

---

**WORKING PAPER 100/2015**

---

**AN INTER-COUNTRY ANALYSIS ON GROWTH OF  
NON-BANK FINANCIAL INTERMEDIARIES**

**K. R. Shanmugam**



**MADRAS SCHOOL OF ECONOMICS**  
**Gandhi Mandapam Road**  
**Chennai 600 025**  
**India**

**April 2015**

# *An Inter-Country Analysis on Growth of Non-Bank Financial Intermediaries*

**K.R. Shanmugam**

Director and Professor, Madras School of Economics

[shanmugam@mse.ac.in](mailto:shanmugam@mse.ac.in)

**WORKING PAPER 100/2015**

**MADRAS SCHOOL OF ECONOMICS**

**Gandhi Mandapam Road**

**Chennai 600 025**

**India**

**April 2015**

**Phone: 2230 0304/2230 0307/2235 2157**

**Fax : 2235 4847/2235 2155**

**Email : [info@mse.ac.in](mailto:info@mse.ac.in)**

**Website: [www.mse.ac.in](http://www.mse.ac.in)**

**Price : Rs. 35**

# An Inter-Country Analysis on Growth of Non-Bank Financial Intermediaries

**K.R. Shanmugam**

## **Abstract**

*Non-Bank Financial Institutions (NBFIs) or shadow banks are internationally recognized as financial intermediaries. There have been debates in the literature on the exact relation (complementary or substitutability) between non-banking and banking sectors and between financial sector development/liberalization and economic growth. This study analyzes these issues using the data from 25 major nations in the world during 2006-13 and panel data methodology.*

*Results of the study suggest that (i) NBFIs hold nearly 22 percent of the total financial system assets; (ii) both credit risk and funding risk associated with interconnectedness between banks and non-banks sectors was larger for NBFIs than for banks in almost all nations; (iii) banks and Non-banking institutions are competing each other; (iv) financial sector represented by banking sector plays a significant role in determining GDP growth of nations, thereby confirming the Schumpeterian idea of finance spurring growth and (v) the economic growth and non-banking sectors growth are positively related, supporting the Robinsonian conjecture of economic growth leading to more dynamic financial sector development.*

*The NBFi regulation is generally underdeveloped in almost all countries. The most nations do not have policy instruments that are specially designed for dealing with systemic risks associated with NBFIs. A perpetual challenge for financial regulators and supervisors in various nations is to choose appropriate regulatory mechanism suited to their countries.*

**Keywords:** *Non-Bank Financial Sector, Regulation, Systemic Risk, Global Economies*

**JEL Codes:** *E44, G21*

## **ACKNOWLEDGEMENT**

*Earlier version of this paper was presented at Fifth MSE faculty seminar in March 2015. The comments received from Dr. N.S Siddharthan are gratefully acknowledged.*

## INTRODUCTION

The financial system of any country consists of (i) financial markets, (ii) financial intermediaries and (iii) financial instruments or financial products. These components facilitate the transfer of funds. They are, in general, not always mutually exclusive. Non-Bank Financial Institutions (NBFIs) or non-bank businesses or shadow banks are internationally recognized as financial intermediaries and defined as "credit intermediation outside the conventional banking system and constitute 1/4<sup>th</sup> of total financial intermediaries (like insurance companies, mutual funds, market makers, and other financial services providers) world wide (IMF, 2014).<sup>1</sup>

While the shadow banking takes vastly different forms across countries, the NBFIs assets (in major 25 nations) amount to US \$ 62601.6 billion (in 2013). The USA has the largest NBFIs assets (US \$ 25203 billion), followed by the UK (US \$ 9293.5 billion). Among the BRICS, India has the third largest shadow banking sector next only to China and Brazil (FSB, 2014).

The NBFIs provide several forms of financial services (within the economic system), serve as competitors to banks and specialize in sectors or groups. For instances, in India, the growth of Non-Banking sector laid foundation for the development of road transport sector because they function mainly in the business of providing finance of the purchase of transport vehicles and good traffic is handled by the Road transport sector.

---

<sup>1</sup> Generally, the non-bank businesses refer to non-deposit taking financial intermediaries only for current accounts and in some countries they include differing characteristics including deposit taking, but not providing credit services like postal saving entities in USA, Japan and Italy. While the terms NBFIs and NBFCs (Non-Banking Financial Companies) are generally used interchangeably, technically there lies a difference. The term NBFC is more suited to India as the definition of NBFC includes companies incorporated under the Companies Act 1956.

The non-banks play a complementary role in the financial inclusion agenda in many countries including India. They can also complement banks by expanding access to credit, i.e., to under-banked communities, sub prime customers and low rated firms or by supporting market liquidity, maturity transformation and risk sharing (Claessens *et. al.*, 2012). For example, securitization mobilizes illiquid assets and structured finance techniques can be used to tailor risk and return distributions to better fit the needs of ultimate investors. Thus, they bring the much-needed diversity to the financial sector, thereby diversifying the risks and increasing liquidity in the markets that promote the financial stability.

Like the Banking sector that has always been highly regulated, the NBFIs are facing increased regulatory restrictions in recent years in many nations. However, due to their simplified sanction procedures, flexibility and timeliness in meeting the credit needs and low cost operations, the NBFIs are getting an edge over banks in providing funding. Regulatory arbitrage is another reason for why NBFIs find a place. The regulatory arbitrage enables less regulated NBFIs to offer financial products at prices that are cost inefficient if offered by regulated banking institutions. As a result, customers and consumers receive more efficient services.

Despite their advantages, the 2008 financial crisis brought out the role of the shadow banking as a source of systemic risk. As the banks in general avail short-term funds for traders and commerce, the NBFIs have emerged to cater to the needs of medium and long-term credit and often borrow funds from banks and extend them as loans to customers. During the crisis period, in many advanced economies, money market mutual funds, securitization vehicles etc were highly leveraged or had

large holdings of illiquid assets and vulnerable to runs when investors withdrew large quantities of funds at short notice. This led to fire sales of assets that intensified financial turmoil by reducing asset values and helped spreading the stress to banks (IMF, 2014).

Thus, the recent crisis identified the NBFIs as the major source of systemic risk through their significance as a source of credit and liquidity in the economy and their interconnectedness with banking system (Dudley, 2009). Experts of this field believe that the only way to control these risks is through proper regulation. Too little or no regulation can lead to crisis. On the other hand, too strict or inappropriate regulation can hinder innovation and development. Getting the right balance is a perpetual challenge for financial regulators and supervisors not only in developing nations, but also in developed/advanced nations. As the data or information on this sector is limited, policy makers in various nations initiated increased efforts to better understand this sector and identify information needed to develop robust monitoring system.

At the 2010 Seoul Summit, the G20 Leaders requested the Financial Stability Board (FSB) to make recommendations to strengthen the oversights and regulation of the shadow banking system along with other international bodies. The FSB (2011) published its first report: "Shadow Banking-Scoping the Issues." Subsequently, it brought out its Global Shadow Banking Monitoring Reports for the years 2012, 2013 and 2014. While the FSB collected the data from 25 major nations with operations of NBFIs, it in its report mostly provides the aggregate level analysis for USA, UK, Euro nations and others. It does not do any empirical exercise to identify the factors determining the growth of NBFIs and to analyze the relation between the economy growth and growth of banking and non-banking sectors. While IMF (2014) analyzes this relationship, it uses the data from 1999 to 2011. As the definition of

NBFIs has changed significantly in many nations from 2006-07, the analysis based on the combined data during 1999-2011 may be biased.

Against this backdrop, this study aims to shed some light on the relationship between growth of non-banking sector and growth of economy and growth of banking sector, using the data for 25 nations during 2006-2013. The rest of this study proceeds as follows: The next two sections explain the theory, the methodology and the data sources. Then analysis of data and empirical results of the study are presented and discussed. The final Section provides the concluding remarks.

## **THEORY AND MODEL**

While the literature on the relation between financial development and economic growth is vast, there has been a debate on the exact relationship between them. One set of literature led by the seminal works of McKinnon (1973) and Shaw (1973) argue that “the cross-country capital flows as well as the progressive development of domestic financial activities contributes to better availability of savings for investment purposes. Intensified and more advanced financial market transactions permit for better, more efficient risk diversification between alternative uses. All this will lead to enhanced economic opportunities and faster output growth. Thus, finance development/liberalization can exert a positive impact on growth as interest rate level changes towards the competitive market equilibrium, while resources are efficiently allocated”.

Another group of literature views that “financial liberalization may turn to be excessively selective, leaving smaller businesses, or small economies without sufficient access to finance” (Stiglitz, 2000). Studies such as World Bank (2001) and Basu and Srinivasan (2002) report country-specific evidence of financial flows disproportionately flooding only in some selected economies of Latin America and Asia.

Thus, the inconclusiveness at the conceptual ground is substantially mirrored in the empirical evidence. See Edison *et. al.*, (2004), Andersen and Tarp (2003) and Gibson and Tsakalotos (1994) for a comprehensive survey of the literature on the effects of capital account liberalization on economic growth. Also see Pagano (1993) and Levine *et. al.*, (1999) for a review of theoretical and empirical works on the link between financial development and growth.

Another dimension of the debate, namely the direction of causality has been raised in some studies starting from Goldsmith (1958, 1969) and Patrick (1966). Since then, arguments for supporting both Schumpeterian idea of finance spurring growth (Schumpeter, 1912) and Robinsonian conjecture of economic growth leading to more dynamic financial sector development (Robinson, 1952) have been made in theoretical and empirical literatures. Greenwood and Jovanovic (1990) also rediscover this two-way relationship in their theoretical model (Gehring, 2013).

While the study by IMF (2014) analyzes the relationship between NBFIs growth and GDP growth, it ignores the following two important issues, namely the exact causal relationship between the two and changing definition of NBFIs sector. The present study attempts to overcome these limitations.

This study specifies the NBFIs growth equation as:

$$\text{NBFIg}_{it} = \gamma_1 + \gamma_2 \text{GDPg}_{it} + \gamma_3 \ln \text{BAT}_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (1)$$

where,  $\text{GDPg}_{it}$  is GDP real growth of nation  $i$  in time  $t$  ;

$\text{NBFIg}_{it}$  is the Annual Rate of Growth of NBFIs Asset (real) in nation  $i$  in year  $t$  ;

$\text{BAT}$  is banks' asset (real) in nation  $i$  at time  $t$  ;

$\lambda_i$  - country specific (unobserved heterogeneity) effect ; and  
 $\mu_t$  - time specific effect.

The standard panel data model - fixed effects or random effects model estimation procedure can be used to estimate the equation (1). The fixed effects model assumes that the unobserved heterogeneity factor and independent variables already included in the equation (1) are correlated while the random effects model assumes that there is no such correlation. The choice between the two methods of estimation depends on the Hausman's statistics. Similarly, the choice between one way (i.e., only country specific effects) and two-way effects (country specific as well as temporal effects) models depends on the standard Chow test.

As there is a simultaneity issue because the GDP growth is endogenous and may be correlated with error in equation (1), the solution is a panel 2SLS model estimation wherein the GDP growth variable is replaced by its fitted values from the auxiliary regression:

$$\text{GDPg}_{it} = \beta_1 + \beta_2 \ln \text{GDP}_{i,t-1} + \beta_3 \ln \text{BAT}_{it} + \beta_4 \text{NBFig}_{it} + \mu_t + \lambda_i + \ddot{u}_{it} \quad (2)$$

## DATA

This study uses the data on NBFIs compiled by the FSB for its Report "Global Shadow Banking Monitoring Report 2014" from the following 25 major countries during 2006-2013: (1) Argentina, (2) Australia, (3) Brazil, (4) Canada, (5) Chile, (6) China, (7) France, (8) Germany, (9) Hong Kong, (10) India, (11) Indonesia, (12) Italy, (13) Japan, (14) Korea, (15) Mexico, (16) Netherland, (17) Russia, (18) Saudi Arabia, (19) Singapore, (20) South Arica, (21) Spain, (22) Switzerland, (23) Turkey, (24) UK and (25) USA.<sup>2</sup> These 25 nations account for nearly 80 percent Global GDP

---

<sup>2</sup> Shadow banking monitoring data base is available in <http://www.financialstabilityboard.org/2014/11/global-shadow-banking-monitoring-report-2014/>. The FSB compiled the data supplied by national jurisdictions based on the balance sheets of the

and 90 percent of Global Financial system assets. The countries-Germany, France, Italy, Netherland and Spain constitute the Euro-area. The GDP (real) and CPI inflation data are also from World Bank website and World Economic Outlook sources. Using the CPI inflation data, the implicit deflator is derived and using this, the real values of NBFIs asset, banks asset etc are computed.

## RESULTS

***An Overview of Financial Systems of 25 Major Countries:*** This section primarily aims to provide a systematic account of size, composition and trends of major global financial system.<sup>3</sup> Countries differ in terms of economic development measured in terms of per capita income (Chart 1).<sup>4</sup> The top 3 nations in terms of per capita figure (in 2013) are: Switzerland (US \$ 90760), Australia (US \$ 65390) and Singapore (US \$ 54040). The poorest nations are: India (US \$ 1570), Indonesia (US \$ 3580) and China (US \$ 6560). India's per capita income is only 1.73 percent of Switzerland's per capita income, which is the highest among the sample nations.

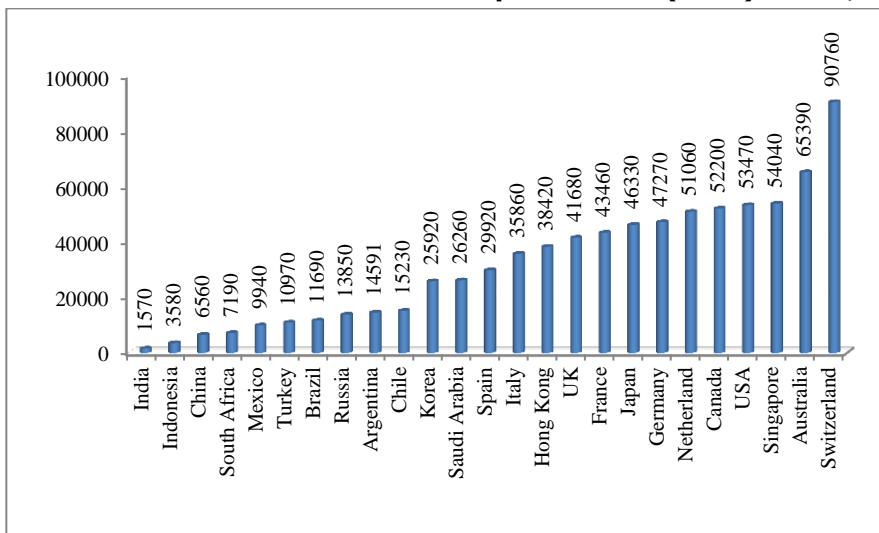
---

financial system, as recorded in national financial accounts (i.e., Flow of Funds). For data source and limitations, see the report: FSB (2014).

<sup>3</sup> The financial system plays a key role in the smooth and efficient functioning of the economy. Its most fundamental contribution is to channel resources from individuals and companies with surplus resources to those with resource deficits. In doing so, the financial system not only satisfies the savings needs of the country, but also facilitates the accumulation of investment capital that is critical to growth and development. It also revolves the risk preferences of individuals and companies (Carmichael and Pomerleano, 1999).

<sup>4</sup> The Countries also differ in terms of the size of GDP. The USA ranks first with the nominal GDP of US \$ 16768 billion, followed by China (US \$ 9622.5 billion), and Japan (US \$ 4547.1 billion). The GDP of India is US \$ 1889.7 billion only (not shown).

**Chart 1: Economic Indicator: Per Capita Income (2013) in US \$**



**Source (Basic Data):** World Bank Website.

In terms of size of financial markets, USA (US \$ 81269.4 billion) has the largest capital market, followed by UK (US \$ 34151.8 billions) and Japan (US \$ 30991.2 billions).<sup>5</sup> Netherlands has the highest financial assets-GDP ratio (1325.1 percent), followed by UK (1278.5 percent) and Hong Kong (1129.9 percent). The bottom 3 nations with low ratio are: Argentina (69.6 percent), Indonesia (79.1 percent) and Mexico (115.6 percent). The ratio is 147.7 percent in India. The Euro-area accounts for nearly 21 percent of the total financial assets and its financial assets-GDP ratio is 534.5 percent (Table 1).

<sup>5</sup> The total financial assets comprise the assets of central banks, banks, insurance companies, pension funds, public financial institutions, financial auxiliaries and other financial intermediaries (or NBFIs).

**Table 1: Financial Indicators**

Countries	Financial Asset (Nominal)		
	Value in 2013 (USD billion)	As Percent of GDP	Average Growth (2006-13)
Argentina	357.0	69.6	9.7
Australia	5111.7	367.4	11.8
Brazil	4913.2	237.6	19.5
Canada	8580.7	485.2	9.8
Chile	612.5	233.9	12.1
China	34427	357.8	24.1
France	17244	591.6	7.4
Germany	16280.6	431.2	4.5
Hong Kong	3096.9	1129.8	12.1
India	2790.9	147.7	15.6
Indonesia	589.4	79.1	16.6
Italy	8027	373.1	6.8
Japan	30991.2	683.1	2.4
Korea	5421.2	400.5	9.3
Mexico	1423	115.6	9.6
Netherland	11747.4	1325.1	8.9
Russia	2746.6	134.7	23.8
Saudi Arabia	1389.2	185.6	15.6
Singapore	2329.6	790.6	11.1
South Africa	1064.2	330.7	6.3
Spain	6193.3	441.8	7.6
Switzerland	6226.4	920	10.9
Turkey	1105.6	151.1	13.3
UK	34151.8	1278.5	7.0
USA	81269.4	484.7	4.9
<b>Total</b>	<b>288089.6</b>	<b>473.2</b>	<b>7.3</b>
<b>Euro-area</b>	<b>59492.3</b>	<b>534.5</b>	<b>6.7</b>

Source (Basic Data): FSB (2014).

During 2006-13, the total (global) financial assets grew at an average rate of 7.3 percent and in euro area, it grew at 6.7 percent

(Table 1). In USA, UK and Japan it grew at 4.9 percent, 7 percent and 2.4 percent respectively. However, it grew at 24.1 percent in China, 23.3 percent in Russia, 19.5 percent in Brazil, 16.6 percent in Indonesia and 15.6 percent in India. As the financial asset growth is relatively high in low income countries as compared to rich nations, it is an evident that convergence happens and poor economies are catching up with rich ones in terms of financial sector development.

Relative to GDP, the banks' assets is the largest in Hong Kong (797.2 percent) and is the lowest in Argentina (30.1 percent). In India, the banks' asset is 88.8 percent of GDP. In six countries – Argentina, India, Indonesia, Mexico, Russia, and Saudi Arabia, the banks' asset-GDP ratio is less than 100 percent (Table 2).

In 14 out of 25 nations, banks hold a larger share of financial system assets, accounting for at least half of the financial system assets. Among these 14 nations, Singapore ranks first with banks share of 76.4 percent, followed by China (72.1 percent) and Hong Kong (70.6 percent). Only in Netherland and USA, banks hold less than 30 percent of total financial assets of their respective countries. In India, the banks' share is more than 60 percent (Chart 2). On a total assets basis, China's banking system is the largest among 25 nations and USA and UK are the second and the third largest (Table 2).

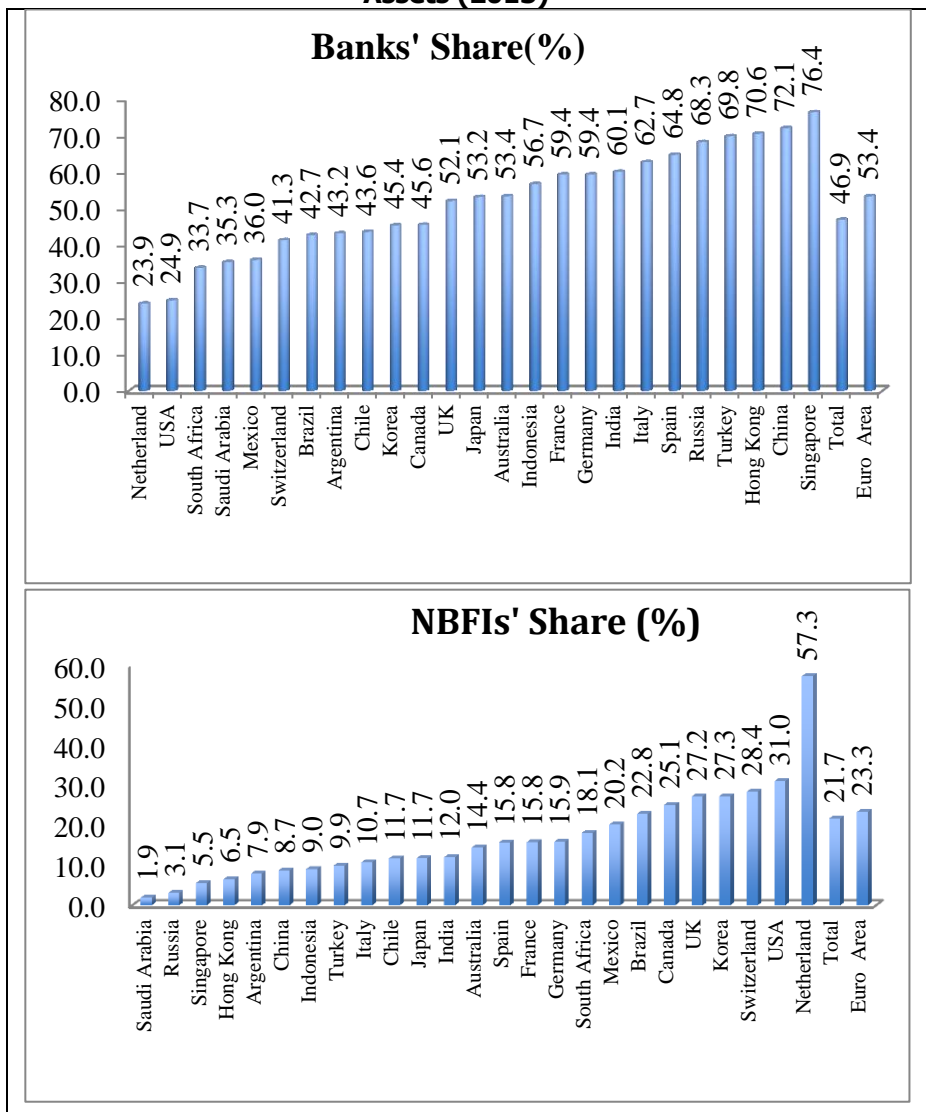
While the global financial systems remain predominantly bank-based (with banks share of 46.9 percent), the NBFIs hold nearly 22 percent of the total financial system assets (Chart 2). In Netherland, the NBFIs hold 57.3 percent of total financial assets and in Euro-area, they hold 23.3 percent. The NBFIs hold 12 percent in India and 8.7 percent in China. In Saudi Arabia, they merely hold about 2 percent of total financial assets.

**Table 2: Size of Banks and NBFIs (2013)**

Countries	Banks Assets		NBFIs Assets	
	USD Billion	As Percent of GDP	USD Billion	As Percent of GDP
Argentina	154.3	30.1	28.2	5.5
Australia	2729.4	196.2	737.6	53.0
Brazil	2099.9	101.5	1120.5	54.2
Canada	3909.3	221.1	2157.1	122.0
Chile	267.3	102.1	71.7	27.4
China	24824.1	258.0	2998.6	31.2
France	10236.2	351.2	2721.5	93.4
Germany	9664.9	256.0	2582.2	68.4
Hong Kong	2185.0	797.2	200.9	73.3
India	1677.2	88.8	335.1	17.7
Indonesia	334.4	44.9	53.3	7.2
Italy	5036.8	234.1	861.7	40.1
Japan	16484.2	363.3	3635.2	80.1
Korea	2460.9	181.8	1478.9	109.3
Mexico	512.0	41.6	287.2	23.3
Netherland	2812.6	317.2	6730.9	759.2
Russia	1874.7	91.9	84.1	4.1
Saudi Arabia	490.9	65.6	26.2	3.5
Singapore	1780.8	604.5	128.8	43.7
South Africa	359.2	111.6	192.7	59.9
Spain	4011.9	286.2	975.5	69.6
Switzerland	2573.6	380.3	1768.0	261.2
Turkey	772.2	105.5	109.8	15.0
UK	17793.8	666.1	9293.5	347.9
USA	20204.1	120.5	25202.8	150.3
Total	135249.6	222.2	62601.6	102.8
Euro -area	31762.3	285.4	13871.8	124.6

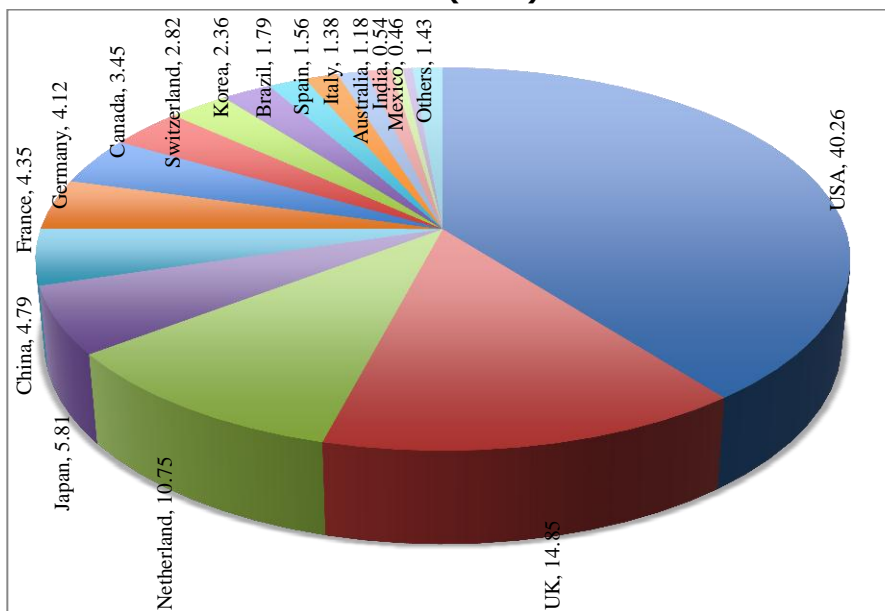
**Source (Basic Data):** FSB (2014).

**Chart 2: Share of Banks and NBFIs in the Total Financial System Assets (2013)**



The NBFIs assets relative to GDP in the 20+Euro area group of nations increase to 102.8 percent (in 2013). In absolute term, the NBFIs assets in all these nations amount to US \$ 62601.6 billion. The USA has the largest NBFIs sector, amounting to US \$ 25202.8 billion, a 40.3 percent of total NBFIs assets in the globe (Chart 3). The United Kingdom has the second largest NBFIs sector, amounting to US \$ 9293.5 billion, a 14.9 percent share of 20+Euro group total. The Euro-area has the third largest NBFIs sector, accounting to US \$ 13871.8 billion, a 22.16 percent share. Combined together, the euro-area, USA and UK represent 77.4 percent of total global NBFIs assets in 2013. This compares with their modest share (51.6 percent) in terms of global banks assets.

**Chart 3: Country's Share (Percent) in Total NBFIs Assets in 25 Nations (2013)**



**Source (Basic Data):** FSB (2014).

The NBFIs assets amount to US \$ 26.2 billion in Saudi Arabia and US \$ 28.2 billion in Argentina (Table 2). China is one of the 8 nations with less than 10 percent share of NBFIs in the total financial system while India is one among nine countries with 10-20 percent share of NBFIs (Chart 2). It is noticed that in India, the NBFIs hold assets worth of US \$ 335.1 billion. However, its share in the total NBFIs asset in the globe is only 0.54 percent (Chart 3). Interestingly, 10 other countries (Argentina, Chile, Hong Kong, Indonesia, Mexico, Russia, Saudi Arabia, Singapore, South Africa and Turkey) have fewer shares than India's share.

During 2006-13, NBFIs assets (nominal) in the 20+euro area grew at an average rate of 7.4 percent (Chart 4). China recorded the highest growth of 128.4 percent. The other top two nations with higher growth were Russia (40.2 percent) and India (36.6 percent). In top 3 nations with larger quantum of NBFIs assets –USA, UK and Netherlands– the NBFIs' asset grew only at 3.9 percent, 11.5 percent and 12 percent respectively. In Euro area, the growth rate was only 8.4 percent.

***Composition of NBFIs:*** Table 3 presents the shares of sub-sectors of NBFIs, namely money market funds, financial companies, structured financial vehicles, hedge funds, equity funds, fixed income funds, broker-dealers, real estate investment funds/trusts, trust companies and other investment funds.<sup>6</sup>

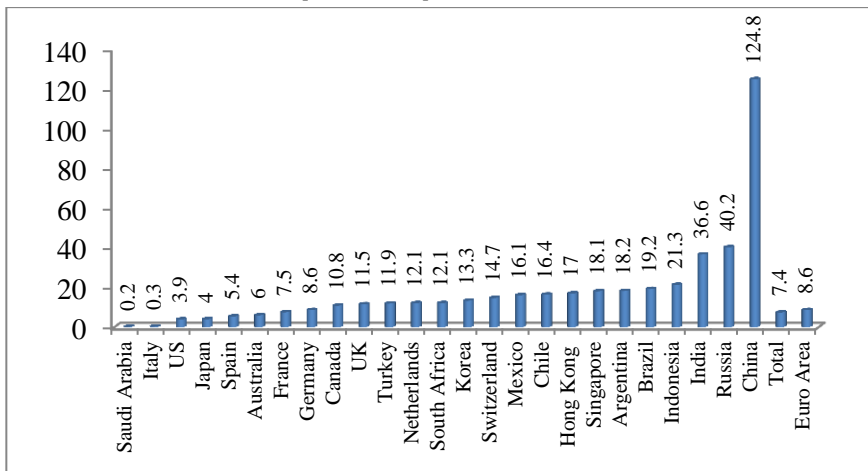
Other investment fund is the largest sub-sector of NBFIs with 38 percent share. The total assets of this sector amounts to US \$ 24 trillion (at end of 2013). The second largest subsector is the broker-dealers. Their assets amounted to US \$ 9.3 trillion, accounting for 15 percent of total NBFIs assets. The structured finance vehicle is the third largest with

---

<sup>6</sup> This section is primarily based on FSB (2014).

8 percent share. Their assets reached almost US \$ 5 trillion. Finance companies assets worth US \$ 4.1 trillion, accounting for 6 percent. While money market funds accounted for 6 percent, real estate investment funds/trust and trust companies accounted for 3 percent each.

**Chart 4: Average Annual Growth of NBFIs Assets (2006-13) in Percent**



Source (Basic Data): FSB (2014).

**Table 3: Composition of NBFIs (at end of 2013)**

Sub-Sectors	Percent Share	Sub-Sectors	Percent Share
Other Investment Funds	38 %	Money Market Funds	6 %
Broker-Dealers	15 %	Trust Companies	3 %
Structured Finance Vehicles	8 %	Real Estate Investment Funds	3 %
Dutch Special Financial Institutions	7 %	US Funding Corporations	3 %
Finance Companies	6 %	Others	11 %

Source (Basic Data): FSB (2014).

***Systemic Risks and Interconnectedness Between Banks and NBFIs:*** Systemic risks can spill over from NBFIs to banking sector and vice versa. This interconnectedness can take many forms, including direct and indirect linkages. The direct linkages, for example, can be created if NBFIs that form part of the banks' credit intermediation chain are owned directly by banks or benefit directly from banks support. Funding interdependence is another source of direct linkage as is the holding of each others assets such as debt securities. Indirect linkage may exist through a market channel as both banks and NBFIs may invest in similar assets. These connections can create a contagious channel through which the stress in one can transmit to the other.

There are many ways to capture the potential risks stemming from the interconnectedness between banks and NBFIs. Two such measures are: direct credit exposures and funding dependence on each other (FSB, 2012). Conceptually, both banks and NBFIs pose credit and funding risks to each other. The FSB (2014) suggests a methodology to calculate the direct measures of credit exposure and funding dependence based on aggregate balance sheet bilateral exposure between two sectors (assets and liabilities of banks to NBFIs and NBFIs to banks). Table 4 presents the details of banks' assets and liabilities to NBFIs (at end of 2013) for selective nations.

The UK has the highest credit risk for banks of 16 percent, followed by Netherland (5.4 percent), Italy (5.3 percent), Indonesia (3.7 percent) and Spain (3.7 percent). Brazil has the largest funding risk (19.1 percent) for banks. Other countries with higher funding risks for banks are: UK (16.3 percent), Chile (11 percent), Netherland (7.7 percent), and Switzerland (6.9 percent). The credit risk and funding risk for banks in India are 2.8 percent and 4.1 percent respectively. Russia has the highest credit risk for NBFIs due to their exposure to the banking sector of 52.1

percent, followed by Italy (30.9 percent), UK (30.6 percent), Indonesia (23.5 percent), and Hong Kong (23 percent).

**Table 4: Banks' Assets and Liabilities to NBFIs**

Countries	Banks Assets to OFIs	Banks Liabilities to OFIs	Banks Assets to OFIs	Banks Liabilities to OFIs
	As a Percent of Bank's Assets, at end 2013		As a Percent of NBFIs Assets, at end 2013	
Argentina	1.3	n.a	6.9	n.a
Australia	3.0	5.4	11.3	19.9
Brazil	2.5	19.1	4.8	35.7
Canada	2.4	2.3	4.3	4.1
Switzerland	2.8	6.9	4.0	10.0
Chile	1.6	11.0	6.0	40.9
Spain	3.7	3.7	15.4	15.3
UK	16.0	16.3	30.6	31.3
Hong Kong	2.1	n.a	23.0	n.a
Indonesia	3.7	6.7	23.5	41.7
India	2.8	4.1	13.8	20.4
Italy	5.3	1.1	30.9	6.6
Mexico	0.5	3.0	0.9	5.4
Netherland	5.4	7.7	2.2	3.2
Russia	2.3	3.9	52.1	87.4
Saudi Arabia	0.1	0.2	2.8	3.7
Turkey	1.8	2.2	12.7	15.5
Euro Area	7.9	7.4	11.2	10.5
South Africa	1.0	n.a	1.9	n.a

**Source (Basic Data):** FSB (2014).

In India, this risk is measured at 13.8 percent. Russia also has the highest funding risk for NBFIs (of 87.4 percent) due to their reliance with banking sector as a source of funding. Other nations with higher funding risk for NBFIs are: Indonesia (41.7 percent), Chile (40.9 percent), Brazil (35.7 percent), UK (31.3 percent), and India (20.4

percent). Only in Canada, Italy, Mexico, Netherland, and Saudi Arabia, this risk is less than 10 percent. Finally, it is noted that the risk associated with interconnectedness between two sectors was larger for NBFIs than for banks in almost all nations.

***Size of Insurance and Pension Funds:*** The Regional Consultative Group for Asia of FSB in its recent report: Report on Shadow Banking in Asia (2014a) redefines the NBFIs that include OFIs (other financial institutions which is basically the NBFIs used above), PFIs (government owned financial institutions providing specialized services), Insurance companies (engaging in the business of underwriting insurance, receiving premiums and paying insurance benefits) and Pension Finds (generally funds set up to pay the pension benefits of employees after their retirement). Therefore, we can review the growth of insurance sector and pension funds during 2006-13 and redefine the NBFIs as NBFIs\* that include the insurance companies, pension finds and PFIs. The insurance companies hold 9.5 percent of total financial assets while pension funds hold 9.2 percent. During 2006-13, the global insurance companies assets grew at 5.26 percent per annum while the pension fund grew at 6.2 percent (Table 5).

The top 5 nations with larger insurance companies' assets are: USA, Japan, France, UK and Germany. These 5 countries account for nearly 68 percent of the total global insurance companies assets. The USA, The UK, Netherland, Australia, and Japan are top 5 nations in terms of larger pension funds assets and they jointly account for 87.4 percent of total pension funds assets in the globe. In India, the insurance companies hold 11.1 percent of total financial assets in the county while the pension funds hold only 0.2 percent. During 2006-13, insurance companies' assets in India grew at 15.9 percent per annum while the pension funds asset grew at 68.8 percent (which is the second highest in

the globe next only to China with 119.5 percent growth). Table 6 shows the size (at end of 2013) and growth of NBFIs\* (redefined NBFIs) assets in 25 nations during 2006-13.

**Table 5: Size of Insurance Companies and Pension Funds (2013)**

Countries	Insurance Companies Assets			Pension Funds Assets		
	US \$ billion	Percent of Total Assets	Growth (Percent) During 2006-13	US \$ billion	Percent of Total Assets	Growth (Percent) During 2006-13
Argentina	13	3.7	0.76	50.5	14.2	11.3
Australia	160.7	3.1	10.64	1,369.5	26.8	15.4
Brazil	236.5	4.8	22.19	312.2	6.4	14.3
Canada	700.9	8.2	7.51	1,242.2	14.5	9.2
Chile	51.7	8.4	10.58	170.5	27.8	13.9
China	1,359.5	3.9	28.50	40.9	0.1	119.5
France	2,998.3	17.4	7.86	0	0	-
Germany	2,949.1	18.1	6.07	0	0	-
Hong Kong	210.6	6.8	16.80	103.0	3.3	11.4
India	310.8	11.1	15.87	5.0	0.2	68.8
Indonesia	53.6	9.1	22.73	13.3	2.3	11.2
Italy	841.4	10.5	3.65	50.6	0.6	10.4
Japan	4,050.9	13.1	3.02	1,330.3	4.3	1.9
Korea	731	13.5	12.35	64.6	1.2	10.5
Mexico	69.7	4.9	10.70	163.7	11.5	15.1
Netherland	598.6	5.1	3.11	1,385.4	11.8	7.4
Russia	39.8	1.5	4.56	58.6	2.1	23.5
Saudi Arabia	8.3	0.6	32.66	0	0	-
Singapore	142	6.1	11.61	0	0	-
South Africa	213.7	20.1	4.10	225.1	21.2	7.3
Spain	410.1	6.6	5.68	128.5	2.1	5.6
Switzerland	613.2	9.8	8.98	721.9	11.6	9.1
Turkey	29.2	2.6	14.87	11.8	1.1	43.4
UK	2,965.2	8.7	3.45	2,847	8.3	8.9
USA	7,508.1	9.2	3.85	16,350	20.1	5.2
Total	27,266	9.5	5.26	26,644.9	9.2	6.2
Euro-area	7,797.6	13.1	6.04	1,564.6	2.6	7.3

**Source (Basic Data):** FSB (2014).

**Table 6: Size of NBFIs\* and Its Growth<sup>@</sup>**

<b>Countries</b>	<b>NBFIs**' Assets (USD Billion)</b>	<b>Percent Share in Total Assets</b>	<b>Avg. Growth Percent (2006-13)</b>
Argentina	91.8	25.7	10.2
Australia	2267.8	44.4	11.0
Brazil	1999.0	40.7	19.0
Canada	4513.9	52.6	9.8
Chile	300.4	49.0	13.5
China	4399.0	12.8	51.7
France	6212.7	36.0	7.4
Germany	5531.3	34.0	7.1
Hong Kong	520.7	16.8	15.1
India	715.8	25.6	20.0
Indonesia	120.1	20.4	20.1
Italy	2190.0	27.3	4.9
Japan	12262.7	39.6	0.6
Korea	2522.6	46.5	12.7
Mexico	715.4	50.3	12.1
Netherland	8715.0	74.2	10.3
Russia	182.5	6.6	38.3
Saudi Arabia	172.3	12.4	8.2
Singapore	270.8	11.6	13.3
South Africa	651.5	61.2	7.2
Spain	1726.4	27.9	6.4
Switzerland	3103.1	49.8	11.9
Turkey	170.9	15.5	13.7
UK	15693.4	46.0	8.4
USA	56991.5	70.1	4.0
Total	132040.6	45.8	5.9
Euro-area	24375.4	41.0	7.9

**Source (Basic Data):** FSB (2014). @ - NBFIs \*- Redefined NBFIs.

The total NBFIs\* assets in 20+ Euro area grew at 5.9 percent, which is less than the NBFIs growth of 7.4 percent. In Euro area alone, it grew at 7.9 percent as against the NBFIs growth of 8.6 percent in this

region. In India and China the NBFIs\* assets grew at 20 percent and 51.7 percent respectively. In these nations, the NBFIs assets grew at 36.6 percent and 124.8 percent respectively. It is noticed that only in Australia, Italy, Saudi Arabia, and Spain the growth of NBFIs\* assets are higher than the growth of NBFIs assets.

### ***Relation Between Growths of NBFIs, Banks and Economy***

This section presents the Panel 2SLS estimation results of equations (1) and (2) discussed in the theory and Model Section. First let us discuss the GDP growth equation results shown in Table 7. It is basically the panel conditional convergence model for economic growth suggested by Barro, Mankiw and Sala-i-Martin (1995). In the preliminary model, we include the NBFIs real growth variable, but it is not statistically significant at 5 percent.<sup>7</sup> Therefore in the final model, it is dropped. The Hausman statistics supports the one-way fixed effects model.

As expected, the  $\beta$ -convergence coefficient (i.e.,  $\beta_2$ ) is negative and statistically significant at 1 percent level as predicted by the theory. This means that there is a negative association between GDP growth and initial GDP, providing a strong evidence for conditional convergence among the nations. The speed of convergence (the rate at which the economy converges towards its steady state income) is -0.164. This is the responsiveness of the average growth rate to the gap between  $\ln GDP^*$  (steady state income) and  $\ln GDP_0$  (initial income). By our empirical setting, this rate is the same for all nations.

The bank asset variable has a positive and significant impact on the GDP growth at 5 percent level of significance. This result provides a strong support for the Schumpeterian idea of finance spurring growth. The top 3 nations having larger intercepts (unobserved heterogeneity

---

<sup>7</sup> Even in the 2SLS estimation, it is not significant and so it is dropped in the final model.

effects) are: Indonesia, Korea, and Japan. Countries with low intercepts are: Turkey, Singapore and Netherlands.

**Table 7: Panel Conditional Convergence (One Way Fixed Effects)  
Model Results  
(Dependent Variable: Real GDP growth of Sample Countries)**

<b>Variables</b>	<b>Coefficients</b>	<b>Abs. t Values</b>
Ln GDP <sub>it,t-1</sub>	-0.1644	5.235
Ln Bank Assets <sub>it</sub>	0.0383	2.388
R Square [F statistics]	0.5531	[8.24]
Hausman Statistics	31.06	
<b>Country Specific Effects</b>		
Argentina	0.8825	6.164
Australia	0.9276	5.966
Brazil	0.9141	6.033
Canada	0.9248	5.879
Chile	1.7338	5.729
China	1.2917	6.295
France	0.8925	5.742
Germany	0.9428	5.812
Hong Kong	0.9863	6.024
India	1.5809	5.983
Indonesia	2.2618	5.666
Italy	0.8725	5.704
Japan	1.7930	5.787
Korea	2.0195	5.757
Mexico	1.3516	5.799
Netherlands	0.7437	5.716
Russia	1.5286	5.828
Saudi Arabia	0.9763	6.162
Singapore	0.7000	6.124
South Africa	1.0489	5.935
Spain	0.8343	5.737
Switzerland	0.7578	5.837
Turkey	0.5913	6.106
United Kingdom	0.8375	5.610
United States	1.2249	5.864

Table 8 presents the panel data model estimation results of NBFIs asset growth equation. In model 1, we provide the regular panel model results. The Hausman statistics supports the two-way fixed effects model. The bank asset has a negative and significant impact on NBFIs growth, indicating competitiveness between banks and NBFIs. The GDP growth is positive, but not significant.

**Table 8: Panel Data Model Estimation Results of NBFIs' Asset Growth (real)**

Variables	Model 1		Model 2 (2SLS)		Model 3 (NBFC*):2SLS	
	Coefficients	t-Values	Coefficients	t-Values	Coefficients	t-Values
GDP Growth <sub>it</sub>	1.3928	1.029	1.8146	2.546	0.882	1.664
Ln Bank Assets <sub>it</sub>	-0.452	-2.67	-0.4147	-2.478	-0.1383	-1.759
Constant	3.3863	2.746	10.7424	3.477		
R <sup>2</sup> [F Stat.]	0.5273	[5.41]	0.5422	[5.75]	0.2435	[2.14]
Hausman Stat.	19.91		14.72		22.11	
<b>Country Specific Fixed Effects</b>						
Argentina	-1.4911	-2.313	-3.3183	-3.07	0.5623	1.666
Australia	0.0027	0.02	-1.4636	-2.077	1.098	1.84
Brazil	-0.1897	-1.245	-1.7649	-2.321	1.0666	1.954
Canada	0.2379	1.354	-1.1959	-1.727	1.1555	1.853
Chile	-1.0458	-2.233	2.9929	1.52	0.7625	1.883
China	1.8419	4.203	2.3954	5.146	1.6666	2.248
France	0.726	1.973	-0.9211	-1.079	1.2962	1.825
Germany	0.7732	1.993	-0.5768	-0.775	1.2999	1.806
Hong Kong	-0.0109	-0.086	-1.1154	-2.065	1.0924	1.884
India	-0.1621	-0.915	2.615	2.011	0.9949	1.84
Indonesia	-1.0292	-2.22	6.5194	1.815	0.7949	1.944
Italy	0.3418	1.413	-1.3445	-1.655	1.1783	1.806
Japan	1.0493	2.047	5.5175	2.532	1.3489	1.753
Korea	0.0252	0.193	5.9668	2.124	1.0974	1.858
Mexico	-0.7233	-2.115	0.7909	0.983	0.8504	1.87
Netherlands	0.2322	1.369	-2.3871	-1.932	1.1574	1.873
Russia	-0.2261	-1.016	2.4101	1.9	1.1659	2.297

*Contd...Table 8*

Contd...Table 8

Variables	Model 1		Model 2 (2SLS)		Model 3 (NBFC*):2SLS	
	Coefficients	t-Values	Coefficients	t-Values	Coefficients	t-Values
Saudi Arabia	-0.9521	-2.731	-2.1876	-3.177	0.7681	1.685
Singapore	-0.1155	-0.84	-3.2788	-2.161	1.032	1.819
South Africa	-0.8522	-2.305	-1.4318	-3.154	0.7663	1.727
Spain	0.3071	1.433	-1.6769	-1.773	1.159	1.808
Switzerland	0.1424	1.014	-2.4369	-1.997	1.1412	1.903
Turkey	-0.8858	-2.338	-4.6323	-2.562	0.8186	1.857
United Kingdom	1.0682	2.133	-0.9761	-0.901	1.3906	1.818
United States	0.9359	1.962	1.4998	2.742	1.3312	1.761
<b>Time Effects</b>						
2006	0.0497	0.544	0.0196	0.216	-	-
2007	0.2186	2.85	0.1853	2.458	-	-
2008	-0.3374	-4.779	-0.3476	-4.972	-	-
2009	0.1233	1.217	0.0694	1.009	-	-
2010	0.0784	1.011	0.0792	1.12	-	-
2011	-0.1096	-1.514	-0.0814	-1.14	-	-
2012	0.0353	0.466	0.0674	0.872	-	-
2013	-0.0582	-0.791	0.0082	0.101	-	-

Model 2 in Table 8 presents the 2SLS panel model results. The GDP growth is now positive and significant, indicating that on an average 1 percent increase in GDP growth of sample nations leads to 1.81 percent increase in NBFIs growth. This result provides a strong support for the Robinsonian conjecture of economic growth leading to more dynamic financial sector development. As in model 1, the bank asset has a negative and significant impact on the NBFIs asset growth, confirming the substitution relation between banks and non-banks sectors in 25 sample nations. Finally, we present the model 3 results in which NBFIs\* growth is the dependent variable (i.e., combined growth of NBFIs including insurance, pension funds etc.). The Chow test and Hausman Statistics support one way fixed effects model. The results are more or similar to results in Model 2. That is, the results in model 3 support that (i) the Robinsonian conjecture that the economic growth leads to more

dynamic financial sector development and (ii) banks and non-banks sectors are competing each other. However, it is noted these results are supported by t values only at 10 percent level of significance.

## **CONCLUDING REMARKS**

The NBFIs play an important role in the credit chain by filling credit voids not covered by other financial intermediaries. Our empirical analysis of interconnectedness of banks and NBFIs indicate that both credit risk and funding risk associated with interconnectedness between these two sectors was larger for NBFIs than for banks in almost all nations. Asian countries like India in general face not the same shadow banking risks as other jurisdictions like USA or UK, because Asia is relatively less developed financial markets, offers less complex financial products and the scale on non-bank sectors remains small in size and non systemic in nature.

The empirical evidences of this study strongly support the Robinsonian conjecture of economic growth leading to more dynamic financial sector development as the GDP growth variable has a positive and significant impact on NBFIs growth. Further, banking sector growth is negatively associated with NBFIs growth, indicating that banks and non-banks are competitors.

The results of the study also confirm the conditional convergence of economic growth among nations. This means that in countries with low level of initial level of GDP, the economic growth is faster as compared to the growth in countries with larger initial GDP. The speed of convergence is -0.164. This is the responsiveness of the average growth rate to the gap between the steady state income and the initial income. As the financial sector represented by banking sector plays a significant role in determining GDP growth of nations, the study confirms

the prediction of the theory led by the seminar works of McKinnon (1973) and Shaw (1973) and also confirms the Schumpeterian idea of finance spurring growth.

The main challenges facing the NBFIs sector is that most nations do not have policy instruments that are specially designed for dealing with systemic risks associated with this sector. However, they use policy tools derived from the general regulatory regime, e.g., consumer protection rule for NBFIs will have an indirect effect in addressing systemic risks by imposing limits on certain activities and or types of risks. A few nations rely on prudential tools provided for banks (FSB, 2012). Some nations use macro-prudential framework to address build-up of systemic risks of NBFCs. For instances, (i) Reserve Bank of Australia (RBA) conducts annual monitoring exercise of shadow banking entities including NBFCs and highlights any risks to the Council of Financial Regulations for policy actions; (ii) Canadian government determines which mortgage quality for government insurance, thus limiting the activities in securitization markets; and (iii) The Financial Stability Oversight Council in USA requires the Federal Reserve to regulate specific NBFCs when they are deemed to be "systematically important" based on the Dodd-Frank Act. These models with appropriate modifications may suit to many nations in dealing with regulatory issues relating to NBFIs.

## REFERENCES

- Andersen, T. and F. Tarp (2003), "Financial Liberalization, Financial Development and Economic Growth in LDCs", *Journal of International Development*, 15 (2): 189-209. URL: <http://ideas.repec.org/a/wly/jintdv/v15y2003i2p189-209.html>.
- Barro, Robert J., N. Gregory Mankiw and Xavier Sala-I-Martin (1995), "Capital Mobility in Neoclassical Models of Growth", *The American Economic Review*, 85(1), 103-115.
- Basu, A. and K. Srinivasan (2002), "Foreign Direct Investment in Africa: Some Case Studies", *IMF Working Paper No. 02/61*. URL: <http://ideas.repec.org/p/imf/imfwpa/02-61.html>.
- Carmichael, Jeffrey and Michael Pomerleano (1999), "The Development and Regulation of Non-Bank Financial Institutions", *The World Bank Publications*.
- Claessens, S., S. Djankov, J. Fan and L. Lang (2002), "Disentangling the Incentive and Entrenchment Effects of Large Shareholdings", *Journal of Finance*, 57 (6): 2741-2771. URL: <http://ideas.repec.org/a/bla/jfinan/v57y2002i6p2741-2771.html>.
- Dudley, W.C. (2009), "Proceedings from the Centre for Economic Policy Studies (CEPS) Symposium 2009: More Lessons from the Crisis".
- Edison, J. H., M. W. Klein, L. A. Ricci and T. Slok (2004), "Capital Account Liberalization and Economic Performance: Survey and Synthesis", *IMF Staff Papers*, 51 (2): 220-256. URL: <http://ideas.repec.org/p/nbr/nberwo/9100.html>.
- FSB (2011), "Shadow Banking: Scoping the Issues-A Background Note of the Financial Stability Board", see: [http://www.financialstabilityboard.org/publications/r\\_110412a.pdf](http://www.financialstabilityboard.org/publications/r_110412a.pdf).
- FSB (2012), "Global Shadow Banking Monitoring Report 2012", November 2012, Financial Stability Board, [http://www.financialstabilityboard.org/publication/r\\_121118c.pdf](http://www.financialstabilityboard.org/publication/r_121118c.pdf).

- FSB (2014), "Global Shadow Banking Monitoring Report 2014", October 2014, *Financial Stability Board*, [http://www.financialstabilityboard.org/publication/r\\_141030.pdf](http://www.financialstabilityboard.org/publication/r_141030.pdf).
- FSB (2014a), "Report On Shadow Banking in Asia", Regional Consultative Group for Asia, August 2014, [http://www.financialstabilityboard.org/publication/r\\_140822c.pdf](http://www.financialstabilityboard.org/publication/r_140822c.pdf).
- Gehring, A. (2013), "Financial Liberalization, Growth, Productivity and Capital Accumulation: the Case of European Integration," *International Review of Economics and Finance* 25: 291-309. URL: <http://ideas.repec.org/a/eee/reveco/v25y2013icp291-309.html>.
- Goldsmith, R. (1958), "Financial Intermediaries in the American Economy Since 1900", Princeton: Princeton University Press.
- Goldsmith, R. (1969), "Financial Structure and Development", New Haven: Yale University Press.
- Gibson, H. D. and E. Tsakalotos (1994), "The Scope and Limits of Financial Liberalization in Developing Countries: A Critical Survey", *Journal of Development Studies* 30 (3): 578-628.
- Greenwood, J. and B. Jovanovic (1990), "Financial Development, Growth, and the Distribution of Income," *Journal of Political Economy* 98 (5): 1076-1107. URL: <http://ideas.repec.org/p/cvs/starer/88-12.html>.
- Herring, Richard and Anthony M. Santomero (1999), "Financial Regulation in the Global Economy", Brookings Institution Press, Washington DC.
- IMF (2014), "Shadow Banking Around The Globe: How Large, And How Risky?", Chapter 2 in 'Global Financial Stability Report: Risk Taking, Liquidity, And Shadow Banking—Curbing Excess While Promoting Growth'.

- Levine, Ross, Norman Loayza and Thorsten Beck (1999), "Intermediations and Growth: Causality and Causes", *World Bank Development Research Group*, Washington D.C.
- McKinnon, R. I. (1973), "Money and Capital in Economic Development", Brooking Institution, Washington, D.C.
- Pagano, M. (1993), "Financial Markets and Growth: an Overview", *European Economic Review*, 37 (2-3): 613-622. URL: <http://ideas.repec.org/a/eee/eecrev/v37y1993i2-3p613-622.html>.
- Patrick, H. T. (1996), "Financial Development and Economic Growth in Underdeveloped Countries", *Economic Development and Cultural Change* 14 (2): 174-189. URL: <http://www.jstor.org/stable/1152568>.
- Robinson, J. (1952), "The Role of Interest and Other Essays", London: Macmillan.
- Schumpeter, J. A. (1912), "Theorie Der Wirtschaftlichen Entwicklung", Leipzig: Duncker and Humblot.
- Shaw, E. S. (1973), "Financial Deepening in Economic Development", Oxford: Oxford University Press.
- Stiglitz, J. E. (2000), "Capital Market Liberalization, Economic Growth, and Instability", *World Development*, 28 (6): 1075-1986. URL: <http://ideas.repec.org/a/eee/wdevel/v28y2000i6p1075-1086.html>.
- World Bank (2001), "Global Development Finance 2001", The World Bank: Washington DC.

# ***MSE Monographs***

- \* Monograph 18/2012  
Performance of Flagship Programmes in Tamil Nadu  
*K. R. Shanmugam, Swarna S Vepa and Savita Bhat*
- \* Monograph 19/2012  
State Finances of Tamil Nadu: Review and Projections A Study for the Fourth State Finance Commission of Tamil Nadu  
*D.K. Srivastava and K. R. Shanmugam*
- \* Monograph 20/2012  
Globalization and India's Fiscal Federalism Finance Commission's Adaptation to New Challenges  
*Baldev Raj Nayar*
- \* Monograph 21/2012  
On the Relevance of the Wholesale Price Index as a Measure of Inflation in India  
*D.K. Srivastava and K. R. Shanmugam*
- \* Monograph 22/2012  
A Macro-Fiscal Modeling Framework for forecasting and Policy Simulations  
*D.K. Srivastava, K. R. Shanmugam and C. Bhujanga Rao*
- \* Monograph 23/2012  
Green Economy – Indian Perspective  
*K.S. Kavikumar, Ramprasad Sengupta, Maria Saleth, K.R. Ashok and R. Balasubramanian*
- \* Monograph 24/2013  
Estimation and Forecast of Wood Demand and Supply in Tamilnadu  
*K.S. Kavi Kumar, Brinda Viswanathan and Zareena Begum I*
- \* Monograph 25/2013  
Enumeration of Crafts Persons in India  
*Brinda Viswanathan*
- \* Monograph 26/2013  
Medical Tourism in India: Progress, Opportunities and Challenges  
*K.R. Shanmugam*
- \* Monograph 27/2014  
Appraisal of Priority Sector Lending by Commercial Banks in India  
*C. Bhujanga Rao*
- \* Monograph 28/2014  
Fiscal Instruments for Climate Friendly Industrial Development in Tamil Nadu  
*D.K. Srivastava, K.R. Shanmugam, K.S. Kavi Kumar and Madhuri Saripalle*
- \* Monograph 29/2014  
Prevalence of Undernutrition and Evidence on Interventions: Challenges for India  
*Brinda Viswanathan.*
- \* Monograph 30/2014  
Counting The Poor: Measurement And Other Issues  
*C. Rangarajan and S. Mahendra Dev*

# ***MSE Working Papers***

## **Recent Issues**

- \* Working Paper 89/2014  
Testing the Expectations Trap Hypothesis: A Time-Varying Parameter Approach  
*Naveen Srinivasan*
- \* Working Paper 90/2014  
Analyzing the Pathway to Improve Tiger Conservation in India  
*Zareena Begum. I and Amanat K. Gill*
- \* Working Paper 91/2014  
A New Approach to Construct Core Inflation  
*Sartaj Rasool Rather; S. Raja Sethu Durai and M. Ramachandran*
- \* Working Paper 92/2014  
Energy Use Patterns And Firm Performance: Evidence From Indian Industries  
*Santosh Kumar Sahu*
- \* Working Paper 93/2014  
Women's Malnutrition In India: The Role Of Economic And Social Status  
*Shikha Dahiya and Brinda Viswanathan*
- \* Working Paper 94/2014  
Asymmetric Price Adjustment - Evidence For India  
*Sartaj Rasool Rather; S. Raja Sethu Durai and M. Ramachandran*
- \* Working Paper 95/2014  
Volatility Spillover Between Oil And Stock Market Returns  
*B. Anand , Sunil Paul and M. Ramachandran*
- \* Working Paper 96/2015  
A Dynamic Economic Model of Soil Conservation Involving Genetically Modified Crop  
*Amrita Chatterjee*
- \* Working Paper 97/2015  
Entrepreneurial Choice of Investment Capital For House-Based Industries: A Case Study in West Bengal  
*Shrabani Mukherjee*
- \* Working Paper 98/2015  
Technology Import, R & D Spillover And Export: A Study of Automobile Sector in India  
*Santosh K. Sahu and K. Narayanan*
- \* Working Paper 99/2015  
Inflation Forecasting and the Distribution of Price Changes  
*Sartaj Rasool Rather, Sunil Paul and S. Raja Sethu Durai*

---

\* Working papers are downloadable from MSE website <http://www.mse.ac.in>

\$ Restricted circulation