

# 1. CASH SHORTAGES AND BLACK MONEY: A LOOK AT INDIA'S 2016 DEMONETIZATION EFFECT, ONE YEAR LATER

**AMITABH S. DUTTA, Ph.D.**, *Associate Professor of Finance, Florida Institute of Technology, Melbourne, FL E-mail: [adutta@fit.edu](mailto:adutta@fit.edu)*

**KISHORE G. KULKARNI, Ph.D.**, *Distinguished Professor of Economics, Chief Editor, International Review of Business and Economics, ([www.irbejournal.com](http://www.irbejournal.com)) Campus Box 77, P. O. Box 173362, College of Business, Metropolitan State University of Denver, Denver, CO 80217-3362. Phone: 001-720-244-3663 Personal website: [www.kulkarnibooks.com](http://www.kulkarnibooks.com), Published papers available at [www.researchgate.net](http://www.researchgate.net)*

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## ABSTRACT

*The decision of demonetization announcement in November 2016, by the Prime Minister of India, Mr. Narendra Modi, was surprising to the general public and controversial to the economic thinkers. While the opponents of such a step have gone through actual calculation of the cost of demonetization in terms of potential GDP loss (2% as predicted by the former Prime Minister and Oxford Economist, Manmohan Singh) some supporters have pointed out the big benefits of this step. In recent days a talk of demonetization has become a "hot potato" that very few want to hold on to. Politically this has become a subject of acute contention and disagreement with some friends turning into foes just for the position they hold on this issue.*

*In this paper we want to be economically eclectic, and attempt to analyze the real economic costs and benefits of this experiment by keeping away from politics. We intend to ask questions such as, why was this done? What were the consequences faced by the general public when this step was taken? Did we achieve the objectives? and What are the economic opportunity costs of doing this in future? Of course, we do not think that anyone can find all the answers, but the investigation itself is considered to be worthwhile.*

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## INTRODUCTION

The Oxford English Dictionary defines the verb demonetize as "deprive (a coin or precious metal) of its status as money" – though in the case of India it was to deprive the then current two top denomination notes in circulation of its status as money – namely the 1,000 and the 500 rupee notes.

This demonetization action was a surprise announcement made by the Prime Minister Mr. Narendra Modi in a televised speech on the evening of November 8, 2016. There were three intended consequences of this act. The first was to target the proliferation of "black money" in the Indian economy. Black money is the term employed to indicate illegal (or unreported and untaxed) income in the economy. Estimates of the

amount of black money in India have always been guesswork as no reliable metric can be determined to account for this statistic. In an economic survey, the Government of India has used the differences in the “soil rates” of the higher currency notes relative to the smaller denominations to estimate black money – admittedly an unreliable measure.

The second intended consequence was to make it harder to counterfeit the currency as well as hopefully trap the current batch of counterfeit notes from entering the legal economy – as counterfeiters would not be able to document the source of their income to exchange old notes for new. The Indian secret service has been of the opinion that terrorists infiltrating India by crossing the borders have been a source of the majority of the counterfeiting detected in recent years.

The third and not necessarily least important consequence was to hamper and reduce the terrorist activity on Indian soil. To do that the assumption was that the terrorists were using the cash payment for terrorist activities channels of which are also very obscure. This paper is an attempt to document the immediate consequences of the demonetization action as well as to determine the effect about eleven months later.

## **SECTION 1: CONSEQUENCES OF DEMONETIZATION**

The first thing to reflect on is that while the Indian economy has grown tremendously in the last three decades, the structure of the Indian economy is very different from those of Western developed nations. One such major difference is of the need for cash payments in India as compared to western nations. According to reports by Boston Consulting Group and Google India, about 75% of the transactions in India are cash based. Mind well, cash payments do not mean illegal payments. Indian residents make cash payments for a lot of things, legal or illegal, because many of these transactions are perceived to be quick and convenient. In rural areas, it is not easy to cash the checks, and cash is seen as the better substitute for convenience. How different is that from say the United States? A recent CBS News report cites a national study to say that in the USA “cash accounts for a relatively small share of total consumer transaction activity at 14 percent.” As one can surmise, the impact of withdrawing currency notes from circulation in an economy is clearly a factor of how much cash is needed to complete transactions. Reportedly, more than 300 million working adults in India had no bank accounts at the time of the demonetization. (This is despite the efforts of current government’s “Jan Dhan Yojana” that invited citizens to open a bank accounts with zero balance to start with).

In fact, economists often differentiate between the cash based sectors (monetary) and the non-cash based (informal monetary) sectors of the Indian economy. The cash based sector of the Indian economy employs about 50 percent of the total workforce. The laborers are often unskilled or semi-skilled, illiterate, and paid daily wages with which they manage to run their household expenses. Maybe illiterate is the wrong term – for many may be able to read a newspaper or write a letter – but certainly we can assume

they are uneducated in the knowledge of using debit or credit cards and operating bank accounts.

What was the impact on system liquidity with the act of demonetization? According to Reserve Bank of India sources (cited by The Wall Street Journal), in March 2016 the 1,000 and the 500 rupee notes totaled 24.4 billion pieces (about 24.4 percent of the total notes in circulation) but in total value they formed 86.4 percent of the cash value in circulation (about 14.2 trillion rupees, or approximately \$ 210 billion USD).

The immediate effect of such a sudden withdrawal of 86% of cash value in circulation was to create extreme shortages of cash. There was insufficient cash to stock ATMs, foreigners visiting India were limited to cashing only about \$65 USD per day per person, while residents were given a limited amount of money in demonetized notes that could be exchanged at their local bank branches for the new 500 and 2,000 rupee notes. Invariably, this led to mile long queues at banks, often with more than one family member lining up simultaneously, so as to increase the amount per household that could be exchanged. While in the main, people were grumbling, yet most tended to accept their lot and waited for hours somewhat patiently. There were a few instances where tempers flared and minor fistcuffs broke out when banks ran out of the new notes and so could not exchange the old ones for those who had already spent quite a while waiting in line.

It is clear that in the immediate short term, there was a lot of turmoil and disruption of day-to-day transactions and a significant impact on cash-based business transactions such as small scale manufacturing like cotton looms. These businesses were unable to pay their daily workers so had to lay them off, some of whom returned to their villages. Besides hampering new production, the lack of cash led to a lot of unsold inventory piling up in the cash sector. Thus, loss of revenues for cash-based businesses was immediate, future prospects of recovery at that time was unknown.

About two months after the demonetization announcement, The Times of India, dated January 4, 2017 had a headline: "97% of scrapped notes deposited with banks as on Dec 30: Report." So, given this tally is accurate, as far as capturing the black money in the system – the demonetization cannot be said to have achieved its objective. While we mention earlier that no accurate figures of the black money in the Indian economy can be definitely stated – it is safe to assume that it must be significantly more than the 3% of the scrapped notes not deposited back into the banking system.

What about the second intent – of making it harder to counterfeit the higher denomination rupee notes? A headline in Hindustan Times dated February 23, 2017 said, "Fake Rs 2000 notes of 'Children Bank of India' dispensed from SBI ATM in Delhi. Within three and half months, counterfeits of the new notes had infiltrated the government bank ATMs in the capital city. The earliest reports of counterfeits of these new note though was in an Ahmedabad Mirror article dated November 22, 2016 which said, "Even as Rs 2,000 notes printed by the Reserve Bank of India (RBI) are yet to reach banks everywhere, the first fake note of this denomination has surfaced in Gujarat." The problem lies in that

the new 500 and 2,000 rupee notes have no special security features that would make them hard to duplicate. Whether the amount of counterfeiting post-demonetization will be less than earlier remains to be seen – however these incidents do highlight that counterfeiting of the new currency has already been implemented by criminals.

Regarding the third intended impact – that of reducing terrorist activity on Indian soil-, it is too early to tell. One can hope that it will definitely have hampered the terrorists' spirits and thus help reduce their evil actions in future.

The notion behind the demonetization was conceptually a good idea but it would be fair to say that there were flaws in its execution. In an October 2017 podcast. Professor Satish Deodhar has not only defined the black money transactions and other objectives of demonetization, but also has given some important justifications for the demonetization attempt. (see Deodhar (2017) in the reference list).

In a recent TV interview however, ex-Finance minister Mr. Arun Shourie has responded with a scathing attack on the demonetization attempt. Opponents of demonetization including Mr. Shourie, have pointed out that the growth rate of nominal GDP has slowed down to 5.7% in the second quarter of 2017, which was as expected by Ex-Prime-minister Manmohan Singh. Some others argue that this decline in growth rate could be a combined result of newly launched Goods and Services Tax (GST) which is taking a long time to be adopted correctly, and jury is still out if this new tax system has saved any headache for tax payers. One thing is true is that in third week of October (2017) the tax authorities have increased the tax revenue by 16% . Ironically government sources, as quoted in Times of India (October 15, 2017) have declared that the temporary blip in the economic activity due to adaptation for GST, that this slowdown is now over and the economy will sail the smooth path of high growth quickly. International Monetary Fund (IMF) Chief Christine Lagarde in the annual meeting of IMF has given a strong support not only to the demonetization but also for GST implementation in India. She believes the Indian economy will trend upward in next few years.

## **SECTION 2: COSTS OF DEMONETIZATION**

As one can expect – costs of economic actions is hard to determine accurately and yet one must make an attempt at it.

The first and obvious cost is the cost of printing the new currency notes. In an October 29, 2017 article in The Hindu it was reported that the RBI has announced that post demonetization it spent Rs. 7,965 crores on printing the two new currency notes plus other denominations. In the previous year, the RBI had spent just Rs.3,421 crores on printing all notes – so this difference of Rs. 4,544 crores may be attributed to the cost of demonetization.

The next obvious cost is the loss of productivity and lower sales of goods and services as denoted by the lower GDP. This though is an object of contention as well as unsure of measurement. For instance, should we look at the difference between actual

GDP of this current year post-demonetization versus a year ago? Or would it be more appropriate to compare it with the projected GDP for this last year? I think all economists would agree that pre-demonetization, Indian economy was on a growth trend – which would have reasonably been expected to continue into the calendar year 2017. Then it may be reasonable to look at what the projected GDP growth was and measure the difference between projected and the actual growth rate.

According to an August 31, 2017 article in The Times of India here are the following comparisons on a year-on-year basis:

In Q1 2017 (April-June), quarterly GDP growth was at 5.7 percent, while 2017 January-March GDP growth was only 6.1 percent. The Q1 GDP growth a year ago was 7.9 percent. While different sectors contributed differently to this slowdown of 2.2 percent, the largest hit was taken by the manufacturing sector which in the 2016 quarter had expanded by 10.7 percent as compared to only 1.2 percent in the 2017 quarter. The financial, insurance, real estate and professional services sector slowed down by about 3 percent from 9.4 percent growth in Q1 2017 to only 6.4 percent growth in Q1 2017.

If we were to compare actual versus projected growth pre-demonetization the losses (or costs of lower GDP growth) would be greater.

According to statisticstimes.com – citing the Planning Commission, Government of India, the Ministry of Statistics and Programme Implementation, and the IMF as its sources – the Economy of India was about 152.51 lakh crore rupees. Suppose we were to approximate that there was about 2 percent lower GDP growth after demonetization. Then this two percent loss would equate to Rupees 305,020 crores loss in GDP – due to demonetization.

### **SECTION 3: OTHER ISSUES AND CONCLUSION**

The above costs of losses to the economy post demonetization must be tempered by the confounding effects of the introduction of the Goods and Services Tax (GST) in to the Indian economy. While any attempt to measure the impact of a change in the economic landscape is bound to be difficult – in the case of trying to measure the impact of demonetization the task is made almost impossible as the GST was introduced on July 1, 2017 almost 8 months after demonetization. Thus any look at the state of the Indian economy in the first year post demonetization will include a little over 4 months of GST impact running concurrently with the impacts of demonetization.

So where does that leave us? It essentially leaves to the uncertainty filled future that is marred by consequences of not only de-monetization but also by the good or bad implementation of GST. Government policy makers are still (circa November 10, 2017) not firm on the list of commodities that will get GST applied. They have changed the list more than 5 times already and the way political winds are flowing more changes are yet to come. So, to answer the question of, “Was the demonetization successful in getting all its goals achieved”? We have to come up with four words “We Do Not Know”. Time

will tell us if there was a complete (or incomplete with what percentage) success. Right now it seems that this puzzle of demonetization can be solved only discreetly, depending upon which political party one belongs. One thing is true that both sides have enough fuel to light up the fire in many different angles. While as the Overseas Indian Citizens (OCI) the authors of this paper would not take any political position, and as astute observers of Indian economy will express their honest opinion that the demonetization exercise needs more time to be successful (or to fail)

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## 2. DEMOCRATIZING INNOVATION: HOW CONSUMER ELECTRONICS IS REVOLUTIONIZING ROCKETSCIENCE

**Abhith Pallegar** *Independent Researcher*

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### **ABSTRACT**

*The traditional flow of cutting-edge technologies observed over the last 100 years was from government supported defense space to its broader application in the civilian domain. We have seen technology flow into consumer products years after its introduction in defense applications. Most common examples of this movement were the invention and incubation of the Internet and Global Positioning System in prestigious national labs, which later trickled down to benefit millions. But there seems to be a shift in the tide of innovation where consumer market has been influential in developing a range of technologies which have flown the other way around.*

*This article focuses on the technologies incubated in the consumer space and its push upward to disrupt other areas. We explore how innovations in the consumer electronics industry have made it cost-efficient and more accessible to build, launch rockets and satellites. We illustrate how new technologies can facilitate more significant involvement in the space sector by private companies and educational institutions. We explore how this shift in innovation can influence the Aerospace industry to open up unlimited possibilities for humanity.*

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**KEYWORDS:** *Electronics, Consumer, Satellite, Rocket, Cost, Innovation.*

### **1. INTRODUCTION**

The broad narrative previous generations grew up with was that innovation was due to the result of government largesse and unlimited R&D budgets that flowed to benefit the civilian population. Traditionally, technological innovations have continuously trickled down from defense to the broader consumer space.

The Internet and the GPS are well known and used technologies which filtered down from highly restricted defense applications to the consumer level. Internet was invented to share and coordinate research between governments and universities in the 1960s. Then in the year 2000, GPS technology was opened to the public during the Clinton administration and got rid of selective availability (Laskow, 2014) for peaceful, commercial and scientific purposes. ("Clinton Acts to Make GPS More Accurate," 2000). Technology invented and incubated by the federal government in the 1960s was finally opened up to the population. The government no longer scrambled the GPS signal and brought pinpoint accuracy in-car navigation to the masses. There are countless examples where technological progress has transpired through pioneering research by government-owned or funded research entities.

CFRP- carbon fiber reinforced plastic, used to build lightweight and sturdy aircrafts was later adopted to construct expensive sports cars. Now that we are moving into an age of composites for manufactured goods, we will see a higher adoption rate of composites

in mass market car models. As cost drops and manufacturing technology improves with newer innovations, cars will be made lighter and sturdier. Formula 1, a home for many firsts, have millions poured into their cars each year to make them faster, lighter and safer. Decades later, last generation F1 technology such as suspension, disc brakes, traction control, paddle shift gearbox, sophisticated engines and onboard electronics which was built for the track, has finally entered into commercial mass-market vehicles.

The Taptic engine in the latest iPhones is based on the Haptic technology. This Haptic technology provides tactile feedback for robot-assisted surgery and remote surgery so that the surgeon can get tactile and kinesthetic feedback. Haptic systems are also used to provide sensory feedback for the blind. (Hurst, 2013). As costs dropped and technology matured, we are seeing them more commonly used on consumer devices like mobile phones, gaming controllers, and virtual reality systems.

## **2. THE SHIFTING TIDE OF INNOVATION - BATTERY TECHNOLOGY**

The natural course of evolution for many technologies that flowed down from high technology industries to the consumer space has now reversed. We are seeing an opposite movement in innovation, today, where some of the critical innovations are flowing from the consumer space to the rocket sciences. The world is observing rapid innovation and technological advances influenced by the consumer space. The technologies incubated in these industries are moving to revolutionize other areas. This consumer-driven innovation will change the technology landscape going forward.

The Original Lithium-ion battery technology invented by John Goodenough in the late 1970s has gone through several iterations and evolutions. First with the Lithium Cobalt Oxide battery ( $\text{Li}_2\text{CoO}_2$ ) and later with derivatives of the primary technology with the addition of Manganese, Nickel, and Iron to make them safer and more efficient. (LeVine, 2015). The Japanese consumer electronics companies like Sony benefited immensely from these innovations in the 1980s and 90s, fueling further research to meet the demands of the customers. Consumer electronics industry provided the necessary velocity for the advancements in variations of lithium-based battery chemistry. Battery manufacturers have made marginal improvements over the years in chemistry and manufacturing technology. These improvements were primarily driven by consumer electronics demand and not matured technology from another industry that trickled down to consumers.

## **3. SPARKING THE ELECTRIC CAR REVOLUTION**

The batteries in consumer electronics are getting more efficient at storing charge and safer to operate. This is an area of sustained progress. Innovations are fueled by the consumer demand for safe and efficient batteries. This has led to sparking the electric car revolution, one of the most significant sweeping changes to the personal transportation



sector, since the invention of the automobile. Today, consumer companies like Apple, Google, and Venture capital-backed companies like Tesla are racing to be a part of the electric car revolution not to mention the established players in the market like GM, Ford, Chrysler competing with traditional research labs such as Argonne and Lawrence Livermore national laboratory on innovation.

Tesla used commonly available Lithium Ion batteries available in consumer electronics, today, for its Tesla roadsters, later the premium model S and more recently the mass market model 3. Tesla is making battery technology cheaper and safer while others are improving the energy density to make it competitive with gasoline. Today, the latest in battery technology is the Lithium Nickel Manganese Cobalt Oxide (NMC), modified and improved upon the basic lithium oxide technology. (LeVine, 2015). They are safer and more efficient for storing charge to make electric cars and being embraced by Silicon Valley startups.

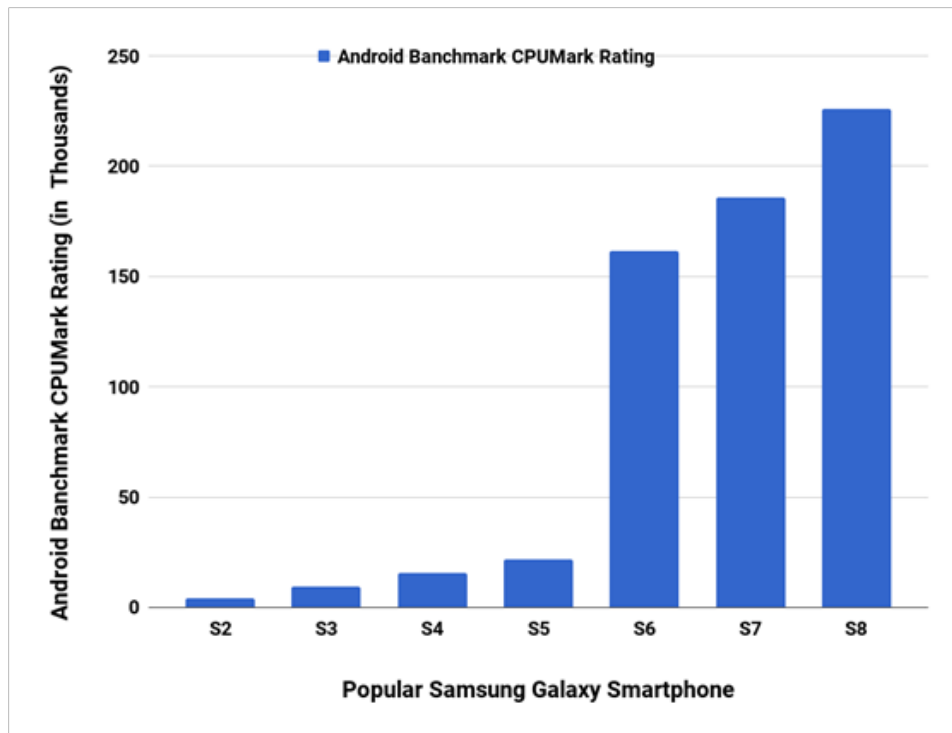
#### **4. LOW-COST ELECTRONICS AND CHIPS**

The smartphone market virtually nonexistent at the start of the millennium has swollen in the last decade. With 1.5 Billion smartphones sold in 2016, and considering there are around 7.5 billion people in the world, it is an astonishing figure. ("Gartner Says Worldwide Sales of Smartphones," n.d.). The architecture of chips in these phones are built around SOCs (system-on-chip) licensed by ARM, a British company recently acquired by Softbank. The efficient ARM chips with newer architecture and design have gained ground in smartphone and tablet market. The phenomenal processing power crammed into a small package is coming close to beating sophisticated workhorse laptops made by Intel in performance.

With billions of smartphones sold each year on the planet, the smartphone industry has become a towering force regarding controlling technological choices and R&D budgets alike. The breathtaking pace of consumer growth has made companies to out-innovate each other to get the biggest piece of the growing staple. The market place and consequently innovative technologies are driven by consumers. The users are pushing for greater innovation, and the competition is heating up. The power of consumer demand is rising in the marketplace especially for mobile computing devices. From the figure, in the last seven years, we can see exponential growth in computing power of popular phones.

The scale of expansion seen in the smartphone market, in the last ten years, has made companies come out with groundbreaking innovations that have reduced costs and improved efficiency of chips and electronics. Upcoming startups and MNCs alike are competing to satisfy an insatiable demand in the world and are contributing to cutting-edge innovation in the consumer market. For example, the evolution of smartphone camera where the camera has to rely on software and computing power to produce better images compared to previous generation cameras which relied on precise optics

and large lens. This shift in focus from hardware to the software to build smaller cameras to fit in our phones that are in turn small enough to fit in our pockets is the result of the growing power of consumer electronics market.



Source: Android Devices - CPU Mark Rating. (n.d.)

Figure 1: Proxy for processor speed of popular smartphone models

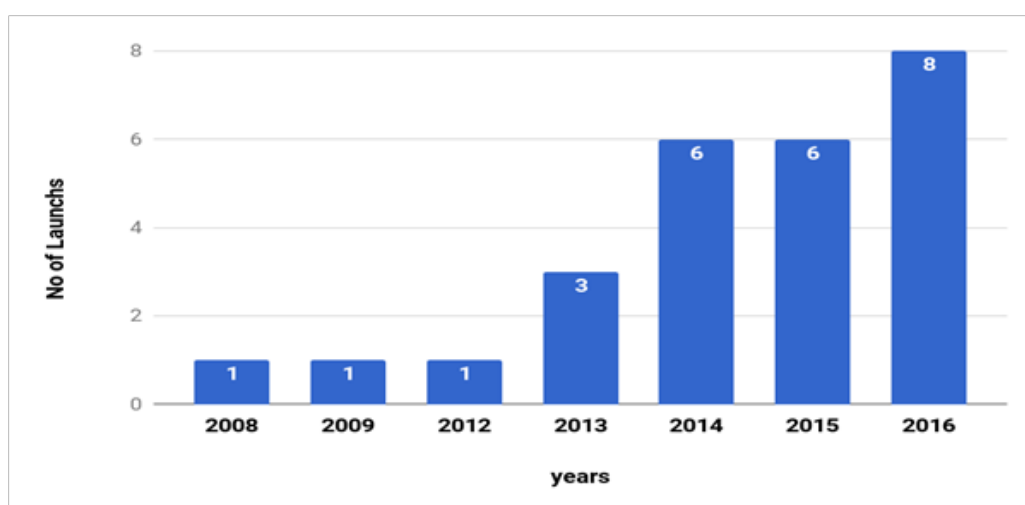
Slapping a chip on everything and branding it an IoT (Internet of Things) device is the hottest trend in the industry, right now. This refers to automating the home and connecting it to the internet. The IoT revolution benefits from economical and ubiquitous processing power available in small form factor. The exponential growth seen in the microprocessor industry with the introduction of ARM chips was largely a product of the enormous demand for cheaper phones and tablets. The core architecture of these chips is such that they are competing against Intel's offerings and have come out with more groundbreaking innovations than their compatriots who have faltered in the last decade. This sector has witnessed more innovations than the commercial market dominated by established players. The innovation from Intel and other chip makers has lagged, and their relevance in the market has taken a significant hit.

## 5. REVOLUTIONIZING ROCKET SCIENCE-PRIVATE SPACE PROGRAMS

Consumer electronics industry has been a part of many advances in recent decades. Cheaper, efficient chips and electronics capable of doing basic and sophisticated tasks have become ubiquitous. These chips have benefited industries like Aerospace. SpaceX, a private aerospace company which designs, builds and launches rockets, uses consumer

grade electronic parts in many of their systems as opposed to space grade equipment that NASA and others used historically. These improvements in consumer electronics have significantly reduced the cost of rockets and satellites. ("A sudden light," 2016). This flow of innovation from consumer space has transformed rocket science more specifically in the building, launching of rockets and sophisticated satellites.

The following figure shows the number of launches of SpaceX in the last eight years. This chart denotes a rapid expansion of private space companies. In addition to this, we also see an increase in the capabilities of private companies; which is made possible by the availability of equipment at a lower price and improved accessibility of sophisticated computers and related systems.



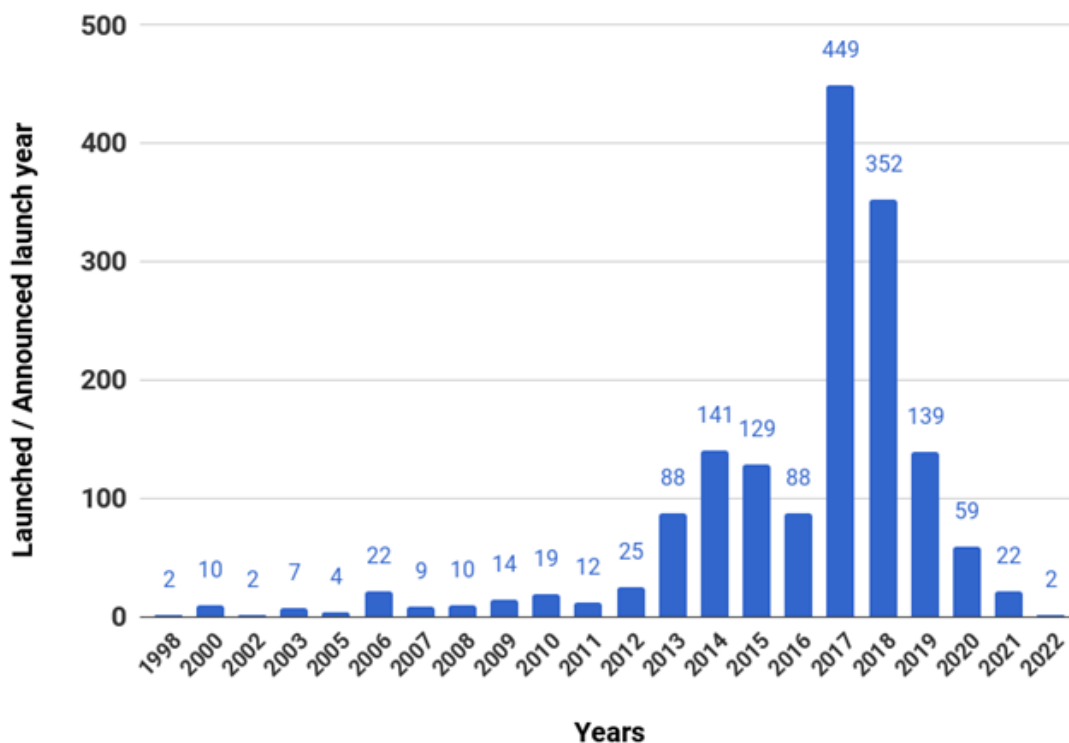
Source : (privco, n.d.)

Figure 2: Number of Launches of SpaceX

## 6. ASSEMBLING SATELLITES

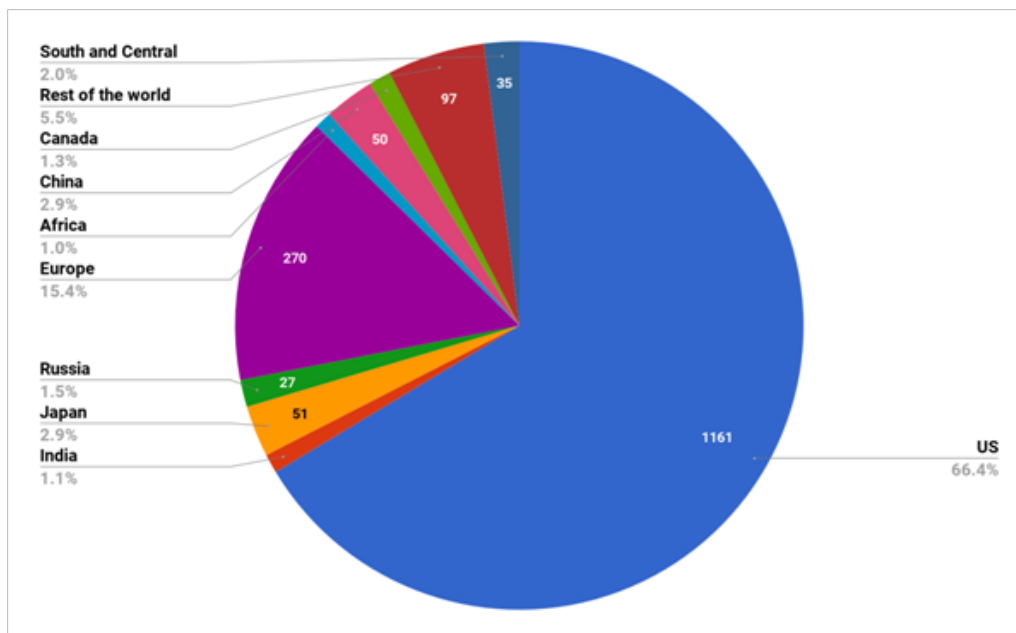
Satellites in the past were big, expensive, built on custom parts and took years to design and develop. Satellites were massive, weighed hundreds of kilos and needed a big rocket to put them into the orbit. The push today is for building smaller nanosatellites that use cheap and easily available consumer grade electronics commonly found in phones to quickly develop and launch a flock of satellites.

The sector is concentrating on borrowing components from the consumer electronics industry and has reduced costs significantly making the industry less risky and capital intensive. These innovative forces have made the rocket technology accessible to more companies, universities and research institutes, which were previously reserved mostly for government agencies with a slice of the country's budget. It is clear from the graph below the number of nanosatellites (satellites that weigh less than 10 kilos) launched has increased exponentially from 9 in 2007 to about 449 which is expected in 2017.



Source : (Kulu, n.d.)

Figure 3: Nanosatellites by announced launch years

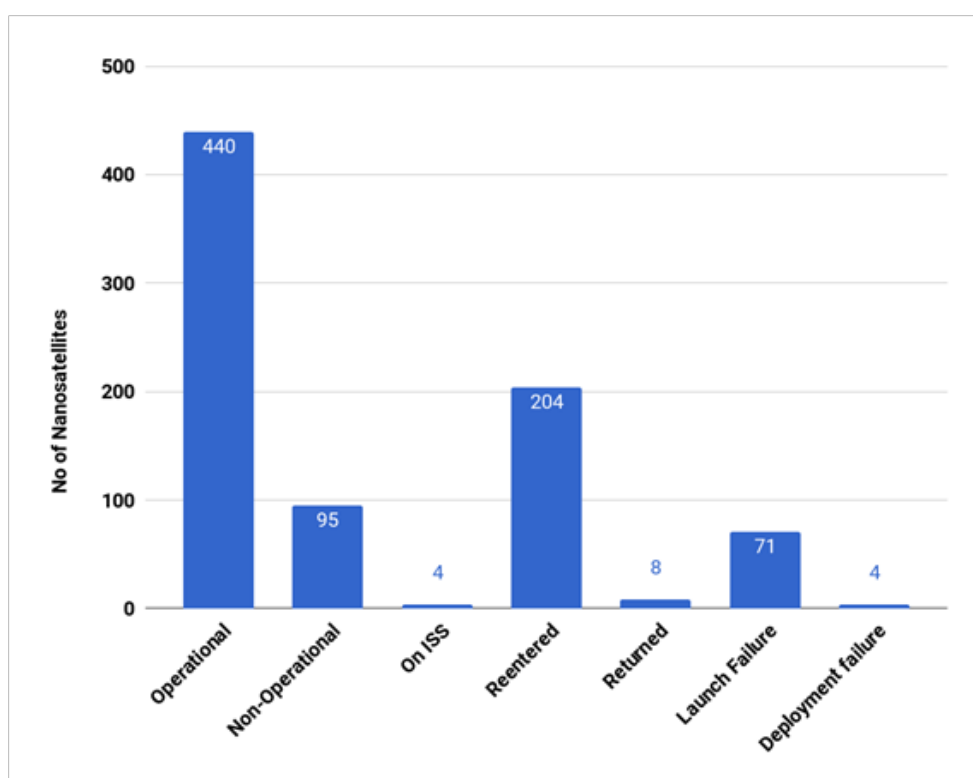


Source : (Kulu, n.d.)

Figures 4: Nanosatellites by Location

Smartphone parts are being used to make nanosats which are small and cost-efficient. (“Nanosats are gone!”, 2014). The new mantra is to build smaller satellites with reduced cost and innovation cycles. With an easily accessible technology, we have seen satellites built on assembly lines and constantly improving with newer versions of the

same. (Painter, 2016). Since the satellites are economical, going forward, the industry can absorb a higher cost of failure. This also implies industry can take on less risk, than it has taken on, historically. Hundreds of satellites are built on assembly lines like cars and launched in batches. The organizations are now building a constellation of smaller satellites. One such constellation of 88 satellites which belonged to a US-based firm Planet was launched by India's ISRO ( Indian space research organization) in the year 2016. (Laskar, 2017). AS of 2017, the following figure denotes the status of launched satellites.

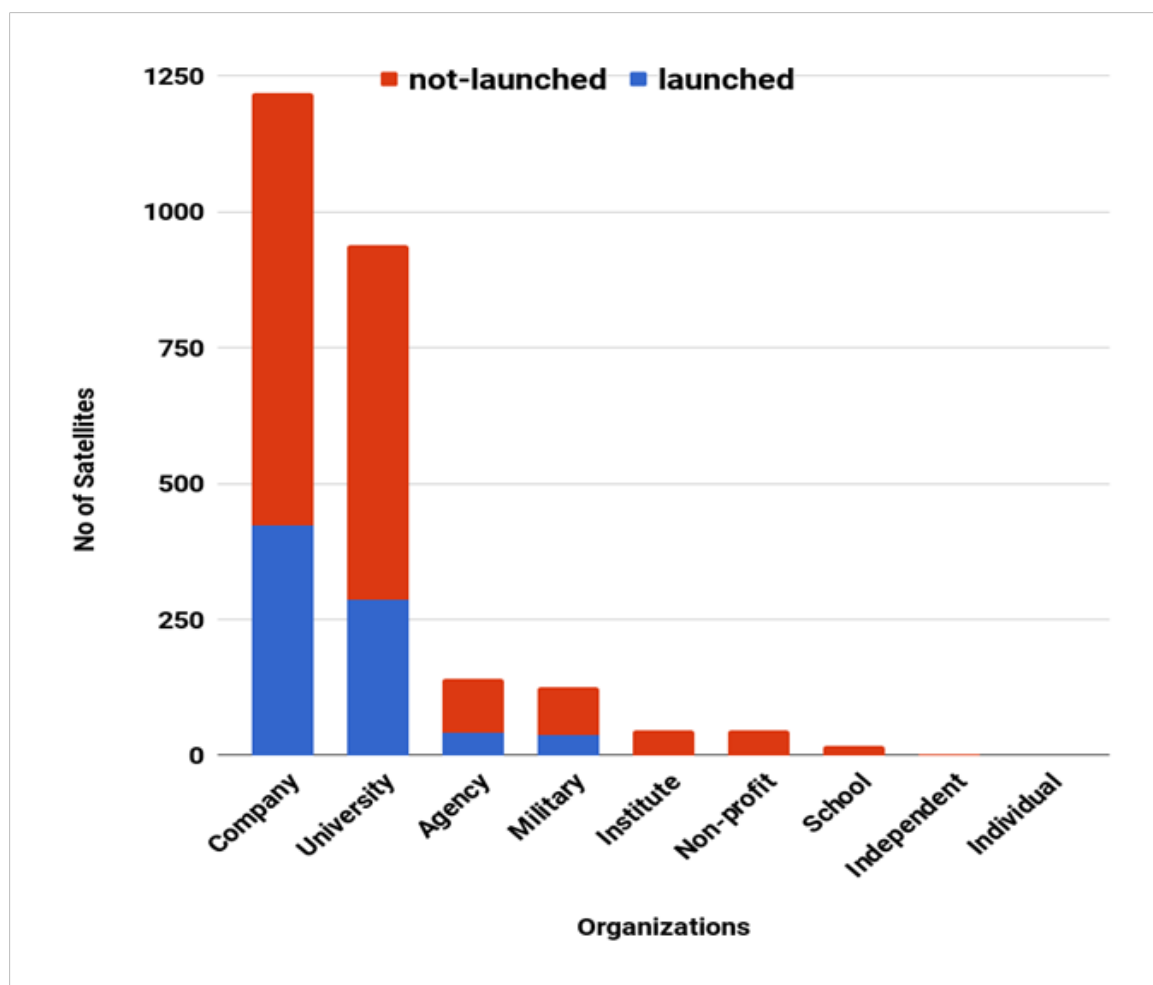


Source : (Kulu, n.d.)

Figure 5: Status of launched nanosatellites

At the dawn of the computer revolution, decades ago, the accessibility to computers was limited to governments and big companies only. But, slowly, as the costs came down computer became accessible to smaller companies and individuals. The space industry is moving along the same technological trajectory with the introduction of cheap and powerful electronics which has widened accessibility. The following graph denotes the remarkable increase in participation by companies and universities.

Privatization of space is important for the long-term growth of the industry which is poised to expand by several folds in the coming decades. Blue Horizon and SpaceX, in their pursuit of the mission, have expanded the scope of space-related operations in the industry, that was largely limited and dominated by the NASA, in the past.



Source : (Kulu, n.d.)

Figure 6: Nanosatellites by Organization

There are numerous launch vehicles available with diverse capabilities which make space accessible to individuals and companies with limited resources. The consumer electronics have gotten to a point where they can be used to build rockets without specialized parts. In turn, this also means more private companies can take part in the space race.

## 7. 3D PRINTING

3D printing technology, first developed in the 1980s used to print 3D objects, never received attention from industry but was fondly embraced by the enthusiast crowd. Only recently, it has seen the application in designing and modeling at a commercial level. This technology was perfected by small companies and startups to cater to the enthusiast market and is redefining the conventional innovation path. 3D printers are a perfect example of a democratized technology that was incubated by enthusiasts and has now found use in the most sophisticated industries.

The cost of these machines has fallen to below \$1000 (Grunewald, 2016) making them cheap and disrupting a multitude of industries including aerospace. These machines used for design, modeling and fast prototyping are adding to the new

manufacturing capabilities unavailable before to the small and large companies alike. Aerospace industries can benefit from this for making complicated custom parts for aircraft, scale models for wind tunnel testing and various other applications in research and development.

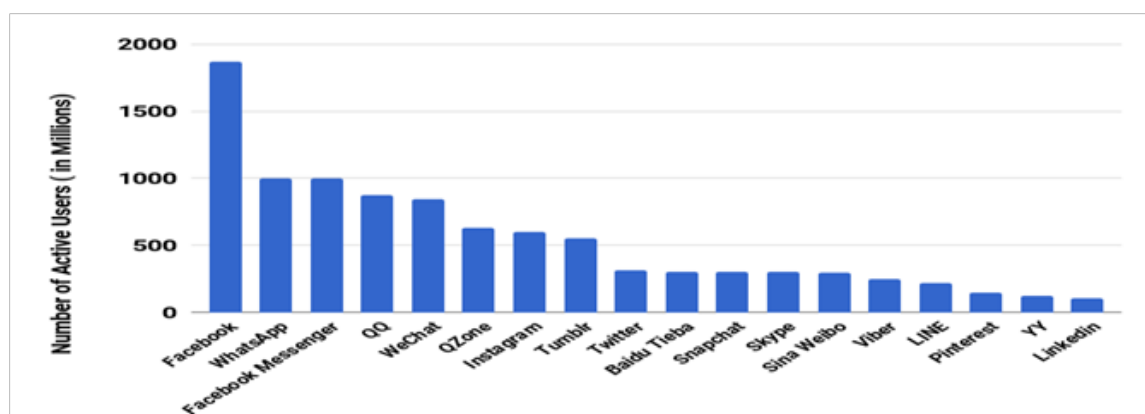
## 8. CONSUMER DRIVEN INNOVATION

The first wave of democratization was seen with the way people buy with Amazon. This “consumer first” thinking is already embraced by Amazon, where the product purchased is reviewed as well as rated by consumers and not by companies. Therefore, which product gets sold and which does not is determined solely by consumers, themselves. Wikipedia, an online encyclopedia, is created, edited by volunteers and used by many. Even though, just a small percentage of people who view the site contribute, it is still up to date and the most comprehensive encyclopedic database available.

This democratization of power from the sellers and companies to consumers themselves saw an immense shift in the way industries and companies view and interact with customers. Going forward innovation, technology, and R&D budgets will be increasingly influenced by consumer behavior. Innovation is rapidly taking place in the products which people demand. It has come to a point where the consumer is driving innovation and R&D budgets of companies like never before.

## 9. SOCIAL MEDIA COMPANIES

High valuations by venture capital industry to social media companies are driven by the number of users. Facebook’s valuation of hundreds of billions of dollars and Uber approaching a hundred billion are driven largely by user growth. The consumer-driven marketplace values the number of users on the platform for social media companies. The main metric for calculating the value of social media companies is not profitability but rapid user growth and the level of engagement with a potential for monetization, later on. The following figure denotes the number of user’s popular social media platforms have as of 2017.



Source: (“Top Social Network sites,” 2017) Figure 7: Number of Active Users

## **10. THE DOWNSIDE**

The shift in the world of technology dictated by the needs of the common consumer can have positive and negative effects. More money is spent on developing technology that involves making phone screens 10% better. Consumer-driven innovation landscape skews the effort away from fundamental research. One of the downside to this innovation drive is the lack of effort and funding that goes to foundational basic science research that could be turned into productive technology in the long term. This path of innovation ignores basic science research that has an asymmetric payoff in the future. Capitalistic marketplace underfunds basic science research. Hence, there is a significant need for governments to fund the increasing research gap

## **11. CONCLUSION - EXPLORING SPACE**

ISS-International Space Station, the most expensive thing ever built by mankind is a combined effort of governments and private companies. The flux of Innovation is no longer a top-down endeavor like it used to be. But now, it is transformed into bottom-up and democratized venture. The consumer space has become a hotbed for peddling innovations. We are witnessing game-changing innovations heading from the consumer space. The next wave of the technological innovation will be driven by the customers who will have pronounced influence in making technological choices. Consumer-driven innovation trajectory is revolutionizing other areas and can open up endless possibilities.

Expansion of human capability will lead to exploring space, and this needs cooperation between the government and the industry. Large Scale Investment in space-related activities can only be furnished by having private players invested in its success. Since technology is more freely available, it is easier for private companies to pursue endeavors which were limited to few resource-rich government-sponsored entities in the past. The easy availability of technology has dramatically increased accessibility on private businesses which means attracting more private investment. Easy accessibility of sophisticated technology means more institutions can participate in exploring space, significantly increasing resources allocated to this endeavor.



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### 3. COLOSSAL INSURANCE SECTOR OF INDIA

**Ms. ANURADHA PRASAD MORE**, Deputy Manager, Public Sector Insurance Company, United India Insurance Company Limited, Dehradun, India  
Contact Details e-mail: anuradhamore@uiic.co.in Alternate e-mail : anuradhapmore@gmail.com  
Phone No : 09557236884.

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#### ABSTRACT

Insurance sector has its roots in the Indian economy since 1818 when the first insurance company Oriental Life insurance was established at Calcutta [now Kolkata]. Even the reference can be found in the form of marine adventure trade loans and carrier's contracts. Industry started taking shape during the British reigning. Since then the insurance industry has undergone the various reforms/changes. Enactment of Insurance Act 1938, nationalization of Life insurance sector in the year 1956, General insurance Sector in the year 1972 and again with the recommendation of Malhotra Committee Report insurance sector re-opened for private players in the year 1999. Setup of IRDAI to regulate and develop Insurance Industry and to secure financial stability of the insurance sector was an added incentive too. Various efforts by the IRDAI and the Government of India such as digital channels for marketing, launching of various social scheme such as PMFBY, PMSBY, PMJBY, RSBY for increasing the penetration of insurance segment specially in rural and social sector of India. Still getting insured is the priority for the entrepreneur and professionals only. Hence it is need of an hour to think about the reasons for low penetration of insurance and the ways to foster incessant growth!

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**Keywords:** digital channels, penetration, PMFBY, PMSBY, PMJBY, RSBY

#### INTRODUCTION

Indian insurance sector has a history of nearly 200 years. Study of Indian insurance sector can be segmented into following three stages:

- Before nationalisation (1947) [Pre-independence period]
- Nationalisation era (1947-1999)
- Opening up of the insurance sector for the private players in the year 1999-

2000 till date.

The first insurance company named "Oriental Life Assurance Company" was started in Calcutta (now called Kolkata) mainly by the Europeans which made the starting point of the Indian Insurance history. This company was transformed into "New Oriental" in the year 1934 and was in operation till 1870. In the year 1870 "Bombay Mutual life Assurance society" was establish and in the year 1871 "Indian Life Assurance company was established which was having its head Office at Meerut [Uttar Pradesh State].

In the period 1900-1912 several foreign insurance companies entered on Indian land and started their operations. Up to the period of 1939 all insurance companies

operating in India was not having stringent rules, regulations regarding the investment, accounting, rating of the product etc. It was transitional period in the Indian insurance history as that was the period of freedom movements against the British rule.

The scientific growth of the Indian insurance sector was started in the year 1939 when Indian Insurance Act 1938 was implemented to regularise the insurance business in India.

In the post independence era the need for nationalisation of insurance sector was felt during the first 5 year planning to mobilise the savings and directed it towards the economic growth for welfare of the people.

Decision was implemented by nationalising Life Insurance Corporation of India in the year 1956 and nationalisation of the General Insurance Sector in the year 1972 through General Insurance Business [nationalisation] Act [GIBNA] 1972. The picture of the insurance sector after nationalisation was somewhat as under:

LIFE SECTOR	GENERAL INSURANCE	OTHER COMPONENTS OF MARKET
<ul style="list-style-type: none"> <li>• LIC OF INDIA</li> <li>• Operating all over India through division and branches.</li> </ul>	<ul style="list-style-type: none"> <li>• GENERAL INSURANCE CORPORATION</li> <li>• NEW INDIA ASSURANCE</li> <li>• UNITED INDIA INSURANCE COMPANY</li> <li>• NATIONAL INSURANCE COMPANY</li> <li>• ORIENTAL INSURANCE COMPANY</li> </ul>	<ul style="list-style-type: none"> <li>• AGENTS</li> <li>• INSURANCE INSTITUTE OF INDIA</li> <li>• OMBUDSMAN</li> <li>• ACTUARIES</li> <li>• SURVEYORS</li> <li>• TAC</li> </ul>

Both the Life and General insurance sector were operating through the network of the Divisional offices and the Branch Offices across the country. Marketing structure of all life as well as general Insurance companies was same as they were having the Development officers recruited for the marketing of the insurance products through their agency network. Employment opportunities were enhanced as the part time/full time agents were engaged in procuring business for the companies. The main source of the selling of insurance was:

- Agents
- Direct selling

Life Insurance Corporation of India has deep rooted as it was only life insurance Company dealing the life insurance portfolio. It has strengthened its marketing network through well trained agency force with attractive commission structure, advertising and selling. Products were drafted and designed as per the prevailing trends and it tries to capture

the urban as well as the rural market. Company got the success in such a way that it imprints on the minds of Indian citizens that insurance means LIC!

General insurance sector also grown well during this period but much more focused on statutory insurance needs such as motor insurance. This segment till today is the largest segment of the general insurance sector. General Insurance Corporation being the holding company for all four Public Sector Undertakings and operating as reinsurer. Pricing of the products, terms and conditions of the products were controlled by the Tariff Advisory Committee set up at that time.

Monopoly of these public sector insurance companies was established regarding pricing and customer service in the field of insurance.

In 1993 Malhotra Committee was set up headed by Reserve Bank of India (RBI) Governor R N Malhotra, which was recommended for opening of insurance sector for private players as the committee was of the opinion that opening of insurance sector will be resulting into competition among various private and public sector insurance companies and will result into better customer services, capital addition through Foreign Direct Investment and increase in solvency margin of insurance companies.

After a strong opposition from the opposite party and various employees unions from public sector undertakings the decision of Malhotra Committee was implemented and finally the insurance sector was opened up for the private players in the year 1999-2000.

Insurance regulatory body called Insurance Regulatory and Development Authority of India was set up on the lines of Security and Exchange Board of India [SEBI] which is having the following missions:

- To protect the interest of the policyholders
- Speedy and orderly growth of Insurance sector
- To set, promote, monitor and enforce high standard of integrity, financial soundness, fair dealing and competence of those it regulates.

The immediate effects of the said decision on the insurance industry were:

- Progressively the Tariff Advisory Committee regime was abolished.
- Market Agreements between General Insurers were scrapped.
- Four Public Sector insurance companies were delinked from General Insurance Corporation of India.
- General Insurance Corporation of India was made separate reinsurance company and renamed as "GIC Re".
- Public sector companies geared them up to face the competition and adopted Information Technology, computerisation, development of software for system support and MIS to improve customer service.
- Premium rates were cut down drastically and the customer become "King" of the market with the end of monopoly of insurance companies and availability of various options at a click of a button !

The decision of allowing private players has definitely widened the insurance sector of

India and has allowed the employment opportunities. With increase in the competition, product research and development has taken place and existing and new products aggressively marketed. Percentage of Foreign Direct Investment increases and new capital infused in the insurance sector which increases the size of the industry.

Even after 17 years of opening of insurance sector for private players Life Insurance Corporation of India outshines private players and remains dominant player in the Life insurance segment. Private and Public sector General Insurers are having 48.01% and 51.99% market share respectively and the picture of the insurance industry is somewhat as under:

IRDAI	GIC Re	LIFE INSURANCE SECTOR	GENERAL INSURANCE	OTHER COMPONENTS
<ul style="list-style-type: none"> <li>Controlling Regulatory Body</li> </ul>	<ul style="list-style-type: none"> <li>National Reinsurer</li> </ul>	<ul style="list-style-type: none"> <li>PSU 1</li> <li>PRIVATE 23</li> <li>TOTAL 24</li> </ul>	<ul style="list-style-type: none"> <li>PSU 4</li> <li>SPECIALISED PSU 2</li> <li>PRIVATE 17</li> <li>STANDALONE HEALTH 6</li> <li>TOTAL 29</li> </ul>	<ul style="list-style-type: none"> <li>TPA</li> <li>SURVEYOR</li> <li>AGENTS</li> <li>BROKERS</li> <li>INSURANCE INSTITUTE</li> <li>OMBUDSMAN</li> <li>ACTUARIES</li> <li>WEB AGGREGATORS</li> <li>BANCASSURANCE</li> <li>CSC</li> </ul>

Following are the factors which boost the insurance sector of India:

### **AGRICULTURAL SECTOR**

Agricultural is a backbone of Indian economy and with the pace of time it is growing sector with implementation of technology, investment in agricultural infrastructure, irrigation facilities, warehousing, cold storage facilities etc. Few years back in Indian insurance scenario Agricultural Insurance Company was looking after the insurance needs of the farmers such as crops insurance, Horticultural, sericulture etc. In fact the Agricultural Insurance Company was incorporated under the Companies Act 1956 in the year 2002 to take care of the Agricultural Insurance. Today Private as well as other public sector companies do actively participating in the Agricultural insurance and underwrite good scale of business. Various schemes launched by the Government such as Pradhan Mantri Fasal Bima Yojana [PMFBY] has definitely increased the agricultural insurance penetration.

### **INDUSTRIAL SECTOR**

Growth of Industries- Agricultural industries, manufacturing industries, export, automobile, energy, telecom, service, Information Technology needs insurance to support their various business activities and hence showing increased insurance penetration in Engineering, Liability, Property and Group Medclaim Insurance segments. Growing competition among various operating insurance companies has resulted into availability of best insurance products, prices and services.

Government sponsored programmes such as “Make In India”, Micro Units

Development and Refinance Agency [MUDRA] Yojana to create the sustainable entrepreneurial culture will be further boosting the industrial health of the economy.

## **POPULATION OF THE COUNTRY**

India has a 2nd largest population of the world i.e. 1.21 billion and do have world's largest youth population i.e. nearly 65% of population is 35 years or under. Young population of any country is proven to be assets of that country if well educated, trained and planned.

Young population engaged in various productive activities such as research and development, innovation, manufacturing, service sector, agricultural sector raise the graph of the economic development upwards which results into increase in the insurance demands as well, do consider insurance as necessity along with their banking and financial planning and trying to secure their various financial responsibilities with the help of the health insurance, property insurance and liability insurance. The Middle aged group do plan for their pension and retirement related insurance coverages.

## **GOVERNMENT POLICIES**

Opening up of insurance sector for private players in year 1999-2000 allowing 26% Foreign Direct Investment which further increases to 49% in the month of March 2015, Insurance Laws [amendment] Bill 2015 was passed. Increase in Foreign Direct Investment limit encourages foreign participation, encourages global insurers to invest in the Indian Segment, which will be intensifying the competition and results into better customer services and innovative range of insurance products offered.

Apart from increase in Foreign Direct Investment limits to increase the insurance penetration the Government has launched various low premium insurance schemes linked to the bank account and to provide minimum life, medical and accidental protection cover to the public at large. To name few schemes are Pradhan Mantri Jeevan Jyoti Bima Yojana, Pradhan Mantri Suraksha Bima Yojana, Rashtriya Swasthya Bima Yojana.

These types of schemes are resulted into increase in insurance penetration to urban as well as rural population and increases insurance awareness.

## **SERVICE SECTOR**

Service sectors of India such as banking, finance are also been linked as distribution channel on insurance. Today bank assurance is one of the major distribution channels for insurance distribution which is having existing cliental base. Therefore, financing of any project by banks or other financial institute is being directly linked with insurance.

Apart from all above and many other contributing factor for positive growth of insurance business over two centuries insurance penetration in India is almost 3% to

5% which is very low comparing to other developing nations of the world and also only 30% of Indian population is covered against insurance.

As far as the health insurance is concerned, the penetration is still very low among the Indian population. The first health scheme was introduced in 1950 i.e. employee state insurance scheme followed by central Government Health Insurance scheme in the year 1954. First private health insurance products launched by public sector non-life insurance company are known as “Medicclaim”. Various health insurance schemes were then launched at the state level to name few-“Yeshasvini” in karnataka state [2003], Aarogyasri in Andhra Pradesh (2007), Rajiv Gandhi Jeevandayee Arogya Yojana [RGJAY]–Maharashtra etc.

Considering the all above contributory factors, major pillars of the India economy which are showing the good results insurance sector being the service sector having low penetration indicates a large untapped market.

Insurance awareness before independence was almost negative and after independence era, it takes time for stabilizing economy with five year planning system. Major areas of concern such as health, education, agricultural development might be the prime concern to secure the basic amenities to all countrymen at that time. With the monopoly of public sector companies operating in the market, insurance penetration growth has not been taken place in true sense with limited options available for buyers or it may be an oligopoly. Marketing channels were limited to only Development Officers and agents.

Even the increase use of technology, introduction of various channels for marketing insurance products insurance penetration is not up to the mark. Some of conspicuous reasons for the same are:

- Human capital development in the insurance industry
- Insurance awareness among public at large
- Availability of Customized products
- After sale services by the insurance intermediaries
- Customer Relationship Management [CRM]

## **HUMAN CAPITAL DEVELOPMENT IN THE INSURANCE INDUSTRY**

Human resource employed is always the main pillar of every industry and insurance industry is not an option to this. Insurance is an highly service and information driven industry where human resource is employed to carry out various functions such as evaluating , analysing and underwriting the Risk, settlement of claims, handling customers, actuaries, surveyors, Third party Administrators, agents who all are playing vital role in the growth of the industry.

According to the industry criterion, it was believed that all the human resource employed should be excellent for the growth of the industry and to tap the untapped market.

Today's insurance industry is lacking the skilled and trained staff. Career in insurance field does not seem to be alluring and turbocharged to the younger generation of the country. Various universities and colleges across the country are not offering the insurance as a separate stream but only as an optional subject to their curriculum. No introduction to the insurance subject till higher secondary education like preliminary introduction to banking and accounts of course few institutions do offer post graduate diploma and like courses at the higher education level. To give an example Association of British Insurers [ABI] is having Personal Finance Education Group with the goal to educate the 4 years to 19 years age group about the financial education and similar programme has been rolled out by the German Insurance Association so that they may become insurance professional where the people of the country treat the insurance professionals with respect.

Initiative should be taken in this direction to foster the insurance sector so that introduction of the insurance subject can be done at the primary level and won't be a new subject to the younger population of India and may be chosen as a career option.

## **INSURANCE AWARENESS**

Various initiatives/efforts were taken by the social reformers in pre-independence and post independence period in the country for the insurance awareness by forming the insurance societies. In 1891 a company called "Hindu Mutual" [Bengal] were providing honorary services through their directors, clerks and secretary for insurance awareness.

Indian insurance history is replete with the stories of social reformers who all strived hard for the insurance awareness in the country. Lack of awareness of insurance in the people who need it most is the main reason for the low penetration of insurance. Various initiatives taken by the government to provide the insurance protection to BPL families sometimes do not reached to the target group of people due to lack of awareness about such schemes.

Awareness can be spread with the joint efforts of the insurers, agents, societies for the welfare of the people and through various government agencies. As IRDAI has made it mandatory for each insurer operating in the market to certain percentage of the rural business, opening of Micro offices in each corner of the country and also through Corporate Social Responsibilities activities [CSR].

Insurer should take efforts vide various seminars at school, colleges, universities campus, educational camps, effective advertisements in the local languages, road shows and through the effective use of media. Government can escalate the message relating the insurance scheme through the Gram Pradhan and the local leaders to the grass root level to achieve the successful implementation of the schemes.

As correctly said by the business legend Shri Ratan Tata,

"Business need to go beyond the interest of their companies to the communities they serve"



## **AVAILABILITY OF CUSTOMIZED PRODUCTS**

Insurance market all over the world is ever growing and changing with the product development, marketing strategies, risk management technologies, risk improvement measurements and so on.

Instead of finding the customer for product the time has arisen to find the product for the customer. With the changing scenario customizing the product according to the need of the customer is the need of an hour. Over the period the trend of the industry is to market the product developed for the common use of the customer but with the customer driven market the insurer should switch over towards the “tailor made” products to suit the need of the demanding buyers. And the industry will focus on the customer delight than the customer satisfaction.

## **AFTER SALE SERVICES BY THE INSURANCE INTERMEDIARIES**

As mentioned earlier insurance is a service oriented industry and the services have to be provided during sale and also after the sale. Selling insurance is selling a “promise to Pay” in case the insured event will happen and hence it is selling an intangible product. This again will be possible with the trained intermediaries who will be in position to handle the after sale queries, situations with the customer and customer can be rest assured that they are dealing with the such organisation which will stand by them during their difficult time and the intangible sale of insurance do take the tangible form .

## **CUSTOMER RELATIONSHIP MANAGEMENT**

With the increase competition among the insurers and availability of the range of products maintaining the customer loyalty become difficult. When the features of the product offered are almost the same the comparison factor remains is only pricing of the product as whole. Factor of service only arises in case of claim under the policy and hence not all the customer comes across the same. In case of general insurance products where the contract of insurance will be for the period of one year switching to another insurer do not matter. Hence the insurance service providers should think beyond the satisfactory customer services and move towards the CRM i.e. customer relationship management which composed of marketing automation and sales automation.

Insurance sector of Asia is the emerging sector and India and China being keenly watched by the leading insurance service providers. Indian insurance sector is no doubt the huge untapped market and having lot of potential to grow. The dream of “digital India” is coming true and connecting almost 60-70% rural population with the main stream of economy. Every programme of the Government is oriented towards achieving economic and social growth of the country and increasing the insurance penetration cannot be left behind.

To conclude with the words of Lala Lajpat Rai-

“Insurance companies fulfil a highly useful economic function in modern society; though they do not produce wealth, they are one of the chief factors in conserving surplus wealth making it available in emergency and, above all, in cultivating habits of thrift and economy without which no community can be prosperous...”

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## 4. CORPORATE GOVERNANCE AND ACCOUNTING INFORMATION DISCLOSURE IN THE NIGERIAN BANKING SECTOR

**IGBEKOYI OLUSOLA ESTHER**, *Department of Accounting, Faculty of Social and Management Sciences, Adekunle Ajasin University, AkungbaAkoko, Ondo State, Nigeria. e.mail: estyshola@gmail.com*

**AGBAJE WALE HENRY**, *Department of Accounting, Faculty of Social and Management Sciences, Adekunle Ajasin University, AkungbaAkoko, Ondo State, Nigeria.*

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### ABSTRACT

*The study examine the effect of corporate governance on the quality of accounting information disclosed in Nigerian banks. The study covers banks that are quoted in the Nigeria Stock Exchange. Data were collected from secondary sources using the annual reports and factbook of selected banks during the period of 2006-2015. Data collected were analyzed using statistical tools; unit root, co-integration and error correction model. The corporate governance indices used in the study include; Audit committee meeting (ACM), Audit committee qualification (ACQ), Board size (BS), Directors in audit committee (DAC), Ownership structure (OS) and Corporate board members (CBM). The study revealed that ACM, ACQ, BS, DAC and OS had a significant positive relationship with accounting information disclosure at 1% and 5% level of significance respectively, while it was discovered that CBM had a negative relationship but was insignificant. It is concluded from the findings of the study that corporate governance contributes to the quality of accounting information disclosed in the banking sector.*

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**KEYWORDS:** *Corporate governance, Accounting Information Disclosure, Banking Sector, Nigeria.*

### INTRODUCTION

The demand for information disclosure in the modern capital market is on the rise and the reason stems from information asymmetry and agency conflicts existing between the management and shareholders (Oyerogba, 2014). Although, the extent and quality of disclosure within the annual reports vary from company to another, it has been observed in previous studies that in the Nigerian context, corporate reporting practices is weak (Ebiringa&Kunle, 2014; Ofoegbu& Okoye, 2006 and Wallace, 1998). Sanusi (2010) stated that since consolidation, some banks were engaging in unethical and potentially fraudulent business practices. It was further stated that these malpractice within the consolidated banks has become a way of life in large part of

the sector; thereby enriching a few at the expense of many depositors and investors. Sanusi further opined that corporate governance in many banks failed because boards ignored corporate governance practices by participating in obtaining unsecured loans at the expense of depositors and not having directors with qualification to enforce good corporate governance on bank management. In addition, the audit processes broke down and as the size of the banks grew the complexities continued within them. In a situation where committee were even in place, for example audit committee among others, they were mostly ineffective or dormant.

Accounting information contains the necessary information that stakeholders need in decreasing uncertainty and assisting them in making appropriate financial and economic decisions, making it much valued by the stakeholders (Ala' Hussein & Mohammad, 2015). Further, Nandi and Ghosh (2012) stated that companies' annual financial reports contain diverse information and thus, they are deemed as one of the most essential sources of information. According to Edogiawerie and Oziegbe,(2016), a good financial report must not only be capable of providing users with mandatory information disclosures but as well go extra mile in providing voluntary information so as to meet the need of the various categories of users. Provision of information upon which sound investment decision can be made is the goal of all disclosure requirements so as to reduce uncertainties and understand as much as possible the values of the company as inferred from its reports (Glassman, 2003).

The significance of corporate governance to the survival of the banking sector cannot be over-emphasized. Jafaru and Iyoha (2012) stated that a healthy corporate governance culture is imperative in the banking sector where the retention of public confidence remains of utmost importance. They further stated that poor corporate governance has been identified as one of the major factors in virtually all known instances of distress in banks. Public confidence here depends largely on the accounting information obtained by the public from the respective company; and this is the major tool that is used for decision-making. The introduction of the code of corporate governance is to produce a bench work that will influence business practices in organizations most especially the banking sector. This is because of the increased rate of distress in the sector and the effect of the performance of the banks will have significant effect on the Nigerian capital market and by implication, the economy at large. Jouini (2013) stated that corporate governance help company to reduce mismanagement, to remedy deficiencies in governance mechanism and to prevent abuse of power and management of risks. The compliance of companies into these recommendations is essential and it forms the basis for evaluating the quality of the governance system and thereby leads to protection of the reputation of the company. The focus of this study is not limited on the accounting information disclosed by the banks according to the code of corporate governance information index but to examine the quality of the information disclosed by these banks in a given financial year.

## **LITERATURE REVIEW**

### *Conceptual Clarifications*

#### *Corporate Governance*

Norlia, Zam and Ibrahim (2011) describe corporate governance as the structures and processes for the direction and control of companies. Corporate governance concerns the relationships among the management, Board of Directors, controlling shareholders, minority shareholders and other stakeholders. Corporate governance structure specifies the distribution of rights and responsibilities among the different participants in the organization. According to Rogers (2008), corporate governance is about building credibility, ensuring transparency and accountability as well as maintaining an effective channel of information disclosure that would foster good corporate performance. It was further opined that, corporate governance is about how to build trust and sustain confidence among the various groups that make up an organization. Alexandra, Reed, and Lajoux(2005) defines corporate governance as the system by which companies are directed and controlled. The nature of corporate governance, therefore, going by this definition consists of two dimensions: direction and control. The direction dimension of corporate governance emphasizes the responsibility of the board to attend to strategic positioning and planning in order to enhance the performance and sustainability of the company; while on the other hand, emphasizes the responsibility of the board to oversee the executive management of the company in the execution of the plans and strategies.

The aim of corporate governance is to ensure that corporations are managed in the best interests of their owners and shareholders (Ahmed, Alam, Jafar& Zaman 2008). This applies specifically to listed companies where the majority of the shareholders are not in participatory everyday management positions; although, it can also apply to other forms of corporations such as companies with few principal owners and a large group of smaller shareholders, public corporations (where all citizens are stakeholders) partner-owned companies and privately owned companies where the ownership has been divided through inheritance in one or several generations (Ahmed, Alam, Jafar& Zaman 2008). It is therefore concluded that corporate governance assures transparency, investor protection, full disclosure of executive actions and corporate activities to stakeholders, environmental impact assessment of corporate activities, assurance of performance related to executive compensation and full disclosure of executive compensation ( Osaze, 2007).

## **NATURE AND SCOPE OF ACCOUNTING INFORMATION DISCLOSURE**

Accounting information contains the necessary information that stakeholders need in order to decrease uncertainty and assist them in making appropriate financial and economic decisions (Ala' Hussein & Mohamad, 2015). One of the major responsibilities of the board of directors is to ensure that stakeholders are provided with high-quality disclosures on the financial and operating results of the entity that the

have been entrusted with governing (Adeshina, Ikhu&Olaleye 2015). Almost all corporate governance codes around the world, including the OECD specifically require the board of directors to provide stakeholders with information on the financial and operating results of a company to enable them to properly understand the nature of its business, its current state of affairs and how it is being developed for the future.(OECD2010) The quality of financial disclosure depends significantly on the robustness of the financial reporting standards on the basis of which the financial information is prepared and reported. In most circumstances, the financial reporting standards required for corporate reporting are contained in the generally accepted accounting principles recognized in the country where the entity is domiciled. There are different channels that companies use to disclose information, such as annual reports, conference calls, analyst presentations, investor relations, interim reports, prospectuses, press releases, and websites, among others; the corporate annual report is considered a very important official disclosure channel (Hope, 2003).

Corporate disclosure can be divided into two broad categories, mandatory disclosure and voluntary disclosure. Mandatory disclosure is information revealed in the fulfilment of disclosure requirements of statute in the form of laws, professional regulations, standards and the listing rules of stock exchanges while voluntary disclosure is any information revealed in excess of mandatory disclosure. Voluntary disclosure aims at introducing and explaining companies' potentials to investors, driving the fluidity of capital market, guaranteeing more effective allocation of capitals, and decreasing capital costs. According to relevant laws and regulations, compulsory disclosure and voluntary disclosure can be transformed mutually. In different economic, political, legal, and social environments, countries face different conditions concerning voluntary disclosure due to the differences in relevant laws. On the other hand, compulsory disclosure can depress or affect voluntary disclosure. Ronen and Yaari (2002) point out that compulsory disclosure cannot stop the disclosure of false information but restrain voluntary disclosure. Therefore, some companies may choose to adopt a partial disclosure strategy by which they merely disclose positive news or negative news. The importance of corporate disclosure is that it is a means of communication between management, outside investors and market participants in general. Demand for corporate disclosure arises from the information asymmetry problem and agency conflicts between management and outside investors (Healy & Palepu, 2001). Enhanced corporate disclosure is believed to mitigate these problems as opined by Healy and Palepu, (2001); Graham, Harvey and Rajgopal (2005).

The supply of corporate disclosure or the way in which information disclosure is managed is referred to as disclosure position Gibbins, Richardson and Waterhouse (1990). The study identified Ritualism and opportunism as the two disclosure position. The idea of the dimension is whether management plays an active or passive role in managing disclosure. Ritualism refers to uncritical adherence to predefined disclosure norms that arises from internal behavioural patterns, motivation perhaps by an

effective system of corporate governance, and not from external disclosure regulations. Opportunism is the propensity to seek firm specific advantages in the disclosure of financial information (Graham, Harvey & Rajgopals, 2005). Companies may benefit from providing more information to the public through a reduction in their cost of capital or an increase in the pure cash flows accruing to their shareholders, consequently increasing their values. However, providing information to the public is not a costless task. Among the costs of disclosure are the costs of information production and dissemination; cost of competitors accessing vital information about a company (Wagenhofer, 1990). Furthermore, lawsuit costs may be incurred when a company is sued regarding its disclosure if the information subsequently turns out to be erroneous (Skinner, 1994). Thus, a decision to provide more information to the public should, in theory, be based on a cost-benefit analysis although detailed estimation of all costs and benefits is difficult (Botosan, 2000).

## **CORPORATE GOVERNANCE AND ACCOUNTING INFORMATION DISCLOSURE**

Klai and Omri (2011) strongly debated that there is a relationship between corporate governance and the financial information reported by firms. Financial reporting is a crucial element necessary for the corporate governance system to function effectively. Section 3.16 of the CBN Codes (2006), state that transparency and adequate disclosure of information is the key attribute of corporate governance. In relation to this, Rogers (2008) suggest the disclosure of more information pertaining to the capital structure and control of the company is one of the ways to win public confidence. Despite this assertion, Karim, Islam and Chowdhury (1998) however discovered in a study conducted on financial reporting using 146 firms in Bangladesh firms as focus, that firms only disclose 26 percent of the voluntary disclosure on the average. Morwan, Mohammad and Chek (2011) however submitted in a study conducted on Malaysian firms that, failure of corporate governance leads to failure in financial reporting in Malaysia. The corporate governance indices that relates to board, ownership and audit committee are the area of focus of this study. The findings of studies conducted on the effect of corporate governance on accounting information disclosure are inconclusive.

Previous studies conducted affirm the significance of the corporate governance indices adopted in the study to accounting information disclosure. Bhagat and Jefferis (2002) stated that audit is important in implementing corporate governance principles and improving the value of a firm. The audit is important because in the event of financial manipulations, the auditors are held accountable for their actions as the availability of transparent financial information reduces the information asymmetry and improves the value of a firm. Hanrahan, Ramsay and Stapledon (2001) stated also that the board of directors play significant role in improving corporate governance because if they perform their fiduciary duties effectively, the performance of the firm will be elevated. The size of the board is also significant because the larger the board, the larger the range

of expertise to make better decision (Zahra & Pearce, 1989). Karamanou and Vafeas (2005) also demonstrated that corporations with more efficient boards and stronger audit committees led to the issuance of more forecasts by management that were also more accurate.

In a study conducted by Karamanou and Vafeas (2005) on the association between corporate boards, audit committees, and management earnings forecasts; submitted that corporations with more efficient boards and stronger audit committee led to the issuance of more forecasts by management that were also more accurate. Contrary to this results, research conducted by Koehn and Ueng (2005) on evaluating the evaluators as to whether investors should trust corporate governance metrics rating, stated that firms with poor governance practices provided financial information that was at least as good as firms with strong corporate governance. In addition, Farber (2005) found that firms previously cited for fraud had difficulty overcoming the stigma, even after improving their corporate governance practices. It was stated specifically, that they still faced issues with credibility as institutional holdings and the number of analyst following the company did not increase subsequent to governance improvements.

Adebimpe and Peace (2011) tested the relationship between corporate governance, company attributes and voluntary disclosures of quoted companies in Nigeria using univariate, multivariate and cross section models. The evidence of the findings revealed that only board size as a significant positive relationship with the extent of voluntary disclosures in selected firms. Allegrini and Greco (2011) also stated that there is a positive linkage between board size and diligence, and corporate voluntary disclosure; Gao and Kling (2012) also found that board size positively affect firm's compliance to the disclosure requirements; and Al-Janadi, Abdul Raham and Omar (2013) submitted that board size appears to substantially contribute to quality voluntary disclosure establishment; while Xiang, Li and Li (2014) Further state that board size has also been found to have an unusual positive impact on quality of information disclosure (Xiang et al.,2014). Some studies have however stated that board size and accounting information disclosure have no linkage and the result from a study conducted by Yermack (1996) show a negative association between board size and firm valuation. It was stated further that the board should be of a sufficient size relative to the scale and complexity of the company's operations and be composed in such a way as to ensure diversity of experience without compromising independence, compatibility, integrity and availability of members to attend meetings. The justification for this submission a larger board size may bring a greater number of directors with experience that may represent multitude of values on the board (Halme&Huse, 1997). A contrary view opined that a reduced number of directors imply a high degree of coordination and communication between them and managers.

Kosnik (1990) argues that board performance is associated with the composition of directors. Outside directors are arguably more effective than inside directors in maximising shareholders' wealth. In contrast, Klein (2002) suggests that inside directors



can contribute more to a firm than outside directors due to their firm-specific knowledge and expertise. Ho and Wong (2001) do not find an association between the number of outside non-executive directors and the extent of voluntary disclosure. Goodstein, Guatam and Boeker (1994) highlight the importance of outside board members in carrying out the board's decision control function. Pearce and Zahra (1992) report that more outside directors on a board increase a firm's environmental uncertainty.

## **EMPIRICAL REVIEW**

Jafaru and Iyoha (2012) conducted a study on directors and corporate governance in the banking sectors: evidence from Nigeria. The study seek to identify the challenges of corporate governance faced by directors in the Nigeria banking sector. The study used ex-post factor research design and centered on the views of executive and non-executive directors of banks in Nigeria. Data collected were analysed using simple percentages, averages, and rank order statistical tools. The study revealed that the major challenge of corporate governance is the effectiveness of the audit committee and lack of shareholder activism.

In a similar study conducted by Adeoye (2015) on corporate governance in the Nigeria banking sector: issues and challenges. The aim of the paper was to examine the issues and challenges around corporate governance in the Nigerian banking industry. The study collected data from primary sources using questionnaire. The study found lack of presentation of information common in banks in pre-consolidation and post consolidation era. Frauds, override of internal control and non-adherence to limit authority in a bid to meet set targets and recapitalization of bank plays vital role in promoting effective corporate governance. In addition, lack of effective corporate governance results in the failure of banks in Nigeria.

Ejeagbasi, Nweze, Ezeh and Nze studied corporate governance and audit quality in Nigeria; evidence from the banking industry. The study examined the relationship between corporate governance and the quality of auditors report with evidence from the Nigerian banking industry. The study adopted the ex-post facto research design and related on historic data of eleven (11) deposit banks in Nigeria. The study used correlation analysis and it was found that board composition has a negative and insignificant relationship with audit quality while separation of roles of the CEO from that of the board, board size and composition of audit committee has positive but insignificant relationship with audit quality.

Jouini (2013) studied corporate governance system and quality of financial information. The study determine the relationship between system of governance and the quality of financial information for a sample of French companies listed in the SBF 250 for a period of 2004-2008. The quality of financial information was measured by discretionary accruals while corporate governance was measured by the global index with 64 items and the sub-indices relating to the characteristics of the board, ownership structure and

quality of the central system. The study found that quality of financial information is positively related to the quality of the board and the quality of the ownership structure. The use of the overall governance index gives more significant results for the three models and affirms the positive relationship between the quality of governance system and the quality of financial reporting.

Fares, Haitham, Haitham and Mohammed (2013) conducted a study on corporate governance and its impact on the quality of accounting information in the industrial community shareholding companies listed in Amman financial market-Jordan. The study was aimed at examining the impact of governance on the quality of accounting information, a field study on industrial firms listed in Amman financial market. Data were obtained from both primary and secondary sources of data which were obtained through administration of questionnaire to 50 industrial companies. Statistical package for the social sciences (SPSS) was used to analyse the data obtained and test the formulated hypothesis. The findings of the study revealed that there is effective implementation of the principles of corporate governance affect the quality of financial reporting, makes it more accurate and quality in a community study. Furthermore, it found that they should be fully aware of the designers and users of financial statements of the concept of corporate governance and the foundations of their application industrial companies listed on valuable Amman financial market.

Nesrine and Abdulwahed (2011) conducted a study on corporate governance and financial reporting quality: The case of Tunisian firms. The study examine the effect of the governance mechanisms on the financial reporting quality for a sample of Tunisian firms listed on Tunis Stock Exchange during the period of 1997-2007. The study utilised a sample of 22 non-financial firms listed in the Tunis stock exchange during the period covered in this study. The findings of the study revealed that the governance mechanisms affect the financial information quality of the Tunisian companies. Particularly, the power of the foreigners, the families and the block holders reduces the reporting quality, while the control by the state and the financial institutions is associated with a good quality of financial disclosure.

Ibadin and Dabor (2015) conducted a study on corporate governance and accounting quality: empirical investigations from Nigeria. The study was aimed at examining corporate governance and quality of financial reporting of companies in Nigeria. Secondary source of data from 150 companies in Nigeria from 2006-2009 was used to gather data. The data were analysed using ordinary least square (OLS) of multiple regression along with the descriptive statistics to obtain the mean, standard deviation, minimum and maximum values. The findings of this study from 2006 through to 2009 showed a mixed result.

Myring and Shortridge (2010) conducted a study on corporate governance and the quality of financial disclosures. The study aimed at utilizing analyst's earnings forecasts to provide an alternate framework for examining the impact of corporate governance procedures on the quality of accounting information in the financial market. The study utilized sample and descriptive statistics to analyse the data gathered in this study. The

utilized sample and descriptive statistics to analyse the data gathered in this study. The findings of this study provide mixed evidence to support the notion that the strength of corporate governance impacts the quality of financial statement information.

Joseph and Ahmed (2017) conducted a study on corporate governance and financial reporting quality in Nigeria. The study was aimed to investigate corporate governance and financial reporting quality of companies listed on the Nigeria stock exchange from 2006 to 2015. Data were obtained from annual reports of 40 quoted companies on NSE from 2006-2015. Multiple regression analysis was used to test the research question formulated in the study. The finding of the study revealed that corporate governance improves the financial reporting quality in Nigeria.

Zahid (2016) conducted a study on corporate governance and value relevance of accounting information: evidence from Pakistan. The study aims to investigate the impact of corporate governance on value relevance of accounting information of KSE index non-financial companies for the time period of 11 years from 2005-2014. The study has used the data of 90 companies in Pakistan. The study use panel data estimation technique and used fixed effect model. The findings of the study revealed that corporate governance have significant effect on value relevance of accounting information, that is, board independence and board size have positive and significant impact on earnings per share. Audit quality have insignificant impact on earnings per share while board independence, board size and audit quality have insignificant effect on book value per share.

Gois conducted a study on financial reporting quality and corporate governance: the Portuguese companies' evidence. The main objective of the paper is to analyse the relationship between the composition and characteristics of corporate governance on the financial reporting quality of Portuguese companies. Data were obtained from annual reports, paper, the necessary elements were collected by hand because there was no registration information for the required period. Thus, the sample of the study comprises of 234 firm observation per year, obtained by way evidence relating to 39 firms for 6 years. Multivariate analysis was used to analyse the formulated hypothesis. The findings of the study reveals that board composition changes and its degree of independence do not produce any influence on the quality of the accounting information.

Adeyemi and Asaolu (2013) conducted a study on empirical investigation of the financial reporting practices and banks' stability in Nigeria. The study was aimed at examining financial reporting practices among post consolidation banks in Nigeria and the subsequent stability of the banks. The study relied on secondary data collected through in-depth content analysis of published annual reports and accounts between 2005 and 2009. The finding of the study indicated a high level of compliance with the mandatory disclosure requirement for banks by scoring on the CDI (mean in excess of 90%). The regression analysis results showed that disclosure has a positive and significant influence on banks stability (as defined by ROA and liquidity)

Nigeria. The study uses historical data. Research data are drawn from financial statements and notes of firms listed in NSE. The results indicate that there were variations in the perceptions of information by users of the importance of disclosure requirements. Statistical tests indicate that the level of disclosure by companies seems to cause differences in the perceived importance of items in the income statement and statement of financial position sections. A high degree of importance was attached to disclosure items such as earnings per share, investments opportunities, and performance than corporate governance information disclosed. Despite of financial reports quality, it can be drawn from this study that all information users do find corporate governance items disclosed in financial reports as useful for their investment decision-making process.

Sheila,Ridzwana and Syed (2013) examined the impact of corporate governance on disclosure quality: empirical evidence from listed banks in Malaysia. Corporate governance variables tested in this study are the board leadership structure, board composition, board size, director ownership, institutional ownership and block ownership. The results reveal that better disclosure quality of the annual reports in banking sector can be achieved by having separate board leadership structure, higher proportion of independent non-executive directors, higher board size, lower ownership by the directors, institutional and block shareholders.

Carlos,Sabri and Amal (2013) examined corporate governance and voluntary disclosure in France ,using a panel of 206 non-financial French listed firms during the period 2006–2009, it find evidence that voluntary disclosure in annual reports increases with managerial ownership, board and audit committee independence, board meeting frequency, and external audit quality. The study also finds that frequency of audit committee meetings and diligence of board and auditing are associated with decreased disclosure. Additional findings show that larger, more profitable, and less indebted firms have greater voluntary disclosure.

Wendy,Philip,Wenwen andQiyu (2016) examined the link between corporate governance, companies' disclosure practices and their equity market transparency in a study of more than 5,000 listed in 23 countries covering 2003-2008.The findings of the study confirm the belief that better- governed firms make more frequent disclosures to the market. The study also found greater disclosure in common law relative to code law countries; also firm with better governance in both code and common laws make more frequent disclosures. More detailed analysis reveals only certain components of corporate governance are associated with disclosures and overall transparency. Taken as a whole, our results confirm corporate governance can play a significant role in determining the efficiency of a country's equity market.

Mark and Rebecca, (2010) examined the relationship between corporate governance and the quality of financial disclosure. Using data from The Corporate Library, an investment research firm that grades the corporate governance structures of U.S. companies, the study examined the impact of strong corporate governance on financial reporting by assessing the analysts information environment. The results provide

mixed evidence on the relationship between corporate governance and the quality of financial disclosures. Specifically, governance scores from The Corporate Library tend not to be related to analysts’ consensus or the accuracy of individual forecasts. The only governance attribute that appears to impact uncertainty is the number of best practices followed by our sample companies

Shamimul, Syed and Robert (2013) examined corporate governance and financial disclosures: Bangladesh perspective. The study analysis overall disclosure index of twenty non-financial companies listed in DSE. The results show that corporate governance is significantly associated with the extent of financial reporting disclosures. External auditor, multi-listing and profitability are significantly associated with overall financial reporting disclosures index. It was discovered in the study that external auditor, a corporate governance variable, can significantly influence the level of corporate financial disclosures. Other variables, such as, board independence, board-size, dominant personality, institutional ownership and general public are not meaningfully associated with the level of financial disclosures. As such, the corporate governance structure in Bangladesh is not at the acceptable level.

**METHODOLOGY**

The study was conducted using data from secondary sources to determine the effect of corporate governance on accounting information disclosure in Nigerian banks. The analysis was done using analytical tools; unit root test, co-integration test and vector correction test; in order to determine the short run and long run effect of the variables. The data used was obtained from the annual reports of selected banks and factbook for period of 2006-2015. Data on board size, composition of board members, directors in audit committee, audit committee meeting, audit committee qualification and ownership structure were obtained from annual reports and factbook, while data on accounting information disclosure was derived using information from the disclosure index; which was scored using the unweighted method (Cooke, 1991) as adopted by Adelopo (2011). The unweighted index is computed as; the number of items disclosed by a company in a given year divided by number of item it could disclose.

**Model Specification**

To establish the effect between these variable, the general model specification is represented as;

$$Y = \beta_0 + \beta_1BS + \beta_2CBM + \beta_3DAC + \beta_4OS + \beta_5ACQ + \beta_6ACM + \mu_1 \dots \dots \dots$$

..eqn (1)

The general specific for this study is as follows;

Where; Y = Accounting information disclosure

BS = Board size

CBM = Composition of Board Members

DAC = Director in Audit Committee

ACM = Audit Committee Meeting

ACQ = Audit Committee Qualification

OS = Ownership Structure

$\mu$  = Error term

$\beta_0$  = Parameter to be estimated ( is the average amount the dependent variable increase when the independent variable increase by one unit, other independent held constant)

$\beta_1$ -  $\beta_3$ = Partial derivatives or the gradient of the independent.

**Data Analysis Technique**

**Unit Root Test**

The unit root test was conducted using the Augmented Dickey Fuller Test (ADF) and DF- GLS. The test is carried out to ascertain the stationarity properties of the time series in order to avoid spurious regression in the regression estimates and ensure reliability of estimates and therefore the application of appropriate test statistic for long run relationship/effect. The ADF formula is thus specified

$$\Delta P = \beta_1 + \beta_2\tau + \sigma P_{it-1} + \alpha \sum_{t-1}^m \Delta P_{it-1} + \varepsilon \dots \dots \dots (1)$$

In an attempt to determine whether a short run dynamic relationship and long run relationship exist between corporate governance and accounting information disclosure, equation 1 is however transformed to its first difference to suit error correction model as below:

$$\Delta Y = \beta_0 + \beta_1 \Delta BS + \beta_2 \Delta CBM + \beta_3 \Delta DAC + \beta_4 \Delta OS + \beta_5 \Delta ACQ + \beta_6 \Delta ACM + \beta_7 \Phi(-1) + \mu_2 \dots \dots \dots (ii)$$

Where:  $\Delta$  = First difference of each variable       $\mu$  = Coefficient of the residual term

**Co-integration Test**

The primary aim of the study is to estimate the long run relationship between Returns on Equity and capitalization, exchange rate, interest rate, market risk, and credit risk. The correct specification of such a long-run relationship that will capture the short-run deviations that might have occurred in estimating the long-run co-integrating equation requires an error correction term (Onwioduokit&Adenuga, 2000; Osakwe, 1983). In this method, the number of co-integrating relations is tested on the basis of trace statistics and maximum Eigen statistics. Once the presence of co-integration is established, we estimate an error correction model (ECM) that includes both the long run and short run dynamics. The Co-integration version of the above model is expressed as

$$\lambda_1 \ln Y_t = a_0 + \sum a_{1i} \lambda_i \ln BS_{t,i} + \sum a_{2i} \lambda_j \ln CBM_{t,i} + \sum a_{3i} \lambda_j \ln DAC_{t,i} + \sum a_{4i} \lambda_j \ln OS_t + \sum a_{1i} \delta_i \ln ACQ_{t,i} + \sum a_{2i} \delta_i \ln ACM_t + \sum a_{3i} \delta_i \ln BS_{t,i} + \sum a_{4i} \delta_i \ln CBM_{t,i} + \sum a_{3i} \lambda_j \ln DAC_{t,i} + \sum a_{4i} \lambda_j \ln OS_t + \sum a_{1i} \delta_i \ln ACQ_{t,i} + \sum a_{2i} \delta_i \ln ACM_{t,i} + U_t \dots \dots \dots (iii)$$

## DATA PRESENTATION AND DISCUSSIONS OF FINDINGS

### Unit Root Test

From the result obtained in table 1 using Engle Granger critical value at 10%, and the Augmented Dickey Fuller (ADF). The unit root test according to the Augmented Dickey Fuller (ADF) suggest that all the variables are stationary at first difference except board size;but was found to be stationary at first difference when Dickey-Fuller generalized least square was applied. Thus we apply the ECM and Johansen co-integration tests to test long run relationship among the variables.

Variables	At Level		At First Difference		Decision
	ADF	Lag Length	ADF	Lag Length	
Y	-1.436913	1	-6.030228**	1	I(1)
BS	-1.410537	1	-1.787981	1	N/S
CBM	1.432470	1	-6.776514**	1	I(1)
DAC	0.160993	1	-2.936201*	1	I(1)
ACM	-0.837584	1	-2.951447*	1	I(1)
ACQ	-0.905035	1	-3.013575*	1	I(1)
OS	-1.771812	1	-4.911207**	1	I(1)
Variables	At Level		At First Difference		Decision
	DF-GLS	Lag Length	DF-GLS	Lag Length	
BS	-1.651583	1	-3.174280*	1	I(1)
EG CV@10%	-3.04				

NB: \*, \*\* & \*\*\* represent significance at 1%, 5% and 10% level respectively

Source: Author's computation with E-view 9.0

### Co-integration Test

The result of the co-integration test using the trace statistics and the Max-Eigen statistics as shown in table 2, revealed that from the trace statistics, the null hypothesis that there is no co-integration among the variables is rejected and the alternative hypothesis is accepted that there is co-integration among the variables because the probability of the hypothesis is less than 5% significance level, the result of the Max-Eigen statistics suggests the same result.

The implication of this is that in the long run, all the variables moves together. We therefore proceed to estimate the long run regression model and presented the result in table 3.

**Table 2: Co-integration Test (Trace and Eigen value)**

Sample (adjusted): 2007 2015 Included observations: 9 after adjustments Trend assumption: linear deterministic trend Series: Y ACM ACQ BS CBM DAC OS Lag interval (in first difference) 1 to 1 Unrestricted Co-integration Rank test (Trace)				
<i>Hypothesized No. of CE (s)</i>	<i>Eigen Value</i>	<i>Trace Statistics</i>	<i>Critical value (0.05)</i>	<i>probability</i>
None*	0.996470	334.9699	125.6154	0.0000
At most 1*	0.843836	142.9946	95.75366	0.0000
At most 2*	0.635047	79.86175	69.81889	0.0064
At most 3	0.478437	45.59021	47.85613	0.0804
At most 4	0.298946	23.45874	29.79707	0.2243
At most 5	0.259819	11.38293	15.49471	0.1890
At most 6	0.033363	1.153690	3.841466	0.2828

Trace Test indicates 3 co-integrating equations at 0.05 level

\*Denotes rejection of the hypothesis at 0.05 level

\*Mackinnon-Haug- Michelis (1999) p-values

<i>Unrestricted Co-integration Rank Test (Eigen value)</i>				
<i>Hypothesized No. of CE (s)</i>	<i>Eigen Value</i>	<i>Trace Statistics</i>	<i>Critical value (0.05)</i>	<i>probability</i>
None*	0.996470	191.9753	46.23142	0.0000
At most 1*	0.843836	63.13285	40.07757	0.0000
At most 2*	0.635047	34.27154	33.87687	0.0449
At most 3	0.478437	22.13147	27.58434	0.2137
At most 4	0.298946	12.07581	21.13162	0.5402
At most 5	0.259819	10.22924	14.26460	0.1973
At most 6	0.033363	1.153690	3.841466	0.2828

Trace Test indicates 3 co-integrating equations at 0.05 level

\*Denotes rejection of the hypothesis at 0.05 level

\*Mackinnon-Haug- Michelis (1999) p-values

### **Error Correction Model (ECM)**

The error correction model result in table 3 show R-squared statistics of 0.813814 which indicate that about 81.38 percent of the variation in accounting information disclosure is explained by the combined effects of all the determinants (the independent variables), the remaining 18.62 percent is attributed to the unexplained variations not captured in this model. The F-statistic of 6.13 is significant at 5 percent level as indicated



in the probability value estimate of 0.000237. The F-statistics shows that the explanatory variables are jointly significant in explaining accounting information disclosure. The result further show that the coefficients of the explanatory variables are statistically significant to explaining accounting information disclosure as their probability values are less than 5% except composition of board members which is negative and statistically insignificant to explaining accounting information disclosure. The coefficient of the error correction model further proves the validity of the long run relation among the variables such that the coefficient of the error correction model is negative and it is significant as the probability value is less than 5%, this result shows that the error correction term actually corrects the disequilibrium of the system, and the speed at which the disequilibrium is being corrected is 33.94% annually, in other word, the error correction term shows that it is adjusting with the previous period disequilibrium at the rate of 33.94%, we therefore conclude that there is a long-run tendency for an improved accounting information disclosure relative to corporate governance. This implies that accounting information disclosure can be treated as an endogenous factor, not a cause of growth in corporate governance, hence corporate governance will influence accounting information disclosure and not otherwise in the long run.

An individual examination of the coefficients and statistical significant of the variables analysed show varying degree of relationships between the dependent and explanatory variables. The outcome of the study reveal that Audit committee meeting (DACM); Director in audit committee (DDAC); Ownership structure (DOS) Audit committee qualification (DACQ) and Board size (DBS) with respective coefficients of 0.108306; 0.146809; 0.0427594; 0.956038; and 0.811646 have significant positive relationship with accounting information disclosure at 1% and 5% levels of significance respectively. It was however discovered that Composition of board members (DCBM) with coefficient (-0.726546) is negatively related to accounting information disclosure, although the relationship is not significant.

The finding of this study further corroborate the findings of Adeshina, Ikhu and Olaleye (2015) who found that corporate governance items disclosed in financial reports are useful for investment decision making process. This was also supported by Carlos, Sabri and Anal (2013) as found that voluntary disclosure in annual reports increase with managerial ownership, board and audit committee independence, board meeting frequency and external audit quality. Wendy, Philips, Wenwen and Qiyu (2016) also found in a similar study conducted among Canadian listed companies revealed that corporate governance plays a significant role in determining the efficiency of a country's equity market, the finding is relevant to this study because the performance of the equity market is based upon the decision made by investors which is mostly informed by the decisions made from accounting information disclosed in firms' annual reports. The findings of this study however negates the findings of Shaminul, Syed and Robert (2010) in a similar study conducted in Bangladesh stating that board independence, board size, director personality, institutional ownership and general public are not meaningfully

associated with the level of financial disclosure. The findings of this study in Nigeria into the period of this study however shows that board size and ownership structure are significantly related to accounting information disclosure. The insignificant relationship between composition of board members and accounting information disclosure discovered in this study further uphold the findings of Ho and Wong (2001) who did not find any association between the number of outside non-executive directors and the extent of voluntary disclosure.

**Table 3: Error Correction Model**

Dependent variable: D(Y)				
Method: Least square				
Sample (adjusted): 2006 2015				
Included observations: 10 after adjustments				
Variable	Coefficient	Std Error	t- statistics	Prob.
C	13.46945	43.79410	0.307563	0.7608
D(ACM)	0.108306	0.066726	0.155967	0.0174*
D(ACQ)	0.956038	0.149658	-0.388171	0.0000*
D(BS)	0.811646	0.239731	-0.048579	0.0216**
D(CBM)	-0.726546	4.598519	-1.027841	0.3131
D(DAC)	0.146809	0.049288	0.029582	0.0081*
D(OS)	0.0427594	0.250377	0.001997	0.0038*
ECM(-1)	-0.339416	0.250377	-5.349604	0.0000*
R-Squared	0.813814	Mean Dependent var		5.914286
Adjusted R-squared	0.713691	S.D dependent var		29.96407
S.E of regression	20.89569	Akaike info criterion		9.114595
Sum squared resid	11789.01	Schwarz criterion		9.470103
Log likelihood	-151.5054	Hannan- Quinn criterion		9.237316
F- statistics	6.130637	Durbin- Watson statistics		2.329833
Prob. (F-statistics)	0.000237			

Source: Author's Computation using E-view 9.0

Note: \* and \*\* indicates significant at 1% and 5% respectively

The finding of this study further upholds the justification for introduction of code of corporate governance which is relevant especially in recent times when the rate of misappropriation due to the manipulation of the financial statement have been on the rise and the confidence of the investors have continued to decline. Although some disclosure are regarded as voluntary, the rate at which the firm is willing to divulge information will determine the confidence imposed on such firm. It was also discovered that the corporate governance determinants that relates to audit quality significantly relates to accounting information disclosure, this result is not far-fetched because it is effective audit that proves the authenticity of annual report published. The findings of this study have therefore supported the submission of theories and previous studies

on the importance of audit maintenance of its independence. This is very important especially in the banking sector that is vulnerable to misappropriation because of the nature of its business.

## **CONCLUSION AND RECOMMENDATIONS**

Corporate governance is a regulatory tool used to ensure the effective protection of the interest of stakeholders especially the public. The code of corporate governance covers several aspects of business practices but this study focus on its effect on accounting information disclosure. It is important to evaluate this area because, it is the information disclosed by the companies that will ensure the kind of decision that will be taken by the public and this will have a ripple effect on the industry of the stock market and the economy as a whole. This study purposively select some corporate governance determinants which includes; audit committee meeting, audit committee qualification, board size, director in audit committee, ownership structure and composition of board members. The empirical results of the co-integration analysis shows that there is a long run equilibrium relationship among the variables; while the error correction model co-efficient from the estimated short run dynamic model showed reasonable speed of adjustment toward the long run equilibrium. Analysing the direction and magnitude of the explanatory variables co-efficient, it was observed that audit committee meeting, audit committee qualification, board size, directors in audit committee and ownership structure positive significant relationship with accounting information disclosure during the period 2006-2015, although they all have different magnitude of influence. It was showed however that composition of board members have a negative relationship during this period but it was not significant.

From the findings of this study, it is therefore recommended that strive to increase the level of accounting information disclosure by making voluntary disclosure in addition to complying fully with the corporate governance disclosure checklist in order to continue to effectively gain the confidence of its accounting information users. Corporate governance codes that relates to audit quality should be taken into considerations to ensure that adequate measure are put in place to ensure quality of audit by focusing on the frequency of audit committee meeting, qualification of audit committee members and the members of directors that are audit committee members.

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## 5. INDIA'S HIGHER EDUCATION SECTOR: CHALLENGES AND OPPORTUNITIES

**ANAND KULKARNI**, Consultant/Principal Adviser Victoria University  
Melbourne Australia, Anand.kulkarni@vu.edu.au.

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### ABSTRACT

*For both developed and emerging economies, knowledge and innovation will increasingly drive competitive advantage, according to a great deal of analysis conducted by the OECD and other Institutions. Higher Education is a key component of future competitive advantage in the knowledge and innovation spheres. This paper will examine the challenges and opportunities for the Indian Higher Education Sector, as it grapples with meeting the needs of a changing economy, and providing access and opportunity for millions of its population. Drawing on a variety of data sources and benchmarking India against a number of nations around the world, this paper contends that India needs to further significantly reform its Higher Education sector in areas of quality, efficiency, accessibility, internationalisation and in meeting labour force needs. This paper will also recommend further policy initiatives.*

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**KEYWORDS:** Higher Education, Knowledge Economy, Knowledge Traits, Knowledge Transfer, Knowledge Transformation, Knowledge Translation.

### INTRODUCTION

The Indian Higher Education scene is, and continues to be, in need of a dramatic overhaul. This paper explores the challenges facing the Indian Higher Education scene and puts forward some solutions going forward. Where feasible and appropriate it benchmarks India's performance against other nations.

Education and training, including in Higher Education, has many benefits and roles: as a supplier of labour to meet industrial, economic and societal needs; as research inputs into the knowledge economy; to enhance participation in civil society; address significant inequality of income and opportunity, promote empowerment including of women and minorities; and especially in earlier years of education, promote health outcomes. Various studies point to positive impacts of investment in Human Capital on economic growth and that social and economic returns from investment in human capital are at least as important as physical capital. In addition, raising skill levels give rise to better quality jobs and higher salaries. Quality of education matters (Khare 2016).

A current day and future University and Institute of Higher Education, is in many senses a knowledge manager which incorporates all aspects of knowledge from its creation through to its diffusion and deployment, aimed at solving commercial and societal challenges.

In our view, this is encompassed in four different domains: Traits; Transfer; Transformation and Translation

At its minimum Universities and Higher Education Institutions need to have the traits of efficiency, access, accountability and effectiveness, and provide a high quality of education.

Knowledge Management also encompasses the idea of knowledge transfer-taking existing knowledge sets and diffusing them to the wider economy and society. Universities need to be adept in being able to disseminate knowledge on a wider scale.

Knowledge transformation is the capacity and potential to shape in a meaningful, and often radical way, the contours of economy and society, through, for example developing new industries, improving competitiveness of existing industries, fostering new and improved technologies and business models and meeting economic and social challenges. In this way universities become important problem solvers of complex challenges. It is fundamentally about innovation in all its guises and forms.

Knowledge translation, to our way of thinking, means an open, inquiring, and accepting mindset in which knowledge garnered from elsewhere, is melded with existing internal knowledge for the betterment of economy and society. It is about the ability of Institutions to incorporate and absorb, and further develop knowledge that is garnered externally. In this way Universities can act as a critical information filter deploying capabilities that link with other sources of knowledge.

In all domains, Universities are vital conduits for flows of knowledge in economy and society, both as drivers and as conduits. They also play a vital role as suppliers of labour, purchasers of goods and services, as centres for excellence and as cultural and economic hubs. The role of Universities as anchors for economic development is underscored by institutions such as Stanford, and MIT, which drive and shape economic development through research, technology transfer, new business development and spinoff's and the like.

Section one of this paper considers traits, section two transfer, section three transformation and section four translation. Section five provides some broad policy recommendations.

## **SECTION ONE TRAITS**

In terms of the traits referred to earlier, India performs quite poorly.

A plethora of reports and studies have found serious issues with governance, accountability and efficiency. The key issues include: over burdensome regulations and standards concerned more about inputs around what can be taught, how,

much investment in assets and facilities is to be undertaken and various rules and regulations about staffing, promotions and the like; poor and variable quality standards across the system including the proliferation of sub-standard institutions; pedagogy which emphasises rote learning rather than innovation; corruption in appointments, maladministration and government interference; significant weaknesses associated with the college affiliation system in terms of lack of autonomy for colleges; equity and access issues; and lack of co-ordination and appropriate planning in capacity and capacity utilisation; and funding anomalies between Central and State Governments ( Agarwal 2009, Altbach 2014, British Council 2014, Government of India (a) 2013, Government of India (b) 2016).

This paper focuses on some of these key factors. At the outset it needs to be stated that the current, modern day Indian Higher Education scene is a reflection of twin legacies. The British rule imposed a system of rote learning and affiliated colleges, over- turning in many ways India's traditional system of learning based among other things on the oral tradition and embodying close knit learning and teaching about life and philosophy between pupil and guru attuned to India's traditions, culture, values and philosophy. According to Tharoor and others the British rule was designed to subjugate Indian Higher Education (and indeed the innovation system as a whole) to British interests, including through English as a medium of instruction (Altbach 2014 and Tharoor 2016). Indeed Tharoor, goes on to say in reference to the teaching of English and quoting Lord Macaulay that " this was designed also to teach a minority of Indians to form a class who may be interpreters between us and the millions whom we govern" (Tharoor 2016 page 219).

The second legacy that the current Indian Higher Education scene faced and faces is that of the post-independence era in which authorities, through the five year plans and other initiatives, centrally determined the patterns of economic and social development entirely including establishing elite public institutions to meet national needs in research and technology, thus rendering Universities largely as teaching rather than research bodies, with notable exceptions among the Indian Institutes of Technology (Altbach 2014 and Krishna V and Patra 2015). It also meant that research bodies in the public domain were guided by central parameters about national development rather than market forces and needs of entrepreneurs.

The affiliated system of Universities and Colleges which continues today is a particular source of angst. Under this system the University awards a degree and sets curriculum and examinations, among other things and Colleges merely implement these dictates. According to many this "dead hand" approach has led to lack of autonomy, creativity and innovation at the College level, and in a manner which does not accommodate local needs and circumstances. For Universities, there is the problem of burdensome administrative oversight of Colleges which deflects resources from research and other academic initiatives, and the affiliation fees that Colleges provide

sets up rent seeking activities on the part of Universities (Government of India (a) 2013, Kapur and Mehta 2017).

## GROWTH IN THE SYSTEM

The system has seen a rapid proliferation of these institutional arrangements, especially Colleges. At the aggregate level, enrolment in Higher Education has grown by 18.5% between 2011-2012 and 2015-2016, compared to overall institutional growth of 15.8%. This however, is masking some significant key facets.

**Table 1: Institutional and Enrolment Growth 2011-2012 to 2015-2016**

	<i>Enrolment Growth</i>	<i>Institutional Growth</i>
Public Universities (National and State Universities)	17.6%	14.8%
Private Universities	39.1%	37.3%
Public Colleges	37.2%	29%
Private Colleges	70.4%	62.7%

Source AISHE various reports, author calculations

From the system is that the system is in a rapid growth phase (and is one of the very largest in the world with 35 million enrolments), as it has been over the last decade and beyond (Ernst and Young 2012, Price Waterhouse Coopers 2012). Another feature of this is the massive shift in the composition of enrolment and institutional growth, towards much greater privatisation. To the figures in the table can be added growth in stand alone institutions (diploma granting ones) of 7%, between 2011-2012 and 2015-2016 where more than 75% of these institutions are privately run.

Yet there are serious implications of this development. Much has been written about the proliferation of private Institutions and Colleges, including in professional and technical areas, often either unregulated, of very poor quality, established rapidly merely as money making devices and through excessive patronage by Government backers (Kapur and Mehta 2017, Government of India (b) 2016). The rapid proliferation of institutions has also created issues such as the inability to hire teachers with faculty shortages running at 40% (Government of India (b) 2016). This is also associated with red tape and restrictions on hiring, poor standards in teacher training, and the lure of higher paid salaries in other industries. It has also meant spreading resources thinly across the entire system, therefore lacking critical mass. The proliferation of institutions has clear implications for capacity utilisation, availability of suitably qualified, and rates of return on investment.

If we take college enrolment as a guide, which is the mainstay of the system, dominating enrolments, enrolment per College has over the period 2011-2012 to 2015-2016, increased only from 721 to 723 while average number of colleges per lakh of population (ages 18-23) has gone from 25-28. Thus it would appear that in the face of the need to cater to an expanding tertiary education population, the focus has been on creating more and more Institutions rather than on better capacity utilisation. The preference has been on “ribbon cutting” exercises in opening new institutions.

The 12th Plan noted this issue clearly when it claimed that “With the growth rate of Institutions matching that of enrolment, the problem of low enrolment per institution evident at the start of the Eleventh Plan remains and that “ this should be realised ...through “ increasing capacity within existing institutions rather than creating new institutions” ( Government of India (c) 2012 page 94).

The Planning Commission also speaks of a poor geographical spread of institutions with large concentrations in big cities and towns. It finds that there were a large number of areas with populations between 10,000 and less than 100,000 without proximity to institutions (Government of India (c) 2012). From other perspectives, some states such as Maharashtra and Karnataka have average enrolments of colleges of less than 500 while other States such as Bihar and Jharkand have 1716 and 1427 respectively, while the average across India is 721. Similar discrepancies are found when considering colleges per lakh of population. Indeed, according to the All India Survey on Higher Education (AISHE), overall some 62.7% of Colleges have less than 500 enrolments (AISHE 2015-2016).

What is missing is a more nuanced careful planning of the system linking more carefully student growth with facilities, potential consolidation of existing institutions to build scale and critical mass, obtaining a balance between online (which is not capital intensive) and physical infrastructure and delivery and providing access on a co-ordinated, balanced spatial approach.

## **BUREAUCRACY**

Another key feature that we note is the growing bureaucratisation of the system.

**Table 2: Growing Bureaucracy**

	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016
Professional staff/teacher ratio	0.64	0.69	0.72	0.74	0.74
Pupil/teacher	23.4	23.0	23.6	23.2	22.8

Source AISHE various surveys, Author Calculations

While the pupil/teacher ratio has remained broadly stable over the last five years or improved slightly (although worsened in 2013-2014), the professional staff/teacher ratio has increased steadily, suggesting that the “bureaucratisation” of the system has increased. Scarce resources have been steadily deployed towards administration rather than to teaching and research, the *raison d’être* of education.

## **PUBLIC AND PRIVATE ROLES**

While growth in institutions and enrolment has been fuelled by private sector growth, this paper takes the view that the private provision and consumption has a definite role to play, in concert and conjunction with a carefully articulated and implemented public role however. Higher Education contains features of mixed goods. On the one hand, externalities associated with research, information gaps for students, risk and uncertainty in terms of unknown future returns from investment in education and training, capital market imperfections, and equity and access issues, all warrant a strong public role (Chowdry 2009). On the other hand, it is the case that individual graduates derive considerable private benefit in the form of salaries and other remuneration, stemming from higher education, while private provision can provide much needed capital, management experience and innovation into the system. Thus, what we argue for is a balanced system of public and private participation, in which both sectors co-exist, complement each other and even at times collaborate. The role of the public sector can be manifold and varied to suit needs and circumstances, including provision of education through public institutions, subsidised support for institutions and students, appropriate regulatory oversight, and information provision to students about choices of study.

Yet what we have seen in India is a diminished role for the public sector in expenditure on Higher Education.

The first observation to make is that over the 5 year period, India has gone backwards in terms of government funding per student, a trait shared only with Pakistan, and to a lesser extent Germany, of the 16 countries that we benchmark against. The second point to note is that India is considerably lower in both years than nearly all of the benchmark countries. Third that India is behind its natural counterparts in BRIC countries (minus China for whom we don’t have data) and worryingly behind Sri Lanka in 2015 and other emerging countries in Malaysia and Thailand although Bangladesh lags far behind. Indeed in 2015, India was behind Pakistan on this measure. India is faring worse on this criteria, than some nations which have GDP levels many times lower than it. It appears that it is less about capacity to pay in the case of India but more about willingness, capabilities and planning.

More broadly, is the question of overall deployment of resources to Higher Education. According to Universitas 21 India ranks 38th out of 50 nations on overall resources dedicated to Higher Education, although noting that India performs better when allowance is made for level of economic development (Universitas 21 2017).

**Table 3: Initial Government funding tertiary per student (U.S \$)**

	2010 or nearest year	2015 or nearest year
India	788.4	711.4
Australia	11101.1	13838.3
Bangladesh	151.4	202.4
Brazil	3122.5	3561.5
Chile	2056.5	2499.7
China	-	-
Germany	17641.3	17515.6
Japan	9968.6	9951.2
Malaysia	4111.2	4918.8
Pakistan	941.5	788.5
Republic of Korea	2232.1	4472.6
Russian Federation	1666.9	2202.9
Sri Lanka	522.0	1054.9
Thailand	814.2	1120.99
U.K	9092.8	16127.3
U.S	9813.96	14842.5

Source : UNESCO

Much of the slack has been increasingly taken up by the private sector, including in all tiers of education. By our calculations in the tertiary sector, total private expenditure in tertiary education has grown almost 3 times in 6 years from 1430923621.9 U.S dollars to 3573435471.3 U.S dollars between 2007-2008 and 2014 . India's growth of privatisation of its education system is mostly unmatched by other countries.

## **DIVERSITY AND QUALITY**

Diversity in Higher Education is in our view an essential trait of a modern system. It allows for greater student choice, fosters synergies and complementarities across disciplines necessary for leading edge research, and provides a breadth of skills that a complex knowledge economy would require. In fact, we propose that India should aspire to diverse specialisations, which integrate deep learning and knowledge with breadth across the system.

Yet India suffers from an "Illusion of diversity". Despite grandiose named institutions of national importance and the proliferation of technical colleges, the fact remains that 71% of graduates are from just three fields: arts, science and commerce with general arts degrees representing more than 36% of graduates (University Grants Commission 2015-2016). As the University Grants Commission (UGC) comments despite the importance of agriculture and veterinary sciences to the Indian economy, very few

are enrolled in this area, while the system needs to focus on more vocationalisation of education (University Grants Commission 2015-2016).

On quality, some 32% of accredited institutions have been rated A grade or above, and out of colleges only 9% of accredited institutions are rated A. 68% of Universities and 91% of Colleges are rated average or below. (Government of India (b) 2016.) Many colleges and universities are still not accredited with the National Assessment and Accreditation Council (NAAC). Raising quality is a major challenge for the Indian higher education sector, a task extremely important but complicated in an era of mass education.

Moreover, the system has very limited practical application. According to a recent survey of what matters to Indian students, a common refrain is that one of the reasons for seeking to go abroad is the absence of practical applications in Indian courses, and that many specialist areas of learning are not available in India ( QS (a) 2016).

To be fair there are a number of high performing, well managed and reputable institutions. For example, the Indian Higher Education scene has been described as a “ Islands of excellence in a sea of mediocrity” (Altbach 2014 page 503). For example, Indian Institutes of Technology and Indian Institutes of Management are of good quality, while many non profit colleges and some private post graduate professional colleges and newer universities exhibit favourable traits (Altbach 2014).

## THE LEAKY PIPELINE AND ACCESS

**Table 4: Gross Enrolment Ratio Tertiary 2016**

India	26.9%
Australia	90.3%
Bangladesh	13.4%
Brazil	50.6%
China	43.4%
Chile	88.6%
Germany	68.3%
Japan	63.4%
Malaysia	26.1%
Pakistan	9.9%
Republic of Korea	93.2%
Russia	80.4%
Sri Lanka	19.8%
Thailand	48.9%
U.K	56.5%
U.S	85.8%

Source : UNESCO



Access and Opportunity is a key trait of a modern economy. Despite improvements in recent years, for a variety of economic and social factors, India has one of the lowest rates of Tertiary Gross Enrolment of the benchmark set. Gross enrolment ratios vary widely on a state by state basis and across various socioeconomic groups in society. It should be noted that the difference in gender is not as pronounced as it was once was. It is open to question whether the system of reservations and affirmative action for various socio-economic groups has achieved its intentions.

India has a significant problem of “leaky pipes”. Pre-tertiary level enrolments are at the lower end of the international comparator set, meaning that the flow through of potential entrants into tertiary education is not occurring. This is counter to the notion of an inclusive education and training system.

As the following table shows, with about 74% Gross Enrolment Ratio in Secondary and Gross Enrolment Ratio of 63.6% in upper secondary, India has among the lowest out of the benchmark set of countries even accounting for improvement over time, while the share of population (above 25 years of age) with at least some secondary education, 48.7%, means that India is relatively poorly placed when considering other nations, especially BRIC and developing nations (Table 6).

**Table 5: Gross Enrolment Ratios: Secondary and Upper Secondary**

2000	2005		2010		2015		Secondary	Upper Secondary
	Secondary	Upper secondary	Secondary	Upper Secondary	Secondary	Upper Secondary		
India	45.1	32.9	54.2	40.5	63.2	50.3	73.97	63.6
China	61	38.96	68.5	48.9	84.9	69.9	94.3	89.7
Brazil	109.99	90.6	101.3	90.6	95.3	89.2	99.65	91.4
Russia	91.5	96.7	82.9	92.7	92.1	90.3	104.5	113.6
Australia	162.6	249.6	148.4	220.6	132.5	168.5	137.6	186.4
Bangladesh	48.1	34.9	45.5	30.9	50.1	39.4	63.5	48.4
Chile	87.1	83.3	97.7	91.8	94.6	91.4	100.7	99.6
Germany	101.6	99.3	102.5	101.6	103.98	106.8	102.7	104.9
Japan	101.8	100.5	101.0	102.2	101.6	101.4	101.8	101.2
Malaysia	66.2	45.8	68.7	51.6	66.9	48.6	77.6	69.4
Pakistan	22.9	13.1	26.5	15.9	35.9	27.4	44.5	35.5
Republic of Korea	98.4	95.9	93.2	82.9	96.1	93.8	98.9	95.3
Sri Lanka	-	-	71.6	55.99	83.6	68.9	129.0	130.4
Thailand	62.8	54.5	71.6	55.99	83.6	68.9	129.0	130.4
U.K	101.9	103.6	105.4	108.4	101.9	96.5	127.8	138.24
U.S	93.95	84.9	95.4	88.3	94.3	89.5	97.6	93.3

Source: UNESCO

**Table 6: Population with at least some secondary education 2010-2015 (% ages 25 and above)**

India	48.7%
China	75%
Brazil	57.5%
Russia	94.6%
Bangladesh	43.1%
Pakistan	35.4%
Australia	91.5%
Germany	96.7%
U.S	95.3%
U.K	82.9%
Japan	91.8%
Republic of Korea	91.4%
Chile	76.5%
Malaysia	77.1%
Sri Lanka	80.5%
Thailand	43.3%

Source : UN

Of concern is the discontinuation (and drop out rates) which indicates clearly that the transition from one level to another level is highly problematic.

**Table 7: % of dropped out/discontinued persons among ever enrolled by level of last enrolment (ages 5-29)**

	Completed level of last enrolment (Discontinuance)		Did not complete last level of enrolment (Drop out)	
	2014	2007-2008	2014	2007-2008
primary	12.9%	13%	10.1%	12.0%
Upper Primary	25.9%	17.3%	16.2%	26.5%
Secondary	30%	27.3%	20.7%	30.2%
High Secondary	34.7%	32.5%	10.8%	19.2%
Diploma	35%	25.3%	4.4%	2.3%
Graduate	41.3%	45.2%	4.7%	8.4%
Post Graduate and above	51.8%	60%	2.9%	4.0%
All	25.2%	20.4%	12.7%	19.4%

Source : National Sample Surveys Office (NSSO)

Overall, while drop out rates have declined across the board, discontinuance has increased between 2007-2008 and 2014 and continue to be significant, especially in the secondary and higher secondary levels. These are the levels that feed into Higher Education. Also discontinuance at higher levels of Graduate and Post Graduate continue to be significant although have declined.

What are the reasons for this? Surveys around discontinuance and dropping out point out that for both males and females, across various ages, four key and inter-related features stand out: financial constraints on households; economic activities e.g working in home business especially for males who may have to assume the breadwinner role; domestic activities, particularly for females across all age groups, and more so for the age group of 6-15 for females; and “not interested in education” which also shows up among among males and females among the lower age groups (NSSO 2014).

These figures reiterate and reflect the broader features of Indian society and economy. They boil down to income insecurity in households, including vulnerable employment among family members, potential costs of education and social conditioning and tradition which still places priority on females getting married at early ages, and providing the domestic support in running households. Finally, and also of concern is the lack of interest in education among people. This raises questions and perceptions about its value and reputation. It can be inferred that the Indian mode of pedagogy with its emphasis on rote learning, examination and outdated curriculum may not be stimulating younger people enough, nor drawing out their innate capabilities of creativity and innovation. Modernisation of modes of teaching and income support to allow for more engagement with education may be the key to greater participation.

**Table 8: % dropping out/Discontinuing by main reason (Male)**

<b>Ages</b>	<b>F i n a n c i a l constraint</b>	<b>E c o n o m i c activities</b>	<b>D o m e s t i c activities</b>	<b>Not interested in Education</b>
5	67.6	2.2	3.6	25.5
6-10	26.8	16.2	4.3	43.3
11-13	29.3	23.8	5.8	33.2
14-15	25.4	29.7	4.9	27.4
16-17	24.2	33.9	5.1	21.5
18-24	16.6	41.1	4.0	8.3
25-29	3.2	42.4	1.4	3.2

Source National Sample Surveys Office (NSSO)

**Table 9: % dropping out/Discontinuing by main reason (Female)**

Ages	Financial constraint	Economic activities	Domestic activities	Not interested in Education
5	33.2	0	14.2	23.1
6-10	16.9	3.6	32.4	33.0
11-13	18.7	3.6	37.3	22.5
14-15	17.3	33.9	33.9	16.1
16-17	15.6	26.3	26.3	11.7
18-24	9.5	21	21.0	4.6
25-29	2.9	19.6	19.6	2.1

Source National Sample Surveys Office (NSSO)

## SECTION TWO: KNOWLEDGE TRANSFER

One of the most important roles of a Higher Education system is to transfer knowledge to the wider community. One manifestation of this which we focus on is through highly skilled labour. High skill, high wage, high value jobs are a hallmark of a knowledge intensive economy. Yet this does not appear to be occurring in any meaningful way.

**Table 10: Employment (000's)**

	High Skilled Employment 2011	High Skilled Employment 2015	Medium Skilled Employment 2011	Medium Skilled Employment 2015	Low Skilled 2011	Low Skilled 2015	Total 2011	Total 2015
India	61698	72040	264485	283649	130749	128418	456932	484106
China	80404	91463	615324	616127	61463	62989	757192	770579
World								
India Share of employment by skill category	13.5%	14.9%	57.9%	58.6%	28.6%	26.5%		
China share of employment by skill category	10.6%	18.9%	81.3%	79.95%	8.1%	8.2%		

Source ILO, Author Calculations

**Table 11: Growth in Employment 2011-2015**

	High Skilled Employment	Medium Skilled	Low Skilled	Total
India	16.8%	7.2%	-1.8%	5.9%
China	13.8%	.13%	2.5%	1.8%

Source ILO, Author Calculations

Overall, in raw number terms, India has significantly lower numbers employed in all categories across both years despite having a comparable population to China. India has a higher share of its economy in higher skilled employment compared to China in 2011. However, India has considerably more employed locked up in low skill jobs in that year. This in large part would reflect the large informal, unorganised sector in India, as well as vulnerable and own account workers, and those working in agriculture. China has a much larger share of workers in medium skill employment compared to India, and less in low skill jobs as shares of total employment, suggesting that China is making a better fist of the transition out of low skill jobs than India, necessary for a knowledge economy. Undoubtedly the industrial composition is at play here. China's large manufacturing sector is working towards its advantage in this respect, while India lacks the depth and breadth of manufacturing as a large scale employer of various types of skilled labour. India's dominant services sector in terms of output (some 75% of GDP) is not necessarily a large employer and tends to employ smaller numbers of elite graduates.

**Table 12: Forward projections of employment**

	2021 High Skilled employment	2021 medium skilled employment	2021 low skilled employment	2021 total employment
India	90554	304761	143307	538622
China	102860	602337	63459	768656
India share	16.8	56.6%	26.6%	
China share	13.4%	78.4%	8.3%	
India growth 2011-2021	46.8%	15.2%	9.6%	17.9%
China growth 2011-2021	27.9%	-2.1	3.2%	1.5%
India growth 2015-2021	25.7	7.2	-1.8	5.9
China growth 2015-2021	12.5	-2.2	0.7	-2
2015-2021				

Source: ILO and Author calculations

Looking ahead and based on ILO forecasts we see in the years 2015-20201 that India is anticipated to make a significant gain in higher skilled employment growth, more so than China (but not higher in raw numbers), with growth over the period 2015-2021 expected to be 25.7% and close to 47% over the period 2011-2021. In fact, total employment is expected to grow in India compared to projected decline in China, with undoubtedly India's demographic dividend playing a key role. By contrast with the exception of the high skilled category China's employment is flat. However, India will still have a very significant share of the population, more so than China, locked in low skill employment, and a smaller share in medium skill employment.

India still faces a number of challenges in employment. Despite having some growth between 2011 and 2015

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" High Skill are Manager, professional and technical jobs, Medium Skills are clerical, service, sales worker. Skilled agriculture, trades workers and plant and machine operators and assemblers and low skilled are elementary occupations"

in high skilled employment it is not enough to absorb the numbers of graduates that India is producing, where most would expect to reside in the high skill category. For example, according to our calculations, there has been a growth in high skilled employment of some 16.8% between 2011 and 2015 while graduates from higher education has grown approximately by 18.9% in the same period. Projecting forward we estimate that between 2011 and 2021, total high skilled employment will grow by 46.8% while graduates from higher education are expected to grow over this period from 2011-2021 by 67.7%. Thus, on the basis of our estimates, growth in high skill employment is not and will not keep up with growth of graduates.

There are some key demand and supply side implications. Firstly, India is not producing enough high skilled knowledge intensive jobs. Our analysis also shows that India's share of knowledge intensive industry employment on a sectoral basis, using OECD data and classifications, is only about 13% of total employment.

This also goes to the heart of the sort of industries that are being generated. There are insufficient knowledge intensive industries in play. India needs a knowledge plan which will identify key sectors and capabilities of the future and make faster transitions out of low skilled employment where employment still dominates. The Make in India needs to have a focus on higher value sectors, technologies and capabilities. It is not enough to Make in India. It should be Make Advanced in India if India's demographic dividend is to secure access to prosperity enhancing higher value, higher paying, more stable jobs. Various data indicate as proxy that salaried jobs have more settled job contracts and access to social security benefits (Government of India (d) 2015-2016). The narrowness of India's employment base is reflected in the problem of insufficient jobs for graduates.

**Table 13: Distribution of persons aged 15 and above 2015-2016**

	Employed	Unemployed	Not in Labour Force
Not Literate	46.3	0.9	52.7%
Below Primary	51.9%	0.9%	47.1%
Primary	54.7%	1.3%	44%
Middle	51.8%	1.6%	46.6%
Secondary	42.8%	1.9%	55.3%
Higher Secondary	39.2%	3.1%	57.7%
Under graduate certificate	46.4%	5.9%	47.7%
Diploma/Certificate	51.5%	6.4%	42.2%
Graduate	51.6%	10	38.4%
Post graduate and above	59.2%	9.8%	31.0%

Source: Government of India (e) Data based on field work from April to December 2015.

Unemployment is highest for graduates among the various levels of education, with also significant proportions of people not in the labour force (even allowing for the fact that some will not be in the labour force due to undertaking further study).

**Table 14: Percentage distribution of unemployment by graduate and post graduate level by reason**

	Non Availability of jobs matching with education/skills/experience	Non availability of adequate remuneration	F a m i l y / personal problems	other
Undergraduate				
Rural + Urban Persons	58.3%	22.8%	5.3%	13.5%
Rural Persons	55.9%	25.1%	5.5%	13.5%
Urban Persons	64.0%	17.5%	5.0%	13.5%
Rural + Urban Male	57.8%	24.1%	3.7%	14.4%
Rural + Urban Female	59.1%	20.8%	7.9%	12.2%
POSTGRADUATE				
Rural + Urban persons	62.4%	21.5%	3.8%	12.4%
Rural persons	58.5%	24.8%	3.7%	13.0%
Urban Persons	68.7%	16.0%	4.0%	11.3%
Rural +Urban Male	61.4%	24.6%	2.4%	11.6%
Rural+Urban Female	63.4%	18.0%	5.4%	13.2%

Source: Government of India (d) Data based on field work from April to December 2015.

<b>Table 15: Number on job seekers on the live register</b>					
	Male	Female	Total	%	% Total
10th passed	126387	6120.9	1875.9		46.9
10th plus 2	7712.4	4400.9	12113.3		30.3
G R A D U A T E / P O S T GRADUATE					22.8
Arts	1952.7	1749.5	3702.2	40.5%	
Science	901.6	807.7	1709.4	18.7%	
Commerce	708.8	635	13434.8	14.7%	
Engineering	197.7	177.1	374.8	4.1%	
Medicine	43.4	38.9	82.3	0.9	
Veterinary	4.8	4.3	9.1	0.1	
Agriculture	33.7	30.2	64	0.7	
Law	19.3	17.3	36.6	0.4	
Education	728.2	652.3	1380.5	15.1	
Others	231.5	207.3	438.8	4.8	
Total	4821.9	4319.6	9141.5	100	
Grand Total	25173.2	14841.3	40014.5		100

Source: Employment Exchange, Data as at December 2013

That India is not doing enough to create high value, higher paying jobs is reflected in the reasons for unemployment amongst graduates. The stand out reasons for unemployment among graduates is the absence of suitable jobs matching education, skills and experience. This is particularly pronounced in the urban areas where one would expect that greater skilled jobs would be available.

Tables 15 and 16 show that graduates account for a fifth of those seeking jobs on the live register (persons seeking jobs on the employment exchanges), with arts graduates dominating the job seekers, while table 16 confirms unemployment across a range of fields of education. It is claimed that only a smallish fraction of those on the live register end up being placed in jobs (Khare 2016).

**Table 16: Distribution of persons aged 15 and above with Graduate and above in Different Fields**

	Employed	Unemployed	Not in Labour Force
Arts/Humanities	50.6%	10.5%	38.9%
Natural Science/Maths	51.9%	10.6%	37.5%
Engineering/Technology	55	11.6%	33.4%
Accounting/Law	61.4%	6.6%	32%
Medical Science	67.7%	4.0%	28.3%
Agriculture/Forestry/Animal Husbandry	61.6%	9.3%	29.7%
Not known or unspecified	61.7%	5.9%	32.2%

Source: Government of India (e)

The other side of the equation is that of employability of graduates. A plethora of studies finds that Indian graduates lack employability skills. A study of 40,000 Indian technical graduates covers skills of English communication, quantitative skills, problem solving and programming skills, found that only 38% were employable (Mehrotra 2015). 21st Century skills of communication, problem solving and analytical skills among others are lacking. Other studies show that only one quarter of engineering graduates are employable, and that only 10% of other graduates are. There are considerable gaps in employability between leading institutions and the rest and between cities (Khare 2016). Yet more studies find that less than 20% of graduates from Higher Education Institutions are rated as immediately employable and that it is time to consider Graduate Employability ratio (Government of India (b) 2016).

Various studies point to emerging skills gaps and shortages. This sits alongside unemployment among graduates as we have seen. For example, there could be a shortfall of 350 million people by 2022 in 20 high growth sectors of the economy (Kumar 2016, Majumdar 2016).

More broadly, is that India will add a million new entrants to the labour force every year (Majumdar 2016). Only 2% of people receive formal vocational training and 3.4% receive informal training, with 95% of people receiving no training at all (Government of India (e) 2015-2016). Thus India needs a massive skilling agenda, a fact recognised



and being acted upon by policy makers, in order to provide employment and address economic needs (Mehrotra 2016).

This goes to the heart of the need for the Higher education (and vocational) curriculum and capabilities to be more aligned with industry and economic needs, supported by policy towards knowledge intensive capabilities and that exposure to industry among academics and students could be especially valuable, especially in the earlier years of tertiary education. It also means integrating Vocational Training with Higher Education. This also suggests a need to shift from rote based learning to more applied and problem solving skills in courses relevant to economic need.

### **SECTION THREE: KNOWLEDGE TRANSFORMATION**

A critical part of Higher Education institutions is their ability to drive change- be it economically, socially, environmentally and culturally. In this context research and development is a strongly transformative capability, through development of new technologies, industries, commercialising of ideas and knowhow. To what extent does India perform in Higher Education, and more generally in research?

We first examine this at a system wide level, then consider Higher Education. At the overall system with a compound annual growth rate of almost 10% over a 20 year period, India now produces the fifth highest number of papers in the world. This compares with 13th place 20 years ago. Thus in volume terms India has been progressing rapidly. ( Sci Mago 2017)

A further issue relates to the composition of the research. In disaggregating the SciMago data base we found that in both India and China, papers were almost entirely dominated by Science, Technology, Engineering and Mathematics (STEM). While it is the case that papers and citations tend to be dominated by scientific endeavours in both countries we found that outputs in arts and humanities, social sciences and multidisciplinary studies tend to be limited. Moreover, within STEM, computer science, engineering and medicine dominate accounting for close to 70% of papers in India (and similarly in China). While one can argue that these disciplines drive the growth of knowledge economy two points can be made: other scientific disciplines also relevant to the knowledge economy are underdone, while the perspectives, insights, critical thinking that arts and social sciences bring are not at all capitalised on. There is a growing recognition around the world of the importance of Science, Technology, Engineering, Arts and Mathematics (STEAM) in driving economic prosperity.

### **QUALITY**

However, quality is a key issue to consider. Citations for India is at the “middle of the pack” behind a number of countries, including some in the developing world such as Thailand and even surprisingly Bangladesh. Earlier data also revealed quality issues as measured by the proportion of a country’s publications in the top 10% most cited

publications and top 25% of most cited journals, where India is at the lower end of the spectrum. Thus publications in volume are not necessarily translating into quality.

**Table 17: Publications**

	1996	2001	2006	2011	2016	CAGR
U.S	339770	347212	511026	607071	601990	2.9
China	28823	60982	189238	387798	471472	15.0
UK	86756	95325	140499	174107	182849	3.80
Germany	73941	88080	125120	153858	164242	4.1
India	20736	25527	46673	96999	138986	9.98
Japan	85720	96134	123377	129281	121262	1.8
Australia	24078	29392	48955	73506	89767	6.8
South Korea	10178	20509	43153	66175	78660	10.8
Russia	31728	34773	35125	43381	73207	4.3
Brazil	8814	15308	33816	54518	68908	10.8
Malaysia	980	1416	4446	20751	28546	18.4
Thailand	1212	2292	5957	10715	14176	13.1
Chile	1735	2331	4954	7800	12448	10.4
Bangladesh	518	606	1123	2530	3995	10.8
Sri Lanka	196	261	598	951	1673	11.3

Source: Sci Mago and Author calculations

**Table 18: Citations per document**

	2011	2016
U.S	16.24	1.23
China	7.71	0.93
U.K	15.82	1.36
Germany	15.55	1.32
India	7.83	0.65
Japan	10.78	0.9
Australia	15.80	1.37
South Korea	11.61	0.97
Russia	5.91	0.54
Brazil	8.8	0.81
Malaysia	7.21	0.67
Thailand	10	0.80
Bangladesh	7.97	0.81
Sri Lanka	8.05	0.78
Chile	12.38	1.12

Source : Sci Mago

**Table 19 :Top 10 % cited documents by country, as a % of all country documents**

	2004-2008	2008-2012
UK	16.74	15.85
US	17.44	15.65
Australia	16.12	15.22
Germany	14.10	14.4
South Korea	10.67	9.70
Chile	9.52	9.12
Japan	9.12	8.56
China	6.75	6.92
India	7.76	6.42
Brazil	7.46	6.29
Russia	4.09	4.16

Source: OECD and Sci Mago Research Group

**Table 20: Papers in most cited journals 2003-2012**

	Share of country's publications in top 25% most cited journals
US	51.63
UK	50.97
Australia	47.80
Germany	43.65
Chile	37.99
Japan	36.49
Korea	36.10
Brazil	28.19
India	24.50
China	20.01
Russian Federation	17.64

Source OECD and Sci Mago Research Group

## **PRODUCTIVITY AND RESOURCES**

The other aspect of the system that we consider is productivity and resourcing. We use two metrics: papers per researcher or what we could describe as labour productivity, while we use papers per PPP dollars expended as a de-facto capital productivity measure.

**Table 21: Papers per researcher**

	2005	2010	2015
Australia	.51	.74	.91
Brazil	.24	.36	-
Chile	.72	1.30	1.38
China	.14	.28	.28
Germany	.44	.45	.46
Japan	.18	.19	.18
Malaysia	.35	.38	.38
South Korea	.21	.23	.22
Russia	.08	.09	.15
Sri Lanka	.32	.41	.60
Thailand	.23	.28	.21
India	.26	.41	.48
U.K	.53	.66	.65
U.S	.45	.49	.47

Source: UNESCO, Sci Mago, Author Calculations

What is noteworthy here is that for most countries (with some exceptions), papers per researcher has grown over the 10 year period, reflecting greater productivity. India is no exception to this although it stands broadly in the middle of the pack, but exceeds the U.S and has consistently exceeded China. Thus India has a productive research labour force when compared to a number of other countries and over time. As table 22 shows, on the metric of thousand papers per PPP dollar expenditure on research we find that for available data India has grown on this metric.

A key issue is the level of resourcing that is directed towards research. When we look at GERD per thousand researchers as a measure of resource availability, using purchasing power parity dollars, we find that in most cases countries have gone backwards, including India. This reflects growing austerity in research budgets around the world, although China, Japan and Thailand particularly buck the trend. India in particular has shrunk dramatically on this measure. China is the interesting case in point- it is increasing its resources per researcher but this is not reflected on its return on investment ie papers per researcher. However, that India has shrunk dramatically is a cause for concern, given that this calls into question the sustainability in the long run of its commitment and funding of research. In terms of raw expenditure on research as measured by GERD India has improved only moderately over 5 years, whereas China has grown significantly (table 24).

**Table 22: Thousand Papers per PPP dollar (constant price 2005)**

	<b>2010</b>	<b>2015</b>
Australia	3.75	4.98
Brazil	1.69	2.06
Chile	8.62	9.78
China	1.74	1.31
Germany	1.94	1.90
Japan	.98	.87
Malaysia	2.90	3.01
South Korea	1.23	1.14
Russia	1.75	2.70
Sri Lanka	4.13	7.19
Thailand	3.41	2.19
India	2.01	3.21
U.K	5.07	5.06
U.S	1.57	1.51

Source: UNESCO, Sci Mago, Author Calculations

**Table 23 GERD per thousand researcher FTE (GERD in ppp \$ constant price 2005)**

	<b>2010</b>	<b>2015</b>
Australia	196.7	181.7
Brazil	213.1	-
Chile	150.7	141.3
China	160.2	211.6
Germany	231.9	243.8
Japan	194.4	211.9
Malaysia	132.7	127.3
South Korea	187.2	195.95
Russia	51.6	53.9
Sri Lanka	98.1	83.1
Thailand	80.9	97.8
India	205.8	148.5
U.K	129.7	129
U.S	310.9	311.1

Source: UNESCO, Author Calculations

**Table 24: GERD (000 ppp constant 2005 prices)**

	<b>2015 or nearest year</b>	<b>2010 or nearest year</b>
India	42038378.0	39690630.53
Australia	18241431.62	18221962.74
Bangladesh	-	-
Brazil	32498467.4	29550361.26
China	342513404.22	194010587.35
Chile	1155359.08	819835.67
Germany	87179229.31	76069811.93
Japan	140316886.86	127539462.51
Malaysia	8895835.53	5473974.96
Pakistan	1944365.05	2200236.0
South Korea	69848079.14	49432690.87
Russia	24225092.38	22822069.66
Sri Lanka	189186.08	209952.76
Thailand	5809929.34	2941730.13
UK	37327531.23	33289134.03
US	420550104.15	372682565.52

Source : UNESCO

What is even more stark is when we consider Higher Education Research and Development expenditure (HERD) per Higher Education Researcher (Table 25). What we find is a complete collapse of India's performance. Its researchers in Higher Education are operating on a "declining shoe string". The resources available to its Higher Education researchers is far less than available in other countries and has declined significantly. That this is so is reflected in the fact that HERD is only worth 4% of total Gross Expenditure on Research, well short of other countries (Table 26). Simply put there is not enough commitment and effort and resourcing put into Higher Education Research in India.

This is the result of the legacies of the past. The great bulk of research in India is done in Government laboratories and public - sector research institutions. This is a legacy of the planning system post -independence in which research was undertaken to fulfil societal objectives and economic needs as espoused by the Government and its central planners. Universities were left largely as teaching bodies, which as we described earlier, suffers from low and variable quality. Thus in Universities the critical nexus between research and teaching in driving new pedagogy, new capabilities and understandings, and enriched course material is missing.

According to the Yashpal Committee some years ago, "Over the years there has been a tendency to treat teaching and research as separate activities.....It should be necessary for all research bodies to connect with Universities in their vicinity and create

opportunities for their researchers and for all universities to be teaching and research universities” (Krishna and Patra 2015 page 210). Thus challenges identified previously remain.

**Table 25: HERD per 1000 Higher Education Researchers FTE; HERD in ppp constant 2005 prices**

	2010	2015
Australia	79	79.6
Brazil	-	-
Chile	96.5	111.2
China	68.6	80.8
Germany	153.0	148.0
Japan	131.1	125.7
India	73.7	14.7
Malaysia	47.5	46.5
South Korea	136.2	155.4
Russia	22.6	25.1
Sri Lanka	41.7	70.8
Thailand	44.7	51.4
UK	56.3	56.7
U.S	-	-

Source: UNESCO and Author Calculations

**Table 26: GERD performed by Higher Education Institutions 000's ppp \$ Constant Dollars 2005 and % of GERD in Brackets**

	2015 or nearest year	2010 or nearest year
India	1658106.26 (3.94)	1629386.77 (4.11)
Australia	5451848.6 (29.6)	4810209.15 (26.4)
Bangladesh	-	-
Brazil	-	-
China	24137806.0 (7.1)	16407911.14 (8.5)
Chile	445124.68 (38.5)	315869.09 (38.5)
Germany	15128478.0 (17.35)	13822638.27 (18.18)
Japan	17228192.15 (12.3)	16417344.57 (12.87)
Malaysia	2533665.90 (28.5)	1585071.02 (28.96)
Pakistan	1154648.12 (59.38)	556620.64 (25.30)
South Korea	6352542.61 (9.1)	5349029.28(10.8)
Russia	2323558.03 (9.6)	1906166.25 (8.4)
Sri Lanka	37781.07 (19.97)	24117.10 (11.5)
Thailand	1097321.31 (18.9)	886569.38 (30.1)
UK	9561613.77 (25.6)	9003146.18 (27.0)
US	55623103.98 (13.2)	54866425.94 (14.7)

Source: UNESCO and Author calculations

In spite of this Indian Higher Education Institutions, have been productive, as measured by the share of total Indian papers produced by the Higher Education sector, which is more than 70% and growing over time (Krishna and Patra 2015). By our calculations, Higher Education papers per Higher Education Researcher have risen over the decade from 2005 to 2015, and more than holds its own with overall papers per researcher (the system wide papers per researcher).

However, it should be noted that Indian Higher Education system is nowhere near as prolific as China's as shown in the following table. In fact, the best Chinese institution produces 5 times as many papers as the best Indian institution.

**Table 27: Indian top ten papers vs china top ten by Institution 2012-2015**

	India	China	
Indian Institute of Science	6381	Shanghai Jio Tong	29121
IIT Kharagpur	4902	Zhejiang University	28828
University of Delhi	4269	Peking University	25867
IIT Bombay	4063	Tsinghua University	25236
Banaras Hindu University	4012	Fudan University	20362
IIT Madras	3823	Sun Yat Sen University	18684
IIT Delhi	3797	Sichuan University	17138
Jadavpur University	3100	Shandong University	17060
IIT Roorkee	3055	Huazhong University of Science	17019
IIT Kanpur	2902	Nanjing university	16911

Source: Leiden Institute

**Table 28: Impact of Research**

	% of papers in top 1% cited	% of papers in top 10% cited	% of papers in top 50% cited
India	0.4%	6.7%	43.9%
China	0.6%	8.1%	47.2%

Source: Leiden Institute

Note Fractional Basis Count

China has an edge in the percentage of papers that are cited among the top 1%, top 10% and top 50 % most frequently cited papers. As is to be expected in both cases, there is a large gap between the top 10% and top 50% share suggesting that most cited are in the moderate end rather than the very elite end.

### **INDIAN CITATION INDEX**

Recent performance on the Indian Citation index which includes more than 950 papers published in Indian journals over the period 2004-2014, over 49 subject areas and across institutions, also provides some important insights (Confederation of Indian Industry 2016)

There is a narrow research base. Out of 49 subject areas in the data base, 5 subject areas: health sciences (23.3%), Biology (11.4%); Pharmacology and Pharmaceuticals (10.4%),



Agriculture (9.2%) and Chemistry (8.4%) account for 62.7% or close to two thirds of papers in the Indian citation index (Confederation of Indian Industry 2016). Many other areas such as arts and humanities and the social sciences do not get a look in The other interesting feature is the narrowness of the publications by State.

**Table 29 Share of publications by State Indian Citation Index**

Tamil Nadu	11.9%
Maharashtra	11.5%
Uttar Pradesh	9.5%
Karnataka	9.3%
Delhi	7.7%
West Bengal	5.3%
Telangana	4.4%
Gujurat	3.9%
Andhra Pradesh	3.7%
Rajasthan	3.7%

Source: Confederation of Indian Industry 2016

The top 10 states thus account for 71% of all publications, while the top 5 account for just on 50%. The capacity for knowledge transformation via publications is thus spatially constrained. The database also reveals that average citations across the sector are low, particularly in the private universities. The latter is to be expected given the young age of these institutions (Confederation of Indian Industry 2016).

There is also a disconnect between volume and quality among foreign authors publishing in Indian journals. For example, China produces the most articles, close to 15,000 in Indian journals yet is ranked 113th on citations per paper out of 176 countries, the U.S is second on articles but 30th on citations. By contrast some of the lesser known and lower research output countries such as Peru and Kryrgyzstan have produced only 41 and 7 articles respectively yet have citations per paper at the top end of 1.9 and 1.7 respectively (Confederation of Indian Industry 2016). In some senses India may be considered a “dumping ground” for papers of not necessarily high worth, while in other ways India is arguably not capitalising on the niche capabilities in terms of volume that some less established research nations could offer.

## **INTELLECTUAL INPUTS**

Part of the issue of India’s Higher Education research performance is linked to its capacity for producing post graduate researchers. India lacks the depth of Ph.D’s amongst its ranks. Student enrolment is shown in the following manner.

**Table 30: Ph.D Enrolments and Out-Turn (pass)**

	2 0 1 1 - 2012	2 0 1 2 - 2013	2 0 1 3 - 2014	2 0 1 4 - 2015	2 0 1 5 - 2016
Ph.D Number enrolled	81,430	95,425	107,890	117,301	126,451
Ph.D share of total enrolment	0.27%	0.32%	0.33%	0.34%	0.37%
Out turn(pass)/enrolment ph.D	26.4%	24.8%	22.1%	18.6%	19.1%

Source: AISHE various years

As can be seen in the following table, Ph.D share of total enrolment is extremely small meaning that India lacks the depth of researchers need to transform itself into a knowledge economy in the future even though the numbers in raw terms seem significant. India's higher education system is very strongly under-graduate driven lacking the specialist capabilities that Ph.D's bring. However, it should be noted that given the system is heavily oriented towards teaching rather than research, Ph.D's in large proportion may not necessarily be required. Although this highlights our concern that by and large Indian Higher Education lacks cutting edge research. Further, and noting that it is not strictly comparable in the absence of specific cohort tracking, we look at the ratio of passes to enrolments in Ph.D's and find that this has declined over time, and is now only around one-fifth.

## PATENTS

Of course publications are not the only outputs of a national innovation system, including its Higher Education Institutions. Patents reflect the industrial application of knowledge and propensity for commercialisation of knowledge and research.

As the following table shows, India's patent performance, although improving over time is dwarfed by China. Moreover, its patents are dominated by non- resident patent applications and patent applications abroad are almost on a par in 2015 with resident patents.

	Resident			Non Resident			Abroad		
	2005	2010	2015	2005	2010	2015	2005	2010	2015
India	4721	8853	12579	19661	30909	33079	3307	6016	11367
	2005	2010	2015	2005	2010	2015	2005	2010	2015
China	93485	293066	968252	790842	98111	133612	4463	15620	42196

Source: World Intellectual Property Organisation

That India is heavily reliant on patent applications by overseas corporations and researchers is shown in the fact that non- resident patents are close to treble that of resident patents. Thus the lack of a domestic patenting capability is shown in these figures to some extent. This points to the absence of an indigenous research and commercialisation capabilities, although we note that there is clear value in the latest ideas and knowhow from abroad. As mentioned patents abroad have increased over time to be almost as large as resident patents, although once again that could largely be

due to foreign entities in India patenting abroad.

A clue to the latter is found in the utility patents from India originating from India in the US patent office. The top places are occupied by companies such as IBM, GE and Texas. The best performing non- corporate entity is CSIR with 298 patents over a period between 2011-2015.

**Table 32: Top twenty utility patents granted in U.S originating from India 2011-2015**

	<b>Total 2011-2015</b>
IBM	1138
GE	589
Texas	346
Symantec	344
Individuals	327
HP	301
CSIR	298
Honeywell	298
Oracle	220
Freescale	192
Info Sys	188
Adobe	184
LSI	180
STMlelectronics	176
Qualcon	169
Microsoft	165
cisco	150
Tata Consulting	143
Samsung	138
Citrix	119

Source: USPTO

In examining the US patent office data base, we find that when summing the patents of the Universities and institutes of national importance, there are only 180 patents in the U.S among these or some 1.7% of patents out of the 10,498 patents from india in the U.S between 2011 and 2015. There is very little patenting abroad on the part of Indian Higher Education Institutions. In this sense, Indian Higher Education Institutions lack an international orientation or driver which patenting in the world's leading office would bring.

More broadly, only 4.7% of Universities were granted at least 5 patents In the Indian Patent Office between 1990 and 2013 and there has been a steady decline in patent performance in Indian Higher Education Institutions since 2003 (Krishna and Patra

2015). Nor does India have the particularly well developed infrastructure for incubators in Higher Education Institutions compared to those abroad, although there have been some moves in this direction in recent times (Krishna and Patra 2015)

There are a number of reasons once can advance for this patenting performance. Arguably, the high concentration of non- resident patents in India maybe constraining the domestic patenting effort due to attracting resources, retaining IP closely, and limited transfers of knowledge into the domestic sector reinforcing the siloed nature of innovation in India. Second, is the nature of the innovation system itself in India reliant on jugaad or informal improvised innovation, innovating around resource and other constraints, meaning less role and importance for more formalised forms of innovation such as patents (Rajdou N et al 2012). The third is the weakness in the system in India in which institutions such as public research bodies (with the exception of CSIR) are not inclined to pursue commercial paths for their research nor have the skills, capability and wherewithal to do so, nor have the strong linkages into industry.

#### **SECTION FOUR: KNOWLEDGE TRANSLATION**

Knowledge translation refers to the ability of Institutions to garner knowledge from elsewhere, take it on board, adopt it, mould and meld with one's own and then develop and diffuse it. In this context we use a number of critical measures such as University rankings and collaboration. Rankings, although in some senses is a measure of quality, is also a reflection of the extent to which an Institution is in the minds of overseas and local students, how it is regarded on a world scale as a place to work, study and collaborate with, and to what extent therefore an institution can be part of the global flow of ideas and knowhow, and people mobility.

On this score we compare India with China on the international rankings of universities. The following tables are instructive.

**Table 33: Times Higher Education Rankings**

	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
India	3/400	5/400	4/400	17/800	31/981	42/1102
China	9/400	10/400	11/400	37/800	52/981	63/1102

Source: Times Higher Education Rankings

**Table 34: Times Higher Education 2017-2018**

	In Top 100	101-200	201-500	501-800	800+
India	-	-	2	15	25
China	2	5	5	32	19

Source: Times Higher Education Rankings

While the number of Indian institutions in the rankings has progressively grown, it is necessary to understand that the number of institutions included in the rankings has also progressively widened. In any case it is true that India's share of institutions ranked has grown from 0.75% in 2012-2013 to 3.8% in 2017-2018. By contrast, China has grown from 2.25% to 5.75% over the same period. What is further instructive is that India has no institution in the top 200 (nor ever has) compared to China which has 2 in the top 100 and 5 in group between 101-200. Institutions in the top 200 certainly would be considered to be among the leading institutions in the world in terms of global standing, as ideas and knowledge hubs, as attractors of students and staff, all critical to the translation factors. Most of the ranked Institutions in India are in the 800+ category, with a reasonably solid presence in the 501-800 group. While China is also well represented in these lower tiers, it has a better spread across the entire spectrum than India. China has consistently over the years had 2 in the top 100 (Peking and Tsinghua). India's current best is IISc Bangalore, at 251-300.

**Table 35: Times Higher Education Scores by Pillar**

	Teaching	Research	Citations	Industry Income	International Outlook
India average	27.6	13.6	23.2	39.2	16.96
China average	28.8	24.2	35.1	61.7	25.8
India's best Institution	53.8	48.6	56.1	92.7	47
China's best Institution	83	93.2	76.9	100	54.4
India's weakest Institution	14.5	6.7	2.1	31.8	12.6
China's weakest Institution	15.2	8.1	9.0	32.8	4.8

Source: Times Higher Education

When looking at the scores for the pillars (the higher the score the better, 100 being the best) that comprise the rankings, we find that on average Indian Institutions lag China on all parameters, with the biggest gap on average being on Industry income although India's best scores highly on this criterion. Thus, what we are seeing again is the weakness in linkages between industry and universities. India's best performing institution also lags China's best against all criteria, and there are large differences in the best, most notably on teaching and research, the core fundamentals of high quality, high ranked universities. However, it should be noted that the gap between India and China's weakest is not as significant, suggesting that there are a number of Universities in both countries that are at the lower end of the spectrum. China though has a number of very well represented Institutions in the International outlook pillar with scores above 90.

The extent of knowledge translation is also reflected in the degree to which papers are collaborative. Translation in this sense is a two way exchange of information, knowhow and flows of knowledge and doing things. It is the capacity to meld, mould

and augment knowledge for economic and social good which is critical. At the system wide level, we observe that over the decade from 2003 to 2012 India has had the highest share of papers with no collaboration. The lack of any collaboration reinforces the siloed approach to Indian research. This means that Indian researchers miss out on the critical flows of ideas, knowhow and joint discovery based on complementary skills which collaboration brings. There are two legacy effects of this that can be surmised. First a system of innovation geared to serving British interests alone which led to narrower research, and secondly in the post independence period research singly driven towards social and industrial aims of a planned economy, did not necessarily and arguably did not provide many reasons for sharing of ideas or much room and incentive for partnerships and inter-disciplinary thinking.

It is also observed that international collaboration is higher than domestic collaboration for India (a feature it shares with a number of other countries), and that there is a higher share of foreign leading authors in international collaboration compared to domestic leading authors. However, for a country of India's development, to be more in tune with overseas collaborators rather than domestic, perhaps does suggest that there is a lack of capability domestically and limited opportunity and ability to partner at home. This in turn may make developing truly home grown technological breakthroughs leading to full capture of the returns at home somewhat difficult. It also suggests that India is highly dependent on the know how of other nations (Ramaswami 2016).

**Table 36: Collaboration in papers 2003-2012**

	No collaboration	International collaboration	Domestic collaboration
Australia	42.88	40.04	17.08
Chile	33.4	52.59	14.02
Brazil	43.6	24.86	31.54
UK	47.5	40.64	11.86
Germany	47.52	41.56	10.93
South Korea	50.73	25.64	23.62
U.S	53.56	25.88	20.57
japan	54.51	21.71	23.77
Russian Federation	60.52	30.9	8.58
China	63.08	15.02	21.90
India	71.46	17.38	11.16

Source: OECD and Sci Mago Research Group

**Table 37: International Collaboration in Papers: 2003-2012**

	% international collaboration	Foreign leading author in international collaboration	D o m e s t i c leading author in international collaboration	No international collaboration
Chile	52.59	31.01	21.58	47.41
Germany	41.56	23.33	18.23	58.44
UK	40.64	22.12	18.52	59.36
Australia	40.04	22.59	17.45	59.96
Russia	30.90	15.13	15.77	69.10
US	25.88	13.72	12.16	74.12
South Korea	25.64	14.55	11.10	74.36
Brazil	24.86	13.77	11.10	75.14
Japan	21.71	10.97	10.74	78.29
India	17.38	9.08	8.30	82.62
China	15.02	9.02	6.00	84.98

Source: OECD and Sci Mago Research Group

## LEIDEN INSTITUTE

If we turn to the Leiden rankings database we observe that overall India's rate of collaborative papers from Universities is 53.2% compared to China at 68.7. Overall, Chinese institutions are more likely to collaborate than India reflecting the closed nature of the Indian set up. International collaboration for China at 24.7% is on a par with India at 24.3%. ("Leiden Institute 2017")

China has a slight edge over India in collaboration in terms of industry collaboration, although noting that both countries have some work to do in this area, and of course that there are many types of collaboration beyond papers.

The Leiden rankings provide data for short distance collaboration (less than 100kilometres) and collaboration over longer distances (greater than 5000 kilometres). What is also interesting is that on average collaboration locally ie less than 100 kilometres away is higher in China at 15.4% compared to India at 11.3%. There are a number of factors at play here including the extent of clustering around universities. Overall, Chinese institutions appear to be better integrated with other institutions locally, other institutions of knowledge, and industry through spatial clustering, than India. The role of Chinese technology parks, and the ability to develop and diffuse tacit know through face to face interactions is a key factor here. The benefits of collaboration locally are manifold including development of economic hubs and regions, gains from mobility of researchers, and flows of tacit knowledge.

On the other hand, China is only slightly ahead in longer distance collaborations

(Greater than 5000 kilometres), but less so than when comparing to short distance collaboration. It is hard to be definitive about why India performs relatively better on longer distance collaboration compared to shorter distance collaboration, but this is consistent with the greater propensity generally to collaborate internationally. Possible explanations could be the diasporic effect of researchers, or the rise of virtual collaboration, or simply the greater availability of possible collaborative partners over wider geographical areas. It could also be about the silo mentality and unwillingness of Indian Institutions to share knowledge and intellectual property with potential local rivals. Of course, without being definitive one can suggest that it is also about the spatial planning of universities and the absence of other institutions in the shorter distance.

### **HIGHER EDUCATION AS A SOURCE OF IDEAS**

Of further relevance in the translation of innovation is the extent to which firms relate to higher education as a source of ideas and knowhow. Only 7.9% of manufacturing firms found that higher education was a highly important source of ideas in India, as opposed to 58.5% of firms who claimed that their own enterprise was highly important, and 32.6% who believe that competitors and other enterprises are (UNESCO).

Further, for the innovation active manufacturing firms, some 53.3% of firms claimed that lack of highly qualified personnel was a highly important hampering factor and that in 44.2% of cases this was a fact even for non innovative active manufacturing firms (UNESCO). Thus, the interface between higher education as a source of ideas in India, and in providing the right type of employee at the right time is a constraint in India. ( Source : UNESCO 2017)

### **INTERNATIONAL STUDENTS**

As indicated, translation is closely linked to internationalisation of the higher education space. India is increasingly international in the outward domain, with 360,000 students abroad. However, this comprises a relatively small proportion of India's eligible higher education population.

Even more stark is that India's share of total students accounted for by international students is approximately 0.1%. India is in 102nd position on this criteria in the Global Innovation Index (Cornell University et al 2017). Most of the Indian inward student mobility is male, by a ratio of two to one, and dominated by undergraduates some 78.5% (AISHE 2015-2016). Thus, India is missing out on the potential brain gain especially that post graduates bring in, in terms of the intellectual and research abilities, and potential linkages into research networks of the world especially down the track. Recent work has focused on brain circulation and knowledge nomads, or those researchers and scientists who travel the world undertaking projects, developing and



deploying knowledge (Day and Stigloe 2009). While there have been some schemes which aim to better link Indian researchers into global networks, students taking on these roles can also be an important investment and future asset, both in terms of inward and outward mobility (Government of India (f) 2015-2016). Of course there is also the issue of brain drain to consider as a number of Indian students studying abroad continue to live and work overseas. The Indian Diaspora is an especially vibrant one, for example, with many success stories in Silicon Valley among other places.

India also performs poorly on the international outlook component of THE rankings, which is made up of both inward students and staff (Times Higher Education Ranking 2017). Thus it is also the case that Indian Higher Education in India does not attract overseas researchers and academic staff due to restrictions on hiring among other things.

A further issue is where these students come from. The following table shows the top ten source countries of India's international higher education.

**Table 38 :Top Ten Source Countries of International Students in India 2015-2016**

Nepal	9574
Afghanistan	4404
Bhutan	2925
Nigeria	2090
Sudan	2059
Malaysia	1901
UAE	1479
Iran	1459
Yemen	1238
Sri Lanka	1189

Source : AISHE 2015-2016

By and large, India's inward mobility is limited to countries in the nearby region and those from less developed economies. Thus India is not tapping into the core academic and research hubs of the world from the developed nations. This in large measure goes to the heart of the lack of quality of higher education as perceived by students from abroad.

A further clue to this may be found in the surrounding eco-system for students. According to the QS top 100 ranked best student cities in the world, India only has two such cities, and towards the lower end of the rankings: Mumbai and New Delhi ranked at 85th and 86th respectively. By contrast China has four at Shanghai (25th); Beijing (30th); Nanjing (80th) and Wuhan (100th) (QS (b) 2017).

Indian student cities achieve their best ranks on affordability and to a lesser extent employer activity, where employer activity is defined as the number of domestic employers who identified at least one institution in the city as providing excellent graduates, international employer popularity and youth employment.

By contrast, both cities perform relatively poorly on the following criteria: Desirability (liveability, safety, pollution, corruption); rankings (number of ranked Universities in the city) and particularly poorly on student mix (number of students, international students, tolerance and inclusion), and relatively poorly on student view (student experiences and staying after graduation) (QS (b) 2017).

These findings point to weaknesses in the surrounding system for universities. Indian cities are relatively unwelcoming and unattractive for students, although affordable. Yet affordability is just one criterion. India also lags on inclusivity, a particularly important dimension for the knowledge economy. Successful, high prosperity locations are melting pots of inclusion, drawing on and nurturing talent from all around the world with a high emphasis on tolerance and inclusion, allied with technology and talent (Florida 2002). This is not the case in Indian cities. It is also an issue more broadly. The recent Talent Index shows that India ranks badly on tolerance of minorities and migrants at 44th and 112th place respectively (INSEAD 2017). This is in addition to issues of congestion and corruption which bedevil Indian cities.

Therefore, India needs to look more broadly and holistically when considering its internationalisation of higher education. We also argue that fundamentally an immersion program in which India could develop, and nurture and market its history, traditions and culture as a basis for fostering integration of foreigners, including students from around the world, is essential.

## **SECTION FIVE: TOWARDS A POLICY AGENDA**

In this section, we consider the key element of an Indian Higher Education Policy which look to address some of the key weaknesses identified in this paper. Among the key measures are:

- Overhauling India's system of governance and accountability through the removal of the affiliation system, which has severely constrained both Universities and their affiliated colleges.
- Changing incentive arrangements including relaxing the constraints on fee setting. One option is for price variability between floor and ceiling prices (differentiated of course between public and private institutions) and within this allowing market forces and competition to determine where prices land. We would also recommend the greater use of scholarships and stipends to address any distributional impacts of the pricing arrangements.
- An overhaul in Governance of Universities through a new structure to regulate the whole of the sector including Higher Education and Vocational Education in an integrated fashion, with funding linked to quality outcomes and performance.
- Allow institutions, including foreign providers, to operate on a for profit basis, including the establishment of branch campuses. The continues to need an

injection of capital to meet the needs of an ever growing student age population, and targeted increases in Gross Enrolment Ratio by the Government. In addition, an influx of foreign capital potentially brings with it new insights, management techniques, innovation in pedagogy and course offerings and research links and capabilities.

- Reform pedagogy to down- play the rote system of learning with its exam orientation to focus effort on meeting the challenges facing the nation in areas of energy, resource management, urban design, health outcomes, security and the like. This would be underpinned by a comprehensive Knowledge Economy Plan. It would also have a focus on employability of graduates.

- A comprehensive approach to improving the research capability of Indian Higher Education sector through rigorous research training and greater expenditure in Higher Education research, and a program of attracting highly cited researchers from abroad.

- Establish new intermediary bodies which link industry and research organisations and Universities through networks of researchers aimed at undertaking collaborative work, enhancing mobility of researchers, and sharing risk.

- Development of a comprehensive International Higher Education Plan aimed at building India as a hub for international students and staff, linking in and reaching out to researchers and academics from around the world.

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## 6. IDIOSYNCRATIC RISK AND RETURNS: THE CASE FOR A MORE EFFICIENT CLASS OF ESTIMATORS

**MOHINDER PARKASH**, Department of Accounting & Finance, School of Business Administration, Oakland University, Rochester, MI48309, USA

**RAJEEV SINGHAL**, Department of Accounting & Finance, School of Business Administration, Oakland University, Rochester, MI 48309, USA, Email: singhal@oakland.edu

**YUN (ELLEN) ZHU**, Department of Accounting & Finance, School of Business Administration, Oakland University, Rochester, MI 48309, USA.

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### ABSTRACT

*Volatility is a key input into many important financial decisions. Therefore, accurate forecast of volatility plays an important role in making these decisions. Typically, volatility is forecast using realized volatility computed from closing stock prices. Employing expectation of volatility such as calculated, several papers find that expected idiosyncratic risk is positively associated with contemporaneous returns. Yang and Zhang [2000] show that estimators belonging to the class of range-based estimators are more efficient than the estimators derived only from closing prices. Using the more efficient range-based volatility estimates, we find no evidence to support the hypothesis that idiosyncratic risk explains returns.*

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**KEYWORDS:** Idiosyncratic Risk, Range-based volatility, Expected volatility, Risk-return relationship.

### INTRODUCTION

Volatility plays an important role in key financial decision including portfolio choice, pricing of derivatives and other financial assets, and risk management. Therefore, precise measurement of realized volatility and accurate forecasts of conditional volatility become crucial for these financial decisions. Since the publication of Goyal and Santa-Clara [2003] (hereafter, GSC) which showed that contrary to the prevailing notion in finance, idiosyncratic risk is priced by the market, estimation of realized and conditional volatility has received a lot of attention in the finance literature. Although several recent papers employing the US and international data also arrive at the conclusion reached by GSC, some authors find mixed results about the relationship between conditional volatility and return.

Broadly, research in this stream of finance has explored two interconnected issues: the estimation of realized volatilities; and translating realized volatilities into expectations of future volatilities. Our paper adds to this debate by analyzing a sparsely-used (in finance) class of volatility estimators based on enhanced information than just close-to-close returns. The estimators we present belong to the class of range-based estimators which have been shown to be more efficient than the estimators based on closing prices[e.g., Garman and Klass 1980; Yang and Zhang 2000]. We employ two range-based estimators based on daily high, low, open, and close prices to find that contrary to the evidence documented in recent papers, no relationship exists between idiosyncratic risk and stock returns.

The classical finance theory is based on the idea that risk is positively associated with future returns, and that the only risk that matters is the systematic risk, commonly represented by beta. For example, the Capital Asset Pricing Model (CAPM), a well-known asset pricing model predicts that the future return of a stock depends on the stock's market beta. In CAPM, idiosyncratic risk ceases to matter because it can be diversified away. However, the assumption that investors are adequately diversified has faced challenges from several empirical and theoretical papers which argue that investors may remain under-diversified for a variety of reasons. Levy [1978] lists studies which show that individual investors are highly undiversified. More recently, Goetzmann and Kumar [2008] find that individual investors in the US are under-diversified and the level of under-diversification is higher for younger, low-income, less-educated, and less-sophisticated investors. These studies cast doubts about the notion that idiosyncratic risk is diversified away and should not be priced.

Our paper addresses two related issues—the impact of idiosyncratic risk on returns; and the measurement of idiosyncratic risk. To that end, we next present a review of the literature in the two areas. In the review, we first describe the research which shows that the use of a larger set of information than just closing prices yields more efficient estimators of realized volatilities. Second, we describe the state of theoretical and empirical research in the area of idiosyncratic risk and its effect on return.

## **MEASUREMENT OF VOLATILITIES**

Stock returns are computed using closing prices. The often used measures of realized volatilities over a period (say a month) take the standard deviation of residuals of close-to-close returns obtained from a pricing model as a proxy for realized volatilities. Since the variance of a close-to-close estimator depends on the inverse of the number of observation during the estimation interval, it is possible to reduce the dispersion by making use of higher frequency data [Andersen, Bollerslev, Diebold, and Labys 2003]. But when available, the higher frequency data suffers from market microstructure problems. If the higher frequency data cannot be obtained, it is pertinent to ask the question

whether a more efficient estimator can be found by inclusion of more information than just the closing prices.

Garman and Klass [1980] is perhaps the earliest attempt at incorporating open, high, and low prices beside the close prices into estimation of volatilities. They show that the estimator derived using more information has a variance markedly lower than that of the classical estimator based on close-to-close prices. However, the Garman and Klass estimator is not independent of the drift and opening jumps in stock prices. To take into account drift in stock prices, Rogers and Satchell [1991] proposed a drift-independent model based on multiple price points during a trading day. But Rogers and Satchell [1991] corrects only for the drift and does not account for opening jumps. Yang and Zhang [2000] develop a minimum-variance estimator which is independent of both drift and opening jumps. In this paper, we use Rogers and Satchell [1991] and Yang and Zhang [2000] estimators of realized volatilities to conduct our analyses.

#### Idiosyncratic Risk and Returns

Mayers [1976] explores the effect of nonmarketable assets and market segmentation on asset prices. In his model, Mayers finds that under the assumption of constant relative risk aversion less than or equal to one, asset prices are lower given nonmarketable assets and market segmentation. In Mayers [1976] each investor holds a unique portfolio contrary to the prediction from CAPM. Levy [1978] allows investors to hold portfolios with some given number of securities. He finds that individual stock variance is important in his model. Merton [1987] models capital market equilibrium in an incomplete information setting and finds that less well-known stocks with fewer investors will tend to have larger expected returns and that expected returns depend on both the market risk and the total variance. Campbell, Lettau, Malkiel, and Xu [2001] list several arguments for the importance of idiosyncratic risk to expected returns. These arguments include: a lack of investor diversification from not following the approach recommended by financial theory or due to constraint imposed by compensation policy; investors may diversify by holding a portfolio of thirty stocks or fewer which depending on the volatility of individual stocks may not be adequate; arbitrageurs who exploit mispricing of individual securities are exposed to idiosyncratic risk; idiosyncratic volatility becomes important in event studies; and option price on a stock depends on total volatility of returns which is made up of volatilities attributable to both the market and to a specific firm. And Malkiel and Xu [2006] present a model in which if a group of investors does not hold the market portfolio, remaining investors will also not be able to hold the market portfolio and idiosyncratic risk may become important.

Turning attention to the empirical treatment of the issue, several papers show that the relationship between idiosyncratic risk and expected returns is either positive, or non-existent, or even negative. These studies are based on US data and use monthly intervals. French, Schwert, and Stambaugh [1987] find a positive relationship between the expected risk premium on common stocks and predictable level of volatility. Lehmann [1990] finds that the residual risk has a significant co-efficient when he



corrects for problems in the statistical methods used in prior studies. In a recent paper, GSC show that average monthly stock variance is positively associated with higher returns in the subsequent month. Fu [2009] uses the exponential GARCH models to estimate expected idiosyncratic volatilities and finds a positive relationship between the conditional idiosyncratic volatilities and expected returns. Malkiel and Xu [2006] control for factors like size, book-to-market, and liquidity in conducting their analyses for US and Japanese equities to find that idiosyncratic volatility is more important than either the  $\beta$ , the systematic risk, or the size in explaining the cross-section of returns. Huang, Liu, Rhee, and Zhang [2010] also document a positive relationship between conditional idiosyncratic volatility and expected returns.

Estrada [2000] uses a database of 28 emerging economies and finds that idiosyncratic risk is significant in explaining the cross-section of returns. Harvey [2000] uses data from 47 different countries to construct 18 different measures of risk. He finds that collectively idiosyncratic risk is positive in explaining the cross-section of expected returns. Brockman, Schutte, and Yu [2009] examine the relationship across 44 countries from 1980 to 2007. They find a significantly positive relationship and attribute it to under-diversification. Lee, Ng, and Swaminathan [2009] obtain data for G-7 countries over the 1990 to 2000 time period and find a positive relationship between idiosyncratic volatility and expected returns.

Although the evidence in favor of a positive relationship between idiosyncratic risk and returns seems dominant, some papers document conflicting results. Longstaff [1989] observes a consistently negative but insignificant relationship between variance and returns for the overall period 1926-1985 and for the three sub-periods in which he divides his sample. Bali, Cakici, Yan, and Zhang [2005] re-examine the relationship between average stock volatility and future returns to conclude that the results in GSC were driven because of small stocks traded on the NASDAQ and that the GSC results disappear when market values are used as weights instead of equal weights to compute average volatility. And Wei and Zhang [2005] find that the results in GSC are driven mainly by the data in the 1990s as the relationship between idiosyncratic risk and future returns disappears when they extend the sample to 2002. Wei and Zhang also raise the possibility that combining equally-weighted average volatility with value-weighted average return may be behind the results reported in GSC. Bali and Cakici [2008] employ a portfolio approach and use various different measures of idiosyncratic volatility, alternative weighting schemes, different breakpoints for the construction of portfolios, and two different samples to find no robust relationship between idiosyncratic volatility and expected returns. Finally, Ang, Hodrick, Xing, and Zhang [2006] find that stocks with high idiosyncratic volatilities have low average returns, which is the opposite of that documented in GSC.

Therefore, the overview of the literature on the relationship between idiosyncratic risk and returns has not been settled as different papers have reported mixed results..

In the next section we describe the two methods used in our paper to measure realized volatilities which will be used to estimate conditional volatilities.

## MEASURES OF REALIZED VOLATILITY

### Fama-French Three Factor Method

In this approach, the idiosyncratic volatility for a stock in a month is computed as the standard deviation of residuals from the regression of daily excess returns on the daily Fama-French [1993; 1996] three factors in that month. Ang, Hodrick, Xing, and Zhang [2006] and Fu [2009] use this approach. Thus in a given month, we run the following regression for each stock  $i$  for days 1 through  $n$  in that month,

#### MEASURES OF REALIZED VOLATILITY

$$r_{it} - r_t = \alpha_{it} + \beta_{it}(r_{mt} - r_t) + s_{it}SMB_t + h_{it}HML_t + \varepsilon_{it}. \quad (1)$$

The realized monthly volatility (VAFF) from equation (2) is the standard deviation of the error terms,  $\varepsilon_{it}$  multiplied by the square root of the number of trading days,  $n$ , in the month.

### Range-Based Methods

Our first range-based measure uses Rogers and Satchell [1991] and Rogers, Satchell, and Yoon [1994]. If  $O_i$ ,  $H_i$ ,  $L_i$ , and  $C_i$  are the open, high, low, and close prices respectively for a stock on day  $i$ ,  $C_{0i}$  is the closing price for the stock on the previous day, and  $n$  is the number of trading days in a month then,

$$o_i = \ln(O_i) - \ln(C_{0i}),$$

$$u_i = \ln(H_i) - \ln(O_i),$$

$$c_i = \ln(C_i) - \ln(O_i),$$

$$d_i = \ln(L_i) - \ln(O_i),$$

and,

$$V_{RS} = \frac{1}{n} \sum_{i=1}^n [u_i(u_i - c_i) + d_i(d_i - c_i)]. \quad (2)$$

$V_{ARS}$ , the realized volatility from equation (3) in a given month is then computed as  $V_{RS}\sqrt{n}$ .

The second range-based measure of volatility ( $V_{AYZ}$ ) is due to Yang and Zhang [2000] and calculated as follows,

$$V_{yz} = V_0 + kV_c + (1 - k)V_{RS}. \quad (3)$$

Where,

$V_{RS}$ =Volatility calculated using Rogers and Satchell [1991] and Rogers, Satchell, and Yoon [1994] and,

$$V_0 = \frac{1}{n-1} \sum_{i=1}^n (o_i - \bar{o})^2,$$

$$V_c = \frac{1}{n-1} \sum_{i=1}^n (c_i - \bar{c})^2,$$

$$\bar{o} = \frac{1}{n} \sum_{i=1}^n o_i,$$

$$\bar{c} = \frac{1}{n} \sum_{i=1}^n c_i.$$

$V_{AYZ}$ , the realized volatility using equation (4) in a given month is then computed as  $V_{YZ}\sqrt{n}$ .

Fu [2009] argues that the relationship between idiosyncratic risk and returns is contemporaneous.

He also finds that idiosyncratic volatility varies substantially over time which would indicate that using realized volatilities to test the relationship may not be appropriate. Therefore, we estimate expected volatilities using realized volatilities based on the approaches described next.

## SPECIFICATIONS OF CONDITIONAL VOLATILITY

### The EGARCH Model

We estimate the conditional idiosyncratic volatility for a stock using two different approaches. To forecast volatility in month  $t$ , we first obtain the monthly residuals,  $u_t$ , for a stock by employing equation (1) in the months from the beginning of the sample period to the month  $t-1$ . The EGARCH (p,q) model is then used to forecast volatility in month  $t$ . Following Fu [2009], we vary  $p$  and  $q$  from 1 through 3 and obtain 9 different models. From among the models that converged in a month, we choose the best-fit model as the one with the lowest Akaike Information Criterion.<sup>1</sup> The specification of the conditional variance of  $u_t$  is:

$$\ln(h_t) = \omega + \sum_{i=1}^q \alpha_i g(z_{t-i}) + \sum_{j=1}^p \gamma_j \ln(h_{t-j}).$$

Where,

$$g(z_t) = \theta z_t + \gamma [|z_t| - E|z_t|],$$

and

$$z_t = \frac{u_t}{\sqrt{h_t}}.$$

In estimation, the parameter  $\gamma$  is assumed to be one and  $E|z_t| = \sqrt{\frac{2}{\pi}}$  if  $z_t \sim N(0,1)$ .

$\sqrt{\exp(\ln(h_t))}$  is our first estimate of the conditional volatility, VEGFF.

## The ARIMA Model

We employ ARIMA (p,q) to get our next two estimates of conditional volatility using realized volatilities based on Rogers and Satchell [1991] and Yang and Zhang [2000]. The equation for forecasts of volatilities takes the form:

$$\sigma_t = \epsilon_t + \alpha_1 \sigma_{t-1} + \dots + \alpha_{t-p} + \theta_1 \epsilon_{t-1} + \dots + \theta_q \epsilon_{t-q}.$$

For every stock in the 30-month period prior to month t,  $\sigma$  is computed using equation (2) or (3).

We restrict forecasting of volatility in the ARIMA approach to only those stocks that have at least 24 monthly returns in the 30-month window. To arrive at the best-fit model, we used twenty five different specifications by varying p and q from 1 through 5. Out of the 25 models, we retain only those which converged. The best-fit model is selected from among the ones that converged based on the minimum Schwarz criterion. The forecasts from the best-fit model provide us our second and third measures of conditional volatility, VEARS and VEAYZ.

## DATA AND VARIABLES

We use the daily and monthly CRSP data for the market information and the Compustat database for the book value of equity. The daily and monthly three factors are downloaded from the website of Kenneth R. French.<sup>2</sup> Since open prices are available for the NYSE/AMEX/NASDAQ firms only from June 15, 1992, onward, and we need 24 months of data to estimate the ARIMA models, our sample is limited to the period between June, 1994 and December, 2015. When daily market data over a month is required, we follow Fu [2009] and

impose the restriction of a minimum of 15 days in a month for which a stock must have both a return and a non-zero trading volume.<sup>3</sup>

In our cross-sectional regressions, we include several control variables. Fama and French [1992] show that the book-to-market ratio (BM) and firm size (ME) are useful in explaining cross-sectional returns. Jegadeesh and Titman [1993] demonstrate that buying past winners and selling past losers generates significantly positive returns over the horizons between three and twelve months. Following Fu [2009], for a stock in a month, we include the cumulative returns (CRET) in the six month period ending two months prior to the month as an explanatory variable. Consistent with Chordia, Subrahmanyam, and Anshuman [2001], to capture liquidity and its variability, we introduce the turnover ratio (TURN) defined as the natural log of the number of shares traded in a month divided by the number of shares outstanding expressed as percentage and the natural log of the variability of the turnover ratio, defined as the coefficient of variation of the turnover ratio (CVTURN), in our regressions. We impose a restriction of at least 18 observations in the computation of the two turnover related variables. Additionally, we follow Anderson and Dyl [2005] rule of thumb and adjust the NASDAQ volume down by 50 percent before 1997 and 38 percent after 1997 to address the effect of double-counting of trading volume for firms listed on that exchange. Finally, we include the systematic risk (BETA) of a stock in our cross-sectional return model.

BETA, BM, and ME are computed using the Fama and French [1992] approach. Specifically, in June of every year, stocks are sorted into 100 size (number of shares times the stock price at the end of previous December) and pre-ranking beta portfolios. The pre-ranking betas are obtained from the regression of excess stock returns on the value-weighted market returns over the past 60 months. A minimum of 24 monthly returns are required for the estimation of pre-ranking betas. For the 100 size-beta portfolios, simple average returns are calculated from July of that year to June of the next year: based on portfolios constructed in June of year  $y$ , we have 100 portfolios returns in each month from July of year  $y$  to June of year  $y+1$ . This procedure is repeated every June over the sample period (1994-2015). For each portfolio, we run a regression of its monthly returns on the monthly-value-weighted market returns and its lag for the entire sample period. The portfolio beta is the sum of the coefficients on the value-weighted market return and its lag. Finally, each stock is allotted the beta of the portfolio in which it resides in June as a proxy for the systematic risk, BETA. BM is calculated as the natural log of the book-to-market ratio. In June of each year  $y$ , the book value of equity is obtained from the fiscal-year end statement of year  $y-1$ . The market value of equity is obtained from stock prices at the end of December in year  $y-1$ . The same BM is used for all the months between July of year  $y$  and June of year  $y+1$ . ME is computed as the natural log of the market capitalization in June of year  $y$  to explain returns from July of year  $y$  through June of year  $y+1$ .

## RESULTS

In Table 1, we present the autocorrelations for the three methods of realized volatilities. The autocorrelations for each firm are computed at various lags and then averaged across the sample firms. VAFF, the realized volatility based on closing prices decays relatively more quickly over the first three lags and then very slowly for higher lags. The more efficient realized volatilities based on information about high, low, open, and close prices (VARS and VAYZ) decay more quickly for four lags and appears to be persistent for lags greater than four.

**Table 1**

### Autocorrelations for the Three Realized Volatility Measures

Variable	LAG1	LAG2	LAG3	LAG4	LAG5	LAG6	LAG7	LAG8	LAG9	LAG10	LAG11	LAG12
VAFF	0.33	0.27	0.25	0.19	0.18	0.17	0.15	0.14	0.15	0.12	0.10	0.12
VARS	0.45	0.35	0.29	0.23	0.21	0.19	0.17	0.17	0.16	0.15	0.12	0.13
VAYZ	0.39	0.30	0.26	0.20	0.19	0.17	0.15	0.15	0.15	0.13	0.10	0.11

Table 2 describes our variables of interest. All the variables are winsorized at 0.5 percent in each tail. We also exclude observations with monthly returns of greater than 300 percent to minimize the possibility of recording errors contaminating our results. The mean and median realized volatilities using the range-based estimators (VARS and VAYZ) are higher than those using closing prices (VAFF). Mean and median volatility forecasts (VEGFF, VEARS, and VEAYZ) also show a similar pattern. Other variables are comparable to the numbers reported in Fu [2009] in terms of means and medians. VAFF and RET exhibit right skewness of more than 3, but the other variables do not appear to be highly skewed.

**Table 2**

### Summary Sample Statistics

Variable	N	Mean	Median	Skew	Q1	Q3
VAFF	1,678,344	0.12	0.09	7.76	0.05	0.16
VARS	1,783,010	0.13	0.09	1.95	0.05	0.17
VAYZ	1,783,010	0.15	0.11	2.07	0.06	0.20
VEGFF	1,783,010	0.10	0.07	2.59	0.03	0.13
VEARS	1,783,010	0.12	0.09	1.53	0.05	0.17
VEAYZ	1,783,010	0.15	0.12	1.62	0.06	0.20
RET	1,782,976	0.01	0.01	5.54	-0.06	0.07
ME	1,429,915	5.56	5.42	0.27	4.08	6.87
BM	1,203,196	-0.50	-0.54	0.94	-1.11	-0.02
TURN	1,563,833	2.11	2.17	-0.11	1.37	2.90
CVTURN	1,563,833	4.07	4.06	0.35	3.70	4.42
CRET	1,518,318	1.06	1.03	1.22	0.86	1.19
BETA	1,564,562	1.18	1.13	0.23	0.81	1.51

Sample correlations among our measures of realized volatilities, conditional volatilities, and returns contemporaneous with conditional volatilities are available in Table 3. Although realized volatilities are strongly correlated, the correlations between closing-price-based conditional volatility (VEGFF) and range-based volatilities (VEARS and VEAYZ) are relatively weaker. As expected, the two measures of range-based conditional volatilities are highly correlated. In the univariate analysis, the correlation between VEGFF and RET is insignificant, but significant and negative between VEARS and RET and VEAYZ and RET.

Table 3

## Sample Correlations

Variable	VAFF	VARs	VAYZ	VEGFF	VEARS	VEAYZ	RET
VAFF	1.00	0.77*	0.81*	0.28*	0.61*	0.62*	-0.07*
VARs	–	1.00	0.93*	0.31*	0.81*	0.79*	-0.05*
VAYZ	–	–	1.00	0.29*	0.75*	0.76*	-0.05*
VEGFF	–	–	–	1.00	0.31*	0.31*	0.00
VEARS	–	–	–	–	1.00	0.94*	-0.04*
VEAYZ	–	–	–	–	–	1.00	-0.04*
RET	–	–	–	–	–	–	1.00

\*Significant at the 1% level

In Table 4, we present our main result to test the hypothesis that there is a relationship between idiosyncratic risk and returns. In our cross-sectional regressions, the t-statistics are based on the Fama and MacBeth [1973] approach. Using all the sample firms, we run the cross-sectional regression with monthly stock returns as the dependent variable each month and generate a time series of monthly parameter estimates. From the time series of parameter estimates, we compute the mean estimate and the standard deviation of the estimate to calculate the t-value.

Table 4

## Regression Results

The dependent variable is the return in the month for which expected volatilities are computed by employing the EGARCH(p,q) model (VEGFF) and the ARIMA(p,q) model (VEARS and VEAYZ). The EGARCH model uses the residuals from the monthly regressions of monthly stock returns on the three Fama-French factors. The ARIMA models use the realized volatilities computed using the Rogers and Satchell [1991] approach (VEARS) and the Yang and Zhang [2000] approach (VEAYZ). BETA, BM, and ME are calculated by following the Fama and French [1992] method. CRET is the cumulative gross returns in the six-month period T-7 to T-2. TURN is the natural log of the average percentage turnover ratio, defined as (shares traded/number of outstanding shares), for a stock in the previous 36 months and CVTURN is the natural log of coefficient of variation of the turnover ratios in the previous 36 months. Numbers in parentheses are the t-statistics computed using the Fama and Macbeth [1973] method.



BETA	BM	ME	CRET	TURN	CVTURN	VAFF	VARS	VAYZ	VEGFF	VEARS	VEAYZ	R2 (%)
0.005	0.001	0.000	–	–	–	–	–	–	–	–	–	3.5
(1.23)	(1.88)	(-0.21)										
0.003	0.000	0.000	0.155	0.001	0.004	–	–	–	–	–	–	17.7
(1.07)	(-0.34)	(0.03)	(62.84)	(1.04)	(2.73)							
0.004	-0.001	-0.002	0.153	0.002	0.006	-0.068	–	–	–	–	–	18.9
(1.61)	(-2.04)	(-4.24)	(67.04)	(2.11)	(4.27)	(-6.27)						
0.003	-0.001	-0.001	0.153	0.001	0.004	–	-0.014	–	–	–	–	19.0
(1.20)	(-1.36)	(-1.48)	(67.12)	(2.14)	(3.20)		(-1.02)					
0.003	-0.001	-0.001	0.153	0.001	0.004	–	–	-0.018	–	–	–	18.8
(1.28)	(-1.31)	(-2.11)	(66.93)	(1.83)	(3.47)			(-1.94)				
0.002	0.000	0.000	0.155	0.001	0.004	–	–	–	0.013	–	–	17.9
(0.90)	(-0.11)	(0.33)	(63.43)	(0.82)	(2.62)				(3.77)			
0.003	0.000	0.000	0.155	0.001	0.004	–	–	–	–	0.002	–	18.7
(1.03)	(-0.22)	(-0.13)	(65.90)	(1.14)	(3.02)					(0.12)		
0.003	0.000	0.000	0.155	0.001	0.004	–	–	–	–	–	0.000	18.6

Numbers in bold are significant at better than 5% level

We present nine specifications of the return model. In the first specification, BETA, BM, and ME do not seem to be helpful in explaining returns. The explanatory power of the model given by r-square is also small (3.5 percent). We then introduce CRET, TURN, and CVTURN to the model. CRET and CVTURN are significant and the explanatory power of the model goes up to 17.71 percent.

Then we introduce our three measures of realized volatilities one by one into the return model with the seven exogenous variables. As in GSC, VAFF, VARS, and VAYZ are the naïve forecasts of conditional volatility. To wit, VARS<sub>realized</sub> in the month t-1 is the forecast of conditional volatility in the month t. VAFF and VAYZ are negative at 5-percent level or better, VARS is not.

To get the main results of our paper, we finally include the three measures of conditional volatilities, VEGFF, VEARS, and VEAYZ. Consistent with Fu [2009] and Huang, Liu, Rhee and Zhang [2010], we find the closing-price-based volatility forecast, VEGFF, to be positive related to returns. However, the more precise measures of volatility, VEARS and VEAYZ are not significant in explaining returns and lead us to conclude that there is no relationship between idiosyncratic risk and returns.

## CONCLUSION

Classical asset pricing theories posit no relationship between the idiosyncratic risk and returns. Research shows that the prediction may not hold true for a variety of reasons including a lack of adequate diversification on part of the investors. Nonetheless, empirical papers adopting different methodologies show that the relationship between idiosyncratic risk and returns is either positive, or nonexistent, or even negative. In any test of the relationship, the estimate of conditional volatility is the main ingredient. The classical estimators of realized volatility, which is used to forecast future volatility, are

based on closing stock prices and have been shown to be highly imprecise. We adopt two estimators of realized volatility from the class of range-based estimators shown to be much more efficient than the classical estimators and use them to forecast volatility. Contrary to recent papers, we find no evidence of a relationship between idiosyncratic risk and returns.

Our paper uses methodologies used in existing research to estimate conditional volatilities. Future research may explore the issue of relative merits of different methodologies used to forecast volatilities.

#### Notes

1 We get similar results if we choose the best-fit model using the Schwarz Bayesian criterion.

2 [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

3 In the September of 2001 there were only 15 trading days. Therefore, in that month, we exclude a firm from our sample if it did not meet the inclusion criteria for at least 12 trading days.

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## 7. ORGANIZATIONAL CITIZENSHIP BEHAVIOR- A STUDY OF TELECOM INDUSTRY

**UPASNA JOSHI SETHI**, Professor, University Institute of Applied Management & Sciences, Panjab University, Chandigarh.  
upasnajoshi.sethi@gmail.com.

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### ABSTRACT

*Organizational Citizenship behavior is a person's voluntary commitment within an organization which is not part of the contractual tasks. Various studies suggested that engaging in OCB can enrich the work lives of employees. The Current Paper aimed to study five dimensions of Organizational Citizenship Behavior of employees in Telecom industry. For the study a sample size of 500 employees who are working in Telecom sector was selected using Snowball Sampling Technique in the areas of Chandigarh, Panchkula and Mohali. The scale used for the purpose of measuring the responses of the employees for Organizational Citizenship Behavior is the one developed by Podsakoff, Mckenzie, Moorman and Fetter in 1990. The scale has five measures named as (1) Altruism (2) Sportsmanship (3) Conscientiousness (4) Courtesy (5) Civic virtue. The result showed the relationship of Organizational Citizenship Behavior With Demographic Variables In The Telecom Industry.*

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**KEYWORDS:** Organisational Citizeship Behaviour, Telecom Sector, Demographic.

### INTRODUCTION

Organizational Citizenship Behavior is thought to have an important impact on the effectiveness and efficiency of work teams and organizations, therefore contributing to the overall productivity of the organization. Organizational citizenship behavior is a relatively new concept in performance analysis, but it represents a very old human conduct of voluntary action and mutual aid with no request for pay or formal rewards in return. Organ (1988) originally coined the term organizational citizenship behavior (OCB) and defined it as individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system and that in the aggregate promotes the effective functioning of the organization'. Organ (1988) highlights five specific categories of discretionary behavior and explains how each helps to improve efficiency in the organization which is stated as follows:

- **Altruism:** Behavior which are directly and intentionally aimed at helping some specific person. (e.g., helping new colleague and freely giving time to others) is typically directed toward other individuals but contributes to group efficiency by

enhancing individuals' performance.

- **Conscientiousness:** Carrying out role behavior well beyond the required level. (e.g. efficient use of time and going beyond minimum expectations) enhances the efficiency of both an individual and the group.
- **Sportsmanship:** Behavior which are involved when a person accepts minor frustrations without complaint. (e.g. avoids complaining and wining) improves the amount of time spent on constructive endeavors in the organization.
- **Courtesy:** Taking action to prevent problems from occurring by respecting others needs. (e.g. advance notices, reminders, and communicating appropriate information) helps prevent problems and facilitates constructive use of time.
- **Civic virtue:** Behavior designed to increase one's participation in and support of the organization as whole. (e.g. serving on committees and voluntarily attending functions) promotes the interests of the organization.

Turnipseed & Rassuli (2005) define OCB as defending the organization when it is criticized or urging peers to invest in the organization; which means that OCB is 'going beyond the call of duty'. OCB refers to behavior that positively impact the organization or its members (Poncheri, 2006), and can also be defined as per Joirman et al, (2006) a behavior that exceeds the routine expectations. This behavior may be different for different people as every employee in an organization perceives job requirements differently i.e. for some employees, helping others (Altruism) may be a routine but some will count it as beyond the scope of job requisites. A person who engages in OCB might receive appreciation and recognition that includes positive emotion and a greater likelihood of repeating the OCB (Miles et al, 2002).

Organizational informal behaviors are not originated from orders but are beneficial for the organization. These behaviors are specified under various names and the most widespread one is the organizational citizenship behavior (OCB). OCB facilitates the renewal, environmental orientation, resource transfer and savings of the organization. It also improves the quality of service, increases the efficiency and the performance of the organization whereas it reduces the costs. An increase of willingness to participate in decision making, the tendency of collaboration, interdependence, responsibility and satisfaction from work has been observed among employees who display high level organizational citizenship behavior. Similarly, OCB increases the ability of attracting and using the employees of the organization by generating favorable feelings among employees towards their organizations. A decrease in intention of quitting, handing over and absenteeism of job has been observed in high level OCB displayed organizations. As the consumer satisfaction increases, this reduces the number of the complaints. Hence there is need to study OCB in Telecom Industry.

## **REVIEW OF LITERATURE**

Sharma (2011) hypothesized that there is a significant difference in the degree of OCB of employees in public industry and private industry organization. The results

showed that employees in public industry organization have greater degree of OCB in comparison to private industry organizations. In terms of organizational citizenship behavior; a significant difference is noticed between public industry and private industry organization. As expected, public industry employees have exhibited higher degree of OCB as compared to private industry employees.

Alizadeh (2012) described the antecedents of OCB from comprehensive perspective, which include role clarity, leadership, organizational commitment, organizational justice and individual traits. The impact of these antecedents is correlated with five organizational performance parameters namely reduced turnover, reduced absenteeism, employee satisfaction and loyalty, consumer satisfaction and consumer loyalty.

Ismail (2014) examined a significant positive impact of organizational justice dimensions (distributive, procedural, and interactional) on OCB. Organizational trust positively affects OCB. Organizational trust plays a mediating role in the relationship between the organizational justice and OCB.

Kolade (2014) examined the relationship between organizational citizenship behavior, hospital corporate image and performance. The findings revealed that hospitals can increase performance through organizational citizenship behavior and positive corporate image. It is also discovered that there is a negative covariance between organizational citizenship behavior and hospital corporate image despite their individual positive contribution to performance. Therefore, hospital management should develop an organizational climate (such as recognition, additional reward, promotion, etc.) that can promote organizational citizenship behavior and enhance a positive corporate image while preventing situations that will discourage staff from rendering extra positive discretionary work related services.

Nandan (2015) examined the mediating effect of psychological capital in the relationship between organizational justice and organizational citizenship behavior. Results show a positive relationship between three dimensions of organizational justice, namely distributive justice, procedural justice and interactional justice towards organizational citizenship behavior, a positive relationship between all these three dimension of organizational justice and psychological capital, and psychological capital towards organizational citizenship behavior.

AVCI (2016) investigated teachers' perceptions of organizational citizenship behaviors and evaluated them in terms of educational administration. Teachers had a high level of positive opinions with regard to organizational citizenship behaviors. The opinions of the respondents varied significantly according to gender, professional seniority, state of education and the working time at the school where they worked. High level of organizational citizenship behaviors in the school affected education activities in positive way, contributed in generating a healthy school climate and influenced students' success in positive way too.

**CURRENT STUDY:**On the basis of literature reviewed it is clear that most of the

studies are conducted in Western Countries and more on professional nurses in Hospital and school teachers and few studies have been conducted in Telecom Industry. In India fewer studies have been conducted in this area but not in Telecom Industry. To fill the gap in research, the present study is undertaken to study organizational citizenship behaviors of employees in Telecom industry.

### **OBJECTIVE:**

The objective is to study five dimensions of Organizational Citizenship Behavior of employees in Telecom industry.

### **METHODOLOGY:**

Sample and procedure: The participant population for study is comprised of different companies in Telecom industry in the Tricity of Chandigarh, Panchkula and Mohali. Questionnaires were distributed to 500 employees working in Telecom industry. Sample was collected using snowball sampling technique. 434 employees returned the questionnaire. Questionnaires were delivered in an envelope and also mailed according to respondents convenience demand to fill the questionnaire. Respondents were asked to return the sealed envelopes to the person who distributed them and mailed questionnaire response was directly received. The participation was voluntary.

The research design of the present study comprises of independent variable Organizational Citizenship behavior. Besides it psycho demographic variables such as age, educational level, work experience in the present organization, , gender and marital status are taken to check the relationship with organizations citizenship behaviors' of employees. Unit of observation is the individuals who respond to the survey.

Data Collection Tools: A standardized questionnaire is used for the data collection purpose.

In short, respondents completed the following information:

- Demographic Details
- Organizational Citizenship Behavior Questionnaire.

### **DATA ANALYSIS:**

The scale used for the purpose of measuring the responses of the employees for Organizational Citizenship Behavior is the one developed by Podsakoff, Mckenzie, Moorman and Fetter in 1990. The scale has five measures named as (1) Altruism (2) Sportsmanship (3) Conscientiousness (4) Courtesy (5) Civic virtue. The scale had 24 items. The representation of different components according to the statement number is given in Table 1.



**Table 1: Dimensions of Organizational Citizenship Behavior**

Sr.	Factors	Statement Numbers
1.	Altruism	1,2,3,4,5
2.	Courtesy	6,7,8,9,10
3.	Conscientiousness	11,12,13,14,15
4.	Civic virtue	16,17,18,19
5.	Sportsmanship	20*, 21*, 22*, 23*, 24*

Note: \* means negative items for which scores are reversed

The items are scored on a seven-point Likert scale according to the following response categories:

1 = Strongly disagree, 2 = Moderately disagree, 3 = Slightly disagree, 4 = Neither disagree nor agree, 5 = Slightly agree, 6 = Moderately agree, 7 = Strongly Agree

In the present research, the reliability of the organizational citizenship behavior scale is determined by using cronbach's coefficient alpha as shown in the table 2.

**Table 2: Reliability Coefficient in the Study**

	Organizational Citizenship Behavior
Number of Items	24
Cronbach Alpha( $\alpha$ )	.883

**Value of 0.70 and above testify strong reliability of the scale**

An inspection of Table 3 shows the mean and standard deviation for five dimensions (item wise) of Organizational citizenship behavior.

Among the perception of Telecom industry employees regarding five dimensions of Organizational Citizenship Behavior the mean score is found highest for three items of Altruism (mean value 4.83) I help others who have heavy workloads; Altruism (mean value 4.73) I willingly give of my time to help other employees who have work related problems; Altruism (mean value 4.61) I am always ready to lend a helping hand to those around me.

The lowest score is given to following two items of Altruism (mean value 3.98) I help orient new employees even though not required; Altruism (mean value 4.22) I help others who have been absent. Thus Altruism (item wise) has got the highest mean value.

**Table 3: Descriptive Statistics of the Organizational Citizenship Behavior Questionnaire (Mean Scores and Standard Deviation).**

No.	Items	Dimension	Mean	S t d . Deviation
OCB1	I willingly give of my time to help other employees who have work related problems.	Altruism	4.73	1.373
OCB2	I am always ready to lend a helping hand to those around me	Altruism	4.61	1.677
OCB3	I help others who have heavy workloads	Altruism	4.83	1.321
OCB4	I help others who have been absent	Altruism	4.22	1.493
OCB5	I help orient new employees even though not required	Altruism	3.98	1.807
OCB6	I try to avoid creating problems for co workers.	Courtesy	4.43	1.681
OCB7	I take steps to try to prevent problems with other employees.	Courtesy	4.32	1.767
OCB8	I don't abuse the right of others.	Courtesy	4.37	1.774
OCB9	I consider the impact of my actions on co workers	Courtesy	4.32	1.778
OCB10	I am mindful of how my behavior affect other people's job.	Courtesy	4.48	1.738
OCB11	I do not take extra breaks.	Conscientiousness	4.37	1.683
OCB12	I obey rules and regulations even when no one is watching.	Conscientiousness	4.27	1.860
OCB13	I give an honest day's work for an honest day's pay.	Conscientiousness	4.55	1.657
OCB14	I give advance notice when unable to come to work	Conscientiousness	4.31	1.815
OCB15	I always complete my work on time.	Conscientiousness	4.44	1.749
OCB16	I attend function that is not required but help the organisation's image.	Civic virtue	4.31	1.802
OBC17	I attend meeting that is not mandatory, but are considered important	Civic virtue	4.25	1.721

No.	Items	Dimension	Mean	Std. Deviation
OCB18	I keep myself informed about the changes in the organization.	Civic virtue	4.30	1.732
OCB19	I read and keep up with organization announcements, memos and so on.	Civic virtue	4.39	1.704
OCB20*	I consume a lot of time complaining about trivial matters.	Sportsmanship	4.29	1.609
OCB21*	I always find fault with that the organization is doing.	Sportsmanship	4.23	1.604
OCB22*	I tend to make "mountains out of molehills" (makes problems bigger than they are.)	Sportsmanship	4.45	1.489
OCB23*	I always focus on what is wrong with my situation rather than positive side of it.	Sportsmanship	4.30	1.677
OCB24*	I express resentment with any changes introduced by management	Sportsmanship	4.32	1.794

• Note: \* means negative items for which scores are reversed

Relationship of Organizational Citizenship Behavior With Demographic Variables In The Telecom Industry

### Demographic Variable-Age

Employees of different age categories differ significantly with their perception of organizational citizenship behavior and its dimensions. (H01)

The descriptive statistics and analysis of Variance (ANOVA) for the number of employees who responded regarding Organizational Citizenship Behavior and its five dimensions under different age group are depicted in table 4. Out of the 434 respondents, 104 are in the age group of less than 30 years, 288 are between 30-40 years and 42 are greater than 40 years of age. From the result of ANOVA, it is clear that there are statistically significant differences between the mean value of different age groups of employees for Organizational Citizenship Behavior, Altruism, Courtesy, Civic Virtue and Conscientiousness ( $p < 0.05$ ). But there is no significant difference in the Organizational Citizenship Behavior dimension Sportsmanship across the different age groups ( $p < 0.05$ ). From the above result it can be concluded that H01 is accepted. Altruism, Courtesy, Civic Virtue and Conscientiousness dimensions of organizational citizenship behavior are supported. But Sportsmanship dimension of organizational citizenship behavior is

not supported. As people mature they display OCB.

**Table 4**

Variables	Age	N	Mean	F-Test	Sig.
Organizational Behavior	<30 yrs	104	4.1530	16.338	.000
	30-40 yrs	288	4.3599		
	> 40 years	42	5.0820		
	Total	434	4.3769		
Altruism	<30 yrs	104	4.1904	10.103	.000
	30-40 yrs	288	4.5125		
	> 40 years	42	4.9650		
	Total	434	4.4769		
Courtesy	<30 yrs	104	4.2038	16.805	.000
	30-40 yrs	288	4.2979		
	> 40 years	42	5.4750		
	Total	434	4.3843		
Conscientiousness	<30 yrs	104	4.1288	16.559	.000
	30-40 yrs	288	4.3285		
	> 40 years	42	5.5050		
	Total	434	4.3894		
Civic Virtue	<30 yrs	104	4.0841	8.536	.000
	30-40 yrs	288	4.2821		
	> 40 years	42	5.1500		
	Total	434	4.3148		
Sportsmanship	<30 yrs	104	4.1577	1.556	.212
	30-40 yrs	288	4.3785		
	> 40 years	42	4.3150		
	Total	434	4.3194		

**Demographic Variable-Education**

Employees of different educational level categories differ significantly with their perception of organizational citizenship behavior and its dimensions. (H02)

**Table 5: Descriptive and Analysis of Variance (ANOVA) of Educational Level Categories for Organizational Citizenship Behavior and its Dimensions in the Telecom Industry**

The descriptive statistics of respondents under different educational categories regarding Organizational Citizenship Behavior and its five dimensions are depicted in Table 5. Out of 434 respondents, 120 are Graduate, 280 are Post Graduate and 34 are professional and under graduates. From the result of ANOVA, it is clear that there is statistically significant difference in the perception of employees about organizational citizenship behavior, Altruism, Courtesy, Conscientiousness, Civic Virtue and Sportsmanship ( $p < 0.05$ ). From the above result it can be conclude that hypothesis H02 is accepted. Altruism, Courtesy, Conscientiousness, Civic Virtue and Sportsmanship dimensions of

Graduates and Post Graduates.

**Table 5**

Variables	Educational Level Categories	N	Mean	F-Test	Sig.
Organizational Citizenship Behavior	Graduate	120	4.6053	26.457	.000
	Post graduate	280	4.1836		
	Others	34	5.2125		
	Total	434	4.3769		
Altruism	Graduate	120	4.7033	19.035	.000
	Post graduate	280	4.2943		
	Others	34	5.2250		
	Total	434	4.4769		
Courtesy	Graduate	120	4.7433	29.577	.000
	Post graduate	280	4.0893		
	Others	34	5.6188		
	Total	434	4.3843		
Conscientiousness	Graduate	120	4.7317	26.621	.000
	Post graduate	280	4.0979		
	Others	34	5.6563		
	Total	434	4.3894		
Civic Virtue	Graduate	120	4.7167	22.886	.000
	Post graduate	280	4.0143		
	Others	34	5.4375		
	Total	434	4.3148		
Sportsmanship	Graduate	120	4.1317	3.538	.030
	Post graduate	280	4.4221		
	Others	34	4.1250		
	Total	434	4.3194		

Demographic Variable- Work Experience in Present Organization (TelecomIndustry) Employees of different work experience in present organization differ significantly with their perception of organizational citizenship behavior and its dimensions. (H03)

**Table 6: Descriptive and Analysis of Variance (ANOVA) of Work Experience in Present Organization for Organizational Citizenship Behavior and its Dimensions in the TelecomIndustry.**

Employees of different work experience in the TelecomIndustry differ significantly with their perception of Organizational Citizenship Behavior and its five dimensions.

The descriptive statistics and analysis of variance (ANOVA) for the number of employees who responded to the Organizational Citizenship Behavior and its five dimensions under the different categories of work experience in the TelecomIndustry are depicted in the Table 6. Out of the 434 respondents, 28 have up to 0-2 years of work experience, 74 have

2-4 years work experience, 111 have 4-6 years work experience and 221 have above 6 years work experience in the Telecom Industry.

**Table 6**

Variables	Work Experience	N	Mean	F-Test	Sig.
Organizational Citizenship Behavior	0-2 yrs	28	4.4846	8.067	.000
	2-4 yrs	74	4.3769		
	4-6 yrs	111	4.0331		
	above 6 yrs	221	4.5360		
	Total	434	4.3769		
Altruism	0-2 yrs	28	4.6000	5.746	.001
	2-4 yrs	74	4.4333		
	4-6 yrs	111	4.1730		
	above 6 yrs	221	4.6281		
	Total	434	4.4769		
Courtesy	0-2 yrs	28	4.6214	4.313	.005
	2-4 yrs	74	4.4778		
	4-6 yrs	111	4.0090		
	above 6 yrs	221	4.5122		
	Total	434	4.3843		
Conscientiousness	0-2 yrs	28	4.5857	8.799	.000
	2-4 yrs	74	4.5722		
	4-6 yrs	111	3.8288		
	above 6 yrs	221	4.5864		
	Total	434	4.3894		
Civic Virtue	0-2 yrs	28	4.5446	4.001	.008
	2-4 yrs	74	4.4097		
	4-6 yrs	111	3.9167		
	above 6 yrs	221	4.4548		
	Total	434	4.3148		
Sportsmanship	0-2 yrs	28	4.0714	4.935	.002
	2-4 yrs	74	3.9917		
	4-6 yrs	111	4.2378		
	above 6 yrs	221	4.4986		
	Total	434	4.3194		

From Table 6 it is clear that there is significant difference in the perception of Organizational Citizenship Behavior, Altruism, Courtesy, Conscientiousness, Civic Virtue and Sportsmanship across the different work experience categories in the present organizations categories ( $p < 0.05$ ). From the above result it can be concluded that hypothesis H03 is accepted. Altruism, Courtesy, Conscientiousness, Civic Virtue and

Sportsmanship dimensions of organizational citizenship behavior are supported. As you spend more time in an organization you get attached to it. It also leads to organizational Commitment.

#### Demographic Variable- Marital Status

Employees of different marital status category differ significantly with their perception of organizational citizenship behavior and its dimensions. (H04)

**Table 7: Descriptive and Analysis of Variance (ANOVA) of Marital Status Categories for Organizational Citizenship Behavior and its Dimensions in the Telecom Industry**

Variables	Marital Status	N	Mean	T	Sig.
Organizational Citizenship Behavior	Married	373	4.3697	-.4.18	.677
	Unmarried	61	4.4229		
Altruism	Married	373	4.4692	-.411	.681
	Unmarried	61	4.5254		
Courtesy	Married	373	4.3598	-.982	.327
	Unmarried	61	4.5390		
Conscientiousness	Married	373	4.3775	-.453	.651
	Unmarried	61	4.4644		
Civic Virtue	Married	373	4.2929	-.801	.424
	Unmarried	61	4.4534		
Sportsmanship	Married	373	4.3491	1.414	.158
	Unmarried	61	4.1322		

The descriptive statistics for the number of employees responded to the Organizational Citizenship Behavior and its five dimensions of marital status category are depicted in Table 7. Out of the 434 respondents, 373 are married and 59 are unmarried.

From the independent t-test result it is clear that there is statistically no significant difference between the mean values of two marital status group of employees for Organizational Citizenship Behavior, Altruism, Courtesy, Conscientiousness, Civic Virtue and Sportsmanship ( $p < 0.05$ ). From the above result it can be concluded that hypothesis H04 is not accepted. Altruism, Courtesy, Conscientiousness, Civic Virtue and Sportsmanship dimensions of organizational citizenship behavior are not supported. Marital status doesn't affect OCB.

#### Demographic Variable-Gender

Employees of different gender categories differ significantly with their perception of organizational citizenship behavior and its dimensions. (H05)

**Table 8: Descriptive and Analysis of Variance (ANOVA) of Gender Categories for Organizational Citizenship Behavior and its Dimensions in the Telecom Industry**

Variables	Gender	N	Mean	T	Sig.
Organizational Citizenship Behavior	Male	353	4.3516	-1.228	.220
	Female	81	4.4904		
Altruism	Male	353	4.4844	.341	.734
	Female	81	4.4430		
Courtesy	Male	353	4.3354	-1.651	.099
	Female	81	4.6025		
Conscientiousness	Male	353	4.3977	.269	.788
	Female	81	4.3519		
Civic Virtue	Male	353	4.2790	-1.099	.272
	Female	81	4.4747		
Sportsmanship	Male	353	4.2612	-2.348	.019
	Female	81	4.5797		

The descriptive statistics for the number of employees who responded regarding Organizational Citizenship Behavior and its five dimensions under the gender category is depicted in Table 8. Out of 434 respondents, 353 are male and 81 are female employees. From the independent t-test result it is clear that there is statistically significant difference between the mean values of two gender group of employees for Sportsmanship ( $p < 0.05$ ). But there is no difference between the mean values of two gender group of employees for Organizational Citizenship Behavior, Altruism, Courtesy, Conscientiousness and Civic Virtue ( $p < 0.05$ ). From the above result it can be concluded that hypothesis H05 is not accepted. Sportsmanship dimension of organizational citizenship behavior are supported. But Altruism, Courtesy, Conscientiousness and Civic Virtue dimensions of organizational citizenship behavior are not supported. Anyone can display OCB irrespective of their gender. Females show more Sportsmanship dimension of organizational citizenship behavior.

## IMPLICATIONS OF THE STUDY

Organizations want and need employees who will do those things that aren't in any job description. And the evidence indicates that those organizations that have such employees outperform those that don't have. Though there are research studies that provide the domain of OCB and its effects on the organizational performance but they have varied viewpoints and are inadequate. OCB is influenced by many variables. The increase in the adverse feelings about the work done, emotional exhaustion and doubtfulness tends to reduce the OCB levels of the employees. On the contrary, the factors like having pleasant feelings about the workplace, support, equality, job satisfaction, loyalty to



the organization, organizational confidence, fairness in the organization, organizational identity, organizational substitution, perception of satisfactory wage, good feelings about the work, interest in the organization, the feeling of social responsibility and motivation, tends to increase the display levels of OCB. Organizations ought to be aware of these variables so that necessary measures can be taken to improve the OCB levels of employees.

The management must strive to retain and continue with the state of organizational citizenship, as it results in improved performance, which is advantageous and helpful to both the employees and the organization, resulting in swift achievement of objectives by the organization and hence a better work-life for the employees.

Although organizations typically select employees for their ability to reach requisite levels of task performance, research indicates that citizenship is important for organizational success. Citizenship becomes even more salient in a business context characterized by increased competition, reliance on teamwork, and the threat of downsizing. In such conditions, adaptability, willingness to exhibit extra effort, and initiative are magnified (Borman & Penner, 2001).

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## 8. MIGRATION FROM MEXICO TO THE U.S.; THE IMPACTS OF NAFTA ON MEXICO AND THE UNITED STATES AND WHAT TO DO GOING FORWARD.

**ASHLEY A. ELSASSER**, University of Denver.

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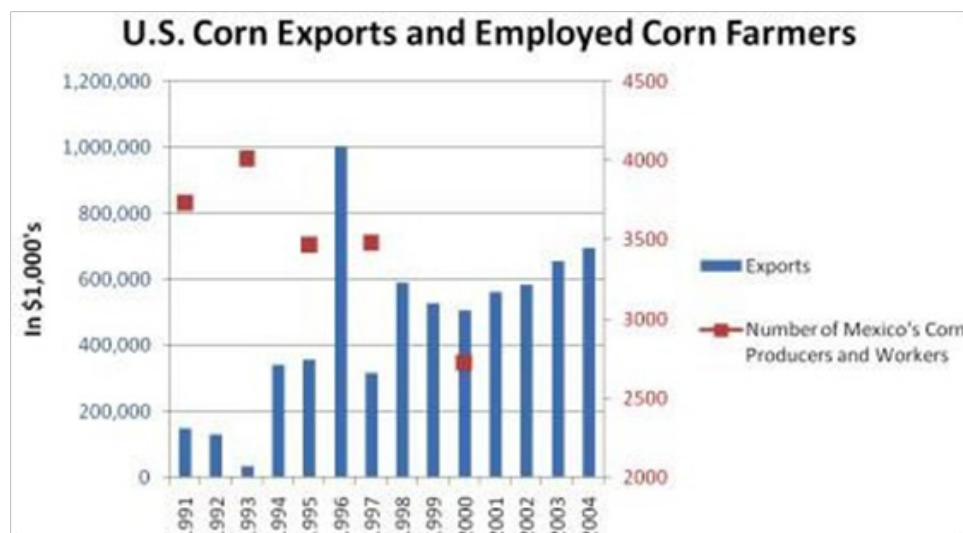
### ABSTRACT

*Research indicates four main causes for migration from Mexico to the United States: Incredibly high crime rates, unemployment, poverty rates, and natural disasters. The first two are especially important in regards to trade between the two border sharing countries. Since agreeing to virtually total free trade, the United States has been able to take advantage of Mexico in such a way that has created further deterioration of the state. If the government of Mexico cannot resurrect the thousands of personal business that were effected do to NAFTA, the U.S. cannot expect for migration from Mexico to deteriorate or halt. By displacing Mexico's small business owner's, Mexico has effectively made their citizens weak to the inevitable increase in poverty, and the Cartels that have bought out swaths of land and human lives. In this paper, I reveal the direct correlations between agreements within the NAFTA and the millions of displaced agricultural workers in Mexico that caused an increase of immigration from Mexico to the United States. On January 1, 1994, The North American Free Trade Agreement (NAFTA), which includes Canada, Mexico, and the United States, was officially formed. By 2008, virtual free trade in almost all goods and services was established amongst all three countries, with the exception of a limited number of agricultural products traded specifically with Canada. The trade agreements of NAFTA were coupled with a surge of Mexican migrants to the U.S. The question under investigation is, why did so many Mexicans move to the United States after the NAFTA was signed? Contrary to the theoretical benefits of free trade, many citizens of the United States and Mexico have developed deep contention towards the agreement between their countries. In the United States, those whose' lives revolve around the manufacturing industry argue that increased trade with low-wage countries, such as Mexico, threatens their employment due to industrial re-location. Mexican's argue that the U.S. is dumping agricultural products and manufacturing industries that destroy local business and decrease the standard of living. Morethan 35 million Americans have Mexican roots, and Mexico is the United States' third-largest trading partner, next to China. Despite the positive correlation that the economic gravity theory presents, that both countries are at an advantage to trade with one-another, I'm afraid it's information is flawed. As the United States and Mexico attempt to find a way to grow their economies and decrease migration, from Mexico to the U.S., it is imperative for them to understand that free-trade, under the current NAFTA, has actually increased immigration from Mexico to the U.S. because of minimal protectionisms for Mexico's workers- especially in agriculture. This paper is written with the intent to inform people of the relationship between trade and immigration, specifically, between the U.S. and Mexico.*

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## INTRODUCTION

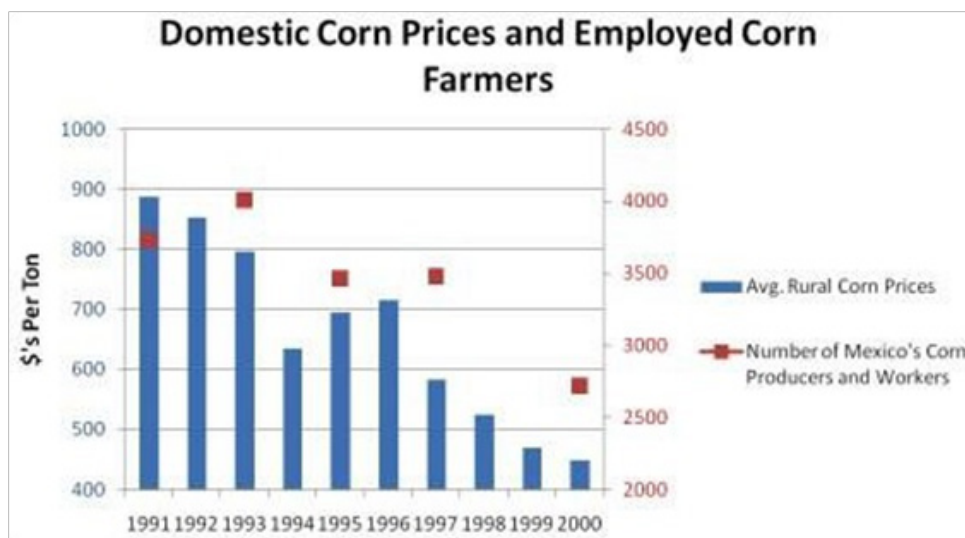
For the United States and Mexico, the North American Free Trade Agreement was a tool to improve bilateral trade and decrease migration from Mexico to the U.S.. Mexico's economy was predicted to grow enough to create more competitive jobs, and most importantly, pull Mexico out of the financial crisis of the 1980s. However, migration from Mexico to the U.S. more than doubled from 1990-2000 comparatively to any other 10-year increment between 1980 to 2017. Contrary to the intent to increase economic growth by eliminating trade barriers, U.S. citizens lost over 3 million jobs due to offshoring (the practice of basing some of a company's processes or services overseas, so as to take advantage of lower costs) and, Mexicans experienced a dramatic decline in the standards of living and job displacement. There are two main reasons why this paradox occurs. First, in addition to a mass reduction of import tariffs, the NAFTA allowed the U.S. to grant large subsidies to American farmers. As a result, American farmers were able to export more agricultural goods at lower costs thus, undermining the Mexican farmers. Daniela Grava writes about many push and pull factors for Mexican immigrants coming into the United States. In her article, *Why do so many Mexican immigrants come to the United States*, she specifically discusses a principle push factor being that of the millions of displaced farmers in Mexico. She quotes Elvira Arellano, a young woman seeking asylum in Chicago, "NAFTA displaced more than five million agricultural workers from the land that they had lived for years, according to Walter Coleman, a pastor of the church where Arellano was given sanctuary for a year in the 1980s. In Mexico, Arellano's father lost his ability to grow corn on his land. When the family land was passed down to Arellano, she did not have the resources to maintain it and ended up losing her job because of the devaluation of the peso, which as she says, was caused by US banks." The graph below depicts the direct correlation of U.S. corn exports flooding Mexican markets and the employment levels of corn farmers in Mexico. In addition, it is evident that prior to the North American Free Trade Agreement the number of Mexican corn producers exceeded 3,500.



Graph 1.(Generated from data compiled by the USDA's U.S. Trade Exports and the Institute of Statistics and Geography. Received from prospectjournal.com)

In addition, Graph 2. represents the increased snowball affect U.S. federal corn subsidies had on Mexican farmer's post NAFTA. As corn producers in Mexico declined so did the average price for corn sold in Mexico. According to the graph, the Mexican corn industry suffered a loss of nearly six hundred corn producers.

Graph 2.



(Generated from data compiled by Mexico's National Institute of Statistics and Geography. Received from prospectjournal.com)

In addition to U.S. corn subsidies, the bilateral negotiations between Mexico and the U.S. allowed large American firms, such as Walmart, to enter the Mexican market.

Consequently, eliminating approximately 28,000 small Mexican business because they could not compete. In the 1980s Mexico abandoned its Import Substitution Industrialization (ISI) policies and opened its economy to international trade and capital flows, especially with the United States. This change in trade policy was intended to increase economic growth by improving the competitiveness of Mexican exports and attracting foreign investments.

Mexico succeeded in attracting foreign investment but, only at the surmise of local businesses and standard of living for Mexican citizens. In this paper, economic data and immigration statistics are used to explain the effects of the NAFTA on economic activity, the distribution of wages, and migration patterns between the U.S. and Mexico. The first section is a brief history of the relationship between the U.S. and Mexico since before the North American Free Trade Agreement. The second section uses economic gravity data to reveal data that shows the extent to which U.S. agricultural subsidies affected Mexican industries causing Mexicans to migrate across the border. Thus, this paper explores the disproportionate effects of free trade on Mexico and the U.S. and how these proportions encourage migration to geographical locations with greater

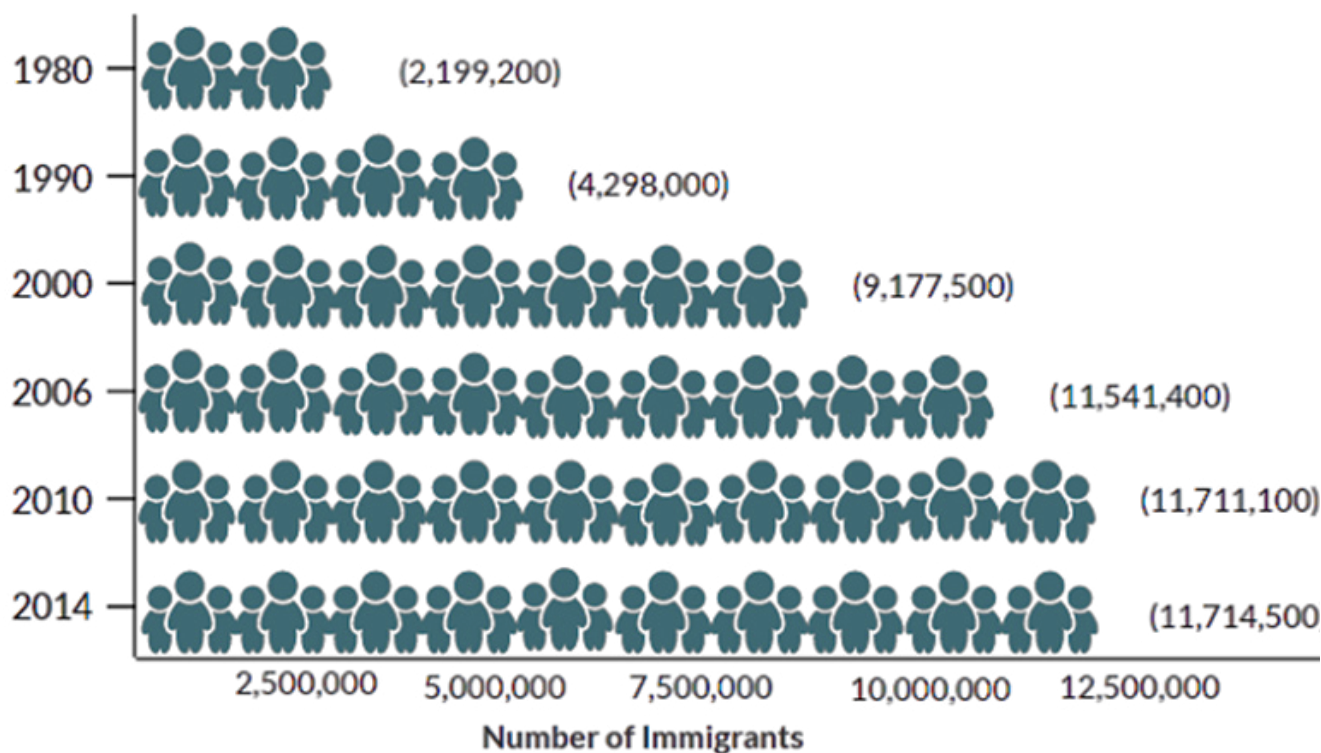
and more stable employment opportunities. In the conclusion, I use data to illuminate readers with the options both the U.S. and Mexico have to restore employment in Mexico and reverse migration. In addition, I share information pertaining to current NAFTA discussions in the U.S.

## **BACKGROUND**

Considering the proximity of the U.S. and Mexico, the U.S. has had a great effect on the Mexican economy since the successful establishment of both countries. In response to a labor shortage during WWII, president Roosevelt wrote an executive order, termed the Bracero Program, that lasted from 1942 to 1965. This program allowed millions of Mexican men, under 6-month visas, to come to the United States to work on farms. In 1965, the United States unilaterally ended the Bracero program. As a result, the Mexican government established the maquiladora program to attract foreign direct investment. This maquiladora (or foreign-owned assembly plant) industry is the largest industry on the Mexican side of the Mexico-US border (Canas, Coronado, Gilmer, & Saucedo, 2011; Martin P., *Immigration, Agriculture, and the Border*, 2002). Maquiladoras are normally owned by foreigners that import raw material and components duty-free to Mexico, assemble them into finished goods and send them back to the United States (Martin P., 2002). Since most of the maquiladoras developed are along the Mexico U.S. border, many migrants see the move to work in them as a step to further migrate to the U.S. (Cornelius & Martin, 1993, p. 486). Other internal migrants that come from the agricultural south do not end up in maquiladoras but in the Pacific Northwest of Mexico, where they work in export-oriented agriculture companies. Many of these migrants also come with the hope to eventually migrate north to the U.S. In 2002, Mexico was the country of origin of the largest number of legal immigrant admissions to the U.S. with 219,380 admissions, representing about 20.6 percent of the total number of admissions. Trade negotiations and immigration policy were formally joined together by the Immigration Reform and Control Act (IRCA) of 1986. The bill eventually enabled more than 4 million people living in the U.S. without immigration documents to gain permanent residence. Underscoring the broad bipartisan consensus supporting it, the bill was signed into law by Ronald Reagan. The IRCA set up a Commission for the Study of International Migration and Cooperative Economic Development to study the causes of immigration to the United States. The commission held hearings after the U.S. and Canada signed a bilateral free trade agreement, and made a report to President George H.W. Bush and Congress in 1990. It found that the main motivation for coming to the U.S. was poverty. To slow or halt the flow of migrants, it recommended that "U.S. economic policy should promote a system of open trade ... the development of a U.S.-Mexico free trade area and its incorporation with Canada." But, it warned, "It takes many years—even generations—for sustained growth to achieve the desired effect." It was these negotiations that led

the NAFTA. As Congress debated the treaty, then-Mexican President Carlos Salinas de Gortari toured the United States, telling unhappy citizens that passing NAFTA would reduce immigration it by providing employment for Mexicans in Mexico- he made the same argument in Mexico. He claimed that NAFTA would set Mexico on a course to become a first-world nation. “We did become part of the first world,” says Juan Manuel Sandoval of Mexico’s National Institute of Anthropology and History. “The back yard.” However, NAFTA did not lead to rising incomes and employment in Mexico, and did not decrease the flow of migrants. Instead, it became a source of pressure on Mexicans to migrate. (Bacon, David, 2014 Globalization and NAFTA caused migration from Mexico) Figure 1. Illustrates the increase of Mexican migrants to the U.S.

**Figure 1. Mexican Immigrant Population in the United States, 1980-2014**



(Source: Data from U.S. Census Bureau 2006, 2010, and 2014 American Community Surveys (ACS) and Campbell J. Gibson and Kay Jung, “Historical Census Statistics on the Foreign-born Population of the United States: 1850-2000” (Working Paper no. 81, U.S. Census Bureau, Washington, DC, February 2006) From 1982 through the NAFTA era, successive economic reforms produced migrants. The displacement had already grown so large by 1986 that the commission established by IRCA was charged with recommending measures to halt or slow it. Its report urged that “migrant-sending countries should encourage technological modernization by strengthening and assuring

intellectual property protection and by removing existing impediments to investment” and recommended that “the United States should condition bilateral aid to sending countries on their taking the necessary steps toward structural adjustment.” The IRCA commission report acknowledged the potential for harm, noting (in the mildest, most ineffectual language possible) that “efforts should be made to ease transitional costs in human suffering.” As soon as NAFTA took effect, U.S. speculators began selling off Mexican government bonds. According to Jeff Faux, founding director the Economic Policy Institute, a Washington, DC-based progressive think tank, “NAFTA had created a speculative bubble for Mexican assets that then collapsed when the speculators cashed in.” In NAFTA’s first year, 1994, one million Mexicans lost their jobs when the peso was devalued. To avert a flood of capital to the north, then-U.S. Treasury Secretary Robert Rubin engineered a \$20 billion loan to Mexico, which was paid to bondholders, mostly U.S. banks. In return, U.S. and British banks gained control of the country’s financial system. Mexico had to pledge its oil revenue to pay off foreign debt, making the country’s primary source of income unavailable for the needs of its people. As the Mexican economy, especially the border maquiladora industry, became increasingly tied to the U.S. market, tens of thousands of Mexican workers lost jobs when the market shrank during U.S. recessions in 2001 and 2008. “It is the financial crashes and the economic disasters that drive people to work for dollars in the U.S., to replace life savings, or just to earn enough to keep their family at home together,” says Harvard historian John Womack.

## **ECONOMIC GRAVITY THEORY**

The Gravity Model of Trade is an important model to use in international economics. It states that when two countries are close and/or share similar GDPs it is most beneficial for them to trade because extraneous costs are cut. Extraneous costs include, transportation, communication, and navigating international borders/barriers. Thus, based on the distance within two countries as well as their respective economic dimensions, the gravity theory can make predications of bilateral trade flow. The gravity equations employed by Lorenzo

Caliendo and Fernando Parro in their article, *Estimates of the Trade and Welfare Effects of NAFTA*, are used to identify NAFTA’s tariff impacts on the welfare of the U.S. and Mexico. By using multiple gravity equations, that account for various factors, Caliendo and Parro were able to construct tables to illustrate the effects of tariff reductions on the welfare of all three NAFTA countries. Table 2 presents the welfare effects from NAFTA’s tariff reductions while fixing the tariff to and from the rest of the world to the year 1993.



**Table 2. Welfare effects from NAFTA's tariff reductions Welfare**  
**Country Total Terms of trade Volume of Trade Real wages**

Mexico	1.31%	-0.41%	1.72%	1.72%
Canada	-0.06%	-0.11%	0.04%	0.32%
U.S.	0.08%	0.04%	0.04%	0.11%

Table 3. Shows the export shares by sector before and after NAFTA's tariff reductions. The effects of the U.S. agricultural subsidies on Mexican farmers can be seen in table 6 as well as other major export industries in Mexico that were affected by NAFTA.

Sector	Mexico		Canada		United States	
	Before	After	Before	After	Before	After
Agriculture	4.72%	3.03%	4.99%	5.04%	6.91%	6.35%
Mining	15.53%	7.85%	8.99%	8.96%	1.72%	1.52%
<b>Manufacturing</b>						
Food	2.33%	1.48%	4.82%	4.68%	5.09%	4.73%
Textile	4.42%	6.92%	1.05%	1.49%	2.68%	3.49%
Wood	0.59%	0.52%	8.12%	8.05%	2.02%	1.98%
Paper	0.62%	0.51%	8.34%	8.44%	4.99%	4.89%
Petroleum	1.62%	5.28%	0.59%	0.78%	4.30%	5.71%
Chemicals	4.40%	2.53%	5.58%	5.40%	10.00%	9.25%
Plastic	0.80%	0.48%	2.06%	2.06%	2.28%	2.43%
Minerals	1.32%	0.84%	0.81%	0.78%	0.94%	0.92%
Basic metals	3.24%	2.00%	10.29%	10.19%	3.05%	3.11%
Metal products	1.22%	1.03%	1.47%	1.53%	2.23%	2.59%
Machinery n.e.c.	4.30%	2.53%	4.69%	4.49%	10.37%	9.70%
Office	3.34%	5.07%	2.44%	2.54%	7.70%	7.29%
Electrical	20.79%	34.07%	2.50%	2.35%	6.07%	7.97%
Communication	8.57%	7.08%	3/11%	3.02%	7.19%	6.81%
Medical	2.48%	3.28%	0.98%	1.03%	5.16%	4.79%
Auto	16.43%	13.05%	24.42%	24.07%	8.20%	8.09%
Other Transport	0.28%	0.26%	3,21%	3.58%	7.32%	6.65%
Other	3.02%	2.20%	1.55%	1.52%	1.77%	1.74%
Normalized Herfindah	0.092	0.138	0.083	0.138	0.083	0.081%

## **AGRICULTURE**

Contrary to prediction, NAFTA did not lead to rising incomes and employment in Mexico, and did not decrease the flow of migrants. Instead, the exact opposite happened. The agreement forced corn, and other crops, grown by Mexican farmers without subsidies to compete in Mexico's own market with corn, and other crops, from huge U.S. producers, who had been subsidized by the U.S. Agricultural exports to Mexico more than doubled during the NAFTA, from \$4.6 to \$9.8 billion annually. Corn imports rose from 2,014,000 to 10,330,000 tons from 1992 to 2008. Mexico imported 30,000

tons of pork in 1995, the year NAFTA took effect. By 2010, pork imports, almost all from the U.S., had grown over 25 times, to 811,000 tons. As a result, pork prices received by Mexican producers dropped 56%. (Bacon, David Globalization and NAFTA Caused Migration From Mexico, 2014) The example David Bacon writes about is just one of many examples of how detrimental U.S. agriculture subsidies are for Mexican farmers. The reality of NAFTA is that there are both negatives and positives to the agreement- it just depends on who you are on the economic spectrum. In the case of agriculture in Mexico, the U.S. was clearly participating in persistent dumping driving local producers out of business.

According to the H-O theorem, the United States is a capital abundant country. Thus, as a whole, the United States experiences few effects caused by changes in the manufacturing industry. Furthermore, one of the explanations for Leontieff's paradox explains that, although the United States can be considered capital abundant it can still export more labor intensive goods because the U.S. can afford to invest in more efficient technology. Likewise, according to the H-O theorem, Mexico should have benefited from foreign manufacturing investments because Mexico is considered to be a labor abundant country. However, as economists have proven capital and labor are not adequate factors of production to base comparative advantage analysis. Mexico was destined to receive the short end of the stick when agreeing to essentially drop all trade barriers because Mexico, being a labor abundant country, is more vulnerable to foreign changes than a capital abundant country. Additionally, cheap labor does not constitute effective production and high equilibrium rates. Instead, it is the efficiency of technology. As a result, Mexico is still at a great disadvantage with the United States because the U.S. had better technology. Thus, when the United States moved manufacturing plants to Mexico, local producers couldn't keep up because their technology of production was not as advanced since they lacked the capital to invest in its growth. David Bacon continues to explain the causes and effects of NAFTA by explaining that under this trade agreement price supports were prohibited, without which hundreds of thousands of small farmers found it impossible to sell corn or other farm products for what it cost to produce them. Mexico couldn't protect its own agriculture from the fluctuations of the world market. A global coffee glut in the 1990s plunged prices below the cost of production. A less entrapped government might have bought the crops of Veracruz farmers to keep them afloat, or provided subsidies for other crops, but, once free-market structures were in place prohibiting government intervention to help them, the farmers suffered. Campesinos from Veracruz, as well as Oaxaca and other major corn-producing states, joined workers heading north. There, they became an important part of the workforce in U.S. slaughterhouses and other industries. U.S. companies were allowed to own land and factories, eventually anywhere in Mexico. U.S.-based Union Pacific, in partnership with the Larrea family, one of Mexico's wealthiest, became the owner of the country's main north-south rail line and immediately discontinued virtually all passenger

service. Mexican rail employment dropped from more than 90,000 to 36,000. According to Garrett Brown, head of the Maquiladora Health and Safety Network, the average Mexican wage was 23% of the U.S. manufacturing wage in 1975. By 2002, it was less than an eighth. Brown says that after NAFTA, real Mexican wages dropped by 22%, while worker productivity increased 45%. These facts that David writes about in his online article are the main reasons why migration from Mexico to the United States increased under NAFTA.

## **MANUFACTURING INDUSTRIES**

Michael Melvin and Steve Hudson in *International Economics Eighth Edition* use PPP, purchasing power parity, exchange rates to describe the decline in living standards in Mexico compared to those in the United States. They explain that Mexico's economy is about the same size as Canada's but more than three times its population and, even though Mexico's wage rate is about 10% comparable to U.S. and Canadian wages, the U.S. still imports 50% more goods from Canada than it does Mexico. According to Melvin and Hudson, NAFTA has had little effect on the United States economy, although it has upset the manufacturing industry. Similar to the case with Mexico, the manufacturing sector in the U.S. is comprised of mostly uneducated and unskilled workers thus, making them the most vulnerable to economic shifts as such. Inadvertently, the moves of large corporations from to Mexico coupled with U.S. agricultural subsidies, have destroyed local competition in Mexico. Major cooperation's responsible are as follows: Walmart, Apple, CitiGroup, General Electric, JP Morgan Chase & Co., General Motors, Fiat Chrysler.

The World Bank, in a 2005 study made for the Mexican government, found that the extreme rural poverty rate of around 37% in 1992-4, prior to NAFTA, jumped to about 52% in 1996-8, after NAFTA took effect. This could be explained, the report said, "mainly by the 1995 economic crisis, the sluggish performance of agriculture, stagnant rural wages, and falling real agricultural prices." By 2010, 53 million Mexicans were living in poverty, according to the Monterrey Institute of Technology—half the country's population. The growth of poverty, in turn, fueled migration. In 1990, 4.5 million Mexican-born people lived in the U.S. A decade later, that population more than doubled to 9.75 million, and in 2008 it peaked at 12.67 million. Approximately 9.4% of all Mexicans now live in the U.S., based on numbers from Pew Hispanic. About 5.7 million were able to get some kind of visa; another 7 million illegally made the transition.

Since China became a member of the World Trade Organization in 2001, the United States has served as their dumping grounds. Today, most things purchased in America are either made in China or, parts of it are. As a result, prices of commodities such as clothing, furniture, and even some technology have dropped dramatically- clothing and furniture, for example, match prices of the 1980s. Although this has created more purchasing power for American's, it has resulted in a decrease of manufacturing jobs and

increase in skill based employment. Many economists argue that China is participating in persistent dumping or even predatory dumping. Dumping is the act of exporting a product to another country at such a low cost that it drives away domestic producers of the same product. The difference between predatory and persistent dumping is exactly how it sounds, persistent dumping means that below domestic priced products are imported on a consistent basis. Predatory dumping is when a foreign country is intentionally exporting products below domestic market prices to demolish domestic competition. According to David Autor and his colleagues, at a local level, "employment falls at least one-for-one with jobs lost to trade." These jobs that are lost to trade are unskilled manufacturing jobs. As these types of jobs decrease in the United States, skill based jobs increase. As a result, the standard of living has increased, and continues to increase for everyone as technology improves and skill based employment increases. It is a fact that dumping negatively effects domestic producers, sometimes devastates them, as in the case of Mexico. However, this is mostly the case for vulnerable employment such as manufacturing plants. Skill based jobs are much harder, if at all, to saturate by foreign imports. As a country desires to grow and stabilize its economy it must encourage the growth of skill based employment.

## **CONCLUSION**

In conclusion, as long as NAFTA continues to allow the United States to take advantage of Mexico, as a labor abundant country, the standard of living will show little growth and the desire for migration will remain. The answer to this dilemma is not to build a wall, , or crack down on immigration reform. Instead, it is to renegotiate trade agreements between Mexico and the United States. For example, proponents of the infant-industry trade would suggest Mexico to negotiate protections on their agriculture industry until they are more capital abundant and less vulnerable to foreign economic changes. It is clear that from the date collected, immigration from Mexico to the U.S. is purely in an attempt to solve economic inequalities. According to Worldstopexports.com, Corn is not among the United States' top 10 exports: The following export product groups represent the highest dollar value in American global shipments during 2016. Also shown is the percentage share each export category represents in terms of overall exports from the United States.

1. Machinery including computers: US\$190.5 billion (13.1% of total exports)
2. Electrical machinery, equipment: \$167.2 billion (11.5%)
3. Aircraft, spacecraft: \$134.6 billion (9.3%)
4. Vehicles : \$124.3 billion (8.5%)

5. Mineral fuels including oil: \$94.7 billion (6.5%)
6. Optical, technical, medical apparatus: \$82.0 billion (5.6%)
7. Plastics, plastic articles: \$58.4 billion (4.0%)
8. Gems, precious metals: \$57.8 billion (4.0%)
9. Pharmaceuticals: \$47.1 billion (3.2%)
10. Organic chemicals: \$33.9 billion (2.3%)

So where is corn in respect to these exports? \$10.3 billion dollars' worth which constitute for 35.9% of total global corn exports. In contrast, Mexico, exportes \$477.6 million dollars' work making up 1.7% of the world's total corn exporters. In total, there are 15 countries that export corn. Argentina is the second leading corn export country but, exports less than the United States at 14.5%. Vegetables account for Mexico's 9th top exported good bringing in \$6.7

billion dollars and constitutes 1.8% of total exports. With these numbers alone we can summarize that the United States and Mexico have room for negotiation. Although, currently, Mexico's top three exports are manufacturing goods, Mexico has the land, labor, resources, and citizen consensus to switch from being manufacturing heavy too agricultural heavy. As eluded to above, this will resurrect the thousands of corn producers and bring back millions of agricultural jobs that were once sustainable for Mexican families. In terms of the U.S., the United States can afford this exchange of exporting power considering corn exports make up such a small amount of overall GDP. Currently, as Donald J. Trump as the president of the U.S. there has been much deliberation over NAFTA and the specific effects it has had on farmers in both the U.S. and Mexico.

Another solution for the U.S. and Mexico is hemp production. For centuries hemp has been hailed as a plant good— for making fabric, rope, sails, paper and canvas. Hemp plants require less chemical spraying than cotton, soy, corn and wheat. It can help reduce soil degradation by faring better with less water and in drier climates. Paper made from hemp could help reduce deforestation, and requires fewer chemicals for processing than wood pulp. Additionally, hemp fabric has antibacterial qualities that can help it fight staph infections in hospitals. The U.S. has approximately 1.9 billion acres of unused farm land and 13.7 million acres that harvest corn. Although president Barack Obama signed the Farm Bill, also known as the agricultural act of 2014, which allowed for state departments of agriculture and higher learning institutions to grow

hemp it is still federally illegal to grow in the U.S., due to the reputation of the marijuana plant. According to Forbes magazine, it is a win-win scenario for the economy and the environment to implement industrial hemp in the U.S.. So, the first step is legalizing the production of hemp- After all, the first draft of the Declaration of Independence was written on hemp paper. The second, is to utilize already existing farm land for its production. Thus, giving Mexican farmer's back their specialty, corn production.

Current Online articles discussing NAFTA and its effect on corn exports:

Scientific America It's Time to Rethink America's Corn System

CNBC Trump budget proposal has may US farmers reeling

The Heritage Foundation Taxpayers, Consumers, and Farmers, Too

Huffington Post Mexican Farmers Affected By Agricultural Subsidies From NAFTA, Other

**International Agreements**

CNN Money Mexican farmer's daughter: NAFTA destroyed us.

Action Institute Corn Subsidies at Root of U.S.-Mexico Immigration Problems

The New York Times U.S. Corn Subsidies Said To Damage Mexico

Forbes Food Fight: Mexico Targets American Corn in Trump 'Trade War'.

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## 9. CO-INTEGRATION BETWEEN SAVINGS AND INVESTMENT IN INDIA AND THE US: AN ECONOMETRIC ANALYSIS OF FELDSTEIN-HORIOKA HYPOTHESES

**NARENDER THAKUR**, *Assistant Professor, Department of Economics, BR Ambedkar College, University of Delhi. Email: narender224jnu@gmail.com.*

**VISHNUDAS GUPTA**, *Independent Researcher*

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### ABSTRACT

*This paper econometrically tests the Feldstein-Horioka hypotheses. It uses the domestic savings and domestic investments variables in India and the US in the period 1960-2014. The Feldstein-Horioka hypotheses states that the cointegration relationship between domestic savings and domestic investments weakens in a country with higher foreign capital mobility and vice-versa. We find that the co-integration relation between the two time-series variables is weakened in the case of the US economy as compared to the Indian economy. These results have policy implications for India as it is opening itself up more to inward foreign investment.*

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**KEYWORDS:** *Feldstein-Horioka Hypotheses, Savings, Investment, Capital Mobility, India and US*

*JEL Classification: E21, E22, F21*

### INTRODUCTION

With increased integration of the global economy over the past quarter century and the liberalization of the emerging markets over roughly the same time period, questions arise on the role domestic savings play in driving domestic investment in light of increased access to global markets.

The Feldstein-Horioka hypothesis states that over a period of time, the relationship between domestic investment and domestic savings weakens. In other words, in a perfectly open economy, the relationship between domestic-saving and domestic investment weakens and it tends to zero and in a perfectly closed economy, this

relationship tends towards unity. The relationship is defined in terms of co-integration between the two variables, viz., domestic savings and domestic investment (Coakley, Kulasi and Smith, 1996).

We test this hypothesis that is the co-integration between the domestic savings and investment through a time series analysis of two countries, the United States of America (USA/US) and India. It is a common assumption that the Indian economy is a relatively less open economy viz-a-viz the US economy. The paper shows the relative importance of foreign capital in a domestic economy, given the increasingly open nature of economies globally.

We place the paper in the context of whether large inflows of foreign capital are required for economic growth in a country or should steps be taken to encourage higher domestic savings and encourage firms to be more reliant on domestic capital.

This paper is divided into four sections. The first section briefly surveys the literature, with the second section includes data, econometric method, and empirical results. The third section is on the long-run relationship between savings and investments in India and US, and lastly section four concludes. We also list the unit root results in the appendix.

## **REVIEW OF LITERATURE**

zBai and Zhang (2010) in their paper solve the FH puzzle by introducing two types of financial frictions - limited enforcement and limited spanning. The first one refers to - contracts being enforced by the threat of default penalties. The second one happens when the only asset available is non-contingent bonds. They find that the combination of limited enforcement friction by having low default penalties (under which capital flows are much lower than those in the data), and limited spanning friction which has to (exogenously) restrict capital flows to the observed level endogenously tends to restrict capital flows and solves the Feldstein-Horioka puzzle.

Khundrakpam and Ranjan (2010) in their paper focus on the FH puzzle with respect to India by analysing the relationship between domestic savings and domestic investment in both the pre and post reform period. They find that in the long run savings rate tends to influence the investment rates without any feedback. However they also observe that the relationship between savings and investment (though statistically significant) appears weaker in the post reform period.

Coakley, Kulasi, and Smith (1996) suggested an alternate explanation to the strong cross section findings in FH (1980). They showed through a theoretical model with econometric evidence that related the saving-investment behaviour to the current account (via a solvency constraint and not by endogenous government policy). In their empirical model they attempted this by an error correction mechanism (proxying a market-determined risk premium on borrowing). The results and their explanation of the same in the paper solves the puzzle of a continuing high association between saving

Adedeji& Thornton (2007) however show us that there are differences between the saving-retention ratios between economies despite the fact that savings and investment are cointegrated .Ma & Li (2016) in their investigation of the FH puzzle found that savings-retentions coefficients tends to vary over time but they tend to generally be higher in developed countries than developing countries.

## DATA, ECONOMETRIC METHODS AND EMPIRICAL RESULTS

The data for the study was taken from the World Development Indicators of the World Bank. The time period of the study is 1960 to 2014. For both India and theUSA we report the Gross Capital Formation & Gross Domestic Savings. All the variables have been deflated by their respective Consumer Price Index (CPI) [CPI, 2010=100]. We initially run the Augmented Dicky Fuller Tests (ADF) to check for unit roots of the time series variables; and with all the variables possessing unit root we test the hypothesis for the two respective countries.

To investigate the long run relationship (if any exist) between gross capital formation(or alternatively gross investment) and gross domestic savings we first run a Dynamic Ordinary Least Squares (OLS) model for both the Countries and then run the Engle Granger co-integration test to check whether the series are co-integrated or not. The results for both India and the USA are given in Tables 1, 2 & 3.

**Table 1: India**

Variable	Coefficient	Std. Error	t-Statistic	P value
Gross Domestic Savings	1.082986	0.031973	33.87196	0.0000
Constant	-0.390597	0.179869	-2.171558	0.0346

R-squared - 0.982940

**Table 2: USA**

Variable	Coefficient	Std. Error	t-Statistic	P value
Gross Domestic Savings	1.286962	0.050947	25.26062	0.0000
Constant	-2.077303	0.384482	-5.402863	0.0000

R-squared - 0.976183

**Table 3: Engle Granger Co-integration Test**

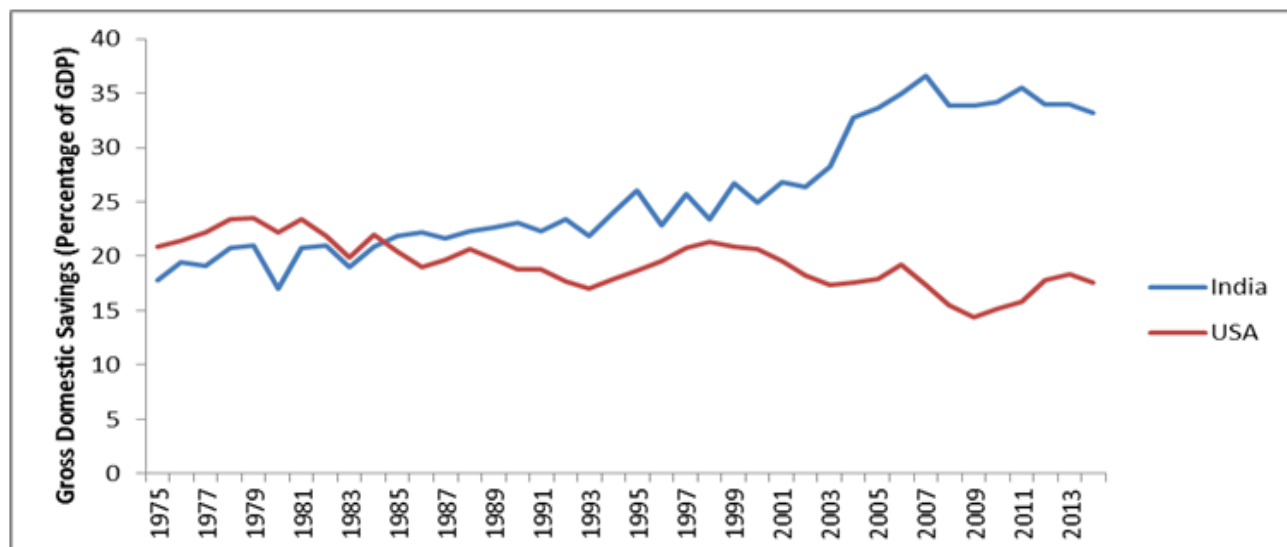
Country	Engle Granger tau-statistic	Prob.*
India	-3.732792	0.0259
USA	-2.111048	0.4762

\*MacKinnon (1996) p-values.

We can observe in Table 3 that for India the variables are co integrated whereas for the US (Table 4) they appear to not be co integrated. Two possible explanations can be offered for this.

The first is that savings in India is comparably more than the USA, thereby allowing firms a larger share of domestic funds vis-à-vis the USA. The gross domestic savings as a percentage of GDP for both the countries is given in Figure 1.

**Figure 1: Gross Domestic Savings (Percentage of GDP)**



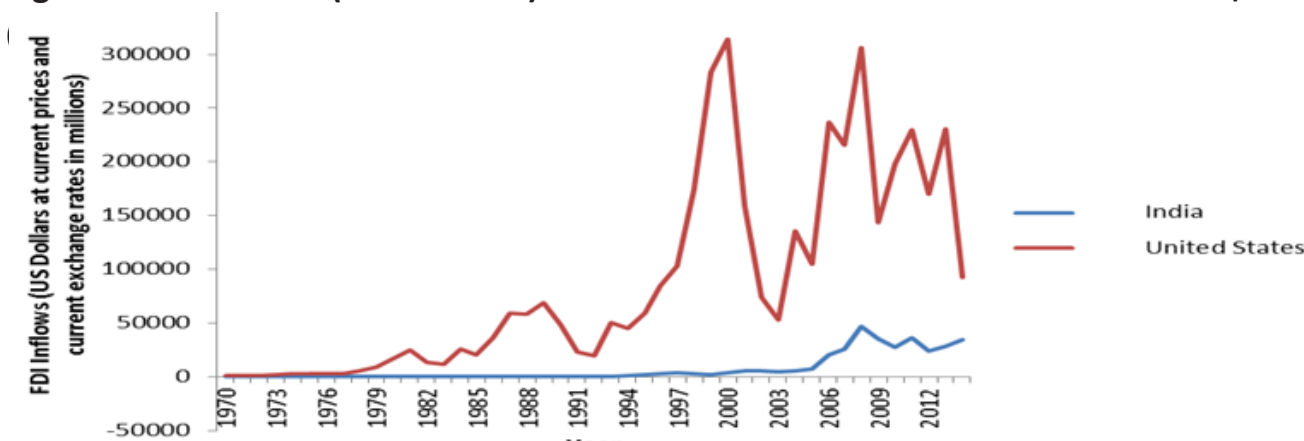
Source: World Development Indicators 2016

The figure shows us that (barring the odd 2-3 years), India’s gross domestic savings as a percentage of GDP are consistently higher than that of the USA. The greater access to domestic funds for Indian firms vis-à-vis US firms may be a possible reason for the co-integration between the Indian variables and no co-integration for the USA variables.

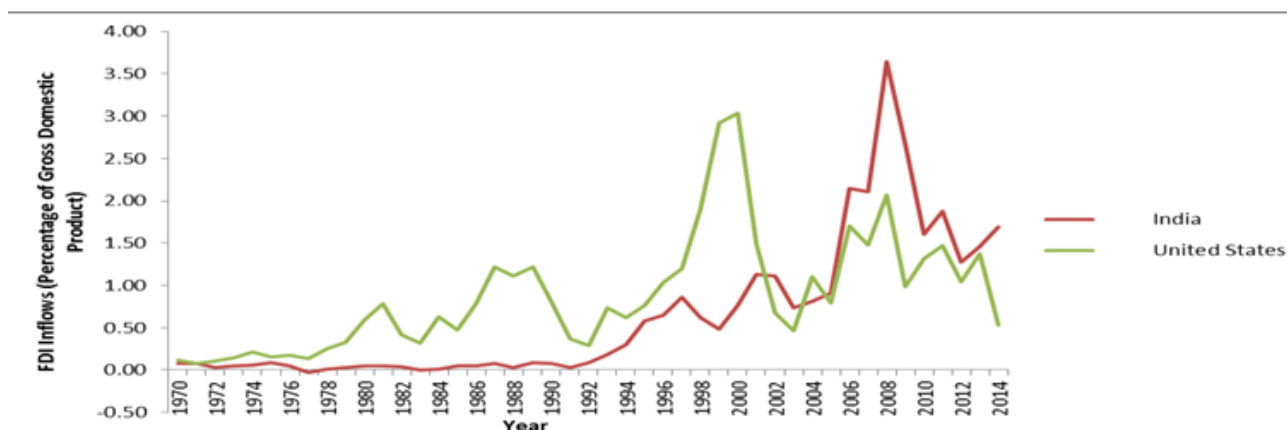
The second reason for the result may be the nature of the respective economies by themselves. While India has initiated several economic reforms and has opened up, it still remains a closed economy on a comparative basis. The USA is among the most developed economies in the world and, compared to India and several other developing economies, has a simpler and faster process for inward investment.

As we can see in Figures 2, 3, and 4 the level of foreign capital in domestic capital formation is higher in the USA as compared to India.

**Figure 2: FDI Inflows (India & USA)** Source: United Nations Conference on Trade and Development

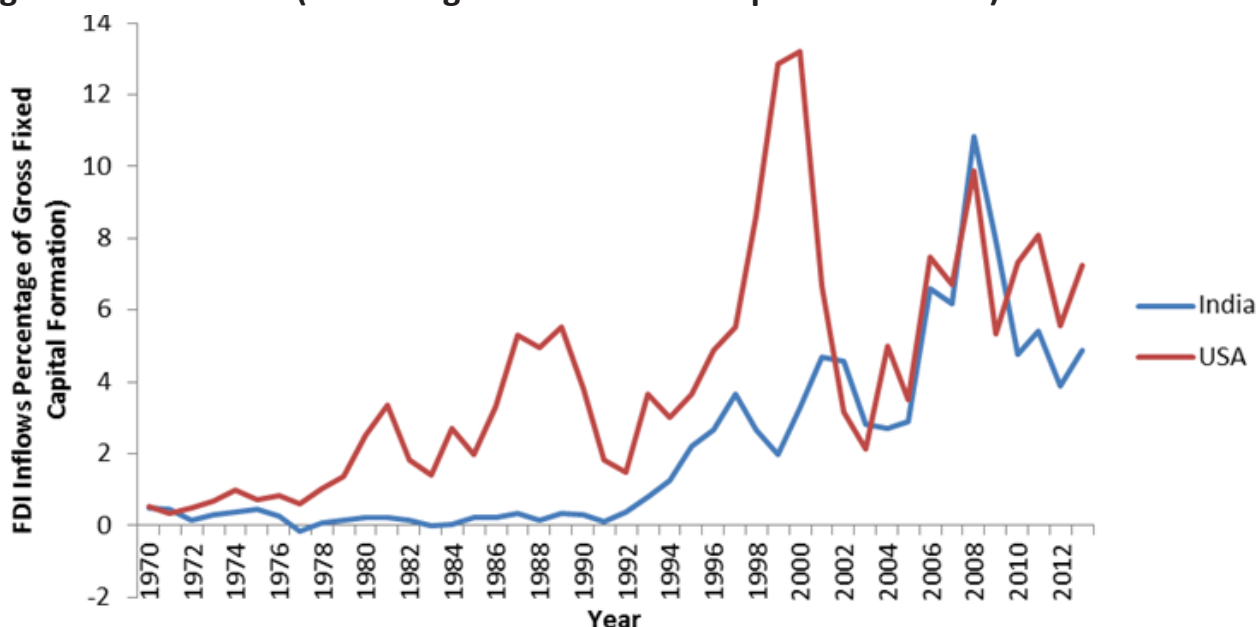


**Figure 3: FDI Inflows (Percentage of Gross Domestic Product)**



**Source: United Nations Conference on Trade and Development (UNCTAD)**

**Figure 4: FDI Inflows (Percentage of Gross Fixed Capital Formation)**



**Source: United Nations Conference on Trade and Development (UNCTAD)**

While Figure 3 shows us that the percentage share of FDI in GDP is higher in India than that of the US, it is still quite small in terms of its absolute number of volume as compared to that of the USA (Figure 2).

What is of interest, and goes some way in reinforcing our results, is the share of FDI inflows as a percentage of Gross Fixed Capital Formation (GFCF) in both the countries (Figure 4). As a percentage share of GFCF, FDI inflows occupy a larger share in the USA than in India. This corresponds with the large FDI inflows in absolute numbers (Figure 2). This provides an explanation for the lack of co-integration between Gross Domestic Investment and Gross Domestic Savings in the US (as shown in Table 3).

Another factor is the level of technological advancement, infrastructure, and the diversity in investment opportunities. These will be higher in the US than India thereby opening up more channels of foreign investment for the former.

We would also like to point out the effect Foreign Portfolio Investments (FPI) may have on the relationship between domestic savings and investments. A greater flow of

FPI may weaken the link between domestic savings and investment. For example, as of December 2015 the USA has attracted a total of US \$ 9.45 trillion of total portfolio investment assets as compared to India where it stands at US \$ 1.56 trillion (within the same time period) . We presume the reason for this trend is quite similar to those listed before in the paper, i.e. the USA is a more attractive investment destination than India.

The above explanations may be among the reasons why domestic investment still plays such a valuable role in India. In the USA, while it still plays a role, the importance has diminished as the country is better connected to the global economy. This facilitates a smoother inflow of foreign capital in the USA as compared to many other countries.

These observations raise a few important questions. In light of recent events in the global economy should a domestic economy be more open to foreign investments? Or should domestic savings be encouraged and domestic firms have a preference for domestic capital? There have also been some questions raised on the relative importance of foreign capital if it leads to increased volatility in the market. However, having greater access to capital (both domestic and foreign) might enable firms (both old and new) to deepen their capital base, boost productivity and expand production and maybe even access outside expertise.

There are no easy answers to these. What we can offer is this – The policymaker while formulating the policy should understand the existing structure of the economy and ask if having greater access to capital would be beneficial for overall economic growth and development.

## **LONG-RUN RELATIONSHIP BETWEEN SAVINGS AND INVESTMENTS IN INDIA AND US**

On the nature of the long run relationship for India, we find that the relation between the gross fixed capital formation and domestic savings is strong and statistically significant (Table 1).

For every 1 per cent increase in domestic savings, the gross fixed capital formation rises by slight more than 1 per cent. This strong result indicates the importance domestic savings have for investment and capital formation in India. In the long run, an economy where domestic savings are encouraged will be conducive for capital development and lead to greater stocks of capital which can only boost the economic growth in the country.

What about the shortrun relationship between savings and capital formation? We run an OLS regression with the error correcting mechanism on the relationship between the first differences of gross fixed capital formation and gross domestic savings in the Indian economy .

We initially run a model with up to 2 lags for both the first difference of the gross fixed capital formation and gross domestic savings and a lag of the error correcting variable. To get the most parsimonious model we remove the insignificant variables

(those with the largest p values) until we get a parsimonious model with all the significant variables. The result is given in Table 4.

**Table 4: India [Error Correcting Model (ECM)]**

Variable	Coefficient	Std. Error	t-Statistic	P value
GDS	0.952522	0.032052	29.71847	0.0000
GDS (-1)	0.077725	0.031570	2.462032	0.0175
GDS (-2)	0.084698	0.032107	2.637962	0.0112
Residuals (-1)	-0.336881	0.100466	-3.353178	0.0016

R-squared 0.953119

From the India ECM model, we observe that all the three savings variables have a positive and significant effect on gross capital formation. This is expected as past savings play a crucial role in present investment. We next observe that the error correcting variable stands around 34 per cent implying that deviations (disequilibrium/shock) from equilibrium are corrected in each year (if these were positive they would be compounded). We subject the India ECM to serial correlation and heteroskedasticity test to ensure the regression remains the Best Linear Unbiased Estimator (BLUE) for us. The results are given in Table 5.

**Table 5: Heteroskedasticity & Serial Correlation Tests**

Test	F-statistic	Prob. F
Breusch-Godfrey Serial Correlation LM Test	0.221837	0.8019
Breusch-Pagan-Godfrey Heteroskedasticity Test	1.695275	0.1669

As is evident the lack of any serial correlation and heteroskedasticity affirms that the India ECM model is robust and (within the model specifications) adequately captures the short run relationship between capital formation and domestic savings.

## CONCLUSION

This paper is an attempt to understand the relationship between domestic savings and capital formation in two different countries over a long time period. More specifically, it tested the Feldstein-Horioka hypothesis for both India and the USA over a longer duration of time.

We found that while a co-integrating relationship between domestic capital formation and domestic savings in India does exist, no such co-integrating relationship exists for the USA. The reason we offered for this is linked to the relative openness and structure of the respective domestic economies coupled with the level of domestic savings in the respective economies. India (despite rapid progress over the last two and half decades) still remains a relatively closed economy compared to many in the developed world. The country also contains many regulatory hurdles as is evident in its ease of doing business indicators. The USA (compared to many other economies) is quite open, has good quality infrastructure, many avenues for investment, and easier

facilitation of inward capital. All these factors among others have contributed to the weakening of the relationship between domestic capital formation and domestic savings in the USA. The US economy also has greater access to international capital as compared to the Indian economy. This too may be a contributing factor in our results. This is in line with the Fieldsten-Horiokahypothesis.

Going forward, as the world becomes increasingly globalized and global capital flowing smoother, we may expect a similar trend among other economies (including India). However this also depends on the restrictions faced by inward capital, the predictability and stability of the domestic regime and its attractiveness as an investment destination.

The recent steps taken by India in terms of bettering its Ease of Doing Business rankings and launching programs such as Make in India, Digital India, Start-up policy and Skill India attempt to ensure that the country becomes an attractive investment destination. This in turn will increase investments and aid economic growth.

There is also a critical policy implication as India is becoming more open. To the extent inward foreign capital is allowed in to help the domestic economy grow, the liberalization should be structured in a way that the domestic economy is not immensely affected by turmoil in global markets. This is an important avenue for research for future studies.

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## Appendix

### **ADF Tests**

#### **India, Gross Capital Formation, logs**

Null Hypothesis: INDGCF has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
<b>Augmented Dickey-Fuller test statistic</b>	-1.820904	0.6808
Test critical values: 1% level	-4.137279	
5% level	-3.495295	
10% level	-3.176618	

\*MacKinnon (1996) one-sided p-values.

#### **India, Gross Domestic Savings, logs**

Null Hypothesis: INDGDS has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
<b>Augmented Dickey-Fuller test statistic</b>	-2.019654	0.5775
Test critical values: 1% level	-4.137279	
5% level	-3.495295	
10% level	-3.176618	

\*MacKinnon (1996) one-sided p-values.

#### **USA, Gross Capital Formation, logs**

Null Hypothesis: USAGCF has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
<b>Augmented Dickey-Fuller test statistic</b>	-3.492843	0.0505
Test critical values: 1% level	-4.140858	
5% level	-3.496960	
10% level	-3.177579	

\*MacKinnon (1996) one-sided p-values.

**USA, Gross Domestic Savings, Logs**

Null Hypothesis: USA GDS has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 1 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.438086	0.0571
Test critical values: 1% level	-4.140858	
5% level	-3.496960	
10% level	-3.177579	

\*MacKinnon (1996) one-sided p-values.

**India, Gross Capital Formation, 1st Difference**

Null Hypothesis: DINDGCF has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.791301	0.0000
Test critical values: 1% level	-3.560019	
5% level	-2.917650	
10% level	-2.596689	

\*MacKinnon (1996) one-sided p-values.

**India, Gross Domestic Savings, 1st Difference**

Null Hypothesis: DINDGDS has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.098603	0.0000
Test critical values: 1% level	-3.560019	
5% level	-2.917650	
10% level	-2.596689	

\*MacKinnon (1996) one-sided p-values.

## USA, Gross Capital Formation, 1st Difference

Null Hypothesis: DUSAGCF has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.276607	0.0000
Test critical values: 1% level	-3.560019	
5% level	-2.917650	
10% level	-2.596689	

\*MacKinnon (1996) one-sided p-values.

## USA, Gross Domestic Savings, 1st Difference

Null Hypothesis: DUSAGDS has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.296089	0.0000
Test critical values: 1% level	-3.560019	
5% level	-2.917650	
10% level	-2.596689	

\*MacKinnon (1996) one-sided p-values.