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Original Research Article

Investigation of the Factors Affecting Financial Instability in Developing Countries: SGMM Approach

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Maintaining financial stability has always been one of the most important economic aims. The literature related to financial stability shows the effect of variables like financial development and financial liberalization on financial instability. However, some conflicting results have been reported about the direction of this impact. Accordingly, the purpose of this study is to investigate the effect of various factors on financial instability with an emphasis on the variables of financial development and financial liberalization in developing countries. The financial instability index calculated by the PCA approach and annual observations from 2005 to 2019 is employed. The research model is estimated using the System-GMM. The results indicate that financial development in developing countries has a positive effect on financial instability and exacerbates it due to the lack of correspondence between the goals of policymakers and the realities of financial markets in such countries. Moreover, the positive impact of financial liberalization on financial instability is obtained representing that following fiscal policies implemented in countries with developed financial markets is not working in developing countries. Thus, financial decision-makers in these countries must adopt stabilization policies in accordance with the characteristics of their financial markets. In addition, the results confirm the negative impact of the government size on financial stability in developing countries, emphasizing the reduction of government presence and the development of the private sector in these markets.

Keywords: Financial instability, financial development, financial liberalization, government size, PCA, SGMM
JEL Classification*:* C58, E44, F38, G15

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1 Introduction

The financial market as one of the four markets in the economy has always been very important and achieving stability and avoiding its instability has been focused on by decision-makers in this field. Having a stable economy requires two complementary and powerful financial and real sectors. In fact, the financial sector is the communication channel between savers and capitalists, which directs surplus funds in the economy to productive activities by reducing costs and increasing confidence and it strengthens economic growth by allocating resources and financing economic activities optimally[1]. According to Mishkin[2] (2009), financial instability is a condition in which the financial system cannot facilitate economic activities and moderate financial imbalances caused by shocks. Financial instability is also known in the form of financial system instability, including three components of financial institutions, financial markets, and financial infrastructure. In fact, financial instability is a situation in which financial institutions are unable to perform their duties properly in order to perform their intermediary functions properly without the help of external institutions, including the government[3]. The instability of financial infrastructure is a condition in which the financial system is not well organized to ensure market discipline with proper performance so that the financial security network and the repayment and settlement systems can operate effectively[4].

Financial instability will lead to price instability and lack of transparency in the economic atmosphere for policymakers of the Central Bank and will hinder economic growth. This situation imposes heavy costs on an economy because price fluctuations in the markets increase and do not send the right signal to the financial institutions and companies about the economic realities and put them at risk of financial inability[5] or even bankruptcy. In addition, in such circumstances, economic development is limited because rational decision-making becomes difficult for economic agents, and the efficiency of resource allocation decreases[6]. Due to the financial crisis of 2008, a great ambition for liberalization policies based on their effect on economic

[1] See Keen, 1995: 607-635.
[2] See Mishkin, 2009
[3] See Mulligan, 2013.
[4] See Batuo et al., 2017
[5] Risk of Financial Inability
[6] See Goldberg & Veitch, 2010

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prosperity, especially in developing countries has come to the fore. According to some experts, the financial crisis has revealed[1] the shortcomings of economic strategies and policies. Today, the issue of financial liberalization has become more important than ever because emerging economies that have faced capital inflows over the past decades are faced with the challenging task of managing external shocks from financial liberalization[2]. Accordingly, the economic downturn and financial instability have drawn much attention to the fundamentals of financial liberalism, especially on how to implement the teachings of financial liberalization in developing countries. Financial liberalization seems to have created more instability and crisis in the financial sector[3]. Financial instability can manifest itself in several cases such as bank failures, asset price fluctuations, or market failures. The probable result of such catastrophic events could be damage to the country's repayment and deposit system, resulting in instability of the entire economy.

The instability affects the real (productive) sector because of its relationship with the financial sector. It, therefore, creates a great potential for macroeconomic costs because it impedes optimal production, consumption, and investment. Thus, it makes major economic goals like achieving growth and development inaccessible. Kaminsky and Reinhart (1999)[4] confirm this negative result and show that financial instability is positively related to financial development. This means that maintaining financial stability and identifying vulnerabilities are essential in a financial system. Some of these vulnerabilities have macroeconomic dimensions and are accompanied by changes in household budgets and corporate balance sheets and each of them can affect the extent and distribution of financial risk within the economy. The distribution of saving bonds in financial markets, the purchase of shares from foreign markets, the purchase of foreign saving bonds, and foreign direct investment are among the signs of the globalization of the financial markets. Globalizing the financial markets and narrowing the national borders are happening rapidly. With the internationalization of the financial markets, the issues of financial instability have also become significant. Managing financial crises and monitoring the liberalization process requires that financial stability and security be measured by indicators to be able to control market fluctuations. The main issue in the present study is to address the fact that given the importance of financial stability to achieve the economic goals

[1] See Kose et al., 2011
[2] See Suwailem et al., 2014
[3] See Demirgue-Kunt & Detragiache, 1999
[4] See Kaminsky & Reinhart, 1999

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of the countries, it is necessary to identify the factors that disrupt this stability. Therefore, the purpose of this study is to identify the factors affecting financial instability with an emphasis on financial development and financial liberalization. Research studies show that a few numbers of studies have been conducted in this field for developing countries, emphasizing the significance of the current study with its innovative aspects. The present study is performed using the Generalized System Method of Moments (SGMM) in the period from 2005 to 2019 based on the data obtained from 42 developing countries. Thus, by discussing preliminary and introductory issues, the theoretical framework and literature review are mentioned. The Introduction of the model and methodology of the research is represented and research findings are reported. The findings are interpreted statistically and economically. At last, the conclusions and policy recommendations are presented at the end of this paper.

2 Theoretical Foundations and Research Background

In the economic literature, financial liberalization is one of the most important generators of the economic growth[1]. Financial liberalization increases financial development by facilitating of resources mobilization into investments projects[2]. Financial market liberalization influences financial development and then financial instability in different ways. First, financial market liberalization may reduce financial repression in financial markets by increasing interest rates to equilibrium. Second, the removal of control over capital inflows encourages foreign and domestic investors to invest in different portfolios, thus reducing the cost of capital and increasing the capital stock. Third, financial liberalization can not only increase the efficiency of the financial system by outsourcing inefficient financial institutions and increasing pressure on financial restructuring but can also reduce[3] information asymmetry and the possibility of bad choices[4]. Financial liberalization can also have negative consequences and lead to financial instability. Financial liberalization has not been able to significantly address investment needs and growth in less developed countries. Thus, countries that have experienced significant rates of economic growth are those that are less dependent on international investment flows[5]. It is clear that in a situation where financial

[1] See Stiglitz, 2000
[2] See Mackinon 1973 & Shaw 1973
[3] Bad Choice
[4] See Claessens et al., 2001
[5] See Asongu, 2014

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flows in an economy are not transferred quickly from one financial center to another, economic volatility can be reduced in the economy due to the lack of financial liberalization. Since the 1980s, many developing as well as developed countries have made significant progress in inflows of international investment. At the same time, due to the heavy economic costs of financial instability or financial crises, they have also had periods of significant slowdown in the economic growth[1]. However, the influx of these flows has been accompanied by currency crises. These negative results led to great interest and focus in political and academic circles regarding the results of financial liberalization. Some experts believe that, compared to more developed countries, underdeveloped countries have significantly made their capital account repayments more vulnerable to economic shocks[2].

2.1 The Theory of Financial Instability

The economic theory of financial instability is an interpretation of the Keynesian general theory. Keynes' general theory was written in 1930 to explain the Great Depression in the United States and other capitalist economies of that time. The theory of financial instability also applies to Joseph Schumpeter's views on monetary and financial credits. The initiation of financial instability hypotheses has been more limited by Minsky (1992). His theoretical argument begins with the theory of financial instability regarding the privatization of the economy as a capitalist economy with expensive assets and a complex financial system. The economic issue following Keynesian theory of Capital Development of the Economy has been known instead of Knightian's theory of the allocation of alternative resources. The capital development of a capitalist economy is associated with the exchange of present currencies with future currencies. The present money generates investment output for resources, while the future money is the profit on capital-owned institutions (as capital used in production). As a result of the process by which the investment is financed, the control of the items in the capital stock is conducted by the production of units by their debts. For each entity, the liabilities on the balance sheet determine a time series of prior payment obligations, even when the assets generate a time series of calculated cash income. According to Minsky at Jerome Levy Institute for Economics in 1992, the theory of financial instability has both theoretical and empirical aspects. The empirical aspect is that since ancient times, capitalist economies

[1] See Henry, 2007
[2] See Ansart & Monvoisin (2016)

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have been plagued by inflation and budget deficits. In such processes, the response of the economic system reinforces this (inflation affects inflation and is constantly increasing, and debt liquidity reduces the value of debt). The theory of financial instability includes Kalecky-Levy's view of profit, in which the structure of aggregate demand determines profit. In the initial summarized model, in each period, with the very simple consumption behavior of the income earners, the total profit equals the total investment. In a more complex structure, the total profit is the same as the investment with a budget deficit. The profit expectations for the future depend on the investment and are determined by the profit obtained from the investment. Thus, the theory of financial instability is the theory of the effect of the debt on the behavior of the system and also includes the validity of debt. Contrary to Orthodox money theory[1], the theory of financial instability is seriously regarded as a profitable activity in banks. Banks make profits through financial and banking activities. Bankers, like all entrepreneurs in a capitalist economy, know that "innovation" guarantees profits, so bankers (using the general term for all intermediaries in finance) are agents or brokers who strive to do business with their assets containing various innovations. This innovative banking and financial feature which is the basic premise of orthodox justice, makes the theory of money impossible, meaning that there are unchanged items of money whose velocity is close to constancy. Therefore, the changes in the money supply are defined as a well-defined linear proportional relationship with the price level.

Minsky introduces three interrelationships between income and debt for the identified economic units as the risk hedge, and Ponzi finance and speculation. Risk hedges are those that can meet all of their contractual payment obligations with their cash flow: the greater the weight of the equity investment in the debt structure, the more likely it is that this unit is a risk hedge financing unit. Speculative financial units are units that can estimate their payment obligations based on their income account according to their debts, even though they cannot repay the principal money from cash flow. These units need to settle their liabilities (for example, they settle new liabilities in order to meet their long-term debt obligations). Governments with floating debts, firms with commercial stocks, and banks are often risk-averse units. For Ponzi financial units, operating cash flows are not sufficient to repay the main debt or interest on cash liabilities through their cash flow from

[1] The total cost theory and the proponents of demand-side economics that call it aggregate demand, or AD, have studied its effects on production and inflation.

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operations. Such units can lend their assets. Taking loans or selling assets to pay profits (and even dividends) in common stock, even as the increased debt and the previous commitment of future earnings, reduces the value of a unit's stock. Ponzi currency reduces the safe margin that the debtor carries. It can be shown that if risk-hedging units prevail, the economy will move toward equilibrium. On the other hand, the higher the Ponzi financial benefits, the greater the probability of the system imbalance.

2.2 Financial Instability in Explaining the Debt Crisis

The financial instability is based on Minsky's views regarding money, financial development, and investment, as well as the concept of debt reduction by Fisher (1933). According to this concept, the downward trend in the economy is intensified by lower prices (supply prices in Minsky conditions). Thus, this reduction can make real debts heavier and lead to the bankruptcy of many production units. Financial instability is the basis of "the theory of how capital is generated within a financial structure that is sensitive to financial crises."[1] The financial structure here is such that "market interactions between borrowers and lenders are formed and the balance sheets of non-financial corporations, intermediaries and households reflect these interactions."[2] According to the theory of financial instability, the economic trend is determined by the fixed investment methods of the company. At the beginning of the growing phase of the business cycle (recovery phase), money is wasted, where the current monetary income is enough for companies to repay debts including interest. This type of financing is largely dependent on the firm's strong reliance on domestic funding rather than external sources[3]. The explanation is that during the recovery phase, the recent recession is still fresh in the minds of economic actors. That is why the number of borrowers is still high. However, these experiences are gradually disappearing, especially as national income increases through supportive investments. The risks to the lender and the borrower are reduced. According to Keynes' theory in 1978, "During the boom, popular estimates of these risks, both the borrower risk and lender risk, are likely to decrease." As a result, companies turned directly to foreign investment. With the passage of time, a situation arises in which the return on investment for many companies is enough to just pay benefits, but not enough to repay the principal investors. To save themselves from

[1] See Minsky, 1982
[2] See Pollin, 1994
[3] See Beshenov & Rozmainsky, 2015

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bankruptcy, these companies have to take out new loans. Minsky refers to this financial capital as speculation. An increase in interest rates or a decrease in cash income for companies inevitably becomes a Ponzi financial capital, while this income is insufficient even for regular interest payments. The only way out of this situation is to increase the amount of debt to repay previous loans. While speculative financial activity makes prosperity, Ponzi's financial activities are leading to a recession. This is due to the fact that the companies that use this way of financing sooner or later will not be able to obtain new loans. Moreover, this situation may happen because of the increased risks of lenders (reflecting the skepticism of financial institutions) or due to the lack of financial resources (money and its alternatives) in the economy. Companies start selling their productive assets to receive these resources, which will reduce the price of demand, the level of investment, and naturally, the economic crisis. Therefore, the most important reason for periodic debt crises is the inability of companies to systematically repay their debts in the financial sector. This is an important result of the theory of financial instability. Even more to the point, during a business cycle, the financial system becomes more and more fragile. That is to say, the liquidity of a balance sheet of an economic entity decreases. In other words, a business cycle can be understood as a phenomenon related to changes in the fragility of the economy[1].

2.3 Financial Liberalization

Financial liberalization refers to the increase and expansion of global relations between countries through international financial flows and capital and has been considered one of the tools to strengthen the financial system and change the financial structure of the countries by making it more competitive. It is also a process that plays an effective role in explaining the international and global financial relations between countries and is closely related to other economic activities. In this case, factors such as international capital flows, financial convergence of countries, expansion of regional and international financial relations, formation of regional and international financial blocks and zones, liberalization, and convergence in regional and international interest rates, liberalization of exchange rate and formation of monetary unions, the performance of financial institutions and the reduction of controls can lead to the development of financial liberalization.

[1] See Carvalho, 1993

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2.4 Financial Development

Financial development is defined as an increase in the ratio of financial assets to GDP and the ratio of financial assets and financial institutions to total financial assets (both of which indicate the institutionalization of savings). That is, financial development increases the level of investment and access to financial resources through increasing the level of savings and emphasizes increasing the level of accumulation of financial capital[1]. What is important for the development of the financial sector in developing economies is to reduce the dispersion of financial markets so that in the financial markets more accurate and consistent prices are gradually established. McKinnon (1973) and Shaw (1973) point out that establishing positive rates of real interest is the first step in this direction that is, proving a context in which the financial system can develop on the basis of more accurate prices. In its report, the International Monetary Fund considers financial development as a comprehensive concept that includes the following dimensions: 1- Development of banking sector 2- Development of non-banking financial sector 3- Development of monetary sector and monetary policy 4- Openness of financial sector 5- and Institutional environment. A brief explanation of each of them is provided in the following sections.

1) **The development of the banking sector:** In most economies, banks are the center of the financial system and payments and play an important role in the process of equipping savings, identifying investment opportunities, and diversifying risk. Therefore, the structure and efficiency of the banking sector are considered an independent dimension of financial development. Banks' activities in a competitive environment include less government intervention, less market concentration, and a stronger role played by foreign banks leading to greater efficiency and growth[2].
2) **The development of the non-banking financial sector**: Examines the development of alternative sources of capital and financial services. These include stock markets, mortgage, and rental financial institutions, security markets, insurance companies, and pension funds. The type of products and markets while transforming the functions of the system enables firms and households to improve their financing according to the cost in an efficient way, equip financial resources, supervise the management of the financial sector and distribute risks.

[1] Feque Majidi et al., 2017
[2] Tayebi et al., 2009

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3) **The development of the monetary sector and monetary policy:** In this dimension, in addition to the financial depth index, the limits of the governments' use of indirect monetary policy tools, interest rates, the efficiency of the monetary policy-making institution as well as credit quotas are examined. Due to the existence of asymmetric information as well as market failures in financial transactions, banking regulation, and supervision, proper control and supervision are important aspects of the financial development.
4) **The Openness of the financial sector**: Another aspect of financial development is the rank and position of the domestic financial system in the cross-border transfer of financial resources. The openness of financial markets to capital inflows and outflows, appropriate exchange rates, and restrictions on the exchange of financial assets or foreign exchange instruments of foreigners and residents are examined in this dimension[1].
5) **Institutional environment:** Legal and political environment has a decisive role in the quality of services provided by financial institutions. For example, in some developing countries, banks are reluctant to increase lending because inefficient judicial systems or corrupted political and administrative institutions prevent loans from being repaid. The quality of legal institutions, property rights, the quality of bureaucracy, and government accountability affect the performance of the financial system.

3 Literature Review

Batuo et al. (2017) examined the relationship between financial development and financial liberalization and financial instability and economic growth for 41 African countries during the period from 1985 to 2010 using the dynamic panel method. The two main findings are: 1) financial development and financial liberalization have a positive effect on financial instability, 2) economic liberalization reduces instability and the rate of decline in the pre-liberalization period is greater than that rate in the post-liberalization period. Beshenov and Rozmainsky (2015) examined Minsky's theory of financial instability and the Greek debt crisis hypothesis among 36 Greek companies from 2001 to 2004. Their study shows how an intra-organizational economy experiences financial fragility and is prone to financial crises. They also show how most Greek companies have become fragile financial structures during the period under review. Agarwal et al. (2013) examined the possibility that the financial instability and financial crisis of 2018 will improve or worsen for

[1] Feque Majidi et al., 2017

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the G20 group. The results show that the links between external sector imbalances, financial instability, and hence the likelihood of starting a financial crisis vary depending on the index used and the base date of the assessment. As can be deduced from these studies, most previous studies have focused on market-based indicators to model financial instability and fewer bank-based indicators have been used. Additionally, the main focus has been on developed countries and less attention has been paid to developing economies in the form of panel data. Thus, the present study made an attempt to eliminate such shortcomings in the research literature and seems to be innovative in this regard. Zarei et al. (2020) investigated the effect of asset market fluctuations on financial instability in Iran's economy based on a Markov Regime Switching Method, from 2009 to 2016. The results show that fluctuations have different effects according to the period as well as the level of financial instability. Therefore, the management of foreign exchange and stock markets in the country should be done according to the level of financial instability as well as the period of fluctuations. Feque Majidi et al. (2017) studied the relationship between financial liberalization, financial development, and economic growth in OPEC countries between 1980 and 2014 using the GMM method. The results of this study show that the effect of variables on financial openness and financial development in OPEC countries is positive and significant. Furthermore, the variables of human capital, inflation rate, trade openness, rate of population, growth and government consumption expenditures have had a positive and significant effect on economic growth.

Hajikarami and Akbarpour (2013) have examined the financial instability and value-added tax for 51 Asian countries during the period from 1995 to 2009. The results of their study confirm the negative relationship between the value-added tax and financial instability. Farzinvash and Ghorban Shiran (2012) have studied the explanation and construction of the financial stability index and its investigation for developing countries. The results show that by increasing the level of development and income of groups of countries, their financial stability index also increases. Moreover, the stability of the financial markets in oil-rich countries of the Middle East is less than other countries, and Iran has one of the most unstable financial markets in the world. Yousefi and Mobarak (2008) have studied the effects of commercial and financial liberalization on the situation of the real and financial sectors of Iran's economy using the vector autoregressive model. The results of this study indicate that the phenomenon of trade liberalization has a positive effect on economic growth and financial development in Iran's economy. However,

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financial liberalization does not have a significant effect on the growth of the real sector of the economy. Therefore, it is inferred that increasing the level of trade in Iran's economy increases the level of financial development as well as economic growth. It is necessary to provide the preconditions and context of financial liberalization so that it can have a positive impact on economic growth.

4 Specifying the Model and the Method of the Research Study

In this section, the research model which contains various variables such as financial development, financial liberalization, and economic growth, and financial instability, is introduced. The present study focuses on the period from 2005 to 2019 and the studied countries are 42 developing economies (countries such as Iran, Argentina, Azerbaijan, Brazil, Egypt, Nigeria, Hungary, Mexico, South Africa, Thailand, Pakistan, Indonesia, Bulgaria, Malaysia, and Armenia, etc.) and statistical data are extracted from the World Bank website. This model is based on the empirical literature in Batuo et al. 's article (2017) entitled "The link between financial development and financial liberalization and financial instability and economic growth for African countries during the period from 1985 to 2010 using the dynamic panel method". The research model is as follows:

$$fins_{it} = \alpha + \beta_0 fins_{it-1} + \beta_1 flib_{it} + \beta_2 fdev_{it} + \beta_3 Gr_{it} + \sum k\gamma k\, X_{ik} + \mu_i + \varepsilon_{it} \qquad (1)$$

Where i and t specify country and time, respectively. $finst$ shows the index of financial instability, $flib$ is the index of the degree of openness of the capital account of each country which indicates financial liberalization, Gr is the index of economic growth which is calculated in terms of temporal changes in national income and $fdev$ is the index of financial development. X represents the vector of the control variables that include variables of inflation and terms of trade. The financial development index is made up of a set of monetary variables that are the sum of liquid liabilities as a percentage of GDP, money supply (M_2) as a percentage of GDP, and domestic private credit to the banking sector as a percentage of GDP (Batuo et al., 2017). As explained above, FDI uses a composite FDI that includes private sector credit and liquidity debts, all based on GDP. The main reason for creating composite indicators is to avoid the problem of multi-polarity, which occurs when introducing several financial variables that are highly correlated with each other at the same time. Therefore, the financial development index in the present study will be:

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$$\left(\frac{FD}{GDP}\right) = \left(\frac{PCC}{GDP}\right) + \left(\frac{CDC}{GDP}\right) + \left(\frac{MQC}{GDP}\right) \quad (2)$$

FD represents the financial development index, PCC represents the change in the private sector credit, CDC represents the change in current debts, and MQC represents the change in money and quasi-money as a percentage of GDP. Researchers have considered different indicators for financial instability. Garcia-Herrero and Lopez (2003) and Cihak (2010) have considered banking crises as an indicator of financial instability. In the present study, the method proposed by Klomp and Haan (2009) is used to follow a financial instability index using the Principal Component Analysis (PCA) on a number of indicators of financial stability (the principal component analysis method is a method in mathematics that converts a number of related variables into a number of independent variables called principal components). It has more advantages than a factor analysis approach. For example, this method, in addition to reducing the Multi-Collinearity problem, improves parsimony and incorporates the measurement of indirect concepts into the calculation. This leads to the estimation of an economic logic with the help of predicator re-conceptualization (Batuo et al. 2017). The main reason for constructing a composite index is to avoid the problem of Multi-Collinearity when introducing several interrelated financial instability variables simultaneously. The data used in the construction of the financial instability index include financial stability indicators which are a combination of fundamental variables in the balance sheet of the banking system such as changing domestic credit by banks, transferring credit to the private sector, changing liquid liabilities, changing money and quasi-money, and changing rates of real interest. Importantly, this criterion includes liquidity because large changes in bank liquidity may indicate a crisis. In much the same vein, credit growth is included in the models that explain the banking crisis. Risk and return indicators such as interest rates and real interest rates are used to indicate whether the financial risk is increasing. As a result, it is likely to weaken the stability of the financial sector. The monetary power indices such as money and quasi-money variables (M_2) are considered as one percent of GDP because large changes in the money supply may indicate the existence of financial and economic problems in general (see Table 1). The first three variables of the principal components account for 83% of the total variance and, as expected, they are closely related to the criterion of the financial stability index. In particular, the correlation between the first principal component and the change in domestic credit provided by banks is 0.90, the

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correlation between the change in credit to the private sector is 0.83 and the change in liquidity debt is 0.77 and its correlation with M_2 is 0.67 (see Table 1). Figure (1) shows a screen plot of the special values of the financial instability components. According to the Kaiser criterion, a component with eigenvalues greater than one must be selected. In this study, the selection of three components by this test is proposed. In addition, the first major component has been used to obtain weighted indicators of financial instability (Batuo et al., 2017).

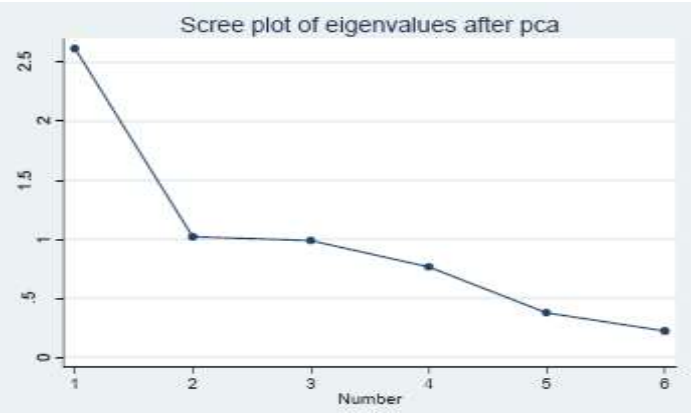

Figure 1. The Scree plot of Principle Component Analysis
Source: Research Findings

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Table 1
Principal Component Analysis of Financial Instability Indicator

Variable	Comb loading(1)	Variance explained(2)	Correlations(3)
Change in domestic credit by banks	0.52	0.43	0.90
Change in credit to the private sector	0.50	0.27	0.83
Change in liquid liabilities	0.49	0.13	0.77
Change money and quasi money M_2 as % GDP	0.46	0.06	0.67
Change in interest rate	0.17	0.05	0.27
Change in interest rate spread	0.15	0.04	0.30

Source: Research Findings
Note: Column (1) shows the component loading weight individual, column (2) shows the variance explained by the component model of the individual indicators, and column (3) shows the correlation between the individual indicator and the component model.

According to the above description, the financial instability index is constructed as follows:

Financial instability index = (change in domestic credit by banks ×0.52) + (change in private sector credit × 0.5) + (change in current liabilities × 0.49) + (change in money and quasi-money as a percentage of GDP × 0.46) + (change in the rate of real interest ×0.17).

4.1 The System Generalized Method of Moments (SGMM)[1]

Arellano and Bover (1995) developed a coherent SGMM framework for examining the efficient IV estimators for panel data models. They do this in the form of Hausman and Taylor's (1981) models which are in static form as follows:

$$y_{it} = X'_{it}\beta + Z'_i\gamma + u_{it} \quad (3)$$

β is as $K \times 1$ and γ is as $g \times 1$. Z_i is the variable of fixed time and x_{it} is the variable of people and time. In the vector form, the above equation can be written as follows:

[1] Arellano and Bover and Blundell-Bond estimator, 2005.

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$$y_i = W_i \eta + u_i \quad (4)$$

With disturbances, a combined one-way error model is as follows:

$$u_i = \mu_i t_T + V_i \quad (5)$$

That is $y_i = (y_{i1}, \dots, y_{iT})', u_i = (u_{i1}, \dots, u_{iT})', W_i = [X_i, t_T, Z_i'], X_i = (x_{i1}, \dots, x_{iT})$. t_T is a vector in T dimensions. Generally, $E(\frac{u_i u_i'}{\omega_i})$ depending on $\omega_i = (x_i'. Z_i')'$ which is $x_i = (x_{i1}', \dots, x_{iT}')'$ will be unlimited.

Arellano and Bover change the system of equations listed above using indirect conversion:

$$H = \begin{bmatrix} C \\ t_T'/T \end{bmatrix} \quad (6)$$

The first conversion lines (T-1) are without μ_i. Hence, all exogenous variables are valid variables for these first equations (T-1). m_i is assumed as the meaning of a subset ω_i variables that are not assumed at the levels with μ_i and which are then larger than m_i or at least equal to η in size. In the studies of Hausman and Taylor, $X = [X_1, X_2]$ and $Z = [Z_1, Z_2]$ that X_1 and Z_1 are exogenous and are of dimensions of $NT \times k_1$ and $N \times g_1$. X_2 and Z_2 are correlated with individual effects and have dimensions of $NT \times k_2$ and $N \times g_2$. In this case, m_i includes a set of variables named X1 and Z1 and m_i is based on $\left(Z_{1,i}', \mathrm{x}_{1,i1,\dots,}'\mathrm{x}_{1,iT}'\right)'$. Thus, a valid IV matrix for the conversion system is complete:

$$M_i = \begin{bmatrix} \omega_i' & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & m_i' \end{bmatrix} \quad (7)$$

The situation is momentarily like this:

$$E(M_i' H u_i) = 0 \quad (8)$$

and is defined as follows:

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$$W = (W_1', \dots, W_N'), y = (y_1', \dots, y_N'), M = (M_1', \dots, M_N'), \bar{H} = I_N \otimes H \quad (9)$$

$\bar{\Omega} = I_N \otimes \Omega$ and the multiplicity of the equation as a vector is obtained by $M'\bar{H}$ as follows:

$$M'^{\bar{H}} y = M'^{\bar{H}} W\eta + M'\bar{H}u \quad (10)$$

Performing GLS in the above equation, Arellano and Bover estimator is derived as follows:

$$\hat{\eta} = \left[W'\bar{H}'M(M'\bar{H}\bar{\Omega}\overline{H'M})^{-1}\right] \times W'\bar{H}'M(M'\,\bar{H}\bar{\Omega}\bar{H}'\,M)^{-1}M'\bar{H}y \quad (11)$$

In practice, the covariance matrix of the converted system $\Omega^{+} = H\,\Omega\,H'$ is replaced by a stable estimator, which is usually:

$$\widehat{\Omega}^{+} = \sum_{i=1}^{N} \widehat{u_i}^{+}\,\widehat{u_i}^{+\prime}/N \quad (12)$$

In which $\hat{u}_i^{+}$ guarantees the compatibility properties and thus the $\hat{\eta}$ estimates that calculate the SGMM estimator provide the compatibility condition.

5 Research Findings

In this part of the study, durability of the data is first examined by the Levin-Lin-Chou test. Then the results of the model estimation are reported. At last, Sargan test is used to measure the proper use of tools in the model. The serial correlation test by Arellano and Bover test examines the existence of the second-order serial correlation in the first-order differential components.

Table 2
Levin-Lin-Chow Stationary Tests Results

Variable	Without Trend & Intercept	With Trend	Stationary Situation
fins	-2.8085 (0.0025)	-4.4014 (0.0001)	Stationary
term	-2.9086 (0.0018)	-3.4745 (0.0003(	Stationary
Inf	-4.0320 (0.000)	06.4571 (0.000)	Stationary
gsize	-4.8040 (0.0003)	-11.3871 (0.0001)	Stationary
fdev	-2.4743 (0.0067)	-5.1048 (0.0007)	Stationary

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Gr	-9.2760 (0.0004)	-9.5221 (0.0003)	Stationary
flib	-24.6376 (0.0000)	-39.3847 (0.0000)	Stationary

Note: Reported values in parenthesis are estimated P-values
Source: Research Findings

According to the values reported in Table (2), it can be concluded that all the variables are durable. In this test, H_0 hypothesis indicates the existence of a root of unity and the opposite hypothesis; H_1 hypothesis indicates the absence of a root of unity or durability. As shown in the table, H_0 hypothesis is rejected for all the variables. As a result, the variables are durable. The impacts of financial development and financial liberalization on financial instability in a selected group of developing countries based on the Systematic Generalized Method of Moments (SGMM) have been estimated and the results are reported in Table (3).

Table 3
The outcomes of model estimation (dependent variable is financial instability)

Variable	Estimated Parameter	Z-statictic	P-value
fins	0.9889364	3.76	0.000
term	-3.43	-1.67	0.095
Inf	-0.0161923	0.45	0.656
gsize	1.03279	8.46	0.000
fdev	0.6168102	34.09	0.000
Gr	-0.0426016	-1.48	0.140
flib	8.768852	4.17	0.000
Cons.	-25.47344	-10.91	0.000

Note: Reported values in parenthesis are estimated P-value
Source: Research Findings

Based on the research findings, the effect of the financial instability of the previous period on the next period is positive and significant. This shows that financial instability affects the subsequent periods and its impact factor is 0.98. The findings show that the impact of financial development on financial instability is positive and significant and its impact factor is 0.61, which is less than the impact of financial liberalization on financial instability meaning that the impact of financial development on financial instability is less than the impact of financial liberalization on financial instability. Moreover, according

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to the findings, the effect of financial liberalization on instability is positive and significant. The impact factor of this index is 8.76, indicating that it has a significant effect on financial instability. This finding shows how instability is related to the financial sector. As the theoretical foundations suggest, the impact of financial liberalization on financial instability was expected to be enormous. The impact of economic growth on financial instability is negative and, of course, meaningless. This shows that achieving economic growth in developing countries tends to reduce financial instability. The development and efficiency of the financial sector with persistent financial instability have led to a lack of confidence in investors. In economies that are experiencing financial instability, economic growth (which may be due to increased investment) leads to a reduction in financial instability and shows an inverse relationship between them. The results show that the effect of the government size (which represents the government's public expenditures) on the financial instability index is positive and significant showing that government size and financial instability are directly related. The larger the size of the government due to increasing its expenditures, the greater the risk of financial instability. The effect coefficient of this variable on financial instability is 1.03 if the other variables are assumed to be constant. The variables of terms of trade, which in some way indicate trade shocks and inflation, are negative but not statistically significant.

Sargan test was performed to test the statistical validity of the instrumental variable used in the model and the result is reported in Table (4). In this test, the null hypothesis indicates the suitability of the tools. When *prob* is greater than 0.05, the null hypothesis with regard to the issue that the tools used in the model are appropriate is accepted. The test output shows that the instrumental variable used in this study (which is the intermittent form of the dependent variable in SGMM approach) has statistical validity.

Table 4
Sargan's Test for Instrumental Variables Validation

Chi-sqr statistic	**P-value**
69.0952	0.0679

Source: Research Findings

The second test is the serial correlation test, which is tested by the proposed Arellano-Bond test. This test examines the existence of the second-order serial correlations in the first-order differential disturbance components. The generalized terms mentioned in the model are valid when there is no serial

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correlation in the disturbance sentences. Arellano and Bond explained a method for testing the first- and the second-order autocorrelation for the first-order difference of errors in which the first-order auto-regression coefficient AR (1) should be significant and the second-order auto-regression coefficient AR (2) should not be significant because in the dynamic panel model when the disturbance sentence has a uniform and independent distribution, the first-order difference of the errors has a first-order correlation and the interruption of the dependent variable is included as an independent variable in terms of model dynamics in the econometric specification. However, the existence of a serial correlation of more than one, such as AR (2), indicates that the generalized terms were not valid for Arellano-Bond autocorrelation test (Arellano and Bond, 1991). The result of this test shows that the null hypothesis cannot be rejected, so the existence of heterogeneity in the erroneous sentences and the validity of the limitation of excessive recognition are rejected and the instrumental variables have statistical validity and no significant correlation exists between tools and components of the erroneous sentence.

Table 5
Arellano-Bond Serial Correlation Test

Test Level	Z-statistic	P-value
1	-1.7075	0.0877
2	-0.0847	0.2781

Source: Research Findings

6 Conclusion

According to the results of the model estimation, it can be seen that the impact of financial development on financial instability is positive and significant and its impact factor is 0.61. It is less than the effect of financial liberalization on financial instability, which means that the impact of financial development on financial instability is less than the effect of financial liberalization on financial instability. The positive impact of financial development on financial instability is in line with the results of a study by Claessens et al. (2001) who stated that financial development has a positive effect on financial instability. Moreover, according to the findings, the effect of financial liberalization on instability is positive and significant. The impact factor of this index is 8.76 indicating that it has a significant effect on financial instability. This relationship shows how instability is related to the financial sector. As predicted from the theoretical foundations, the impact of financial

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liberalization on financial instability is enormous. According to the reviewed studies, financial liberalization can cause financial instability. Financial liberalization has not been able to significantly address the investment and growth needs in less developed countries. Thus, countries that have experienced significant rates of economic growth are those that have been less dependent on international investment flows. It is clear that in a situation where financial flows in an economy are not able to transfer quickly from one financial center to another, due to the lack of financial liberalization, economic volatility can be reduced in the economy. At the same time, due to the heavy economic costs of financial instability or financial crises, they have also experienced periods of significant slowdown in economic growth. However, the influx of these flows has been accompanied by currency crises. In fact, emerging economies that have faced capital inflows over the past decades have been faced with the challenging task of managing external shocks from financial liberalization. Financial liberalization seems to create more instability and crisis, especially in the financial sector. Another finding of the current study is the positive and significant effect of financial instability on later periods. The impact of economic growth has been negative and of course non-significant. The development and efficiency of the financial sector with persistent financial instability have led to a lack of confidence in investors. In economies with financial instability, the economic growth caused by the lack of investment increases leading to decreasing economic growth. Thus, this finding shows the relationship between financial instability and economic growth and shows the inverse relationship between them. With respect to other explanatory variables, the results show that the government size, which in some way reflects the government's public expenditures, is positive and significant, and indicates that the government size and financial instability are directly related. The larger the size of the government due to increasing its expenditures, the greater the financial instability. The effect coefficient of this variable on financial instability is 1.03. The variables of terms of trade, which indicate trade shocks and inflation, are negative but not statistically significant.

Policy Implications

The study shows how liberalization and financial development have a negative impact on financial stability in developing countries. The positive effect of capital account openness on financial instability is obtained. Also, the injection of foreign capital into developing countries is in need to strengthen economic growth. Therefore, the monetary and financial authorities of such

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countries need to strike a balance between these opposing forces in order to control financial instability as well as boost economic growth. It can also be recommended that developing countries move towards implementing policies to expand financial development, because despite the positive impact of this variable on financial instability, firstly, the extent of this impact is slight, and secondly, the side effects of financial development on the economy out weights its effect on financial instability. In fact, the results of various studies have shown that the variable of financial development has a threshold effect and despite the strengthening of instability in the early stages, has a stabilizing effect in higher stages of growth (e.g. Shahbazi and Saeedpour, 2013; Hooshmand and Daneshnia 2012; Rasekhi and Ranjbar, 2009; Jafari Samimi et al., 2010). In addition, given the positive impact of government size on financial instability in developing countries, privatization policies leading to a reduction in government size in the economy can be recommended.

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