

Effects of Private Credit and Capitalization Deepening on Economic Growth of the Asian Countries

Altaf Hossain*

This study examines patterns of the marginal effects of financial (private credit and market capitalization) deepening on economic growth of the Asian countries from 1980 to 2013. This study also tries to detect any occurrences of excessive finance, period – wise. Outcome of the study concludes that the strength of the finance – growth nexus has been vanishing or weakening, (sometimes negative) in more recent time data of the Asian countries. During the 2008 – post – crisis period when some international regulatory frameworks like BASELIII was adopted and implemented, the effect of deepening credit growth and market capitalization are negative and smaller, respectively, on economic growth may be due to identified excessive credit growth and capitalization. The presence of excessive finance is also ensured. That is, BASELIII is not working to limit excessive finance. During other periods, where excessive finance is not diagnosed for private credit, the weaker or negative strengths of the relationships may be due to (1) something has changed in the fundamental relationship, (2) economic volatility and the increased probability of large economic crashes and (3) the potential misallocation of resources, even in good time.

JEL Classifications: S20, A15, N21

Keywords: Finance – Growth Nexus, Excessive Finance, Vanishing Effect, Post – Crisis Period, BASELIII, Dynamic Panel Data Model, Asian Countries.

1. Introduction

The general idea that economic growth is related to financial development and structure can go back at least to Schumpeter (1911). A generation ago, economists like Goldsmith (1969), Shaw (1973) and McKinnon (1973) began to draw attention to the benefits of financial structure development and financial liberalization. Most empirical studies conclude that the financial development, together with a more efficient banking system, accelerates economic growth (Levine 1997, 2005 and Wachtel 2001). However, some economists do not believe that finance – growth relationship is important (for example, Lucas 1988, and Chandavarkar 1992). Tobin (1984) suggested that a large financial sector may lead to a suboptimal allocation of talents and to private returns that are much larger than social return. Also see Rajan (2005) and Johnson (2009). Arcand, Berkes & Panizza (2012) showed that these claims have an empirical backing and that the marginal effect of financial development on economic growth becomes negative when credit to the private sector reaches 100 percent (or something plus/minus 100 percent depending on other economic or financial factors) of GDP. *This level of financial sector development, at which it starts to have a vanishing or negative marginal effect on economic growth over the recent time periods, is defined as **excessive financing**.* But Kuznets (1955) states that financial markets begin to grow as the economy approaches the intermediate stage of the growth process and develop once the economy matures.

*Assistant Professor, Department of Statistics, Islamic University, Kushtia, Bangladesh.
E-mail: rasel_stat71@yahoo.com

Hossain

In the 1980's and 1990's, several developed and developing countries liberalized their banking systems, which led to excessive financing and witnessed many episodes of banking crises characterized by a huge decrease of the level of economic growth (Rachdi 2014). Although there have some global responses like BASELIII to the problems of financial – led – economic crises, which usually comes as results of excessive finance, their implementations are not enough satisfactory to tackle crises. BASELIII, approved in Basel, Switzerland in 2009, is a comprehensive regulatory framework to regulate and supervise the international banking system to be saved from further credit crisis.

Overall, it is clear that in finance – growth literature, some studies support a presumption that larger financial sectors (financial deepening) are always good for economic growth and they have a positive marginal effect on economic growth and prosperity. On the other hand, some other but recent studies do not support the presumption. In these circumstances, it is very important to know what is happening to the impact of financial deepening on economic growth in Asia. In this regard, still there is no study with the Asian countries as a whole, which covers the 2008 – post crisis period, 2010 – 2013. Here it is mentionable that during this period some international regulatory frameworks like BASELIII was being adopted and implemented.

So in the crucial reality of deregulation and financial market liberalization, this study is an attempt to detect the occurrences of excessive finance, and find patterns of the relationship between financial deepening and economic growth with their possible associated causes over different sub-period from 1980 to 2013 in the Asian countries by using a Dynamic Panel Data (DPD) Model. In other words, the main objective is to find the effects of the period of deregulation and policies of market liberalization, and adopted regulatory measure like BASELIII on patterns of the finance – growth nexus during 1980 – 2013 in the Asian countries.

Unlike (e.g., Jun 2012) and Like (e.g., Rousseau and Wachtel 2011, and Arcand, Berkes & Panizza 2012) some recent studies, this study with the Asian countries do not support the so-called presumption that larger financial sectors (financial deepening) are always good for economic growth. Particularly, during the 2008 – post – crisis sub-period 2010 – 2013, the effect of deepening credit growth and market capitalization are negative and smaller, respectively, on economic growth may be due to identified excessive credit growth and capitalization. That is, some international regulatory frameworks like BASELIII adopted during the sub-period is not working to limit the excessive finance.

The next section reviews existing literatures to find research gaps for the study. In section 3, we report the significances and sources of data with variable description and study design. The section 4 sequentially describes appropriate models to capture the finance – growth relationship and presents a method to identify any occurrence of excessive finance. Finding and discussion are reported in section 5. Finally, conclusions are drawn on the basis of summary in section 6.

2. Literature Review

Bagehot (1873) and Schumpeter (1911) were among the first to point out that finance plays a key role for economic development. Empirical work by Goldsmith (1969) confirmed the presence of a correlation between finance and economic development but

Hossain

could not establish whether the link between these two variables was causal. Successive work by King and Levine (1993), Levine, Loayza, and Beck (2000), Beck, Levine, and Loayza (2000), and Rajan and Zingales (1998) provided convincing evidence that financial development has a causal effect on economic growth. See King and Levine (1993), de Haas (2001) and Levine (2005) for more details. Hsu and Lin (2000) had investigated the relationship long – run economic growth and financial development to see whether stock market and financial institutions promote economic growth using Taiwan's data from 1964 through 1996. They found that both banking and stock market development are positively related with short – run and long – term economic growth. Also see Arestis, Demetriades & Luintel (2001) and Hassan, Sanchez & Yu (2011). Martin Wolf noted that there might be something wrong with a situation in which “instead of being servant, finance had become the economy's master” (Wolf 2009).

Caporale et al. (2014) examined the relationship between financial development and economic growth in ten new EU member countries by estimating a dynamic panel model over the period 1994 – 2007. They reported that financial depth is found to be lacking in all ten countries, and therefore the contribution of the relatively underdeveloped credit and stock markets to growth has been rather limited, with only a minor positive effect of some indicators of financial development. It is also doubted that this might be a consequence of the large stock of non – performing loans and banking crises experienced by these economies at the beginning of the transition period. Liu and Hsu (2006) showed the finance – aggregate had positive effects on Taiwan's economy, but had negative effect on other two countries – Korea and Japan during the period of 1981 to 2001 (quarterly data). During that period Taiwanese economy suffered less than both Korea and Japan from the Asian financial crises. Jun (2012) considered a panel of 27 Asian countries over 1960 – 2009 and suggested that financial market development promotes output growth and in turn output growth stimulates further financial development; where model estimation was done using the GMM approach.

Ang and McKibbin (2007) approved that financial liberalization is an integral part of financial sector development. See also Kim and Kenny 2007, Galindo, Schiantarelli & Weiss 2007, Baltagi, Demetriades & Law 2009 and Abiad, Oomes & Ueda 2008. Identifying the causes – financial crises and excessive financial deepening, Rousseau and Wachtel (2011) show that the finance – growth relationship has been weakened in more recent data. Particularly, the strength of this relationship of period from 1990 to 2009 is not as strong as it was during 1960 to 1989. However they find little indication that liberalization played an important direct in reducing the effect of finance. See also Rousseau and Wachtel (2005). Cecchetti and Kharroubi (2012) investigated how financial development affects aggregate productivity growth. They found that the level of financial development is good only up to a point, after which it becomes a drag on growth, i.e., financial sector size has an inverted U – shaped effect on productivity growth. Arcand, Berkes & Panizza (2012) identifies a threshold above which financial development no longer has a positive effect on economic growth. And the results suggest that finance starts having a negative effect on output growth when credit to the private sector reaches 100% of GDP. Aghion, Banerjee & Piketty (1999) argue that a more developed financial sector is able to absorb macroeconomic shocks. However, in the 1980's and 1990's, several developed and developing countries liberalized their banking systems and witnessed many episodes of banking crises characterized by a huge decrease of the level of economic growth (Rachdi 2014). Rachdi (2014) investigated the finance – growth nexus in presence of banking crises for both high –

Hossain

income (OECD) and MENA (non - OECD) countries over the period 1980 – 2009. Their econometric results show a negative coefficient between banking crises and economic growth. This coefficient is not statistically significant for high – income countries and significant for MENA countries.

Literature reviews of this study induce the following research gaps. There is a big question about the presumption that larger financial sectors (financial deepening) are always good for economic growth and they have a positive marginal effect on economic growth and prosperity. Some studies support the presumption and some other does not. Numerous researches on the finance – growth nexus have been conducted but most uses data on industrialized nations such as OECD. No study checked what is happening to the impact of financial deepening on economic growth of the Asian countries as a whole. Although there are some researches with the Asian countries on this issue but these were limited to only a small number of Asian countries such as China, Japan, Korea, Malaysia, and Taiwan (see Ang and McKibbin 2007, Liang and Teng, 2006, and Lui and Hsu 2006 among others for example). Moreover, these studies did not cover the recent 2008 crisis period and its post crisis period when some international regulatory framework like BASELIII was taken to limit the excessive finance.

On the basis of the above literature review and research gaps, there are some testable hypotheses as follows, mainly about the so-called presumption that financial deepening on economic growth is positive. That is, (i) whether the marginal effects of financial deepening on economic growth of the Asian countries are positive or negative or weakening during different sub-periods from 1980 to 2013; that is, whether the period of deregulation and policies of financial market liberalization, started in the last half of the 1980s, have changed the so – called presumption about the finance – growth nexus of the Asian countries, (ii) whether some international regulatory framework like BASELIII adopted during the 2008 – post – crisis period adequately perform in the Asian countries to limit the excessive finance or not, and (iii) whether there is any occurrences of excessive in the Asian countries during the study period.

3. Data and Study Design

This study considers panel data on financial and macroeconomic indicators for the Asian countries over the period from 1980 to 2013. Data are downloaded from the latest edition (2014) of the World Bank's *World Development Indicators (WDI) data base*. The selection of countries from Asia is based on data availability from this source. The variables are selected based on survey of the existing related literatures, especially the recent ones. During variable selection procedure, another consideration of keeping a minimum number of variables was in mind to make the model more parsimonious. The per capita GDP growth is used as the dependent variable. The ratio of private credit to GDP (PC) is used as the indicators of banking sector development for one of the explanatory variables. On the stock markets, for example, the explanatory variable is the ratio of stock market capitalization to GDP (MC). Furthermore, initial per capita GDP growth, percentage of gross secondary school enrolment, the share of government consumption in GDP and openness to trade measured by the ratio of imports and exports to GDP are considered as control variables.

To implement objectives, the whole period from 1980 to 2013 will be divided into several sub – periods (eg., 1980 to 1984; 1985 to 1989; 1990 to 1994; 1995 to 1999; 2000 to

2004; 2004 to 2007; 2007 to 2010 and 2010 to 2013) and the dynamic panel data (DPD) model will be applied to each sub-periods to find the marginal effects of the financial sector development on economic growth of the Asian countries for each sub-periods in presence of other controlling variables like governmental consumption, openness and secondary school enrolment . The time span of 1980 to 2013 is selected for our study as we want to see the impact of the policy of deregulation and financial market liberalization, which took place during the end of the 1980s and the early 1990, on the finance growth nexus of the Asian countries.

4. Theoretical Underpinnings

King and Levine (1993) shows a robust causal relationship between financial sector development or financial deepening (FD) and economic growth (y) by using the following model (general form) of the panel data structure.

$$y_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where $i = 1, 2, \dots, n$ represents the cross-sectional unit beginning with the first individual unit (1) and proceeding to the last (n), $t = 1, 2, \dots, T$ captures the time period in which the subject is observed beginning with the first time period (1) and proceeding to the last (T), and w is an unobservable independent variable. μ and λ are for individual and time dummies, respectively. Finally ε stands for the disturbance term of the model. Main concern is with the value of β_1 where higher positive value indicates that the finance – growth relationship is positive and stronger. FD includes the indicators of financial sector development/deepening. X stands for control variables. Many economic issues are dynamic by nature and use the panel data structure to understand adjustment. If initial GDP or one time lagged dependent variable is used as an explanatory variable, the above model is called a dynamic panel data (DPD) model and this model is broadly discussed as follows.

A serious difficulty arises with the one – way fixed effects models in the context of a dynamic panel data model particularly in the “small T, large N” context. As Nickell (Econometrica 1981) shows, this arises because the demeaning process which subtracts the individual’s mean value of y and each X from the respective variable creates correlation between regressor and error. The same problem affects the one – way random effects model. The u_i error component enters every value of y_{it} by assumption, so that the lagged dependent variable cannot be independent of the composite error process.

One – solution to this problem involves taking first differences of the original model. Consider a model containing lagged dependent variable and a single regressor X:

$$y_{it} = \beta_0 + \rho y_{i,t-1} + X_{it} \beta_1 + \mu_i + \varepsilon_{it}$$

The first difference transformation removes both the constant term and the individual effect:

$$\Delta y_{it} = \rho \Delta y_{i,t-1} + \Delta X_{it} \beta_1 + \Delta \varepsilon_{it}$$

There is still correlation between the differenced lagged dependent variable and the disturbance process: the former contains $y_{i,t-1}$ and the latter contains $\varepsilon_{i,t-1}$.

Hossain

In this context, the DPD approach is usually considered as the work of Arellano and Bond (AB) (Rev. Ec. Stad. 1991), but they in fact popularized the work of Holtz – Eakin, Newey and Rosen (Econometrica 1988). It is based on the notion that the instrumental variables approach noted above does not exploit all of the information available in the sample. By doing so in a generalized method of moments (GMM) context, we may construct more efficient estimator of the dynamic panel data model. Arellano and Bond argue that the Anderson – Hsiao estimator, while consistent, fails to take all of the potential orthogonality conditions into account. A key aspect of the AB strategy, echoing that of AH, is the assumption that the necessary instruments are ‘internal’: that is, based on lagged values of the instrumented variable(s). The estimators allow the inclusion of external instruments as well. The AB approach, and its extension to the ‘System GMM’ context, is an estimator designed for situations with: (1) ‘Small T, large N’ panels, (2) A linear functional relationship, (3) One left – hand variable that is dynamic, depending on its own past realizations, (4) Right – hand variables that are not strictly exogenous: correlated with past and possibly current realizations of the error and (5) Fixed individual effects, implying unobserved heterogeneity.

The Arellano – Bond estimator sets up a generalized method of moments (GMM) problem in which the model is specified as a system of equations, one per time period, where the instrument applicable to each equation differ. A potential weakness in the Arellano – Bond DPD estimator was revealed in later work by Arellano and Bover (1995) and Blundell and Bond (1998). The lagged levels are often rather poor instruments for the first differenced variables, especially if the variables are close to a random walk. Their modification of the estimators includes lagged levels as well as lagged differences. The original estimator is often entitled difference GMM, while the expanded estimator is commonly termed System GMM. The cost of the system GMM estimator involves a set of additional restrictions on the initial conditions of the process generating y . That’s why we will use difference GMM methods in estimating the DPD model for our analysis.

A crucial assumption for the validity of GMM is that the instruments are exogenous. As the DPD estimators are instrumental variable methods it is particularly important to evaluate the Sargan – Hansen test results when they are applied. There is another test named the Hansen of overidentifying restrictions – if not rejected, provide support for the validity of exclusion restrictions. For the system GMM estimator instruments may be specified as applying to the differenced equations or both. Another important diagnostic in DPD estimation is the AR (1) test for autocorrelation of the residuals. If the assumption of serial independence in the original errors is warranted, the differenced residuals should not exhibit significant AR (2) behaviour. If a significant AR (2) statistic is encountered, the second lags of the endogenous variables will not be appropriate instruments for their current values. If T is far large (more than 7 – 8) an unrestricted set of lags will introduce a huge number of instruments, with a possible loss of efficiency. By using lag limit options, we can specify, for instance, that only lags 2 – 5 are to be used in constructing the GMM instruments.

Since financial sector development or deepening should have its limits with respect to the respective country’s economic growth. If the financial sector develops more rapidly than the growth of the respective country’s GDP, then this excessive financial deepening might be a burden on the economy. There are many historical evidences that the financial sector developments have its vanishing or negative marginal effects on the

GDP growth due to excess financing in the context of developing and developed countries both. This scenario can be depicted in the following **Figure 1**.

Figure 1: The effect of excessive financial deepening on the economic growth.

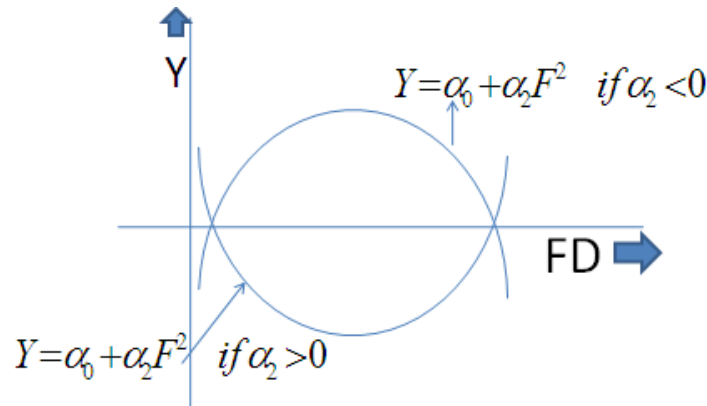


Figure 1 illustrates that the financial sector development (FD) has positive effect on the economic growth (Y) up to a point, above which further FD (excessive finance) has its negative effect on output, Y if $\alpha_2 < 0$. That is, the excess finance starts having negative effect on the economic growth for this case. To capture and/or test the presence of the effect of excess financing in the model, King and Levine’s version of the Barrow growth regression has the form

$$Y_{it} = \alpha_0 + \alpha_1 FD_{it} + \alpha_2 FD_{it}^2 + \beta X_{it} + u_{it}$$

And the Dynamic Panel Data (DPD) model capturing the effect of excess finance has the following form

$$Y_{it} = \rho Y_{i,t-1} + \alpha_1 FD_{it} + \alpha_2 FD_{it}^2 + \beta X_{it} + u_{it}$$

The estimation method is the same (GMM) for both types of models – one type does not include square term (FD^2) and other type includes this term to capture excessive finance. If $\alpha_1 > 0$ and $\alpha_2 < 0$ then the financial deepening has a positive effect on the economic growth but the effect starts to have negative when the financial deepening exceeds its limit to the economic growth.

5. The Findings and Discussions

The **Table 1** reports the results of a set of panel regressions aimed at estimating the effect of credit to private sector on economic growth. Panel regressions are used for each 5-year-period (except the periods 2004 – 2007, 2007 – 2010 and 2010 – 2013, which are 4 – year – period each, as to treat the period of 2007 – 2010 as the recent financial led economic crisis and the period of 2010 – 2013 as the recent post crisis period) from 1980 to 2013 and are estimated using the difference – GMM with all available control variables used as instrument. For the model of the results of Table 1, the ratio of private credit to GDP (PC) is used as the indicator of financial sector development. The set of controls include initial GDP per capita growth (not reported in table), the government consumption over GDP (GC), the trade openness (Trade), the rate of secondary school enrollment (SSEn) and time fixed effects (not reported in table).

Hossain

The bottom six rows of the table 1 report the standard difference GMM specification tests and show that all regressions (except that of periods, 1990 – 1994 and 2010 – 2013) reject the null of no first order autocorrelation, and most models do not reject the null of no second order autocorrelation (the exception is the period, 1985 – 1989, where the null is marginally rejected with a p-value of 0.049). The Hansen tests of the overidentifying (OID) restrictions never reject the null, and thus provide support for the validity of our exclusion restrictions.

The first column of the **Table 1** estimates the model for the period 1980 – 1984 and confirms the presence of a positive and statistically significant correlation between financial depth (PC) and growth. This correlation is also positive, statistically significant and same for the both periods 1985 – 1989 and 1990 – 1994 but the strengths of the relationships/correlations have been remarkably declined to the point estimate of 0.054 from the point of 0.122 in the period 1980 – 1984.

This trend of declining strength of the relationship still continues in the period 1995 – 1999 and weakened to the point of 0.01, rather the situation has been worsen more that the relationship is not statistically significant during this period. The statistically significant but a negative correlation/relationship has been started with the point estimate of – 0.06 in the period 2000 – 2004 and this negative relation continues upto the period of 2010 – 2013 (the point estimate of – 0.09). There is only one exception in the period 2004 – 2007 (between the periods of 2000 – 2004 and 2010 – 2013) that the correlation is positive (0.053) and statistically significant however the strength of the relationship is still far less than that of the starting period 1980 – 1984.

According to Arcand, Berkes & Panizza (2012), there are two possible explanations for the vanishing or (recently) negative effects documented in table 1. One possibility is that something has changed in the fundamental relationship between financial depth and economic growth. The second explanation has to do with the fact that the true relationship between financial development and economic growth is non – monotonic and the models of table 1 are miss–specified and therefore suffer from the increasing downward bias that we hypothesized in the introduction.

If the relationship between financial depth and growth is indeed non-monotonic, the increase in the share of observations with a large financial sector must have played a role in amplifying the downward bias of the miss – specified regressions of table 1. This would lead to the low and insignificant or sometimes negative point estimates of the marginal effect of PC on economic growth. The upshot is that, despite being miss–specified, the standard linear equation without a quadratic term worked well with smaller financial sectors. However, the impact of the miss-specification error is amplified in the presence of large financial sectors.

Hossain

Table 1: Panel Estimations for Private Credit to GDP on Economic Growth

	1980 - 1984	1985 - 1989	1990 - 1994	1995 - 1999	2000 - 2004	2004 - 2007	2007 - 2010	2010 - 2013
PC	0.122*** (0.04)	0.054*** (0.02)	0.054*** (0.011)	0.01 (0.03)	-0.06*** (0.02)	0.053* ** (.003)	-0.04*** (0.01)	-0.09*** (0.01)
GC	0.04 (.12)	-0.21** (0.05)	-0.21*** (0.06)	0.03 (0.2)	-0.20*** (0.01)	- 0.23*** (.005)	-0.89*** (0.12)	-0.14 (0.1)
Trade	- 0.013 (0.03)	0.01 (0.00)	-0.002 (0.007)	-0.07*** (0.02)	0.07*** (0.00)	0.08*** (0.002)	0.12*** (0.006)	0.19*** (0.009)
SSEn	0.54*** (0.10)	-0.033* (0.02)	0.08*** (0.02)	-0.44*** (0.05)	0.12*** (0.01)	0.16*** (0.01)	0.26*** (.03)	0.15*** (0.03)
N. Obs.	88	103	113	85	147	128	125	85
N. Gr.	22	23	27	29	37	39	38	32
AR1	-2.02	-1.25	-0.84	-2.20	-1.91	-1.36	-1.58	-0.23
p-value	0.043	0.210	0.40	0.028	0.056	0.17	0.12	0.81
AR2	0.14	-1.97	1.26	-0.03	0.72	-0.33	-0.65	-1.16
p-value	0.893	0.049	0.20	0.979	0.47	0.74	0.52	0.25
OID	19.96	20.44	19.46	22.08	29.88	33.15	31.77	28.94
p-value	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
RobusRobust (Windmeijer) standard errors in parenthesis; ***means p<0.01, **means p<0.05, *means p<0.1, N. Obs. is the number of observations and N. Gr. is the number of groups.								

In these circumstances, **Table 2** reports the results of a set of panel regressions aimed at estimating the effect of both credit to private sector and its square term on economic growth where the fitted models have considered the presence of a non-monotonic relationship.

Since the coefficient of squared term of PC is a positive value for the period of 1980 – 1984, the size of the financial sectors are smaller (no excessive financing) during this period and it indicates that the standard linear equation without a quadratic term works well. So the point estimate of 0.122 from the table 1 will be kept as the marginal contribution of PC to economic growth for the period 1980 – 1984. For the period 1985 – 1989, the coefficient of squared term is a negative value which suggests that there are larger financial sectors (excessive financing) during this period. So excessive finance or financial depth made the marginal effect of PC on growth reduced to the point estimate of 0.054 (given in table 1, without adding a quadratic term) during the period 1985 – 1989. But the marginal effect of PC on growth is the point of 0.19 in table 2 after adding the squared term to the models.

Hossain

Table 2: Panel Estimations for Private Credit to GDP and its squared term

	1980 - 1984	1985 - 1989	1990 - 1994	1995 - 1999	2000 - 2004	2004 - 2007	2007 - 2010	2010 - 2013
PC	0.053*** (0.2)	0.19*** (0.04)	-0.38*** (0.11)	0.18*** (0.03)	-0.15*** (0.01)	0.045*** (0.005)	-0.13*** (0.007)	0.15*** (0.02)
SSqPC	0.0004*** (0.0001)	-0.0008*** (0.0002)	0.0012*** (0.00)	-0.0009 *** (0)	0.0004*** (0.00)	0.00003** (0.0)	0.0003** * (0.0)	-0.001*** (0.0)
GC	-0.03 (0.07)	0.03 (0.13)	-0.61** (0.23)	-0.49*** (0.07)	-0.23*** (0.01)	-0.22*** (0.02)	-0.85*** (0.06)	-0.305* * (0.12)
Trade	0.04 (0.02)	-0.03* (0.02)	0.065*** (0.02)	-0.06*** (0.008)	0.081*** (0.00)	0.07*** (0.002)	0.13*** (0.002)	0.23*** (0.003)
SSEn	0.63*** (0.12)	-0.03* (0.01)	-0.23*** (0.068)	-0.47*** (0.02)	0.10*** (0.01)	0.18*** (0.012)	0.25*** (0.011)	0.17*** (0.02)
N. Obs.	88	103	102	85	147	128	125	85
N. Gr.	22	23	26	29	37	39	38	32
AR1	-2.57	-1.42	-0.45	-2.10	-1.93	-1.38	-1.56	-0.23
p-value	0.01	0.157	0.65	0.036	0.053	0.16	0.12	0.81
AR2	0.08	-1.80	0.49	-0.54	0.73	-0.45	-0.69	-1.18
p-value	0.94	0.072	0.62	0.59	0.46	0.65	0.49	0.23
OID	15.16	15.41	17.99	21.31	30.21	34.61	28.38	25.04
p-value	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Robust (Windmeijer) standard errors in parenthesis; ***p<0.01, **p<0.05, *p<0.1								

During the period 1990 – 1994, the positive coefficient of the squared PC indicates that there is no excess financing or financial depth. Any other fundamental changes in the finance – growth nexus reduced the marginal effect of PC on the economic growth to the point of 0.054 (given in table 1) during the period 1990 – 1994. So we don't need to add the squared PC to the model but we can keep the point estimate of 0.054 as the marginal effect of PC on growth during this period. Similarly, excess financing during the period 1995 – 1999 made the marginal effect of PC on economic growth reduced to the point of 0.01 and insignificant. With the squared PC, the coefficient of the squared PC is a negative value and the marginal effect of PC on growth is the point of 0.18.

During the period 2000 – 2004, the marginal effect of PC on growth is a negative value for both with and without a squared term. The positive coefficient of squared PC suggests that there is no excess finance during this period. The causes of this robust negative correlation between financial sector development and economic growth during this period might be the economic volatility and the increased probability of large economic crashes, or due to that something has been changed in the fundamental relationship between finance and growth. Both with and without adding the squared PC

Hossain

to the models, the marginal effect of PC on growth shows a statistically significant and positive value during the period 2004 – 2007 as the period 1990 – 1994.

Similar to the period 2000 – 2004, the marginal effect of PC on growth is a negative value for both with and without squared PC during the crisis period 2007 – 2010, which indicates that occurrence of the financial crisis, especially banking crisis had changed something in the fundamental relationship between financial deepening and economic growth of the Asian countries during this period. Like the period 1985 – 1989, the relationship or correlation is a negative value during the period 2010 – 2013 due to the effect of excessive finance. That is, global responses like BASELIII to the problem of crises as results of excessive finance is not considered and not implemented in the Asian countries. With the squared PC, the marginal effect of PC on growth is the point of 0.15 during the period 2010 – 2013.

The **Table 3** reports the results of a set of panel regressions aimed at estimating the effect of market capitalization as a ratio of GDP on economic growth. The ratio of market capitalization to GDP (MC) is used as the indicator of financial sector development. The bottom six rows of the table report the standard difference GMM specification tests and show that all regressions not reject the null of no first order autocorrelation as well as second order autocorrelation without any exception. The Hansen tests of the overidentifying restrictions never reject the null and thus provide support for the validity of our exclusion restrictions. The precisions of the models used in the different periods of the table 3 are more or less the same and all the models are highly précised as the standard errors (within the first brackets) are very much closed to 0 (zero). For MC, the time period have started from the period 1990 – 1994 instead of 1980 – 1984; this is because, the period 1980 – 1989 does not have enough amount of observations for MC so that the DPD model can be fitted.

The marginal effects of MC as the ratio of GDP are all positive and statistically significant (except the period of 2004 – 2007) for all the periods from 1990 to 2013. During the period 1990 – 1994, the point estimate of the marginal effect of MC is 0.005 which is a very low – sized value but this effect increases to the point of 0.028 by the period 1995 – 1999 and then it again increases to the point of 0.043 by the period of 2000 – 2004. This increasing trend breaks during the period 2004 – 2007. During this period, the marginal effect of MC is the point of – 0.0006, which is a negative value although the magnitude or strength of the value is insignificant and very much closed to 0 (zero). When the model is fitted for the period 2007 – 2010, the marginal effect of MC gets its increasing pace back but the point estimate of the effect is 0.019, which is lower than that of the periods 1995 – 1999 and 2000 – 2004 both. But during the period 2010 – 2013, the marginal effect is the point of 0.05 which is the highest value among all periods.

Hossain

Table 3: Panel Estimations for Market Capitalization (MC) on Economic Growth

	1990 - 1994	1995 - 1999	2000 - 2004	2004 - 2007	2007 - 2010	2010 - 2013
MC	0.005*** (0.00)	0.028*** (0.003)	0.043*** (0.002)	-0.0006 (0.0005)	0.019*** (0.001)	0.05*** (0.003)
GC	-1.68*** (0.40)	0.36*** (0.13)	-0.82*** (0.03)	0.41*** (0.069)	-1.32*** (0.09)	-1.45*** (0.30)
Trade	0.037*** (0.01)	-0.17** (0.01)	0.032*** (0.004)	0.08*** (0.002)	0.095*** (0.003)	0.067*** (0.009)
SSEn	-0.016 (0.06)	-0.35*** (0.07)	0.16*** (0.03)	0.12*** (0.008)	0.25*** (0.03)	0.075 (0.06)
N. Obs.	64	60	113	100	95	64
N. Gr.	17	21	27	28	28	25
AR1	-1.15	-1.89	-1.60	-0.78	-0.96	-0.05
p-value	0.25	0.059	0.11	0.43	0.33	0.96
AR2	-0.16	1.02	0.56	-0.13	-2.37	-0.44
p-value	0.87	0.30	0.57	0.89	0.02	0.66
OID	11.63	14.18	21.40	20.55	22.61	21.38
p-value	0.866	1.0	1.0	1.0	1.0	1.0

The **Table 4** reports the results of a set of panel regressions aimed at estimating the effect of market capitalization on economic growth. Panel regressions are used for each sub-period. Both the ratio of market capitalization to GDP (MC) and its squared term (SqMC) are used as the indicators of financial sector development.

All the point estimates of the marginal effect of SqMC (squared MC) are both negative and statistically significant (although the magnitudes are very small), which indicate that excess market capitalization (large financial market) is present in Asia during each period. That is, the true relationship between financial sector development (specifically, market capitalization) and economic growth is non – monotonic.

The marginal effect of MC on economic growth was the point of 0.005 (suffered from the downward bias) without adding SqMC in the model during the period 1990 – 1994 whereas this effect figure is 0.08, which is both positive and significant, after adding the SqMC term during the same period. During 2004 – 2007, the point estimate was – 0.0006 (without adding the SqMC term), which was negative, insignificant and closed to zero whereas this point figure is 0.026 (after adding the SqMC term), which is both positive and significant. For the case of MC, there is nothing changed in the fundamental relationship between financial deepening and economic growth; but excessive finance causes the vanishing or negative effect on economic growth. So it is appropriate to add

Hossain

the squared MC to models for checking the marginal effects of MC on growth over all periods from 1990 – 2013 in Asia.

Table 4: Panel Estimations for Market Capitalization (MC) and its squared term

	1990-1994	1995-1999	2000 - 2004	2004 - 2007	2007 - 2010	2010 - 2013
MC	0.08*** (0.003)	0.09*** (0.004)	0.055*** (0.001)	0.026*** (0.00)	0.047*** (0.003)	0.087*** (0.008)
SqMC	-0.0001*** (0.00)	-0.0002*** (0.0)	-0.00004*** (0.0)	-0.00005*** (0.0)	-0.00005*** (0.0)	-0.00001*** (0.0)
GC	-2.18*** (0.12)	0.58*** (0.04)	-0.63*** (0.01)	0.15*** (0.017)	-1.47*** (0.07)	-1.68*** (0.07)
Trade	-0.03*** (0.002)	-0.21*** (0.000)	0.05*** (0.0)	0.074*** (0.0)	0.092*** (0.001)	0.047*** (0.002)
SSEn	-0.18*** (0.0003)	-0.32*** (0.05)	0.101*** (0.006)	0.12*** (0.003)	0.25*** (0.02)	0.072*** (0.017)
N. Obs.	64	60	113	100	95	64
N. Gr.	17	21	27	28	28	25
AR1	-1.38	-1.89	-1.74	-0.86	-1.54	0.28
p-value	0.17	0.05	0.08	0.39	0.13	0.77
AR2	-0.07	1.02	0.72	0.18	-2.16	-0.75
p-value	0.94	0.31	0.47	0.85	0.03	0.45
OID	9.41	14.14	18.04	24.07	21.27	18.76
p-value	1.0	1.0	1.0	1.0	1.0	1.0

After adding the SqMC term to the model, it shows that the level of the point estimates of the marginal effects of MC on growth is higher than that of the level of the model without adding the SqMC (Table 3) for all periods. However, the directions of the increasing or decreasing trend of the marginal effect of MC are the same as the model without adding SqMC within the same period. That is, the strength of the marginal effect of MC increases from the period 1990 – 1994 to the period 1995 – 1999, and decreases during the period 2000 – 2004 and it decreases further during the period 2004 – 2007.

In the period 2007 – 2010, this marginal effect again gets its increasing trend of the strength back although this period 2007 – 2010 cannot exceed the previous periods (except the period 2004 – 2007) in magnitude/strength yet. But the marginal effect of MC on growth shows the highest strength during the recent period 2010 – 2013 among other considered periods. Finally, during all periods, the point estimates of the marginal effects

Hossain

of MC on economic growth are both positive and statistically significant detecting the presence of excessive finance.

Unlike (e.g., Jun 2012) some recent studies with the Asian countries, this study with the same countries do not support the so-called presumption that financial deepening on economic growth is positive. During the 2008 – post – crisis sub-period 2010 – 2013, the effect of deepening credit growth and market capitalization are negative and smaller, respectively, on economic growth may be due to identified excessive credit growth and capitalization. Having added the square term of credit growth and market capitalization separately, the presence of excessive finance is ensured, which indicates that BASELIII is not implemented or not working in the Asian countries during this post crisis period.

6. Summary, Conclusions and Limitations

There is a general presumption that larger financial sectors (financial deepening) are always good for economic growth and they have a positive effect on economic growth and prosperity. Although there exists a large number of literatures showing that ‘financial deepening’ plays a positive role on economic development (Levine 2005), there are also a few experts who question the robustness of the finance – growth relationship. Following the same paths of Rousseau and Wachtel (2011) and Arcand, Berkes & Panizza, (2012), this research also questions the above mentioned presumption but about the Asian countries, and test the following hypotheses: (i) whether the marginal effects of financial deepening on economic growth of the Asian countries are positive or negative or weakening during different sub-periods from 1980 to 2013; that is, whether the period of deregulation and policies of financial market liberalization, started in the last half of the 1980s, have changed the so – called presumption about the finance – growth nexus of the Asian countries, (ii) whether some international regulatory framework like BASELIII adopted during the 2008 – post – crisis period adequately perform in the Asian countries to limit the excessive finance or not, and (iii) whether there is any occurrences of excessive in the Asian countries during the study period. This work brings in a new dimension considering the Asian countries as a whole and covering the 2008 – post crisis period of 2010 – 2013, during which period, some international regulatory framework like BASEL III was adopted and implemented. The study uses a dynamic panel data (DPD) model to capture and find the strength of the finance – growth nexus. The squared terms of private credit and market capitalization are respectively added to the DPD model to identify any occurrences of excessive finance.

Unlike (e.g., Jun 2012) and Like (e.g., Rousseau and Wachtel 2011, and Arcand, Berkes & Panizza, 2012) some recent studies, outcome of the study does not support the so – called presumption and suggests that the strength of finance – growth relationship of the Asian countries is not as strong (sometimes negative) in more recent data as it was in the original studies with data for the period from 1960 to 1980. In this regard or circumstances, Rousseau and Wachtel (2011) doubted that the incidences of financial crises and excessive financial deepening or too rapid growth of credit were related to the dampening of the effect of financial deepening on growth. They also concluded that excessive financial deepening may also be a result of widespread financial liberalizations in the late 1980s and early 1990s in countries that had lacked the legal or regulatory infrastructure to exploit financial development successfully.

Hossain

Upon adding the square term of private credit and market capitalization to the models, we get results that are also consistent (with some exceptions) with the results of Arcand, Berkes & Panizza, (2012) – “if the true relationship between financial depth and economic growth is non – monotone, models that do not allow for non – monotonically will lead to a downward bias in the estimated relationship between financial depth and economic growth.” However, the level of the strength of the finance – growth relationship of our analysis is lower for the Asian countries compared to other studies for other countries, especially, the developed countries. That is, using the square term of deepening in the model we test whether there is any excessive financial deepening on growth and our results prove that there are excessive finances (private credit) during some periods. Occurrence of such excessive finance (private credit) may be responsible for the lower or negative strength of finance growth relationships during the respective periods. During other periods, where excessive finance is not diagnosed for private credit, the weaker or negative strengths of the relationships may be due to (1) something has changed in the fundamental relationship, (2) economic volatility and the increased probability of large economic crashes (Minsky 1974, and Kindleberger 1978) and (3) the potential misallocation of resources, even in good times (Tobin 1984). During the post – crisis (of 2008) period, 2010 – 2013, the effect of deepening credit growth is negative on economic growth may be due to identified excessive credit growth; that is, having added the square term of credit growth the credit growth is a positive value and strongly significant; which indicates that BASEL III is not implemented or not working in the Asian countries. The conclusion is almost the same for the marginal effect of market capitalization as that of the credit growth on economic growth in Asian countries. During all sub-periods from 1990 to 2013, there is excessive market capitalization (however, it happens in small scale) which may be responsible for the vanishing effect (over different time periods) or negative effect of market capitalization on economic growth in recent time periods. After capturing excessive market capitalization in the model, its marginal effects are all positive and significant; however, the pattern of vanishing effects still exists except that in the period, 2010 – 2013.

To keep the finance – growth relationship strongly positive, we suggest that the policy makers of Asian countries should consider the following governmental or public actions – (1) limiting excessive financial deepening, (2) managing financial – led – economic crises and volatility, (3) controlling the potential misallocation of resources, (4) disobeying some unrealistic obligations by international organizations like IMF, WB and WTO and (5) finally searching the causes what changes occurred in the fundamental relationship between finance and growth.

Some limitations in the process of marriage between statistical models and the related theories of financial economics remain in our study. This process of marriage essentially makes a statistical model enlivened one in the field of financial econometrics. We cannot try to completely separate the causes behind the vanishing effect of financial deepening on economic growth from the causes of the negative effect of that financial deepening although it is very difficult to implement as our analysis gives mixed results for the Asian countries.

References

- Abiad, A, Oomes, N & Ueda, K 2008, 'The quality effect: Does financial liberalization improve the allocation of capital?', *Journal of Development Economics*, vol. 87, pp. 270 – 282.
- Aghion, Ph, Banerjee, A & Piketty, T 1999, *Financial liberalization and volatility in emerging market economies*, In: Agenor, PR, Miller, M, Vines, D, & Weber, A (Eds), *The Asian Financial Crises: Causes, Contagion and Consequences*, Cambridge University Press, Cambridge, pp. 167 – 190.
- Ang, JB & Mckibbin, WJ 2007, 'Financial liberalization, financial sector development and growth: Evidence from Malaysia', *Journal of Development Economics*, vol. 84, pp. 215 – 233.
- Arcand, JL, Berkes, E & Panizza, U 2012, 'Too much finance?', *IMF working paper*, 12/161.
- Arestis, P, Demetriades, PO & Luintel, KB 2001, 'Financial Development and Economic Growth: The Role of Stock Markets', *Journal of Money, Credit, and Banking*, vol. 33, pp. 16 – 41.
- Bagehot, W 1873, *Lombard Street: A Description of the Money Market*, *History of Economic Thought Books*, McMaster University Archive for the History of Economic Thought.
- Baltagi, BH, Demetriades, PO & Law, SH 2009, 'Financial Development and openness: Evidence from panel data', *Journal of Development Economics*, vol. 89, pp. 285 – 296.
- Beck, T, Levine, R & Loayza, N 2000, 'Finance and Sources of Growth', *Journal of Financial Economics*, vol. 58, pp. 261 – 300.
- Caporale, GM, Rault, C, Sova, R & Sova, A 2014, 'Financial Development and Economic Growth: Evidence from Ten New EU Members', *IZA Discussion Paper No. 8397/2014*, The Institute for the Study of Labor (IZA), Bonn, Germany.
- Chandavarkar, A 1992, 'Of Finance and Development: Neglected and Unsettled Questions', *World Development*, vol. 20, pp. 133 – 142.
- Cecchetti, SG & Kharroubi, E 2012, 'Reassessing the impact on growth', *BIS Working Paper WP/2012/381*, *Monetary and Economic Department*, Bank for International Settlements.
- De Haas, RTA 2001, 'Financial Development and Economic Growth in Transition Economies: A Survey of the Theoretical and Empirical Literature', *Research Series Supervision 35*, Netherlands Central Bank.
- De la Torre, A, Ize, A & Schmukler, S 2011, *Financial Development in Latin America and the Caribbean: The Road Ahead*, The World Bank, Washington DC.
- Galindo, A, Schiantarelli, F & Weiss, A 2007, 'Does financial liberalization improve the allocation of investment? Micro evidence from developing countries', *Journal of Development Economics*, vol. 83, pp. 562 – 587.
- Goldsmith, RW 1969, *Financial Structure and Development*, Yale University Press, New Haven.
- Hassan, MK, Sanchez, B & Yu, JS 2011, 'Financial Development and Economic Growth: New Evidence from Panel Data', *The Quarterly Review of Economics and Finance*, vol. 51, 88 – 104.
- Hsu, CM & Lin, SM 2000, 'Financial Development and Endogenous Growth Model', *Industry of Free China*, vol. 9, pp. 21 – 47.
- Johnson, S 2009, *The quiet coup*, *The Atlantic* (May 2009).

Hossain

- Jun, S 2012, 'Financial Development and Output Growth: A Panel Study for Asian Countries', *Journal of East Asian Economic Integration*, vol. 16, no. 1, pp. 97 – 115.
- Kindleberger, CP 1978, *Manias, Panics, and Crashes: A History of Financial Crises*, Basic Books, New York.
- Kim, B & Kenny, WL 2007, 'Explaining when developing countries liberalize their financial equity markets', *Journal of International Financial Markets, Institutions and Money*, vol. 17, pp. 387 – 402.
- King, RG & Levine, R 1993, 'Finance and growth: Schumpeter might be right', *The Quarterly Journal of Economics*, vol. 108, no. 3, pp. 717–37.
- Kuznets, S 1955, 'Economic Growth and Income Inequality', *American Economic Review*, vol. 45, pp. 1 – 28.
- Levine, R 1997, 'Financial Development and Economic Growth: Views and Agenda', *Journal of Economic Literature*, Vol. 35, pp. 688-726.
- Levine, R 2005, 'Finance and Growth: Theory and Evidence', *Handbook of Economic Growth*, in: Aghion P & Durlauf S (ed) 1, pp. 865 – 934.
- Levine, R, Loayza, N & Beck, T 2000, 'Financial intermediation and growth: Causality and causes', *Journal of Monetary Economics*, vol. 46. no. 1, pp. 31–77.
- Liang, Q & Teng, JZ 2006, 'Financial Development and Economic Growth: Evidence from China', *China Economic Review*, vol. 17, pp. 395 – 411.
- Liu, WC & Hsu, CM 2006, 'The Role of Financial Development in Economic Growth: The Experience of Taiwan, Korea, and Japan', *Journal of Asian Economics*, vol. 17, pp. 667 – 690.
- Lucas, RE 1988, 'On the Mechanics of Economic Development', *Journal of Monetary Economics*, vol. 22, no. 1, pp. 3-42.
- Minsky, HP 1974, 'The Modeling of Financial Instability: An Introduction', in *Modelling and Simulation*, Vol. 5, Proceedings of the Fifth Annual Pittsburgh Conference, Instruments Society of America, 1974, pp. 267 – 72.
- Rachdi, H 2014, 'Finance – Growth Nexus in Presence of Banking Crises: Evidence in High Income and MENA Countries', *Journal of Economics and Development Studies*, vol. 2, no. 2, pp. 369 – 384.
- Rajan, RG 2005, 'Has financial development made the world riskier?', *Proceedings of the 2005 Jackson Hole Conference*, The Kansas City Fed.
- Rajan, RG & Zingales, L 1998, 'Financial dependence and growth', *American Economic Review*, vol. 88, no. 3, pp. 559–86.
- Rousseau, PL & Wachlet, P 2011, 'What is happening to the impact of financial deepening on economic growth?', *Department of Economics Working Paper WP/2009/09*, Vanderbilt University, Nashville, TN 37235.
- Schumpeter, JA 1911, *A Theory of Economic Development*, Harvard University Press.
- Stiglitz, JE & Members of a UN Commission of Financial Experts 2010, *Global Crisis: The Way Forward*, The Stiglitz Commission Report, The New Press, Orient Blackswan Private Limited, New Delhi.
- Tobin, J 1984, 'On the efficiency of the financial system', *Lloyds Bank Review*, vol. 153, pp. 1–15.
- Wachtel, P 2001, 'Growth and Finance: What do we know and how do we know it?' *International Finance*, vol. 4, no. 3, pp. 335 – 362.
- Wolf, M 2009, 'Why dealing with the huge debt overhang is so hard', *Financial Times*, 27 January.