

Does Stock Market Promote Capital Accumulation?

Panel Data and Time Series Evidence from Less Developed Countries

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ABSTRACT

Our panel data analysis (1995-2005) of a sample of 38 less developed countries shows that the value of stock trading relative to stock market capitalisations (called the turnover ratio) has no relationship with the growth rate of fixed capital formation. The same is the outcome if we consider the other indicator of stock market development - the number of domestic firms listed in the stock market in relation to the size of population. Our conclusion holds irrespective of whether the countries have English legal origin or not. Our time series analysis (1976-2005) of 15 LDCs shows that in only four cases there is some kind of positive long-run relationship between the stock market turnover ratio and the growth of capital accumulation. Carrying forward the same analysis for listed firms over a quarter century (1980-2005), we find only one country case supporting the hypothesis that stock market development promotes capital accumulation.

Keywords: stock market, capital accumulation, growth, and legal origin

JEL Classifications: O16, O50, O57, E22, K22, N20.

I. Introduction

Does stock market work? Is there any link between stock market development and long-term growth and capital accumulation? Some well-known studies give an affirmative answer to these questions. For instance, the cross-country study undertaken by Levine and Zervos (1998) found that the development of banks and stock markets has a positive effect on growth. In another study Levine (2003) argued that although the theory provides an ambiguous relationship between stock market liquidity and economic growth, the cross-country data for 49 countries over the period 1976-93 suggest a strong and positive relationship (see also Levine, 2001). Henry (2000) studied a sample of 11 LDCs and observed that stock market liberalisations lead to private investment boom. More recently, Bekaert *et al* (2005) analysed data of a large number of countries and observed that the stock market liberalisation ‘leads to an approximate 1 % increase in annual real per capita GDP growth’. Arrestis *et al* (2001) analysed time series data for 5 developed countries and found a favourable role of stock market along with bank in economic growth; but they observed that the favourable role of stock market is exaggerated in different cross-country studies.

This gets a renewed support from the body of literature that follows the publication of a paper by La Porta *et al* – hereafter LLSV (1998). In this literature it is argued that financial market in general and stock market in particular works better in an Anglo-Saxon legal environment as it provides better investor and creditor protection. The less developed countries inheriting this legal environment through colonisation and conquest experiences higher financial development: financial institutions and stock

markets flourish, general public participate more in financing investment projects of companies (Djankov *et al* 2005).

As a result one aspect of the present regime of globalisation has been a tendency towards legal globalisation. Dancing to the tune of this trend of legal globalisation shareholder protection law underwent substantial changes in many countries during 1995-2005 (Sarkar, 2007; Armour *et al*, 2007).

In this perspective the present study questions the conventional wisdom that stock market works on the basis of both panel data and time series analyses. Our findings are presented in Section II. Section III provides the concluding observations.

II. The Present Study

Stock market provides investible fund to the firms from the savers who in turn can get back his money at any time of their choice through a flourishing stock market. A highly liquid buoyant stock market provides the market mechanism for promoting growth and investment. In a buoyant stock market firms can float new shares to raise capital for investment.

The hectic activities in the stock market are measured by stock trading in relation to overall economic activities (usually measured by GDP). In the process market valuation of the firms rises – it is captured by real market capitalisation in relation to GDP. The turnover ratio is the ratio between the two – stock trading relative to

market capitalisation. This ratio is often used to get a rough idea of the buoyancy in the stock market in the absence of any other better measure for which the relevant data are available.

Apart from the liquidity in the stock market, there is another series that can be used to measure the size of stock market – the number of domestic firms listed in the national stock market. For cross-country comparison it is usually deflated by the size of population. We shall use both series and examine their relationship with capital accumulation at cross-country panel level and individual country level.

A. Panel Data Analysis, 1995-2005

From World Bank (World Development Indicators 2007-CDROM – hereafter WDI) source we have obtained a couple of series that are expected to capture stock market development for 38 LDCs (the list of countries at the end of this subsection) over the period 1995-2005: the turnover ratio (TURN) - the value of stock trading relative to the aggregate market value of stocks of all the companies listed in the domestic stock market (i.e. stock market capitalisations) and the number of domestic firms listed in the stock market (per million population), LISTPOP. From the above-mentioned source we have also collected the data for the growth of gross domestic fixed capital formation (GGKF). Since the channel through which stock market development is expected to influence growth is capital accumulation, we would like to examine the relationship between GGKF and TURN or LISTPOP at the cross-country panel level.

We have considered three alternative models between the growth of gross domestic fixed capital formation (GGKF) and stock market turnover ratio (TURN) or LISTPOP: between-effects model (BE), the country-fixed effect model (FE) and the random-effect model (RE). The BE model is equivalent to taking the average (mean) of each variable for each case across time and running a regression on the data set of averages. As this averaging procedure results in a loss of information, it is not used much in the current literature. Nevertheless we have estimated this BE model and did not observe any significant relationship between the two (details are skipped).

The FE is designed to control for omitted variables that differ across countries but are constant over time. In the FE one dummy variable is generated for each country-case and included this in a standard linear regression to control for the fixed country-effects. The RE is used if there is a reason to believe that some omitted variables may be constant over time but vary between cases, and others may be fixed between cases but vary over time. There are two well-known tests which help to choose the appropriate models: Breusch-Pagan Lagrange multiplier test and Hausmann test. We have used both the tests and observed that while the former supports the FE model the latter supports the FE model in many cases; in some cases the outcome of the two tests tallied with each other. So we have fitted both the models in each case and observed no fundamental change in our conclusion. For the sake of brevity we have reported only the estimates of the RE model (Table 1).

Our estimates show that the growth of capital accumulation (GKFG) has no significant (positive or negative) relationship with stock market turnover ratio

(TURN) or the number of domestic firms listed in the stock market (per million population), LISTPOP.

We have also considered other factors such as the importance of foreign direct investment in GDP (FDIY) and the indicator of banking sector development as measured by the ratio of bank credit to GDP (DCBY), which may be expected to influence the growth of capital accumulation. But the basic conclusion of no relationship between stock market developments and capital accumulation remains.

Finally in the tradition of legal origin hypothesis of LLSV, we have divided the sample into two groups:

A. 16 English-Law Origin Countries: Bangladesh, Botswana, Ghana, Hong Kong, India, Jamaica, Kenya, Malaysia, Nigeria, Pakistan, Singapore, South Africa, Sri Lanka, Thailand, Trinidad & Tobago and Zimbabwe;

B. 22 Other countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cote d' Ivoire, Ecuador, Egypt, Indonesia, Jordan, Korea, Mexico, Morocco, Paraguay, Peru, Philippines, Saudi Arabia, Tunisia, Uruguay, Venezuela and Zambia.

In our panel data analysis, we have combined the two groups by the use of a binary variable, called, ENG; it assumes the value 1 for the 16 English law countries and assumes the value zero for the 22 countries which have other legal heritage. The use of this English law dummy does not change our conclusion – the dummy is not significant nor is the coefficient of TURN or LISPPOP. We have also used slope

dummies (ENG multiplied by TURN or LISTPOP as appropriate) with or without intercept dummy but we have observed none of them significant (details are skipped). It implies that irrespective of legal heritage stock market does not matter so far as the capital accumulation is concerned.

Time Series Analysis

With this over-all picture of panel data analysis we set ourselves to examine individual country experiences. It is, however, very difficult to get a long time series data for different indicators of stock market development. From the Financial Structure Dataset of World Bank (available on-line) we have been able to collect annual data on one important indicator of stock market development for 15 countries (out of 38 countries covered in our panel data study) since the mid-1970s (for some countries since the early 1980s). It is the turnover ratio (TURN) defined as the ratio of the value of total shares traded in a country's stock market to average real market capitalization.¹ We have collected the WDI data for the growth of gross capital formation (GKFG) for all these countries.² Our objective is to examine whether there

¹ Turnover Ratio (TURN) is the ratio of the value of total shares traded to average real market capitalization. It is calculated using the following method:
$$T_t/P_a_t / \{(0.5)*[M_t/P_e_t + M_{t-1}/P_{e_{t-1}}]\}$$
 where T is total value of stock trading, M is stock market capitalization, P_e is the end-of period CPI, P_a is average annual CPI.

² For Korea we have calculated GGKF from the data on gross capital formation available in International Financial Statistics published by IMF.

is any meaningful long-run relationship between this indicator of stock market development (TURN) and the growth of capital accumulation (GGKF) for all these 15 LDCs over the period since the mid-1970s or early 1980s till 2005 for which we have the relevant data.

We shall use Autoregressive Distributive Lag (ARDL) approach to cointegration developed by Pesaran and Shin (1999) to test for the existence of a long run relationship between the two variables irrespective of whether they are stationary or stochastic. This approach does not require any pre-testing of the variables to determine the order of their integration (how many times the data are to be differenced to achieve the stationary property of the data). This approach is especially useful here as the standard tests of stationarity have very low power for a small sample.

The following ARDL (p, q) model is fitted:

$$(1) \quad G_t = a + b.t + \sum_{i=1}^p b_i G_{t-i} + \sum_{j=0}^q c_j S_{t-j}$$

where G is the growth rate of gross capital formation (GGKF), S is the stock market turnover ratio (TURN), t is the time trend which captures the effect of other explanatory variables (it is omitted from the ARDL equation when its coefficient is found to be insignificant), the subscripts t , $t-i$, $t-j$, indicate different time periods and p and q are unknown lags to be determined by Schwarz Bayesian criterion (SBC) as suggested by Pesaran and Shin (1999).

The estimates of the long-term coefficients are reported in Table 2. The estimates show that for 4 countries (Jordon, Peru, Thailand and Venezuela) a positive long-run relationship exists between stock market development (indicated by turnover ratio, TURN) and capital accumulation (GGKF). Excepting Thailand all these countries have non-English legal heritage.

For three countries, Korea, Zimbabwe and Pakistan we find negative relationships! For all others there is no significant relationship. For Korea the negative relationship vanishes through the re-estimate of the ARDL (p, q) equation by incorporating intercept dummy (D97) for the 1997 crisis. Use of intercept and slope dummies (D97 and SD97=D97*t) for Thailand changes the positive relationship to no relationships. For Malaysia the same procedure does not alter the conclusion (of non-existent relationship).

From WDI data we collected another indicator for stock market development – the number of listed firms in the stock market (LIST) for a shorter period 1980-2005. Replicating the whole study we got only one country case (Argentina) where a positive relationship exists. Zimbabwe is the only country showing a negative relationship for both the indicators of stock market development perhaps due to its political turmoil.

Taking the negative relationships and no relationship as cases against the hypothesis that stock market development promotes growth and capital accumulation, we find that for at most four countries (Jordon, Peru, Venezuela and Argentina) we got some

support in favour of the hypothesis. None of these countries belong to the group of English legal origin countries.

III. Concluding Observations

Once Keynes (1936) compared stock markets with casinos and discounted the importance of stock market for capital accumulation and growth:

‘.. when the capital development of a country becomes the by-product of the activities of a casino, the job is likely to be ill-done’ (Keynes 1936, p.159).

Joan Robinson held the view that financial development (one aspect of which is stock market development) follows growth but not the other way round. The study of World Bank (1993) pointed out that stock markets have played little role in the post-war industrialisation of Japan, Korea and Taiwan. Singh (1997) argued that the recent move towards stock market liberalisation is ‘unlikely to help in achieving quicker industrialisation and faster long-term economic growth’ in most of the less developed countries (LDCs).

Nevertheless, in the present era of financial liberalisation under the aegis of the three pillars of the Britton Woods system (IMF, World Bank and WTO) stock market development has been an important part of both internal and external financial liberalisation in the less development countries (LDCs).

In this perspective our study based on the analysis of both panel data and time-series data for less developed countries observes no relationship between stock market

development and long-term growth and capital accumulation. Thus it questions the conventional wisdom manifested in the mainstream research works, which are by and large cross-sectional (the study of Arestis *et al* 2001 for some developed countries is an exception).

The findings of our study are not counter-intuitive. It should be noted that private capital formation depends on many complex factors summed up by Keynes (1936) as ‘animal spirits’. Different countries have different histories regarding the emergence of the capitalist class with different socio-economic socio-psychological and political economic complexities. Stock market has very marginal influence (if at all) on these factors. This is what we observe in the present study.

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Table 1. Capital Accumulation and Stock Market Development: Panel Data Analysis¹, 1995-2005

Intercept	TURN	LISTPOP	DCBY	FDIY	ENG	R ²
3.89**	0.01					0.00
5.3**	0.004		-0.04	0.16		0.01
5.08	0.004		-0.04	0.16	0.73	0.01
4.16**		-0.02				0.00
5.11**		-0.03	-0.03	0.28		0.01
4.74**		-0.04	-0.03	0.29	1.07	0.01

1 The following equation is fitted:

Growth of Gross Domestic Capital Formation (GGKF)

$$= a + b_1 \cdot \text{TURN} \text{ (or LISTPOP)} + c_1 \cdot \text{FDIY} + d_1 \cdot \text{DCBY} + e_1 \cdot \text{ENG}$$

Setting one or more parameters (c to e) equal to zero, we have fitted alternative regression equations.

* Significant at 5 per cent level.

** Significant at 1 per cent level.

Table 2. Capital Accumulation and Stock Market Development:**Estimates of Long-term Relationships through ARDL Method¹, 1976-2005**

<u>Country/</u>	<u>Period</u> (Model)	LIST	TURN	a	t
ARGENTINA	1980-2005 (0, 0)	1.12*		-517.32*	7.83*
	1977-2005 (0,0)		24.37	-3.49	
BRAZIL	1980-2005 (0, 0)	0.03		-12.65	
	1977-2005 (0,0)		20.34	-8.42	
CHILE	1980-2005 (0, 0)	-0.18		56.76*	
	1978-2005 (0,0)		64.95	4.77	
INDIA	1980-2005 (0, 1)	-0.00001		7.48	
	1976-2005 (2,0)		0.58	-3.2	0.22*
INDONESIA	1980-2005 (0, 1)	-0.26*		-151.84*	4.45*
	1977-2005 (0,0)		0.06	4.69	
JORDAN	1980-2005 (0, 0)	0.06		-2.96	
	1977-2005 (1,0)		91.29**	-13.17**	
KOREA	1980-2005 (2, 3)	-0.01*		17.03**	
	1980-2005 (2, 3) ²	-0.004		11.85**	
	1976-2005 (3,4)		-6.32*	15.31**	
	1976-2005 (2,4) ³		-1.23	11.49**	
MALAYSIA	1980-2005 (0, 4) ⁴	-0.17*		-202.27**	6.51**
	1976-2005 (0,0) ⁴		16.17	1.99	
MEXICO	1980-2005 (0, 1)	0.09		-10.34	
	1977-2005 (0,0)		3.38	0.93	
PAKISTAN	1980-2005 (1, 0)	0.001		18.47	-0.36*
	1984-2005 (1,0)		-1.22**	4.12**	
PHILIPPINES	1980-2005 (0, 3)	-0.04		9.32	
	1976-2005 (0,0)		29.77	-4.27	
PERU	1980-2005 (0, 2)	0.01		2.68	
	1981-2005 (3,0)		38.31*	-2.46	
THAILAND	1980-2005 (2, 2) ⁵	-0.12*		-58.78*	2.04*
	1976-2005 (0,1) ⁵		28.74*	37.14	-1.15*
VENEZUELA	1980-2005 (2, 0)	0.34		-22.34	
	1977-2005 (2,0)		69.08*	-5.81	
ZIMBABWE	1980-2005 (4, 4)	-1.32**		81.24*	
	1980-2005 (2,0)		-116.58**	10.35**	

1 The following ARDL (p, q) model has been fitted:

$$G_t = a + b.t + \sum_{i=1}^p b_i G_{t-i} + \sum_{j=0}^q c_j S_{t-j}$$

where G = GGKF, S = TURN or LIST, the subscripts t , $t-i$, $t-j$ indicate different time periods and p and q are unknown lags to be determined by the SBC.

Setting the coefficients such as b , d_k and e_l (for all k, l) we have fitted alternative ARDL equations such as ARDL (p, q) with or without time trend.

2 . Intercept dummy, D97 is added to the ARDL equation; it is 0 for 1976-96 and =1 for 1997-05. Its estimate is -12.04 significant at 5 per cent level.

3 Intercept dummy, D97 is added to the ARDL equation; it is 0 for 1976-96 and =1 for 1997-05. Its estimate is -8.95 significant at 10 per cent level.

4 Adding Intercept dummy, D97 (= 0 for 1976-96 and =1 for 1997-05) along with slope dummy, SD97 =d97*t to the ARDL equation the conclusion does not change. We observe no relationship between stock market variable and capital accumulation.

5 Adding Intercept dummy, D97 (= 0 for 1976-96 and =1 for 1997-05) along with slope dummy, SD97 =d97*t to the ARDL equation we observe no relationship between stock market variable and capital accumulation.

** Significant at 1 per cent level (based on asymptotic standard errors).

* Significant at 5 per cent level (based on asymptotic standard errors).