Role of Domestic Banking and Financial Institutions in Project Finance: Insights from Hydropower Sector in Nepal

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ABSTRACT

Hydropower is a low carbon renewable energy alternative for replacing carbon emission energy sources. In Nepal, this infrastructure sector is being developed for fulfilling the internal demand of electricity. Previous studies emphasized public-private partnership (PPP) utilizing project finance (PF) model in infrastructure sector. Recognizing the importance of domestic banking and financial institutions (BFIs) in project finance this study delves into factors significantly affecting the role of BFIs in project finance. Cross-sectional survey utilizing questionnaires was conducted among respondents representing the independent power producers (IPPs) and BFIs in Nepal. Regression analysis showed predictor variables like economic environment, guidelines of the central bank and low default rate have significant impact on project finance. The findings indicate issues related to adequate legal provision for non-recourse financing causing adverse impact on the role of BFIs for project finance arrangement. Credibility of hydropower project sponsors is an important determinant in financing hydropower project. The availability of comparatively more bankable projects in other investment sectors against the investible fund constraints resulted in limited complete project finance arrangement of hydropower projects. Detail investigation on guarantees to the lenders against the project loan and improvements needed in legal frameworks to accommodate the non-recourse finance and making economic and legal environment friendlier to private sector is the limitation of this study left for future researches.

KEYWORDS

Banking and financial institutions, Infrastructure sector, Hydropower, Project finance, Renewable energy

INTRODUCTION

Energy infrastructure is the essential requirement for economic development. Nepal is blessed with hydropower, a source of renewable energy, which can be used to meet its domestic demand of electricity. State budget alone is not sufficient to meet growing financing need of infrastructure sector resulting in public private partnership (PPP) framework to play an important role (Verdouw, Uzsoki & Dominguez,

2015). In Nepal, participation of private sector in building hydropower infrastructure is done under PPP model (Bhetuwal, 2017).

In the 1990s Government of Nepal adopted policy to mobilize private sector in hydropower project in PPP model. As a result of this initiation, annual reports of Nepal Electricity Authority (NEA) show significant contribution of IPPs in hydropower generation. As of mid-July 2022 a total of 1,020,528 KW (about 47% of total installed capacity of Nepal's hydropower plant) has been developed by IPPs (NEA, 2022). As of mid-July 2022, power system of Nepal has 2189,918 KW installed capacity. This consists of 95.04% of hydropower, 2.44% thermal and 2.50% solar power generation of the total installed capacity. NEA, the public sector undertaking and its subsidiary contributes 48.46% of hydro, thermal 2.44%, solar 0.99%, comparing to IPPs solar 1.51% and IPPs hydro 46.60% (NEA, 2022). This shows the importance of IPPs in power generation of Nepal. IPPs power project are constructed with private investment which include the domestic BFIs loan which indicates the critical role played by the BFIs in hydropower sector financing.

As per the directive issued by Government of Nepal (GoN), promoter for any hydropower project first need to apply to the Department of Electricity Department (DoED) for project survey with showing its technical and financial capability to undertake such survey. Upon satisfactory submission the DoED grants survey license with specific period of validity. If the promoter after obtaining the survey license want to proceed for project implementation it needs to again apply for construction license with the DoED within the period of validity of the survey license. Upon satisfaction of the conditions given for the construction application DoED provides generation license with condition that the promoter (i.e. the, IPP) shall complete the power purchase/sale agreement with the NEA (a government undertaking) and the financing agreement with the financial institution within two year of the approval of generation license. BFIs may refuse or accept the financing. Purchase/sale price in the power purchase/sale agreement shall be within the broad guideline given by the Electricity Regulatory Commission (ERC). Investment Board is another body of GoN under the chairmanship of the prime minister of Nepal to look into the matter related with the PPP and private investment, particularly the foreign direct investment in Nepal's infrastructure development including hydropower. Nepal Rastra Bank (NRB), the central bank of Nepal is regulator of the BFIs which also provides guidelines for investments. Its current guidelines include certain mandatory investment in hydropower sector by domestic BFIs. Data provided by NRB shows that as of mid-January 2020 commercial banks of Nepal have loaned NRs. 129.77 million to hydropower sector.

Over the past decades project finance has been increasingly popular to channel the resources for infrastructure development. Project finance involve distinct structure of financing to special purpose vehicle with equity from sponsors and loan with the banks (Abid *et al.*, 2021). Project Finance has become the most popular model of financing for large infrastructure projects including power plants (Dorobantu & Müllner, 2019). In the case of renewable energy projects, project finance is a powerful tool for mobilizing capital, but it faces different types of challenges (Barroco & Herrera, 2019) and quite a number of factors affects implementation of such infrastructure project within the international standard of project finance arrangement.

There is a strong trend of non-recourse finance which is more important for renewable energy as compared to the fuel-based power plants. In non-recourse finance lenders agree to the term that in the borrower's default to repay, the lender will not have access to the assets of the borrower beyond agreed upon collateral which normally happens to be the project created assets only. Renewable energy projects

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like hydropower uses less equity and higher debt amount and sources of such debt amount may be from international and domestic financial institutions. These energy renewable projects are at risk of 'debt overhang' (Steffen, 2018). In case of mega-projects along with evaluating the construction risks affecting bankability examining the factors like risks pertaining to operational, legal, political, counter party, currency and concession are critical criteria for success (Owolabi *et al.*, 2020).

Nepal needs to attract foreign sovereign as well as private investment (Alam *et al.*, 2017) and stimulate its economic growth with changes in investment strategy and joint venture with national and international partners for developing its hydropower (Gunatilake, Wijayatunga & Holst, 2020). Foreign direct investment (FDI) inflow in Nepal is substantially low in comparison to other countries. During the year 2016 its shares was 0.01 per cent of the total FDI of the world, while at the same time South Asia received 3.1 per cent of the world FDI inflow (NRB, 2018). At present, the level of domestic institutional investment is minimal comparing to the urgent need of investment requirement.

Banking sector is the main domestic institutional investor in any infrastructure project and plays important role by providing project loan to infrastructure projects. However, there are various grievances from the developers regarding complete project finance model in infrastructure. The insufficiency of the investible fund is an important aspect. To comply with the requirement of compulsory maintenance of investment portfolio with investment in hydropower sector, domestic banks and financial institutions (BFIs) in Nepal are found preferring investment through a consortium or syndicate financing. Abid *et al.*, (2021) mentioned involvement of banks in syndicate bestow political parasol to lessen political risks. National financial institutions are key enabling institutions for low carbon energy transition in energy sector (Hall, Foxon & Bolton, 2016). Domestic institutions are the prime role player in financing infrastructure sector projects of any country.

Study on the role of domestic BFIs in hydropower sector in this setting is scarce. Therefore, the main objective of this paper is to analyse the factors affecting the role of domestic BFIs in project finance in hydropower sector in Nepal. The findings can provide insights to policy makers, financial institutions, and hydropower operators in understanding the role of domestic financial institutions in infrastructure projects.

Review of Literature

Domestic arrangers in project finance can be proved to be superior over the foreign banks because of their ability to assess the projects in various dimensions which may include the project assets and their underlying network of contracts as well as their ability to credibly communicate the true value of the project and ensuring more effective monitoring of the project company (Ahiabor & James, 2019).

Esty (2004) mentioned model of financing an asset directly affects it getting financed and its worthiness. Finding on studies of 61 countries showed that countries with stronger creditor rights, stronger legal enforcement, less-developed financial systems and less government ownership of banking assets, loan spreads and fees positively relate to the fraction of total fund by foreign banks (Esty, 2005).While constrained investment capacity has negative impact on infrastructure development, wide interest rate spread has adverse effect on financing the green field projects. Such lending restrictions has aggravated banking regulations which ultimately has impact of discouraging long term lending by financial institutions (Dobbs *et al.*, 2013). Many experts hope that institutional investors like pension funds, insurance companies and sovereign funds will help to contribute growing need of infrastructure investment but these institutional investors have frustration about the suitable vehicle for target allocation for infrastructure.

In comparison with the need of redirection and scaling-up of investment and finance to adapt economic and societal system for low-carbon climate resilient economy, current domestic level is insufficient both in developed and developing countries (Hainaut & Cochran, 2018). In case of many developing countries there are high political and legal risks. Rao (2018) mentioned especially where the legal risk is high; bank syndicate may have a positive impact in expanding bank lending.

By virtue of their relationship with host government as well as wider range of stakeholders and access to the local currency fund, and having greater potential to assess the risks and opportunities, the optimal anchor investors of infrastructure sector of any country are the domestic institutional investors (Danso & Samuels, 2017). Previous studies showed that comparing to corporate loan, project loan has low default rate and high recovery rate (Esty, 2004).

Fundamentally, short term pervasiveness in capital markets, structural and policy barriers including regulatory disincentives, lack of appropriate financing vehicles, transparency, limited expertise in risks and investment management, viability issues and lack of appropriate data benchmark for illiquid assets like infrastructure are the constraints for long term financing by institutional investors (Della Croce & Yermo, 2013). Wherever political risk is higher project finance is more likely to be used and banks are more likely to participate in the syndicate. The terms of loan contract depends upon political risk along with legal and institutional environment (Hainz & Kleimeier, 2012). The contractual structure unique to project finance leads to better project governance and investment management (Kleimeier & Versteeg, 2010).

Given the huge amount of literature in infrastructure financing and project finance and the role played by the domestic financial institutions question relating the factors which motivate these institutions in renewable energy project like hydropower is very relevant for detail study. Under the above background independent variables for this study have been specified below with the important economic reasons of their selection for the study.

High Recovery (repayment) rate and Low default rate

Financial institutions are primarily concerned over the recovery or the repayment of the loan from the borrower. High recovery refers the high rate of recovery of the loan amount when the loan borrower defaults. The rate suggests the percentage of the amount of outstanding loan recovered when the borrower failed to fully settle the obligation. Low default rate in investment portfolio indicate low credit risk with low probability of the failure of borrower to repay as the contractual obligation. Literature review suggests project finance loan has high recovery and low default rate. Esty (2004) citing Standard & Poor's analysis mentioned loans under project finance model have high recovery rate and low default rate comparing to loans under corporate finance model.

High return (interest) rate

Infrastructure project loan are long term loans. Hydropower project loans have also long-term period. In their study (Dailami and Leipziger, 1998) mentioned rate of default in 5 year loan is twice the default rate of 15 year loan even though the latter has high interest rate. It is further elaborate that countries with high inflation have high interest rate which is taken as the incentive to infrastructure loan. It is also highlighted that with entry of foreign institutions and interest rate liberalization there is considerable growth in debt in Asian and Latin American countries.

NRB guidelines on investment in hydropower

Central banking authority through its financial and monetary practices specifically by amending regulatory frameworks and promoting green loans and products plays critical role in renewable energy investment and scaling up sustainable finance (Durrani, Rosmin and Volz, 2020). NRB as the regulator of banking sector in Nepal issues guidelines for domestic BFIs to regulate the investment in different sectors. Therefore, NRB regulation among the various factors having impact on the role of domestic BFIs participation in hydropower project finance is the very critical factor considered for the study.

Sponsor's credibility

Bankability is critical for BFIs investment. Zhu & Chua, (2018) mentioned shareholder's credibility as well as financial market as important among political and economic environment, legal system and regulatory framework, public sector's reliability and other critical bankability criteria for PPP projects. Majority shareholders are the sponsors of the project in hydropower sector in Nepal.

Financial market

Financial market is the key component of the financial system for financial stability and operation efficiency. Development of equity, bond and debt in the financial market are important for availability of domestic credit (Dorobantu & Müllner, (2019). Financial market seems to impose high premium in project finance loan in countries with high inflation (Dailami & Leipziger, (1998), and impact of domestic arranger on pricing of project finance loan in emerging markets (Ahiabor & James, (2019) is important.

Willingness to non-recourse financing

Fundamental of project finance is the non-recourse term of loan. In limited recourse too, the recourse is limited to the assets created by the project only. In case of full recourse term, the lender will not have any right of recourse over any assets of the sponsor in case of default. But Nepal is very unfamiliar with non-recourse financing (Pandit, 2015). This has raised question whether such unfamiliarity is causing the reluctance in project finance arrangement with international standard.

Political environment

High political and legal risks exist in the situation of many developing countries. If the legal risk in the given overall political environment of the country is high this will have considerable impact on bank lending. Rao (2018) noted that if the legal risk is considerable bank lending is favourably affected by bank syndicates. Nepali BFIs have mostly participated in bank syndicate in financing hydropower projects. Impact of the given political environment of the country has also been considered for evaluation to achieve the objective of the study.

Economic environment

Research of Eta (2015) showed significant relation between banking and financial sector investment and economic environment. After the hydropower sector was opened to private sector investment foreign private investors from different countries started to come to Nepal. At the time the country is encouraging foreign private investors how friendly the country's overall economic environment is to the domestic banking sector is also an important issue.

Market competition among financial institutions

In financing of infrastructure there is competition between FIs in capital market, bond market and bank loan. (Scannella, 2012) looked at various market model and found competition among the FIs in each market. The syndicate structure and loan competition among FIs were also indicated by Esty (2005). Relating this with Nepal's hydropower market, after the hydropower sector was opened for private sector there appeared competition among not only the new project developer but among the FIs as well. Whether this has impact on the role of domestic BFIs in participation in hydropower project finance is another variable.

Financial structure of the project

Project finance provides such financial structure of project that allows the lender to control the project assets (Kripa and Xhafa, 2013) which can play as the motivator to increase the role of the BFIs in infrastructure investment. Scannella (2012) mention financing structure of infrastructure project finance as one of the key structural feature that characterise the project with specific financing structure. This determines the role of the multiple parties in project financing arrangement.

Role of private financing in the context of private verses public capital, investment constraints and wide interest rate is highlighted by Dobbs *et al.*, (2013). Role of domestic BFIs as the arranger is project finance is highlighted by Ahiabor & James (2019). Policy barriers as discussed by Della Croce & Yermo (2013), legal and institutional environment as well as the political risk as mentioned by Hainz & Kleimeier (2012) and Rao (2018) shows the impact of political, legal and institutional bottlenecks in energy sector project finance. Importantly, guidelines for BFIs investment issued by the NRB are critical for the hydropower sector development. Dobbs *et al.*, (2013) mentioned that restrictions aggravating the banking regulation has discouraged the lending by financial institutions. This shows regulatory provisions very critical to influence the role of domestic BFIs in hydropower project finance. Based on these previous studies domestic BFIs lending to hydropower project with effective project finance at an international standard instead of traditional corporate finance model has been analysed in this paper. For this purpose, the first question asked to the respondent consist of different mechanism of financing a hydropower project including the project finance arrangement. Similarly, respondents were given questions to express their opinion on the importance of PPP and project finance in infrastructure development. Also, the respondents from IPPs categories were asked questions in order to evaluate if the basic motive of establishing a new hydropower company satisfies the project finance basic criteria of (i) establishment of new company as special purpose vehicle, (ii) to obtain limited or non-recourse finance and (iii) repayment of loan from the project cash flow generated from sale of power generated. The received response indicate project finance as suitable mechanism intended to achieve successfully. Therefore, project finance is the dependent variable. . However, obtaining robust project finance arrangement is influenced by numbers of factors. There are eleven factors (high recovery rate, low default rate, central bank's policy, sponsor's credibility, willingness to non-recourse financing, political environment, economic environment, regulatory provisions (legal framework and systems), market competition among financial institutions and financial structure of the project) identified as the predictor variables which have been considered for the analysis.

METHODOLOGY

The motive behind this study is to analyse the factors affecting participation of domestic BFIs in project finance in hydropower projects in Nepal. The respondents of the study were IPPs, domestic financial institutions (FIs) including the banking companies. Descriptive and analytical design has been adopted to analyse the factors affecting the participation of BFIs in hydropower project finance. For the purpose of the study cross-sectional data have been collected from the respondents representing the IPPs and BFIs in Nepal. While factors important from the viewpoint to BFIs are the main point of concern for this study, factors which the IPPs perceive to influence the role of domestic BFIs is equally important because IPPs are the direct beneficiary of the role played by BFIs. Therefore, this study sought the perceptions from both.

The survey was initially conducted through online Google Forms and questionnaires were distributed to the respondents through internet, with several follow-ups. Some of the responses were collected by visiting the office of the representative of the responding institutions known to have overall knowledge of the business and full access to the institutional information. The questionnaire altogether included 96 questions pertaining to several attributes of the project finance including factors influencing domestic BFIs in project finance. Table 1 below shows the demographic profile of the survey respondents.

Table 1: Profile of Respondents

Particulars	Frequency	% of Total	Particulars	Frequency	% of Total
Age Group:			Organizational Position:		
Below 35 years	11	20	CEO/Dy.CEO/CEE	14	26
35 to 60 years	34	63	CFOs	13	25
Above 60 years	5	9	Company Secretary	6	11
Undisclosed	4	8	Chief Manager/Sr. Manager/Director	6	11
Total	**54**	**100**	Consultant	9	17
Educational Category:			Sr. Engineer	3	6
PhD	3	6	Undisclosed	2	4
MPhil	1	2	Total	54	100
Master of Engineering	17	31	Experience of Respondents (Years)		
Master of Business Administration	19	35	Less than 10	10	18
Chartered Accountants	8	15	10 to 20	13	24
Bachelors	5	9	20 to 30	16	30
Undisclosed	1	2	More than 30	6	11
Total	54	100	Undisclosed	9	17
			Total	54	100

The majority of the respondents are in 35 to 60 years age group, have 20 to 30 years work experience and 24% of respondents have 10 to 20 years of work experience, and have master level education. Organizational position of the respondents shows that 26% of the respondents are Chief Executive Officers (CEOs)/Deputy CEOs /Chief Executive Engineers; 25% are Chief Financial Officers (CFOs). This indicate good representation in view of the organization position because responding to this kind of survey requires overall organizational responsibility and access to the whole organizational information.

The questionnaire of the main study pertaining to this paper consisted three parts namely, (a) questions asked to all respondents, (b) questions asked to IPPs respondents only and (c) questions asked to BFIs respondents only. Part (a) included the question in different aspects of project finance including the questions pertaining to role of domestic BFIs. As the IPPs are the direct beneficiary of the domestic BFIs investment in hydropower, the motive to ask such questions to IPPs about perspective on what actually motivate the domestic BFIs to participate in hydropower project finance is very pertinent to the objective of the study. It is important to know how the clients (i.e. IPPs) perceived the role of BFIs in project finance hydropower sector.

Along with the analysis of common questions under part (a) asked to the both category of respondents this paper analyses the specific questions asked to BFIs i.e. questions in part (c) of the questionnaire. BFIs being the main player in project finance, justifies specific questions given to them as mentioned above. These questions were related to qualitative type and have been considered for descriptive analysis in view of the nature and number of the responses.

For questions asked to both categories of respondents i.e. IPPs and BFIs regression has been used for analysis. As mentioned above in case of specific questions asked to the respondents of BFIs (in addition to the questions asked to both of the categories of respondents) only descriptive analysis is done in view of the number of samples. Appendix 1 shows the questions asked to the respondents from BFIs category and questions asked to both category of respondents BFIs as well as IPP.

As of July 2017, total number of IPPs of different capacities stood around 211. Similarly, the number of BFIs including commercial banks, development banks, finance companies and micro finance companies and other institutions stood at 28, 57, 22, 90 and 11 respectively. For the purpose of this study the populations of IPPs have been filtered with basic criteria of installed capacity and Power Purchase Agreement[1] (PPA). Similarly, filtration of population of BFIs has been considered on the basis of geographical area of operation. All commercial banks have national level operation and invested in hydropower projects. Development banks are of two categories with national level operation and district level operation. Development banks with district level operation, finance companies, micro finance companies and BFIs falling under other categories have not been covered in the population under the study as these institutions regardless of their population are not expected to invest in hydropower as hydro sector is very capital intensive and beyond the investment capacity of these small institutions. Initially, insurance companies were also the targeted respondents but as per the response of some of the insurance companies that they are not allowed to embark in hydro sector. Employee Provident Fund and Citizen Investment Trust which are the retirement funds and currently having significant level of investment in hydropower sector

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[1] Installed capacity is the sum of maximum capacity of the turbines installed to generate energy measured in watt (W) in a hydropower plant. PPA is an agreement between the project developers (i.e. IPP) and power off-taker to purchase/sell of power generated by the plant.

have been considered. Applying the filtration criteria discussed above the final population stood as 134. This total population have been considered for required samples on the basis of the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

Application of the above formula gives a total requirement of approximately 82 samples which have been allocated to the different strata of institutions. The allocated number came to be 57, 16, 7 and 2 in hydropower companies, commercial banks, development banks and retirement funds respectively. The responses of the survey have been as follows:

Table 2: Response Rate

Respondents Categories	Samples	Responses	Rate %
Hydropower Companies (IPPs):	57	35	61%
Commercial Banks	16	14	87%
Development Banks	7	3	43%
Retirement Funds	2	2	100%
Total	82	54	66%

Questionnaires included 5-point Likert-Scale (5 for strongly agree and 1 for strongly disagree) as well as dichotomous and bipolar interval questions and open-ended questions for qualitative analysis. The questionnaire items were adapted from previous studies including Danso & Samuels (2018), Zhu and Chua (2018), Zhang (2005), Lasa, Ahmad & Takim (2019), Eta (2015), Sharma & Thakur (2016), Kumaraswamy & Zhang (2001) and Kvaraciejiene (2014). The instrument has been verified and validated with opinion of industry experts, and a pilot study. The reliability of the data has been accepted with Cronbach's Alpha of 0.721. Statistical Package for the Social Sciences (SPSS) and MS-Excel were used to analyse and describe the data for the stated purpose of the study.

Variables were identified from the review of previous studies and other literatures. Altogether 11 independent variables including high recovery (repayment) rate, low default rate, high return (interest) rate, NRB guidelines that requires bank to invest in hydropower, sponsor's credibility, willingness to non-recourse financing, political environment, economic environment, legal framework and legal system, market competition among financial institutions, financial structure of the project have been considered for the analysis. Linear regression with Enter and Stepwise option in the SPSS has been applied for data analysis.

RESULTS

Descriptive Analysis

As highlighted in methodology section there were two sets of questions comprising one with questions asked to all respondents and other with questions given the respondents of BFIs category only. Appendix 1 shows the summarised version of the questions.

To estimate the responses of the survey participant descriptive analysis of the data set pertaining to part (a) of Appendix 1 was performed. The descriptive statistics including the frequencies, mean, mode, standard, deviation, skewness and kurtosis were computed. The descriptive statistics of the survey

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pertaining to the data considered for regression analysis have been given in Table 3 below and discussions are in the following paragraph.

Table 3: Descriptive Statistics of Survey Data

Variables	Mean	Mode	Std. Deviation	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis	Sum
Project Finance	3.78	4.00	1.16	-1.20	0.32	0.92	0.64	204
High Recovery (repayment) rate	3.31	4.00	0.99	-0.44	0.32	-0.40	0.64	179
Low default rate	3.26	4.00	1.07	-0.26	0.32	-0.51	0.64	176
High return (interest) rate	3.35	4.00	1.10	-0.31	0.32	-0.88	0.64	181
NRB guidelines on investment in hydropower	3.78	4.00	1.18	-0.78	0.32	-0.43	0.64	204
Sponsor's credibility	3.74	4.00	1.03	-1.06	0.32	0.63	0.64	202
Willingness to non-recourse financing	3.07	4.00	1.01	-0.04	0.32	-0.86	0.64	166
Political environment	3.52	4.00	1.06	-0.89	0.32	0.48	0.64	190
Economic environment	3.54	4.00	1.09	-0.77	0.32	-0.12	0.64	191
Legal framework and legal system	3.61	4.00	1.14	-0.84	0.32	0.11	0.64	195
Market competition among financial institutions	3.37	4.00	1.15	-0.86	0.32	-0.20	0.64	182
Financial structure of the project	3.54	4.00	1.09	-0.95	0.32	0.26	0.64	191

The table shows the sum, mean, mode, and standard deviation of the data. Similarly, skewness and kurtosis have also been depicted in the table. As shown, mean value of the responses resulted to be more than 3 or approximately 4 in most of the variables. Additionally, the mode value in all the variables is 4. This denotes respondents agreeing on the effect of the independent variables in dependent variable (project finance) by the domestic BFIs. Standard deviations are also within the acceptable range. Review of the skewness and kurtosis suggest the data to be moderately normal.

As discussed above survey conducted for the study also included qualitative type questions (summarised in Appendix 1 part b) asked only to the respondents from BFIs. These questions were about various qualitative aspects regarding participation by BFIs in hydropower project finance. These questions have been separately analysed to obtain the results pertaining to effectiveness of project finance model in

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hydropower sector of Nepal. The findings have been shown in the table below with discussion in the following paragraphs.

Table 4: Findings of Analysis of the Specific Qualitative Questions Asked to BFIs Respondents

. No:	Statement of Question	Findings
1	Sector dominating the BFIs investment portfolio	Hydropower sectors seem to be in the average rank of BFIs investment portfolio. Agriculture, Tourism & Trade sector occupies highest rank followed by Consumable (hire purchase etc.). Then hydropower infrastructure sector followed by Infrastructure sector other than hydropower.
2	Types of investment	Almost all the banks participated with debt financing and mostly through syndicate of banks.
3	Participation in Non-recourse Finance	More than 56% of the respondents answering this question opted YES and 44% opted NO.
4	Reason for not accepting non-recourse finance (supplementary to question in 3 if answer is NO)	Respondents opting NO were asked supplementary question to indicate the given alternative reason behind. All of the respondents opting NO above answered this question. The sum of the responses indicated availability of comparatively more bankable projects in other investment sector as the reason for non-recourse finance
5	Number of hydropower project participated	Options were given in the block of number of projects as None, 1 to 5, 6 to 10 and more than 10. Received responses are Zero, 33%, 12% and 55% respectively.
6	Number of hydropower project participated in complete project finance model	Options were given in the block of number of projects as None, 1 to 5, 6 to 10 and more than 10. Received responses are 33%, 47% and 7% and 13% respectively.
7	Most challenging problem for complete project finance model	Sponsor's credibility and shortage or unavailability of funds for investment as the most challenging problem.
8	Reason for taking personal guarantee from project sponsors of hydropower project	Possibility of fund misuse by the project sponsors, without personal guarantee repayment is not ensured and unmet demand of loan due to availability of other attractive sector are the most important reason or asking personal guarantee.
9	Most important issues to address limited or nonrecourse in hydropower	Not answered
10	Other suggestions/comments for effective project finance	Not answered

Among the questions asked, the first question was regarding the investment status of hydropower sector in the investment portfolio of BFIs. Respondents were requested to rank the investment sector according to their investment amount in each of the sector. For ease of analysis in this study all of the sectors prescribed by the central bank have been regrouped and categorised in five categories without diluting the core nature of the sector.

As per the analyses of the received responses (see No: 1 in Table 4), agriculture, tourism and trade sector is having highest investment. Consumable (hire purchase etc.) is the sector having second highest investment. The ranking by the respondents indicated that these two sectors are dominating the investment of portfolio of banks. Consumable sector is followed by hydropower sector. Thus, hydropower comes to be third highest sector in the domestic FIs investment portfolio and followed by the infrastructure sector other than hydropower and financial services sector. Hydropower sector being in the middle of the portfolio simply indicates that despite the emphasis given by all of the stakeholders, on the basis of the investment portfolio ranking by the respondents; this sector still needs to get importance in investment portfolio of domestic BFIs. The mandatory provision to invest in hydropower has been complied by the BFIs cautiously and most of the BFIs have investment in hydropower sector through syndicate financing.

Information publicly available shows investment by the domestic BFIs in the hydropower sector is mostly in the form of syndicate financing. The practice of syndicate financing is due to the political and legal risks. As mentioned by Hainz & Kleimeier (2012) in a situation of higher political risk, project finance is more likely to be used and banks prefer to participate in the syndicate. Rao (2018) mentioned bank syndicate as the measure in a case of high legal and political risks.

In relation to the type of investment (see No: 2 in Table 4), the respondents were to select the given option among the Debt, Equity, Mezzanine and None. Received responses show 83% of the domestic FIs replied debt as mode of financing in hydropower sector among the given alternatives.

Review of literature revealed unfamiliarity in non-recourse finance in Nepal and viewing the grievances towards BFIs being reluctant to go with limited or non-recourse finance question was given to the respondent to obtain the information causing such situation. In other words, to obtain information on the propensity of BFIs to project finance in hydropower projects, the respondents were asked questions about their participation in non-recourse finance and possible reason behind any non-participation (see No: 3 and 4 in Table4) by their institutions.

Analysis of the received responses show 40% of the total respondents answered this question and all of the answer were either 'agree' to 'strongly agree' to "comparatively more bankable projects are available from other investment sectors" against the project finance in hydropower among other alternative including the situation related to non-recourse finance.

Respondents were also asked (see No: 5 and 6 in Table 4) to give information about the total number of hydropower projects and projects with completely project finance arrangement. Analyses of the responses showed that total number of hydropower project invested by their institutions indicated zero response in 'None' category, 33% in 'One to Five' projects' category, 12% in 'Six to Ten Project" category and more than 55% in 'More than Ten Projects'. Similarly in case of question relating to hydropower projects with fully project finance arrangement, 33% respondents selected "None", 47% answered 'One to Five' projects' category, about 7% selected 'Six to Ten Project" and 13% responses for 'More than Ten Projects'. It seems that all of the respondents have loan in hydropower sector as there is zero response in 'None' category. With the overall response, it can be inferred that domestic BFIs have good participation in hydropower projects investment but less participation in projects with fully project finance model. It also

shows that all of the respondents have invested in hydropower project but not all have invested with project finance model.

Another question (see No: 7 in Table4) was asked to the respondent to find the most challenging problem for complete project finance model. It is anticipated that there need some steps for improvements legal and regulatory provisions and other aspects of the arrangement to increase participation of BFIs in project finance in hydropower sector. Such steps may include improvements in (i) banking regulation (ii) policy of central bank (iii) availability of fund for investment (iv) credibility of sponsors and (v) relevant laws of the country having no provision for non-recourse finance. Analysis of responses revealed that 87% of the respondents answering this question indicated sponsors credibility and shortage or unavailability of funds for investment as the most challenging problem. Hainaut & Cochran, (2018) mentioned that around the world current domestic level investment is insufficient when compared with the required scaling-up of investment. The credibility of the sponsors of the private project is regarded as a critical issue. Similarly, the laws relevant to the infrastructure project financing with no provision for non-recourse finance has also been taken as important by the respondents. Responses indicate necessity of improvement in central bank's policy despite the banking regulation has been perceived least problematic among the given options.

Excepting the limited recourse provision on the project assets no other undertakings by the sponsors or any other stakeholders in any form of guarantee are generally asked by the lender in a project finance arrangement. Based upon the interviews and discussion held with the project developers, bankers, regulators and officials of the government there is practice of guarantee in favour of the lender by the project sponsors or by the other stakeholders including the government. Question was asked to the respondent to indicate the reasons behind such practices (see No: 8 in Table 4). The most possible driving reasons behind such practice of guarantee noted were (i) possibility of misuse of the loan amount by the sponsors (ii) banks having huge unmet demand of loan from various sectors other than hydropower (iii) banks needing to ensure about jeopardy in project's implementation due to unforeseen future events (iv) fully project finance is difficult to implement and (v) without sponsor's personal guarantee repayment is not ensured.

The analysis of the responses received indicated possibility of fund misuse by the project sponsors is very critical. This is followed by the BFIs general understanding that without guarantee from the sponsors, repayment is not ensured. Jeopardy in project implementation due to any unforeseen future events recorded average response. Unmet demand of loan due to availability of other attractive sector has also caused the BFIs not to be motivated in project finance in hydropower and asking guarantee. The analysis of the received answers indicates general understanding among all the parties of hydropower infrastructure projects with international level of project finance is difficult to achieve in the present situation.

Open ended questions (see No: 9 and 10 in Table 4) were also asked to find the response about the most important issues to address problem of applying limited or non-recourse financing in hydropower section and the other suggestion or comments for effective project finance in Nepal. None of these questions were answered by the respondents.

Regression results

Data collected from both of the categories of the respondents has been analysed with the multiple regressions in SPSS software. Firstly, the Enter Option given in the software was performed to obtain the overall scenario of the selected independent variables with the dependent variable. Secondly, the Stepwise option was performed to obtain the best models with the same data set. The resulted models, ANOVA and the coefficient as well as other findings have been discussed in the following paragraphs. The results of the

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analysis of data have been discussed below: The result of the analysis with Enter option is shown in the table below:

Table 5: Regression Results- Enter Option with All Independent Variables

	Estimate	SE	Std. B			Collinearity Statistics	
				t-stat	P	Tolerance	VIF
(Constant)	.489	.719		.681	.500		
HRR	-.085	.249	-.071	-.341	.735	.337	2.965
LD	-.314	.197	.285-.	1.593	.101	.457	2.189
HIIR	-.187	.240	175	-.779	.440	.289	3.458
NRB	.336	.143	.340	2.340	.024*	.693	1.443
SC	.076	.225	.065	.336	.738	.388	2.578
WNRF	.052	.190	.044	.273	.787	.553	1.808
PE	.211	.245	.192	.861	.394	.293	3.410
EE	.134	.259	.126	.515	.069**	.246	4.073
LFS	.124	.221	.122	.563	.764	.311	3.211
MC	.057	.189	-.057	-.302	.764	.415	2.407
FSR	.004	.268	-.004	-.015	.988	.231	4.333
N	54						
R^2	.399						
Adjusted R^2	.238						
F Statistics	2.477						

Notes:

Independent Variable is Project Finance.

*Indicates significance at 5% and ** indicates significance at 10%

HRR=High Recovery Rate, LD=Low Default Rate, HIIR=High Income (interest) Rate, NRB=Central Bank (Nepal Rastra Bank, NRB) Guidelines, SC=Sponsor's Credibility, WNRF=Willingness to Non-Recourse Financing, PE=Political Environment, EE=Economic Environment, LFS=Legal Framework and System, MC=Market Competition among Financial Institutions, FRP=Financial Structure of the Project.

The result listed in the table indicates that there is some model with NRB is significant at 5% level whereas model with EE is significant at 10% level.   Stepwise regression is a stepwise estimation process of developing a model with lowest numbers of statistically significant variables among the large number of independent variables (Hair *et al.*, 2014).   The Stepwise regression is an automated model selection

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procedure that picks the variables to include in the regression equation (Frost, 2021). Variables found not statistically significant have been excluded from the model. Hence, the variables kept by the analytical tool in the model have been discussed for their relation with the dependent variable which is project finance. The best fit is model with greater value of R-squared. P value within the significant level is considered to select the model. The model with larger R and Adjusted R square has been selected for model selection. P value less than the significance level is considered statistically significant (Frost, 2019) for deciding upon the model. The results obtained in the third model among the three models have been shown in the table below:

Table 6: Regression Results- Stepwise Option- Model Selection

Results	Model 1	Model 2	Model 3	Results	Model 1	Model 2	Model 3
Estimate:				R	.452	.562	.608
(Constant)	2.080	1.109	.611	R^2	.204	.316	.369
LD		-	.302	Adjusted R^2	.189	.289	.331
NRB	-	.339	.317	F Statistics	13.094	11.545	9.562
EE	.480	392	.274	P	0.001	0.000	0.000
Std. Error:				**ANOVA**			
(Constant)	.490	.571	.605	t-statistics:			
LD	-		.132	(Constant)	4.246	1.942	1.009
NRB	-	.119	.116	LD	-	-	2.295
EE	.133	.128	.135	NRB	-	2.856-	2.736
Std. Beta (B)				EE	3.619	3.065	2.036
LD	-	-	.285	**P:**			
NRB	-	.344-	.321	(Constant)	.000	.058	.318
EE	.452	.369	.249	LD	-	.	.026*
Collinearity					-	.006*	.009*
Statistics:				NRB			
Tolerance:				EE	.001*	.003*	.047*
LD	-	-	.836				
NRB	-	.942	.934				
EE	1	.942	.861				
VIF:							
LD	-	-	1.196				
NRB	-	1.061	1.071				
EE	1	1.061	1.162				

Independent Variable is Project finance. Estimation method OLS

LD=Low Default Rate, NRB=Central Bank (Nepal Rastra Bank, NRB) Guidelines, EE=Economic Environment,

*Indicates significance is at 5% levels.

Table 7 shows that in model 3, R is .608 and R Square is .369 and adjusted R Square .331 According to Cohen (1992), R value of .51 and R Square of .2592 is large. R-Square value of as low as 10

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per cent is also acceptable in case of art humanities and social sciences. The R-square for model 3 indicated the coefficient of multiple determinations close to the data fitted in the regression line.

The ANOVA pertaining to this model reached significance $F_{(3, 50)} = 9.562$ with $p = .000$ in model 3 and $p = .001$ and $p = .000$ in model 1 and model 2 respectively which are <0.05. The resulted coefficients table showed Tolerance statistics and the VIF satisfying the condition of no multi collinearity of the data set to apply the regression.

As seen in the analysis resulted with three models shows relation as mentioned below:

Model 1: PF=2.08+.48 EE   (1)

Model 2: PF=1.109+.392EE+.339NRB, and   (2)

Model 3: PF=.611+.302EE+.317NRB+.274 LD   (3)

Where,

PF is Project Finance, EE is Economic Environment, NRB is Central Bank Policy on BFIs and LD is Low Default Rate. Low default rate is the average rate of default to repay the loan by borrower of BFIs from hydropower sector.

The value of Standardised Coefficient (Beta) is .132, .116 and .135 with significance of .026, .009 and .047 respectively for economic environment, NRB guidelines and low default rate. Similarly, the resulted coefficients showed value of unstandardized coefficient (B) in model 3 is .285, .321 and .274 respectively for economic environment (EE), central bank's policy (NRB) and low default rate (LD) indicating 28 per cent, 32 per cent and 27 per cent change in dependent variable that may be resulted by the respective independent variables.

Specifically, in Model 3 economic environment, NRB guidelines and low default rate are found significant. According to Esty (2004) project loan has low default rate and high recovery rates comparing to corporate loan. This opinion of Esty is highly relevant to the results of this analysis as the variable low default rate from among the eleven independent variables taken for the study has been found significant. Additionally, the interview conducted as the part of the study found that all of the interviews have been concluded with unanimous opinion that present level of investment is not adequate comparing to the requirement. For future, government should be making private sector friendly economic environment and policy frameworks including the government rules and central bank guidelines relating to BFIs.

CONCLUSION

To utilize Nepal's high potential of water resources in order to fulfil the domestic demand as well as treating hydropower as a market commodity partnership with private seems to have been accepted as unanimous phenomena. In this paper empirical evidence on hydropower project finance and role of domestic FIs has been highlighted. Data analysis showed among the predictor variables economic environment, central bank's guidelines and low default have statistically significant impact on project finance. These variables significantly motivate the FIs to involve in hydropower sector. Findings indicated that economic environment and central bank's policy have strong influence on the role of BFIs hydropower sector project finance.

The findings also showed that projects with complete project finance model are few and BFIs have opportunities in comparatively more bankable projects in other investment sector. Most of the commercial banks have investment in hydropower sector as a compliance with central banks investment prioritization guidelines. Commercial banks are participating in hydropower projects generally in the form of syndicate

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financing. Hydropower seems to be in average status in the investment portfolio of domestic BFIs. Sponsors credibility and possibility of misuse of fund are the most critical factors being considered by the BFIs. As a security measure, BFIs impose personal guarantee conditions to the project sponsors for any unforeseen future events jeopardising the project success and repayment of the loan. The personal guarantee is found to be basically in the form of reputational guarantee from stakeholders including the project sponsors.

The contribution to the body of knowledge include empirical evidence on   hydropower project finance in Nepal and role of domestic financial institutions as one of the main player as per the opinion collected from the IPPs and BFIs responding to the survey. Findings provide insights to policy makers, financial institutions, and hydropower operators in understanding the role of domestic financial institutions in infrastructure projects. Acceptability of personal guarantees in the form of reputation and not directly involving any assets of the guarantor in a financing arrangement satisfying all of the project finance criteria is the area left for further research. Other factors worth further investigation includes private sector friendly economic environment, improvements in the guidelines of the central bank and the necessary provision for limited or non-recourse financing in the relevant legal frameworks.

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Appendix 1

(a) Statement of Questions Asked to both categories of respondents (IPPs and BFIs)

No:	Statement of Question	Rating Scale
	Dependent variable:	
1	Project finance is the appropriate financing mechanism for hydropower project in Nepal	5-point Scale
	Involvement of domestic banking and financial institutions (BFIs) in hydropower project finance have been influence by:	
	Independent variables:	
1	High recovery (repayment rate)	5-point Scale
2	Low default rate	5-point Scale
3	High return (interest) rate	5-point Scale
4	NRB guidelines that require BFIs to invest in hydropower projects	5-point Scale
5	Sponsor's credibility	5-point Scale
6	Willingness to non-recourse financing	5-point Scale
7	Political environment	5-point Scale
8	Economic environment	5-point Scale
9	Legal framework and legal system	5-point Scale
10	Market completion among financial institutions	5-point Scale
11	Financial structure of the project	5-point Scale

(b) Statement of Specific Questions Asked to the Respondents of BFIs Category

No:	Statement of Question	Rating Scale
1	Please rank the loan investment to various sectors mentioned below to indicate the sector that dominate the bank's investment portfolio (5 being given to highest and 1 for lowest). Sectors as per Central Banks Guidelines: (i) Hydropower infrastructure (ii) Infrastructure other than hydropower (Telecomm, Water Supply, Transport) (iii) Financial Services being Insurance, Investment Institutions, Real Estate etc. (iv) Agriculture, Tourism and Trade being wholesale and retail (v) Consumable Loan being Hire Purchase, Fixed Deposit, Education, Hospitals and other service sector	5-point Scale
2	Type of participation (Equity, Debt, Mezzanine and None) the bank/institution has made during past 5 years in hydro power projects	Close ended option

3	Indicate if the bank/institution participated in hydro power project with project finance (limited or non-recourse) arrangement	Yes or No
4	If the answer to question 3 above is No, indicate the reasons according to level of importance, 5-being highest and 1 for lowest. Options given: (i) the institution's investment policy on limited or non-recourse finance in hydropower (ii) no adequate legal provision exists pertaining to limited or non-recourse finance (iii) hydropower project sponsors prefer corporate finance rather than Project Finance (iv) directives of Nepal Rastra Bank (v) comparatively more bankable projects are available in other investment sector.	5-point Scale
5	To indicate the range of the number of hydropower projects the BFI has invested in (i) None (ii) One to Five (iii) Six to Ten and (iv) more than Ten	Close ended option
6	To indicate the range of the number of hydropower projects the BFI has invested in a complete project finance model (i) None (ii) One to Five (iii) Six to Ten and (iv) more than Ten.	Close ended option
7	To rank the challenging problems (5-being given for most challenging and 1 for less challenging) faced by the institution in entering into project financing arrangement in hydro power. Option given: (i) Banking regulations (ii) Central Bank's Policy (iii) Available Funds for investment (iv) Sponsor's credibility (v) Relevant Laws of the country has no provision for non-recourse finance	5-point Scale
8	To indicate the reasons of personal guarantees , if taken for hydropower projects by the bank/institution Options given:(i) possibility of misuse of the loan amount by the sponsors (ii) bank/institution have huge unmet demand of loan from various sectors other than hydropower (iii) project implementation may be jeopardized due to unforeseen future events (iv) fully project finance is difficult to implement (v) without sponsor's personal guarantee repayment is not ensured,	5-point Scale
9	Most important issues to address for effective project finance (limited or nonrecourse) and its usefulness in hydro power development in Nepal	Open ended
10	Other suggestions/comments for effective project finance (non-recourse) in infrastructure development in Nepal.	Open ended