC2 loads negative on financial institution access and positive on financial institution depth and efficiency, positive to depth, access and efficiency indices under financial market as positive to FI, FM and FD Sub-indices. PC2 loads moderate and positive association with financial institution access only. PC3 loads positive relationship with on depth and efficiency under financial institution and financial market indices respectively, also loads positively on FI, FD and FM under sub-indices. Only financial institution depth having positive association with PC3.

Similarly, in China, PC1 loads positively on depth, access and efficiency under both financial institutions financial markets as well as to FI, FM and FD sub-indices. PC1 reflect positive and moderate association with access and depth under financial institution and financial market indices except for financial market efficiency the association is positive and strong. Lastly PC1 also reflect positive association to FI, FM and FD Sub-Indices.

Lastly, In Turkmenistan, PC1 loads positive relationship with efficiency under financial institution, depth under financial market. Under PC1 financial institution efficiency, FI and FD Sub-indices have positive association with PC1, Under PC2 is only financial market depth index and FM sub-index have positive moderate association with PC2. Zero values are due to zero variance.

4.2.1. Financial Development comparison between China and other Central Asian Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Cumulative</th>
<th>Financial Institution</th>
<th>Financial Markets</th>
<th>Sub-indices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Depth</td>
<td>Access</td>
<td>Efficiency</td>
</tr>
<tr>
<td>China PR PC1</td>
<td>88.20%</td>
<td>0.5945</td>
<td>0.5733</td>
<td>0.4941</td>
</tr>
<tr>
<td>Kyrgyz Republic</td>
<td>65.80%</td>
<td>0.5034</td>
<td>0.5014</td>
<td>0.1554</td>
</tr>
<tr>
<td>PC2</td>
<td>87.90%</td>
<td>0.0068</td>
<td>-0.0564</td>
<td>0.7043</td>
</tr>
</tbody>
</table>

Source: Authors (Stata)

China Principle Components (PC) 1, Financial Institution, Financial market indices and Sub-indices relationship explained by 88.2%. China reflect to be advanced financial system as it is components shows a positive relationship with depth access and efficiency of both financial institution, financial markets and to sub-indices respectively. When comparing China and Kyrgyz Financial institution indices, China financial institution access and depth in both PC1 and PC2 are higher than that of Kyrgyz the same into financial market except only for financial market accessibility. China financial system development seems higher than that of Kyrgyz,
financial market sub-index of Kyrgyz is grow faster than that of china but in the other side Kyrgyz financial institution sub-index reflects back stepping compare to financial market sub-index.

Table 6: China PR and Kazakhstan

<table>
<thead>
<tr>
<th>Country</th>
<th>Cummulative</th>
<th>Financial Institution</th>
<th>Financial Markets</th>
<th>Sub-indices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Depth</td>
<td>Access</td>
<td>Efficiency</td>
</tr>
<tr>
<td>China PR</td>
<td>PC 1</td>
<td>88.20%</td>
<td>0.5945</td>
<td>0.5733</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>PC 1</td>
<td>54.10%</td>
<td>0.5945</td>
<td>0.4868</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>76.70%</td>
<td>0.0982</td>
<td>-0.4434</td>
</tr>
</tbody>
</table>

Source: Authors (Stata)

The table above reflect that, China financial system is advanced than that of Kazakhstan as its system shows a positive relationship with depth access and efficiency of both financial institution, financial markets and sub-indices respectively. China financial system is moderately advancing while not only Kazakhstan financial institution, financial markets financial system seems weak but also even internal advancement of financial system is weak too.

Table 7: China PR and Tajikistan

<table>
<thead>
<tr>
<th>Country</th>
<th>Cummulative</th>
<th>Financial Institution</th>
<th>Financial Markets</th>
<th>Sub-indices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Depth</td>
<td>Access</td>
<td>Efficiency</td>
</tr>
<tr>
<td>China PR</td>
<td>PC 1</td>
<td>88.20%</td>
<td>0.5945</td>
<td>0.5733</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>PC 1</td>
<td>54.3%</td>
<td>0.5611</td>
<td>0.6352</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>89%</td>
<td>-0.2044</td>
<td>-0.2115</td>
</tr>
</tbody>
</table>

Source: Authors (Stata)

China and Tajikistan comparison outlook, as based to Tajikistan PC1 its financial institution indices are strong very close to that of china. But when comes to Financial market indices on both PC1 and PC2 reflect immaturity in Tajikistan financial market. China financial Institution and financial market indices are than that of Tajikistan. In Tajikistan internal financial system advancement is strongly prevailing from Financial Institution to Financial system advancement (FD) while China, advancement of financial system prevailing from both financial institution and financial markets.

Table 8: China PR and Uzbekistan

<table>
<thead>
<tr>
<th>Country</th>
<th>Cummulative</th>
<th>Financial Institution</th>
<th>Financial Markets</th>
<th>Sub-indices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Depth</td>
<td>Access</td>
<td>Efficiency</td>
</tr>
<tr>
<td>China PR</td>
<td>PC 1</td>
<td>88.20%</td>
<td>0.5945</td>
<td>0.5733</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>PC 1</td>
<td>47%</td>
<td>-0.2044</td>
<td>-0.2115</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>74.70%</td>
<td>0.4419</td>
<td>-0.0265</td>
</tr>
<tr>
<td></td>
<td>PC 3</td>
<td>86.40%</td>
<td>-0.2056</td>
<td>0.6827</td>
</tr>
</tbody>
</table>

Source: Authors (Stata)

From the table above, China financial institution and financial market depth, Accessibility and efficiency in providing financial service is higher than that of Uzbekistan not only reflected into that but also the same reflected into internal financial system that as signified by presented Sub-indices. From PC2 and PC3 the accessibility of financial institution services in Uzbekistan seem higher than that of china and financial institution plays great role into financial system advancement in the country this differ from China as in china financial institution and financial market both support advancement into country’s financial system.

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Table 9: China PR and Turkmenistan

<table>
<thead>
<tr>
<th>Country</th>
<th>Cumulative</th>
<th>Financial Institution</th>
<th>Financial Markets</th>
<th>Sub-indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>China PR</td>
<td>PC 1</td>
<td>88.20 %</td>
<td>0.5945</td>
<td>0.5733</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>PC 1</td>
<td>70 %</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PC 2</td>
<td>100 %</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Results are highly affected by absence of data and zero variance, based on available information, Turkmenistan, financial institution efficiency seems to be a strong component in strengthening FI, also the depth of financial markets seems to play the same role, but its only financial institution index seems to have great results over Turkmenistan financial system advancement.

3. Principal components analysis

Table 10: Region financial cooperation Eigen analysis of the Correlation Matrix

<table>
<thead>
<tr>
<th>No.</th>
<th>Components</th>
<th>Eigen-value</th>
<th>Proportion</th>
<th>Cumulative</th>
<th>Eigen-value</th>
<th>Proportion</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Comp1</td>
<td>3.73994</td>
<td>0.6233</td>
<td>0.6233</td>
<td>2.65152</td>
<td>0.8838</td>
<td>0.8838</td>
</tr>
<tr>
<td>2</td>
<td>Comp2</td>
<td>1.06269</td>
<td>0.1771</td>
<td>0.8004</td>
<td>0.38484</td>
<td>0.1162</td>
<td>1.00</td>
</tr>
<tr>
<td>3</td>
<td>Comp3</td>
<td>0.669186</td>
<td>0.1115</td>
<td>0.912</td>
<td>0.2784</td>
<td>0.000</td>
<td>1.00</td>
</tr>
<tr>
<td>4</td>
<td>Comp4</td>
<td>0.269528</td>
<td>0.0449</td>
<td>0.9569</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Comp5</td>
<td>0.14944</td>
<td>0.0249</td>
<td>0.99818</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Comp6</td>
<td>0.109119</td>
<td>0.0182</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table above presents a eigen-values for regional financial institution and financial markets access, depth and efficiency and also separately provide eigen value for regional FI, FM and FD sub-indices. From Financial indicators indices principle components PC-1 and PC-2 eigen values are greater than one and “cumulative” explained up to 80%. From the financial institution (FI), financial market (FM) and financial development (FD) sub-indices have only PC1 with eigen-value is greater than one and the relationship between sub-indices and PC1 is explained by 88.38%. These means principle components with eigen-value greater than one are selected for analysis.

Table 11: Eigen-Vectors-Regional Financial Indicators

<table>
<thead>
<tr>
<th>Cumulative</th>
<th>Financial Institution</th>
<th>Financial Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depth (fidi)</td>
<td>Access (fiai)</td>
</tr>
<tr>
<td>PC 1</td>
<td>62.3%</td>
<td>0.4950</td>
</tr>
<tr>
<td>PC 2</td>
<td>80.0%</td>
<td>0.1468</td>
</tr>
</tbody>
</table>

The table above explain the entire financial development indicators of China and Central Asia financial cooperation, only two components retained with maximum cumulative value that explain up to 80% of the tested variables.

1. In context of regional financial Institution, PC1 load positive relationship with depth, access and efficiency with financial institutions, also PC1 reflects moderate association with financial institution Depth while PC2 load positive relationship with depth, access and negative relationship with efficiency under financial
institutions on the other side PC2 reflects association with financial institution service accessibility.

2. In context of regional financial Markets, PC1 load positive relationship with depth, access and efficiency with financial markets indices, also PC1 reflects week association with all financial market indices. PC2 load negative relationship with depth and access of financial market and positive relationship with financial institutions efficiency. And PC2 reflect weak association with all financial market indices.

<table>
<thead>
<tr>
<th>Sub-indices</th>
<th>Cumulative</th>
<th>FII</th>
<th>FMI</th>
<th>FDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC1</td>
<td>88.4%</td>
<td>0.5697</td>
<td>0.5474</td>
<td>0.6131</td>
</tr>
</tbody>
</table>

Source: Authors (Stata)

The table above explain the sub-indices for regional financial cooperation between China and Central Asia countries, PC1 retained as its engine value found greater than 1 (table.16 &17) the cumulative explain 88.4% of the association between PC1 and its cumulative explain 88.4% of the tested variables. PC1 reflect the positive and moderate association with regional financial institution index (FII), financial market index (FMI) and regional financial development index (FDI). The regional financial institution index (FII) value is bit higher than that of financial market (FMI) this means financial institution plays great role in regional financial cooperation financial system advancement than financial market regarding central Asian countries operate under planned economy system where financial institution are SOE’s and capacitated with government while financial markets depends on private sector which under planned economic system private sector get limited.

5. Conclusion

From Empirical Perspective, the empirical part of the study under fixed effect model explains and shows to what extent do the financial Institutions and financial markets as key players are involved into fostering China and Central Asia regional financial cooperation, where the financial development index for each individual country of cooperation including financial depth, access and efficiency for both regional financial markets and institutions examined and empirically it found that:

- China reflects well, strong and have advanced financial system than all other central Asian countries as all financial indices to have positive relationship not only with financial market and financial institution but also to all FI, FM and FD sub-indices
- The accessibility to financial institution service reflects to higher in china and Turkmenistan, other countries reflect to experience a limited accessibility of financial Institution service and efficiency into Turkmenistan. In case of financial market; Depth, accessibility and efficiency is challenge, Depth to Kyrgyz efficiency to Kazakhstan and accessibility to Uzbekistan.
- Though there is a difference among countries, but Most of the central Asian Countries Financial Institution found at least to have good financial institution indices compare to financial market which have week indices which also affect the pace in advancing their financial system.

The overall perspective of the regional financial cooperation

- Regional financial institution Depth is moderate while accessibility of financial service is higher and stronger within the region
- Regional financial market Depth and accessibility reflected moderate (average)
Lastly, FI and FD regional development sub-indices are positive towards regional financial development while FM sub-indices reflect negativity on regional financial market progress by means of either weak integration system or infant one mostly of other countries than china.

Regional Financial institutions, Financial market and financial development indices are all at moderate level and financial institution index value is higher than of financial market by of supporting regional financial system advancement than financial market.

From International financial cooperation experience perspective
In case of China and central Asia cooperation, do like other cooperation, the prospect of the collaboration depends on the strength of the organization to deal with challenges to have acute macroeconomic management, i.e. financial and currency crisis, development of well structural policies and currently china aim at RMNB internationalization and IMF include RMNB into special drawing reserve (SDR), so RMNB will be used regionally and for international transaction, the RMNB common currency project should be well designed. Sufficient funding mechanisms for regional investments are necessary.

Prosperous cooperation needs management at the individual, country, institutional levels, Transparency and the engagement of the business community and civil society to strengthen the mechanisms for regional cooperation. Regional economic cooperation organizations that involve ministries of finance or economy and central banks tend to be more active than those relying on the leadership of line ministries or foreign affairs and Open regionalism –this involves the construction of institutions which open extra-regional membership without discrimination against non-regional economies, for long term reasons this is the most fruitful approach as established in the case of East and South-East Asia.

Central Asian countries and china's cooperation is lately a global emerged economic partnership in which the integration viewed advantageously to Central Asia as it uttered on investments, production of goods and services and distribution into the various sector of the economy into each of member states. As of late cooperation, China and Central Asian countries have lessons from international experience from other regional cooperation as an approach to foster successful and market-based integration of economic activities across borders

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