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Does Personal Finance Impact on Financial Development? Evidence from Bangladesh

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Abstract: The purpose of the study is investigated the efficiency of personal finance in terms of financial gain and advancement. Despite the fact that there is an abundance of research on personal finance literacy in the literature, there is a scarcity of research on the effect of personal finance on financial growth in the literature, particularly in Bangladesh. With the passage of time, the amount of national income and savings in the country has been steadily increasing throughout time. Despite the fact that its frequency has fluctuated, there have been no official studies conducted on the usefulness of personal finance in terms of financial development. Time-series data over the period 2001-2019 of Bangladesh has been employed in this article. By using Generalized Linear Model (GLM), this study observes the effects of personal finance on financial development. This study observes positive effect of personal finance on financial development. Also, this study also finds that market capitalization and trade openness positively as well as inflation and interest rate negatively effects on development of Bangladesh's financial system. Likewise, uni-direction causal relationship observes between the issues by employing Toda-Yamamoto Granger Causality. Similarly, Co-integration results suggest that long-run relationship among the variables. The observations of this paper suggest that policy makers and government of the country should make effort to ensure secure individual savings, which will increase personal finance in market, which in turn will increase financial development as well.

Keywords: Personal finance, financial development, Granger causality, co-integration, GLM, Bangladesh

Introduction

The mobilization of individual savings, which accounts for the majority of national savings, will become the emphasis of initiatives to strengthen domestic savings. Gloriously, individual savings is a tough undertaking since families' inclination to save is influenced by a wide variety of social influences, but their capability to save is governed by their spending power. Government measures aimed at raising the share of savings held as financial assets by households have been successful. Household disposable incomes and hence their ability to save will rise by the amount that improved allocation of resources efficacy as a consequence of enhancing savings leads to higher financial development.

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The promotion of financial savings has an indirect effect on both economic and financial development.

Financial deepening (inducing households to store more of their savings in the method of financial assets) and guaranteeing the optimal allocation of these assets to investment are related activities of the financial system that are frequently referred to as 'movement of individual savings'. The use of money in the form of currency as a payment method is the first step in financial development. Check deposits and other financial instruments are used to complement money in the next phase. Self-financed, primitive lending, and borrowing in kind may exist even before monetization. Prior to the establishment of banks, there are frequently informal financial markets that operated alongside the formal financial system. Specializing between financial companies is a characteristic of advanced stages of financial development, while economies of scale may eventually change this situation with a shift toward broad banking.

In the last couple of decades, the level of national income, savings, investment, and financial system of Bangladesh has been growing so much that the World Bank declared Bangladesh a developing nation. One of the basic causes of raising financial growth is individual saving that increases capital for the private sector during the period known as personal finance. Accordingly, perceiving the reasons underlying personal finance is vital, particularly in emerging countries, to encourage private sector investment and can impact financial development. These are attracted to researchers to identify how much personal finance impacts the financial development of the country.

However, studies on personal finance literacy and education have been conducted (Nidar & Bestari, 2012; Volpe, Chen, & Liu, 2006) because students and the general public have a lack of knowledge about personal finance from a couple of decades ago. Only Holst (1990) examined personal finance impacts on financial development, but the author mainly focused on government policy and had no empirical evidence. Apart from these, there is still a scarcity of studies on affiliation between personal finance and financial development, especially in emerging nations. Hence, the objective of this paper fills the gap, and figures out the connection between personal finance and financial development. Therefore, the research question is "How does personal finance affect the financial growth of Bangladesh?"

The contribution of the study is manifold. To begin with, this study provides an insight into the reconsideration of the linkage between personal finance and financial development in a developing country. Then, this study will generate the best knowledge for the researchers, which will enhance literature on the impact of personal finance on financial expansion for developing nations. Ultimately, the result of the study will be helpful for policymakers in rewarding more attention to developing certain policies and strategies that in turn impetus the financial development of Bangladesh.

Literature Review

Theoretical Framework

The two related features of the financial system that are commonly described as “mobilization of personal savings” are getting households to hold a larger portion of their savings in the form of financial assets (financial deepening) and making sure that these assets are efficiently allocated to investment. The use of currency as a means of payment marks the beginning of financial growth. Check deposits and other financial instruments are added on top of currency as a further stage. Self-financing and primitive lending and borrowing in kind may exist even before monetization. Before banks are created, there are frequently informal financial markets that continued to operate alongside the formal financial system’s development (financial dualism). Commercial banks may or may not develop security markets, but savings banks and institutions specializing in rural, industrial, or housing finance frequently begin to specialize early on.

Concept of Personal Finance

Personal finance refers to person’s cash flow according to his/her decisions. According to [Livingstonel and Lunt \(1993\)](#) personal finance is the process of financial management where individual’s makes to save, spend, and budget, monetary sources as well as various future risk are also taking in account. [Galperti \(2019\)](#) defined; personal finance is a field of science which deals with accrues of financial properties as well as expenditure. Also, this term associate with how household members manage their financial resources ([Świecka & Musiał, 2018](#)). [Kotzè and Smit \(2008\)](#) argued that personal finance is the saving propensity of people. Therefore, personal finance is the individual’s financing decision including saving, insurance, mortgage planning, insurance, and even retirement planning. In this modern age, it is quite incredible to have no particular knowledge about financial instruments and product, which helps everybody to enhance assets and achieve financial stability.

Concept of Financial Development

Financial development defined as the progress of efficiency, quality, and quantity of financial intermediate services ([Choong & Chan, 2011](#)). Financial development refers to proliferate banks financial services, financial mediators and upsurge capital markets volume of financial transaction ([Hussain & Kumar Chakraborty, 2012](#)). A developed financial functioning is the major tools of a country ([Matei, 2020](#)). [Gelbard and Leite \(1999\)](#) argued that a well-developed financial system simplifies mobilize economy, interchange goods and services, distributes resources, and minimize the risk. However, well-functioning and well-built economic structure stimulates economic development by accumulation of funds as well as progress of modern technologies, these happens due to rise savings, produce investment information, encourage and facilitate foreign direct investment inflows, optimize capital distribution. In addition, better-developed financial system reduces inequality and poverty through expansion access finance to vulnerable groups and under-

privileged people, facilitate risk managing through susceptibility to surprises, and growing savings and productivity due to larger income generates. While security markets may not exist and commercial banks continue to control, financial intermediary specialization normally begins fairly early, in the shape of savings banks and organizations concentrating in agricultural, industrial, or housing finance.

Life Cycle Saving Theory

The life cycle savings hypothesis proposes that people are born without an inheritance and die without leaving a legacy, assuming that they spend the same amount of their income throughout their lives (Ando & Modigliani, 1963). As a consequence, young individuals are more prone than older people to taking out loans to cover their everyday expenses while they are still in school and developing new abilities. The expectation is that they will pay off their debts and put money aside for the future at this point in their lives. Retirees are expected to spend down their retirement funds and assets throughout their golden years. But many retirees continue to save in the hope of passing on their wealth to their children or charity organizations in their later years.

The theory of the life cycle savings hypothesis indicates that people are prone to saving, which leads to increased capital in the financial market, which meets the financial difficulties of the domestic organization, which in turn increases the financial development of the country.

Household Finance Theory

The term "household finance" was invented by the economist (Campbell, 2006). Positive family finance examines what families do to explain why they behave as they do, whereas normative or prescriptive household finance emphasizes rules of thumb based on past experience and intuition. Several prescriptive financial ideas are based on the economic model of expected utility analysis (Schuchardt et al., 2007). All of these applications rely on making reasonable assumptions to limit the possible range of objectives and disregard most problems. In many circumstances, maximizing predicted utility is a function of overall wealth or consumption (credit utilization, saving behavior, portfolio investment decisions, and insurance). Prescriptions for financial behavior may also be based on historical data rather than a predicted utility model. Some of the assumptions in most financial planning software are consistent with utility maximization findings, but most are goal-directed studies. However, this household financial planning positively induces financial development.

Previous Empirical Studies

Employing panel data over the period 1880-1990, Hansson and Jonung (1997) examined the relationship between finance and economic development of Sweden. The authors found that finance has the tendency to develop the economic growth of Sweden. On the other hand, Law and Singh (2014) observed the mixed impacts of finance. Using

87 developed and developing countries data of 1980-2010, they examined the impact of finance on economic growth and found that certain level of finance positively induce economic growth, but, extreme level finance has adverse impact on the economic development. Kotzè and Smit (2008) showed their study that personal finance can encourage entrepreneur to start a business, South African's peoples have low level of savings. The authors argued that personal finance is the major source of fund to start a business. The authors also suggested that financial literacy is essential for business progression, and detain the growth of commercial action. Nidar and Bestari (2012) argued that literacy about personal finance knowledge (e.g., insurance, credit, and investment), is quite low among the students. Holbrook (2005) designated referendum model that measures the satisfaction of personal finance weighted by economic tone. The author observed that personal finance capture the economic performance of the obligatory administrations. Lai and Tan (2009) contended that planning of personal finance impacts on the attitude of insurance, management, investment, estate and retirement planning that are much needed for the emerging nations.

Methodology

Data Description and Their Sources

This study uses time-series data of Bangladesh over the period of 2001-2019 to observe link between personal finance and financial development. Thus, dependent variable, financial development, is measured by domestic credit to private sectors (DCPS) percentage of GDP, collected from World Development Indicator (WDI), which produces by World Bank (WB) as well as independent variable, personal finance, is measured by savings percentage of GDP, obtained from World Development Indicator (WDI). Consequently, we have collected market capitalization, trade openness, interest rate, and inflation from World Development Indicator (WDI). Bangladesh is an interesting context to the study due to its nature of increasing national income and economic development. The result of this study will useful across the developing countries.

The Model

The goal of this research is to examine the link between individual financial well-being and the country's overall financial progress. Thus, this study employs econometric model generalized linear model (GLM) regression to examine the significant connection between the issues. This model suggested by Ayeche, Barhoumi, and Hammas (2016); Siddik, Kabiraj, Hosen, and Miah (2021); Qin and Ndiege (2013). Therefore, econometric model, generalized linear model (GLM), regression as follows:

$$FD_t = \beta_1 + \beta_2 PF + \beta_3 MC + \beta_4 INF + \beta_5 TO + \beta_6 IT + \eta_t \quad (1)$$

Table 1

Variable, measurement, symbol, and their sources

Variable	Measurement	Sign	Source
Financial development	Domestic credit to private sectors percentage of GDP	FD	WDI
Personal finance	Savings percentage of GDP	PF	WDI
Market capitalization	Market capitalization percentage of GDP	MC	WDI
Inflation	Consumer price index	INF	WDI
Trade openness	Sum of Exports and Imports	TO	Authors' calculations
Interest rate	Lending rate	IT	WDI

Source: Authors' calculations

In the above equation (2), FD_t signifies as a dependent variable which financial development at period of t ; PF_t denotes personal finance which is key interest of variable, β_t is coefficient of baseline model. Similarly, MC_t represents market capitalization, TO_t presents trade openness, IT_t represents interest rate, INF_t indicates inflation, and denotes residual error term. Therefore, table 1 shows details of applied variables.

Variable Selection Process

Dependent Variable

This study has taken an effort to inspect personal finance affects financial development of Bangladesh. Financial development is thus included as a dependent variable that enhances domestic credit to the private sector (DCPS) via domestic financing. Financial development dignifies the progress of financial intermediary services such as improvement of efficiency, quality, and quantity of financial institution's activities (Abu-Bader & Abu-Qarn, 2008). Domestic credit to the private sector as a percentage of GDP has been used as a substitute measure of financial development by many writers several authors (Badeeb & Lean, 2017; Durusu-Ciftci, Ispir, & Yetkiner, 2017; Guru & Yadav, 2019). Therefore, in this paper, domestic credit to private sectors (DCPS) is considered as a proxy measure of financial development. Domestic credit to private sectors (DCPS) portion to GDP is the best measure of financial development. This indicator gives evidence regarding the credits distributed by commercial banks to private segments. Furthermore, this instrument accurately estimates the act of financial intermediaries in the provision of capital to private firms who are facing financial difficulties.

Independent Variables

The major interest of independent variable of this study is personal finance. In modern financial science, personal finance taking place according to personal benchmarks, and become quite essay to differentiate the households finance, institutional finance, businesses institutions finance, and enterprises finance. The wider term of personal finance covering all phenomena and processes consists with accretion, acquisitions, as well as distribution of financial funds by individual and involved in financial tasks. However, personal finance indicates that the saving tendency of people (Kotzè & Smit, 2008). Individual savings collectively impact amalgamates money that available to business institutions to borrow to enlarge. Besides, personal finance acts as fuel financial growth relying, indeed,

on individual decision. Moreover, the larger portion of personal finance leads to investment; other things remain equal, which in turn increase larger level of physical capitals over the period. These all allowing an organization produce more products and services. Ultimately, these direct to raise financial structure of an organization. Peng, Bartholomae, Fox, and Cravener (2007) in survey his study considered saving one of the measurement of personal finance. Therefore, this study is considered positive impact of personal finance on financial development.

This study considers market capitalization as another independent variable. Market capitalization, aggregates value of company's current stock price, is one of inevitable features, which helps the depositors to calculate stock risk and return. In addition, market capitalization allows investors to size up a company, and manages mutual funds. In consequence, this way also allows investors to buy abundance share in one transaction, which in turn increases the investment on behalf of companies that indicates the proliferating financial development of a country (Ake, 2010). Alshubiri (2021) found that stock market capitalization positively related to financial growth. Hence, a positive mark of market capitalization is expected in this paper.

Krause, Rioja, et al. (2006); Sumon and Miyan (2017) stated that inflation has considerable influence on financial growth. The term inflation is referred to the increasing level of price of consumable properties at a particular time period. Boyd, Levine, and Smith (2001) also suggested that inflation has noteworthy linked to financial development, and they also indicated that higher rate of inflation has the tendency to have inefficient, smaller, and inactive banks as well as equity markets. However, price stability is the most important for the financial intermediations; greater inflation combines informational disproportionateness, discourages long-standing contracting, and ethical vulnerability. According to Huybens and Smith (1998), due to high inflation, informational asymmetry arises which negatively induces credit market resistance with adverse ramification for the financial institutions' performance. So, adverse influence of inflation is expected in this study.

Trade openness is one of driving force of financial development that calculated by summation of imports and exports of a country. Owing to increase liberalization and globalization, many countries are connecting foreign trade and capital flow to get facilities from financial development. If a nation ready to open capital flow and trade, this nation has capability to improve its financial system because of its act in stimulating rivalry markets (Kim, Lin, & Suen, 2010). According to Baltagi, Demetriades, and Law (2009), trade openness promotes financial growth. So, positive sign of trade openness is expected in this study.

Interest rate is employed is in this current paper as an independent variable. Rate of interest is one of the major elements which have the ability of Fluctuation country's financial structure. The term interest rate refers to the rate that bank or financial institutions charge for lending funds to borrowers. It is a part of financial system, and mushrooming interest rate indicates that borrower have to pay more interest for using their funds. However, the parameter determines both financial decisions of public and private organizations, and other types of decisions that related to economy. Therefore, interest rate effects on financial development due to looser tight of monetary policy by regulatory authorities. Besides, investors are quickly response because of changing interest rate. Moreover, ris-

ing level of interest rate increase cost of borrower, in consequence, private sectors remain reluctant to borrow funds, which have adverse impact on financial development. [Aftab, Jebran, Ullah, and Awais \(2016\)](#) observed negative link between interest rate and financial development. Thus, minus sign consider for interest rate in this study.

Results and Discussion

Descriptive Statistics

To determine association between personal finance and financial development of developing country, this study uses more macroeconomic factors. Along with this, this paper determines the causality relationship between the issues. In addition, con-integration relationship among the variables is determined. Ultimately, this study produces the completely new insights and more accurate results with checking robustness of the model for the developing country. The estimated results are written consequently below;

Table 2
Results of Descriptive statistics

Variables	Observation	Mean	Std. Dev.	Min	Max
FD	19	37.29527	8.03402	24.17959	47.5833
PF	19	35.49116	3.483412	28.42229	40.5959
MC	16	23.72643	12.85516	1.811959	39.59726
INF	19	6.560376	2.075664	2.007174	11.39517
TO	19	38.17053	6.312766	26.85823	48.11092
INT	19	11.8889	1.443841	9.54	13.94417

Table 2 exhibits the summary of employed variables, where dependent variable is financial development, DCPS, and main variable of interest, independent variable, is personal finance, SAV. In case of dependent variable, financial development, this study observes a mean of 37.295 with a maximum of 47.583 and minimum of 24.180, besides, lower standard deviation has been calculated, which implies a lower level of variability. For independent variable, personal finance, mean value of 35.491 with a maximum 40.596, minimum of 28.422, and inferior standard deviation have been measured. Moreover, other independent variables such as market, Inflation, trade openness, and interest rate are showed lower standard deviation; thereby entails variables have a lesser level of inconsistency.

Correlation Matrix

As demonstrates table 3, this paper conducts correlation analysis to detect correlation along applied variable. [Wooldridge \(2015\)](#) argued that correlation coefficient would not be more than 0.7. In this study, lower value of correlation coefficient for all independent variables have been perceived, which denotes meager level of multicollinearity. On the other hand, this article operates Variance Inflation Factor, VIF, and analysis to check multicollinearity as well. [Ott and Longnecker \(2015\)](#) recommended that VIF values would

be not more than 10. This study observes value of variance inflation factor less than .7. Based on author's suggestion these findings exhibit that there is quite lower level of multicollinearity, and this mode of multicollinearity is not vital issue for this study.

Table 3
Results of Correlation analysis

Variable	FD	PF	MC	INF	TO	INT	VIF	1/VIF
FD	1							
PF	0.5808	1					3.49	0.286355
MC	0.7705	0.5377	1				1.56	0.640042
INF	0.2721	0.6744	0.2276	1			2.52	0.396127
TO	0.493	0.8043	0.4271	0.7487	1		4.2	0.238248
INT	-0.4261	0.2742	-0.0022	0.2707	0.4171	1	1.29	0.77716
Mean VIF							2.61	

Unit Root Analysis

Literature recommended that time series data can be often non-stationary where as non-stationary time-series data could drive to yield spurious risk of regression result. However, this study inspects the non-stationary properties of time-series data applying the [Perron \(1988\)](#) test. The PP test can be stated as:

$$\Delta E_t = \omega_t + \omega E_{t-1} + \sum_{i=1}^{p-1} \beta_i \Delta E_{t-i} + \mu_t \quad (2)$$

In above equation (2), E_t is applied endogenous variable; ω denotes coefficient of variables; P is lag number as well as deference terms and μ_t present residual error term. Therefore, the null hypothesis H_0 and the alternative hypothesis H_a are used in the PP unit root check. Depending on PP unit root analysis, the alternative hypothesis may accept for 1st deference of combination of intercept plus trend and intercept series.

Table 4
Results of Philips Perron unit root analysis

	Level				1st Deference			
	Intercept		Intercept + Trend		Intercept		Intercept + Trend	
	stat	prob	stat	prob	stat	prob	stat	prob
FD	-1.607	0.45	-0.457	0.976	-2.857	0.071*	-3.1	0.137
PF	-2.248	0.198	-1.204	0.878	-3.605	0.017**	-3.981	0.031**
MC	-2.488	0.14	0.059	0.998	-1.847	0.34	-4.739	0.020**
INF	-3.512	0.020**	-3.978	0.030**	-5.905	0.000***	-7.71	0.000***
TO	-1.428	0.546	-1.09	0.902	-3.385	0.027**	-6.012	0.001***
INT	-1.07	0.704	-1.249	0.868	-2.715	0.092*	-2.674	0.257

***/**/* designates 1%/5%/10% level of significance, respectively.

Table 4 exhibits that the outcome of PP unit root test. In column (2), this study finds financial development and interest rate are strongly reject null hypothesis intercept only at 10% level of significance respectively. Personal finance rejects null hypothesis both intercept and trend and intercept at 1% and 5%, also, trade openness rejects null hypothesis both intercept and trend and intercept at 5% and 10% level of significance. Interestingly,

in level and 1st deference, inflation rejects null hypothesis in both terms at 5% and 10% significance level. Finally, this study observes interest rate is intensely rejected at 10% level of significant. Hence, this paper observes all variables are significantly rejected null-hypothesis correspondingly, which implies after first differencing all applied variables are stationary.

Co-integration Test

Co-integration analysis supports to elude spurious risk of regression and also detect economic relationship among variables. However, to observe long-run and short-run relationship among the applied variables, present study conducts [Park \(1992\)](#) co-integration test. In table 5 exhibited the Findings of Park added variable co-integration test. This study has found null hypothesis is rejected, however, after inserting a quadratic trend to the original model as well as analyzing for cointegration, the findings show that employed variables in the aforementioned model are co-integrated.

Table 5
Results of Co-integration Test- Park Added Variable Test

	Variables	Chi-square	df	Probability
MODEL	FD, PF, MC, INF, TO, IT	5.489	2	0.064*

* designates 10% level of significance.

Generalized Linear Model (GLM)

To figure out the relationship between personal finance and financial improvement is the major aim of the study, using context of the Bangladesh. The scarcity of researches, particularly on relationship between personal finance and financial development, inspire to find out a different set of effects. Moreover, the unit root test and co-integration analysis suggest that time series data and variables are applicable for generalized linear model (GLM) regression. Hence, we have incorporated an econometric model "Generalized Linear Model (GLM)" regression model to observe the liaison among the dependent, independent, plus control variables. Generalized linear model (GLM) allows constructing a linear link between the variables, even though their fundamental non-linear connection exists. In addition, this study employ Generalized linear model (GLM) which is quite advance than the ordinary least square approach; indeed, one key feature of this model is rectifying heteroscedasticity as well as serial correlation ([Siddik et al., 2021](#)). Also, this technique allows reaction variables, which have an error distribution approach other than normal distribution. [Siddik et al. \(2021\)](#) also suggested that generalized linear model (GLM) regression technique fitted through maximum likelihood, and further assured ideal characteristics of estimates. Moreover, this study employs generalized linear model (GLM) and the results have shown table 6.

A positive impact of personal finance on financial development has been observed in this study. This finding indicates that the more rising personal finance, the more proliferating financial development. Personal finance, flows of income from savers, upsurge investment and capital for financial institutions. In fact, when one person saves from

his/her income to banks or other organizations, this savings increases finance in the capital markets. Besides, savings in banks provide interest that encourages depositors to deposit more money, on the other case, some portion of savings banks lend to other firms or investors which have demand for it. Moreover, greater tendency of individual savings has the capability to finance larger level of investments as well as boost up productivity, as consequence proliferation financial development.

Table 6
Estimates results of Generalized Linear Model (GLM)

FD	Coeff.	Std. Err.	z	P>z
PF	0.479	0.213	2.25	0.024**
MC	0.283	0.035	8.15	0.000***
INF	-0.748	0.253	-2.96	0.003***
TO	0.894	0.147	6.08	0.000***
INT	-3.551	0.282	-12.62	0.000***
_cons	26.589	5.558	4.78	0.000***

*** / ** designates 1%/5% level of significance, respectively.

In line with [Alshubiri \(2021\)](#), this research has been examined the positive relationship between market capitalization and financial development. This indicates that market capitalization can help improving financial development by efficient direct flow of savings and investments in the private sectors in ways, which can meet up their demand of credit. Further, stock market capitalization is inevitable for financial growth as it allows private organizations so that they can boost up capital by public finance, payment of debt, and expand their business.

Inflation rate has negative influence on financial development and this finding similar with [Boyd et al. \(2001\)](#); [Huybens and Smith \(1998\)](#) but opposite finding with [Krause et al. \(2006\)](#). The examination directs that rising rate of inflation decline financial development by reducing capability of allocating funds or resources as well as stimulating economic development by capital accumulation. Moreover, higher rate of inflation can prevent value of savings that discourages savers, as consequence, capital scarcity situations arise for the private institution's that negatively induces financial development.

This research, like [Baltagi et al. \(2009\)](#), finds that trade openness has a beneficial impact on financial progress. The finding designates that increasing trade openness helps increasing financial proliferation at a time. Therefore, trade openness reduces the stronger competition among the incumbents in the markets that aids to raise financial development.

Interest rate negatively associates with financial development and this finding similar with [Aftab et al. \(2016\)](#) but adverse with [Krause et al. \(2006\)](#). When rate of interest goes high, private companies have to pay higher interest on their credit, as a results companies become reluctant to take loan, which reduce the flow of capital into the organization, thereby financial development of the country's goes down.

Granger Causality Analysis

In this study, Toda-Yamamoto approach has applied to find the direction between two key issues financial development and personal finance. This technique is more advanced than the conventional Granger causality analysis (Granger, 1969). The advantages of Toda-Yamamoto approach causality method are (i) used Vector Auto-regression, VAR technique with granger causality is the most useful method for the time series data (Qiu, Liu, Subrahmanya, & Li, 2012) (ii) removes the time domain model depend upon precise in size; (iii) variables have not require to be stationary; (iv) variables order of integration have not been the same; and (v) variables have not necessary to be co-integrating. The equation of VAR model as under:

$$FD(t) = \sum_{i=1}^p \mu_1 FD(t-i) + \sum_{i=1}^p \mu_2 PF(t-i) + \eta_1 \quad (3)$$

$$PF(t) = \sum_{i=1}^p \mu_3 FD(t-i) + \sum_{i=1}^p \mu_4 PF(t-i) + \eta_2 \quad (4)$$

In the above equation (3) and (4), p is lagged observation, μ is coefficient, and η represents error term.

Table 7
Results of Granger Causality (Toda-Yamamoto Approach)

Equation	Excluded	F	df	df.r	Prob > F
FD	PF	1.1517	3	9	0.3802
PF	FD	5.5161	3	9	0.0199**

** designates 5% level of significance.

The outcome of the granger causality test is shown in table 7. This study has found a unidirectional causality between two main variables financial development and personal finance. This directs that there is no granger causes financial development, which indicates that financial development does not influence personal finance. In contrast, this study observes unidirectional granger causality between financial development and personal finance at 5% significant level, which suggests a significant impact of personal finance on financial improvement. This illustrates the significant correlation between personal finance and financial development.

Robustness Checking

To check robustness of employed model, this study employs savings to income ratio as the proxy measure of personal finance for our original model from the period of 2001-2019. Savings to income ratio refers to people's amount of savings according to their level of income. Value of both item saving and income are gathered from World Bank Indicators (WDI) as well as savings to income ratio is calculated by the author. The result of the robustness checking has shown table 8.

In this case, this study finds almost similar result. The main independent variable, personal finance, has the significant positive impact on financial growth. This result contains that accelerating of personal finance increases the financial development of Bangladesh. This paper also finds that market capitalization and trade openness both have significant positive influence on financial development respectably. On the other hand, market interest rate has significant negative effect but inflation rate has an irrelevant adverse effect on financial progress. Thus, result of GLM regression specifies that the model uses in this study is robust and irrefutable.

Table 8
Robustness of GLM regression

FD	Coefficient	Std. Error	z	P>z
PF	49.00842	12.77194	3.84	0.000***
MC	0.167018	0.045547	3.67	0.000***
INF	-0.01036	0.24512	-0.04	0.966
TO	0.437192	0.189574	2.31	0.021**
INT	-1.71624	0.527683	-3.25	0.001***
_cons	23.06122	4.432028	5.2	0.000***

*** / ** designates 1%/5% level of significance, respectively.

Conclusion

This article inspects the effectiveness of personal finance on financial progress. Although the abundance study exists in the literature on literacy of personal finance, there is shortage of study on the influence personal finance on financial expansion, especially in Bangladesh. By the passage of time, level of national income and saving continuously is rising in the country. Though, its prevalence has varied, there exist no formal studies on the effectiveness of personal finance on financial development.

With a view to testing linear relationship, data of 2001-2019 have been used for Bangladesh. This study measures additional determinants of financial development; adjusting generalized linear model (GLM) method and result consists with robust. Ultimately, this study confirms that the outcome of personal finance has an affirmative influence on financial development. Thus, this study also finds that market capitalization and trade openness positively as well as inflation and interest rate negatively effects on development of Bangladesh's financial system.

Policy implication is the most important for this study. The implication is, present research will enhance knowledge to the researchers on developing a relationship between the personal finance and financial development of different political and cultural contexts. Thus, government policy maker should pay more attention to develop such policies and strategies which in turn rising saving tendency of the people. For instance, policy maker should stable interest rate, control inflation, expand services of non-government organizations services, and ensure security of saving's funds.

In this study, however, have some limitations. Considering the influence, there is shortage of the literature to provide theoretical foundation for the study. This study has insufficient sample size for statistical measurement which imprecise the outcomes. To fill

these limitations, further study can be conducted in based on determining effects of personal finance and growth of financial system in different cultures and political contexts in order to confirming the outcomes is significant before generalizing them. Future researchers can be broadening employed model with including more explanatory variables to understand the common scenario of personal finance on improving financial system.

Implications of the Study

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Limitations and Recommendations of the Study

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