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FOREIGN DIRECT INVESTMENT AND GROWTH OF INDIA: DOES FINANCIAL SECTOR DEVELOPMENT HELP IN IMPROVING ABSORPTIVE CAPACITY?

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ABSTRACT

This paper investigates whether there exists a long term relationship between foreign direct investment (FDI) and economic growth in India with special reference to the role of financial sector development (FSD), which is now considered as a critical contingent factor as borne out by recent empirical studies elsewhere. A 35 -year period (1979-2013), which is covered by this paper, witnessed gradual introduction of economic reforms picking up speed from early 1990s. The doors were opened to FDI. Undertaking an empirical study on FDI's contribution to growth of Indian economy by taking into account the role of financial sector development (FSD) as a contingent factor, this paper concludes that FDI and FSD have contributed to growth. It is also confirmed that the interaction term between FDI and financial development indicates a complementary relationship between the two.

Keywords: India; FDI; FSD; Growth; Threshold Level; Interaction Effect.

1. INTRODUCTION

Foreign direct investment (FDI) inflows to India rose from an average US$100 million in the 1980s to exceed US$2 billion in the later 1990s. They peaked to US$43 billion in 2008. These steep increases in FDI are attributed to economic reforms initiated in 1991 and implemented gradually during the next two decades. As regards foreign trade, tariffs were reduced on goods of consumption and capital goods. The average tariffs fell from 87 percent in 1990 to 25 percent in recent years. In the domestic sector, banking sector and capital markets were opened up to foreign banks together with reduction in rates of taxes on individual and company incomes. As a result, after growing at less than 2 percent in earlier decades, India's economy which grew by 5.1 percent in 1992-93 soon after reforms, maintained higher rates of growth during 2010-14, at above six percent.

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There was notable progress in financial sector development (FSD) as well. The improvements flowed from increases in number of bank branches in both smaller towns and in rural areas not only by the public sector banks but also by the new entrants from the domestic private sector as well as foreign owned banks. Positive results from these improvements are well reflected since 1990s in the indicators such as domestic credit, bank credit and broad money all expressed as percentages of GDP.

Since India's gross domestic product (GDP) as well as per capita output recorded rapid growth during the last two decades, there has been a growing interest in conducting empirical studies on the relationship between FDI and economic growth. However, the role of FSD has not received much attention from researchers in the past while conducting empirical studies on FDI-economic growth nexus. Recent studies by Alfaro *et al*. (2004), Hermes and Lensink (2003); Azman-Saini *et a.l* (2010) studies have established that the relationship between FDI and growth is contingent upon several factors, the foremost being FSD. Further, they convincingly argued that the well-functioning financial markets reduce the risks involved in investment decisions by domestic investors who innovate along the lines of foreign entrepreneurs through imitation, thereby contributing to improving absorptive capacity. We, therefore, consider appropriate to focus our attention on the role of domestic financial system and interaction between FDI and FSD for the study.

Aside from updating the previous studies by way of covering a longer period, this paper specifically includes policy variables representing economic governance. They include real exchange rate, which is the product of nominal exchange rate and the ratio of foreign price and domestic price and trade openness. Given the foreign price level, the domestic inflation is influenced by fiscal and monetary policies of the country, while openness is determined by high degree of trade liberalization.

The paper is organized along the following lines: section II presents a brief summary of literature on contributions of FDI and FSD to economic growth; section III reviews the trends in FDI inflows to India and FSD over last three decades; section IV outlines the modeling and methodology adopted for the empirical study; section V discusses the results and; the final section VI presents a summary of the findings with policy implications.

2. A BRIEF LITERATURE REVIEW

Amongst all sources of external capital, which supplement domestic savings in capital-shortage developing countries, FDI being non-debt flows, have been recognized as the most constructive of all flows. FDI inflows are less volatile and less prone to sudden withdrawal due to shifts in sentiment unlike hot moneys. The FDI inflows, which seek long term returns, promote economic development through the transfer of technology when supported by a high degree of absorptive capacity in terms of human capital and helpful trade regime in the recipient country (Balasubramanyam *et al.* 1996; Borensztein *et al.* 1998).

The term FDI would normally refer to substantial equity stake and effective control of enterprises. However, in the context of growing services sector in developing countries,

a broader definition seems to have been emerging. This now refers to non-equity participation by foreigners by way of licensing, franchising, joint ventures with limited equity participation and R&D cooperation (de Mello 1997). Historical ties with former colonial rulers in the last century largely influenced FDI flows to developing countries in some specific areas. Most of the FDI inflows in the past were primarily of the natural resource exploiting type: the rubber and palm oil plantations in Malaysia and sugar and tourism-related infrastructure in the Caribbean and the Pacific, and tea and coffee estates in India are leading examples.

The natural resource based FDI inflows were later on followed in the 1970s and 1980s by FDI in export-oriented, labour intensive electronic goods, such as television sets assembling, garments and other industries mainly because of cheap labour availability and investor-friendly policies pursued by recipient countries which laid stress on export-led growth. The third type of investment, known as market seeking, was mainly limited to service sector including banking and finance and retail trade.

One of the benefits of FDI in developing economies was seen in the realization of economies of scale and specialization, which contributed to export earnings and employment opportunities, besides facilitating efficient transfer of skills and cross border adoption of best practices (Borensztein *et a*l. 1998; Xu, 2000; Kohpaiboon, 2003). Greater access to worker training provided by FDI also stepped up productivity as the manufacturing units and firms owned by foreign investors acted as catalysts. They served as models for emulation by domestic entrepreneurs. Further, Agosin and Mayer (2000) note that FDI facilitates domestic investors serve as suppliers to FDI funded projects by complementing local resources, thereby providing a signal of confidence in investment opportunities. Seetanah and Khadaroo (2007) have found evidence that private investment registered increases by more than the FDI flows because foreign equity capital financed only part of the total investment project, since a substantial number of foreign investment projects were usually financed from local financial resources. The literature so far accumulated points out that FDI is a composite bundle of capital stock, know-how, and technology, which augments "the existing stock of knowledge in the recipient economy through labor training, skill acquisition and diffusion, and the introduction of alternative management practices and organizational arrangement" (Seetanah and Khadaroo 2007).

Hermes and Lensink (2003) summarized different channels through which positive externalities associated with FDI can occur namely: (i) competition channel where increased competition is likely to lead to increased productivity, efficiency and investment in human and/or physical capital; (ii) training channel through increased training of labour and management; (iii) linkages channel whereby foreign investment is often accompanied by technology transfer and such transfers may take place through transactions with foreign firms; and (iv) domestic firms imitate the more advanced technologies used by foreign firms commonly termed as the demonstration channel.

2.1. The role of FSD

The role of FSD in growth has been traditionally in terms of financialisation of savings. In the absence of institutions such as commercial banks and credit agencies in the rural areas, any cash savings get spent away on consumption. With a view to mobilizing

resources, banks have been encouraged to open rural branches. The savings so mobilized are made available in terms of loans to domestic entrepreneurs, who seek to imitate the new technologies adopted by foreign investors. Greater and easier availability of credit from domestic loan institutions reduces the risks inherent in the investments undertaken, thereby promoting absorptive capacity of the host country receiving FDI inflows. Recent empirical studies on FDI and growth nexus have highlighted the growing influence of domestic credit availability on investment triggered by FDI. Referring to findings of ambiguous relationship between FDI and growth, recent investigations by Azman-Saini *et al* (2010), Giuliano and Ruiz-Arnaz (2005) and Hermes and Lensink (2003) have pointed out such ambiguous relationship between capital transfers from overseas and growth might be due to ignoring the contingent factors. They made a specific mention of FSD in the host country, which is a key factor in making the impact of FDI more pronounced.

Empirical evidence on the FDI-FSD growth- nexus gathered by Alfaro *et.al* (2004) shows FSD allows potential entrepreneurs take advantage of knowledge spillovers from FDI. However, they make it clear that some threshold of FSD is crucial for the positive effects of FDI. Threshold models (Alfarao et al. 2004; Azman-Saini *et al.* 2010; Zadeh and Madani 2012) employed show that positive growth becomes possible only if FSD, as percent of GDP exceeds a certain threshold level.

Notable studies on FDI-growth nexus in India are Agrawal (2005), Agrawal and Shahani (2005), Bajpai and Sachs (2000), Bhat *et al.* (2004), Chakraborty and Basu (2002), Chakraborty and Nuunenkamp (2007), Dua and Rashid (1998), Pradhan (2002), and Sahoo and Mathiyazhagan (2003). All of them confirm that FDI and growth are cointegrated. Chakraborty and Basu (2002) study concluded that India's GDP was not Granger caused by FDI and the causality ran from GDP to FDI. Dua and Rashid (1998) came to a similar conclusion: Granger causality tests confirmed FDI responded to industrial output, a proxy used by them for GDP; and FDI inflows did not Granger cause industrial output.

These studies are based on limited data series, most of them confined to initial years of this century. A more recent study by Pradhan (2010) which utilized data series covering a longer period (1970-2007) including data series of seven years in the current century came to a different conclusion from the ones reached by earlier studies. According to Pradhan (2010), there was bi-directional causality between FDI and economic growth. Incidentally, Pradhan's study (2010) also included FSD as a variable in the model. The study result showed that the linkage ran from financial deepening to growth. The study did not include an interaction term and there was no reference to any threshold level of FSD required for the complementarity of relationship between FDI and FSD.

3. TRENDS IN FDI FLOWS TO AND FSD IN INDIA

Until 1990, India which gained political independence in 1947, pursued highly protectionist policies, which were influenced by a socialistic ideology. Governments which periodically took over from the previous ones continued to place faith in the public sector. Protectionism was aimed at curbing personal consumption of luxury goods through

quotas and licensing for various categories of imports besides high tariffs. Trade policies permitted capital goods only for state owned enterprises. The pre-reform period was thus dictated by the popular political dogmas, which assigned a larger role for public sector. The assumption was that private sector would not be in a position to promote development until public goods were in abundant supply and that only the state could provide them. In addition, in the absence of a robust private sector, public sector took upon itself the responsibility of being a major provider of jobs, by enlarging the civil service and state owned enterprises (Shenoy 1963). The share of trade in GDP of the country was just around seven percent during 1965-1980, imports and exports accounting for 3.7 percent and 3.4 percent respectively (Kulkarni and Bhattarai 2012). A similar restrictive approach was followed in regard to FDI as well. FDI was also looked down upon as an anathema.

While (Table 1) and (Table 2) present the shares of global FDI flows (1970-2013) and shares of FDI flows to developing countries by region (1970-2013), (Table 3) gives details of share of FDI as percent of GDP in major countries in the Asian region.

Table 1: Share of global FDI flows in percentage (1970-2013)

	1970-74	**1975-79**	**1980-84**	**1985-89**	**1990-94**	**1995-99**	**2000-04**	**2005-09**	**2010-13**
World	100	100	100	100	100	100	100	100	100
Developing economies	21.24	26.69	32.24	17.79	30.61	29.20	27.16	34.13	48.79
Developed economies	78.76	73.31	67.75	82.21	68.71	69.69	71.14	60.96	45.15
Africa	6.42	3.70	2.64	2.23	2.15	1.51	1.88	3.10	3.51
America	35.98	39.58	47.54	47.06	29.23	37.12	29.44	26.70	32.60
Asia	4.74	11.02	19.11	10.27	21.18	17.43	17.49	22.79	29.12
Europe	46.08	40.94	26.63	35.55	43.18	41.21	47.13	40.59	24.90
Oceania	6.78	4.76	4.07	4.88	3.58	1.63	2.35	1.92	3.81
LDCs (Least developed countries)	0.96	1.45	0.70	0.47	0.65	0.65	0.87	0.94	1.59

Source: UNCTADSTAT, 2015.

Table 2: Share of FDI flows to developing countries by region in percent (1970-2013)

	1970-74	**1975-79**	**1980-84**	**1985-89**	**1990-94**	**1995-99**	**2000-04**	**2005-09**	**2010-13**
Africa	30.23	13.86	8.18	12.57	7.02	5.18	6.94	9.09	7.20
North America	50.54	46.26	33.48	30.16	26.14	38.44	33.30	27.74	34.07
Asia	16.47	39.26	57.58	56.55	66.48	56.20	59.65	62.89	58.35
Oceania	2.77	0.62	0.75	0.72	0.36	0.18	0.10	0.28	0.38

Source: UNCTADSTAT, 2015.

Until late 1980s, India relied only on bilateral and multilateral loans for supplementing domestic savings (Kulkarni and Bhattarai 2012). Inflows of FDI were preferred only as a means of acquiring industrial technology that was unavailable through licensing agreements and capital goods import (Nagaraj 2003). India allowed FDI only in designated industries under conditions that they would set up joint ventures with domestic industries. These conditions also required export obligations, and promotion of local research and development. The Foreign Exchange and Regulation Act (FERA) of 1974 allowed foreign firms to have equity holding only up to 40 percent (Nagaraj 2003). Foreign firms were not allowed to use their brands but hybrid brands like Hero-Honda were promoted (Kulkarni and Bhattarai 2012).

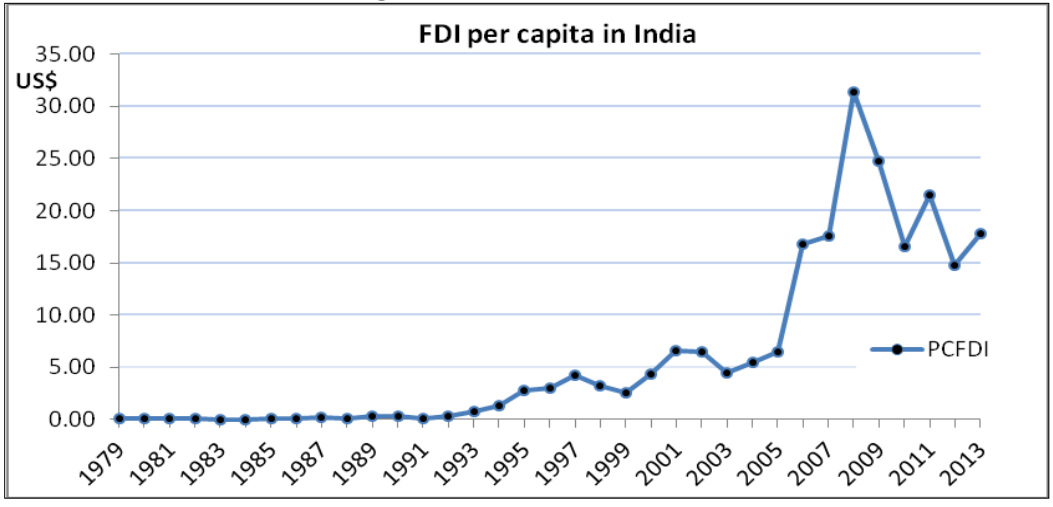
Table 3: FDI in Asian countries (net inflows: percent of GDP)

Asian countries	Average 1980-1989	Average 1990-94	Average 1995-99	Average 2000-04	Average 2005-09	2010	2011	2012	2013
Bangladesh	0.0	0.0	0.2	0.4	1.0	0.7	0.9	1.1	1.0
China	0.6	3.4	4.4	3.2	4.4	4.5	4.4	3.5	3.7
Cambodia	-	2.3	6.6	3.1	7.1	6.5	6.2	10.3	8.8
India	0.0	0.1	0.6	0.9	2.2	1.6	2.0	1.3	1.5
Indonesia	0.4	1.2	1.1	-0.8	1.7	2.0	2.3	2.3	2.6
Malaysia	3.2	7.1	4.6	2.8	3.1	4.4	5.2	3.2	3.7
Maldives	0.5	2.4	2.1	3.2	6.5	9.3	17.2	9.0	13.3
Nepal	0.0	0.1	0.3	0.1	0.1	0.5	0.5	0.5	0.4
Philippines	0.6	1.5	2.0	1.3	1.6	0.5	0.9	1.3	1.4
Singapore	9.6	9.7	12.9	14.4	16.9	23.3	17.4	19.5	21.4
Sri Lanka	0.8	1.1	1.3	1.1	1.5	1.0	1.6	1.6	1.4
Thailand	1.0	1.8	3.3	3.4	3.7	2.9	0.7	3.5	3.7
Vietnam	0.0	6.1	7.5	3.6	6.5	6.9	5.5	5.4	5.2

Source: UNCTADSTAT, 2015.

Severe balance of payment crisis in the late 1980s was held responsible for a sea-change in the economic philosophies of the ruling party. Reforms were introduced in 1990 for liberalizing the economy with a greater role for private sector (Ahluwalia 2002). However, the economy was afflicted with another balance of payment crisis in 1991-92, which was attributed to fiscal profligacy. Although curbs on spending brought down the fiscal deficit, the medium term fiscal objective of improving public savings for essential public investment was never implemented at any time (Ahluwalia 2002). The reasons were apparent: governments at the centre happened to be coalition governments on the basis of minimum agenda, with an eye on next elections. The populist measures of subsidized welfare schemes contributed to fiscal deficits.

Figure 1: Post Liberalisation



Source: World Development Indicators (2015)

India's FDI per capita in the 1970s was low (Figure 1), which picked up pace in the late 1980s. This is also the period the government began an era of liberalization. Lowering import duties and dismantling some of the hurdles against trade did improve the economy. However, as a consequence of these measures, India began to incur twin deficits: fiscal deficits of the central and state governments mounted to a historic high of 10 percent of GDP; and the current account balance hovered around 3.3 percent of GDP, with inflation around 10 percent (Aggarwal 2003). Consequently, the balance payment crisis, which soon ensued, compelled the country to devalue the currency by 29 percent in 1993 and seek assistance from IMF.

The conditionalities associated with IMF assistance set the pace for reforms. Reforms were on all fronts: lowering tariff rates and rises in import and export quotas, de-licensing of investment in 18 designated industrial sectors and opening the door to foreign investment all proved effective. Inflation which was 13.6 percent in 1991 came down to 1.3 percent in 2001-2002. This is also the period India saw higher private investment in IT sector supported by keen interest from foreign investors. Panagaria (2008) noted: "India has a foreign investment policy, which is approximately as open that of China."

Liberalization process which began in right earnest in the 1990s and subsequent reforms on several fronts instigated by IMF ultimately helped India to get out of the socialist ideology of the 1950s. The annual economic growth rate, which was around 4 percent during 1981-90 improved to 6 percent in the decade (1991-2000). The economy grew faster in the next 10 years as well (2001-2010), mainly because of the improved liberal domestic investment environment and encouragement for FDI.

3.1. FSD in India

Implementation of financial sector reforms began in the 1990s, almost simultaneously with real sector reforms. The financial sectors introduced were based on the recommendations of two committees: Committee on Financial System, 1992 and the Committee on Banking Sector Reforms, 1998. An authoritative staff study by Reserve Bank of India (Sahoo 2013) notes that these reforms aimed at (i) removing structural bottlenecks, which hampered the sector since bank nationalization in 1969; (ii) introducing new players/instruments; (iii) allowing free pricing of financial assets; (iv) relaxing quantitative restrictions; (v) effecting improvements in trading, clearing and settlement practices; and (vi) encouraging greater transparency.

In regard to banking sector, the objective was to create and maintain a deregulated environment, enabling free play of market forces while at the same time strengthening prudential norms and the supervisory system. Restrictions on activities undertaken by existing institutions were gradually relaxed and barriers to entry into the banking sector were removed. As regards non-banking financial intermediaries, reforms were also implemented for removing sector-specific deficiencies (Sahoo 2013). Thus, the financial sector reforms were of a far reaching kind. They were all aimed at removing the inefficiencies accumulated over five decades, which witnessed inadequate competition, low capital base, poor productivity and high intermediation cost in the financial markets characterized by control over pricing of financial assets, barriers to entry, high transaction costs and restrictions on movement of funds/participants between the market segments.

Table 4: India, and South Asian and low middle income countries: Some financial indicators (in percent)

	India	**South Asian countries**	**Low Middle income countries**
Account			
All adults	53.1	48.4	42.7
Adults in rural area	50.1	43.5	40
Financial Institutions			
2014	52.8	45.5	41.8
2011	35.2	32.3	28.7
Mobile Account	2.4	2.6	2.5
Debit Card Holders			
2014	22.1	18	21.2
2011	8.4	7.2	10.1
Savers in Financial Institutions			
2014	14.4	12.7	14.8
2011	11.6	11.1	11.1
Borrowers from Financial Institutions			
2014	6.4	6.4	7.5
2011	7.7	8.7	7.5

Table 5: India: Financial indicators as percentages of GDP: 1980-2014

Financial Indicators (% of GDP)	**Broad Money**	**Quasi Money**	**Domestic credit**	**Bank Credit to Private Sector**
1980-1989	38.2	24	47.7	23.5
1990-1999	44.8	29.6	48.6	23.5
2000-2004	59.5	42.4	53.6	30.9
2005-2009	71.3	51.5	61.1	44.7
2010	76.2	56.6	70.1	49.6
2011	78.0	59.5	71.9	50.7
2012	76.7	59.2	73.8	51.7
2013	77.4	60.6	75.9	51.9
2014	76.8	60.6	77.3	51.1

Source: IMF (2015)

Although there have been noticeable improvements in terms of spread of bank branches (public sector bank branches rose from 8262 in 1969 to above 63,000 in 2013) and financial intermediation process reflected in mobilization of savings and deposits, and provision of bank credit, which is an important indicator of bank-based financial deepening, India's performance is far below the corresponding indicators in BRIC countries and advanced countries as well (Table 4). (Table 5) provides further details of specific indicators of FSD, which include domestic credit, broad money, bank credit to private sector, all expressed as percentages of GDP.

4. MODELING, DATA AND METHODOLOGY

We now proceed to investigate the impact of FDI on India's per capita real GDP (*y*) by undertaking an econometric analysis over a period of 35 years (1979-2013). In accordance with recent theoretical developments and empirical studies that a positive impact of FDI on growth is dependent on certain contingent factors with prime focus on financial sector development we employ an appropriate indicator of FSD in our analysis.

Our choice amongst FSD indicators of India over the 35 year period is credit to private sector by banks as percent of GDP (*PSC).* Besides its own contribution of PSC to *y*, we also attempt to check the effect of its interaction with FDI, by including an interaction term: *FDI*PSC* on *y.* In addition to the three variables, we include one policy variable. Considering the constraint imposed by limited number of annual observations in regard to degrees of freedom, we include only one: which is openness of the economy represented by trade as percent of GDP.

Further we introduce a dummy variable for capturing the influence of economic reforms on growth. The dummy variable assumes the value of zero for the years prior to 1990. It assumes the value of unity for the years beginning from 1990 till the end of the study period. (Table 6) presents data used for the analysis.

Table 6: Summary statistics of variables used in model

Variables	Mean	Maximum	Minimum	Standard Deviation
Per capita Real GDP (Rs)	38963.97	82274.34	18677.49	18446.53
Investment (% of GDP)	26.94	38.94	18.04	6.00
FDI (% of GDP)	0.78	3.55	0.003	0.87
PSC (% of GDP)	31.21	51.87	20.19	11.07
Openness (% of GDP)	27.56	55.55	12.01	14.82

4.1. Model

The model, which is in double log for estimation purpose is written as follows with all variables expressed in logs:

$$y_t = \beta_0 + \beta_1 INV_t + \beta_2 FDI_t + \beta_3 PSC_t + \beta_4 OPEN_t + \beta_5 FDIPSC_t + \beta_6 D_t + e_t \quad (1)$$

where

y_t = real GDP per capita (in Indian Rupees in 2005 prices);
INV = gross capital formation (GCF) in percent of GDP);
FDI = foreign direct inflows (percent of GDP);
PSC = credit by banks to private sector (percent of GDP);
OPEN = total trade (percent of GDP);
FDIPSC = interaction term between FDI and PSC;
D = dummy for reform taking the value of zero for all years up to 1990; and unity for years beginning from 1990; and
e_t = the random error term.

The hypotheses sought to be tested are: (i) *FDI* and *y* are positively associated; (ii) *INV* and *y* are positively related; (iii) *PSC* and *y* are directly related; (iv*) OPEN* directly

influences economic growth. All the coefficients of *FDI*, *INV* and *OPEN* should therefore have positive signs. On the other hand, we are not sure how the interaction term would behave. In case, *FDI* and *PSC* are complements and mutually support growth, the sign of the interaction term would be positive and significant; on the other hand if the sign is negative and significant, the interpretation would be FDI and PSC are substitutes in promoting growth; and if the sign is insignificant, the conclusion would be that two are independent of each other in their own roles.

4.2. Data

The data on real GDP per capita, investment, FDI inflows, openness, private credit are all drawn from *World Development Indicators* issued by World Bank. Since the number of observations is small, for investigating the existence of a long run relationship between *y, FDI, INV, PSC* and *OPEN*, we resort to the bounds testing procedure proposed by Pesaran et al. (2001). The bounds test with ARDL framework has some notable advantages: (i) it allows testing for the existence of a cointegrating relationship between variables in levels irrespective of whether the underlying regressors are I(0) or I(1) (Pesaran and Shin 1999; Pesaran et al. 2001); (ii) it is considered more appropriate than the Johansen-Juselius multivariate approach for testing the long run relationship amongst variables when the data are of a small sample size (Mah 1995; Tang and Nair 2002); (iii) estimators of the short-run parameters are consistent and the estimators of long-run parameters are super-consistent in small sample sizes (Pesaran and Shin 1999).

The ARDL equations are given as follows:

$$\Delta y_t = \beta_{10} + \beta_{11} y_{t-1} + \beta_{12} INV_{t-1} + \beta_{13} FDI_{t-1} + \beta_{14} PSC_{t-1} + \beta_{15} OPEN_{t-1} + \beta_{16} FDIPSC_{t-1} + \sum_{i=1}^{p} \alpha_{11i} \Delta y_{t-i} + \sum_{i=0}^{p} \alpha_{12i} \Delta INV_{t-i} + \sum_{i=0}^{p} \alpha_{13i} \Delta FDI_{t-i} + \sum_{i=0}^{p} \alpha_{14i} \Delta PSC_{t-i} + \sum_{i=0}^{p} \alpha_{15i} \Delta OPEN_{t-i} + \sum_{i=0}^{p} \alpha_{16i} \Delta FDIPSC_{t-i} + \varepsilon_{1t} \quad (2)$$

$$\Delta INV_t = \beta_{20} + \beta_{21} y_{t-1} + \beta_{22} INV_{t-1} + \beta_{23} FDI_{t-1} + \beta_{24} PSC_{t-1} + \beta_{25} OPEN_{t-1} + \beta_{26} FDIPSC_{t-1} + \sum_{i=0}^{p} \alpha_{21i} \Delta y_{t-i} + \sum_{i=1}^{p} \alpha_{22i} \Delta INV_{t-i} + \sum_{i=0}^{p} \alpha_{23i} \Delta FDI_{t-i} + \sum_{i=0}^{p} \alpha_{24i} \Delta PSC_{t-i} + \sum_{i=0}^{p} \alpha_{25i} \Delta OPEN_{t-i} + \sum_{i=0}^{p} \alpha_{26i} \Delta FDIPSC_{t-i} + \varepsilon_{2t} \quad (3)$$

$$\Delta FDI_t = \beta_{30} + \beta_{31} y_{t-1} + \beta_{32} INV_{t-1} + \beta_{33} FDI_{t-1} + \beta_{34} PSC_{t-1} + \beta_{35} OPEN_{t-1} + \beta_{36} FDIPSC_{t-1} + \sum_{i=0}^{p} \alpha_{31i} \Delta y_{t-i} + \sum_{i=0}^{p} \alpha_{32i} \Delta INV_{t-i} + \sum_{i=1}^{p} \alpha_{33i} \Delta FDI_{t-i} + \sum_{i=0}^{p} \alpha_{34i} \Delta PSC_{t-i} + \sum_{i=0}^{p} \alpha_{35i} \Delta OPEN_{t-i} + \sum_{i=0}^{p} \alpha_{36i} \Delta FDIPSC_{t-i} + \varepsilon_{3t} \quad (4)$$

$$\Delta PSC_t = \beta_{40} + \beta_{41} y_{t-1} + \beta_{42} INV_{t-1} + \beta_{43} FDI_{t-1} + \beta_{44} PSC_{t-1} + \beta_{45} OPEN_{t-1} + \beta_{46} FDIPSC_{t-1} + \sum_{i=0}^{p} \alpha_{41i} \Delta y_{t-i} + \sum_{i=0}^{p} \alpha_{42i} \Delta INV_{t-i} + \sum_{i=0}^{p} \alpha_{43i} \Delta FDI_{t-i} + \sum_{i=1}^{p} \alpha_{44i} \Delta PSC_{t-i} + \sum_{i=0}^{p} \alpha_{45i} \Delta OPEN_{t-i} + \sum_{i=0}^{p} \alpha_{46i} \Delta FDIPSC_{t-i} + \varepsilon_{4t} \quad (5)$$

$$\Delta OPEN_t = \beta_{50} + \beta_{51} y_{t-1} + \beta_{52} INV_{t-1} + \beta_{53} FDI_{t-1} + \beta_{54} PSC_{t-1} + \beta_{55} OPEN_{t-1} + \beta_{56} FDIPSC_{t-1} + \sum_{i=0}^{p} \alpha_{51i} \Delta y_{t-i} + \sum_{i=0}^{p} \alpha_{52i} \Delta INV_{t-i} + \sum_{i=0}^{p} \alpha_{53i} \Delta FDI_{t-i} + \sum_{i=0}^{p} \alpha_{54i} \Delta PSC_{t-i} + \sum_{i=1}^{p} \alpha_{55i} \Delta OPEN_{t-i} + \sum_{i=0}^{p} \alpha_{56i} \Delta FDIPSC_{t-i} + \varepsilon_{5t} \quad (6)$$

$$\Delta FDIPSC_t = \beta_{60} + \beta_{61} y_{t-1} + \beta_{62} INV_{t-1} + \beta_{63} FDI_{t-1} + \beta_{64} PSC_{t-1} + \beta_{65} OPEN_{t-1} + \beta_{66} FDIPSC_{t-1} + \sum_{i=0}^{p} \alpha_{61i} \Delta y_{t-i} + \sum_{i=0}^{p} \alpha_{62i} \Delta INV_{t-i} + \sum_{i=0}^{p} \alpha_{63i} \Delta FDI_{t-i} + \sum_{i=0}^{p} \alpha_{64i} \Delta PSC_{t-i} + \sum_{i=0}^{p} \alpha_{65i} \Delta OPEN_{t-i} + \sum_{i=1}^{p} \alpha_{66i} \Delta FDIPSC_{t-i} + \varepsilon_{6t} \quad (7)$$

There are two steps involved in the procedure for examining the long-run relationship between *y*, *INV*, *FDI*, *OPEN* and *PSC*. First, we estimate Equations (2) to (7) by ordinary least squares techniques. Second, the existence of a long-run relationship can be traced by imposing a restriction on all estimated coefficients of lagged level variables equating to zero. Hence, bounds test is based on the F-statistics (or Wald statistics) with the null hypothesis of no cointegration $(H_0 : \beta_{i1} = \beta_{i2} = \beta_{i3} = \beta_{i4} = \beta_{i5} = \beta_{i6} = 0)$ against its alternative hypothesis of a long-run cointegration relationship $(H_1 : \beta_{i1} \neq \beta_{i2} \neq \beta_{i3} \neq \beta_{i4} \neq \beta_{i5} \neq \beta_{i6} \neq 0)$.

Since the F-statistics used for this test have a non-standard asymptotic distribution, Pesaran *et al.* (2001) have generated two different sets of critical values for given significance levels. The first set assumes that all variable are integrated of order zero, I(0) and the second set assumes all variables are integrated of order one, I(1). If the computed F-statistic is greater than the upper critical bounds value, then the null hypothesis is rejected. In contrast, if the computed F-statistic is smaller than lower critical bounds value, it indicates no long-run relationship between variables. If the computed F-statistic lies between lower and upper bounds values, then the test becomes inconclusive.

Besides ordinary least square estimation of a long run cointegration by bounds testing procedure, we also employ general method of moments (GMM) estimator with a view to controlling for potential endogeneity of all variables included in the equation. By doing this, it was ensured that the disturbance term is not serially correlated and the levels of the explanatory variables are weakly exogenous. In other words, they are not correlated with future error term. Thereafter, we proceed to conduct Granger causality tests with a view to determining the directions of relationship, whether unidirectional or bi-directional.

5. RESULTS AND INTERPRETATIONS

Although examining the stationarity properties is not a must for the bounds testing procedure, we undertake unit root tests to ensure that none of the variables are I(2), which is one of the preconditions of the bounds test. There are two different types of unit root tests used, namely Phillips and Perron (1988) unit root procedure and Ng and Perron (2001) modified the Phillips-Perron's (PP) tests, are conducted for variables in logarithmic levels and logarithmic first-differences. The results reported in (Table 7)

indicates that all series are non-stationary at level, however, all first-differenced variables are I(0). In other words, they are integrated of order one.

Table 7: Unit root tests

Variables	PP Test		Ng and Perron Test, MZa	
	Level (constant with trend)	1st Difference (constant without trend)	Level (constant with trend)	1st Difference (constant without trend)
Y	-0.13	-4.32**	-0.42	-15.91**
FDI	-3.04	-7.42**	-11.86	-16.79**
INV	-2.83	-8.44**	-11.12	-16.49**
PSC	-1.40	-5.59**	-8.05	-26.42**
OPEN	-2.56	-5.38**	-12.56	-16.95**
PSCFDI	-3.01	-6.50**	-11.63	-16.82**

Notes: The PP critical value at 5% level is –2.95 and –3.54 for constant without trend and constant with trend regressions, respectively. These critical values are based on Mackinnon (1996). The optimal lag is selected on the basis of Akaike Information Criterion (AIC). The Ng and Perron critical value is based on Ng and Perron (2001) critical value and the optimal lag is selected based on Spectral GLS-detrended AR based on SIC. The null hypothesis of the test is: a series has a unit root. The asterisk ** denotes the rejection of the null hypothesis at the 5% level of significance.

Table 8: ARDL Bound Test for cointegration analysis

Dependent variable	Computed F-statistic			
Y	10.90***			
FDI	1.52			
INV	1.89			
PSC	2.11			
OPEN	0.93			
PSCFDI	1.27			
Critical value	Pesaran et al. (2001)[a]		Narayan (2005)[b]	
	Lower bound	Upper bound	Lower bound	Upper bound
1%	3.41	4.68	4.257	6.040
5%	2.62	3.79	3.037	4.443
10%	2.26	3.35	2.508	3.763

Notes: [a] Critical values are obtained from Pesaran et al. (2001), Table CI(iii) Case III: Unrestricted intercept and no trend, p. 300. [b] Critical values are obtained from Narayan (2005), Table case III: unrestricted intercept and no trend, p. 10. *, ** and *** indicate significance at 10%, 5% and 1% levels, respectively.

The findings of the bounds test are reported in (Table 8). The results confirm the existence of a long run relationship amongst the variables when real GDP per capita, *y* is set as the dependent variable. The computed F-statistic is 10.90, which is greater than the upper critical values provided by Pesaran, et al (2001) and Narayan (2005) at 1% significance level. Hence, the null hypothesis of no cointegration is rejected for this equation. However, the respective computed F-statistics in the equations with other variables as dependent variables are found not statistically significant even at 10% significance level. Thus, there is only one cointegrating equation, showing the relationship runs from *FDI*, *FSD*, the interaction term and *OPEN* and dummy variable to the dependent variable *y*.

Having confirmed the existence of a long-run relationship between *y*, *INV*, *FDI*, *PSC*, and *OPEN*, we now proceed to estimate the long run equation by using the autoregressive distributed lag model (ARDL). The long-run equation is:

$$y_t = \underset{(6.16)}{6.47}^{***} + \underset{(5.05)}{1.08}\,FDI_t^{***} + \underset{(0.22)}{0.68}\,INV_t^{**} + \underset{(1.97)}{0.16}\,PSC_t^{*} + \underset{(0.11)}{0.46}\,OPEN_t^{***}$$

$$+ \underset{(4.92)}{0.33}\,PSCFDI_t^{***} - \underset{(-1.14)}{0.02}\,D \qquad (8)$$

$$Adj\ R^2 = 0.70 \qquad S.\ E.\ of\ regression = 0.012$$

*, ** and *** indicate significance at 10%, 5% and 1% levels, respectively. Figures in parentheses representing calculated "t" values.

Since the dummy variable for economic reforms is not significant, we drop it from estimation and re-estimate the long run equation.

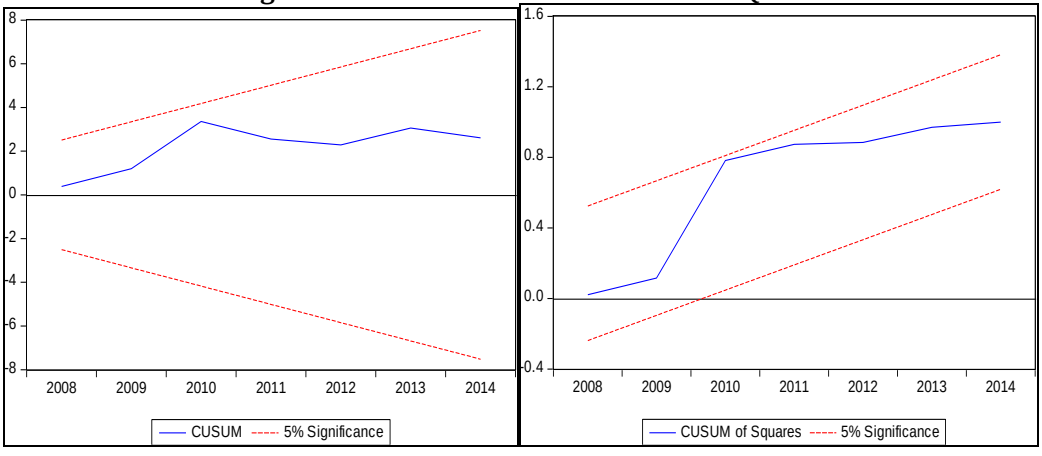
$$y_t = \underset{(6.91)}{6.52}^{***} + \underset{(5.67)}{1.07}\,FDI_t^{**} + \underset{(3.56)}{0.58}\,INV_t^{***} + \underset{(3.43)}{0.23}\,PSC_t^{***} + \underset{(5.48)}{0.46}\,OPEN_t^{***}$$

$$+ \underset{(5.55)}{0.32}\,PSCFDI_t^{***} \qquad (9)$$

$$Adj\ R^2 = 0.75 \qquad S.\ E.\ of\ regression = 0.011$$

*, ** and *** indicate significance at 10%, 5% and 1% levels respectively. Figures in parentheses representing calculated "t" values.

Figure 2: Plot of CUSUM and CUSUMSQ test



The equation estimated without the dummy variable for reforms has a higher adjusted R^2 and slightly lower standard error of regression, suggesting that the equation is a better fit for the analysis. This is further supported by the plot of CUSUM and CUSUMSQ (Figure 2) and the diagnostic tests (Table 9) on the bound test. The plot of CUSUM and CUSUMSQ indicates the bound test model is stable as the plot is within the 5% significance level. Lastly the diagnostic tests reveal that the model is free from econometrics problems.

Table 9: Diagnostic checking Test

Test	Null Hypothesis	Test statistic
Jarque-Bera Test	H_0: Normality of error term	1.17 (0.56)
Breusch-Godfrey Serial Correlation LM Test	H_0: No autocorrelation	3.60 (0.11)
ARCH Test	H_0: Homoskedasticity	0.002 (0.96)
Ramsey RESET	H_0: The model is correctly specified	0.003 (0.96)

Note: Figures without brackets indicate the test statistic values; figures in brackets indicate the probability value.

5.1. GMM

Given the existence of a long-term relationship as indicated by bounds testing, we now move to general method of moments (GMM) estimator. The use of GMM method is increasingly used for correcting any potential endogeneity that may be present in the model which ensures the robustness of the estimates. The GMM estimates, without the insignificant dummy variable for reforms are reported as follows:

$$y_t = \underset{(22.98)}{9.01^{***}} + \underset{(2.19)}{0.57\ FDI_t^{**}} + \underset{(6.03)}{1.31\ INV_t^{***}} + \underset{(4.62)}{1.03\ PSC_t^{***}} + \underset{(5.15)}{0.71\ OPEN_t^{***}} + \underset{(2.41)}{0.18\ PSCFDI_t^{**}} \quad (10)$$

Adj R^2 = 0.92 *S. E. of regression = 0.11*

*, ** and *** indicate significance at 10%, 5% and 1% levels respectively. Figures in parentheses representing calculated "t" values.

In the equation, we find *FDI, INV, PSC* and *OPEN* are directly associated with the dependent variable *y* and also significant. Further, we also observe the interaction term has emerged with a positive sign and it is found significant, indicating a complementarity relationship between *PSC* and *FDI*. The *p*-value of the Sargan statistic is 0.91, which

suggests that the instruments used are not correlated with the residuals[1]. In other words, the null hypothesis of no over-identifying restrictions is failed to reject.

The coefficients are also the elasticities, as the model is in a double log form. One percent change in FDI raises the per capita GDP rate by 0.57 percent. Similarly, one percent change in INV, PSC and Openness of the economy increases per capita GDP by 1.31 percent, 1.03 percent and 0.71 percent respectively.

5.2. Threshold level of private sector credit

We adopt the procedure employed by Hermes and Lensink (2003) for deriving the threshold level of private sector credit as percent of GDP. As *y*, *FDI* and *PSC* are in natural logarithms, we use the differential of *y* with respect to *FDI* and interactive term of *FDI* and *PSC* and equate its first order derivative to zero for determining the threshold levels of *PSC* required for *FDI* to contribute to economic growth. We calculate the threshold level as shown below:

$$\Delta y/\Delta FDI = 0.57 + 0.18PSC$$

From the above we obtain the natural logarithm of the exponential value: 0.57/0.18 =3.17. The exponential value of the natural logarithm will give us the actual percentage that would be the pre-required level of PSC for *FDI* to enhance economic growth. The threshold level PSC is: 23.81 percent of GDP.

The results show that *FDI* can stimulate economic growth in India through financial sector development. Once the threshold level of PSC is exceeded, the complementarity relationship between the two begins to work and pushes up the growth.

5.3. Granger causality test

As the variables are cointegrated, we proceed to conduct the Granger causality test in examining the direction of causality within the Vector Error Correction Model (VECM). The empirical results are shown in (Table 10).

From the results, the error correction term is found to be negative and significant, which confirms the long-run relationship between the dependent variable, per capita real GDP and the explanatory variables. The coefficient of 0.03 indicates a slow adjustment speed for disequilibrium. The error correction terms in equations with dependent variables other than per capita real GDP are not significant which indicates that the linkage runs only from FDI, PSC and interaction term and OPEN to y.

Summarizing the directions of causality, we observe unidirectional causality running from FDI, PSC, Open, and interaction term to output; from Openness and the interaction term to FDI; from Open, FDI, and interaction term to INV; and from FDI and interaction term to PSC. Also, we observe bidirectional causality exists between INV and output, and between PSC and INV.

[1] Refer to Holtz-Eakin, et al. (1988) for details.

To sum up, the VECM Granger causality results confirm the hypothesis that FDI, INV, PSC, and Open contribute significantly to per capita output.

Table 10: Granger Causality Test results

Dependent variable	Δy	ΔFDI	ΔINV	ΔPSC	ΔOPEN	ΔPSC*FDI	ECT (t-statistic)
Δy	-	19.42***	26.99***	4.49**	19.26***	29.36***	-0.03** (-2.47)
ΔFDI	0.75	-	0.15	1.32	4.95*	75.67***	-0.06 (-0.46)
ΔINV	28.10***	8.04**	-	3.28*	16.00***	4.06**	-0.08 (-1.60)
ΔPSC	1.05	3.65*	4.85**	-	2.45	2.96*	-0.01 (-0.25)
ΔOPEN	0.36	2.13	1.25	0.27	-	0.96	-0.11 (-1.29)

Note: Figures without brackets indicate the F-statistic value and coefficient for the ECT. Figure in brackets is the t-statistics for the ECT.

6. CONCLUSIONS AND POLICY IMPLICATIONS

This paper undertook an empirical study of FDI's contribution to economic growth in India during 1979-2014 by paying attention to FSD as a contingent factor in the FDI-Growth nexus. Employing the bounds testing procedure under ARDL framework, we find the existence of a long run relationship in India between growth in per capita income, FDI, investment and credit to private sector, and openness of the economy. The results confirm that FDI can stimulate economic growth in India through financial sector development. The threshold level of private sector credit is 23.8 percent of GDP. Once this level is exceeded, the complementarity relationship between the two begins to work towards speeding up growth.

The policy implications are clear. The ongoing efforts towards promoting greater financial inclusion should be strengthened by encouraging the spread of branches. Further efforts towards improving greater access to credit will enhance the contribution of FDI to GDP.

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