Volume-8, Issue-2, July - December, 2021
PP. 56-82

The role of Interest rate liberalization on Endogenous Private savings growth on East and South Asian Countries- Staggered Diff and Diff panel data approach.

Ishrat I Mowla[1]

Abstract

Recent Studies in South and East Asian countries have shown that the impact of interest rate liberalization is either insignificant or significantly negative on private savings growth. However, the staggering growth of private savings in the run up of heated Asian Financial Crisis (AFC) followed by Global Financial Crisis(GFC), transformed South and East Asian region into a hub for large capital stock. Historically interest rate has always been a dominant factor in mobilizing the savings growth despite other macroeconomic juggernaut factors. This paper examines the role of interest rate liberalization on private savings in eleven Asian developing countries using panel data for the period 1980 to 2015. For Most of the South and East Asian countries the financial liberalization took place between 1980s and 1990s. However using system Staggered Diff in Diff approach, this paper concludes that there is no significant impact of interest rate liberalization on private savings growth within the specified time. Nevertheless, it was traced that interest rate liberalization significantly stimulated the Asian financial crisis further to drain out the capital from Asian region. Consequently negative economic outflow and positive trade flows took place during global financial crisis in the non shocked economies of Asian region while leaving the mark of casualties in shocked economies.

Keywords: Interest liberalization, Private Saving Growth, Staggered Diff and Diff approach, Asian Financial Crisis, Global Financial Crisis

JEL Classification: B23, C23, E21, F02, G28

1.0 Introduction

Apparently the variation in savings growth rate can explain the variation in the economic growth rates in developing economies. It is generally accepted that interest rate influences aggregate savings of the economy.

[1]Joint Director, Bangladesh Bank. Views expressed in this article are the author's own which do not necessarily reflect the views of the organization she works. All remaining errors are the author's own.

Hence interest rate liberalization is a parallel evolutionary transformation in the savings growth pattern in emerging economies as recommended by Washington Consensus. Interest rate normally has either of the dual impact on savings. Through substitution effect low interest rate provides less incentive to save and higher encouragement to spend and vice versa. Through income effect low interest rate might encourage to save more to equalize previous earning. Theoretically substitution effect outweighs income effect on savings. During 1990 capital market got highly active in South Asia on a short term notice following interest liberalization. Hence the participation of many informal and formal banking intermediaries produced many informal capital markets. Increased credit availability due to interest liberalization was causing low interest rate and this ultimately drove capital outflow or consumption rather than savings .Such circumstance failed many institutions to hold back a large chunk capital during the surge of AFC (Asian Financial Crisis). In East Asian region majority of the countries were liberalized financially during 1980 to different degrees. During mid 90s Most of the East Asian countries badly fell into crisis due to accumulated short-term foreign debts, highly leveraged corporations and dropping export levels. These situations ultimately led to a persistent shrinkage of these emerging economies. The emerging economies of the South and East Asian region were to some extent benefitted in the convergence of low interest rate in USA. The rising commodity price amplified the commodity export and capital inflow towards Asian countries during GFC. In the long run various factors such as intensity of interest liberalization, growth of economy, financial turmoil, stage of development, economic openness, investment environment etc turned Asian region a trusted hub for private savings and investment in the following years.

The main objective of this paper is to find out whether interest liberalization or any other factors that stimulated the private savings growth on Eleven Asian countries.

Hence the paper is organized in the following manner viz The trend of private saving growth in South and East Asian economies during (1980-2015), Literature Review, Data, Model & the Rationality, Econometric Analysis & Result interpretation and Conclusion.

Table 1

Countries	Interest liberalization	AFC
Bangladesh	1993	1997
India	1993	1997
Indonesia	1984	1997
South Korea	1992	1997
Malaysia	1991	1997
Pakistan	1993	1997
Philippines	1983	1997
Singapore	1985	1997
Sri Lanka	1990	1997
Thailand	1994	1997
Vietnam	1991	1997

Source: Bashar, Okmr& Khan, H (2009),Gochoco, MS (1991),.International Monetary Fund (IMF) (2007), *Sri Lanka*, .Munir, S & Chaudhry, I (2014), The World Bank Group (2002)

2.0 The trend of private saving growth in South and East Asian economies during (1980-2015)

During 1990s most of the Asian countries were blessed with major financial development. There was a massive foreign capital inflow following financial liberalization. Hence we see a major kink up of private savings growth during 1990s among these countries (Graph 1). Financial liberalization paved the way towards reduction in reserve liquidity and increased credit demand in India, Bangladesh and Sri Lanka. These South Asian countries attracted lot of capital for investment for being labour intensive economies from Euro zone until AFC. Further investment lead towards rise in income and thereby private savings growth.

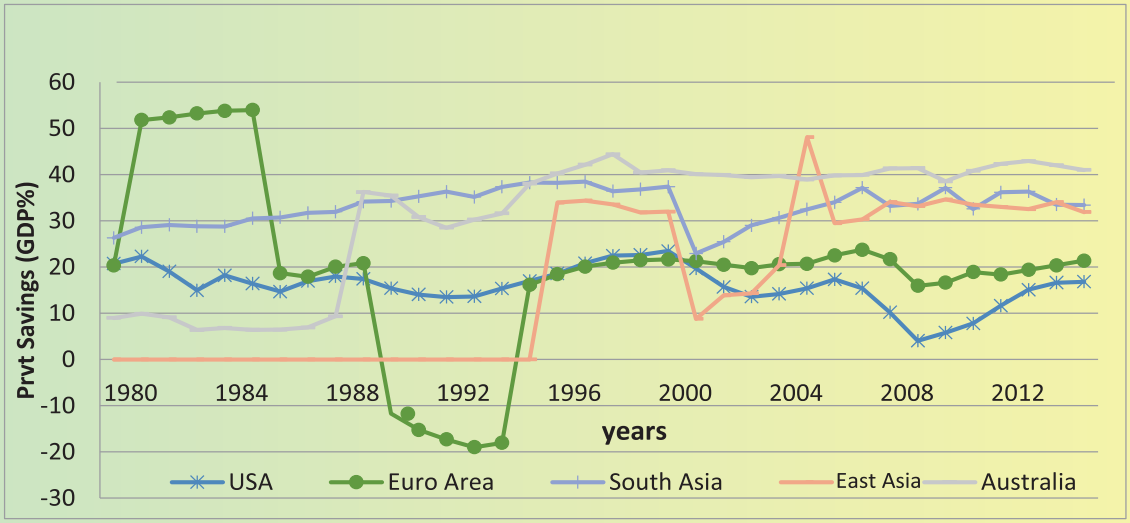
In Euro zone, people started to consume more and save less. Meanwhile equity market got highly active in 1990 (World Bank report). Much of the private credits extended by banks and non banks in South Asia were proved to be unproductive. In Bangladesh when Share market scam 1999 started its purge, huge capital outflow took place following AFC. In East Asia majority of the countries were liberalized financially from 1985 to 1994 to different degrees. During 1980s connected lending within industrial financial conglomerates and government pressures played an important role on credit allocation. Hence a rising trend of private savings growth is noticed in East Asian zone (Graph 1)

until 1996. Before AFC, the rise of interest stimulated huge crowding in effect in South and East Asian Region while creating further leeway for investment. Therefore people started keeping deposits with banks and non banks during income growth. Until AFC, capital in-flight accompanied with labour productivity gave a boost up to the manufacturing sector. During East Asian Financial Crisis(EAFC)Malaysia, Thailand, Korea, Indonesia and the Philippines were badly hit. In the later part of the story Singapore and Hong Kong also joined the flock (fig 2-East Asia). The Accumulated short-term foreign debts, highly leveraged corporations and dropping export levels led a persistent shrinkage of five emerging economies by 7.7% and millions of people lost their jobs while sustaining livelihood losses (Yellen, 2007). Hong Kong Institute of Economics and Business Strategy ascertained that asset prices and currencies in most of the Asian countries dropped by 30% to 40%. By the end of 1990s, most of the countries in Asian region were showing signs of overcapacity. By the end of 1990s these countries depended vulnerably on foreign investment.

It became quite evident that high level short term foreign debts were over accumulated and most of the companies turned to be highly leveraged. Consequently export level started to drop. Currency started to depreciate driving lower interest rate. Ultimately huge capital outflow was in the course of action. Hence we see a rising trend of private savings in USA and Euro zone after AFC.

Literally it was the replenishment of the capital that flowed out too Asian region prior to AFC. On the other hand when AFC shock hit the Asian region government started to cut budget. Subsequently household started to consume instead of saving while looking forward for a future tax cut. Due to lower interest rate remittance changed its channel due to the presence of lower interest rate or it was consumed by the house hold. Therefore by the end of 90s private savings dropped in South and East Asian region (Graph 1). Interestingly during 2007-08 the deregulation, declining demand, freezing financial markets, and loss of confidence Global financial crisis shock caused huge capital outflow towards Asian region from in USA and Euro zone . After GFC (J McKibbin, B Stoeckel,2011) shock, the economic world observed huge capital outflow towards Asian region while export sector in Asian region got a thrust to boost. Asian countries have shown a rising pattern (Graph 2) for private saving.

Fig 1: **Zonal Private Savings growth trajectory pattern**



Source : Graphical Presentation of private savings growth of USA, European Zone , South Asia, East Asia and Australia based on data from World outlook database, IMF and world development indicator (WDI), World Bank.

3.0 Literature Review

Financial liberalization is a process of detaching domestic economy to establish the connection with the globalized financial system (Melvin & Norrbin, 2017). It facilitates the movement of international capital by freeing up financial system through reforming capital control policy, foreign exchange policy and domestic financial market. Financial liberalization may expand international diversification of savings from other countries to be more responsive to foreign interest rates even (Masson et al., 1998). Theoretically it is suggested by Sauve 1999 that financial liberalization benefits the developing countries through opening financial markets for foreign investors leading towards creating room for more savings and investment (Thailand, Hansanti, 2005).

Financial liberalization is always expected to have an impact on interest rates and asset prices while implementing interest rate liberalization. The more countries are liberalized the volatility of interest rates are reflected in the dynamic behavior of developing countries. Generally financial liberalization has short term impact in both real and nominal money market interest rates (Honohan, 2000). Interest rates liberalization raises domestic savings at macroeconomic level. In case of Kenya, we see mild consequence

countries with serious macro economic and financial imbalances or inadequate regulatory and supervisory framework are likely to run into severe problem if they liberalize interest rate.(Mehran & Laurens, 1997)

Famous growth models of Harrod (1948), Domar (1948), Solow (1956), Swan (1956) and Romer (1986) (Roux et al., 2018) advocated for interest liberalization on private savings growth. They have asserted that policies which stage-manage interest rates to be low will not go as planned in the financial sector of the economy. In that case lower interest rate will have negative impact on savings growth and thereby investment. AZ Baharumshah (et al, 2003) have applied VECM and co-integration techniques to find out the determinants of domestic savings of East Asian countries such as Malaysia, S Korea, Thailand, Philippines and Singapore. They concluded that the impact of interest rate is inconclusive on domestic savings. The extent of financial liberalization is reflected by the interest rate (Baharumshah et al., 2003) Demirguc-Kunt and Detragiache (1998), Kamisky and Reinhart (1999) and also Cole and Slade (1998) figured out that bank deposits were highly reduced in 53 countries including Malaysia for 1980 to 1995 while using a Multivariate logit framework. All these countries were liberalized with an imbalanced macroeconomic policies. While Kaminsky and Reinhart reported that 18 out of 25 banking crises occurred in a liberalized economies. (Chow & Eu, 2008).

Another study reveals that interest rate liberalization had negative non significant impact on savings in Nigeria. Therefore interest rate liberalization could not augment savings growth in Nigeria. Many countries such as Angola, Burundi, Congo, Cote d'Ivoire, Gambia, Ghana, Kenya, Madagascar, Malawi, Mozambique, Nigeria, Rwanda, Tanzania, Zambia, Zimbabwe, India, China, Turkey, etc. have made attempts at liberalizing their financial sectors by deregulating interest rates, eliminating or reducing credit controls, allowing free entry into the banking sector, giving autonomy to commercial banks, permitting private ownership of banks and liberalizing international capital flows since 1970 . Odhiambo (2009) posits that of these six dimensions of financial liberalization, interest rate liberalization seems to have been the main center of attention.(Onwumere et al. 2012). AFC is actually appeared to be the outcome of a weak financial system and volatile capital movement which was brought about by the globalization of financial market. Led by technological advancement and communication in the globalized era financial liberalization was inevitable driven by the notion that free capital movement was better than less free capital movement. However this extended naïve belief system is

required to be validated by many qualifiers. Asian economies are presumed to have sound macroeconomic policies which are reflected in pre-crisis write-ups. According to Sheehan 1998 private capital flows were highest between 1993 and 1996 in countries like Thailand, Indonesia, Malaysia and South Korea. These countries have shown higher rate of domestic savings due to capital inflows and further investment (Hansanti, 2005).

With the withdrawal of government intervention financial liberalization were highly active in financial market. These economies are successful in mobilizing large amount of savings and thereby channeling them toward productive investment. Kumar and Debroy mentioned that absence of government role, unwarranted expansion of overcapacity of private firms unproductive savings and investment.(Lee, 2002). Ahmed. S (2015) in Bangladesh Vision 2030 mentioned that among several factors Deregulation drive in financial sector causing high remittance inflow while keeping interest rate within manageable range lead towards expansion of national saving since year 2000.

M.K Mujeri & S. Younus (2009) explained a bank profit maximization model based on empirical industrial organization approach using panel data of 48 banks covering a period of 2004 to 2008 during the tenure of interest deregulation financial system in a developing country like Bangladesh exhibit larger interest rate spread causing lower deposit rate while discouraging savings and limiting resources to finance bank credit. These ultimately creates impediments for small business, house hold enterprises and rural industries those who play important role for creating investment environment in any developing countries. Chowdhury A. R (2001) estimated a saving function to evaluate the impact of determinants of private savings in Bangladesh leading to a conclusion that real interest rate has positive impact on private savings rate where as financial reforms implying interest liberalization had actually reduced savings. According to his views political interference in extending loans to institutions and individuals with high credit risk while non performing assets contributed to high interest margins. These ultimately adversely affected private savings growth ever since financial reform took place from the year 1980

In Latin America financial liberalization took place in 1970 but it was withdrawn and financial repression continued until 1980s with debt crisis, hyperinflation, government deficit and the growth of population (Dornbusch and Edwards 1991, World bank group). In the year 1990 another substantial financial liberalization occurred with interest liberalization in different timing and degrees. Partial rate liberalization generated

pressures for more interest rate liberalization. As soon as borrower channeled their funds in to deregulated instrument and sectors, credit accessibility rose and more loan defaulters were found. Unfortunately, when macroeconomic situation was unstable and interest rates were free, interest rate goes very high. As a result, various banking problem appeared giving rise to a capital market failure.

4.0 Data, Model & Methodology and the Rationality

4.1 Data

My sample involves 11 Asian developing countries viz Bangladesh, India, Indonesia, S Korea, Malaysia, Thailand, Pakistan, Srilanka, Vietnam, Philippines and Singapore. I have included the dummy variable for interest rate liberalization while controlling the Asian financial crisis and Global financial crisis to see the impact on the private savings growth of these eleven Asian countries. This section discusses in detail about the data used in our study and the methodology.

The data for this study is compiled from various sources. I use panel data which comprises of 11 developing countries from the period 1980 to 2015. The savings regression is based on annual data which are compiled from two main data sources and they are World outlook database, IMF and world development indicator (WDI), World Bank.

4.2 Econometric Model

The explanatory variables included in our savings regression are based on analytical relevance and data availability. In addition, these variables have strong literature backing.

$$S_{it} = \beta S_{it-1} + \alpha X_{it} + \gamma I + \mu F + \Omega S + \eta_i + \varepsilon_{it} \quad \text{.....1}$$

Where the subscripts i and t denotes country and time respectively

S is the savings growth rate,
I represents the interest liberalization as dummy variable
F represents as the controlled dummy variable of Asian financial crisis
S represents as the controlled dummy variable of Global financial crisis
X represents the explanatory variables that possibly affect private savings,
η is the set of unobserved, time-invariant country specific effects,
ε is the error term.

4.3 Explaining the econometric methodology

The main objective of this investigation is to test the (null) hypothesis that interest liberalization leads to improve private savings growth in the emerging economies of Asia. Most of the countries were liberalized in the midst of 1980s. The comparison is shown through diff in diff approach in terms of respective country liberalization year while examining the situation of Asian Financial Crisis Impact and Global Financial Crisis Impact.

The treatment group falls before the time of liberalization and Control group fall after the year of interest liberalization execution for analytical purpose I have used dynamic panel diff in diff fixed effect approach to find out the estimate expected impact of interest rate liberalization on private savings growth while controlling the macroeconomic shocks of Asian financial crisis and Global financial crisis. Although these countries have different levels of economic development, the applied econometric approach ensures robustness while overcoming other endogeneity issues along with focusing on the differences of the impact of post and prior macroeconomic shocks. In addition to that, I will be using the lagged values of the endogenous variable as suitable instruments to overcome any endogeneity issues.

4.4 Rationale for the chosen determinants:

***Budget deficit*:** With the increase of government expenditure or low tax, national consumption will be tempted to rise or private savings will increase. (Barro 1974) reports the concept as Recardian equivalence. Barro claims that private savings replenishes the government budget and thereby making public savings irrelevant to fiscal deficit. In summary when public saving falls, private savings increases making budget deficit a causal factor. Therefore there is a negative relation sustains between budget deficit and private savings. According to Corbo and Schmidt-Hebbel (1991) investigated on the evidence that in developing countries the magnitude of crowding out effect is less than 1 implying lack of full Ricardian equivalence. A similar evidence is provided by (Bernheim, 2014), (James P. Cunningham, 2005) and (Masson et al., 1998) for industrial countries.

***Income**:* According to Modigliani's life cycle hypothesis (1966) will be stimulated to rise due to higher growth leading towards rising aggregate savings of working age population.

In disparity, (Dolde & Tobin, n.d.) argues that individual will increase consumption expecting rise in future income which leads to a fall in savings. (Carroll & Weil, 1994), (Edwards, n.d.) and (Hiebert, 2006) reported that income growth has a positive association with private savings. Whereas (Attanasio et al., 2000) discovered that the positive relationship between growth and private savings are sensitive to the additional controls added to the savings regression.

Real interest rates and private savings exhibit an imprecise relationship. Income effects have a positive effect whereas the substitution effects have a negative effect on private savings. Human wealth (individual income) is higher than financial wealth and human wealth negatively affected by real interest rate. While a positive coefficient for real interest rates suggests that the substitution effects are greater than income effect. Empirical research gives mixed results for the relation between real interest rate and private savings. A positive relation is found between private savings and real interest rate by (Bosworth, 2005) and (Ogaki & Reinhart, 1998). (Masson et al., 1998) also find a positive impact but not robust relation. While, (Bandiera et al., 2000)find no effect of real interest rate on private savings.

Inflation has perplexing effect on private savings. Inflation carried out with nominal rate increases savings. However, when inflation surges, there is a fall in real GDP which reduces real income and thereby affecting privates savings indirectly. Hence inflation lays both direct and indirect effect on savings growth. Most studies show evidence of negative or zero effect of inflation on savings (Masson et al., 1998) (Pesaran et al., 2000) (Loayza et al., 2000)

Per capita gross national income is having a positive effect on private savings. According to the economic intuition, per capita increases private savings. This effect is likely to fade away as per capita grows and even becomes negative when countries become rich where growth and investment opportunities are relatively lower. (Ogaki & Reinhart, 1998) provide evidence for diminishing returns of per capita income on savings.

Dependency ratio reflects negatively on private savings. If a country has a high proportion of working age population, then there would be high private savings as the worker's save for retirement. This is highlighted by the life-cycle hypothesis. When the working age retires, then they start to spend their saving to maintain their level of

consumption thus leading to a fall in the savings rate. (Masson et al., 1998) provide negative effect of dependency ration on private savings.

Terms of trade gives rise to savings and improvement in trade balance according to Harberger - Laursen - Metzer effects. Literature suggests that there is a positive relation between terms of trade and savings.

Unemployment has a negative effect on private savings. An increase in unemployment will reduce the per capita income which in turn reduces private savings.

Numerous studies identified various policy and non-policy factors affecting private savings. The subsequent table summarizes the impending determinants of private savings identified in the panel studies.

Table 2: Determinants of private savings identified in the literature

Variable/ category	Specific variables	Expected impact	Empirical Findings
Income	Terms of trade	0 or (↑)	(↑) or (0)
	Growth rate	(↑)	(↑)
	GDP per capita	(↑) or 0	(↑)
Rates of return uncertainty	Interest rate	(↑)	(0) , (↑) [unclear]
	Inflation	(↑)	(↓) or (0)
	unemployment	(↓)	(↓)
Financial deepening	Private credit flows	(↓)	(↑)
	Broad money flows	(↓)	(↑) [unclear]
Foreign borrowing constraints	Current account deficit	(↓)	(↓)
Fiscal policy	Public savings	(↓)	(↓)
	Public consumption	(↓)	(↓)
	Public surplus	(↓)	(↓)

Note: The qualitative results listed in column (4) of the above table review significant signs of saving regression corresponding to various panel studies. Masson (1995) study investigated about the determinants of private savings for industrial and developing countries using panel data while numerical empirical studies have been carried out for developing countries

5.0 Econometric Analysis and Result interpretation

5.1 Correlation test

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) PVTsavings	1.000														
(2PVTsavings_L	0.814	1.000													
(3) Interestlib	0.102	0.109	1.000												
(4) GFC	0.113	0.085	0.325	1.000											
(5) AFC	-0.084	0.073	0.629	0.406	1.000										
(6) TOT	0.209	0.169	0.354	0.052	0.380	1.000									
(7) BB	-0.284	0.213	0.288	0.068	0.293	0.130	1.000								
(8) GDPgrowth	0.197	0.162	0.055	0.023	0.112	0.027	0.022	1.000							
(9) CAB	0.145	0.125	0.222	0.235	0.375	0.396	0.225	0.111	1.000						
(10) realint	0.183	0.183	0.171	0.016	0.025	0.050	0.108	0.091	0.168	1.000					
(11) dependency	-0.275	0.251	0.469	0.405	0.476	0.436	0.395	0.093	0.350	0.027	1.000				
(12) loggnipc	-0.118	0.158	0.173	0.175	0.168	0.173	0.189	0.070	0.041	0.052	0.422	1.000			
(13) unemp	0.002	0.020	0.566	0.130	0.391	0.231	0.192	0.037	0.097	0.078	0.102	0.125	1.000		
(14) remittance	-0.252	0.268	0.107	0.240	0.200	0.144	0.050	0.013	0.033	0.035	0.164	0.250	0.165	1.000	
(15) mgdp	-0.181	0.181	0.151	0.011	0.055	0.130	0.045	0.158	0.233	0.200	0.151	0.081	0.225	0.373	1.00

PVTsavings_L= Private savings with lagged value, Interest lib- Interest liberalization using dummy variable, Interest lib_L- Interest liberalization using dummy variable with lagged value, AFC- Asian Financial Crisis using dummy variable, GFC- Global financial crisis with dummy variable, Budgetbalance- Budget Balance, GDP growth- GDP growth rate, realint- Real Interest rate; Dependency- Dependency rate, loggnipc-Log of Gross national Income per capita, CAB-Current Account Balance, unemp-unemployment rate, TOT- Terms of Trade (Trade balance-Export/Import), Mgdp- Money Supply /GDP rate indicating financial deepening, , Budgetbalance_L- Budget Balance with lagged value, GDP growth_L- GDP growth rate with lagged value, realint_L- Real Interest rate with lagged value; Dependency_L- Dependency rate with lagged value, loggnipc_L-Log of Gross national Income per capita with lagged value, CAB_L-Current Account Balance with lagged value, unemp_L-unemployment rate with lagged value , TOT_L- Terms of Trade (Export/Import) with lagged value, Mgdp_L- Money Supply /GDP rate indicating financial deepening with lagged value,

In this correlation matrix private savings is highly and positively correlated with the lagged values of private savings. Interest rate liberalization is positively correlated with private savings growth by 10.2%. On the other hand Asian Financial Crisis is 8.4% negatively correlated while Global Financial Crisis is 11.3% positively correlated with private savings growth in these 11 Asian countries. Terms of trade, GDP growth, Current Account balance, real interest rate positively affect private savings growth. Dependency ratio has a negative impact on private savings growth as suggested by life cycle hypothesis. Even Log GNI, mgdp and remittance negatively affect saving. Budget balance (Budget deficit) lowers private savings which happens only for short term.

Unemployment does not have any correlation with private savings growth. However in this correlation matrix it is noticeable that interest liberalization is positively correlated 62.9% with Asian financial crisis while AFC is 40.6% positively correlated with Global financial Crisis impact. Both the correlations are closer to one. To find out the whether there is any causality factor in I take the approach of diff in diff with the panel data

5.2 Descriptive statistics

Table 2

Variable	Obs	Mean	Std. Dev.	Min	Max
PVTsavings	396	23.074	8.925	-5.764	50.236
PVTsavings_L	395	23.046	8.919	-5.764	50.236
Budgetbalance	396	192.389	111.98	1	388
GDPgrowth	396	198.475	114.416	1	392
Realint	393	127.802	94.712	1	303
dependency	396	60.459	15.529	35.796	91.887
loggnipc	387	13.112	1.37	10.616	15.948
Unemp	396	45.311	34.023	1	116
remittace	330	3.458	3.158	.012	13.323

The above table provides that the mean is calculated on the overall observation (including time-series and cross country). Moreover the standard errors are calculated on overall data set and in addition, variance between countries and within countries across time has been calculated for each variable under consideration.

5.3 Model explanation

Table 3 :

	(1)	(2)	(3)	(4)
VARIABLES	OLS-t	OLS-t_L	FE-t_r_new	RE-t_r_new
PVTsavings_L	0.660***	0.702***	0.653***	0.660***
	(0.0655)	(0.0778)	(0.0646)	(0.0416)
Interestlib	-0.319	-0.850	0.250	-0.319
	(1.124)	(1.208)	(1.344)	(0.975)
AFC	-2.052***	-2.906**	-2.083***	-2.052*
	(0.750)	(1.071)	(0.782)	(1.064)
GFC	7.960***	11.67***	7.552***	7.960***
	(1.575)	(1.344)	(1.529)	(2.497)
Budgetbalance	-0.0129***		-0.0131***	-0.0129***

	(1)	(2)	(3)	(4)
VARIABLES	OLS-t	OLS-t_L	FE-t_r_new	RE-t_r_new
	(0.00389)		(0.00393)	(0.00264)
GDPgrowth	0.00322		0.00351	0.00322
	(0.00269)		(0.00272)	(0.00249)
Realint	0.00312		0.00325	0.00312
	(0.00367)		(0.00366)	(0.00292)
Dependency	-0.0842***		-0.0839***	-0.0842***
	(0.0297)		(0.0299)	(0.0273)
Loggnipc	-0.461*		-0.488**	-0.461*
	(0.229)		(0.225)	(0.243)
CAB	0.00464*		0.00459*	0.00464*
	(0.00257)		(0.00254)	(0.00273)
Unemp	0.00243		0.00314	0.00243
	(0.00930)		(0.00921)	(0.00949)
Remittance	-0.152		-0.158	-0.152
	(0.117)		(0.117)	(0.100)
TOT	0.0172		0.0150	0.0172
	(0.0211)		(0.0211)	(0.0194)
Mgdp	-0.000947		-0.00119	-0.000947
	(0.00342)		(0.00348)	(0.00291)
TOT_L		-0.00213		
		(0.0166)		
Budgetbalance_L		-0.00234		
		(0.00433)		
GDPgrowth_L		-0.00142		
		(0.00297)		
CAB_L		0.00164		
		(0.00391)		
realint_L		0.00243		
		(0.00309)		
dependency_L		-0.0641**		
		(0.0294)		
loggnipc_L		-0.285*		
		(0.159)		
unemp_L		0.00393		
		(0.00913)		
remittace_L		-0.111		
		(0.114)		
mgdp_L		-0.00222		
		(0.00390)		
Interestlib_L			-0.662	
			(1.146)	
Constant	13.01**	7.670*	14.25**	13.01**
	(5.695)	(4.440)	(5.785)	(5.647)
Observations	325	325	324	325
R-squared	0.759	0.670	0.761	0.752
Number of Time	36	36	36	36

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

The covariates of Model 1 explain it by 75.9% points with 325 numbers of observations. In this model I ran a regression with the lag of private savings growth variable while applying the shock of interest liberalization, Asian financial crisis and global financial crisis. The lag value of private savings growth has a positive significant impact on the private savings with a magnitude of 0.66 while the shocks have a significant impact on private savings growth rate. The Asian financial crisis (AFC) has a significant negative impact with a magnitude of 2.052 on private savings growth. The Global financial Crisis (GFC) has significant positive impact with a magnitude of 7.960 on private savings growth. I have included the covariates of Terms of Trade, Budget Balance GDP growth, Current Account Balance, Real interest rate, dependency, Log Gross National Income, Unemployment and Remittance. Among them Budget Balance has negative impact of 0.0129 , dependency with a negative impact of 0.0842, log GNI (Income)with a negative impact of 0.461, CAB with a positive impact of 0.00464 affect private savings significantly.

OLS regression model no 2 covariates explain the model by 66.9%. Model 2 considered the lag values of the macroeconomic variables. I have included the lagged values of the covariates of Terms of Trade, Budget Balance GDP growth, Current Account Balance, Real interest rate, dependency, Log Gross National Income, Unemployment and Remittance. In this model the lagged values of Dependency and Gross national income had negative impacts on private savings growth with a magnitude of 0.0660 and 0.312 respectively.

Short run Impact evaluation : In the short run, interest rate liberalization was causing rise in real interest rate and thereby increase in reserve liquidity and lower credit demand took place.

Long run Impact evaluation: However with the pace of time while interest liberalization exists, `Asian financial crisis is significantly and negatively affecting the private savings growth with a magnitude of 2.906 due to huge and uncontrollable capital flight. There after the Global financial crisis is positively affecting the private savings growth with a magnitude of 11.67 significantly due to huge capital inflow towards South and East Asian region. As like before the lag value of private savings is significantly positive on the private savings growth with a magnitude of 0.702 with a long lasting persistence. Surprisingly log of Gross National Income are significantly negative.

In regression model 3 (base model) I have applied staggered fixed effect diff in diff approach. The covariates have defined the model with an R-sq of 76.1 percentage points. In this model the lag value of private saving growth, GFC crisis are significantly raising private savings growth with a magnitude of 0.653 and 7.552 respectively in South and East Asian region.

In the short run: Interest liberalization never played a significant role to increase private savings growth directly. Whereas Asian financial crisis shock, Budget balance, dependency, log of Gross National Income significantly decrease private savings growth with a magnitude of 2.083, 0.0131, 0.0839, 0.488 respectively. On the other hand CAB increases private savings growth 0.00459. It is noticeable that the budget balance is significantly decreasing private savings. Here Budget balance indicates the budget deficit.

In the long run: When budget deficit is rising which indicate the government of south and East Asian countries are aggregately increasing the fiscal stimulus. This will depreciate exchange rate due to lower interest rate in the short run. Hence in the long run export will rise. Eventually investment will fall in the countries. When the crowding out takes place due to government step the private sector crowd in will take place in a large scale. They will take the benefit by increasing asset pricing which is likely to induce private saving. During Asian financial crisis when stock market failed the price of asset dropped immensely. Large capital outflow took place for catching up with higher interest rates. Capital flew to USA and other advanced economies. So overall the private savings were showing a downward trend until 2007. Similar to previous model, the income representing log GNI and remittance are significantly lowering the private savings growth. This can again be explained by Ricardian behaviour. Ogaki et al 1995 reported that the middle and higher middle income countries can show up with diminishing returns to per capita income on savings.

Table 4:

VARIABLES	(1) OLS- intlib to AFC	(2) OLS- AFC to Sub
Interestlib	0.147**	
	(0.0661)	
AFC		0.01**
		(0)
Constant	0.167*	-0
	(0.0972)	(0)
Observations	329	330
R-squared	0.958	1.000

In the above two regressions, (Table 4)it can be observed that in the first model, interest liberalization is highly significant in causing Asian financial crisis with the presence of other significant covariates. In the second regression model 2 Asian financial crisis appears to be highly significant on impact of Global Financial crisis in South East Asian Region. Therefore interest liberalization appears to pave way to AFC and AFC to GFC.

75.91% of the Regression model 4 is explained by the covariates. In this model I have applied Random effect diff and diff approach. Most of the countries in Asian region are pegged with US $. During GFC huge capital crowd in caused currency appreciation. Subsequently the central bank relaxed the monetary policy by lowering interest in the short run period. As a result they have a little blip down in private savings in the following period of Global financial crisis. Countries where private sectors were predominantly rising asset price, transmission of capital fund to these countries were very likely to happen. **In the short run** higher investment drives the income of the people goes up. As a result, there is higher demand of goods and services. When income rose due to remittance and current account balance the demand for goods and services rose too. When USA and Euro zone were highly affected by Global financial crisis, government went for fiscal consolidation. Overall GDP of USA and Euro zone were falling down. The exchange rate depreciated due to lower interest rate in the short run. Subsequently a huge capital out flow took place towards Asian region to catch up their autarky (home) interest rate. The exchange rate appreciated. Huge investment took place. As per Keynesian characteristics as income rose, people started to save because of future higher tax. **In the long run** global financial crisis turned out to be a mechanism to stock private savings

significantly for Asian countries. The growth pattern is still enduring with the variation of time. The results appear almost similar like Model 3. To choose between Random effect and Fixed effect I ran Hausmen test.

5.4 Hausman Test

In the end I conducted a Hausman test to choose between Random effect and Fixed effect. As null hypothesis I considered the random effect model is appropriate to reach conclusion. But the P value is greater than 0. Therefore I can not conclude that I reject the null hypothesis

Test: H_0: difference in coefficients not systematic

Hausman (1978) specification test

	Coef.
Chi-square test value	0
P-value	1

Decision: Model no 4 is concluded to be appropriate.

5.5 Covariate balance

Table 5:

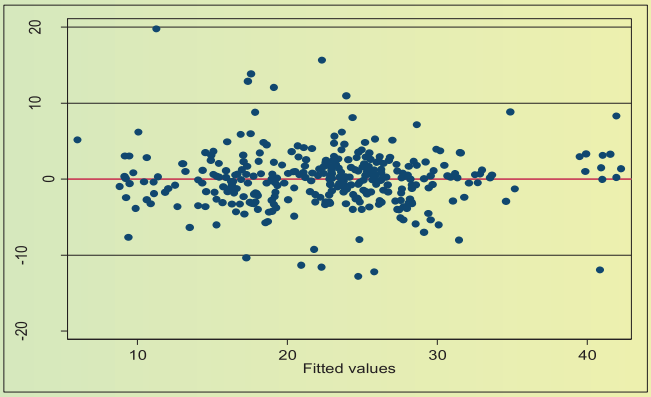
	Treated			Control			Balance	
	Mean	Variance	Skewness	Mean	Variance	Skewness	Std-diff	Var-ratio
PostCrisis~m	0.721	0.202	-0.983	0.031	0.031	5.388	2.020	6.611
subpm	0.371	0.234	0.533	0.052	0.050	4.032	0.846	4.699
PVTsavings	23.138	54.968	0.238	21.409	70.438	0.519	0.218	0.780
PVTsavings_L	23.067	56.363	0.258	21.210	69.543	0.494	0.234	0.810
Budgetbala~e	218.275	12043.180	-0.389	146.521	11534.900	0.681	0.661	1.044
GDPgrowth	198.891	12077.180	-0.086	185.938	10388.780	0.296	0.122	1.163
realint	137.192	8161.770	0.149	102.594	8877.696	0.863	0.375	0.919
dependency	57.068	170.369	0.383	72.019	154.070	-0.280	-1.174	1.106
loggnipc	13.440	1.687	0.604	12.968	1.088	1.108	0.401	1.550
unemp	61.079	841.783	-0.215	18.427	722.205	1.331	1.525	1.166
remittace	3.712	11.256	0.867	2.968	6.851	1.072	0.247	1.643

Here in table 5 most of the covariates 'standard deviation is close to zero. The variances of almost all variables are close to 1. There it appears that panel data before treatment and post treatment appears to have a normal distribution

5.6. Test of Heterogeneity

I have categorized south Asian countries as Bangladesh, India, Pakistan, Sri Lanka and Rest of the countries as East Asian countries.

Graph 3



In the graph 3 it appears that most of the observations are close to zero. To trace heteroskedasticity I ran a regression between two category of observations viz South Asian and East Asia.

5.7 Regression analysis

Table 6:

VARIABLES	(1) het-reg
PVTsavings_L	0.678***
	(0.0410)
Interestlib	-0.370
	(0.974)
GFC	8.229***
	(2.495)
AFC	-1.482*
	(0.996)
Budgetbalance	-0.0126***
	(0.00261)
GDPgrowth	0.00256
	(0.00247)
realint	0.00151
	(0.00281)
dependency	-0.0950***
	(0.0267)
loggnipc	-0.516**
	(0.239)
unemp	0.00275
	(0.00952)
remittace	-0.185**
	(0.0930)
Constant	15.97***
	(5.374)
Observations	324
R-squared	0.754

Interpretation: In the above regression Table 6 the covariates explain 75% of the OLS model with 324 observations. I ran the regression while categorizing between South vs East Asia. In this model it can be observed that interest liberalization is insignificant on private savings growth with significant impact of Asian financial crisis and Global financial Crisis.

5.8 Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

H_0: Constant variance

Variables: fitted values of PVT savings

x_1^2 = **1.63**

Prob > x^2 = 0.2019

Breusch-Pagan / Cook-Weisberg tests the null hypothesis that the error variances are all equal versus the alternative hypothesis states that the error variances are a multiplicative function of one or more variables as the value of dependent variable gets bigger. In test the chi square appears high. Therefore we cannot reject the null hypothesis that there is no heteroskedasticity

5.9 Other Econometric issues:

Firstly, to estimate savings regression and allow inertia caused by lagged value of savings in annual data, I used dynamic specification. This helps in determining the long-run and the short-run effects on savings.

Finally, there can be some unobserved country specific issues which can have an effect on private savings. Under Staggered diff in diff approach the issue of joint endogeneity and control for unobserved country specific effects associated with the regressor are well taken care off.

6.0 Conclusion

An attempt in my paper was made to show whether the impact of interest rate liberalization really worked out to develop the hub for private savings growth across 11 East and South Asian countries with a different history of economic development. In my panel study the applied econometric Diff in Diff approach ensures robustness to reduce endogeneity issues to observe the impact of post and prior macroeconomic shocks. The study figured out that the interest liberalization could not be significant to raise private savings growth in support of Mckinnon-Shaw when Asian financial crisis and GFC laid the shocks consequently. Asian Financial Crisis significantly reduced private savings growth while Global financial crisis significantly increased private savings in the Asian region. However, indirectly interest liberalization paved the way towards financial crisis. Admittedly interest liberalization suggests quality and voluminous savings in the formal financial sector under macroeconomic supervision so that it can provide necessary credit

supply. However, evidence suggests that countries experiencing decreasing budget balance will face a short term slow down and in future a long term gain will be waiting. Countries who are pegging their currencies with US$ accentuate the positive transmission through monetary policy relaxation. Interest rate decided by market causes accessibility of credit which can give rise to non bank intermediary's participation. Consequently it stimulated further capital out flow. Interestingly during 2007-08 the deregulation, declining demand, freezing financial markets, and loss of confidence Global financial crisis shock caused huge capital outflow towards Asian region from in USA and Euro zone . In the long run Asian financial crisis acted as the reminiscent towards Global financial crisis in the 11 South and East Asian countries creating large saving stock in Asian region even though unplanned interest rate liberalization.

References:

Ahmed S, (2015) Searching for Sources of Growth in Bangladesh:, Bangladesh Vision 2030: Framework for economic policy making and strategy formulation in a pluralistic democracy,Bangladesh Institute of Bank Management, pp. 49-63

Attanasio, O. P., Picci, L. and Scorcu, A. E. (2000) 'Saving , Growth , and Investment ':, Technology, 82(May), pp. 182–211.

Baharumshah, A. Z., Thanoon, M. A., & Rashid, S. (2003). Saving dynamics in the Asian countries. Journal of Asian Economics, 13(6), 827–845. *https://doi.org/10.1016/S1049-0078(02)00187-2</p*

Chowdhury, A. R. (2001). Discussion Paper No . 2001 / 78 The Impact of Financial Reform on Private Savings in Bangladesh, *Development*, (February 2001).

Balassa, B., & Balassa, B. (1993). The Effects of Interest Rates on Savings in Developing Countries. Policy Choices for the 1990s, 242–258. *https://doi.org/10.1007/978-349-13033-7_8*

Bandiera, O. et al. (2000). Does financial reform raise or reduce saving?, Review of Economics and Statistics, 82(2), pp. 239–263. *doi: 10.1162/003465300558768.*

Barro, R. J. (1974). Are government bonds net wealth? Journal of Political Economy, 82(6), 1095–1117. *https://doi.org/10.1086/260266*

Bernheim, B. D. (2014). Evaluation Equivalence : An Evidence of Theory, 2(1987), pp. 263–304.Barro, R. J. (1974) 'Are government bonds net wealth?', Journal of Political Economy, 82(6), pp. 1095–1117. *doi: 10.1086/260266.*

Briscoe, J. (1997). Economic growth, Water Quality International. doi: 10.4324/9781315678535-ch3.Bosworth, B. (2005) 'Prospects for Saving and Investment in Industrial Countries', NASPA Journal, 42(4), p. 1. *doi: 10.1017/CBO9781107415324.004.*

Carroll, C. D. and Weil, D. N. (1994). Saving and growth: a reinterpretation, Carnegie-Rochester Confer. Series on Public Policy, 40(C), pp. 133–192. *doi: 10.1016/0167-2231(94)90006-X*.

Chow, F. Y. and Eu, C. T. (2008). 'Banking Sector Stability and Financial Liberalization : Some Evidence From', Canadian Journal of Economics, (December), pp. 1–23.

Corbo, V., & Schmidt-Hebbel, K. (1991). Public policies and saving in developing countries. Journal of Development Economics, 36(1), 89–115. *https://doi.org/10.1016/0304-3878(91)90006-H*

Dolde, W. and Tobin, J. (1967) 'Retirement Saving and Capital Formation', pp. 56–57.

Douglas, K. M., & Sutton, R. M. (2010). Kent Academic Repository. European Journal of Social Psychology, 40(2), 366–374. *https://doi.org/10.1080/00369220601100075*

Edwards, S. (1995) WHY ARE SAVING RATES SO DIFFERENT ACROSS COUNTRIES:AN INTERNATIONAL COMPARATIVE ANALYSIS, NBER Working paper 5097

Foundation, G. D. (2018) 'Giordano Dell-Amore Foundation INTEREST RATE LIBERALIZATION, SAVINGS , INVESTMENT AND GROWTH : THE CASE OF KENYA / LIBERALISATION DES TAUX D ' INTERET , EPARGNE , INVESTISSEMENT ET CROISSANCE : LE CAS DU KENYA Author (s): T . W . Oshikoya Source : Savi'.

Franco Modigliani - The Life Cycle Hypothesis of Savings, (1966).the Demand for Wealth and the Supply of Capital - 1966.pdf'

Friedman, M. (1987) 'From The Collected Works of Milton Friedman, compiled and edited by Robert Leeson and Charles G. Palm.', From The Collected Works of

Milton Friedman, compiled and edited by Robert Leeson and Charles G. Palm., 4(September), pp. 3–20.

Friedman, M. (1987). From The Collected Works of Milton Friedman, compiled and edited by Robert Leeson and Charles G. Palm. From The Collected Works of Milton Friedman, Compiled and Edited by Robert Leeson and Charles G. Palm., 4(September), 3–20.

Haque, NU, Pesaran MH & Sharma S (1999), 'Neglected Heterogeneity and Dynamics in Cross-Country Savings Regressions', IMF Working Paper, International Monetary Fund, Washington, D.C. (May 1999).

Hiebert, P. (2006) 'Household saving and asset valuation in selected industrializedcountries'. *http://www.rba.gov.au/publications/rdp/2006/2006-07.html.*

Honohan, P. (2000). How Interest Rates Changed Under Financial Liberalization: A Cross-Country Review. World Bank Policy Research Working Paper, 2313.

International Monetary Fund. (2006). Uruguay: Financial System Stability Assessment, including Reports on the Observance of Standards and Codes on the following topics: Banking Supervision and Payment Systems. IMF Staff Country Reports, 06(439), 1. *https://doi.org/10.5089/9781451839388.002*

Introduction, I., Performance, E., Scheme, B., Bonded, S., Scheme, W., Credit, E., Scheme, G., Fund, E. P., & Dean, A. (2009). Liberalisation and Growth in Bangladesh: An Empirical Investigation. The Bangladesh Development Studies, 32(1), 61–76.

James P. Cunningham, A. C. H. (2005) 'MICROECONOMIC TESTS OF RICARDIAN EQUIVALENCE', (March), pp. 25–27.

Honohan, P. (2000) 'How Interest Rates Changed Under Financial Liberalization: A Cross-Country Review', World Bank Policy Research Working Paper, (2313).

Khanin, G. (1992) 'Economic growth in the 1980s', The disintegration of the Soviet economic system, pp. 73–85.Kelly, R. and Mavrotas, G. (no date) 'Cointegration Evidence from Africa', (0161).

Lee, C. H. (2002) 'March 15, 2002 INTRODUCTION: ISSUES AND FINDINGS', pp. 1–51. *doi: 10.4324/9780203218150.*

Loayza, N., Schmidt-Hebbel, K. and Servén, L. (2000) 'Saving in developing countries: An overview', World Bank Economic Review, 14(3), pp. 393–414. *doi: 10.1093/wber/14.3.393.*

Masson, P. R., Bayoumi, T. and Samiei, H. (1998) 'International evidence on the determinants of private saving', World Bank Economic Review, 12(3), pp. 483–501. *doi: 10.1093/wber/12.3.483.*

M.K Mujeri & S. Younus (2009) 'An Analysis of Interest Rate Spread in the Banking Sector in Bangladesh', *The Bangladesh Development Studies*, Vol. XXXII, December, No. 432(4), pp. 1–33

McKibbin, W. J. and Stoeckel, A. B. (2012) 'Global fiscal consolidation', Asian Economic Papers, 11(1), pp. 124–146. *doi: 10.1162/ASEP_a_00126.*

Mehran, H. and Laurens, B. (1997) 'Interest Rates: An Approach to Liberalization', Finance and Development, (June), pp. 33–35.Available at: *https://www.imf.org/external/pubs/ft/fandd/1997/06/pdf/mehran.pdf.*

Melvin, M. and Norrbin, S. (2017) 'International money and finance', International Money and Finance, pp. 1–344. *doi: 10.4324/9781315517414.*

Modigliani, F. and Brumberg, R. (2013) Utility analysis and the consumption function: An interpretation of cross-section data, Post Keynesian Economics. *doi: 10.4324/9781315016849.*

Ndirangu, N. (2008). HIE IMPACT OF FINANCIAL LIBERALIZATION ON SAVINGS IN KENYA Naomi Ndirangu A research Project submitted to the

School of Economics , University of Nairobi pursuant to the requirements of the Degree of Master of Arts in Economics © H I.

Ogaki, M. and Reinhart, C. M. (1998) 'Measuring intertemporal substitution: The role of durable goods', Journal of Political Economy, 106(5), pp. 1078–1098. *doi: 10.1086/250040.*

Onwumere, J. U. J., Okore, A. O. and Ibe, I. G. (2012) 'The impact of interest rate liberalization on savings and investment: Evidence from Nigeria', Research Journal of Finance and Accounting, 3(10), pp. 130–136.

Owusu, E. L., & Odhiambo, N. M. (2013). Financial liberalization and economic growth in Ivory Coast: An empirical investigation. Investment Management and Financial Innovations, 10(4), 171–180.

Roux, L., Moyo, C., & Le Roux, P. (2018). Munich Personal RePEc Archive Interest rate reforms and economic growth: the savings and investment channel Interest rate reforms and economic growth: the savings and investment channel. 85297.

Zagha, R., Weltbank (Eds.), (2005) Economic Growth in the 1990s. *doi: 10.1596/0-8213-6043-4.*