



# Does Financial Inclusion Induce Financial Stability? Evidence from Cross-country Analysis

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## Abstract

In recent times, financial inclusion and financial stability issue have become a priority on policy agendas across the world. However, there is relative dearth of empirical studies addressing and establishing the link between the same. This study fills this gap. Using panel data of 2001-2013, this study empirically investigated whether financial inclusion contributes to country's financial stability, measured by Z-score. Robust results from GMM dynamic panel data estimator show that financial inclusion variables as measured by number of SME borrowers to total borrowers and ratio of outstanding SME loans to total loans have significant positive contributions to financial stability. Findings also indicate that GDP per capita, liquidity, proportion of private credit to GDP are positively and proportion of domestic credit provided to private sector and financial crisis are negatively associated with financial stability. Empirical findings of this study is of greater significance to the policymakers as it will invoke the attention of governments and policymakers to undertake such policies to accelerate financial inclusion of their countries which in turn will lead to country's greater financial stability. This study also contributes to empirical literatures of the issue of financial inclusion and financial stability by reconfirming (or otherwise) findings of previous studies.

**JEL Classification:** G21, G28, O16.

**Keywords:** Financial stability, financial inclusion, financial openness, GMM dynamic panel estimator, robustness.

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## 1. INTRODUCTION

The concept of financial inclusion has gained much attention since the early 2000s and is a consequence of empirical findings that financial inclusion efforts have positive effects on the goal of poverty alleviation of a country (Shiimi 2010). Considering the imperatives, in recent years Governments, central banks and regulators around the world have taken initiatives and initiated new regulations to promote financial inclusion in their countries. Almost in the same time, due to recent 2007-2009 global financial crisis, concept of financial stability has been emerged as policy priority and thus gained renewed interest of the researchers across the world. Evidence suggests that financial stability contributes to the sustainable development of countries. On the other side, if there is financial instability, it could severely hamper the growth process of developing economies, even developed economies growth also affected by the same (Creel et al. 2015). Thus, we assume that financial stability plays a positive role in the country's growth process and based on this assumption, in this research an attempt has been taken to explore whether financial inclusion promotes financial stability.

However, there is ongoing debate on the issue of whether financial inclusion contributes to financial stability. Some evidence suggests unidirectional positive association of financial inclusion with financial stability (Okpara 2011; Prasad 2010; Cull et al. 2012). Authors argued that by providing greater access to and better uses of banking services to vast section of the society, including the disadvantaged group, financial inclusion efforts ensure efficiency of resources and financial intermediation which, in turn, boost financial stability given that a country has already implemented improved financial infrastructure and skilled supervision. Whilst other researchers observed that financial inclusion does not cause financial stability. These mixed evidences create an avenue for the researchers to examine and establish the connection between financial inclusion and financial stability.

On the other hand, while measuring financial inclusion, indicators of Small and Medium Enterprises, SME, inclusion have not been considered by the researchers. In general, the easier the access to and use of finance for SMEs, the higher the level of financial inclusion and ultimately the more is the financial stability of the economy. Having large impact on creation of jobs and poverty reduction of any economy along with the feature of fairly resilient to economic shocks and business cycles, SMEs are considered as a driving force for social and economic stability across the world (Shinozaki 2012). While evidence suggests that SMEs promote economic stability, the link between SMEs access to and use of finance and financial stability has yet to be investigated.

Therefore, to fill this gaps, this paper aims at empirically investigate the effects of financial inclusion on financial stability using panel data of 2001–2013. The paper contributes to the empirical literatures by reconfirming (or otherwise) findings of previous studies done across the world. Empirical findings of this study have greater significance for the policymakers specially developing countries where low level of financial inclusion exists because it will invoke the attention of policy makers and governments to pursue such policies to foster financial inclusion through SMEs which ultimately will convey long term financial stability benefits for their respective economies.

## 2. LITERATURE REVIEW

### 2.1 Conceptualizing Financial Inclusion and Financial Stability

The imperatives of both financial inclusion and financial stability towards economic progress of a country motivate researchers, academicians and policy makers to focus and thus address these issues. Based on the varied context and scope of the study, different authors conceptualized financial inclusion in different way. According to Hannig and Jansen (2010), financial inclusion programs aim to provide greater opportunity of access to formal financial services to the unbanked people, including disadvantaged group which in turn foster economic development of a country. Focusing on both access and usage dimension of financial inclusion, Khan (2011), described financial inclusion as a course of action which tries to ensure, first of all, access to formal system and then providing well-timed and ample credit facilities to the demanders of financial services including the weaker and disadvantaged people of the country.

Arguing that a single measure is not enough, Sarma (2012) described financial inclusion as a process offered by the policy makers of a country through which each and every members the country together with the weaker and underprivileged segments, could transport under the sunshade of official financial system. From a practical viewpoint, Siddik et al. (2015) discussed several indicators of financial inclusion and argued that financial inclusion should be measured by a comprehensive index of several indicators, such as access indicators, availability indicators as well as usage indicators, which will ensure an inclusive financial system where all people will have the opportunity to participate in the growth process of a country. However, the importance of SMEs was overlooked in the previous studies and thus in this study we addressed financial inclusion from SME perspectives.

One of the extensively recognized public goals is financial stability which achieved policy priority among world policy makers due to its imperatives in the economic growth process of counties. However, the complex nature of financial systems makes it difficult to define financial stability. In addition, based on prevailing circumstances after main financial crises of 1980, 1990 and 2007, the theoretical concept of financial stability have continually been revised and adapted and accordingly there is no commonly settled definition.

Financial stability is a multifaceted concept which relies on the interaction of major components of the financial system and necessitates stability of the major organizations and markets. This does not prevent intermittent collapses of smaller firms and sporadic considerable losses at bigger firms; these are endemic of the usual carrying out of the countries' financial system. Anatolyevna and Ramilevna (2013) conceptualized financial stability as a situation in which a financial system, which consists of financial markets, financial intermediaries and market infrastructures, is able to resist financial shocks which are adequate to notably mess up the distribution of savings to lucrative investment alternatives. This definition implies that financial stability is strongly allied to the risks diminution to minimum intensity and resistance to shocks. Concept of financial stability could differ from developed economies to developing economies. In developed economies with well developed financial systems, financial stability is essentially concluded by the state of non-banking financial institutions such as retirement funds, brokerage houses, investment funds, etc.). In contrast to developed economies, developing economies

comprises of undeveloped stock market, insurance companies and investments in those countries mostly depend on bank loans. As such in these developing economies banks are considered as the key pillar of financial stability and gateway to economic stability (Popovska 2014). In the present study financial stability has been described as the ability of financial institutions to defend against financial shocks.

## 2.2 Previous Empirical Studies

The main focus of this research is to explore whether and how financial inclusion relates to financial stability. The literature on this issue is pretty thin and provides mixed evidences. Some scholars observed positive relationship while others observed negative influence of financial inclusion on financial stability. These mixed results create an avenue for the researchers to explore and establish the causality between the issues. Additionally, one could argue that financial stability could promote financial inclusion. This direction of causality from financial stability to financial inclusion seems less interesting to the researchers as it is unlikely that financial stability could worsen financial inclusion of a country.

Using data from 2004-2011, Morgan and Pontines (2014) investigated the causal relation and found that financial inclusion, measured by proportion of credit provided to small and medium-sized enterprises, SMEs, promotes stability of the financial system. Han and Melecky (2013) examined the link between financial inclusion and financial stability. Using 90 countries data authors observed that financial inclusion, measured by wider access to and use of deposits, can build the banks' deposit base stronger in period of financial trauma which ultimately promotes financial stability of countries, especially the middle income countries.

Using data from 1990-2011, Okpara (2011) observed a unidirectional positive influence of financial inclusion on financial stability and thereby argued that there exists long-run affiliation between these. Khan (2011) advocates three core approaches through which financial inclusion can have positive influence on financial stability. Firstly, by increasing amount of credit to SMEs, banks can diversify their investment portfolio which in turn would reduce the overall riskiness of the banks. Secondly, greater financial inclusion means more small savers are participated in the financial system. When there are more small savers, the deposit volume and its stability would be raised which in turn diminish reliance on non-core financing, which has a detrimental impact especially in times of financial catastrophe. This reflects in a decline of procyclical uncertainty. Thirdly, higher financial inclusion may well reflects to an improved monetary policy through which financial stability goal could be achieved.

Hannig and Jansen (2010) argued that inclusion of low-income and disadvantaged people in the financial system will lead to increase of credit and deposit bases. Authors provided some anecdotal support that indicates financial institutions that provides services to the excluded segments, especially lower end be likely to endure macro-crises and assist to uphold local economic doings. Prasad (2010) discussed that SMEs are usually labor intensive. Author found that lack of enough access to loan facilities for SMEs has unfavorable outcomes on level of employment growth of countries.

Contrary to the view that financial inclusion promotes financial stability, there are also literatures which argued that financial inclusion poses risks for financial stability. For example, Mehrotra and Yetman (2015) argued that under the condition of recklessly speedy credit expansion, higher financial inclusion causes uncertainty for financial stability. This speedy growth of unfettered parts of the country's financial system may, in addition, weaken the stability of regulated financial system. The benefits of involvement in good times might be translated into negative externalities in times of crisis (De la Torre et al. 2013).

Using cross-country data, Sahay et al. (2015) observed a negative impact of financial inclusion on financial stability. Authors argued that without having proper supervision, when credit is expanded to all, it will increase the risk of financial stability. Financial safeguards have a tendency to decline when access to credit increases; they turn down more rapidly in countries with poor banking supervision. In contrast, strong supervision countries could observe benefits of financial stability from this higher access to credits.

While there is debate on whether financial inclusion enhances financial stability, our contribution is two-fold. First, we put forward a framework where we make out conception and measurement issues of financial inclusion and financial stability. Second, we provide empirical evidence on link between financial inclusion and financial stability.

### **3. METHODOLOGY**

#### **3.1 Data Sources and Their Description**

Scarcity of data was the main challenge we confronted in addressing the research question of whether financial inclusion causes financial stability. Global Financial Development database, GFDD, produced by the World Bank, is the largest cross-country data base in this area. GFDD contains cross-country time-series data of 217 countries on a great number of variables linked to financial inclusion and some variables of financial development and financial stability<sup>3</sup>. But main issue with this database is, it contains shorter time series data on most important variables along with existence of missing data of many economies. From this source, on the basis of availability, we have collected data over the period of 2001-2013 on financial stability which, in this study, we measured by Z-score. We have also collected data for the same period on all control variables, namely on GDP per capita, relative amount of private credit to GDP, proportion of domestic credit to GDP provided to private sector, ratio of the value of liquid assets. However, data on variables of greater interest was not available in this database. We collected data on variables of financial inclusion namely ratio of number of SME borrowers to total borrowers and proportion of outstanding SME loans to total loans, from IMF's financial access survey, FAS, database. This is another useful cross-country database in the area of present study<sup>4</sup> which entails time series data of 2004-2014 on commercial banks along with non-bank financial institutions together with micro finance institutions, insurance companies, credit unions and SMEs. In line with period of and the country on which we collected data from GFDD, we collected financial inclusion data on the same economies. Like-wise GFDD, missing values are

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<sup>3</sup>Data set is available at <http://data.worldbank.org/data-catalog/global-financial-development>

<sup>4</sup>Data set and their description is available at <http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C>

also more in this database which makes its effective size much smaller. Table 1 specifies the sources from which data was collected.

### **3. 2. Variables Selection**

#### *3.2.1 Dependent Variable*

In this study we made an attempt to investigate whether financial inclusion promotes financial stability. Thus, we consider financial stability as dependent variable. Although a number of variables, such as bank Z-score, stock market volatility, provision for non-performing loan etc., could be used to measure financial stability, data on these variables is scarce. Thus, in order to measure financial stability, based on the availability of data we use proxy variable namely bank Z-score. Z-score is a popular measure of financial stability employed by a more number of scholars (Čihák & Hesse 2010; Diaconu & Oanea 2014; Morgan & Pontines 2014, Rajhi & Hassairi 2013). A higher Z-score indicates a lower probability that a country's banking system will become unstable and a lower Z-score indicates higher probability of default by financial institutions. Along with availability of data, the great advantage of employing Z-score is that one can use this score to compare default risk extent of different institutions with different ownership structure and goals.

#### *3.2.2 Independent Variables*

Since the aim of this research is to examine whether financial inclusion promotes financial stability, thus financial inclusion is considered as independent variable. Although a number of indicators, such as number of bank branches per 1000 population, number of automated teller machine, ATM, per 1000 population, number of SME borrowers, and number of accounts at formal institutions and so on, can be applied to assess financial inclusion, the data scarcity is a major problem. On the basis of availability of data, we measure financial inclusion by two proxies. One is ratio of number of SME borrowers to total borrowers; the other is proportion of outstanding SME loans to total loans. The logic behind the use of these variables is, the more the number of SME, the more the financial inclusion which in turn will improve the institution's capacity to diversify risk. And the more the outstanding SME loans, the greater the financial inclusion, which, in turn, would reduce likelihood of default by financial institutions.

#### *3.2.3 Control Variables*

In this research, we used a number of control variables to isolate the relation of financial inclusion with financial stability. First of all, in line with Morgan and Pontines (2014), we expect GDP per capita will have a positive impact on financial stability through financial inclusion. If GDP per capita increased, this will enhance financial inclusion which ultimately would promote financial stability. Thus, we expect and assign a positive sign to this variable.

Liquidity position also affects financial stability. Financial institutions with greater liquidity are subject to less probability of default which results is greater financial stability (Han & Melecky 2013). We measure this variable by the percentage of liquid assets and assign a positive sign to this variable.

Another control variable we incorporated in our study is proportion of domestic credit to GDP provided to private sector. This higher the proportion of domestic credit supplied to the private sector, which means that more financial resources is provided to private sector could result in financial instability as most of the resources will be applied to a particular sector. Thus, we expect and assign a negative sign to this variable. We also controlled for the share of private credit to GDP as many recent studies observed that use of more private sector credit to GDP results in higher probability of financial instability (Drehmann et al. 2011; Drehmann & Juselius 2014; Gourinchas & Obstfeld 2012; Morgan & Pontines 2014).

Another control variable we considered is the size of the financial sector, has been used by many researchers to examine the relationship between financial development and economic growth. (King and Levine 1993; Gelb 1996) used ratio of broad money (M2) to GDP as a measure of size of financial sector and found positive relationship between financial depth and economic growth. We expect a positive sign (+) for this variable. We also control for real interest rate. Akbas (2015) observed a low degree of casual relationship from real interest rate and economic growth while Sango and Moussa (2017) found positive impact. We expect a negative sign with the argument that the lower the interest rate, the easier for SMEs to avail credit facilities which would have a positive impact on financial stability. Since our study covers 2001-2013, it is worthy to control for effects of global financial crisis happened during 2007-2008. Noman et al. (2017) found negative impact of global financial crisis on banking stability of ASEAN countries. In order to control the potential effects of global financial crisis of 2007-2008, as employed by Kodongo and Ojah, (2016) we include time dummies in our estimation. The global financial crisis dummy variable, GFC, takes the value 1(one) for years 2007 and 2008, while is 0(zero) for all other years.

### 3.3 The Model

In order to formally investigate the association of financial inclusion with financial stability, we develop the following baseline dynamic-panel model:

$$FS_{i,t} = \alpha(FI_{i,t}) + \beta X_{i,t} + \varepsilon_{i,t} \dots\dots\dots(1)$$

In the above specified model,  $FS_{i,t}$  is the dependent variable which reflects the level of financial stability and  $FI_{i,t}$ , the main variable of interest, measures financial inclusion and the associated  $\alpha$  is the coefficient, which quantifies the impacts of financial inclusion on financial stability.  $X$  is the vector of control variables namely per capita GDP,  $LNGDP_{i,t}$ ; percentage of liquid assets to deposits and short-term funding,  $LADSTF_{i,t}$ ; proportion of domestic credit provided to private sector to GDP,  $DCPS_{i,t}$ ; proportion of private to GDP,  $PCDMTOGDP_{i,t}$ ; broad money M2/GDP, real Interest rate,  $RINTR$ , and the associated  $\beta$  represents a list of nuisance parameters;  $\varepsilon_{i,t}$  is an error term;  $i = 1, \dots, N$  correspond to the country; and  $t = 1, \dots, T$  reflects time. A summary of complete list of variables used in this study, their measurements, legend and sources of data are provided in Table 1.

**Table 1. Summary of list of employed variables, their specification and data sources**

Variable	Measurement	Legend	Sources
Financial Stability	Bank Z-score	Z-Score	GFDD
Financial Inclusion	Number of SME borrowers to total borrowers	SMEBTB	FAS
	Ratio of outstanding SME loans to total loans	SMELTL	FAS
	Logarithm of GDP per capita	LNGDP	GFDD
Control Variables	Domestic credit to private sector (% of GDP)	DCPS	GFDD
	Liquid assets to deposits and short term funding (%)	LADSTF	GFDD
	Proportion of private credit by deposit money banks and other financial institutions to GDP	PCDMTOGDP	GFDD
	Broad money (% of GDP)	M2/GDP	WDI
	Real Interest rate	RINTR	WDI
	Global financial crisis; A dummy variable that takes 1 if the year is 2007 to 2008, otherwise 0	GFC	Authors' compilation

## 4. EMPIRICAL FINDINGS AND THEIR DISCUSSION

### 4.1 Descriptive Statistics

Table 2 exhibits the descriptive statistics which provides some insights about the variables applied in this research. In case of our dependent variable, Z-score we found a mean of 15.35 with a minimum of -21.22 and maximum of 74.13 meanwhile we observed a moderate level of variability. One of the important findings provided in this Table 2 is that while for all other variables number of observation is 2169 or more, for variables of interest it is only 259 and 400 for SMEBTB and SMELTL respectively which confirms the scarcity of data on financial inclusion. Nonetheless, we found a mean of .086 and .255 for SMEBTB and SMELTL respectively with a very low level of standard deviation.

**Table 2. Descriptive Statistics**

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Z-score	2274	15.34978	10.67789	-21.22413	74.12949
SMEBTB	259	.0862186	.1310797	.0000255	.7593334
SMELTL	400	.2558819	.1762452	.0008036	.7759635
LNGDP	2397	10.77827	2.39893	2.556374	17.17497
DCPS	2276	51.33446	48.15011	.4913875	311.063
LADSTF	2316	40.64401	25.52033	.3221363	244.8168
PCDMTOGDP	2169	49.40595	46.96676	.0099441	313.8509
M2/GDP	2072	58.52267	65.33268	2.85470	977.0122
RINTR	2003	6.926296	20.44204	-42.31018	572.9363
GFC	2639	.1538462	.3608696	0	1

### 4.2 Correlation Statistics

As shown in Table 3, we observed very low correlations among variables used in the right-hand side of the model. This implies that there is very low level of multicollinearity and such multicollinearity is not an issue in our empirical analysis.

**Table 3. Correlations of the variables**

	Z-score	SMEBTB	SMELTL	LNGDP	DCPS	LADSTF	PCDMTOGDP	M2/GDP	INTR	GFC
Z-score	1.0000									
SMEBTB	-0.0695	1.0000								
SMELTL	0.0976	0.1487	1.0000							
LNGDP	0.5120	0.0873	0.1312	1.0000						
DCPS	0.3734	-0.0911	0.1139	0.0586	1.0000					
LADSTF	0.1340	-0.1083	-0.2079	-0.0399	-0.0258	1.000				
PCDMTOGDP	0.3630	0.1255	-0.0991	-0.1680	-0.1953	-0.0249	1.0000			
M2/GDP	0.6348	-0.0096	-0.0155	0.0201	0.1982	-0.1772	0.1906	1.0000		
RINTR	-0.2737	0.0771	0.0070	-0.0788	-0.1331	0.0610	-0.1085	-0.0682	1.000	
GFC	0.0965	-0.0781	-0.0138	0.0073	-0.0993	0.1549	-0.1147	-0.0819	.0435	1.000

### 4.3 Overall Results, Robustness Check and Their Discussion

#### 4.3.1 Estimated Results with the Baseline Model

In order to estimate our specified model, we applied the Blundell and Bond (1998) system-GMM dynamic panel estimator, a method compiled of first-differences instrumented on lagged levels, and of levels instrumented on lagged first-differences, on the ground that it provides a scrupulous cure for endogeneity bias. In addition it also holds two further attractive statistical features. First, comparing to the cross-sectional regressions, tackling measurement error, the GMM dynamic panel estimator is more robust. Second, if we adequately lagged the instrumental variables, the GMM dynamic panel estimator remains steady. We employ the two-step estimator as Wooldridge (2010) stated that it solves the problems of heteroscedasticity, autocorrelation of errors, simultaneity bias and measurement mistakes. In Table 4, we present results of estimation. In Table 4, Model (1) represents the impacts of SMEBTB on financial stability while model (2) indicates the effects of SMELTL on financial stability.

**Table 4. Estimated results with GMM dynamic panel estimator**

Explanatory Variables	Dependent Variable: Z-score					
	Model (1)			Model (2)		
	Coefficient	Std. Error	P> z	Coefficient	Std. Error	P> z
Z-score <sub>i,t-1</sub>	.4372864	.1561067	0.005***	.7189722	.0354007	0.000***
SMEBTB <sub>i,t-1</sub>	72.72712	95.03869	0.044**			
SMELTL <sub>i,t-1</sub>				11.35389	2.017344	0.000***
LNGDP	5.341833	9.242366	0.563	1.802776	.3675859	0.000***
DCPS	-.6266023	.2493754	0.012**	.0013661	.0210328	0.948
LADSTF	.0624782	.0131562	0.000***	.0638675	.0034447	0.000***
PCDMTOGDP	.5112389	.2230412	0.022***	.0258651	.017314	0.135
M2/GDP	-.0154441	.0729815	0.832	-.0426622	.0145747	0.003***
RINTR	.1838186	.0436227	0.000***	.0203493	.0099479	0.041**
GFC	-.2217411	.6447252	0.731	-.7042192	.0562302	0.000***
cons	50.3676	65.52558	0.027**	-9.544743	1.980971	0.000***
Number of observations	117			176		
Number of Groups	18			35		
Number of instruments	105			113		

**Note:** \* significant at 10%; significant at 5% and \*\*\* significant at 1%.

Findings of the study indicate that both the two measures of financial inclusion, SMELTL and SMEBTB have significant positive impact on financial stability, as measured by Z-score which implies that the more the amount of credit provided to the SMEs the lower the probability that financial institutions would become default. Similarly the greater the number of SME borrowers, the lower the probability of default which indicates more financial stability as we found significant positive effects of SMEBTB on financial stability. Our results are consistent with the findings of (Han & Melecky 2013; Hannig & Jansen 2010; Morgan & Pontines 2014; Okpara 2011). Thus, we argue that broader access to and use of finance for SMEs lead to significantly improve resilience of the overall financial system and thus financial stability.

Among control variables, similar to the findings of Morgan and Pontines (2014), we found significant positive impacts of GDP per capita on Z-score; that is countries with higher income are less likely to be financially instable. We also found that uses of more percentage of liquid assets to deposits and short term funding leads to more financial stability. This finding is in line with Han and Melecky (2013) and Morgan and Pontines (2014). Empirical findings also indicate that the more proportion of private credit to GDP the greater the financial stability of financial institutions. On the other hand, we found significant negative impacts of proportion of domestic credit provided to private sector on financial stability which is consistent to the findings of Drehmann and Juselius (2014) and Gourinchas and Obstfeld (2012). We observed significant positive impact of size of financial sector on financial stability which is similar to the findings of (King and Levine 1993; Gelb 1996). Consistent to the findings of Sango and Moussa (2017) we found positive impact of interest rate on the financial stability. Likewise Noman et al. (2017) we found negative impacts of global financial crisis on financial stability.

### 4.3.2 Robustness Check

In order to check the robustness of our specified model, we employ additional two variables namely proportion of financial systems deposit to GDP, FSDGDP and financial openness, FO, in our original model. Data on FSDGDP over the period of 2001-2013 on same 203 economies was collected from GFDD. We assume that the higher the proportion of financial system's deposit to GDP, the more financially stable the economies are. For financial openness, recent studies of (Bayar 2016; Frankel & Saravelos 2012; Morgan & Pontines 2014) observed that financial openness is greatly associated with greater financial inclusion via financial development which leads to greater stability of the financial system. Thus we incorporate financial openness variable in our analysis by collecting data from the Lane and Milesi-Ferretti (2007) database which is updated to 2011<sup>5</sup>. After incorporating these additional two variables, we perform GMM dynamic panel analysis and we present the empirical results in Table 5.

**Table 5. Results of robustness check with GMM dynamic panel estimator**

Explanatory Variables	Dependent Variable: Z-score					
	Model (1)			Model (2)		
	Coefficient	Std. Error	P> z	Coefficient	Std. Error	P> z
Z-score <sub>i,t-1</sub>	.4545189	.0538667	0.000***	.6758993	.1235396	0.000***
SMEBTB <sub>i,t-1</sub>	-14.70812	24.02486	0.040**			
SMELTL <sub>i,t-1</sub>				8.292657	4.034462	0.040**
LNGDP	2.540508	.8662138	0.003***	3.212187	.6864595	0.000***
DCPS	-.2307995	.1281727	0.072*	-.1202961	.0430281	0.005***
LADSTF	.0846314	.0087398	0.000***	.0757061	.0108651	0.000***
PCDMTOGDP	.1738522	.1273388	0.172	.1220156	.0456005	0.007***
M2/GDP	-.0028416	.0039328	0.470	.0951741	.0219636	0.000***
INTR	.1589329	.0463922	0.001***	.0227875	.0151841	0.133
GFC	-.6195027	.813212	0.446	-.4131412	.3621085	0.254
FSDGDP	.1720055	.0392705	0.000***	-.2141329	.0387403	0.000***
FO	-.2653868	.6434121	0.680	.0613068	.6050094	0.919
_cons	-16.55129	6.796967	0.015**	-17.68431	4.974672	0.000***
Number of observations	98			153		
Number of Groups	16			31		
Number of instruments	89			115		

Note: \* significant at 10%; \*\* significant at 5% and \*\*\* significant at 1%.

We found empirical results with additional variables are similar to the findings of our baseline model. That is both the financial inclusion variables have positive impact on financial stability. We also observed that all other control variables are significant as it was the case before introducing the two additional variables for robustness check. However, as opposed to the findings of Abdin (2016) and Morgan and Pontines (2014) who found positive impacts of financial openness on financial stability, we found no significant impacts of FSDGDP and FO on financial stability. This result indicates that our model is robust and thus generalizable.

<sup>5</sup> Link for data set: <http://www.philiplane.org/EWN.html>

## 5. CONCLUSIONS

While there is relative dearth of empirical studies on these global agenda of financial inclusion through SMEs and financial stability and their causality, using cross-country panel data of 2001-2013, this research empirically investigated whether SMEs financial inclusion fosters financial stability. While some of the previous studies suggested a positive impact of financial inclusion on financial stability, others found negative or mixed impacts. Our study confirms the view that financial inclusion, which we measured by two variables, one is SMEBTB and the other one is SMELTL, have significant positive impact on financial stability as measured by Z-score. That is, the greater the level of financial inclusion, the lower the probability that financial institutions would become defaulter. We also observed positive impact of GDP per capita, proportion of liquid assets to deposits, M2/GDP, interest rate on financial stability, while we found a high proportion of domestic credit granted to private sector trim downs financial stability. These results are robust for additional explanatory variables employed in the study. Therefore, with this finding, this study encourages policymakers of the countries to undertake such policies to foster financial inclusion through SMEs which, in turn, would contribute to the goal of greater level of financial stability. This study urges the policy makers to remove constrains of access to bank finance for SMEs such as need for collateral, business track records, low amount of credit. At the same time we suggest proper supervision is a crucial factor of financial stability.

The main challenge of this study was the scarcity of data, specifically data on financial inclusion variables. Although a number of variables could be used to measure financial stability, due to some variables have only 1 or 2 years data, we were unable to incorporate all measures of financial inclusion. Due to this short span data, we worked with panel data and applied the system-GMM dynamic panel estimator in order to control the endogeneity issue. Upon availability of data, future research could be carried out by incorporating household sector's inclusion in the financial system of the country. Similarly once the data on other financial stability indicators such as stock market volatility, growth or drops in bank deposit, financial crisis etc. would be available, one could employ these to observe a comprehensive impact of financial inclusion on financial stability.

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